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Application Note: AS3933-AN05 – WAKE Timing

AS3933

AN05-WAKE Timing

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Revision History

Revision	Date	Owner	Description
1.0	16.01.2015	JRY	Initial Release

1 General Description

The WAKE signal, as it is used by the AS3933 to indicate a correct wake up, shows slightly different behavior depending on the AS3933's configuration. This application note is intended to point out the differences and clarify how to work with them.

2 Single Pattern Detection

The problem at hand is demonstrated with the Manchester coded pattern '1001 0110' and data '0010 1100'. Both cases Manchester Decoder enabled and disabled will be explained.

2.1 Manchester Decoder Enabled

WAKE goes high at the end of the pattern's last Manchester symbol on the DAT output. The recovered clock signal on CL_DAT goes low in this instant. The data on DAT is valid with each consecutive rising edge on CL_DAT. As the WAKE signal goes high at the start of the first data bit following the pattern no data is lost.

**Figure 1: Single Pattern and Manchester Decoder Enable**
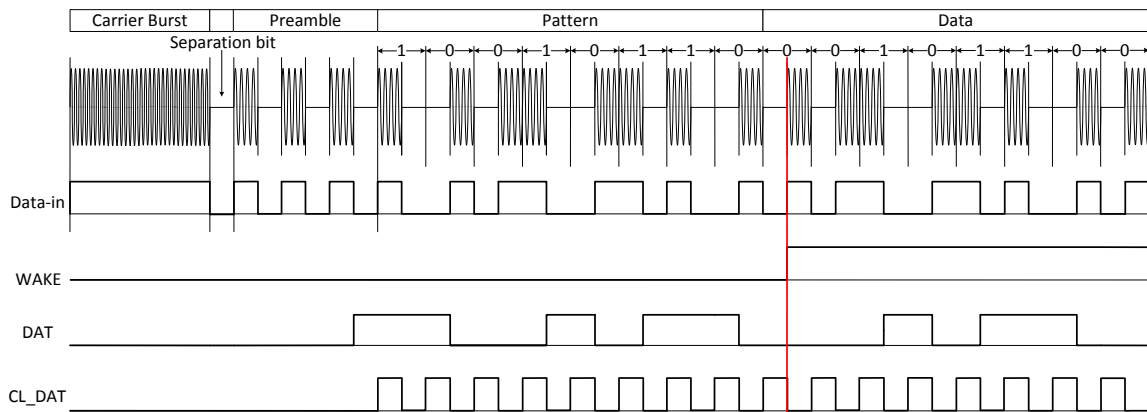
Operation with single pattern is correct for Manchester coded data since the WAKE signal goes high on the falling edge of CL_DAT. No data is lost and CL_DAT signals new data following the pattern once WAKE is high.

2.2   Manchester Decoder Disabled

WAKE goes high half a Manchester symbol after the last bit of the pattern is displayed on DAT. Data immediately following the pattern can be lost due to the shift of the WAKE signal. Therefore, the half Manchester symbol after the pattern should not be used for data.

Figure 2: Single Pattern and Manchester Decoder Disabled
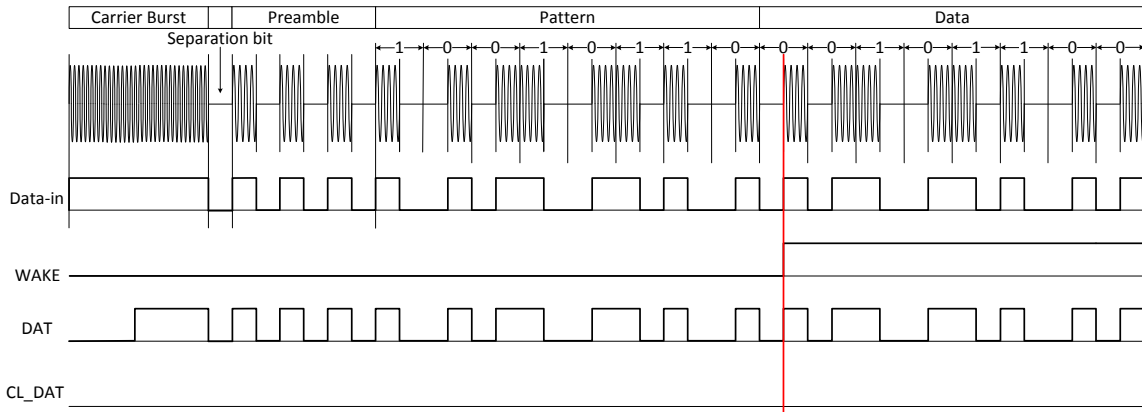
Operation with single pattern and raw data requires a time gap the length of one half Manchester symbol between the pattern and the data due to the WAKE delay.

