

White Rabbit Switch Training: Configure from scratch



18th February 2026

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Outline

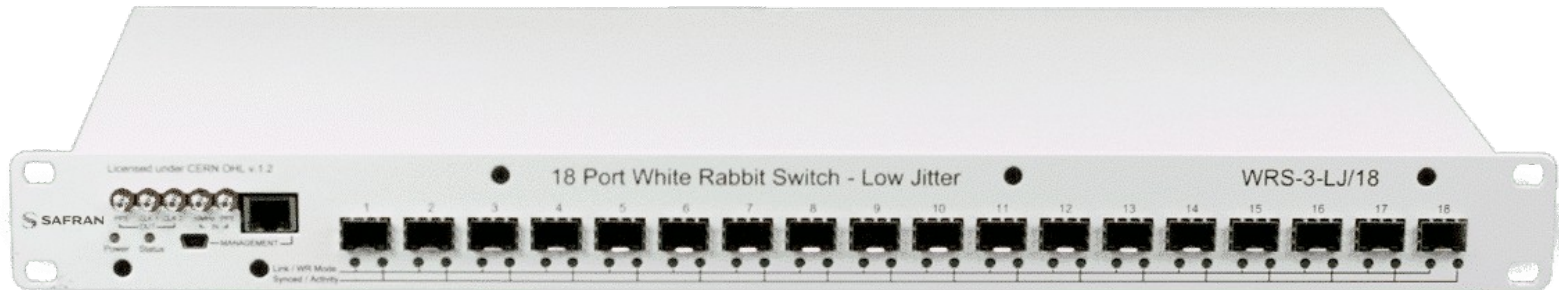
- Quick review of available WRs versions
- Communication with WRS
- Basic WR setup (GPS->GM->BC)
- Setup the scope

WR Switch versions: Safran

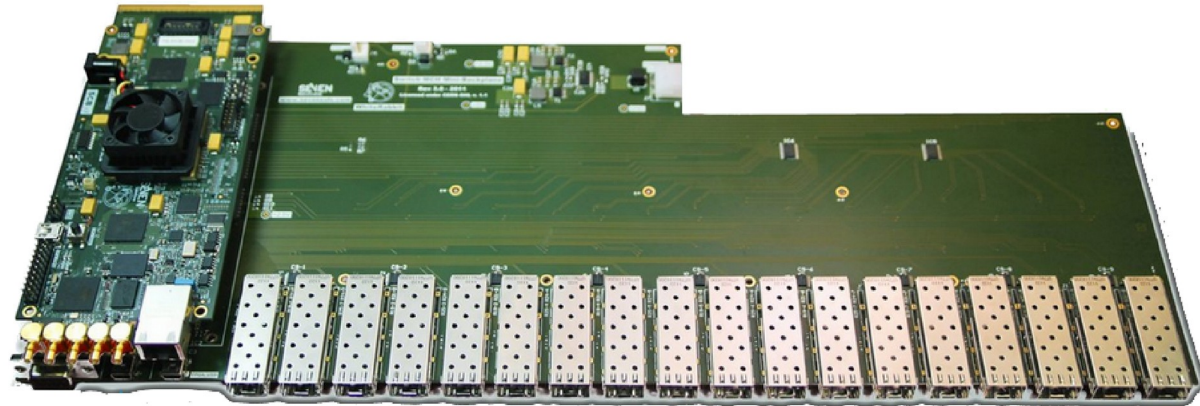
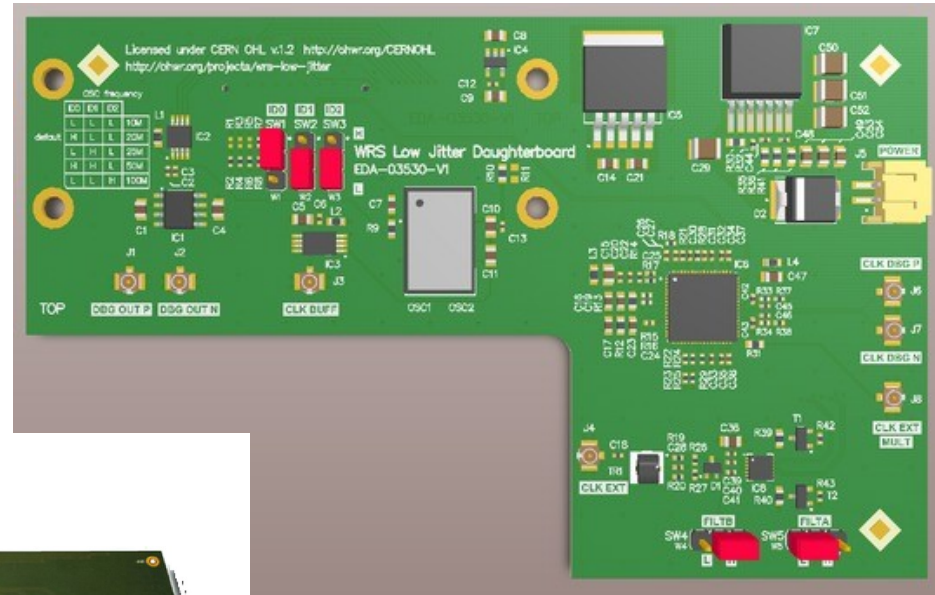
- Seven Solutions→Orolia→Safran
- Low-Jitter: Separate (with SMA connector) or integrated

