PCM AMI Line Receiver and Clock Recovery Circuit

GENERAL DESCRIPTION

The XR-T5740 is a monolithic bipolar IC designed for T1 line receiver application operating at 1.544 M bit/s. It provides all the active circuitry required to perform automatic line build out (ALBO), threshold detection, binary NRZ data and clock recovery as the XR-T5640 but with a crystal filter instead of a LC tank circuit.

A clock recovery using an LC filter circuit version of the XR-T5740 is also available as the XR-T5640.

FEATURES

Clock Recovery using Crystal Filter
On-chip NRZ Data and Clock Recovery Circuitry
Less than 10 ns Sampling Pulse Over the Operating Range
Triple Matched ALBO Ports
Single 5.1 V Power Supply

APPLICATIONS

T1 PCM Line Receiver
T1C PCM Line Receiver (requires external gain)
General Purpose Bipolar Line Receiver

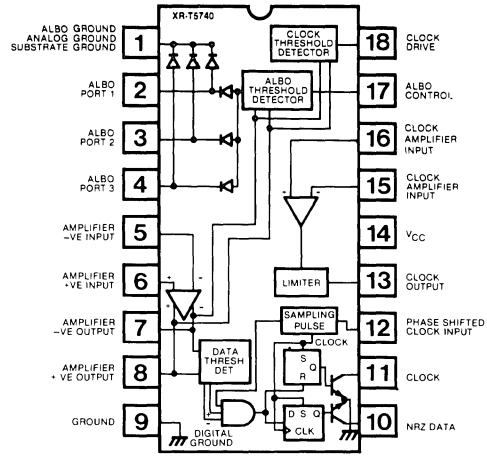
ABSOLUTE MAXIMUM RATINGS

Storage Temperature	−65°C to +150°C
Operating Temperature	−40°C to +85°C
Supply Voltage	−0.5 to +10V
Supply Voltage Surge (10 ms only)	+25V
Input Voltage (except Pins 2,3,4,17)	−0.5 to +7V
Input Voltage (Pins 2,3,4,17)	−0.5 to +0.5V
Data and Clock Output Voltage	−0.5 to 20V
Voltage Sure (Pins 5,6,10,11) (10 ms only)	+50V

ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-T5740	Ceramic	−40°C to +85°C

FUNCTIONAL BLOCK DIAGRAM



SYSTEM DESCRIPTION

The XR-T5740 is designed as a receiver for interfacing T1 PCM carrier lines on plastic or pulp insulated cables. It can also be used as a general purpose alternate mark inversion (AMI) receiver.

The XR-T5740 is a modified version of XR-T5720 PCM repeater IC. It contains all the active circuitry needed to build a T1 receiver for interfacing up to 6300 ft. The preamplifier, the clock amplifier, threshold detectors, ALBO port, data latches and output drivers are similar to the ones on XR-T5720. Clock extraction is done by means of a crystal filter circuit.

Bipolar +1 and −1 pulses are combined within the IC to form a binary non-return to zero PCM signal at Pin 10. A synchronous clock signal is made available at Pin 11. Both outputs have open collector transistors.

ELECTRICAL CHARACTERISTICS

Test Conditions: T_A = 25°C, V_{CC} = 5.1 V ± 5%

PARAMETERS	MIN	TYP	MAX	UNIT	CONDITIONS
Supply Current		22	30	mA	ALBO Off
Clock & Data Output Leakage Current		0	100	μA	$V_{pull\text{-}up}$ = 15V
Amplifier Pin Voltages	2.4	2.9	3.4	V	At Unity DC Gain
Amplifier Output Voltage Swing	2.2			V	
Amplifier Output Offset Voltage	−50	0	50	mV	R_S = 8.2 kΩ
Amplifier Input Bias Current			5	μA	
ALBO on Current	3			mA	
Drive Current		1		mA	
AC CHARACTERISTICS					
Pre-Amplifier					
AC Gain at 1 MHz		50		dB	Open Loop
Input Impedance	20			kΩ	
Output Impedance			200	Ω	
Clock Amplifier					
AC Gain		32		dB	Open Loop
−3 dB Bandwidth	10			MHz	
Delay		10		ns	
Output Impedance			200	Ω	
ALBO					
Off Inpedance	20			kΩ	
On Impedance			25	Ω	
CLOCK DATA OUTPUT BUFFERS					R_L = 130Ω, $V_{pull\text{-}up}$ = 5.1V ± 5%
Rise Time		30		ns	
Fall Time		30		ns	
Output Pulse Width		244		ns	
Sample Pulse Width		10		ns	
V_{OL}		0.7		V	
I_L sink		35		mA	
THRESHOLDS					
ALBO	1.4	1.5	1.6	V	
Clock Drive Current Peak		1.0		mA	At V_O = V_{ALBO} Threshold
Clock Thresholds					
% of ALBO	63		75	%	
Data Threshold					
%of ALBO	40	46	52	%	

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