

Remote Radio Operation for Dummies

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Why remote operation?



- if you travel often you can still enjoy ham radio,
(even from an hotel room or from CERN's cafeteria)
- you could set up your station in a noise-free location
- your home QTH doesn't have room for big antennas

Some references



much information on the web

several different solutions

No much information on CW available

Much help from Dave G3YXM

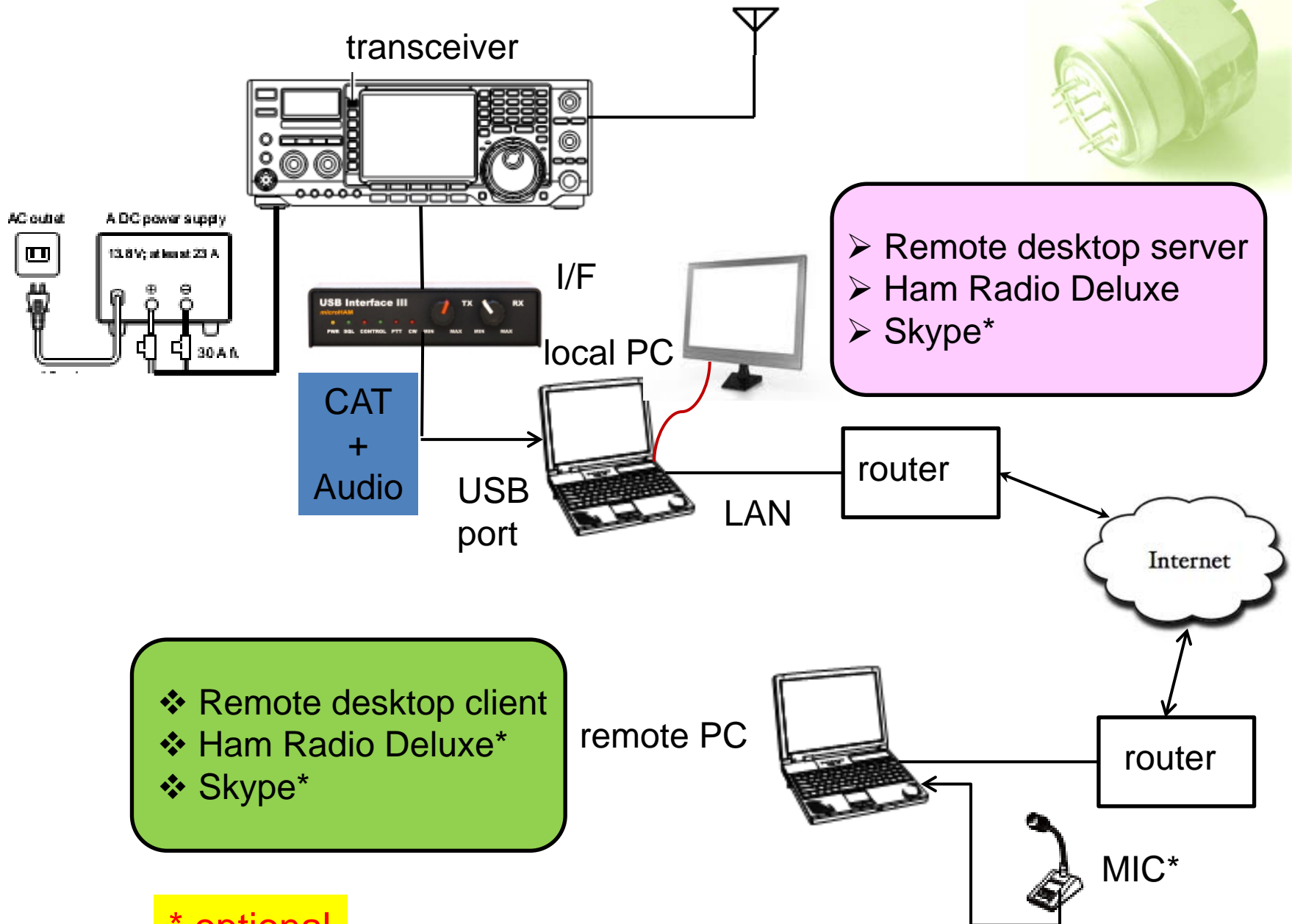
➔ <http://www.wireless.org.uk/remote.htm>

What we need



Minimal setup

- a (fast) ADSL connection
- a PC (desktop or laptop) to control the radio
- a CAT-enabled transceiver
- a PC-Radio interface with proper cables
- some (free) software



Radio-PC CAT Interface

- ❖ For transceiver CAT control. At least a cable with proper plugs and level/protocol interface. ICOM requires an interface between CI-V and a serial or USB bus. For other radios a serial cable could be enough (maybe with a USB to RS232 translator if your PC only has USB ports)
- ❖ Audio cables between the PC sound card and the radio..

Several commercial and homebrew options available.
I use MicroHam **USB Interface II** to perform both functions.

- Incorporates CI-V to USB translator (no need to buy the Icom adapter)
- Has isolation transformers on the audio lines (very important)



