PRELIMINARY

Programmable Encoder/Decoder

Features

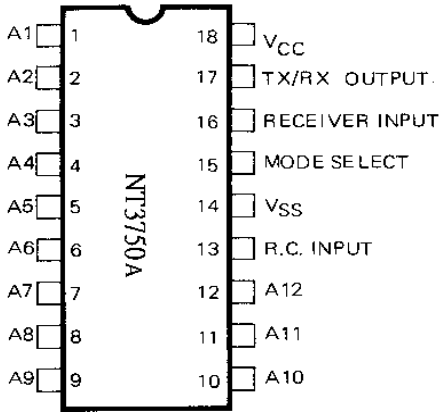
- Single chip contains both Encoder and Decoder
- 3V to 11V operation
- On chip oscillator uses non-critical RC components
- Cross interference of receiver is virtually eliminated by circuitry which requires 4 valid words to be received, each within 64ms of the other
- Schmitt Trigger input provides excellent noise immunity
- Applications: alarm control system, security system cordless telephone, remote control
- Interfaces with RF, ultrasonic, or infrared modulators and demodulators
- 2^{12} = 4096 different codes

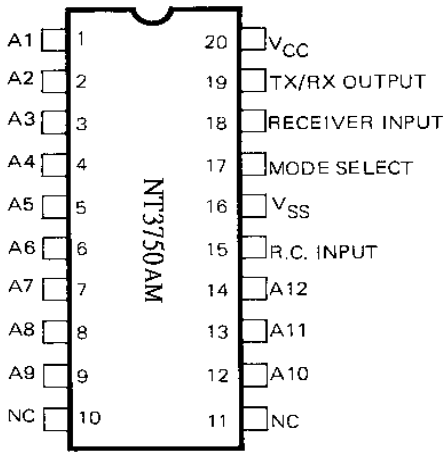
General Description

The NT3750A Encoder/Decoder is a CMOS/LSI digital code Transmitter-Receiver system. Working in the transmit (encoder) mode, the NT3750A will sequentially encode and transmit 12 bits of input. Each of the 12 bits may be 1 or 0 to allow 4096 different codes.

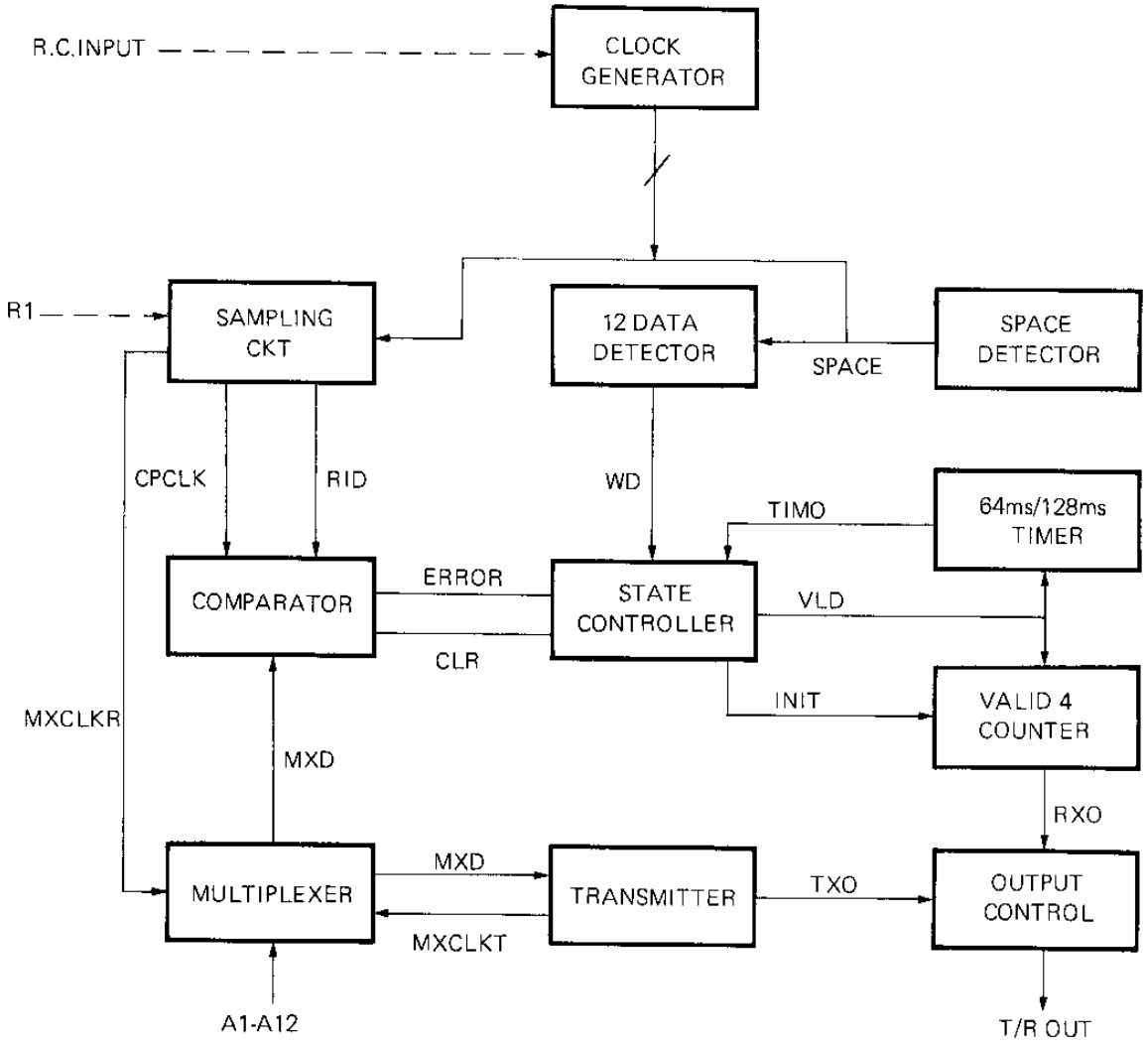
In the receive (decoder) mode, the incoming signal is compared to the local code in a sequential manner. Once an error is detected the system will reset and begin its comparison on the next word. If all 12 bits are received correctly, a "valid" signal is generated. This signal clears a 64ms counter and triggers a 3-stage counter. The 3-stage counter counts the "valid" pulses and when 4 pulses have been detected, the TX/RX output pin goes low. After the TX/RX output pin goes low, the next "valid" must be received within 128ms, otherwise, the TX/RX output will be disabled.

