

**Replacing a NeuroCheck FireWire (NCF, FWX) camera
by a NeuroCheck GigE (NCG) camera**SE-CG-353-EN
May 8, 2017

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Content: This whitepaper describes the process to replace a NeuroCheck NCF or FWX-FireWire camera by a NeuroCheck NCG Gigabit Ethernet Camera. It contains descriptions of all necessary steps: From the choice of hardware-components to the software configuration.

The most common use cases for replacement are:

- Reorganizing the planning of new systems/duplicates
- Replacement because of a defect of an old camera
- Preventive replacement of all old cameras
- Adding NCG cameras to a system with NCF cameras

Note: 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.

Status: 8th of May 2017



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1. Introduction

The digital cameras of the NeuroCheck NCF and FWX series based on the FireWire interface (IEEE1394a/b) were highly popular by customers for many years.

However the NCF and FWX series were discontinued, additionally the distribution of the FireWire interface in modern computer decreases more and more in the last several years.

As successor or replacement of these cameras there are the equally high-class digital cameras of the NeuroCheck NCG series, based on the widely spread Gigabit Ethernet interface.

For many models of the NCF series there is an equivalent model of the NeuroCheck NCG series that is identical in the chips, the resolution and the case measurements.

Please note: Digital cameras of the old NeuroCheck FWX series, based on the FireWire-a interface (IEEE1394a) are not that easy to replace, as their equivalent type of the NeuroCheck NCG series differs in its case measurements.

This document gives recommendations for the preparation and the execution of the replacement from NCF/FWX to NCG cameras for following four scenarios:

- Reorganization of the planning of new systems/duplicates from NCF/FWX to NCG.
- Defect of a NCF/FWX camera on a productive system enforces an immediate replacement.
- Preventive replacement of all NCF/FWX cameras by NCG cameras.
- Expanding a system by adding new NCG cameras whilst keeping several NCF cameras inside the system.

All hints of this document relate to the NeuroCheck Software version 5.1, 6.0 and 6.1 in the same way, if not marked otherwise.



2. Summary of the single steps

1. Chose appropriate camera model (NCF1xx→NCG2xx)
2. Order additional hardware components (network card, ethernet cable, power cable)
3. Save the software configuration state NCF (camera setup, reference images)
4. Rebuild hardware components (remove FireWire camera, install GigE)
5. Install drivers (network card, NCG camera, filter driver,...)
6. Configure NCG camera (IP-address,...)
7. Integrate new camera into NeuroCheck software
8. Configure camera setup
9. Readjust new camera with reference images (orientation, focus, aperture,...)

3. Selection of the hardware components

3.1. Camera

For many types of the NCF series there is an equivalent type of the NeuroCheck NCG series that is identical in the chips, the resolution and the case measurements.

The suitable model can be identified easily with the help of the model number.

You have to replace the “NCF1” by “NCG2”. For example: NCF114 → NCG214.

Note: For some types of color cameras there will be small differences in pixel resolution.



3.2. Network card

There are special GigE-Adapter cards necessary for the using NCG cameras.

The following order numbers belong to the components which are recommended by NeuroCheck GmbH and which have proven in long-term practical application (please check if the possibly old operating system supports the board) :

- For PCI-Express Slot:
 - With 1 port → NET-0010
 - With 2 ports → NET-0002
 - With 4 ports → NET-0004
- For PCI Slot:
 - With 1 port → NET-0011



3.3. Ethernet cable

NeuroCheck GmbH recommends the usage of high-quality Cat-6 Ethernet-cables, which have proven in long-term practical application. The order numbers are:

- Cable for unmoved camera:
 - 5m → NWK-0005
 - 10m → NWK-0010
- Cable suitable for drag chain:
 - 5m → NWK-0105
 - 10m → NWK-0110



3.4. Additional: Power supply cable

Some models of the NCG cameras support „PoE“ (Power over Ethernet), these models do not need additional power supply.

If this is not specified in the data sheet of the camera, you need an additional supply cable with a M8x1 / 3 pole plug.

The order numbers of components that are recommended by NeuroCheck GmbH are:

- Cable for power supply:
 - 5m → BOE-0002
 - 10m → BOE-0003

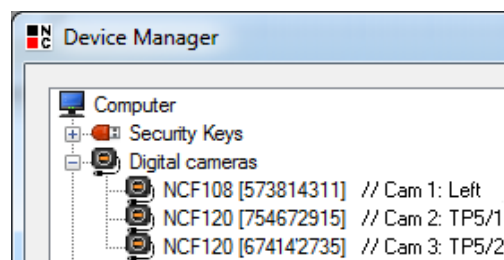


Do not forget a suitable power supply unit, if no busbar is used!

4. Preparation of the software

4.1. List of cameras

If you have several cameras in one system, you should create a screenshot of the NeuroCheck device manager at first. This is essential as you have to recreate the correct order of the cameras from this screenshot afterwards. Please pay attention that all descriptions are visible on the screenshot so that you can assign them afterwards definitely.



