

### INTRODUCTION

The purpose of this application note is to present an example circuit, illustrating how to operate the XR-T5683 device at 10.1 Mbps. This note shows the results of measurements made on the XR-T5683 at a 10.1 Mbps data rate. Hardware used for this evaluation was a slightly modified board designed for 8.448 Mbps E2 service. The only change to the circuit, which is shown in *Figure 1*, involved lowering the LC clock extraction circuit tuning capacitor value.

### Circuit Details

LC Tank Circuit:

L1 - Schott Corporation Part Number  
67146440, 5 $\mu$ H nominal, Q ~ 90

C7 - 33 pF  
R7 - 15 k $\Omega$

#### Note

*Circuit actually resonates at 10.1 MHz due to stray capacitance.*

### Transformers

The input and output transformers are both Pulse Engineering type PE-65835. The input unit is connected as a 1:2 step-up and the output as a 2:1 step-down.

### Measurement Results

The oscilloscope photographs given in *Figure 2* shows XR-T5683 operation at 10.1 Mbps.

Photos A and B show the receive-side timing relationship between the input signals as measured at the transformer primary, the recovered clock (RCLK), and the dual-rail data (RPOS and RNEG). Photo A is for a repetitive 1010 pattern while photo B uses a pseudo-random sequence.

Photo C has an expanded horizontal scale that more clearly shows the received data (RPOS) to recovered clock (RCLK) timing relationship.

Photo D is the transmitter output for all ones data. The pulse amplitude shown in this picture is approximately 1V peak because the measurement was made with the output transformer secondary connected to the oscilloscope 50 $\Omega$  input through a 75 $\Omega$  to 50 $\Omega$  matching pad that had 5.6 dB loss.

### CONCLUSION

These measurements show that in the circuit tested, the XR-T5683, the Pulse Engineering transformers, and the Schott timing inductor are all functional at 10.1 Mbps.

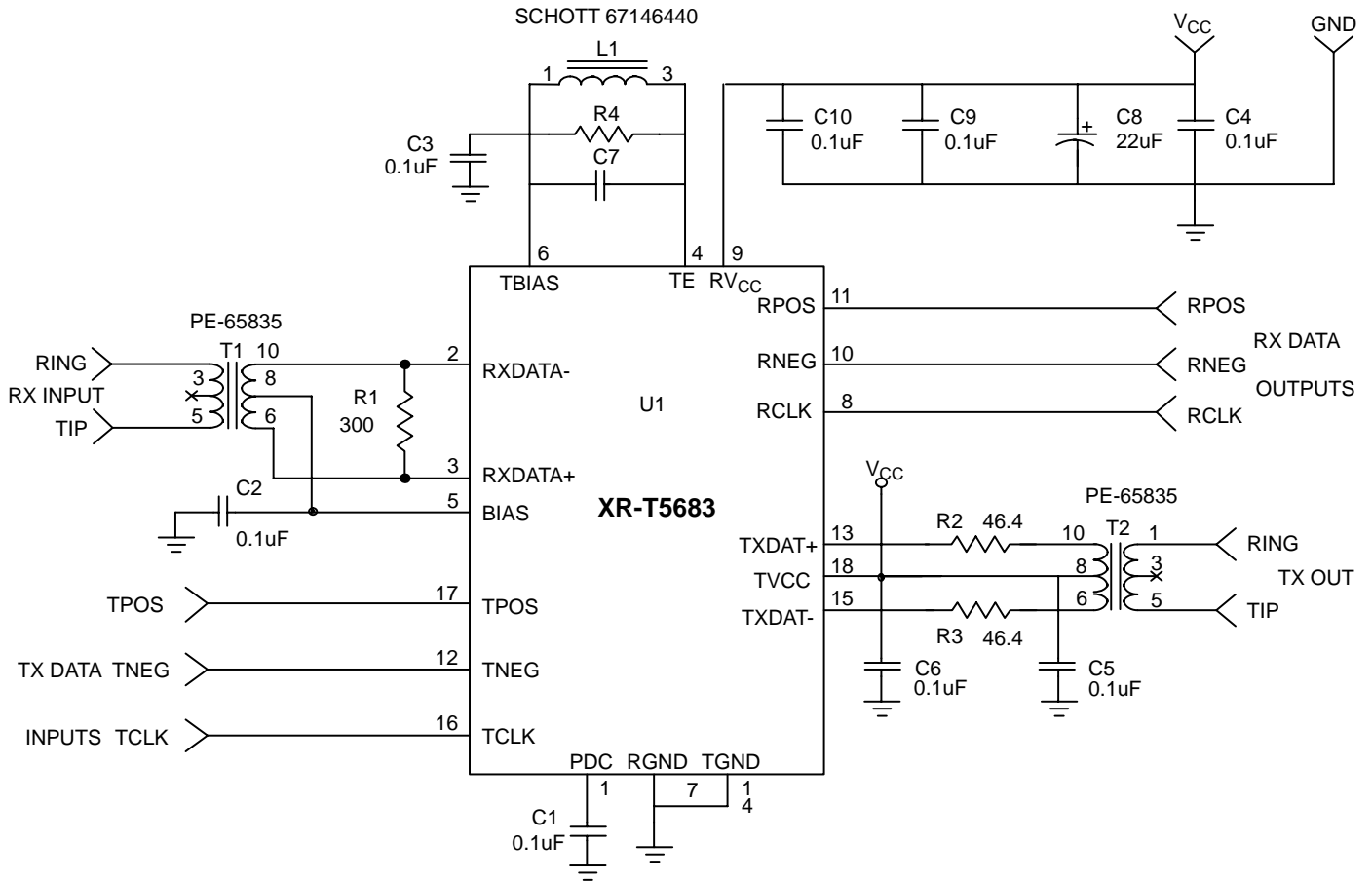
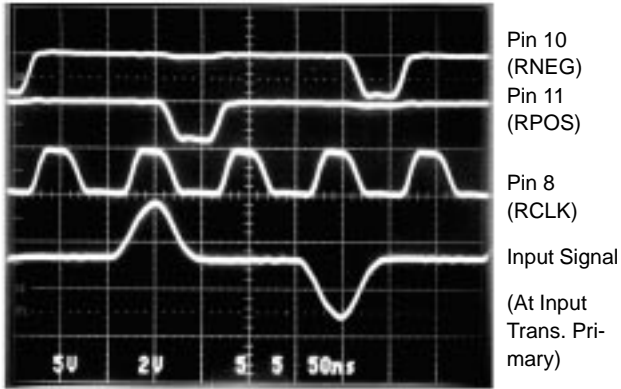
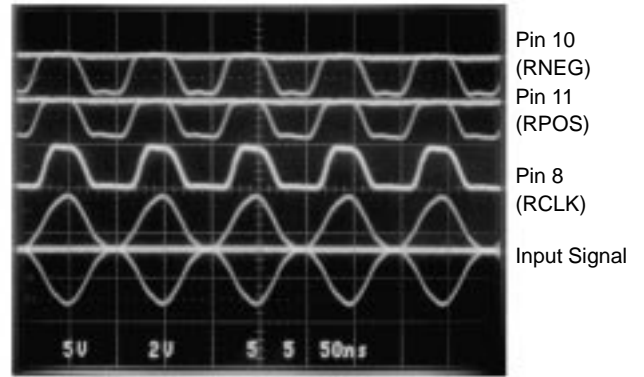


