

Introduction to RTTY

A close-up photograph of a man in a military uniform and helmet, looking slightly to the side with a confused expression. The text "RTTY? I know nothing!" is overlaid in white, bold, sans-serif font at the bottom of the image.

RTTY? I know nothing!

What is RTTY?

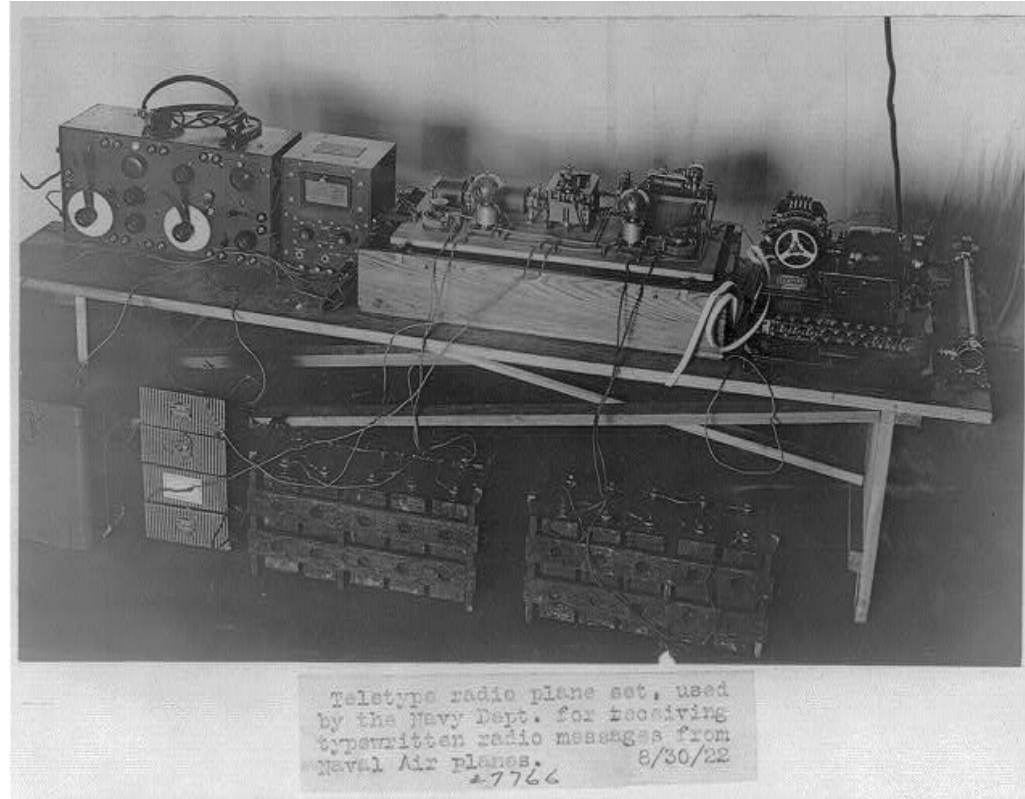
RTTY stands for Radio Teletype

On August 9, 1922 during a Navy experiment a text was typed in an airplane and simultaneously printed out at a ground station.

After World War II, Amateur Operators started to modify their radios to support Frequency Shift Keying, **FSK**, so they could hook up Telexes and transmit RTTY across the air.

It became one of the first digital modes for Amateur Operators during the 1980s with the advent of the person computer, where the first simple programs were used to key the transmitter using a serial or parallel port.

Radio Teletype Used During WWII



How does RTTY Work?

