# Transmitter Test Plan

CSMA/CD Transmitter Bus Using Unipolar Return to Zero (RZ) Encoding

Bus Idle 0V, 1000bps transmission rate

The Unit Under Test (UUT) is the message exchange node being tested (Implemented on the Cypress PSoC board), and should be properly powered up and configured prior to beginning the test.

Required Hardware:

Oscilloscope

Computer with RealTerm software capable of sending data through a serial connection (USB)

USB Cable

Begin Test:

1. Connect the ground lead from the oscilloscope to the UUT. Connect the scope channel 1 lead to the Transmit pin of the UUT. Verify the UUT transmit pin (P0\_6 on the Cypress PSoC board) is IDLE at 0V. Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_
2. Launch the RealTerm software on the computer. Verify the board is connected to the serial port on the computer and set at the proper baud rate (57600 bps).
3. Set the scope so that it can capture one whole 8-bit transmission. The scope may need to be set to trigger on channel 1.
4. Transmit any character from the RealTerm Serial Terminal of the computer to the UUT. Verify with the scope that the transmitted signal from the UUT contains a leading ‘1’ bit for any character transmitted. Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_
5. Using the RealTerm Software, navigate to the “Send” tab. Type 0xFF in the send numbers box, then press send numbers. Using the scope, verify that the UUT transmits a pattern of alternating 1’s and 0’s, with a leading ‘1’ bit. Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_
6. Verify 8 bits exist for this transmission. Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_
7. Next, measure the periodicity of the signal using the oscilloscope. The signal uses Unipolar-RZ, which will have a transition from +5V to 0V in the middle of the bit interval. At a rate of 1000bps, the signal will have a change rate of 2000bps. Verify that the signal has a periodicity of 500µs, and a bit interval of 1000bps. (Variation of ±1.32% is allowed so the value is allowed to be between 506.6µs and 493.4µs) Record the periodicity: \_\_\_\_\_\_\_\_\_\_\_\_\_\_  
   Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_
8. Next, send a NUL character (ASCII NUL, 0x00). Verify with the oscilloscope that only the starting ‘1’ bit appears on the scope. Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_
9. Measure the period the start bit appears as line high. Verify this is at line high for 500µs. Record the period the start bit is line high: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   
   Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_(variation of ±1.32% is allowed here as well)
10. Next, send ASCII ‘H’ through RealTerm. The produced signal should be 10 10 00 00 10 00 00 00. Record and compare the data echoed back to Realterm below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | 10 | 00 | 00 | 10 | 00 | 00 | 00 |
|  |  |  |  |  |  |  |  |

Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_

1. Ensure the waveform on the scope for ASCII ‘H’ looks similar to that shown in figure 1 below. Ensure that amplitude of the waveform is 5V ±5% (between 4.75 and 5.25V).   
   Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_  
     
   

Figure 1: Waveform for ascii ‘H’. Note: Environmental noise may or may not appear as tiny peaks as shown in the waveform. Optimally, these peaks should not exists, or be insignificant.

1. Next, send ASCII ‘i’ through RealTerm. The produced signal should be 10 10 10 00 10 00 00 10. Record and compare the data echoed back to Realterm below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | 10 | 10 | 00 | 10 | 00 | 00 | 10 |
|  |  |  |  |  |  |  |  |

Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_

1. Ensure the waveform on the scope for ASCII ‘i’ looks similar to that shown in figure 1 below. Ensure that amplitude of the waveform is 5V ±5% (between 4.75 and 5.25V).   
   Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_  
     
   

Figure 2: Waveform for ascii ‘i’. Note: Environmental noise may or may not appear as tiny peaks as shown in the waveform.

1. Send a string of five different characters. Ensure that the same character is not being transmitted for the entirety of the transmission (that is, there should be a different string of bits for each character in the transmission). This is easiest done through the send tab in RealTerm. Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_
2. Next, send 0xAA through RealTerm. The produced signal should be 10 00 10 00 10 00 10 00. Record and compare the data echoed back to Realterm below. Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | 00 | 10 | 00 | 10 | 00 | 10 | 00 |
|  |  |  |  |  |  |  |  |

1. Ensure the waveform on the scope for 0XAA looks similar to that shown in figure 1 below. Ensure that amplitude of the waveform is 5V ±5% (between 4.75 and 5.25V).   
   Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_  
     
   

Figure 3: Waveform for OXAA. Note: Environmental noise may or may not appear as tiny peaks as shown in the waveform.

Pass/Fail: \_\_\_\_\_\_\_\_\_\_\_\_\_  
  
End Of Test.   
Test Witnesses: Date of Test:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Print Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
  
  
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