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 22.1.2012. Earlier I used K3 radio and the solution was quite similar.
Motivation

• If you have a second home with low noise environment and space for antennas but would like to operate radio 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 except its menu driven items
• antenna selection is automatic based on radio band and frequency
• SteppIR antenna tuning is automatic based on radio frequency
• rotator selection (1/3) is automatic based on antenna selected
• rotator control is with mouse click on map
• linear amplifier band switching and tuning is automatic based on radio frequency
• rebooting of ADSL-modem and rotator control is by 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>
</tr>
</thead>
<tbody>
<tr>
<td>CODEC</td>
<td>Serial port COM 0</td>
<td>Serial port COM 1</td>
<td>Serial port COM 2</td>
<td></td>
</tr>
</tbody>
</table>

#### Data/Audio Transmission system

![RemoteRig diagram](image-url)
Remote site, without easy local operating capability
This is how I started
Remote site, with local operating capability
This was my second evolution version

SteppIR control

Galvanic isolation

SteppIR tuning

SteppIR Y-cable

CAT switch

Local CAT RS232

Remote CAT

COM 2/com 0

Microbit RemoteRig

Radio end

RRC1258MkII

FW v2.50

COM 1

Rotator control

Yaeasu G-1000DXC

Idiom Press RotorCard

Antenna selection decoder OH1TV

Antenna relays

Speaker

PTT

Keying

Microphone

Band data

Mic switch

Remote

Local

Local mic

Rotator selector

1:3 OH1TV

Outdoors

3 rotators Yaeasu G-1000

Antenna relays

NAT

DMZ or port forwarding

ADSL 2M/0.5M

ADSL terminal and router Telewell EA501

LAN – Ethernet

USB

PC with:

Voice keyer

SM3W

Logging SW

DX4WIN / TR4W

Microbit Setup Manager SW

COM 1

PTT

Keying

2xRS232 to keying & PTT

Foot switch

SteppIR tuning

CAT RS232

Remote CAT

COM 1

LAN – Ethernet

USB

PC with:

Voice keyer

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COM 2/com 0

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ADSL terminal and router Telewell EA501

LAN – Ethernet

USB

PC with:

Voice keyer

SM3W

Logging SW

DX4WIN / TR4W

Microbit Setup Manager SW

Total 12 "boxes"
Remote site with linear, local operating capability

My third evolution version as of 22.1.2012

My third evolution version as of 22.1.2012

Remote site with linear, local operating capability

My third evolution version as of 22.1.2012
Remote site detail, for local operation only
USB > RS232 > keying and PTT

Two different SW applications can control PTT and keying

PC with:
- Voice keyer
  SM3W
- Logging SW
  DX4WIN / TR4W
- Microbit Setup
  Manager SW

PC used only when operating locally

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

In: 2 x RS232
Out:
  DTR to keying
  RTS to PTT

Includes
Opco-isolators
OH1TV

1x USB

RS232
RS232
RS232
RS232
RS232
RS232

CAT to radio via remote-local switch

Keying from RRC
To radio
Keying
PTT
Foot switch
Remote site
Serial settings COM1 and COM2

RRC-1258 MkII: Radio [OH1TV]

<table>
<thead>
<tr>
<th>Serial settings</th>
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<tbody>
<tr>
<td>COM1 mode</td>
</tr>
<tr>
<td>4800 baudrate</td>
</tr>
<tr>
<td>8 data bits</td>
</tr>
<tr>
<td>1 stop bits</td>
</tr>
<tr>
<td>0 - Off parity</td>
</tr>
<tr>
<td>No rts/cts</td>
</tr>
<tr>
<td>00 terminator (hex)</td>
</tr>
</tbody>
</table>

| COM2 mode                |
| 19200 baudrate           |
| 8 data bits              |
| 1 stop bits              |
| 0 - Off parity           |
| 00 terminator (hex)      |

Submit
Basic control site
This is how I started

Connect / disconnect commands Remote-site set-up, FW update and monitoring

PC with:
- Internet Browser
- Rotator Control HRD rotator v 5 SW
- FT5k control HRD v 5 SW
- FT5k power on/off IW1AWH utility
- Microbit Setup Manager SW

Needed only to set the IP-address in the beginning

Microbit RemoteRig
Control end
RRC1258MkII FW v2.50

Router
D-link
DSL 2M/2M
LAN - Ethernet
COM 1
COM2/COM 0
USB
AUX/MIC
AUX/MIC box
Headphones Microphone PTT
Keyer paddle

Internet Browser
Rotator Control HRD rotator v 5 SW
FT5k control HRD v 5 SW
FT5k power on/off IW1AWH utility
Microbit Setup Manager SW

LAN - Ethernet
USB
AUX/MIC
AUX/MIC box
Headphones Microphone PTT
Keyer paddle

Total 4 "boxes"
Current control site

PC with:

- Internet Browser
- Rotator Control (HRD rotator v 5 SW)
- FT5k control (HRD v 5 SW)
- Microbit Setup Manager SW
- General Logging (DX4WIN v 8.05 SW)
- Contest Logging (TR4W SW)
- CW Keying via USB - USB cable

Connection to remote station is opened and closed with Browser.
Radio is opened automatically when opening the connection, RRC feature

Microbit RemoteRig
Control end
RRC1258MkII FW v2.50
I/O

AUX / MIC box
Headphones
Microphone
PTT

Keyer paddle

Radio on LED
Linear on/off switch
Linear on LED

I/O box

LAN - Ethernet

Router
D-link

DSL 2M/2M

OR

Connection to remote station is opened and closed with Browser.
Radio is opened automatically when opening the connection, RRC feature

PC: Microbit RRC Virtual Comport (COM5), set in DX4WIN and TR4W
RRC: IO –settings: USB DRT as CW: YES

Total 5 "boxes"
Screen shot of the Control panel
Control site with RRC Micro PC-client
Control with RRC-Micro PC-client

This is another way to control the remote station

IW1AWH utility doesn’t work here with v1.4.0 even if it is ok with RRC based control station. It is not really made for FT5k but other Yeasu radios.

More about RRC Micro PC-client on Microbit’s pages