WRS	Safran	Standard	v3.3 and later	SCB 3.4	3.4
WRS-3-LJ/18	Safran	Low Jitter	Not compatible !!!	SCB-LJ 1.0	N/A
WRS-3-LJ/18	Safran	Low Jitter	v8.0 and later	SCB-LJ 2.0	3.6.2.0

<https://gitlab.com/ohwr/project/wr-switch-sw/-/wikis/home#compatibility-of-the-official-firmware-releases-with-commercially-available-wr-switches>



WR Switch versions: Low-Jitter Daughterboard



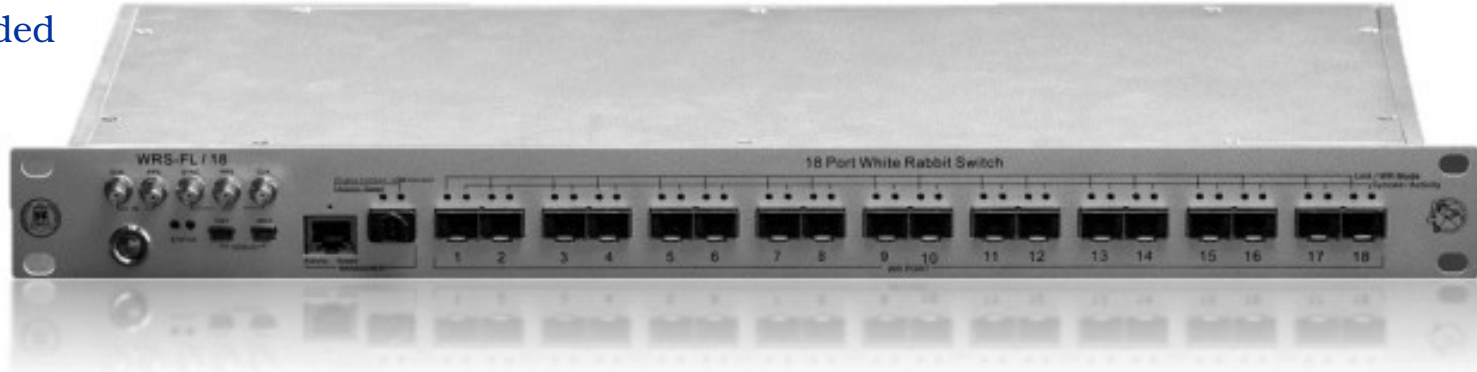
WR Switch versions: Creotech

- Standard
- Low-Jitter: Separate (with SMA connector)
- Telco?



