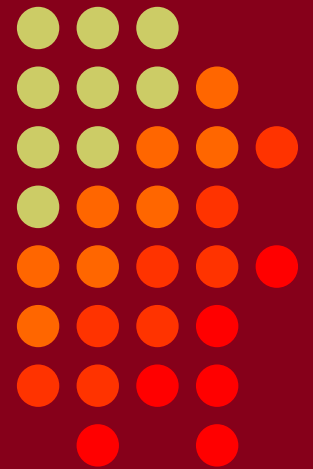# CTU 2013 Presents

Operating a RTTY Contest—Beginner to Expert
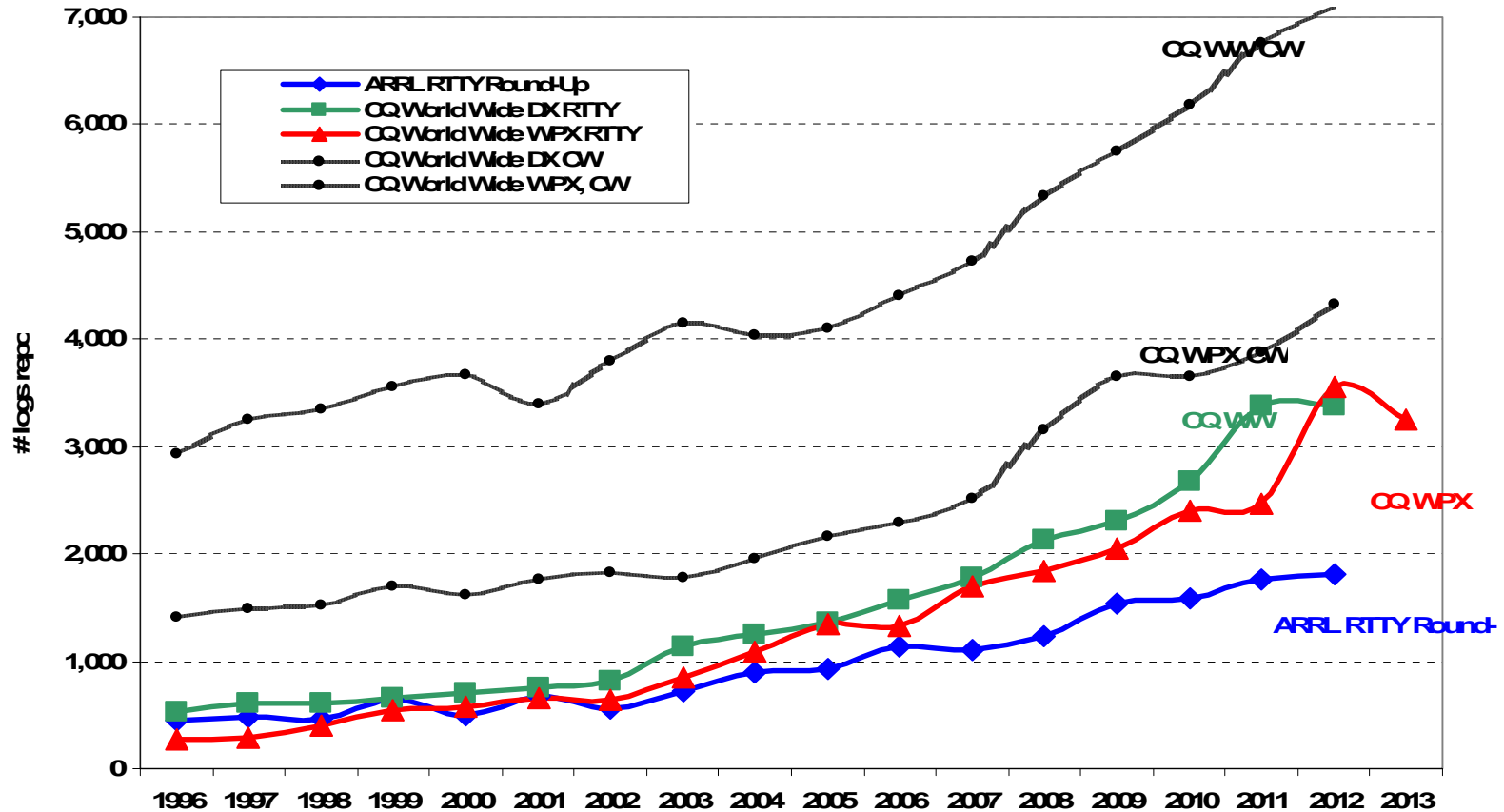
Ed Muns, W0YK

• CTU •
CONTEST
UNIVERSITY

ICOM

Three Largest RTTY Contests

Legend:
- ARRL RTTY Round-Up
- CQ World Wide DX RTTY
- CQ World Wide WPX RTTY
- CQ World Wide DX CW
- CQ World Wide WPX, CW

Chart labels: CQ WW CW, CQ WPX CW, CQ WW, CQ WPX, ARRL RTTY Round-

Y-axis: # logs repc (0 to 7,000)
X-axis: 1996 to 2013

CTU CONTEST UNIVERSITY

ICOM

Lots of RTTY Contests

> *two/month*

- **Biggies (7)**
  - CQ WW RTTY (last weekend in September)
  - CQ WPX RTTY (2nd weekend in February)
  - ARRL RTTY Roundup (1st weekend in January)
  - BARTG (3rd weekend Jan, 3rd weekend March)
    - 75 Baud (April & September)
  - WAE RTTY (2nd weekend in November)
- **NCJ contests (4)**
  - NAQP RTTY (3rd Sat. in February, 2nd Sat. in July)
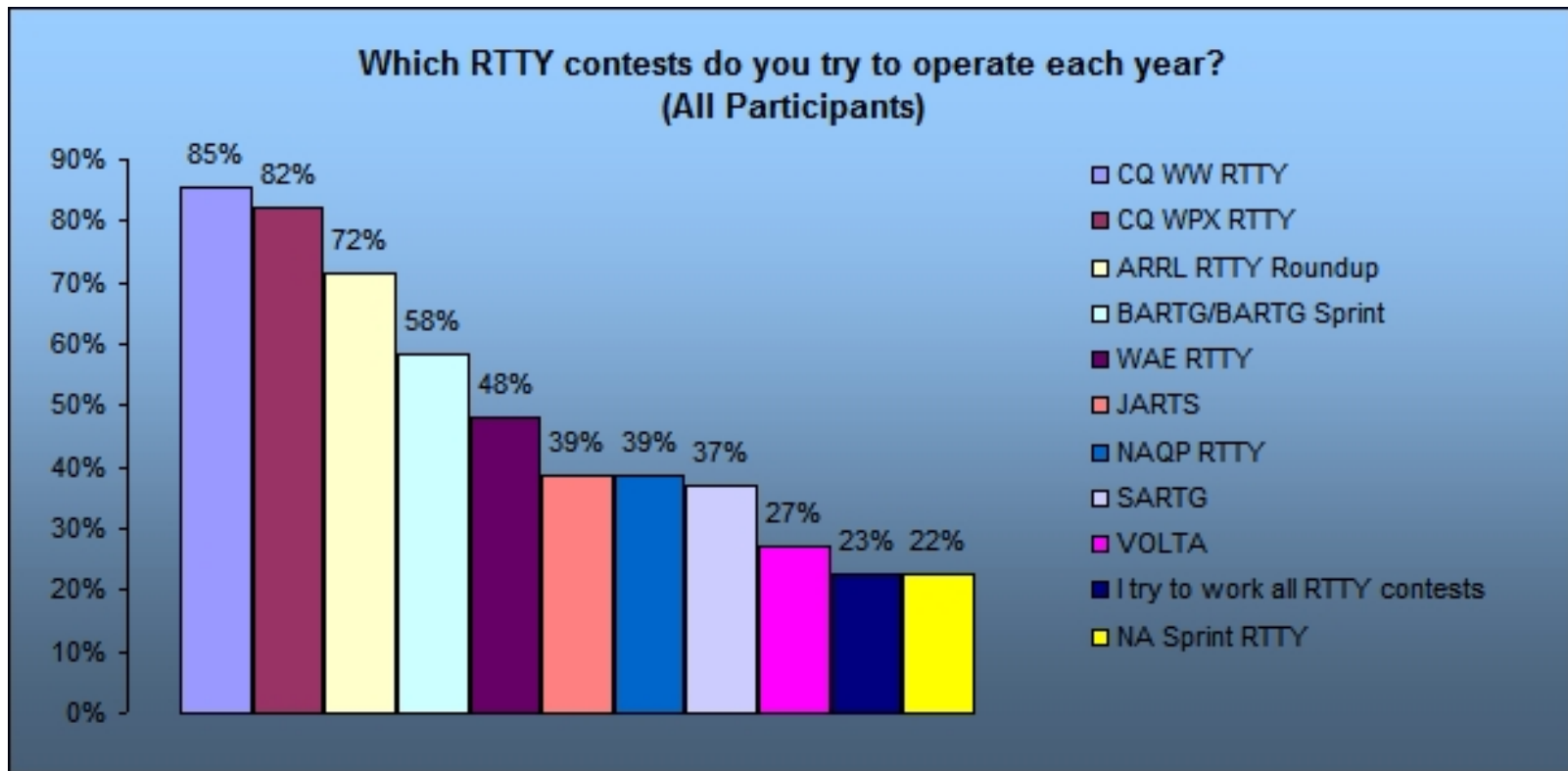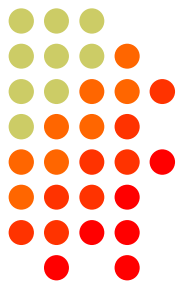 - Sprint RTTY (2nd Sat. in March & October)
- **Other popular RTTY contests (20)**
  - Ten-Meter RTTY (1st Sat. in December)
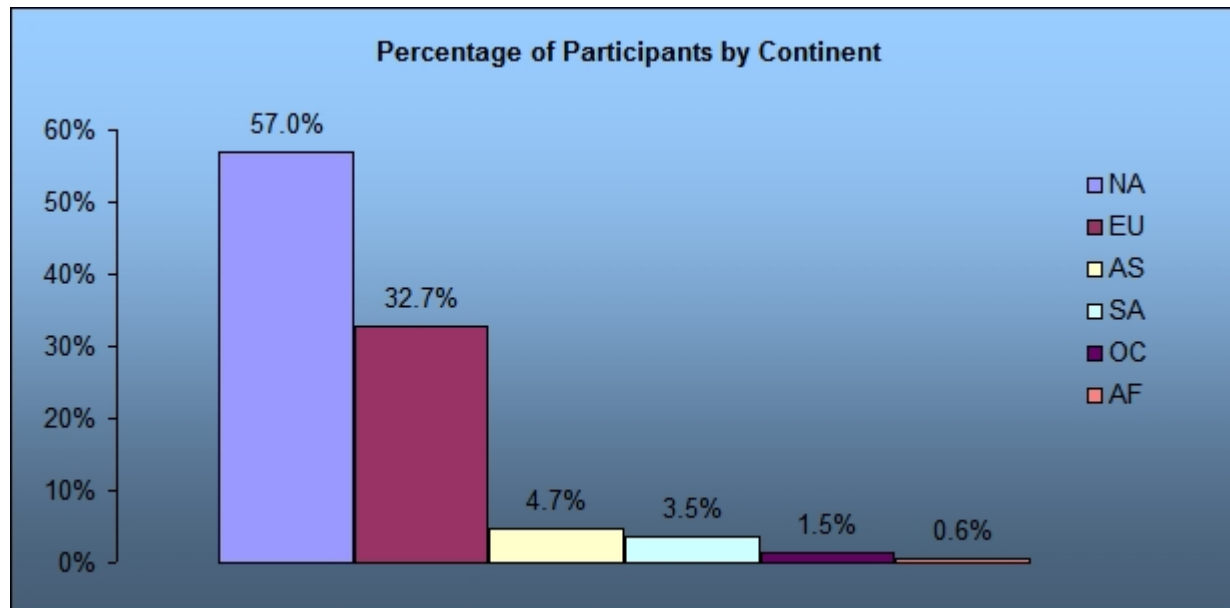 - JARTS, Makrothen, SARTG (2)
  - 15 others

CTU
CONTEST
UNIVERSITY

iCOM

Contest Popularity

2010 survey

Which RTTY contests do you try to operate each year?
(All Participants)

- 85% CQ WW RTTY
- 82% CQ WPX RTTY
- 72% ARRL RTTY Roundup
- 58% BARTG/BARTG Sprint
- 48% WAE RTTY
- 39% JARTS
- 39% NAQP RTTY
- 37% SARTG
- 27% VOLTA
- 23% I try to work all RTTY contests
- 22% NA Sprint RTTY

RTTY Contesters

2010 survey

Percentage of Participants by Continent

- NA 57.0%
- EU 32.7%
- AS 4.7%
- SA 3.5%
- OC 1.5%
- AF 0.6%

- 825 participants; 13 questions
- conducted in February 2010

CTU
CONTEST UNIVERSITY

iCOM

RTTY Contesters

2010 survey

**Which best describes you when it comes to RTTY contesting?
(All Participants)**

- 61.2% — Casual RTTY Contester
- 33.6% — Serious RTTY Contester
- 5.2% — Extreme RTTY Contester
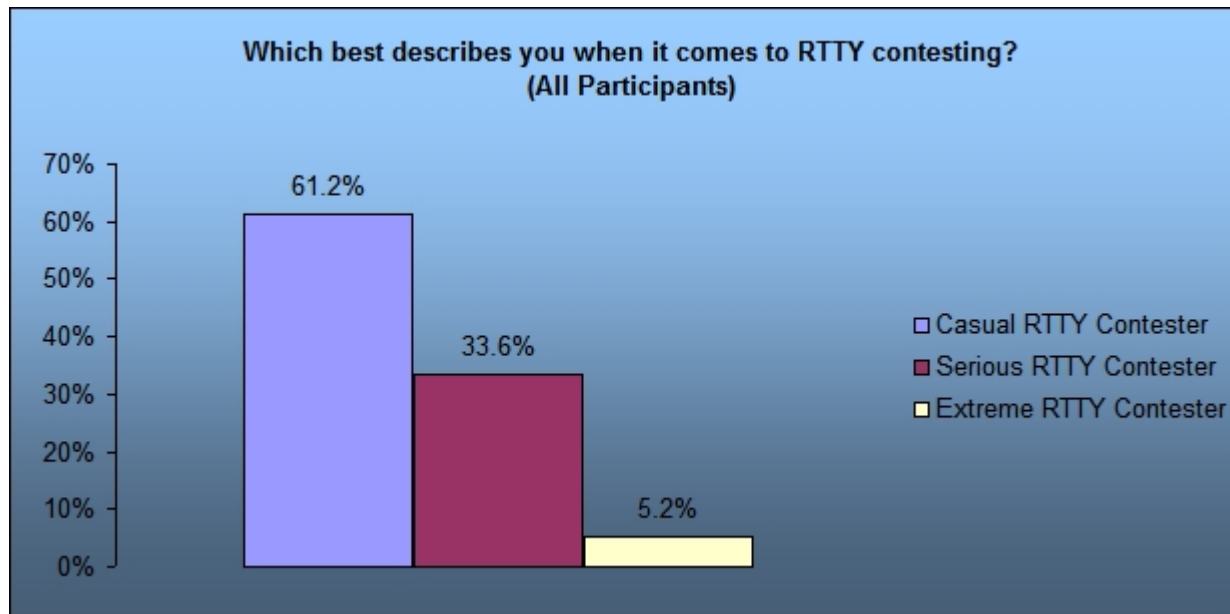
• The percentage of Casuals is much higher than shown, because few took the survey

RTTY Contesters

contester styles

- Casual
  - New
  - Making QSOs
  - Chasing awards
  - ➔ majority of participants … sometimes slower operators
- Serious
  - High rates; snappy QSOs; no chit-chat
  - ➔ minority of participants … faster operators (and easily annoyed by slower operators!)

