SEMTECH

SX1261/2

WIRELESS & SENSING PRODUCTS

Application Note:

Software Manchester Encoding

AN1200.35
Rev 1.0
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1 Introduction

This document presents how to configure the SX1261/2 chip so that it can use Manchester encoding.

Manchester encoding is a DC-free coding technique created by G. E. Thomas in 1949, widely used in many wired and wireless communications such as 10BASE-T Ethernet, RFID or WM-Bus.

The coding technique consists of

- either replacing 0 by a positive edge and 1 by a negative edge: this is direct Manchester encoding
- or doing the same and reversing the polarity: this is reverse Manchester encoding

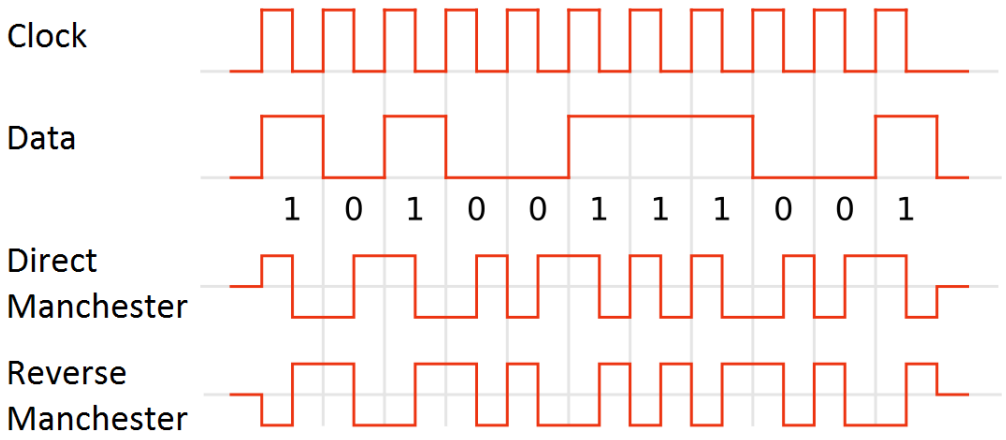

Figure 1: Manchester Encoding Schemes[1]

[1] Public domain image, source Stefan Schmidt

2 Manchester Encoding in the SX1261/2

2.1 How to Use

Manchester encoding has been implemented as a new packet type in a derivative of the development kit code, so only two steps are required to use it.

2.1.1 Step 1: Select

Select the coding polarity at object instantiation within the *sx126x.cpp* file by setting the parameter "*polarityReversed*" to:

- "*true*": reverse coding
- "*false*": direct coding

```
/*!
 * \brief Manchester object
 */
Manchester ManchesterObj( true );
```

Figure 2: Coding Polarity Selection

2.1.2 Step 2: Enable

Enable Manchester encoding by

- either selecting "MANCH" type on the development kit screen
- or setting the packet type with the parameter "*Radio.SetPacketType(PACKET_TYPE_GFSK_MANCHESTER);*"

All the other parameters (CRC, transmission bitrate…) are used as a FSK packet type.

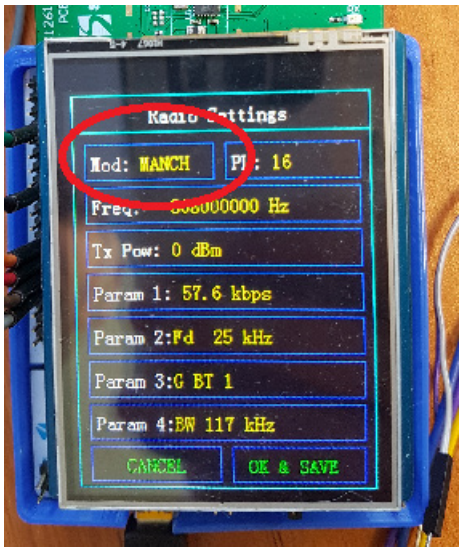

Figure 3: Manchester Modulation Selection

2.2 Limitations

Given that Manchester encoding is implemented in software, some limitations apply.

2.2.1 Payload Size

The maximum payload size is limited by the buffer size of the SX1261/2 (255 bytes), minus optional header and CRC, the total is then divided by two.

Table 1: Max Payload Size

Header (variable length)	2 Bytes CRC	Maximum Payload Size [bytes]
		127
	x	125
x		126
x	x	124

2.2.2 Address Filtering

Node address filtering[2] has not been implemented; therefore it should not be used in Manchester encoding.

2.2.3 CRC Length

Implemented CRC lengths in Manchester encoding are

- 0 bytes (No CRC)
- 2 bytes

CRC seed and polynomial can be set as standard FSK packet type.

[2] As defined in the SX1261/2 Data Sheet: "GFSK PacketParam5 – AddrComp"

3 Conclusion

Even if hardware Manchester encoding is not implemented in hardware, it can easily be implemented in software as long as max payload size is enforced.

4 Revision History

Version	Date	Modifications
1.0	December 2017	First Release

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