

12th WSEAS CSCCC Multiconference
July 22-25, 2008,
Heraklion, Crete, Greece

TUTORIAL

4th IARIA ICWMC 2008 – 3rd ICCGI 2008
July 27 – August 1, 2008,
Vouliagmeni, Athens, Greece

- 
- **Amateur Radio in Engineering Education**
 - **Amateur Radio Telecommunications and Networking in Education**
-

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internet email: skoric@uns.ns.ac.yu

→ **radio email: YT7MPB@YT7MPB.#NS.YUG.EU**



Content (3 x 45-50 min.)

- Part 1 Why do we need this?
 Why don't we do something else?
- Part 2 How much does it cost?
 How much do we save?
 How long will this take?
- Part 3 Who has done this before?
 What do we plan next?
 ... and ...
- Quiz (***)



Part One

**-Why do we need
Amateur Radio ?**



**... student interest is waning in the United States
compared to the days of ...**

... the shrinking population of women in IT ...

... effort to get children excited and interested in technology ...

... Girls are unlikely to be drawn to technology ...

**... undergraduates interested in computer science
is at its lowest since the 1970s ...**



Basic principles and goals:

- To improve technological literacy
- To promote science and engineering
- To attract newcomers from doctors, lawyers, soldiers, students, artists ...
- To remain as a non-for-profit and voluntary activity – a hobby
- To remain as legal but less regulated activity

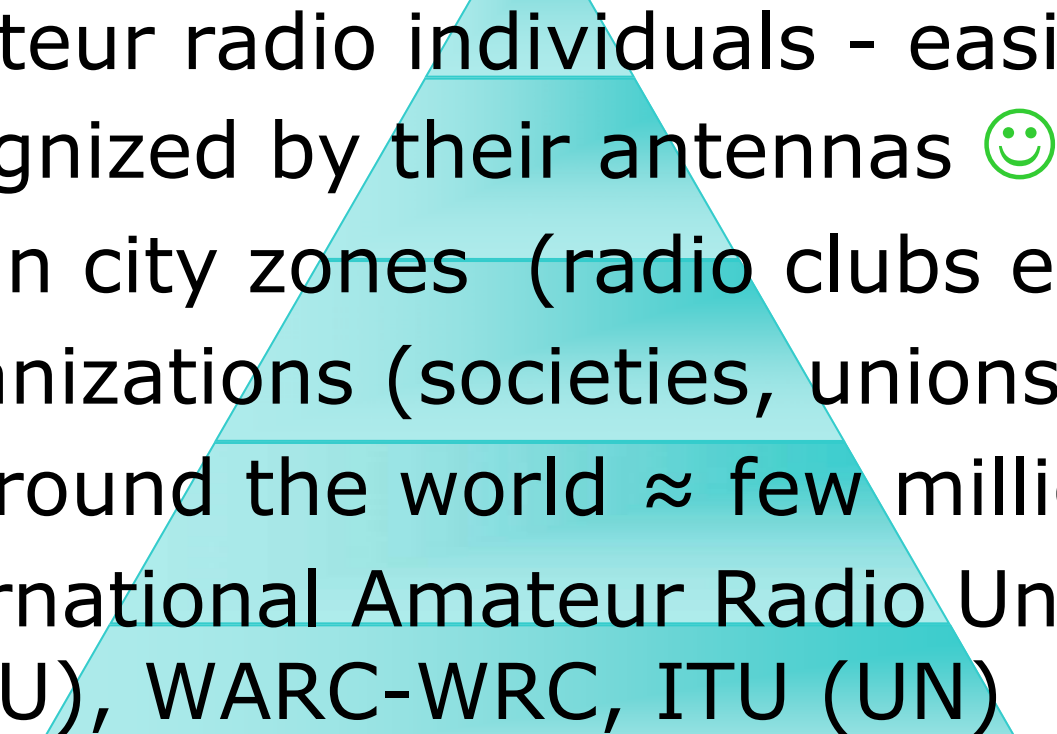


Main tasks of 'ham radio':

- Learning the basic radio skills
- Building and installing radio stations and other equipment
- Exchange knowledge worldwide
- Saving lives and properties after earthquakes, tornadoes, floods ...
- Help to the nation in peace and war

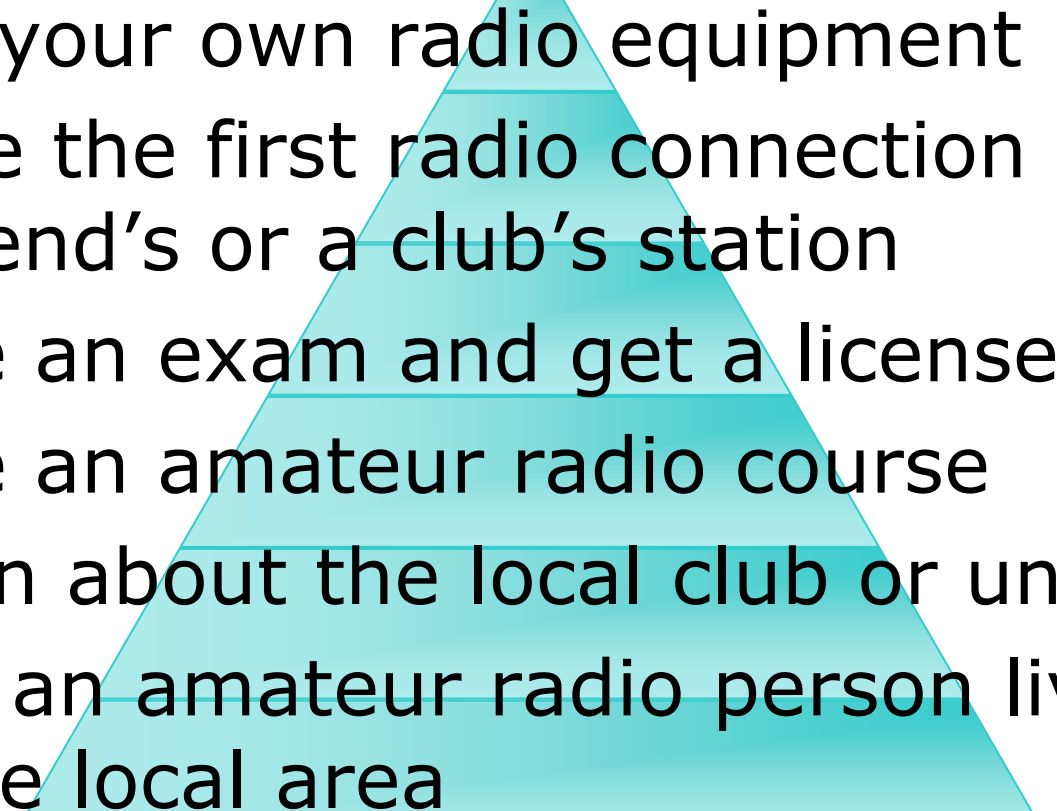


Where live the amateurs:

- 
- Amateur radio individuals - easily recognized by their antennas 😊
 - Urban city zones (radio clubs etc)
 - Organizations (societies, unions etc)
 - All around the world \approx few millions
 - International Amateur Radio Union (IARU), WARC-WRC, ITU (UN)



How to join the amateur radio:

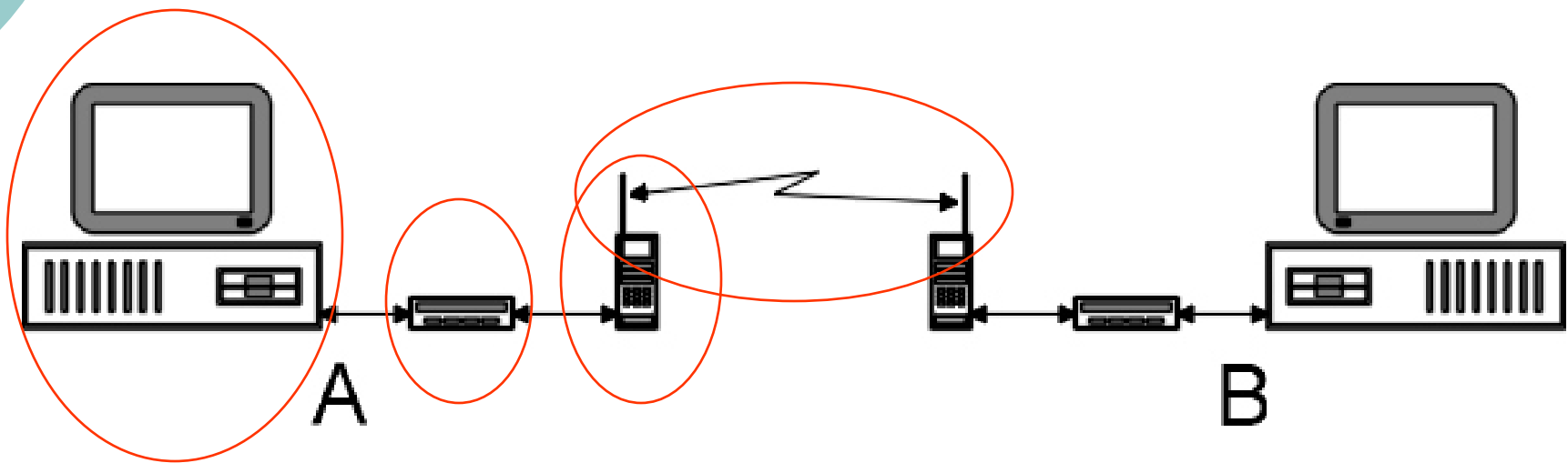
- 
- Buy your own radio equipment
 - Make the first radio connection with a friend's or a club's station
 - Take an exam and get a license
 - Take an amateur radio course
 - Learn about the local club or union
 - Find an amateur radio person living in the local area



Part One

- **What is the “packet-radio” ?**
- **Why don't we do something else instead of it?**

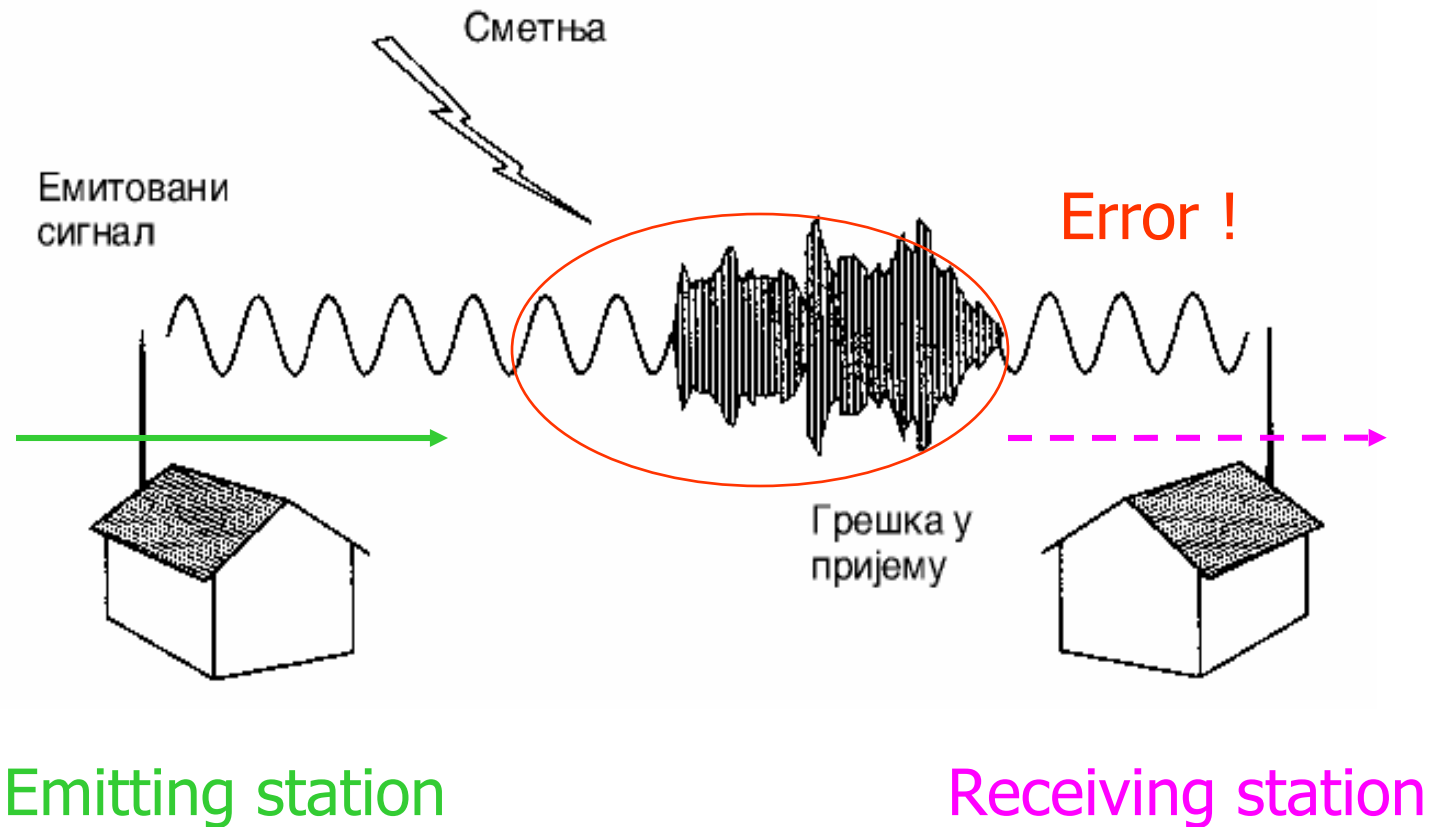
Direct amateur 'packet radio' ...



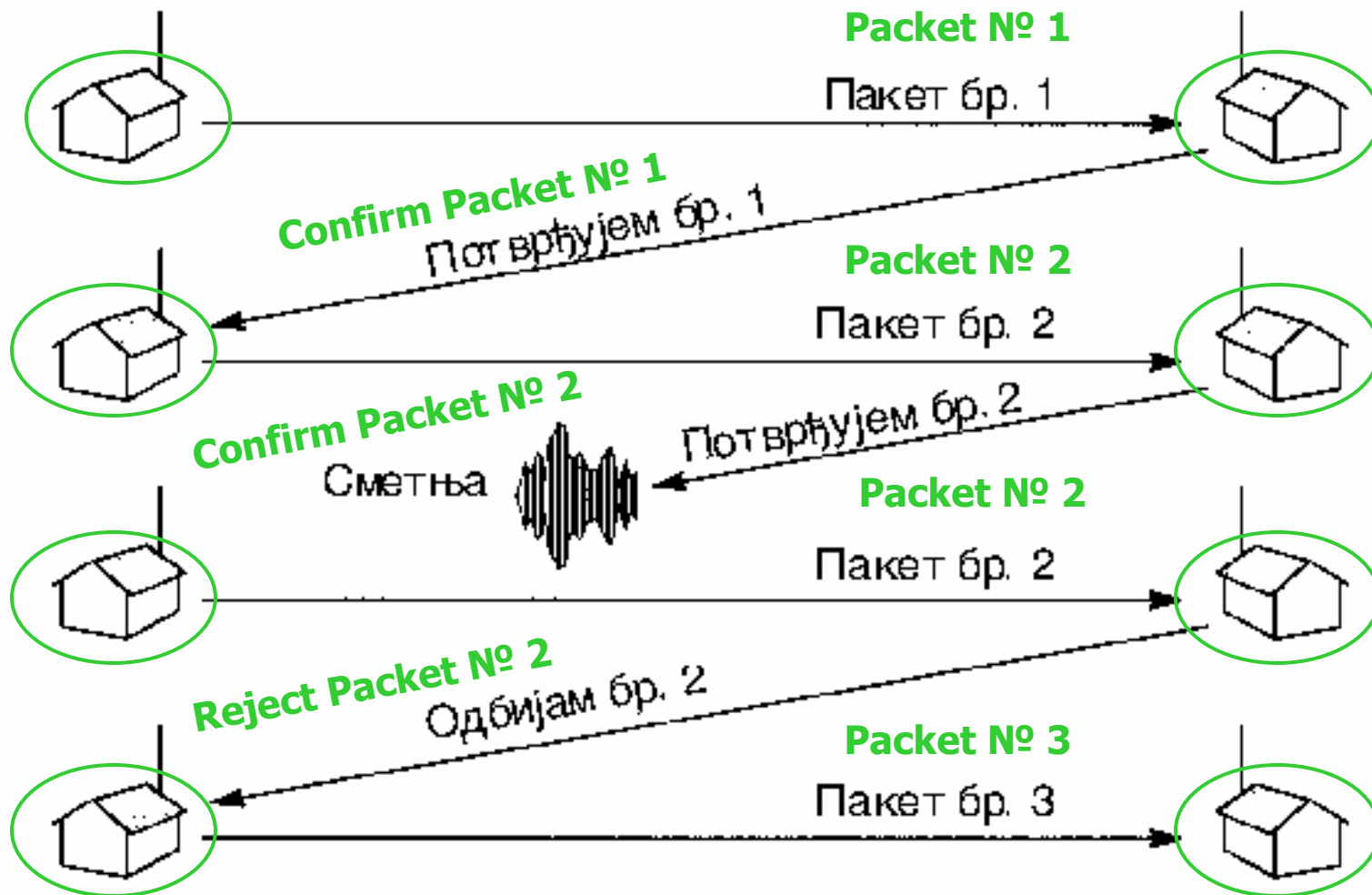
Problems ...

... not only in Serbia

Bad conditions

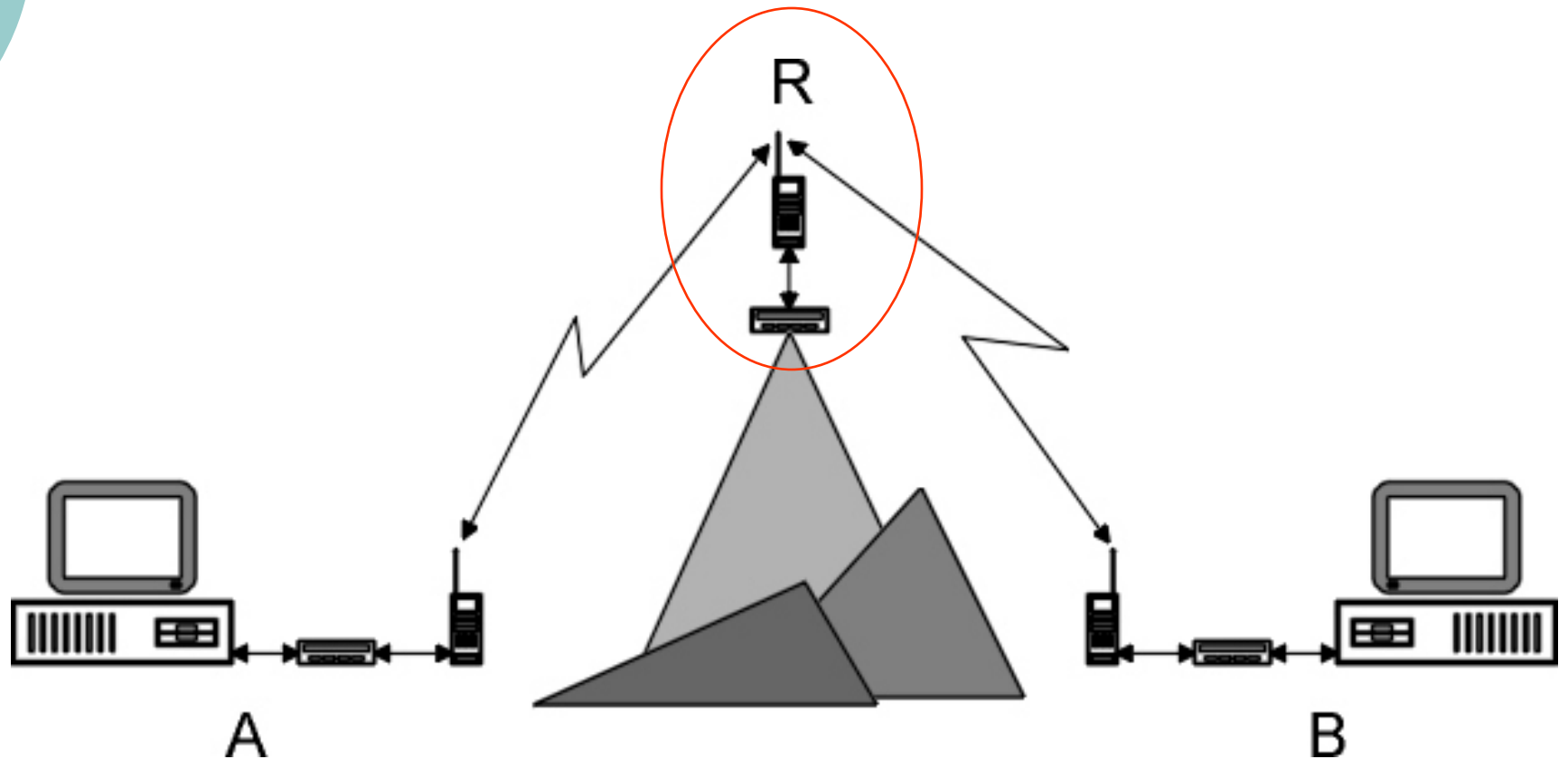


... and Solutions

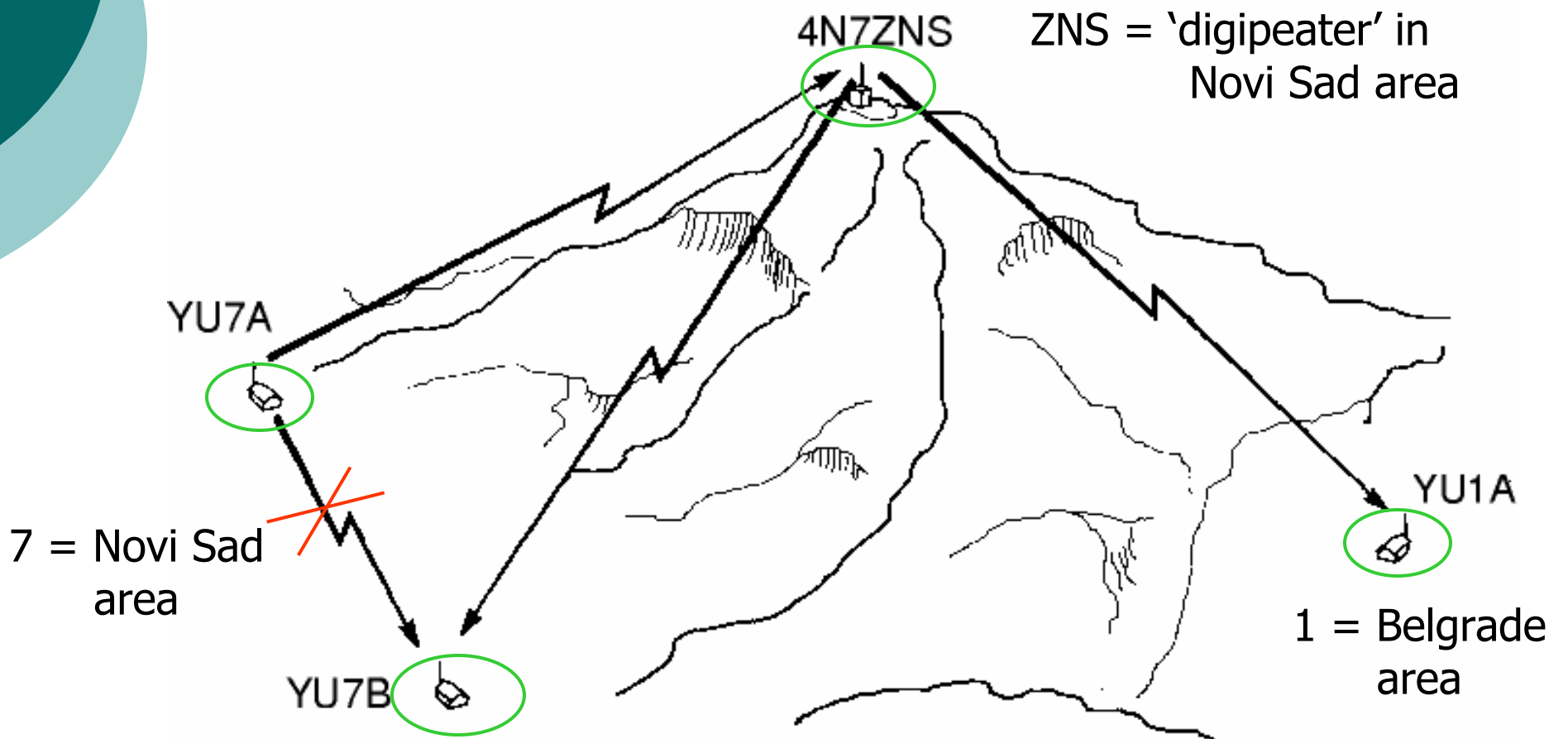


Link over a repeater ...

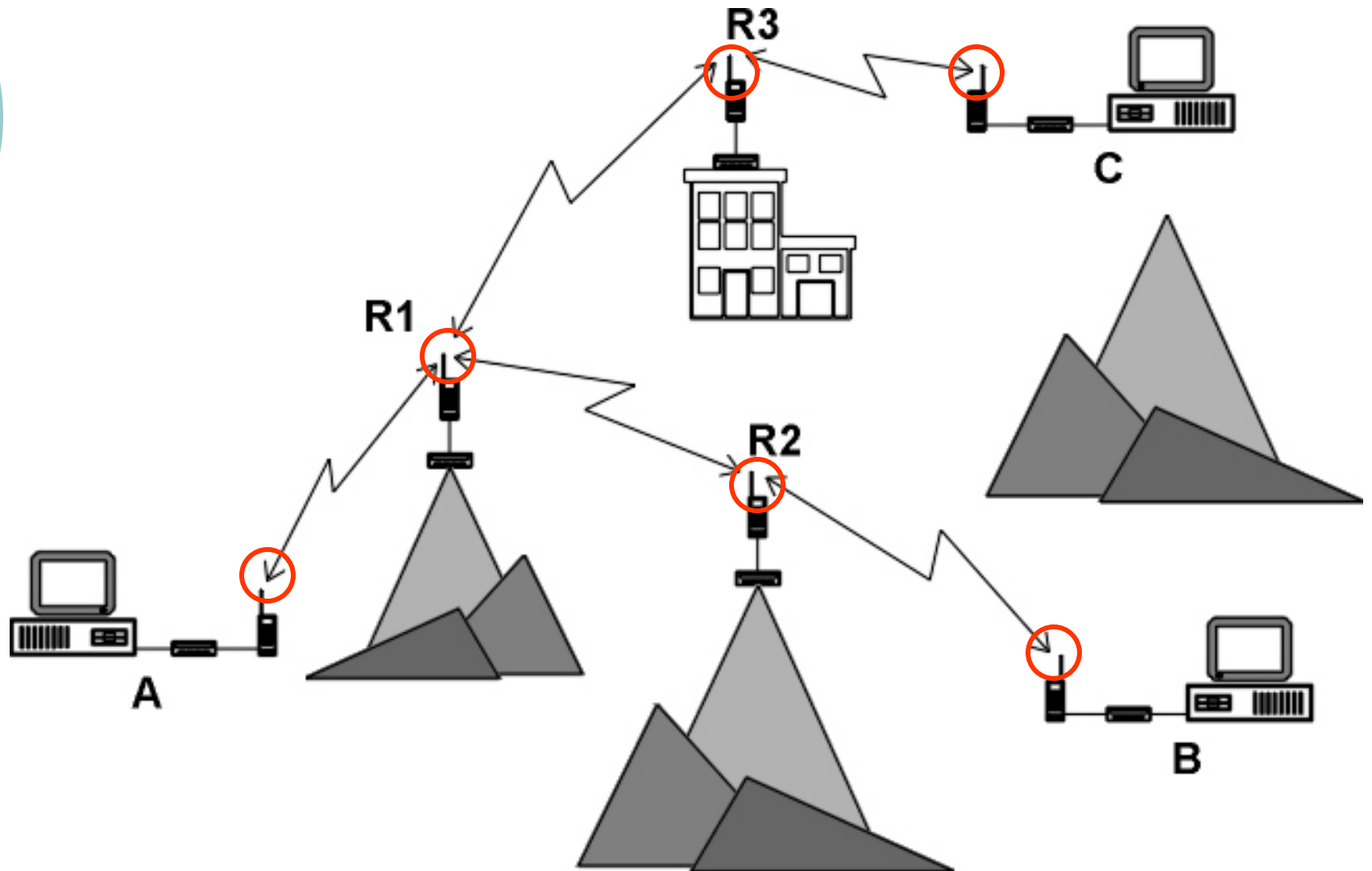
R = Repeater or Digital Repeater or 'Digipeater' or a 'Node'



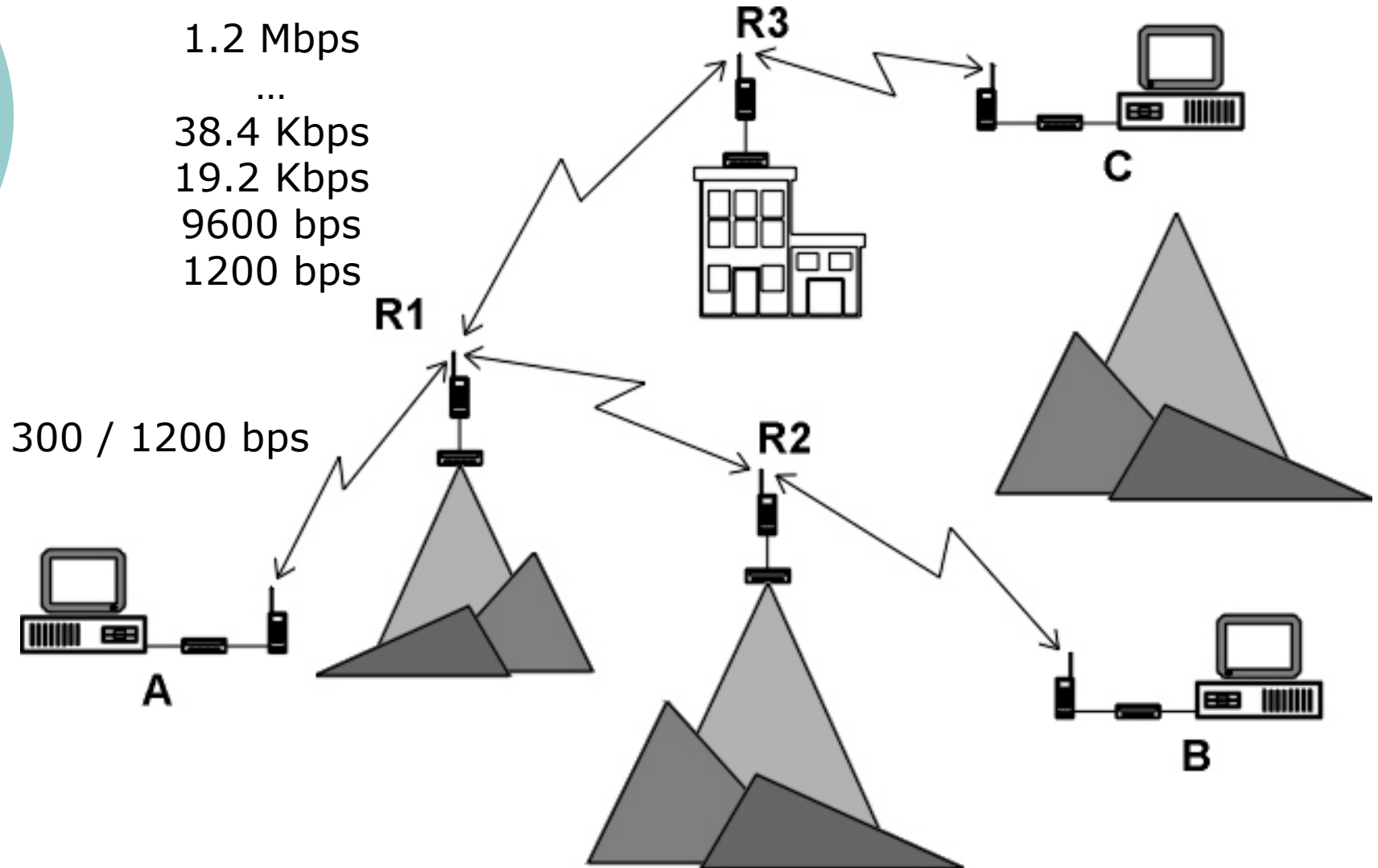
Example:



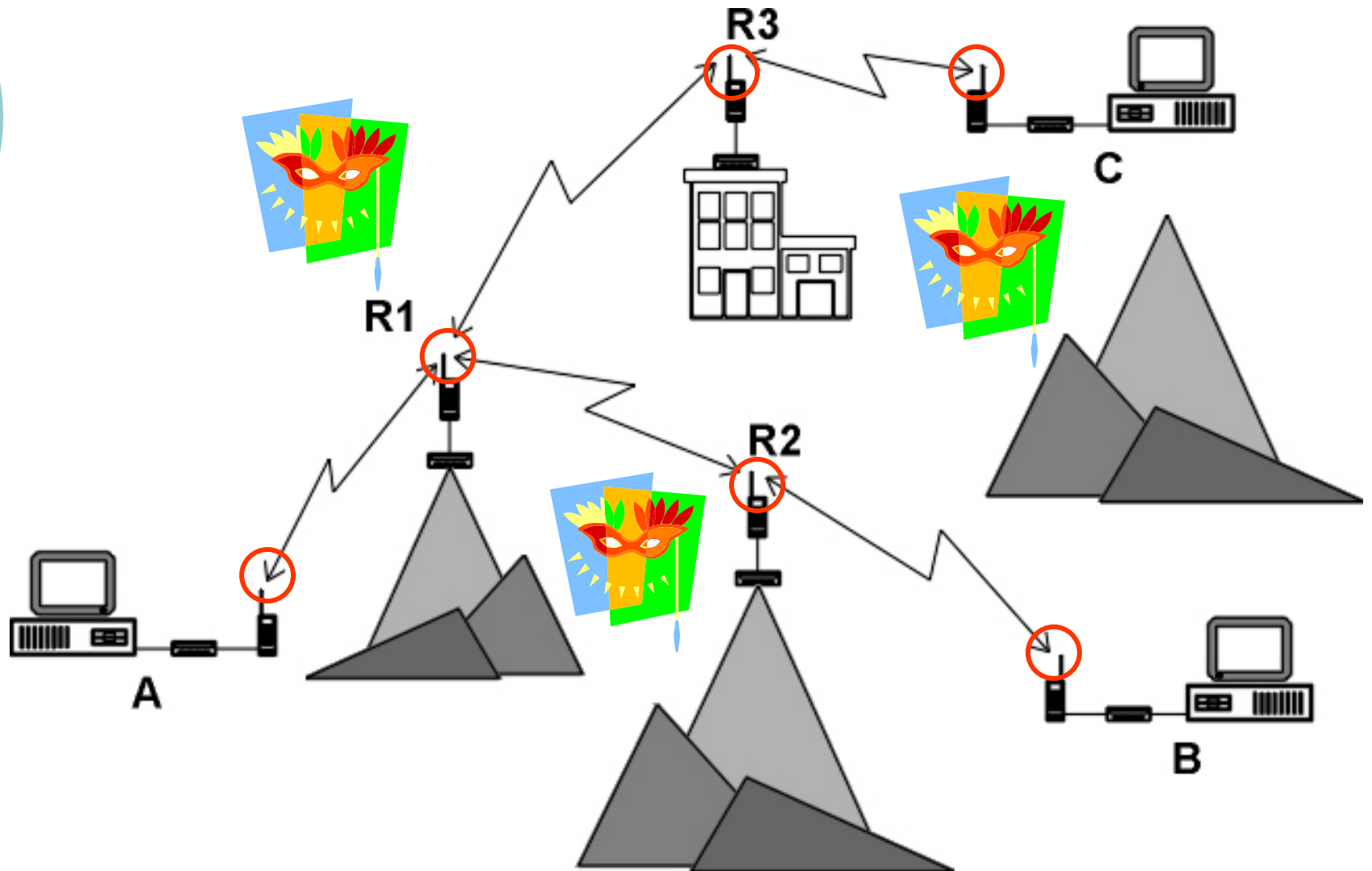
Radio network ...



The speed of the network ...



Security and Privacy ...





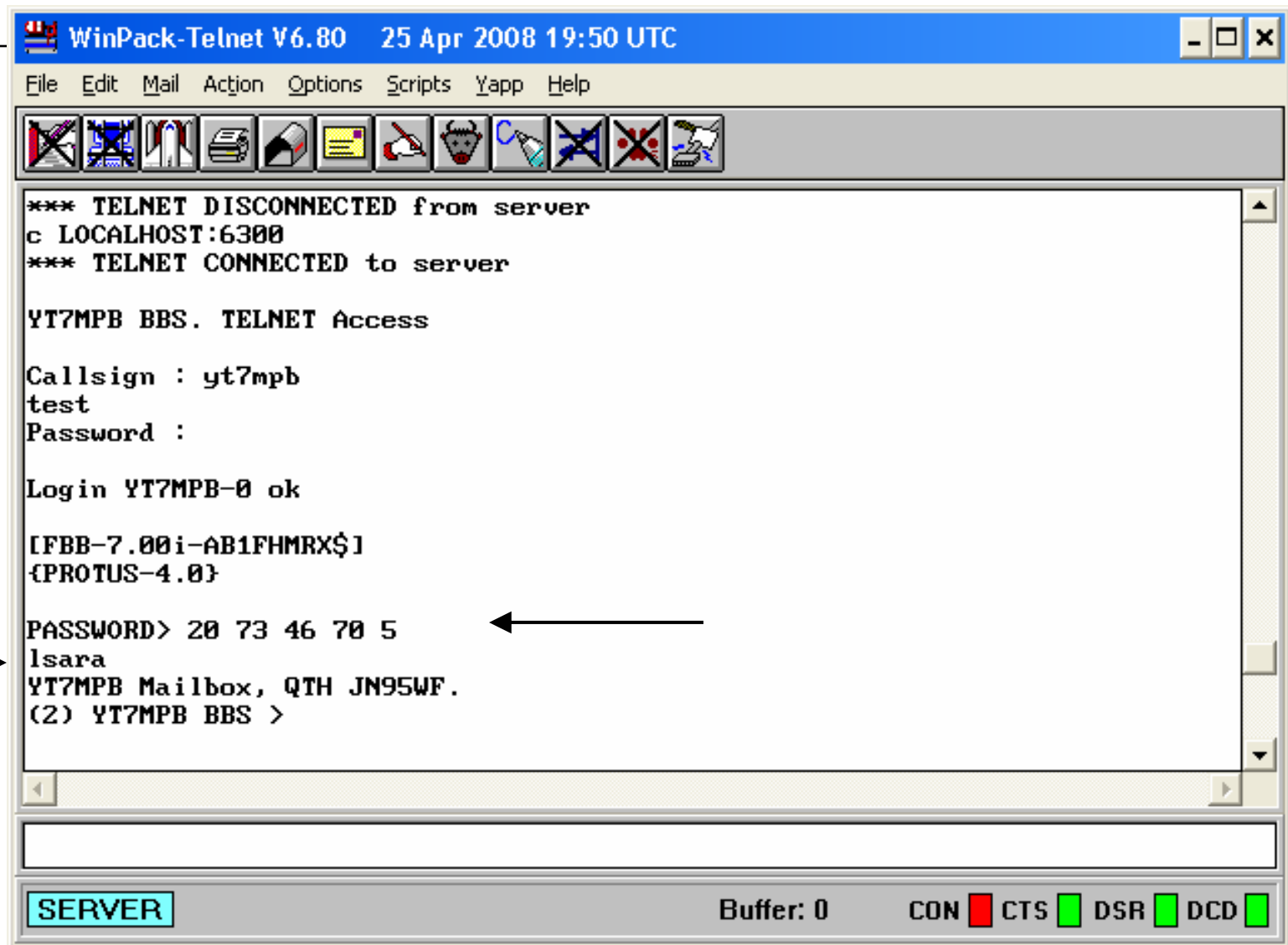
Alphanumeric string ...

umoransamodkafanavolimpivoirakij...afanavolimpivoirakijuumoransamodkaf

1234567890123456789012345678 ... 123456789012345678901234567890

1 10 20 ... 60 70 80

Alphanumeric string ...



The screenshot shows a WinPack-Telnet V6.80 window. The title bar indicates the date and time: 25 Apr 2008 19:50 UTC. The menu bar includes File, Edit, Mail, Action, Options, Scripts, Yapp, and Help. The toolbar contains various icons for file operations and network settings. The main text area displays the following text:

```
*** TELNET DISCONNECTED from server
c LOCALHOST:6300
*** TELNET CONNECTED to server

YT7MPB BBS. TELNET Access

Callsign : yt7mpb
test
Password :

Login YT7MPB-0 ok

[FBB-7.00i-AB1FHMRX$]
{PROTUS-4.0}

PASSWORD> 20 73 46 70 5
lsara
YT7MPB Mailbox, QTH JN95WF.
(2) YT7MPB BBS >
```

Two arrows point to the alphanumeric string "20 73 46 70 5" in the terminal output. The status bar at the bottom shows "SERVER" in a blue box, "Buffer: 0", and four status indicators: CON (red), CTS (green), DSR (green), and DCD (green).