ICOM

RTTY Contesters

- "Gentleman RTTYers"
  - RTTY is the gentleman's *mode*
    (similar to 160 being the gentleman's *band)*
- RTTY contest junkies
  - Years of experience; many different contests
- New contesters
  - Many with extensive PC skill
- Multi-Mode contesters
  - Strong growth

CTU
CONTEST
UNIVERSITY

iCOM

What Makes a Great RTTY Contester?

- Contester who happily logs casual callers

- Uses CW & SSB techniques where useful

- Strives to exploit RTTY uniqueness

  - Auto-decode frees operator time … use it to do things difficult with CW & SSB, e.g., SO3R!

  - Speed is ~2x CW

- Applies learning back to CW & SSB

CTU
CONTEST
UNIVERSITY

ICOM

Giving Back

- Open logs
  - Allows others to learn
  - Raises level of competition
- Sharing
  - Improves operating quality and skill
  - Raises level of competition
- Growing the sport
  - "Lighthouse": AA5AU & www.rttycontesting.com

CONTEST UNIVERSITY

ICOM

The Cynics Say …

- "RTTY is a pain to set up and get working."

  … it's really not too difficult! (see first presentation)

- "The RTTY decoder/encoder does everything."

  however, this attribute …

  - frees the operator to improve other skills

  - enables more contest participants

  - provides mode diversity for contest junkies

Operating a RTTY Contest

- RTTY considerations
- Optimize message buffers
  - UnShift On Space (USOS or UOS)
  - Space vs. Hyphen
- Accelerator keys; stateful Enter key (ESM); key re-mapping
- Super Check Partial & Pre-Fill
- Callsign stacking ("slow down to win")
- Multiple decoders
- SO2V, SO2R-SOnR
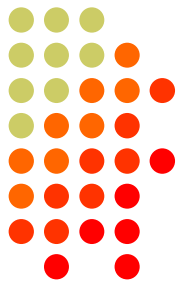- Logging Software: WriteLog vs. N1MM Logger vs. Win-Test
- Ergonomics

CTU
CONTEST
UNIVERSITY

ICOM

RTTY Considerations

Much like CW and SSB, except:

- Non-human decoding implications
  - *e.g., serial number repeat, universal "fist" or "voice"*
- RTTY established practice
  - *e.g., 'CQ' at end of CQ message*
- Whisper-level headphone volume
  - *just to detect presence & timing*
- Avoid distraction
  - *tempting to read, do email, watch TV, etc.*
- Key-down transmission … 100% duty cycle

RTTY Sub-Bands

- 10 meters: 28080-28100, during contests 28060-28150
- 15 meters: 21080-21100, during contests 21060-21150
- 20 meters: 14080-14100, during contests 14060-14150
  - JA: 14070-14112
- 40 meters: 7025-7050 and 7080-7100, during contests 7025-7100
  - JA: 7025-7045
  - EU: below 7050
- 80 meters: 3580-3600, during contests 3560-3600
  - JA: 3520-3530 and 3599-3612
- 160 meters: No RTTY contesting

CONTEST UNIVERSITY

iCOM

RTTY Sub-Bands

don't QRM!

- Avoid PSK-31 operations near:
  - 28120, 21070, 14070, 7070 and 3580
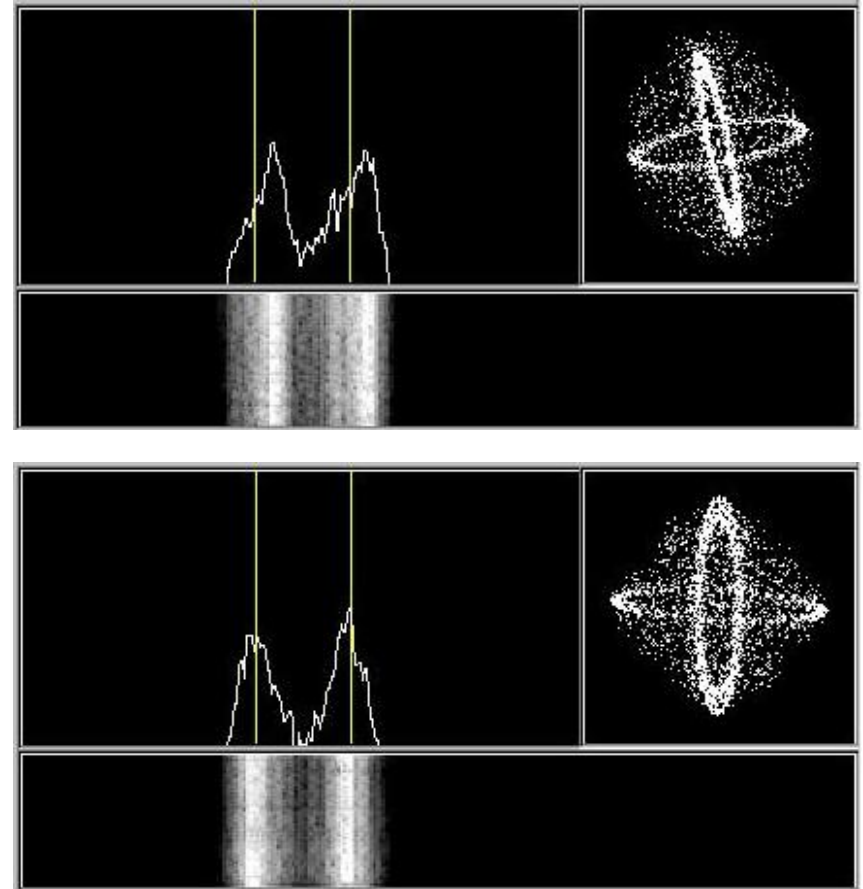- Avoid the NCDXF beacons:
  - 21150 and 14100

- More details:

  www.aa5au.com/gettingstarted/rtty_subbands.htm
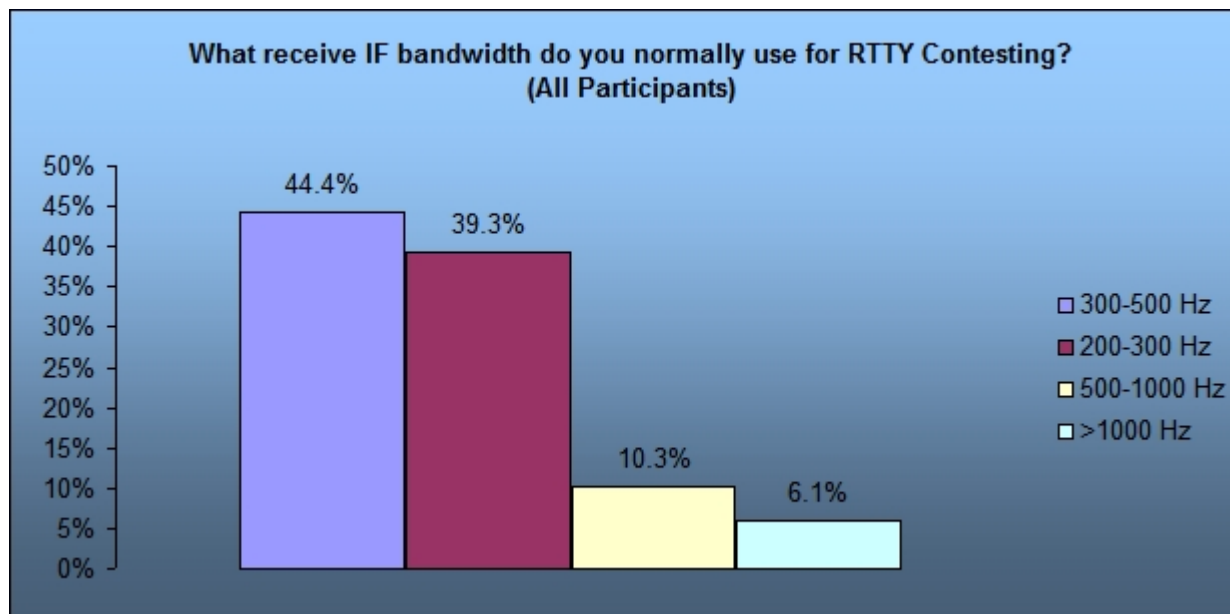
Receiving

- ## Set RX audio level
  - noise just above baseline
- ## Use narrow filtering
  - CW filters < 500 Hz
- ## Learn to tune by ear
  - practice with eyes closed
  - get within 10-20 Hz
- ## Use "low tones" (if FSK)
  - less fatigue

ICOM

IF Bandwidth

2010 survey

What receive IF bandwidth do you normally use for RTTY Contesting?
(All Participants)

- 300-500 Hz: 44.4%
- 200-300 Hz: 39.3%
- 500-1000 Hz: 10.3%
- >1000 Hz: 6.1%

- Like FSK, narrow IF filtering for RTTY appeared in radios in the early 1990s

CTU CONTEST UNIVERSITY

ICOM

Tips

"All I receive is gibberish!"

- "Upside-down"
  - Reverse Mark & Space in software
  - LSB vs. USB

- Figures vs. letters
  - TOO=599, WPIR=2084
  - Shift-click to convert, or
  - Look at top two rows

- Mic/Line In, level, muting, tones, flutter

CTU
CONTEST UNIVERSITY

ICOM
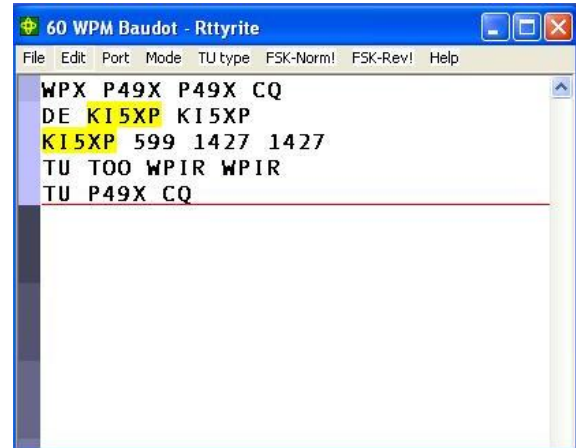
Tips

"They never answer me!"

- "Upside-down"
  - FSK polarity switch in radio
  - AFSK mode, LSB vs. USB
- MMTTY AFC & NET
  - AFC & NET are on by default!
    (and every time you choose a profile!)
  - Change defaults in USERPARA.INI
- Radio mode, tones, FSK interface, AFSK: Mic & SC level & speech processor
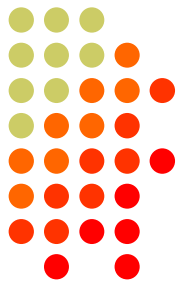
CONTEST UNIVERSITY

iCOM

More Tips

- Transmit when others stand-by
- Add his call at end of exchange in pile-ups
- Recommend RIT, but if you use AFC/NET …
  - AFC only for running, not S&P
  - Use AFC/NET for S&P (only avail. with AFSK)
- Mode-independent skills, e.g.,
  - Bandmap usage
  - QSO B4
  - Roving mult: "Squat & Shoot" *(Cajun-speak!)*

CTU

CONTEST UNIVERSITY

ICOM

and … More Tips

- 100% duty cycle … *caution!*
- Practice
  - During frequent RTTY contests
  - NCCC Thursday night practices
- Multi-Ops
- SO2V & SO2R
- LoTW

CTU
CONTEST
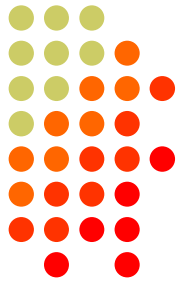UNIVERSITY

ICOM

Basic RTTY Contest QSO

- ***WPX K5AM K5AM CQ***
- ***ZC4LI ZC4LI***
- ***ZC4LI 599 1349 1349***
- ***[K5AM] TU 599 985 985***
- ***[ZC4LI] TU K5AM CQ***

K5AM: running station

ZC4LI: S&P station

CONTEST UNIVERSITY

ICOM

RTTY Messages

- Short, as with CW/SSB
- No extraneous info
- 599 (not 5NN) once
- Serial number twice
- Space (not hyphen)
- Omit 'DE'
- RTTY chars (%R, %E)

www.rttycontesting.com/rttymessages.htm

CW/RTTY/SSB Memory Setup

F2:	%RWPX P49X P49X CQ %O%E
F3:	DE P49X %E
F4:	P49X %E
F5:	%R%C 599 %N %N %E
F6:	%RTU P49X CQ %O%E
F7:	%RQRV %ZL.1 %E
F8:	%R%P1 TU NOW %C 599 %N %N %E
F9:	%RCALL? %E
F10:	%R?NR? %E
F1&F11:	%R%N %E

Browse...
OK
Cancel
Help
○ Normal keys
○ Shifted keys
○ SSB
○ Shifted SSB

CW/RTTY/SSB Memory Setup

F2:	%RWPX P49X P49X P49X CQ %O%E
F3:	UP 1 %E
F4:	%B
F5:	%R%C %E
F6:	%RKB P49X CQ %O%E
F7:	%RQRV %ZR.1 %E
F8:	%R%P1 KB NOW %C 599 %N %N %E
F9:	%RQRZ? %E
F10:	%RAGN? %E
F1&F11:	%RQSL LOTW OR W0YK %E

Browse...
OK
Cancel
Help
○ Normal keys
○ Shifted keys
○ SSB
○ Shifted SSB

CTU
CONTEST UNIVERSITY

iCOM

RTTY Messages

optimize

- Modular
  - Chaining
- Group logically
- Supports a cadence

CW/RTTY/SSB Memory Setup

F2:	%RWPX P49X P49X CQ %O%E
F3:	DE P49X %E
F4:	P49X %E
F5:	%R%C 599 %N3 %N3 %E
F6:	%R%C TU P49X CQ %O%E
F7:	%RQRV %ZB.1 %E
F8:	%R%P1 TU NOW %C 599 %N3 %N3 %E
F9:	%RCALL? %E
F10	%R?NR? %E
F1&F11:	%R%N3 %N3 %E

Browse...
OK
Cancel
Help
( ) Normal keys
( ) Shifted keys
( ) SSB
( ) Shifted SSB

CW/RTTY/SSB Memory Setup

F2:	%RCQ WPX P49X P49X P49X CQ %O%E
F3:	UP 1 %E
F4:	%B
F5:	%R%C %E
F6:	%R%C KB P49X CQ %O%E
F7:	%RQSL W0YK W0YK %E
F8:	%R%P1 KB NOW %C 599 %N3 %N3 %E
F9:	%RQRZ? %E
F10	%RAGN? %E
F1&F11:	%RQTH? %E

Browse...
OK
Cancel
Help
( ) Normal keys
(•) Shifted keys
( ) SSB
( ) Shifted SSB

CTU
CONTEST UNIVERSITY

ICOM

RTTY Messages

formatting

CW/RTTY/SSB Memory Setup

F2:	%R%PX P49X P49X CQ %O%E
F3:	DE P49X %E
F4:	P49X %E
F5:	%R%C 599 %N3 %N3 %E
F6:	%R%C TU P49X CQ %O%E
F7:	%RQRV %ZB.1 %E
F8:	%R%P1 TU NOW %C 599 %N3 %N3 %E
F9:	%RCALL? %E
F10:	%R?NR? %E
F1&F11:	%R%N3 %N3 %E

Browse...

