



Doc.-Name	OM KCC X and IP Configurator	Author	Mertens	Rev.	C	Kappa 
Doc.-No.	905-119069	Date		Vers.	01	


Operation Manual KCC-X based on SDK-X and IPConfigurator

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Abbreviations	
KCC-X	Kappa Camera Control
FE	Flight Eye
API	Application Programming Interface
SW	Software
HW	Hardware
TBD	to be defined
OS	Operating System i.e. Windows 10 Professional 64bit

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1 Introduction

1.1 Objective

This document describes the usage of the demo software product delivered by Kappa to adjust and configure your SDK-X compatible devices.

The KCC-X and the IP-Configurator are both demo applications based on the Kappa SDK-X, which is also available to your developers to integrate the same functionality into your own application solution.

1.2 Supported devices

The following devices are currently supported:

- FE320
- FE350*
- More to follow

* depending on the firmware, a separate XML file is necessary which will be provided with the SDK-X.

1.3 Short description of the software (SW)

The KCC-X is a generic software which generates a list of all included functions of the connected device (so-called features).

The features are defined by a feature-map which will be provided by the device itself during the connection process. This list may differ from software releases and/or devices.

1.4 Application Programming Interface (API)

The features of a device can also be accessed by a Kappa software development kit (SKD) which can be acquired through the Kappa download portal.

It is called SDK-X and gives your developer the opportunity to implement it into your software application solution.

1.4.1 SDK-X

Kappa's software development kit (SDK-X) uses the feature list functionality which is provided by the device itself. Therefore, it is easier to configure the device because there is no need to operate directly on register addresses (Communication ICDs) like former SDKs by Kappa did.

Hint: For trouble shooting, the SDK-X provides a logfile which can be found at:


%AppData%/Kappa/SDK.X

1.4.2 Supported communication protocols

The Kappa SDK-X is based on the GEN<i>CAM GenTL (generic transport layer) by EMVA and includes three communication protocols:

- GigE Vision®
 - ➔ used i.e. for IP cameras like the FE310, FE320 and FE350
- GEN<i>CAM GenCP (generic control protocol)
 - ➔ used for serial communication like the Tauri 3
- USB3 Vision® interface
 - ➔ used for FDC-S USB

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1.4.3 Supported platforms and implementation help

The SDK-X will be shipped with several simple examples in source code and in order to facilitate usage and functionality of the devices.

Those samples consist of at least:

- how to connect to a device
- how to configure
- how to acquire an image
- and many more

Most of the samples represent Windows and UNIX.

Supported platforms are

- Windows 7+ (32bit/64bit)
- Ubuntu / Debian 9+

Do you need help with the implementation or do you need a specific platform?

Please do not hesitate to contact our sales team.

1.4.4 Download / supplier

The SDK-X can be downloaded separately on the Kappa Homepage:

<https://www.kappa-optronics.com/en/about-kappa/service/downloads.cfm>

2 IPConfigurator

Kappa-devices are delivered with factory default settings which might not suit your network configuration. If the network/subnet does not fit, the KCC-X will not show the device.

If this is the case, the IP settings have to be adjusted with the "IPConfigurator"-application to your network configurations.