'Table' – matrix 31 x n ...

1 umoransamo

2 dkafanavol

3 impivoirak

4 ijuumorans

5 amodkafana

. . .

25 umoransamo ←

26 dkafanavol

27 impivoirak

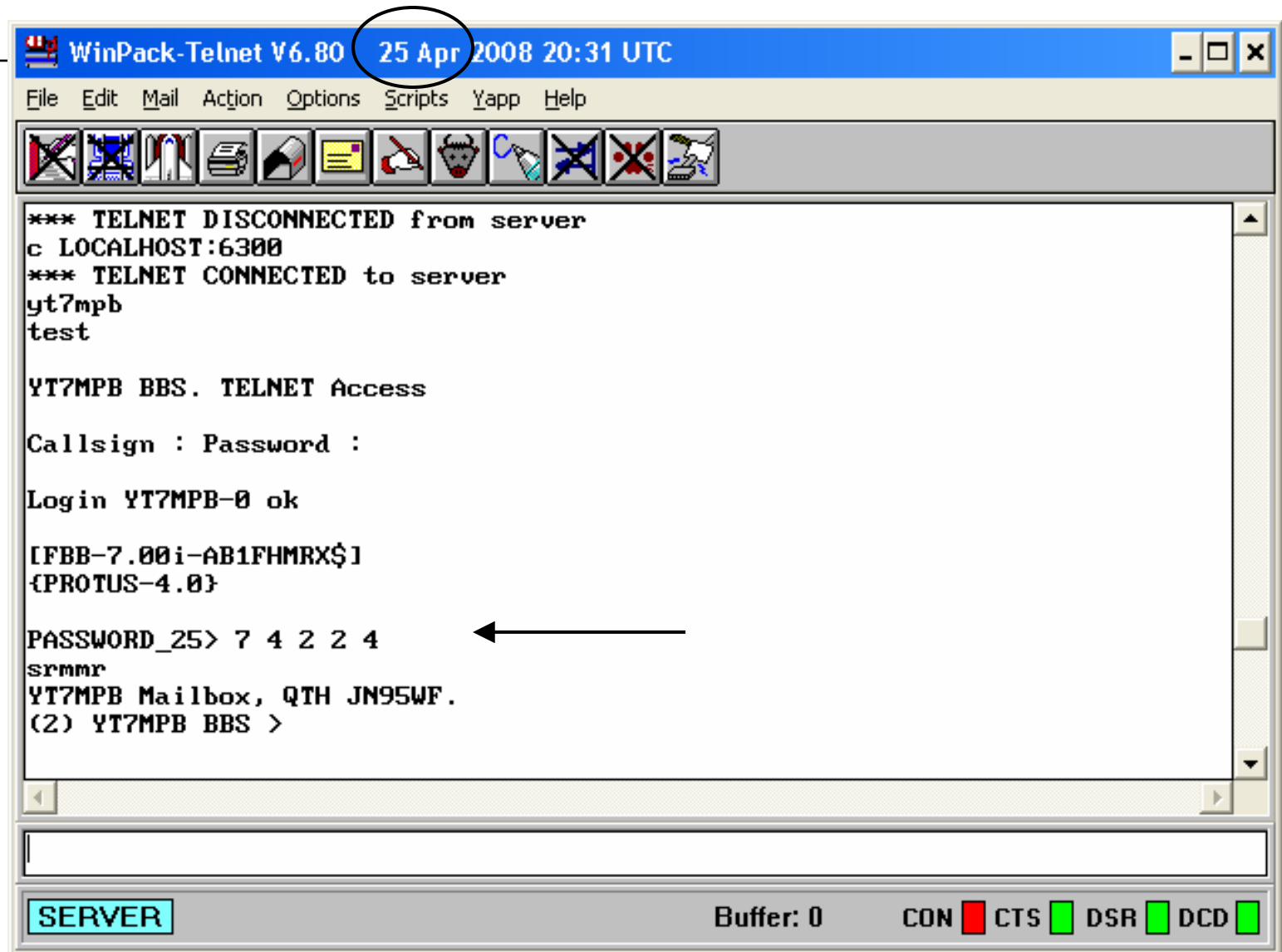
28 ijuumorans

29 amodkafana

30 volimpivoi

31 rakiiuumor

'Table' – matrix 31 x n ...



WinPack-Telnet V6.80 25 Apr 2008 20:31 UTC

File Edit Mail Action Options Scripts Yapp Help

*** TELNET DISCONNECTED from server
c LOCALHOST:6300
*** TELNET CONNECTED to server
yt7mpb
test

YT7MPB BBS. TELNET Access

Callsign : Password :

Login YT7MPB-0 ok

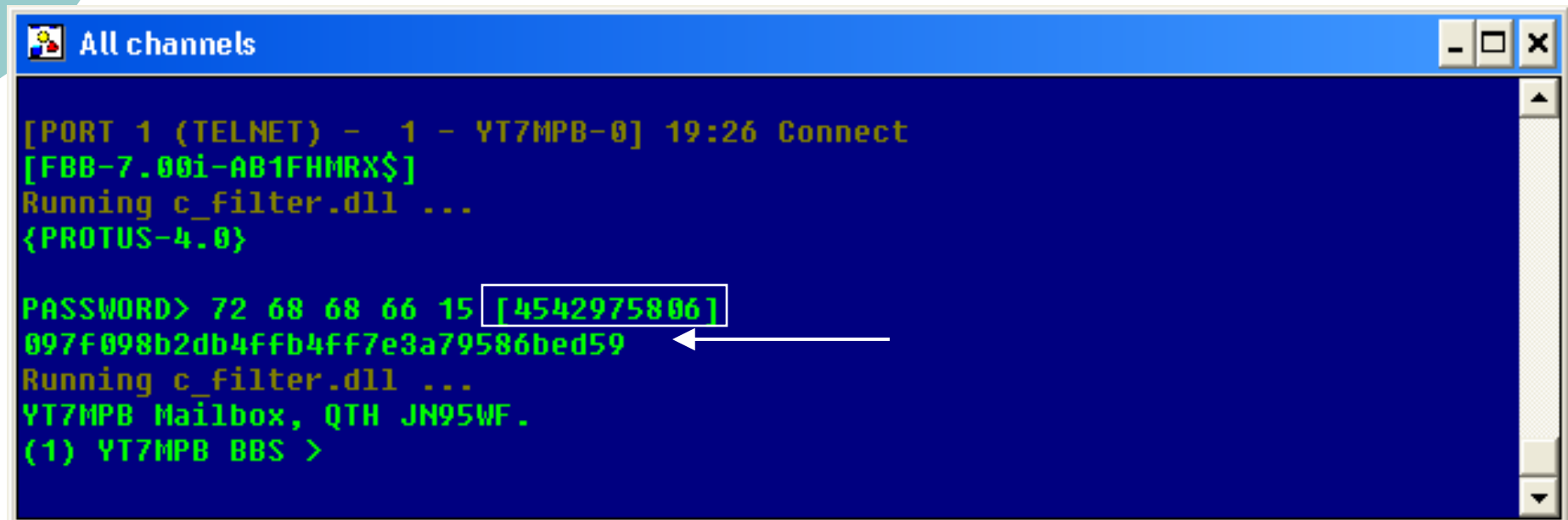
[FBB-7.00i-AB1FHMRX\$]
{PROTUS-4.0}

PASSWORD_25> 7 4 2 2 4 ←

srmmr
YT7MPB Mailbox, QTH JN95WF.
(2) YT7MPB BBS >

SERVER Buffer: 0 CON ■ CTS ■ DSR ■ DCD ■

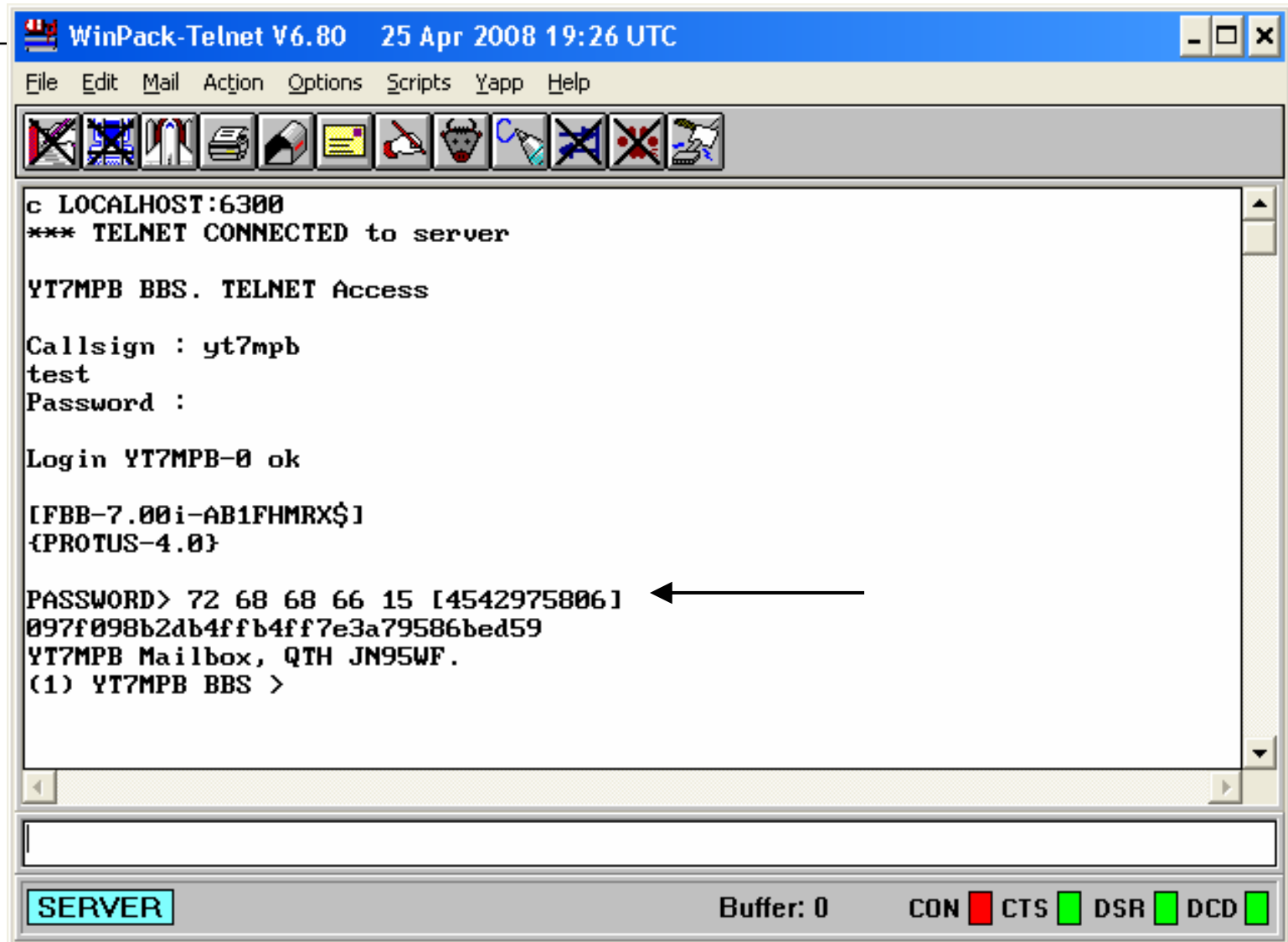
MD2 Algorithm ...



```
All channels
[PORT 1 (TELNET) - 1 - YT7MPB-0] 19:26 Connect
[FBB-7.00i-AB1FHMRX$]
Running c_filter.dll ...
{PROTUS-4.0}

PASSWORD> 72 68 68 66 15 [4542975806]
097f098b2db4ffb4ff7e3a79586bed59
Running c_filter.dll ...
YT7MPB Mailbox, QTH JN95WF.
(1) YT7MPB BBS >
```

MD2 Algorithm ...



The screenshot shows a WinPack-Telnet V6.80 window with a menu bar (File, Edit, Mail, Action, Options, Scripts, Yapp, Help) and a toolbar. The main text area displays the following telnet session:

```
c LOCALHOST:6300
*** TELNET CONNECTED to server

YT7MPB BBS. TELNET Access

Callsign : yt7mpb
test
Password :

Login YT7MPB-0 ok

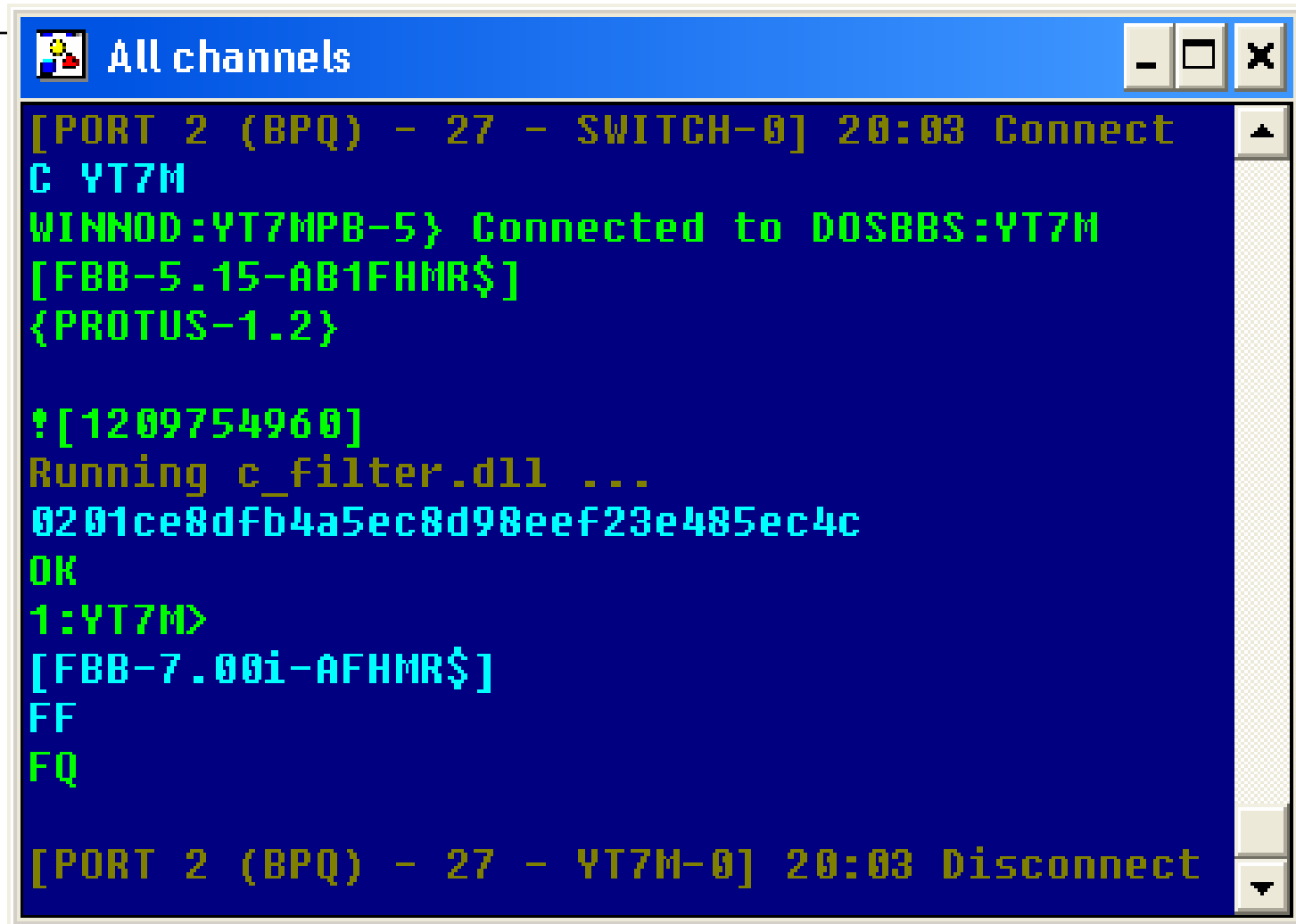
[FBB-7.00i-AB1FHMRX$]
{PROTUS-4.0}

PASSWORD> 72 68 68 66 15 [4542975806]
097f098b2db4ffb4ff7e3a79586bed59
YT7MPB Mailbox, QTH JN95WF.
(1) YT7MPB BBS >
```

Two arrows point to the MD2 hash output: one from the left points to the first line of the password prompt, and another from the right points to the MD2 hash value.

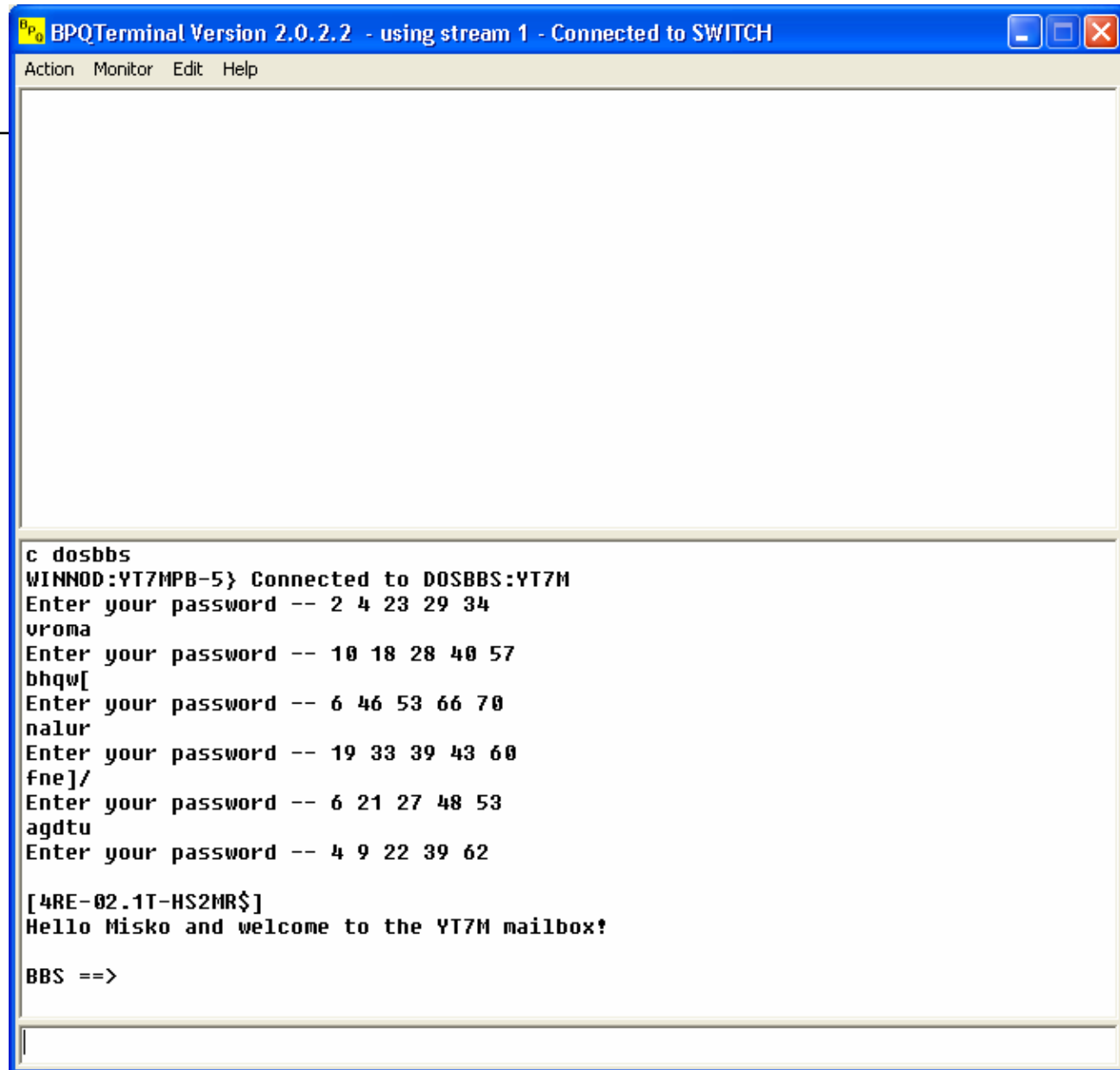
At the bottom of the window, there is a status bar with a "SERVER" button, "Buffer: 0", and status indicators for CON (red), CTS (green), DSR (green), and DCD (green).

MD2 Algorithm ...



```
[PORT 2 (BPQ) - 27 - SWITCH-0] 20:03 Connect  
C YT7M  
WINNOD:YT7MPB-5} Connected to DOSBBS:YT7M  
[FBB-5.15-AB1FHMR$]  
{PROTUS-1.2}  
*[1209754960]  
Running c_filter.dll ...  
0201ce8dfb4a5ec8d98eef23e485ec4c  
OK  
1:YT7M>  
[FBB-7.00i-AFHMR$]  
FF  
FQ  
[PORT 2 (BPQ) - 27 - YT7M-0] 20:03 Disconnect
```

Masqueraded password ...

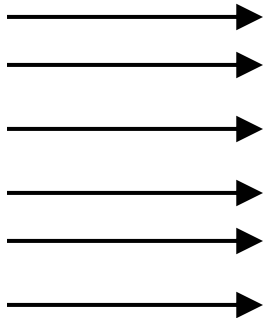


```
BPQTerminal Version 2.0.2.2 - using stream 1 - Connected to SWITCH
Action Monitor Edit Help

c dosbbs
WINNOD:YT7MPB-5} Connected to DOSBBS:YT7M
Enter your password -- 2 4 23 29 34
vroma
Enter your password -- 10 18 28 40 57
bhqw[
Enter your password -- 6 46 53 66 70
nalur
Enter your password -- 19 33 39 43 60
fne]/
Enter your password -- 6 21 27 48 53
agdtu
Enter your password -- 4 9 22 39 62

[4RE-02.1T-HS2MR$]
Hello Misko and welcome to the YT7M mailbox!

BBS ==>
```

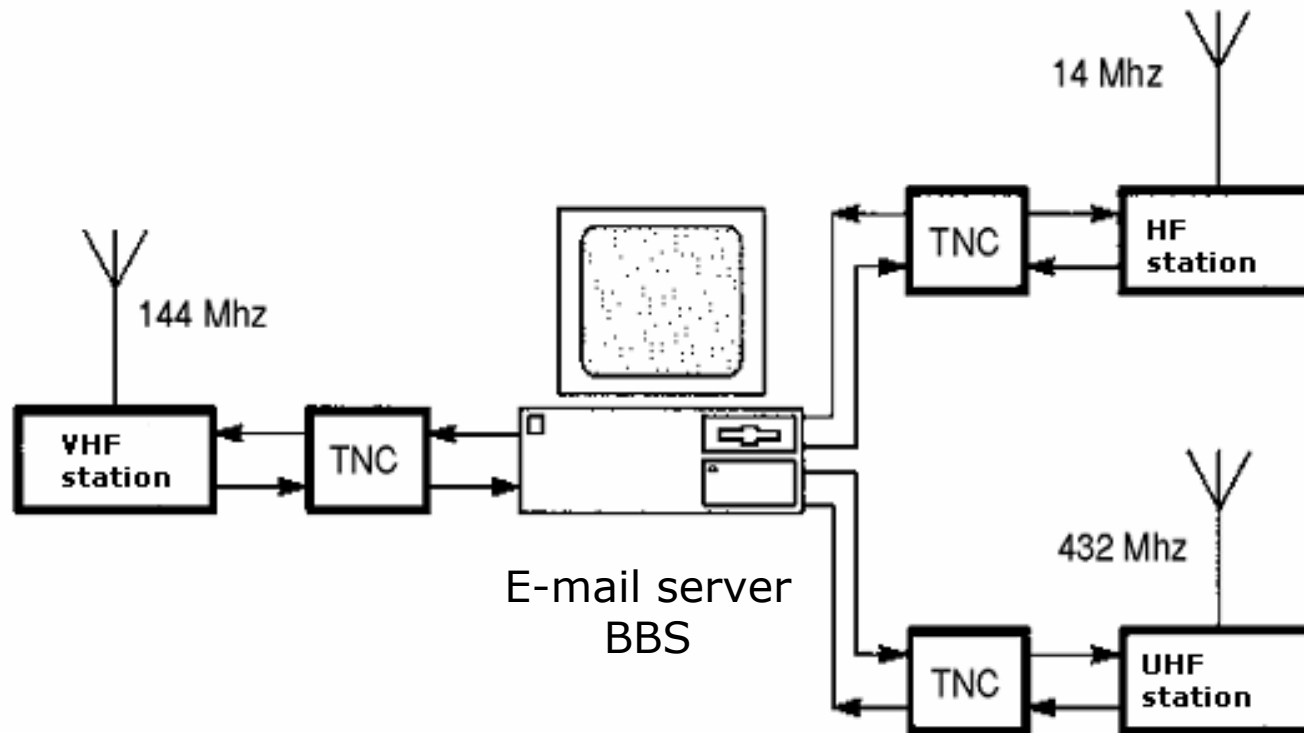




Features and advantages:

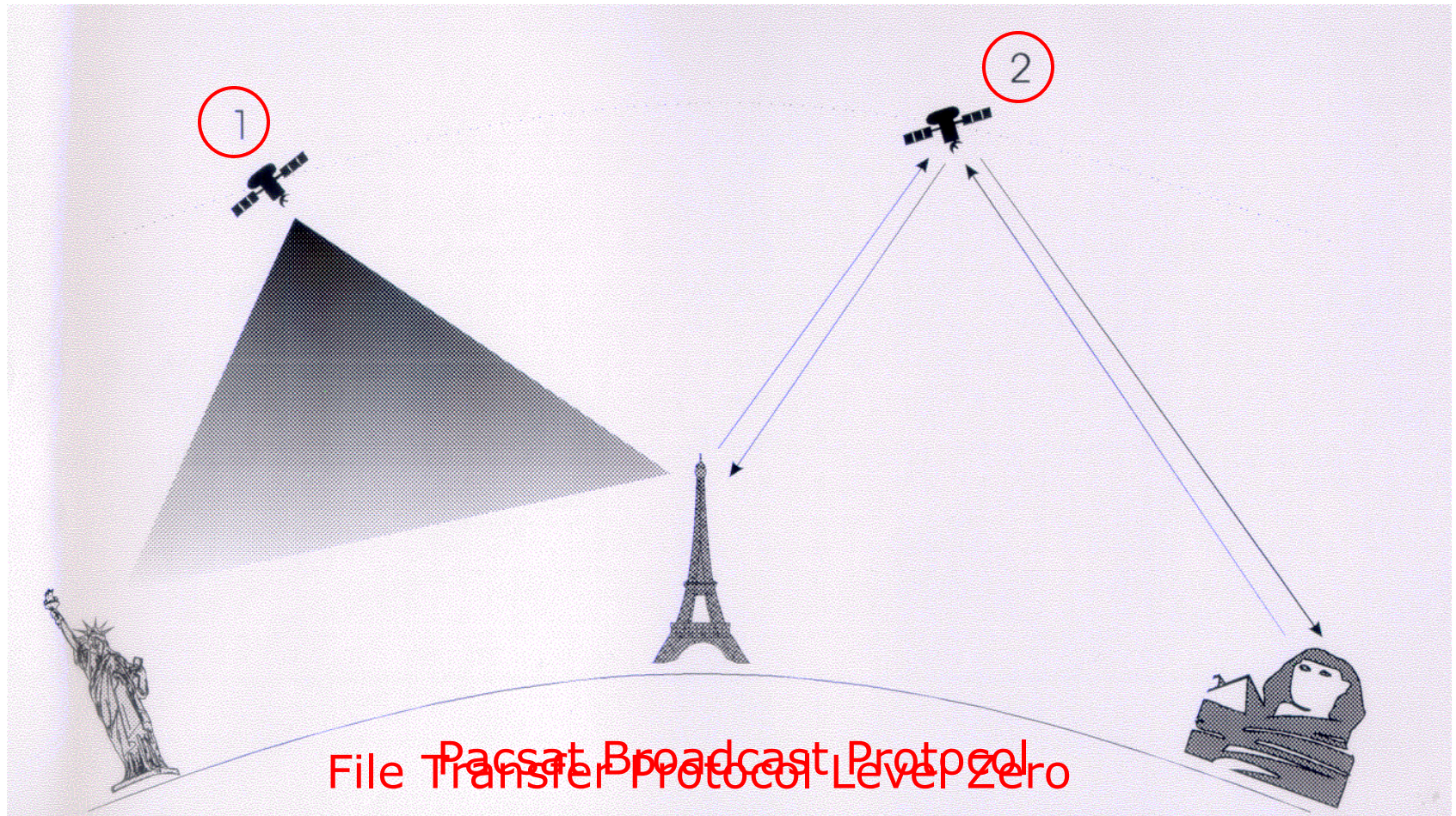
- **Independent** from wired/cell telephony
- Long lasting communication link at low cost: **1 minute = 1 hour = 1 day**
- Mobility on **remote** and **rural** locations
- Real-time communication
- E-mail system included
- Text and binary files exchange
- Low power consuming
- We build our own network!

“Bulletin board system” (BBS) ...

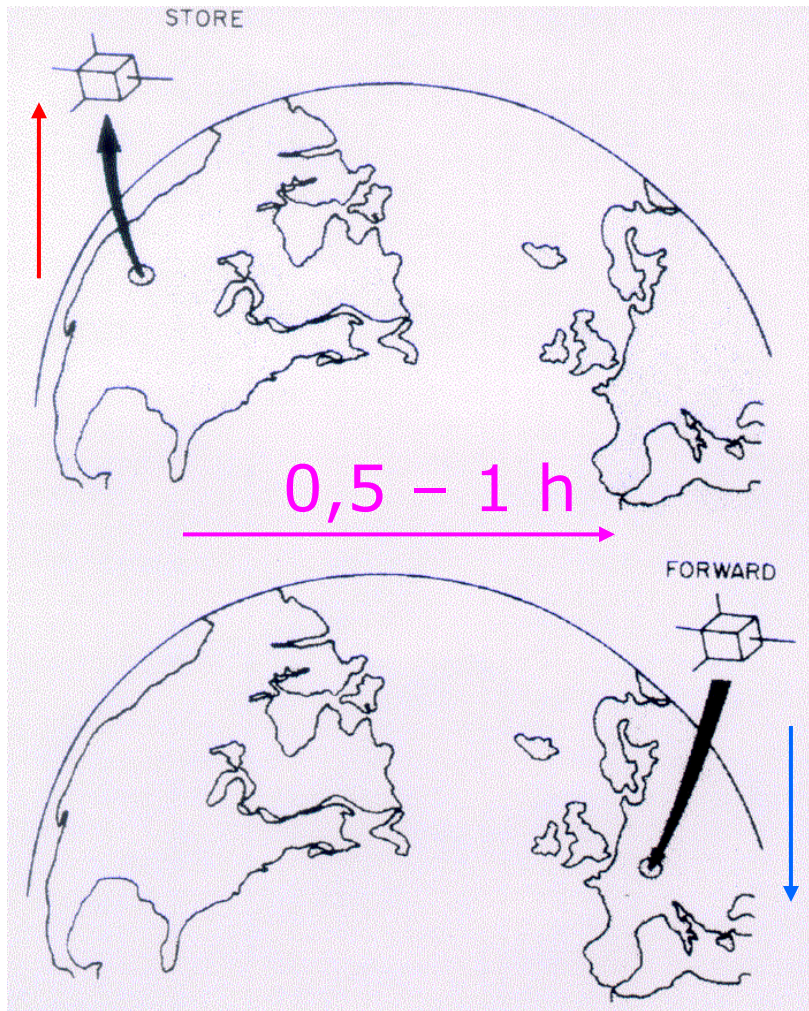


TNC = Terminal Node Controller (modem)

Amateur satellite modes:



Satellites are **not** geostationary!

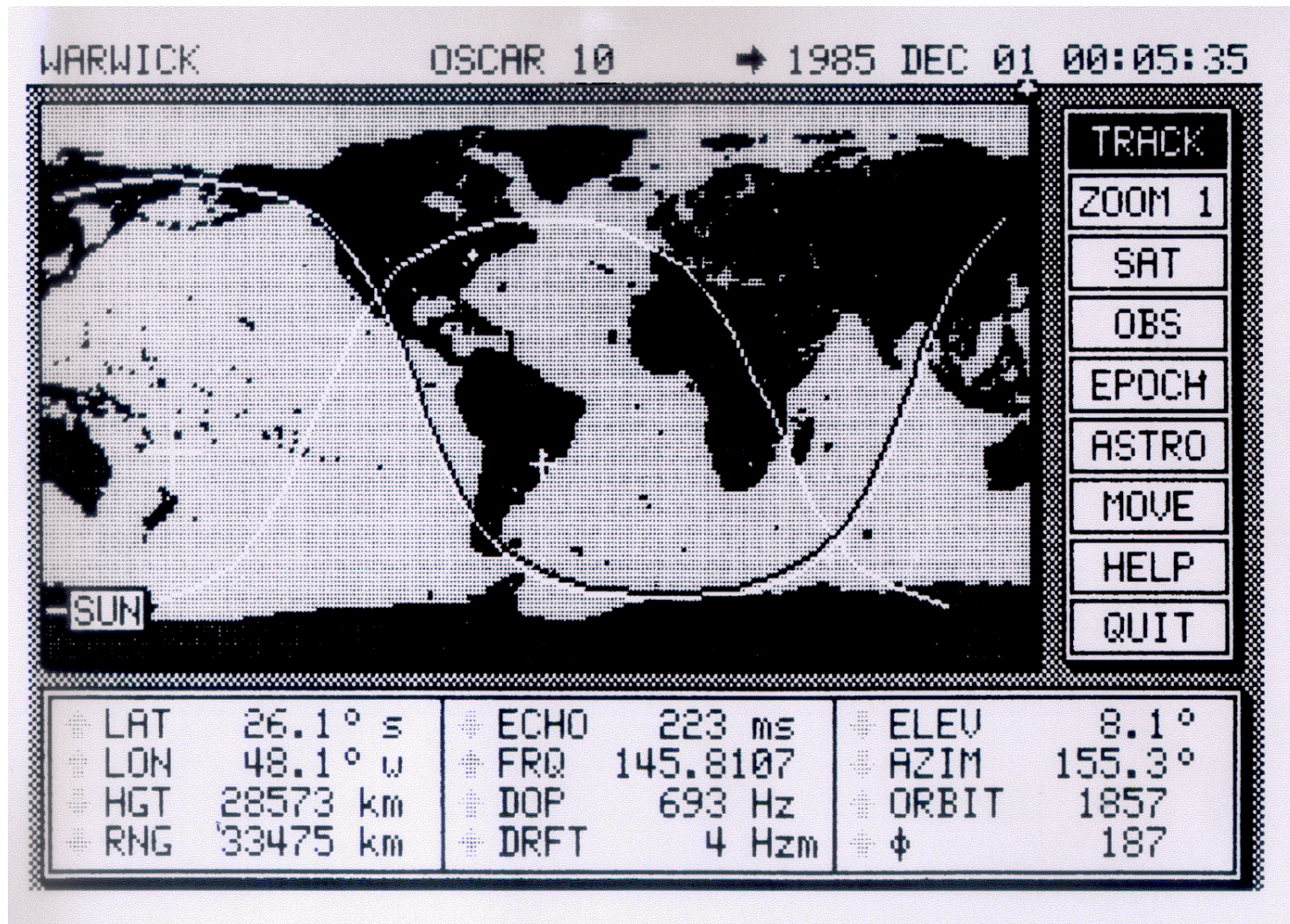


Sending a message to the satellite – “upload”

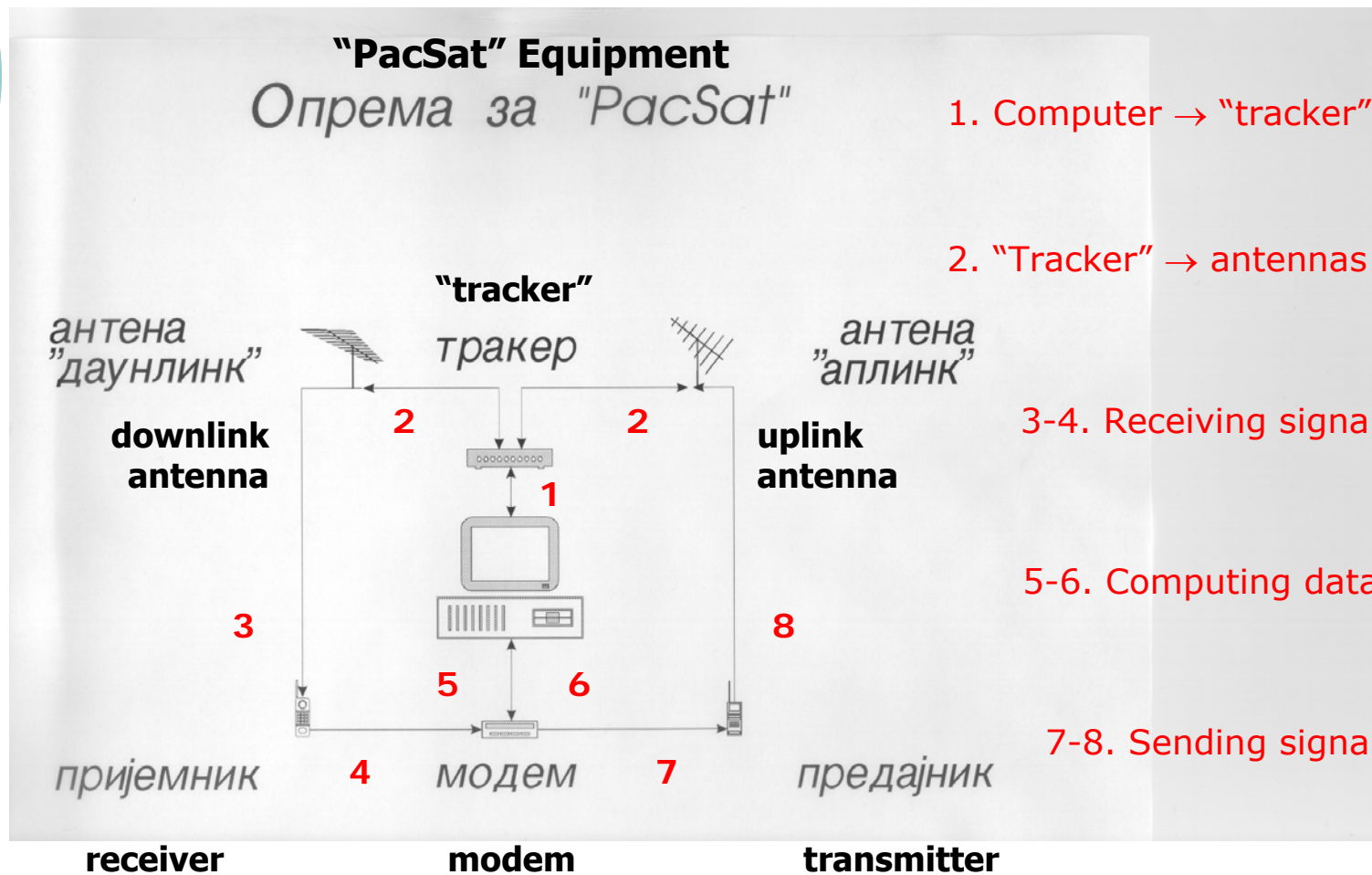
Changing the position

“Downloading” a message from the sky

Where is that "bird" ?