OK

Cancel

Help

◉ Normal keys

○ Shifted keys

○ SSB

○ Shifted SSB

CTU
CONTEST
UNIVERSITY

ICOM

RTTY Messages

efficiency

CW/RTTY/SSB Memory Setup

F2:	%RWPX P49X P49X CQ %O%E
F3:	DE P49X %E
F4:	P49X %E
F5:	%R%C 599 %N3 %N3 %E
F6:	%R%C TU P49X CQ %O%E
F7:	%RQRV %ZB.1 %E
F8:	%R%P1 TU NOW %C 599 %N3 %N3 %E
F9:	%RCALL? %E
F10	%R?NR? %E
F1&F11:	%R%N3 %N3 %E

Browse...

OK

Cancel

Help

(•) Normal keys

( ) Shifted keys

( ) SSB

( ) Shifted SSB

CTU
CONTEST
UNIVERSITY

ICOM

RTTY Messages

special

CW/RTTY/SSB Memory Setup

F2:	%RWPX P49X P49X CQ %O%E
F3:	DE P49X %E
F4:	P49X %E
F5:	%R%C 599 %N3 %N3 %E
F6:	%R%C TU P49X CQ %O%E
F7:	%RQRV %ZB.1 %E
F8:	%R%P1 TU NOW %C 599 %N3 %N3 %E
F9:	%RCALL? %E
F10:	%R?NR? %E
F1&F11:	%R%N3 %N3 %E

Browse...

OK

Cancel

Help

⦿ Normal keys

○ Shifted keys

○ SSB

○ Shifted SSB

CTU
CONTEST
UNIVERSITY

iCOM

Operating

personal

CW/RTTY/SSB Memory Setup

F2:	%RCQ WPX P49X P49X P49X CQ %O%E
F3:	UP 1 %E
F4:	%B
F5:	%R%C %E
F6:	%R%C KB P49X CQ %O%E
F7:	%RQSL W0YK W0YK %E
F8:	%R%P1 KB NOW %C 599 %N3 %N3 %E
F9:	%RQRZ? %E
F10:	%RAGN? %E
F1&F11:	%RQTH? %E

Browse...

OK

Cancel

Help

○ Normal keys

◉ Shifted keys

○ SSB

○ Shifted SSB

CTU
CONTEST
UNIVERSITY

iCOM

Interim Summary

- Predominantly casual RTTY contest participants
- RTTY sub-bands; 10-80 only; avoid PSK & beacons
- Narrow (CW) receive filtering
- Common problems
  - "Upside-down" or reversed Space/Mark (and, LSB vs. USB)
  - Figures vs. Letters
  - Audio:
    - RX audio output level and TX (AFSK only) audio input level
    - Unmuted soundcard inputs and outputs
    - Space and Mark tone consistency between decoder and radio
  - Off-frequency tuning (e.g., MMTTY AFC & NET); propagation flutter
- Messages ("macros")
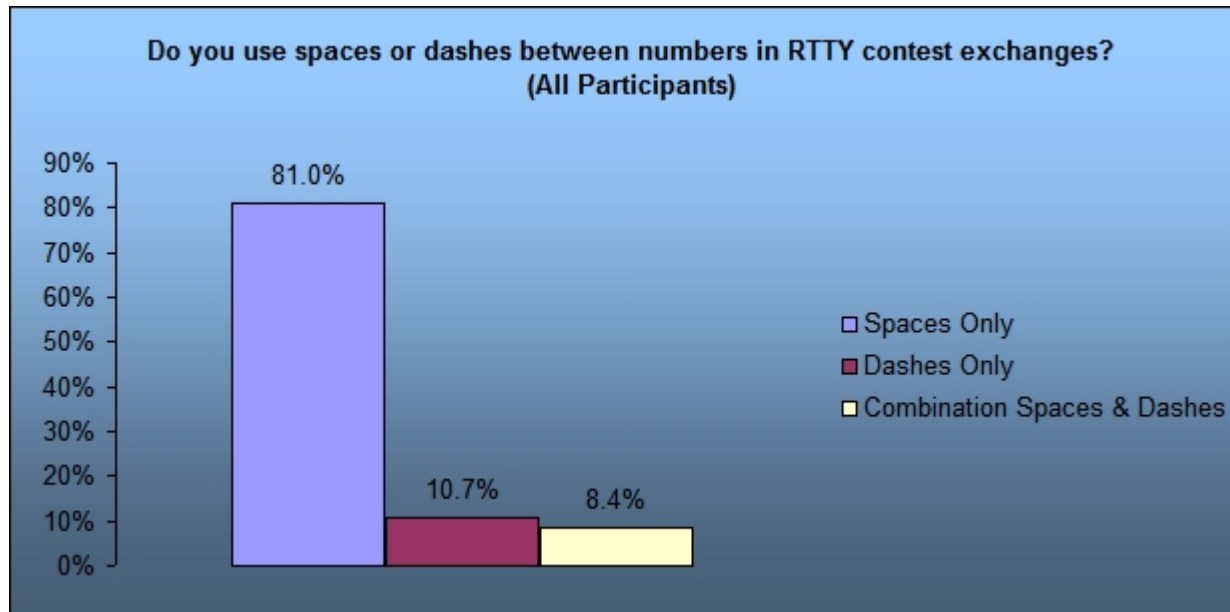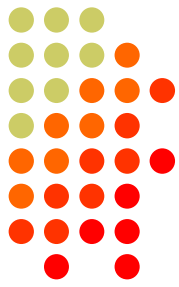 - Short, 5NN, exchange twice, Space delimiter

CTU
CONTEST
UNIVERSITY

ICOM

Space Delimiters

2010 survey

Do you use spaces or dashes between numbers in RTTY contest exchanges?
(All Participants)

- Spaces Only
- Dashes Only
- Combination Spaces & Dashes

81.0% 10.7% 8.4%

Space Delimiters

*UnShift On Space**

*UOS or USOS

TX RX	599 123 123	599 CA CA
UOS on	f599 f123 f123	f599 CA CA
UOS on	f599 f123 f123	f599 CA CA
UOS on	f599 f123 f123	f599 CA CA
UOS off	f599 f123 f123	f599 :- :-
UOS off	f599 123 123	f599 1CA CA
UOS on	f599 QWE QWE	f599 1CA CA
UOS off	f599 123 123	f599 1CA CA
UOS off	f599 123 123	f599 1CA CA

f: FIGS character

l: LTRS character

Garbled copy

- Protocol that provides some noise immunity for shift characters by:
    - forcing the Letters set after a received Space
    - sending a FIGS character after a Space when the next character is in the Figures set
- MMTTY:
    - RX UOS and TX UOS can be independently enabled or disabled

CTU

CONTEST UNIVERSITY

iCOM

Space Delimiters

UOS and a noise hit

TX RX	599 123 123	599 123 123	599 CA CA	599 CA CA
best case UOS on	f599 f123 f123	f599 f123 f123	f599 CA CA	f599 CA CA
UOS on	xTOO f123 f123	f599 xQWE f123	xTOO CA CA	f599x:– CA
UOS on	f599 f123 f123	f599 f123 f123	f599 CA CA	f599 CA CA
UOS off	xTOO f123 f123	f599 xQWE f123	xTOO CA CA	f599x:– :–
UOS off	f599 123 123	f599 123 123	f599 1CA CA	f599 1CA CA
UOS on	xTOO QWE QWE	f599xQWE QWE	xTOO 1CA CA	f599 x:– CA
worst case UOS off	f599 123 123	f599 123 123	f599 1CA CA	f599 1CA CA
UOS off	xTOO QWE QWE	f599xQWE QWE	xTOO 1CA CA	f599 x:– :–

f: FIGS character

l: LTRS character

Garbled copy

Turning on UOS for both RX and TX is the best hedge:

- Most other stations will be that way
  - MMTTY default; 78% of survey respondents use MMTTY
- With only one noise hit, at least one of the important exchange elements is received properly

CTU
CONTEST
UNIVERSITY

ICOM

Hyphen Delimiter?

TX RX	599-123-123	599-123-123	599-CA-CA	599-CA-CA
UOS on	f599-123-123	f599-123-123	f599-1CAf-1CA	f599-1CAf-1CA
UOS on	xTOOAQWEAQWE	f599x123-123	xTOOA1CAf-1CA	f599-x:-f-1CA
UOS on	f599-123-123	f599-123-123	f599-1CAf-1CA	f599-1CAf-1CA
UOS off	xTOOAQWEAQWE	f599x123-123	xTOOA1CAf-1CA	f599-x:-f-1CA
UOS off	f599-123-123	f599-123-123	f599-1CAf-1CA	f599-1CAf-1CA
UOS on	xTOOAQWEAQWE	f599x123-123	xTOOA1CAf-1CA	f599-x:-f-1CA
UOS off	f599-123-123	f599-123-123	f599-1CAf-1CA	f599-1CAf-1CA
UOS off	xTOOAQWEAQWE	f599x123-123	xTOOA1CAf-1CA	f599-x:-f-1CA

UOS is defeated: so all four cases have identical noise results

f: FIGS character

l: LTRS character

Garbled copy

- Sending Hyphen instead Space "defeats" UOS and speeds up the message slightly by eliminating the FIGS character
  - However, if the first FIGS character is hit by noise, then the entire exchange is garbled
- Space with USO enabled is a slightly better hedge
  - Majority of stations use MMTTY with UOS enabled so at least one of the important exchange elements is received

CTU CONTEST UNIVERSITY

ICOM

LTRS/FIGS Characters
noise immunity

- MMTTY Double Shift may be enabled to send two LTRS or FIGS characters instead of one

- Eliminates single noise hits on LTRS and FIGS characters

- Moderate speed penalty for all transmissions

Probably not a good trade-off

CTU
CONTEST
UNIVERSITY

iCOM

Super Check Partial

- SCP (Super Check Partial) enables computer to pick out call signs in receive window

  - Call signs

  - New mults and double mults

  - Dupes

XYZAB	AA5AU	XYZAB
XYZAB	9Y1VC	9N8TT
XYZAB	W5UKM	XYZAB

N1MM Logger

- Use main SCP from CW/SSB/RTTY contests

  - RTTY SCP is a subset

CTU
CONTEST
UNIVERSITY

ICOM

Super Check Partial
logger differences

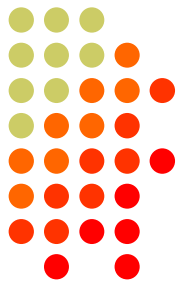**N1MM Logger**

WriteLog

Win-Test

Pre-Fill

"Danger, Will Robinson!"

- Pre-fill is a **_typing aid_** using prior log data
- Each logger is unique:
  - N1MM: Call History Lookup File (text file)
    - User-created with Excel from prior logs
  - WriteLog: Pre-fill File (ADIF file)
    - User-created with text editor from prior ADIF logs
  - Win-Test: Database File
    - Provided for specific contests by the Win-Test team
- **Log what is communicated to you!**

CONTEST UNIVERSITY

ICOM

Disciplined QSO Flow

- Standard keystroke (or mouse) sequences for:
  - Normal contact in Run mode
  - Normal contact in S&P mode
  - Repeats/Fills (in either mode)
  - QSO phase skip & tail-enders (in Run mode)
- Each sequence is executed the same way hundreds (thousands) of times during the contest
- Avoid deviations and special sequences

CONTEST UNIVERSITY

ICOM

The 4 Phases of a QSO

- Normal Run mode flow:
  1. Enter or F1 (CQ)
     - repeat
     - AGN?
  2. pile-up

  3. Insert or ' (grab call sign, send exchange)
     - Send fill(s)

  4. receive exchange
  ➢ check pre-fill, click their exchange
     - AGN? or NR? or QTH? or NAME?
  1. Enter or + (log contact, send TU/CQ)
     - optionally send F7 (QRV message)

- Normal S&P mode flow:
  1. CQ

  2. Enter or F4 (mycall)
     - repeat
  3. receive exchange
  ➢ check pre-fill, click their exchange
     - AGN? or NR? or QTH? or NAME?
  4. Enter or F5 (send exchange)
     - send fill(s)

  1. find next CQ

CTU
CONTEST
UNIVERSITY

ICOM

Callsign Stacking

"Slow Down to Win"

- Sailboat racing analogy:
  - Pinwheel effect at mark-rounding
- Let pile-up continue 1-3 seconds after getting first call sign
  - Increase chance for another call sign or two
  - Increase chance for QSO-phase-skip
- Apply same tactic for tail-enders … pause before sending TU/CQ message

CTU
CONTEST
UNIVERSITY

iCOM

Callsign Stacking

skip 2 phases

Normal

1. *WPX P49X P49X CQ, or TU P49X CQ*

2. *K3LR K3LR K5ZD K5ZD*

3. *K3LR 599 2419 2419*

4. *TU 599 842 842*

Shortened

1. (skip CQ)

2. (skip pile-up)

