WinMux3

User Manual

Customer Support

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WinMux3

User Manual

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1 Introduction

1.1 Purpose

This document provide the user guidelines for how to use WinMux3 tool.

1.2 Scope

This document provide the customization details of the TE-UE multiplexer usage.

Table 1-1 presents the reference information of the modules which are used but beyond the scope.

Table 1-1. Reference Information beyond Scope

Modules	Reference information
N/A	

1.3 Who Should Read This Document

This document is primarily intended for:

- NBIoT TE-UE tester

1.4 How to Use This Manual

This segment explains how information is distributed in this document, and presents some cues and examples to simplify finding and understanding information in this document. Table 1-2 presents an overview of the chapters and appendices in this document.

Table 1-2. Chapter Overview

#	Chapter	Contents
1	Introduction	Describes the scope and layout of this document.
2	References	Lists the reference documents.
3	Definitions	Describes the terms and definitions.
4	Abbreviations	Abbreviations.
5	Overview	Overview.
6	Main menu	Main menu desription.
7	Channel windows	Describes the channel windows.
8	Functional tabs	Describes the functional tabs.
9	Status bar	Describes the status bar information.

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1.4.1 Terms and Conventions

This document uses special terms and typographical conventions to help you easily identify various information types in this document. These cues are designed to simply finding and understanding the information this document contains.

Table 1-3. Conventions

Convention	Usage	Example
[1]	Serial number of a document in the order of appearance in the References topic	Look up Chapter 2: System Architecture in [1]
void xx(zz)	Source code	static int __stdcall cb_download_bloader_init(void *usr_arg){}
☞	Important	

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2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

[1] 3GPP TS 27.010 V13.0.0, Terminal Equipment to Uer Equipment(TE-UE) multiplexer protocol

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3 Definitions

N/A

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4 Abbreviations

Please note the abbreviations and their explanations provided in Table 4-1. They are used in many fundamental definitions and explanations in this document and are specific to the information that this document contains.

Table 4-1. Abbreviations

Abbreviations	Explanation
AT	ATtention
CR	Carriage Return
CTS	Clear To Send
DCD	Data Carrier Detect
DLCI	Data Link Connection Information
DSR	Data Set Ready
DTR	Data Terminal Ready
ISP	Internet Service Provider
MUX	Multiplexer
PPP	Point to Point Protocol
RTS	Request To Send

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5 Overview

Note: preparation for running WinMux3

1. Install the Microsoft .NET Framework Runtime 3.5 or above
2. Install the com0com driver, driver path: \nbiot\tools\core\genie\tools\com0com\install.bat.

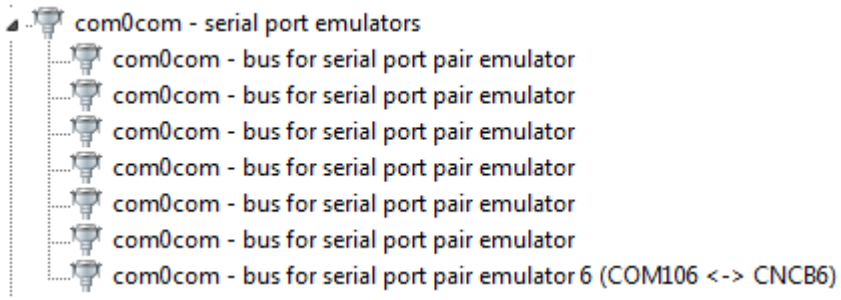

Figure 5-1. com0com port emulators.

The tool user interface is mainly divided into the **Channel Windows** on the left, **Functional Tabs** on the right, **Debug Info** section at the bottom and **Status Bar**.