➔ Be sure to order it with the cables for your radio



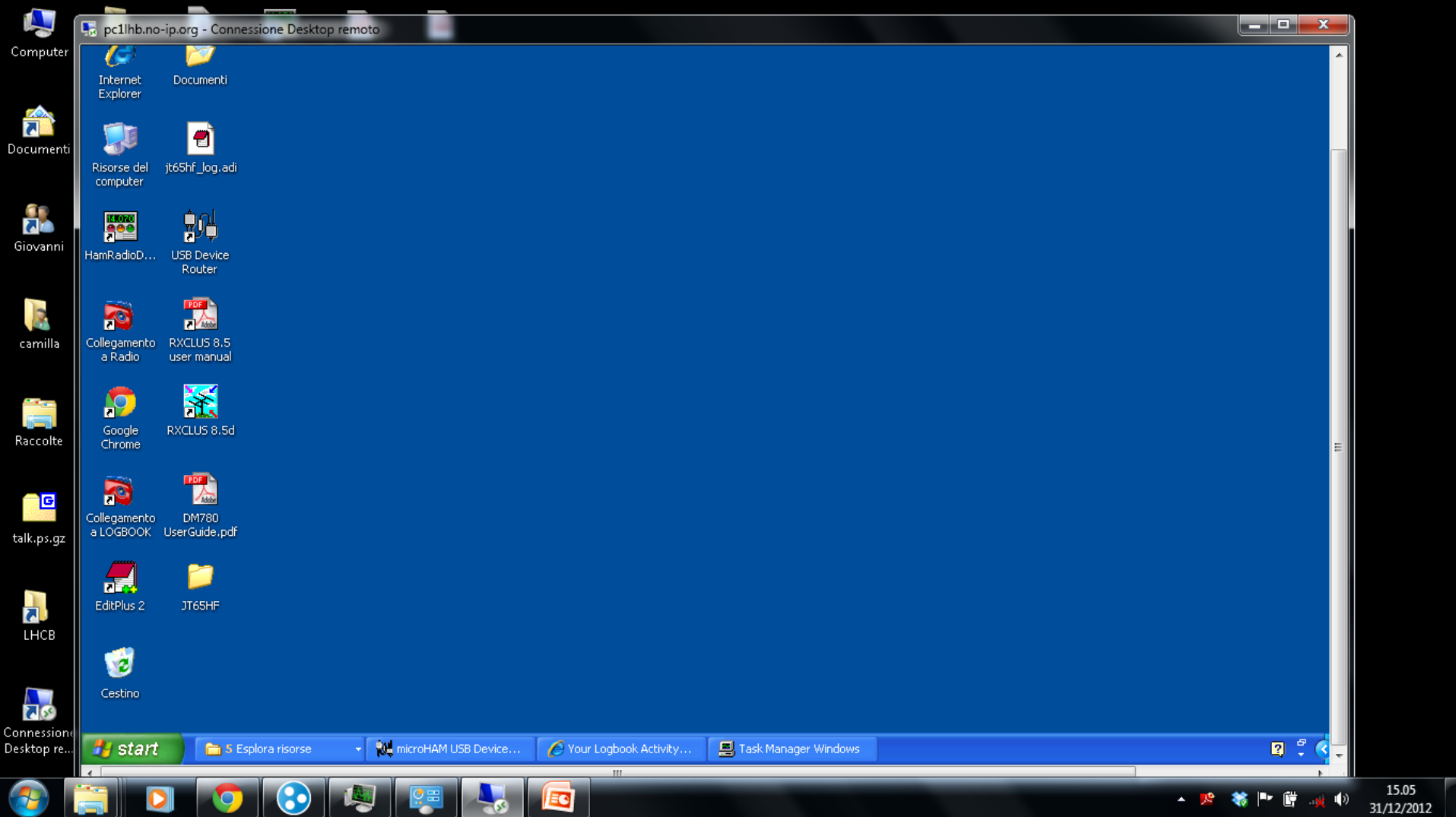
For radio control there are a few programs

I will focus on **Ham Radio Deluxe** since it 's free and very flexible and allows client-server operation

For remote login I explored three free solutions

- ☐ Microsoft Remote Desktop
- ☐ TightVNC and its possible variants
- ☐ LogMeIn
- ☐ Chrome Remote Desktop

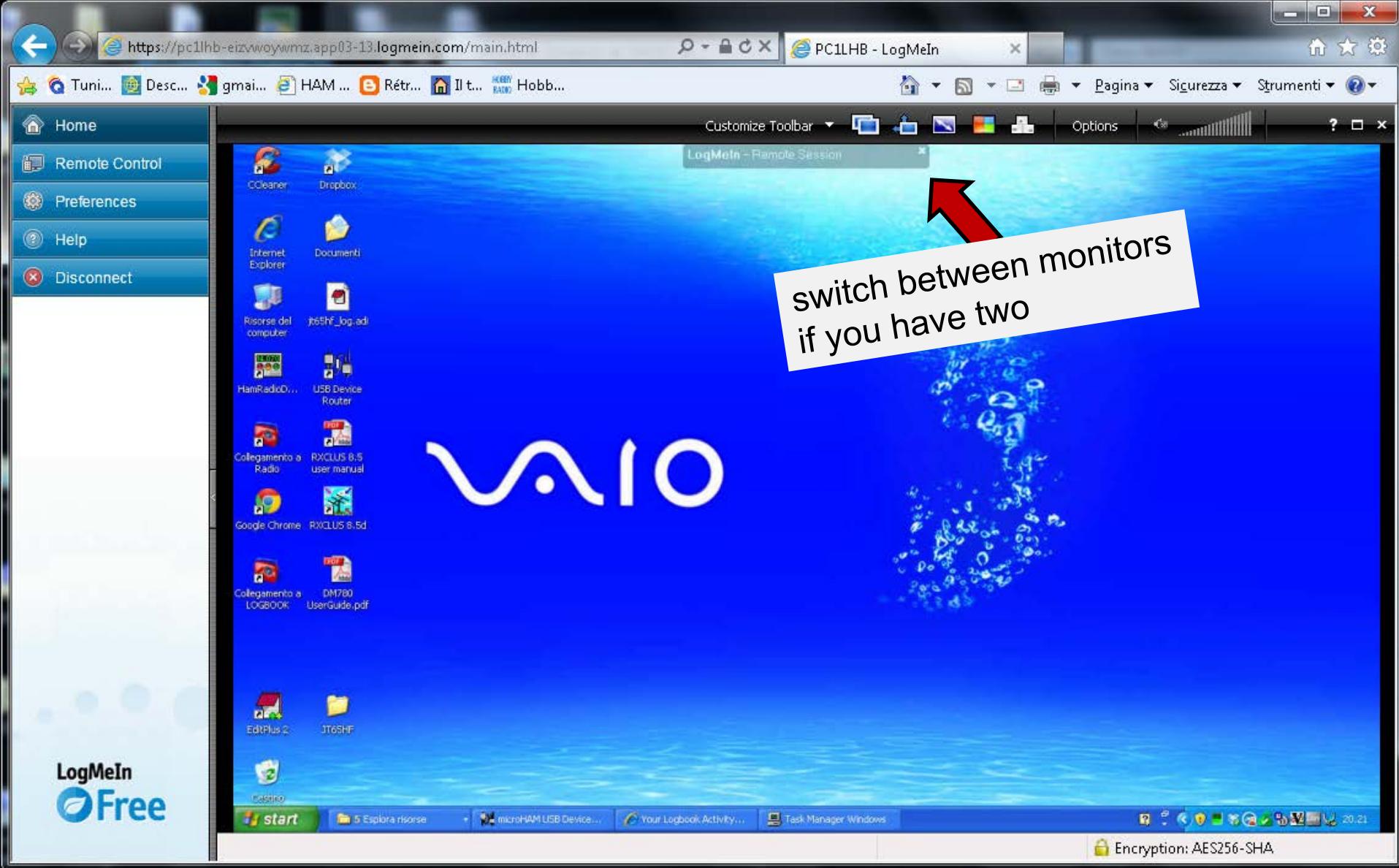
your choice....