WR Switch versions: Synctech

- Fan & fan-less
- Low-Jitter included



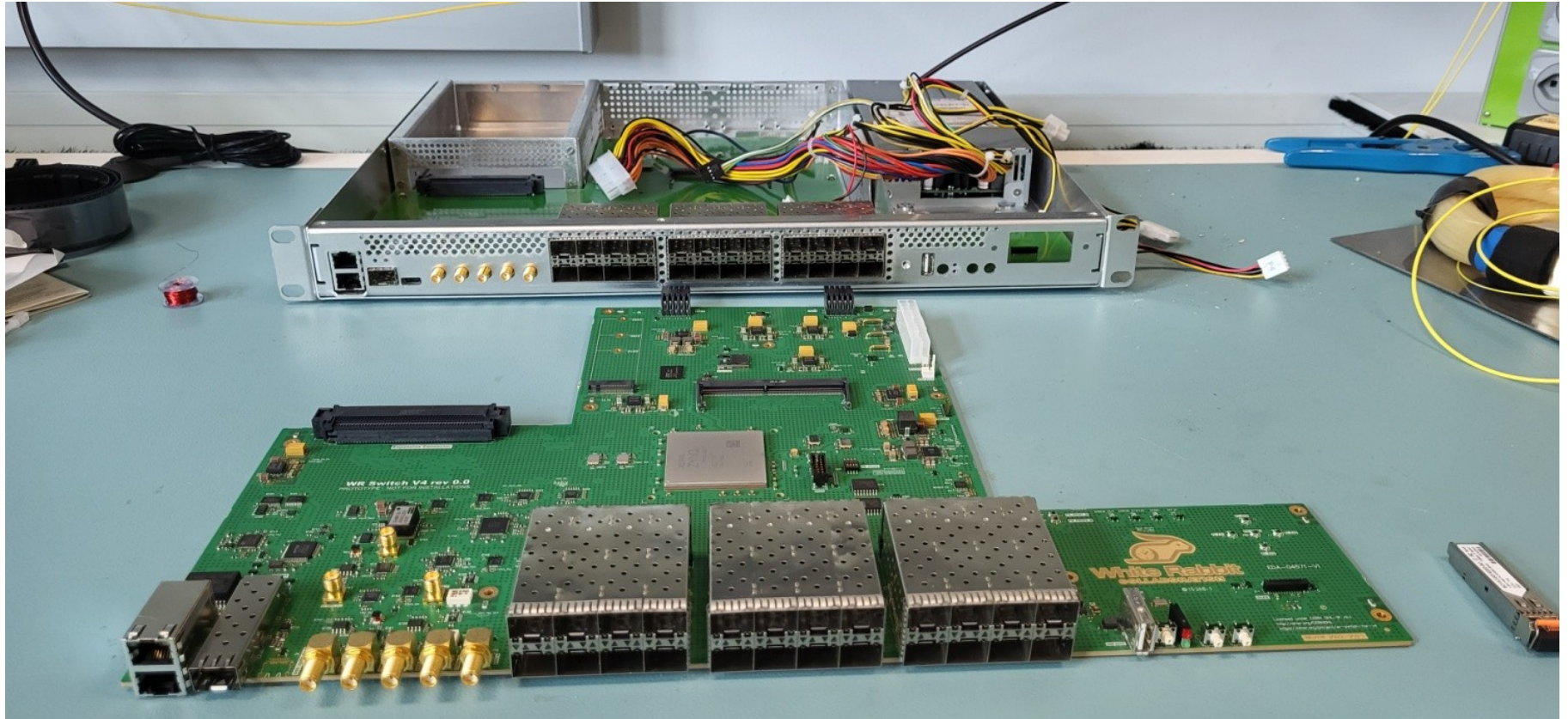
- WRS-CM version:
 - Compatible
 - 12V power
 - Fan-less

