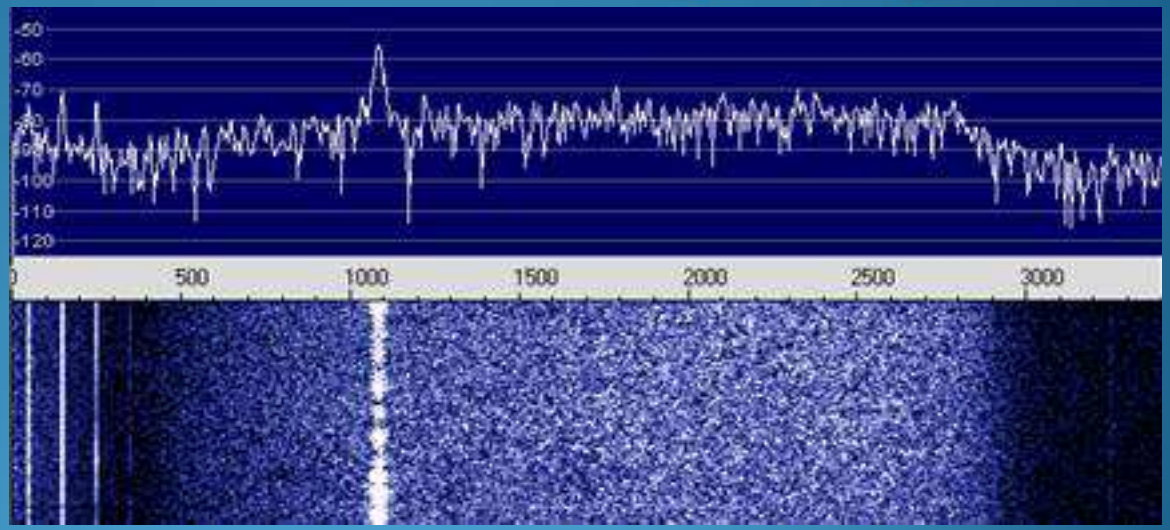
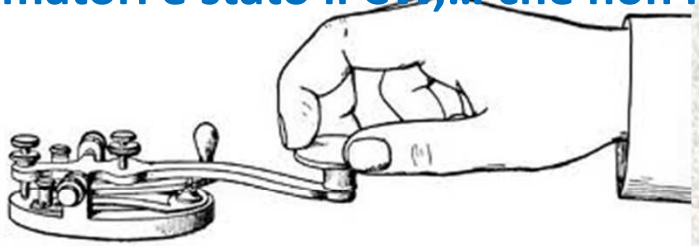
Going Digital

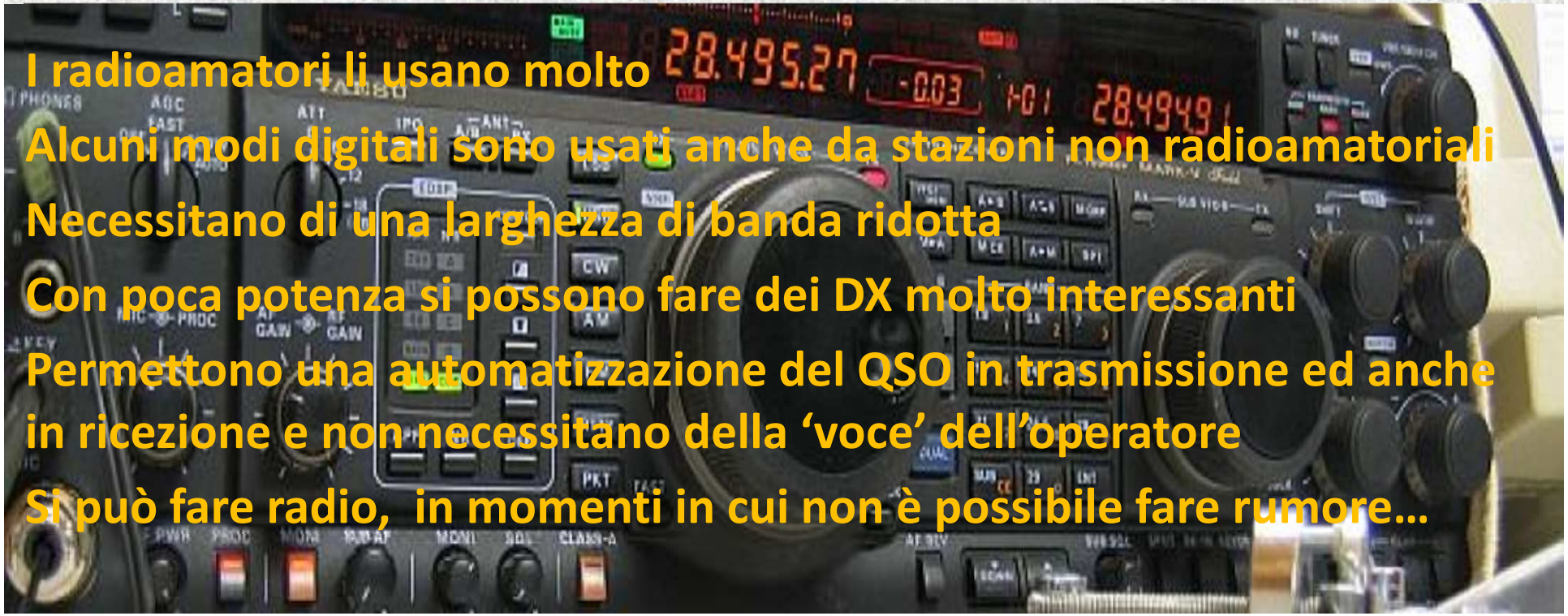


I MODI DIGITALI

Con l'avvento del personal computer, i radioamatori sono stati i primi a fare sperimentazione di trasmissioni in digitale….

…. anche se il primo modo digitale usato dai radioamatori è stato il CW,… che non ha bisogno del computer per essere modulato…





I radioamatori li usano molto

Alcuni modi digitali sono usati anche da stazioni non radioamatoriali

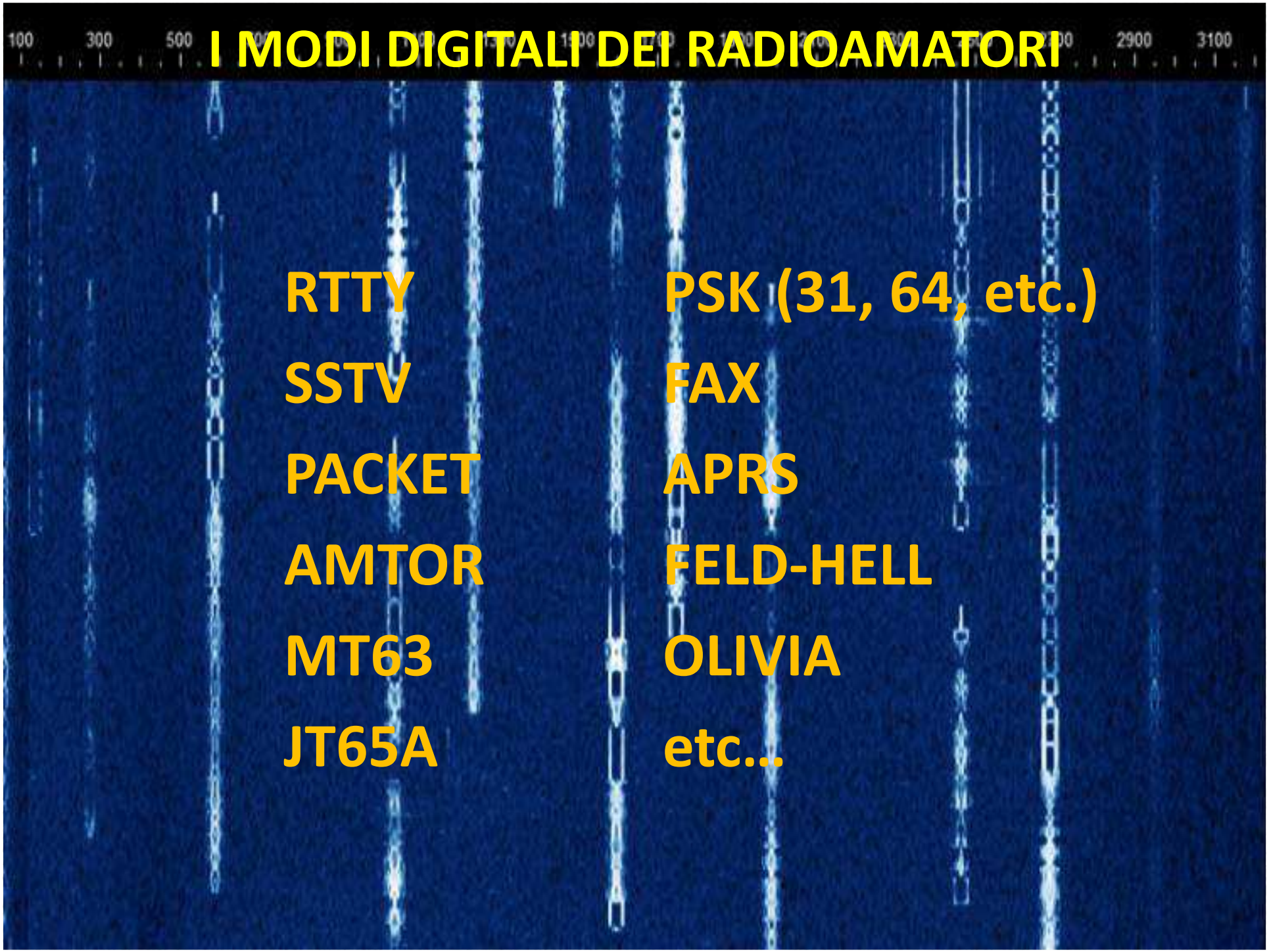
Necessitano di una larghezza di banda ridotta

Con poca potenza si possono fare dei DX molto interessanti

Permettono una automatizzazione del QSO in trasmissione ed anche in ricezione e non necessitano della 'voce' dell'operatore

Si può fare radio, in momenti in cui non è possibile fare rumore…

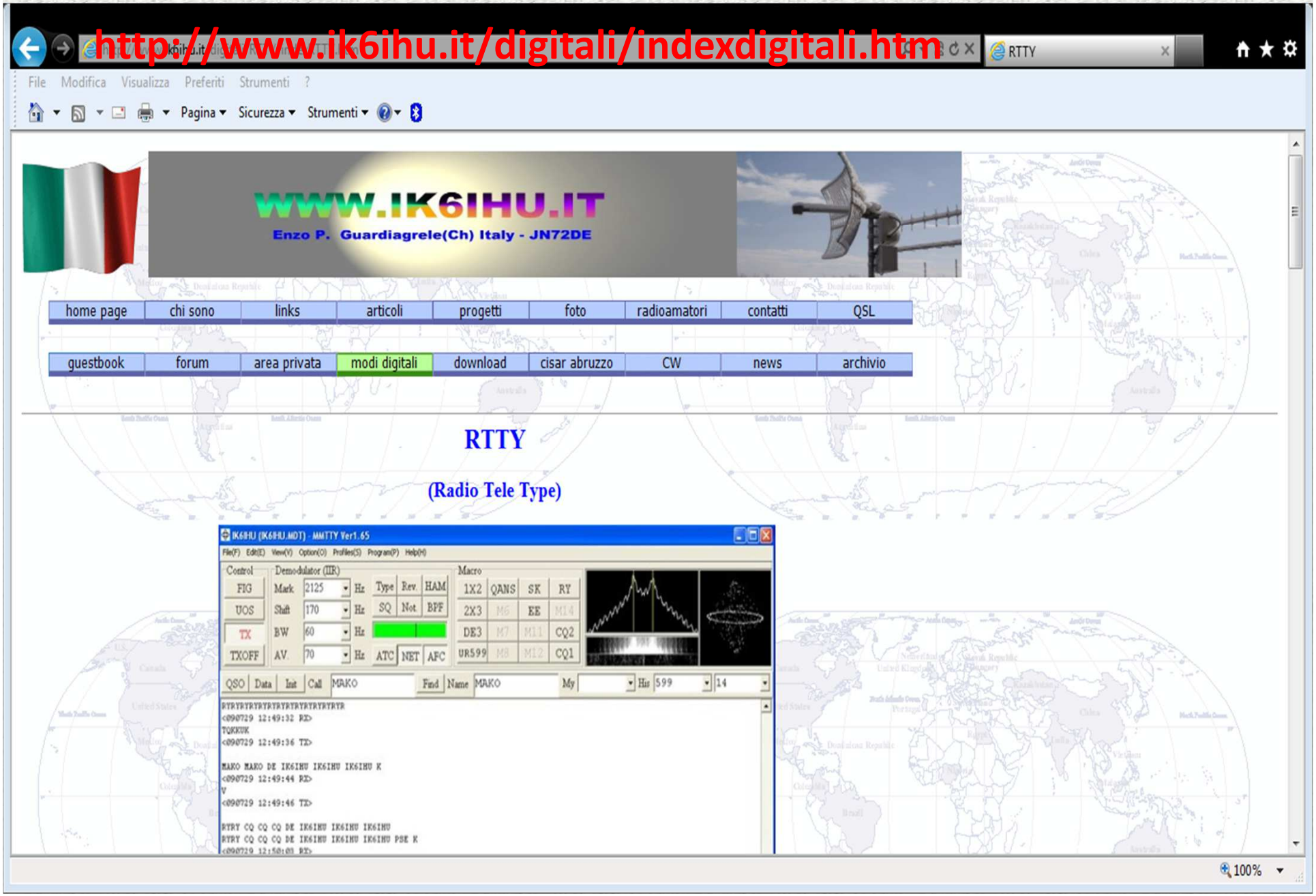
I MODI DIGITALI DEI RADIOAMATORI



RTTY	PSK (31, 64, etc.)
SSTV	FAX
PACKET	APRS
AMTOR	FELD-HELL
MT63	OLIVIA
JT65A	etc…

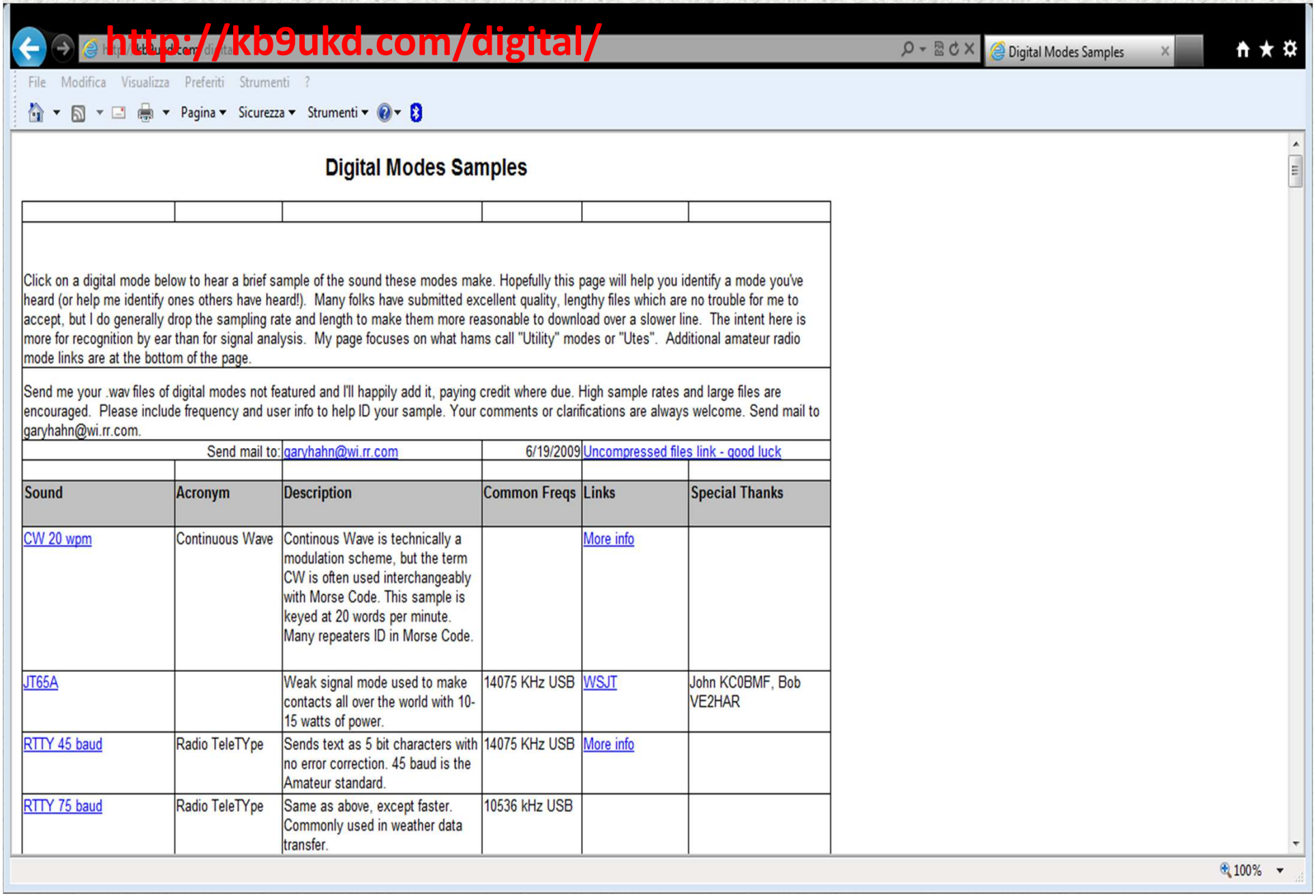
LE RISORSE SU WEB

http://www.ik6ihu.it/digitali/indexdigitali.htm



LE RISORSE SU WEB

http://kb9ukd.com/digital/



Digital Modes Samples

Click on a digital mode below to hear a brief sample of the sound these modes make. Hopefully this page will help you identify a mode you've heard (or help me identify ones others have heard!). Many folks have submitted excellent quality, lengthy files which are no trouble for me to accept, but I do generally drop the sampling rate and length to make them more reasonable to download over a slower line. The intent here is more for recognition by ear than for signal analysis. My page focuses on what hams call "Utility" modes or "Utes". Additional amateur radio mode links are at the bottom of the page.

Send me your .wav files of digital modes not featured and I'll happily add it, paying credit where due. High sample rates and large files are encouraged. Please include frequency and user info to help ID your sample. Your comments or clarifications are always welcome. Send mail to garyhahn@wi.rr.com.

		Send mail to:	garyhahn@wi.rr.com	6/19/2009	Uncompressed files link - good luck

Sound	Acronym	Description	Common Freqs	Links	Special Thanks
CW 20 wpm	Continuous Wave	Continous Wave is technically a modulation scheme, but the term CW is often used interchangeably with Morse Code. This sample is keyed at 20 words per minute. Many repeaters ID in Morse Code.		More info	
JT65A		Weak signal mode used to make contacts all over the world with 10-15 watts of power.	14075 KHz USB	WSJT	John KC0BMF, Bob VE2HAR
RTTY 45 baud	Radio TeleTYpe	Sends text as 5 bit characters with no error correction. 45 baud is the Amateur standard.	14075 KHz USB	More info	
RTTY 75 baud	Radio TeleTYpe	Same as above, except faster. Commonly used in weather data transfer.	10536 kHz USB		

LE RISORSE SU WEB

http://www.nonstopsystems.com/radio/radio-sounds.html

File Modifica Visualizza Preferiti Strumenti ?

Pagina Sicurezza Strumenti

Radio sounds

LISTEN NOW!

Latest update: *25-Apr-2010 (added ROS mode)*

Update: *30 March 2010 (cleaned up dead links, added & cleaned up recordings, added waterfalls, added JT65A)*

NOTE: users have observed that sometimes it may take a while (10-20 sec) before a sound files "connects"...

[sound clips] [waterfall spectra] [mode descriptions]

These are several files with examples of sounds from digital radio modes on short wave. More info on most of these modes is provided at the bottom of this page.

- **Hellschreiber** (Typenbildfeldfernschreiber)
  - Feld Hell
  - Feld-Hell QSO (18 minutes recording of the weekly Sunday euro Hell Net on 3577-3582 kHz at 15:00-15:30 UTC; recorded on 14 sept 2008 by Bill, KA8VIT, via this great web-SDR in The Netherlands)
  - Hell-72 GL (sorry, poor quality)
  - Hell-80 (actual QSO with start-stop and synchronous transmissions)
  - Hell-80 (asychronous mode)
  - Hell FM-105
  - Hell FM-245
  - Hell PSK-105
  - Hell PSK-245
  - Hell FSK-105
  - Hell-FSK-245
  - C/MT Hell - text appears in waterfall display
  - Duplo Hell
  - Hell-Thomson

100%

LE RISORSE SU WEB

http://www.i0hjn.it/RTTY%20PER%20CHI%20INCOMINCIA.pdf

IØHJN
Gaetano (Guy) Caprara

RTTY per chi incomincia

Ho ritenuto utile raccogliere in un unico documento gli aspetti principali riguardanti le trasmissioni radioamatoriali in RTTY. Queste note hanno lo scopo di aiutare il novizio che si avvicina a questo modo di trasmissione ma anche essere un pro-memoria che può tornare utile all'operatore più esperto.

Il documento è focalizzato sull'uso del software MMTTY che è ritenuto il miglior decodificatore disponibile. In particolare vedremo MMTTY inserito nel software per contest QARTest di Paolo IK3QAR.

Premetto che la maggior parte del documento è tratta da materiale reperito sui siti in Bibliografia e dall'Help di MMTTY. Una raccomandazione che non mi stancherò mai di fare è di leggersi con attenzione il Manuale di QARTest. Scoprirete diverse funzioni che qui non sono citate ma che utilizzate come si deve risultano estremamente utili in contest..

RTTY

L'RTTY è un sistema di trasmissione digitale che utilizza il codice Baudot a 5 bits. Questo significa che ogni carattere è formato da 5 bits anche se in realtà ne vengono trasmessi 8 in quanto vi è la presenza di uno start bit e di 2 stop bit. Normalmente in HF si usa una baud rate (velocità) di 45.45 baud che è l'equivalente di 60 wpm (word per minute = parole al minuto). Anche se questa è la velocità standard capita a volte di imbattersi in trasmissioni più veloci come 50 baud (66 wpm) ma anche di 75

LE RISORSE SU WEB

http://www.i0hjn.it/RTTY%20tips%20&%20tricks.pdf

IØHJN
Gaetano (Guy) Caprara

RTTY Contest – Tips & Tricks

I MESSAGGI DI QARTEST IN CONTEST RTTY

QARTest per ogni tipo di contest propone dei propri messaggi di default.

Di seguito trovate i miei messaggi di QARTest per il Contest Sezioni HF categoria RTTY. Tenete presente che potete programmare i messaggi a vostro piacimento anche durante lo svolgimento del Contest (a me capita spesso). Quelli che vi propongo sono a scopo di esempio.

Il Contest delle Sezioni HF prevede lo scambio dell'RST e del codice della Sezione (per ARI Colli Albani è 0013).

