Software-Update Labcycler and Labcycler 48

Version 2017-05-17, including blockprocessors M16C and M32C.

Structure of the Labcycler and Labcycler 48

The Labcycler has three processors:

- **GUI**, which runs the user interface. The software is supplied in *.x30 format and downloaded using the Monitor Program, which is pre-installed in the GUI processor and not normally touched by users. The computer program used to download GUI software is **KD3083.exe**.

- **Power**, which controls the peltier elements, the heated lid, the fans. In case of Labcycler 48 power also evaluates the block temperatures.
The power software is supplied in Motorola-format (*.mot) and downloaded via the GUI processor, which, therefore, has to have valid GUI software loaded. The computer program used to download power software is **M16CFlasher.exe**.

- **Block**, which measures the block temperatures. In case of **Labcycler 48** this is done by the power processor, there is **no block processor**.
The block software is supplied in Motorola-format (*.mot) and downloaded via the GUI and power processors, which, therefore, have to have valid GUI and power software loaded. The computer program used to download block software is **M16CFlasher.exe**.

Thus, the Labcycler-Software consists of four elements, or three in the Labcycler 48:

1. Graphical User Interface (GUI)
2. Power Software (incorporates block software in Labcycler 48)
3. Block Software (does not exist in Labcycler 48)
4. Monitor Program for GUI (not normally touched during software update)

It is recommended to update these elements in the sequence 1, 2, 3. Only if step 1 fails, please refer to step 4.
If a program is running on the Labcycler, wait until the program is finished, because obviously the program can not continue while the old software is deleted and the new one is being programmed.

System requirements for KD3083.exe:
Computer with Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 8.1 or Windows 10. Min. 256 MB RAM.

System requirements for M16CFlasher.exe:
Computer with Windows 2000, Windows XP, Windows Vista or Windows 7, Windows 8.1 or Windows 10.

0. Connecting Computer – Labcycler

a. You need a serial cable, which is 'crossed'. It is also called 'null modem'. Usually, all cables which have female plugs on both ends are of the correct type.

b. Plug the cable into the serial port on the back of the Labcycler. If the Labcycler has two serial ports, use the left port with label 'PC'.

c. Connect the other end with a serial interface of your computer if your computer has a male 9-line DSUB-connector. Serial interfaces are standardized as RS232. In the operating system, whichever you have, these RS232 interfaces are referred to as COM1 ... COMn.
If your computer does not have a male 9-line DSUB-connector, use a USB-Port with a USB/RS232-converter, which is readily available in computer shops. We recommend converters with FTDI-chip. IMPORTANT: The USB/RS232-converter must be suitable for the version of your windows system! Keep in mind that the COM-number you get depends on the USB-port that you have plugged into. Sometimes, unfortunately, the operating system sees more than one COM, while only one of them works. There seems to be no other way than trying them all, until one does work.

1. Updating Graphical User Interface (GUI)

1.1 Installation of Debugger Software KD3083

This installation has to be done only once on your computer. After that you can skip 1.1, continue with 1.2.

a. You need administrator permissions on your system to install. To download the installation tool, visit our homepage www.sensoquest.de. Go to <Downloads> <Tools>. Click on the ZIP-Package 'Installation Software' and open it. Save the files and keep the name of the memory location in mind.

b. Locate the downloaded files on your system. Double-click the debugger installation file 'KD3083_Setup_xxxx_xx_xx.exe' in which 'xxxx_xx_xx' is the version of the installation file. Follow the installation instructions.

1.2 Loading Labcycler-Software for the GUI (Graphical User Interface):

a. Connect the Labcycler to the computer and switch the Labcycler on.

b. If your Labcycler has a GUI-software version before 1.820 installed, skip the following four steps (the indented ones).

- Click <Options> and <Diagnosis> from the Labcycler-menu.

- Click <Code>, enter the digits 777 (the numbers are not shown on the display) and confirm with button <Enter>. If the code entry was correct, additional functions will become available. This code is intended as a warning: now things can be done that should not be done during normal use of the Labcycler.

- Click <GUI Pgm> to update the GUI-software. A window with the following message will be opened: 'Do you really want to install new software? Attention!! This will stop the Labcycler!'