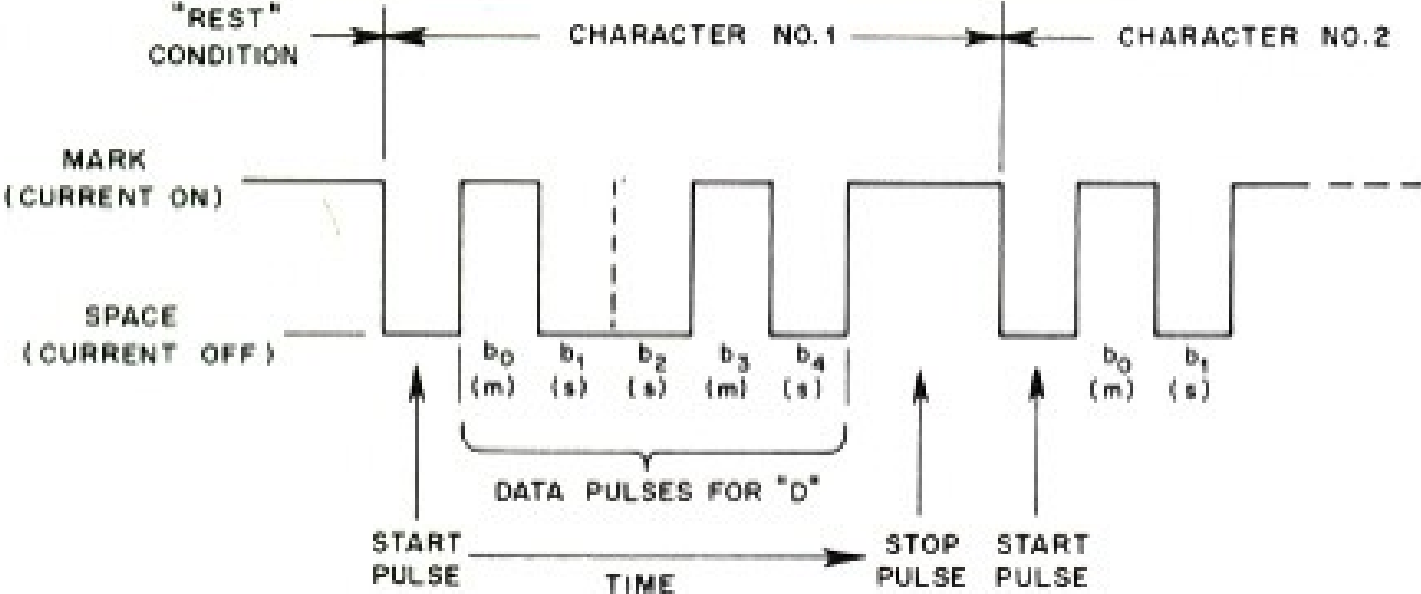
Baudot Code is used to represent the letters and numbers using two different values a **Mark** and a **Space**.

International Telegraph Alphabet No. 2 (ITA2) is the Baudot standard currently in use.

There is also a start bit and two stop bits that indicate the start and end of each character.

A special shift character is sent to indicate if the following character is either a letter or figure since the same code can represent either a letter or number/special character.