SUGGERIMENTO: una volta individuati, sulla base dell'esperienza, quali sono i messaggi che meglio si adattano al vostro modo di operare, potete usare il comando "Esporta" e salvarli così in un file che potrete richiamare ad ogni nuovo contest. In tal caso vanno personalizzate in base al contest le aree contrassegnate in giallo

Noterete che alla fine dei messaggi non ho usato i caratteri finali "K" o "BK", in contest sono totalmente inutili ed allungano solo il messaggio trasmesso. Inoltre, quasi tutti i messaggi iniziano con {CR} per far si che il nostro messaggio venga trasmesso su una nuova riga evitando così di confonderlo col noise che il

LE RISORSE SU WEB

http://www.arrl.org/band-plan

160 Meters (1.8-2.0 MHz):

1.800 - 2.000	CW
1.800 - 1.810	Digital Modes
1.810	CW QRP
1.843-2.000	SSB, SSTV and other wideband modes
1.910	SSB QRP
1.995 - 2.000	Experimental
1.999 - 2.000	Beacons

80 Meters (3.5-4.0 MHz):

3.590	RTTY/Data DX
3.570-3.600	RTTY/Data
3.790-3.800	DX window
3.845	SSTV
3.885	AM calling frequency

40 Meters (7.0-7.3 MHz):

7.040	RTTY/Data DX
7.080-7.125	RTTY/Data
7.171	SSTV
7.290	AM calling frequency

LE RISORSE SU WEB

http://www.arrl.org/band-plan

30 Meters (10.1-10.15 MHz):

10.130-10.140	RTTY
10.140-10.150	Packet

20 Meters (14.0-14.35 MHz):

14.070-14.095	RTTY
14.095-14.0995	Packet
14.100	NCDXF Beacons
14.1005-14.112	Packet
14.230	SSTV
14.286	AM calling frequency

17 Meters (18.068-18.168 MHz):

18.100-18.105	RTTY
18.105-18.110	Packet

15 Meters (21.0-21.45 MHz):

21.070-21.110	RTTY/Data
21.340	SSTV

LE RISORSE SU WEB

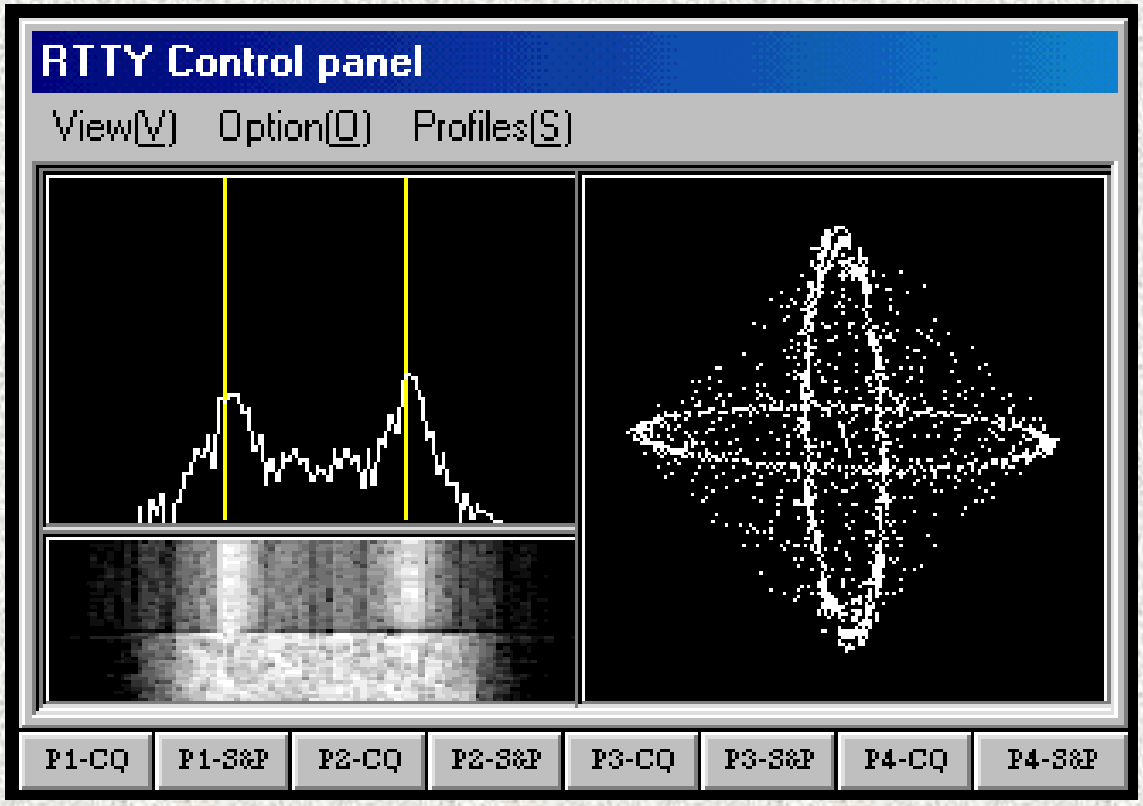
http://www.arrl.org/band-plan

12 Meters (24.89-24.99 MHz):

24.920-24.925	RTTY
24.925-24.930	Packet

10 Meters (28-29.7 MHz):

28.000-28.070	CW
28.070-28.150	RTTY
28.150-28.190	CW
28.200-28.300	Beacons
28.300-29.300	Phone
28.680	SSTV
29.000-29.200	AM
29.300-29.510	Satellite Downlinks
29.520-29.590	Repeater Inputs
29.600	FM Simplex
29.610-29.700	Repeater Outputs



Band Plan RTTY

3.600 +/- 20 KHz

7.040 +/- 5 KHz

10.145 +/- 5 KHz

14.090 +/-10 KHz

18.105 +/- 5 KHz

21.100 +/- 20 KHz

24.925 +/-5 KHz

28.100 +/- 50 KHz

50.600

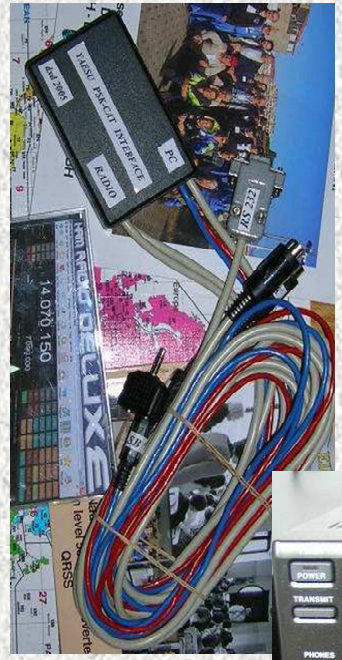
144.600

432.600 (FSK/PSK)

433.600 (FM/AFSK)

1296.600

LA STAZIONE PER I MODI DIGITALI



IL COMPUTER ed i PROGRAMMI

Porta RS-232 (COMx)

Porta USB

Scheda audio

Ingresso ed uscita audio

Software per la gestione dell'interfaccia commerciale (router virtuale)

Software per la gestione dei modi digitali

MMTTY	**MM hamsoft di JE3HHT Makoto Mori**
MMSSTV – MMVARI	**http://hamsoft.ca/**
MIXW (ver. 2x o 3)	**http://mixw.net/**

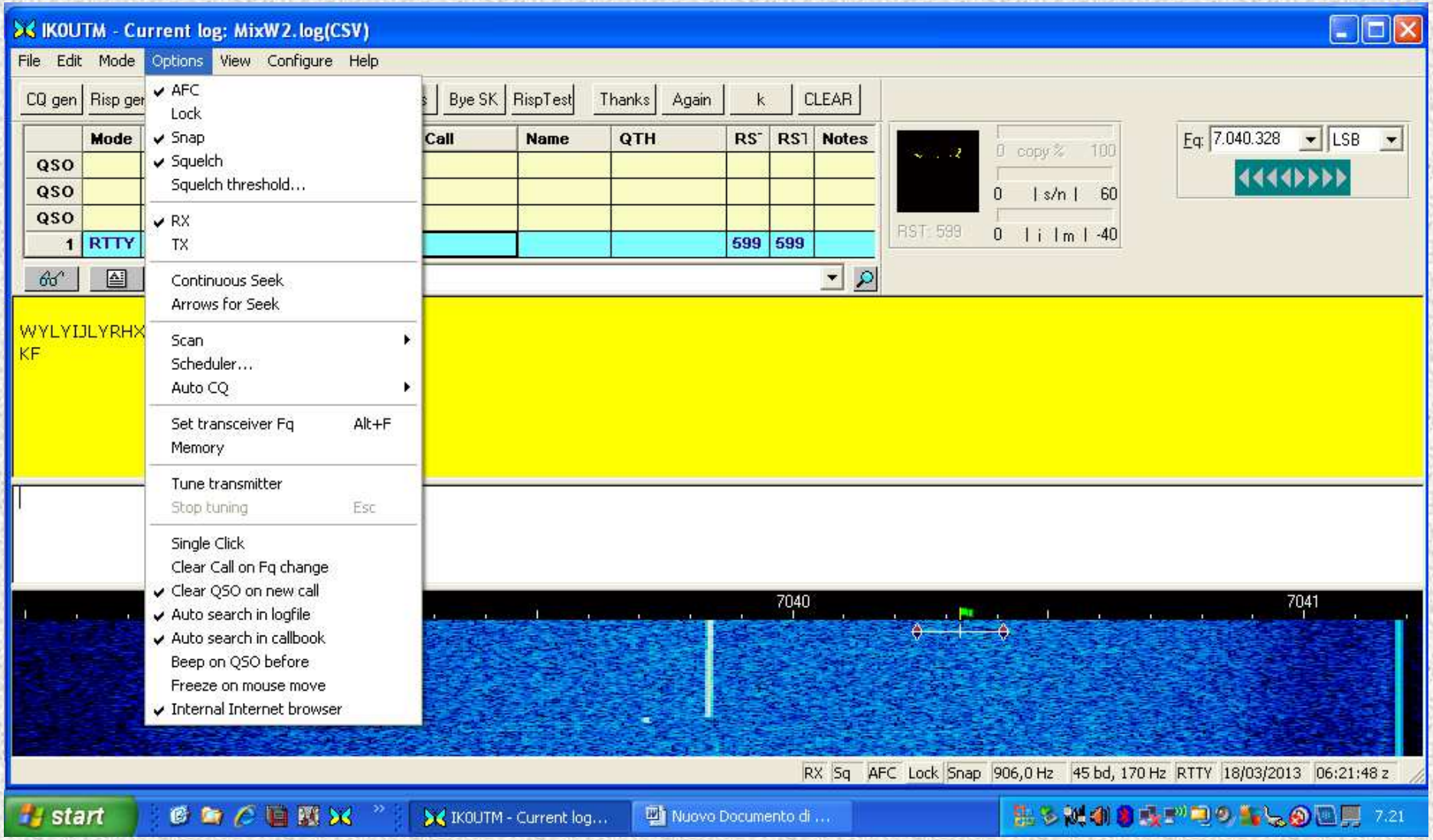
FT-857D + Interface IZ0DXD + MixW

Presa RS232 →su RS232 del PC

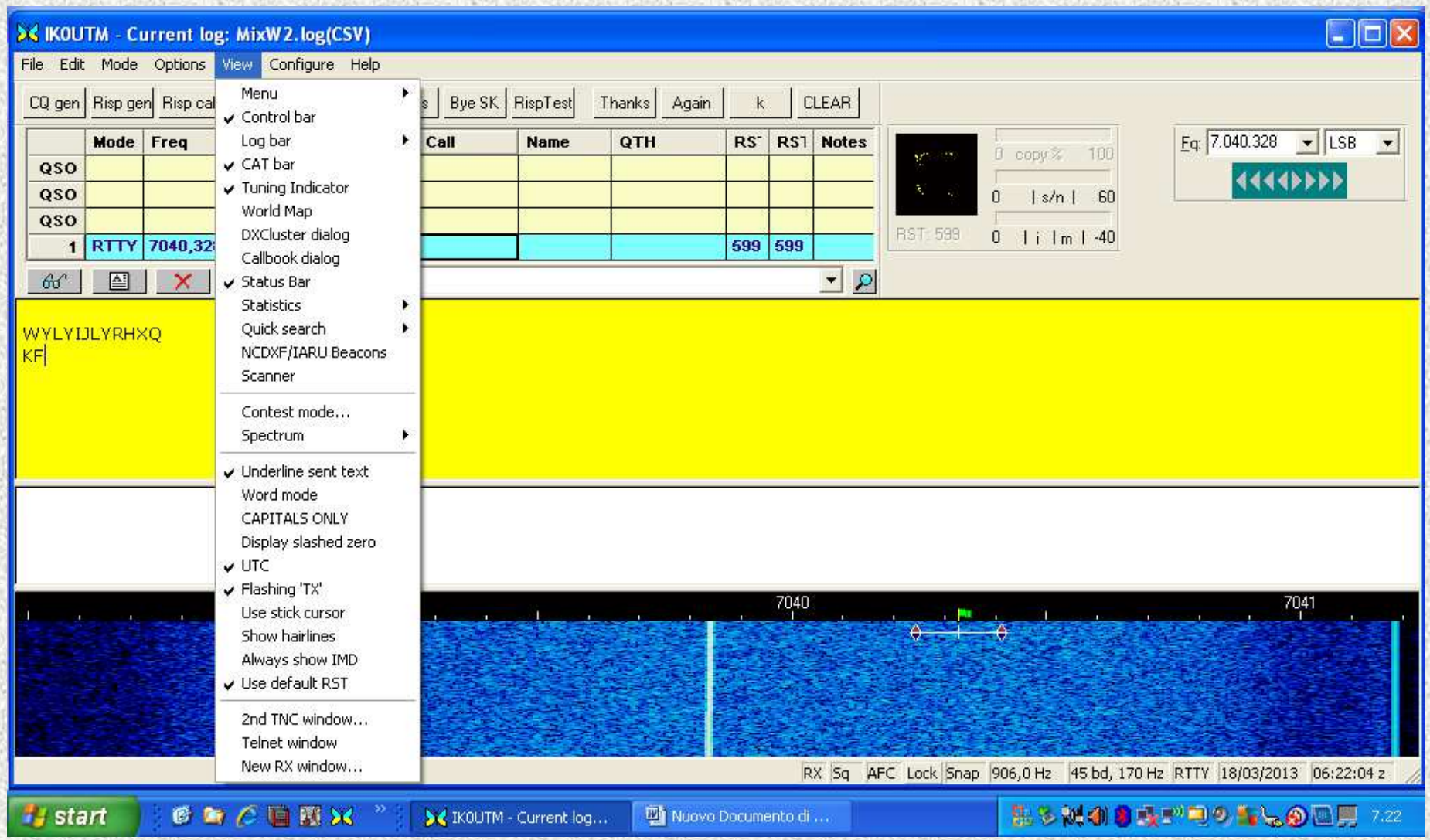
Jack in-out →mic e cuffia PC

Prese miniDIN dati e CAT → prese dati sul retro FT-857

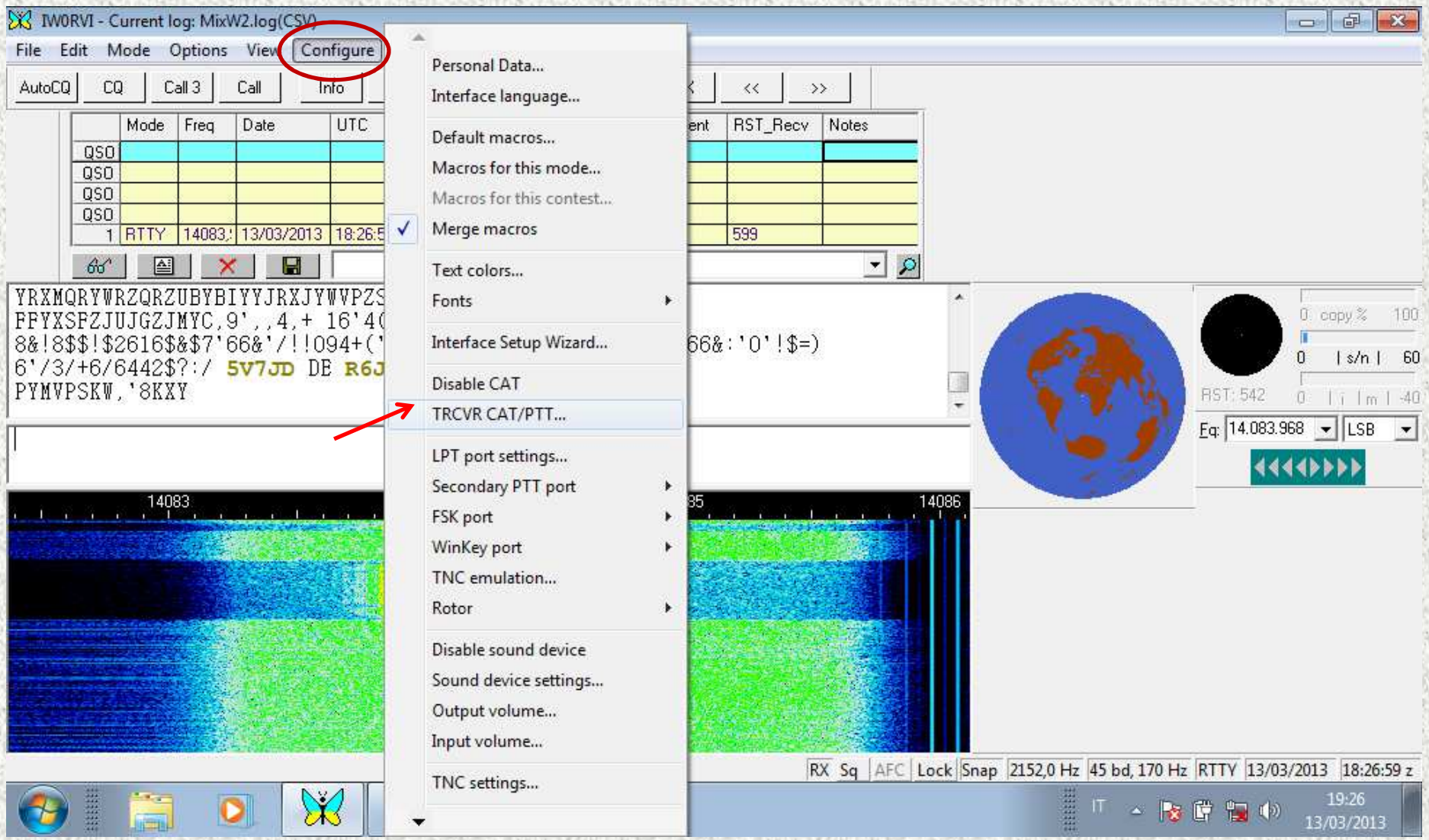
Configurazione MixW con FT-857D e interface DXD



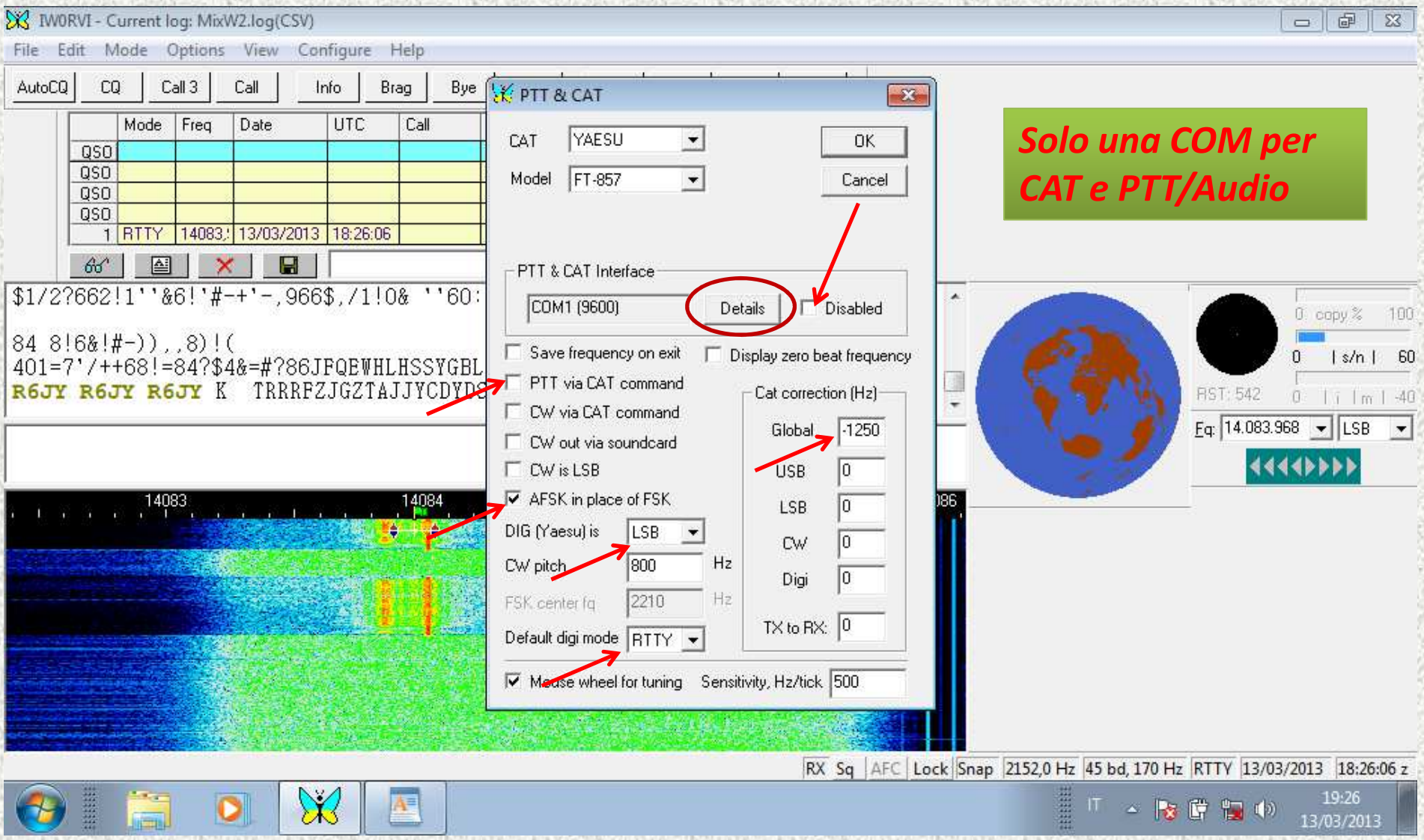
Configurazione MixW con FT-857D e interface DXD



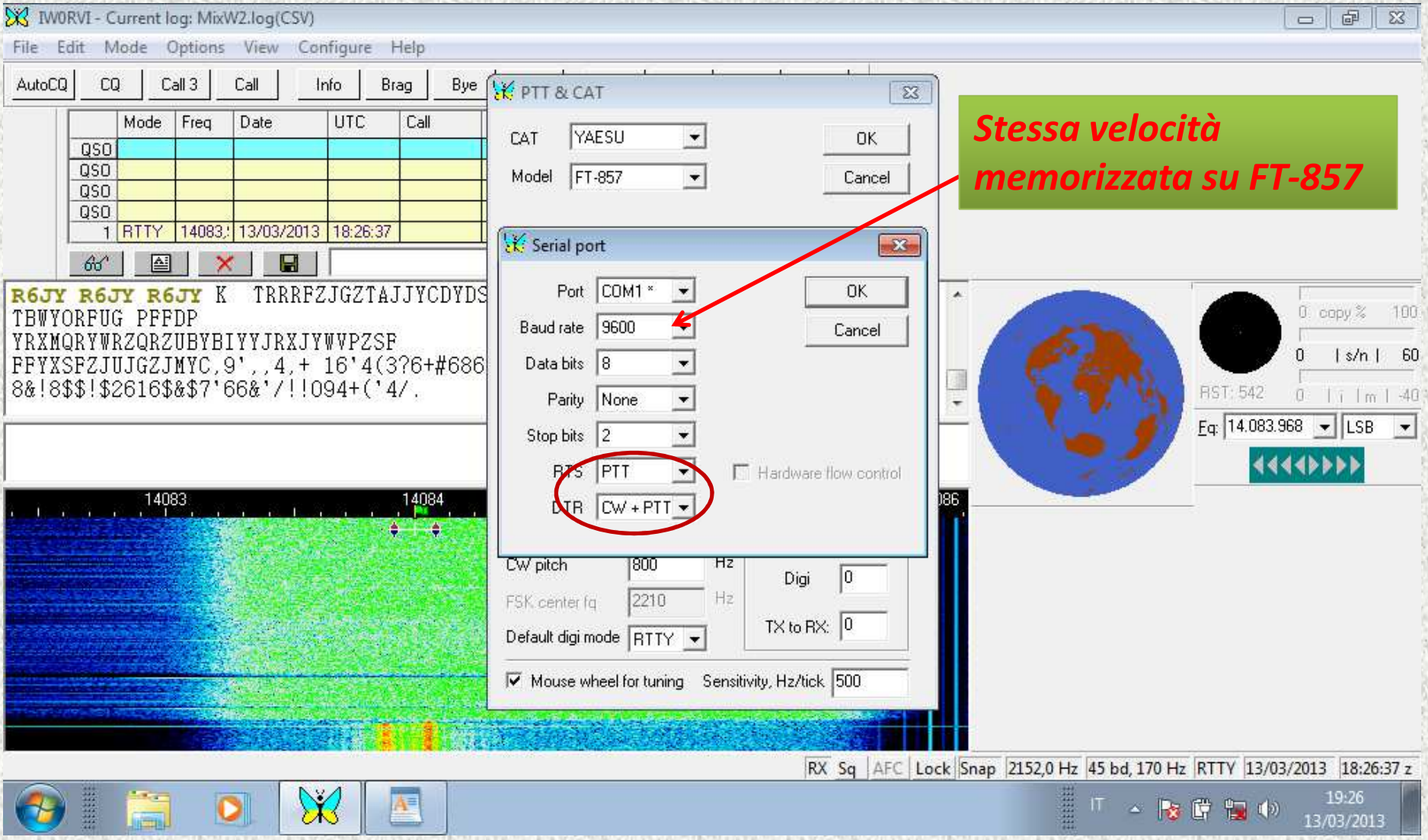
Configurazione MixW con FT-857D e interface DXD



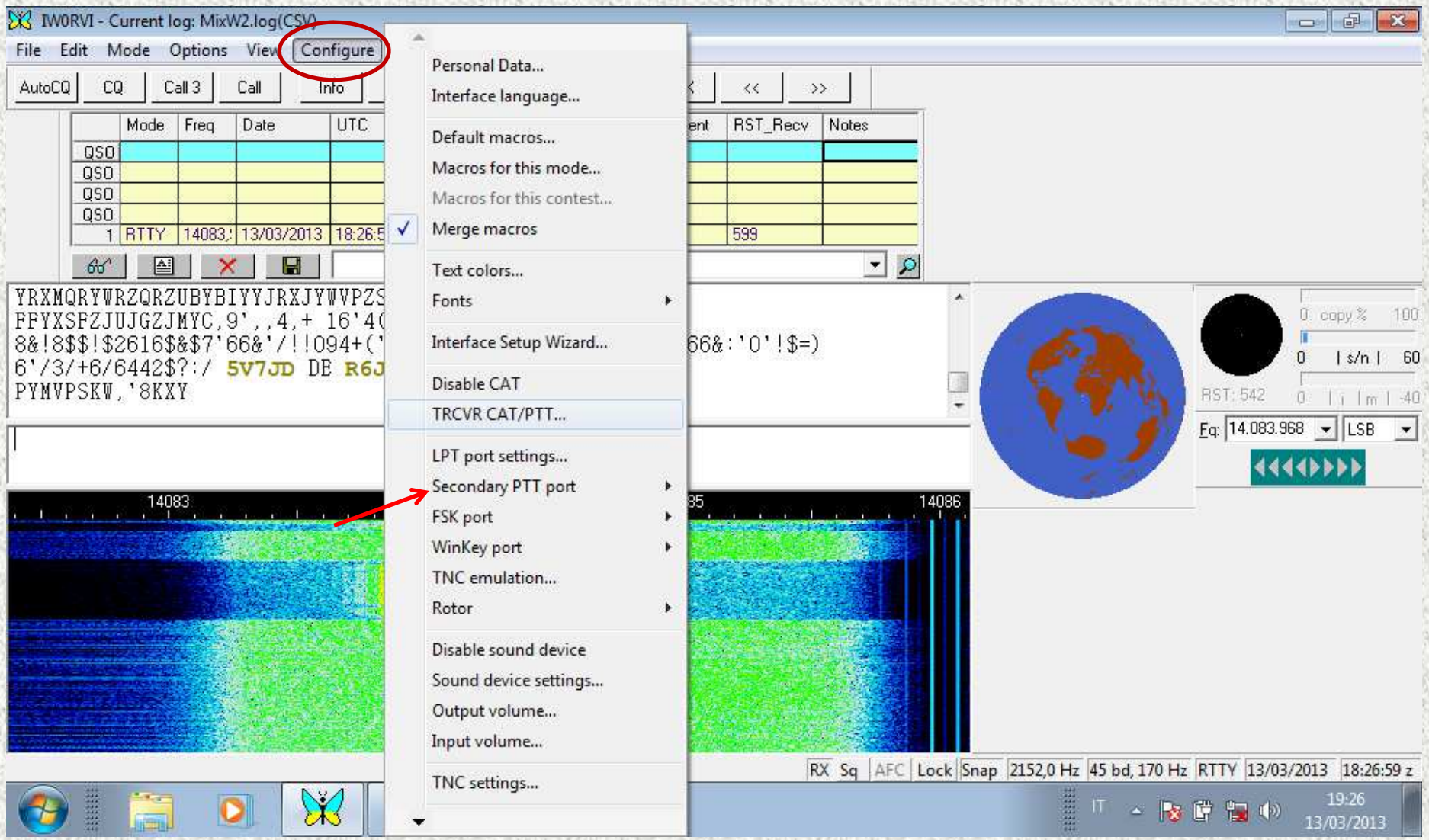
Configurazione MixW con FT-857D e interface DXD



