

MTC Workbench User Manual

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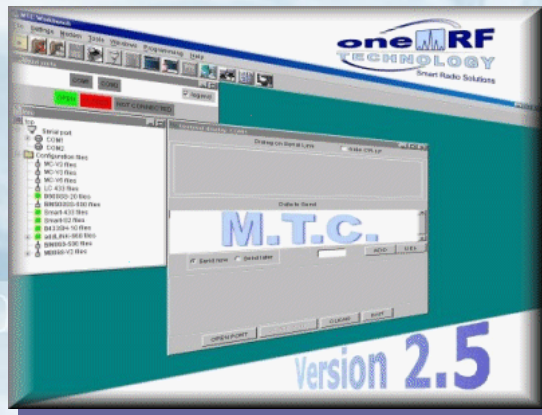


TABLE OF CONTENTS

CHAPTER I. INTRODUCTION	1	CHAPTER VII. PEER-TO-PEER DIALOG	21
I.1. AIM OF DOCUMENT.....	1	VII.1. CONFIGURATION	21
I.2. SOFTWARE & MANUALS	1	VII.2. PEER-TO-PEER DIALOG TOOL	22
I.3. PRODUCT OVERVIEW	2	VII.3. REMOTE PEER-TO-PEER DIALOG TOOL.....	26
I.4. SOFTWARE INSTALLATION (WINDOWS).....	2	CHAPTER VIII. NETWORK DIALOG.....	30
CHAPTER II. INITIALISATION PROCESS	3	VIII.1. CONFIGURATION	30
II.1. INITIALISATION	3	VIII.2. NETWORK DIALOG TOOL	32
II.2. AUTO-CONFIGURATION	4	CHAPTER IX. TERMINAL	34
CHAPTER III. BASIC USER LEVEL DESCRIPTION... 5		IX.1. TERMINAL TOOL	34
III.1. THE DESKTOP.....	5	IX.2. TERMINAL CONFIGURATION.....	36
III.2. THE MENU BAR	6	CHAPTER X. RADIO MODULES CONFIGURATION 39	
III.3. THE TOOL BAR.....	8	X.1. DISPLAYING A CONFIGURATION	39
CHAPTER IV. ADVANCED USER LEVEL		X.2. CONFIGURING A RADIO MODULE.....	41
DESCRIPTION	9	X.3. CREATING A NEW CONFIGURATION FILE.....	42
IV.1. THE DESKTOP	9	X.4. SAVING A CONFIGURATION.....	45
IV.2. THE MENU BAR.....	10	CHAPTER XI. PROGRAMMING.....	47
IV.3. THE TOOL BAR	13	CHAPTER XII. APPENDIX	49
CHAPTER V. THE APPLICATION TREE	14	XII.1. DOCUMENT HISTORY	49
V.1. 'TREE' WINDOW DESCRIPTION	15	XII.2. SOFTWARE HISTORY	49
V.2. 'TREE' WINDOW OPERATION	17		
V.3. 'ABOUT PORTS' WINDOW.....	18		
CHAPTER VI. CHANNEL SCANNING	19		

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CHAPTER I.

INTRODUCTION

I.1. AIM OF DOCUMENT

The aim of this document is to present the features and functionalities of One RF Technology's radio Modules Test and Configuration (MTC) Workbench software. The MTC Workbench will be described within:

- > An introduction chapter about the software and its installation
- > A chapter describing the initialisation process
- > Three chapters presenting the user interface
- > Five chapters describing the software's basic and advanced operation
- > A set of appendix to assist the user in the software operation

I.2. SOFTWARE & MANUALS

The different functioning modes and the use of the registers, illustrated by many examples, are fully described in the "Functionalities & Operating Modes" manual.

Each board and modem have a separate technical manual including the datasheet for radio, electrical and mechanical data, as well as complementary details on the use of the board/modem in the different functioning modes. This manual will be updated more often than the general ones, so please use it for accurate information.

I.3. PRODUCT OVERVIEW

The radio **Module Test & Configuration** (MTC) Workbench is a One RF software framework to test and configure all radio modules supplied by One RF Technology. The purpose is to supply a framework where new software components can be added very easily, in order to support new radio modules.

Several and diversified radio modules, connected to the PC/workstation via various hardware interfaces (RS232, RS422, ...), can be tested and configured at the same time. The framework provides a desktop to display, test and configure multiple units with a standard set of functions, common for all radio modules.

It also provides an interface to add radio module specific functions, supplied by the radio module specific software plug-in, to the framework.

The software is based on JAVA / Swing technology in order to support several OS platforms. MTC Workbench software is compatible with most Windows OS (i.e. 98, 2000, XP from Service Release 3) but is not compatible with Windows Millenium Edition (it is a 'home' OS and does not recognise serial ports).

I.4. SOFTWARE INSTALLATION (WINDOWS)

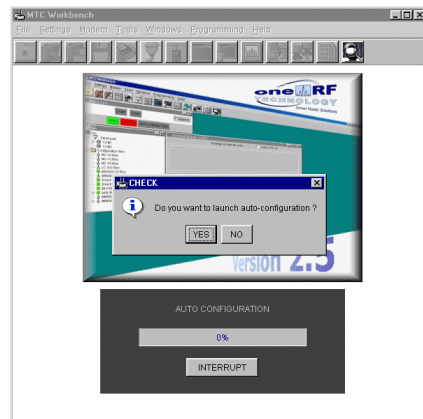
1. Put the One RF Master CD into the PC. The CD is autolaunched and displays a browser on the One RF database page.
2. Go to any product page by clicking on the corresponding link.
3. Install the MTC Workbench software by clicking on the "MTC Workbench Installation" link. The software is automatically installed in "C:\Program Files\One RF\MTC\" (this directory can be changed).

CHAPTER II. INITIALISATION PROCESS

II.1. INITIALISATION

When the program is launched, it calls an application configuration file, stored in one of its data directories, in order to determine the type of serial ports, radio modules and modems or interface characteristics (i.e. graphic layout characteristics) the software should feature.

Once all the necessary information has been found in the configuration file, a first desktop, including the One RF Technology logo and the software version, is displayed along with a check message allowing the user auto-configuring his serial ports, i.e. detecting radio modules and/or modems:



If no radio module (i.e. board, radio module or demo kit) is connected to the PC from which the MTC software is operated, the auto-configuration step can be bypassed by clicking on 'No'. The software operation desktop (described in paragraphs 3.1 and 4.1) is then displayed.

If one or several radio modules are connected to the PC, the auto configuration needs to be launched for the software to recognise and detect those units. A click on 'Yes' launches the auto-configuration.

II.2. AUTO-CONFIGURATION

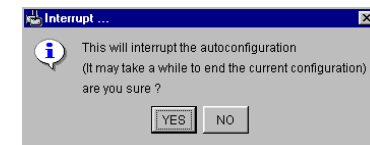
Once the auto configuration is launched, the software asks the system the number of communication ports it contains as well as their denomination and tries to detect any radio module connected to it. This detection results in the auto configuration process and can be described as follows:

- It scans the different serial port parameters that can be used to configure any type of radio module : speed from 1.2 to 115.2 Kbps, 7 and 8 data bits, 1 and 2 stop bits, none, even and odd parity. The flow control is set from the board's parameters after the detection is finished.
- For each value of bit rate, all the values of parity are tested. For each value of parity, all the values of data bits are tested.
- Once a serial port configuration allows communicating with the radio module, the loop is exited and that configuration is stored.

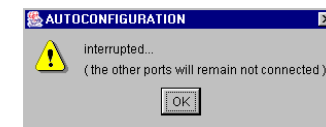
The software sends a +++ message to check if a radio module is connected on each port. If no answer is received (i.e. no radio module connected) after a time out, the software tries to configure the other serial ports with the same procedure described above, following the order defined by the system (e.g. numerical order: COM1, COM2, then COM3, etc).

If an answer is received (i.e. a radio module is connected), the port is configured, and the software tries to detect other radio modules on the next serial port, following the numerical order of the ports.

If the user needs to interrupt the auto-configuration for any reason (E.g. more ports than needed defined in the system), the 'INTERRUPT' button needs to be clicked. The following confirmation message is then displayed:



Clicking on 'No' continues the auto configuration where it was interrupted. Clicking on 'Yes' confirms the interruption (effective when the current auto configuration is done) and displays the following message:



Clicking on 'OK' ends the auto configuration and displays the software's operation desktop, described in the following paragraph.

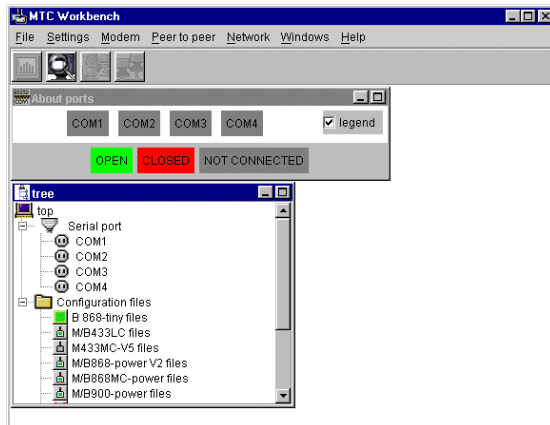
CHAPTER III. BASIC USER LEVEL DESCRIPTION

This chapter describes the main aspects of the MTC software's user interface configured in basic user level. This basic user interface allows quick configuration and dialog between two compatible radio modules as well as some basic and common functions such as auto configuration and channel scanning.