heavy

Windows Remote Desktop

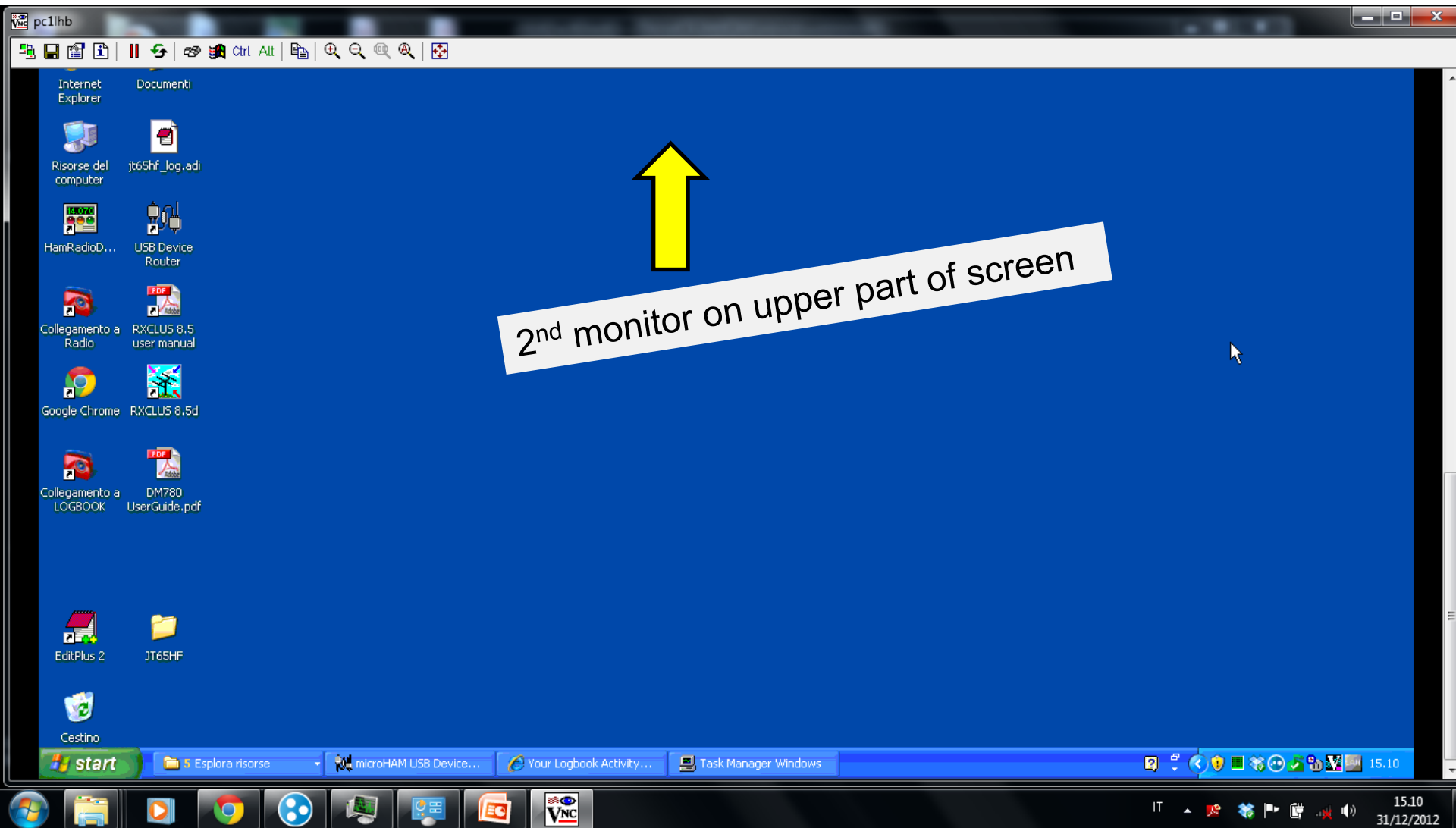
→ The server only works with professional Windows versions
(XP., Win 7)



LogMeIn is another solution for remote desktop

Lighter

Non-professional version is free



Tight VNC

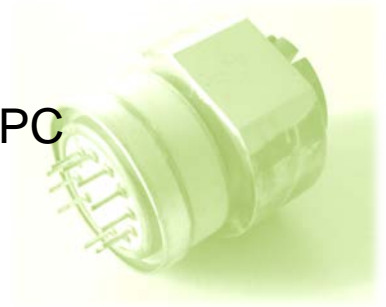
Freeware

<http://www.tightvnc.com/>

Lightest

5/5/2013 IZ5PQT

the audio input/output from the radio must go to the local PC



to transmit the audio over the internet (VoIP) the simplest solution is to use SKYPE.

I also tried PicoPhone, a very simple VoIP program, but Skype seems to be better. IPsound does not work on Win 7

You need two separate accounts on the local and remote PC

If you work only in digital modes the minimal solution does not require Skype, unless you want to hear the psk tones. All the audio processing and generation occurs in the local PC.



If you use Skype you should setup the local PC Skype for automatic reply

The radio must be left always on (more on this later) unless you have somebody that can switch it on for you

Then

- 1) Log in remotely on the local PC
- 2) Start HRD and possibly DM780 or MMTTY or WSIT-X on the local PC
- 3) Call the local PC on Skype (mandatory if you work phone, optional for psk). It will answer automatically putting the audio online.

Now you can work as if you are in front of the local PC

BUT.....

..which IP address for the local PC?



If it has a static IP address (example: CERN machine), no problem. Just enter its number or name.

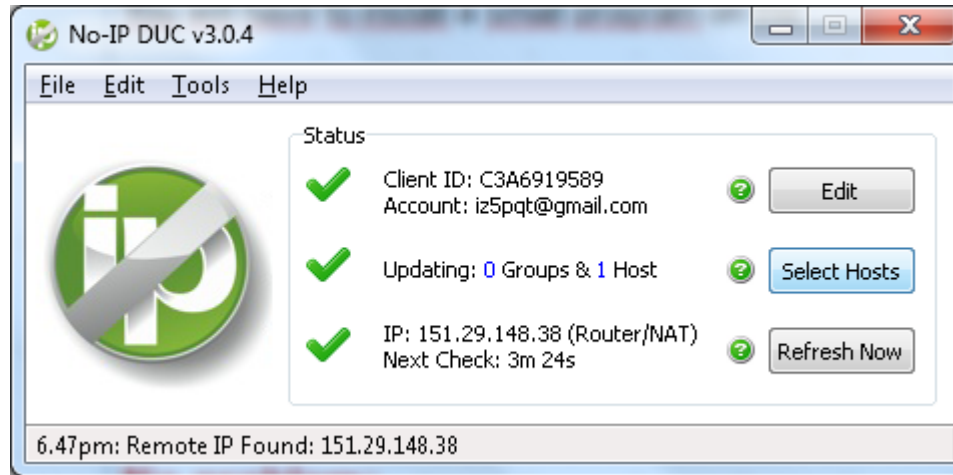
But your home ADSL provider will in general assign a dynamic IP that changes every time you restart the connection.

