



6. DIGITAL MODES – AI6JB

Chapter 6 Part 2 of 2

ARRL General Class
Sections 6.2, 6.3, 6.4, 6.5





Section 6.2

Character-Based Modes

Simplest digital communications mode – CW

- Message encoded by an operator then transmitted to another station where they are read by another operator
- Speeds are relatively slow
- CW is convenient to use



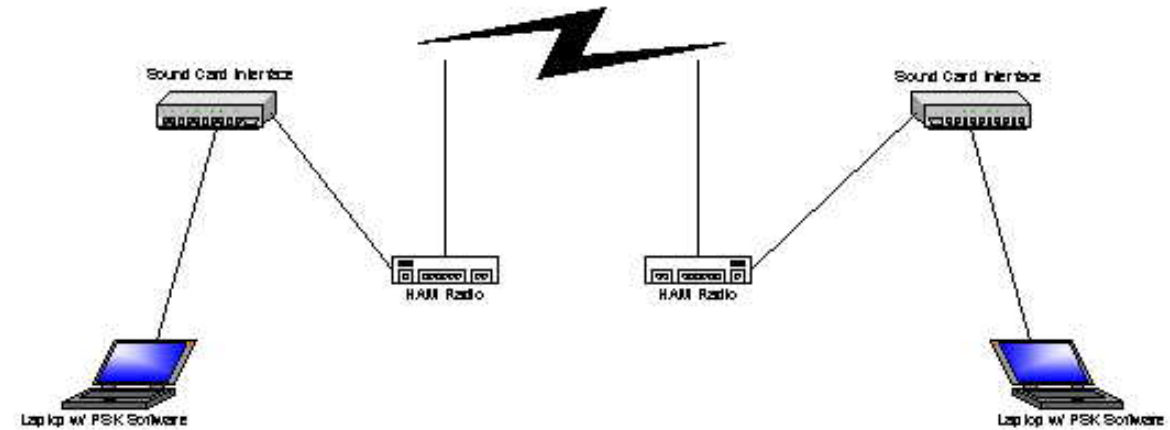


Section 6.2

Character-Based Modes

Computer-to-Computer work the same way

- Computer encodes message, then transmitted to another station where another computer decodes (reads) the message.
- Require little additional equipment other than sound card or modem
- Sometimes referred to as keyboard-to-keyboard or chat



Structured vs. Unstructured modes

- Structured = Specifically formatted message (e.g. Packet)
- Unstructured = Transmit a stream of characters without additional data



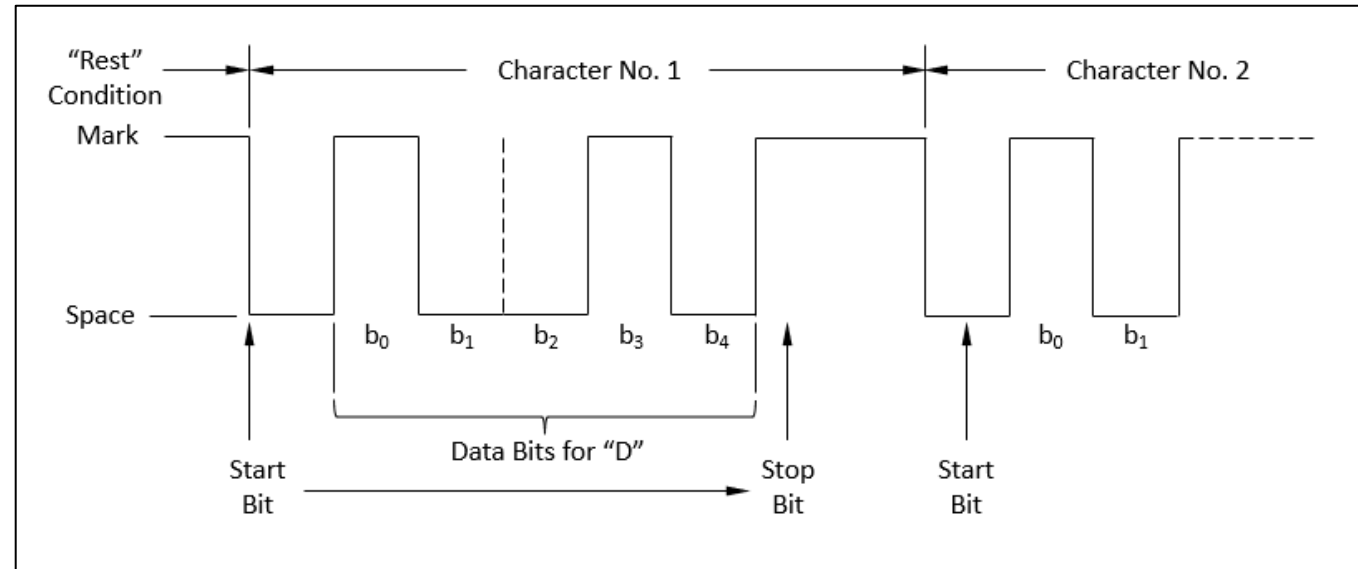
RTTY: Oldest form of ham radio digital communications

The **Baudot** timing sequence for the bit pattern that encodes the letter **D**.

The start bit is sent first. Start / stop bits are required to allow the receiving and transmitting systems to sync.

Mark / **space** are represented as audio tones in the signal.

Baudot is origin of term *baud*.