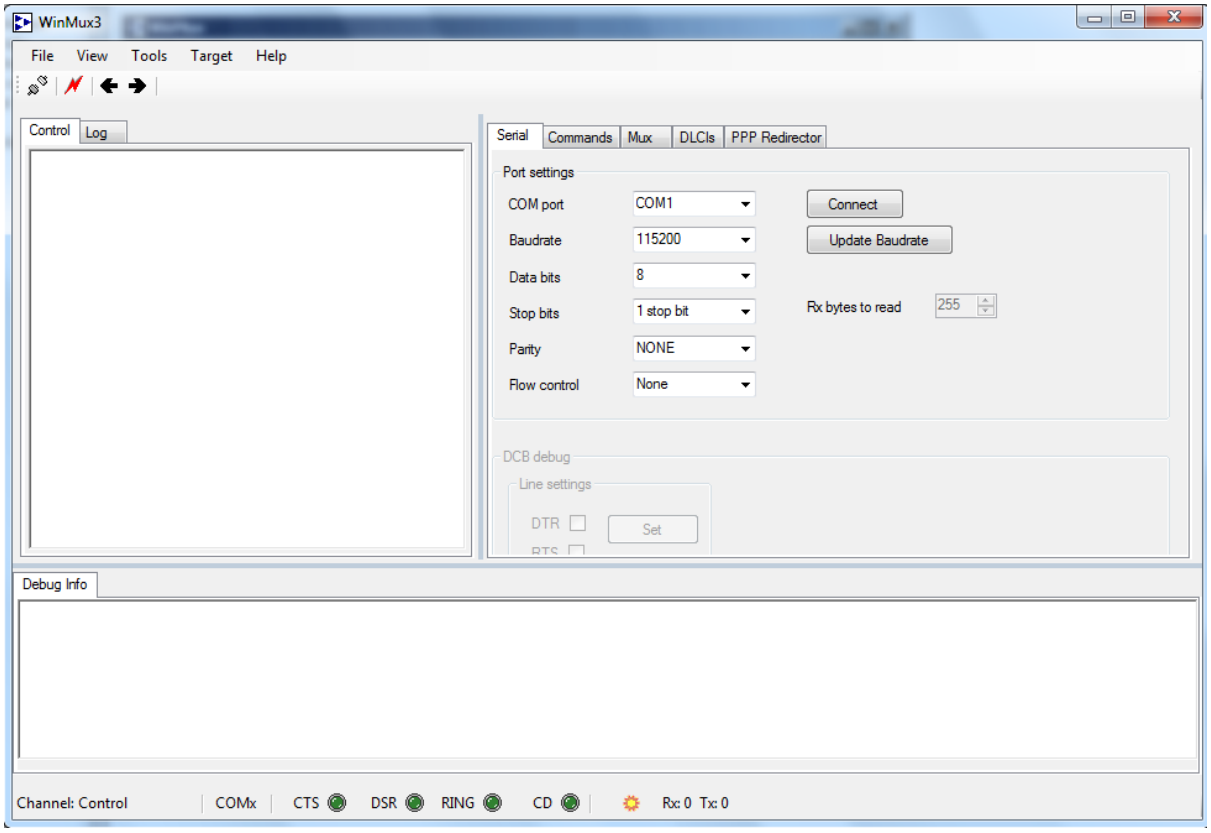

Figure 5-2. main UI overview.

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5 Overview

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6 Main Menu

6.1 File

1. **Load configuration file(*.xml)**: load configuration such as COM port setting, DLCI parameters, AT commands from a xml file.
2. **Save configuration file(*.xml)**: save current configuration such as COM port setting, DLCI parameters, AT commands to a xml file.
3. **Exit**: exit program.

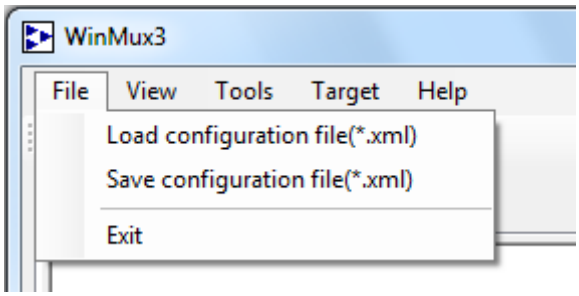

Figure 6-1. file menu.

6.2 View

1. **Control**: current focused window switch to Control window.
2. **Log**: current focused window switch to Log window.

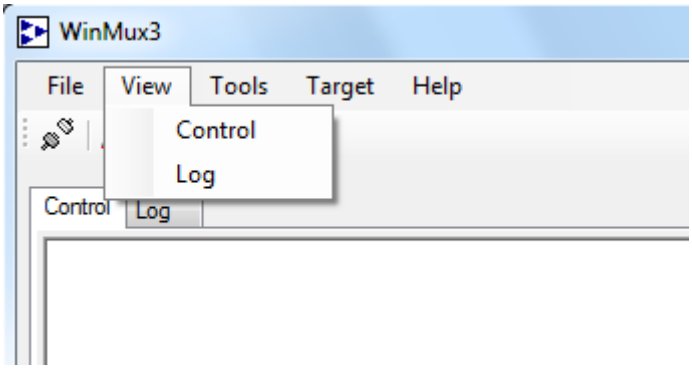

Figure 6-2. view menu.

6.3 Tools

1. **Commands**:
   Execute: execute the current selected AT command line.
   Add: add an AT command line above the current selected line.
   Edit: modity current selected AT command line.
   Delete: delete current selected AT command line.

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2. **Log**:
   Log options: show log options window for detail setting.
3. **Options**: show WinMux3 default options window.