The description goes through three paragraphs presenting the desktop, the menu bar and the tool bar.

III.1. THE DESKTOP

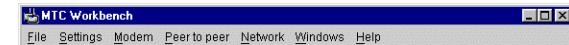
Once the auto configuration is done, or if it was interrupted, the operation desktop is displayed:



The operation desktop includes two windows used for the software operation and which can not be closed: The 'Tree' window, containing all the information for the software operation, and the 'About Ports' window, giving the status of every serial port during the software operation, are described in [chapter V](#). As many software, it is also composed of the following elements:

- > **A menu bar:** It allows the user to access a standard set of functions and options to operate the MTC software. It is described in [chapter III.2](#).
- > **A tool bar:** It contains different buttons corresponding to the main functions and options of the menu bar. It is described in [chapter III.3](#).

III.2. THE MENU BAR



Each menu is composed of several submenus corresponding to specific functions or actions. Every menus and submenus are described in the following paragraphs. Each function and option will be further described in the next chapters.

• **The 'File' Menu**

The 'File' menu is composed of 'Exit', a submenu which quits the software program.

• **The 'Settings' Menu**

The 'Settings' menu is composed of the following submenus:

- > **Language:** Allows the user to change the software's operation language (English and French are available for the moment). The default language is English.
- > **User level:** Allows the user to switch from a basic operation desktop to an advanced operation desktop and vice-versa. The menus available depend on the chosen level:

MENUS	File	Settings	Modem	Tools	Peer-to-peer	Network	Windows	Prog.	Help
BASIC LEVEL	✓	✓	✓	-	✓	✓	✓	-	✓
ADVANCED LEVEL	✓	✓	✓	✓	-	-	✓	✓	✓

• **The 'Modem' Menu**

The 'Modem' menu is composed of the following submenu:

- > **Channel scanning:** Displays a window which presents either the radio channel's occupation rate or the signal's level received by the radio module. The channel scanning function is described in [Chapter VI](#).
- > **Autoconfiguration:** Allows the user to launch an autoconfiguration on one or on all ports from the desktop (e.g. for connection loss or modem replacement).

• **The 'Peer-to-peer' Menu**

The 'Peer-to-peer' menu is for basic operation configuration and is composed of the following submenus:

- **Configuration:** Displays a window allowing quick configuration of two radio modules for peer-to-peer dialog. The parameters concerned are the operating mode and the radio channel.
- **Dialog:** Displays an advanced terminal dialog window between two given radio modules, the ports of which are chosen by the user. The peer-to-peer dialog window is described in [chapter VII.2](#).

• **The 'Network' Menu**

The 'Network' menu is composed of the following submenus:

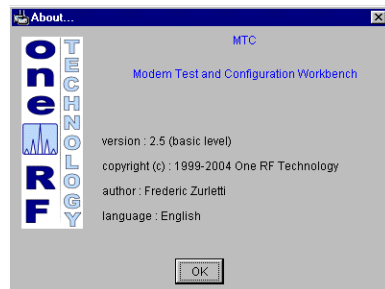
- **Configuration:** Displays a window allowing quick configuration of two radio modules for network dialog. The parameters concerned are the operating mode (Network client, server or addressed secured), the network and clients' IDs, and the radio channel.
- **Dialog:** Displays an advanced terminal dialog window between two given radio modules already configured with all necessary network parameters (i.e. mode, network and clients' IDs). The ports are chosen by the user. It is described in [chapter VIII.2](#).

• **The 'Windows' Menu**

The 'Windows' menu lists the different windows already opened and allows the user to change the active window. Note that both 'Tree' and 'About ports' windows will always appear in that list as they can not be closed.

• **The 'Help' Menu**

The 'Help' menu is composed of an '**About**' submenu which displays a window containing all information about the software development such as software version, copyright, author, etc:



III.3. THE TOOL BAR

The tool bar contains shortcut buttons corresponding to the main functions of the menu bar described in the previous paragraph. Some of those are only applicable in certain conditions and are therefore disabled (greyed) when not available.



The buttons' functions are listed in the following table.

	Name	Function / Action
①	Channel scanning	Channel scanning of the current radio module
②	Auto-configuration	Operates new auto configuration on all or selected ports
③	Opens basic peer-to-peer dialog	Opens peer-to-peer dialog window between two chosen ports
④	Opens basic network dialog	Opens network dialog window between two chosen ports

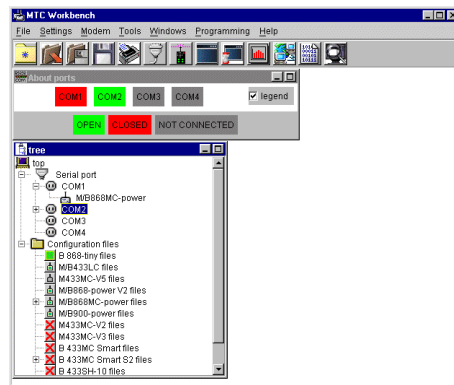
CHAPTER IV. ADVANCED USER LEVEL DESCRIPTION

This chapter describes the main aspects of the MTC software's user interface now configured in advanced user level. This advanced user interface allows advanced configuration, basic and remote dialog between two compatible radio modules, modem functions (auto configuration, channel scanning), advanced tests and evaluation with the improved Terminal interface.

The description goes through three paragraphs presenting the desktop, the menu bar and the tool bar.

IV.1. THE DESKTOP

Once the auto configuration is done, or if it was interrupted, the operation desktop is displayed:

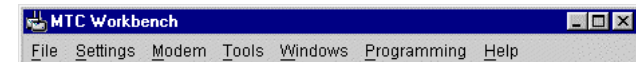


The operation desktop includes two windows used for the software operation and which can not be closed: The 'Tree' window, containing all the information for the software operation, and the 'About Ports' window, giving the status of every serial port during the software operation, are described in [chapter V](#).

As many software, it is also composed of the following elements:

- [A menu bar](#): It allows the user to access a standard set of functions and options to operate the MTC software. It is described in [chapter IV.2](#).
- [A tool bar](#): It contains different buttons corresponding to the main functions and options of the menu bar. It is described in [chapter IV.3](#).

IV.2. THE MENU BAR



Each menu is composed of several submenus corresponding to specific functions or actions. Every menus and submenus are described in the following paragraphs. Each function and option will be further described in the next chapters.

• The 'File' Menu

The 'File' menu is composed of the following submenus:

- **New**: Allows the user to create either a radio module or a port. Creating a radio module means that the user chooses a radio module configuration file to load in the given connected radio module, configuring it; while creating a port allows the user to define a configuration for a given serial port.
- **Open**: Allows the user to open a specific radio module configuration file.
- **Close**: Closes the active window.
- **Save**: Saves the active window. Note that only radio module files can be saved.
- **Save as**: Saves the active window as a new file which extension is checked to be of the right type.
- **Print**: Prints the data contained in the active window.
- **Exit**: Quits the software program.

• **The 'Settings' Menu**

The 'Settings' menu is composed of the following submenus:

- **Language:** Allows the user to change the software's operation language (English and French are available for the moment). The default language is English
- **User level:** Allows the user to switch from a basic operation desktop to an advanced operation desktop and vice-versa. The menus available depend on the chosen level:

MENUS	File	Settings	Modem	Tools	Peer-to-peer	Network	Windows	Prog.	Help
BASIC LEVEL	✓	✓	✓	-	✓	✓	✓	-	✓
ADVANCED LEVEL	✓	✓	✓	✓	-	-	✓	✓	✓

• **The 'Modem' Menu**

The 'Modem' menu is composed of the following submenu:

- **Autoconfiguration:** Allows the user to launch an autoconfiguration on one or on all ports from the desktop
- **Channel scanning:** Displays a window which presents either the radio channel's occupation rate or the signal's level received by the radio module. The channel scanning function is described in [chapter VI](#).
- **Modem Configuration:** Allows the user to open a window to configure a given radio module type: the default configuration file is displayed. The 'Save as' submenu is then to be used so that the default file does not change.
- **Serial port:** Allows the user to open a window to configure a chosen serial port. A port can not be configured if a modem is connected.

• **The 'Tools' Menu**

The 'Tools' menu is composed of the following submenus:

- **Terminal:** Displays a terminal window on a chosen port to operate within a given radio module. The terminal window is described in [chapter IX](#).
- **Terminal configuration:** Displays a window within which the user can configure several buttons to simplify the use of the terminal window (E.g. buttons for 'AT' commands). The terminal configuration window is described in [chapter IX.2](#).
- **Peer-to-peer dialog:** Displays an advanced terminal dialog window between two given radio modules, the ports of which are chosen by the user. The peer-to-peer dialog window is described in [chapter VII.2](#).
- **Remote peer-to-peer dialog:** Displays an advanced terminal dialog window between two given radio module connected on two different PCs, the ports of which are defined by the user. The remote peer-to-peer dialog window is described in [chapter VII.3](#).