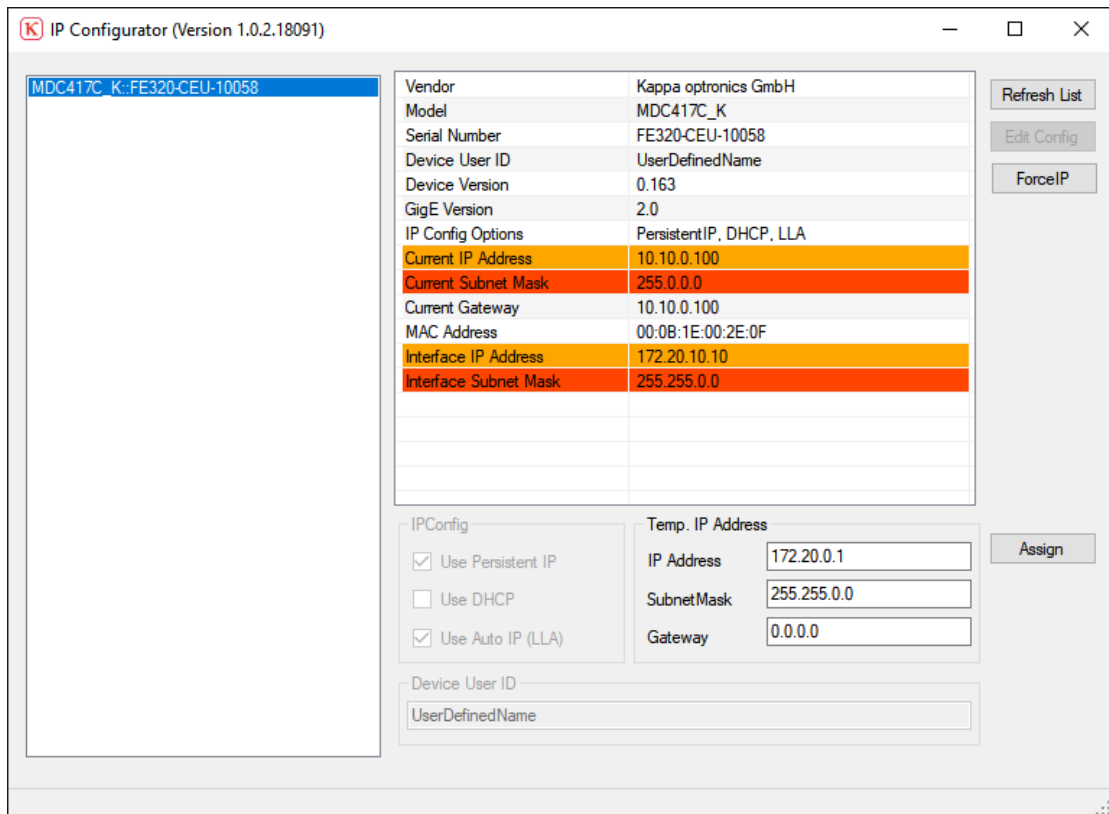
2.1 Temporary IP change

In order to change the IP of the device temporarily (IP will be reset after reboot or power loss), do the following:

1. Open „IPConfigurator“
2. Click „Refresh List“
3. Select the device from the list on the left by clicking on it
4. Change „Temp. IP Address“ settings to your needs

HINT: It is only possible to pull the device to your subnet (your PC has „Interface IP Address“, the device has „Current IP Address“), not to any other subnet.

