



# Technical Specification

Residential premises – Passive and Active equipment

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## 1. Introduction

The purpose of this document is to describe the Open Infra passive and active infrastructure installed in the residential premises.

## 2. Background

The purpose is to let the reader understand how the equipment work from a logical and technical point of view. It also outlines the passive infrastructure and how other devices not delivered by Open Infra can be combined with the network.

## 3. Overview

Open Infra build and deliver so called Open Access networks. This network is extended into the residential home. Thus the passive and active equipment have been optimized to allow more than one service provider to deliver services at the same time. Typical scenarios are situations whereas the Internet provider can be one and telephony or Television are delivered from a second or even a 3<sup>rd</sup> provider.

### 3.1 Active equipment (CTS device)

The active equipment installed in the residential home is a device manufactured from CTS. The devices comprise an Ethernet switch with one fiber WAN uplink.

The main function of the Fiber switch is to convert from Optical to Electrical interface (Ethernet) to simplify the integration for the customer using own Ethernet devices.

The second function is to branch out to more than 1 Ethernet interface to allow for more than one service provider to connect their devices at the same time as other service providers in parallel.

Open Infra also have the ability troubleshoot the device by being able to monitor MAC, IP addresses and link status on the various ports. This is useful when customer call service providers or Open Infra requesting technical support.

**The device is remote managed by Open Infra and the intension is not that the residential user should log into or reconfigure the unit.**

For further clarification;

- The Fiber switch does not have any Firewall, Wifi or any other functionality.

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- The Fiber switch is 100% transparent and only forward and switch traffic
- The Fiber switch is wirespeed and non block and does not have any bandwidth limitations

## 3.1.1 Gigabit Version “HES-3106”

The CTS active equipment have one APC - CS Fiber connector. The Fiber interface is using the simplex SFP standard BX20 for 1 x Gigabit uplink. The Wave length used on the customer side is TX 1310nm and RX 1550nm.

The device also has 5 x 10/100/1000Mbps RJ-45 electrical connectors.

For more information visit CTS homepage:

<https://www.ctsystem.com/en/product/productdetail.php?fid=12&pid=11>

## 3.1.2 10 Gigabit Version “HES-5106SFP+”

The CTS active equipment have one APC - CS Fiber connector. The Fiber interface is using an SFP+ simplex interface for 1 x 10 Gigabit uplink using standard BX-U-LR. The Wave length used on the customer side is TX 1270nm and RX 1330nm.

The device also has 4 x 10/100/1000Mbps RJ-45 + 1 x 1/2.5/5/10Gbps RJ-45 interface.

For more information visit CTS homepage:

<https://www.ctsystem.com/en/product/productdetail.php?fid=12&pid=138>

## 3.2 Passive equipment

Open Infra deliver a single mode fiber to the CTS indoor Fiber Tray. The fiber tray is a plastic device which purpose is to protect the sensitive fiber cable, the fiber connector and provide a modular and flexible mounting platform for the active CTS family of devices. This to simplify in field service situation when the active equipment has to be upgraded, replaced or repaired.

## 4. Connecting Ethernet devices to the fiber switch

The Open Infra network utilizes a BNG concept for AAA (authentication, authorization, and accounting) based on a method called PoE. In the network a method named DHCP Option 82 is used to identify the individual households. This function works in the background and is not noticeable for the residential user.

In simple terms and devices that are capable of being DHCP client will authorize towards the network and get an IP address from its service provider.

This makes it possible to connect any type of gateway, music device, STB, computer etc.

Note: It is very common in Germany that PPPoE is used for AAA in DSL and Fiber networks. This is not the case in the Open Infra infrastructure. Therefore any PPPoE or other AAA feature has to be turned on in for example gateway equipment for the clients to function.

- Only use plan DHCP client function.

## 5. Connecting other active equipment

Even if Open Infra does not recommend replacing the CTS devices it is possible.

If the CTS devices is replaced Open Infra will have limited ability to support trouble shooting in multiple Service provider environments.

To connect another type of devices. For example an Fritzbox with Fiber interface it is necessary to use the correct fiber uplink. Easiest is to use an SC SFP standard BX10 compatible with using the same wavelength as described in section 3.1.

Open infra recommendation when using Fritzbox or other Wifi GW products is to connect the devices in any of following ways:

1. For Gigabit application connect the Fritzbox 7590 WAN interface using Ethernet 1000Mbps RJ-45 to one of the CTS ports.
2. For 10 Gigabit applications connect the a 10G capable Wifi Gateway to the 1/2.5/5/10Gbps RJ-45 interface.

Even if it is not recommended from a practical and passive point of view it is possible to:

- A. Connect Fritzbox 5530 directly to the Open Infra Fiber network. This procedure requires the plastic cover on the CTS FTU to be lifted. (See illustration 1). Connect an SC to LC single fiber patch to the CTS SC fiber connector. An SC-SC female to female joint is required to make the interconnection to the patch. After this insert the LC connector in the 5530 fiber interface. The plastic cover of the CTS Fiber Tray has an area that can be cut to let the Fiber patch out of the enclosure. (See illustration 2).