Pin Configurations





Block Diagram



Block Diagram Description

CPCLK:	CLK of Comparator	CLR:	Clear signal of Comparator
MXCLKR:	CLK of Multiplexer when in Receiver mode	ERROR:	Error signal from Comparator
MXCLKT:	CLK of Multiplexer when in Transmitter mode	TIMO:	TIMER time-out signal (64ms or 128ms)
MXD:	Output data of Multiplexer (one of A1, A2.... A12)	T/R OUT:	Transmit/Receiver output pin
		INIT:	Reset signal of Valid 4 Counter
RID:	Sampled data by Sampling CKT	WD:	Word detected signal
VLD:	"Valid" signal. It is used to trigger Valid 4 Counter and reset 64ms/128ms Timer	TXO:	Transmitter output
		PXO:	Receiver output

Absolute Maximum Ratings*

Power Supply Voltage . . . . . −0.3V to 11V

Operating Temperature . . . . . −20 ~ +70 °C

Storage Temperature (Tstg) . . . . . −55 ~ +150 °C

Applied Voltage on any Pin

. . . . . V_{SS} −0.3 < V_{IN} < V_{DD} +0.3

*Comments

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extended periods may affect device reliability.

DC Electrical Characteristics (T_A = 25°C, V_{DD} = 9V unless otherwise specified)

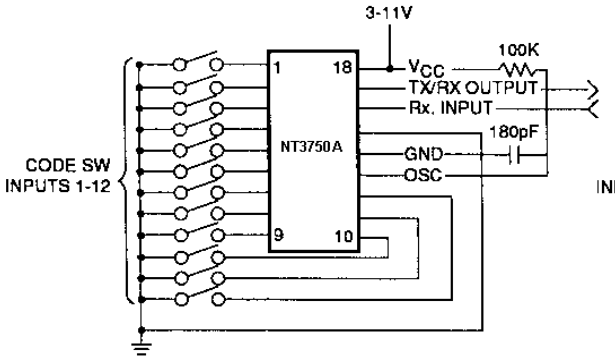
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Operating Voltage	V_{DD}	3.0	—	11	V	
Operating Current	I_{DD}	—	—	1.2	mA	
Schmitt Trigger Input Level	—	V_{SS} +4	—	V_{SS} +2	V	Level 1 Level 0
Other Pins Input Level	—	V_{DD}−0.5 V_{SS}	—	V_{DD} V_{SS} +0.5	V	Level 1 Level 0
Output Pin Logic Level	V_{OH} V_{OL}	V_{DD}−0.5 V_{SS}	—	V_{DD} V_{SS}+1	V V	Isource = 5μA Isink = 2mA
Input Resistor to V_{CC}	—	200K	—	1.2M	Ω	
Oscillator Frequency	F	—	100	—	KHz	±15% exclusive of external components