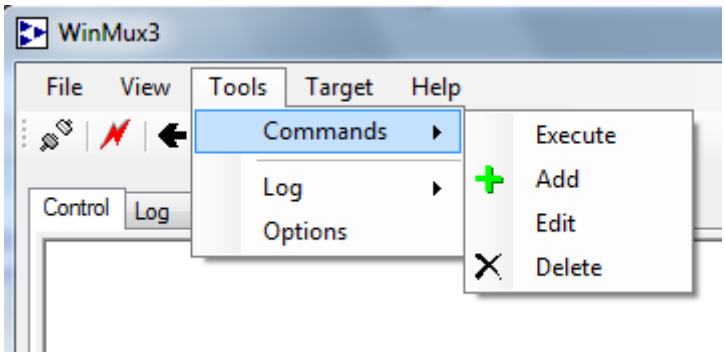

Figure 6-3. tools commands menu.

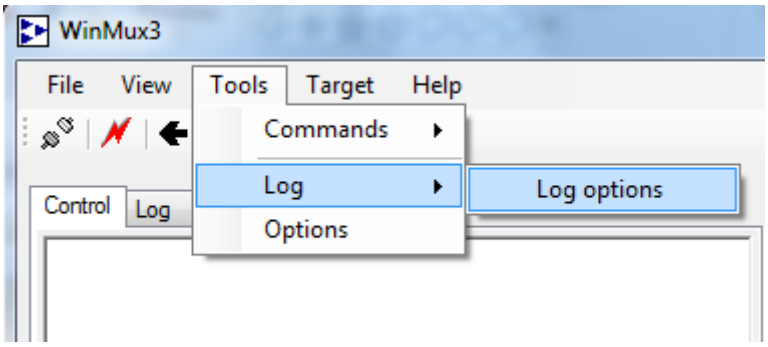

Figure 6-4. tools log menu.

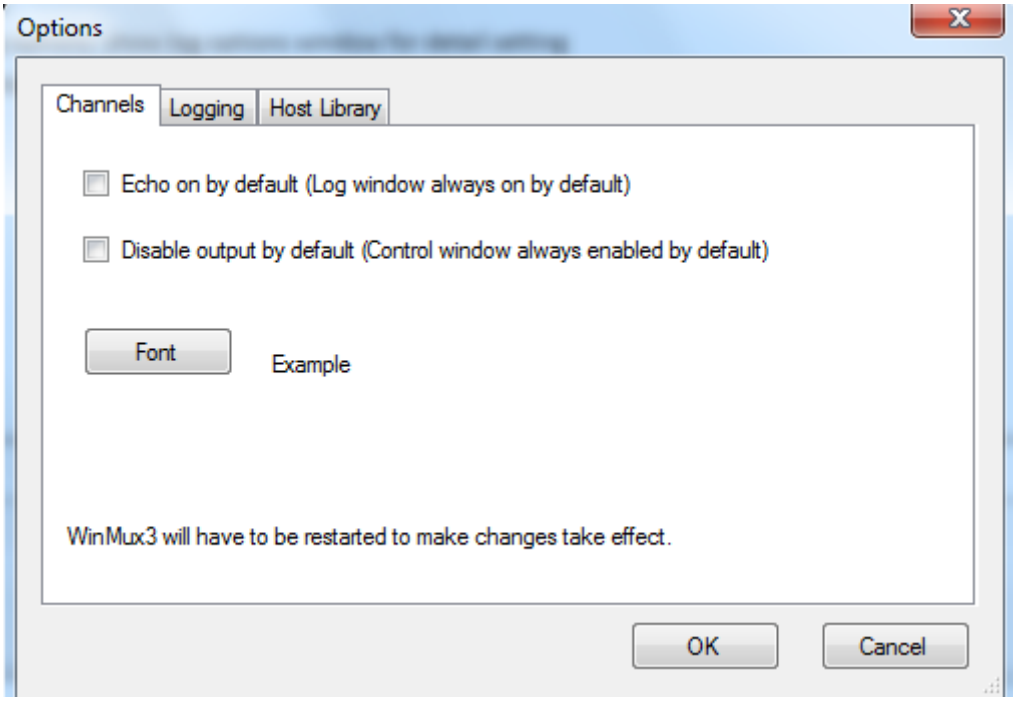

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Figure 6-5. tools options menu window.

6.4 Target

1. **Enter low power mode**: send enter low power mode mux command to UE.

