

MiniMux Ethernet Bridge Documentation

Introduction

This document explains how to build a transparent bidirectional Layer 2 Ethernet Bridge using two MiniMux Ethernet Bridges.

Firmware Versions

Your MiniMux Firmware Version should be V6.10 or higher. To determine your Firmware Version, connect your MiniMux's Serial Port to your PC, set your terminal software to 115200 Baud, 8 Bits, No Parity, One StopBit (115200 8N1) and power-on / reset the device.

The power on message should look like this:

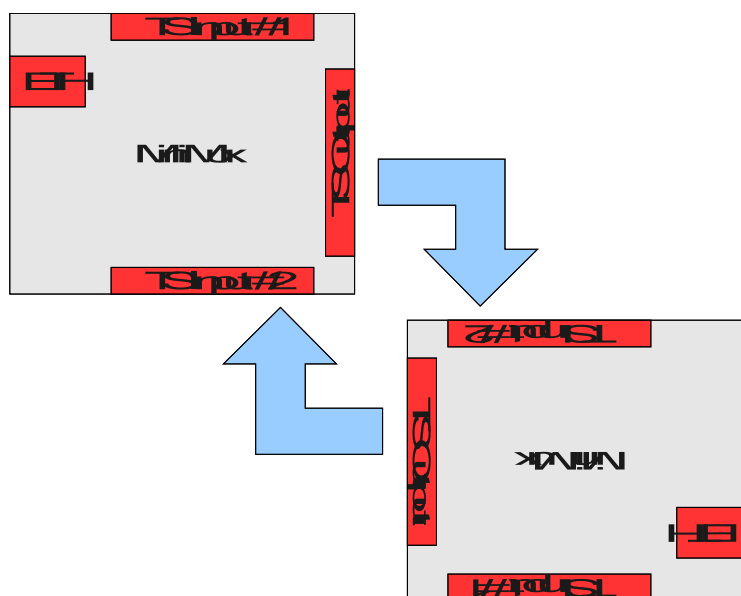
If your MiniMux's Firmware Version is older than V6.10, please request an update.

MiniMux Configuration

You can configure all settings related to the Ethernet Bridge either via Serial Port or Display Module. This documentation explains the configuration via Serial Port. All Menus and Settings described are also accessible via the Display Module.

Simple Test Setup

We recommend to build the following simple test setup with just two MiniMuxes and cables before building a more complex setup involving modulators and NIMs.



Hardware

1. Connect the TS Output of MiniMux #1 to a TS Input of MiniMux #2. You can use any cable that connects at least Pins 9 to 24.
2. Connect the TS Output of MiniMux #2 to a TS Input of MiniMux #1. You can use any cable that connects at least Pins 9 to 24.
3. Connect both MiniMux to power

Software

Apply the following configuration to **both** MiniMuxes. As the test setup is completely symmetric, the configuration is the same for both.

1. In “Port Configuration”, set the unconnected Port's Input Mode to “disabled” and set the Input Mode for the Port connected to the other MiniMux to “external clk”. We will setup the MiniMux to output a TS clock on its Output Port later.

Port configuration

- | | |
|--------------------|----------------|
| 1) TS 1 Input Mode | (disabled) |
| 2) TS 2 Input Mode | (external clk) |

2. In “TS In Settings”, set “PSI Tables” to “pass”. We do not want to filter any tables on the TS Input.

Input 2 Settings

- | | |
|---------------|--------|
| 1) PSI Tables | (pass) |
|---------------|--------|

3. In “Output Settings” set “Clock Direction” to “generate” - we need to generate a TS clock on the output port as the MiniMux is configured to use an external TS clock on the input (see Step 1). Set “Clockrate” to a sane value between 1000 kbps and 100000 kbps – this setting will define how fast your test Ethernet Bridge works. You can use different settings in each direction to simulate an assymetric link. The “Framesize” setting does not matter.

Output Settings

- | | |
|--------------------|--------------|
| 1) Clock Direction | (generate) |
| 2) Clockrate | (10000 kbps) |
| 3) Framesize | (204 Byte) |

4. In “PSI Settings” set “PSI Table Generator” to “disabled”. We do not need any PSI tables for ethernet bridging.

PSI Settings

- | | |
|------------------------|------------|
| 1) PSI Table Generator | (disabled) |
|------------------------|------------|

5. In “Ethernet Bridge Settings”, set “ETH->DVB Bridge” and “DVB->ETH Bridge” to “enabled (block)”. We want to enable bridging in both directions and we want the MiniMux to block the TS PIDs that are used for Ethernet Data. The blocking is important to prevent TS packets from bouncing back and forth indefinitely between the two MiniMuxes.

Set “ETH->DVB PID” and “DVB->ETH PID” to “0x1FFE”. You can use any PID you like here – but it is important that the ETH->DVB PID on one Mux matches the DVB->ETH PID on

the other Mux and vice versa. Because we set the MiniMux to block the incoming TS packages on the DVB->ETH PID, we can use the same PID for ETH->DVB.

Set “TS Passthrough” to “disabled” to prevent any TS packets other than Ethernet from passing through the Mux. This setting supersedes the blocking done in the “ETH->DVB Bridge” and “DVB->ETH Bridge” settings as it blocks not only the Ethernet PIDs but all TS PIDs.

Set “Ethernet Flow Control” to “enabled”. The MiniMux will send Flow Control packages to prevent Ethernet Data coming in too fast for the bridge.