What do we need to "track" an amateur satellite? ***

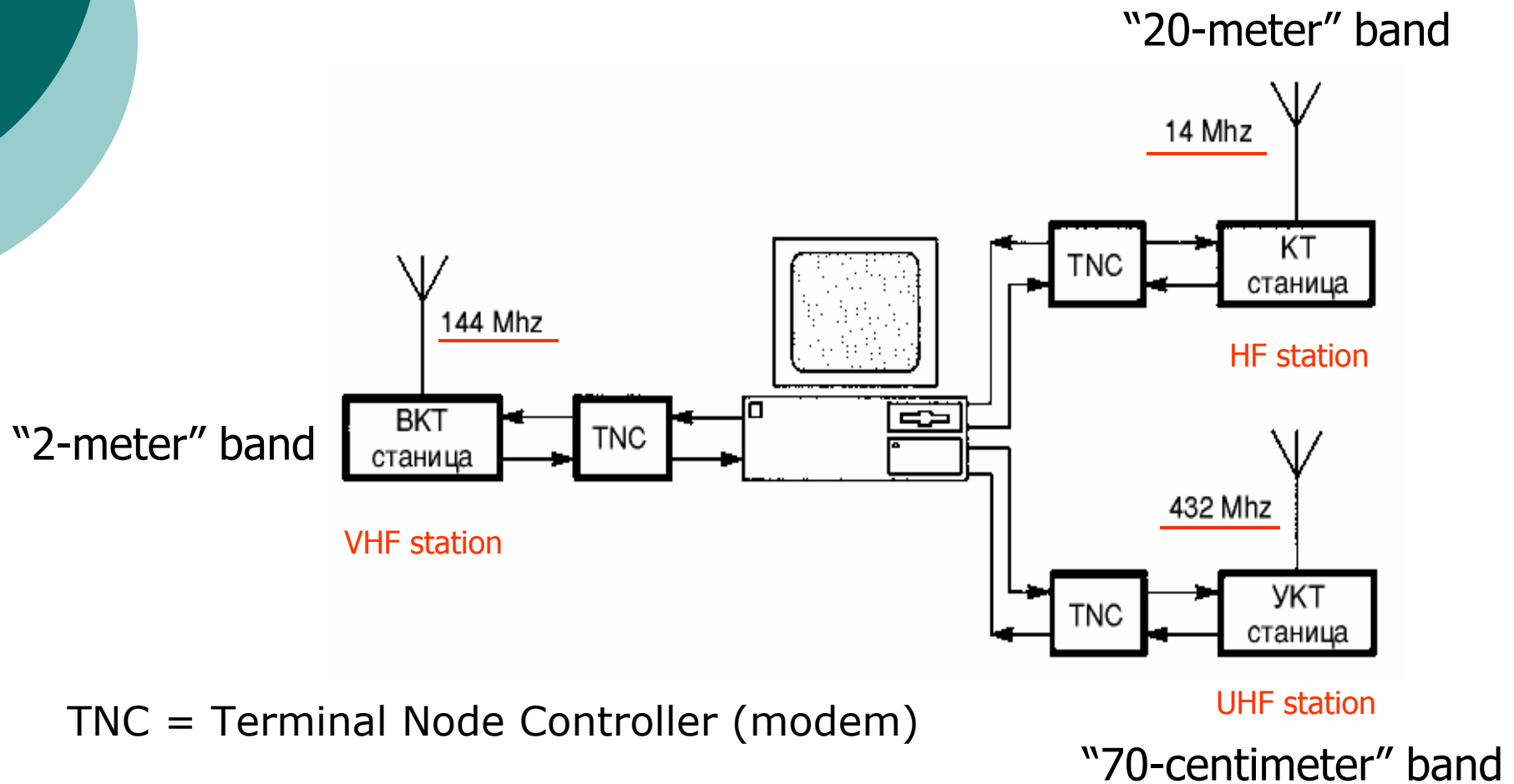




Part Two

- **Hardware**

Packet radio equipment ...





Computers to be used:

- Commodore 64 (special modem)
- Amiga, Atari ... (special modem)
- PC XT (i8086) (RS232 modem)
- PC AT (i286) (RS232/LPT mod.)
- i386, i486 (RS232/LPT mod.
/internal PC cards)
- Pentium (RS232/LPT mod.
/internal PC cards
/USB modem)

“Old-timers” run packet-radio!





Radio stations:

- Types: handheld (“walkie-talkie”), mobile (vehicle), fixed (home)
- Brands: Icom, Yaesu, Kenwood, Alinco, Standard ...
- Power: batteries (NiCd, NiMH), vehicle batteries, outlets 220 V
- Antennas: handheld - mobile, vehicle, omni directional (“GP”), unidirectional (“Yagi”) ...

“Walkie-talkie” amateur radio station

← “rubber ducky”

← BNC connector



radio

battery

200-500 €

Mobile radio for a vehicle

400-800 €



A stationary – “fixed” radio



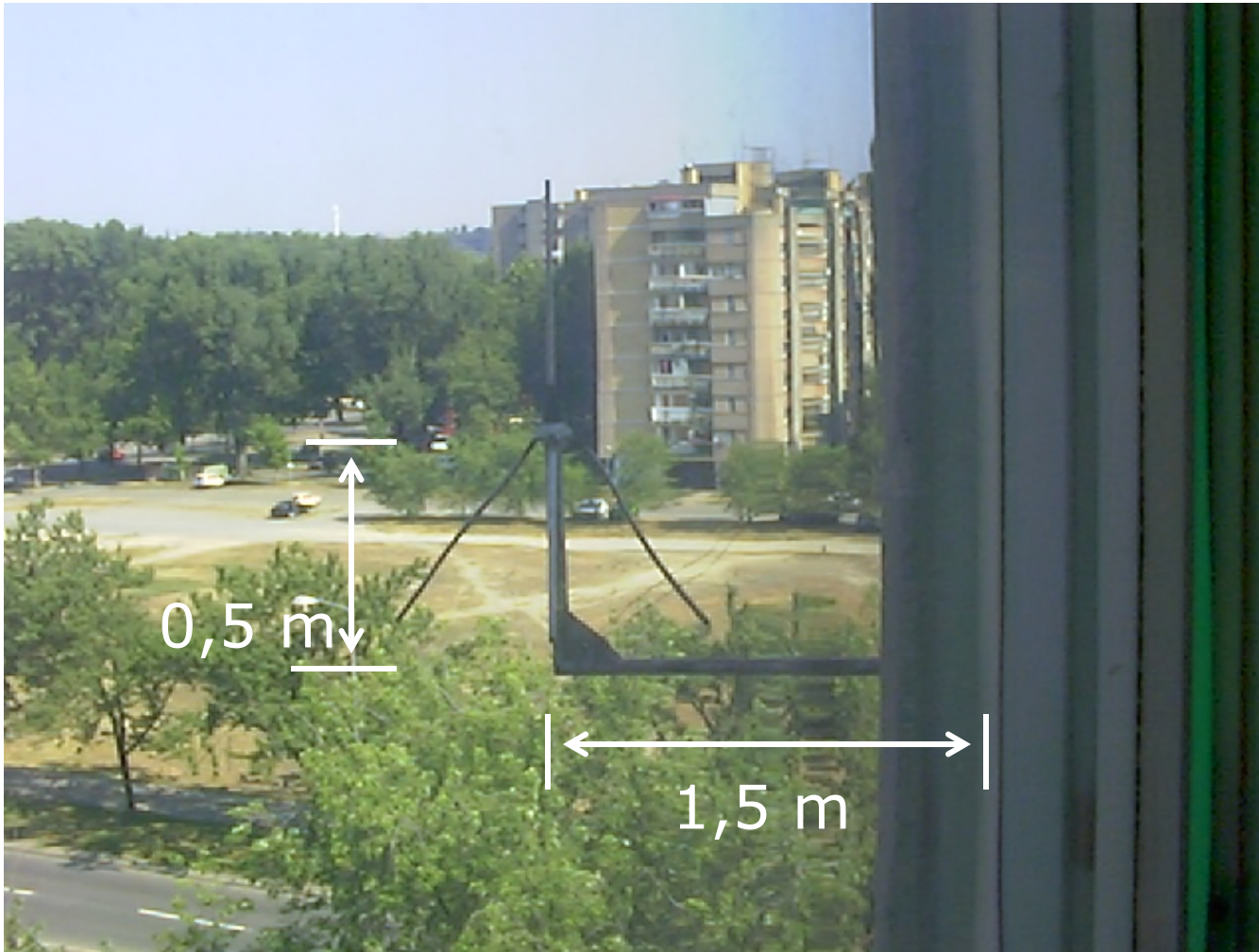
700-1500+ €

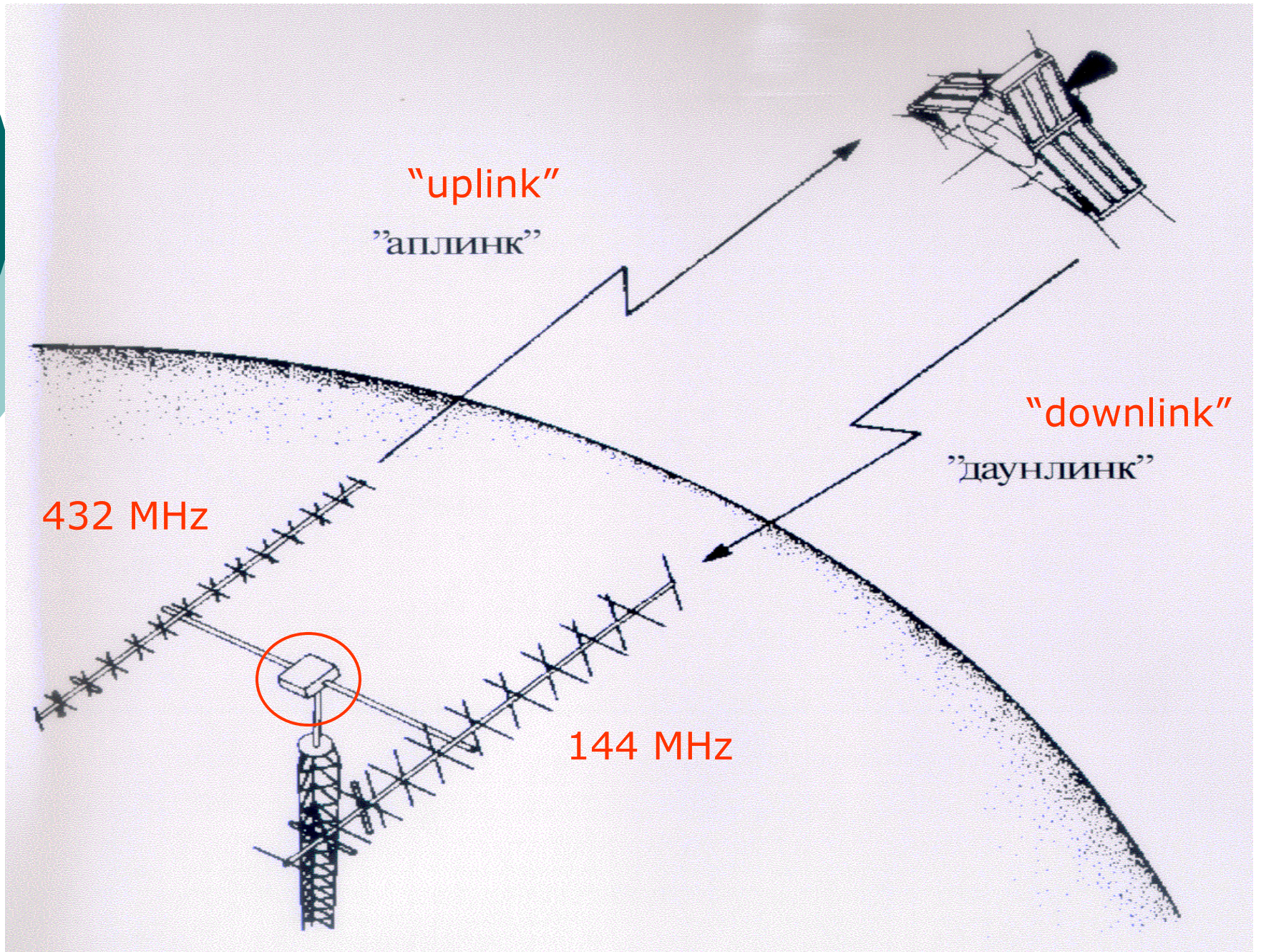
Simple packet radio antenna ...

15-30 €



Simple packet radio antenna ...



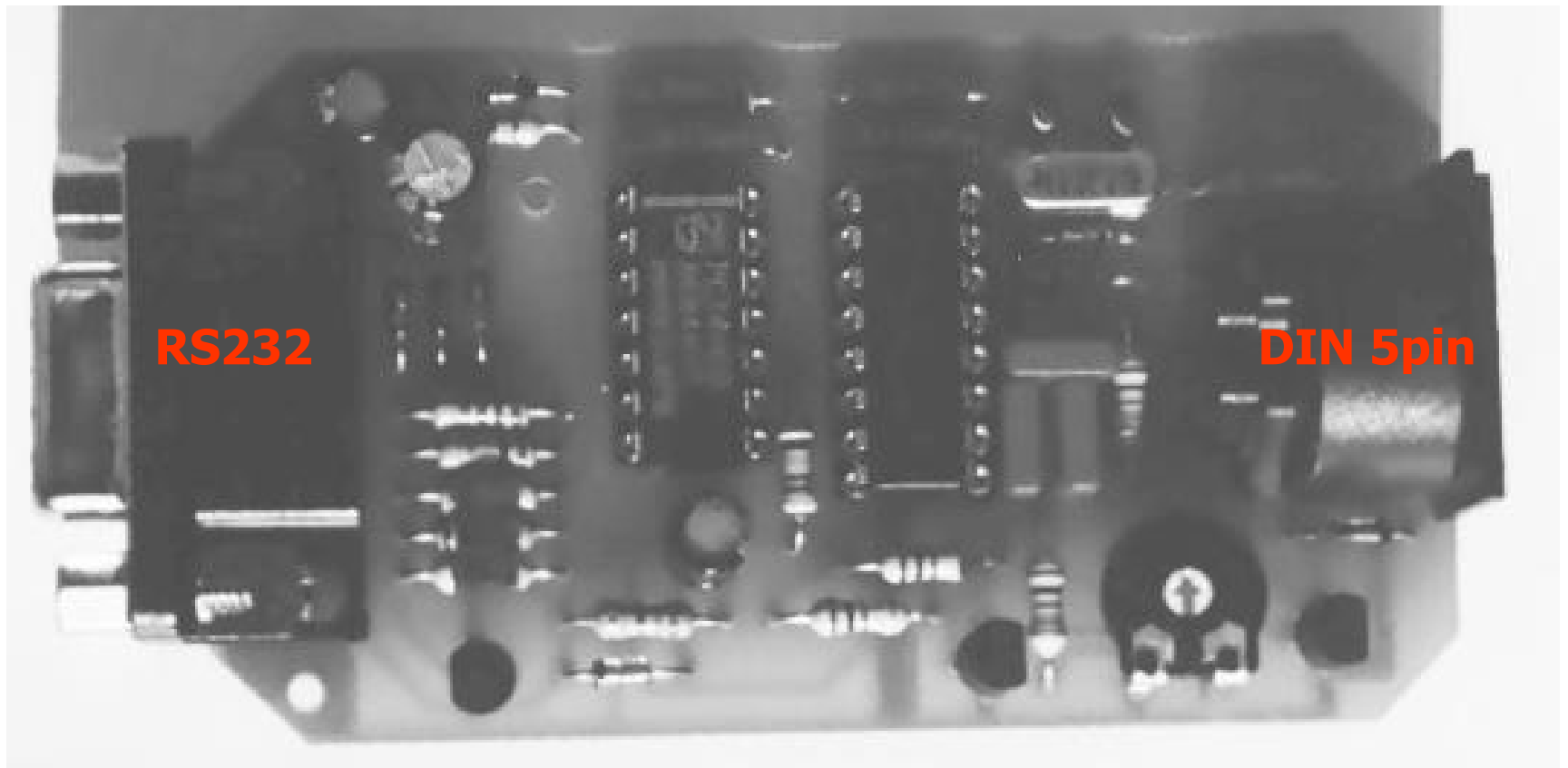


A satellite equipped amateur station

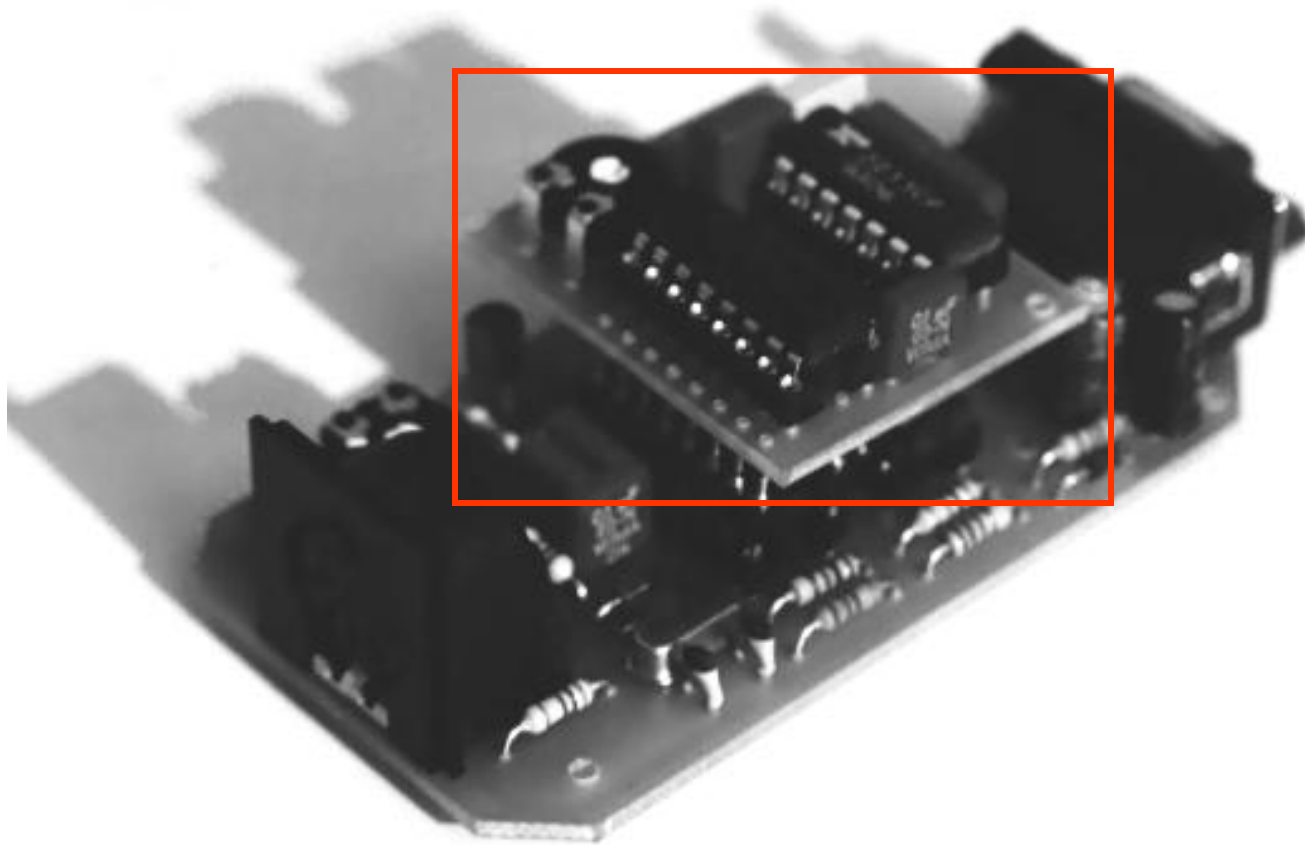


Simple serial modem

20 €



Serial modem upgraded

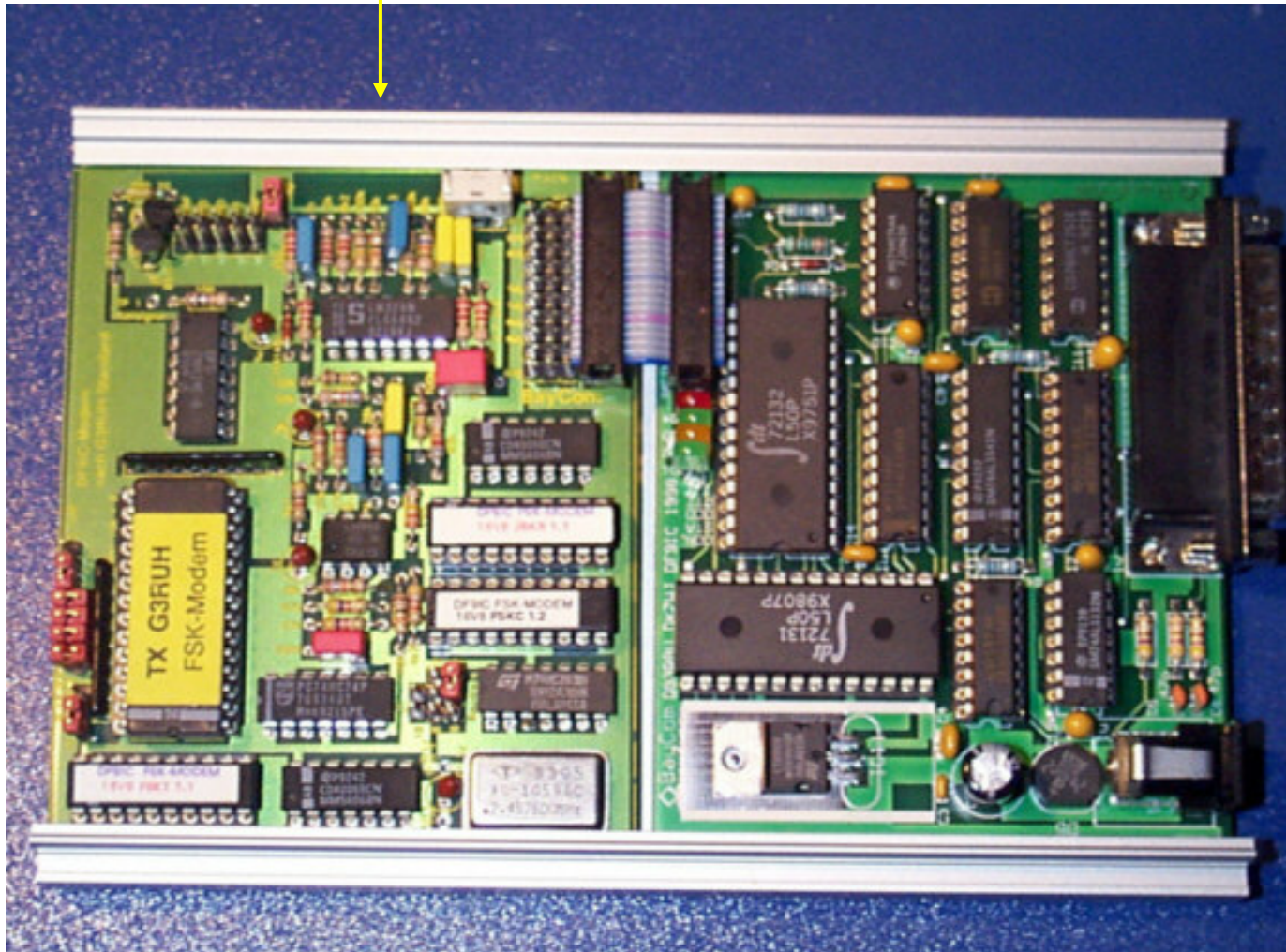


Modem for parallel (LPT) connectors



“Centronix”
LPT

Modem for parallel connectors equipped with an adaptor to run 9600 bps G3RUH protocol (satellite)