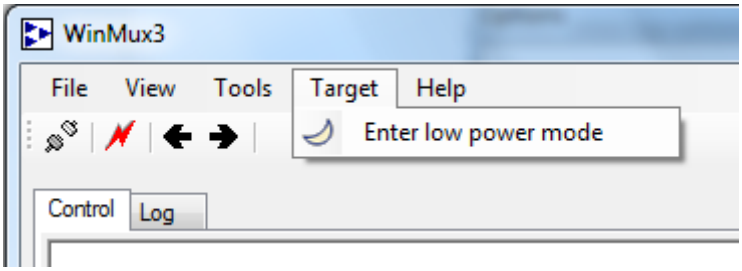

Figure 6-6. target menu.

6.5 Help

1. **About**: show about box.
2. **WinMux Help**: this user manual.

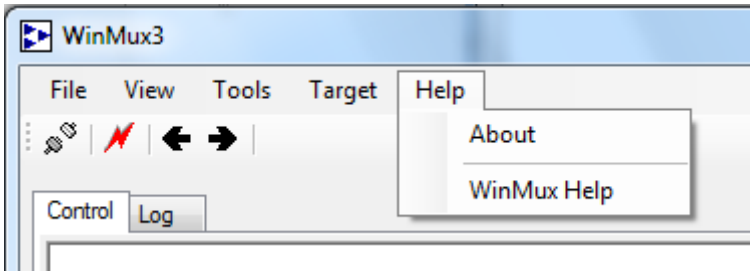

Figure 6-7. help menu.

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7 Channel Windows

The channel windows provide the user the ability to send AT commands and data to a muxed channel. Depending on the current mode the channel window will have more or less functionality.

Standard copy(CTRL+C) and paste(CTRL+V) functions are provided.

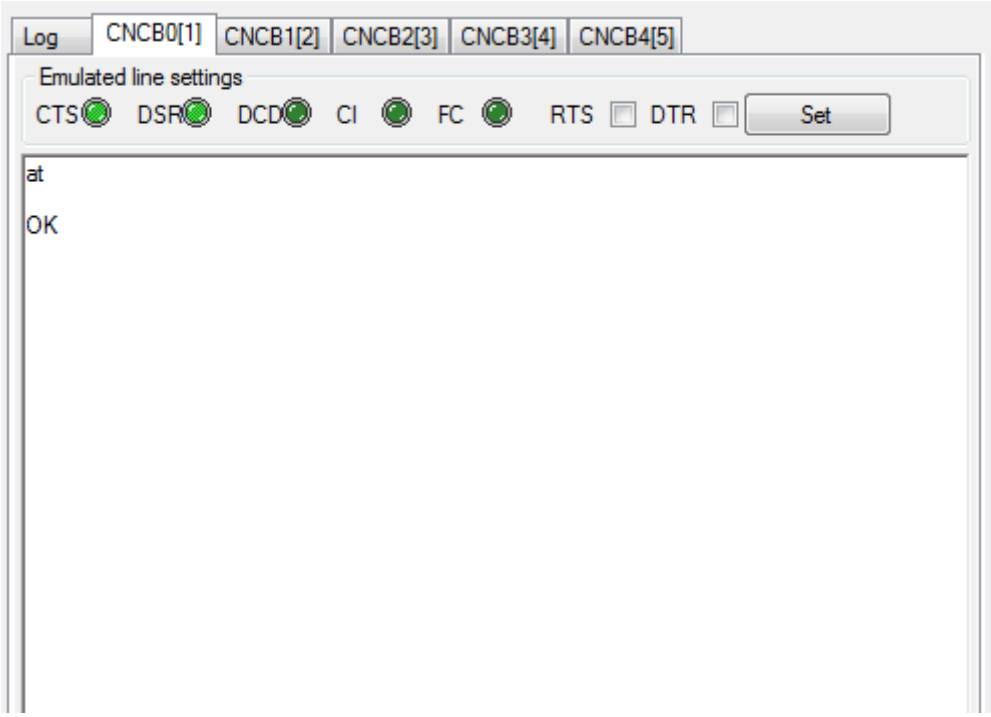

Figure 7-1. muxed channel window.

The following indicators are available on muxed channel windows:

- CTS – clear to send
- DSR – data set ready
- DCD – data carrier detect
- CI – inverted ring indicator
- FC – flow control

The DTR(data terminal ready) and RTS(request to send) status change can be requested by clicking the **Set** button.

7.1 Popup menu options

By right clicking on the channel window, a popup menu of options is displayed.