Or:

- B. If it is possible to exchange the SFP in the Fritzbox an 1000BaseTX SFP can be used in the 5530 SFP WAN port. Then an RJ-45 TP cable can be used to connect to any of the 5 x CTS RJ-45 ports.

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**Illustration 1 – CTS and plastic cover**



**Illustration 2 – Location for cutting hole in plastic cover**

## 6. Configuration of FritzBox WAN interface

Existing Fritzboxes or preconfigured device intended for legacy, DSL or other networks might have PPPoE or other AAA functionality enabled. For the WAN interface this has to be turned off and normal DHCP client turned on.

See illustration 3 and 4.

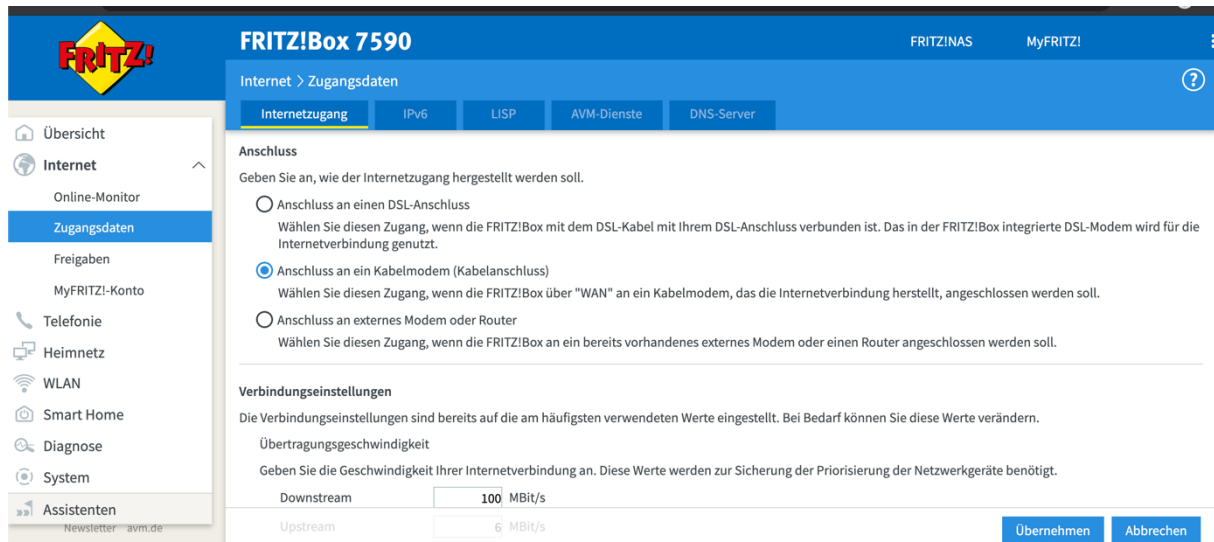


Illustration 3 – Configure Fritz!Box for Cable connection through WAN port

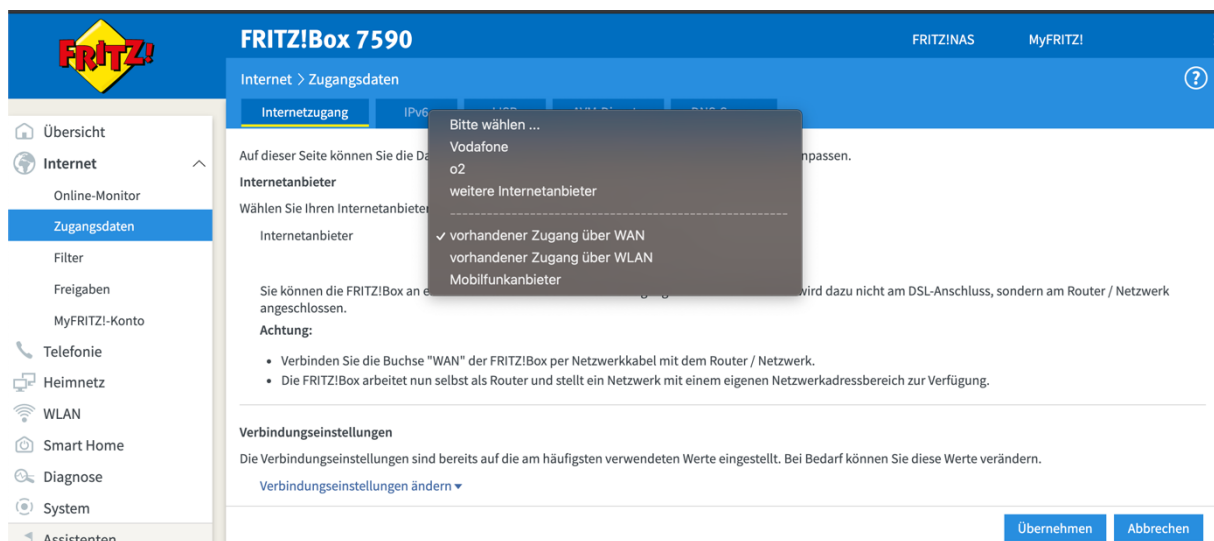


Illustration 4 – Configure AAA method to DHCP over WAN interface

## 7. Document revision

This is revision 1.1 of the Open Infra technical specification.  
Revision date 13.4.2021.