

3.0 COMPONENTS

TABLE 1: PARTS LIST

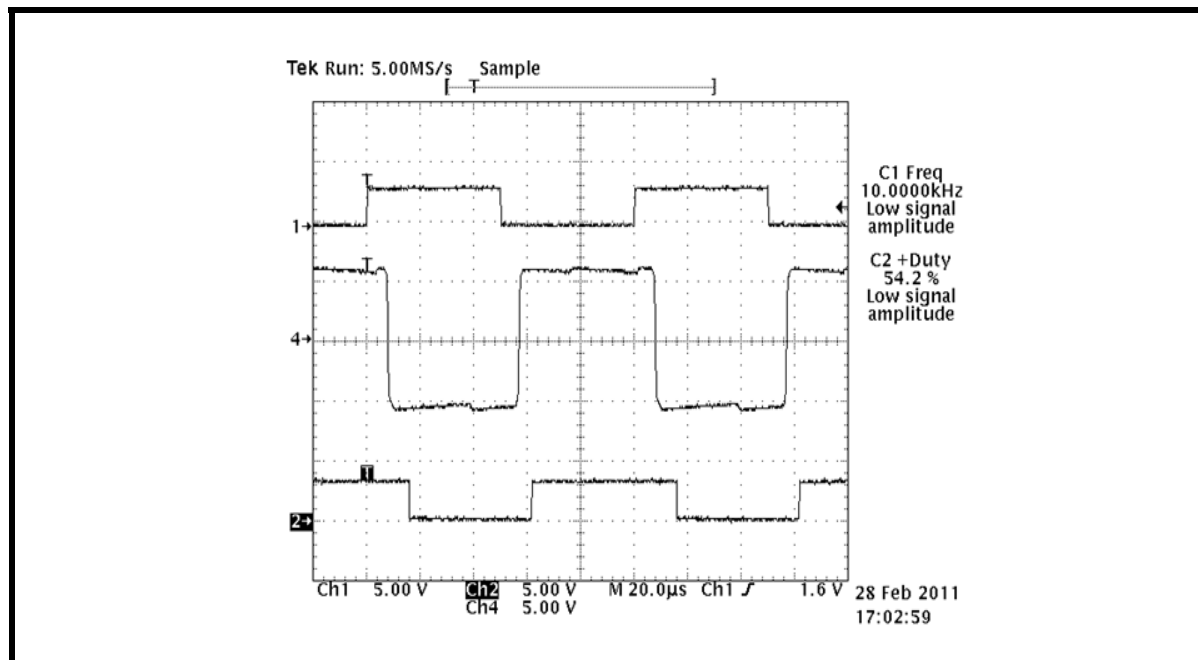
ITEM	QUANTITY	REFERENCE	VALUE	MANUFACTURER	COMMENTS
1	2	U1, U2	SP3232E	Exar	RS-232 Transceiver
2	1	U3	MCT61	Fairchild Semi	Optocoupler
3	1	T1	SM51384L	Bourns	4kV Isolation Transformer
4	1	D1	BAT42W-V	Vishay	Diode
5	6	C1, 4, 6, 7, 8 and 9	0.1uF		Capacitor, 16V, X7R
6	1	C2	82pF		Capacitor, 16V, X7R
7	1	C3	10uF		Capacitor, 16V, X7R
8	1	C5	1.0uF		Capacitor, 16V, X7R
9	1	C10	470pF		Capacitor, 2kV min.
10	1	R1	15k ohms		Resistor
11	5	R2, 3, 4, 5, 6	1.5k ohms		Resistor

4.0 DESIGN NOTES

- The data rate is limited to 20kbps due to the low voltage operation of the optocoupler. For faster speeds an alternative optocoupler would be needed for improved operation below 5V
- For best performance, a circuit board with ground planes is required. The primary and secondary ground planes should have a wide separation space to prevent high voltage breakdown.
- The SP3232E's Vcc bypass capacitors (C4 and C5) and charge pump capacitors (C6-9) should be placed as close as possible to the device.
- Trace widths should be as wide as possible for transceiver power, ground and pump capacitors.
- Ceramic type capacitors with their low ESR properties are ideal for the charge pump.

5.0 LOOPBACK BENCH TEST RESULTS

The following waveform shows the loopback performance when sending and receiving a clock pulse at 10kHz when the driver output (TOUT) is connected to receiver input (RIN) with a 2500pF capacitive load. CH1 is the driver input, CH4 is the RS-232 signal (driver output / receiver input) and CH2 is the resultant receiver output.



6.0 SUMMARY

This reference circuit provides a cost effective low component count solution for isolated RS-232 single channel applications such as for a utility meter reader.

The features of the circuit discussed in this application note are:

- 4kV Isolated RS-232
- 3.3V single supply operation
- 1 TX and 1 RX
- 15kV ESD protection for RS-232 I/O
- 20kbps data rate

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