3. *K3LR TU NW K5ZD 599 2420 2420*

4. *TU 599 1134 1134*

CONTEST UNIVERSITY

iCOM

Callsign Stacking

tail-ender

Normal

1. *WPX P49X P49X CQ, or TU P49X CQ*

2. *K3LR K3LR*

3. *K3LR 599 2419 2419 K5ZD*

4. *TU 599 842 842*

Shortened

1. (skip CQ)

2. (skip pile-up)

3. *K3LR TU NW K5ZD 599 2420 2420*

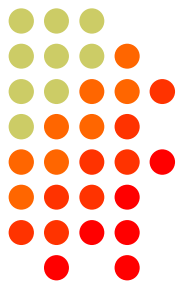4. *TU 599 1134 1134*

CTU CONTEST UNIVERSITY

iCOM

Callsign Stacking

- Efficiently work:
  - multiple callers in a pile-up, and
  - tail-enders to a completing QSO
- Calls pushed onto the stack as they arrive
- Message parameter pops call off of the stack into the Entry window
- Eliminates 2 of 4 QSO phases, which doubles rate
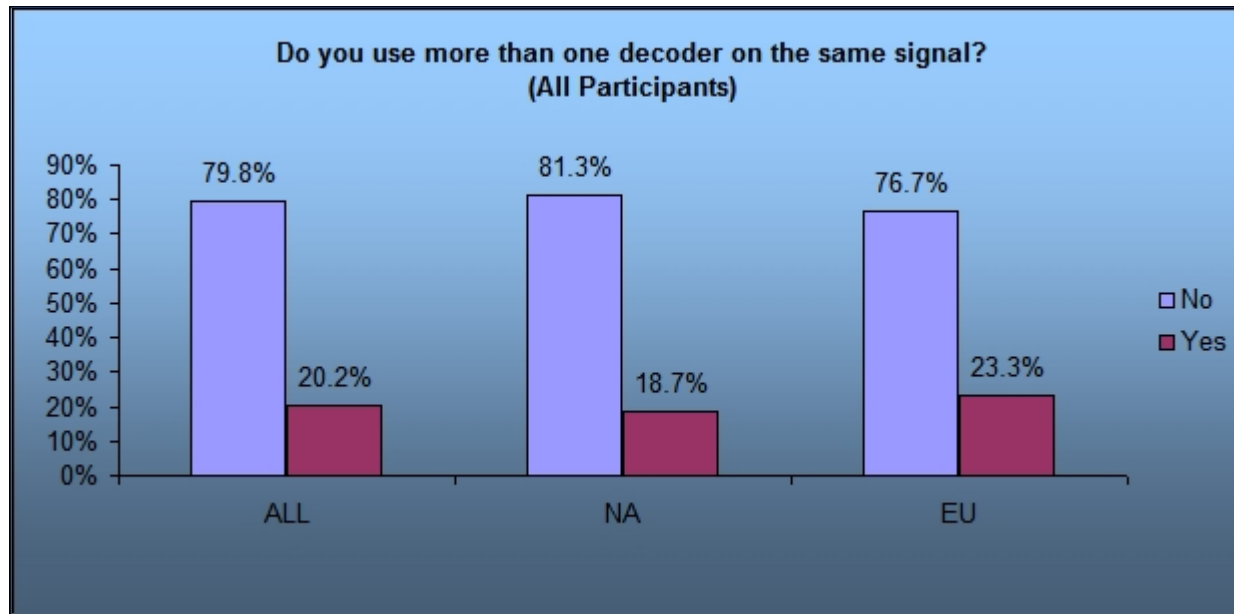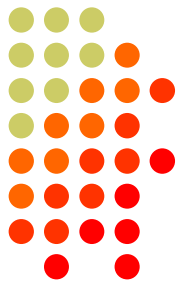
CONTEST UNIVERSITY

ICOM

RTTY Decoders
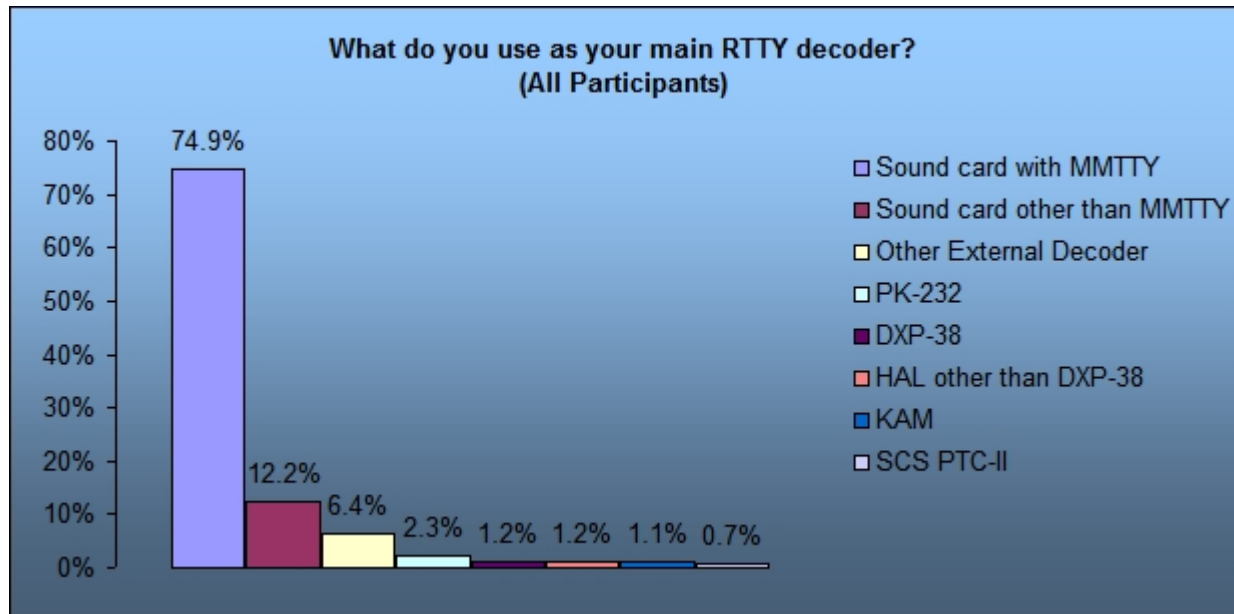
2010 survey

- 87% use soundcard decoding/encoding
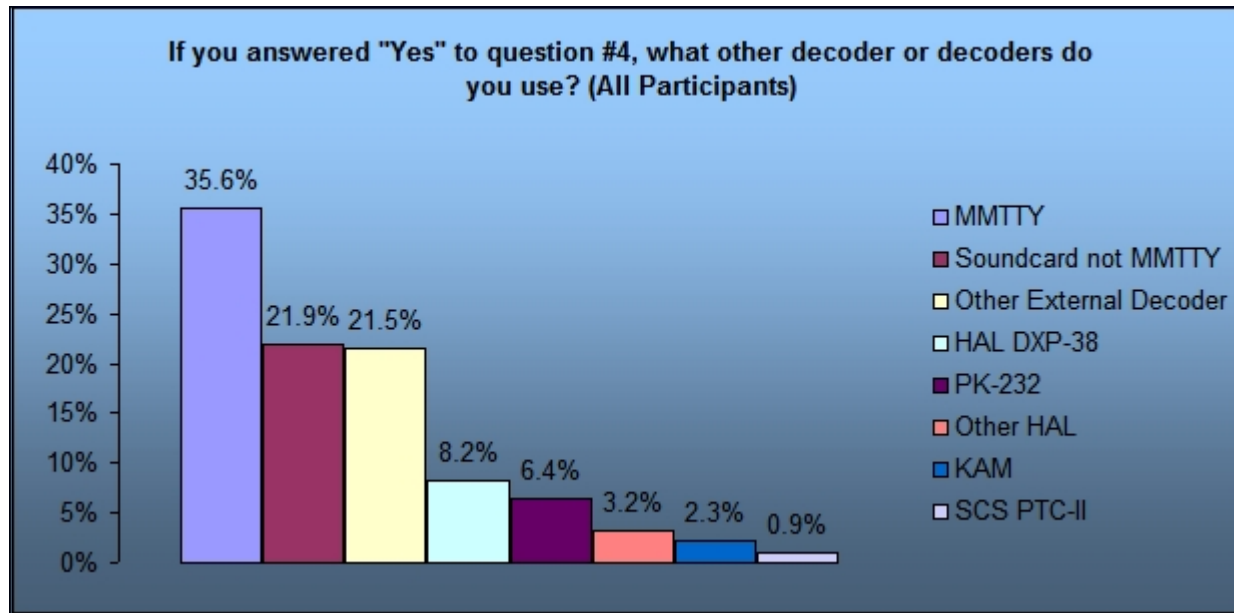- 86% of soundcard users run MMTTY

Multiple RTTY Decoders

2010 survey

Do you use more than one decoder on the same signal?
(All Participants)

- ALL: No 79.8%, Yes 20.2%
- NA: No 81.3%, Yes 18.7%
- EU: No 76.7%, Yes 23.3%

• 20% use multiple decoders

Multiple RTTY Decoders

2010 survey

If you answered "Yes" to question #4, what other decoder or decoders do you use? (All Participants)

- MMTTY — 35.6%
- Soundcard not MMTTY — 21.9%
- Other External Decoder — 21.5%
- HAL DXP-38 — 8.2%
- PK-232 — 6.4%
- Other HAL — 3.2%
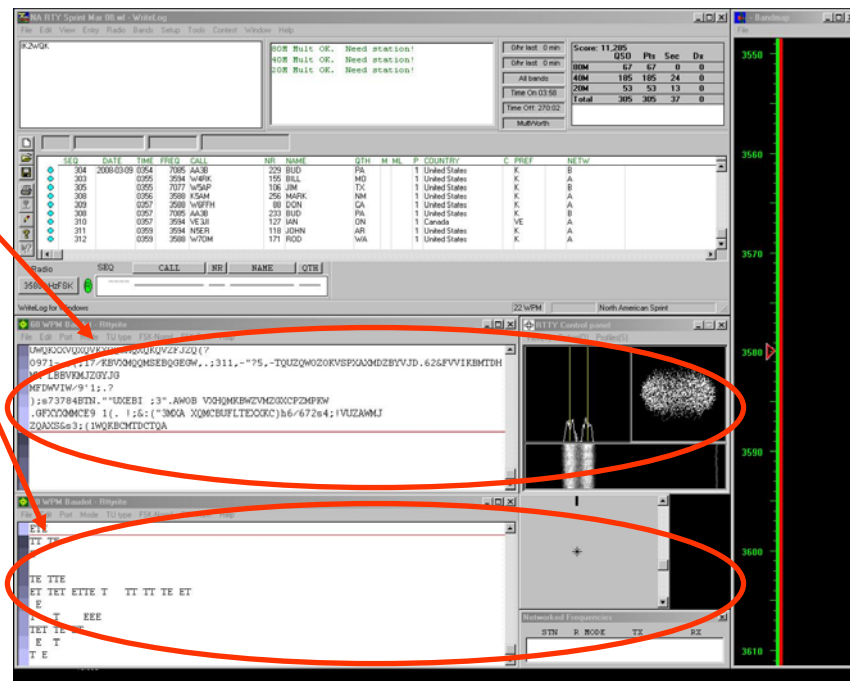- KAM — 2.3%
- SCS PTC-II — 0.9%

CTU CONTEST UNIVERSITY

ICOM

Multiple RTTY Decoders
MMTTY & DXP38-WriteLog

- ### Parallel decoding
  - #### Software, e.g., MMTTY
  - #### Hardware, e.g., DXP38
- ### Diverse conditions
  - #### Flutter
  - #### Multi-path
  - #### QRM, QRN
  - #### Weak signals
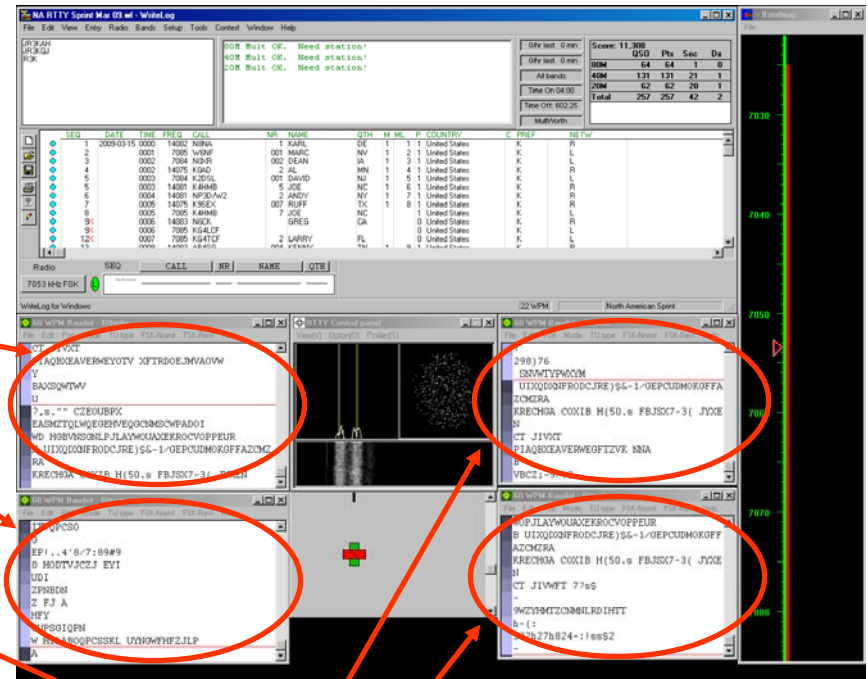 - #### Off-frequency stations