Ethernet Bridge Settings

1) ETH->DVB Bridge	(enabled (block))
2) DVB->ETH Bridge	(enabled (block))
3) ETH->DVB PID	(0x1FFE)
4) DVB->ETH PID	(0x1FFE)
5) TS Passthrough	(disabled)
6) ETH Flow Control	(enabled)

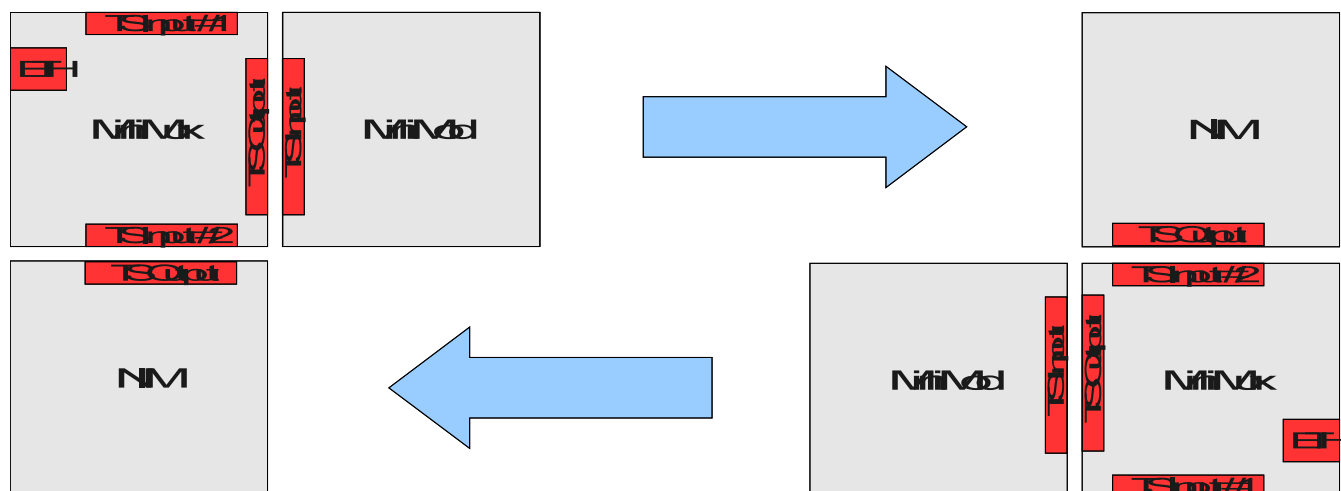
Testing the Bridge

To Test the Ethernet Bridge, disconnect an already existing an working ethernet link and replace it by the Ethernet Bridge. For example, connect a Notebook to your office network via cable – verify the connection is working properly. After that replace that cable with the Ethernet Bridge. As the Bridge is working on Layer 2 and is completely transparent, it should (almost) look like a piece of cable from the network's point of view.

Please make sure this test setup works before you proceed to more complicated setups.

Advanced Test Setup

This describes a test setup for a real over-the-air Ethernet Bridge using MiniMods, MiniMuxes and NIMs. You can use DVB-S/C/T Modulators and NIMs for this setup. You can even use a different modulation for each direction.



Hardware

Connect the components as shown on the diagram. We recommend to use standard cables with 34 wires and connect MiniMux and MiniMod to power.

Software (MiniMod)

For both MiniMods, please apply the following configuration procedure:

1. In “Input Settings”, set “Input Mode” to “raw TS”. Do **not** use the “ETH bridge” setting. Set “clock direction” to “internal clock”. The MiniMod shall generate the TS clock for the MiniMux's TS Output. Set Clock Edge to “rising edge”.

Input Settings

- | | |
|--------------------|----------------|
| 1) Input Mode | (raw TS) |
| 2) Clock Direction | (external clk) |
| 3) Clock Edge | (rising edge) |

2. In “Modulation Settings”, setup the modulation settings as you need them. We recommend to start with stable settings (high FEC, low constellation, ...) and upgrade to more performant settings later. Remember that you need to use a modulation that the NIM on the **other** side understands.

Software (MiniMux)

For both MiniMuxes, please apply the following configuration procedure:

6. In “Port Configuration”, set the unconnected Port's Input Mode to “disabled” and set the Input Mode for the Port connected to the NIM to “Tuner”.

Port configuration

- | | |
|--------------------|------------|
| 1) TS 1 Input Mode | (disabled) |
| 2) TS 2 Input Mode | (Tuner) |

7. In “Tuner Settings”, set “PSI Tables” to “pass”. We do not want to filter any tables on the TS Input. Setup the Tuner's setting so that it can receive the modulation from the MiniMod on the other side.

Tuner 2 Settings

- | | |
|---------------|--------|
| 1) PSI Tables | (pass) |
| ... | |

8. In “Output Settings” set “Clock Direction” to “external” - the MiniMod generates the TS clock for this port. The “Framesize” setting does not matter.

Output Settings

- | | |
|--------------------|------------|
| 1) Clock Direction | (external) |
| 2) Framesize | (204 Byte) |

9. In “PSI Settings” set “PSI Table Generator” to “disabled”. We do not need any PSI tables for ethernet bridging.

PSI Settings

- 1) **PSI Table Generator** (disabled)

10. In “Ethernet Bridge Settings”, set the same settings as for the simple setup.

Ethernet Bridge Settings

- 1) **ETH->DVB Bridge** (enabled (block))
- 2) **DVB->ETH Bridge** (enabled (block))
- 3) **ETH->DVB PID** (0x1FFE)
- 4) **DVB->ETH PID** (0x1FFE)
- 5) **TS Passthrough** (disabled)
- 6) **ETH Flow Control** (enabled)