Baudot Signal



How do we transmit Baudot over the Radio

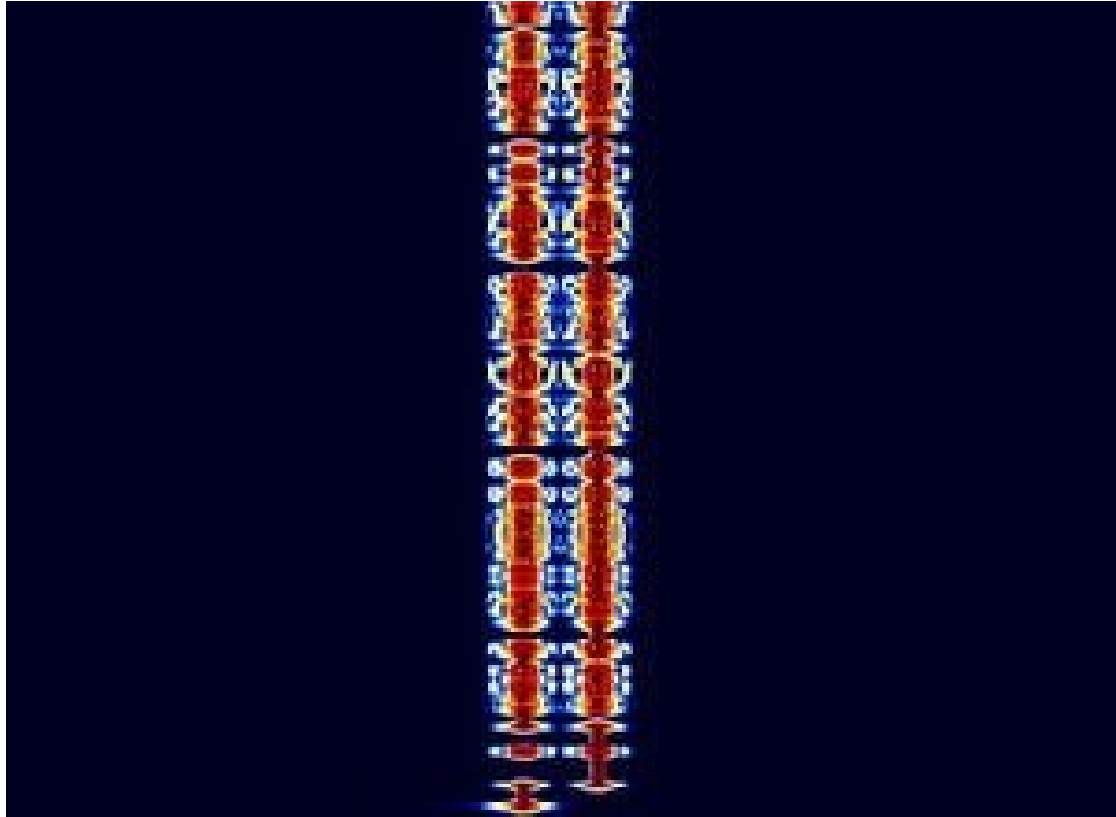
For Amateur Radio we use either Frequency Shift Keying, **FSK**, or Audio Frequency Shift Keying, **AFSK**, to represent the **Mark** and **Space** when transmitting depending on our transmitter and it's interfaces.

A **2125 Hz** tone is sent for the **Mark** and a **2295 Hz** tone is sent for the **Space**.

This sends a signal that is **170 Hz** in width that provides a baud rate of **45.5bps** or **60 WPM**

[What a RTTY Signal Sounds Like](#)

What a RTTY Signal Looks like on a Waterfall Display



What Do We Need to Operate Using RTTY

- HF Transceiver that either has a built-in Audio Sound Card or can be interfaced with a audio adapter.
- Some HF Transceivers like the Elecraft KX3 have a RTTY decoder built in and you can either send RTTY via a key or an application that keys the transceiver using special commands.
- Radio Audio Interface such as a Signalink, RigBlaster, etc.
- A PC / Laptop
- A Program for Decoding and Sending RTTY, We'll be talking about MMTTY
- N1MM or WriteLog for Logging (both integrate with MMTTY)

MMTTY Layout

The screenshot displays the MMTTY Ver1.61B software interface. The title bar reads "AA5AU [AA5AU.MDT] - MMTTY Ver1.61B". The menu bar includes File(F), Edit(E), View(V), Option(O), Profiles(S), Program(P), and Help(H).