No problem:

use a service like no-ip (free) or dyndns.

Register an account with no-ip.com. Your local PC will be assigned a name. In my case this is **pc1lhb.no-ip.org**

When you register you will be asked to install a small program on the local PC

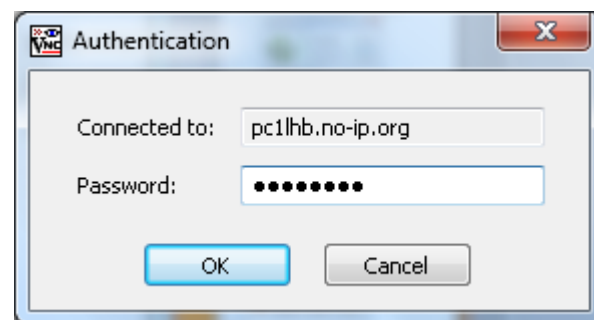
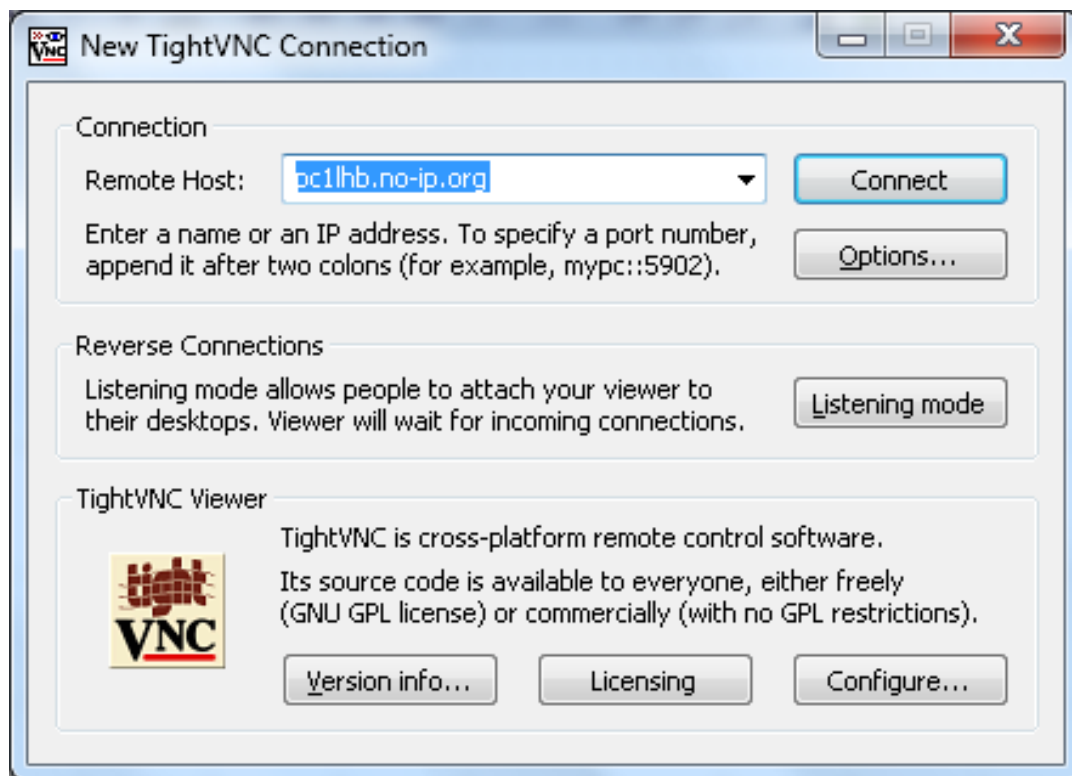


This will continuously monitor the true IP of the local PC and assign it to the computer name, pc1lhb.no-ip.org in my case.

It should be configured to start automatically when the PC boots (default option)

👉 You don't need a dynamic DNS if you use LogMeIn

Then you simply enter



to login remotely (in this case via VNC)

Firewalling



Example of allowed services in the router firewall (Windows firewall is disabled)

NETGEAR SMARTWIZARD™ router manager
N150 Wireless ADSL2+ Modem Router model DGNT1000

Firewall Rules

Outbound Services

	#	Enable	Service Name	Action	LAN Users	WAN Servers	Log
	Default	Yes	Any	ALLOW always	Any	Any	Never

Add Edit Move Delete

Inbound Services

	#	Enable	Service Name	Action	LAN Server IP address	WAN Users	Log
<input type="radio"/>	1	<input checked="" type="checkbox"/>	RDP	ALLOW always	192.168.0.11	Any	Never
<input type="radio"/>	2	<input checked="" type="checkbox"/>	HRD	ALLOW always	192.168.0.11	Any	Never
<input type="radio"/>	3	<input checked="" type="checkbox"/>	VNC	ALLOW always	192.168.0.11	Any	Never
<input type="radio"/>	4	<input checked="" type="checkbox"/>	VNC2	ALLOW always	192.168.0.11	Any	Never
<input type="radio"/>	5	<input checked="" type="checkbox"/>	PicoPhone	ALLOW always	192.168.0.11	Any	Never
<input type="radio"/>	6	<input checked="" type="checkbox"/>	PicoPhone	ALLOW always	192.168.0.10	Any	Never
<input type="radio"/>	7	<input checked="" type="checkbox"/>	WOL	ALLOW always	192.168.0.11	Any	Never
<input type="radio"/>	8	<input checked="" type="checkbox"/>	Telecamera	ALLOW always	192.168.0.11	Any	Never
	Default	Yes	Any	BLOCK Always	Any	Any	Never

Add Edit Move Delete

IP of local PC in your LAN

192.168.0.11

Firewalling

port definition for the various services



The screenshot shows the Netgear Smart Wizard router manager interface. The top header includes the Netgear logo and the text "SMARTWIZARD™ router manager N150 Wireless ADSL2+ Modem Router model DGN1000". On the left is a navigation menu with options like "Setup Wizard", "Add WPS Client", "Setup", "Basic Settings", "ADSL Settings", "Wireless Settings", "Security", "Logs", "Block Sites", "Firewall Rules", "Services", "Schedule", and "E-mail". The "Services" page is active, displaying a "Service Table" with 7 rows. Each row has a status icon, a number, a service name, and a port number. Below the table are three buttons: "Add Custom Service", "Edit Service", and "Delete Service".