WR Switch versions: Synctech - Nodes

- Based on Cute-WR-A7



WR Switch versions: v4



Used connectors

SMA Male



SMA Female



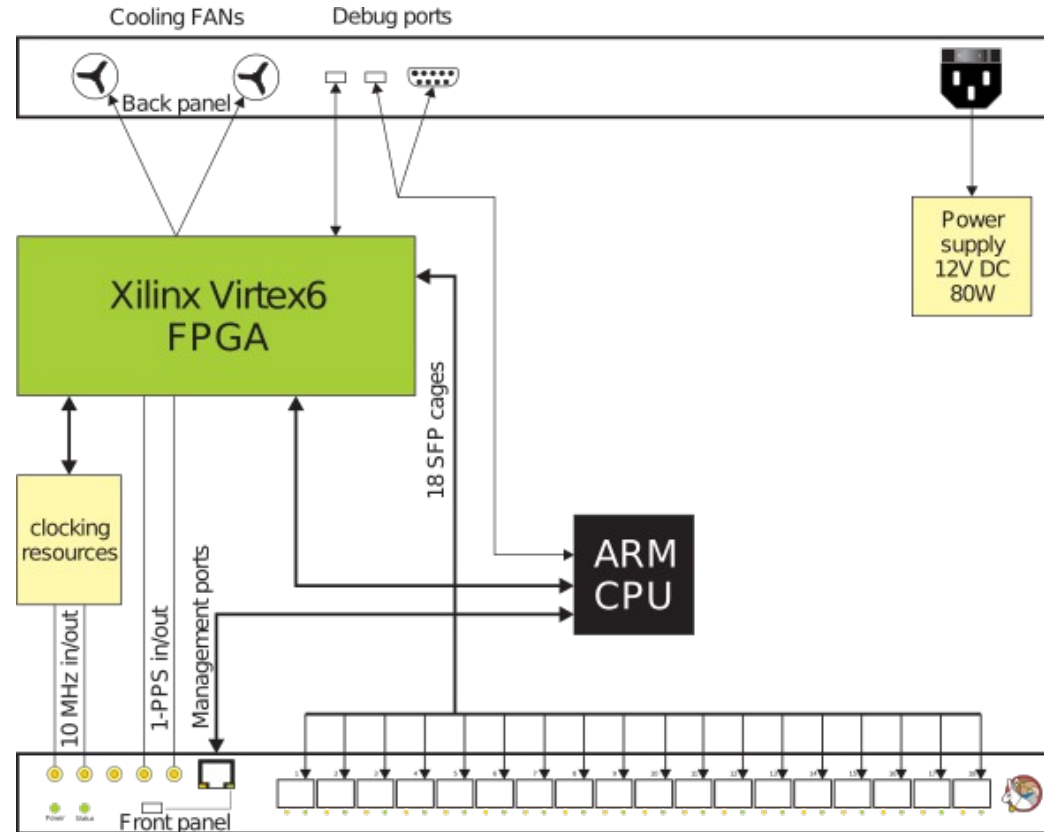
SMA

SMC

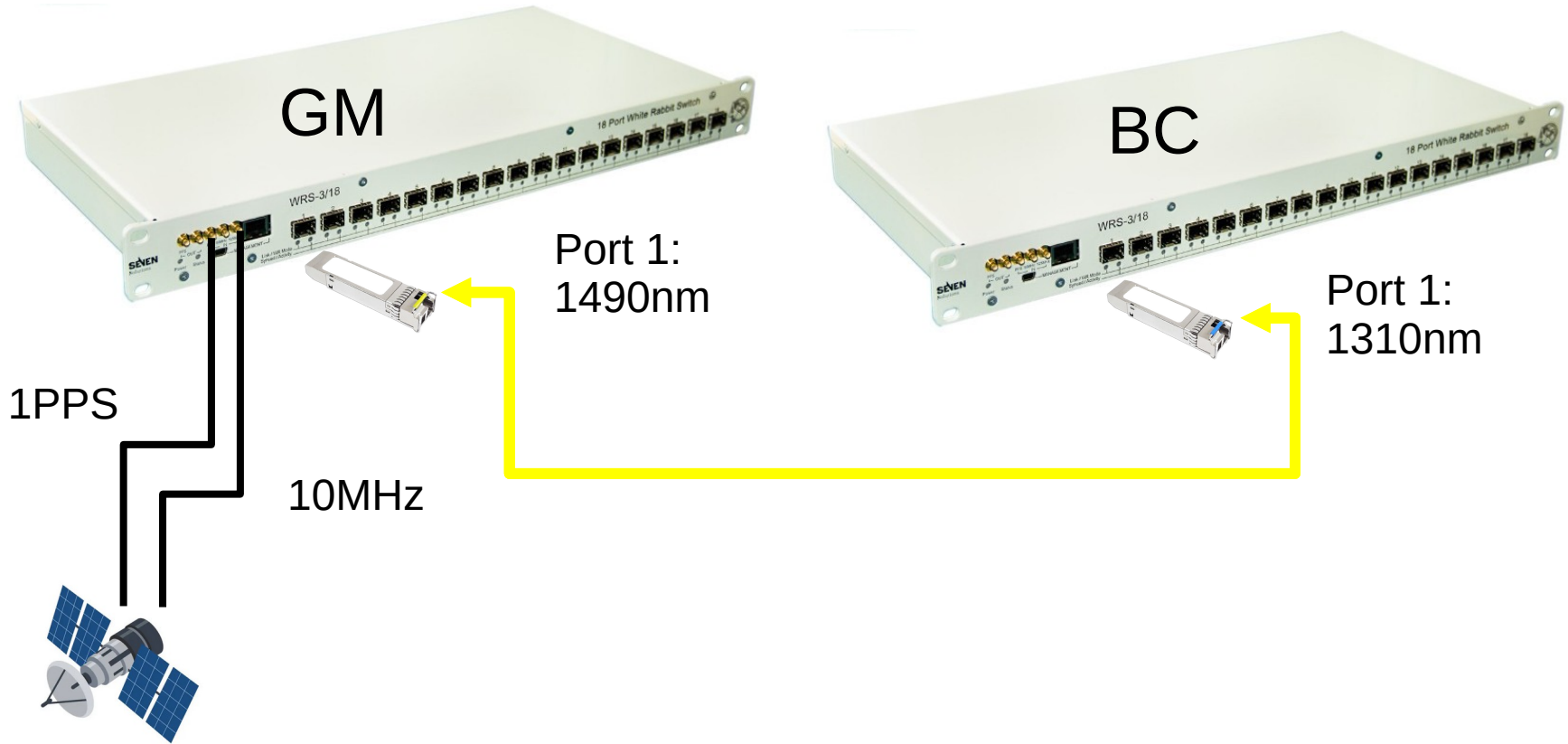
BNC

Communication with WRS

- ARM
 - USB Front (management)
 - USB Back (ARM)
 - RJ-45 Front
- FPGA
 - USB Back (FPGA)
 - 18x WR ports
- Limited traffic between ARM and Switching core



Lab setup



Hands-on session with wrs_menuconfig

- Based on dot-config from kernel
- Tools to configure
 - Manual editing (not recommended)
 - wrs_menuconfig
 - wrs_nconfig (recommended for serial connections)