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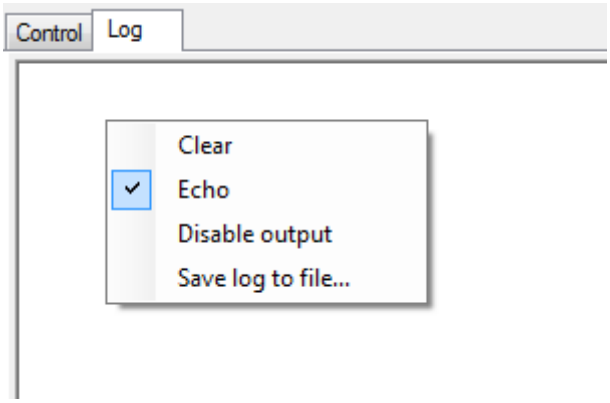

Figure 7-2. popup menu of options.

Clear: clear the contents of this channel window.

Echo: toggle echoing of transmitted characters.

if Echo is on, TX characters will be displayed in blue and all RX characters in red.

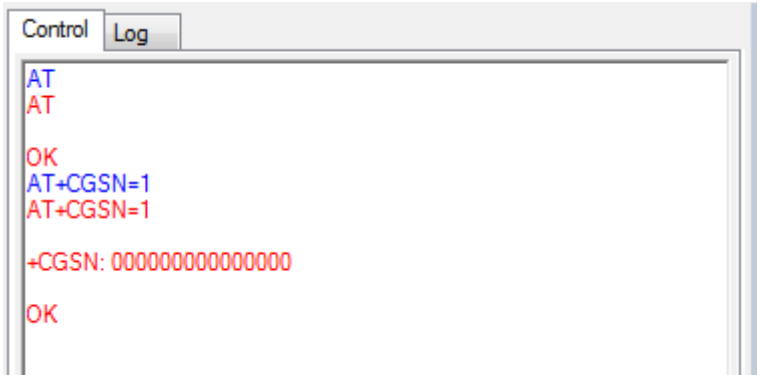

Figure 7-3. Echo on.

if Echo is off, only RX characters will be displayed in black.

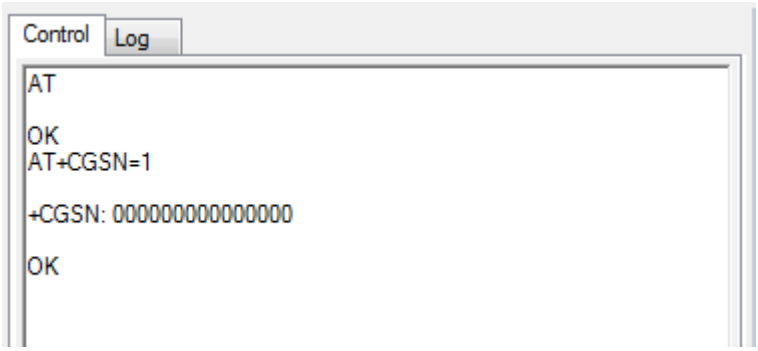

Figure 7-4. Echo off.

Disable output: Selecting this option disable output to be streamed to the window. Disabling this option will have a performance increase when a lot of data is being sent or received.
The window background will be grayed to indicate the disabled status.

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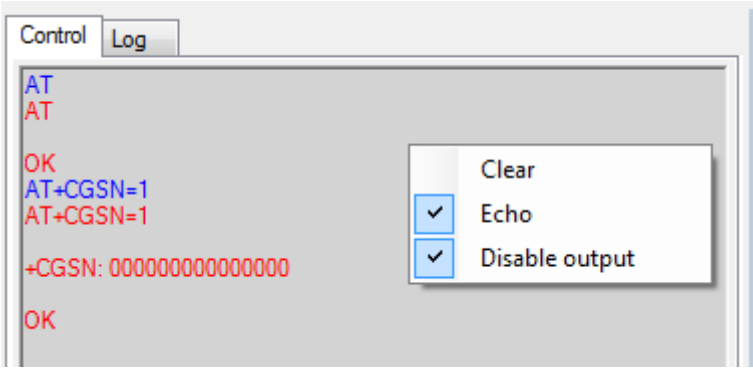

Figure 7-5. disable output.

Save log to file…:

check – show a save file dialog and then save the subsequent contents output in current channel window to a text file.

Uncheck – stop saving output and close the log file.

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8 Functional Tabs

The functional tabs provide extra functionality to the user to interact to the UE hardware and software.

Serial: interaction to the serial port

Commands: provide AT command shortcuts

Mux: interaction to the multiplexer

DLCIs: DLCI negotiation parameters setting

PPP Redirector: redirect a COM port to an AT and DATA channel

8.1 Serial

The serial provide the standard functionality to interact with an AT serial port.

The user can select the name of the AT serial port and baudrate, data bits, stop bits, parity, flow control, and then click **Connect** button.
When a connection is made the **Connect** button will change to **Disconnect**.

While connected the user can change the connection baudrate by selecting a different baudrate and clicking the **Update Baudrate** button.

