EXAR

Preliminary Information

XR-T445B

T-75-11-37

Low Voltage PCM Repeater

GENERAL DESCRIPTION

The XR-T445B is a monolithic repeater circuit for Pulse-Code Modulated (PCM) telephone systems. It is designed to operate as a regenerative repeater at 1.544 Megabits per second (Mbps) data rate on T1-type PCM lines. It is packaged in a hermetic 16-Pin CERDIP package and is designed to operate over a temperature range of -40°C to +85°C. It contains all the basic functional blocks of a regenerative repeater system, including Automatic Line Build-Out (ALBO) and equalization, and is insensitive to reflections caused by cable discontinuities.

The key feature of the XR-T445B is its ability to operate with low supply voltage (6.3 volts and 4.3 volts) with a supply current of less than 13 mA. Compared to conventional repeater designs using discrete components, the XR-T445B monolithic repeater IC offers greatly improved reliability and performance, along with significant savings in power consumption and system cost.

FEATURES

Contains all the Active Components of a PCM Repeater
Low-Voltage Operation (6.3 volts)
Low-Power Dissipation (13 mA)
On-Chip ALBO Port
High-Current Output Drivers
Increased Reliability over Discrete Designs
2 Megabit Operation Capability
Improved Layout Sensitivity

APPLICATIONS

PCM Repeater for T1 Systems
PCM Repeater for 2 M Bit/s Systems

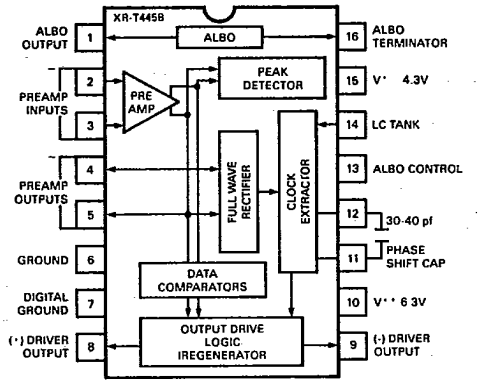
ABSOLUTE MAXIMUM RATINGS

Storage Temperature	-65°C to +150°C
Operating Temperature	-40°C to +85°C
Supply Voltage	-0.5 to +10 V
Input Voltage (Except Pin 1,16)	-0.5 to +7 V
Input Voltage (Pin 1,16)	-0.5 to +0.5 V
Data Output Voltage (Pin 8,9)	20 V
Voltage Surge (Pin 2,3,8,9) (10 msec only)	50 V

ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-T445B	Ceramic	-40°C to +85°C

FUNCTIONAL BLOCK DIAGRAM



SYSTEM DESCRIPTION

The XR-T445B contains all the active circuits required to build one side of a T1 or 2 M bit/s PCM repeater. T1 is the most widely used PCM transmission system, operating at 1.544 M bit/s. It can operate on either pulp or plastic insulated twisted pair cables. Although the cable gauge may vary the total cable loss should not exceed 36 dB at 772 kHz. For a 22 gauge pulp insulated cable and a bit error rate (BER) of less than 10^{-6} the max allowable repeater to repeater spacing is about 6300 feet.

Bipolar PCM signal is attenuated and dispersed in time as it travels along a transmission cable. This signal, when received, is amplified and reconstructed by the preamplifier automatic line build out (ALBO), clock and data threshold detector circuits contained within the XR-T445B Amplitude equalization and frequency spectrum shaping is achieved through the variable impedance of the ALBO port and its associated ALBO network.

Incoming pulse stream is full wave rectified and timing information is extracted by the clock threshold detector. Clock recovery is then achieved by pulsing a tank circuit tuned to 1.544 MHz. Either injection locking or pulsed tank type clock extraction are possible with the XR-T445B. By grounding Pin 13, the circuit works in the pulsed tank mode. Floating (open) Pin 13 switches the XR-T445B to an injection locked mode. The oscillator's sinusoidal waveform is amplified and phase shifted by 90 degrees with the help of a capacitor between Pins 11 and 12.

Data is sampled and stored in the output data latches by an internally generated sampling pulse. Buffer drivers are then enabled to produce precisely timed output pulses whose width and time of occurence are controlled by the regenerated clock signal.