CTU
CONTEST
UNIVERSITY

iCOM

Multiple RTTY Decoders
multiple MMTTY profile windows

- Parallel decoding
  - same audio stream
  - switching takes too long
- Multiple profile windows
  - Standard
  - Fluttered signals
  - Fluttered signals (FIR)
  - Multi-path
  - hyper sensitive
  - EU1SA
  - AA6YQ-FIR-512
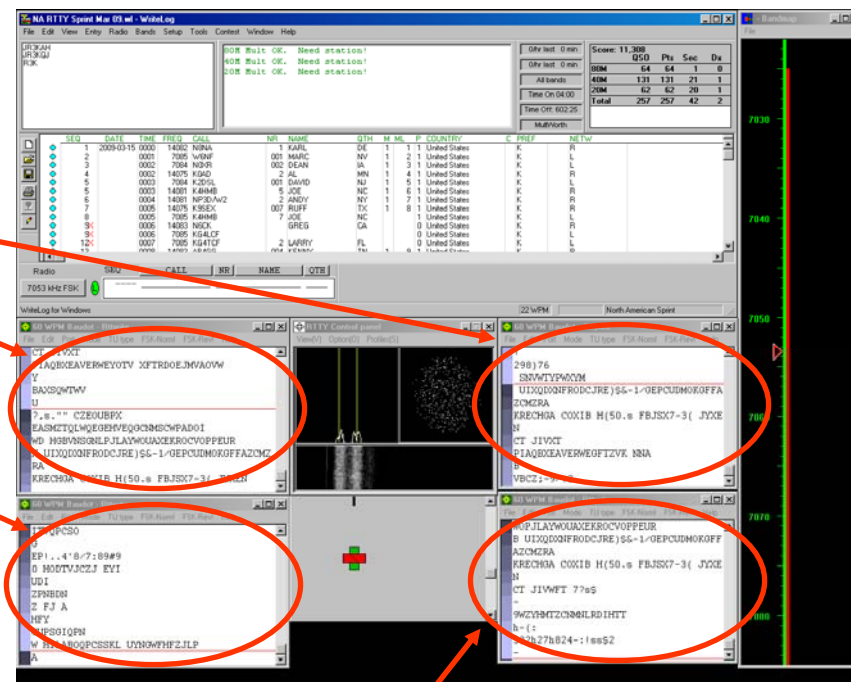   - weak signals in QRN

ICOM

Multiple RTTY Decoders
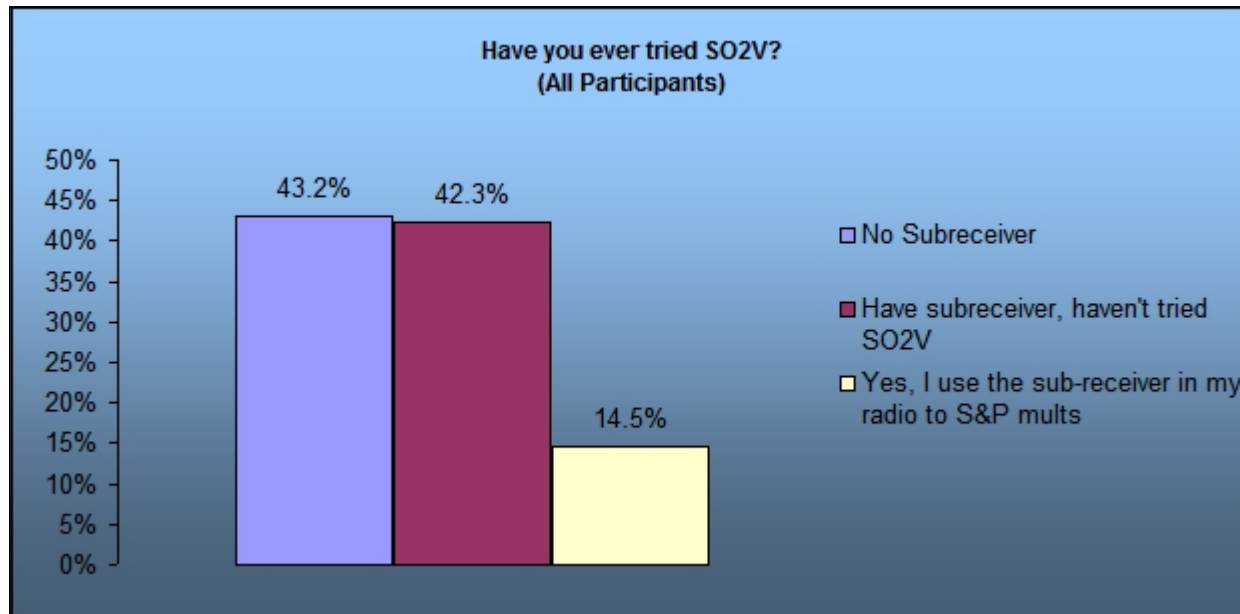## *two IF bandwidths*

- Narrow IF filtering (main RX)
  - Hardware modem, i.e. DXP38
  - MMTTY profiles
    - Standard
    - Fluttered signals
    - Fluttered signals (FIR)
    - Multi-path
    - hyper sensitive
    - EU1SA
- Wide IF filtering (sub RX)
  - MMTTY profiles
    - AA6YQ-FIR-512
      - Dual Peak Filter
      - "Matched filter"

SO2V

Have you ever tried SO2V?
(All Participants)

43.2%   42.3%   14.5%

- No Subreceiver
- Have subreceiver, haven't tried SO2V
- Yes, I use the sub-receiver in my radio to S&P mults

- Almost 15% have tried SO2V

SO2V

- If Assisted and running on VFO-A, then
  - A<>B
  - Click spot, tune, ID station, work station
  - A<>B, resume running
- Or, setup decoder windows on A and B
  - Radio must have two true receivers
  - Monitor both frequencies simultaneously with right/left channels of sound card
    - Right-click call from 2nd RTTY window into VFO-B Entry Window
  - Two ways to transmit on VFO-B:
    - A<>B, work the mult, A<>B
    - SPLIT, work the mult, $\overline{\text{SPLIT}}$, resume running
      - Requires "wire-OR'd" FSK or AFSK and two transmit RTTY windows
      - K3/WriteLog invokes SPLIT when call is right-clicked
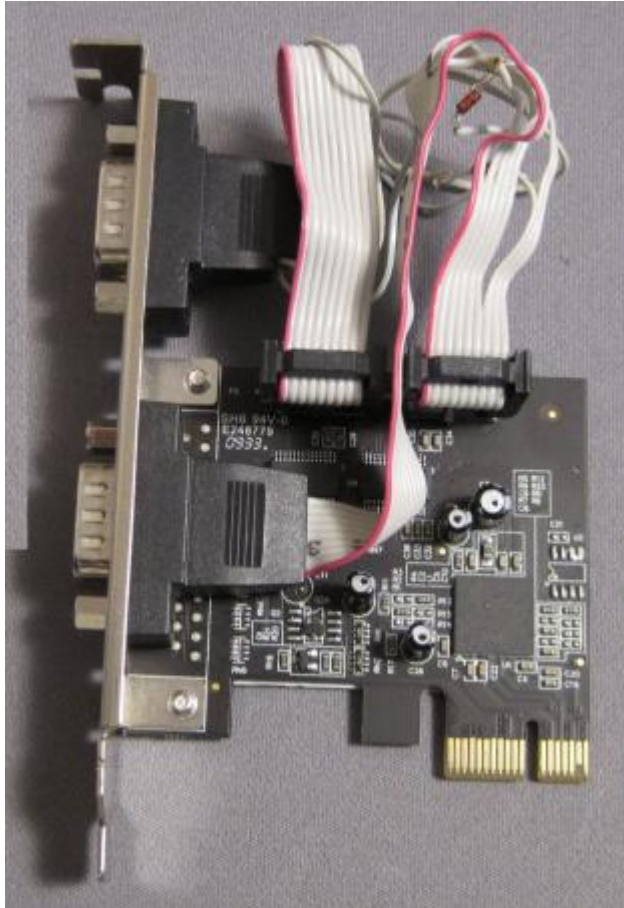
SO2V Wire-OR FSK/PTT
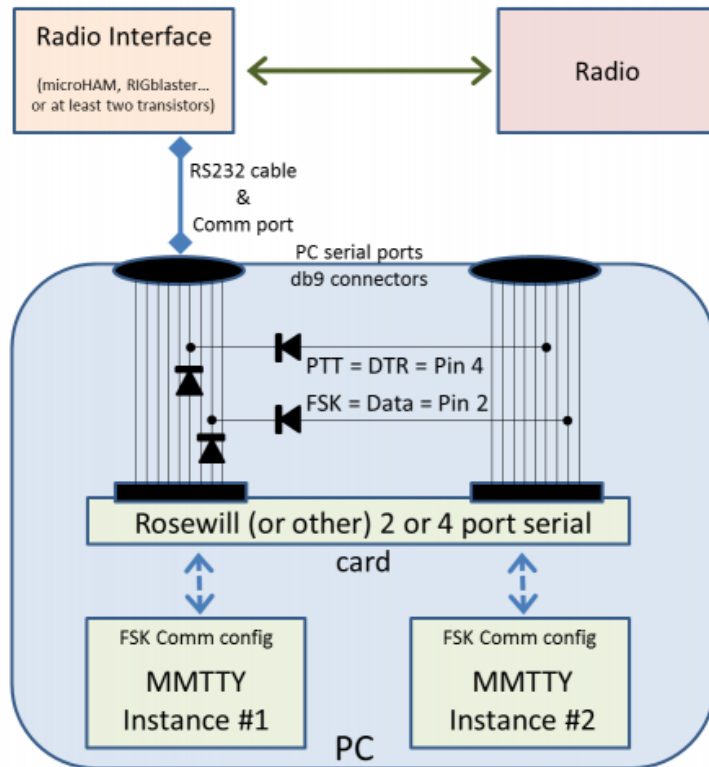
Serial Signals (K8UT)
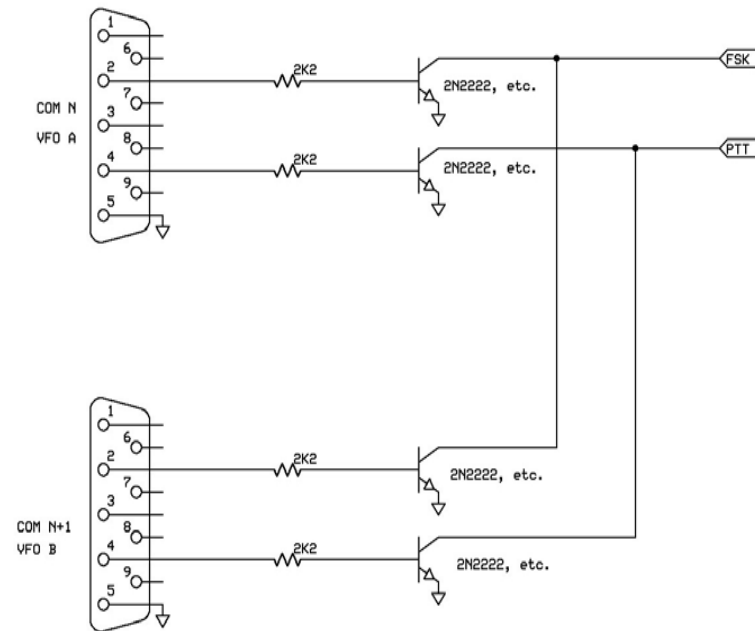
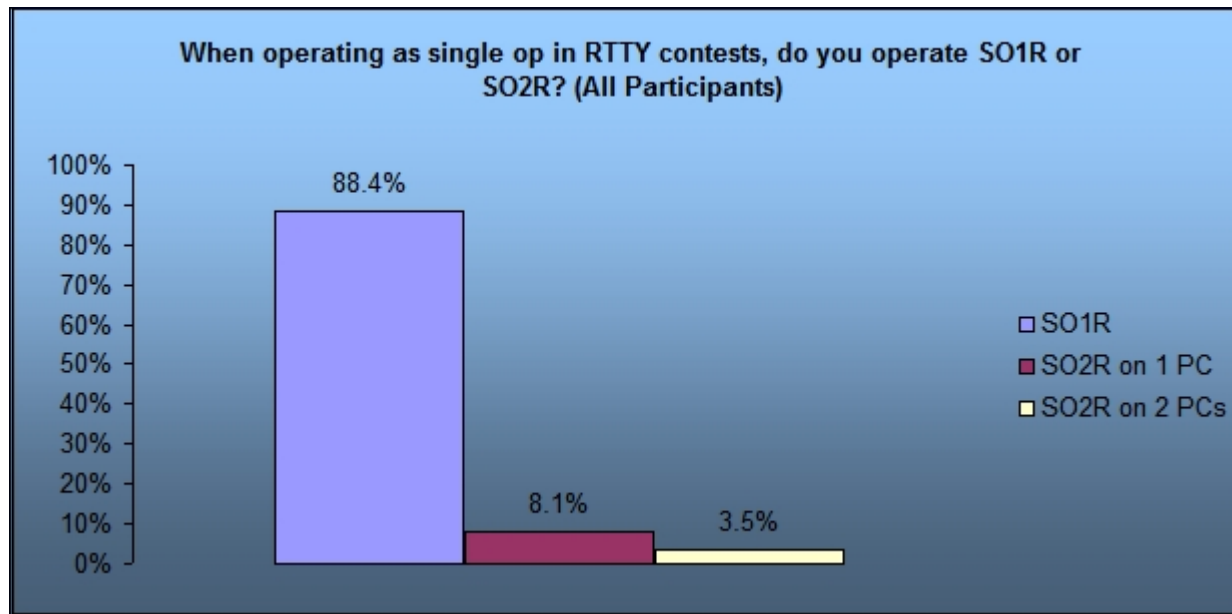**FSK/PTT Signals (W0YK)**

SO2V Wire-OR FSK/PTT

Serial Signals (K8UT)

FSK/PTT Signals (W0YK)

SO2R

2010 survey

When operating as single op in RTTY contests, do you operate SO1R or SO2R? (All Participants)

- SO1R
- SO2R on 1 PC
- SO2R on 2 PCs

88.4%
8.1%
3.5%

- 12% operate SO2R
- 30% of SO2R users use 2 PCs

54/92

SO2R

- Eliminates SO1R RTTY boredom
- Think beyond run and S&P:
  - Dueling CQs; run on two bands simultaneously
  - S&P on two bands simultaneously, esp. w/Packet
  - SO2V on one or both radios (SO4V!)
- Two networked computers:
  - Eliminates PC focus swapping
  - RTTY doesn't require much typing
    - Mini-keyboards ideal for RTTY
  - 2 x SO2V=SO4V for picking up mults on both run bands
  - Easily extendible to SO4R

  No time to watch TV or read spy novels!