- Click <Yes>. The Labcycler is now prepared for the download. No normal operation is possible until it is switched off and on again.

c. **Note: The M16C-Flasher software must not be open, because it would occupy the serial port!**

d. Start debugger software KD3083 by clicking the KD3083-icon on your desktop. (Alternatively you can find the debugger KD3083 in the program menu, normally in the folder 'SensoQuest'.)

e. Check the 'Port'-setting of the Init-windows. The name of the port must conform to the serial port, which you want to use. If you are not sure, try 'COM1' first.

f. Click <OK> of the Init-window. The main window of the debugger KD3083 will open. The display of the Labcycler will get dark at the same moment, because the processor will be reset. If this window does not open, an error message appears after some seconds. To solve this problem read chapter 1.4.

g. Click <File> <Download> <Load Module> of the KD3083-menue. Browse for the Labcycler-Software gn_d_ddd.x30, delivered with your update package and open it, which will start loading the program. Here d_ddd stands for the present version number, e.g. 1_822. **Attention: use gn_d_ddd_mini.x30 for the Labcycler 48!**

h. Wait for about two or three minutes as long as the 'Loading program'-window is shown. It looks as if nothing happens for a while. When the 'Loading program'-window is closed, the loading is complete. **ATTENTION: Do NOT press 'cancel' or interrupt the process otherwise, because this is the most frequent reason for chapter 4 to be executed!**

i. Close the debugger KD3083 by clicking <File> <Exit>.

j. Switch off the Labcycler.

1.3 Update from GUI versions before 2.000:

If you have updated from a version before 2.000 to one from 2.000 on, you will need a licence code to enable the Labcycler to run. This code is available from SensoQuest by email free of charge. Send the serial number of your Labcycler and you will get it. The serial number is found on the rear of the Labcycler.

1.4 Troubleshooting, Connection to Labcycler fails

If the debugger software cannot connect to the Labcycler, check the following points:

a. Start the debugger software KD3083. Check the field ‘Port’ of the Init-window. ‘COM1’ is the common value, but possibly you are using another COM. Try all offered ports, starting with the lowest number.

b. Sometimes a port doesn’t work. Plug the cable into another port. Try all port-identifier as seen above.

c. Check the following settings of the Init-window of the debugger software KD3083:

   MCU
   - MCU: M30852FJ.MCU (<Refer…>)
   - ‘Serial’.
   - Port: Select the serial port to which the Labcycler is connected, e.g. ‘COM1’
   - Baud Rate: 38400

   Debugging Information
   - Compiler: IAR EWM32C
   - Object-Format: IEEE-695

   Resume
   - Activate ‘Resume’.

d. Clarify, which serial ports are correctly installed. To do that, open the Windows Device Manager (for Windows 10: Press Windows-key + X at the same time. Then click <Device Manager>. Click <Ports (COM and LPT)>. Look at the list of serial ports (COM).
   If you can see one or more serial ports COMx, keep the identifiers in mind, for example ‘COM1’ or ‘COM9’. Restart the debugger KD3083. Set ‘Port’ of the Init-window to one of the installed Ports. Try again to connect.

e. Connect interface to the Labcycler. Start software M16C_Flasher. (How to install M16C-Flasher see chapter 2.1.) Press <Settings> to change the serial Port COMx if necessary, and then <Close>. Press <Terminal> of M16C_Flasher. Select the Baudrate to 115200. Switch on the Labcycler. After that you should get messages from the Labcycler every 20 seconds:

   ‘UpLnP.....’

   If you get these messages, your interface and cable are working correctly. If not, try all ports COMx, offered by the setting window of the M16C-Flasher software. If it still doesn’t work, plug the cable into another port and try again.

f. Make sure you have a <u>crossed</u> RS232-cable. See chapter 0.

g. Check: Is your USB/RS232-converter suitable for the version of your windows system?

h. Read the manual of the converter. Do you need to install or update the software driver?

i. Use a USB/RS232-converter with FTDI-chip.

j. Switch off the Labcycler and switch on again. Does the Labcycler display not come up again? The screen is empty? **ONLY in this case** refer to chapter 4.

k. A trivial cause might be the internal cable from socket UART1 on the GUI board to the socket 'PC' on the rear of the Labcycler having gone loose.
Since march of 2010 we have been using clips to arrest them in the socket, so that this should not happen any more, except when someone failed to re-install it after service. In older Labcyclers these cables might have come loose due to vibrations during transport.

2. Updating Power-Software

Note: The debugger software KD3083 **must not** be open, because it would occupy the serial port.

2.1 Installation of M16C-Flasher Software

The M16C-Flasher software is included in the provided software tool package, together with the debugger software KD3083. How to download see chapter 1.1.

Double-click the file M16C_Flasher_Setup.exe. Follow the installation instructions.