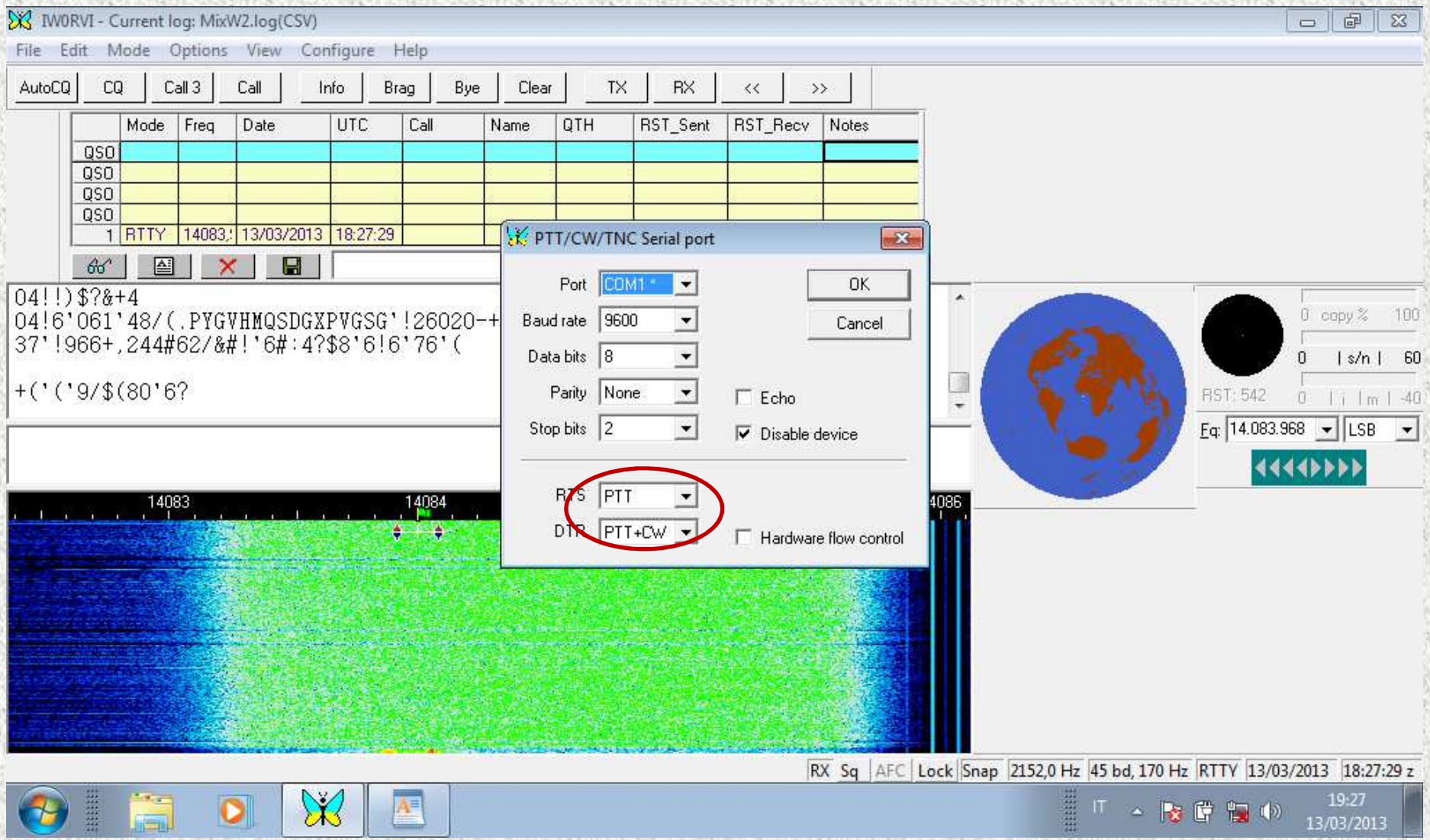
Configurazione MixW con FT-857D e interface DXD



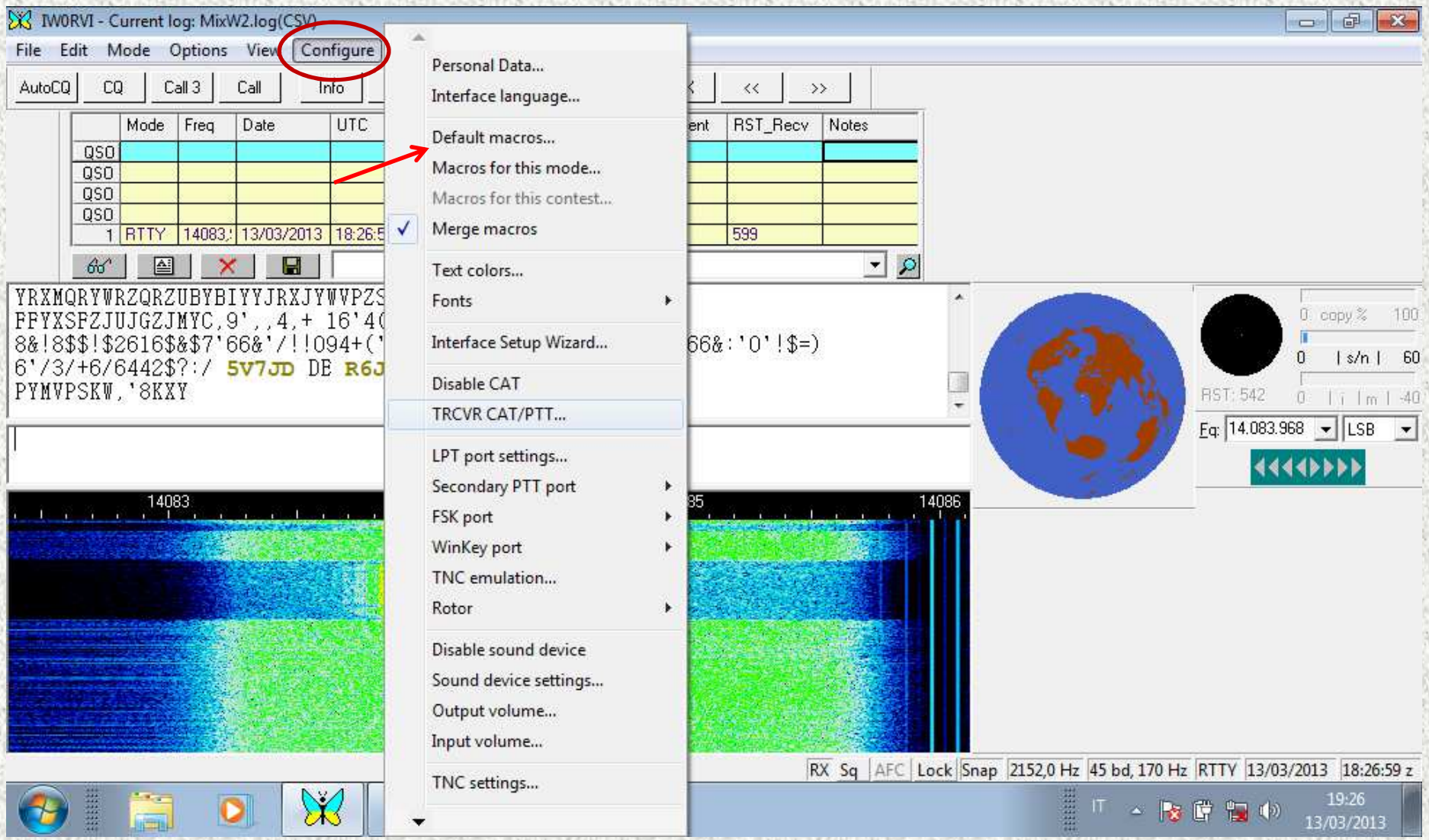
Configurazione MixW con FT-857D e interface DXD



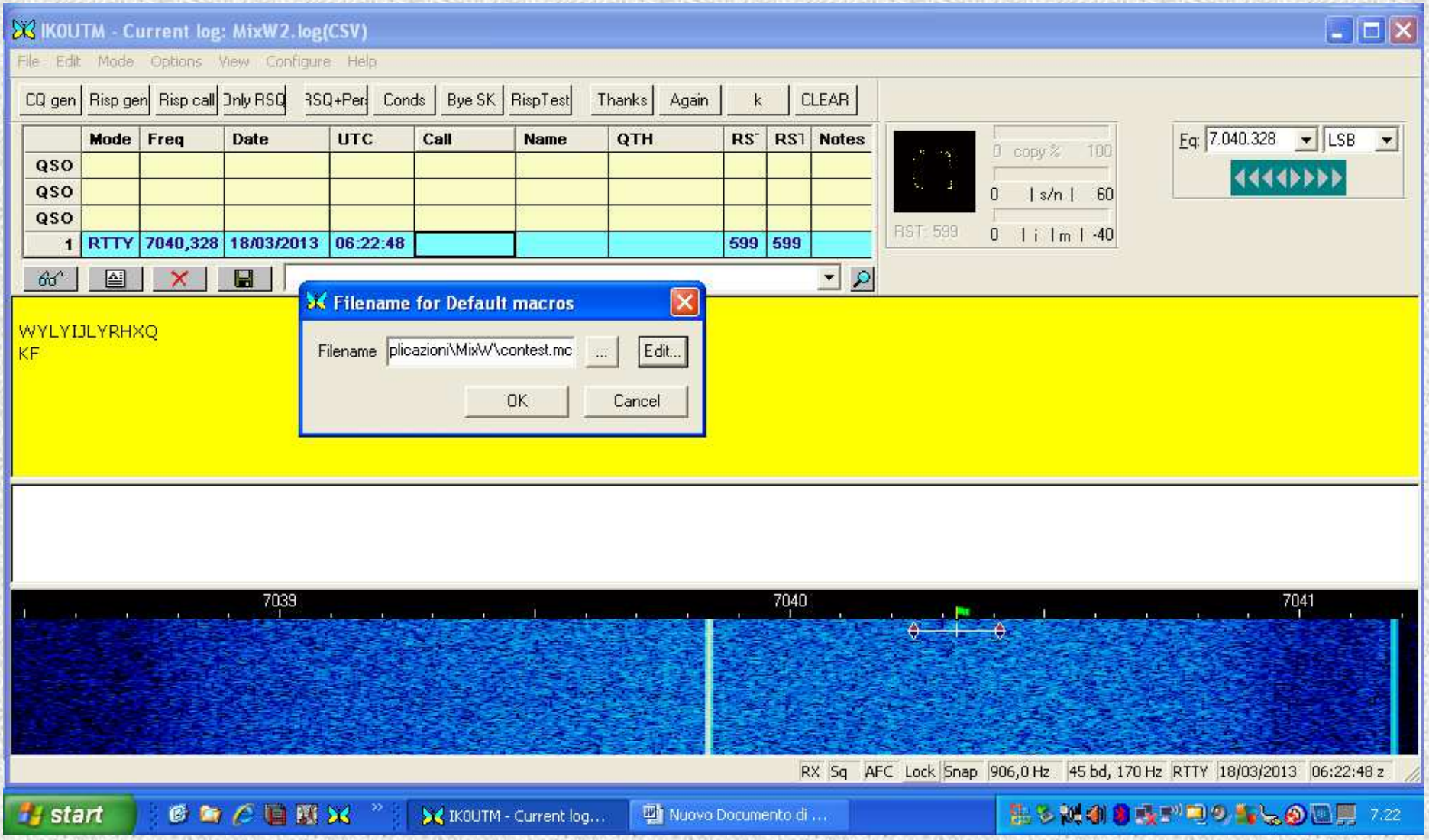
Configurazione MixW con FT-857D e interface DXD



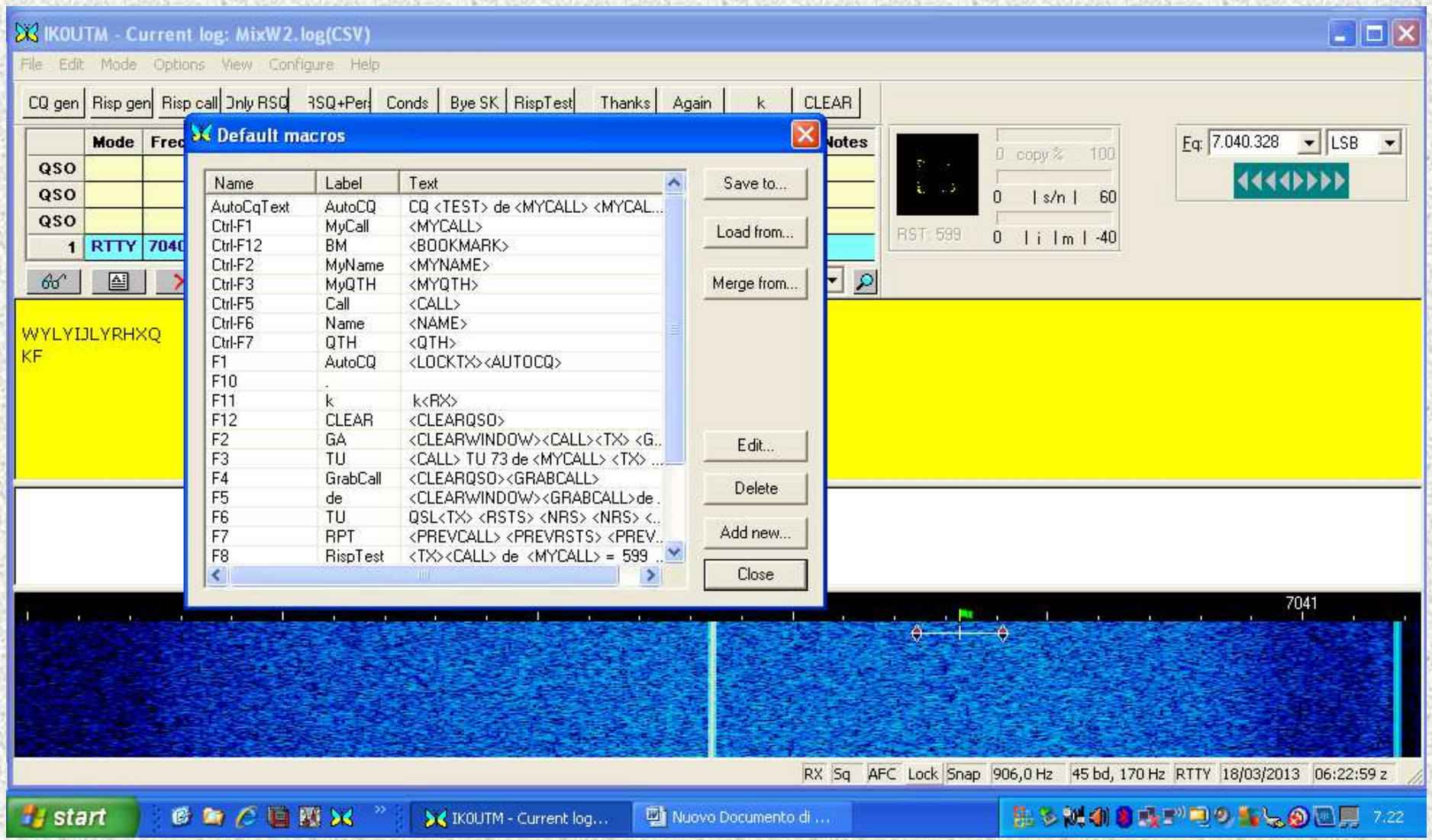
Configurazione MixW con FT-857D e interface DXD



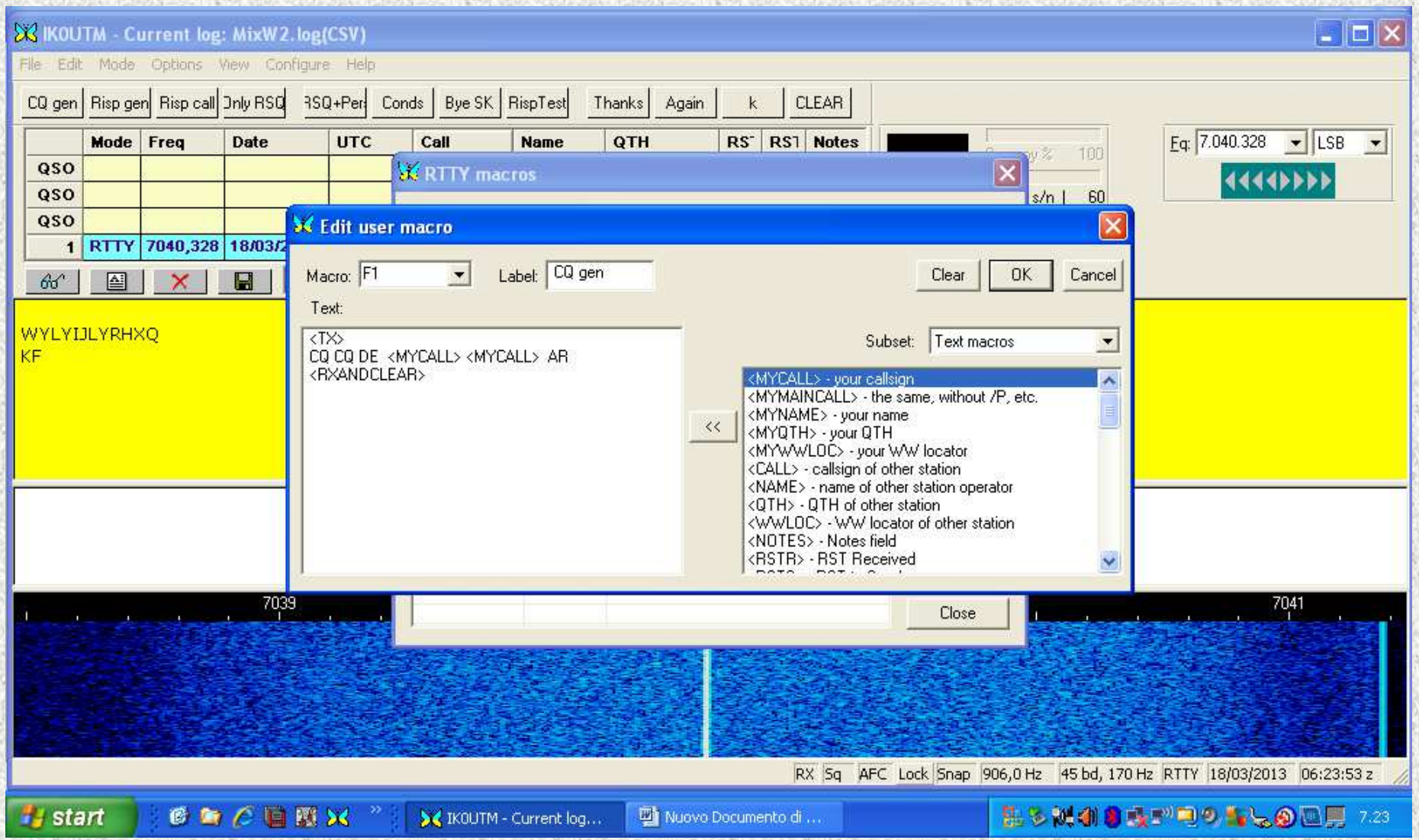
Configurazione MixW con FT-857D e interface DXD



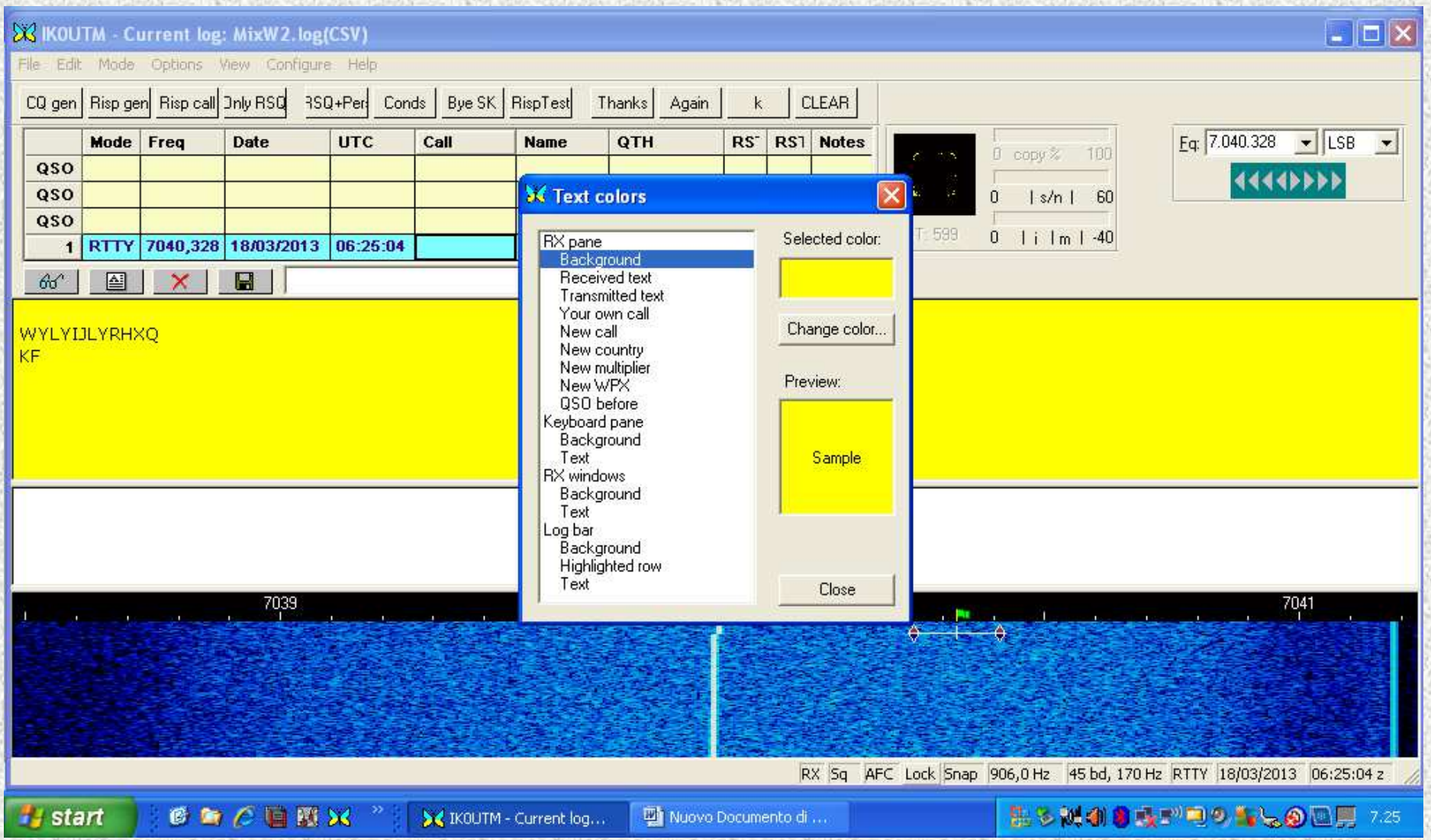
Configurazione MixW con FT-857D e interface DXD



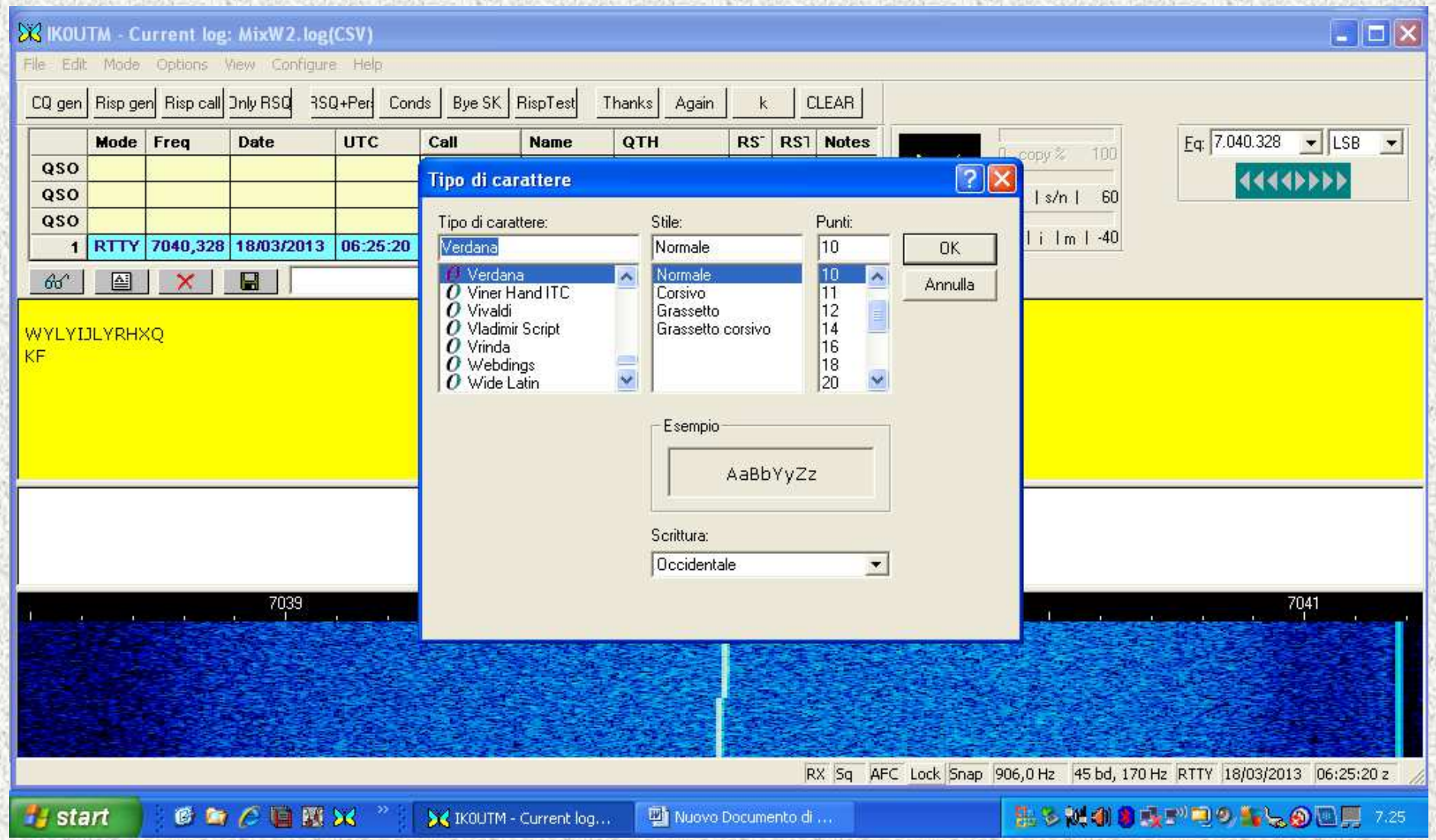
Configurazione MixW con FT-857D e interface DXD