• **The 'Programming' Menu**

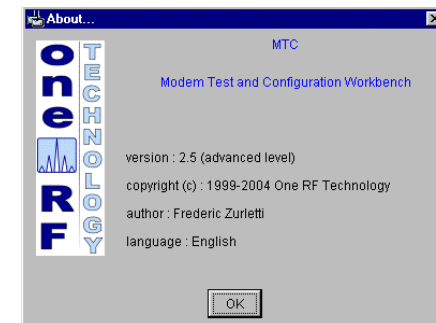
The 'Programming' menu includes a 'Flashing' submenu that shall be used for programming. It displays a programming configuration window. Obviously, a modem does not need to be detected by the MTC to be programmed

• **The 'Windows' Menu**

The 'Windows' menu lists the different windows already opened and allows the user to change the active window. Note that both 'Tree' and 'About ports' windows will always appear in that list as they can not be closed.

• **The 'Help' Menu**

The 'Help' menu is composed of an 'About' submenu which displays window containing all information about the software development such as software version, copyright, author, etc:



IV.3. THE TOOL BAR

The tool bar contains shortcut buttons corresponding to the main functions of the menu bar described in the previous paragraph. Some of those are only applicable in certain conditions and are therefore disabled elsewhere.



The buttons' functions are listed in the following table.

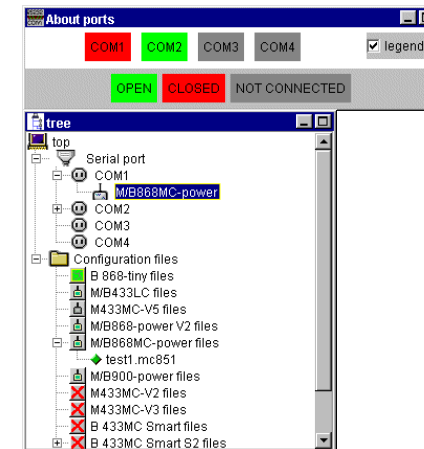
	Name	Function / Action
①	New	Allows the user to chose to create a new port or modem configuration
②	Open	Allows the user to open an existing configuration
③	Close	Closes the current window
④	Save	Saves the current window
⑤	Print	Prints active window information/data
⑥	Opens port window	Opens the current serial port's window
⑦	Opens modem window	Opens the current radio module's window
⑧	Opens terminal window	Opens terminal window on the current port
⑨	Opens terminal configuration window	Opens terminal configuration window on the current port
⑩	Channel scanning	Channel scanning of the current radio module
⑪	Opens peer-to-peer dialog	Opens peer-to-peer dialog window between two chosen ports
⑫	Programming	Opens firmware flashing window
⑬	Auto-configuration	Operates new auto configuration on all or selected ports

CHAPTER V.

THE APPLICATION TREE

Once the auto configuration is done, the software builds and displays the application tree using the serial ports defined in the system, the connected modems detected during auto configuration and the modem configuration files found in the application configuration file.

The application tree is composed of two windows that cannot be closed: the 'Tree' window and the 'About Ports' window.

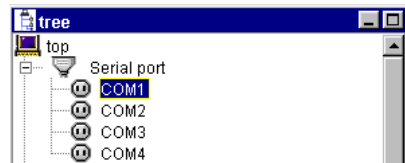


Note: The application tree, i.e. the Tree window especially, can not be exploited in basic user level configuration. In basic level configuration, the Tree is just used as information.

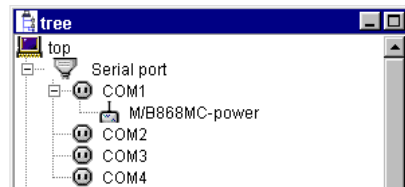
V.1. 'TREE' WINDOW DESCRIPTION

• **The COM ports**

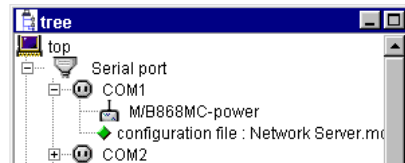
As shown on the previous pictures, the 'Tree' window is composed of two distinct parts. The first part (named 'Serial port') lists all the serial ports detected by the system during the initialisation process:



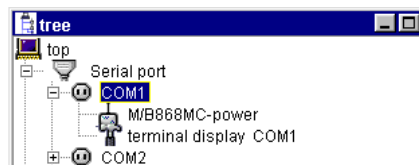
- When a radio module is connected to the port, a node (⊕) appears besides the port name. When clicked, that node makes the module's type appears as a child node of the port node:



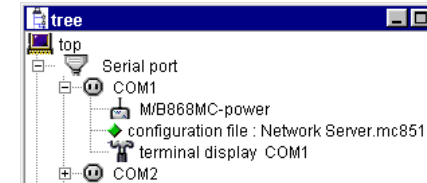
- When a configuration file is assigned to a radio module, it appears as a second child node of the port node:



- When a tool is operated on a radio module, it also appears as a second child node of the port node:

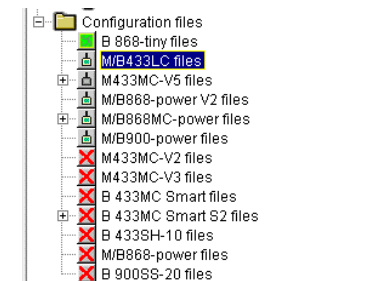


- When a tool and a configuration file are applied to a radio module, they both appear as child nodes of the port node:



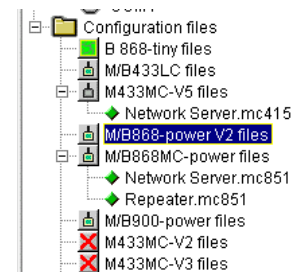
• **The configuration files**

The second part of the 'Tree' window (named 'Configuration files') lists the different configuration files, sorted by radio module type, found by the software during the initialisation process:

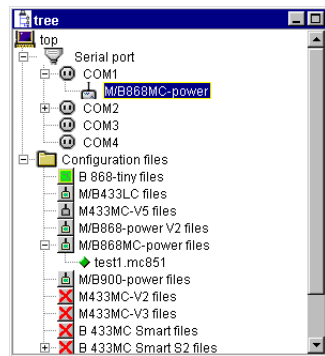


- Legend:**
- Boards configuration files
 - ⊕ Modems configuration files
 - ⊕ Modem and board common configuration files
 - ⊗ Obsolete modules configuration files

- When a configuration file has been found by the software, a node (⊕) appears besides the radio module type's name. When clicked, that node makes the configuration file's name appears as a child node of the module type node:



V.2. 'TREE' WINDOW OPERATION



Each node can be expanded or reduced with a left-click (the node is not selected) or with double-click on its name or its icon (the node is selected).

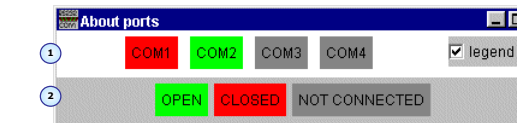
The window also includes some right-click 'pop-up' menus to access functions and options of the menu or the tool bar. Those menus are accessible from the 'Tree' with a right-click on the node name. Below are listed the pop-up submenus available from the 'Tree', when applicable

- > top
 - N/A
- > Serial port
 - 'Autodetect' submenu: launches auto configuration
- > COM1
 - 'Assign' submenu: Displays a browse window to assign configuration file to the module connected on COM i.
 - 'Deassign' submenu: Deassigns the configuration file from the module connected on COM i.
 - 'Autodetect' submenu: launches auto configuration on COM i only.
 - 'Properties' submenu: displays COM i properties window
- > MC-V3
 - N/A
- > Configuration files
 - N/A
- > MC-V3 files
 - 'New' submenu: displays a browse window to create a configuration file
- > NetworkServer.mc3
 - 'Open' submenu: displays configuration file window
 - 'Save as' submenu: displays browse window to save a new file
 - 'Print' submenu: N/A. Shall print configuration file window.

Note: A file can also be assigned by a simple 'Drag & Drop' of the file on the chosen port.

V.3. 'ABOUT PORTS' WINDOW

The 'About port' window gives information about the status of each serial port detected by the system during auto configuration:



- 1 System's Serial Ports 2 Ports color signification legend

OPEN

Modem connected to corresponding port. Port in use (E.g. a tool is operating on that port.)

CLOSED

Modem connected to corresponding port. Port not in use

NOT CONNECTED

No modem connected to corresponding port

Note: The legend (i.e. ports status) can be hidden by disabling the 'Legend' button.

CHAPTER VI.

