



## UM3750

### Programmable Encoder/Decoder

#### Features

- Single chip contains both Encoder and Decoder.
- 3V to 11 V 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.

#### General Description

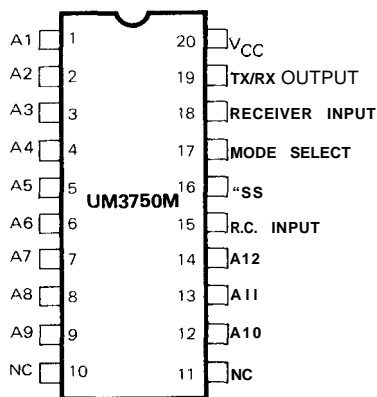
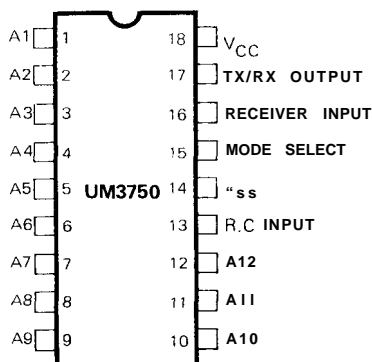
The **UM3750 Encoder/Decoder** is a CMOS/LSI digital code Transmitter-Receiver system. Working in the transmit (encoder) mode, the UM3750 will sequentially encode and transmit 12 bits of input. Each of the 12 bits may be 1 or 0 to allow 4096 different codes.

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

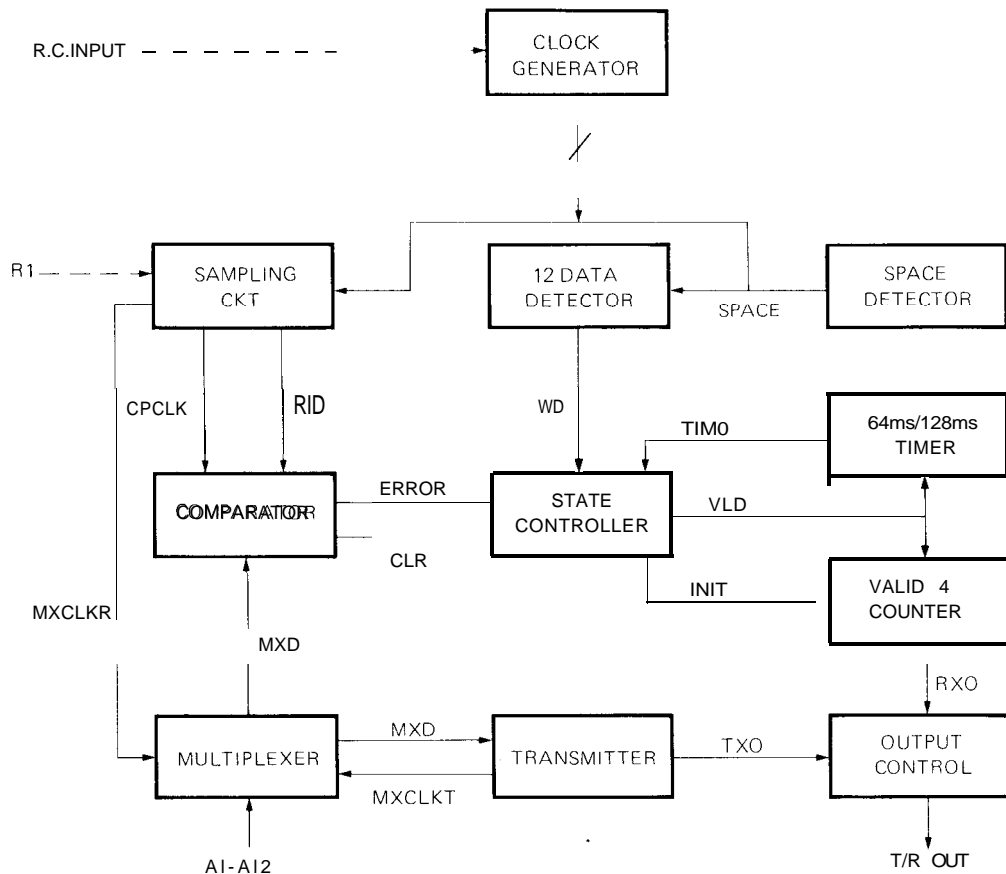
- Schmitt Trigger input provides excellent noise immunity.
- Applications. alarm control system, security system cordless telephone, remote control.
- Interfaces with RF, ultrasonic, or infrared modulators and demodulators

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" pluses 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, giving a one valid in 6 requirement to keep the TX/RX output pin.

