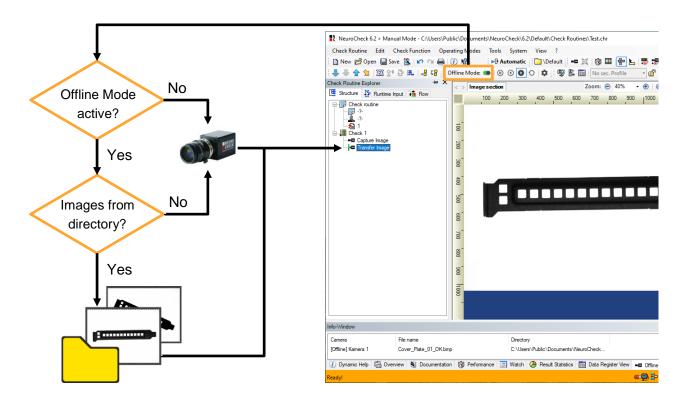| Author:	NeuroCheck GmbH, E-mail: support@neurocheck.com
Contents:	This white paper will give tips on how to use Offline Mode in the NeuroCheck software.
Notes:	This document is not part of the official product documentation of the NeuroCheck software.
	NeuroCheck GmbH does not accept responsibility for the correctness, accuracy or completeness of the information provided in this document.

Table of contents:

1. Introduction

Operating the standard software NeuroCheck on industrial PCs has proven its worth for years.

However, there are some constellations in which it is desirable to edit an existing NeuroCheck project without the "real" hardware (cameras, fieldbus & digital I/O) at a workstation and to be able to execute the check routine without hardware access errors.

In addition, the use of missing software connections (e.g. database) can be ignored and skipped in offline mode.

2. What are the benefits of Offline Mode?

With the offline mode, you can execute check routines at your workstation even if you do not have access to the configured hardware. Possible use cases can include analyzing previously saved (error) images or optimizing the cycle time of a check routine.
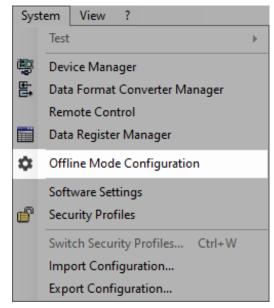
3. Offline Mode in a nutshell

1. Use NeuroCheck software 6.2 from version 6.2.17.
2. In the "Offline Mode Configuration" (System > Offline Mode Configuration), configure an offline mode behavior for each necessary device of a supported device category.
3. Activate offline mode (Operating modes > Offline mode).
4. Execute the check routine.

4. Detailed description of using Offline Mode

Before you can use the Offline Mode, you must first create an Offline Mode configuration. To do this, open the "Offline Mode Configuration" dialog via the NeuroCheck menu.

Open configuration dialog via the system menu

Open configuration dialog via toolstrip element

(1)   Configuration of the Offline Mode

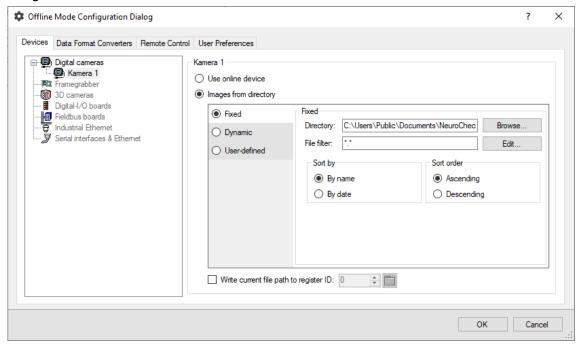In the configuration dialog, there are four tabs in which different settings can be made:
- Devices
- Data Format Converter
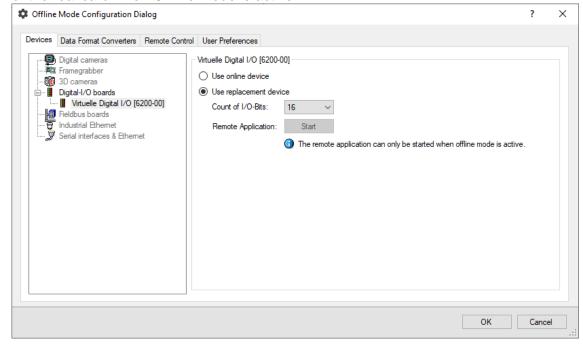- Remote Control
- User Preferences

(1) Devices

Digital cameras, Framegrabber & 3D cameras

For cameras, images can be configured that are returned by the cameras when offline mode is active. Each execution of the "Capture image" check step switches to the next image file.
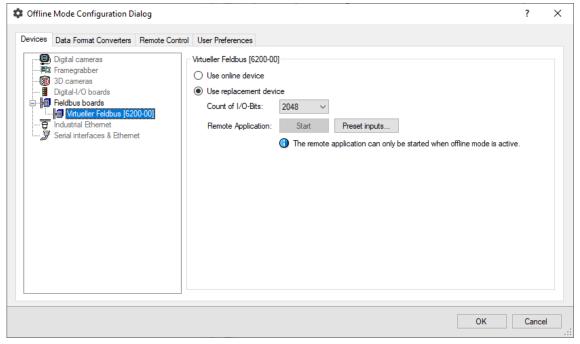

