

# White Paper OR1™ StreamConnect® II System

IEC 80001



# WHITE PAPER



## Foreword

With this document, KARL STORZ supplies the operator with information to be used for the integration of the OR1™ STREAMCONNECT® II system into the operator's IT network. This document is subject to change as knowledge advances, and it was generated according to the best of our knowledge and beliefs. Since framework conditions, installations, and the operation of the network are the responsibility of the operator, we cannot fully guarantee failure-free operation. The operator must ensure the protection, safety, and availability of the IT network through the operator's own risk management procedures according to DIN EN 80001.

## Introduction

The OR1™ STREAMCONNECT® II system enables convenient video and audio communication between the OR and one or several workstations within a hospital (such as physician's offices or lecture halls).

At the core of the system is the hospital network (LAN), to which the following participants are connected via network cable:

1. One or several ORs/zones (up to 42)
2. OR1™ STREAMCONNECT® II server
3. OR1™ STREAMCONNECT® II user PCs/control stations (up to 32).

The OR1™ STREAMCONNECT® II software is installed on the control station. This software communicates directly with the OR1™ STREAMCONNECT® II server. The OR1™ STREAMCONNECT® II server is configured via a special administrator mode of the OR1™ STREAMCONNECT® II HD software.

The user logs into the system with the user's special user name and password. Each of these user PCs is a workstation within the hospital (in a physician's office, lecture hall, etc.) and must be connected to the same LAN as the OR1™ STREAMCONNECT® II server. Hence, a video/audio stream can be transmitted, for instance, from an OR within the hospital to up to 32 physician's offices, lecture rooms, or other rooms within the hospital.

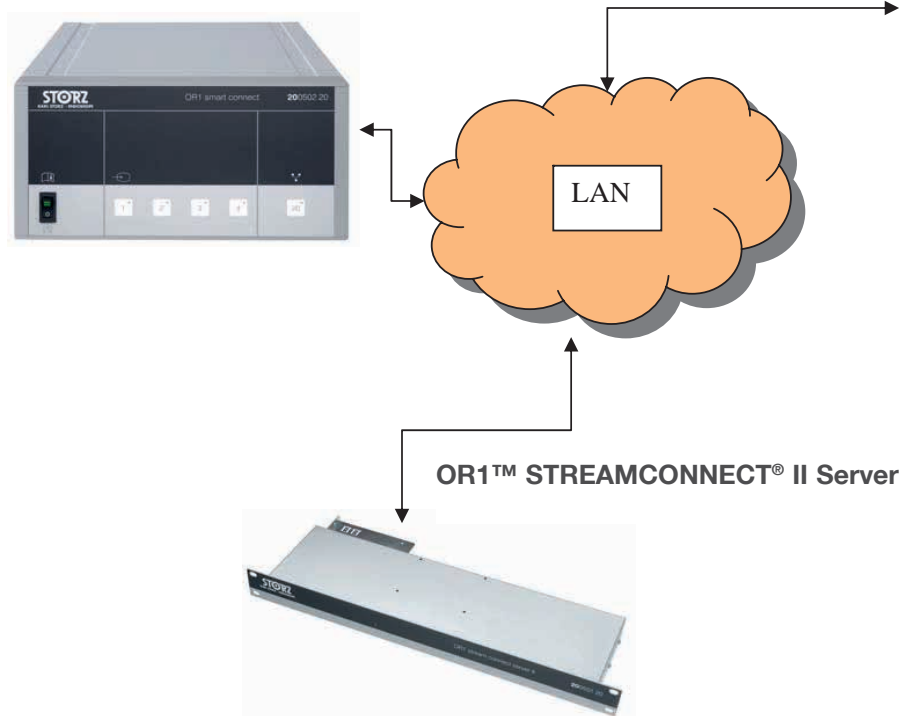
The OR1™ STREAMCONNECT® II system is not a medical device within the meaning of the European Medical Device Directive (MDD). The OR1™ STREAMCONNECT® II system is not approved for use in diagnostics.



## System overview

**OR1™ MPEG Encoder**  
No. 1 up to max. No. 42

**Control station**  
No. 1 up to No. 32



Note: The image shows one of many configuration options. The hardware can vary in appearance.