SO2R

M2 configuration

Left-hand Trackball

Right-hand Trackball

Right-sized Keyboards

56/92

SO2R in the NA Sprint

- Set VFOs at least 10 kHz apart on both radios

- Find a clear spot on one radio and CQ while you tune the other radio for a station to work

- If you don't find a station to work quickly (within a minute), find a clear frequency and duel CQ

- After a QSO swap VFOs on that radio, search for up to a minute, then resume dueling CQ

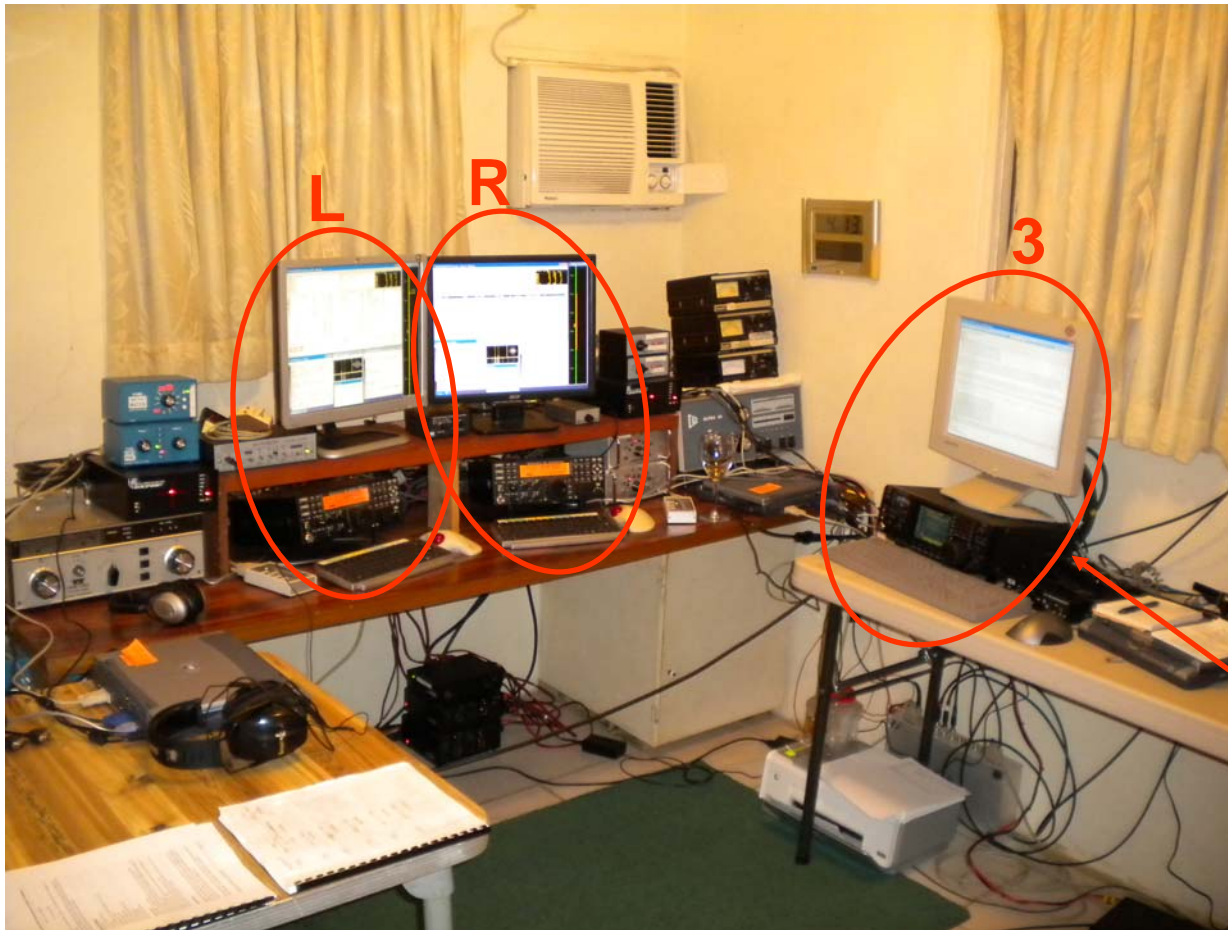- Don't waste time trying to work the "couplet" … CQing is OK in Sprint!

SOnR

> 2 radios

- Simplify antenna/filter band-decoding:
  - Dedicate a band/antenna to the 3rd (or 4th) radio
- Networked PC/radio simplifies configuration
- RTTY (vs. CW or SSB) easier for operator
  - PC decodes for operator
  - Low tones & high tones allows two radios per ear
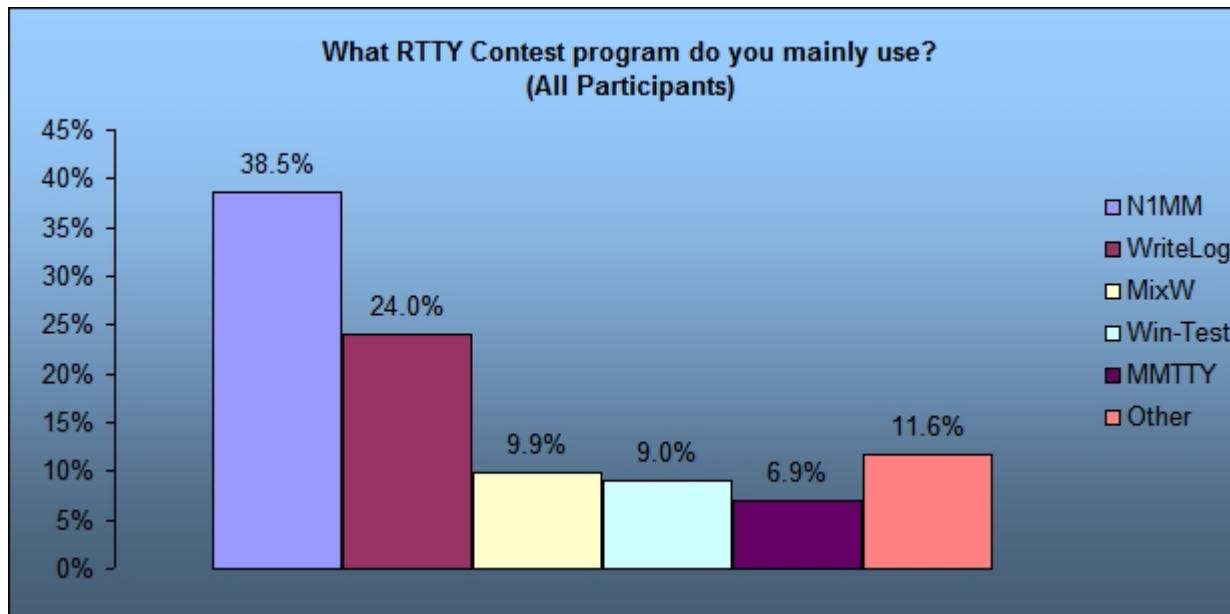   - Classic audio headphone mixer provides radio 1, radio 2 or both

CTU
CONTEST
UNIVERSITY

ICOM

SOnR

Multi-Multi configuration

L   R   3

dedicated
to 10 meters

CTU
CONTEST
UNIVERSITY

ICOM

Logging Software

What RTTY Contest program do you mainly use?
(All Participants)

- N1MM: 38.5%
- WriteLog: 24.0%
- MixW: 9.9%
- Win-Test: 9.0%
- MMTTY: 6.9%
- Other: 11.6%

- MixW still ahead of Win-Test
- MMTTY used stand-alone

2012 CQ WPX RTTY

3550 submitted logs

A bar chart showing the number of submitted logs by logging software. The vertical axis ranges from 0 to 2000 in increments of 200. The data values (approximate):

Software	Logs
N1MM	~1840
MixW	~520
WriteLog	~300
Win-Test	~210
Qartest	~100
UR5EQF LOG	~80
UCXLOG	~70
ADIF2CBR	~70
RTCL Print	~70
RCKLOG	~60
CTESTWIN	~50
MMTTY	~40
AATEST	~30
ContestLC	~30

CTU
CONTEST
UNIVERSITY

ICOM
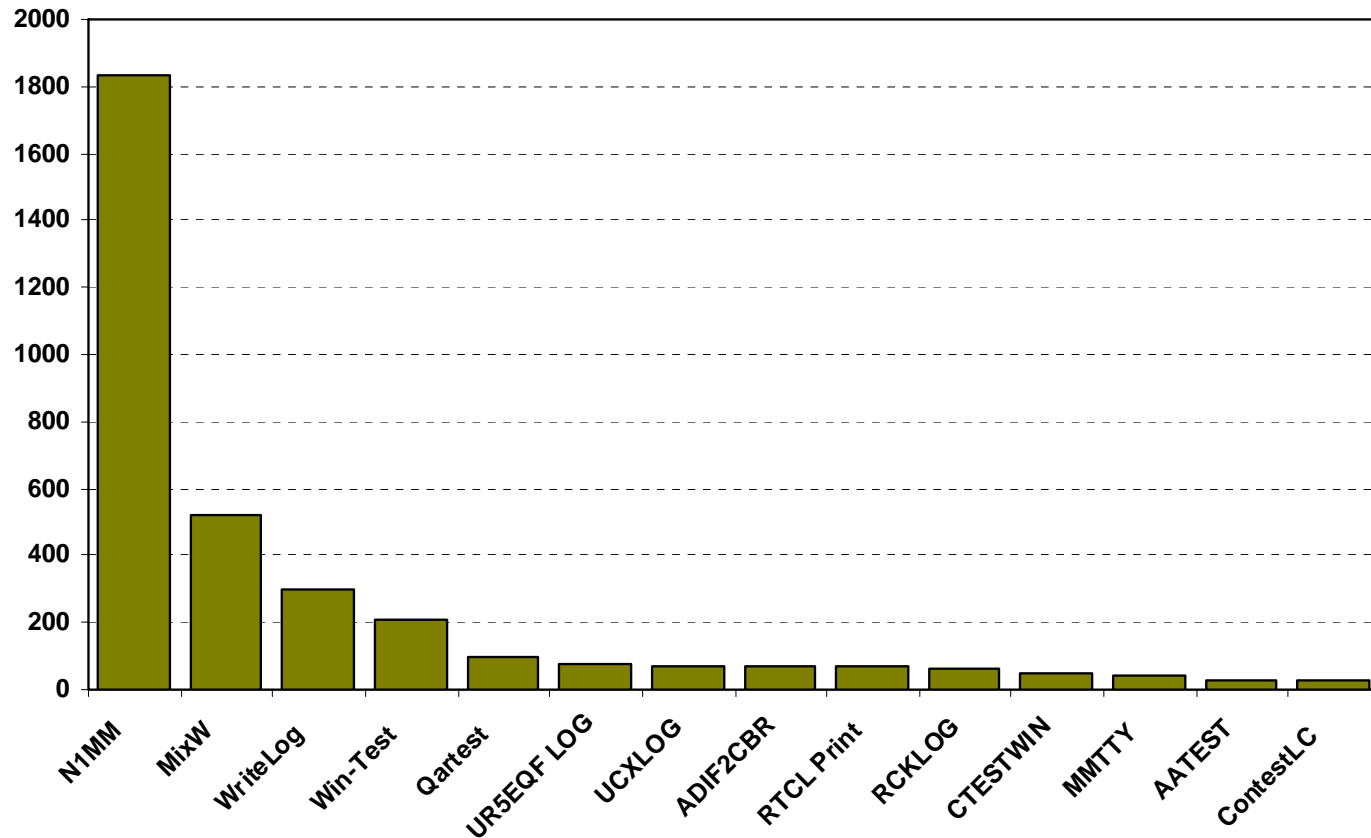
Logging Software

- N1MM Logger *(2000; dedicated RTTY software designer)*
  - Free
- WriteLog *(1994)*
  - created for RTTY *(CW & SSB came later)*
  - *www.rttycontesting.com* web site
- Win-Test *(2003; RTTY is low priority)*

All three integrate MMTTY and have similar functionality for basic RTTY contesting.

RTTY Contest Loggers

	WriteLog	N1MM	Win-Test
MMTTY	☺	☺	☺
2Tone	☺	☺	-
other decoders	☺	some	none
Call sign acquisition	☺	☺	☺
Contests supported	☺	☺	fewer
Advanced RTTY	☺	☺	none

- *All three are entirely adequate for basic RTTY contesting*
- *Use the logger you are already familiar with for CW & SSB*

CTU CONTEST UNIVERSITY

iCOM

Logging Software
N1MM Logger, WriteLog, Win-Test

- 13 features compared
  - Simplifying assumption: features equally weighted
  - Rated 0 to 5
- All three score '5' on:
  - MMTTY integration
  - Stateful Enter key (ESM: Enter Sends Message)
  - Accelerator keys
  - QRV message parameter
- Another 9 advanced RTTY features distinguish these loggers

CTU CONTEST UNIVERSITY

iCOM

Logging Software
MTTY integration

- Install free MMTTY software

- Logger integrates MMTTY
  - WriteLog requires additional MMTTY plug-in SW

- All three loggers
- Integrated excellent encoder/decoder

CTU
CONTEST
UNIVERSITY

iCOM

Logging Software
stateful Enter key

- Stateful Enter key (ESM=Enter Sends Message)
  - Cursor in call sign field:
    1. Sends CQ if Call Sign Window empty, else
    2. Sends call sign & exchange
  - Cursor in exchange field:
    3. Sends TU/CQ
- N1MM Logger highlights active key(s)

- All three loggers
- Efficient keyboarding

Logging Software

accelerator keys

- Insert grabs call sign & sends exchange
- + logs QSO & sends TU/CQ
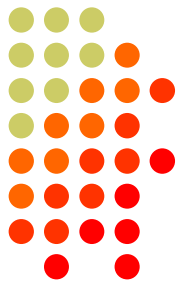
- All three loggers
- Saves keystrokes

Logging Software

automatic QRV

- *QRV 28079.3*
- Message parameter for other radio's VFO

- All three loggers
- Efficient QSY, mult move or "self-spotting"

CTU
CONTEST
UNIVERSITY

iCOM

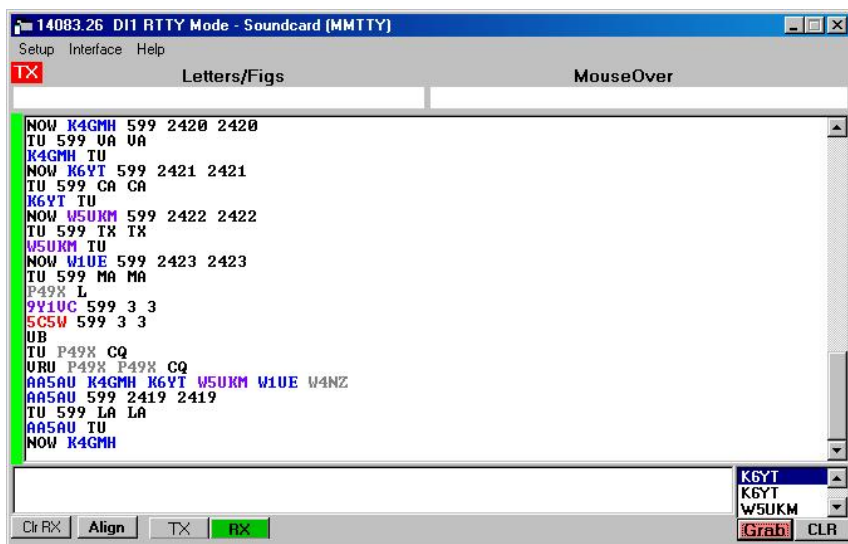# RTTY Contest Loggers
relative ratings

WL	N1	WT	Logger
5	3	4	• RTTY window readability
5	4	0	• Multiple decoders
5	4	0	• multiple MMTTY or 2Tone
0	5	3	• ESM mouse ctrl & Sprint mode
5	5	0	• SO2V
5	3	3	• M2 SO2R configuration
5	4	5	• Re-mapped keys
5	5	3	• Call sign stacking
5	3	5	• AFSK/FSK flexibility
40	*36*	*23*	*Overall*