Pin Description (for NT3750/A)

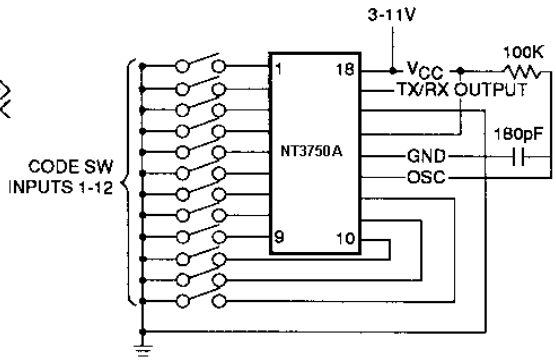
Pin No.	Designation	Description
1–12	A1–A12	These data select lines are used to set the addresses of the encoder/decoder pair. They have on-chip pull-up resistors
13	R.C. INPUT	R.C. input pin for single pin oscillator. A resistor is connected from this pin to V_{CC} and a capacitor from this pin to GND. The frequency = 2/RC
14	V_{SS}	The ground pin of the NT3750A
15	MODE SELECT	This pin changes the IC from Receive mode to Transmit mode. By grounding this pin the IC is put into the Receive mode. By connecting to V_{CC} the IC is put into the Transmit mode
16	RECEIVER INPUT	The receiver input receives the digital PCM waveform from the detect circuit
17	TX/RX OUTPUT	In the transmit mode, this output pin produces the PCM waveform for transmitting. In the receive mode, this output pin provides the comparison result and detects low if comparison is ok
18	V_{CC}	The positive power supply pin of the NT3750A

Note: The only difference between NT3750A and NT3750AM is that the latter has two extra NC pins.

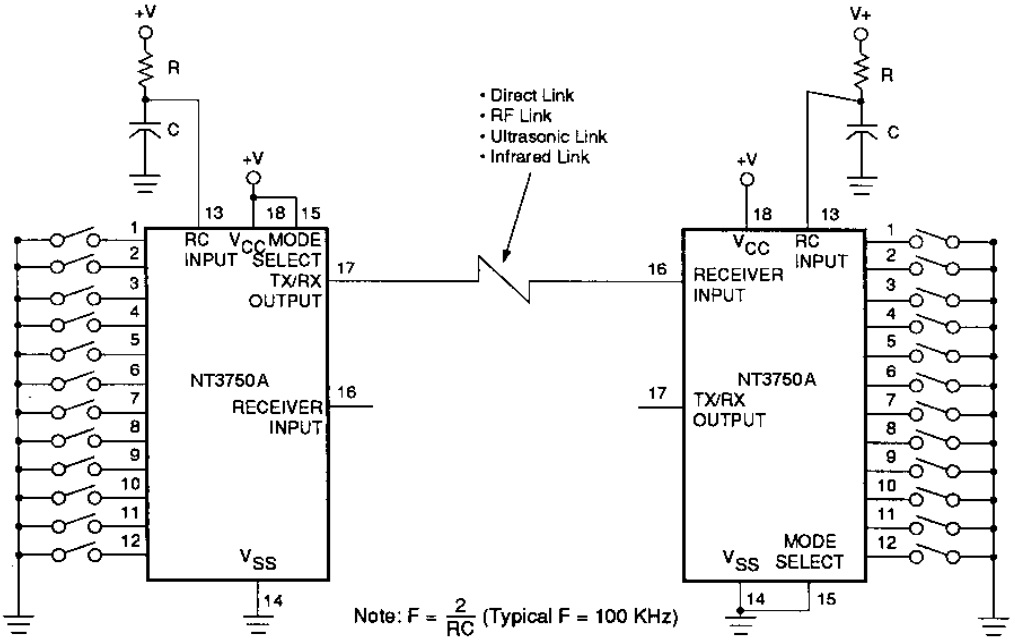
Application Circuits (for reference only)