## System requirements for the control station

The control station is not included in delivery. An existing PC in the hospital network serves as the control station, onto which the OR1™ STREAMCONNECT® II HD software is installed.

The software package to be installed includes the following components:

- .NET 3.5
- German language pack for .NET
- OR1™ Player and OR1™ Talkback (OCX, ActiveX-components)
- OR1™ STREAMCONNECT® II HD software application (EXE)

The existing PC must meet the following system requirements:

### Minimum workstation requirements for S-video signal transmission:

- PC
  - Min. 1.5 GHz processor
  - Min. 512 MB RAM
  - Min. 10 GB hard disk
- Operating system
  - Windows® XP (SP3), Windows® 7 (32 Bit or 64 Bit) or Windows® 10 (32 Bit or 64 Bit)
- Software
  - .NET Framework 3.5
  - Windows® Installer 3.1
- Monitor
  - Recommended resolution: 1280 x 1024
  - Min. resolution: 1024 x 768
- The use of video images requires VLC-Player (version 2.2.4)
- The Talkback function requires a soundcard

### Minimum workstation requirements for DVI-D signal transmission 1080p50/p60:

- PC
  - Min. Intel Core2 @ 3.00 GHz or min. Intel Core2 Duo @ 2.66 GHz
  - Min. 4 GB RAM
  - Min. 10 GB hard disk
- Operating system
  - Windows® XP (SP3), Windows® 7 (32 Bit or 64 Bit) or Windows® 10 (32 Bit or 64 Bit)
- Software
  - .NET Framework 3.5
  - Windows® Installer 3.1
- Graphics card
  - a video card with GDDR3 video memory, such as the nVidia GeForce 8600GT with 256 MB video memory

- Monitor
  - Recommended resolution: 1280 x 1024 and 1920 x 1080
  - Min. resolution: 1024 x 768
- The use of video images requires VLC-Player (version 2.2.4)
- The Talkback function requires a soundcard

## Network load

There is no definitive answer regarding the required bandwidth. It very much depends on the video image to be transmitted (transmissions with many moving pictures, for instance, require greater bandwidth than those of still images). Therefore, we can only provide you with a “guideline” – no definitive table is available.

- For HD streaming, the bandwidth should be at least 6 Mbit/s, ideally 10 Mbit/s or more
- For S-video streaming, the bandwidth should be at least 4 Mbit/s, ideally 6 Mbit/s or more

## Network requirements for streaming

Multicasting is only possible in modern, multicast-enabled network environments. When utilising multicast for network distribution traffic the following requirements are mandatory for networks and must also be supported by the network administration authority.

- Switched networks: minimum Layer3
- Network support of IGMPv2, possibly IGMPv3
- Routed networks: Additional support of a multicast routing protocol (PIM-DM, DVMRP, PIM-SM, or others)
- Both network and networking equipment must be configured in order to ensure multicast traffic

KARL STORZ is not responsible for setup and configuration of the network. If required, KARL STORZ would like to propose consultative support for creating a multicast-enabled networking structure (consulting contract and support respectively).

For KARL STORZ streaming Media Servers and clients the following operating systems are supported for IGMPv2 networks:

- Windows® 2000, Windows® 2000 Server, Windows® 2003 Server [Microsoft Patch and an additional registry setting are necessary], WinXP® (only with ServicePack2)

The following operating systems are supported for IGMPv3 networks:

- WinXP®, Windows® 2003 Server

Note: Unicast operation is generally possible but must be separately considered and planned.

## Streaming network recommendations

Class D addresses:

224.0.0.0 – 239.255.255.255

239.252.0.0 – 239.255.255.255 are approved for private use only

- General difficulties while using IGMP-snooping: as long as no IGMP client grabs and receives the multicast traffic of an IGMP sender, the network will be flooded.