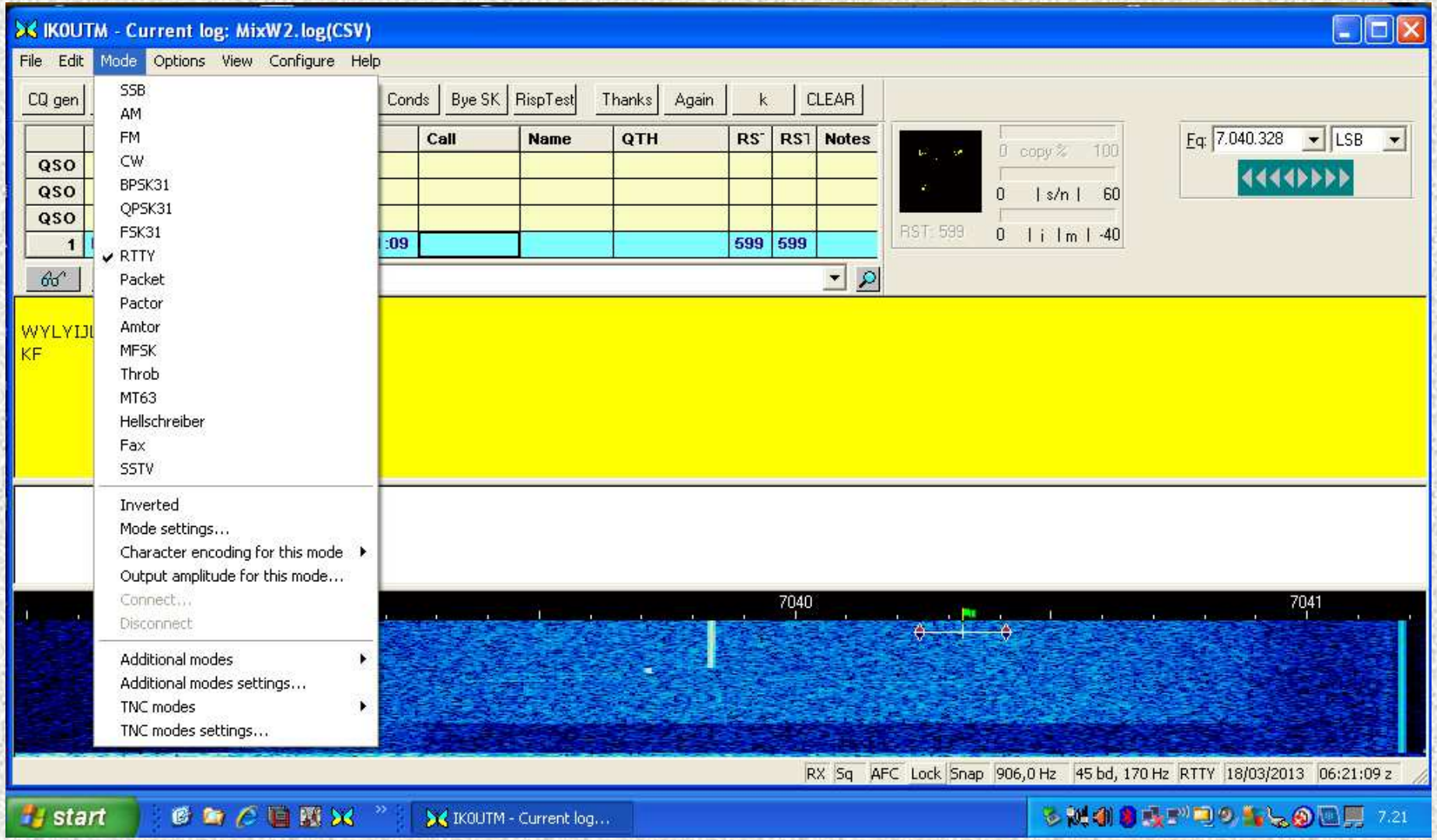
Configurazione MixW con FT-857D e interface DXD



Configurazione MixW con FT-857D e interface DXD



Configurazione MixW con FT-857D e interface DXD



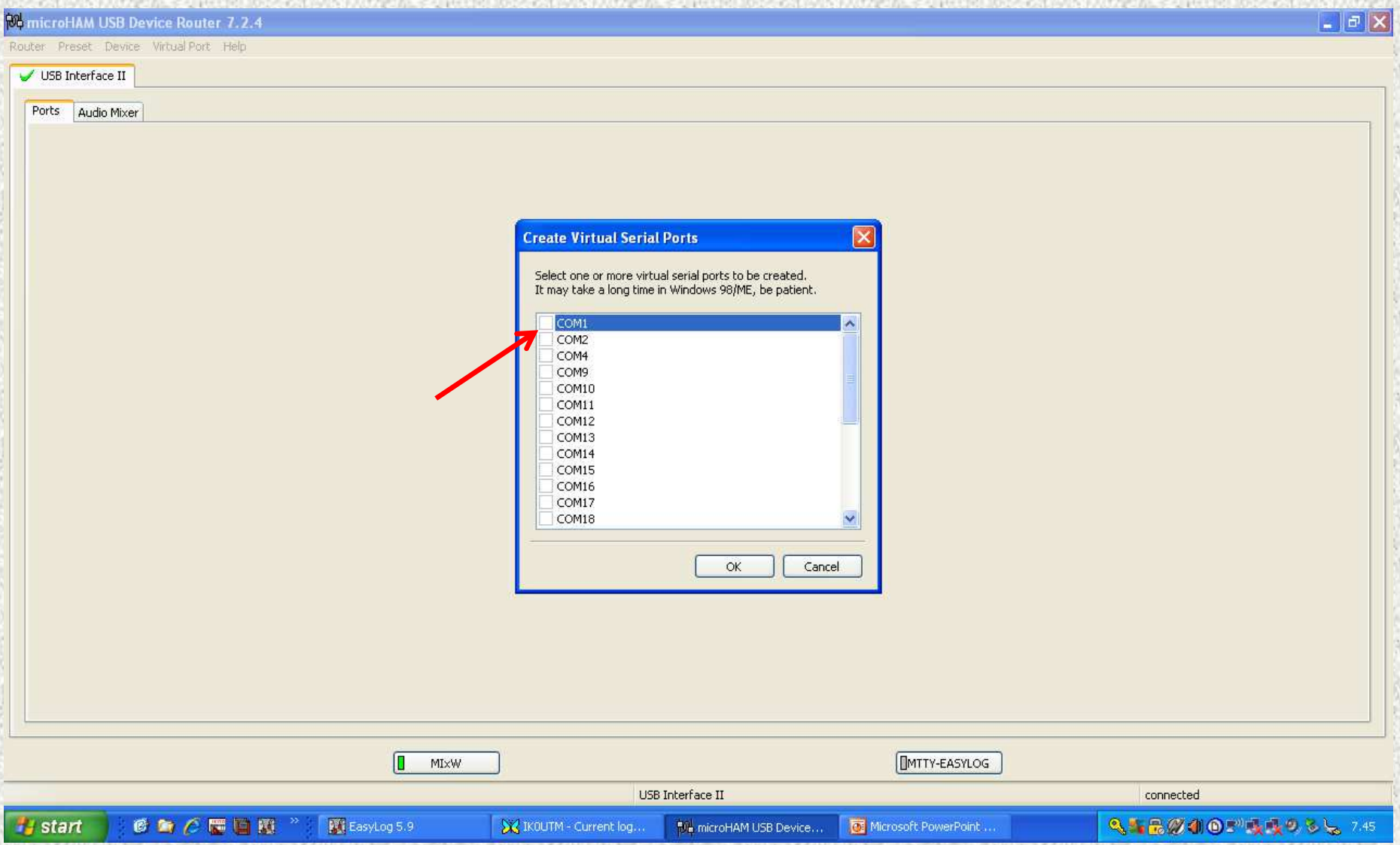
Configurazione MixW con FT-857D e interface DXD

Microham USB Interface II

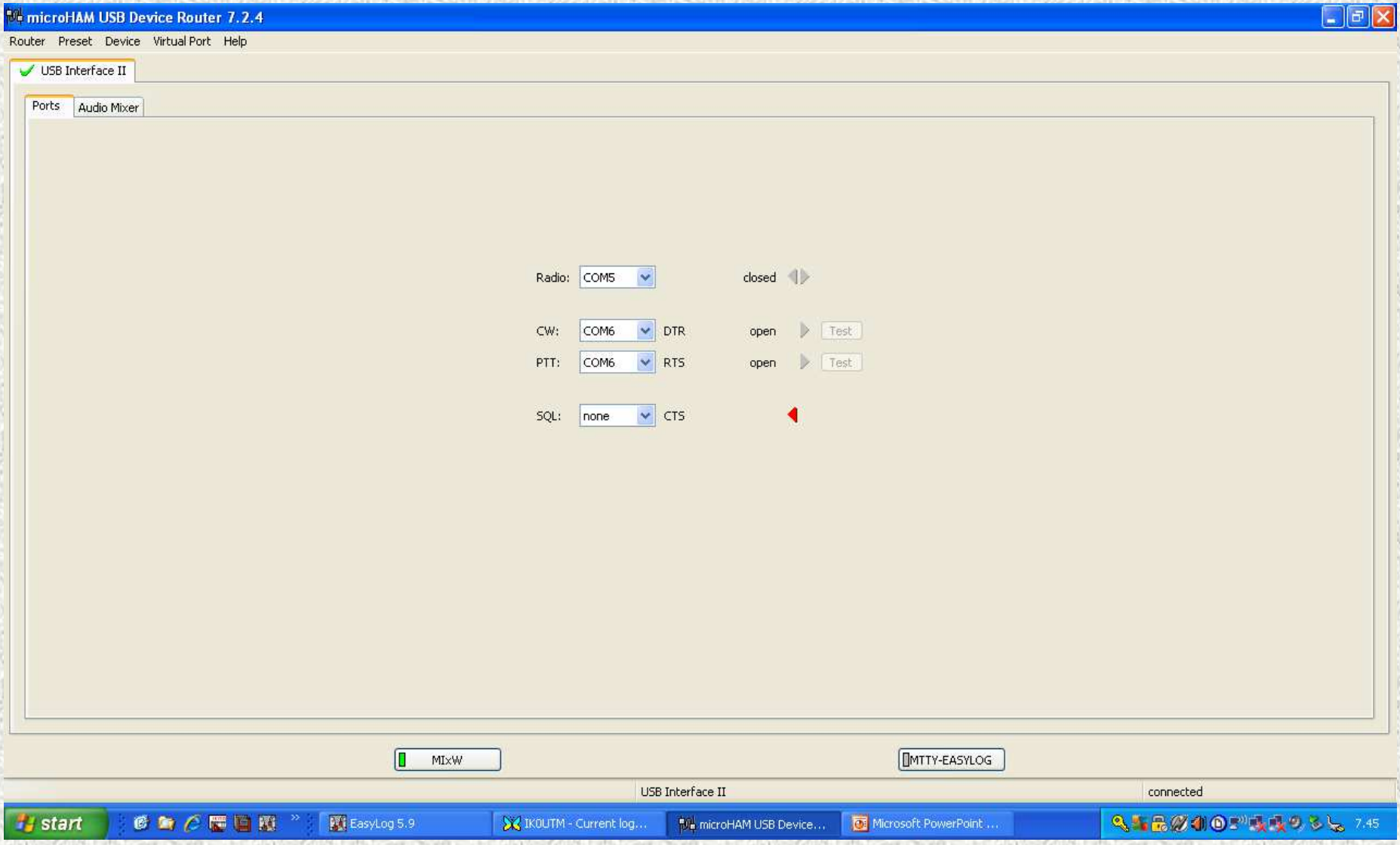
Impostare la 'ponticellatura' a seconda del modello di RTX che verrà collegato

(FUNZIONAMENTO DEL CAT)

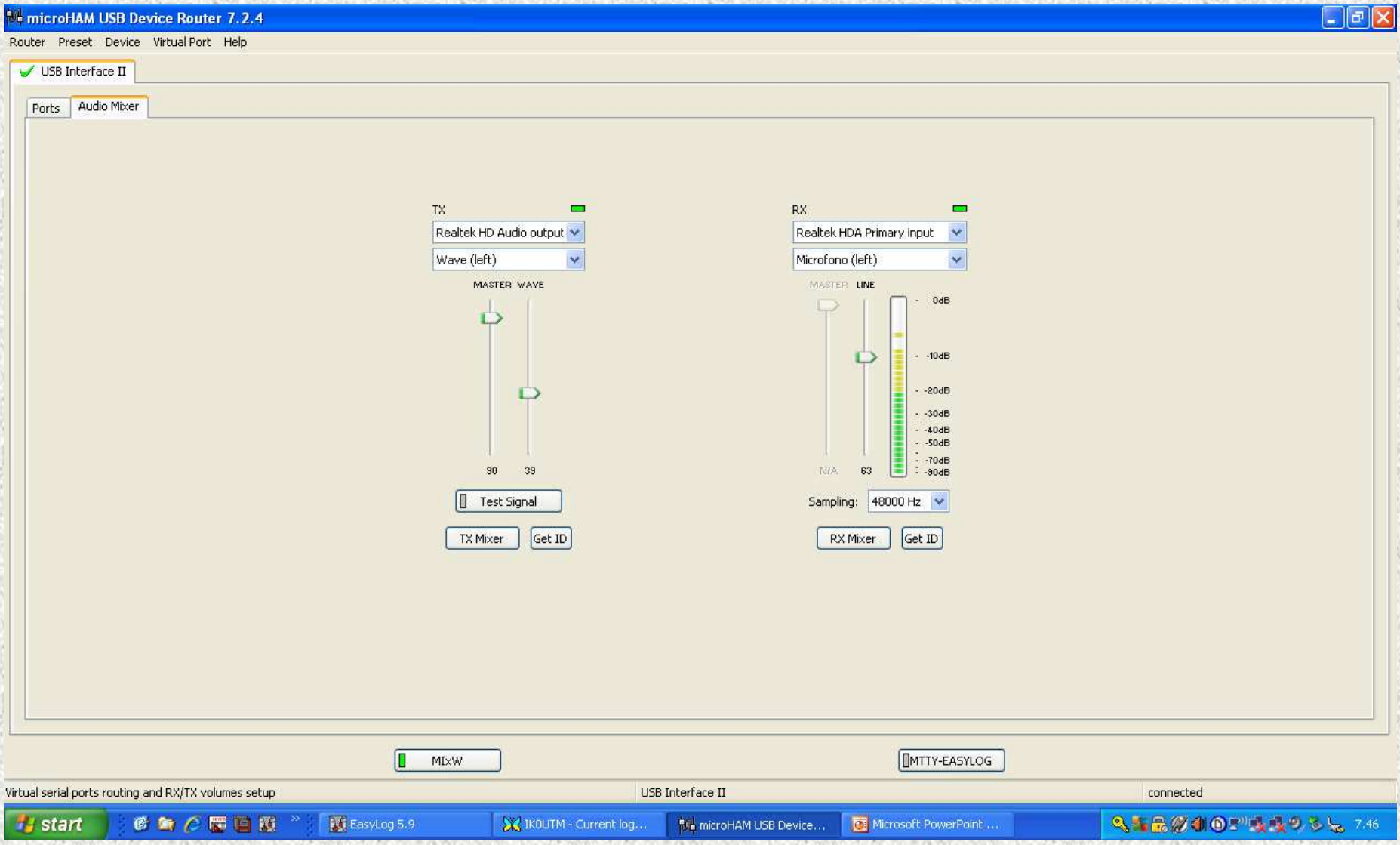
Microham USB Interface II - configurazione



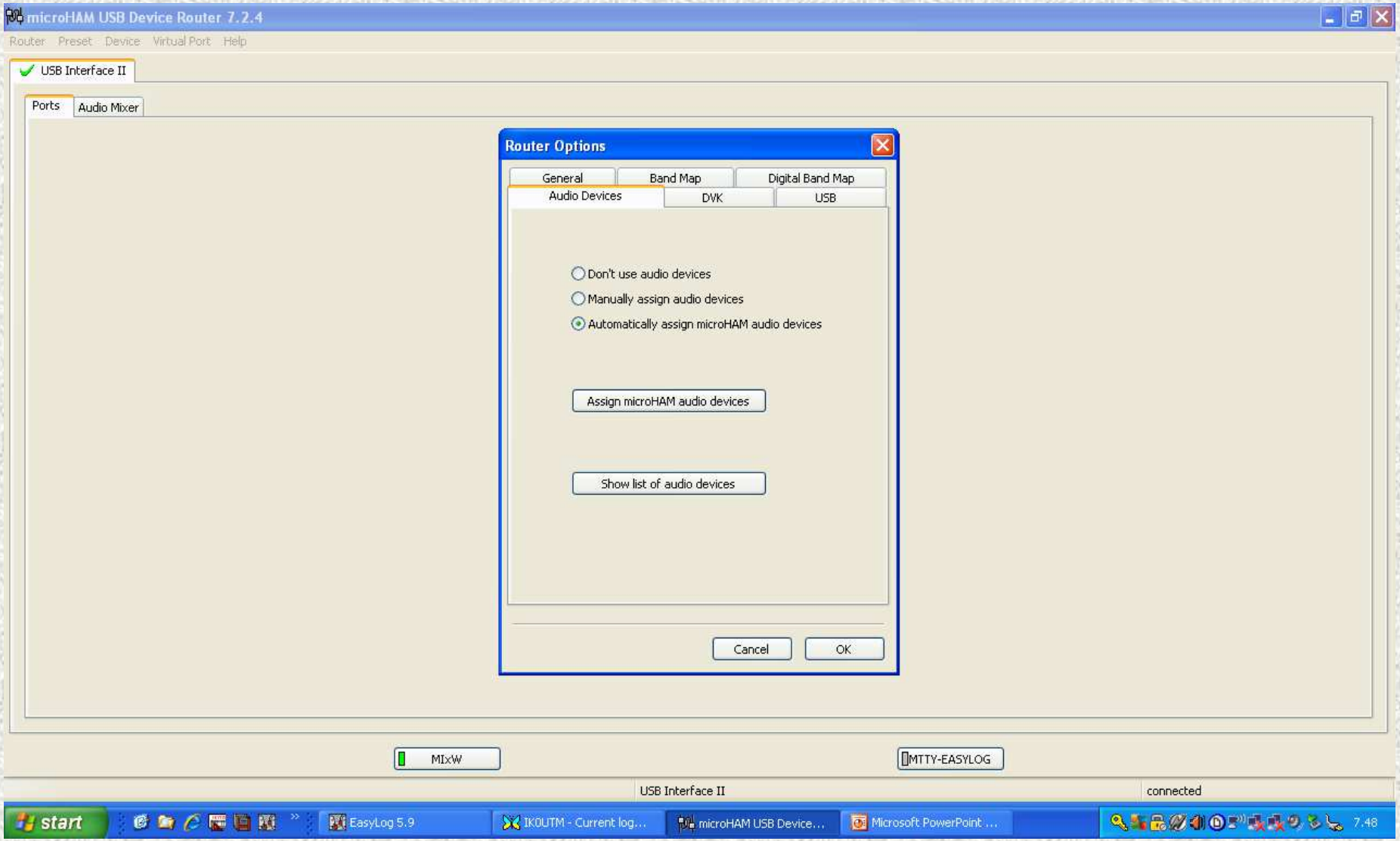
Microham USB Interface II - configurazione



Microham USB Interface II - configurazione



Microham USB Interface II - configurazione

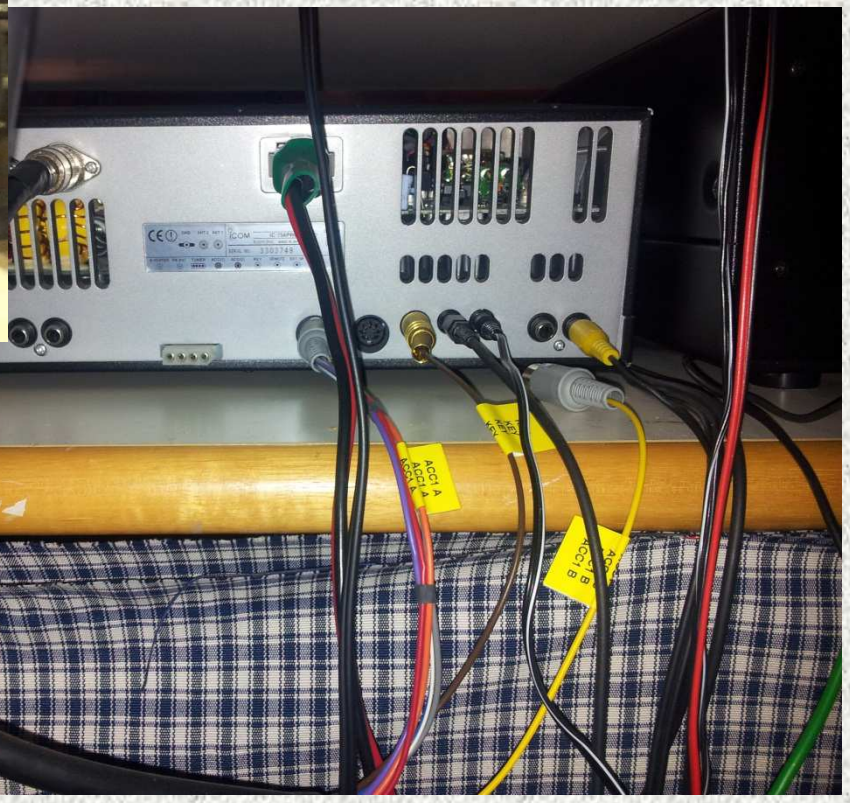


Microham USB Interface II - configurazione

ICOM IC-756 PRO III e Microham USB II

Azzerare il guadagno microfonico

Azzerare il compressore audio



FSK o AFSK ?

Frequency Shift Keying

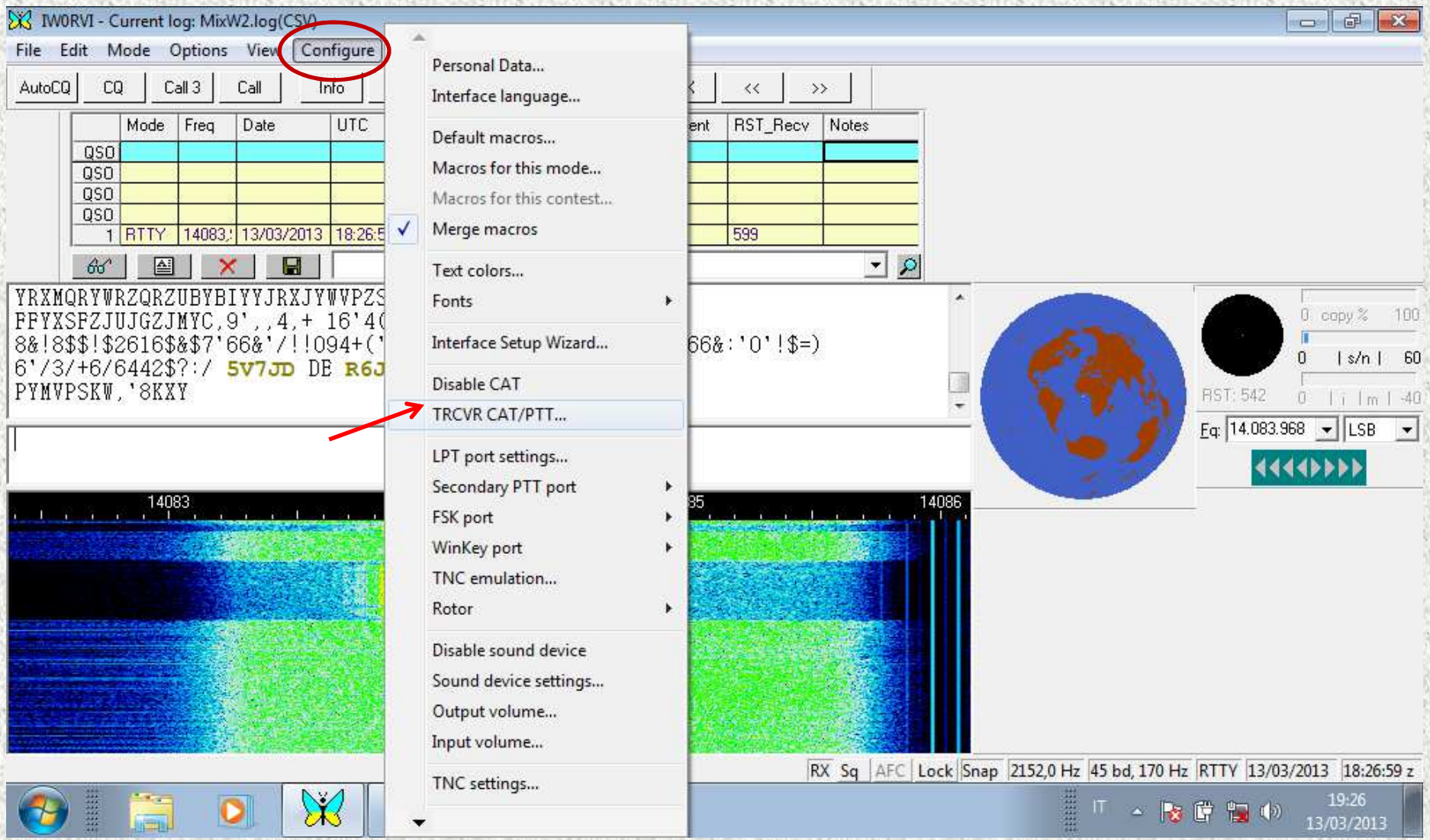
ICOM IC-756 PRO III

FSK

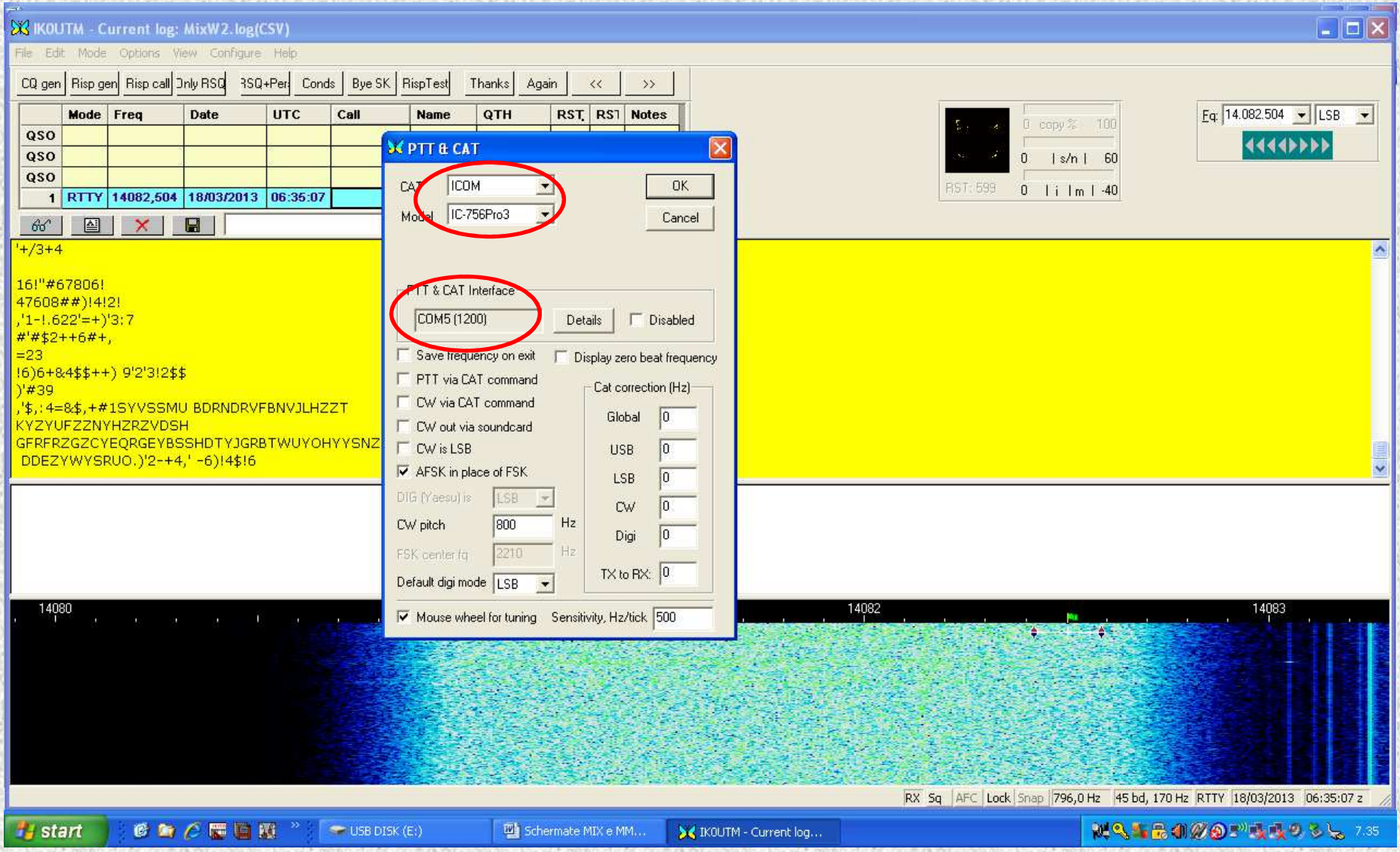
Le frequenze di Mark e di Space in trasmissione sono gestite direttamente dall'RTX (che quindi deve disporre del modo "FSK" o "RTTY") tramite un modulatore interno.