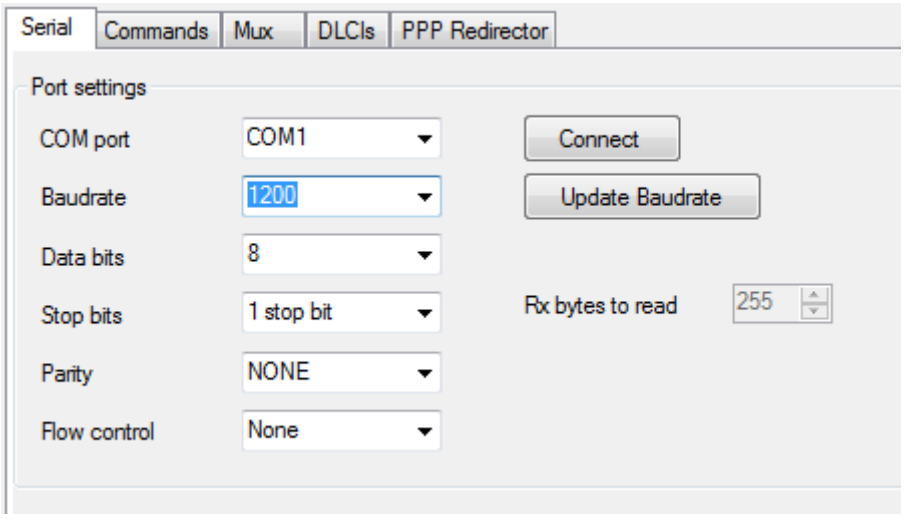

Figure 8-1. serial.

8.2 Commands

The command tab provide for adding AT shortcut commands.
The command will be send to the window that has focus when double clicked.

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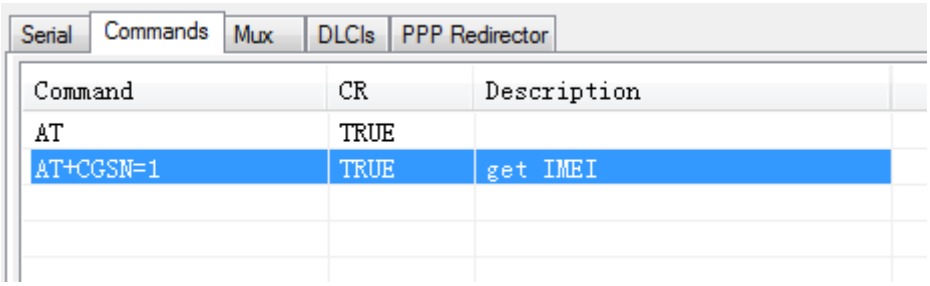

Figure 8-2. commands.

A popup menu provide the actions that can be performed on each item.

The CR(Carriage Return) option specify if a 0x0D character is appended to the end of the command when sent.

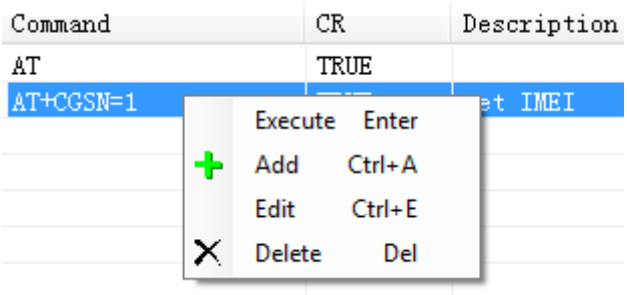

Figure 8-3. commands popup menu.

8.3 Mux

The Mux tab provide interaction to the UE multiplexer.

The **Start Mux** button send a request to the UE to start the multiplexer. The UE multiplexer has to been started already for a correct response.

The standard response when the multiplexer start is to respond with four 0xF9 characters which in HEX represent “F9F9F9F9”.

The **Close Mux** button will send the close mux commands to the UE. If successful, the mux channels and windows will be closed and the input will be back to the standard AT control channel.

The **Host reset** button reset the internal host library, close mux windows etc. This is normally used when the UE doesn’t respond or is in an error state.

The channel information group show the current state of all the mux windows.

Auto Start check box is useless.