Solutions:

- Use “Join own multicast” with every IGMP sender or
- Before you start a multicast sender a client/receiver needs to be started
- Multicast addresses, with which IGMP snooping does not work, i.e. the network will always be flooded (Cisco and HP):

|           |             |           |
|-----------|-------------|-----------|
| 224.0.0.x | 224.128.0.x | 238.0.0.x |
| 225.0.0.x | 225.128.0.x |           |
| 226.0.0.x | 226.128.0.x |           |
| 227.0.0.x | 227.128.0.x |           |
| 228.0.0.x | 228.128.0.x |           |
| 229.0.0.x | 229.128.0.x |           |
| 230.0.0.x | 230.128.0.x |           |
| 231.0.0.x | 231.128.0.x |           |
| 232.0.0.x | 232.128.0.x |           |
| 233.0.0.x | 233.128.0.x |           |
| 234.0.0.x | 234.128.0.x |           |
| 235.0.0.x | 235.128.0.x |           |
| 236.0.0.x | 236.128.0.x |           |
| 237.0.0.x | 237.128.0.x |           |
| 238.0.0.x | 238.128.0.x |           |
| 239.0.0.x | 239.128.0.x |           |

Background information: In the range of 224.0.0.x there are multicast addresses reserved for various multicast routing protocols etc. If anybody should filter and use these, the routing will not work.

Additional information: <http://www.iana.org/assignments/multicast-addresses>.

- If an IGMP sender sends a multicast request to one of the addresses above by mistake, problems will be caused. These addresses which, by standard, should be accessible by every switch port are, in this case, added as an entry into the CAM table of the switch and from that moment on this multicast group will only be forwarded to this one specific client (IGMP receiver). This is so-called unwanted and illegal IGMP snooping. The problem lies in the fact that the standard communication of the multicast routing protocols and multicast routines are blocked.

Further information:

The first nine bits of a multicast address are ignored when they are mapped onto a MAC address. Due to this fact there exists a so-called 32:1 overlap, i.e. there are always 32 multicast addresses which look alike for a switch.

Examples:

- The first byte (224-239) will never be taken into account
- When setting the second byte it is very important not to set it with the exact numeric difference of 128 because the switch cannot see the difference between 224.138.1.0 and 239.10.1.0
- If problems with the command “leave group” occur in a Cisco Routing Environment (which is sent on 224.0.0.2), please ask if the network administrators use the protocol “HSRP” (Cisco failover). This protocol can also communicate on 224.0.0.2 and therefore problems may arise.
- The addresses 224.0.0.x have a TTL = 1. From 224.0.1.x on the TTL is not explicitly defined. Problems: in a routed environment it may occur that a “bad” Layer2/3 switch changes the TTL = 1 to TTL = 0. In this situation the multicast routing protocols will fail to work. Cisco and HP switches do not modify the 224.0.0.x address.
- SAP's: All of our encoders use SAPv1, i.e. they all send a SAP announcement to the multicast address 224.2.127.254:9875. However, the source port is not defined.

To avoid conflicts concerning multicast addresses, please always use private addresses and pay attention so that additional multicast addresses from the ranges 239.124.x.x, 239.125.x.x, 239.126.x.x, 239.127.x.x are not present in the network.

## IP addresses

The installation of the OR1™ STREAMCONNECT® II system requires the operator to supply addresses for the following components:

- OR1™ STREAMCONNECT® II server
  - Static IP address without DHCP
  - Subnet mask
  - Standard gateway
- For each OR1™ MPEG encoder system
  - Multicast address
  - Port
  - Static IP address without DHCP
  - Subnet mask
  - Standard gateway

## Firewall settings

The following ports must be considered in the firewall settings:

- Port activation for FTP and HTTP
- Activation of Ports 6002 and 6007 when using the TCP network protocol
- Activation of Port 6003 when using the UDP network protocol

## Licensing model

The following licenses can be purchased for the OR1™ STREAMCONNECT® II system. The purchased licenses are related to the OR1™ STREAMCONNECT® II server and are stored on it as files:

- OR1™ STREAMCONNECT® II Zone License  
This license serves to activate a zone, that is, one OR1™ MPEG encoder system. A maximum of 42 zones / OR1™ MPEG encoder systems can be integrated into the OR1™ STREAMCONNECT® II system. One of these licenses is required for each zone.
- OR1™ STREAMCONNECT® II Device Control License  
This license serves to activate the device control function in the OR1™ STREAMCONNECT® II system for AV system NEO and Foundation systems. With the aid of the device control function, up to 6 signal sources in the OR can be controlled from the control station. Only one control function is needed, regardless of how many AV System NEO and Foundation systems are integrated into the overall OR1™ STREAMCONNECT® II system.
- OR1™ STREAMCONNECT® II Overview License  
This license serves to activate an IP camera overview as single view or multiple view. A maximum of 15 IP cameras can be integrated into the OR1™ STREAMCONNECT® II system. One license is required.