Referred to in FCC rules as *narrowband, direct-printing telegraphy*



Radioteletype (RTTY)

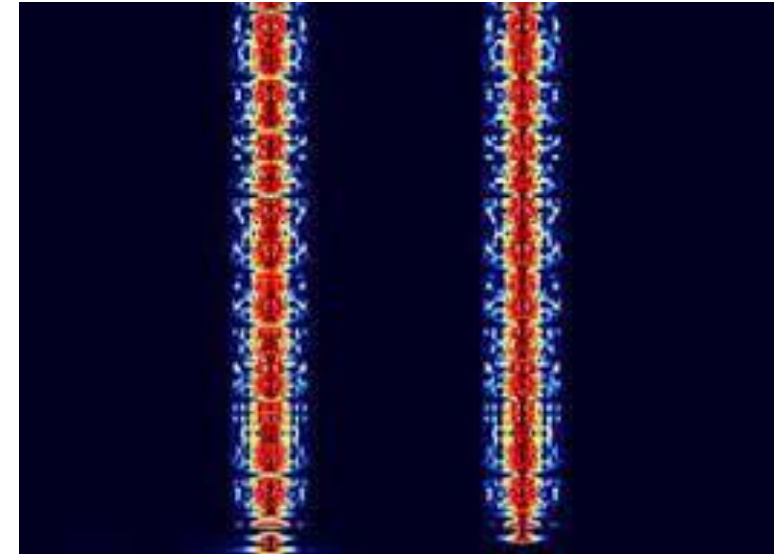
RTTY uses Baudot code (represents each character as a 5-bit sequence)

- 5 bits allow for 32 different characters ... not enough for entire English alphabet, numerals, and punctuation
- 2 special codes (LTRS & FIGS) are used to switch between 2 character sets (doubles number of available characters)

The difference between the mark and space tones (see Fig 6.1) is called the signal's shift

You should always answer an RTTY station at same speed and shift it's using

- Most common HF phase shift is 170 Hz





PSK31 (Phase Key Shifting)

Most popular PSK mode (also called 31 Baud)

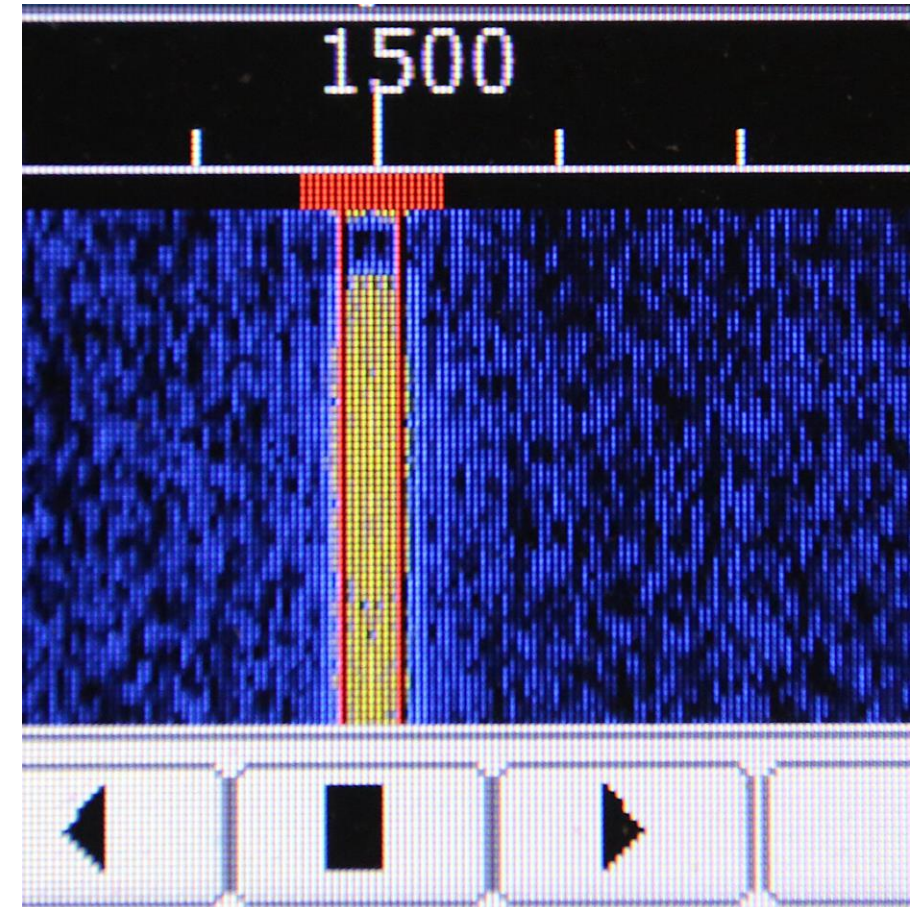
Uses a sound card to generate RTTY signals

31 is the symbol rate (actually 31.25 baud)

Designed for keyboard-to-keyboard communication
(typing rates up to 50 wpm)

Also referred to as BPSK31

QPSK31 (Quadrature PSK31) sends TWO audio tones,
so there are now four possible phase shift combinations





PSK31 (cont.)

Since PSK has two tones, you must select the right sideband (USB or LSB) to decode the data ... sideband sensitive

PSK uses a variable length character code called **Varicode** that assigns shorter codes to common characters and longer codes for uncommon characters (like Morse code)

- Capital letters & punctuation take longer to send
- If you're used to RTTY (no lower case), turn off CAPS LOCK!

QPSK31 / PSK31 have about the same bandwidth (2.5 kHz)

QPSK31 is sideband sensitive and its encoding provides error detection



QUESTIONS?

ONLINE EXAM REVIEW AND PRACTICE QUESTIONS:

<http://www.arrl.org/examreview>