2795T and 2795Y Transformers Application Note

The 2795T and 2795Y transformers provide two transformation ratios to match both 75Ω and 120Ω line impedances with Lucent 3.3 V transceivers using a single terminating network design. These dual-ratio transformers can also be used for 100Ω lines with a change in resistor values. The 2795T is optimized for the receive function, while the 2795Y is optimized for the transmit function. The 2795T can be used for both receive and transmit operation; the 2795Y is designed for transmit operation only. Suggested applications for a single-transformer design solution (two 2795T transformers) are shown in Figure 1. The recommended two-transformer design solution (2795T and 2795Y) is shown in Figure 2. For 2795T and 2795Y data sheet refer to document TM00145.

Single-Transformer Design and Common Termination Network

A typical line termination network using the 2795T transformer for both the receive interface and the transmit interface is shown below for a single channel. The termination network consists of capacitors and resistors arranged to provide the proper voltage gain and impedance matching to the characteristic impedance of the various transmission lines. The network is designed to operate with both E1 cable impedances (75Ω and 120Ω) with no change in components. For DS1 applications (100Ω), only the resistor values need to be changed. The same transformer can be used for all three cable impedances in both receive and transmit operation. Figure 1 below shows the proper connections for each cable impedance. Connections for cable selection are made on the line side for the receive interface and on the device side for the transmit interface. The components and suggested values are listed in Table 1. Capacitor CS provides high-frequency return loss enhancement.

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2795T and 2795Y Transformers Application Note

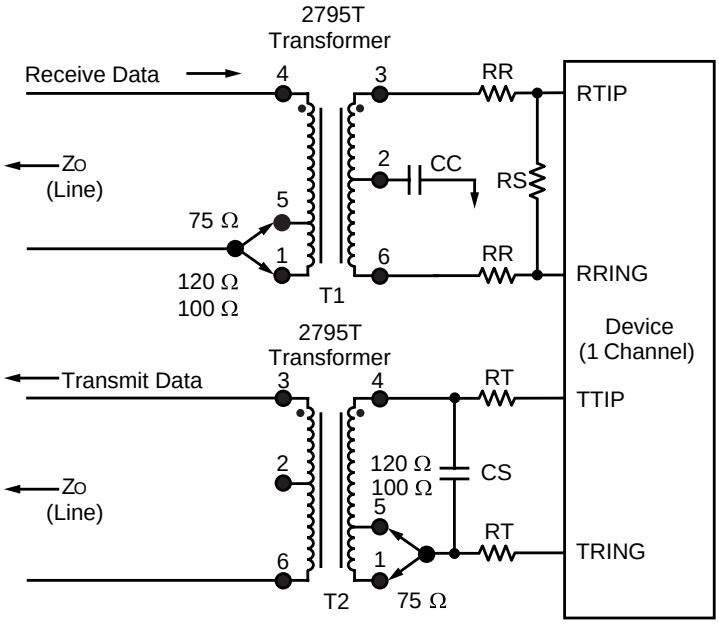

Figure 1. Connections for two 2795T transformers

Symbol	Name	Value		
Zo	Characteristic impedance	75Ω (E1)	120Ω (E1)	100Ω (DS1)
CC	Center tap capacitor	0.1 µF	0.1 µF	0.1 µF
RR	Receive series resistor	158Ω	158Ω	132Ω
RS	Receive shunt resistor	114Ω	114Ω	95.3Ω
RT	Transmit series resistor	6.2Ω	6.2Ω	1.2Ω
CS	Shunt capacitor	470 pF	470 pF	470 pF
T1	Bel part number—receive	2795T	2795T	2795T
T2	Bel part number—transmit	2795T	2795T	2795T

Table 1. Components and values for two 2795T transformers

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2795T and 2795Y Transformers Application Note

Two-Transformer Design and Common Termination Network

A typical line termination network using the 2795T transformer for the receive interface and the 2795Y transformer for the transmit interface is shown below for a single channel. The termination network consists of capacitors and resistors arranged to provide the proper voltage gain and impedance matching to the characteristic impedance of the various transmission lines. The network is designed to operate with both E1 cable impedances (75Ω and 120Ω) with no change in components. For DS1 applications (100Ω), only the resistor values need to be changed. The 2795T transformer is used for all three cable impedances at the receive interface. The 2795Y transformer is used for all three cable impedances at the transmit interface. Figure 2 below shows the proper connections for each cable impedance. Connections for cable selection are made on the line side for both receive and transmit interfaces. The components and suggested values are listed in Table 2. Capacitor CS provides high-frequency return loss enhancement.

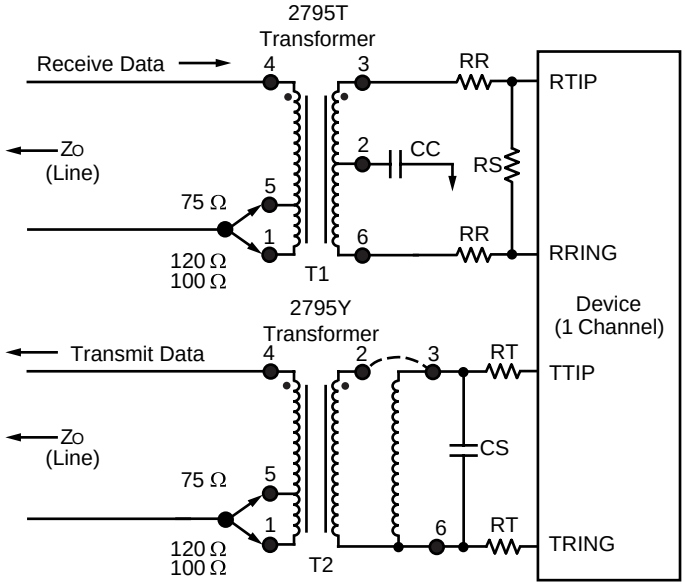

Figure 2. Connections for one 2795T transformer and one 2795Y transformer

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2795T and 2795Y Transformers Application Note

Symbol	Name	Value		
Zo	Characteristic impedance	75Ω (E1)	120Ω (E1)	100Ω (DS1)
CC	Center tap capacitor	0.1 µF	0.1 µF	0.1 µF
RR	Receive series resistor	158Ω	158Ω	132Ω
RS	Receive shunt resistor	114Ω	114Ω	95.3Ω
RT	Transmit series resistor	7.15Ω	7.15Ω	1.8Ω
CS	Shunt capacitor	330 pF	330 pF	330 pF
T1	Bel part number—receive	2795T	2795T	2795T
T2	Bel part number—transmit	2795Y	2795Y	2795Y

Table 2. Components and values for one 2795T transformer and one 2795Y transformer

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