5. As depicted, the mismatch of IP settings will be highlighted in terms of color:

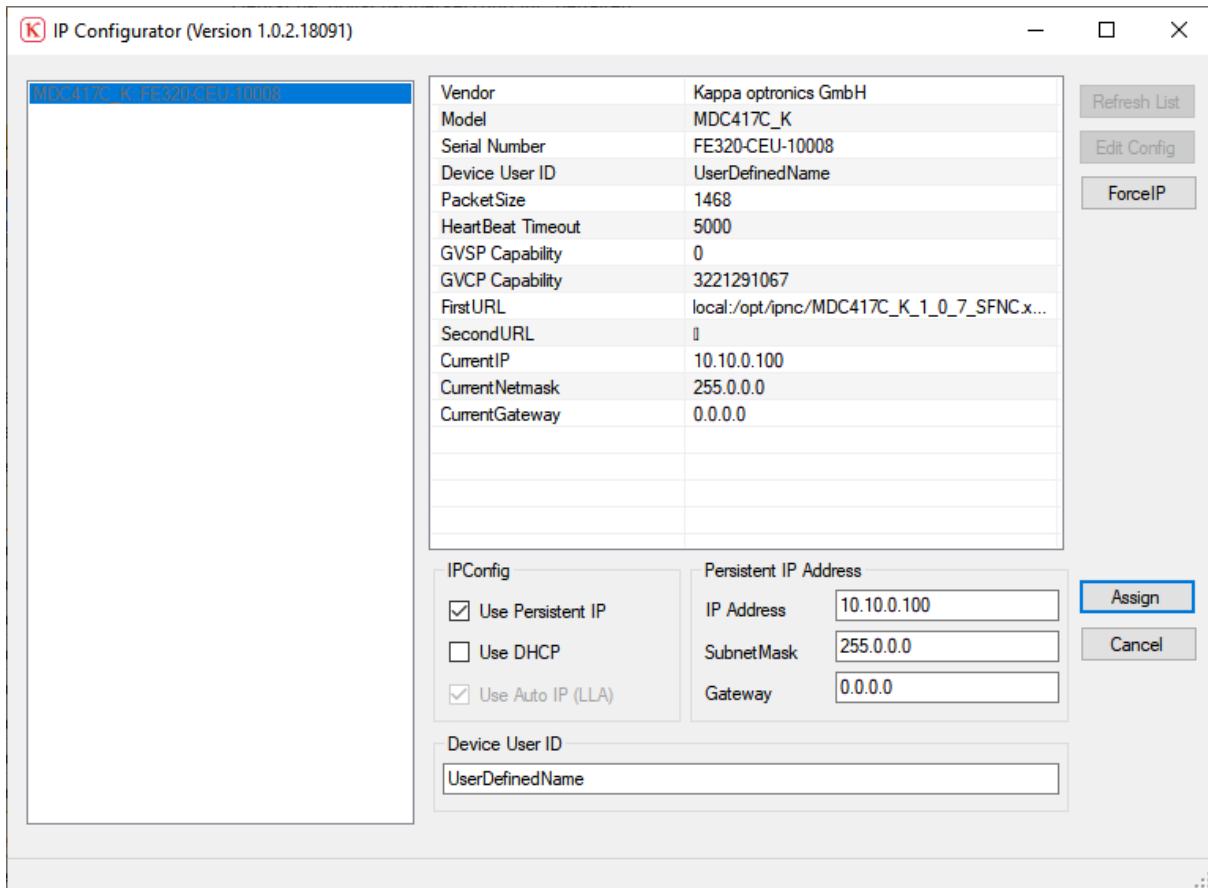


6. Change „Temp. IP Address“ to your IP/subnet settings (e.g. 172.20.0.12)
7. Click „Assign“
8. Click „Refresh List“ to check if the setting has been adapted

2.2 Persistent IP Change

In order to change the IP of the device permanently (IP will be kept after reboot or power loss), do the following:

1. Open „IPConfigurator“
2. Click „Refresh List“
3. Select the device from the list on the left by clicking on it
4. Click „Edit Config“



The screenshot shows the 'IP Configurator (Version 1.0.2.18091)' window. On the left, a list of devices is shown with 'MDC417C_K_FE320-CEU-10008' selected. The main area displays configuration details for this device:

Vendor	Kappa optronics GmbH
Model	MDC417C_K
Serial Number	FE320-CEU-10008
Device User ID	UserDefinedName
PacketSize	1468
HeartBeat Timeout	5000
GVSP Capability	0
GVCP Capability	3221291067
First URL	local:/opt/ipnc/MDC417C_K_1_0_7_SFNC.x...
Second URL	␣
Current IP	10.10.0.100
Current Netmask	255.0.0.0
Current Gateway	0.0.0.0

Below this table are configuration options:

- IPConfig:**
 - Use Persistent IP
 - Use DHCP
 - Use Auto IP (LLA)
- Persistent IP Address:**
 - IP Address:
 - SubnetMask:
 - Gateway:
- Device User ID:**


Buttons on the right include 'Refresh List', 'Edit Config', 'ForceIP', 'Assign', and 'Cancel'.

5. Change „Persistent IP Address“ settings to your needs
6. Click „Assign“ in order to adapt your settings
7. Reboot the device, e.g. with a power cycle
8. The device should boot up with the set IP configuration after a short while

Warning / Remark:

Do NOT use an IP address from the multicast address range (224.1.1.1 – 239.255.255.255) as a personal IP address of a device.

It is always recommended to “use DHCP” to manage all IPs of all devices in the network by a DHCP server. To give the device a persistent IP address it has to be in the same subnet as your PC. Use the temporary IP setting to test and before you set the device to a persistent address.

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3 KCC-X

3.1 Setup

KCC-X will be installed in the selected folder.

The software „**IPConfigurator**“ will also be installed in the chosen directory.

The setup will be provided with VLC setups as well, which has to be installed manually.