	#	Service Name	Ports
	1	HRD(TCP/UDP)	7805
	2	RDP(TCP/UDP)	3389
	3	VNC(TCP)	5800
	4	VNC2(TCP)	5900
	5	PicoPhone(TCP/UDP)	11676
	6	WOL(UDP)	9
	7	Telecamera(TCP/UDP)	90

The software provider will tell you what are the relevant ports to open

Other minor problem:



your local PC must be permanently on. Even if there is the possibility to wake up a switched-off or sleeping PC via its network card, in practice this won't work from outside the local network (LAN). → An UPS is very useful

More serious problem: switch the radio on or off

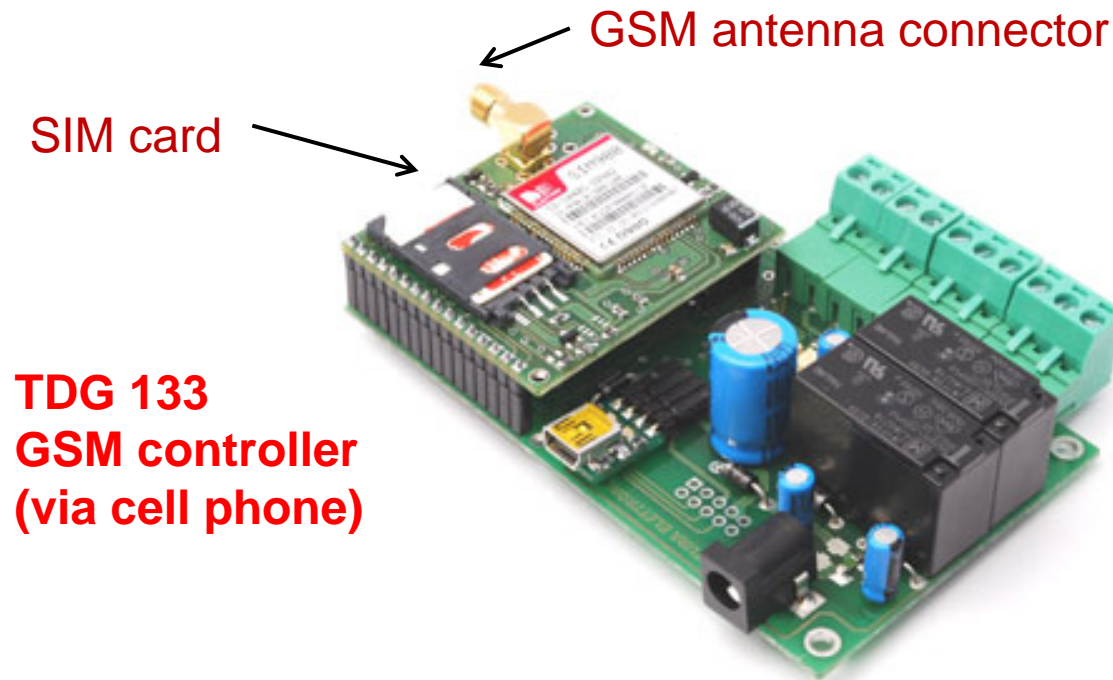
Some modern radios (e.g. Elecraft) have provisions for remote power switching. You just need a remote-controlled relay.

Others, like ICOMs, don't allow this.

My IC-765ProIII “remembers” its on/off state once the DC voltage is restored after switchoff, so I keep it on.

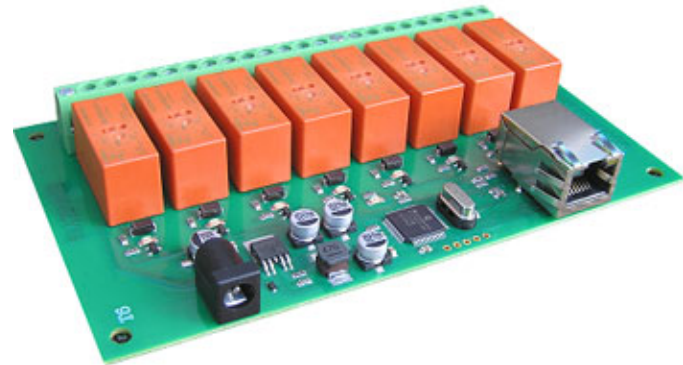
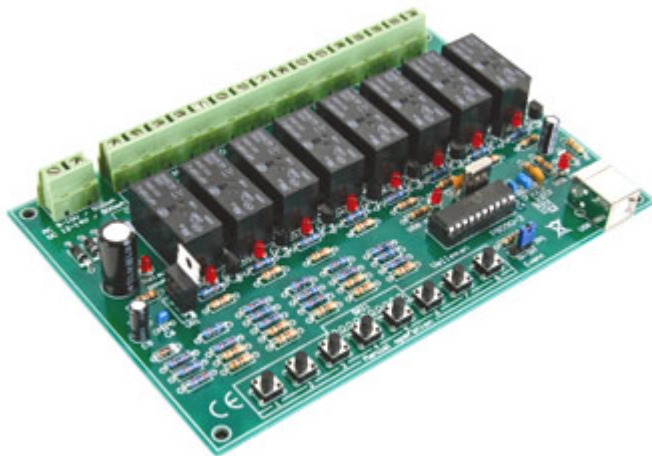
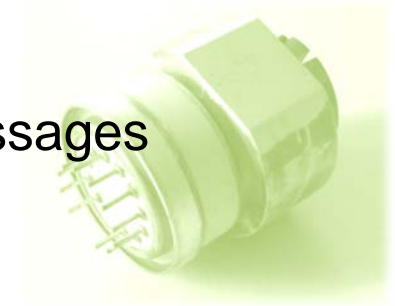


To turn it off I switch the 13.8 VDC line from the power supply (which I leave always on) using an automotive 40 A relay (available in car accessories shops for few Euros), in turn switched by another small relay in a GSM controller