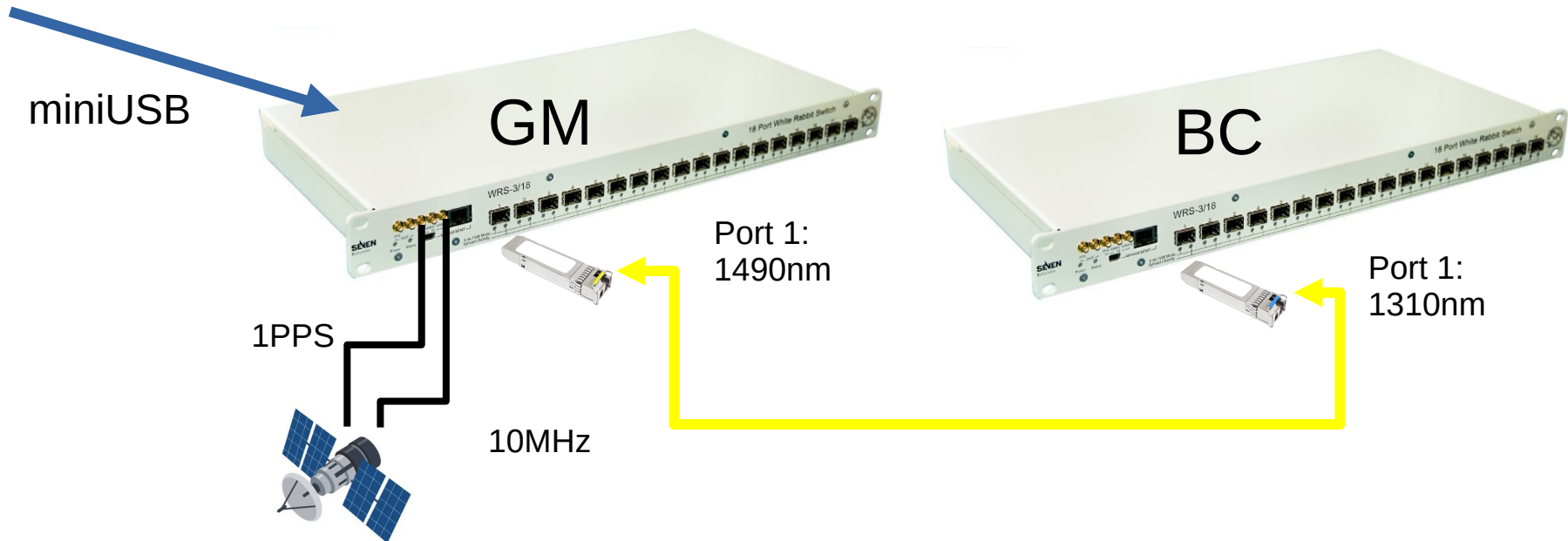
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White Rabbit Switch configuration          .config - White Rabbit Switch configuration
(8.0) Firmware version
() Hardware version
() Additional info about dot-config
Source for a run-time replacement of dot-config (Try to get the URL to a dot-config via DHCP) --->
*** XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX ***
*** XX Local Overwrite enabled! XX ***
*** XX (config values may be overwritten by values in XX ***
*** XX /update/permanent/dot-config/dot-config-overwrite) XX ***
*** XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX ***
[*] Overwrite dot-config with values locally stored in /update
Source for a run-time replacement of leap seconds file (Use local leap seconds file) --->
External source of Time of Day at boot --->
Local Network Configuration --->
Global PTP configuration (profile, timing mode, BMCA and external port config, ...) --->
Port PTP/Timing configuration --->
SFP and Media Timing Configuration --->
PPS generation --->
Management configuration --->
External clk2 clock signal configuration --->
NIC throttling configuration --->
[ ] Enable 500nm termination for 1-PPS input
Custom boot script configuration --->
LLDP options --->
Radius-vlan options --->
[*] Read SFPs' Diagnostic Monitoring
[*] Disable web interface
Developer options --->
RTU HP mask --->
VLANs --->
```

```
.config - White Rabbit Switch configuration          White Rabbit Switch configuration
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenu ---). Highlighted letters are hotkeys. Pressing <Y> includes,
<N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ] excluded <M> module
< > module capable