4.2. Camera setup

During the camera replacement, all software configurations (for example exposure time, trigger, camera specific configurations, ...) of the old camera have to be transferred to the new camera. All these configurations can be exported from the NeuroCheck software with the help of the camera-setup file. Please open therefore the NeuroCheck device manager, chose the camera that should be replaced, chose "Camera Setup: Export..." and create the camera-setup file on the hard disk.

If you have several cameras in your system, you have to create a camera-setup file for each camera separately. Please choose appropriate names for the exported files in order to be able to create a definite assignment from the file to each camera position.

Please note that an export of the camera-setup is not possible if the camera to be replaced is defect. This is why an export of the camera-setup file should be done after the finishing of the installation of your system in any case.

4.3. Reference images/ setup images

During replacement of a camera the mechanical parameters (position, orientation, rotation angle, focus, aperture,...) have to be restored afterwards.

NeuroCheck reference images that were taken with the old cameras help you to restore these parameters for the new camera. Please open therefore the dialog "Reference images" and save them inside a Check Routine:

- NeuroCheck 5.1: Menu item Check Routine ► Reference images
- NeuroCheck 6.0/6.1: Check Routine ► Properties ► Diagnostics ► Reference images

For each camera save at least one reference image which contains a sample part to inspect under real conditions.

Please note, that a creation of reference images is not possible if the camera to be replaced is defect. This is why the creation of reference images should be done after the finishing of the installation of your system in any case.

5. Execution of the replacement

5.1. Update the Software version

1. All NeuroCheck software versions 6.0 and 6.1 can identify GigE cameras automatically. In software version 5.1 the support for GigE cameras depends on the software version: This is possible from version 5.1.1087[SP11] on. If you have an older version installed you have to update your installation at least to this version.
Please download the newest NeuroCheck 5.1 Service-packs here:
www.neurocheck.com ► Service/Support ► Downloads ► Software Updates and Drivers ► NeuroCheck 5.1 ► NeuroCheck 5.1 Service Pack 12

5.2. Remove NCF/FWX from the NeuroCheck Software

1. Please check if you have exported all necessary camera configurations from the NeuroCheck device manager and if they are ready to use.
2. Delete the NCF/FWX cameras that you want to replace by NCG cameras from the NeuroCheck device manager by selecting the camera in the device manager and applying the button "Remove".
3. Close the NeuroCheck software, shut down the operating system and your computer and remove the power cable of the computer from the power supply.

5.3. Rebuild hardware components

1. Note: Mixed operation of FireWire boards and Ethernet network cards is possible.
2. Possibly apply labels for identification to all new NCG cameras.
3. Disassemble all NCF/FWX cameras that you want to replace.
4. Disassemble FireWire cable.
5. Remove the FireWire card from your computer.
6. Mount the Ethernet network card in your computer. If you have PoE (Power over Ethernet) network card, connect the Molex-plug.
7. Lay the Ethernet-cable from the computer to the camera position.
8. If you replace a FWX camera and not a NCF camera with a NCG camera, you should now install an appropriate intermediate adapter at the camera mount so that the image field of the new camera is identical to the image field of the old camera.
9. Exchange the lens from the old to the new camera. If possible use the fixture screws to keep the configurations of the aperture and the focus.
10. Install the NCG cameras at the old positions of the NCF/FWX cameras.
11. Connect network cable to the NCG camera.
12. If the camera is not suitable for PoE (Power over Ethernet), lay a power cable from the bus bar to the NCG camera and connect it (3-pole plug).
13. If necessary connect trigger/flash cable to the NCG camera (4-pole or 8-pole plug).