External modem EPPFLEX in the housing

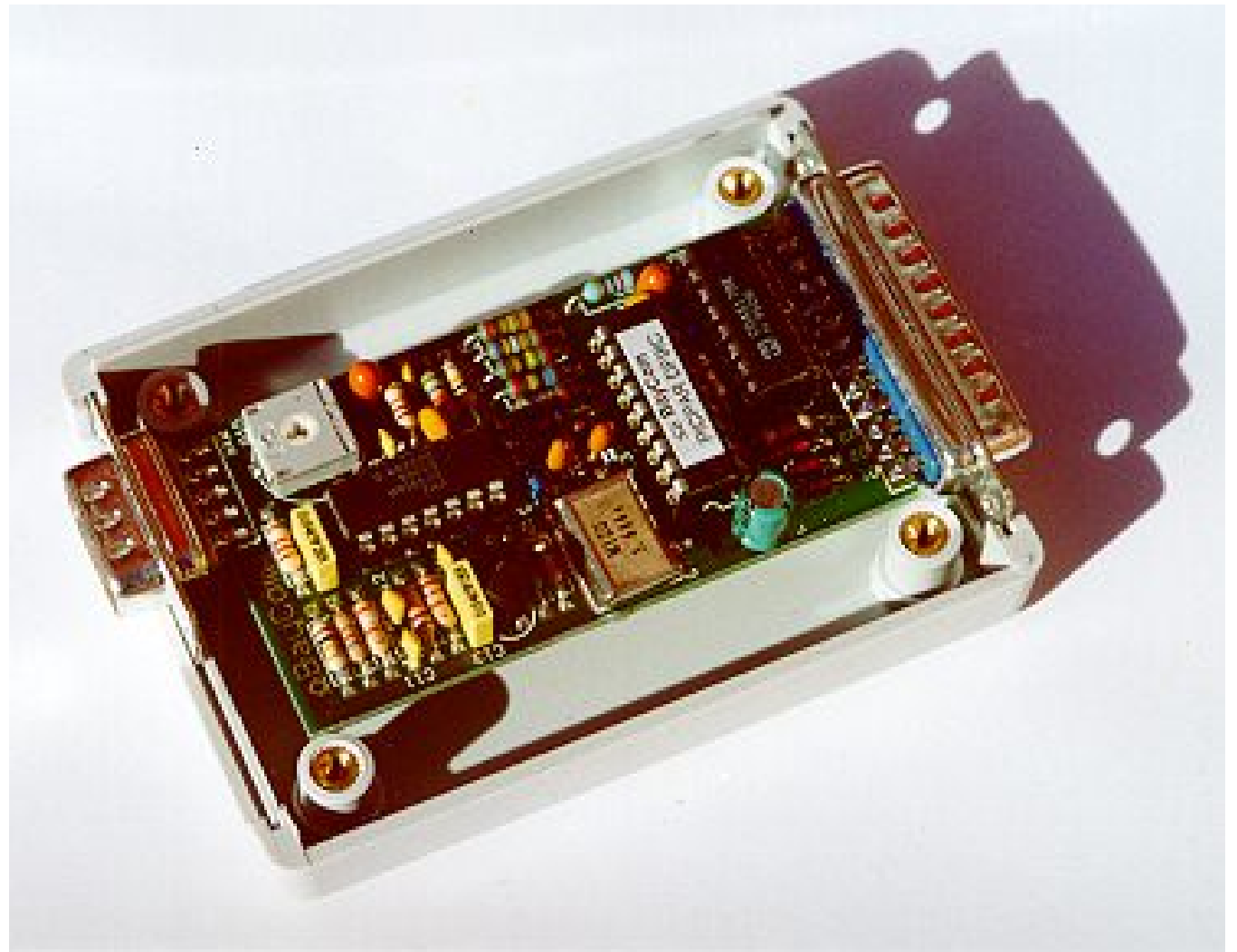
100-200 €



EPP = Enhanced
Parallel Port

External modem PICPAR

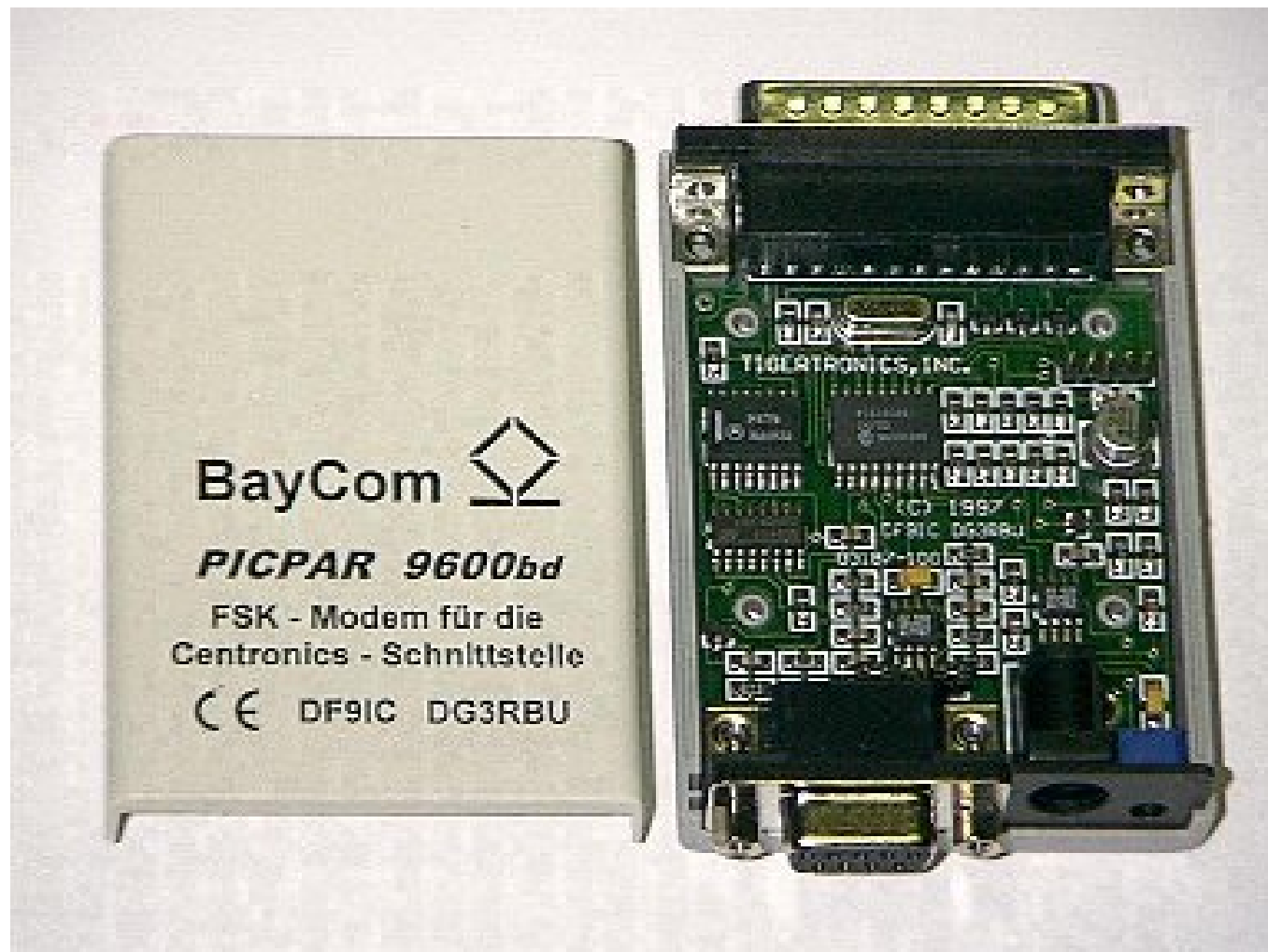
≈ 50 €



External modem PICPAR in housing



External modem PICPAR in SMD version



External SMD modem in its housing

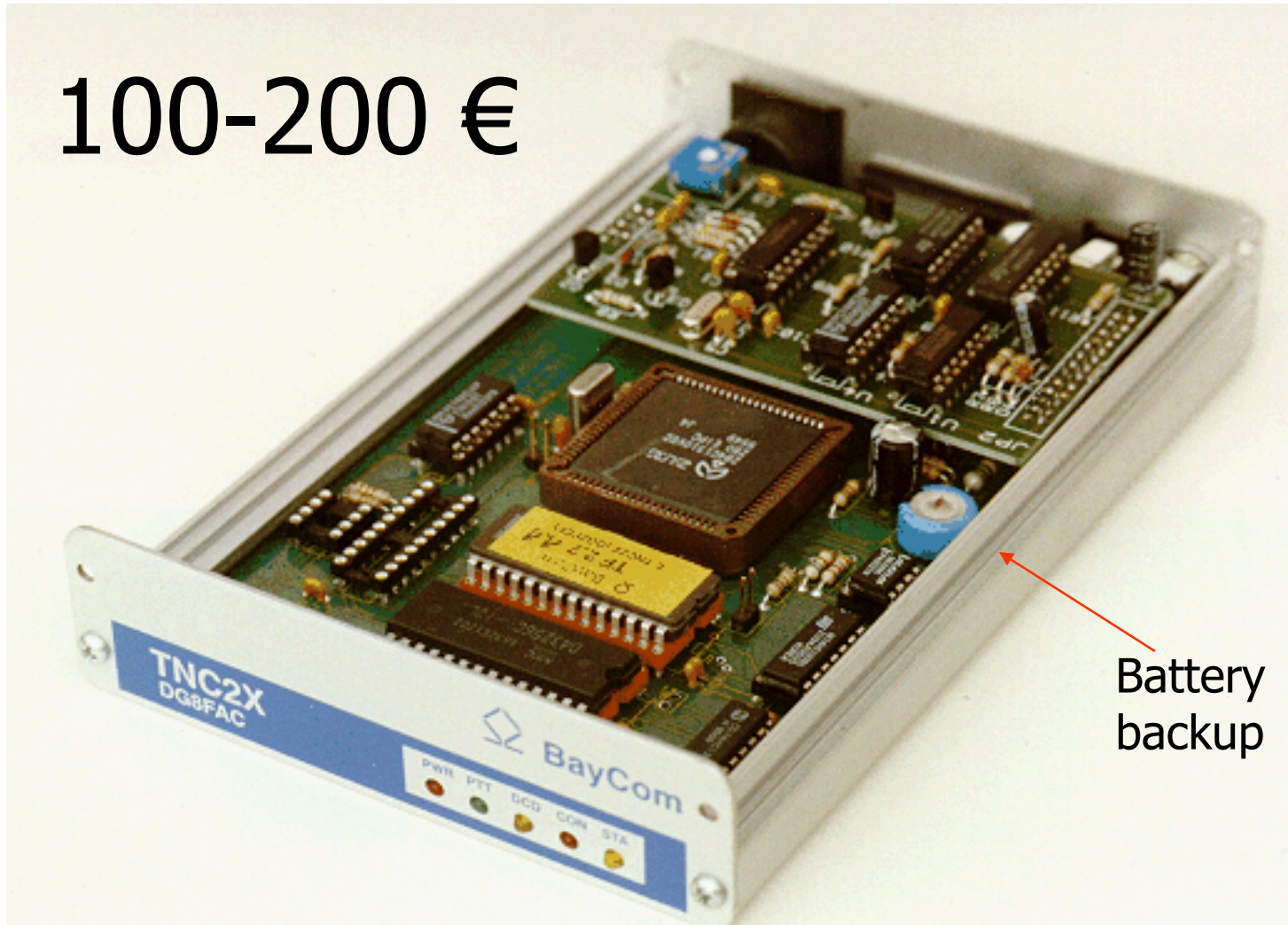


New generation of USB controllers

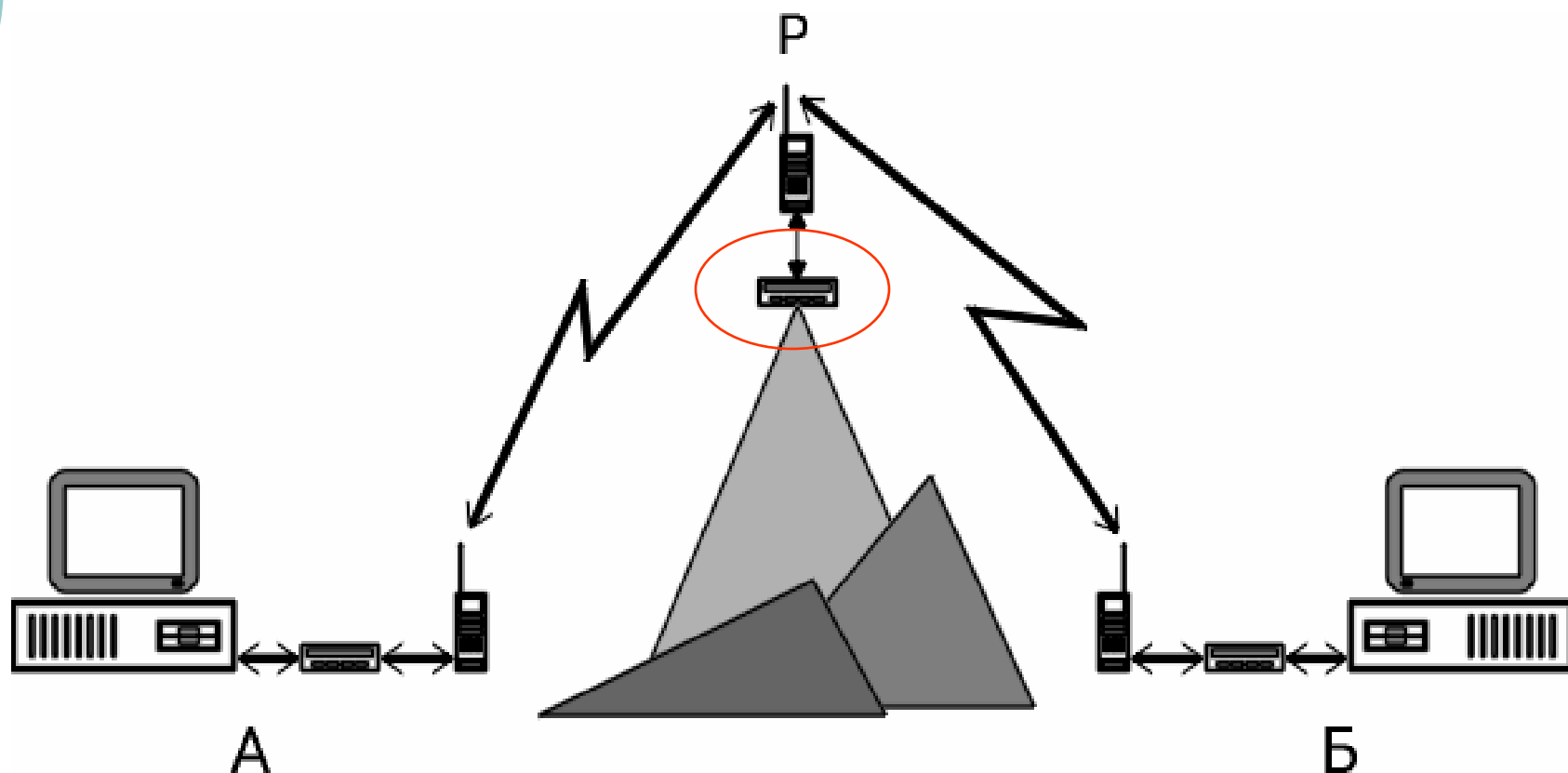


A "classical" TNC2 controller

100-200 €



TNC device as a radio relay controller (Node Controller) ***



Packet radio controller KPC 3 Plus

≈ 200 \$



Packet radio controller KPC 9612 Plus

≈ 350 \$

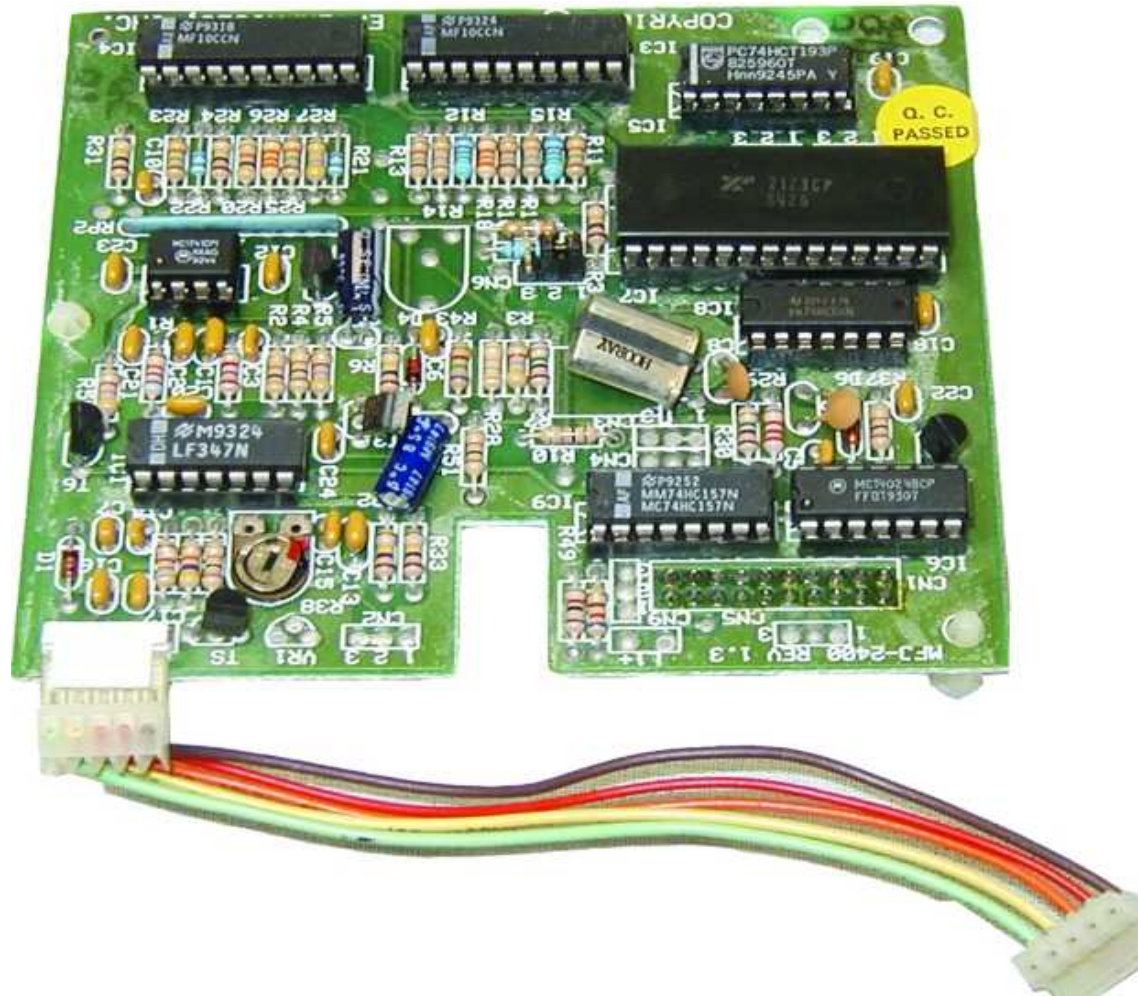


MFJ-1278B Multi-mode Data Controller

≈400 \$

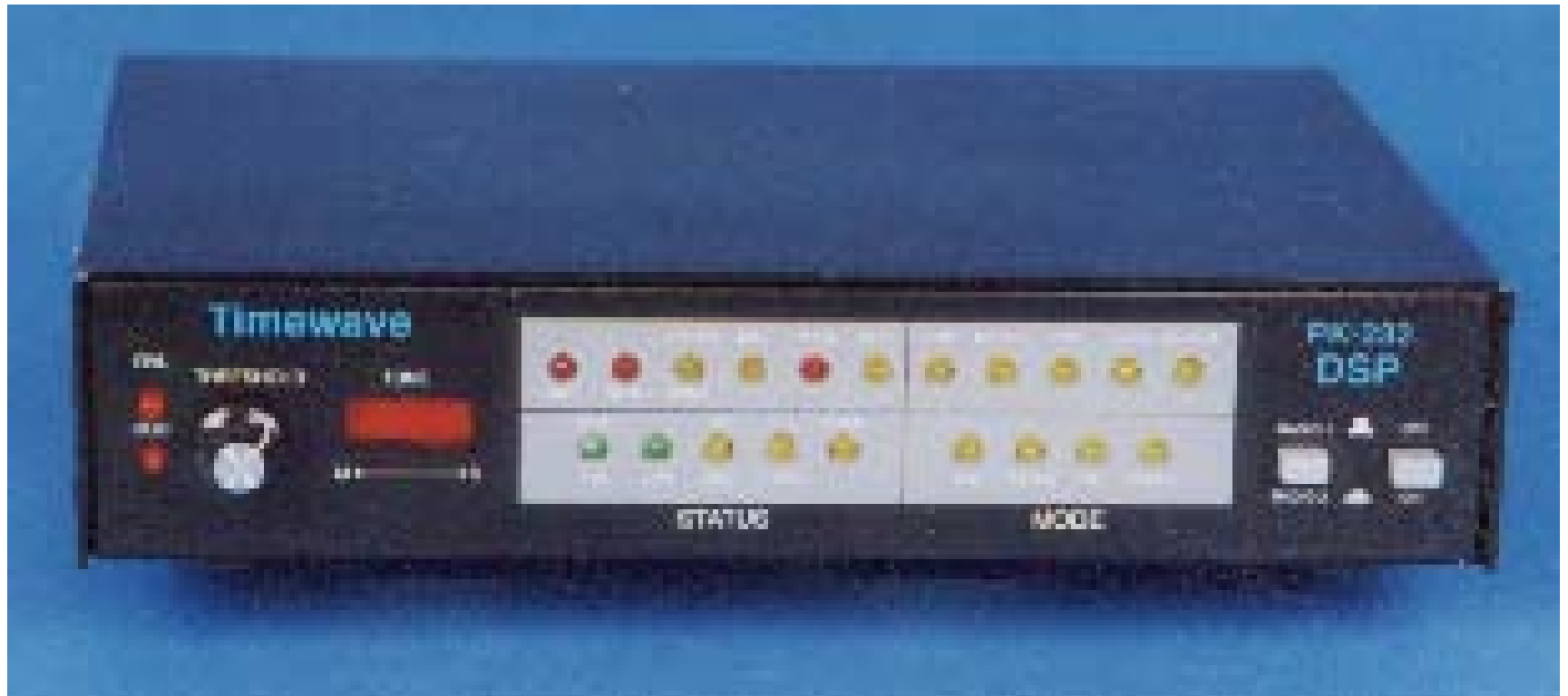


Modem MFJ-2400 as an add-on board for MFJ-1278B

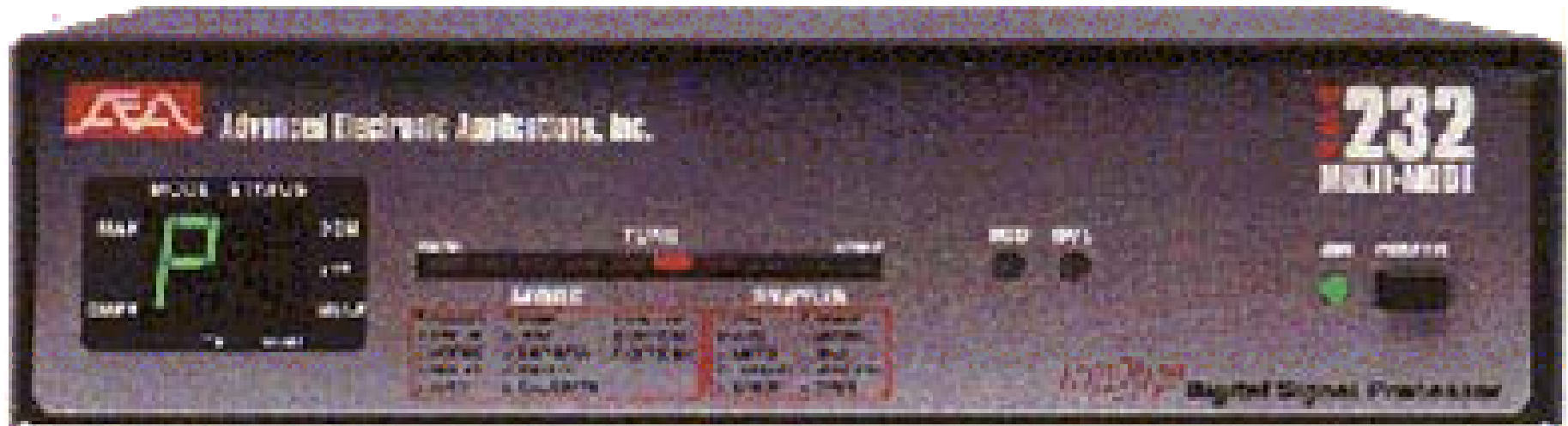


Timewave (AEA) PK-232 controller

≈ 500 \$

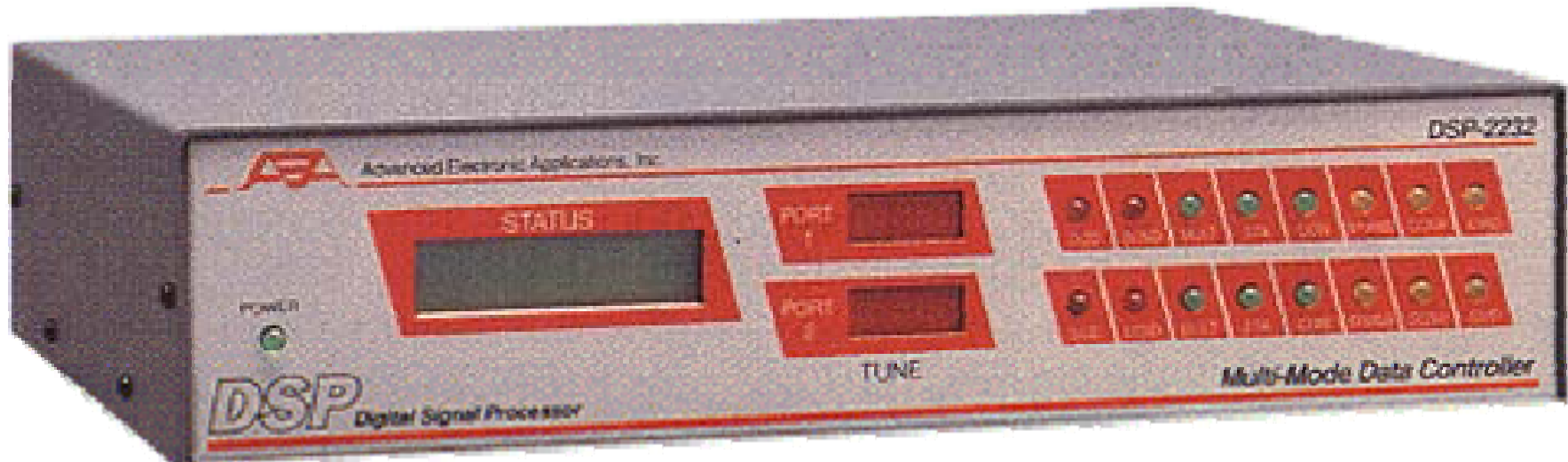


AEA DSP-232 Dual Switchable Port Multi-Mode Data Controller



AEA DSP-2232 Data Controller

800-1000 \$



KAM – “Kantronics All Mode”

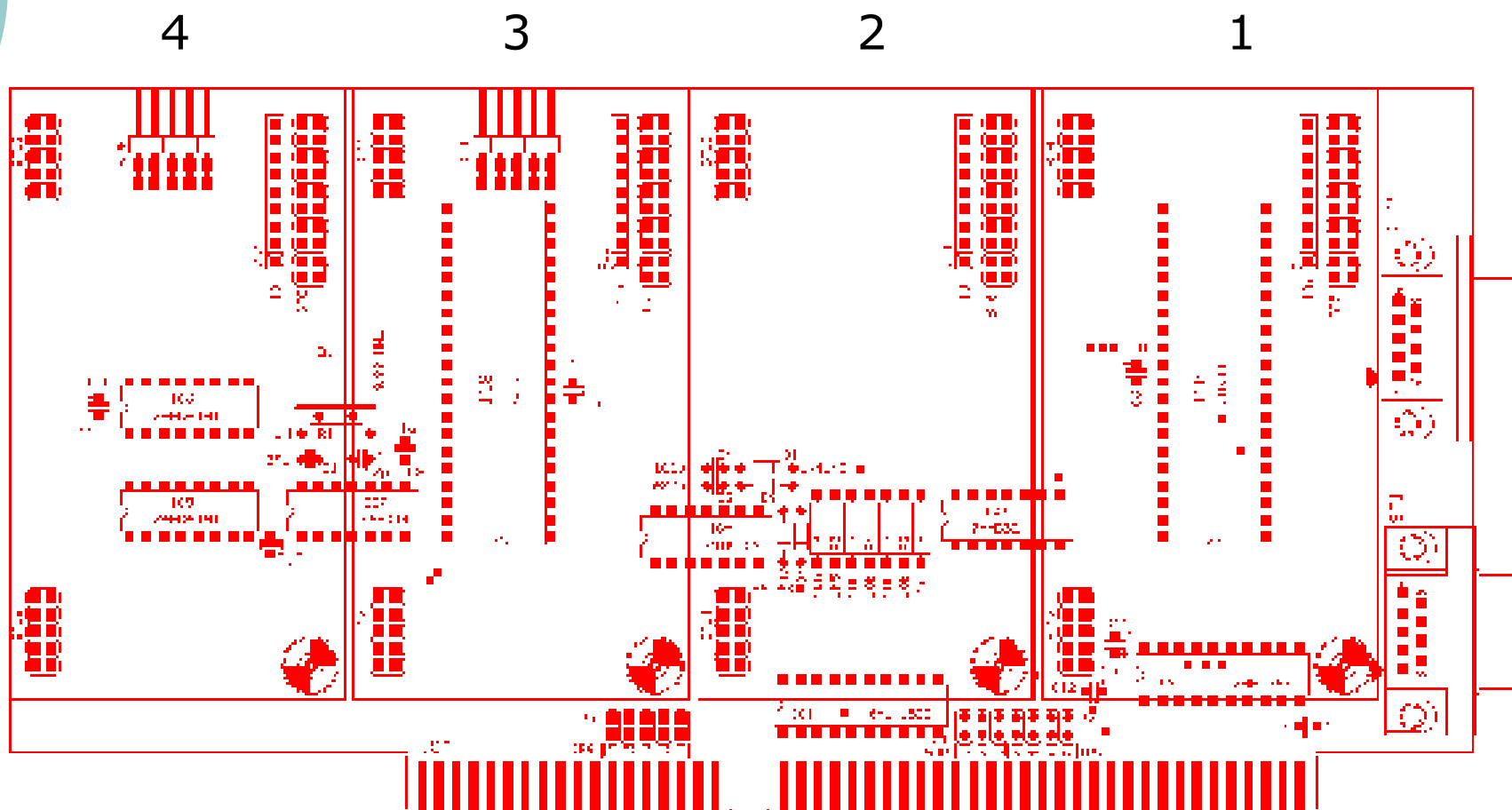
400 \$



Combined Packet-Pactor controller capable to operate 3 radio stations

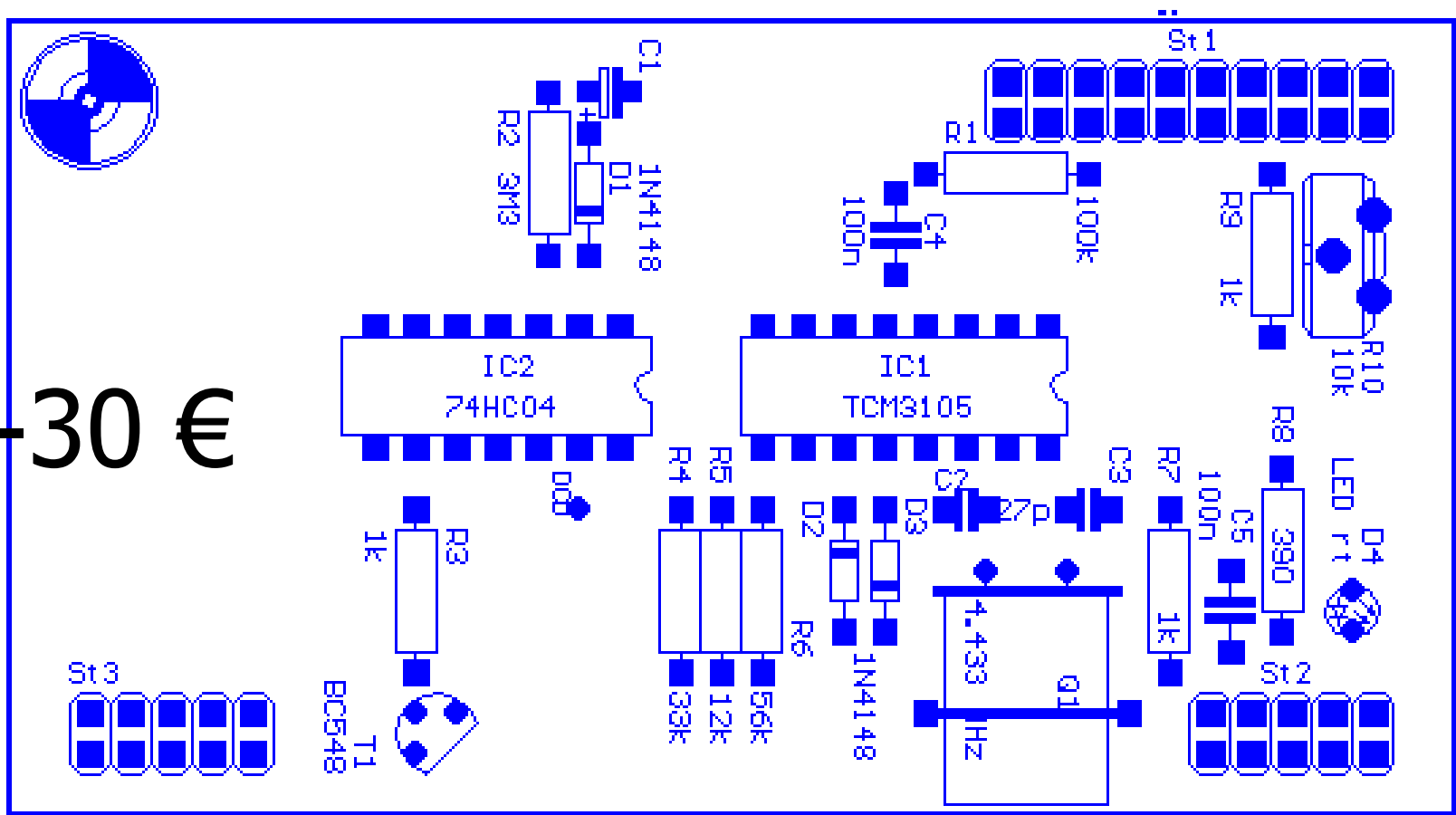


Motherboard card BayCom "USCC>4" (ISA version)

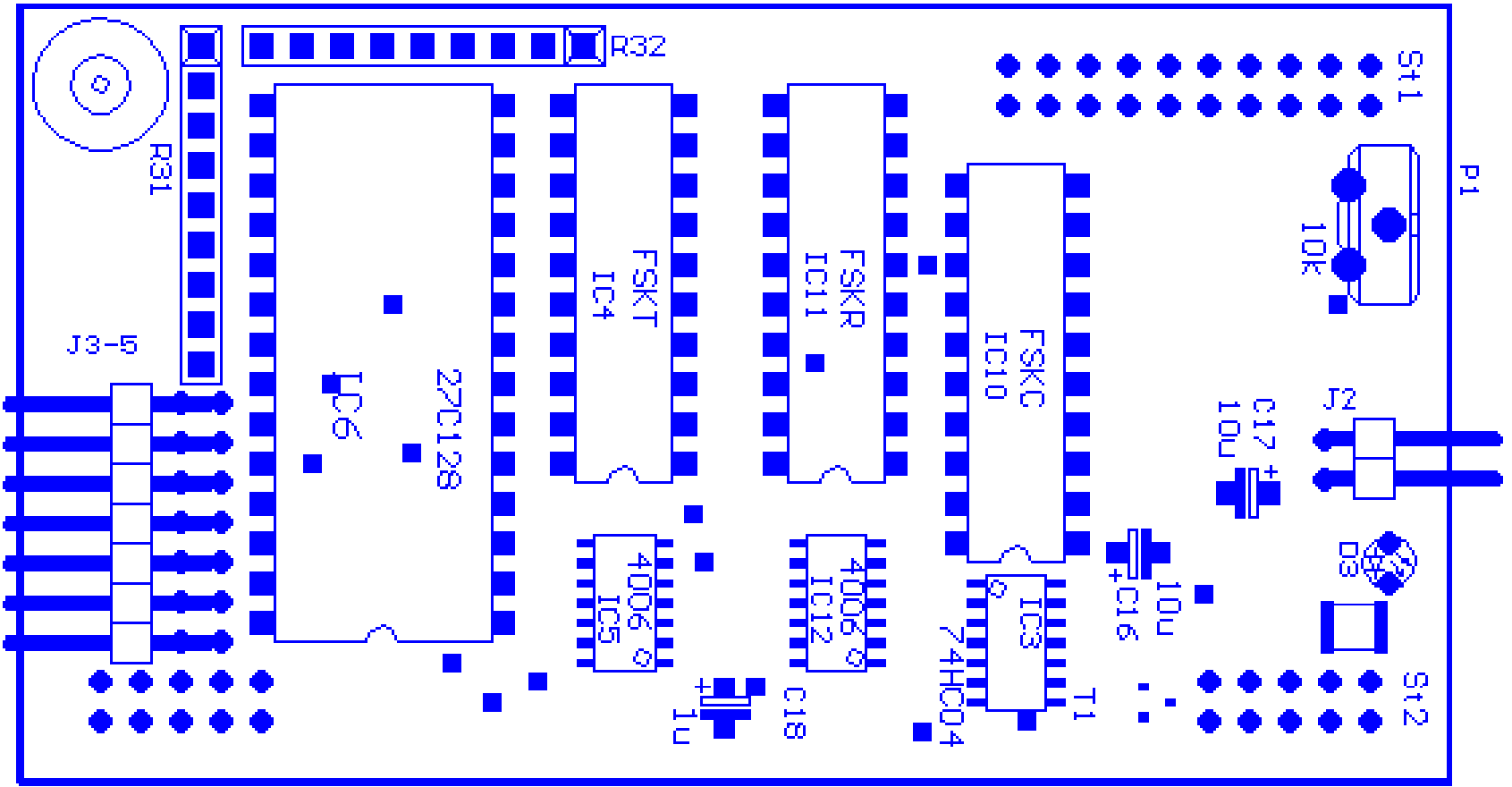


VHF/UHF modem card

25-30 €



VHF/UHF modem card



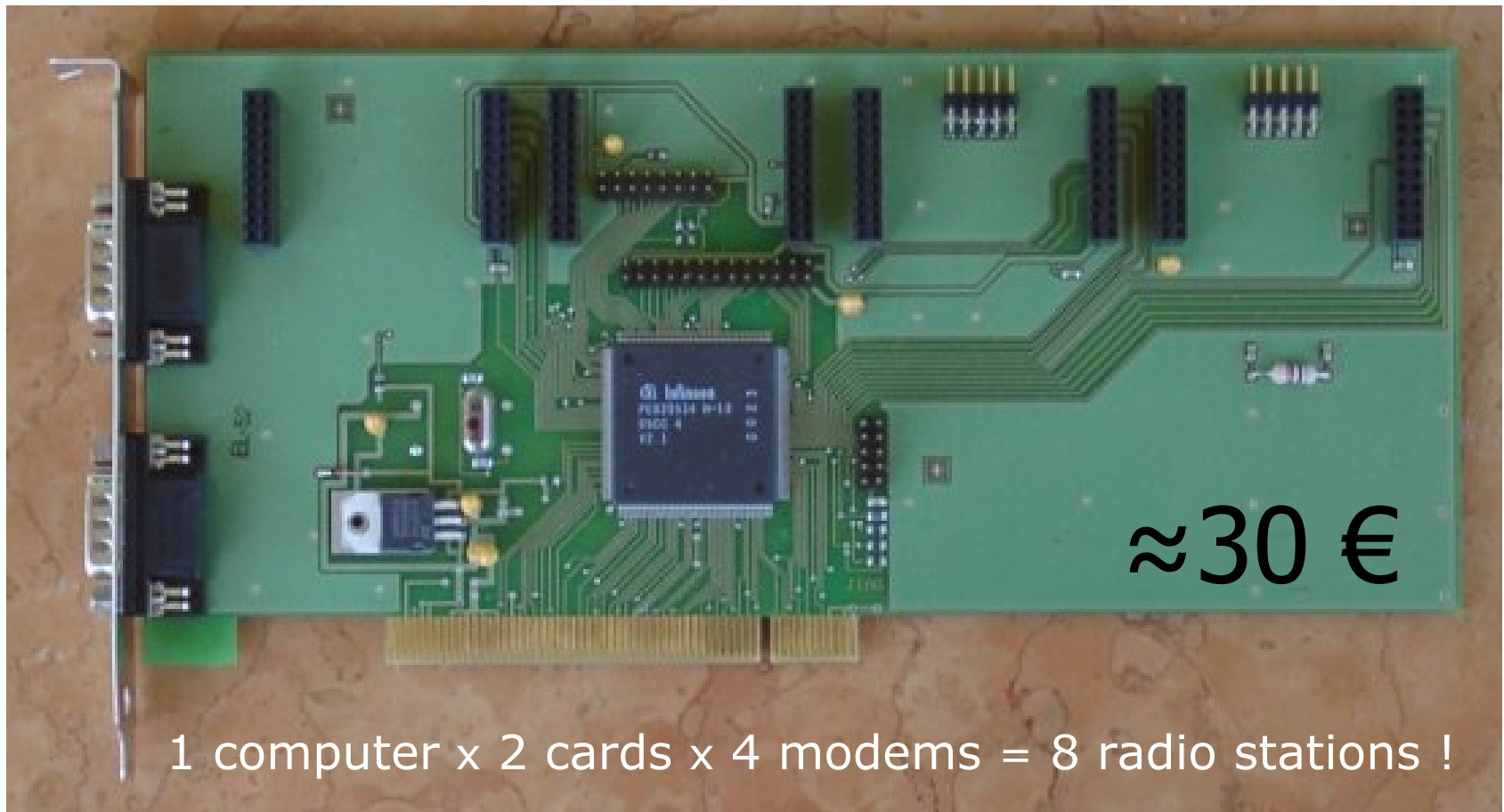
Motherboard card BayCom "USCC>4" (PCI version)

1

2

3

4





Part Two

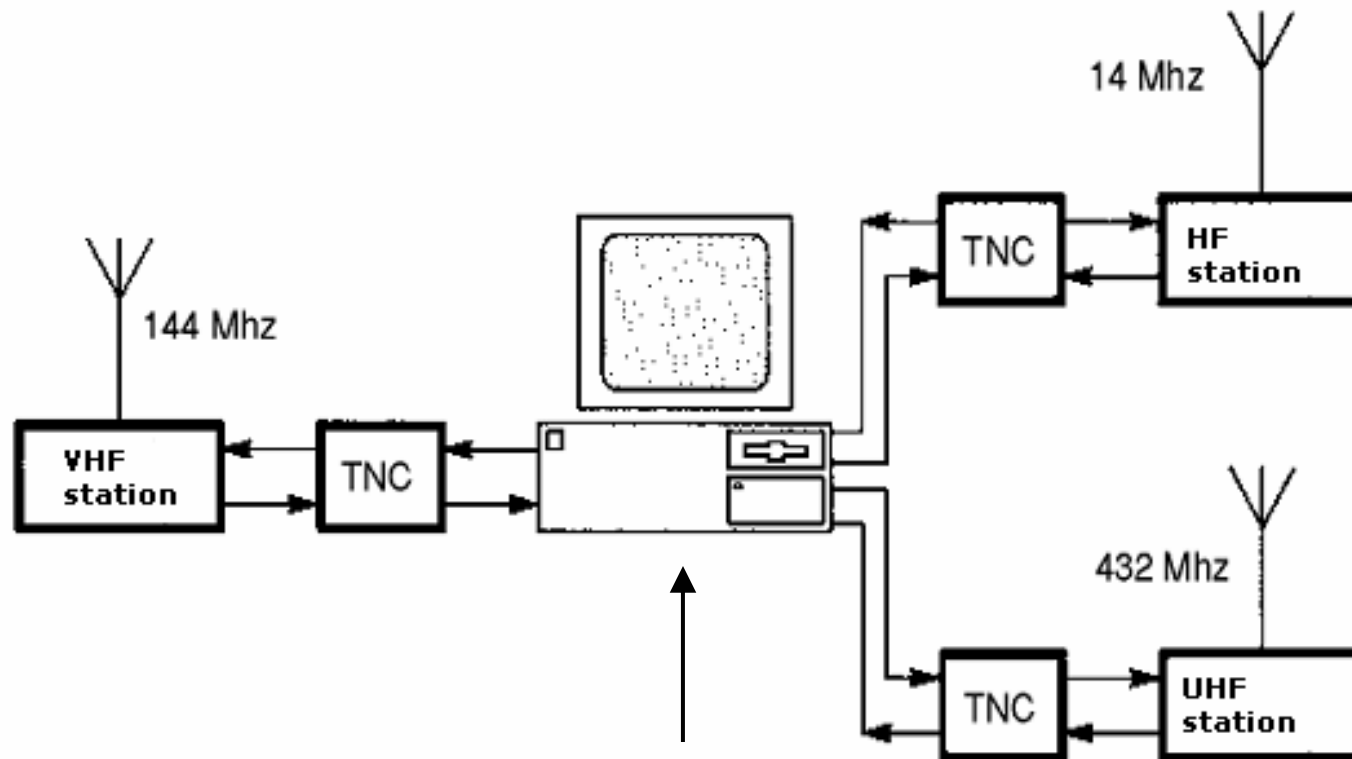
- **Software**



Software solutions in local networks: server client

- "DosFBB" app.
 - Windows "WinFBB" application
 - Linux "LinFBB" application (X11)
 - Linux "LinFBB" daemon ("xfbbd")
- Linux "xfbbC" (text)
 - Linux "xfbbX" (X11)
 - Windows "xfbbW"
 - Windows "telnet"
 - Linux "telnet"
 - DOS "telnet"
 - DOS "Xrouter"
 - DOS "JNOS"

1st possible scenario: The 'sysop' is the single user (no LAN)



MS DOS "DosFBB" server application
Windows "WinFBB" server application
Linux "LinFBB" server application (X11)
Linux "LinFBB" server daemon ("xfbbd")

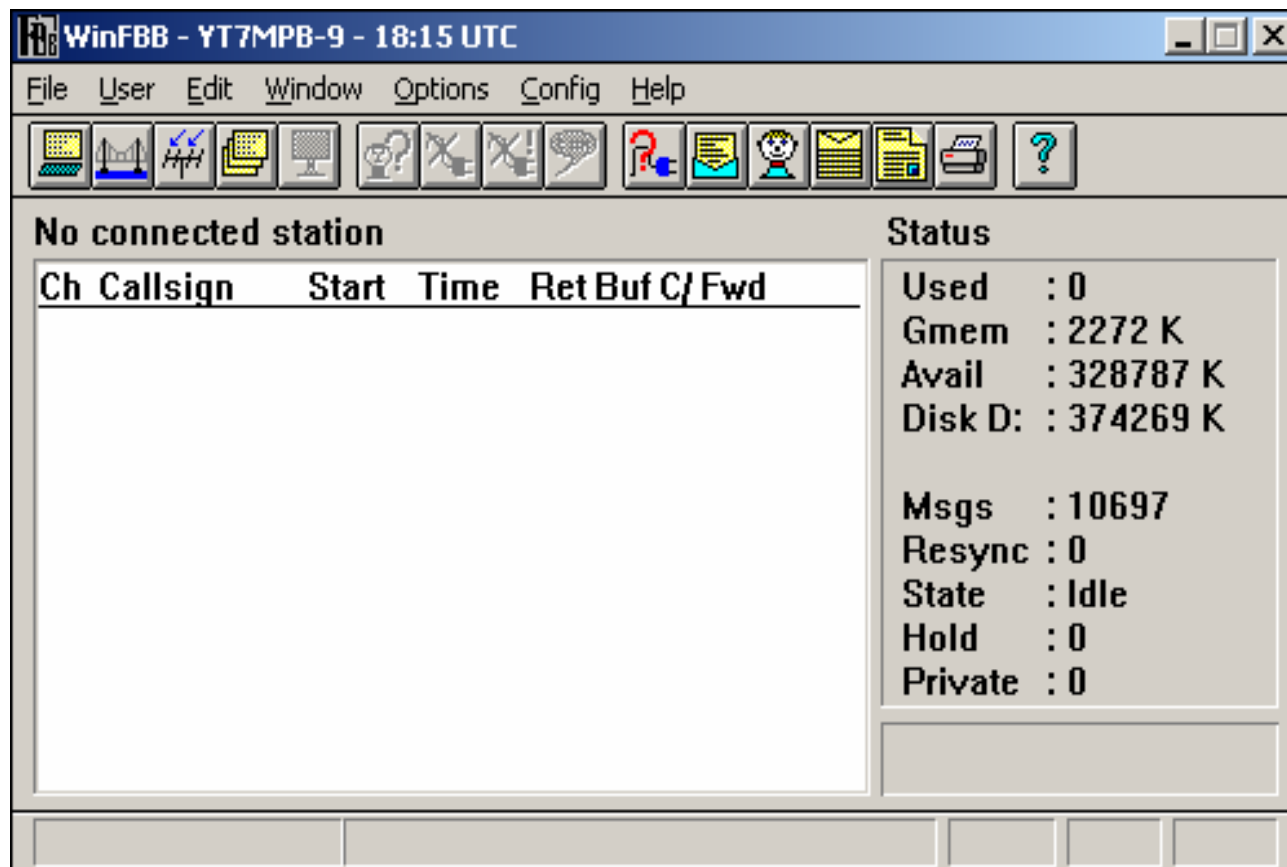


Software solutions: Windows

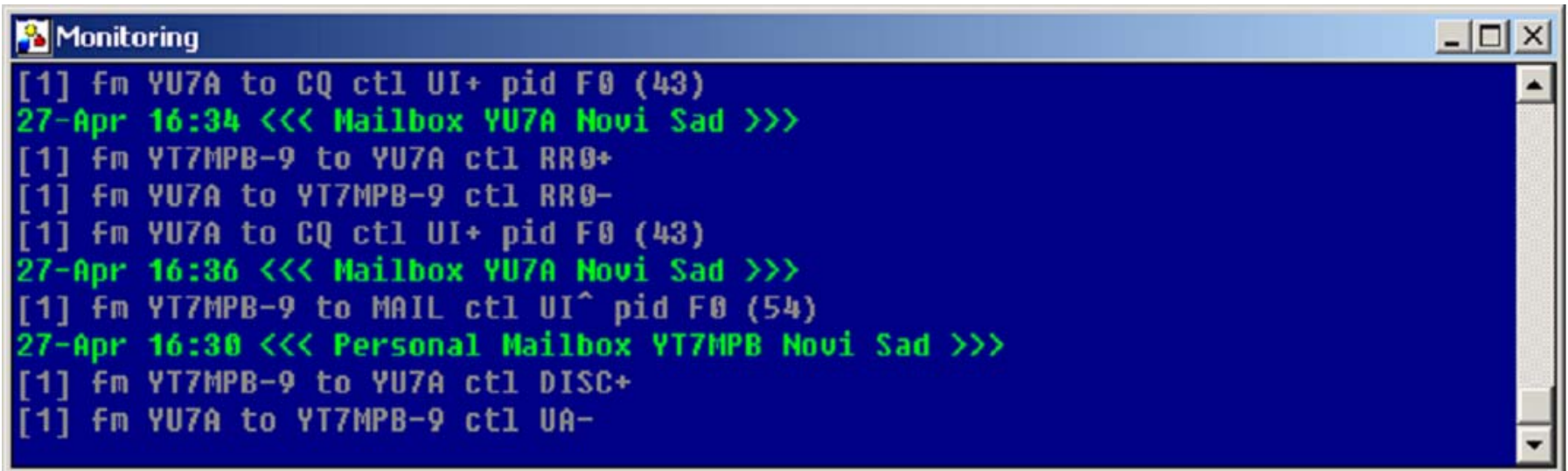
“WinFBB” application

0 € (Free!)

"WinFBB" (1)

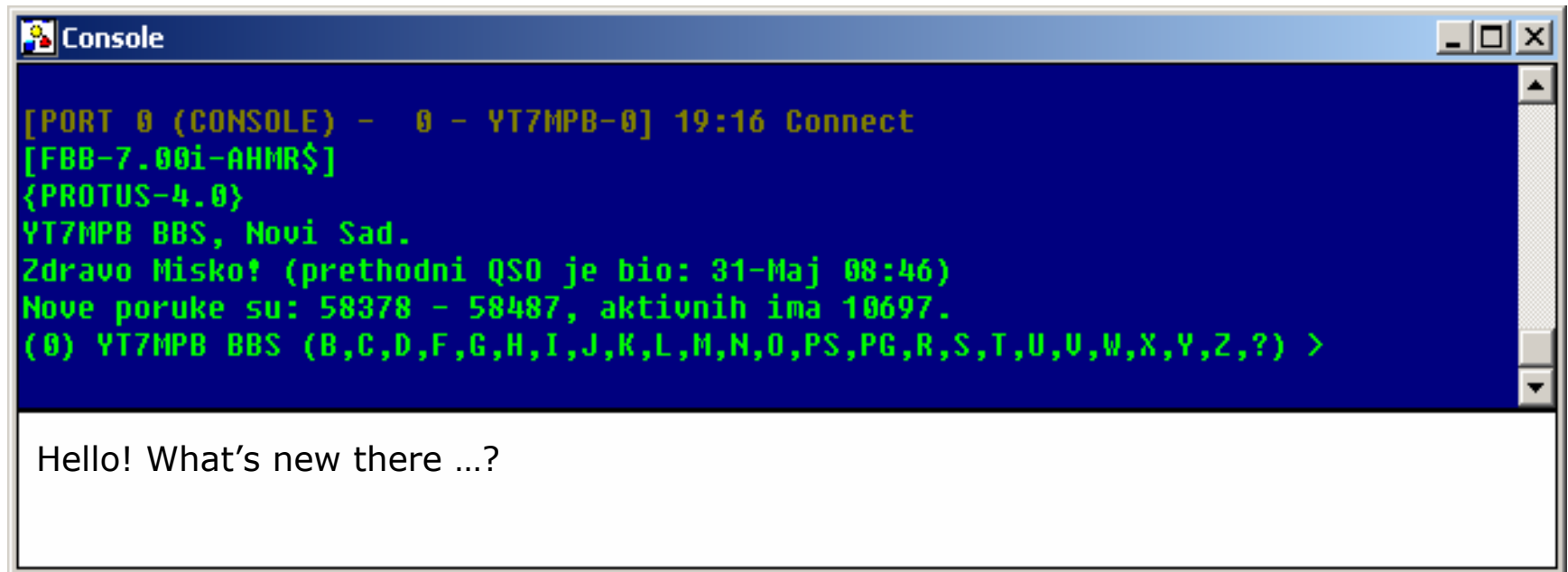


"WinFBB" (2)



```
Monitoring
[1] fm YU7A to CQ ctl UI+ pid F0 (43)
27-Apr 16:34 <<< Mailbox YU7A Novi Sad >>>
[1] fm YT7MPB-9 to YU7A ctl RR0+
[1] fm YU7A to YT7MPB-9 ctl RR0-
[1] fm YU7A to CQ ctl UI+ pid F0 (43)
27-Apr 16:36 <<< Mailbox YU7A Novi Sad >>>
[1] fm YT7MPB-9 to MAIL ctl UI^ pid F0 (54)
27-Apr 16:30 <<< Personal Mailbox YT7MPB Novi Sad >>>
[1] fm YT7MPB-9 to YU7A ctl DISC+
[1] fm YU7A to YT7MPB-9 ctl UA-
```

"WinFBB" (3)



```
[PORT 0 (CONSOLE) - 0 - YT7MPB-0] 19:16 Connect
[FBB-7.00i-AHMR$]
{PROTUS-4.0}
YT7MPB BBS, Novi Sad.
Zdravo Misko! (prethodni QSO je bio: 31-Maj 08:46)
Nove poruke su: 58378 - 58487, aktivnih ima 10697.
(0) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,U,W,X,Y,Z,?) >
```

Hello! What's new there ...?

My Documents Real.com Guide Shortcut to PTT NT 10 Point Security ... P201.pdf

My Computer RealDownload Shortcut to UMS Universal u Novom Sa... balon bit

My Network Places RealJukebox The Bat! Izmena Statuta Me...

Recycle Bin RealPlayer Basic WinFBS Vuca sajnis...

Internet Explorer Shortcut to DUnet InfoTeh200... Prevod novog statuta.TXT

Windows Explorer Shortcut to PON Izmena Statuta Me... povodom prevoda.TXT

WinZip Shortcut to InfoSky MSenan2m... Acrobat Reader 4.0

Netscape Communicator Shortcut to Neebee Statut-jun2... Christmas 2001_start...

AOL Instant Messaging... Shortcut to NPoint Base.txt Digital-Wide...

WinFBS - YT7MPB-9 - 23:49 UTC

File User Edit Window Options Config Help

1 connected station

| Ch | Callsign | Start | Time | Ret | Buf | C/ | Fwd | Status |
|----|----------|-------|-------|-----|-----|----|-----|--|
| 00 | YT7MPB-0 | 23:48 | 00:00 | 0 | 0 | | | Used : 0 Gmem : 1024 K Avail : 524350 K Disk D: : 999934 K Msgs : 3913 Resync : 0 State : Idle Hold : 0 Priv : 171 |

Ch:00 YT7MPB-0 But:500 Task:14-00-00 NUM

Monitoring

```
[1] Fa YT7MPB-9 to MAIL ct1 UI pid F0 (54)
03-Feb 23:48 <<< Personal Mailbox YT7MPB Novi Sad >>>
```

Console

```
[PORT 0 (CONSOLE) - 0 - YT7MPB-0] 23:48 Connect
[F00-7.001-AMMR$]
{PROTUS-4.0}
YT7MPB BBS, Novi Sad.
Zdravo Misko! (prethodni QSO je bio: 04-Feb 00:19)
Nove poruke su: 90851 - 91126, aktionih ina 3913.
Histe precitali nove poruke za vas: 171 kom.
(0) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,N,M,O,PS,PC,R,S,T,U,V,W,X,Y,Z,?) >
```

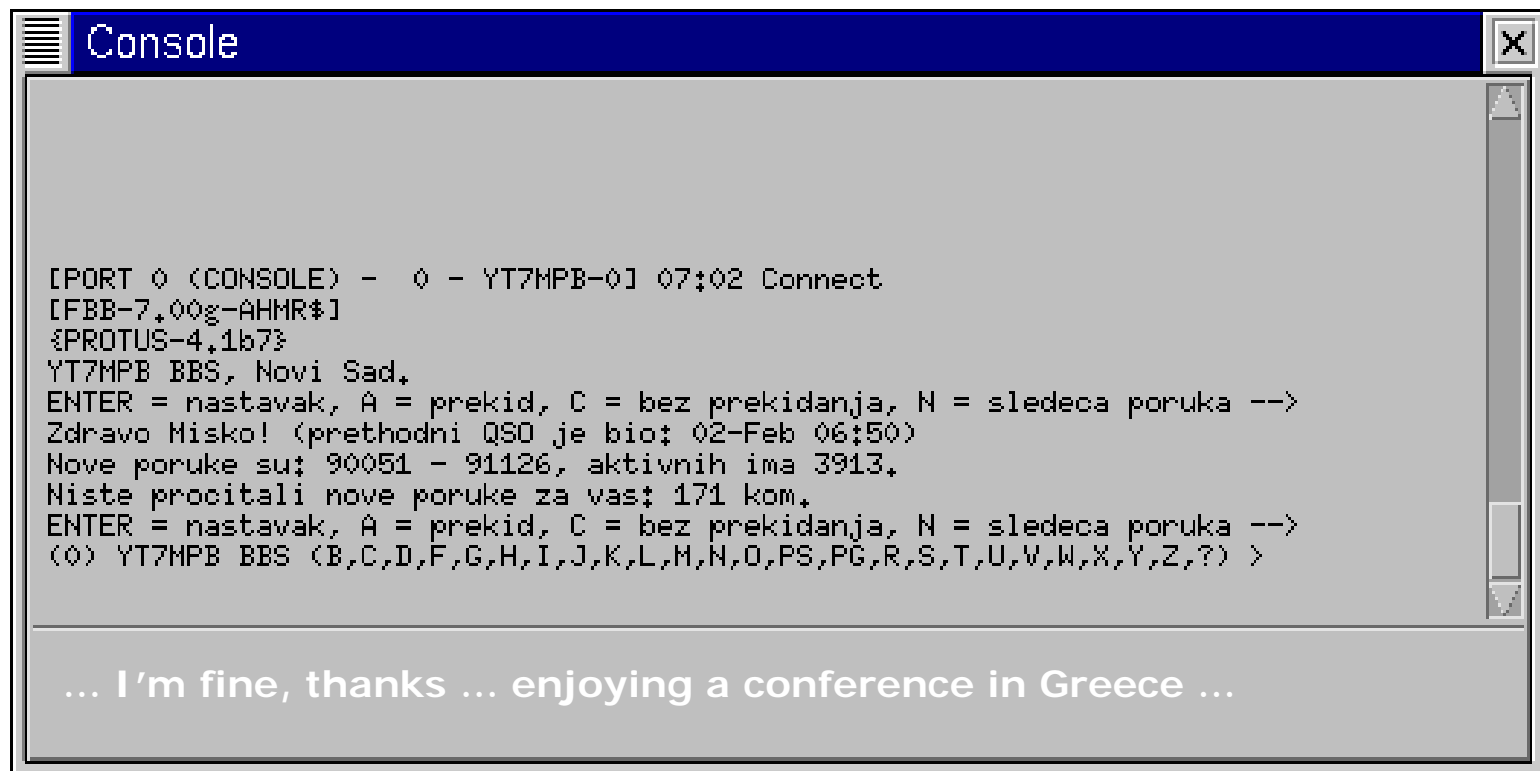


Software solutions: Linux

1. *“LinFBB” application (X11)*
2. *“LinFBB” daemon (“xfbbd”)*

0 € (Free!)