CHANNEL SCANNING

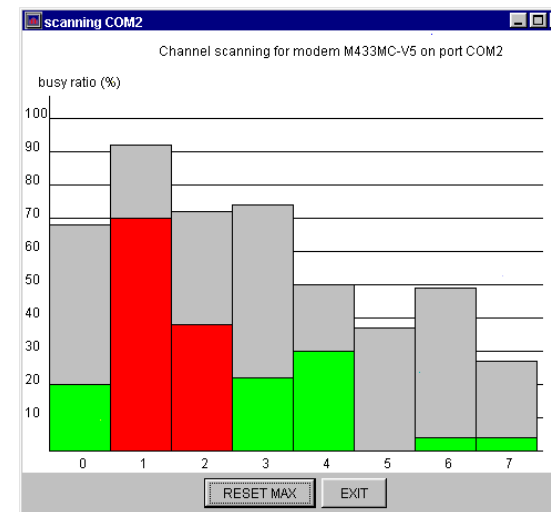
The first and simplest tool available on MTC software is the channel scanning tool. It allows the user measuring the noise occupation ratio on each channel of the frequency band used by the radio modules. It can be operated either from the tool bar or from the menu bar.

This function is not available on all modems and boards. It will be greyed if this feature is not included in the modem detected.

From the menu bar, the 'Modem/Scanning' submenu has to be selected. The following window is displayed, allowing the user to choose the serial port on which the scanning has to be operated:



Once the choice is made, the following scanning window is displayed:



Below is the description of the scanning window:

- > The title indicates what kind of modem and which port is scanned
- > The Y-axis states the occupation ratio, in %
- > The X-axis states the radio channels of the frequency band in use
- > The columns represent the occupation ratio for each channel
 - The grey part of the columns represents the maximum value of the occupation rate since beginning of scanning
 - The green part indicates a noise ratio lower than 30 %
 - The red part indicates a noise ratio higher than 30 %
- > The 'Reset Max' button, resets the maximum reached (grey areas) to null.
- > The 'exit' button closes the window

Therefore, the scanning window shown above allows the user to:

- > Check if any radio module is operating on any of the radio channels of the frequency band in use, being aware that the scanning period is 1s.
- > Know the occupation ratio for each radio channel
- > Check if any radio disturbances are occurring on any channel of the frequency band
- > Choose which channel the radio module has to be operated on

CHAPTER VII.

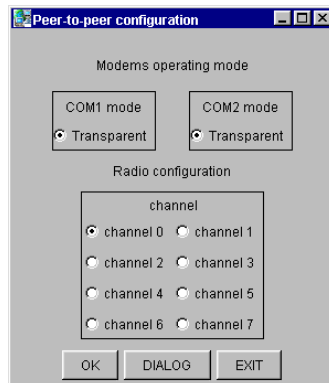
PEER-TO-PEER DIALOG

The second tool available with the MTC software is the peer-to-peer dialog tool, allowing the user to communicate between two compatible radio modules. In basic user level configuration, it consists in a distinct menu allowing quick configuration and dialog. In advanced user level configuration, it is part of the tool menu and can also be feature as a remote tool between two separate PCs.

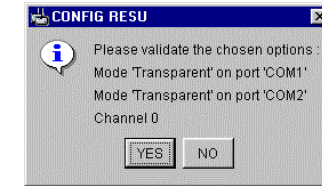
VII.1. CONFIGURATION

- ***Basic User Level***

From the menu bar, the 'Peer-to-peer/Configuration' submenu has to be selected. A window allowing the user configuring two compatible radio units for peer-to-peer dialog is displayed:



Both operating mode and communication channel should be chosen by the user. Once the configuration is done, pressing 'OK' or 'DIALOG' allows the user to validate it:



If 'OK' was pressed, pressing 'Yes' quits the peer-to-peer configuration window and the user has then to select the peer-to-peer dialog tool either from the menu bar or the tool bar.

If 'DIALOG' was pressed, pressing 'Yes' opens the peer-to-peer dialog window (See [chapter VII.2](#)). Pressing 'No' cancels the configuration in both cases.

- ***Advanced User level***

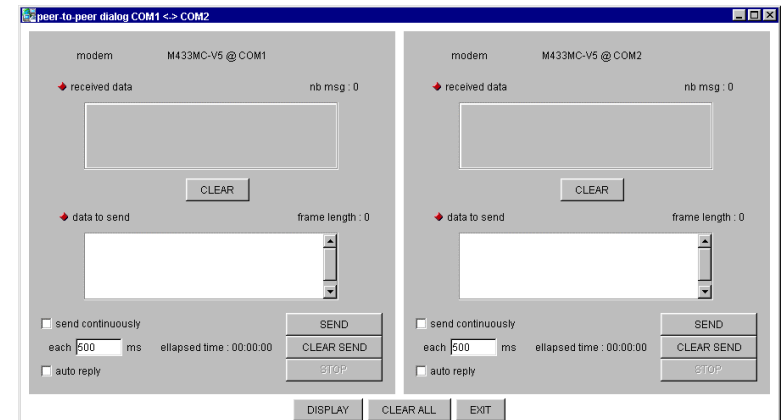
There is no peer-to-peer configuration feature in advanced user level. The configuration should be done directly on the radio units via their configuration files (See [chapter X.2](#)).

VII.2. PEER-TO-PEER DIALOG TOOL

- ***Tool Operation***

From the menu bar, the 'Tool/Peer-to-peer dialog' (Advanced user level) or the 'Peer-to-peer/Dialog' (Basic user level) submenu has to be selected. A window allowing the user choosing on which ports the peer-to-peer dialog tool has to be operated is displayed. The same window is displayed when using the tool bar.

Once the choice is validated by the user, the following peer-to-peer dialog window is displayed:

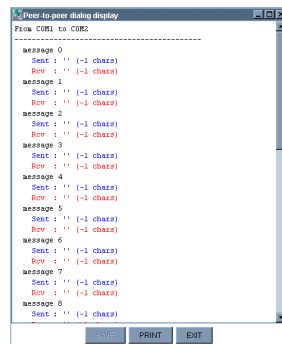


The peer-to-peer dialog window is composed of two identical panels, one for each module. The different fields and buttons of those panels are described below:

- > **Title:** displayed on top of the panel, it gives the type of module and the port it is connected to (E.g. MC-V3@COM1) as well as its function, when applicable (i.e. Master or slave)
- > **'Received data':** This non-editable field displays the data received on the radio link from the other module. The red dot indicates the status of the communication: it goes to green if a message is being received.
- > **'Nb msg':** Provides the number of messages received by the module since the beginning of the dialog.
- > **'Data to send':** Displays the data to be sent by the user to the other module. The red dot indicates the status of the communication: it goes to green when a message is being sent.
- > **'Frame length':** Provides the length of the frame to be sent by the user.
- > **'Send continuously':** Enabling this option allows the user to transmit data (from 'Data to send') permanently to the other modem. The time out (i.e. 'Each [...] ms' field) is configurable but should be greater than 500 ms.
- > **'Auto reply':** Enabling this option allows the user to send every received frame back to the transmitter.
- > **'Elapsed time':** Specifies how long the modem has been transmitting when the send continuously option is enabled.
- > **'Send' button:** Sends the frame previously entered by the user in the 'data to send' field to the other module.
- > **'Clear Send' button:** Clears the 'data to send' field as well as the 'received data' field of the other module.
- > **'Stop' button:** Stops a permanent transmission (when 'send continuously' is enabled).

The two other buttons at the bottom of the window are general for both modules:

- > **'Display' button:** Displays a summary of the dialog established between the two radio units:



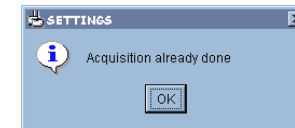
- > **'Clear All' button:** Clears all the window's fields (described above).
- > **'Exit' button:** Quits the peer-to-peer dialog window.

• **Acquisition process**

When using the dialog tools with Spread Spectrum units (i.e. B/M900SS-xxx, B433YY-10), an acquisition step needs to be executed in order to determine the operation mode of each modem (i.e. Slave/Master or Client/Server, as well as ID numbers). This acquisition step requires given configuration of modules. In advanced user level configuration, those configurations have to be done directly by the user on the module as advanced user level does not feature a quick configuration tool.

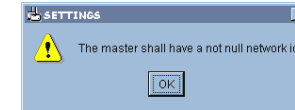
Several cases can occur, displaying the following messages:

- > The acquisition is already done:



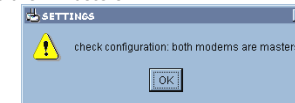
Pressing 'OK' enables the Peer-to-peer dialog tool window.

- > The master network ID is null:



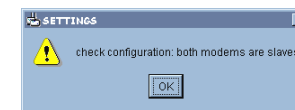
Pressing 'OK' quits the Peer-to-peer dialog tool window and the modules are to be configured.

- > The units are 2 masters



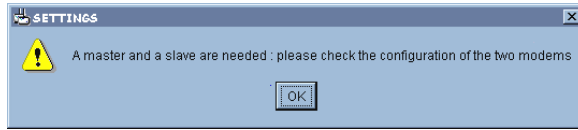
Pressing 'OK' quits the Peer-to-peer dialog tool window and the modules are to be configured.

- > The units are 2 slaves :



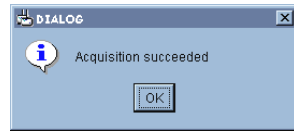
Pressing 'OK' quits the Peer-to-peer dialog tool window and the modules are to be configured.