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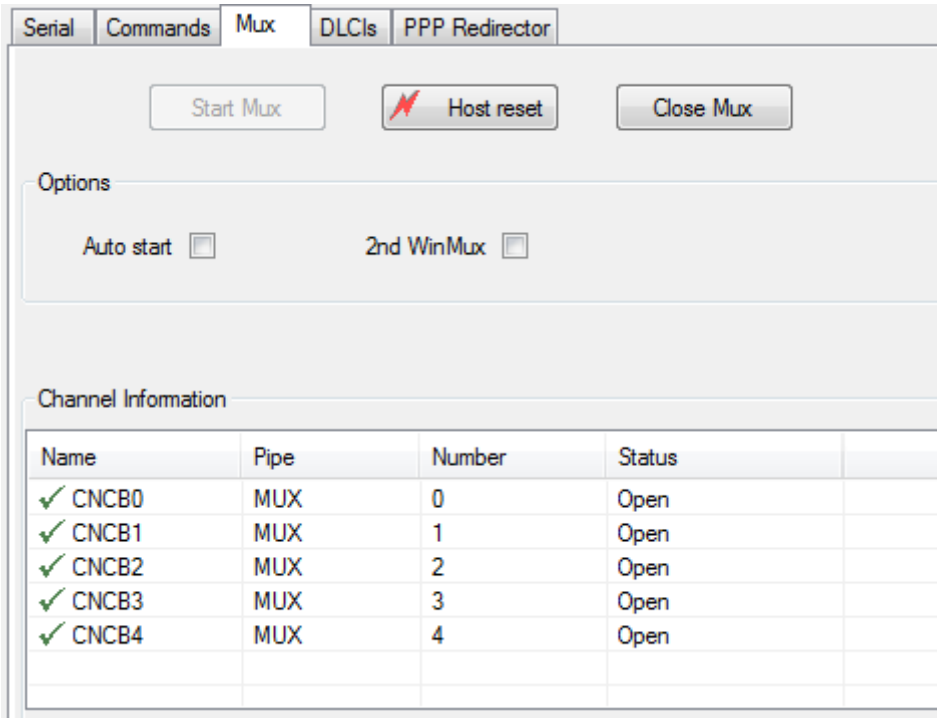

Figure 8-4. mux.

8.4 DLCIs

DLCIs provide the DLCI negotiation parameters setting.

CL – Convergence Layer

Prio - Priority

T1 – Acknowledgement Timer

N1 – Maximum Frame Size

N2 – Maximum number of retransmissions

K – Window Size

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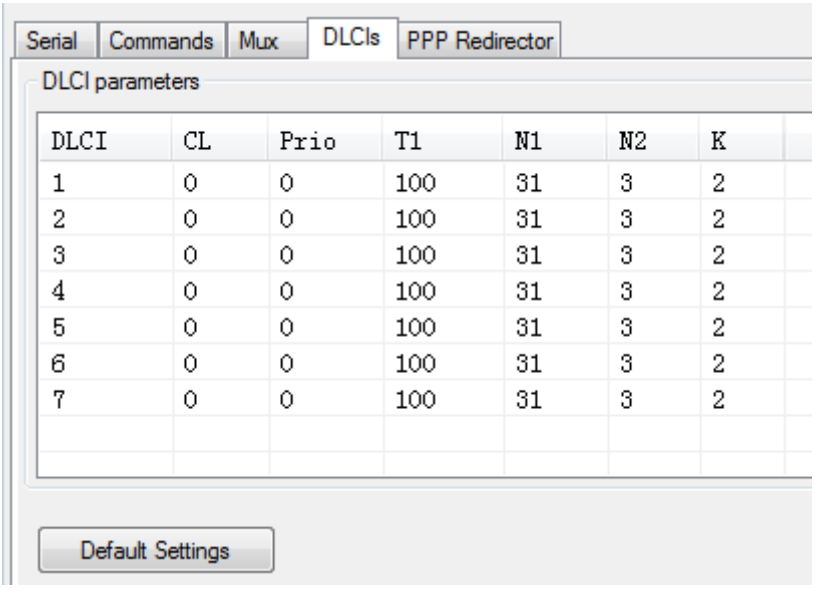

Figure 8-5.DLCIs.

8.5 PPP Redirector

The redirector tab is used to test PPP functionality with the WinMux.

The AT and DATA channels are used to redirect windows PPP messages through the WinMux application to the UE hardware.

The current implementation use 3 RS-232 ports. The following diagram show the configuration. COM B and COM C are connected by way of a loop back serial connection. By setting up dialup networking in windows to connect to a standard modem on COM C, this setup will simulate a modem connection connecting to COM C.

The WinMux software will redirect COM B to either an AT or DATA channel.