3   Double Pattern Detection

For the double pattern detection the pattern needs to be sent twice in a row. Therefore, the Manchester coded pattern is now '1001 0110 1001 0110' and data still '0010 1100'. Again, both cases with Manchester Decoder enabled and disabled will be explained.

3.1   Manchester Decoder Enabled

WAKE goes high when CL_DAT goes high half a Manchester symbol before the end of the pattern displayed on DAT. Therefore, the rising edge of CL_DAT coinciding with WAKE going high does not signal valid data. On each consecutive rising edge of CL_DAT the data on DAT is valid. No data is lost due to the WAKE signal going high early.

**Figure 3: Double Pattern and Manchester Decoder Enabled**
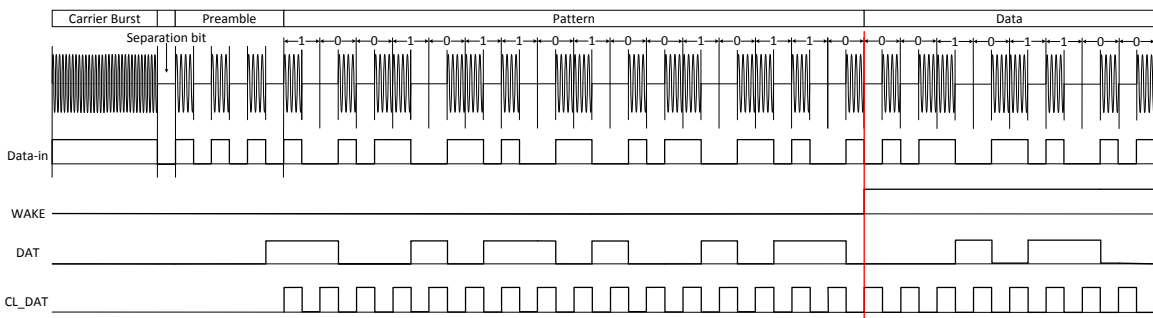
Operation with double pattern and Manchester coded data requires that the CL_DAT rising edge coinciding with the WAKE rising edge is not used to acquire data since the last bit of the pattern is displayed at that moment.

3.2   Manchester Decoder Disabled

WAKE goes high after the last bit of the pattern displayed on DAT. Data immediately following the pattern is not lost.

Figure 4: Double Pattern and Manchester Decoder Disabled
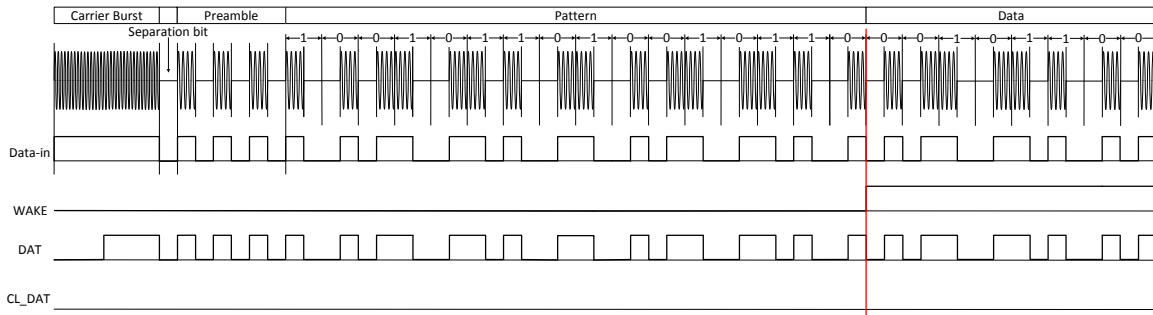
Operating the AS3933 with double pattern and raw data does not cause any problems with regards to data transmission as the WAKE signal goes high at the start of the data transmission.

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