Note: The OR1™ STREAMCONNECT® II HD software is not subject to a licensing model, that is, the OR1™ STREAMCONNECT® II HD software can be installed on any number of control stations.

## User rights

Main user rights or administrator rights are not required to work with the system. Administrator rights are granted through a pre-installed administrator role. The required passwords can be provided to the operator.

The individual users are administered by the hospital administrator. The users create their own passwords. The software automatically closes if there is no login within 120 seconds.



## Remote maintenance

Remote maintenance requires network access that connects the device to the hospital network. In accordance with the Federal Data Protection Act (Bundesdatenschutzgesetz) as well as the data protection laws of the respective federal state, KARL STORZ ensures that external access is limited to the respective device.

All individuals accessing the device are specifically trained and instructed KARL STORZ employees who have confirmed in writing that they have undergone instruction and will apply the corresponding procedures. KARL STORZ guarantees that no patient-related information will be used for service purposes, copied, or used in any other form.

KARL STORZ will inform the operator by phone or in writing (via e-mail with confirmation request) before performing any required remote access.

KARL STORZ and the operator will agree on the required modalities, the procedures, the necessary contacts, etc., in advance. These agreements will be made in writing.

Three options are available for the actual external access to the device:

### 1. Remote access via TeamViewer

As the standard option, KARL STORZ offers remote maintenance via the TeamViewer software. Remote maintenance procedures must be explicitly approved by the operator. The TeamViewer software requirements can be viewed at [www.teamviewer.com](http://www.teamviewer.com).

### 2. Remote access via VPN

In this type of remote access, a VPN connection is established between the KARL STORZ service center and a dedicated access server at the hospital. This access server is then used to access the devices via the tools/applications typically employed at the hospital. This type of access requires setting up an access server within the hospital (unless one has already been set up for remote access by other suppliers) as well as access data and modalities. The operator and KARL STORZ must agree in writing on access data and modalities in advance.

### 3. Special remote access agreements

If the hospital must meet special guidelines or requirements that are not covered by options 1 or 2, specially tailored remote access procedures may be considered. Feasibility must be ensured by both parties in advance. In this process, KARL STORZ will always comply with the applicable data protection laws of the German federal states.

## Patch management

The OR1™ STREAMCONNECT® II server runs a separate operating system (RTOS → Real Time Operating System). Regular patching is not required.

The control station is an existing PC within the hospital network and is supplied by the operator. Safety patches can be installed for the operating system.

## Malware defense

The OR1™ STREAMCONNECT® II server runs a separate operating system (RTOS → Real Time Operating System). This operating system only runs on this board with the special server CPU.

The operating system runs programs that are specially compiled for this controller; therefore, it is practically immune to virus attacks.

The control station is an existing PC within the hospital network that is supplied by the operator. Software for malware protection can be installed and run. The operator must configure the software such that it does not limit the operation of the OR1™ STREAMCONNECT® II system.

## Data protection/backup

No data is changed when the OR1™ STREAMCONNECT® II server runs, so that cyclic backup is not required. After initial operation of the OR1™ STREAMCONNECT® II system, the service technician can generate a backup file. If the OR1™ STREAMCONNECT® II server is exchanged, this file can then be installed on the new unit.

The OR1™ STREAMCONNECT® II server offers no data storage option. The OR1™ STREAMCONNECT® II system offers local storage of videos on the control station.

## Conformity assessment

For a copy of the conformity assessment document, please contact:

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Welcome to the future of endoscopy!

Do you have questions about the  
KARL STORZ OR1™ StreamConnect® II system?

Our OR1™ team would be delighted to help.

KARL STORZ SE & Co. KG

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**It is recommended to check the suitability of the product for the intended procedure prior to use.**

**STORZ**  
KARL STORZ—ENDOSKOPE

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