The interface is divided into several sections:

- Control Panel:** Contains buttons for FIG, UOS, TX, and TXOFF. The Demodulator (IIR) section includes Mark (2125 Hz), Shift (170 Hz), BW (60 Hz), and AV (70 Hz) settings. A Type Rev. HAM section has buttons for SQ, Not., and BPF. A green progress bar is visible below the Not. button. The ATC, NET, and AFC buttons are also present.
- Macro Table:** A grid of buttons for macros: LX2, QANS, SK, RY, 2X3, M6, EE, ML4, DE3, M7, M11, CQ2, UR599, M8, M12, CQ1.
- Spectrum Display:** A real-time spectrum plot showing signal activity with two vertical yellow lines indicating a frequency range.
- Call Log:** A table with columns for QSO, Data, Init, Call, Find, Name, Mv, His, and a final column. The current entry shows "599" and "14".
- Text Window:** A large area for displaying received text, currently showing Morse code:
! ". 5
/3"2.'NFFZFWATBPUTOMDRZVAJSHS I
VCUAWECGIFGULCERGDNHWTSVZWX IPJs:s.&&/KGNZBFOTKWWF JE081h)33
"
29s AEFV
1\$, &2KLJAVIANOKPQXX
O\$2"!7.:GSEVKVBTQM QGHXWHPAWHF
BYOMKZOMSQFWIMMYMAVTGNGZGXZCHE
BWOUCQOMLLYFD_
- Bottom Panel:** Includes buttons for Clear, LXI, DEAR, ANS, BTU, and Edit. A Char. wait indicator is on the right.

How to Tune RTTY Using MMTTY

- Use the VFO on your radio and dial in the peaks to match the 2 yellow lines on the spectrum scope
- Click view and the X-Y scope to see a crossed-ellipses tuning display
- If the X-Y display seems to rotate in the wrong direction, open the MMTTY Option > Setup window (or the DI's Setup > Setup MMTTY menu item), select the Font/Window tab and check (or uncheck) the Reverse rotation button
- Make sure you click the "HAM" button to set MMTTY to the correct mark and shift settings
- The default values for the HAM setting can be changed under the Demodulator tab in the MMTTY Option > Setup window
- It's better to turn AFC off when you are in a crowded section of the band and manually tune the signals; if you leave AFC on, nearby strong signals may pull the tuning away from the signal you want to copy
- Also in crowded sections it can be helpful to use the built-in notch and bandpass filters

Properly Tuned RTTY Signal

The screenshot shows the MMTTY Ver 1.61 software interface. The title bar reads "VE5KC [VE5KC.MDT] - MMTTY Ver 1.61". The menu bar includes File, Edit, View, Option, Profiles, Program, and Help.

Control Panel:

FIG	Mark	2125	Hz	Type	Rev.	HAM
UOS	Shift	170	Hz	SQ	Not.	BPF
TX	BW	60	Hz	[Green bar]		
TXOFF	AV.	70	Hz	ATC	NET	AFC

Macro Panel:

1X2	QANS	SK	RY
2X3	M6	EE	M14
DE3	M7	M11	CQ2
UR599	M8	M12	CQ1

Call Log:

QSO	Data	Init	Call	JE3HHT	Find	Name	MAKO	My	599	His	599	14
-----	------	------	------	--------	------	------	------	----	-----	-----	-----	----

Main Text Area (Received RTTY):

```
RURY CQ CQ CQ DE VE5KC VE5KC VE5KC  
RURY 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 _
```

Bottom Panel:

Clear	1X1	DEAR	ANS	BTU	[Dropdown]	Edit	Char. wait	[Slider]
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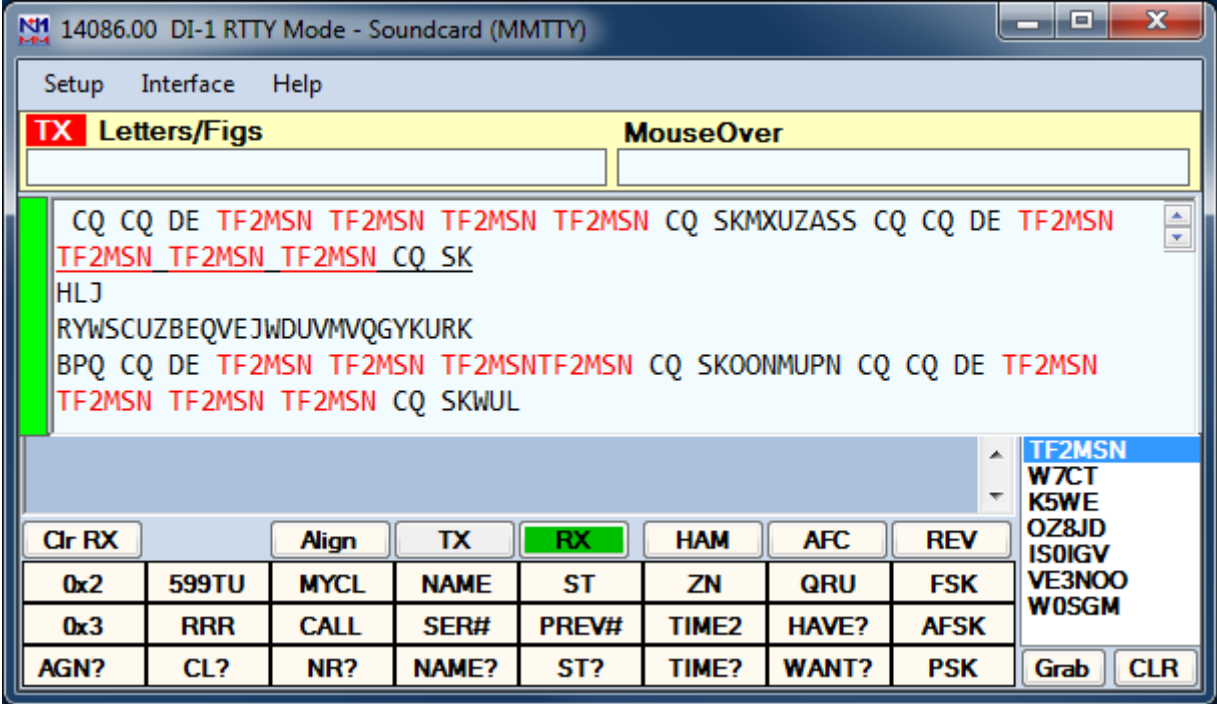
Bottom-most Text Area (Red Text):

```
RGR %c DE %m ALL OK DEAR %m  
RGR %c DE %m ALL OK DEAR %m  
BTU %c DE %m KN
```

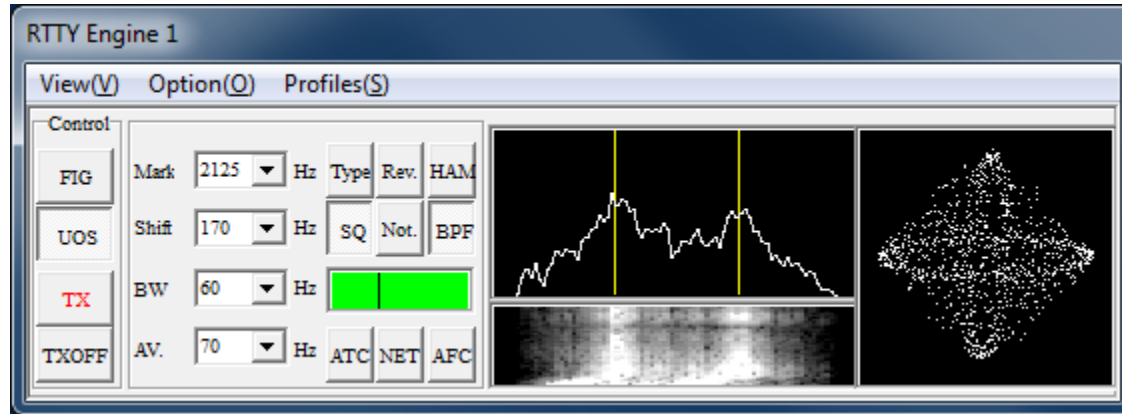
Using N1MM+ with MMTTY

- The combination allows you to use all the features of N1MM+ while working RTTY.
- N1MM+ displays its own Digital Interface window and uses the MMTTY Engine to get the decoded RTTY data and send your responses.
- When a callsign is recognized in the receive input stream the callsign will be colored according to the same color scheme that is used in the Bandmap Window and brought to the Grab window.
- To call a station you click on the callsign in the Grab window and click the Grab button to set it as the current station.
- If you click on the received exchange it will load it into the RCVD EXCH field for logging purposes.