Digital-I/O boards

For digital I/O boards, a (virtual) substitute device can be configured to be used instead of the real card when Offline Mode is active.
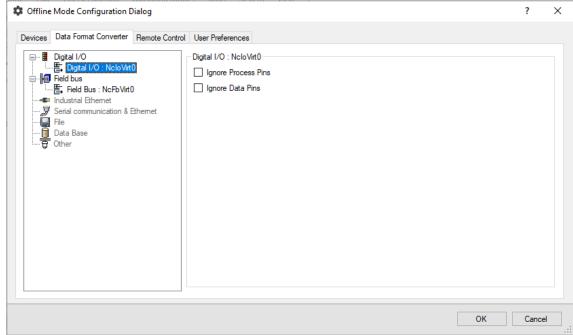
Fieldbus boards

For fieldbus boards, a (virtual) substitute device can be configured to be used instead of the real card when Offline Mode is active.
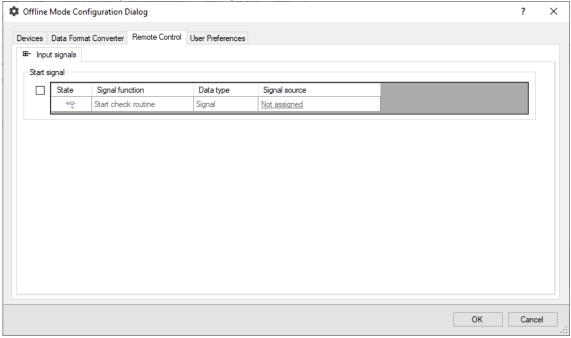

(2) Data Format Converter

The channels of data format converters can be configured to ignore and thus skip the reading and writing of pins in the active Offline Mode.
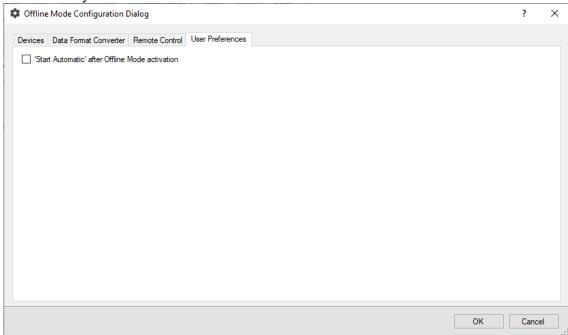
(3) Remote Control

A different start signal can be configured for the active Offline Mode.

(4) User Preferences

When the Offline Mode is activated, the "Start automatic" command should be executed automatically.

(2)   **De-/activation of the Offline Mode**

Offline Mode can be (de)activated both in manual mode and in automatic mode. In **manual mode**, the button in the "Offline Mode" tool strip element or the "Operating Modes" menu can be used for this purpose.

In **automatic mode**, the commands for activating or deactivating offline mode can be stored in a control panel menu or called up from control panel function keys with the button type "Direct function call".

The Offline Mode activation state can only be changed in automatic mode if NeuroCheck is in the idle state.

(3)   **Control of Offline Mode image sources**

When cameras in Offline Mode are replaced by image files, the sequence of these image files can be controlled. The image advance can be paused, the order of the images can be reversed and the list of images can be reset.
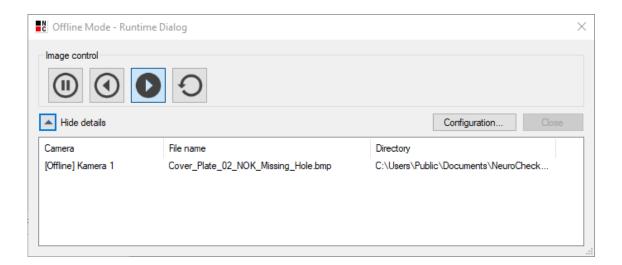
In **manual mode**, some buttons in the "Offline Mode" toolstrip element are available for this purpose.
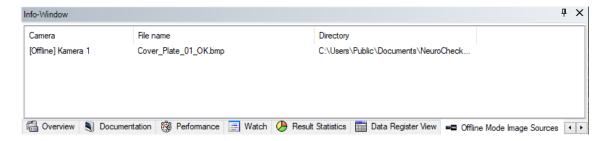

If the image files are **paused**, the check routine can be executed several times with the same image file. In this case, the execution of the "Acquire image" check function does not switch to the next file.

The same buttons can also be found in the "Offline Mode Runtime Dialog", which is displayed when Offline Mode is activated in **automatic mode**. The "Configuration..." button can also be used in automatic mode to open the offline mode configuration dialog and make changes to the configuration.

The "Show details" button can be used to display all cameras with their currently active image file in a list. This allows you to see at a glance which image files are being used in the current check routine execution. The same list of cameras can also be found in the "Offline Mode Image Sources" info window of the manual mode.