#### Pin Configurations



# Block Diagram



## Block Diagram Description

**CPCLK** CLK of Comparator  
**WXCLKR** CLK of Multiplexer when in Receiver mode  
**WXCLKT** CLK of Multiplexer when in Transmitter mode  
**MXD** Output data of Multiplexer (one of A1, A2 .... A12)  
**RID** Sampled data by Sampling CKT  
**VLD** "Valid" signal. It is used to trigger Valid 4 Counter and reset 64ms/128ms Timer

**CLR** Clear signal of Comparator  
**ERROR** Error signal from Comparator  
**TIMO** TIMER time-out signal (64ms or 128ms)  
**T/R OUT** Transmit/Receiver output pin  
**INIT** Reset signal of Valid 4 Counter  
**WD** Word detected signal  
**TXO** Transmitter output  
**PXO** Receiver output

**Absolute Maximum Ratings\***

Power Supply Voltage      -0 3v to 11V

Operating Temperature    -20 Deg to 70 Deg C

Storage Temperature (Tstg)    -55 Deg to 150 Deg 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.

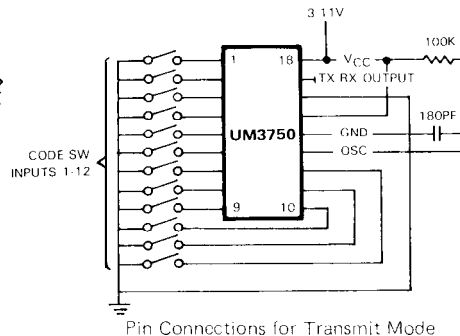
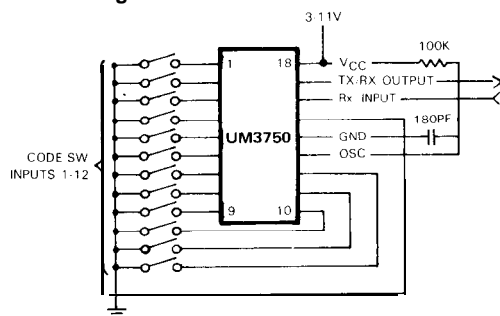
**D.C. Electrical Characteristics** ( $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 9\text{V}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
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	$I_{source} = 5\mu\text{A}$ $I_{sink} = 2\text{mA}$
Input Resistor to $V_{CC}$	—	200K	—	1.2M	$\Omega$	
Oscillator Frequency	F	—	100	—	KHz	$\pm 15\%$ exclusive of external components

**Pin Designation**

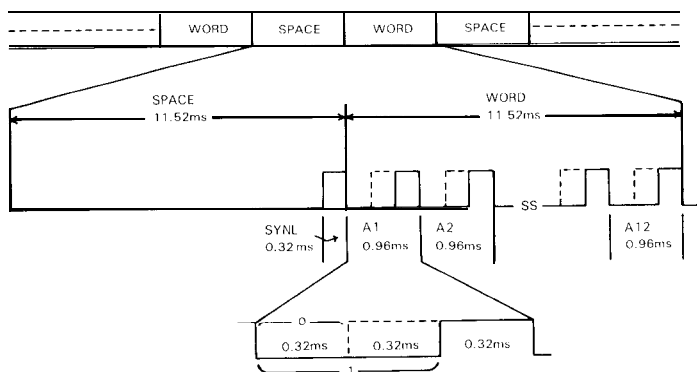
Pin No.	Designation	Description
1 - 12	A1 — A12	These data select lines are used to set the addresses of the encoder/decoder pair. They have on-chip pull-up resistors.
13	R.C. INPUT	R.C. input pin for single pin oscillator. A resistor is hooked from this pin to $V_{CC}$ and a capacitor from this pin to GND. The frequency = $2/RC$ .
14	$V_{SS}$	The ground pin of the UM3750.
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 UM3750.