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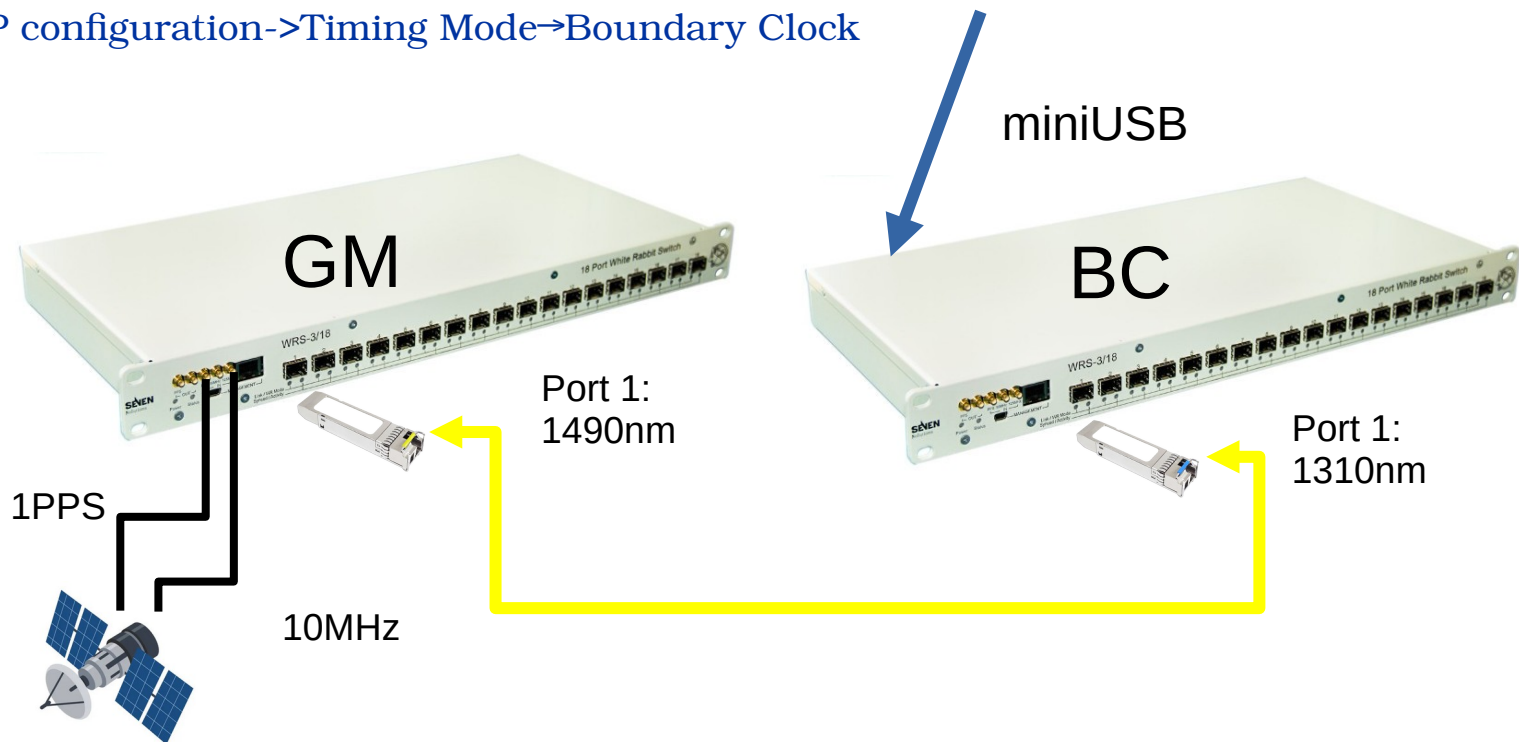
Configuration of Grand Master (GM)

- Connect to GM with USB (back)
- Set it as Grand-Master
 - Global PTP configuration->Timing Mode->Grand-Master
- Restart



Configuration of Boundary Clock (BC)

- Connect to BC with USB (back)
- Set it as Boundary Clock
 - Global PTP configuration->Timing Mode->Boundary Clock
- Restart