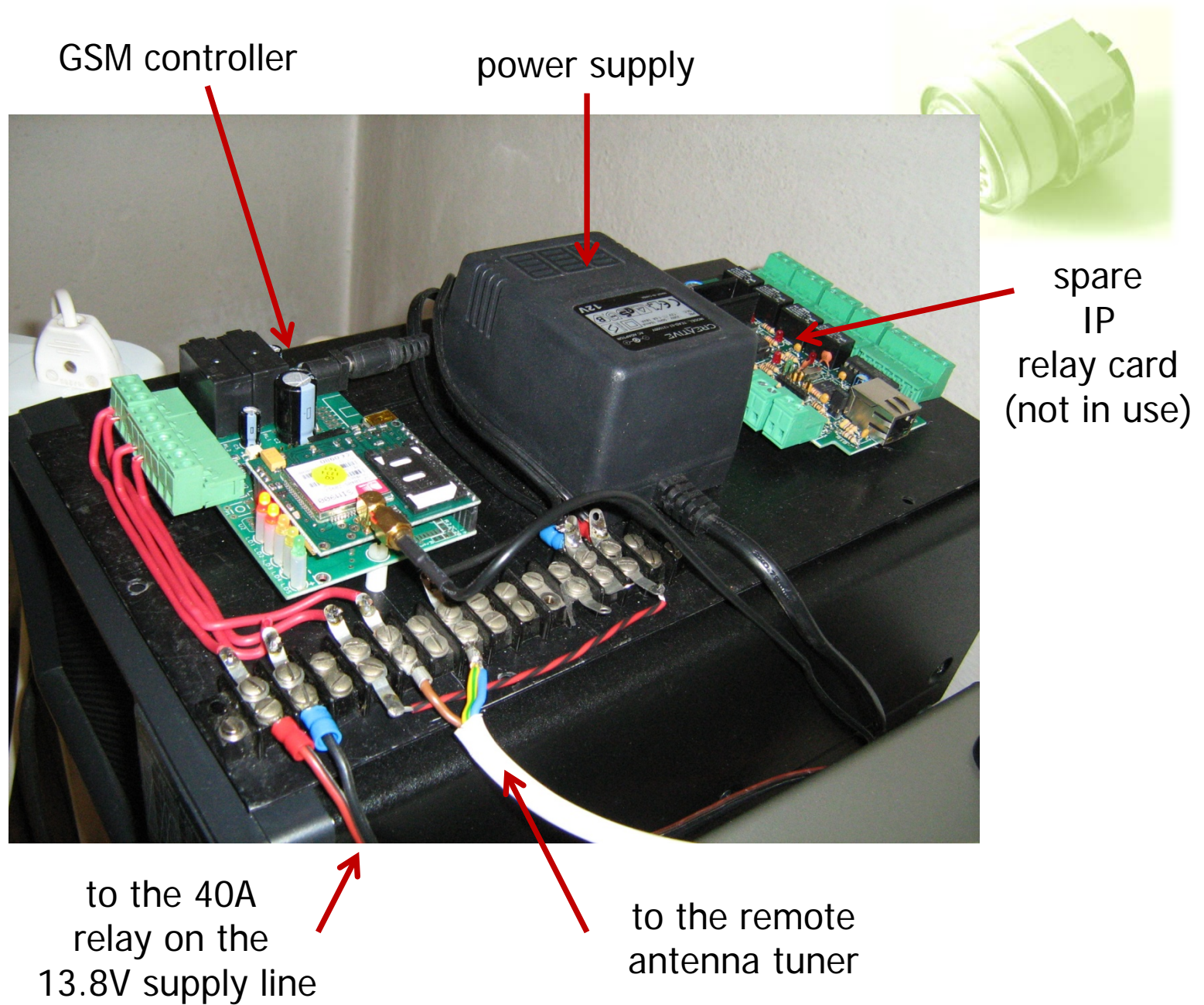
The TDG 133 is controlled and configured via text messages (SMS) from any cell phone. Very practical.

You could use instead an USB-relay I/F or an IP-relay I/F



check the futurashop.it site.

☞ I prefer to be independent from the local PC in case it hangs up,
leaving maybe the TX in transmission state



Why don't switch the 220 V mains to the PS?

Well, you could do that but there is the risk of some transient spike at power on and I did not want to take any risk.



The TDG133 has a second relay that could be used for that purpose. I use it instead to power on and off my remote antenna tuner.

Or you can build some simple circuit that sequentially turns on 220 VAC and then the 13.8 VDC.

Many possibilities!!

Extra refinement. Check if the radio is on/off or on fire.



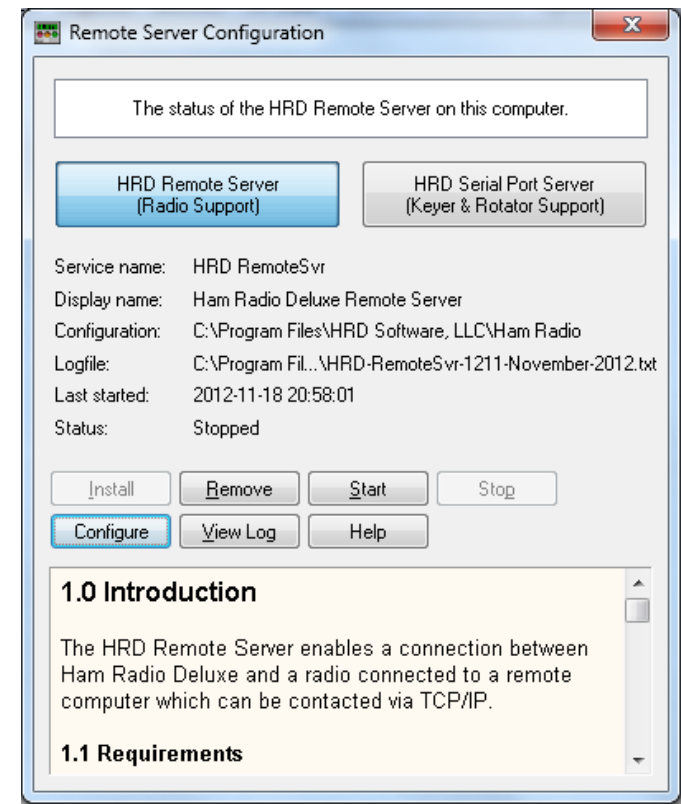
Possible alternative: HRD client-server mode