“LinFBB” (3)



```
[PORT 0 (CONSOLE) - 0 - YT7MPB-0] 07:02 Connect
[FBB-7.00g-AHMR$]
{PROTUS-4.1b7}
YT7MPB BBS, Novi Sad,
ENTER = nastavak, A = prekid, C = bez prekidanja, N = sledeca poruka -->
Zdravo Misko! (prethodni QSO je bio: 02-Feb 06:50)
Nove poruke su: 90051 - 91126, aktivnih ima 3913.
Niste procitali nove poruke za vas: 171 kom.
ENTER = nastavak, A = prekid, C = bez prekidanja, N = sledeca poruka -->
(O) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >
```

... I'm fine, thanks ... enjoying a conference in Greece ...

XFBB - YT7MPB-9 - 23:03 UTC
Monitoring

File User Edit Window Options Config Help

1 connected station

| Ch | Callsign | Start Time | Rt | Buf | C/Fwd | Status |
|----|----------|------------|-------|-----|-------|---|
| 00 | YT7MPB | 22:02 | 00:00 | 0 | 0 | Used memory : 0 Data memory : 1216 K Disk#1 free : 1889216 K Messages : 3913 Resynchro : 0 State : Idle Hold msgs : 0 Priv msgs : 171 |

Monitoring

```
[I] fm YT7MPB-9 to MAIL ctl UI^ pid F0 (54)
03-Feb 21:54 <<< Personal Mailbox YT7MPB Novi Sad >>>
[I] fm YT7MPB-9 to MAIL ctl UI^ pid F0 (54)
03-Feb 22:00 <<< Personal Mailbox YT7MPB Novi Sad >>>
```

Console

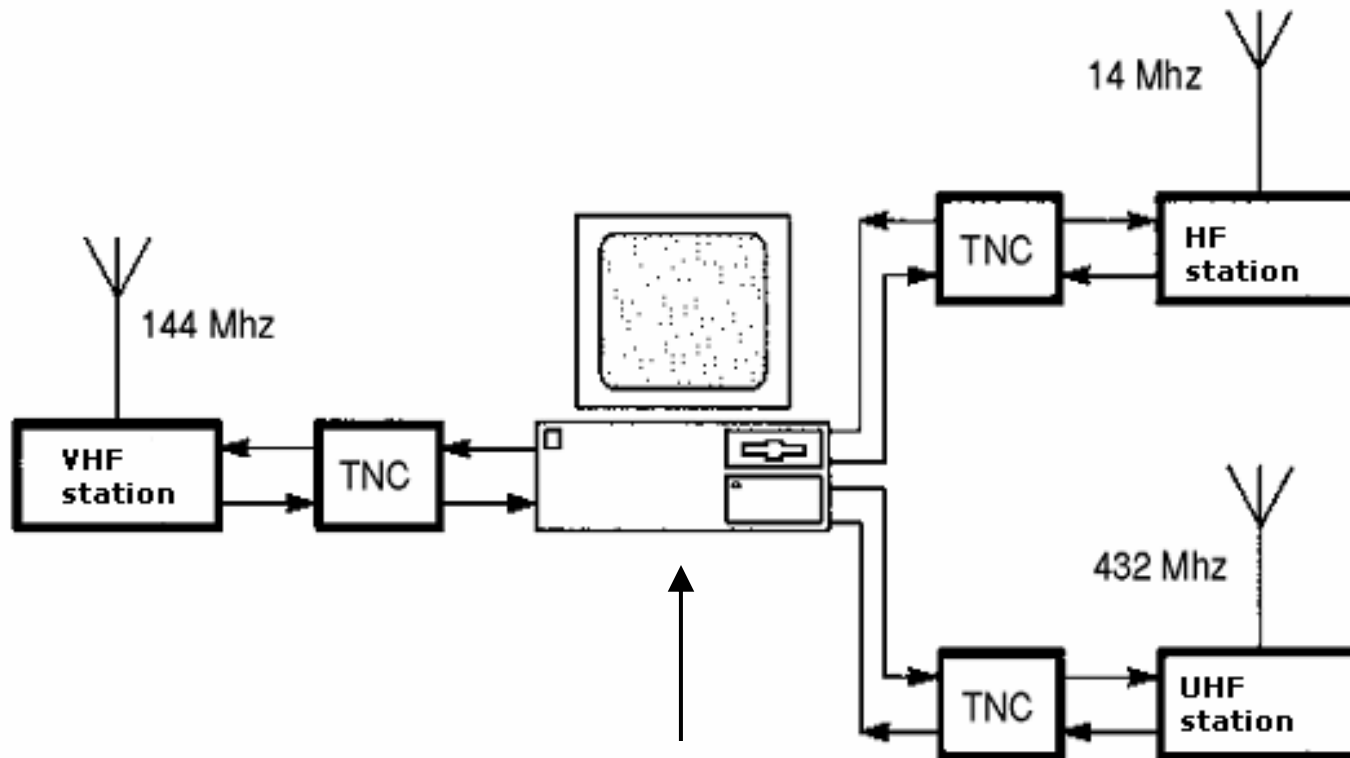
```
[PORT 0 (CONSOLE) - 0 - YT7MPB-01 22:02 Connect
[FBF-7,00g-AHMR#]
{PROTUS-4,1b7}
YT7MPB BBS, Novi Sad.
ENTER = nastavak, A = prekid, C = bez prekidanja, N = sledeca poruka -->
Zdravo Misko! (prethodni QSO je bio: 03-Feb 19:32)
Nove poruke su: 90051 - 91126, aktivnih ima 3913.
Niste procitali nove poruke za vas: 171 kom.
ENTER = nastavak, A = prekid, C = bez prekidanja, N = sledeca poruka -->
<0> YT7MPB BBS <B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?> >
```

skoric@localhost... XFBB - YT7MPB... skoric@localhost...

/home/skoric Monitoring Console

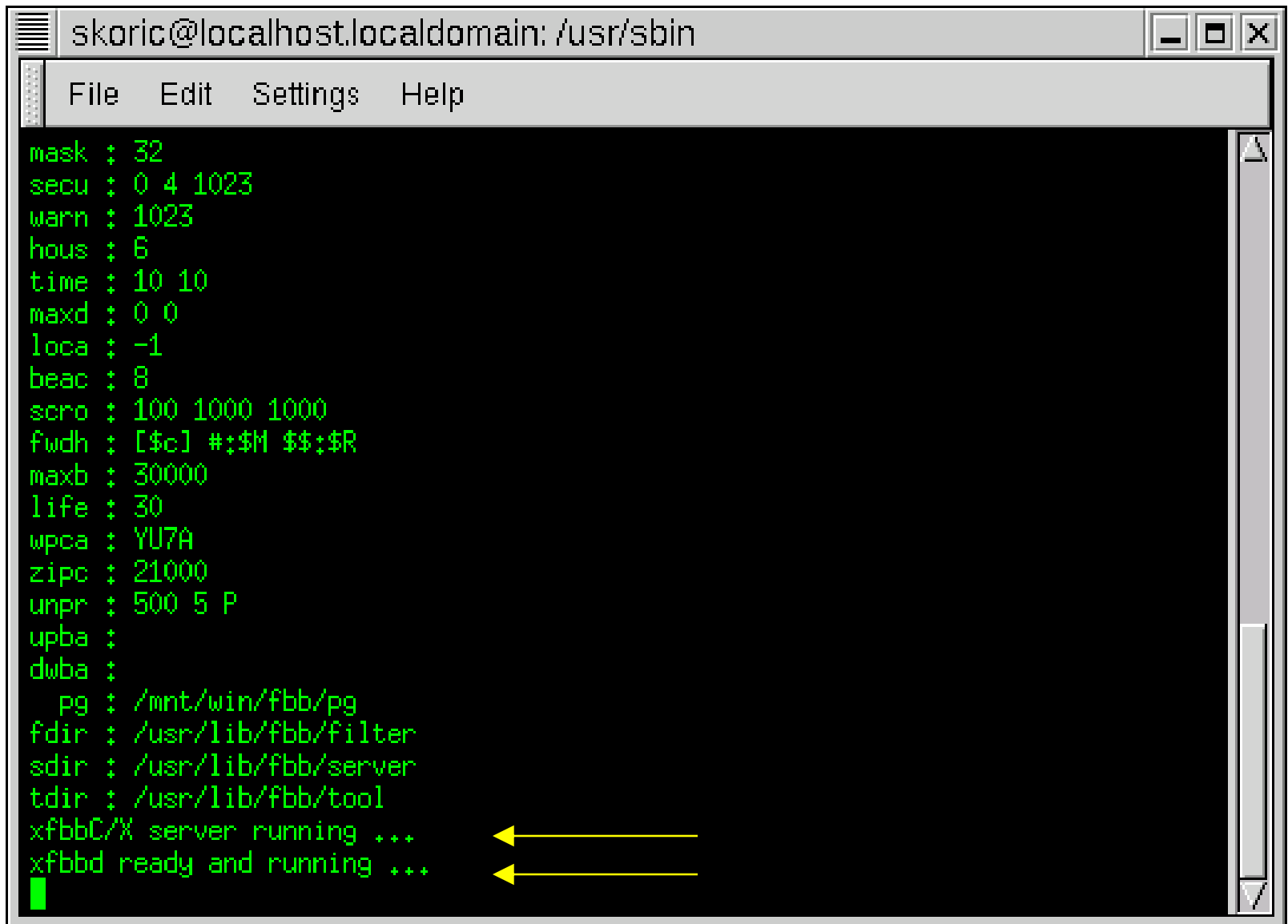
Sun Feb 03 10:03 PM

2nd possible scenario: The 'sysop' is the single user (no LAN)



Linux "LinFBB" server daemon ("xfbbd")
Linux "xfbbC" local client (text mode)
Linux "telnet" command (server console)
Linux "xfbbX" local client (GUI mode)

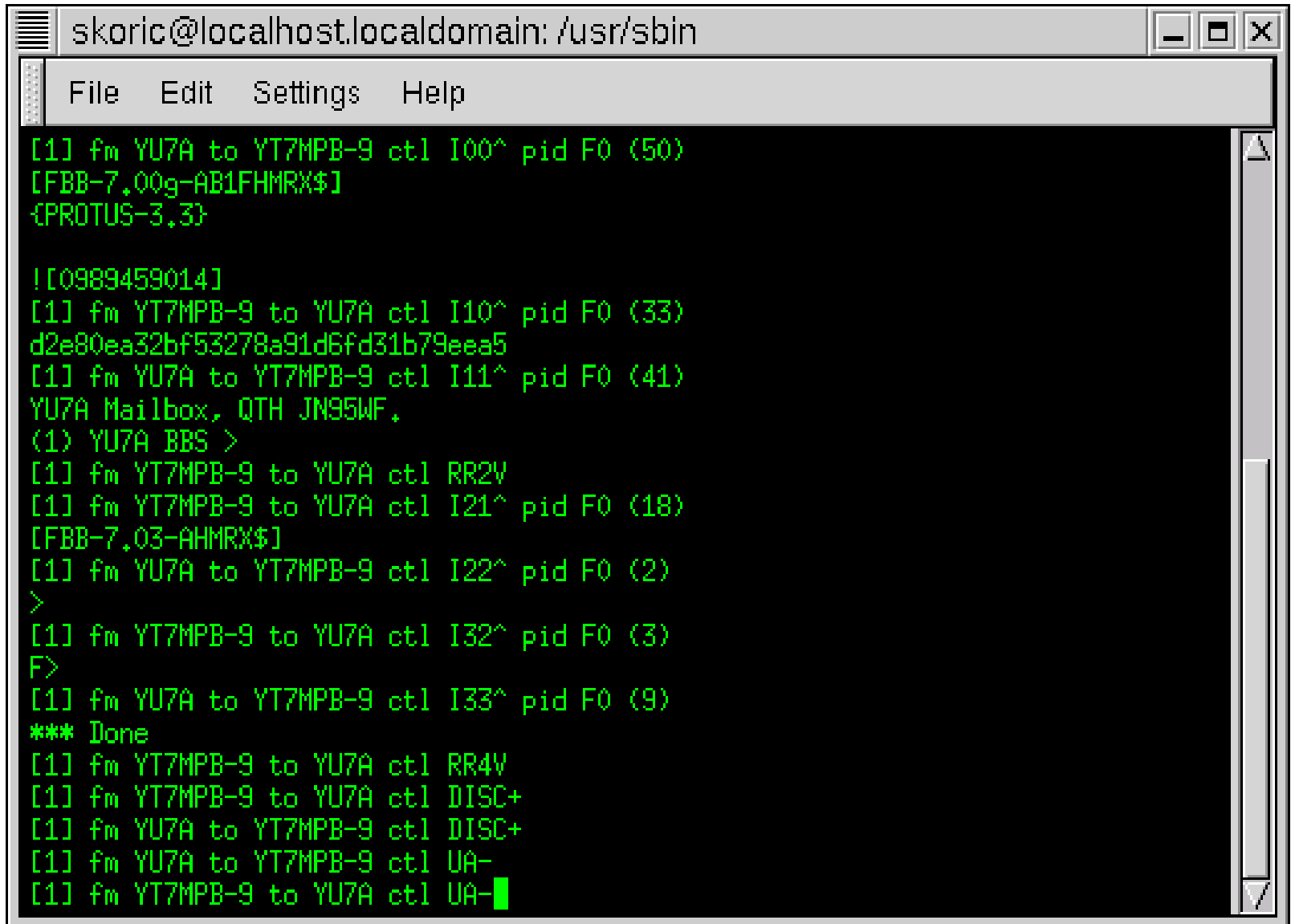
LinFBB's "xfbbd"



A terminal window titled "skoric@localhost.localdomain: /usr/sbin" with a menu bar (File, Edit, Settings, Help). The terminal displays the configuration for the xfbbd service. The configuration parameters are listed in green text. At the bottom, two status messages are shown: "xfbbdC/X server running ..." and "xfbbd ready and running ...", with two yellow arrows pointing to the right from the text.

```
mask : 32
secu : 0 4 1023
warn : 1023
hous : 6
time : 10 10
maxd : 0 0
loca : -1
beac : 8
scro : 100 1000 1000
fwdh : [$c] #:$M $:$R
maxb : 30000
life : 30
wpcn : YU7A
zipc : 21000
unpr : 500 5 P
upba :
dwba :
  pg : /mnt/win/fbb/pg
fdir : /usr/lib/fbb/filter
sdir : /usr/lib/fbb/server
tdir : /usr/lib/fbb/tool
xfbbdC/X server running ...
xfbbd ready and running ...
```

LinFBB's "xfbbC" (sysop)



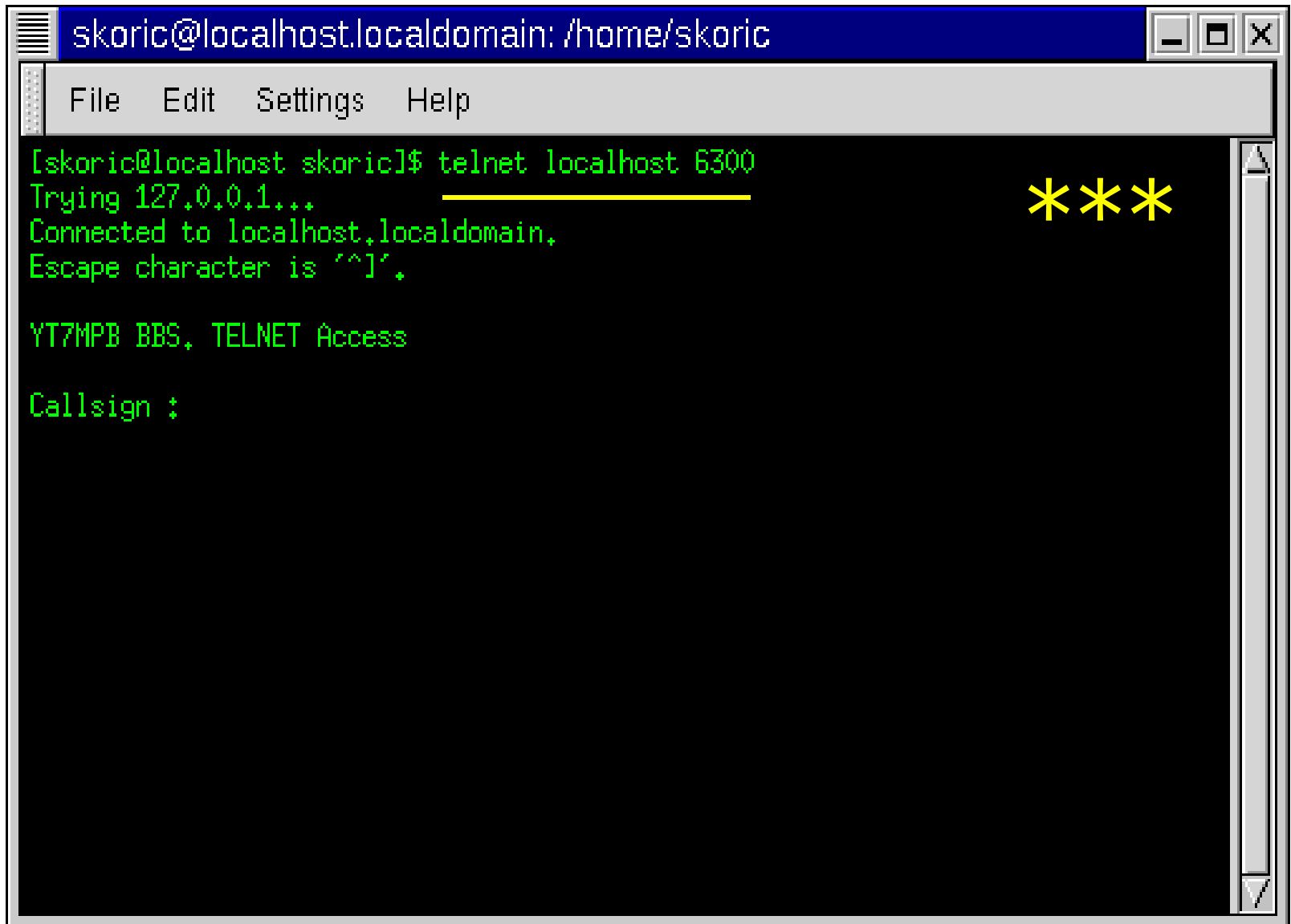
```
skoric@localhost.localdomain: /usr/sbin
File Edit Settings Help
[1] fm YU7A to YT7MPB-9 ct1 I00^ pid F0 (50)
[FBB-7.00g-AB1FHMRX$]
{PROTUS-3,3}

![[0989459014]
[1] fm YT7MPB-9 to YU7A ct1 I10^ pid F0 (33)
d2e80ea32bf53278a91d6fd31b79eea5
[1] fm YU7A to YT7MPB-9 ct1 I11^ pid F0 (41)
YU7A Mailbox, QTH JN95WF.
(1) YU7A BBS >
[1] fm YT7MPB-9 to YU7A ct1 RR2V
[1] fm YT7MPB-9 to YU7A ct1 I21^ pid F0 (18)
[FBB-7.03-AHMRX$]
[1] fm YU7A to YT7MPB-9 ct1 I22^ pid F0 (2)
>
[1] fm YT7MPB-9 to YU7A ct1 I32^ pid F0 (3)
F>
[1] fm YU7A to YT7MPB-9 ct1 I33^ pid F0 (9)
*** Done
[1] fm YT7MPB-9 to YU7A ct1 RR4V
[1] fm YT7MPB-9 to YU7A ct1 DISC+
[1] fm YU7A to YT7MPB-9 ct1 DISC+
[1] fm YU7A to YT7MPB-9 ct1 UA-
[1] fm YT7MPB-9 to YU7A ct1 UA-█
```

LinFBB's "xfbbC" (sysop)

```
skoric@localhost.localdomain: /usr/sbin
File Edit Settings Help
xfbbC V3.01 - Callsign : yt7mpb - Remote host : localhost
[PORT 0 (CONSOLE) - 0 - YT7MPB-01 21:45 Connect
[FBB-7.03-AHMR$]
{PROTUS-4,1b7}
YT7MPB BBS, Novi Sad,
Zdravo Misko! (prethodni QSO je bio: 09-Maj 21:39)
Nove poruke su: 58864 - 58933, aktivnih ima 11149,
(O) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >
```


Linux "telnet" (sysop)



A terminal window titled "skoric@localhost.localdomain: /home/skoric" with a menu bar containing "File", "Edit", "Settings", and "Help". The terminal output shows a telnet session to localhost on port 6300. The text is as follows:

```
skoric@localhost.localdomain: /home/skoric
[skoric@localhost skoric]$ telnet localhost 6300
Trying 127.0.0.1...
Connected to localhost.localdomain.
Escape character is '^]'.

YT7MPB BBS, TELNET Access

Callsign :
```

Three yellow asterisks (***) are displayed on the right side of the terminal output.

```
skoric@localhost.localdomain: /usr/sbin
Help
[root@localhost sbin]# ./fbb start
Starting xfbdd:
[root@localhost sbin]# █
```

```
skoric@localhost.localdomain: /usr/sbin
File Edit Settings Help
[root@localhost sbin]# ./xfbbc -m -f -h localhost -i yt7mpb -w misko

Client application for xfbdd v3.2 ( help : xfbbc -? )

Connecting localhost ... Ok
Authentication in progress ... Ok
Monitoring channel 0 ...

█
```

```
skoric@localhost.localdomain: /usr/sbin
File Edit Settings Help
xfbbc V3.01 - Callsign : yt7mpb - Remote host : localhost

[PORT 0 (CONSOLE) - 0 - YT7MPB-0] 00:18 Connect
[FBB-7.04-AHMR$]
{PROTUS-4,1b7}
YT7MPB BBS, Novi Sad,
Zdravo Misko! (prethodni QSO je bio: 03-Feb 21:48)
Nove poruke su: 90051 - 91126, aktivnih ima 3913.
Niste procitali nove poruke za vas: 171 kom.
(O) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >

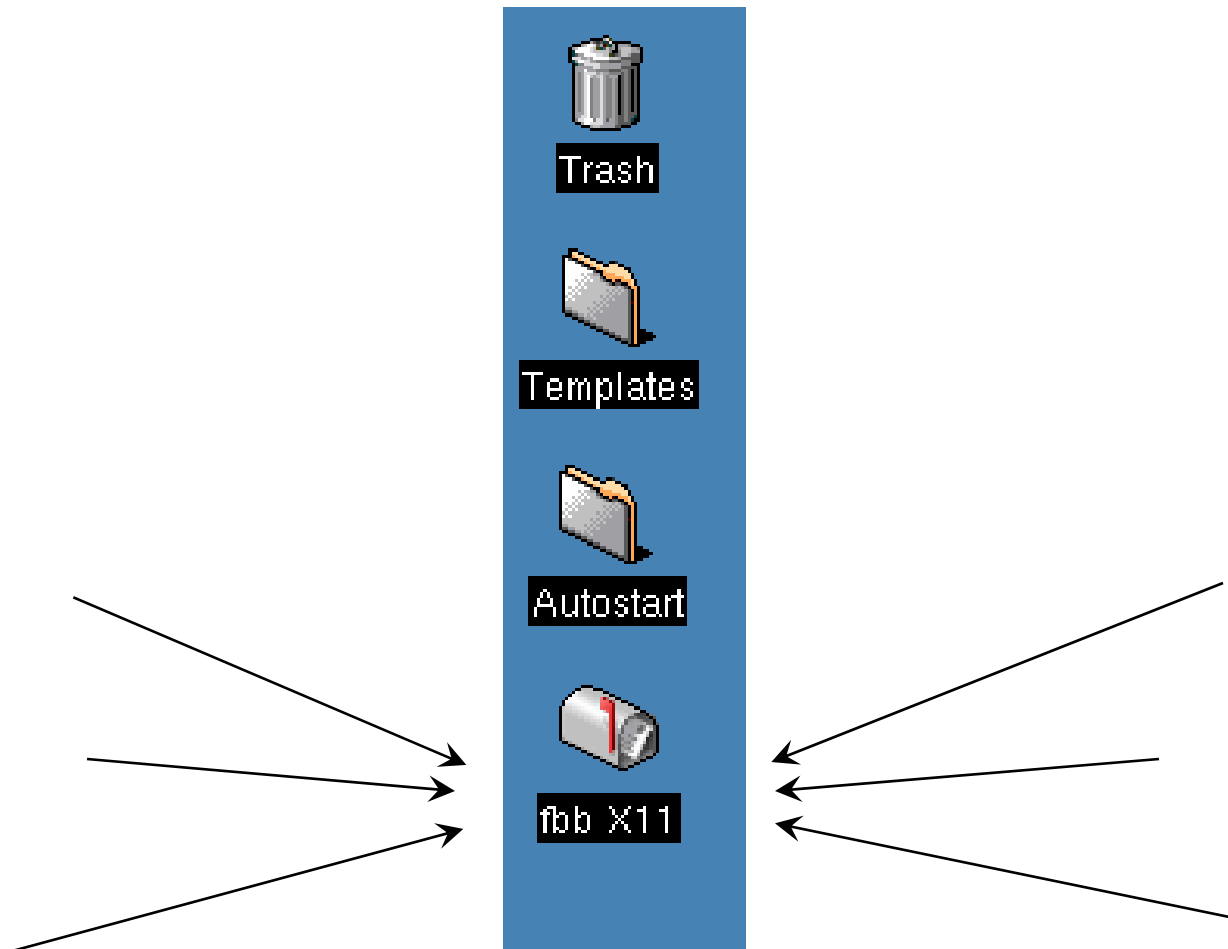
█
```

```
skoric@localhost.localdomain: /home/skoric
File Edit Settings Help
[skoric@localhost skoric]$ telnet localhost 6300
Trying 127.0.0.1...
Connected to localhost.localdomain.
Escape character is '^]'.

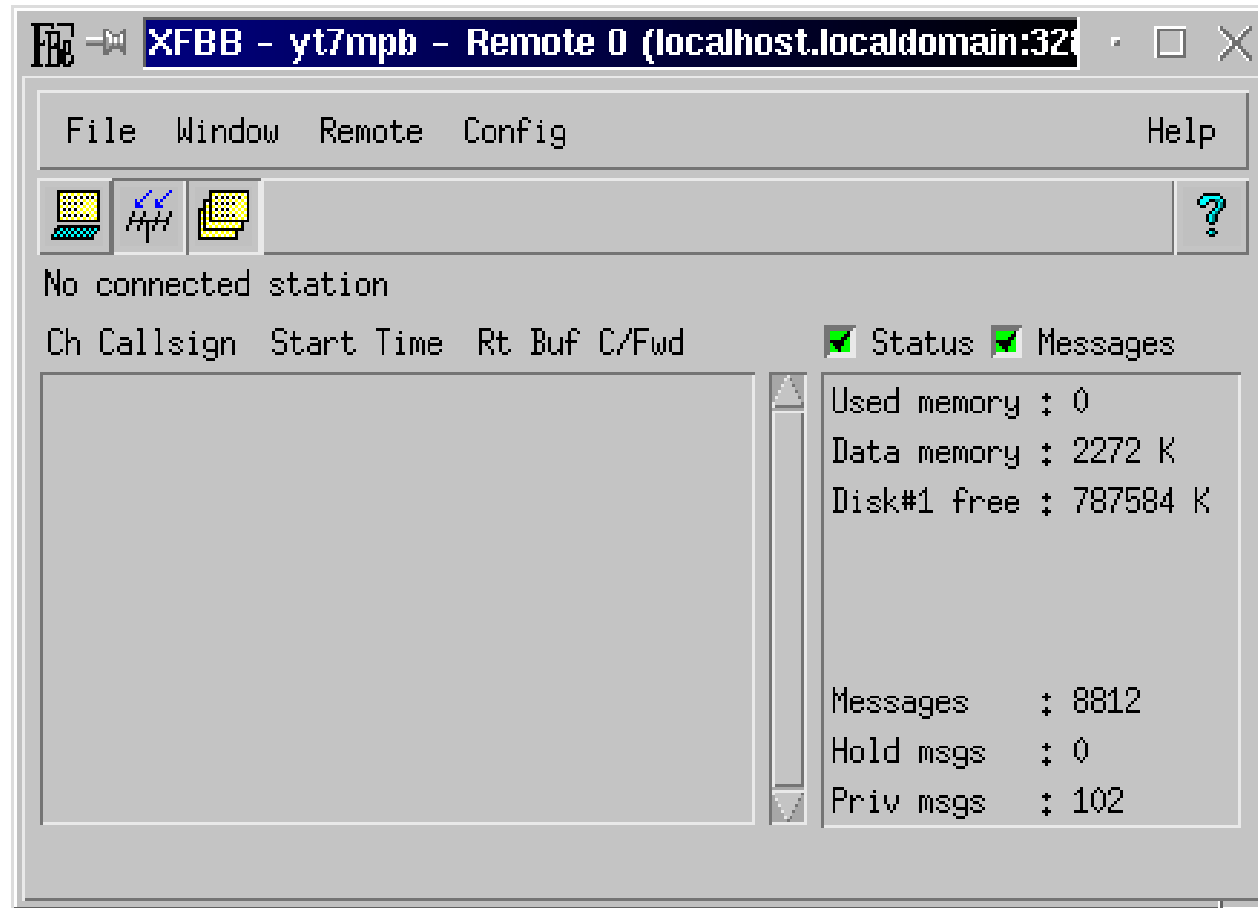
YT7MPB BBS, TELNET Access

Callsign : █
```

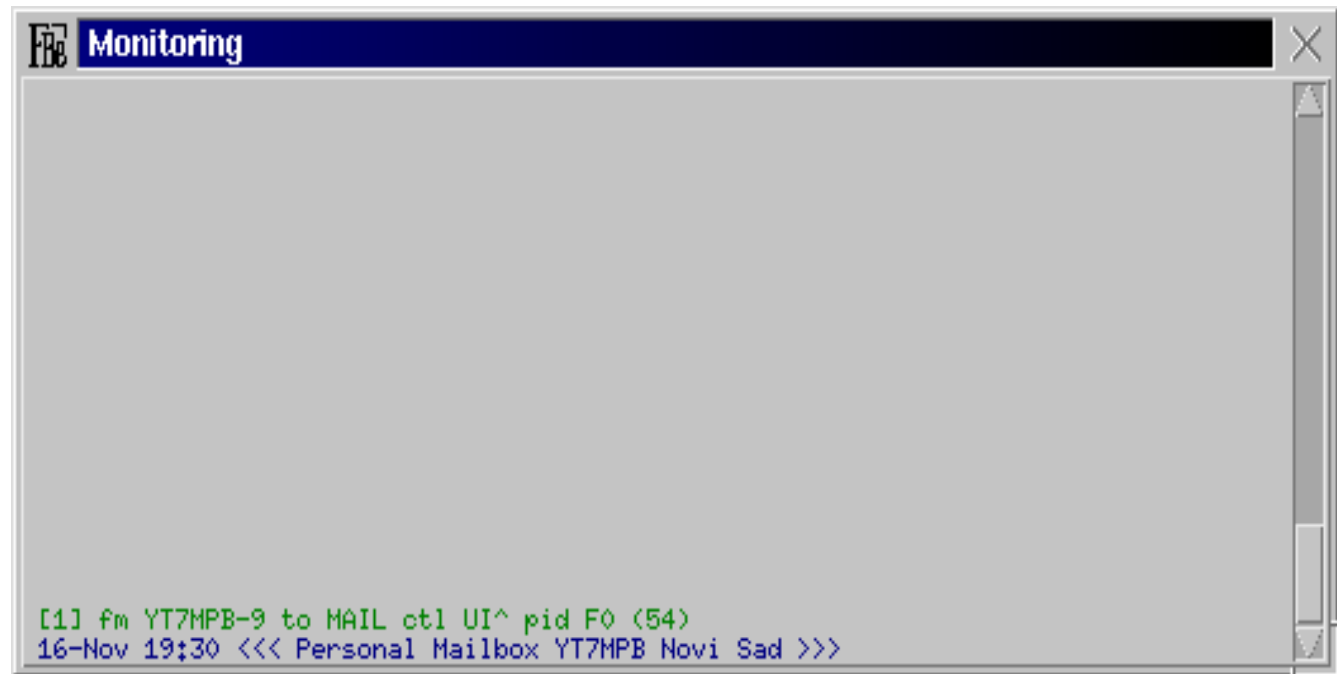
“LinFBB” client “xfbbX”



“LinFBB” *client* “xfbbX” (1)



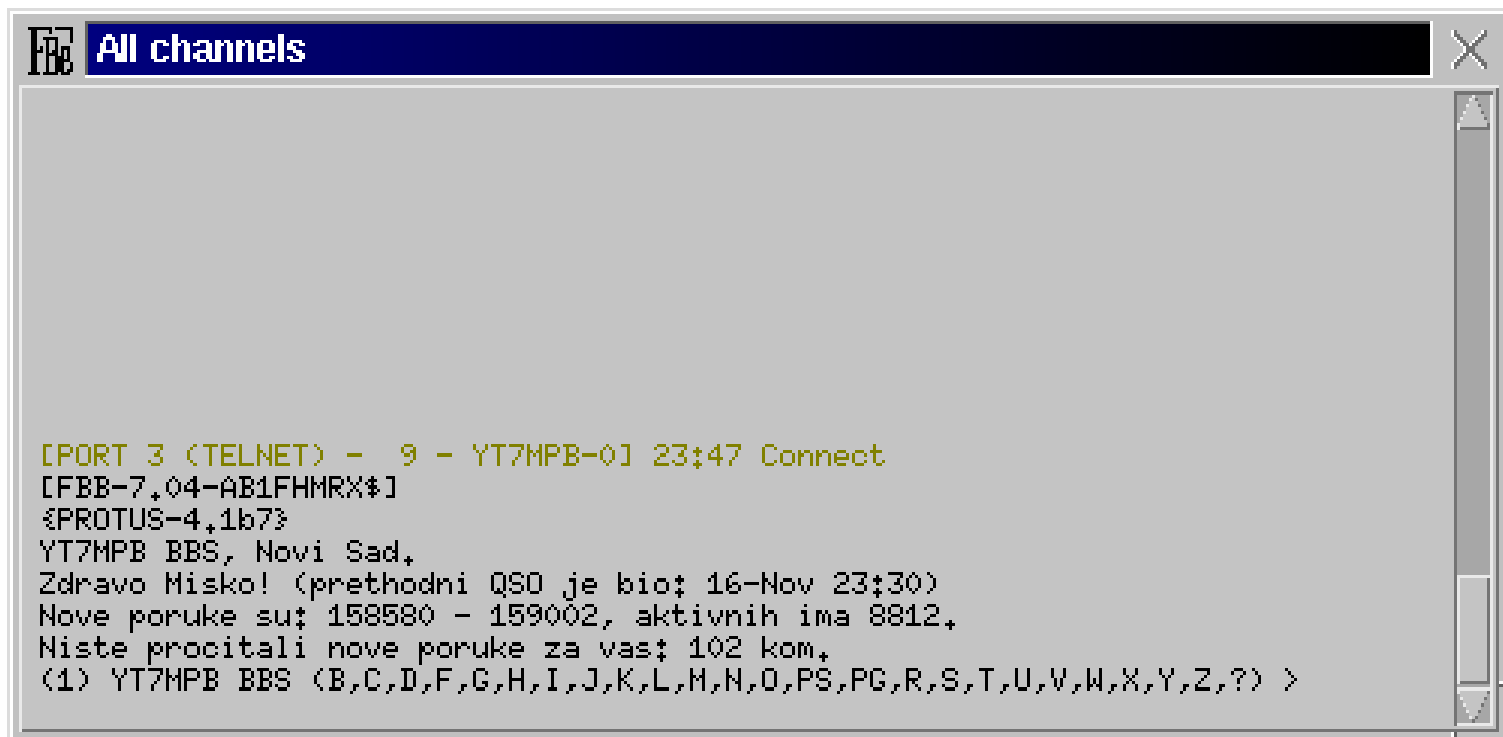
“LinFBB” *client* “xfbbX” (2)



The screenshot shows a window titled "Monitoring" with a dark blue header bar. The main area is a light gray rectangle. At the bottom, there is a message header in green and blue text. The text reads: "[1] fm YT7MPB-9 to MAIL ctl UI^ pid F0 (54)" on the first line, and "16-Nov 19:30 << Personal Mailbox YT7MPB Novi Sad >>" on the second line. The window has a standard Mac OS-style title bar with a close button (X) in the top right corner and a scroll bar on the right side.