CTU
CONTEST
UNIVERSITY
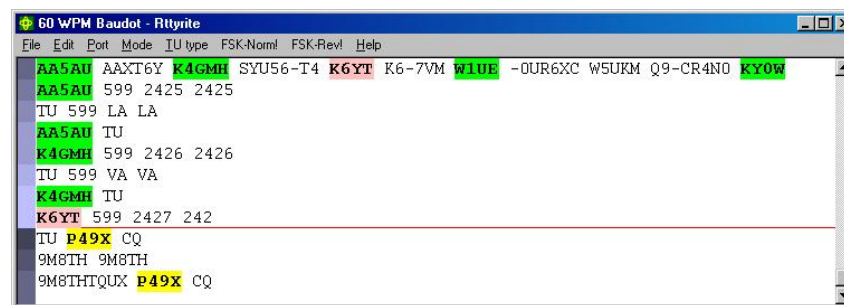
ICOM

Logging Software
RTTY Window Readability

N1MM Logger

Colored text is difficult to read, especially the dark blue (unworked call) which has negligible contrast to black text or black background. The dark blue cannot be changed by the user. *HOWEVER …*
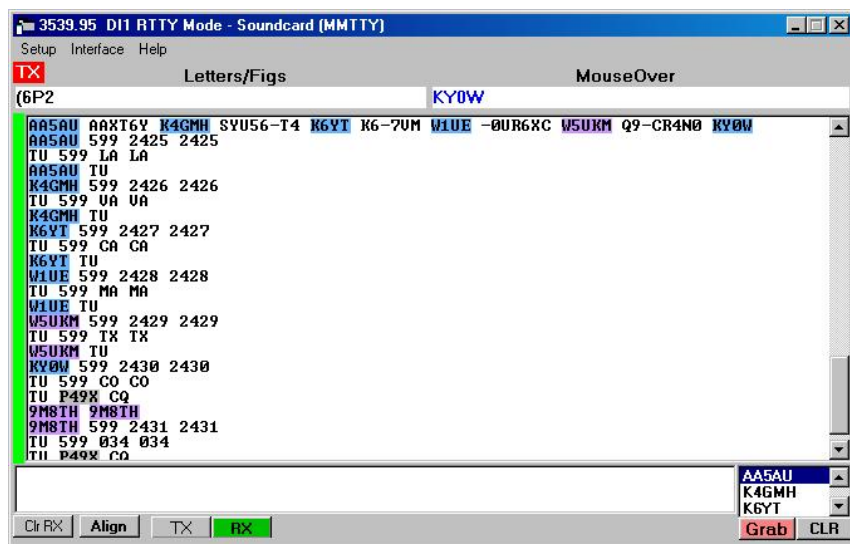
WriteLog

Colored highlighting has outstanding readability. The text all remains black for maximum contrast and the highlighting does not detract. Rather the large highlight area around the text make it extremely easy to zero in on the call sign of interest, especially when quickly moving one's eyes between multiple windows.

CTU
CONTEST UNIVERSITY

ICOM

Logging Software
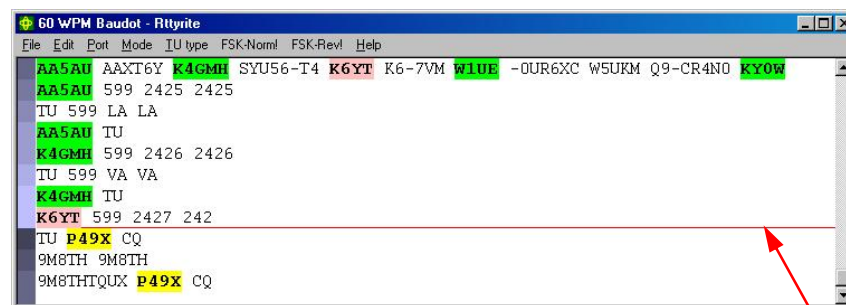## *RTTY Window Readability*

N1MM Logger

Colored text is difficult to read, especially the dark blue (unworked call) which has negligible contrast to black text or black background. The dark blue cannot be changed by the user. *HOWEVER, there is now an option for highlighting like WriteLog and WinTest.*

WriteLog

Colored highlighting has outstanding readability. The text all remains black for maximum contrast and the highlighting does not detract. Rather the large highlight area around the text make it extremely easy to zero in on the call sign of interest, especially when quickly moving one's eyes between multiple windows.

WriteLog is unique in having a NON-SCROLLING RTTY window, so you don't have to chase text up the screen!

CTU
CONTEST UNIVERSITY

ICOM

Logging Software

multiple decoders

- N1MM Logger limited to 4 total, but has best DXP38 support

- WriteLog has 10 additional decoders per rcvr and the most hardware MODEMs

- Win-Test only supports one instance of MMTTY

- WriteLog & N1MM Logger only

- Multiple parallel decoders for marginal copy

CTU
CONTEST
UNIVERSITY

ICOM

Logging Software
ESM mouse control

- Left-click enters call sign or exchange
- Right-click (ESM) sends exchange or TU/CQ
- QSOs can be worked entirely with mouse action, except for the rare instance where a call or exchange must be typed in
- Particularly suited to unique non-prefillable exchanges such as serial numbers

- N1MM Logger only
- Eliminates keyboard for efficiency

CTU
CONTEST
UNIVERSITY

ICOM

SO2V

- Basic capability with two VFOs
- Advanced capability with two receivers
  - Requires second receiver in radio
  - Independent RTTY window for second receiver
  - radio/logger SPLIT mode

- N1MM Logger & WriteLog
- Interleave S&P QSOs on Run band

CTU
CONTEST
UNIVERSITY

ICOM

SO2R

- PC & UI per radio; networked
- Single signal interlock
- Extendible to SOnR

- Only WriteLog
- Another user preference alternative; SOnR

CTU
CONTEST
UNIVERSITY

iCOM

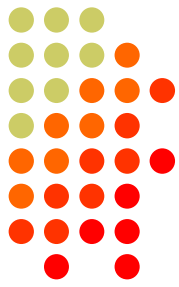# Logging Software

key re-mapping

- Soft re-definition of keyboard keys
- Examples:
  - Insert → '
  - = → PopCallFromStack
- WriteLog provides a rich built-in function set for key shortcuts

- WriteLog & Win-Test remap keys and functions
- N1MM Logger uses HotKeys
- Relocates keys for efficiency

Logging Software

re-mapped keys

Fn key labels

long CQ

Push to Stack

Pop from Stack

mycall

Sprint S&P exch

Stateful Enter
- CQ
- hiscall/exch
- TU/log

Insert … hiscall/exch

c1 TU NOW

CTU CONTEST UNIVERSITY

ICOM

Logging Software
callsign stacking

- N1MM Logger can automatically fill stack
- WriteLog has convenient stack management
- Win-Test script can use partner stack

- All three loggers
- Doubles rate by skipping CQ & pile-up

CTU
CONTEST
UNIVERSITY

iCOM

Logging Software
callsign stacking

- N1MM Logger automatically pushes calls into the Grab window.
  - It can also explicitly push calls onto the Call Stack (like WriteLog and Win-Test)
  - There is a rich list of stack functions and ESM integration
- WriteLog explicitly right-clicks calls onto the call stack
- Win-Test requires a LUA script to push calls onto the Partner Stack

Automatic vs. explicit pushing is personal pref.
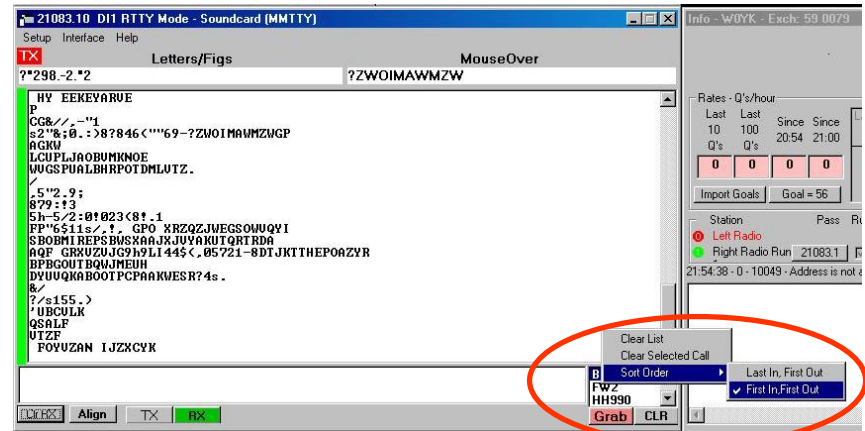
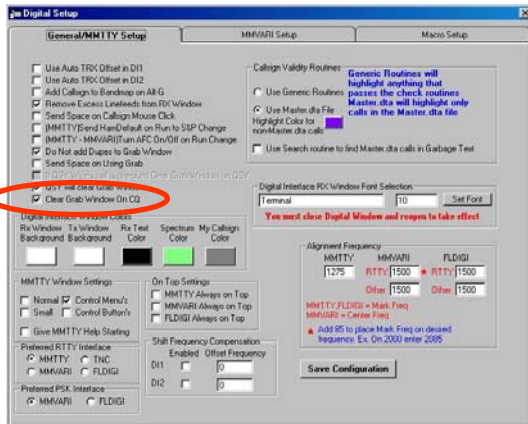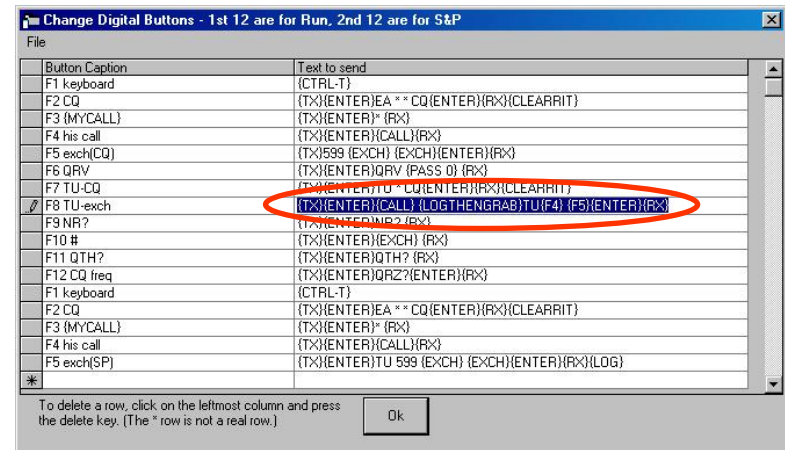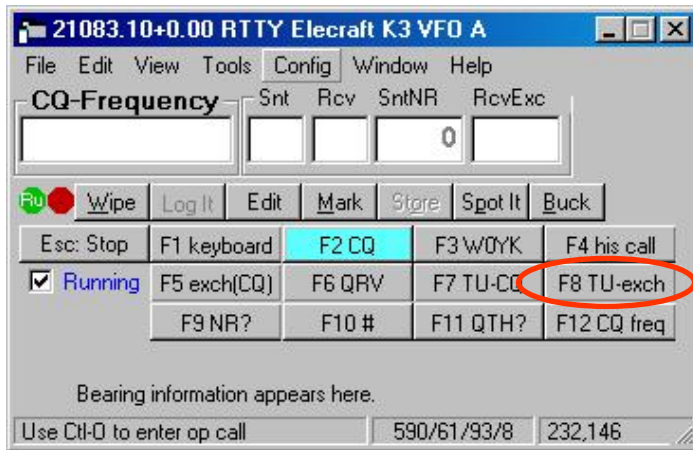# Logger Software
callsign stacking: N1MM Logger

- Setup:
  - Create a F8 message (macro):
    - {TX} ! {LOGTHENGRAB}TU NOW {F4}{F5}{RX}
    - ! or F4: his call; F5: CQ-exchange … your choice of Fn
  - Configure the Grab window:
    - Choose "Clear Grab window with CQ" (on DI tab of Configuration window)
    - Choose "First In, First Out" (right-click Grab window)
- Operate:
  - Each highlighted call in DI window automatically goes into Grab window
  - Send this macro in place of TU/CQ macro when you want to work the next call in stack
  - Sending the CQ message clears the Grab window
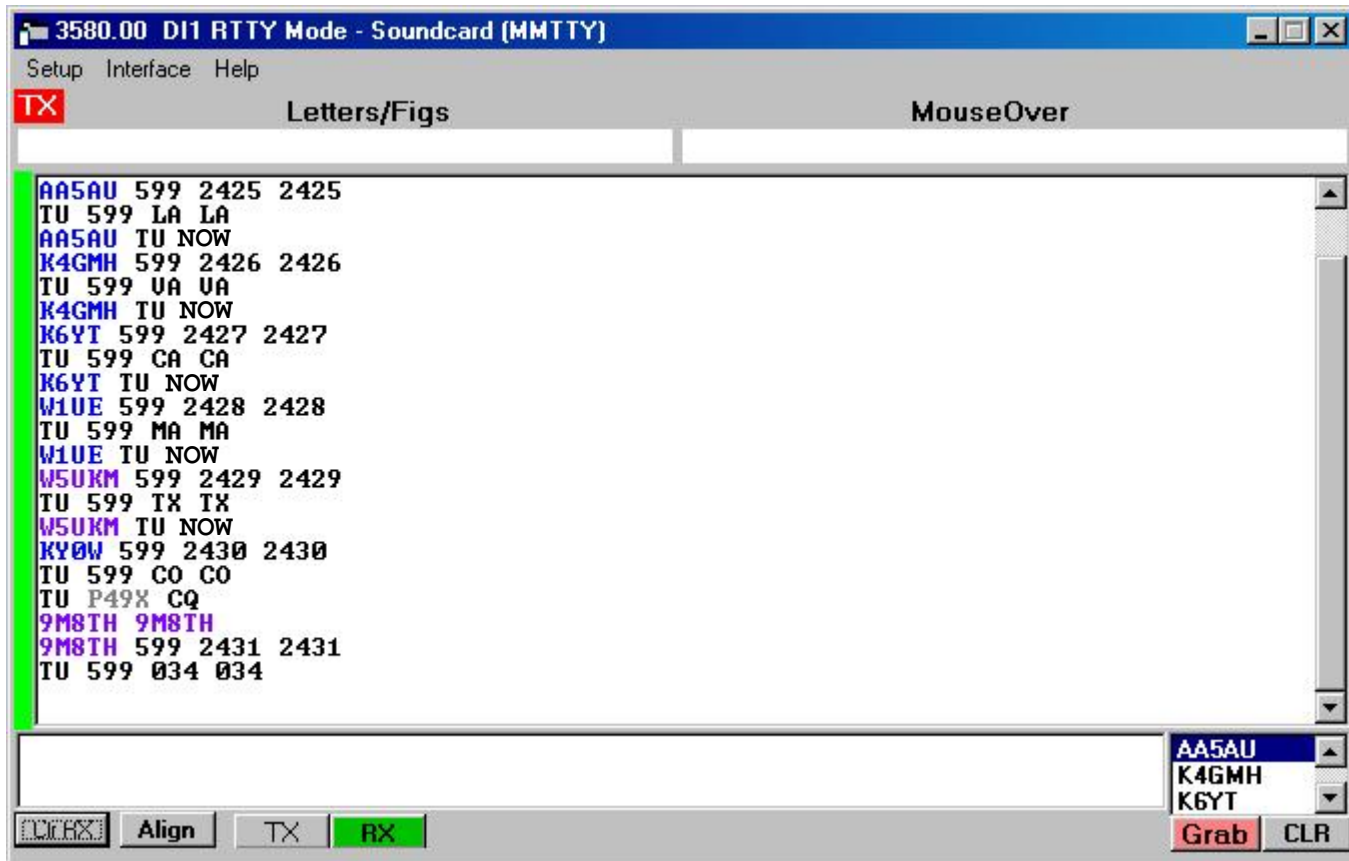 - Delete calls from stack by right-clicking and choosing "Delete"