2.2 Connecting Computer – Labcycler

If not yet done, connect your computer to the Labcycler as explained in chapter 0.

2.3 Flasher Settings and Start

a. If not yet opened, start the M16C-Flasher. You can find it in the windows program menu, normally in the folder 'M16C-Flasher'.

b. Please check the following settings and change them if necessary.

Main Window
- Select the radio button 'M16C80/M32C'.

Settings
- If necessary, select the correct serial port which you want to use, e.g. 'COM1'.
- Baud Rate: 9600

2.4 Preparing the Labcycler

a. Switch on the Labcycler.

b. Click <Options> and <Diagnosis> from the Labcycler-menu.

c. Click on <Code>, enter the digits 777 (the numbers are not shown on the display) and confirm with button <Enter>. If the code entry was correct, additional functions are

available. This code is intended as a warning: now things can be done that should not be done during normal use of the Labcycler.

d. Click on <**Pwr** Pgm> (!) to update the power-software. A window with the following message will be opened:

e. 'Do really want to install new software? Attention!! This will stop the Labcycler!'

f. Click <Yes>. The Labcycler is now prepared for the download. No normal operation is possible until it is switched off and on again.

2.5. Loading Power-Software

a. Click <Connect> from the M16C-Flasher-menu (computer). If the devices are connected, the message 'Check Ok' will be displayed. If not, check the settings as seen in chapter 2.3. Did you select the correct port identifier 'COMx'? Try all offered ports, starting with the lowest number. Then, if possible, plug the cable into another port and try again. If it still doesn't work, see chapter 1.4.

b. Click <Prog> from the M16C_Flasher-menue. Browse for the Labcycler Software p_d_ddd.mot, or p_d_ddd_mini.mot for the Labcycler48, delivered with your update package and open it. Again d_ddd stands for the present software version, e.g. 1_810. **ATTENTION: do NOT install p_d_ddd.mot in the LabCycler48, because this will create a condition that requires the cycler to be sent to the manufacturer!**

c. Wait for about one minute until the message 'Programming Ok' will be displayed.

d. Switch off the Labcycler.

e. Close the M16C_Flasher in any case to prepare for the next step.

3. Updating Block-Software (not in Labcycler48)

3.1 Connecting Computer – Labcycler

If not done, install the connection between Labcycler and the computer as explained in chapter 0.

3.2. Starting the Flasher

Restart the M16C-Flasher from your Windows-Program-Menu. (**M16C-Flasher has to be shut down after updating the power-software, because otherwise it would try to load the power-software again, this time into the block processor!**)

3.3 Preparing the Labcycler

a. Note the serial number of your block, which you find on the label on the side of it. You will need that later to define the correct version of the block software.

b. Switch on the Labcycler.

c. Click <Options> and <Diagnosis> from the Labcycler-menu.

d. Click on <Code>, enter the digits 777 (the numbers are not shown on the display) and confirm with button <Enter>. If the code entry was correct, additional functions are available.

e. Click on <**Blk** Pgm> to update the block-software. A window with the following message will be opened:
'Do really want to install new software? Attention!! This will stop the Labcycler!'

f. Click <Yes>. The Labcycler is now prepared for the download.

3.4. Loading the Block-Software

a. Click <Connect> from the M16C-Flasher-menu. If the devices are connected, the message 'Check Ok' will be displayed.

b. Click <Prog> from the M16C_Flasher-menue.

c. From version 2.520 on there are two versions of the block software: b_d_ddd_M16C.mot and b_d_ddd_M32C.mot. They run on different versions of the block processor. Use the previously noted serial number of your block to define which version you need: the serial number has 10 digits. If the seventh (or fourth last) is a '0', use b_d_ddd_M16C.mot. If it is a '1', use b_d_ddd_M32C.mot.

d. Browse for the correct version of the Labcycler Software, delivered with your update package and open it.

e. Wait for about one minute until the message 'Programming Ok' is displayed.

f. Switch off the Labcycler.

g. Close the M16C_Flasher.

h. Restart the Labcycler for testing the software update.

i. Click <Help> and <About> from the Labcycler-menu. Check the software version numbers.

4. Updating the Monitor Software for the Graphical User Interface

These steps are ONLY necessary if:

- case 1: The Labcycler display remains dark after switching off and on.
  This can happen if a software download to GUI is interrupted or cancelled for any reason. In these cases the monitor program in the processor could be damaged and would have to be reloaded. This only applies to GUI. If downloading to power or block is interrupted, the download can always be re-started, because GUI has full control of the programming mode in power and block.