ICOM IC-756 PRO III

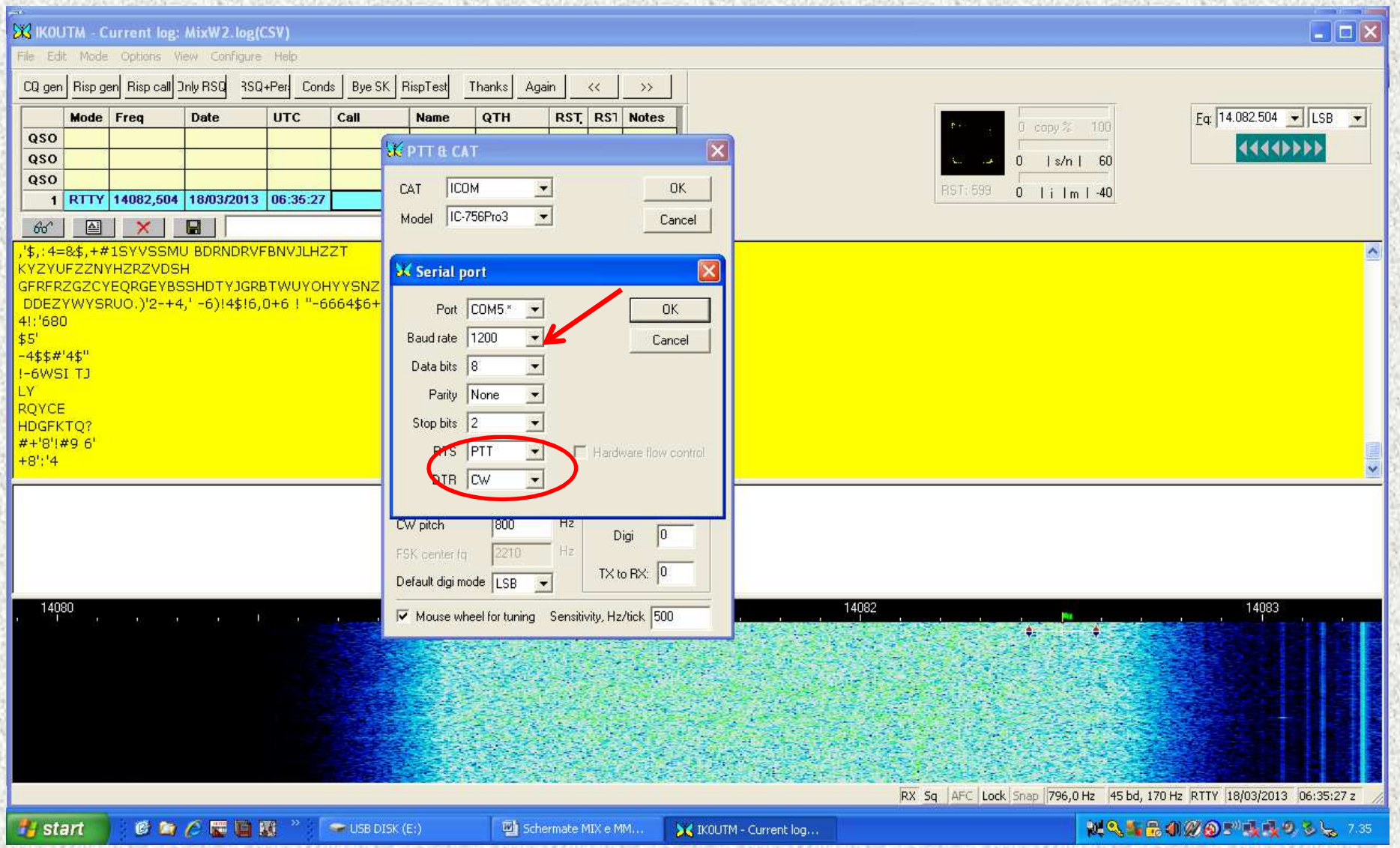
ICOM IC-756 PRO III e Microham USB II



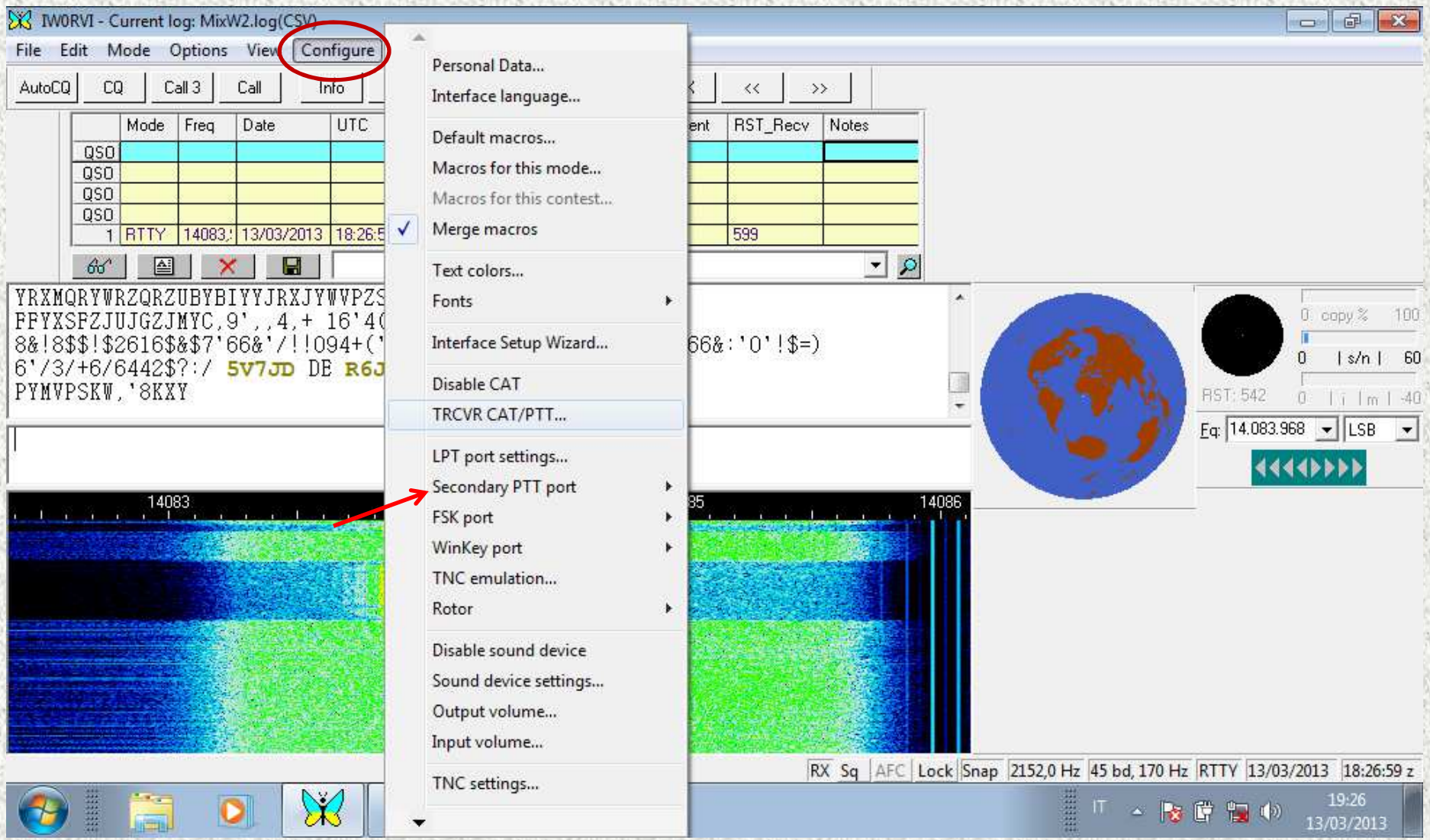
ICOM IC-756 PRO III e Microham USB II



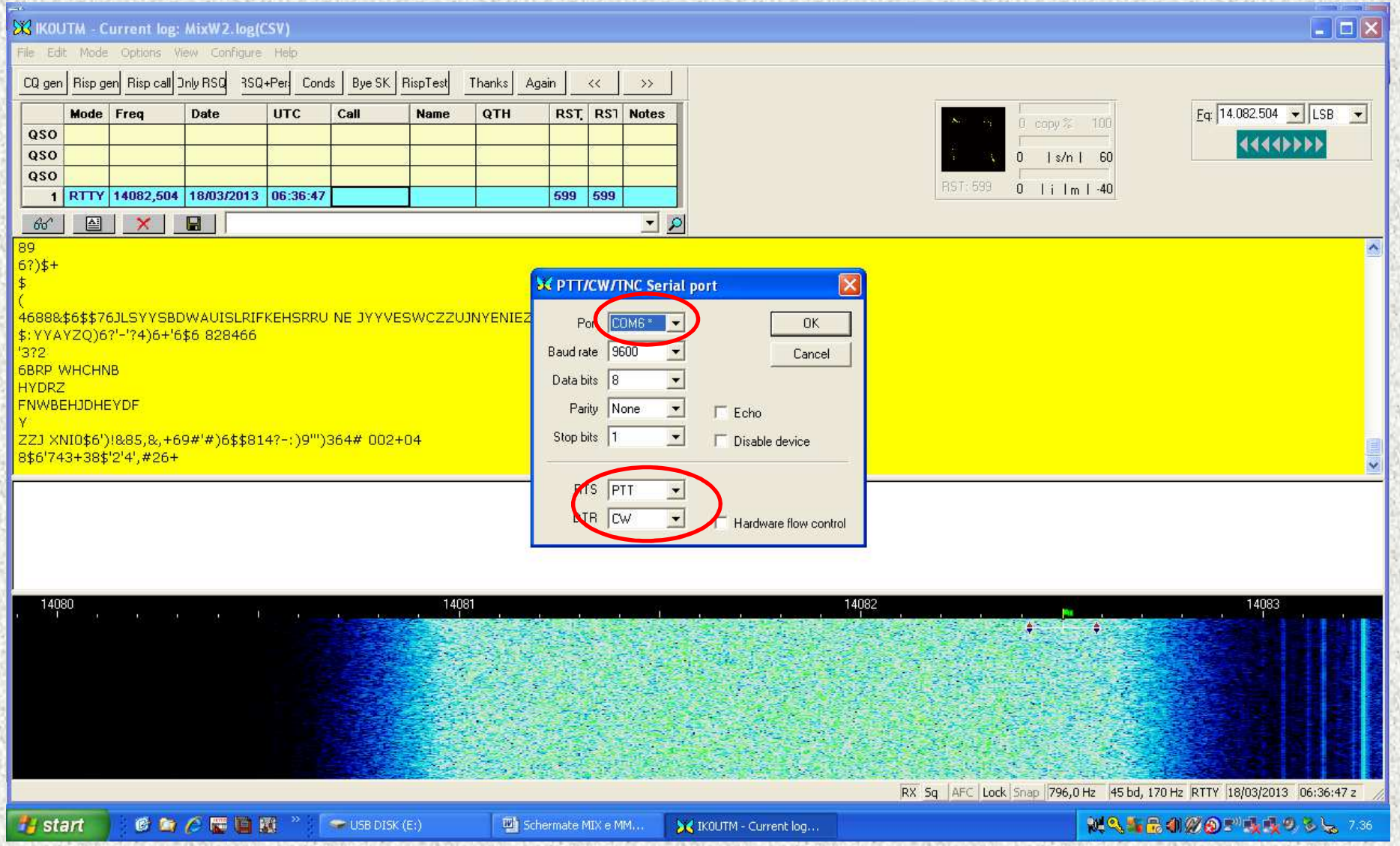
ICOM IC-756 PRO III e Microham USB II



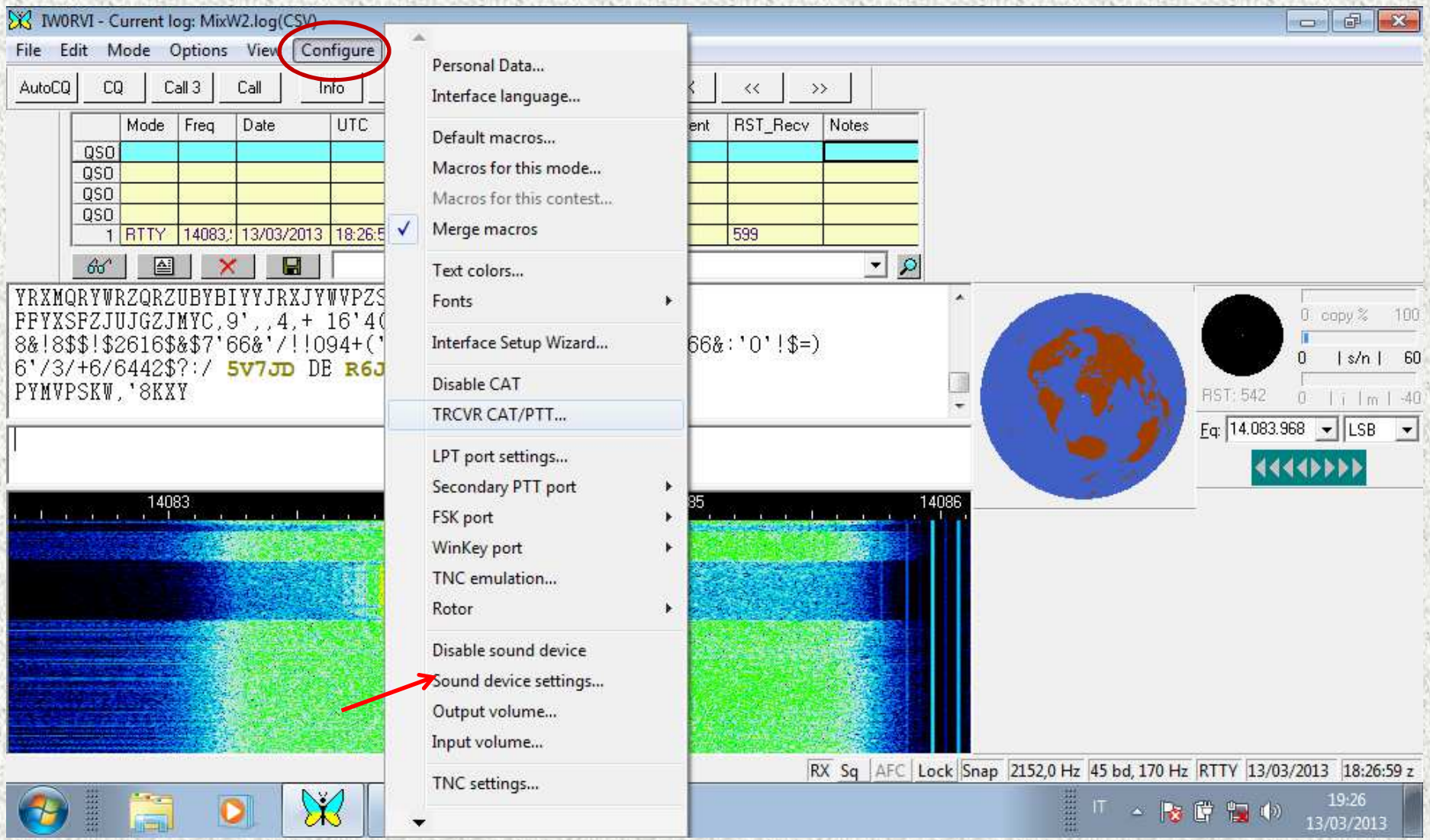
ICOM IC-756 PRO III e Microham USB II



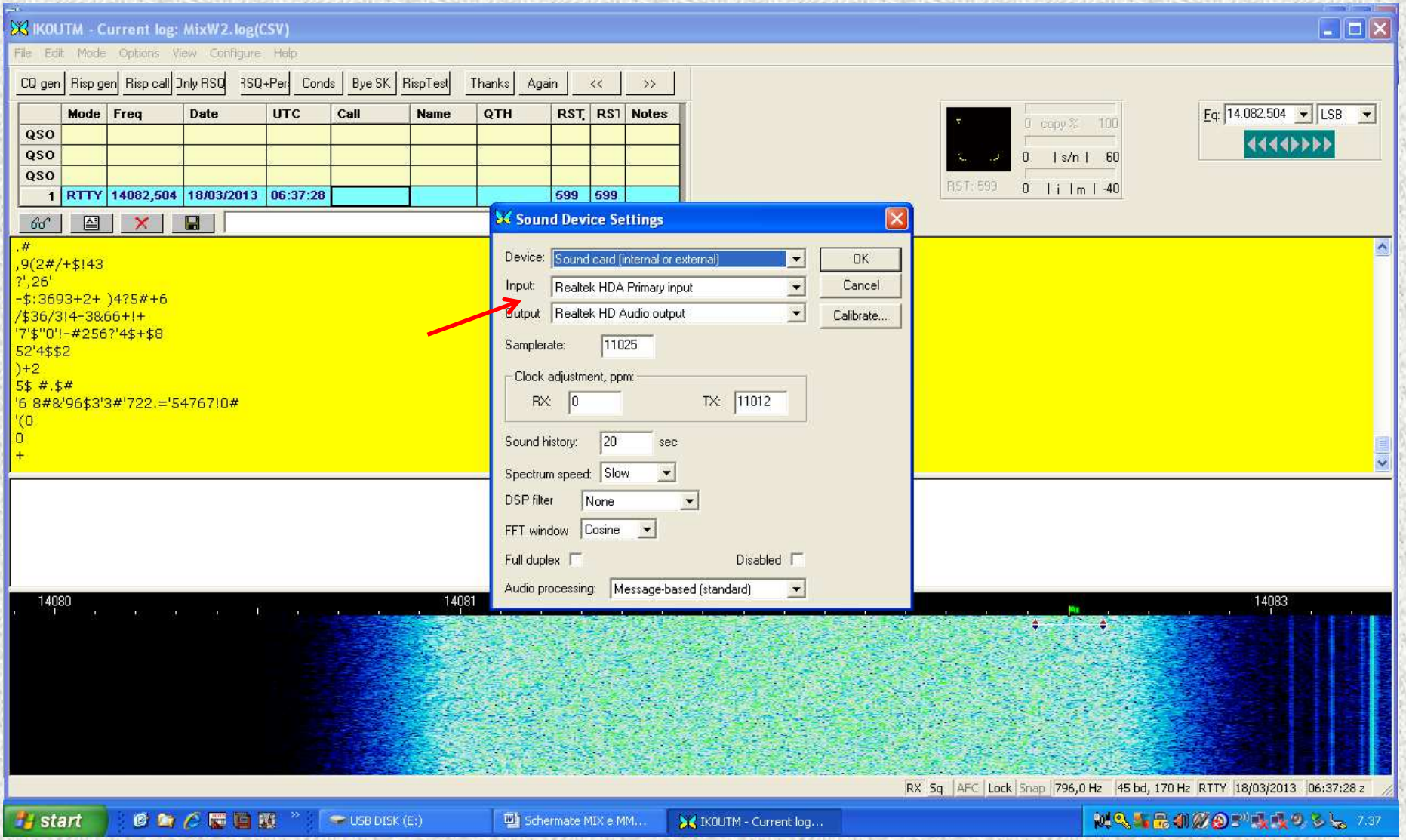
ICOM IC-756 PRO III e Microham USB II



ICOM IC-756 PRO III e Microham USB II



ICOM IC-756 PRO III e Microham USB II

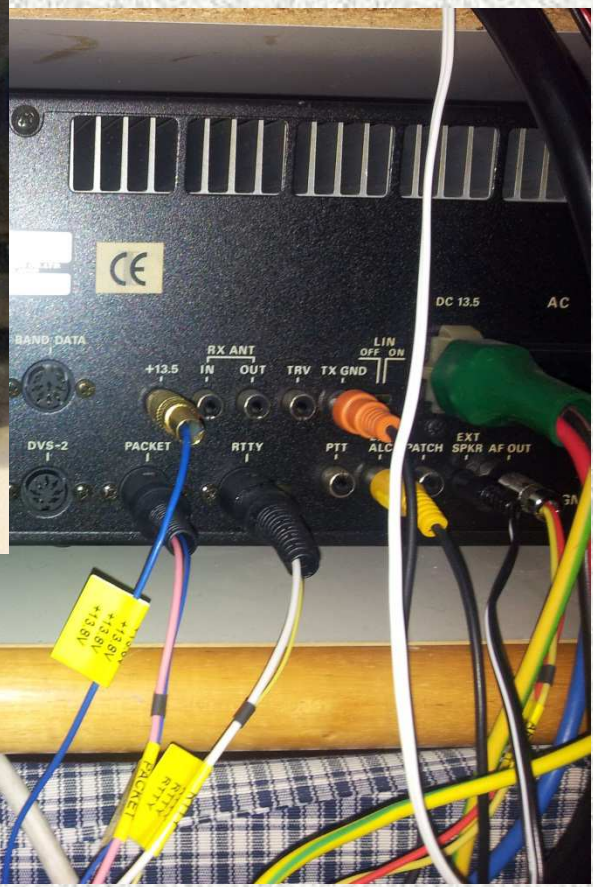


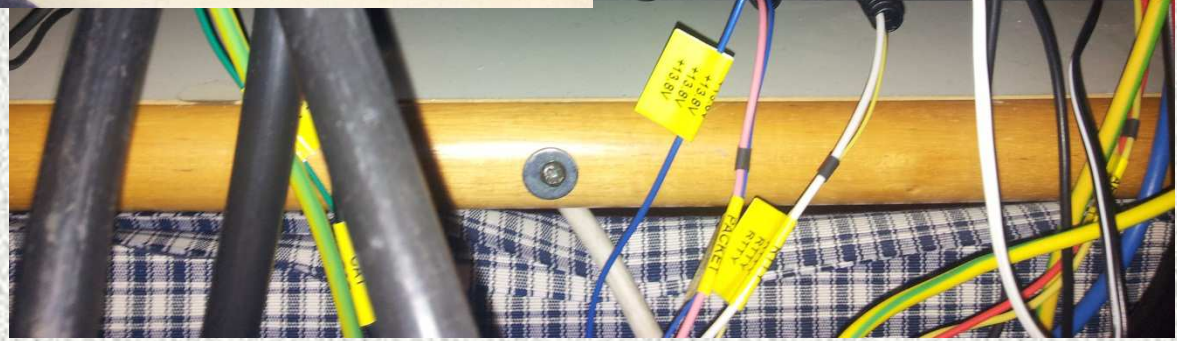
ICOM IC-756 PRO III e Microham USB II

YAESU FT-1000 MP

Azzerare il guadagno microfonico

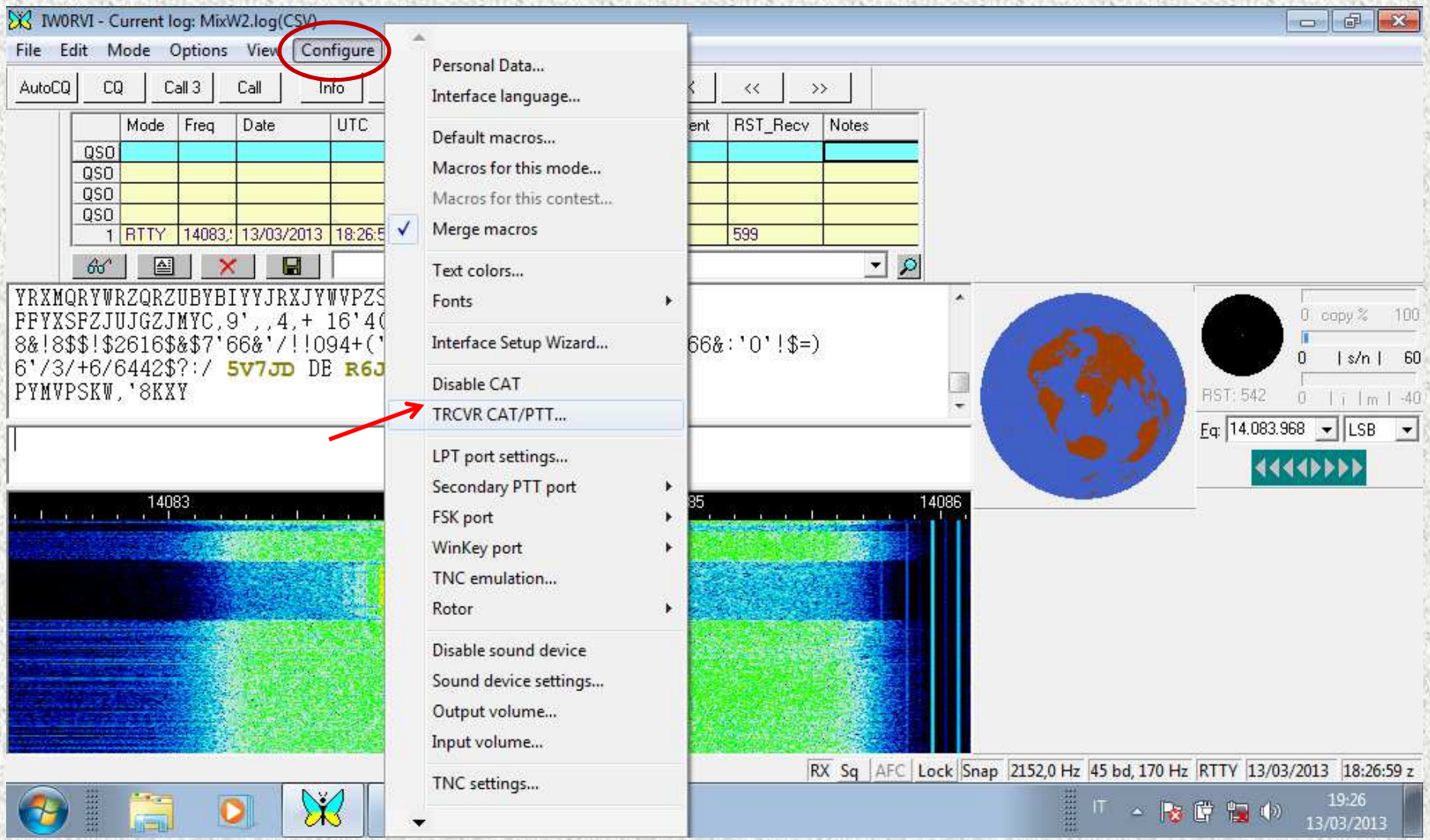
Azzerare il compressore audio



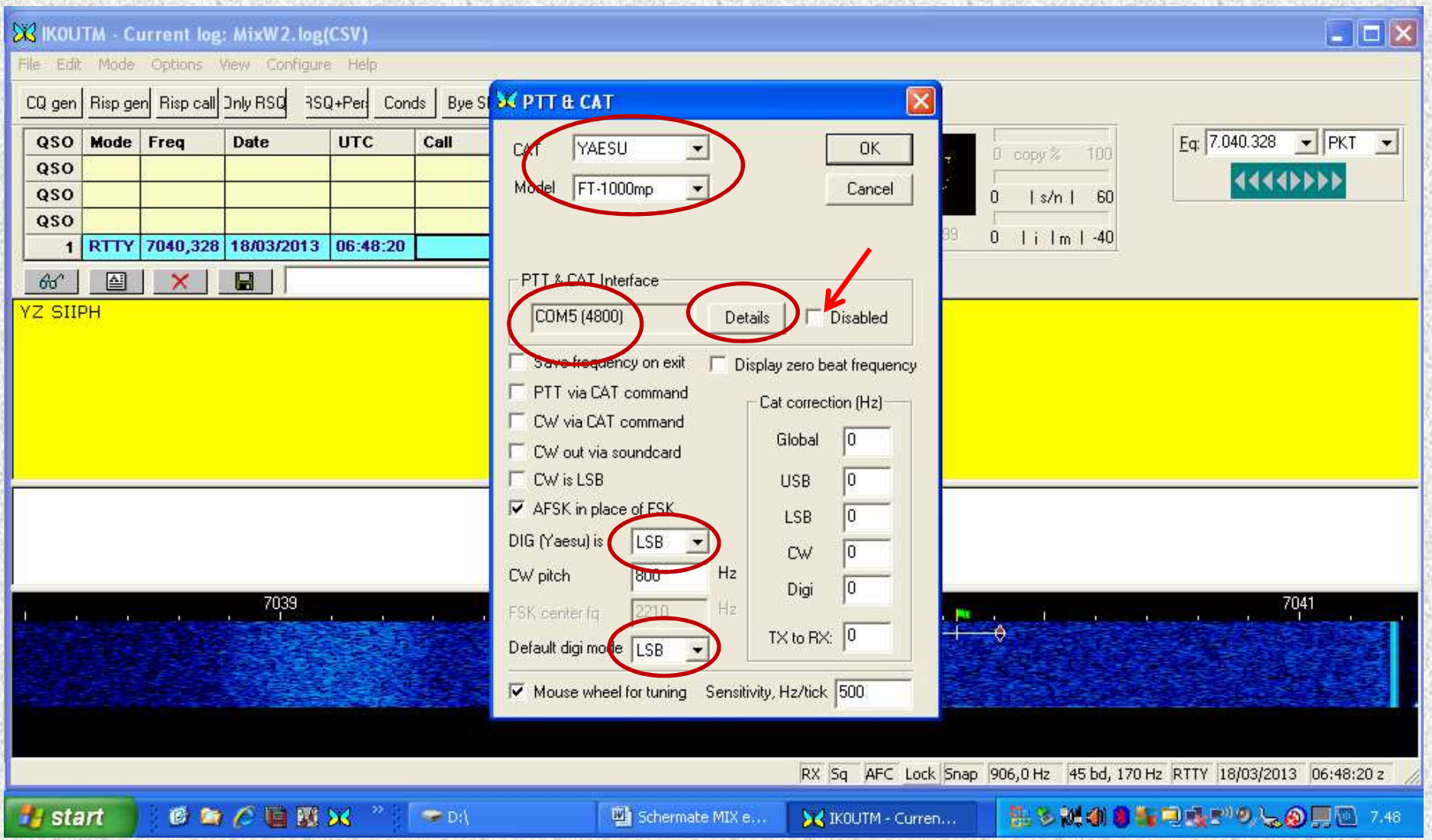


AFSK

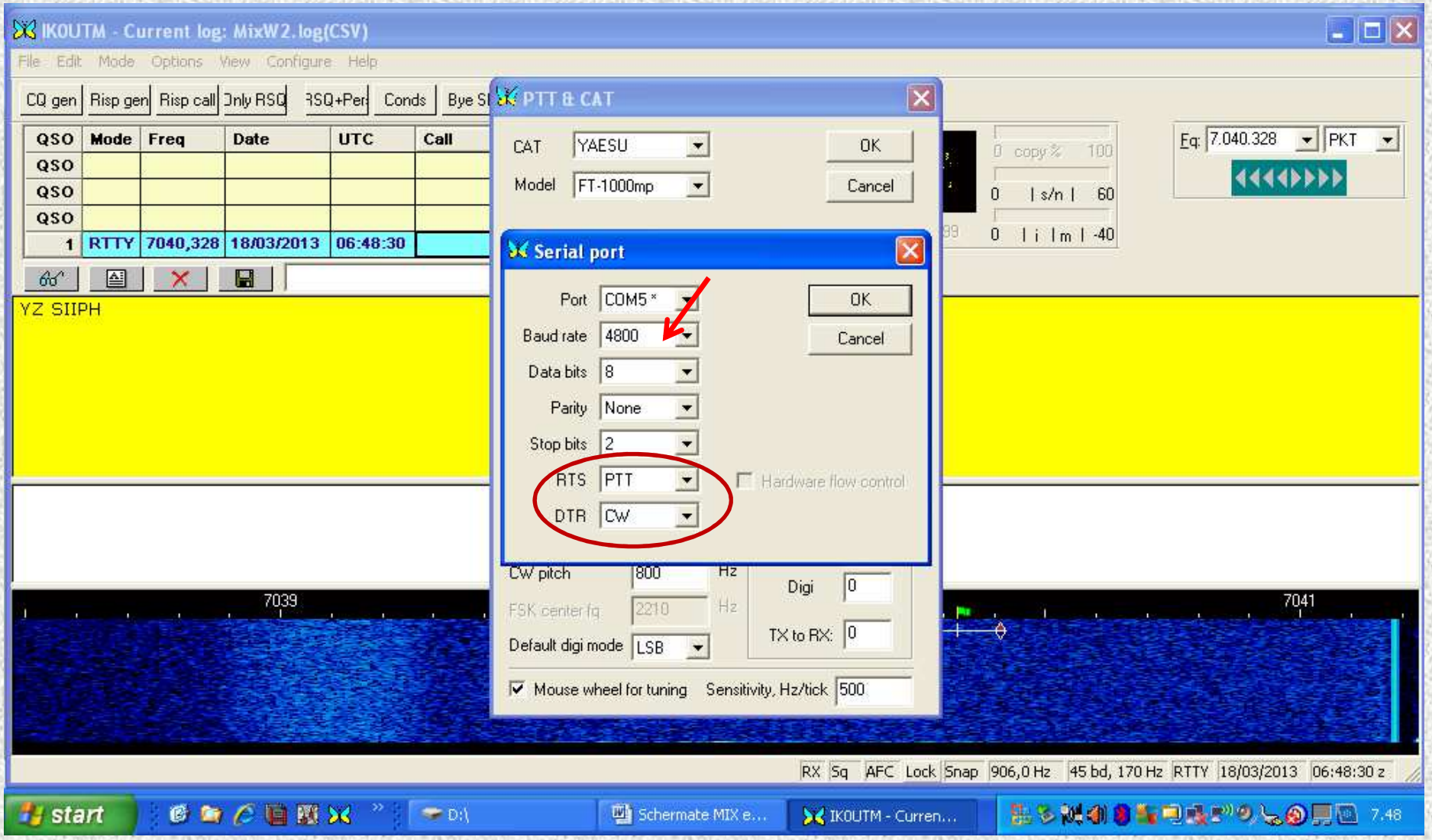
YAESU FT-1000MP e Microham USB II



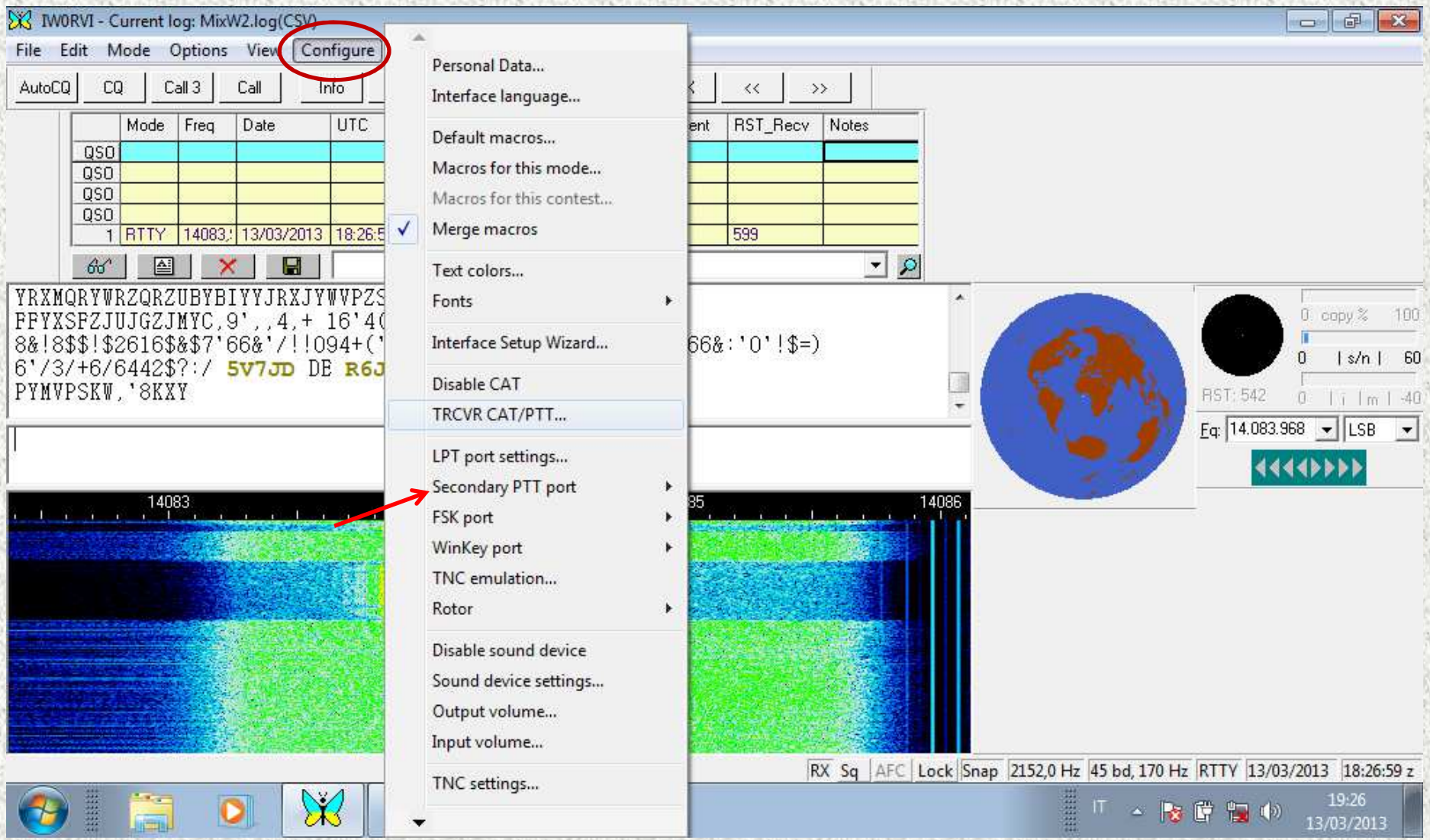
YAESU FT-1000MP e Microham USB II



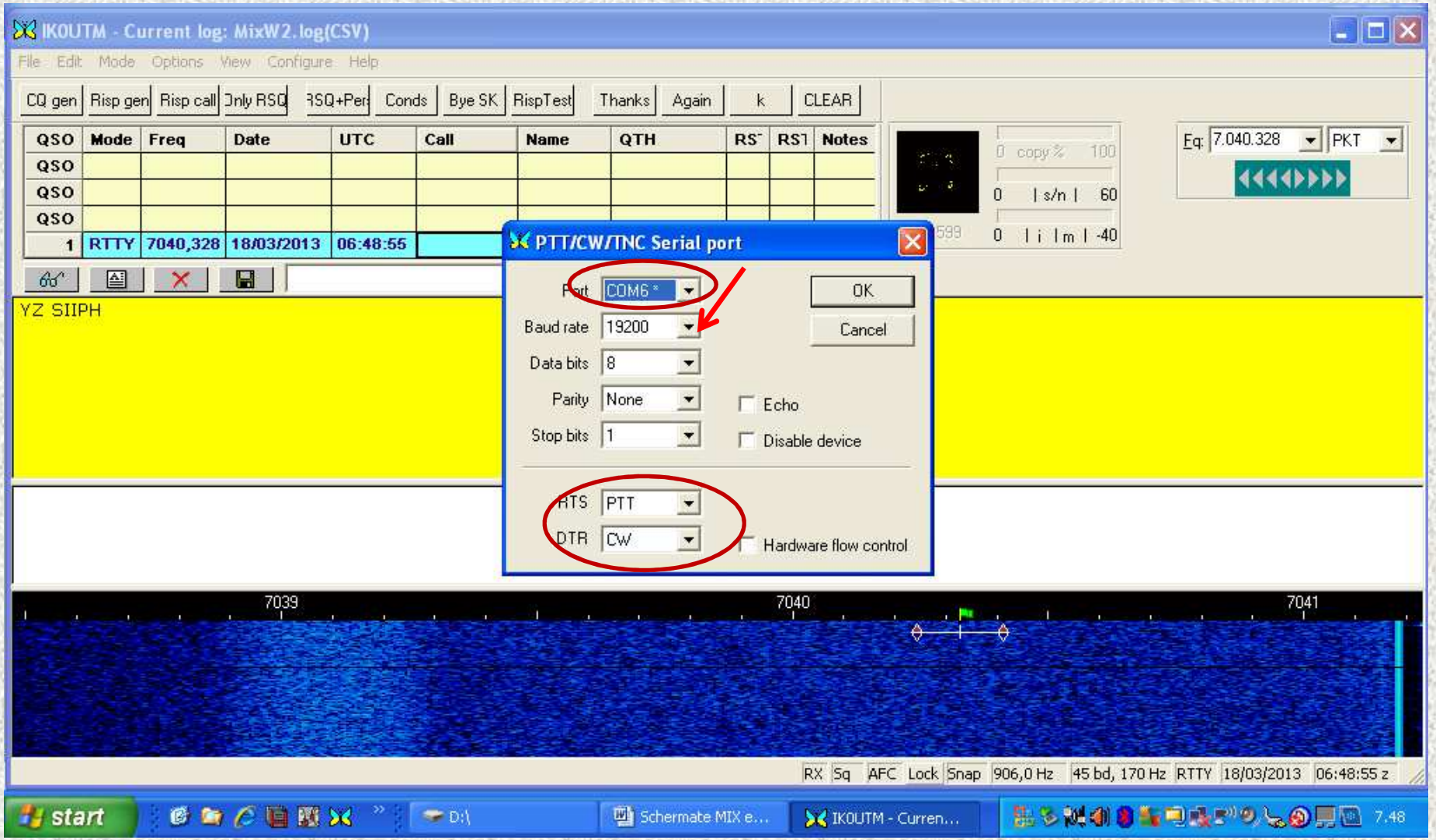
YAESU FT-1000MP e Microham USB II



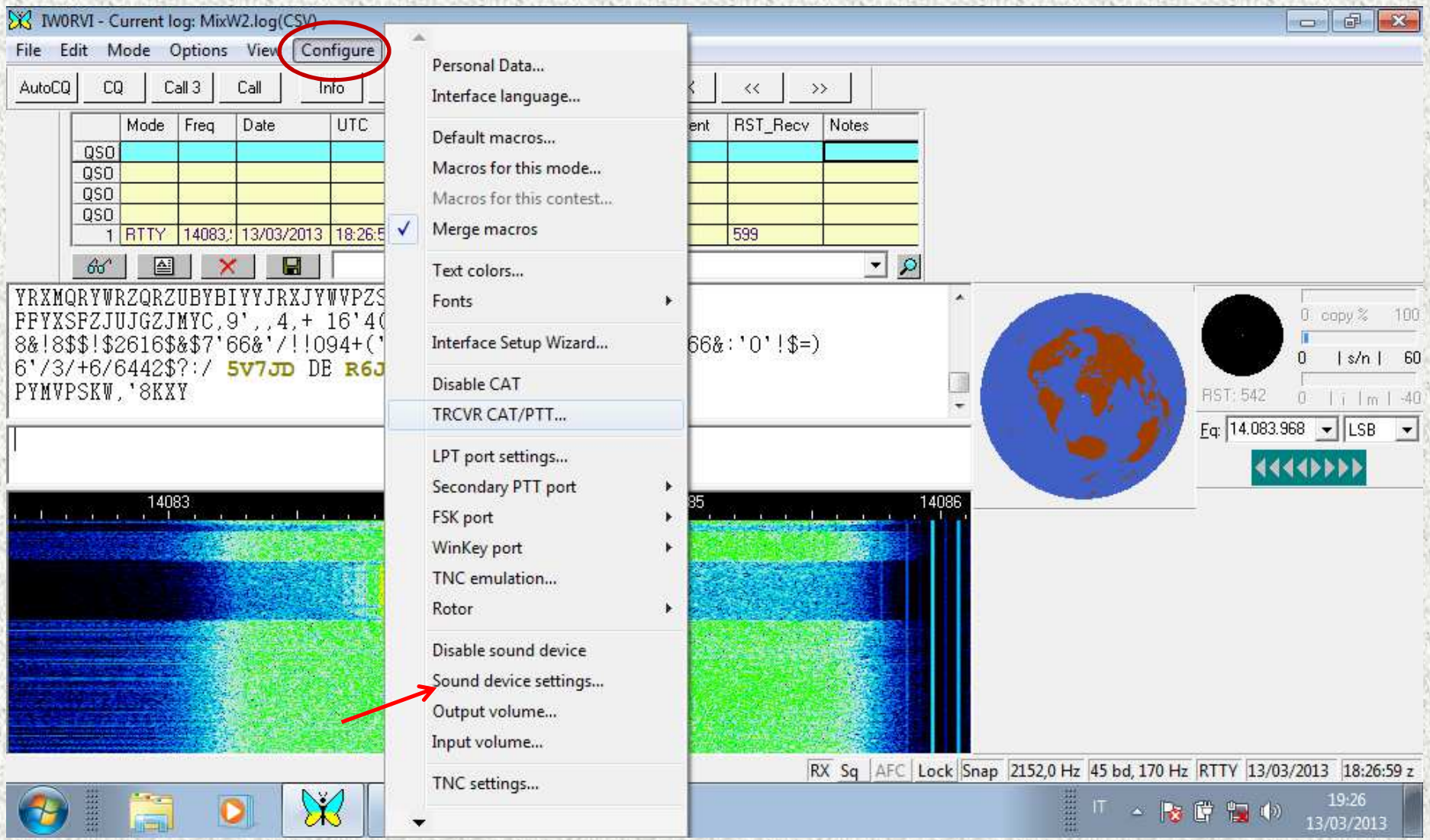
YAESU FT-1000MP e Microham USB II



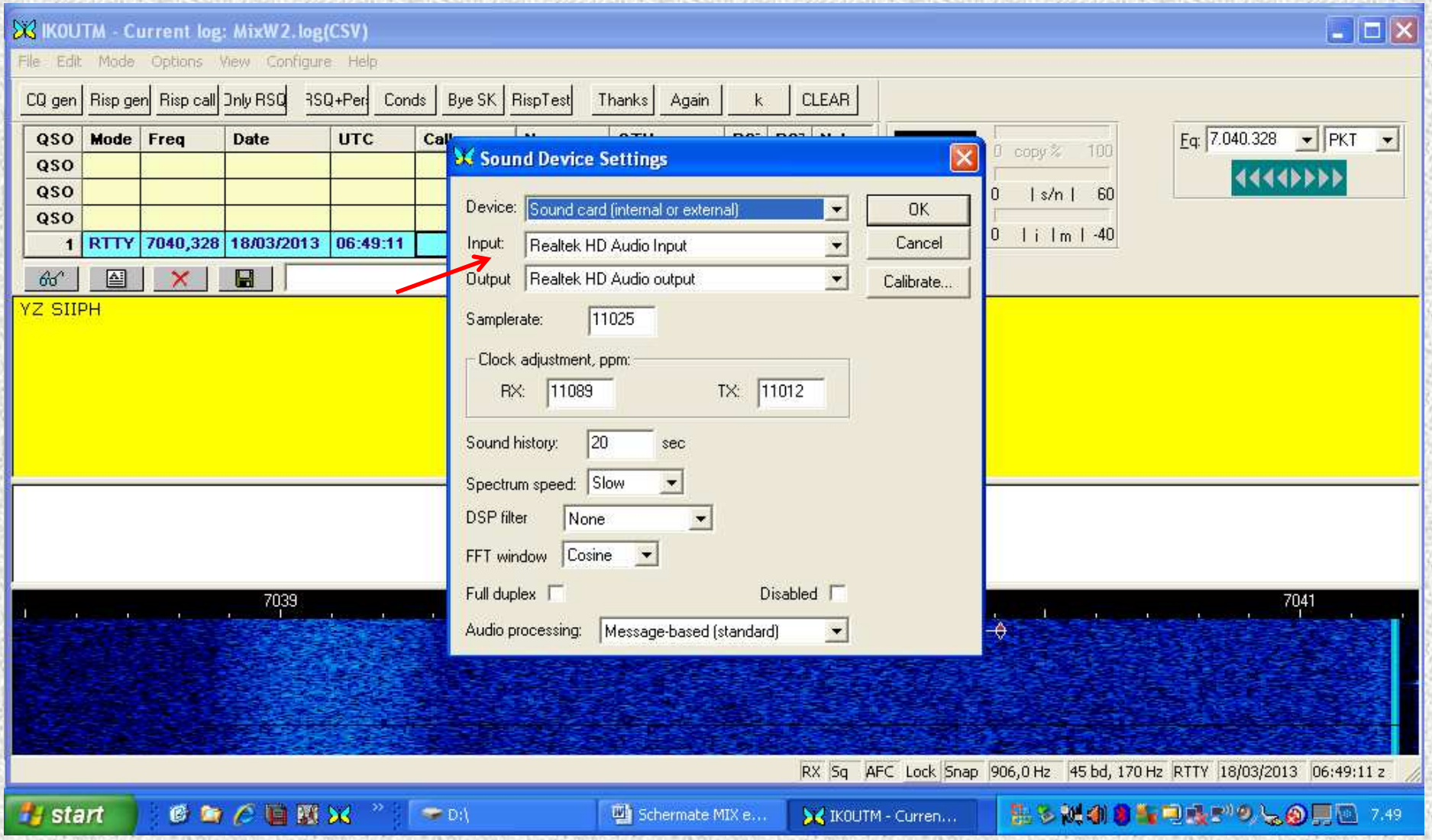
YAESU FT-1000MP e Microham USB II



YAESU FT-1000MP e Microham USB II



YAESU FT-1000MP e Microham USB II



YAESU FT-1000MP e Microham USB II

MMTTY

RTTY CQ CQ **MM HAMSOFT** CQ CQ SSTV

Site Provided by VE5KC & Kteck Webs

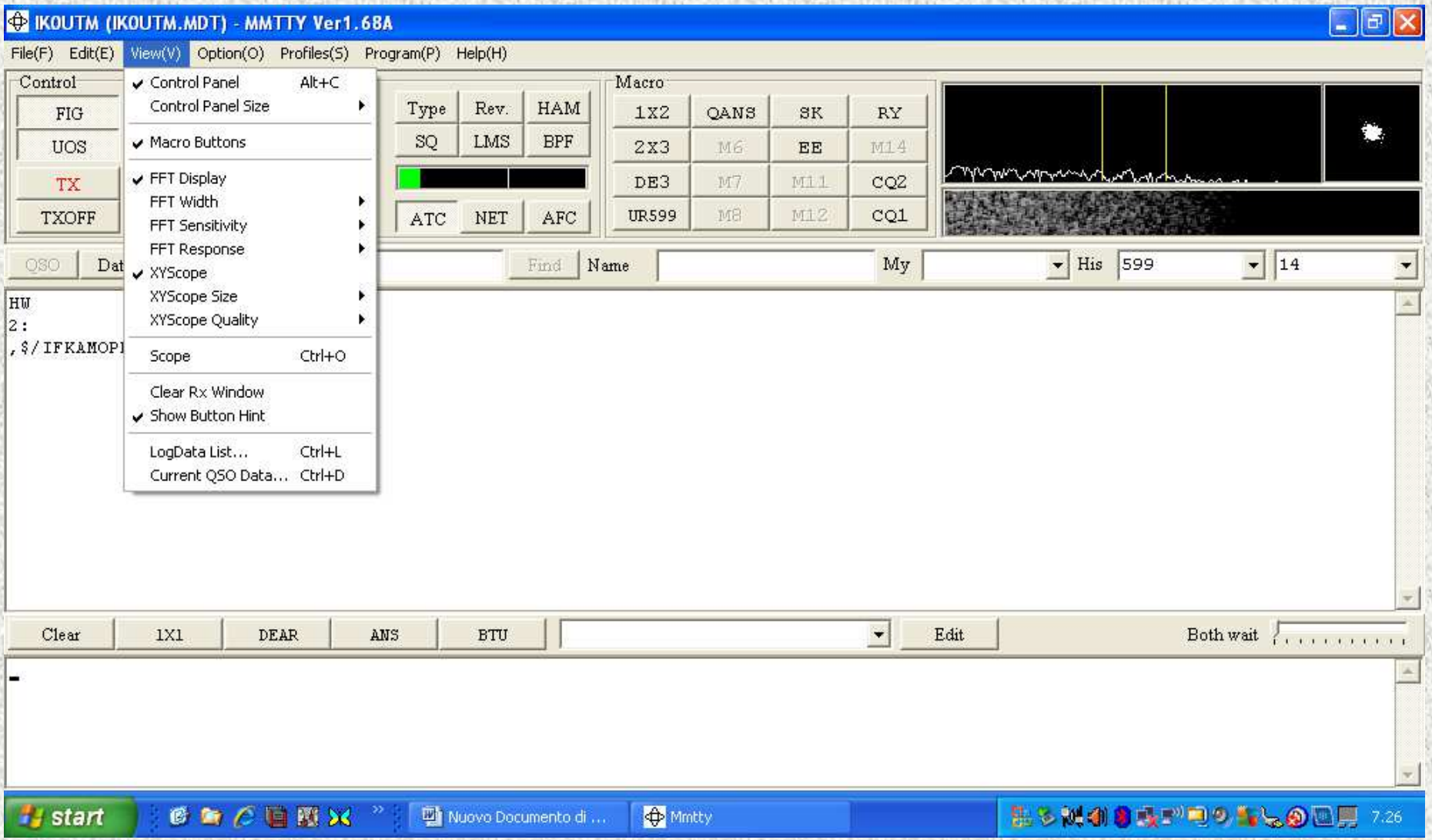
MMTTY
BY
JE3HHT - Makoto Mori

RTTY with Windows and Soundcard
WinXP - Vista - Win7

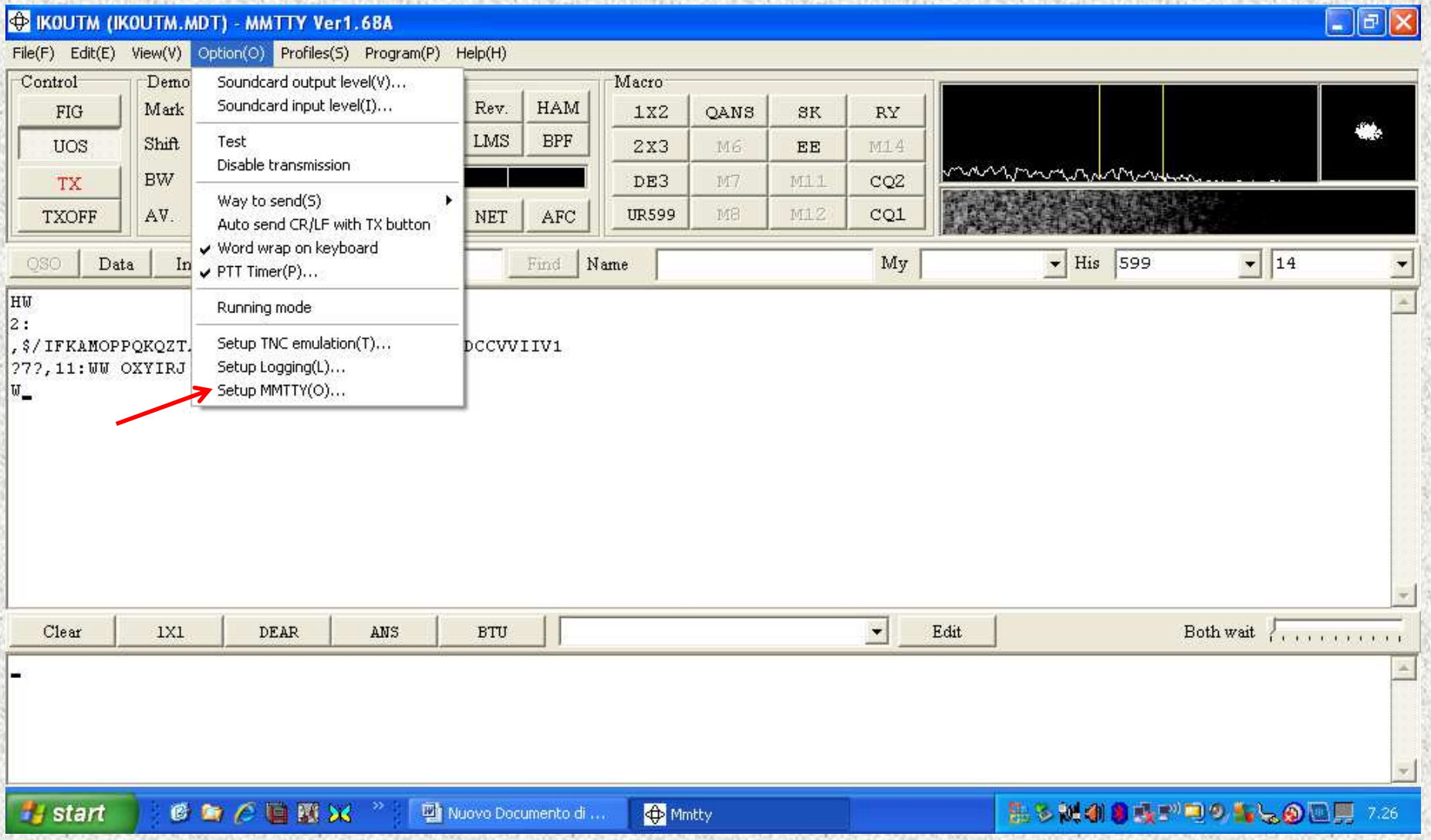