The default paths are:

KCC-X - C:\Program Files\Kappa\KCC_X
 KCC-X.ini - C:\ProgramData\KAPPA
 Log files - C:\Users\<<USERNAME>\AppData\Roaming\Kappa\SDK.X

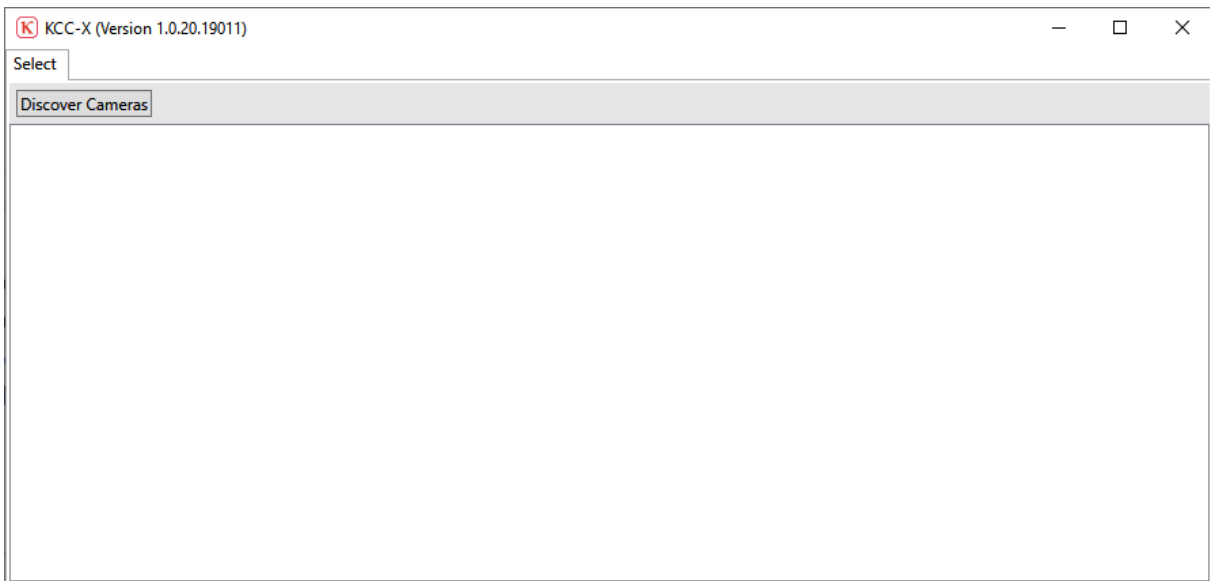
Attention: If using a 64bit OS, please install the VLC 64bit version. Using a 32bit VLC player on a 64bit OS can result in black screens during playback.

3.2 Start

Make sure the device is connected to the computer you are currently using, either by direct connection (i.e. Camera ↔ PC RJ45) or via network switch, and powered up. See datasheet for the correct voltage settings.

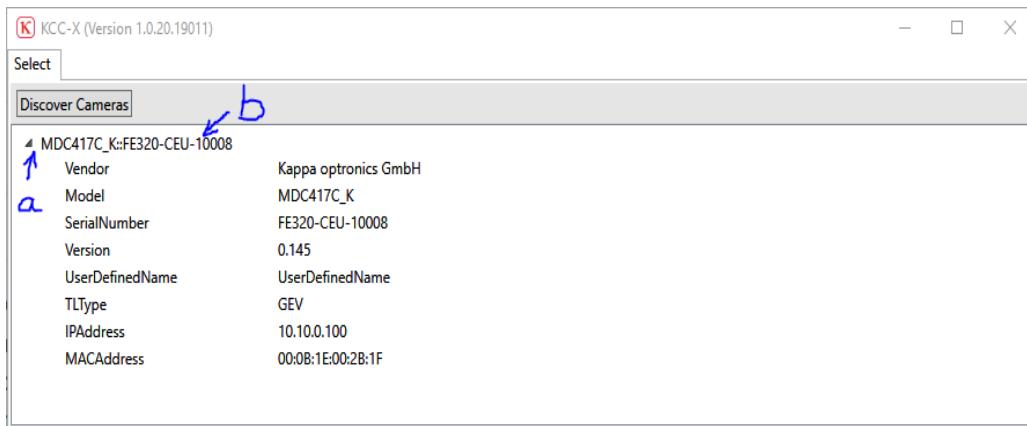
In order to start KCC-X, do the following:

1. Double click the application icon in order to open the software



2. Click “Discover Cameras” (If no devices are listed, see chapter IPConfigurator)
3. All found devices will be listed below
4. Now there are two options:
 - a. Click on the small arrow to show more information about the device

b. Click on the name itself to open the connection



5. Click on the name of the device to connect (case b). The KCC-X software will provide a second tab called “Features”



6. In the upper left corner are the “**Acquisition Start**” and “**Acquisition Stop**” commands. Most of stream depending settings can only be set when the device is in stop mode.

7. In the upper right corner, the visibility option is divided into three types (Beginner → Expert → Guru).

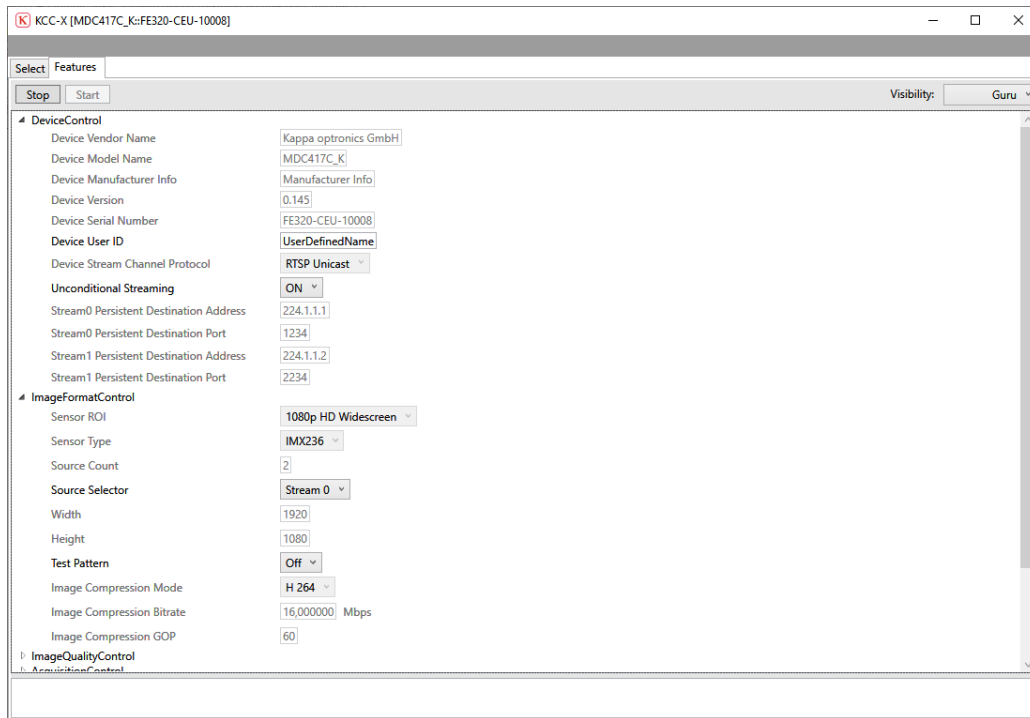
INFO: If you are missing an option in the feature tree list, switch to another visibility mode. Guru is the highest level and shows everything.

8. The main window provides a list of all features the connected device supports.

INFO: This feature list view may vary depending on the connected device and/or firmware of the device. Not every feature will be described in this manual, for more information hover over a feature and look at the box at the bottom.

9. The empty box at the bottom shows additional information while hovering the mouse cursor over a feature.

10. In this case, the “DeviceControl” shows a list of features that can only be set when the “Acquisition State” is set to “Stop” via the button in the upper region. Click the “Stop” button.



11. Now you are able to set e.g. the “Device Stream Channel Protocol” from “RTSP Unicast” to “GVSP”.

12. Hit the “Start” button to start acquisition.

HINT: If the correct version of VLC is installed, an extra window will open and show a live stream of the camera.

3.1 Save custom settings of the device


It is possible to save custom-made settings as boot defaults.