- case 2: Wrong GUI software. Labcycler 48 software is in the Labcycler or vice versa. You still have a working monitor, but you are not able to activate the GUI software update mode with the buttons <Options>, <Diagnosis>...

In these cases the debugger software KD3083 does not get access to the Labcycler processor. Follow the steps to install the monitor software anew:

a. Open the Labcycler according to chapters 5 or 6, depending on type.

b. The GUI processor is under the front cover in both types of Labcyclers, that means under the display. Identify the three pins 'ST1' on the board. They can not be confused because they are the only of their kind.

c. You need a short-circuit-jumper, which is a usual item with computers.

d. **For Labcycler:**
   Put the jumper across the center and right pin, as viewed onto the component side of the board and from the front of the Labcycler. This enables the bootload after power up.
   Be sure to follow the precautions under 5.2!

   For Labcycler 48:
   Put the jumper across the center and upper pin. This enables the bootload after power up.

e. Use the M16C-Flasher-program to load the monitor program jmon32_P_1_300.mot. The procedure is similar to chapter 2 'Updating Power Software' as follows:
   - chapter 2.1 in the same way.
   - chapter 2.2 in the same way.
   - chapter 2.3 in the same way.
   - chapter 2.4: Switch the Labcycler on. Nothing more.
   - chapter 2.5: Use the monitor program instead of power software.

f. The Labcycler must be switched off. Remove the jumper on 'ST1' and switch on again. Nothing will appear on the display so far, because this needs the software that is now to be installed with KD3083.

g. Start debugger software KD3083 (see chapter 1). You should get access to the Labcycler processor as usual and be able to program the GUI software. Everything should be returned to normal.

h. Close the Labcycler according to 5.3 or 6.3, depending on type of cycler.

5. Opening and closing the Labcycler (not Labcycler 48)

5.1: Opening:

a. IMPORTANT: Disconnect the Labcycler from the mains power!

b. IMPORTANT: wait for at least 15 minutes for the HIGH-VOLTAGE-CAPACITORS to discharge! Omitting this step can result in electric shock as well as damage to the equipment!

c. Take out the block.

d. Unscrew the 6 screws in the bottom plate and remove the plate (a grounding connector has to be pulled off for that).

e. Set the machine upright again, open the lid, pull up the white cover carefully while pushing the two arresting pins for the lid in until the cover snaps over the pins.

f. Then further lift the cover CAREFULLY, paying attention not to get the rear slots in the cover in contact with the blue rear carriers of the lid, because this could damage the paint on the blue carriers. This is the most tricky part of the operation and may require some force to pull the cover sufficiently forward, i.e. away from the carriers. Work with the fingers of both hands on the rear of the white cover and the thumbs pressing against the open lid to secure enough distance.

g. When the cover is free, mind the two cables connecting it to the chassis: they go into the top and bottom sockets in the column of 4 sockets on the processor board and have 10 respectively 16 wires, so they can not be confused during reassembly.

5.2: When Labcycler is Open:

Make sure nobody is able to touch the components on the PFC-board, which is the one hanging upside down in the shielded compartment, only accessible from the bottom of the Labcycler.
ATTENTION: when powered up, there will be nearly 400 V between the components in this compartment, involving the risk of electrical shock as well as damage if touched or brought into contact with electrically conducting objects!

5.3: Closing the Labcycler:

a. ATTENTION: before trying to reassemble the Labcycler, keep it disconnected from the power line for at least 15 minutes for the capacitors on the PFC-board (see above) to discharge.
Omitting this step can result in electric shock as well as damage to the equipment!

b. Reassemble the cover, bottom plate and block. Do not forget to reconnect the grounding cable on the bottom plate!

6. Opening and closing the Labcycler 48

6.1: Opening:

a. IMPORTANT: Disconnect the Labcycler 48 from the mains power!

b. Unscrew the 6 screws in the bottom plate.

c. Set the machine upright again, open the lid, pull up the white housing carefully.

d. When the cover is free, mind the cables connecting it to the chassis.

6.2: When Labcycler 48 is Open:

Other than with the big Labcycler, no dangerous voltages lie open, but still make sure that no electrically conductive parts can touch the circuitry, and do not touch it yourself, because there is a risk of causing damage through electrostatic discharge.

6.3: Closing the Labcycler 48:

Reinsert all connections that you might have separated, put the housing back onto the chassis and insert the six screws.