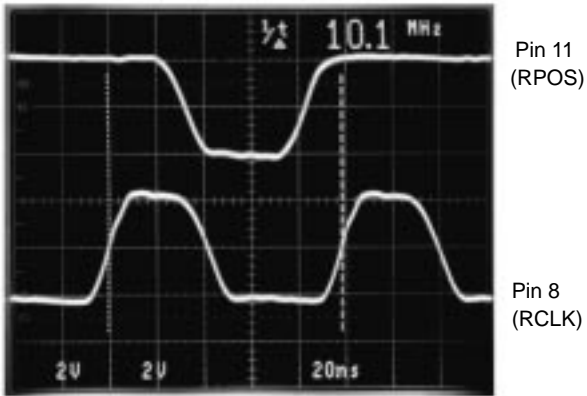
Figure 1. XR-T5683 Circuit Diagram



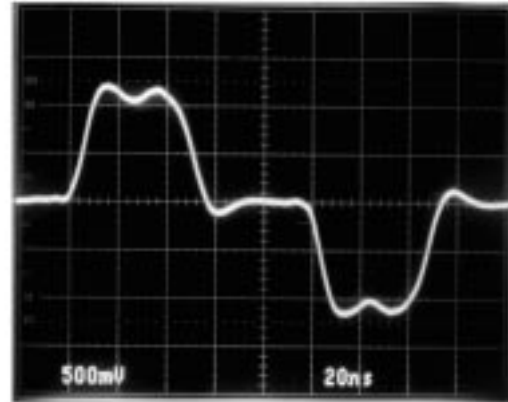
**A. 1010... Data**



**B. 2<sup>15</sup> - 1 Length AMI Encoded Pseudorandom Data**



**C. 1010... Data**



**D. 1111... Data, Transmit Output (Transformer output measured through 5.6dB 75Ω to 50Ω Pad terminated with 50Ω)**

**Figure 2. XR-T5683 Operating at 10.1 Mbps**

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