To do this, do the following:

1. Open KCC-X application
2. Connect to the device
3. Set your custom settings
4. Go to the feature “UserSetControl”
5. Select “User Set Save Selector” to “User Set 0” or “User Set 1”
6. Click “Execute”

After a cold reboot, the device boots with the “User Set 0” settings.

It can be checked with the KCC-X application under the “User Set Default” feature (should be “User Set 0” instead of factory default “Default”). To load the factory defaults, only select “Default” for “User Set Default” without executing.

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4 Common use cases

4.1 Retrieving the stream(s) with third-party software

To check if the device is streaming properly, you can use i.e. the VideoLanClient Application (VLC - <https://www.videolan.org>).

The following example can be used with a FE320 with factory default settings:

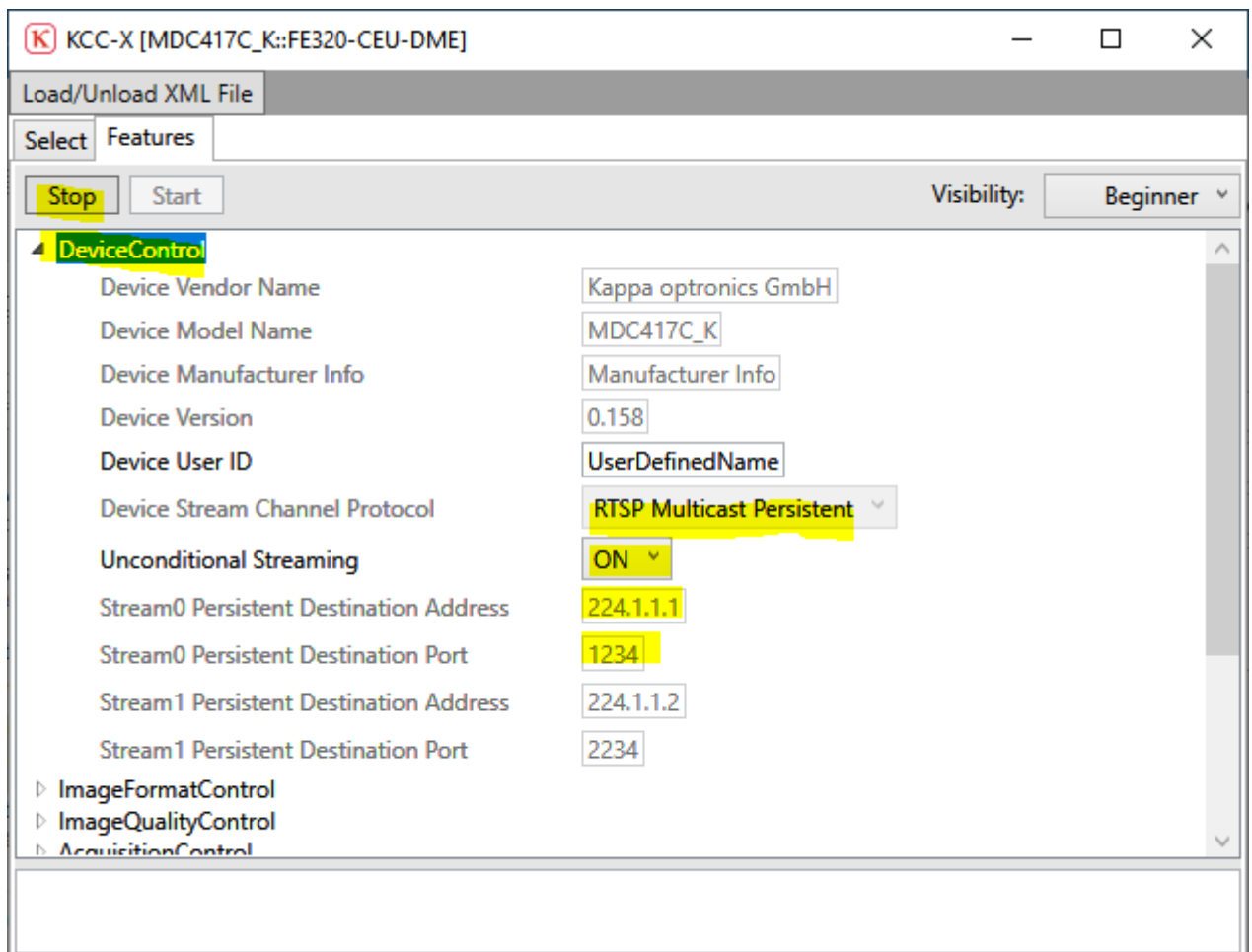
1. Open VLC application
2. Click "Media"
3. Click "Open Network Stream..."
4. Enter the URL:
"Stream0": *rtsp://10.10.0.100:8557/PSIA/Streaming/channels/2?videoCodecType=H.264*
"Stream1": *rtsp://10.10.0.100:8556/PSIA/Streaming/channels/2?videoCodecType=H.264*
5. Click "Play"