"MMTTY is free for Amateur Radio Use"

Click for full screen view

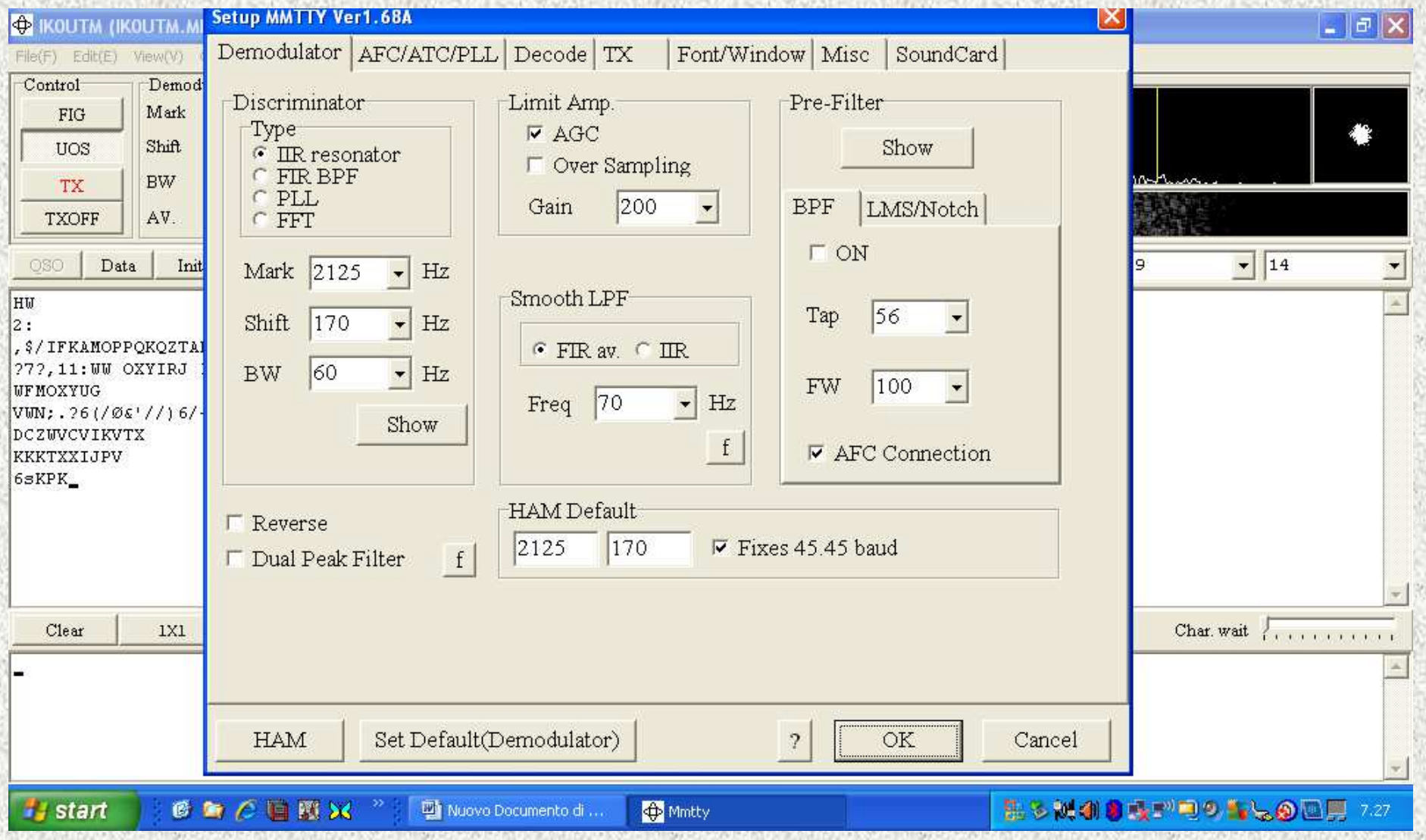
MMTTY


IKOUTM (IKOUTM.MDT) - MMTTY Ver1.68A
File(F) Edit(E) View(V) Option(O) Profiles(S) Program(P) Help(H)
Control
FIG
UOS
TX
TXOFF
Control Panel Alt+C
Control Panel Size
Macro Buttons
FFT Display
FFT Width
FFT Sensitivity
FFT Response
XYScope
XYScope Size
XYScope Quality
Scope Ctrl+O
Clear Rx Window
Show Button Hint
LogData List... Ctrl+L
Current QSO Data... Ctrl+D
Type Rev. HAM
SQ LMS BPF
ATC NET AFC
Macro
1X2 QANS SK RY
2X3 M6 EE M14
DE3 M7 M11 CQ2
UR599 M8 M12 CQ1
QSO Dat
Find Name My His 599 14
HW
2:
,$/IFKAMOP
Clear 1X1 DEAR ANS BTU Edit Both wait
start
Nuovo Documento di ...
Mmtty
7.26

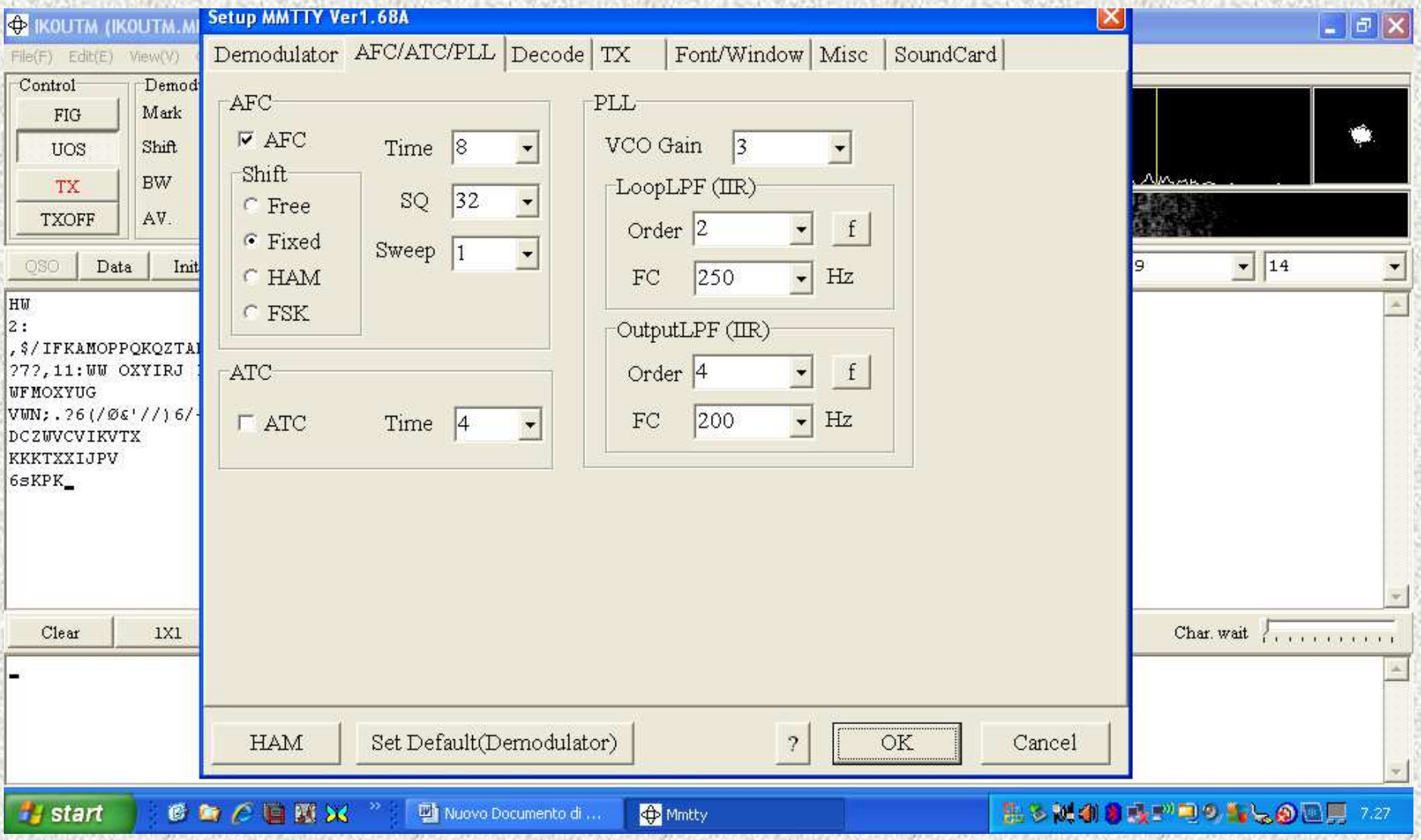
MMTTY


IK0UTM (IK0UTM.MDT) - MMTTY Ver1.68A
File(F) Edit(E) View(V) Option(O) Profiles(S) Program(P) Help(H)
Soundcard output level(V)...
Soundcard input level(I)...
Test
Disable transmission
Way to send(S)
Auto send CR/LF with TX button
Word wrap on keyboard
PTT Timer(P)...
Running mode
Setup TNC emulation(T)...
Setup Logging(L)...
Setup MMTTY(O)...
Control
FIG
UOS
TX
TXOFF
Demo
Mark
Shift
BW
AV.
Rev.
HAM
LMS
BPF
NET
AFC
Macro
1X2
QANS
SK
RY
2X3
M6
EE
M14
DE3
M7
M11
CQ2
UR599
M8
M12
CQ1
QSO
Data
Find
Name
My
His
599
14
HW
2:
?7?,11:WW OXYIRJ
W
Clear
1X1
DEAR
ANS
BTU
Edit
Both wait
start
Nuovo Documento di ...
Mmtty
7.26

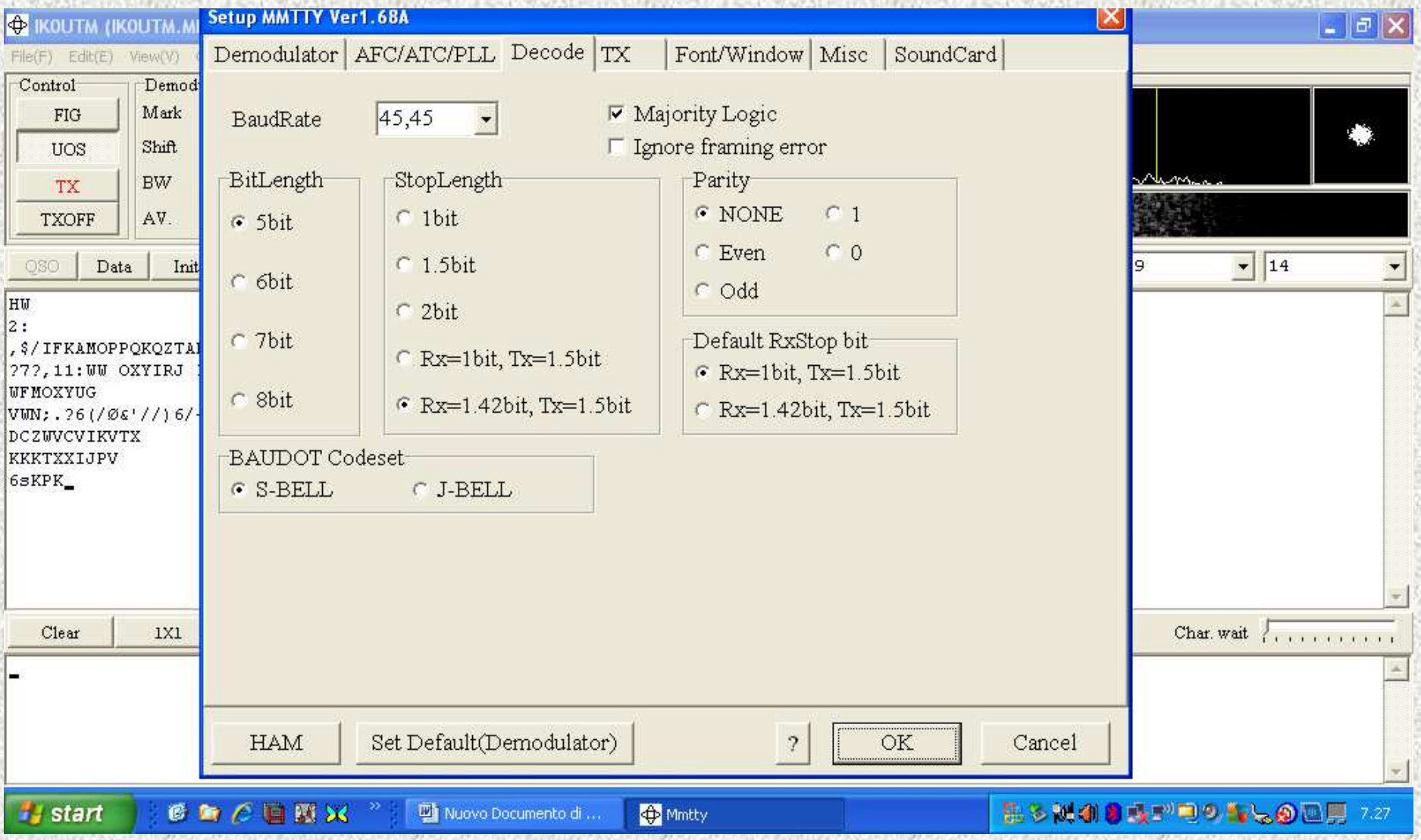
MMTTY


IKOUTM (IKOUTM.MI
File(F) Edit(E) View(V)
Control
FIG
UOS
TX
TXOFF
Demod
Mark
Shift
BW
AV.
QSO
Data
Init
HW
2:
,$/IFKAMOPPQKQZTAI
??7,11:WW OXYIRJ
WFMOXYUG
VWN;.?6(/Ø&'//)6/-
DCZWVCVIKVTX
KKKTXXIJPV
6≤KPK
Clear
1X1
Setup MMTTY Ver1.68A
Demodulator
AFC/ATC/PLL
Decode
TX
Font/Window
Misc
SoundCard
Discriminator
Type
IIR resonator
FIR BPF
PLL
FFT
Mark 2125 Hz
Shift 170 Hz
BW 60 Hz
Show
Limit Amp.
AGC
Over Sampling
Gain 200
Smooth LPF
FIR av.
IIR
Freq 70 Hz
f
Pre-Filter
Show
BPF
LMS/Notch
ON
Tap 56
FW 100
AFC Connection
Reverse
Dual Peak Filter
f
HAM Default
2125
170
Fixes 45.45 baud
HAM
Set Default(Demodulator)
?
OK
Cancel
9
14
Char. wait
start
Nuovo Documento di ...
Mmtty
7.27

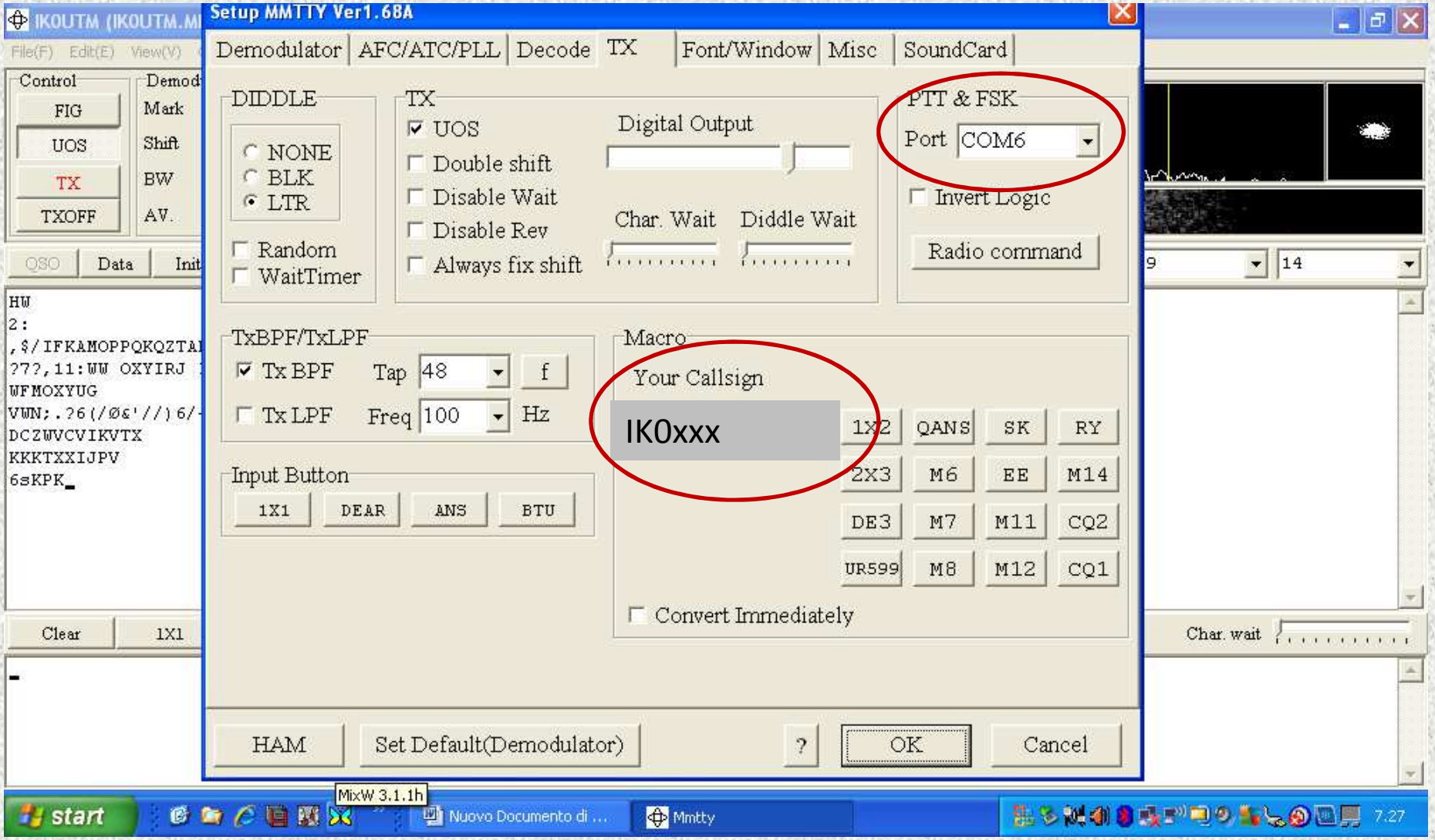
MMTTY


Setup MMTTY Ver1.68A
Demodulator
AFC/ATC/PLL
Decode
TX
Font/Window
Misc
SoundCard
AFC
AFC
Time 8
Shift
Free
Fixed
HAM
FSK
SQ 32
Sweep 1
ATC
ATC
Time 4
PLL
VCO Gain 3
LoopLPF (IIR)
Order 2
f
FC 250 Hz
OutputLPF (IIR)
Order 4
f
FC 200 Hz
HAM
Set Default(Demodulator)
?
OK
Cancel
Control
FIG
UOS
TX
TXOFF
Mark
Shift
BW
AV.
QSO
Data
Clear
1X1
Char. wait
start
Nuovo Documento di ...
Mmtty
7.27

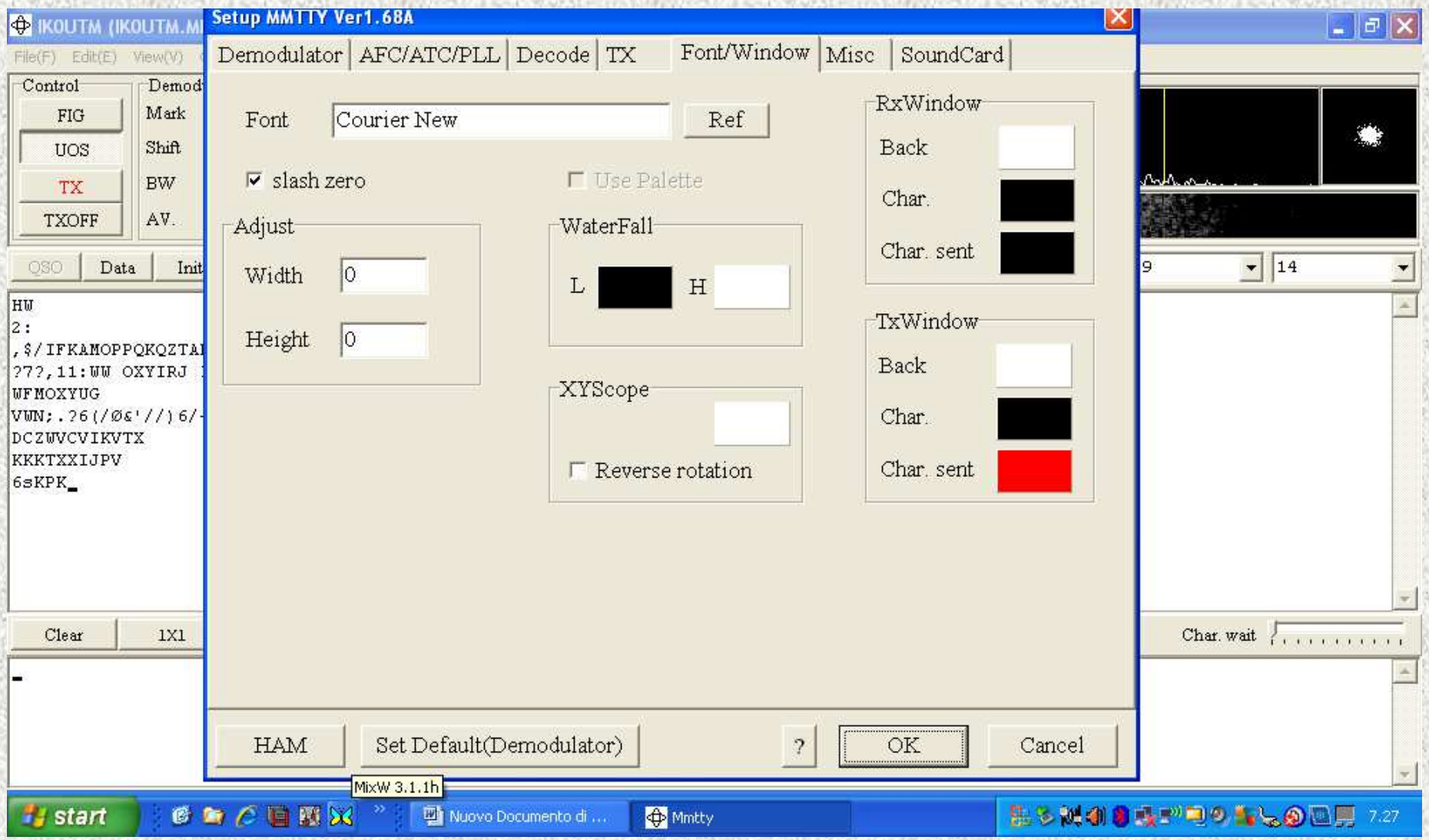
MMTTY


Setup MMTTY Ver1.68A
Demodulator
AFC/ATC/PLL
Decode
TX
Font/Window
Misc
SoundCard
BaudRate
45,45
Majority Logic
Ignore framing error
BitLength
5bit
6bit
7bit
8bit
StopLength
1bit
1.5bit
2bit
Rx=1bit, Tx=1.5bit
Rx=1.42bit, Tx=1.5bit
Parity
NONE
1
Even
0
Odd
Default RxStop bit
Rx=1bit, Tx=1.5bit
Rx=1.42bit, Tx=1.5bit
BAUDOT Codeset
S-BELL
J-BELL
HAM
Set Default(Demodulator)
?
OK
Cancel
Control
FIG
UOS
TX
TXOFF
Mark
Shift
BW
AV.
QSO
Data
Clear
1X1
Char. wait
start
Nuovo Documento di ...
Mmtty
7.27

