1 Overview

The Carl Zeiss MicroToolBox 2004 (MTB2004) is a program package, that simplifies and unifies the software control of Carl Zeiss light microscopes and their accessories. It may be used under the operating systems Windows 2000 and Windows XP. It is programmed in c# using the .net framework 2.0. Therefore, the simplest and most effective way for using it is also using a .net language, but it is also possible to use the MTB2004 with COM (Component Object Model) interfaces.
1.1 Components of the MTB2004

The central component of the MTB2004 is the MTBServer. It is a singleton (may exist only in one instance on a system), but may be used simultaneously from several clients. The MTBServer consists of several device specific DLLs: MTBKernelXXX.dll.

Clients may use the server functions defined in the API (Application programmers interface), located in the MTBApi.dll. The MTBApi classes are connected with the MTBServer via .net remoting.

The server itself communicates with the hardware using the CzCanSrv.exe. This is another server, that gives a unified access via different interfaces (RS232, USB, TCP-IP) to the hardware. It also may redirect all communication requests to a simulation unit that is integrated in the MTBServer (MTBSimulation.dll). This allows programming, testing and demonstration of software components without having microscope hardware available.

The information which devices and components should be controlled or simulated is held in the configuration file ActiveConfiguration.xml. Information about all available devices and components is stored in the Carl Zeiss delivered MTBComponents_XXX.xml and in the user defined UserComponents.xml. These configuration files are located in the folder: 'c:\Documents and Settings\All Users\Application Data\Carl Zeiss\MTB2004\<Version>'

All this configuration information can be conveniently edited with the configuration client MTBConfig.exe.
2 Installation

2.1 SDK/RDK: What is the difference?

The MTB2004 Installation exists in 2 different versions: The Software Developers Kit (SDK) and the Redistribution Kit (RDK).

The RDK is intended to be delivered together with your software. It contains all necessary MTB2004 components, necessary for the end user at runtime.

The SDK is only for the software development team, which signed the MTB license. It contains, additionally to the RDK, the following components: MTB2004 API documentation, simple .net and COM demo programs inclusive source code, and a comprehensive test program (MTBTest.exe) showing all MTBApi functions.

2.2 Install MTB-Server as Service?

Base of the MTB2004 is a server, that has to be running. It may be started in 2 different ways:

- Automatically as a service: the MTBServices is started automatically on booting the Operating System.
- Manually with MTBProviderConsole: MTBProviderConsole is a small console program, that starts the MTBServer and keeps it running as long as it runs itself.

Installing the MTB as a service is more convenient for the end user. For programmers it is often useful to use MTBProviderConsole, in order to stop all MTB2004 functions and to restart with a ‘clean’ system.

2.3 MTB Demo Source Codes

There are 2 demo programs delivered with the MTB2004 SDK: one for native .net applications, programmed in c#, and one for COM application programmed in c++.

For both demo programs the source code is available. By default it is installed in the directory ‘My Documents\Carl Zeiss\MTB 2004’

2.4 Do you want to copy the server dlls in another directory?

When you create own programs, it is necessary to copy the ‘MTBApi.dll’ and ‘MTBApi.dll.config’ to their execution directory. You may simply copy these files yourself, or let the installation program do this for you.
3 First steps
There are 3 steps necessary for a first demonstration of the MTB2004:

1. Start the MTBServer
2. Create a configuration
3. Start a MTB2004 client

3.1 Start the MTBServer
If you installed the MTBServer as a service (see chapter 2.2), everything is already done. Otherwise start MTBProviderConsole.exe ('MTB Provider Console' Icon on the desktop and in the start menu).

3.2 Create a Configuration
In order to create a configuration start MTBConfig.exe ('MTB Configuration' Icon on the desktop and in the start menu). The first time you start it, you may get a warning that there is no configuration available. Ignore this. Then create a new configuration, either manually with ‘New Configuration’ (in the file menu or in the context menu of the configuration tree on the left side), or, if you have already some hardware connected to the computer, with “AutoConfiguration”.

In both cases, you should get a configuration entry in the configuration tree on the left side. If you select the components in the tree, alternatives (e.g. other microscope types, other filters…) are displayed in the list box on the upper right side and properties (if there are any) may be set in the window on the lower right side (e.g. ‘Simulate Device’).

If you have a valid configuration, save it either by leaving the program with the ‘OK’ Button or by pressing the ‘Apply’ Button.

3.3 Start a MTB2004 client
A good client for testing the MTB2004 is MTBTest.exe ('MTB Test' Icon on the desktop and in the start menu).

After starting the program, press the ‘Connect to MTB’ button on the lower left side. Herewith the client connects to the MTBServer and looks for the configured devices and their components. The components found are listed in the window on the left side.

Then you may press the ‘Build User Interface’ Button. Then a user interface for controlling all components found is shown.

3.4 Create own Programs using the MTB2004
There are 2 sample applications delivered with the SDK: MTBDemoNet, a C# .net application and MTBDemoCOM, a C++ COM application. Please have a look to these applications and their source code. There you will find the schemes, how to connect to the MTB, call MTBAPI functions and getting MTB events.