Remote control of my amateur radio station over the Internet

This is a short description of how I have done remote control of my radio station over the Internet.
RemoteRig from Microbit has been the basic building block. The current radio is Yeasu FTdx-5000 and the amplifier Expert 2K-FA. Description is as of 18.1.2018.
Motivation

• If you have a second home with low noise environment and space for antennas but you would like to operate radio also from your city location, remote controlled station is an ideal solution.

• Building remote station is system engineering. You don’t build a radio but quite a complex radio system with automation and integration. It is very interesting.
  – You will learn more about IP and IT-technologies
  – Building such a station provides a lot of home building mini projects. Junction boxes, decoders, connection cables,

• And it works. Operating convenience can be brought to the same level as working locally at the radios.

• This technology is now so mature that an average ham can apply it.
Remote control over the Internet

Remote controlled functions include:
- switching the radio and amplifier on and off
- controlling the radio
- antenna selection is automatic based on radio band and frequency
- Ultrabeam antenna tuning is automatic based on radio frequency
- rotator selection (1/3) is automatic based on antenna selected
- rotator control is with mouse click
- linear amplifier band switching is automatic based on radio frequency
- rebooting is by SMS cell phone
The RemoteRig concept

<table>
<thead>
<tr>
<th>Connection Management (eg SIP)</th>
<th>Audio</th>
<th>TTL</th>
<th>RS232</th>
<th>RS232</th>
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</thead>
<tbody>
<tr>
<td>CODEC</td>
<td>Serial port COM 0</td>
<td>Serial port COM 1</td>
<td>Serial port COM 2</td>
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</table>

Data/Audio Transmission system

Ethernet/Internet
Remote site with linear, local operating capability
as of 18.1.2019

- Ultrabeam tuning
- Speaker
- PTT
- Keying
- Microphone
- CAT switch
- Remote CAT
- Local CAT
- Local SSB
- Local WSJT-X
- Mic switch
- Audio from PC
- 2x RS232 to keying & PTT
- Foot switch
- Power on
- RF to antennas
- Antenna selection decoder
- OH1TV
- Antenna relays
- 5 antennas
- Rotator selector
- 1:3 OH1TV Outdoors
- Rotator control
- YAESU G-1000DXC
- Band data
- Local mic
- Remote mic
- Local SSB
- Local WSJT-X
- ALC
- PTT
- RF
- +12V
- Power
- Port
- RF to antennas
- Port
- COM 1
- COM 2
- 4G modem and router
- LAN – Ethernet
- USB
- Microbit Web switch
- Microbit Setup Manager SW
- Logging SW
- DX4WIN / TR4W
- WSJT-X SW
- PC with:
Remote site detail, for local operation only
USB > RS232 > keying and PTT

PC with:
- Digital mode
  WSJT-X v2.0.0
- Logging SW
  DX4WIN / TR4W
- Microbit Setup Manager SW

PC used only when operating locally

Different SW applications can control PTT and keying

USB to 4 x RS232 serial adapter
VScom USB-4COM

In: 2 x RS232
Out: DTR to keying
RTS to PTT
Includes
Opto-isolators
OH1TV

Keying from RRC
To radio Keying
PTT
Foot switch
CAT to radio via remote-local switch

18.1.2019
OH1TV
Connection to remote station is opened and closed with Browser.
Radio is opened by Remoterig Yeasu feature

PC with:
- Internet Browser - rotator control
- SPE-2K-FA linear
  Control SW
- FT5k control
  HRD v 6.5.0 SW
- General Logging
  DX4WIN v 9.04 SW
- Digital mode
  WSJT-X v2.0.0
- Microbit Setup
  Manager SW

LAN - Ethernet

1 x USB

USB to
4 x RS232
Serial adapter

COM 1
COM 2

RS232 /
Keying transistor

I/O

2-way audio

External Memory
Keyer

Audio PTT
box
Galvanic isol
SSB/Digi switch

I/O

Digi PTT

Digi in
Digi out

Microphone

PTT

Headphones

Keyer paddle

Router

DSL
10M/10M

COM 16-COM 15

Internet Browser - rotator control

Total 7 "boxes"
Screen shot at the control end

WSJT-X

WSJT-X

Log

Radio

Linear

Rotator