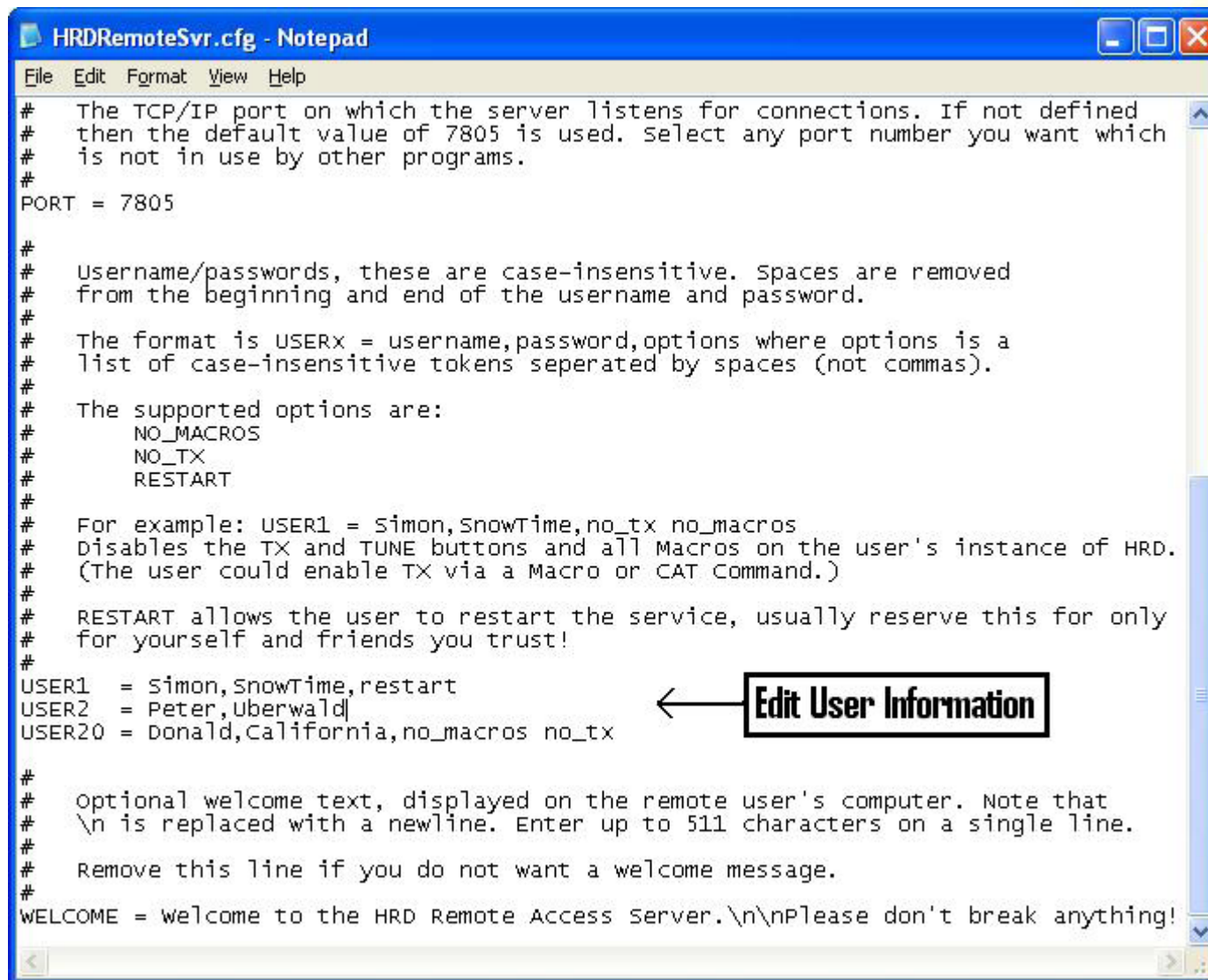
The remote desktop plus the VoIP traffic (phone mode)
and (if used) the DM780 waterfall refresh (digital modes)
put a heavy load on the PC and the network
connection

A possibility is to run HRD and DM780 as
clients on the remote PC and use only
the light HRD server on the local PC

In this case you don't even need the
remote desktop connection:
you do everything remotely



configuration of HRD server on radio PC



```
HRDRemoteSvr.cfg - Notepad
File Edit Format View Help
# The TCP/IP port on which the server listens for connections. If not defined
# then the default value of 7805 is used. Select any port number you want which
# is not in use by other programs.
#
PORT = 7805
#
# Username/passwords, these are case-insensitive. Spaces are removed
# from the beginning and end of the username and password.
#
# The format is USERx = username,password,options where options is a
# list of case-insensitive tokens separated by spaces (not commas).
#
# The supported options are:
#     NO_MACROS
#     NO_TX
#     RESTART
#
# For example: USER1 = Simon,SnowTime,no_tx no_macros
# Disables the TX and TUNE buttons and all Macros on the user's instance of HRD.
# (The user could enable TX via a Macro or CAT Command.)
#
# RESTART allows the user to restart the service, usually reserve this for only
# for yourself and friends you trust!
#
USER1 = Simon,SnowTime,restart
USER2 = Peter,Uberwald
USER20 = Donald,California,no_macros no_tx
#
# optional welcome text, displayed on the remote user's computer. Note that
# \n is replaced with a newline. Enter up to 511 characters on a single line.
#
# Remove this line if you do not want a welcome message.
#
WELCOME = Welcome to the HRD Remote Access Server.\n\nPlease don't break anything!
```

← **Edit User Information**

Connecting to the remote HRD server



Remote Connection

Connect to a computer running the HRD Remote Access Program

Previous Connections

Address	User	Port	PTT Config
151.29.213.211:7805	giovanni	COM1	COM2, DTR
5.112.37.250:7805	giovanni	COM1	COM2, DTR
pc1lhb.no-ip.org:7805	giovanni	COM1	COM2, DTR

Remove

New Connection

Address: pc1lhb.no-ip.org

Port: 7805 Default = 7805

Username: giovanni

Password:

☒ Save settings

Connect Load Save

COM Ports

Logfile Restart

OK Cancel Help

server info

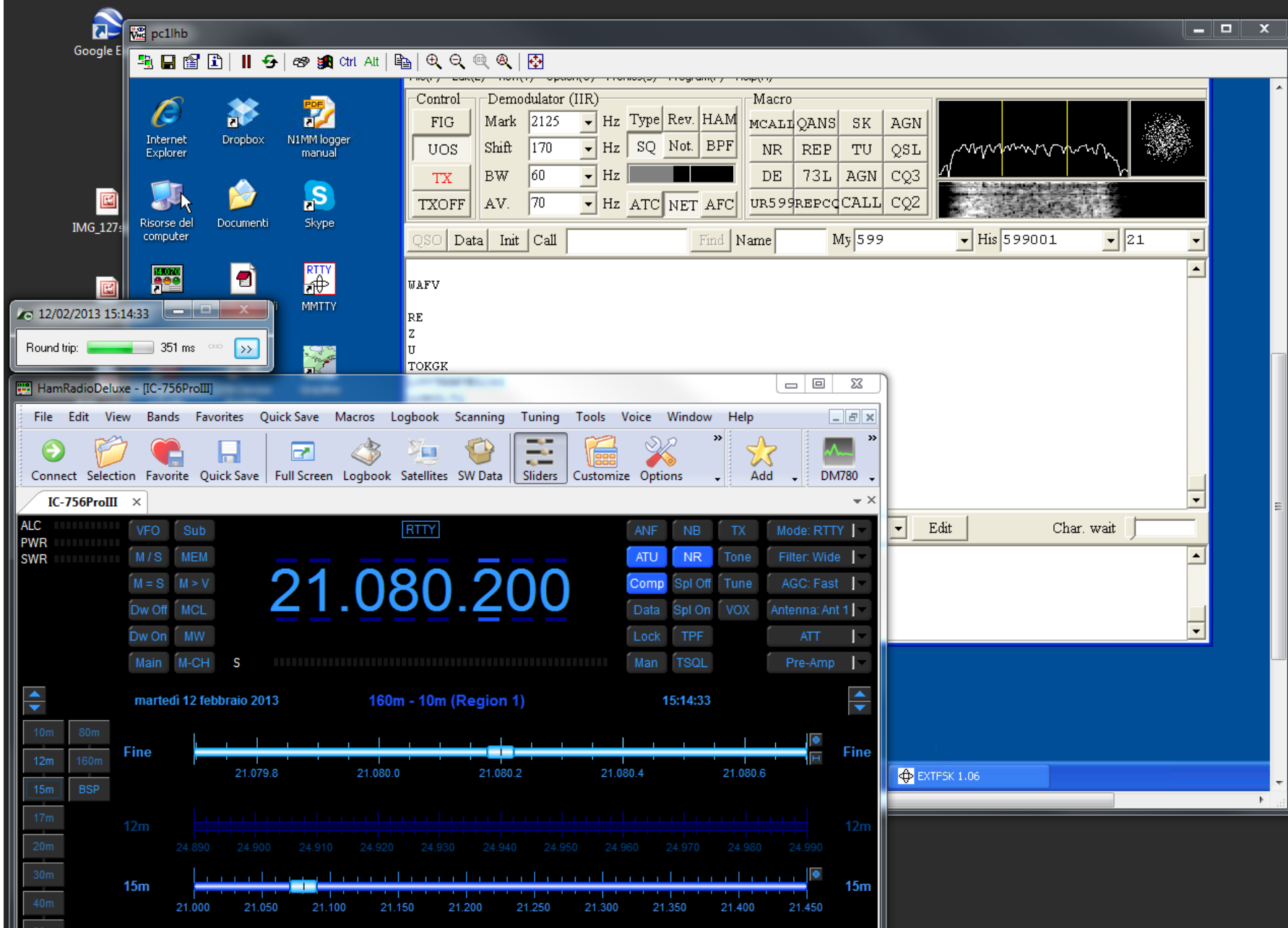
IP address of the radio PC

Client-server mode caveat

If you don't have a very fast internet connection the audio quality via skype is insufficient to use DM780 on the remote PC. In that case use the first method (remote desktop).



The HRD client provides a measurement of the ping delay on the connection. It should be as small as possible.

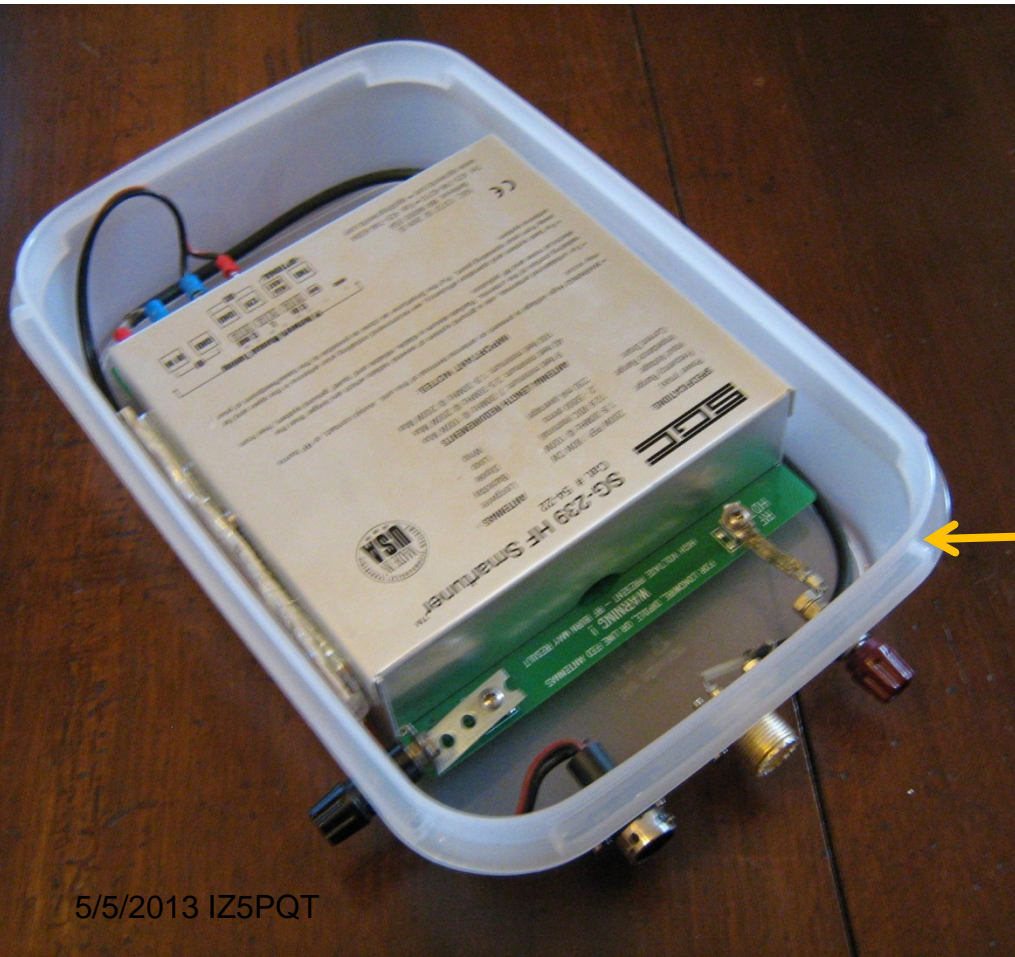


Final additions

- My antenna is an inverted-L which needs a tuner. I have now an automatic SG-239 external tuner.



- To switch on and off the tuner PS I use the second relay of the TDG133 GSM controller.



2-liter fridge box



Have fun!

Good DX!