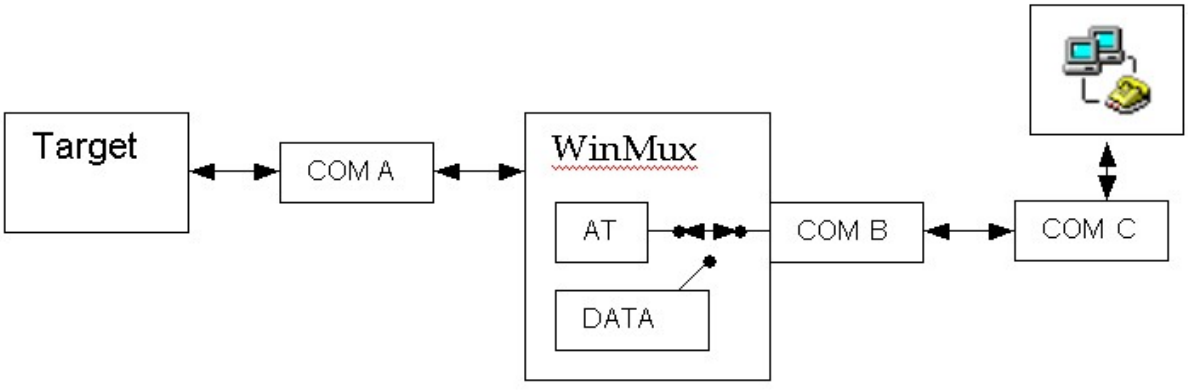

Figure 8-6.redirector configuration.

The following diagram show the wiring of a standard RS-232 loop back connector.

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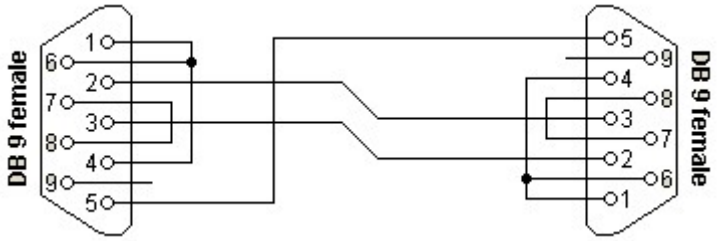

Figure 8-7.loop back connector.

The following steps are needed to use the PPP redirector tab

Modem setup

Add a standard 115200 modem in the control panel and connect it to COM C. Set the properities to not have any flow control.

Dialup networking

Create a dialup network using the modem and connecting to an ISP.

WinMux setup

In the PPP redirector tab select 115200 baudrate and enter COM B.

In the **Muxed Channel** select the muxed channel that will be used.

Click **Connect** button.

All data from the COM C port will now be redirected to the specified muxed channel. Currently the switch to the data channel will happen when data received is detected on that channel. The switch back to the AT command channel will happen when "+++" is detected in the data stream.

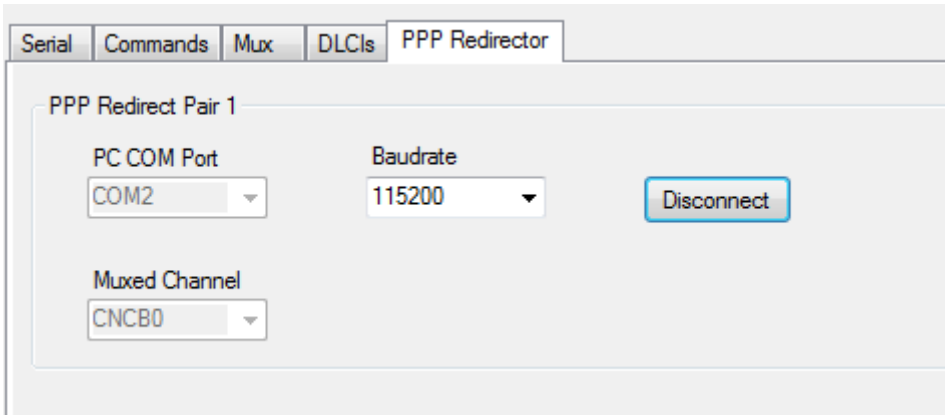

Figure 8-8.PPP Redirector.

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9 Status Bar

The status bar at the bottom provide extra information for AT serial port.

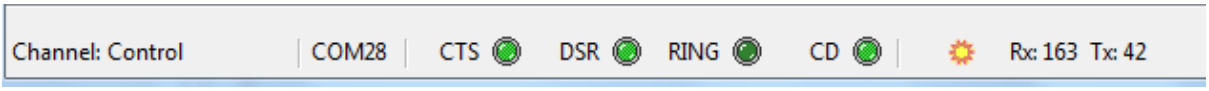

Figure 9-1.status bar.

The sections describe the following:

- The current window that has focus.
- The serial COM port that is connected.
- CTS(Clear to Send) of physical serial line.
- DSR(Data Set Ready) of physical serial line.
- RING indicator of physical serial line.
- CD(Carrier Detect) of physical serial line.
- The power status of the UE hardware(sun - awake, moon - asleep).
- Rx – bytes received
- Tx – bytes transmitted

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