- > The units are not 1 master and 1 slave:



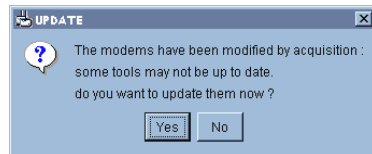
Pressing 'OK' quits the Peer-to-peer dialog tool window and the modules are to be configured.

- > For all other cases, the acquisition should start. Once done, the following message will be displayed:



Pressing 'Yes' enables the Peer-to-peer dialog tool window.

When acquisition succeeds, the parameters are not updated. Therefore, the following message is displayed when quitting the peer-to-peer dialog tool:



Pressing 'Yes' updates the module's parameters, pressing No aborts changes.

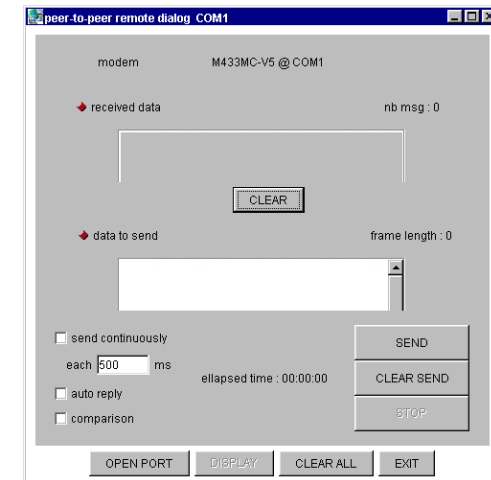
If, for any reason, the acquisition can not be done or fails (disconnection, disturbances, etc), some registers need to be modified, i.e. all registers corresponding to the network (or Master/Slave) management have to be checked and modified if needed (i.e. S250s registers).

VII.3. REMOTE PEER-TO-PEER DIALOG TOOL

• **Tool Operation**

From the menu bar, the 'Tool/Remote peer-to-peer' submenu has to be selected. A window allowing the user to choose on which port the remote peer-to-peer dialog tool has to be operated is displayed.

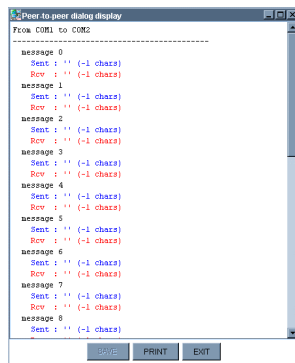
Once the user validates the choice, the following peer-to-peer dialog window is displayed:



This window is composed of only one panel (identical to the peer-to-peer dialog panels) which fields and buttons are described below:

- > **Title:** displayed on top of the panel, it gives the type of module and the port it is connected to (E.g. M433MC-V5 @ COM1) as well as its function, when applicable (i.e. Master or slave)
- > **'Received data':** This non-editable field displays the data received on the radio link from the other module. The red dot indicates the status of the communication: it goes to green if a message is being received.
- > **'Nb msg':** Provides the number of messages received by the module since the beginning of the dialog.
- > **'Data to send':** Displays the data to be sent by the user to the other module. The red dot indicates the status of the communication: it goes to green when a message is being sent.
- > **'Frame length':** Provides the length of the frame to be sent by the user.
- > **'Send continuously':** Enabling this option allows the user to transmit data (from 'Data to send') permanently to the other modem. The time out (i.e. 'Each [...] ms' field) is configurable but should be greater than 500 ms.

- **'Auto reply':** Enabling this option allows the user to send every received frame back to the transmitter.
- **'Comparison':** Allows comparison between the received frame and the frame sent from the remote unit.
- **'Nb msg sent':** Provides the number of messages sent to the other module.
- **'Elapsed time':** Specifies how long the modem has been transmitting when the send continuously option is enabled.
- **'Send' button:** Sends the frame previously entered by the user in the 'data to send' field to the other module.
- **'Clear Send' button:** Clears the 'data to send' field as well as the 'received data' field of the other module.
- **'Stop' button:** Stops a permanent transmission (when 'send continuously' is enabled).
- **'Open port button':** Opens the serial port to enable communication. Turn in 'Close port' button when the port is open.
- **'Display' button:** Displays a summary of the dialog established between the two radio units:



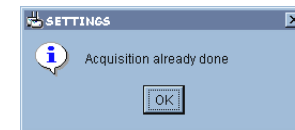
- **'Clear All' button:** Clears all the window's fields (described above).
- **'Exit' button:** Quits the peer-to-peer dialog window.

• **Remote acquisition process**

When using the dialog tools with Spread spectrum units (i.e. B/M900SS-xxx, B433YY-10), an acquisition step needs to be executed in order to determine the operation mode of each modem (i.e. Slave/Master or Client/Server, as well as ID numbers). In advanced user level configuration, those configurations have to be done directly by the user on the module as advanced user level does not feature a quick configuration tool. For remote tools, the acquisition starts when the port is open.

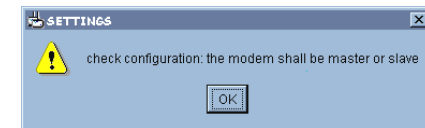
Several cases can occur, displaying the following messages:

- The acquisition is already done:



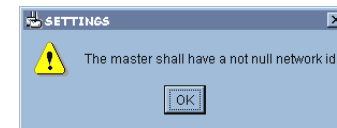
Pressing 'OK' enables the remote peer-to-peer dialog tool window.

- The module is neither a master nor a slave:



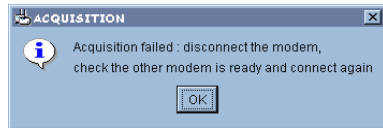
Pressing 'OK' quits the remote peer-to-peer dialog tool window.

- The module is a master, but its network ID is null:



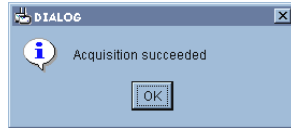
Pressing 'OK' quits the remote peer-to-peer dialog tool window.

- For all other cases, two cases can occur, displaying the following messages:
 - The acquisition failed and the modules need to be configured properly:



Pressing 'OK' quits the remote peer-to-peer dialog tool window.

- The acquisition succeeded:



Pressing 'OK' enables the remote peer-to-peer dialog tool window.

If, for any reason, the acquisition can not be done or fails (disconnection, disturbances, etc), some registers need to be modified, i.e. all registers corresponding to the network (or Master/Slave) management have to be check and modified if needed (i.e. S250s registers).

CHAPTER VIII.

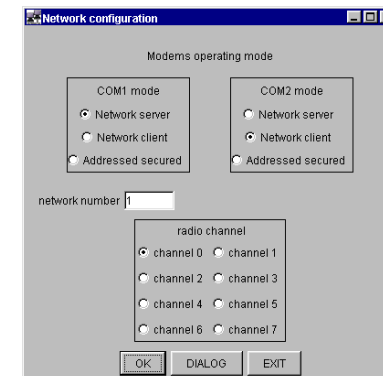
NETWORK DIALOG

For client/server communications between compatible units, the MTC features the network dialog tool, similar to the Peer to Peer dialog tool. In basic user level configuration, it consists in a distinct menu allowing quick configuration and dialog. In advanced user level configuration, it is part of the tool menu and can also be feature as a remote tool between two separate PCs.

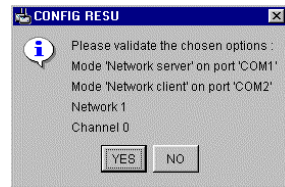
VIII.1. CONFIGURATION

- ***Basic User Level***

From the menu bar, the 'Network/Configuration' submenu has to be selected. A window allowing the user configuring two compatible radio units for network dialog is displayed:



The operating mode, communication channel and network number should be chosen by the user. For addressed secured mode configuration, the clients' IDs also have to be chosen by the user. Once the configuration is done, pressing 'OK' or 'DIALOG' allows the user to validate it:



If 'OK' was pressed, pressing 'Yes' quits the network configuration window and the user has then to select the network dialog tool either from the menu bar or the tool bar. If 'DIALOG' was pressed, pressing 'Yes' opens the network dialog window (See [chapter VIII.2](#)). Pressing 'No' cancels the configuration in both cases.

• **Advanced User level**

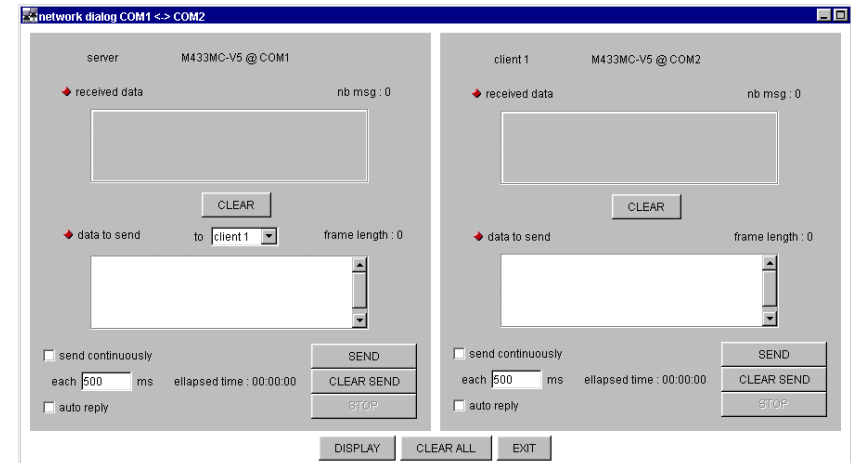
No dialog tool is available in advanced level. Please use the configuration tool and the Terminal windows to test these operating modes.