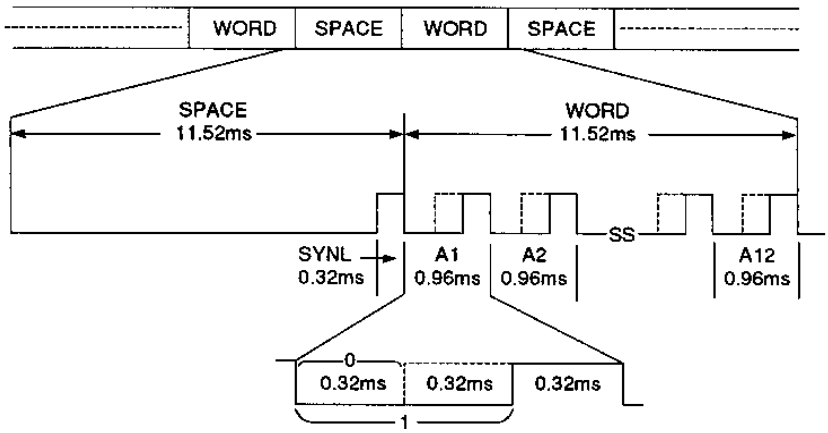
Pin Connections for Receive Mode



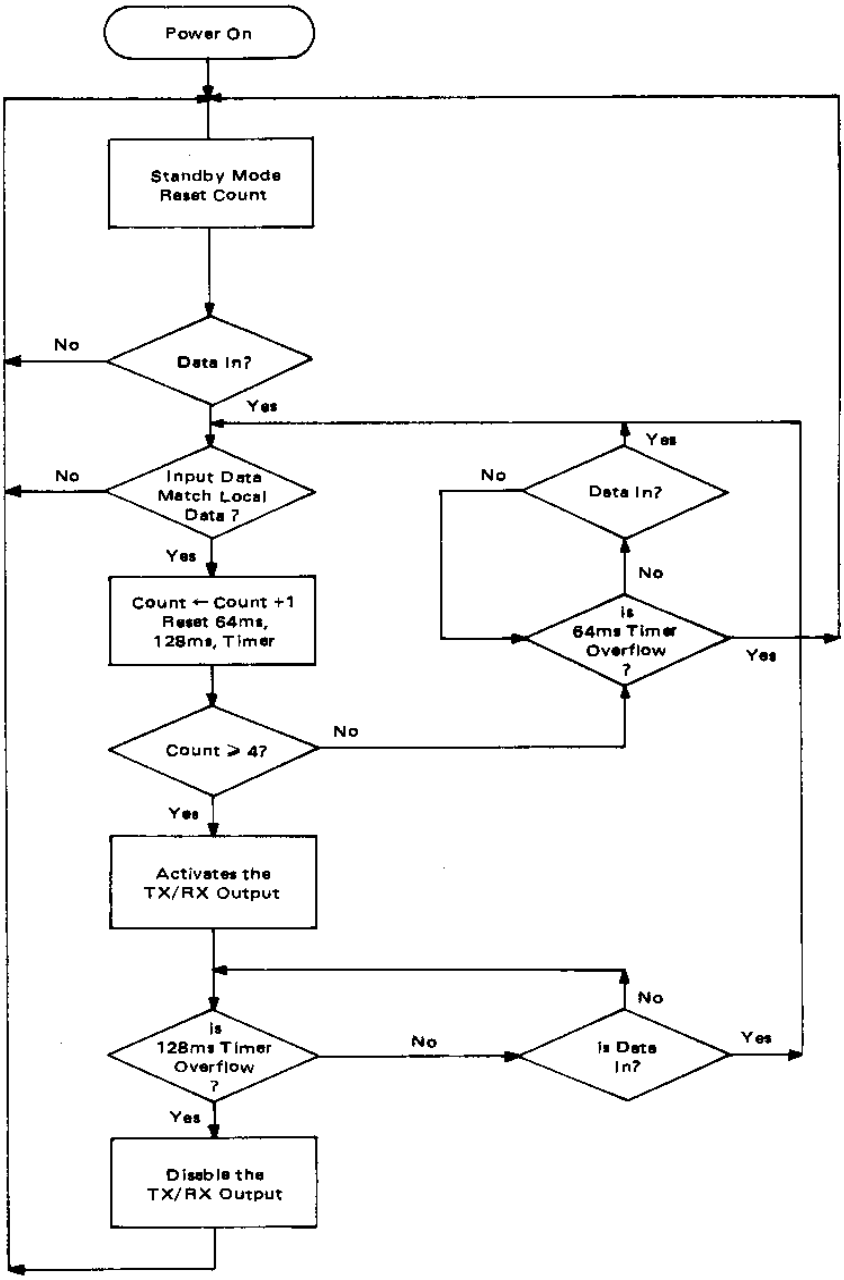
Pin Connections for Transmit Mode



Output Waveform (based on 100 KHz)



Decoder Flowchart



Ordering Information

Part No.	Package
NT3750A	18L DIP
NT3750AM	20L SOP