### Connection Diagram for Transmitter/Receiver

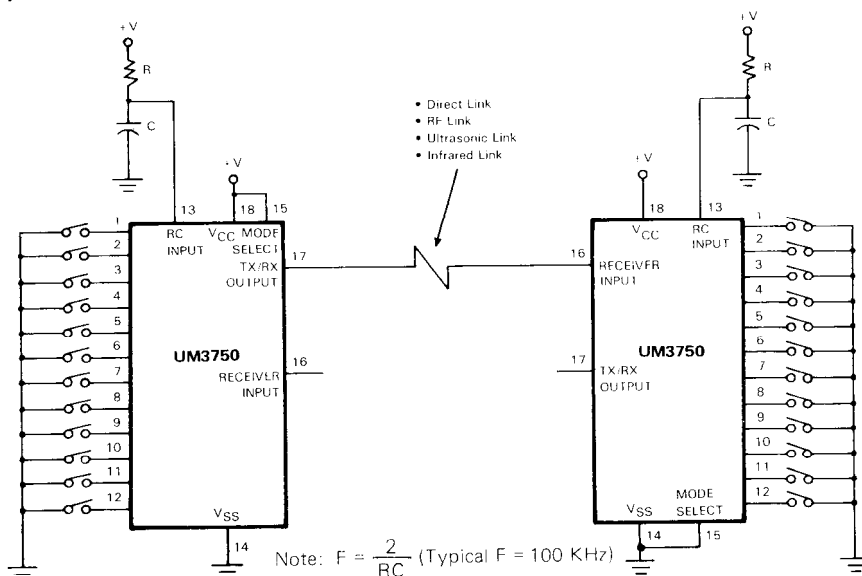


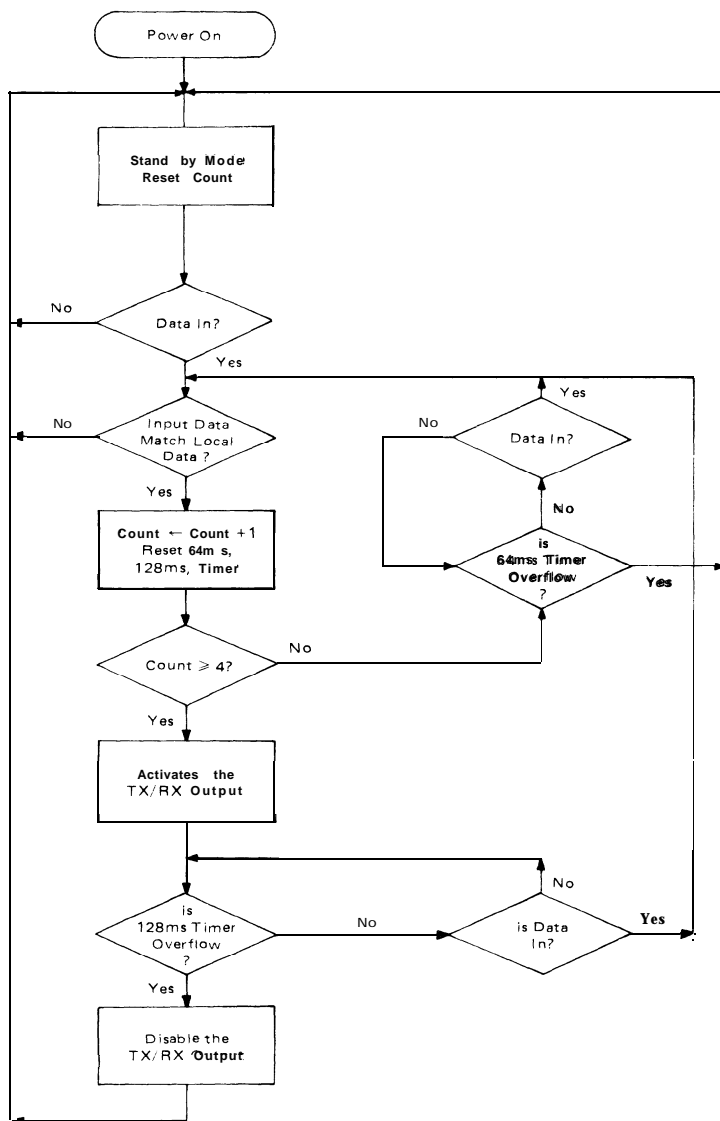
Pin Connections for Transmit Mode

### Output Waveform (based on 100 KHz)



### Typical Application CKT



**Decoder Flowchart**

**Ordering Information**

Part No.	Package
UM3750	18L DIP
UM3750M	20L SOP