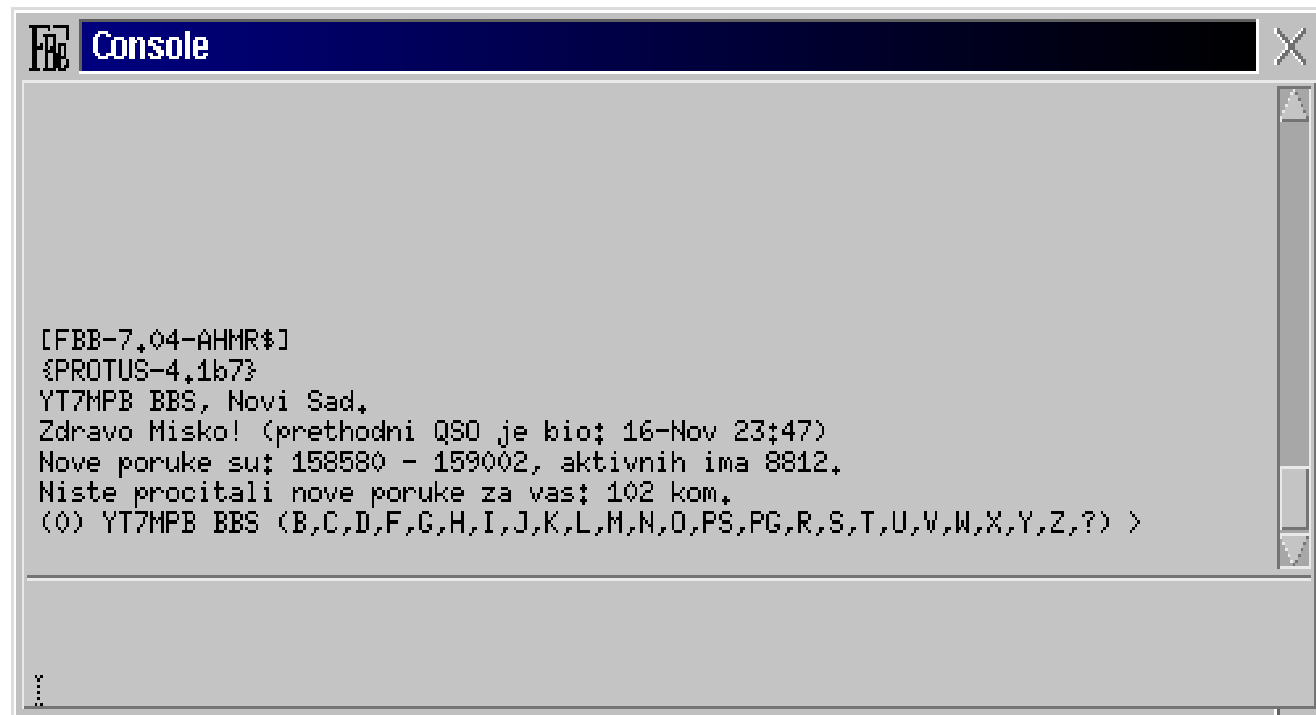
```
[1] fm YT7MPB-9 to MAIL ctl UI^ pid F0 (54)
16-Nov 19:30 << Personal Mailbox YT7MPB Novi Sad >>
```

"LinFBB" client "xfbbX" (3)



```
[PORT 3 (TELNET) - 9 - YT7MPB-0] 23:47 Connect
[FBB-7.04-AB1FHMRX$]
{PROTUS-4,1b7}
YT7MPB BBS, Novi Sad,
Zdravo Misko! (prethodni QSO je bio: 16-Nov 23:30)
Nove poruke su: 158580 - 159002, aktivnih ima 8812,
Niste procitali nove poruke za vas: 102 kom,
(1) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >
```

"LinFBB" *client* "xfbbX" (4)



```
[FBB-7.04-AHMR#]  
{PROTUS-4.1b7}  
YT7MPB BBS, Novi Sad.  
Zdravo Misko! (prethodni QSO je bio: 16-Nov 23:47)  
Nove poruke su: 158580 - 159002, aktivnih ima 8812.  
Niste procitali nove poruke za vas: 102 kom.  
(0) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >
```

fbf 3 - yt7mpb - Remote 0 (localhost.localdomain:3286) -

File Window Remote Config Help

1 connected station

| Ch | Callsign | Start Time | Rt | Buf | C/Fwd | Status | Messages |
|----|----------|-------------|----|-----|-------|-------------------------------------|-------------------------------------|
| 09 | YT7MPB | 23:47 00:04 | 0 | 0 | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Used memory : 0
Data memory : 2272 K
Disk#1 free : 746944 K

Messages : 8812
Hold msgs : 0
Priv msgs : 102

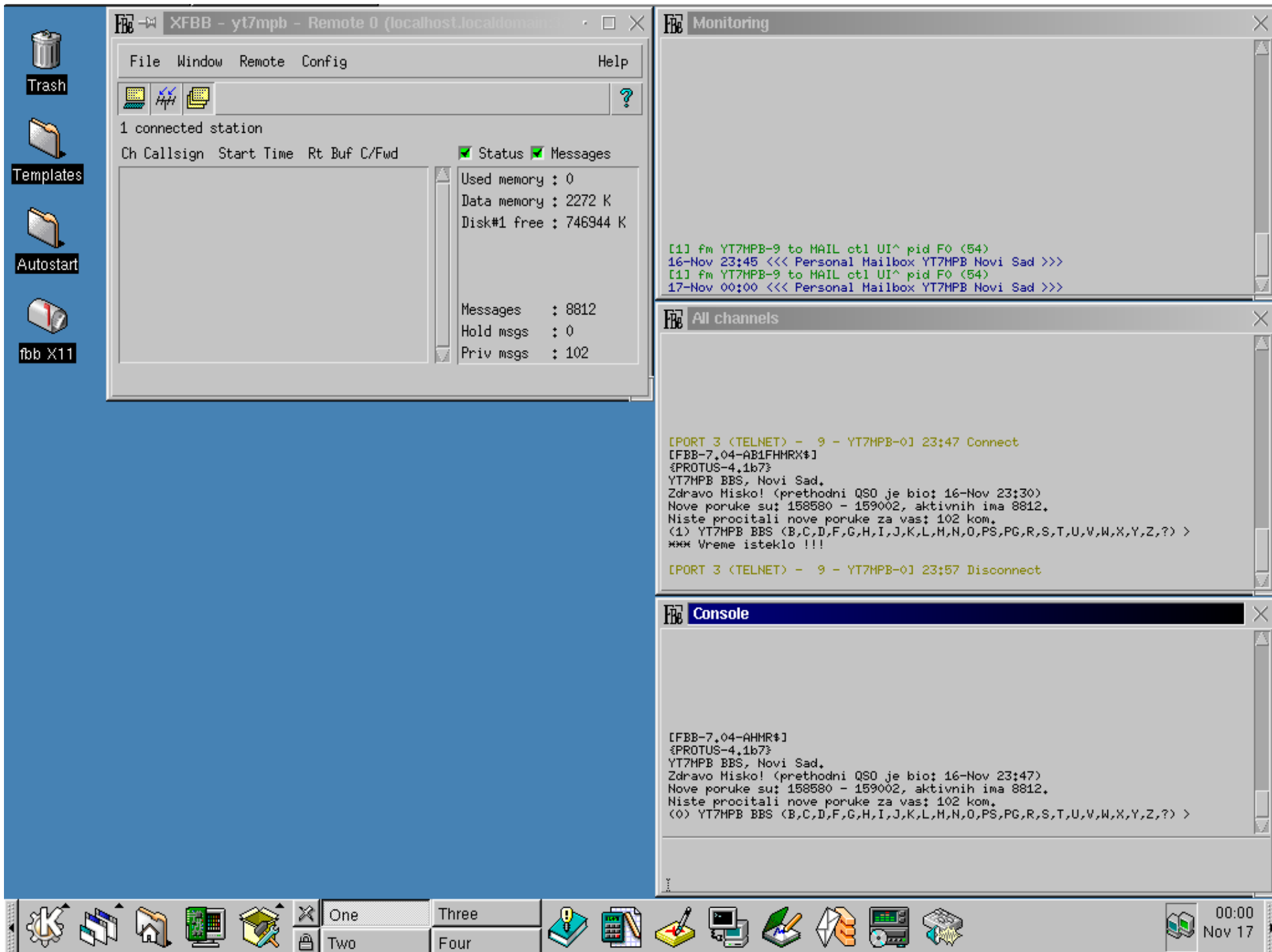
fbf Monitoring

[1] fm YT7MPB-9 to MAIL ct1 UI^ pid F0 (54)
16-Nov 23:45 <<< Personal Mailbox YT7MPB Novi Sad >>>

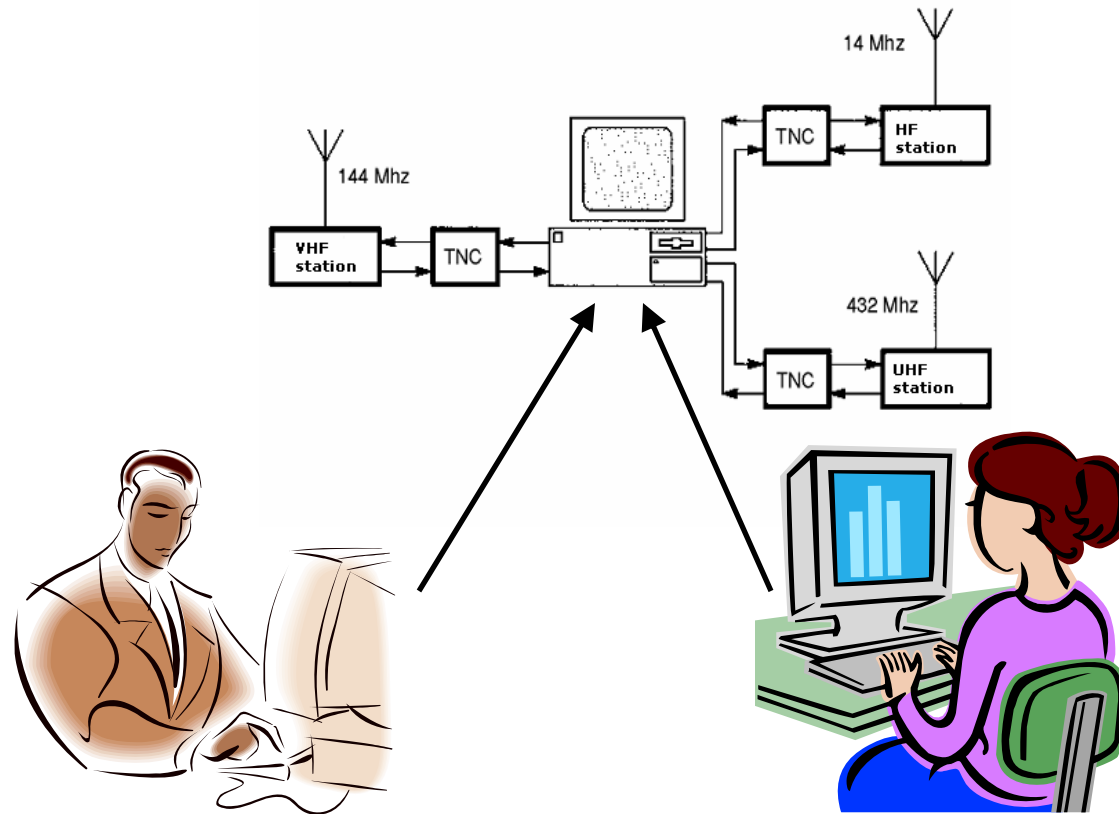
fbf All channels

[PORT 3 (TELNET) - 9 - YT7MPB-01 23:47 Connect
[FBB-7,04-AB1FHMRX#]
{PROTUS-4,1b7}
YT7MPB BBS, Novi Sad.
Zdravo Misko! (prethodni QSO je bio: 16-Nov 23:30)
Nove poruke su: 158580 - 159002, aktivnih ima 8812.
Niste procitali nove poruke za vas: 102 kom.
(1) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >

Taskbar with icons: Start menu, Open, Home, Network, Mail, One, Two, Three, Four, Help, Calculator, Notepad, Remote Desktop, Paint, Internet Explorer, Music, Volume, Network, System tray showing 23:52 Nov 16.

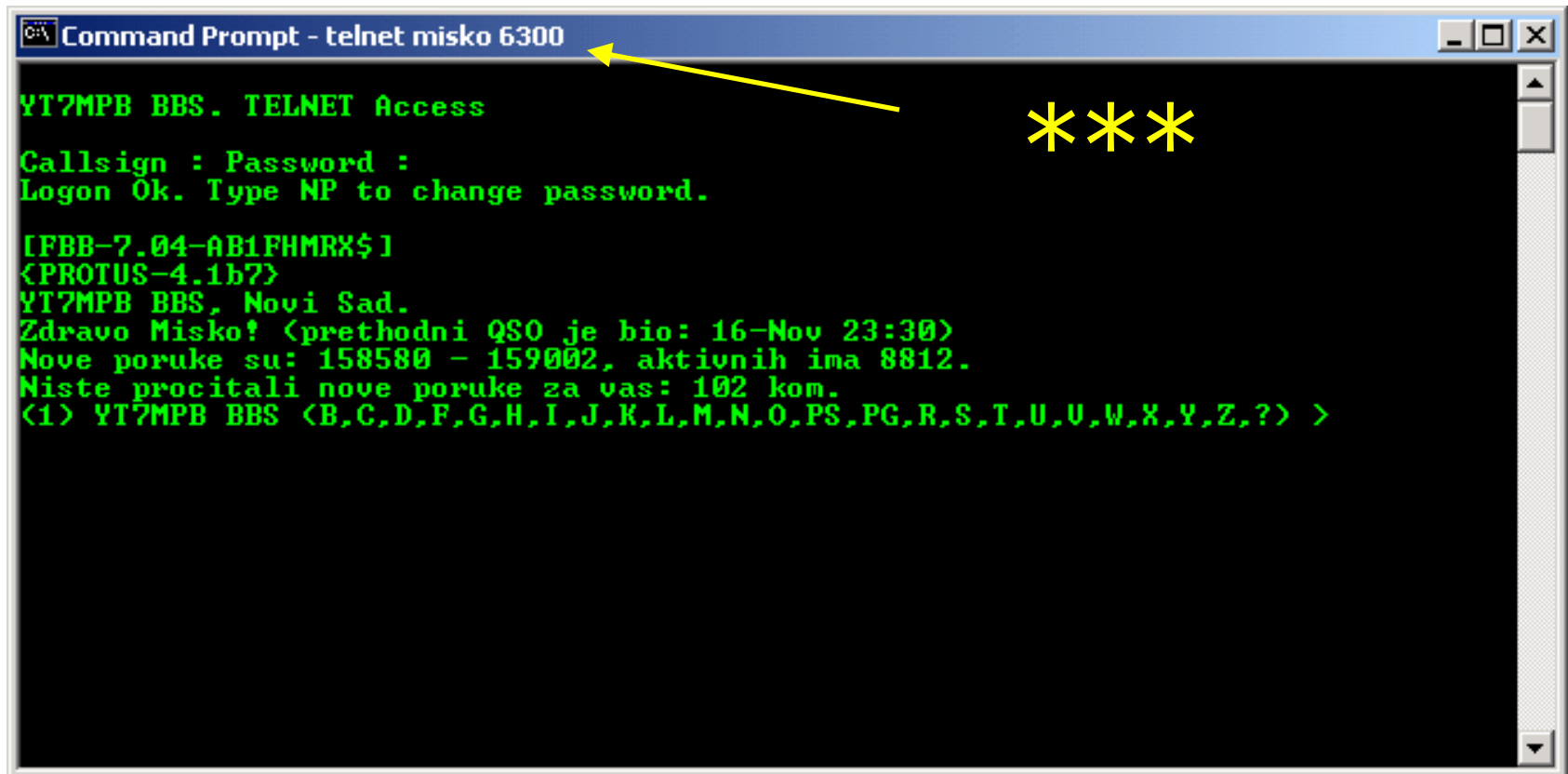


3rd possible scenario: The access via a LAN is available



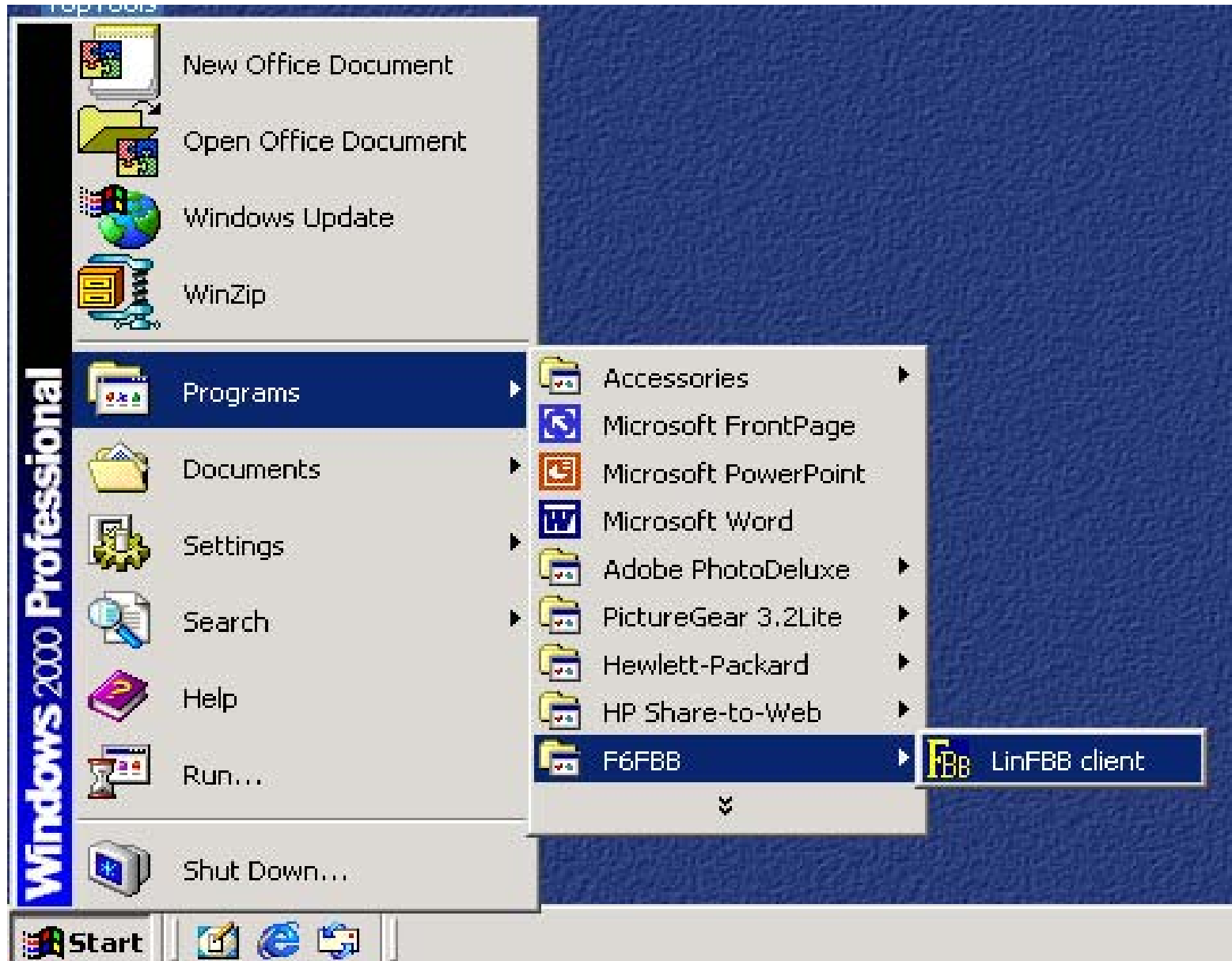
Windows "telnet" command (LAN user)
Windows "xfgbW" client (LAN sysop)
MS DOS "telnet" command (LAN user)

Windows "telnet" (user)

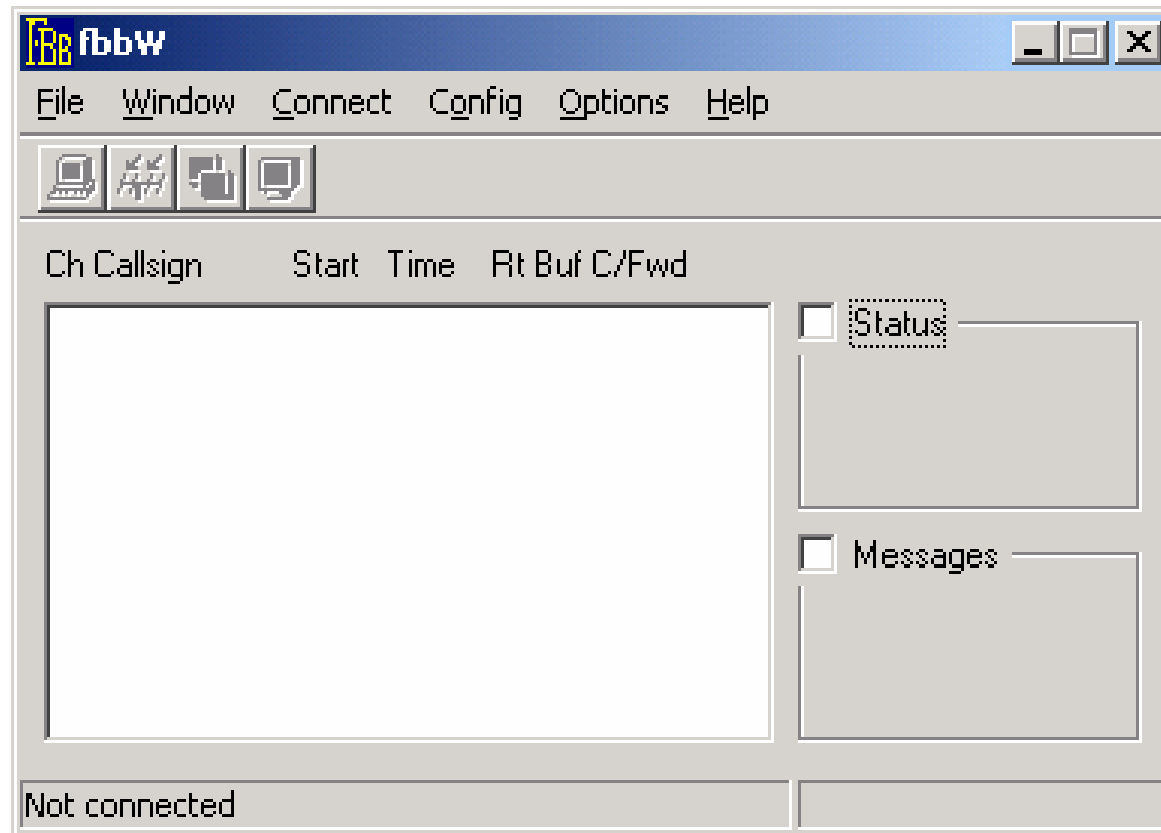


```
Command Prompt - telnet misko 6300
YT7MPB BBS. TELNET Access
Callsign : Password :
Logon Ok. Type NP to change password.
[FBB-7.04-AB1FHMRX$]
<PROTUS-4.1b7>
YT7MPB BBS, Novi Sad.
Zdravo Misko! <prethodni QS0 je bio: 16-Nov 23:30>
Nove poruke su: 158580 - 159002, aktivnih ima 8812.
Niste procitali nove poruke za vas: 102 kom.
<1> YT7MPB BBS <B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,U,W,X,Y,Z,?> >
```

Windows client "xfbbW"

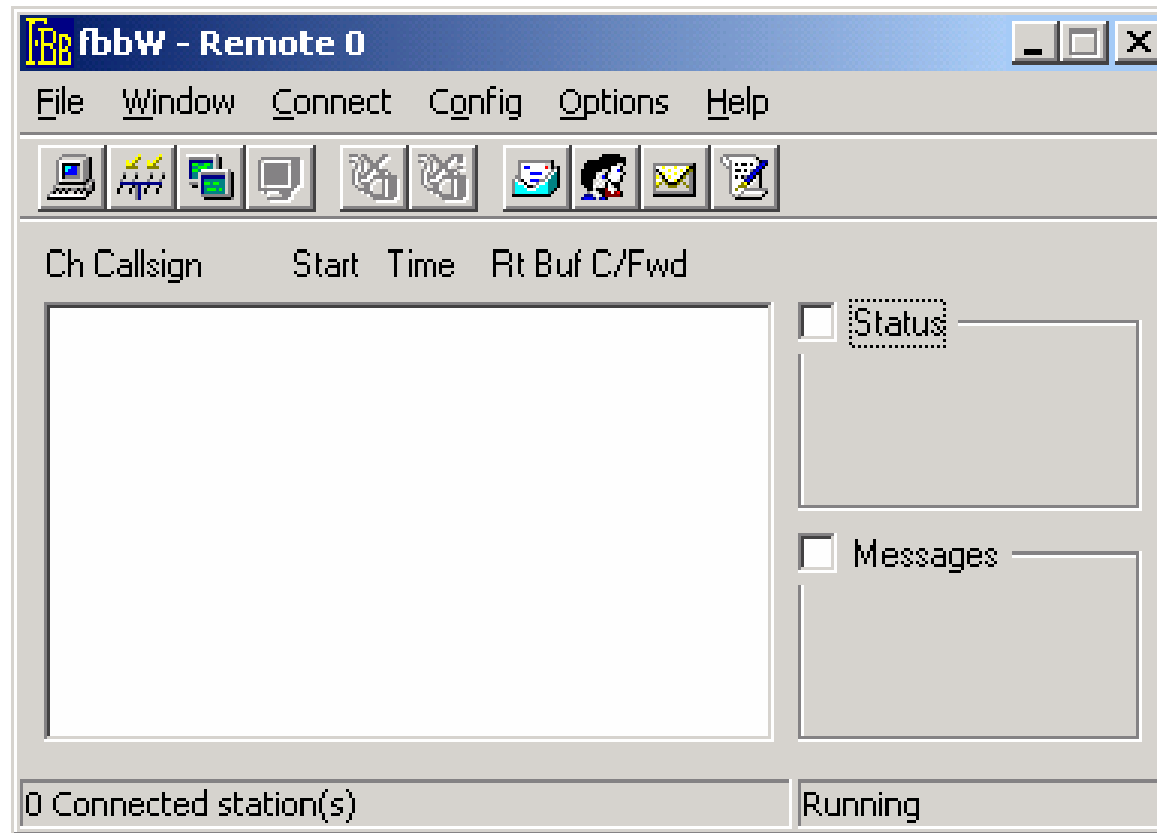


Windows *client* "xfbbW" (1)



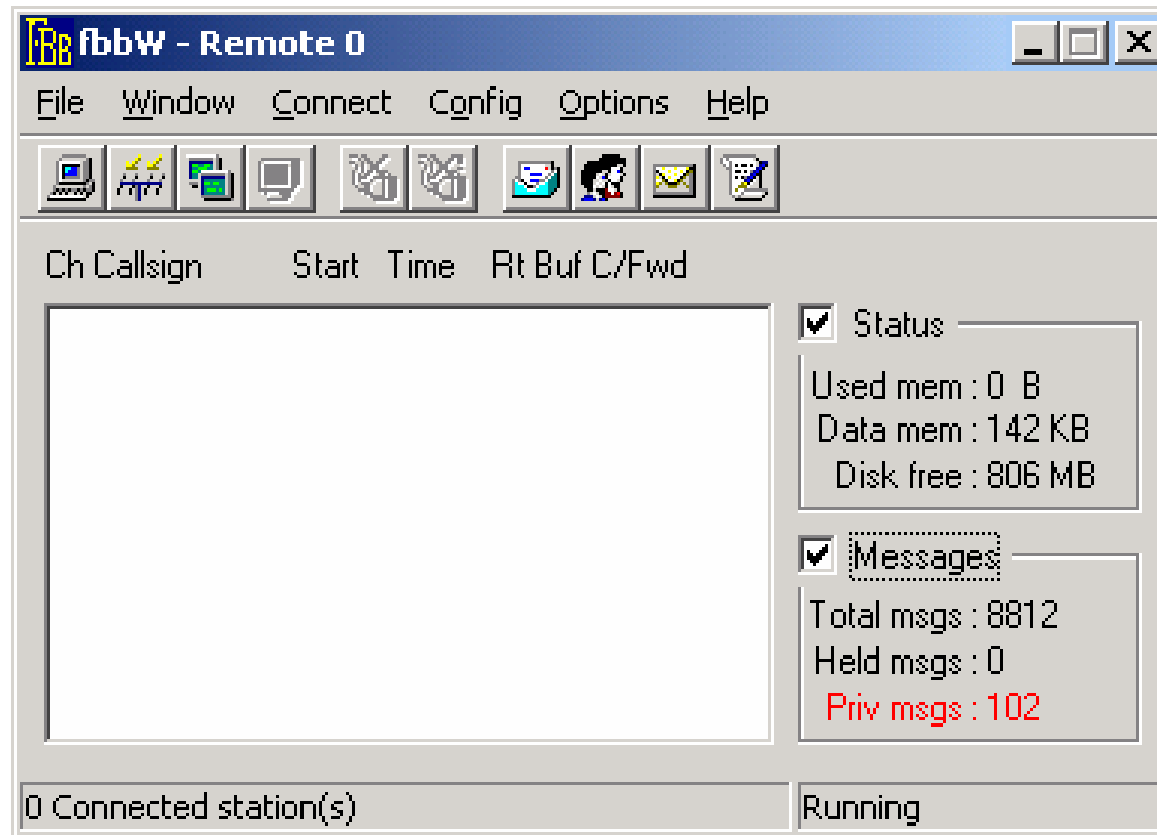
1. Connection with Linux server not established.

Windows *client* "xfbbW" (2)



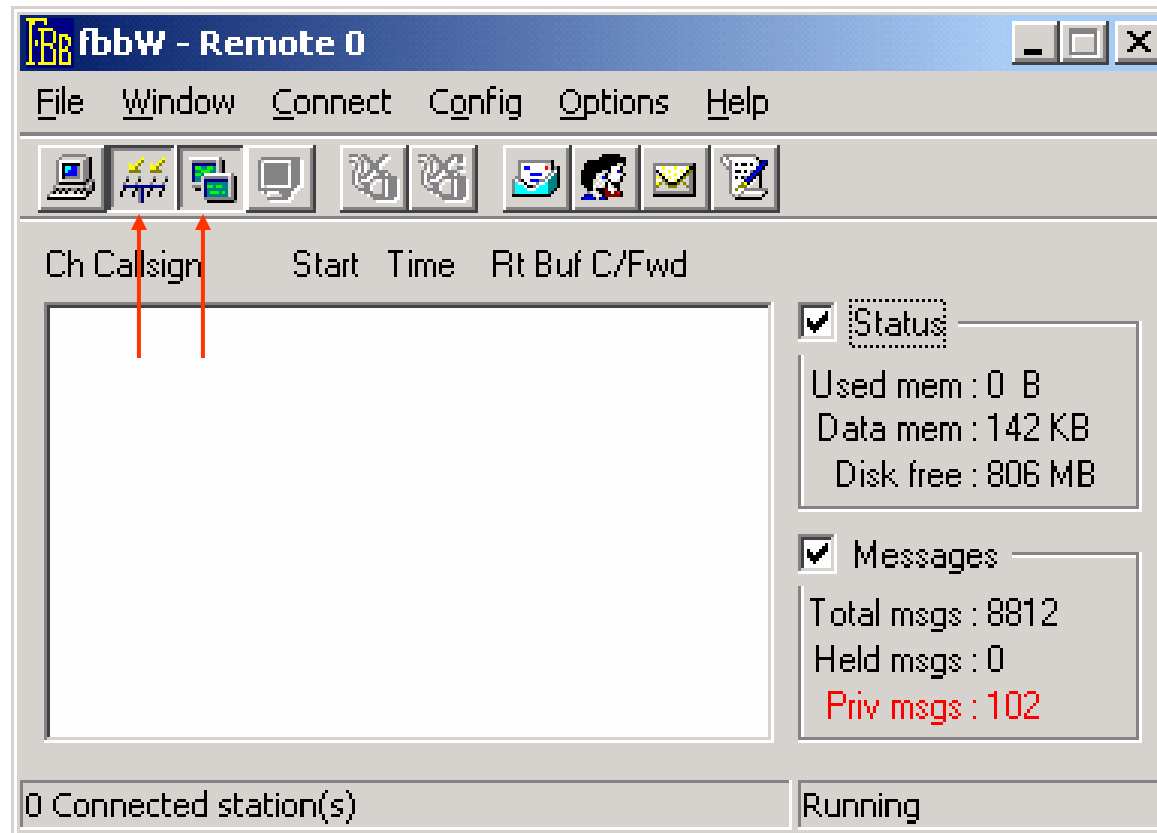
2. Connection with Linux server established (no users yet).

Windows *client* "xfbbW" (3)



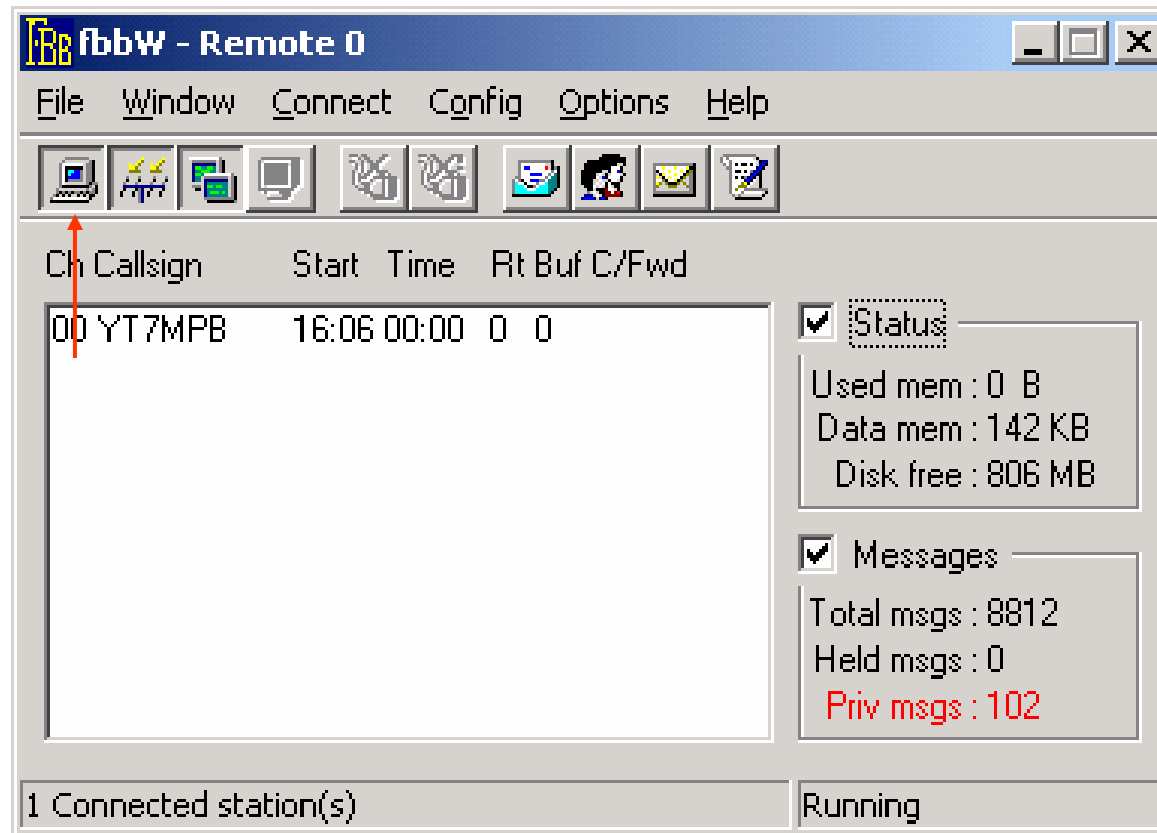
3. Getting the system information from the Linux server.

Windows *client* "xfbbW" (4)



4. Activating the windows: "Monitoring", "All channels".

Windows *client* "xfbbW" (5)



5. Starting the remote "Console" connection.

fbBW - Remote 0

File Window Connect Config Options Help

| Ch | Callsign | Start | Time | Rt | Buf | C/Fwd |
|----|----------|-------|-------|----|-----|--------|
| 00 | YT7MPB | 02:30 | 00:01 | 0 | 0 | |
| 08 | 4N7ZNS | 02:31 | 00:00 | 2 | 0 | YU1A |
| 10 | N0WJP | 02:25 | 00:06 | 0 | 0 | N0WJP |
| 11 | KD4GBA | 02:25 | 00:06 | 0 | 0 | KD4GBA |
| 12 | W87AWL | 02:25 | 00:06 | 0 | 0 | W87AWL |
| 16 | I1YLM | 02:25 | 00:06 | 0 | 0 | I1YLM |
| 17 | WU3V | 02:25 | 00:06 | 0 | 0 | WU3V |
| 18 | ea8ee | 02:25 | 00:06 | 0 | 0 | EA8EE |
| 19 | N5VGC | 02:25 | 00:06 | 0 | 0 | N5VGC |
| 21 | HR2PAQ | 02:26 | 00:05 | 0 | 0 | HR2PAQ |

12 Connected station(s)

Main command window listing connected users

Monitoring

```
[1] fm YT7MPB-9 to YU7A ctl SABM+
[1] fm YT7MPB-9 to YU7A ctl SABM+
[1] fm YT7MPB-9 to YU7A ctl SABM+
[1] fm YT7MPB-9 to YU7A ctl SABM+
[1] fm YT7MPB-9 to YU7A ctl SABM+
[1] fm YT7MPB-9 to YU7A ctl SABM+
[1] fm YT7MPB-9 to YU7A ctl SABM+
[1] fm YT7MPB-9 to YU7A ctl SABM+
[1] fm YT7MPB-9 to 4N7ZNS ctl SABM+
[1] fm YT7MPB-9 to 4N7ZNS ctl SABM+
[1] fm YT7MPB-9 to 4N7ZNS ctl SABM+
[1] fm YT7MPB-9 to 4N7ZNS ctl SABM+
[1] fm YT7MPB-9 to 4N7ZNS ctl SABM+
```

'Monitoring' window listens to the frequency

All channels

```
541_VK5KRJ
B41784ZR6CPB
9311_HA5OB
XFWD #:157601 T:B Fm:VK5ATN To:ANTENA@WW Id:110830VK5ATN
XFWD #:157605 T:B Fm:ZR6CPB To:SYSOP@WW Id:E01783ZR6CPB
XFWD #:157608 T:B Fm:VK5KRJ To:VSWR@WW Id:541_VK5KRJ
XFWD #:157610 T:B Fm:ZR6CPB To:FUTURE@WW Id:B41784ZR6CPB
XFWD #:157611 T:B Fm:HG6IEG To:MOVGIF@WW Id:9311_HA5OB
Compress XFwd In: 19492 - Out: 14328 - Compress: 27 %
SS 14332
```

'All channels' window shows all users' activities

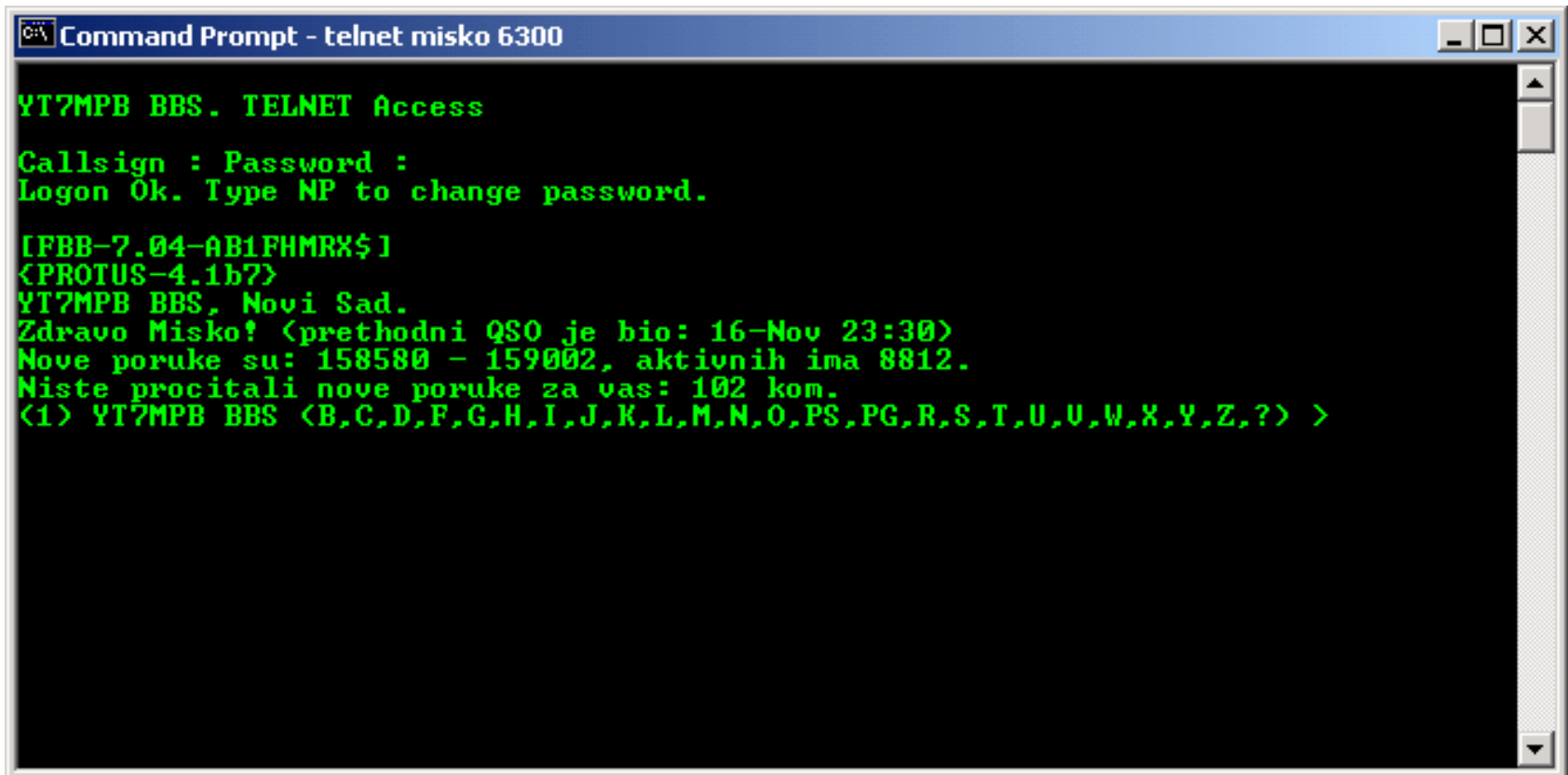
Console

```
[FBB-7.04-AHMR$]
{PROTUS-4.1b7}
YT7MPB BBS, Novi Sad.
Zdravo Misko! (prethodni QSO je bio: 16-Nov 02:16)
Nove poruke su: 158580 - 158924, aktivnih ima 8734.
Niste procitali nove poruke za vas: 91 kom.
(2) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >
```

```
fr 3
b
```

'Console' window is a simulation of the BBS's console

Windows "telnet" (user)