VIII.2. NETWORK DIALOG TOOL

• **Tool Operation**

From the menu bar, the 'Tool/Network dialog' (Advanced user level) or the 'Network\Dialog' (Basic user level) submenu has to be selected. A window allowing the user choosing on which ports the network dialog tool has to be operated is displayed. The same window is displayed when using the tool bar.

Once the user validates the choice, the following network dialog window is displayed:



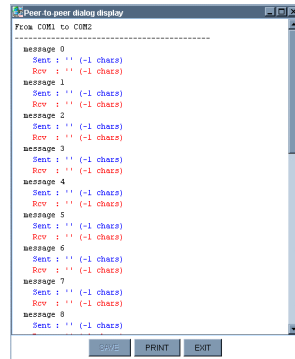
The network dialog window is composed of two identical panels, one for each module. The different fields and buttons of those panels are described below:

- > **Title**: displayed on top of the panel, it gives the type of module and the port it is connected to (E.g. MC-V3@COM1) as well as its function, when applicable (i.e. Server or Client N°n)
- > **'Received data'**: This non-editable field displays the data received on the radio link from the other module. The red dot indicates the status of the communication: it goes to green if a message is being received.
- > **'Nb msg'**: Provides the number of messages received by the module since the beginning of the dialog.
- > **'Data to send'**: Displays the data to be sent by the user to the other module. The red dot indicates the status of the communication: it goes to green when a message is being sent.
- > **'To [Client/Address n]'**: Indicates to which client or modem the frame is to be sent
- > **'Frame length'**: Provides the length of the frame to be sent by the user.
- > **'Send continuously'**: Enabling this option allows the user to transmit data (from 'Data to send') permanently to the other modem. The time out (i.e. 'Each [...] ms' field) is configurable but should be greater than 500 ms.

- **'Auto reply':** Enabling this option allows the user to send every received frame back to the transmitter.
- **'Nb msg sent':** Provides the number of messages sent to the other module.
- **'Elapsed time':** Specifies how long the modem has been transmitting when the send continuously option is enabled.
- **'Send' button:** Sends the frame previously entered by the user in the 'data to send' field to the other module.
- **'Clear Send' button:** Clears the 'data to send' field as well as the 'received data' field of the other module.
- **'Stop' button:** Stops a permanent transmission (when 'send continuously' is enabled).

The two other buttons at the bottom of the window are general for both modules:

- **'Display' button:** Displays a summary of the dialog established between the two radio units:



- **'Clear All' button:** Clears all the window's fields (described above).
- **'Exit' button:** Quits the network dialog window.

• **Acquisition process**

When using the dialog tools with Spread Spectrum units (i.e. B/M900SS-xxx, B433YY-10), an acquisition step needs to be executed in order to determine the operation mode of each modem (i.e. Slave/Master or Client/Server, as well as ID numbers). This acquisition step requires given configuration of modules. In advanced user level configuration, those configurations have to be done directly by the user on the module as advanced user level does not feature a quick configuration tool.

Please refer to the Peer-to-Peer Dialog chapter for a detail of the acquisition process.

CHAPTER IX.

TERMINAL

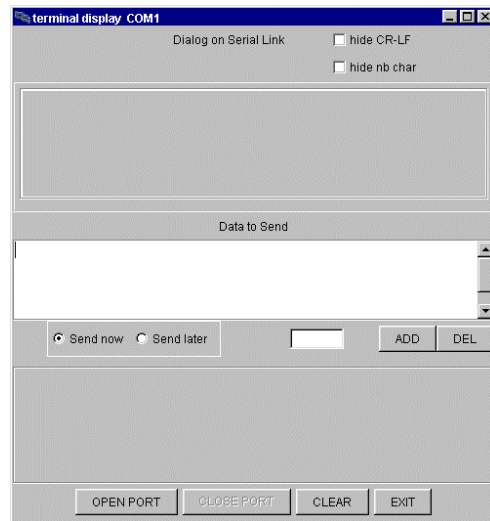
Another tool available with the MTC software is the terminal. It is equivalent to an advanced terminal emulation program and can only be operated in advanced user level configuration. As many terminal programs, it allows operating within a given radio module through serial link, i.e. it allows communications, registers handling, network management and test functions. Therefore, Hayes mode should be mostly used inside the terminal but data frames can also be transmitted.

IX.1. TERMINAL TOOL

From the menu bar, the 'Tool/Terminal' submenu has to be selected. It can also be selected from the tool bar. The following window is displayed, allowing the user to choose on which port the terminal has to be operated:



Once the user validates the choice, the following terminal window is displayed:



The different fields and buttons are listed below:

- > **'Dialog on serial link'**: This field contains all the data flowing between the module and the software (user), i.e. the data (or commands) sent to the module as well as the module's answers.
 - o **Hide CR-LF**: If this box is checked, the blue CR (Carriage Return) and LF (Line Feed) will no more be written. The text will still show the effects of the CR by going to the beginning of the next line.
 - o **Hide Nb Char**: If this box is checked, the number of received characters will no more be displayed. This value is useful for tests to verify the frame length.
- > **'Data to send'**: This field contains the data to be sent to the module by the user.
- > **'Open port' button**: Opens the serial port to which the module is connected and therefore enables communication with the module.
- > **'Close port' button**: Closes the serial port to which the module is connected and therefore disables communication with the module.
- > **'Clear' button**: Clears 'Communication data' and 'Sent Data' fields
- > **'Exit' button**: Quits the terminal window.

The last part of the terminal window (free field below the 'Sent Data' field) is the area in which functions buttons (for Hayes commands) can be defined with the terminal configuration window (See following paragraph) in order to simplify the terminal operation.

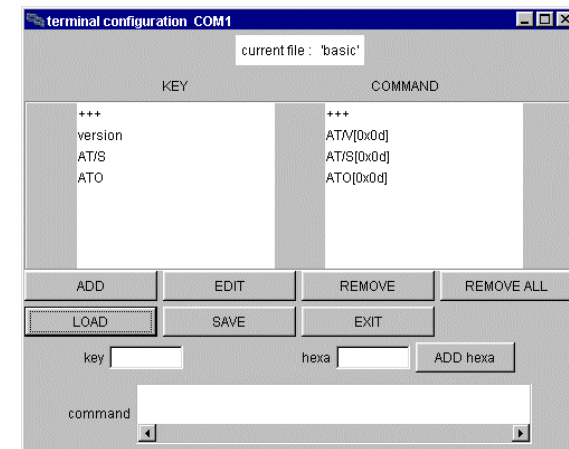
IX.2. TERMINAL CONFIGURATION

In order to simplify the use of the terminal tool, function buttons can be defined and implemented through a second tool, the terminal configuration tool. The terminal configuration tool can be displayed either from the menu bar or from the tool bar.

• **Operation Principles**

From the menu bar, the 'Tool/Terminal configuration' submenu has to be selected. A window allowing the user to choose on which port the terminal configuration tool has to be operated is displayed.

Once the choice is validated by the user, the following terminal configuration window is displayed:



The different fields and buttons are described below:

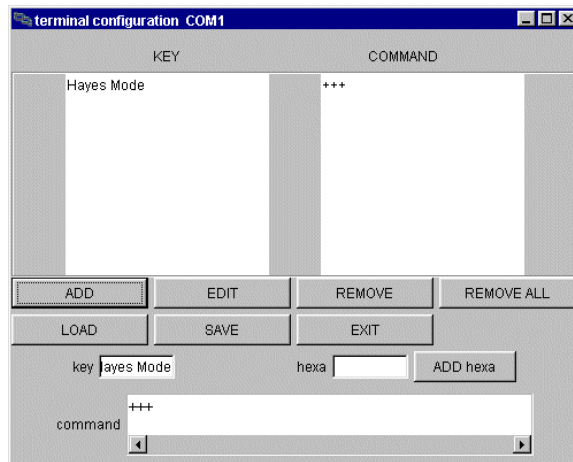
- > **'KEY'**: Lists the name of the buttons which Hayes commands. They are defined in the 'COMMAND' field.
- > **'COMMAND'**: Lists the Hayes commands corresponding to the buttons defined in the 'KEY' field.
- > **'key'**: This editable field must be filled with the name of the button the user wants to define (e.g. Hayes Mode)
- > **'command'**: This editable field must be filled with the Hayes command corresponding to the button the user wants to define (e.g. +++)
- > **'hexa'**: This editable field must be filled with additional hexa characters alternatively needed by some Hayes commands (e.g. ATO needs <CR> => hexa character is 'd')
- > **'Add' button**: Adds the key and corresponding Hayes command defined by the user in the 'key', 'command' fields to the configuration