(4) Other new features

(1) Process View

The **LED** element can visualize the new output signal "Offline mode active" (see chapter 4(4)(2)).

The elements **counter**, **result rate tachometer**, **diagram** and **measurement history** offer the new property "Update mode". This can be used to define which counter behavior the elements should show:

- *Current Mode (Online or Offline)*:

  Uses the execution statistics in the current mode.

- *Total (Online and Offline)*:

  Uses the execution statistics of both modes.

- *Online*:

  Uses only the online execution statistics.

- *Offline*:

  Uses only the offline execution statistics.

(2) Remote Control

New output signal "Offline Mode active", which is set to HIGH when Offline Mode is active. The signal can and should be used to control the regular operating mode from the PLC.

(3) Security Profiles

New permissions for using the offline mode functionality.
- Manual mode: Offline Mode: activate and deactivate
- Automatic mode: Offline Mode: activate and deactivate
- System configuration: Offline Mode

(4) Check function: „Get System Information"

The check function "Get system information" enables the current activation state of the offline mode to be written to a register cell. The new value is located under "NeuroCheck" > "Operating mode" > "Offline mode active".

5. Appendix: Remarks and Restrictions

(1)   Use of multi-instances

When using NeuroCheck multi-instances, it should be noted that devices used in several instances should have the same offline mode configuration, otherwise unexpected behavior may occur. Furthermore, it is recommended to avoid mixed operation of "Online Mode" and "Offline Mode" instances.

(2)   Use of multi-frame image files

If you use multi-frame image files (*.tiff) to store (error) images and want to use them in Offline Mode, you have to load the individual image layers manually from the tiff container. We offer this functionality in the "PI_ImageTools" plug-in.

The following procedure is recommended:
1. Create new register cells.
   - Cell 0: Boolean
   - Cell 1: Boolean
   - Cell 2: String
2. Create a virtual camera that loads the image files in Offline Mode. Specify the desired directory and file filter (e.g. *.tiff) for this camera in the offline mode configuration. Also write the file path of the current file to the register with ID = 2 (see Figure 1).
3. Create two individual checks. One for „Online image capture" from the real device and one for „Offline image capture" from the multi-frame image file.
   a. In the „Online image acquisition" the images can be drawn in regularly from the real hardware and the stored in the data tray.
   b. In the „Offline image acquisition" a check function of the type „Acquire image" must be configured, which takes an image of the virtual camera. In the active Offline Mode, the path of the current file is written to register 2 each time an image is captured. All frames of this file are then copied to the NeuroCheck data tray using the „Load Multi-Frame Image to Tray" check function of the „PI_ImageTools" plug-in (see Figure 2).
4. At the beginning of the check routine, write the current Offline Mode activation state to register 0 via the check function "Get System Information" and write the inverse of it to register 1 with the check function "Modify Data in Register".
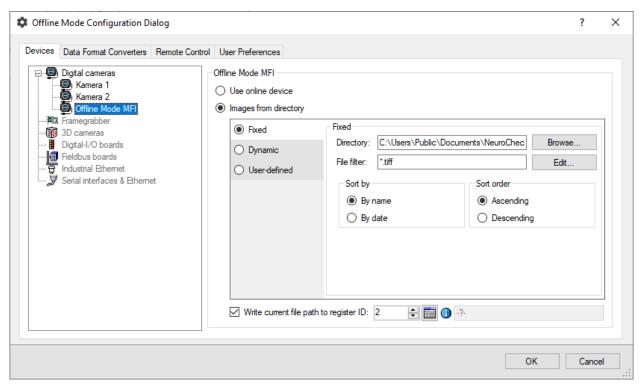5. Activate the two individual checks from point 2 depending on the register values of cell 0 and 1.
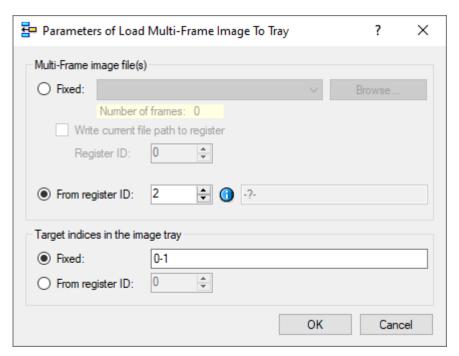
Figure 1: Multi-Frame Image Kamera
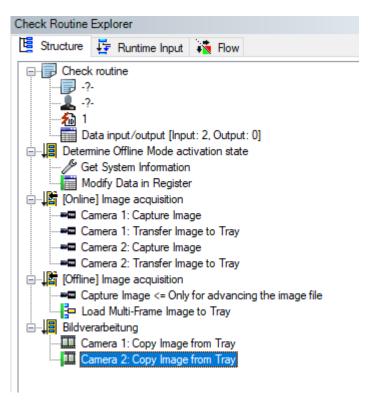

Figure 2: Load Multi Frame Image to Tray

Figure 3: Check routine