5.4. Install drivers

1. Note: Mixed operation of FireWire and NCG drivers is possible.
2. Use the NeuroCheck driver package for the „NCG series GigE Cameras“. You can download it from:
www.neurocheck.com ► Service/Support ► Downloads ► Software Updates and Drivers ► Chose the NeuroCheck version (Here example state from March 2017):
 - NeuroCheck 5.1: „GigE_Nc51SP12d.zip“
 - NeuroCheck 6.0: „CameraDriver_NCG_NCF_FWX_NC60SP6plus_6_0_55.zip“
 - NeuroCheck 6.1: „CameraDriver_GAPI25_NCG_NCLG_NCCG_6_1_08.zip“
3. Extract the zip-package on your local hard disk. It contains several subdirectories with drivers that have to be installed. For the following steps you need a windows account with administrator privileges. Please be sure that the NeuroCheck software is closed during the execution of the following steps.
4. Copy the drivers for the NCG cameras:
 - NeuroCheck 5.1: Copy all files from the subdirectory „NcDriver“ into the NeuroCheck 5.1 installation directory („C:\Program Files\NCheck51“). Overwrite exiting files.
 - NeuroCheck 6.0/6.1: Chose from the subdirectory “NcDriver” the package of that directory that fits the bitness of your operating system (32-Bit/64-Bit) and copy all files to the NeuroCheck 6.0/6.1 installation directory („C:\Program Files\NeuroCheck 6.0/6.1“). Overwrite exiting files.
5. Configure the network adapter (Jumbo-Frames, receive buffer, subnet). Please see for detailed description the whitepaper „SE-CG-241 Checklist for using NCG cameras.pdf“.
6. Each driver package contains a „Readme.txt“ file with instructions to the installation. Please follow these instructions.
7. Install low level driver of the camera. Each driver package contains a help file with detailed instructions for the installation:
 - NeuroCheck 5.1: In the subdirectory „NcDriver“ of the package the file „NcGeBoGe.chm“.
 - NeuroCheck 6.0 and NeuroCheck 6.1 until version 6.1.11: In the subdirectory „HelpFile“ of the package the file „NcDc.Baumer.UI.NET.chm“.
 - NeuroCheck 6.1 from version 6.1.12 on: In the subdirectory „HelpFile“ of the package the file „NcDc.NeuroCheck.BO.UI.chm“.

Please follow these instructions carefully.
8. For stable running of GigE cameras, special filter drivers are necessary. Please install these filter drivers with the tool “DriverManager.exe” and check the successful installation in the properties of the network adapter. The filter drivers have to be activated separately for each network adapter that is connected to a NCG camera.

5.5. NCG Camera: Configure IP-address

Each NCG camera needs a fix and unique IP-address in order to be usable for NeuroCheck software. The first three parts of the IP-address (the so called “subnet”) have to be identical to the IP-address of the network adapter, to which the camera is connected to.

To configure the IP-address use one of the following tools best:

- NeuroCheck 5.1: From the subdirectory “NCP IP-Configuration“ of the driver package either the „Command Line Tool“ or the “WindowsAppliaction Tool“.
- NeuroCheck 6.0: From the subdirectory “GigE \ NCP IP-Configuration” of the driver package the “NCG IP configuration tool”
- NeuroCheck 6.1 until version 6.1.11: The tool “NCG_IP-Configuration.exe“ from the directory of the software installation (“C:\Program Files\NeuroCheck 6.1“).
- NeuroCheck 6.1 from version 6.1.12 on: The tool “CameraIPConfigurator.exe“ fom a subdirectory of the software installation (“C:\Program Files\NeuroCheck 6.1\Tools\NcCameraIPConfigurator\“)

5.6. Integrate the NCG camera into NeuroCheck software

1. Start NeuroCheck software and open the NeuroCheck device manager.
2. Apply the button “New...” for the integration of new camera. Chose the category „Digital camera“ and select the driver for “NeuroCheck NCG Gigabit-Ethernet” cameras.
3. On the last page of the wizard, select the NCG cameras that should be integrated.
4. If the list is empty or the integration of the cameras fails, check the success of the driver installation in the NeuroCheck device manager with the help of the About dialog of the device manager. Check if all steps described in the help file of the driver were executed successfully.
5. If the NCG camera has been integrated successfully: Remove all old NCF/FWX cameras from the list, if not already done.
6. Restore the original order of the cameras:
 - NeuroCheck 5.1: Command „Move up/Move down“ from the context menu (right mouse button) on one camera of the list.
 - NeuroCheck 6.0: Command „Move up/Move down“ from the context menu (right mouse button) on one camera of the list.
 - NeuroCheck 6.1: Use the buttons with the blue arrows.



5.7. Configure camera-setup

1. In order to configure the properties of the new cameras you have to select the camera in the NeuroCheck device manager and select the button "Properties...".
2. In the dialog that opens „Camera Properties“ you have to configure all properties manually. Please use the a priori exported camera setup file to assist you: You can open the file with the help of the Internet Explorer and print it. Most of the properties can be transferred 1:1 from a NCF to a NCG camera.
3. Also configure the new properties of the NCG cameras in the section "GigE Communication". Again see for detailed description the Whitepaper „SE-CG-241 Checklist for using NCG Kameras.pdf“.

5.8. Readjust the camera with reference images

1. Check the new camera with the help of the reference images created before. You can use the dialog "Adjust camera" to compare the actual live image with a reference image. Open it via menu Tools ► Adjust camera.
2. If necessary perform a mechanic fine adjustment to the camera: Position, distance, orientation, angle,...
3. If necessary perform a optical fine adjustment to the camera: Aperture, focus, ...
4. If necessary you have to adjust the configuration in the NeuroCheck device manager again: Exposure, gain, white balance...
Please note though that these values are not taken into account in case of a configured automatic exchange of the camera-setup file during run-time.
5. If you replace a FWX camera you probably have to adopt your check routine, because of the differing dimensions of the cameras.
6. If you had to use a camera with a deviating pixel resolution, you will have to adopt your check routine now.