- > **'Add hexa' button:** Similar to the 'Add' button. To be used when a Hayes command requires an additional hexa character
- > **'Edit' button:** Edits an existing button for its modification
- > **'Remove' button:** Removes a selected button previously defined by the user
- > **'Remove all' button:** Removes all the buttons previously defined by the user
- > **'Load' button:** Opens a previously defined configuration
- > **'Save' button:** Saves the current configuration
- > **'Exit' button:** Quits the terminal configuration window

• **Configuration Example**

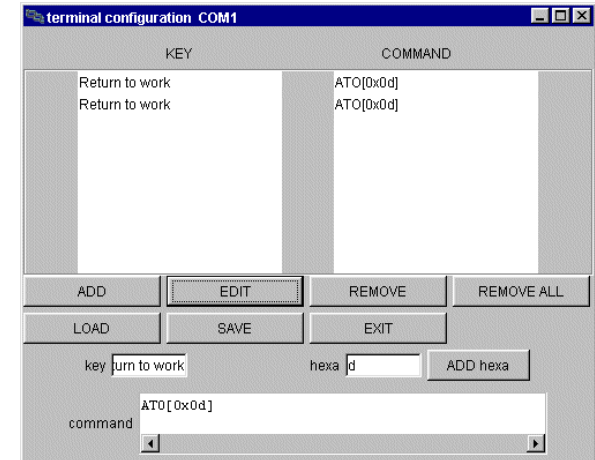
The below example describes the implementation of two common terminal buttons: one to toggle to Hayes mode (command is `+++`), and one to toggle back to operating mode (command is `ATO<CR>`).

1. Enter the name to give to the button in the 'key' field: In Hayes Mode
2. Enter the corresponding command in the 'command' field: +++
3. Press the 'Add' button. The 'Hayes Mode' button is defined and is displayed in the 'KEY' and 'COMMAND' fields:

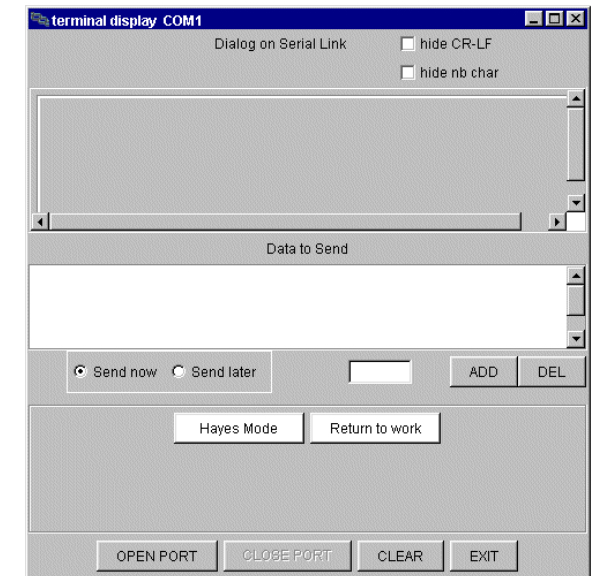


4. Enter the name to give to the second button in the 'key' field: Return to work
5. Enter the corresponding command in the 'command' field: ATO
6. Enter the additional hexa character (<CR> is 'd') in the 'hexa' field: d
7. Press the 'Add hexa' button. The additional character appears in the 'command' field:

8. Press the 'Add' button. The 'Out Hayes Mode' button is defined and is displayed in the 'KEY' and 'COMMAND' fields:



The buttons are then available in the terminal window and can be used as commands:



Several terminal configuration files are already set-up and stored in the 'data' directory of the MTC. Those, files are accessible via the 'LOAD' button in the Terminal configuration window.

CHAPTER X. RADIO MODULES CONFIGURATION

This chapter concerns the radio module configuration. The following paragraphs detail all the possible actions to be operated on module's configuration:

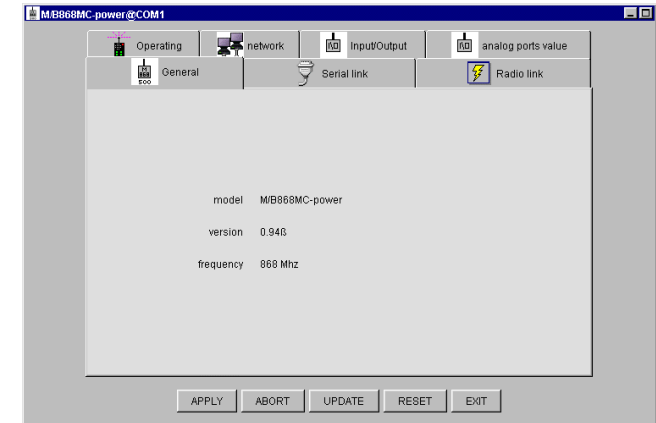
- Handling, consulting, modifying a connected modem's configuration (chapters [X.1](#) & [X.2](#)).
- Creating configuration files to be assigned to connected modules (Chapters [X.3](#) & [X.4](#)).

X.1. DISPLAYING A CONFIGURATION

The first and simplest action to be performed through MTC software is to display radio module's configuration files, either from a connected module or created and defined by the user.

• **Displaying A Connected Radio module Configuration**

In order to configure a connected modem, its configuration file needs to be displayed. A double-click on the connected module name (top part of the 'Tree' window) displays the corresponding configuration file (example below is for a M/B868MC-power modem):



The window displayed depends on the modem type as they all have different parameters.

The window is composed of several panels corresponding to parameters categories (E.g. Serial link parameters, radio link parameters, etc). The values displayed in the different fields of the configuration file window correspond to the modem's current configuration.

The configuration file windows can also be displayed from the tool bar.

- **Displaying A Pre-Defined Radio module Configuration**

Configuration files can be created and defined by the user or can be pre-defined in the system and configurable. They should be saved in a configuration directory and should therefore appear in the bottom part of the 'Tree' window as described in [chapter V](#).

- From the 'Tree' window, a double click on the chosen configuration file name displays its window.
- From the menu bar, the 'File/Open' submenu has to be selected. A browse window, named 'OPEN' is then displayed to allow the user to choose which file has to be open and displayed.

X.2. CONFIGURING A RADIO MODULE

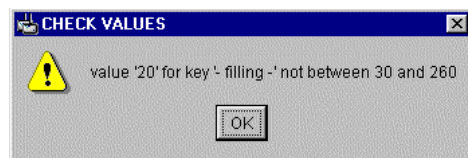
The second action to be performed on radio modules is the actual configuration. Every connected radio module detected by the software during auto configuration can be configured through its parameters. The configuration can concern either a few parameters or all of them. Several possibilities can be used, depending on the data to be modified.

- **Modifying A Few Configuration Parameters**

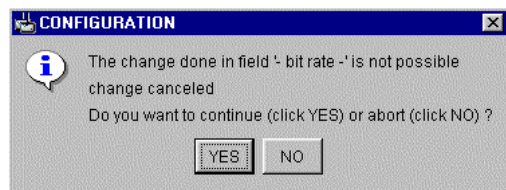
If only a few parameters need to be modified, the configuration can be operated directly inside the radio module.

Once the configuration file is displayed (see [chapter X.1](#)), the user has to select the panel corresponding to the data to be modified. Each parameter can be modified through the corresponding field (either editable or containing a pre-defined list of values).

Once a new value is entered in a field, the modification has to be validated by pressing the 'APPLY' button. For the editable fields, if the value entered by the user is invalid or out of range, a message like the following is displayed (example is for the filling rate parameter):



If a value requires another register to be changed previously, the following message is displayed:



Clicking on 'No' aborts all changes
Clicking on 'Yes' cancel the forbidden modification but validate the other modifications.

- **Modifying A Whole Configuration**

If the whole configuration has to be modified, it is equivalent to load a new configuration in the radio module. This action is to be performed from the 'Tree' window.

In the 'Tree' window, a right click on the port; to which the module to be configured is connected, displays a pop-up menu. To load a configuration file, the 'assign' submenu has to be selected. A browse window is then displayed, allowing the user to choose the file to assign to the radio module. The chosen file then appears as a child node of the serial port node and its window is displayed (See [chapter V](#))

The same operation can be done with a simple 'Drag & Drop' (mouse left click). The configuration file has to be selected from the bottom part of the 'Tree' window, and then dragged and dropped on the radio module's icon in the top part of the 'Tree' window. The chosen file appears as a child node of the serial port node and its window is displayed.

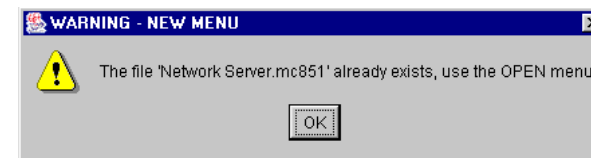
X.3. CREATING A NEW CONFIGURATION FILE

As shown already, the user can create a configuration file at any time. This operation can be performed either from the 'Tree' window or the menu bar.

