

## Application Note

Ref.: Modem Radio Protocol

Author: EW/LN/CB

# RADIO PROTOCOL ON MODEM

### 1 - PRESENTATION OF THE DOCUMENT

This document deals with the radio protocol used on ADEUNIS RF radio modems. The products involved are ARF13: RS232 modem and ARF16: RS485 modem. For further explanations refer to the "low level radio protocol" application note.

### 2 - RADIO PROTOCOL

The serial link bytes are not transmitted as they arrive on the modem. They are stored before being included in a radio frame. In this frame we will find 27 bytes, 24 or less for data to be transmitted and 2 for a checksum. This checksum is used by the modem microcontroller only, it is not transmitted on the RS232 link. The bytes are transmitted without start and stop bit, these bits are added on receipt.

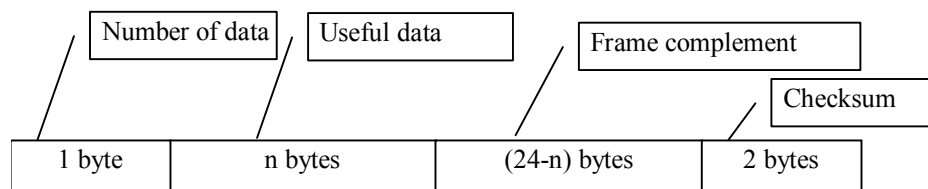


Figure 1: Full informative frame

To achieve a fine radio communication, these data have to be encoded in Manchester format and informative bytes have to be enclosed between special signals.

These signals are:

- A prelude: An alternative signal used to install the receiver bias. It does not carry any piece of information. This signal fits the data slicer threshold to the average value of the signal received. In the modem it is 2.5 kHz for 6 ms.

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- A synchronisation pattern: A special pattern that needs to be recognised to post the logic receiver that the informative frame follows. This signal enables a useful signal to be differentiated from a noise. Duration: 3.6 ms.

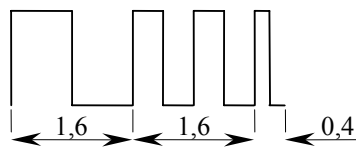


Figure 2: Synchronisation pattern TXD pin signal

- An informative frame: data received on the serial link and encoded in Manchester format. A character pointing to the number of valid bytes in the frame precedes this data. The data may be followed by null bytes to complement the frame. Duration of a bit: 0.4 ms - of one byte: 3.2 ms.

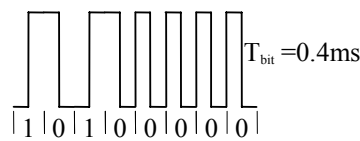


Figure 3: Number of character (5) TXD pin signal

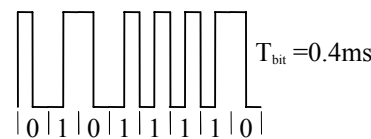


Figure 4: character z (7A) TXD pin signal

- A pattern for the end of the frame: this specific symbol is optional, however it enables a communication to be confirmed. It is represented by 0.8 ms at 0 followed by 1.2 ms at 1.

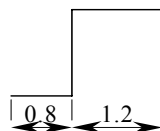


Figure 5: End of frame symbol TXD pin signal

The total duration of the radio transmission is 98 ms.