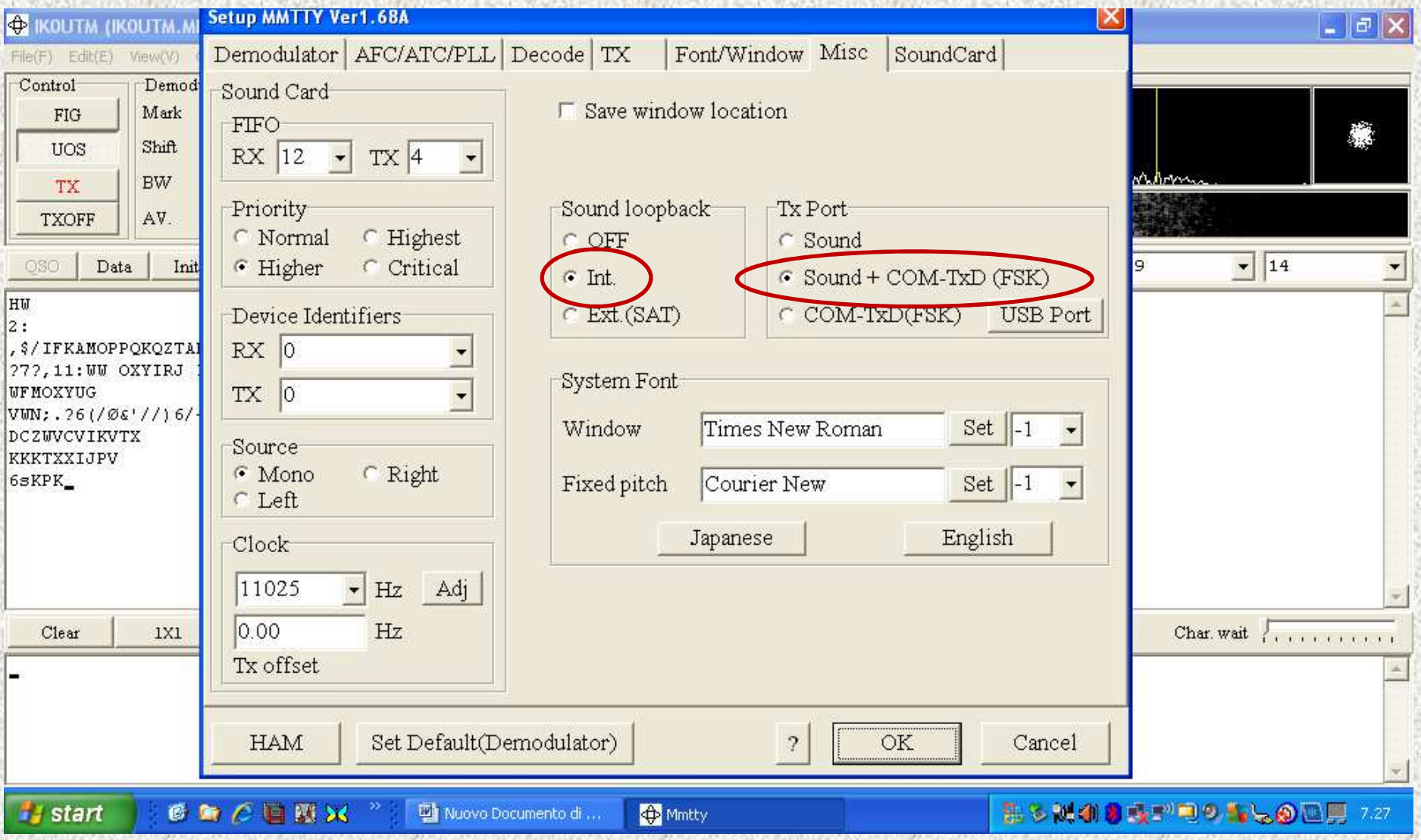
MMTTY


Setup MMTTY Ver1.68A
Demodulator
AFC/ATC/PLL
Decode
TX
Font/Window
Misc
SoundCard
DIDDLE
NONE
BLK
LTR
Random
WaitTimer
TX
UOS
Double shift
Disable Wait
Disable Rev
Always fix shift
Digital Output
Char. Wait
Diddle Wait
PTT & FSK
Port
COM6
Invert Logic
Radio command
TxBPF/TxLPF
Tx BPF
Tap
48
f
Tx LPF
Freq
100
Hz
Input Button
1X1
DEAR
ANS
BTU
Macro
Your Callsign
IK0xxx
1X2
QANS
SK
RY
2X3
M6
EE
M14
DE3
M7
M11
CQ2
UR599
M8
M12
CQ1
Convert Immediately
HAM
Set Default(Demodulator)
?
OK
Cancel
Control
FIG
UOS
TX
TXOFF
Mark
Shift
BW
AV.
QSO
Data
Clear
1X1
Char. wait
MixW 3.1.1h
Nuovo Documento di ...
Mmtty
start
7.27

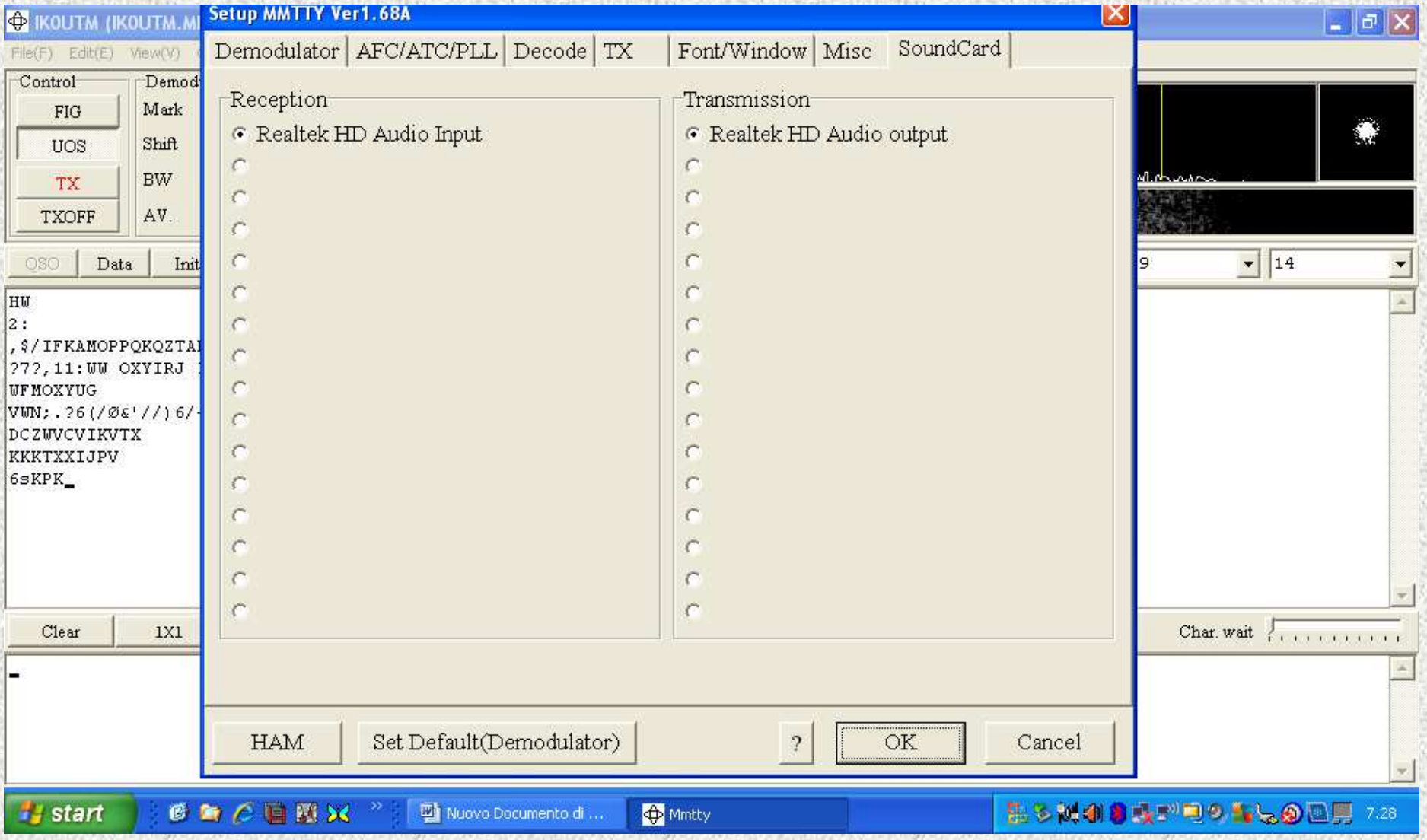
MMTTY


Setup MMTTY Ver1.68A
Demodulator
AFC/ATC/PLL
Decode
TX
Font/Window
Misc
SoundCard
Font
Courier New
Ref
slash zero
Use Palette
Adjust
Width
0
Height
0
WaterFall
L
H
XYScope
Reverse rotation
RxWindow
Back
Char.
Char. sent
TxWindow
Back
Char.
Char. sent
HAM
Set Default(Demodulator)
?
OK
Cancel
Control
FIG
UOS
TX
TXOFF
Mark
Shift
BW
AV.
QSO
Data
Clear
1X1
Char. wait
MixW 3.1.1h
start
Nuovo Documento di ...
Mmtty
7.27

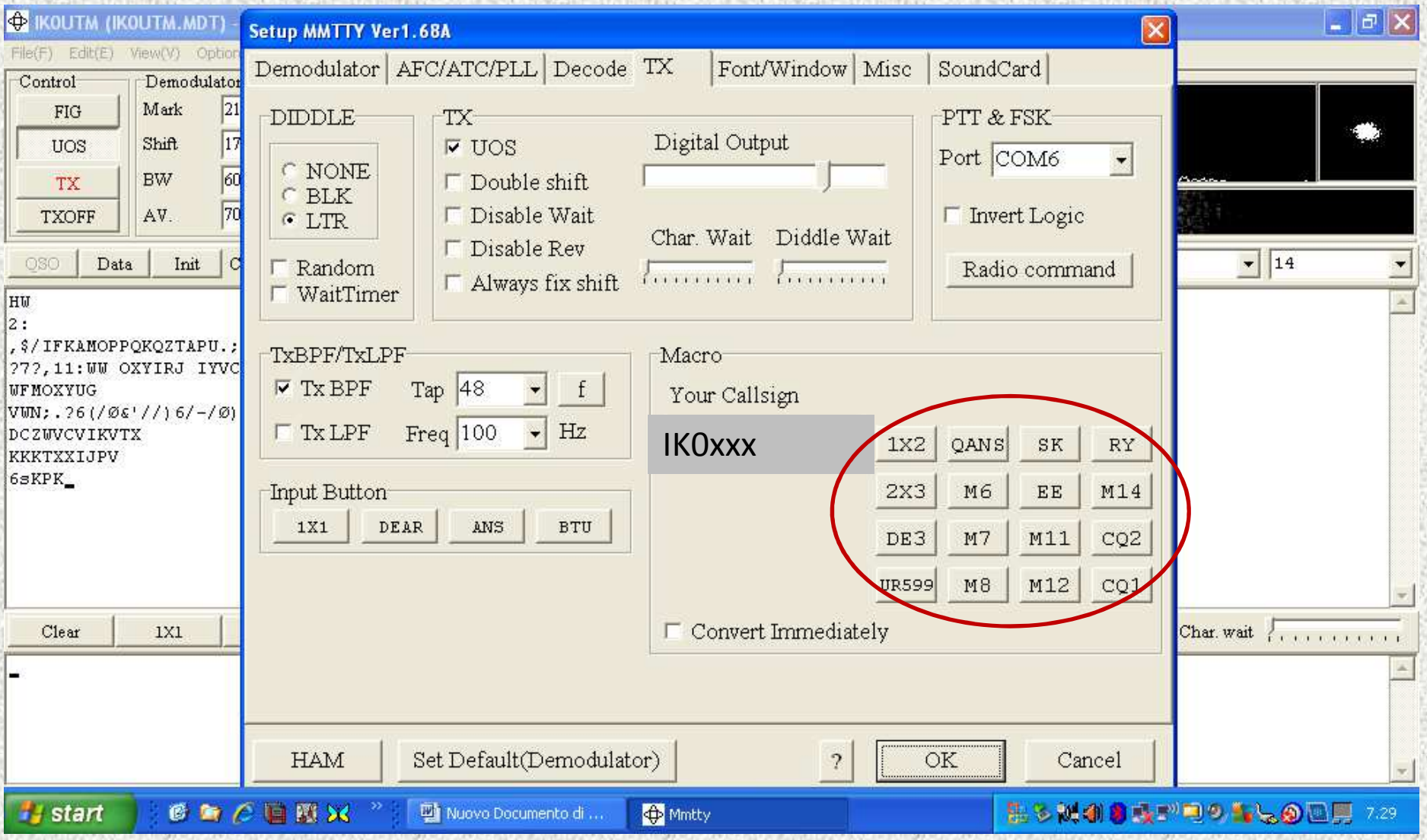
MMTTY


Setup MMTTY Ver1.68A
Demodulator
AFC/ATC/PLL
Decode
TX
Font/Window
Misc
SoundCard
Sound Card
FIFO
RX 12
TX 4
Priority
Normal
Higher
Highest
Critical
Device Identifiers
RX 0
TX 0
Source
Mono
Left
Right
Clock
11025 Hz
Adj
0.00 Hz
Tx offset
Save window location
Sound loopback
OFF
Int.
Ext.(SAT)
Tx Port
Sound
Sound + COM-TxD (FSK)
COM-TxD(FSK)
USB Port
System Font
Window
Times New Roman
Set
-1
Fixed pitch
Courier New
Set
-1
Japanese
English
HAM
Set Default(Demodulator)
?
OK
Cancel
Control
FIG
UOS
TX
TXOFF
Mark
Shift
BW
AV.
QSO
Data
Clear
1X1
Char. wait
start
Nuovo Documento di ...
Mmtty
7.27

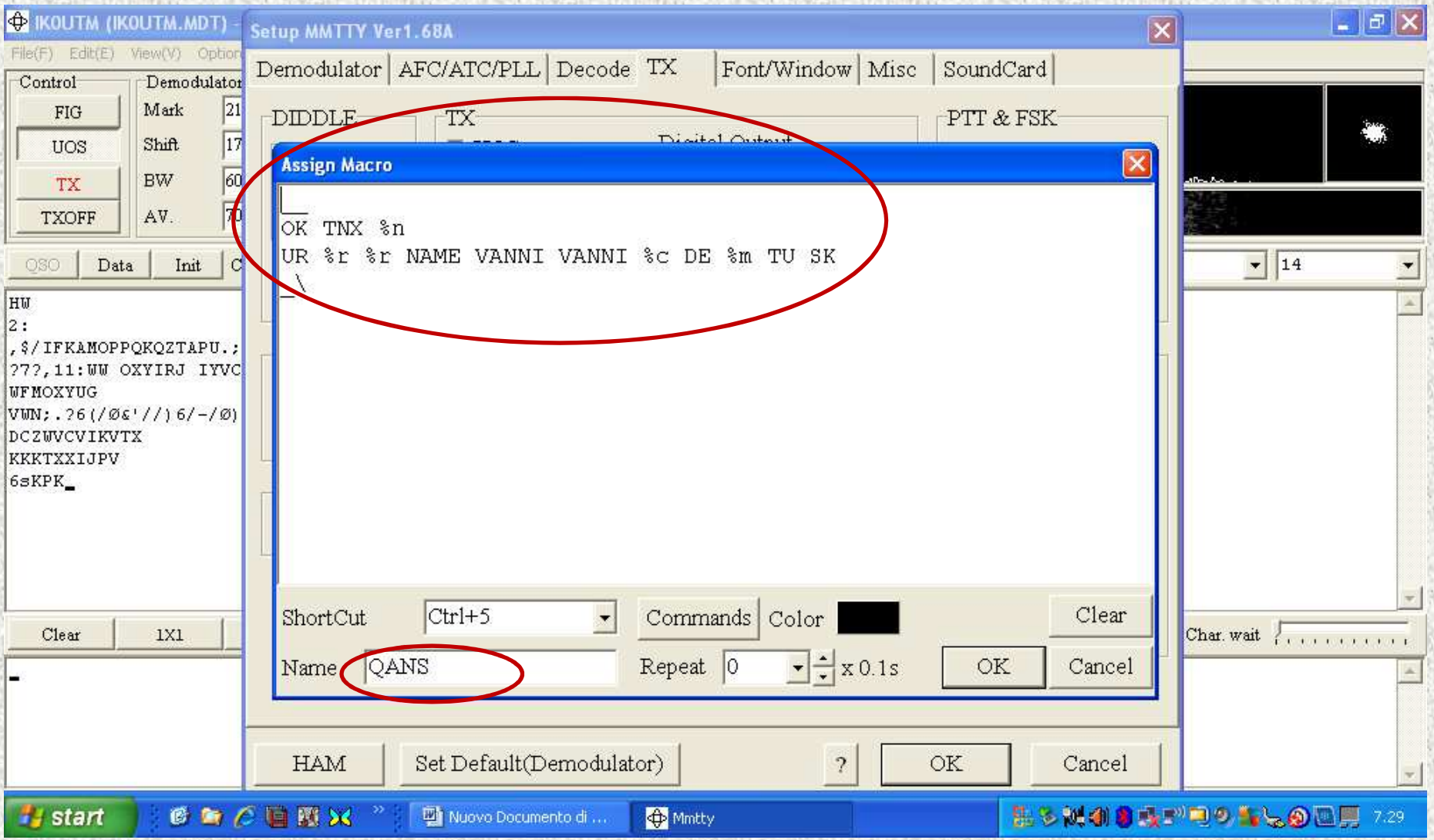
MMTTY


Setup MMTTY Ver1.68A
Demodulator
AFC/ATC/PLL
Decode
TX
Font/Window
Misc
SoundCard
Reception
Realtek HD Audio Input
Transmission
Realtek HD Audio output
HAM
Set Default(Demodulator)
?
OK
Cancel
Control
FIG
UOS
TX
TXOFF
Mark
Shift
BW
AV.
QSO
Data
Clear
1X1
Char. wait
start
Nuovo Documento di ...
Mmtty
7.28

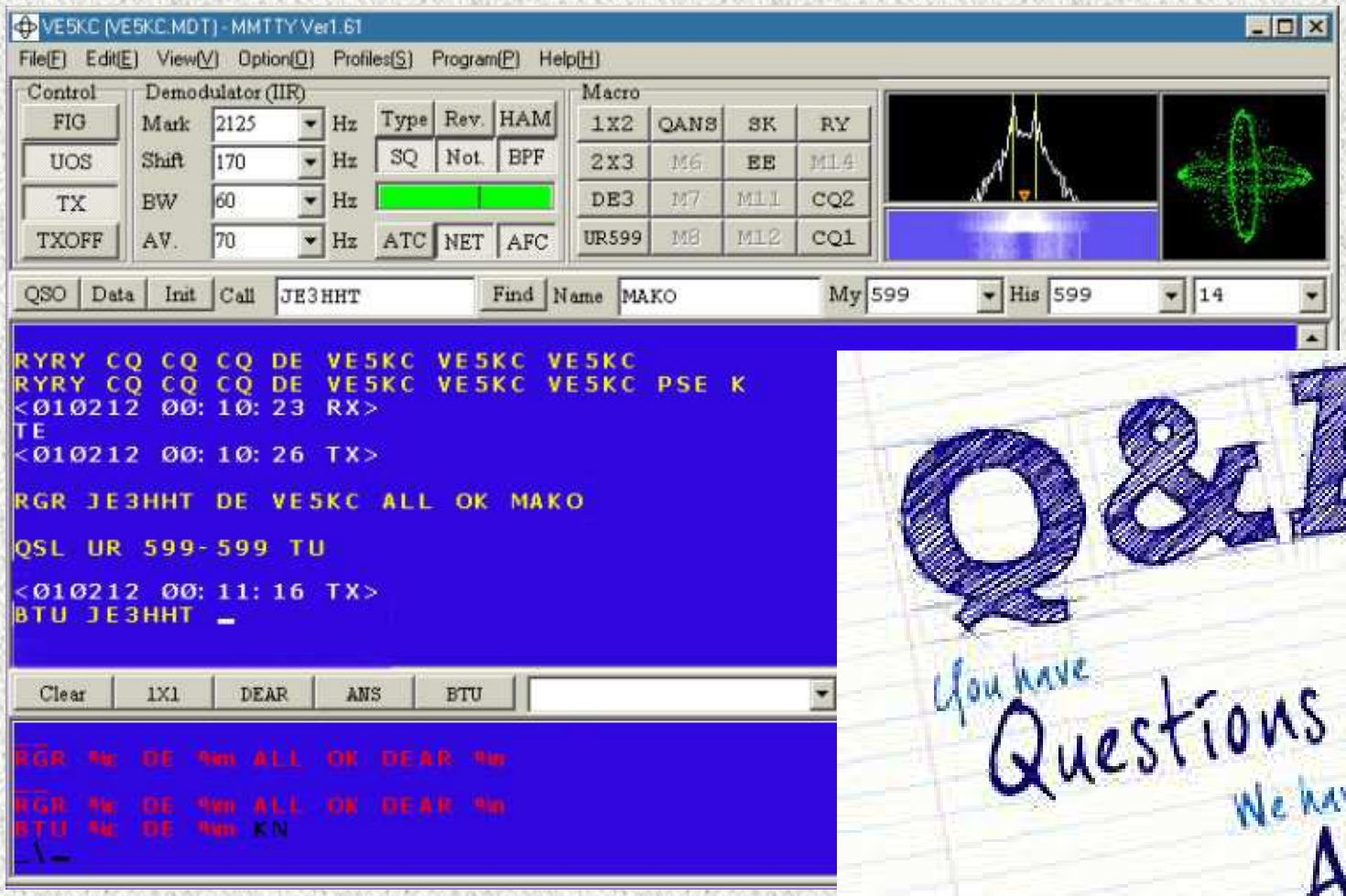
MMTTY


IK0UTM (IK0UTM.MDT)
Setup MMTTY Ver1.68A
Demodulator
AFC/ATC/PLL
Decode
TX
Font/Window
Misc
SoundCard
DIDDLE
NONE
BLK
LTR
Random
WaitTimer
TX
UOS
Double shift
Disable Wait
Disable Rev
Always fix shift
Digital Output
Char. Wait
Diddle Wait
PTT & FSK
Port
COM6
Invert Logic
Radio command
TxBPF/TxLPF
Tx BPF
Tap
48
f
Tx LPF
Freq
100
Hz
Input Button
1X1
DEAR
ANS
BTU
Macro
Your Callsign
IK0xxx
1X2
QANS
SK
RY
2X3
M6
EE
M14
DE3
M7
M11
CQ2
UR599
M8
M12
CQ1
Convert Immediately
HAM
Set Default(Demodulator)
?
OK
Cancel
Control
FIG
UOS
TX
TXOFF
Demodulator
Mark
Shift
BW
AV.
QSO
Data
Init
Clear
1X1
Char. wait
start
Nuovo Documento di ...
Mmtty
7.29

MMTTY


IKOUTM (IKOUTM.MDT)
Setup MMTTY Ver1.68A
Demodulator
AFC/ATC/PLL
Decode
TX
Font/Window
Misc
SoundCard
DIDDLE
TX
PTT & FSK
Assign Macro
OK TNX %n
UR %r %r NAME VANNI VANNI %c DE %m TU SK
ShortCut
Ctrl+5
Commands
Color
Clear
Name
QANS
Repeat
0
x 0.1s
OK
Cancel
HAM
Set Default(Demodulator)
?
OK
Cancel
Control
FIG
UOS
TX
TXOFF
Mark
Shift
BW
AV.
QSO
Data
Init
Clear
1X1
Char. wait
start
Nuovo Documento di ...
Mmtty
7.29

MMTTY


VE5KC (VE5KC.MDT) - MMTTY Ver1.61
File(F) Edit(E) View(V) Option(O) Profiles(S) Program(P) Help(H)
Control
FIG
UOS
TX
TXOFF
Demodulator (IIR)
Mark 2125 Hz
Shift 170 Hz
BW 60 Hz
AV. 70 Hz
Type Rev. HAM
SQ Not. BPF
ATC NET AFC
Macro
1X2 QANS SK RY
2X3 M6 EE M14
DE3 M7 M11 CQ2
UR599 M8 M12 CQ1
QSO Data Init Call JE3HHT Find Name MAKO My 599 His 599 14
RYRY CQ CQ CQ DE VE5KC VE5KC VE5KC
RYRY CQ CQ CQ DE VE5KC VE5KC VE5KC PSE K
<010212 00:10:23 RX>
TE
<010212 00:10:26 TX>
RGR JE3HHT DE VE5KC ALL OK MAKO
QSL UR 599-599 TU
<010212 00:11:16 TX>
BTU JE3HHT
Clear 1X1 DEAR ANS BTU
RGR %c DE %m ALL OK DEAR %m
RGR %c DE %m ALL OK DEAR %m
BTU %c DE %m KN


Q&A
If you have Questions
We have Answers