N1MM+ RTTY Digital Interface Screen



MMTTY RTTY Engine When Using N1MM+



W1AW Bulletins – Great for Testing Your Setup

Frequencies are 3.5975, 7.095, 14.095, 18.1025, 21.095, 28.095, 50350 kHz, and 147.555 MHz.

The digital bulletin times remain at 6 PM and 9 PM Eastern Time - currently 2300 UTC and 0200 UTC, respectively - daily.

Bulletins are sent at 45.45-baud Baudot, PSK31 in BPSK mode and MFSK16 in a daily, revolving schedule.

Common RTTY Frequencies

80 meters: 3580 – 3650 (3520 – 3525 in Japan)

40 meters: 7080 – 7100 in the US (varies widely outside US)

30 meters: 10110 to top of band

20 meters: 14080 – 14099 (avoid the NCDXF beacons at 14100)

15 meters: 21080 – 21100

10 meters: 28080 – 28100

Typical RTTY Contest QSO

CQ CONTEST K5VZ K5VZ CQ ← I'm calling CQ

W5JK W5JK W5JK ← W5JK replies to my CQ call

W5JK 599 145 145 W5JK ← I reply to W5JK with a signal report of 599, I also send my serial number twice for the QSO (this number is unique to each QSO).

599 034 034 W5JK ← W5JK sends his report and serial number.

W5JK TU K5VZ CQ ← I confirm receipt of his report by sending TU, by putting "CQ" at the end, I solicit the next contact and tells anyone else on the frequency that it is OK to call.

Additional QSO Contest Terms

NR? NR? ← If a station doesn't receive your report and serial they will send NR? (no reply). This is where you send your last message and more often than not it's received the second time around. Quite often if they don't receive it a second time they will go back to calling CQ. You can try a third time after the CQ call and you may even rescue another couple of points

AGN AGN ← As above – this means please send again

RTTY QSO Tips

- **CR:** A Carriage Return inserted in your “exchange” buffer, prior to, and after the “sent” data will allow the receiving station to view your “exchange” on a new line, not mixed in with the “alphabet soup” that appears during receive!
- **CONTEST:** You should insert “the name of the contest” in place of “contest” in the data line!
- **CQ:** Placing a CQ after your callsign, when calling CQ, will allow tuning stations to immediately know you are calling, not answering another station!
- **Call Sign:** When calling a CQ’ing station there is no need to send their call, just send “CR” your call your call ” CR”! The calling station already knows their call and, especially in “less than good” band conditions, the first data sent is usually printed well, then all the following is “alphabet soup”!
- Don’t use outdated characters or character strings such as DE, K, BK or UR in any of your messages.
- If RST is part of the required exchange, only send it ONCE and it should ALWAYS be 599. If RST is NOT required, do not send it.

Resources

MMTTY Download - <https://hamsoft.ca/pages/mmtty.php>

RTTY Tutorial - <https://www.aa5au.com/rtty/getting-started-on-rtty/>

RTTY Contesting Site - <https://www.rttycontesting.com/>

N1MM Logger+ RTTY Quickstart Guide -
<https://www.rttycontesting.com/tutorials/n1mm/plus/>

N1MM Logger+ RTTY Setup - <https://n1mmwp.hamdocs.com/manual-operating/digital-modes/#digital-mmtty-for-rtty-support>

RTTY Contest QSO Guide - <https://www.rttycontesting.com/lagniappe/rtty-messages>