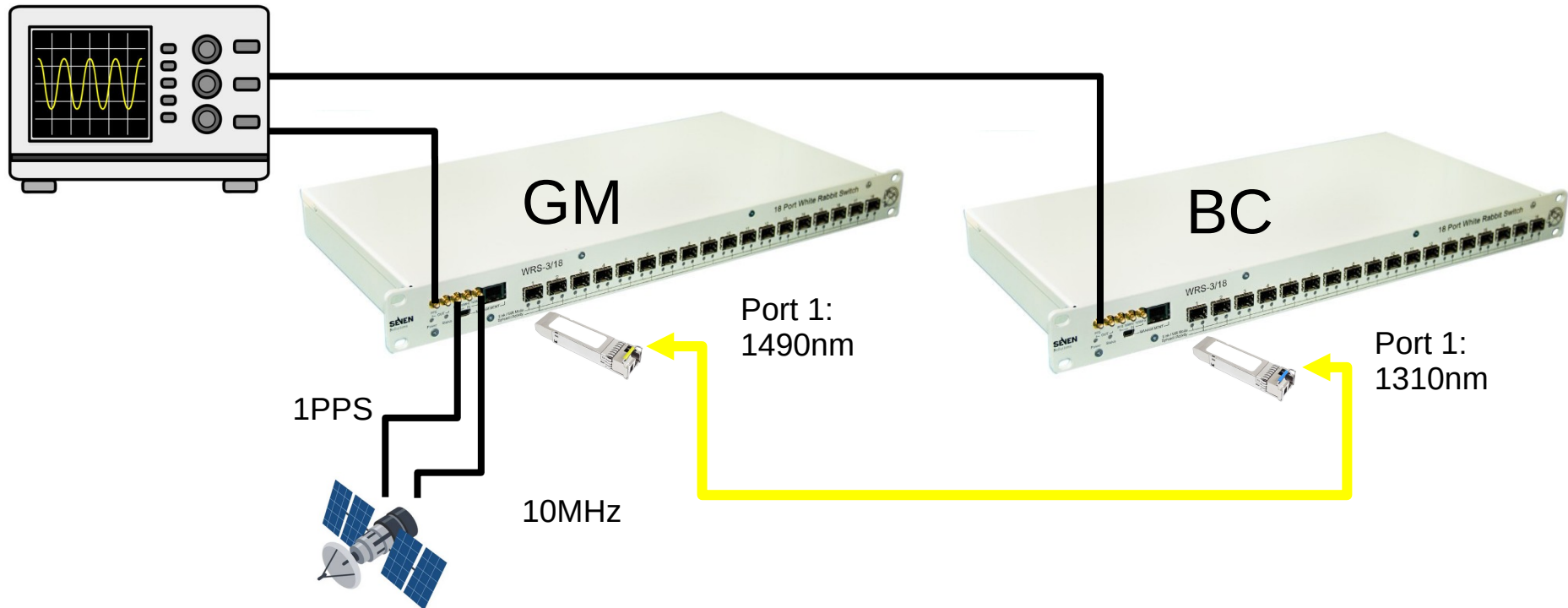


Lab setup

- Make sure everything is connected
 - Connect PPS from both WRS to scope
 - WRSEs are connected with SFPs and a fiber
- Observe that GM sync to external source
 - In wr_mon
- Observe that BC sync to GM
 - In wr_mon

Connecting Scope

- Connect GM's PPS-out with coaxial cable to oscilloscope (channel1)
- Connect BC's PPS-out with coaxial cable to oscilloscope (channel2)



Lab setup

- How to setup the scope
- Setup a scope:
 - Enable channel 1 and 2
 - set timescale to 1ns/div (X axis)
 - voltage scale (y axis)
 - voltage offset
 - check termination setting
 - Configure trigger to channel 1
 - trigger level
 - trigger slope (rising)
- Refer to the slide from the previous day

Final Lab setup

- Make sure everything is connected
 - Connect PPS from both WRS to scope
 - WRSes are connected with SFPs and a fiber
- Observe that GM sync to external source
 - In wr_mon
 - On the scope
- Observe that BC sync to GM
 - In wr_mon
 - On the scope