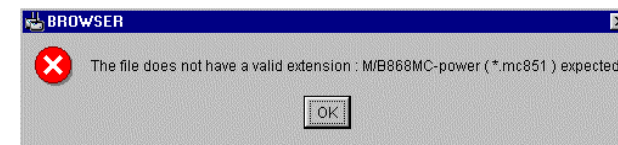
- **From the Tree Window**

As described in [chapter V](#), the configuration files are stored in the bottom part of the 'Tree' window and sorted by radio module type. In order to create a particular module type configuration file, that module type has to be selected in the 'Tree' window. A right click then displays a 'new' pop-up submenu. To create a new configuration file, that submenu has to be selected. A browse window (named 'NEW') is displayed, allowing the user to give a name to the file to be created.

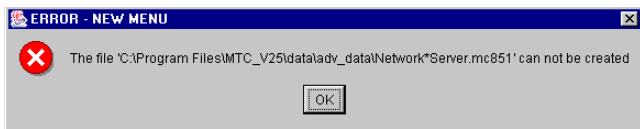
- If the given name already exists, the following message is displayed:



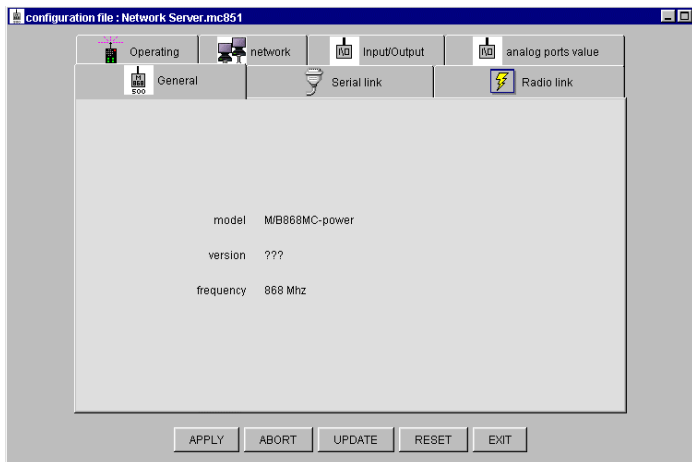
- If the given name does not have the proper extension, the following message is displayed:



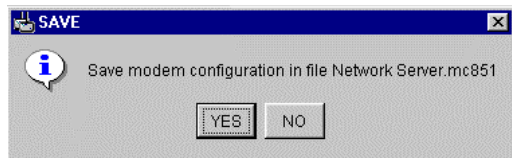
- > If the file can not be created for any reason (e.g. use of wrong characters), a message like the following is displayed:



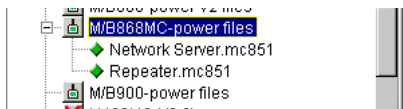
- > If the given file name is validated, the file is created and its window is displayed with the default values of the radio module type:



The file is then created but not validated. For the file to be validated, i.e. to be stored in the bottom part of the 'Tree' window, the 'APPLY' button has to be pressed. The following message is displayed:

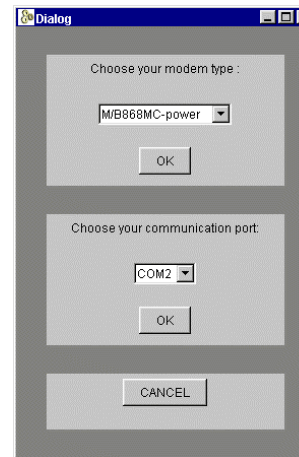


Once the creation is validated ('Yes' pressed), the new file appears in the bottom part of the 'Tree' window:



• **From The Menu Bar**

As described in chapters [III.2](#) and [IV.2](#), the submenu to be selected for a file creation is the 'File/New' submenu. The following window is displayed, allowing the user to choose either the type of modem for which the configuration file has to be created or the serial port to be configured:



Once the selection is made, a browse window (named 'NEW') is displayed, allowing the user to give a name to the file to be created. Once the given name is validated (see previous paragraph for invalid name cases), the file is created and its window is displayed.

As described previously, the file has to be validated by pressing the 'APPLY' button. Once validated, the file appears in the bottom part of the 'Tree' window.

A file can also be created from the tool bar (See chapters [III.3](#) and [IV.3](#))

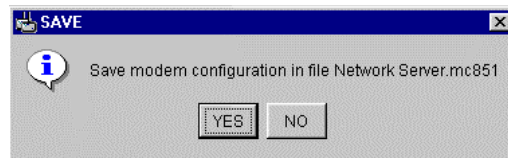
X.4. SAVING A CONFIGURATION

Once configuration files has been created or modified, they obviously can be saved from the tool bar or from the 'File' menu of the menu bar. The 'Save' submenu allows to save an existing configuration file while the 'Save as' submenu allows to save the current file as a new configuration file.

• ***Saving An Existing Configuration***

When a file has been modified, the modifications have to be saved into the configuration file. While the configuration file window is displayed, the 'File/Save' submenu has to be selected.

- > If the file does not exist or is not defined, the software toggle to a 'SAVE AS' browse window, allowing the user to give a name to the file.
- > If the file exists and is already defined, it can be saved at any time, and the following confirmation message is displayed:



Pressing 'Yes' saves the file as defined.

• ***Saving As A New Configuration***

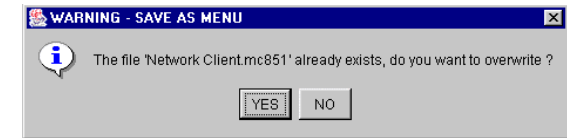
When a file has been created by the user, it has to be saved in the configuration file directory. While the configuration file window is displayed, the 'File/Save as' submenu has to be selected. A 'SAVE AS' browse window is then displayed, allowing the user to give a name to the new configuration file.

- > If the file name does not have the right extension (or no extension), the save action is aborted and the following message is displayed:



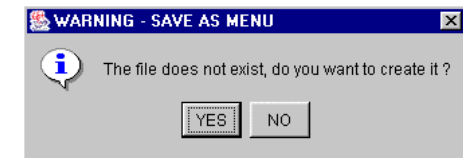
Both 'Save' and 'Save as' functions can be operated from the tool bar (See chapters [III.3](#) and [IV.3](#))

- > If the file already exists, the following message is displayed:



Pressing 'No' aborts the save action, while pressing 'Yes' displays the confirmation message.

- > If the file name does not exist and is valid, the file can be saved and the following message is displayed:



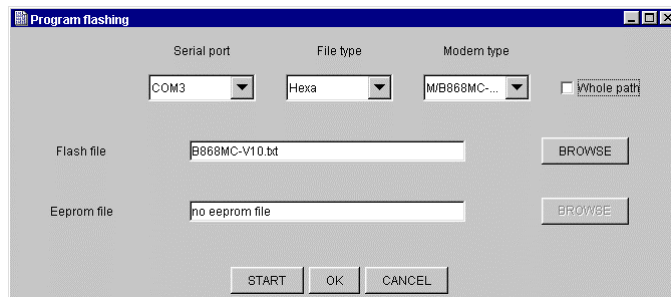
Pressing 'No' aborts the save action, while pressing 'Yes' displays the confirmation message.

CHAPTER XI.

PROGRAMMING

The last operation available with MTC Workbench is the programming: Nearly all One RF modems can be re-programmed for firmware upgrade.

From the menu bar, the 'Programming\Flashing' submenu is to be selected. The following window is displayed:



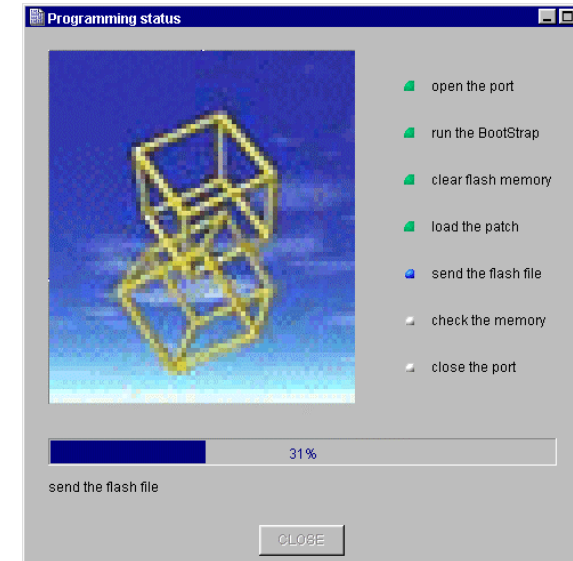
This window allows the user to choose proper serial port, file type (only Hexa files are available for customers) and the modem type.

Once the choice is made in all corresponding fields, click on the 'START' button.

An intermediate window shows the specific hardware configuration needed for the used module before starting : specific cable, switches setting,...

When set, click on "Continue"

The following programming window is displayed, showing the programming status:



Once the flashing is done, the 'CLOSE' button is enabled and closes the programming window.

CHAPTER XII.

APPENDIX

XII.1. DOCUMENT HISTORY

<i>Revision</i>	<i>Date</i>	<i>Author</i>	<i>Subject</i>
v1.0	04.2004	M-H Bertin	Creation

XII.2. SOFTWARE HISTORY

<i>Revision</i>	<i>Date</i>	<i>Author</i>	<i>Subject</i>
v1.0	04.2004	M-H Bertin	Creation