Note: Change IP:Port in step 4 if needed or changed.

The VLC should show the stream of the device.

4.2 Using multicast streaming – unidirectional streaming (RTP)

- Open KCC-X
- Stop acquisition
- Change the "DeviceControl > Device Stream Channel Protocol" to „RTSP Multicast Persistent“
- Check if "DeviceControl > Unconditional Streaming" is set to "on"
- See (or change) "DeviceControl > Stream0 Persistent Destination Address" and "DeviceControl > Stream0 Persistent Destination Port" settings for destination application:



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- Create a new “multicast-unidirectional.sdp” file with the following content:

```
v=0
c=IN IP4 224.1.1.1
m=video 1234 RTP/AVP 96
a=rtpmap:96 H264/90000
a=fmtp:97 streamType=5;profile-level-id=44;mode=AAC-
hbr;sizelength=13;indexlength=3;indexdeltalength=3
```

- By opening the “multicast-unidirectional.sdp” with VLC, the streaming should start directly without any RTSP handshake necessity before.

For further info see:

- <https://wiki.videolan.org/SDP>
- <https://wiki.videolan.org/Documentation:Modules/rtsp/>

4.3 Common multicast receiving problems

There are common problems while receiving a multicast stream in Windows, most of them are just blocked due to security reasons. The next subchapter will descriptions a few solutions that might help you.

Note: Make sure your encoding device has enough power and try to avoid using an office laptop in battery mode. Due to some power saving functions, a visible picture loss or much higher latency could occur during playback.

4.3.1 Firewall settings

Some firewall default settings might block UDP packets, so you need to allow the multicast stream to be received.

If you cannot switch it off, either temporally or permanently, there is also a way to put the receiving application to the whitelist of applications.

To do this in Windows, do the following:

1. Open “Windows Defender Firewall”
2. Click on the left column on “Advanced Settings”
3. Click on “Inbound Rules” option
4. Select “New Rule” on the right side
5. Under “Rule Type” select the option “Program” and hit “Next”
6. Select the option “This Program path” and browse to your application (i.e. VLC)
7. Select the “Allow the connection” option
8. Click “Next” and leave all further option as default
9. Use a name and hit finish
10. Start and check if the stream is working


4.3.2 Several network adapters / VM Network Adapter

If a Virtual Machine is installed on your system, it will also install the Host-Only network for the VM. This adapter can create issues with Multicast streaming and the Firewall.

Try to disable the not required Network adapter from the control panel and check if that resolves the error.

To do this, try the following:

1. Open “**Network and Internet > Network and Sharing Center**”
2. Go to “**Change Adapter Settings**” from the left column
3. **Right-click on the “VirtualBox Host-Only Network”** adapter and select “**Disable**”
4. Start and check if the stream is working

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An additional solution could be to set the network metric manually.

In order to do so, right-click the network adapter which is the receiving adapter for the multicast stream and go to the IPv4 settings. Change the Windows default from “Automatic metric” to a low value (i.e. 0). The lower the value the higher the priority.

4.4 Tweaking VLC latency via KCC-X

The VLC recommends a buffer time of 1000ms (default value) which is the reason a latency of more than >1s will be recognized. There is the possibility to tweak that with the caching parameter. To do that, make sure KCC-X is not running (close the application) and edit the following file:

`%programdata%/KAPPA/KCC-X.ini`

Change the value from “**CachingTime = 1000**” to i.e. “**CachingTime = 300**”.