CTU CONTEST UNIVERSITY

ICOM

Logging Software
callsign stacking: N1MM Logger - 2

Logging Software
callsign stacking: N1MM Logger - 3

3580.00 DI1 RTTY Mode - Soundcard (MMTTY)

Setup Interface Help

TX   Letters/Figs   MouseOver

```
AA5AU 599 2425 2425
TU 599 LA LA
AA5AU TU NOW
K4GMH 599 2426 2426
TU 599 VA VA
K4GMH TU NOW
K6YT 599 2427 2427
TU 599 CA CA
K6YT TU NOW
W1UE 599 2428 2428
TU 599 MA MA
W1UE TU NOW
W5UKM 599 2429 2429
TU 599 TX TX
W5UKM TU NOW
KY0W 599 2430 2430
TU 599 CO CO
TU P49X CQ
9M8TH 9M8TH
9M8TH 599 2431 2431
TU 599 034 034
```

AA5AU
K4GMH
K6YT

CLRX   Align   TX   RX   Grab   CLR

Logger Software
callsign stacking: N1MM Logger - 4

Alternatively, the Call Stack may be used:

- Setup:
  - Create a F8 message (macro):
    - {TX} ! {LOGTHENPOP}TU NOW {F4}{F5}{RX}
    - ! or F4: his call; F5: CQ-exchange … your choice of Fn

- Operate:
  - Alt-click a callsign to push it onto the Call Stack
  - Send this macro in place of TU/CQ macro when you want to work the next call in stack
  - Sending the CQ message clears the Call Stack
  - Delete calls from the Call Stack by right-clicking and choosing "Delete"

CTU
CONTEST UNIVERSITY

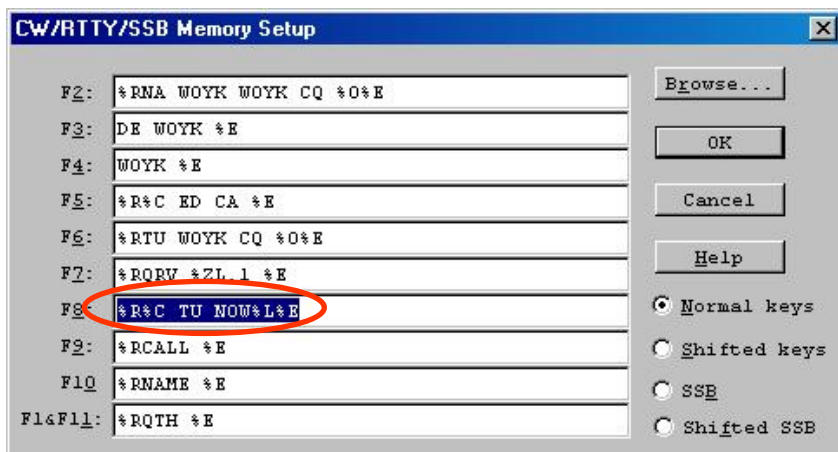ICOM

Logging Software
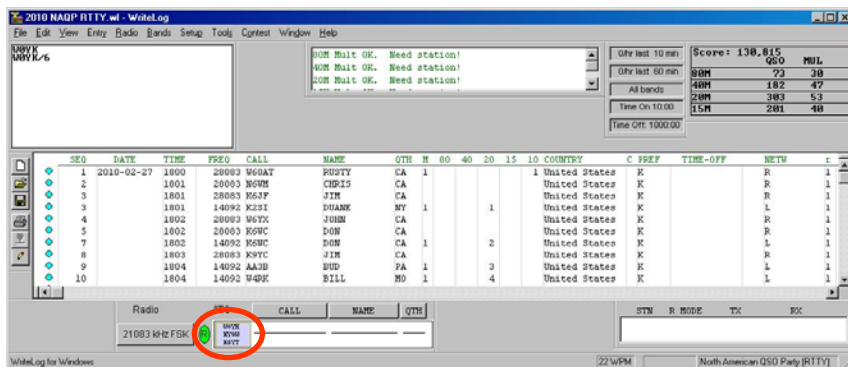## *callsign stacking: WriteLog*

- Setup:
  - Configure right-click for Push-only in writelog.ini:
    - [RttyContextMenuEntries]
    - 1=PUSHCALL
  - Define Push and Pop keys, using the Keyboard Shortcuts feature:
    - Push Call on the Graves (~) key
    - Pop Call on the Equals (=) key
  - Create <TU NOW msg>
    - %R%C TU NOW%L
- Operate:
  - Push calls onto stack
    - configure right-click for single menu item
    - right-click call in Rttyrite window
  - At the end of the current QSO, press <TU NOW msg> followed by the Insert key or Enter key (the normal CQ-exchange msg)
  - Press TU/CQ msg (rather than + or Enter) when you don't want to pop the stack for your next contact
  - Pop/Push to rotate the desired call into Entry window without losing others (replace Push with Alt-W to delete a call, or do another Pop)

CONTEST UNIVERSITY

ICOM

Logging Software
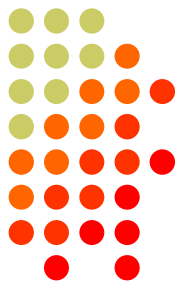## *callsign stacking: WriteLog - 2*

- Create Fn macro
  - %R%C TU NOW%L%E

- Push calls onto stack
  - Right-click call in Rttyrite window

Logging Software

callsign stacking: WriteLog - 3

Logging software window titled "60 WPM Baudot - Rttyrite" showing RTTY contest contacts with stacked callsigns.

Logging Software
AFSK & FSK flexibility

- WriteLog has built-in AFSK & FSK
- N1MM relies on MODEM for AFSK or FSK

- WriteLog
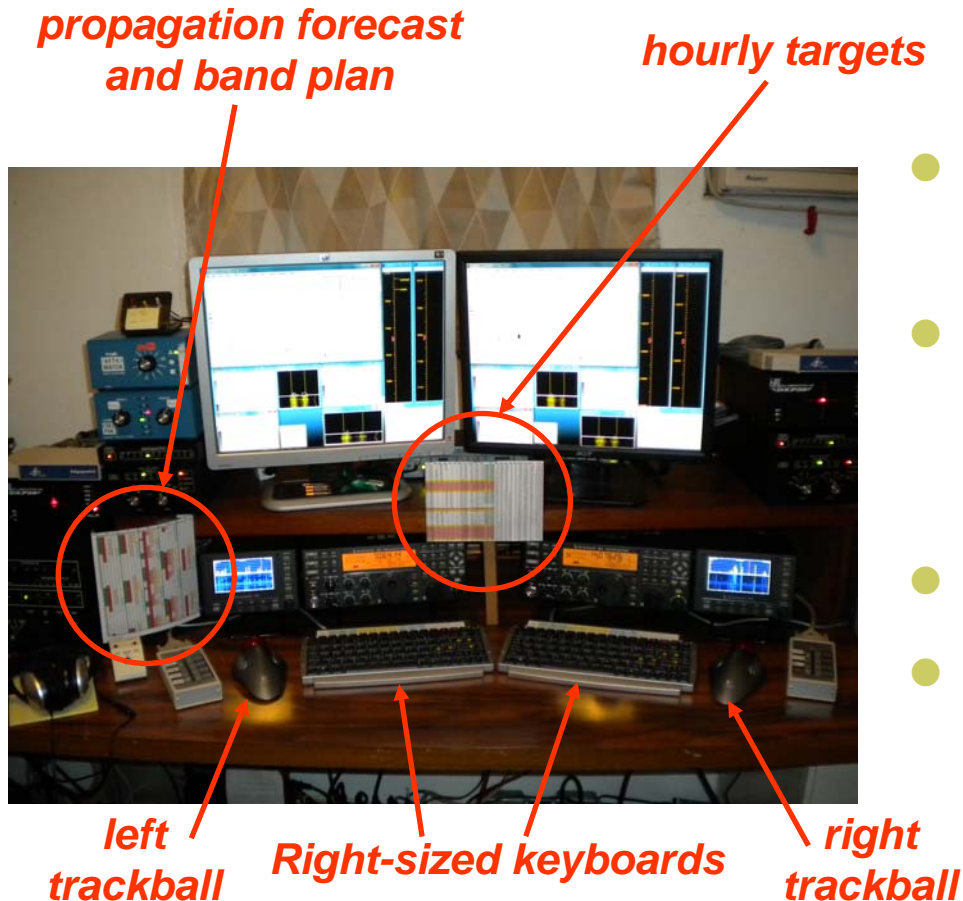- Independence from MODEM for transmit

CTU
CONTEST
UNIVERSITY

iCOM

RTTY Contest Loggers
relative ratings

WL	N1	WT	Logger
5	3	4	• RTTY window readability
5	4	0	• Multiple decoders
5	4	0	• multiple MMTTY or 2Tone
0	5	3	• ESM mouse ctrl & Sprint mode
5	5	0	• SO2V
5	3	3	• M2 SO2R configuration
5	4	5	• Re-mapped keys
5	5	3	• Call sign stacking
5	3	5	• AFSK/FSK flexibility
40	**36**	**23**	*Overall*

CTU
CONTEST
UNIVERSITY

ICOM

Ergonomics

user interface

propagation forecast and band plan

hourly targets

left trackball

Right-sized keyboards

right trackball

- Comfortable heights, reaches, layout
- Right-sized keyboard
  - Fn keys template
  - Label re-mapped keys
- Right & left trackballs
- Bose QC2 phones
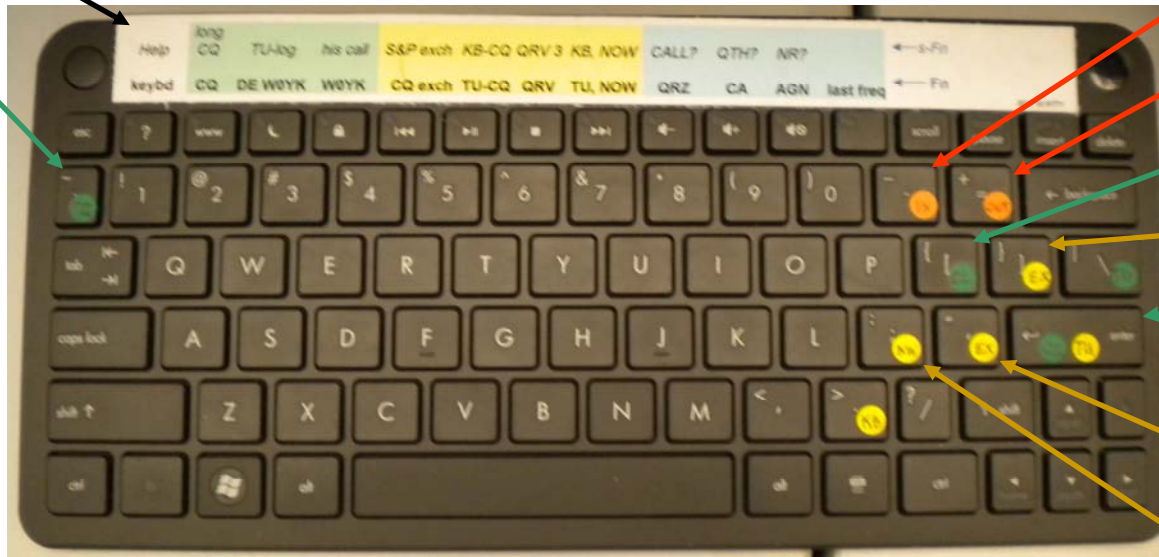 - Minimal volume
  - Stereo

CTU
CONTEST UNIVERSITY

ICOM

Ergonomics

right-sized keyboard

Fn key labels

long CQ

Push to Stack

Pop from Stack

mycall

Sprint S&P exch

Stateful Enter
- CQ
- hiscall/exch
- TU/log

Insert …
hiscall/exch

c1 TU NOW

Full-size QWERTY keyboard; no number pad; integrated cursor keys

CTU
CONTEST
UNIVERSITY

iCOM

Ergonomics

keyboard or mouse?

- Keyboard – minimal typing in RTTY
  - Either:
    - F1, Insert and + … or,
    - Enter, Insert and Enter (ESM – Enter Sends Message)
    - Plus Fn keys or re-mapped Fn keys
  - Mouse click received exchange, if not pre-filled
- Mouse/trackball
  - 100% (N1MM Logger)
  - 80% (WriteLog and Win-Test)

Resources

- www.rttycontesting.com
  - Tutorials and resources (beginner to expert)
  - WriteLog/MMTTY
- rtty@contesting.com
  - Email reflector
  - RTTY contester networking
  - Q&A
- Software web sites
  - mmhamsoft.amateur-radio.ca/ (MMTTY)
  - n1mm.hamdocs.com/tiki-index.php (N1MM Logger)
  - www.writelog.com (WriteLog)
  - www.wintest.com (Win-Test)
- Software Reflectors
  - mmtty@yahoogroups.com (MMTTY)
  - N1MMLogger@yahoogroups.com (N1MM Logger general)
  - N1MMLogger-Digital@yahoogroups.com (N1MM Logger RTTY & PSK)
  - writelog@contesting.com (WriteLog)
  - support@win-test.com (Win-Test)

CTU
CONTEST
UNIVERSITY

ICOM