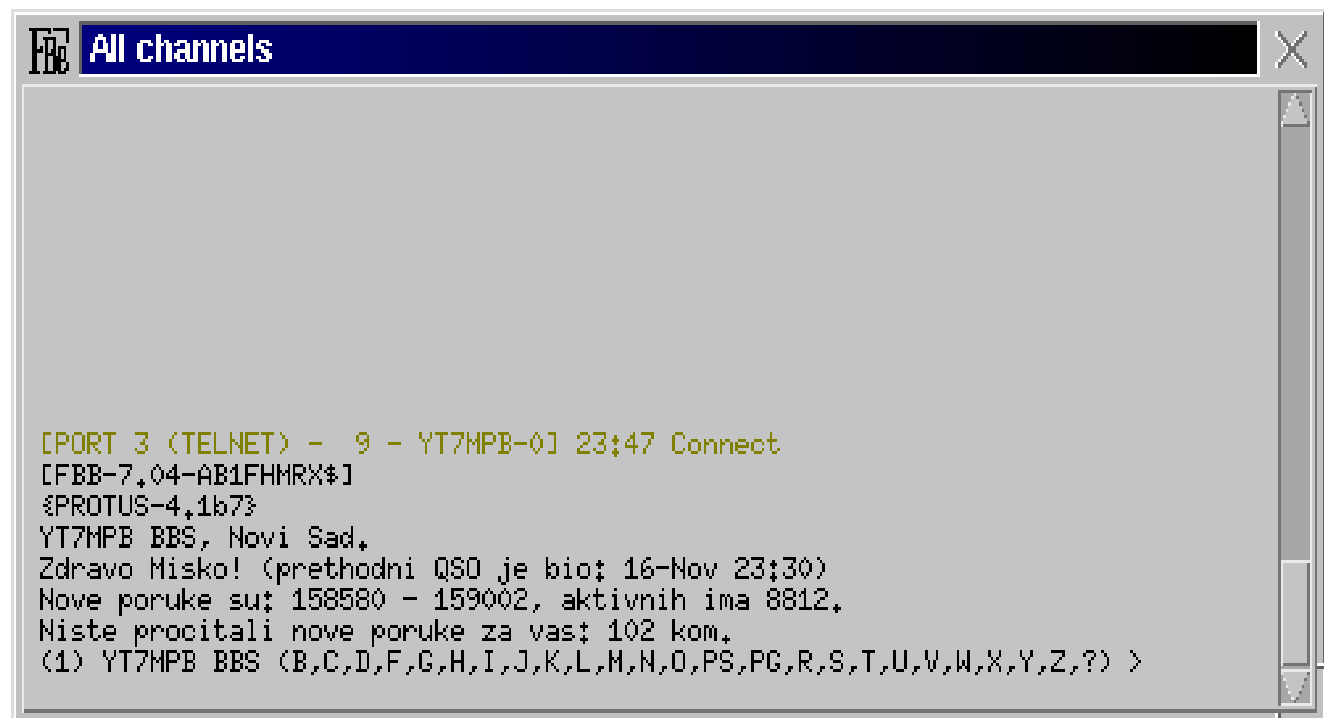
```
Command Prompt - telnet misko 6300

YT7MPB BBS. TELNET Access

Callsign : Password :
Logon Ok. Type NP to change password.

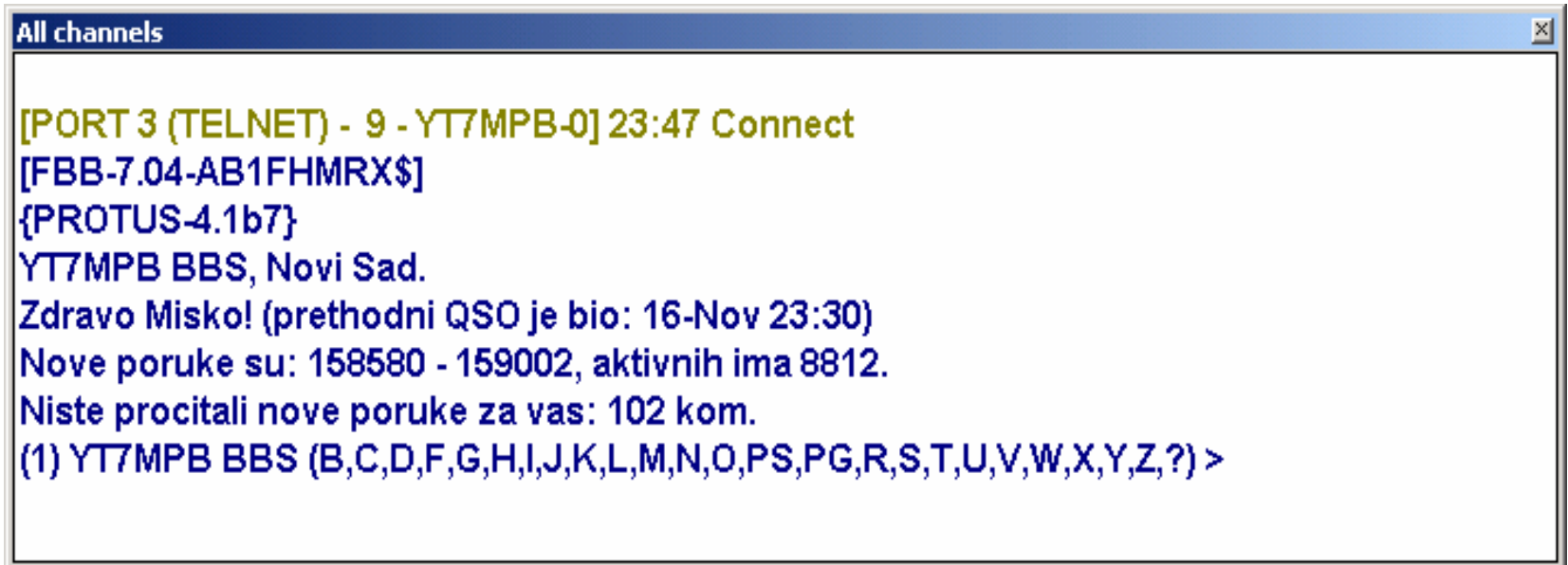
[FBB-7.04-AB1FHMRX$]
<PROTUS-4.1b7>
YT7MPB BBS, Novi Sad.
Zdravo Misko! <prethodni QS0 je bio: 16-Nov 23:30>
Nove poruke su: 158580 - 159002, aktivnih ima 8812.
Niste procitali nove poruke za vas: 102 kom.
<1> YT7MPB BBS <B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,U,W,X,Y,Z,?> >
```

Monitoring a user (BBS console)



```
[PORT 3 (TELNET) - 9 - Y7MPB-0] 23:47 Connect
[FBB-7,04-AB1FHMRX#]
{PROTUS-4,1b7}
Y7MPB BBS, Novi Sad.
Zdravo Misko! (prethodni QSO je bio: 16-Nov 23:30)
Nove poruke su: 158580 - 159002, aktivnih ima 8812.
Niste procitali nove poruke za vas: 102 kom.
(1) Y7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >
```

Monitoring a user ("xfbbW" client)



```
All channels
[PORT 3 (TELNET) - 9 - YT7MPB-0] 23:47 Connect
[FBB-7.04-AB1FHMRX$]
{PROTUS-4.1b7}
YT7MPB BBS, Novi Sad.
Zdravo Misko! (prethodni QSO je bio: 16-Nov 23:30)
Nove poruke su: 158580 - 159002, aktivnih ima 8812.
Niste procitali nove poruke za vas: 102 kom.
(1) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >
```

DOS "telnet" (user)

```
***  
Console messages:  
  
University of Port Elizabeth - PC DOS Telnet Client  
NCSA Telnet version 2.3.07.04 for the PC  
  
Alt-H presents a summary of special keys  
  
Tektronix initialized  
  
My Ethernet address: 08:40:95:20:04:09  
My IP address: 192.168.1.2  
My NetMask   : 255.255.255.0  
My Broadcast : 192.168.1.255  
  
Server mode, press ESC to exit or ALT-A to begin a session
```

DOS "telnet" (user)

```
University of Port Elizabeth - PC DOS Telnet Client  
NCSA Telnet version 2.3.07.04 for the PC  
  
Alt-H presents a summary of special keys  
  
YT7MPB BBS. TELNET Access  
  
Callsign : _
```

University of Port Elizabeth - PC DOS Telnet Client
NCSA Telnet version 2.3.07.04 for the PC

Type of the
program

Alt-H presents a summary of special keys

YT7MPB BBS. TELNET Access

Type of the
connection

Callsign : yt7mpb

Password :

Login

Logon Ok. Type NP to change password.

5FBB-7.04j-AB1FHMRX\$C

YT7MPB BBS, Novi Sad.

System
and user
info

Hello Misko. 4819 active messages, last is 105772, last listed is 103444.

Assigned channels:

Ch. 0 (TELNET) : YT7MPB-0 - Sat 23/09/06 16:03

Actual
users

You have 121 new (unread) message(s).

(1) YT7MPB BBS)

User's
prompt

! server

16:04:53

DOS "telnet" (user)

Access
type

YT7MPB BBS. TELNET Access

Login

Callsign : yt7mpb
Password :
Logon Ok. Type NP to change password.

System
and user
info

[FBB-7.04j-AB1FHMRX\$]
YT7MPB BBS, Novi Sad.
Hello Misko. 4647 active messages, last is 105599, last listed is 103444.

Other
users

Assigned channels:
Ch. 8 (TELNET) : YT7MPB-0 - Thu 21/09/06 21:26
Ch. 13 (TELNET) : ED1ZAC-0 - Thu 21/09/06 21:15
Ch. 15 (TELNET) : CE8FGC-0 - Thu 21/09/06 21:15
Ch. 17 (TELNET) : 7M3TJZ-0 - Thu 21/09/06 21:15
Ch. 18 (TELNET) : EA5RQ-0 - Thu 21/09/06 21:15
Ch. 19 (TELNET) : PY2DML-0 - Thu 21/09/06 21:15

You have 106 new (unread) message(s).

Prompt

(1) YT7MPB BBS>

DOS "telnet" (user)

| Nº | Type | Size | To: | Via | From: | Date/Time | Subject |
|--------|-------|-------|--------|-----|--------|-----------|-----------------------------|
| 220104 | B\$ | 866 | KAM | @WW | VE3DDG | 0506/0154 | Re: kam+ |
| 220103 | B\$ | 922 | PKETDX | @WW | G0FTD | 0506/0005 | Re: Making packet much |
| 220102 | B\$ | 1229 | AGW | @WW | G0FTD | 0505/2323 | Win98,AGW and RAM |
| 220101 | B\$ | 633 | FBB | @WW | OZ1BIN | 0506/0020 | Need INIT.SRV WinFBB |
| 220100 | B\$ | 24571 | APRS | @WW | DO8PDZ | 0504/1442 | Snapshot in JO40OV |
| 220099 | B\$ | 10073 | APRS | @WW | DO8PDZ | 0503/1632 | Snapshot in JO40OV |
| 220098 | B\$ | 21976 | APRS | @WW | DO8PDZ | 0430/1546 | Snapshot in JO40OV |
| 220097 | B\$ | 1149 | PACTOR | @WW | DF7ML | 0412/0912 | my ALPHA *.cbk-list |
| 220096 | B\$ | 12520 | APRS | @WW | DO8PDZ | 0418/1025 | Snapshot in JO40OV |
| 220095 | B\$ | 1980 | TECH | @WW | G8MNY | 0505/1831 | 23cm Filter |
| 220094 | B\$ | 2294 | KAM | @WW | G4IJL | 0505/1631 | Re: kam+ |
| 220093 | B\$ | 10505 | SIX | @WW | IW0BET | 0505/1257 | SixItaly May 04 03/03 |
| 220092 | B\$ | 7895 | SIX | @WW | IW0BET | 0505/1257 | SixItaly May 04 02/03 |
| 220091 | B\$ | 10125 | SIX | @WW | IW0BET | 0505/1257 | SixItaly May 04 01/03 |
| 220090 | B\$ | 880 | PACKET | @WW | VK6BE | 0505/0132 | Re: Getting better question |
| 220089 | B\$ | 9976 | SPACE | @WW | ZL2VAL | 0505/0814 | Robot mission to |
| 220088 | B\$ | 5285 | ASTRO | @WW | ZL2VAL | 0505/0813 | Pulsars head to |
| 220087 | B\$ D | 5876 | ROVERS | @WW | ZL2VAL | 0505/0812 | 7+ ENDURA_1.JPG 8/8 |
| 220086 | B\$ D | 10076 | ROVERS | @WW | ZL2VAL | 0505/0811 | 7+ ENDURA_1.JPG 7/8 |
| 220085 | B\$ D | 10376 | ROVERS | @WW | ZL2VAL | 0505/0925 | 7+ ENDURA_1.JPG 6/8 |
| 220084 | B\$ D | 10076 | ROVERS | @WW | ZL2VAL | 0505/0807 | 7+ ENDURA_1.JPG 5/8 |

```

23144 B$ 18939 WX ZNEBBS W1GMF 0618/1247 ZONE MAINE/NEW HAMPSHIRE 0618
23143 B$ 6134 WX ZNEBBS W1GMF 0618/1247 SURFACE CONDITIONS 0618
23142 B$ 18150 WX ZNEBBS W1GMF 0618/1246 COASTAL WATERS 0618
ENTER = continue, A = Abort, R/U # = Read message # ->
23141 B$ 5573 WX ZNEBBS W1GMF 0618/1246 CLIMATIC SUMMARY 0618
23140 B$ 25544 WX ZNETN W1GMF 0618/1246 VIRGINIA WX FORECAST 0618
23139 B$ 7756 WX ZNETN W1GMF 0618/1246 VIRGINIA WX ROUNDUP 0618
23138 B$ 14175 WX ZNETN W1GMF 0618/1246 TENNESSEE WX FORECAST 0618
23137 B$ 4131 WX ZNETN W1GMF 0618/1246 TENNESSEE WX ROUNDUP 0618
23136 B$ 555 WX ZNETN W1GMF 0618/1246 CAROLINA WX FORECAST 0618
23135 B$ 18388 WXSAT ZWW G4ROA 0618/1246 WX Sat Status 18/6
23134 B$ 4988 TECH ZWW G8MNY 0618/1246 13cms Yagi from Pringles Can
23133 B$ 2984 TECH ZWW G8MNY 0618/1246 23cm 10el Yagis for ATV
23132 B$ 2825 TECH ZWW G8MNY 0618/1246 13cms Dipole & Reflector
23130 B$ 757 SYSOP ZWW UR7IMM 0618/1246 UR7IWZ BBS closed...
23129 B$ 2473 QUAKE ZALLUS KG6BAJ 0618/1246 2007-06-18 04:15 (Mod 4.0) ISL
23128 B$ 2394 QUAKE ZALLUS KG6BAJ 0618/1246 2007-06-17 18:54 REVISED: (MI
23127 B$ 2489 QUAKE ZALLUS KG6BAJ 0618/1246 2007-06-17 18:54 (Mod 5.1) ISL
23126 B$ 1520 WX ZNEBBS M10TX 0618/1246 WOBURN CLIMATIC REPORT 6/17/07
23125 B$ 755 METEO ZCXNET CX2SA 0618/1246 WX Minas 18/06/2007 - 00:00
23124 B$ 1981 SOLAR ZEU OK0NAG 0618/1246 Geoalert
23123 B$ 5298 KEPS ZAMSAT CX2SA 0618/1246 Orbital Elements 07168.MISC
23122 B$ 6845 KEPS ZAMSAT CX2SA 0618/1246 Orbital Elements 07168.WEATHE
ENTER = continue, A = Abort, R/U # = Read message # ->_

```

DOS "telnet" (user)

University of Port Elizabeth - PC DOS Telnet Client
NCSA Telnet version 2.3.07.04 for the PC

Alt-H presents a summary of special keys

YT7MPB BBS. TELNET Access

Callsign : yu7bdr
Password :



**"yu7bdr" has
restricted
permissions**

Login YU7BDR-0 ok

[FBB-7.00i-AB1FHMRX\$]
{PROTUS-4.0}

Zdravo klub, na raspolaganju vam je ogranichen izbor naredbi.
(1) YT7MPB BBS (B,H,KM,LM,O,RM,SP SYSOP,T,?) >

DOS "telnet" (sys admin)

University of Port Elizabeth - PC DOS Telnet Client
NCSA Telnet version 2.3.07.04 for the PC

Alt-H presents a summary of special keys

YT7MPB BBS. TELNET Access

Callsign : yt7mpb

Password :

**"yt7mpb" has
admin
privileges**

Login YT7MPB-0 ok

[FBB-7.00i-AB1FHMRX\$]

{PROTUS-4.0}

YT7MPB BBS, Novi Sad.

Zdravo Misko! (prethodni QSO je bio: 09-Maj 17:11)

Nove poruke su: 216388 - 220210, aktivnih ima 1913.

Niste procitali nove poruke za vas: 3 kom.

(1) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >

DOS "telnet" (user)

```
(1) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >
g ← "gateway"
Sada ste na kanalu 8, port 3. 1 dostupnih portova.
H = pomoc. Q = Bye.
1 : 144.875
Broj porta (Q = Bye) :1
Kanal 7 dodeljen na 144.875.
Cmd :m ← "monitor"
YT7MPB: MONITOR ON
Cmd :[1] fm 4N7WW to T99XKC ct1 RR1V
[1] fm 4N7WW to T99XKC ct1 RR1-
[1] fm 4N7WW to T99XKC ct1 RR1-
[1] fm 4N7WW to T99XKC ct1 RR1-
[1] fm 4N7WW to T99XKC ct1 RR1-
[1] fm 4N7WW to T99XKC ct1 RR2V
[1] fm 4N7WW to T99XKC ct1 RR3V
[1] fm 4N7WW to T99XKC ct1 RR3-
[1] fm 4N7WW to T99XKC ct1 RR4V
[1] fm 4N7WW to T99XKC ct1 RR5V
[1] fm 4N7WW to T99XKC ct1 RR5-
[1] fm 4N7WW to T99XKC ct1 RR5-
[1] fm 4N7WW to T99XKC ct1 RR5-
[1] fm 4N7WW to T99XKC ct1 RR5-
Cmd :q ← "quit"
(1) YT7MPB BBS (B,C,D,F,G,H,I,J,K,L,M,N,O,PS,PG,R,S,T,U,V,W,X,Y,Z,?) >
```

Monitoring a user (LinFBB)

Main program window

"All channels" window

"Monitoring" window

XFBB - YT7MPB - Remote 0 (localhost3286) - 01:31 U

File Window Remote Config Help

6 connected stations

| Ch | Callsign | Start Time | Rt | Buf | C/Fwd |
|---------------|----------|------------|----|-----|-------|
| [Empty table] | | | | | |

Status Messages

Used memory : 0
Data memory : 1216 K
Disk#1 free : 1708992 K

Messages : 4647
Hold msgs : 0

All channels

```
[PORT 2 <TELNET> - 8 - YT7MPB-01 21:26 Connect
[FBB-7.04j-AB1FHHRX*]
YT7MPB BBS, Novi Sad,
Hello Nisko, 4647 active messages, last is 105599, last listed is 103444.

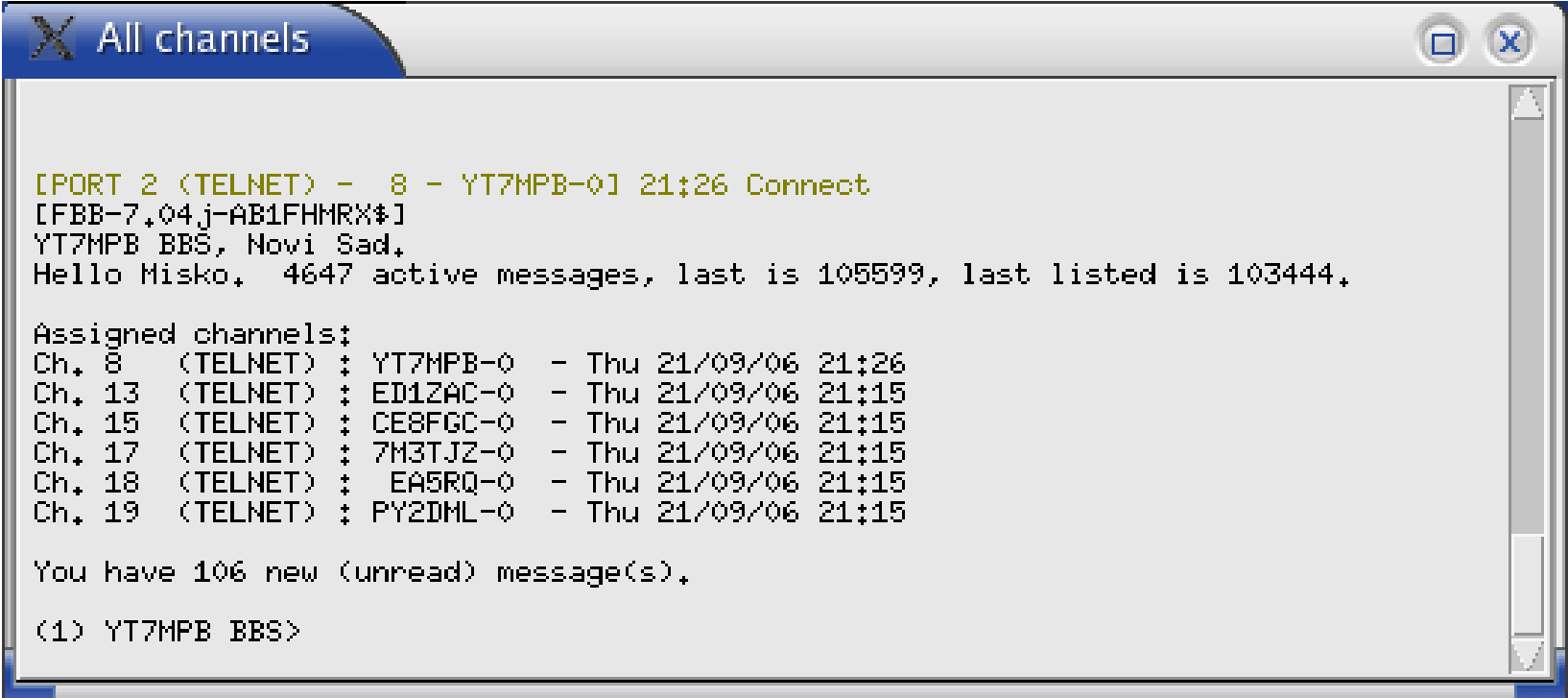
Assigned channelst:
Ch. 8 <TELNET> : YT7MPB-0 - Thu 21/09/06 21:26
Ch. 13 <TELNET> : ED1ZAC-0 - Thu 21/09/06 21:15
Ch. 15 <TELNET> : CE8FGC-0 - Thu 21/09/06 21:15
Ch. 17 <TELNET> : 7H3TJZ-0 - Thu 21/09/06 21:15
Ch. 18 <TELNET> : EA5RQ-0 - Thu 21/09/06 21:15
Ch. 19 <TELNET> : PY2DHL-0 - Thu 21/09/06 21:15

You have 106 new (unread) message(s).
<1> YT7MPB BBS>
```

Monitoring

2 3 4 XFBB - YT7MPB - Remote 0 9:31

Monitoring a user (LinFBB)



```
X All channels

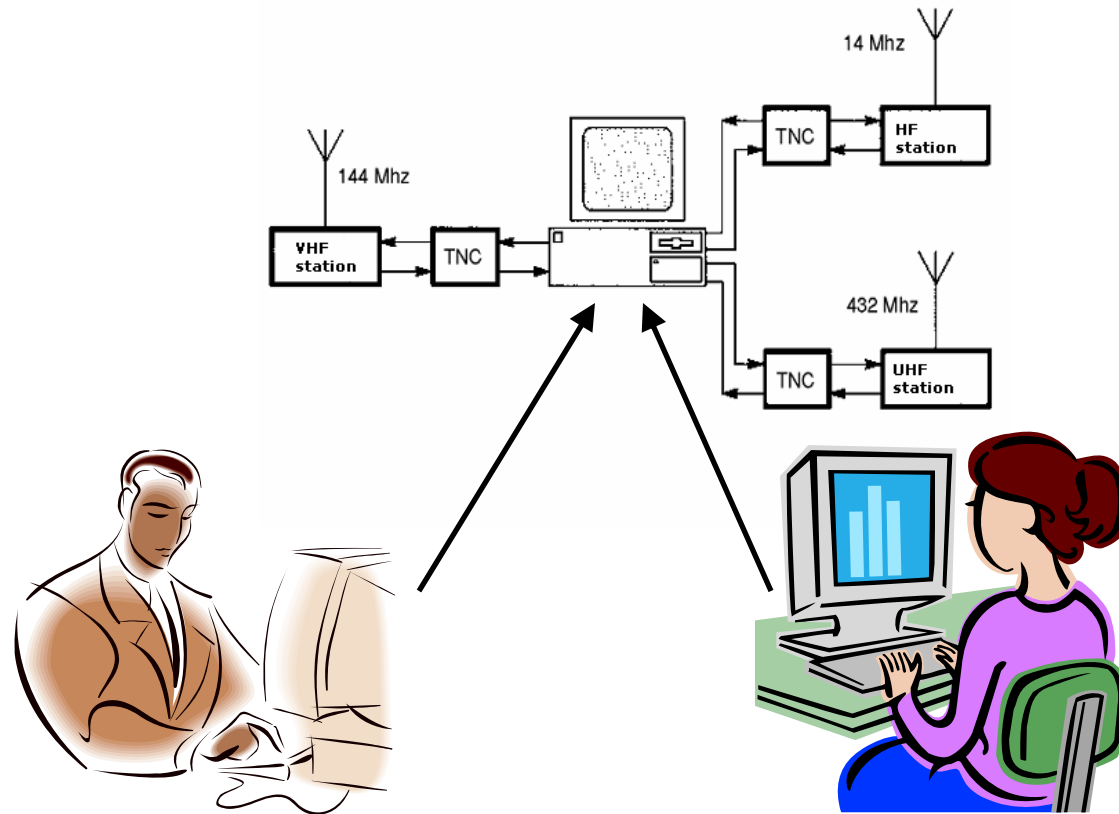
[PORT 2 (TELNET) - 8 - YT7MPB-0] 21:26 Connect
[FBB-7.04j-AB1FHMRX#]
YT7MPB BBS, Novi Sad,
Hello Misko. 4647 active messages, last is 105599, last listed is 103444.

Assigned channels:
Ch. 8 (TELNET) : YT7MPB-0 - Thu 21/09/06 21:26
Ch. 13 (TELNET) : ED1ZAC-0 - Thu 21/09/06 21:15
Ch. 15 (TELNET) : CE8FGC-0 - Thu 21/09/06 21:15
Ch. 17 (TELNET) : 7M3TJZ-0 - Thu 21/09/06 21:15
Ch. 18 (TELNET) : EA5RQ-0 - Thu 21/09/06 21:15
Ch. 19 (TELNET) : PY2DML-0 - Thu 21/09/06 21:15

You have 106 new (unread) message(s).

(1) YT7MPB BBS>
```


4th possible scenario: 'telnet' from within other programs



MS DOS "Xrouter" telnet command
MS DOS "JNOS" telnet command

DOS "Xrouter" (user)

```
18/06/07 21:29:39 CON:1 YT7MPB XROUTER v176c  
telnet 192.168.1.1 6300
```

```
YT7MPB:LIMANé TELNET: Trying 192.168.1.1 6300
```

```
YT7MPB:LIMANé Connected to 192.168.1.1 6300
```

```
YT7MPB BBS. TELNET Access
```

```
Callsign :
```

18/06/07 21:31:45 CON:1 YT7MPB XROUTER v176c sYT7MPB:LIMAMc 191048

ENTER = continue, A = Abort, R/U # = Read message # ->

- 23121 B\$ 7487 KEPS ZAMSAT CX2SA 0618/1246 Orbital Elements 07168.MICROS
- 23120 * B\$ 3793 KEPS ZAMSAT CX2SA 0618/1246 Orbital Elements 07168.OSCAR
- 23119 B\$ 9008 KEPS ZAMSAT CX2SA 0618/1246 2Line Orbital Elements 07168.A
- 23118 B\$ 14920 FBBLOGZWW CX2SA 0618/1246 FBBLOG Nr 24/2007 * CX2SA BBS
- 23117 B\$ 14924 FBBLOGZLATNET CX2SA 0618/1246 FBBLOG N° 24/2007 * CX2SA BBS
- 23116 B\$ 2486 SOLAR ZEÜ OK0NAG 0618/1246 Solar & Geophysical Activity S
- 23115 B\$ 2769 EMC ZWW KB2VXA 0618/1246 Re: UK3XX > 10MHz wipeout
- 23114 * B\$ 1954 SOLAR ZEÜ OK0NAG 0618/1246 Solar Region Summary (SRS)
- 23113 B\$ 15213 DX ZWW KBBNW 0618/1246 Ohio/Penn DX Bulletin No. 813
- 23112 B\$ 1423 LAW ZWW UK6BE 0618/1246 Re: Landmark ruling on gays in
- 23111 B\$ 5473 METEO ZBRANET CX2SA 0618/1246 Previsfo do tempo 18/06/2007
- 23110 B\$ 4684 PONDERZWW G4EBT 0618/1246 Sony's violent Cathedral game
- 23109 B\$ 8480 RONDE ZNLDNET PI4MPL 0618/1246 BULLETIN MEPPELRONDE 2823
- 23108 B\$ 5994 SMACK ZWW G4EBT 0618/1246 UK Smacking law review
- 23107 B\$ 3081 SOLAR ZEÜ OK0NAG 0618/1246 Report of Solar Geophysical Ac
- 23106 B\$ 1820 TERRORZWW G4WYW 0618/1246 Re: Gitmo detainees (G0FTD)
- 23105 B\$ 1627 EMC ZWW GM7HUD 0618/1246 Re: 10Mhz to be wiped out?
- 23104 B\$ 805 METEO ZCXNET CX2SA 0618/1246 WX Minas 17/06/2007 - 16:00
- 23103 B\$ 15566 RTTY ZNLDNET PI4RCK 0618/1246 PI4RCK RTTY Bulletin (170607)

ENTER = continue, A = Abort, R/U # = Read message # ->

r 23114 23120

F1=Help F2=Mon=OFF F3=MPORT=FFFF F4=MMASK=03FF F5=Capt=OFF Alt-X=Exit

"JNOS" (NOS = Network OS)

```
Z1:18 11952/107776 FH=17 IDLE=10
BBS:
@ Command:
JNOS version 1.11f (80186)
by Johan. K. Reinalda, WG7J/PA3DIS
and James P. Dugal, N5KNX
Copyright 1991 by Phil Karn (KA9Q) and contributors.
XMS detected.
TxDelay: 40
Persist: 64
SlotTime: 5
TxTail: 5
FullDup: 0
vhf: input output (ASCII dump)
jnos> _
```

DOS "JNOS" (user)

```
21:28 09872/109856 FH=17 IDLE=10
BBS:
0 Command:
JNOS version 1.11f (80186)
by Johan. K. Reinalda, WG7J/PA3DIS
and James P. Dugal, N5KNX
Copyright 1991 by Phil Karn (KA9Q) and contributors.
XMS detected.
TxDelay: 40
Persist: 64
SlotTime: 5
TxTail: 5
FullDup: 0
vhf: input output (ASCII dump)
jnos> telnet 192.168.1.1_
```

DOS "JNOS" (user)

```
21:34 03440/116128 FH=17 IDLE=10
BBS:
B Command:
JNOS version 1.11f (80186)
by Johan. K. Reinalda, WG7J/PA3DIS
and James P. Dugal, N5KNX
Copyright 1991 by Phil Karn (KA9Q) and contributors.
XMS detected.
TxDelay: 40
Persist: 64
SlotTime: 5
TxTail: 5
FullDup: 0
vhf: input output (ASCII dump)
jnos> telnet 192.168.1.1 6300_
```

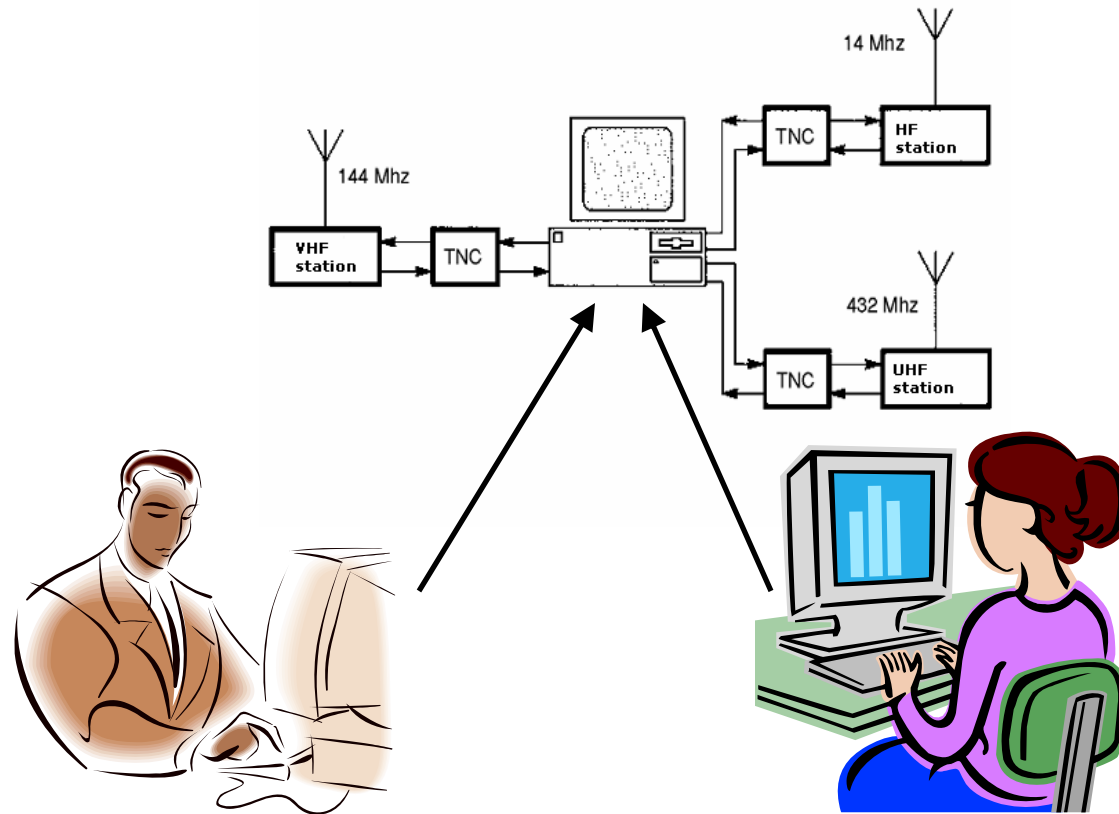
DOS "JNOS" (user)

```
21:21 04528/105712 FH=17 IDLE=10 Ses: 1
BBS:
1 Telnet: 192.168.1.1:6300 TxQ 0000 St: Established T:
Resolving 192.168.1.1... Trying 192.168.1.1:6300...
Telnet session 1 connected to 192.168.1.1

YT7MPB BBS. TELNET Access

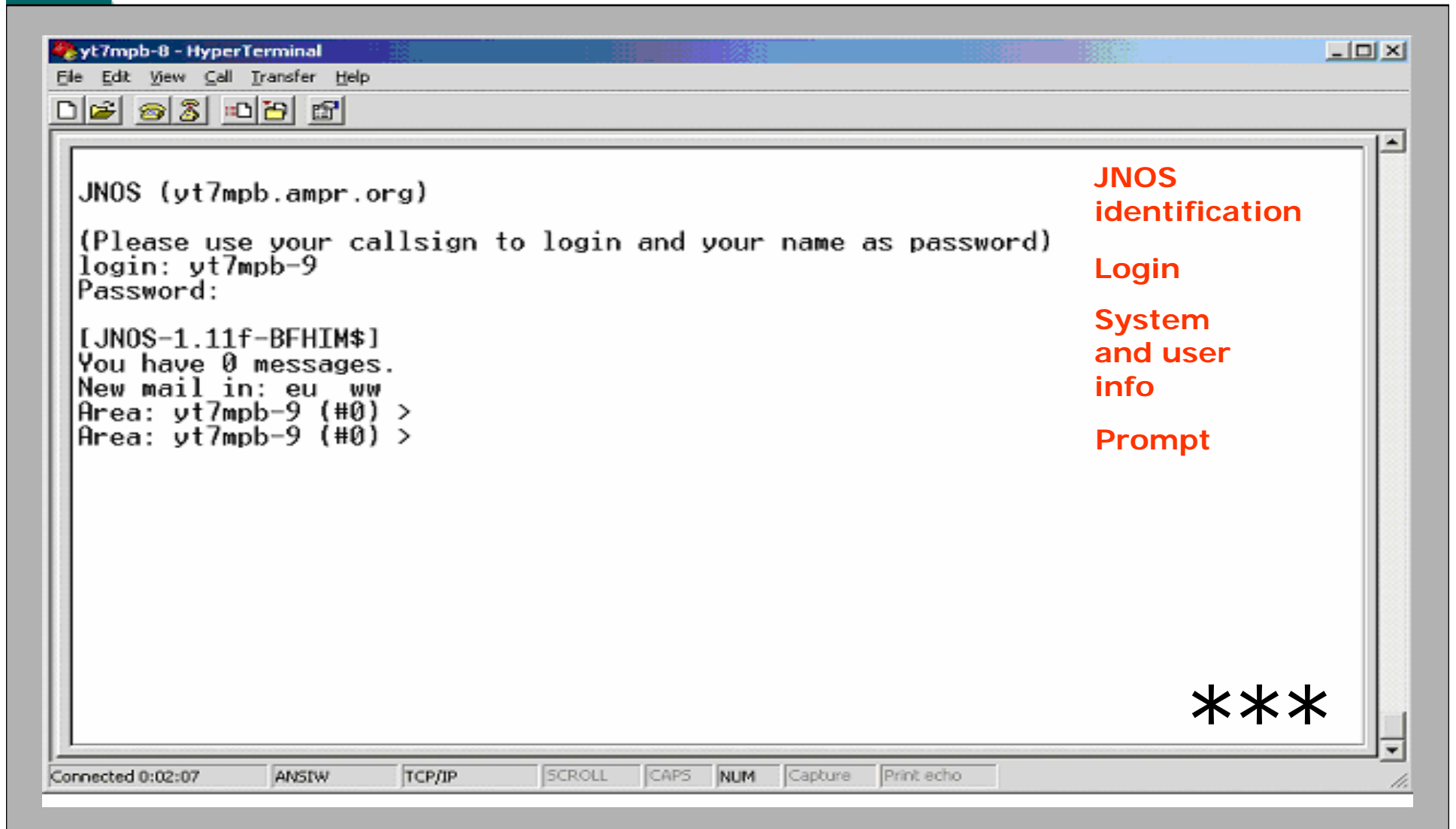
Callsign : _
```

5th possible scenario: 'telnet' from the opposite direction



Telnet to DOS "JNOS" mailbox from Windows
Telnet to DOS "JNOS" mailbox from Linux

Telnet connection to DOS "JNOS" (from Windows' Hyper Terminal)



```
yt7mpb-B - HyperTerminal
File Edit View Call Transfer Help
JNOS (yt7mpb.ampr.org)
(Please use your callsign to login and your name as password)
login: yt7mpb-9
Password:
[JNOS-1.11f-BFHIM$]
You have 0 messages.
New mail in: eu ww
Area: yt7mpb-9 (#0) >
Area: yt7mpb-9 (#0) >
```

**JNOS
identification**

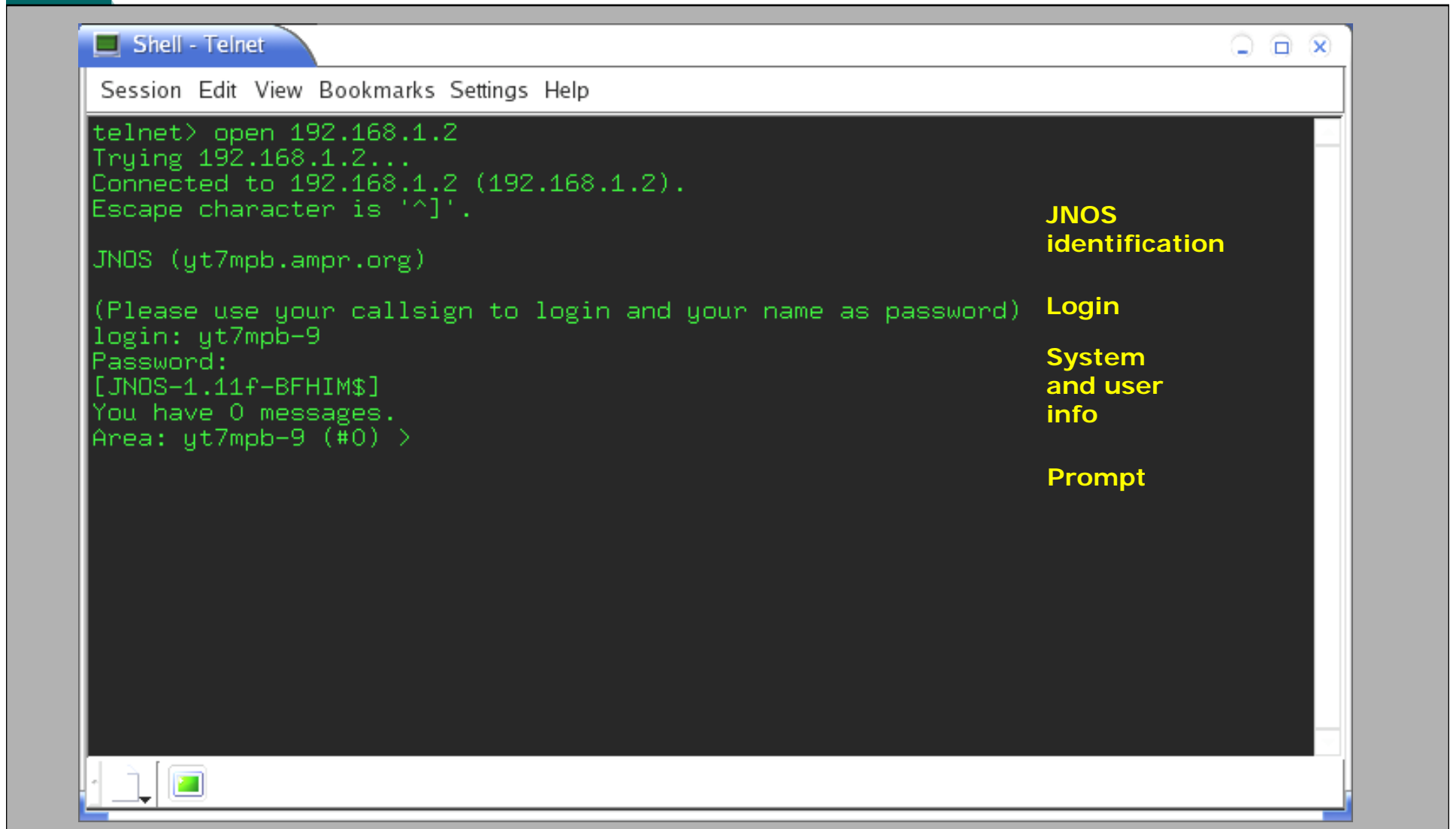
Login

**System
and user
info**

Prompt

Connected 0:02:07 ANSW TCP/IP SCROLL CAPS NUM Capture Print echo

Telnet connection to DOS "JNOS" (from Linux' Shell)



The image shows a terminal window titled "Shell - Telnet" with a menu bar containing "Session Edit View Bookmarks Settings Help". The terminal output is as follows:

```
telnet> open 192.168.1.2
Trying 192.168.1.2...
Connected to 192.168.1.2 (192.168.1.2).
Escape character is '^]'.

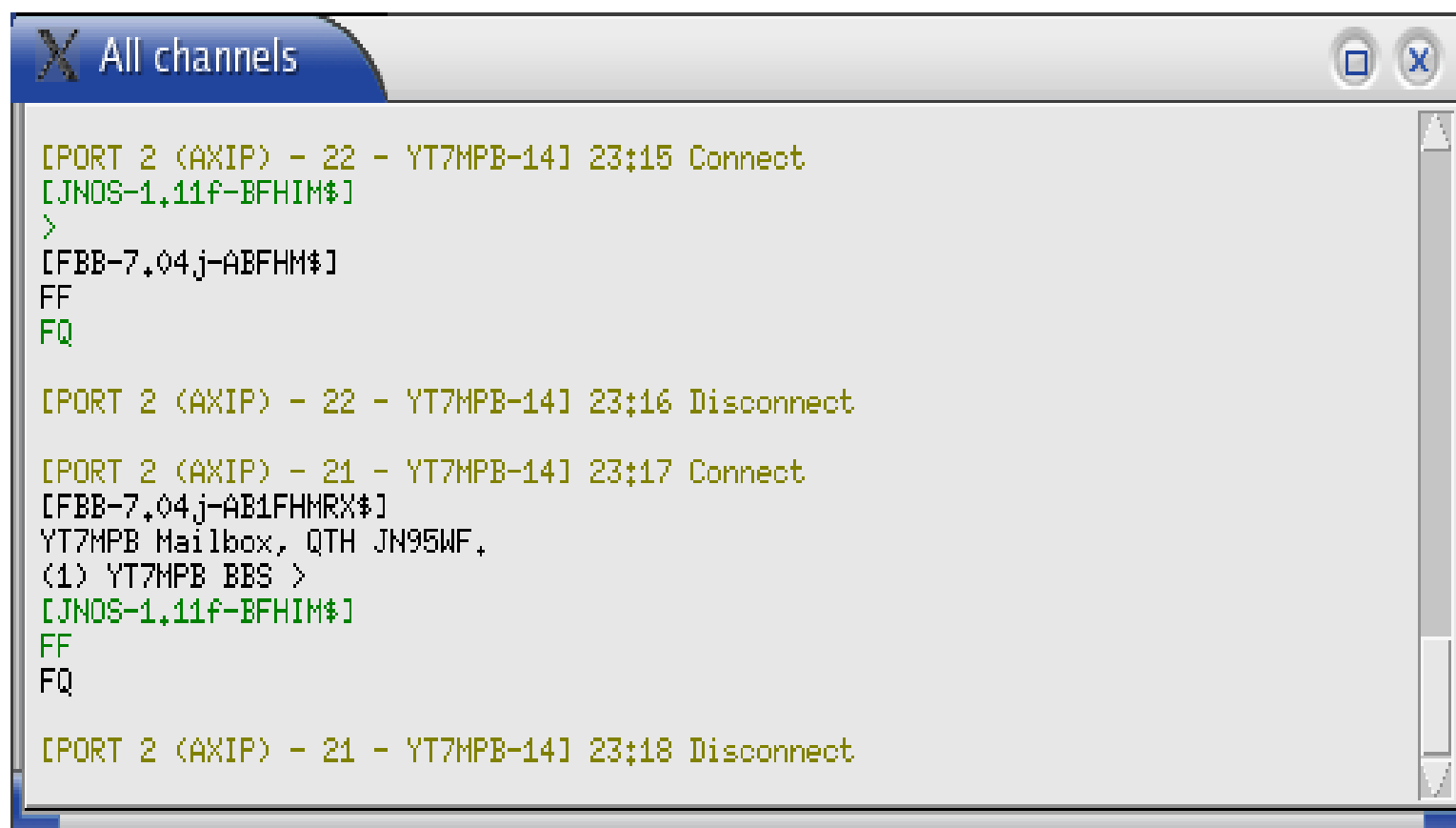
JNOS (yt7mpb.ampr.org)

(Please use your callsign to login and your name as password)
login: yt7mpb-9
Password:
[JNOS-1.11f-BFHIM$]
You have 0 messages.
Area: yt7mpb-9 (#0) >
```

Annotations on the right side of the terminal output:

- JNOS identification** (points to "JNOS (yt7mpb.ampr.org)")
- Login** (points to the login prompt and input)
- System and user info** (points to "[JNOS-1.11f-BFHIM\$]")
- Prompt** (points to "Area: yt7mpb-9 (#0) >")

The **automatic** email exchange between DOS "JNOS" and "LinFBB"



```
X All channels

[PORT 2 (AXIP) - 22 - YT7MPB-14] 23:15 Connect
[JNOS-1.11f-BFHIM$]
>
[FBB-7.04j-ABFHM$]
FF
FQ

[PORT 2 (AXIP) - 22 - YT7MPB-14] 23:16 Disconnect

[PORT 2 (AXIP) - 21 - YT7MPB-14] 23:17 Connect
[FBB-7.04j-AB1FHMRX$]
YT7MPB Mailbox, QTH JN95WF,
(1) YT7MPB BBS >
[JNOS-1.11f-BFHIM$]
FF
FQ

[PORT 2 (AXIP) - 21 - YT7MPB-14] 23:18 Disconnect
```

The equipment used in the home LAN: DOS "JNOS" + WinFBB/LinFBB

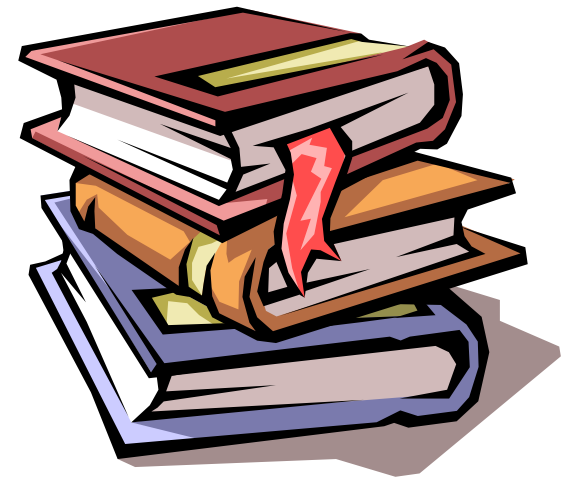


The equipment for DOS "JNOS" mailbox





LinFBB program installation manual:
“FBB Packet-radio BBS mini-HOWTO”



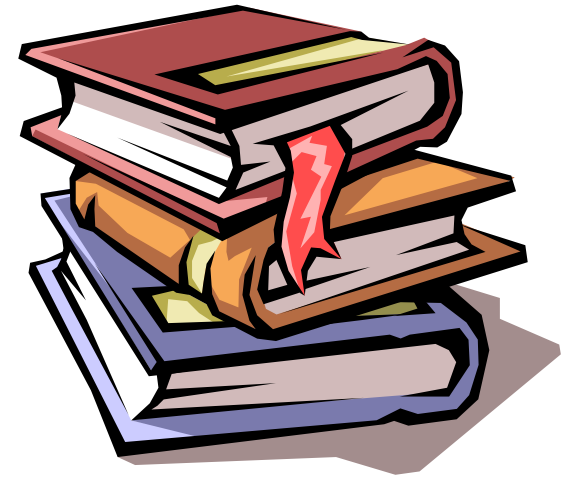
<http://tldp.org/HOWTO/FBB.html>



Linux installation manuals:

“LILO mini-HOWTO”

“Linux+WindowsNT mini-HOWTO”



<http://tldp.org/HOWTO/LILO.html>

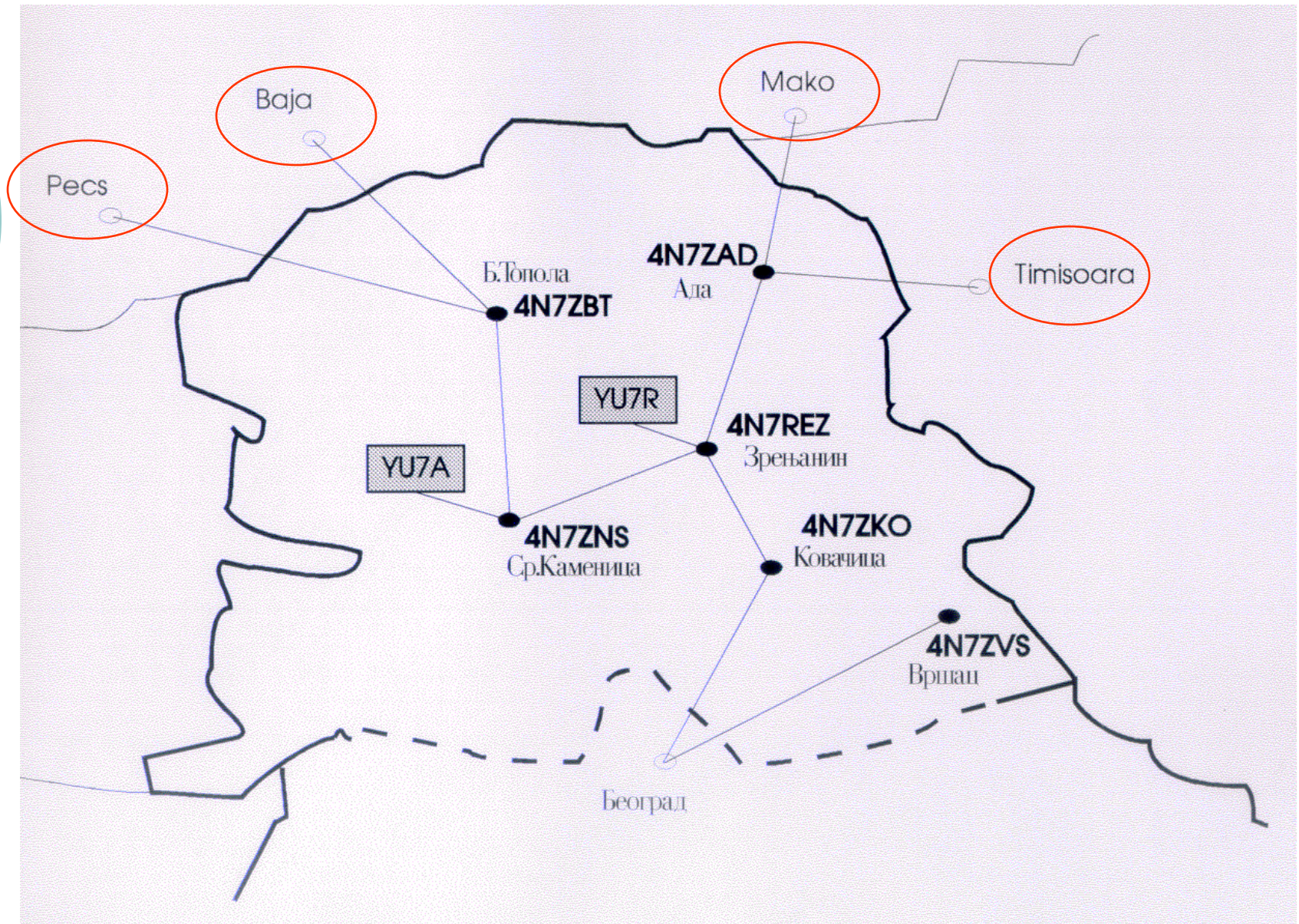
<http://tldp.org/HOWTO/Linux+WinNT.html>



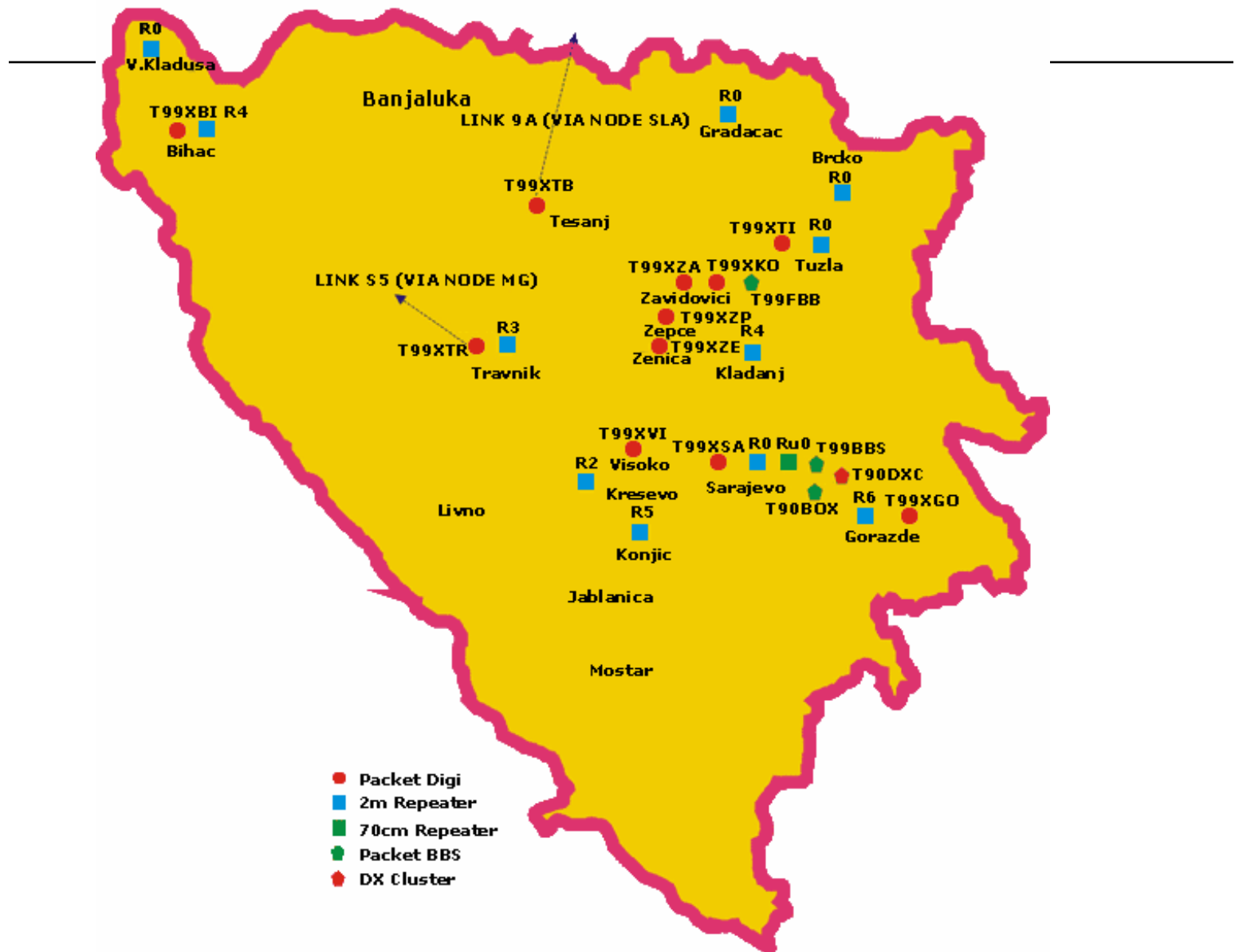
Part Three

- Who has done this before?
- What do we plan next?

Packet radio network in Vojvodina

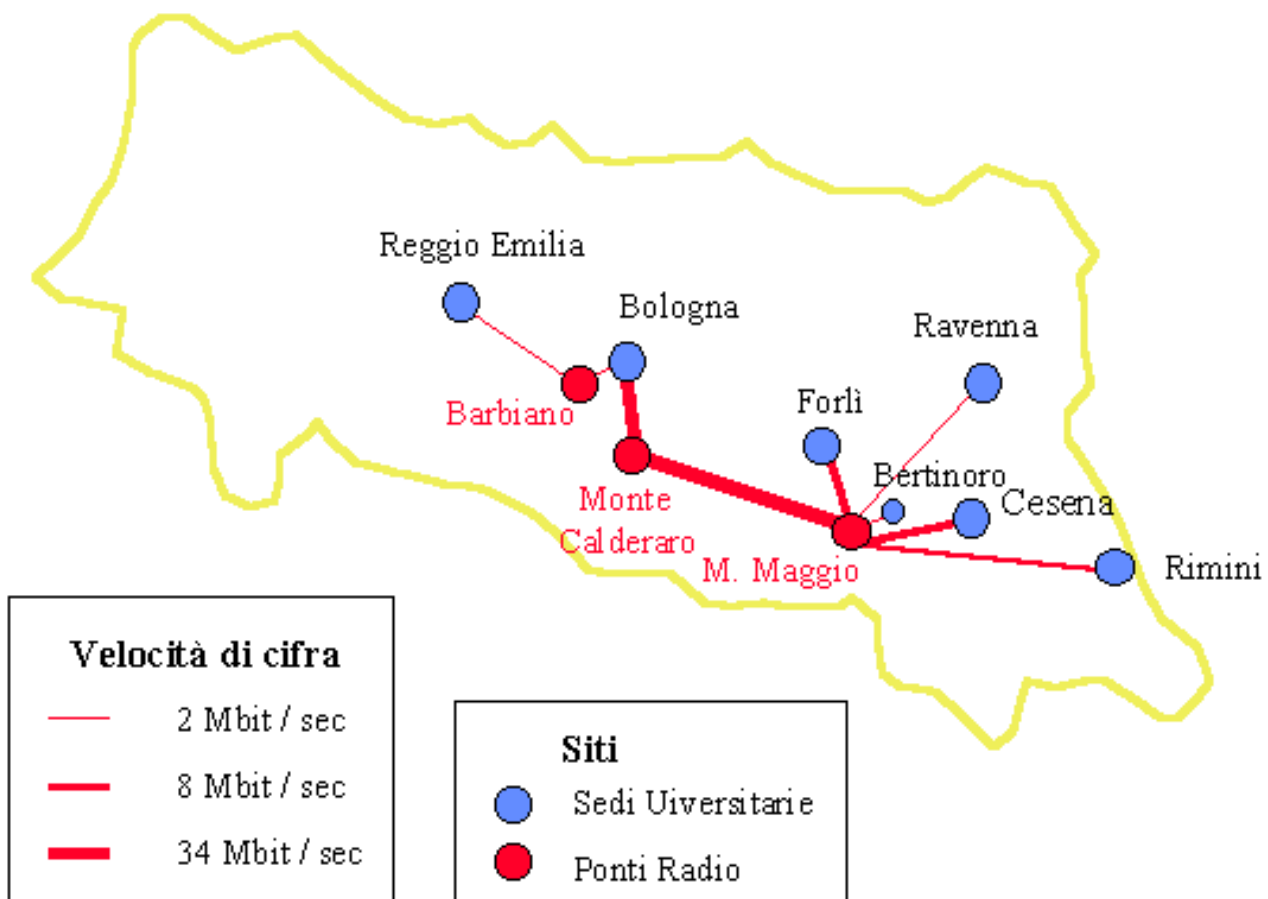


Bosnia network

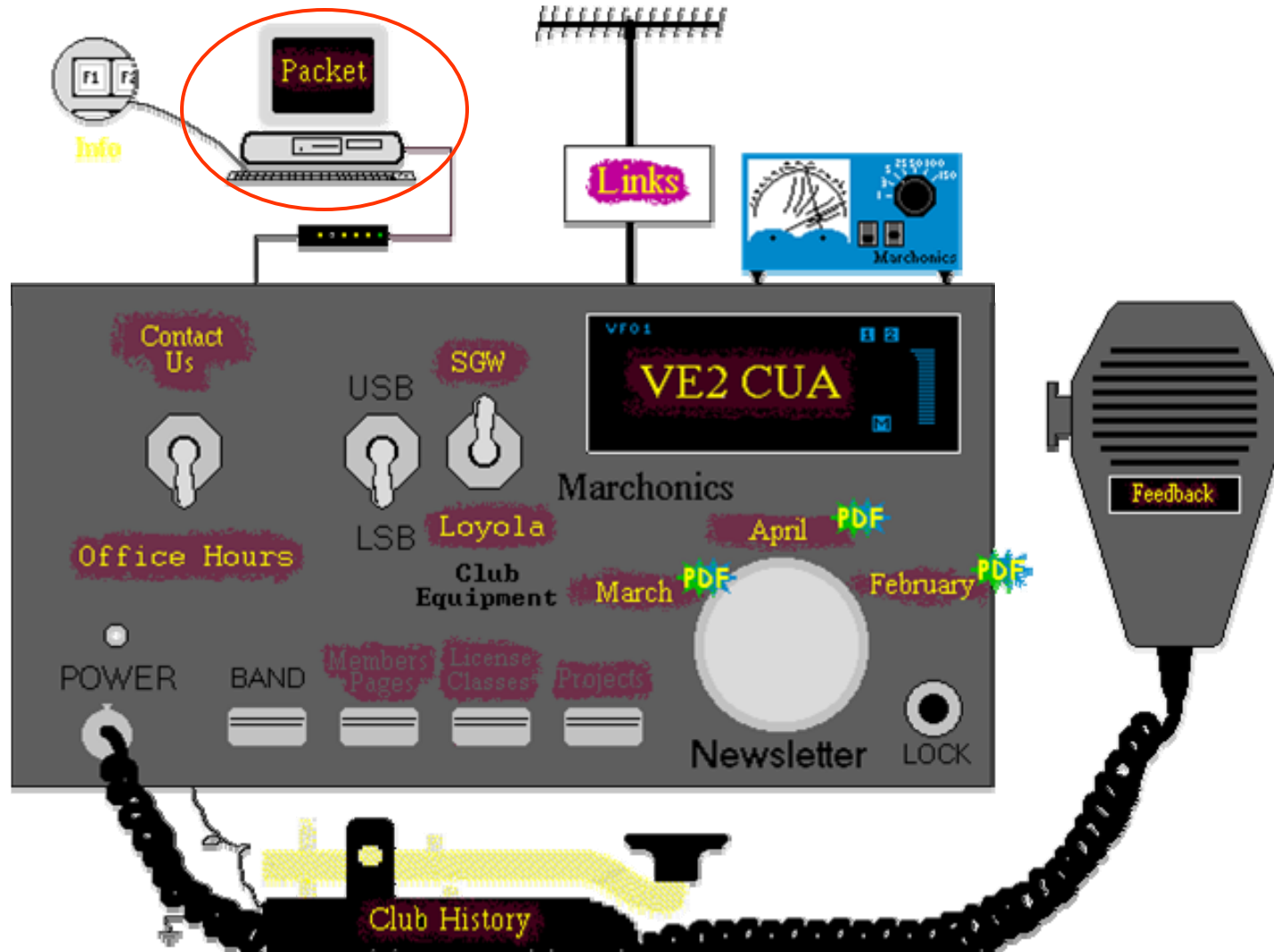


University of Bologna Computer Science of Cesena

Collocazione Geografica delle Tratte Radio



The Concordia University (Canada) Amateur Radio Club



Macquarie University (Australia)

Radio Station VK2GMU

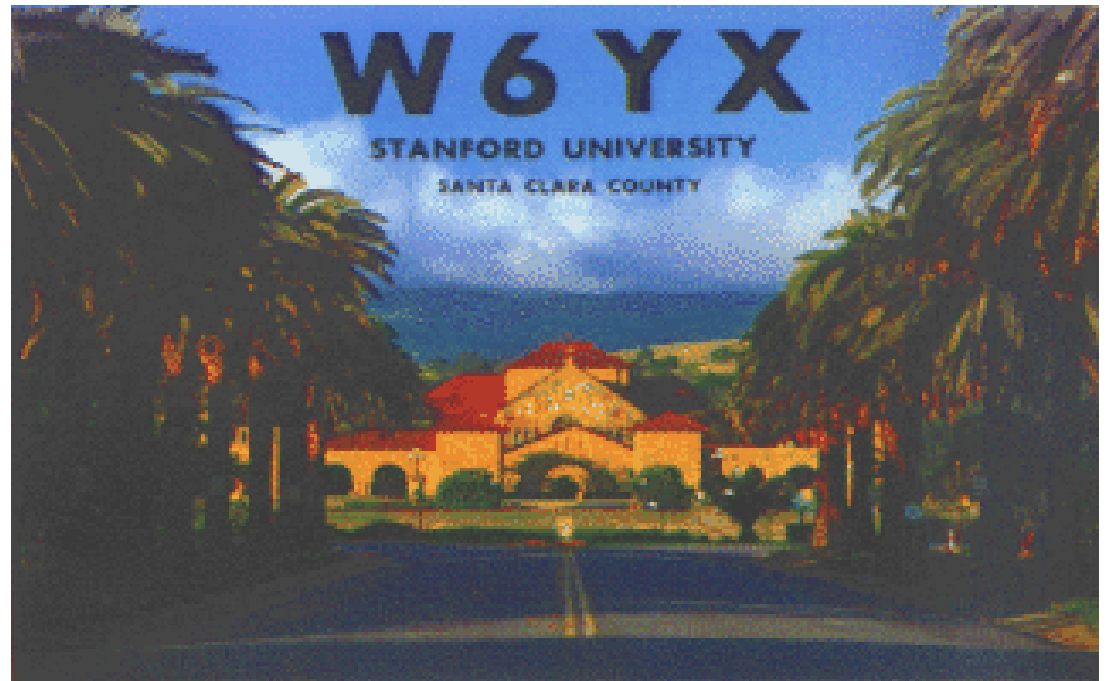
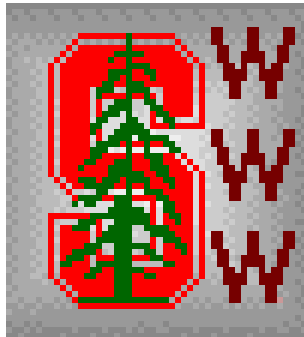
Wireless Institute Civil Emergency Network -

WICEN



Stanford Amateur Radio Club (USA) W6YX

Packet radio & high speed data communications



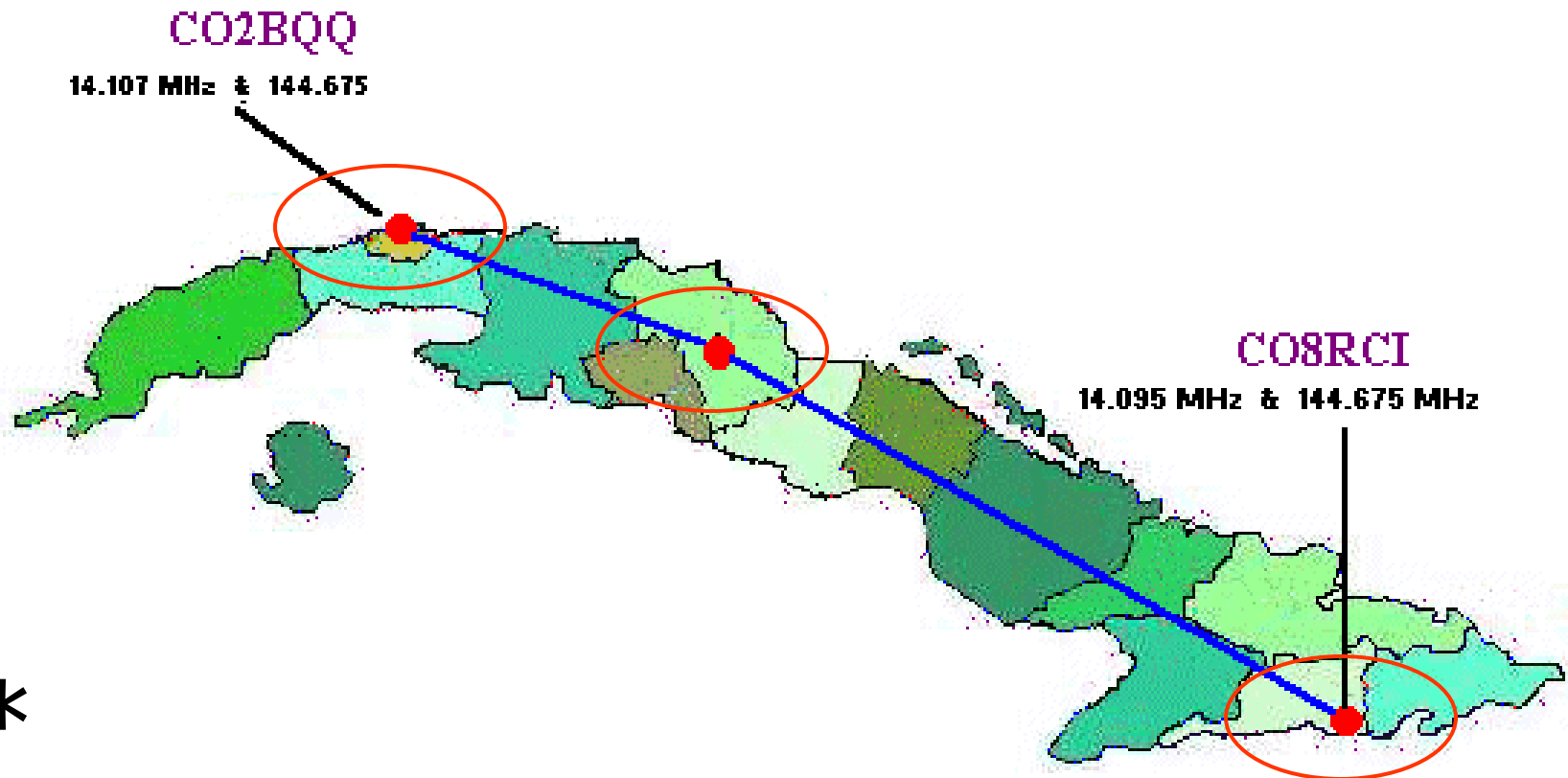
University of Maryland (USA) Amateur Radio Association UMARA

The Spartan Packet Radio Experiment (SPRE)



CO2BQQ - The University City "JOSE ANTONIO ECHEVARRIA" in Ciudad de la Habana

CO8RCI - The University of Santiago de Cuba, in the same name province

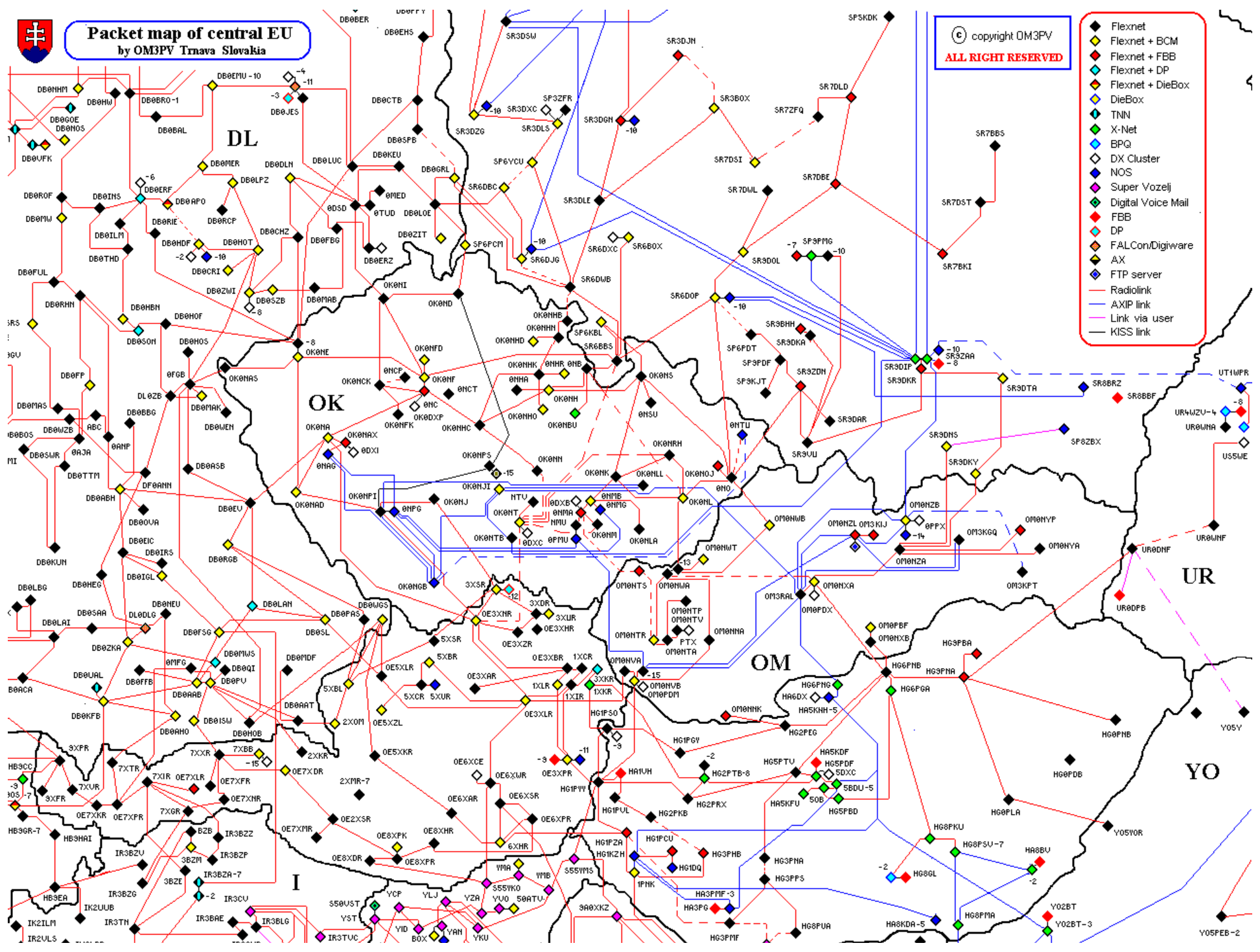




Packet map of central EU by OM3PV Trnava Slovakia

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- ◆ TNN
- ◆ X-Net
- ◆ BPQ
- ◆ DX Cluster
- ◆ NOS
- ◆ Super Vozelj
- ◆ Digital Voice Mail
- ◆ FBB
- ◆ DP
- ◆ FALCon/Digiware
- ◆ AX
- ◆ FTP server
- Radiolink
- AXIP link
- Link via user
- KISS link





Suggestion:

*Implementation of a dedicated
"amateur **digital** license" (ADL) →*



ADL 😊

- Computer and radio hardware
- Operating systems and 'ham' digital software
- Configuration of radio modems and other equipment (antennas, ground etc)
- RFI – Radio frequency interference issues
- Regulatory set of questions (band plan etc)
- Foreign language (in written test)



ADL 😊

- Work any **digital** (data) mode
- Work any **digital** (data) sub-band
- Use only dedicated **digital** (data) radio station (easily to modify)
- Would be the **best solution** for the cell telephony and the Internet users
- Would be the **best solution** for kids in schools, universities etc



Suggestion:

- *Radio amateurs should **join** the educational and scientific activities at the local **schools** and **universities** wherever possible – in particular in **developing countries.***

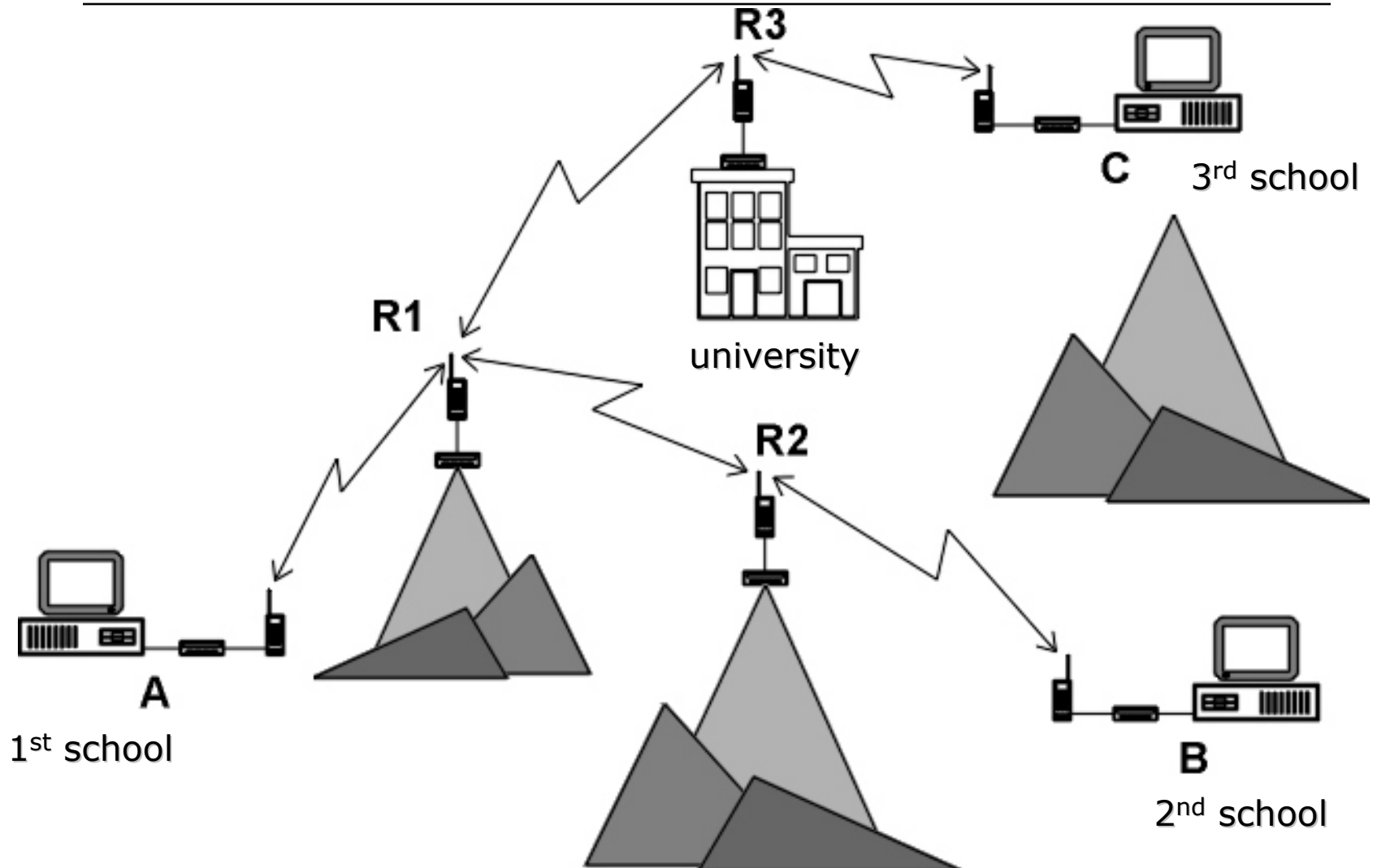


Suggestion:

- *The academia should help building the **AMUNET** - the Amateur University Network*

→ → → → → → → → → → → → →

A future vision: the *AMUNET* between the university and the village schools







Suggestion:

*After a local **AMUNET** - the Amateur University Network, has been established, it would be the right time to apply for financing some wider projects, like "**TEMPUS**", "**FP6**" and other similar projects – being sponsored by the EU.*



The amateur radio contribution:

In the USA is considered that “the **amateur radio is a **valuable tool** to develop new ideas in communications, and that’s why the amateurs are encouraged to make the experiments, to build the equipment etc”.**

Ralph Mowery, radio amateur

- "Teaching Technology Growing in Importance" Cincinnati Enquirer (08/06/07); Fischer, Ben

A growing effort to get children excited and interested in technology includes programs like **summer camps** at universities for potential engineers and scientists, and open-access computer labs and weekend workshops hosted by nonprofits.



Int'l Student Summer School

- Takes up to 7-10 days.
- Co-sponsored by a IEEE, WSEAS, ACM, EESTEC chapter or the local community → accommodation.
- Co-sponsored by the participants → travel to the event venue.
- Co-sponsored by local amateurs → technical equipment & test labs.



Questions?

... deserving awards!

Thank You!