



## Description

PT 2260 is a remote control encoder paired with either PT 2270 or PT 2272 utilizing CMOS Technology. It encodes data and address pins into a serial coded waveform suitable for RF modulation. PT 2260 has a maximum of 10 bits tri-state address pins providing up to 59,049 (or  $3^{10}$ ) address codes; thereby, drastically reducing any code collision and unauthorized code scanning possibilities.

PT 2260 is one of the first generation of Encoder/Decoder ICs that utilizes the unique PTC Technology. When paired with PT 2270, this encoder/decoder (PT 2260 / PT 2270) pair can operate at very wide temperature range (see Features). Thus, this very important feature enables your Encoder/Decoder to operate under the worst environmental condition.

## Features

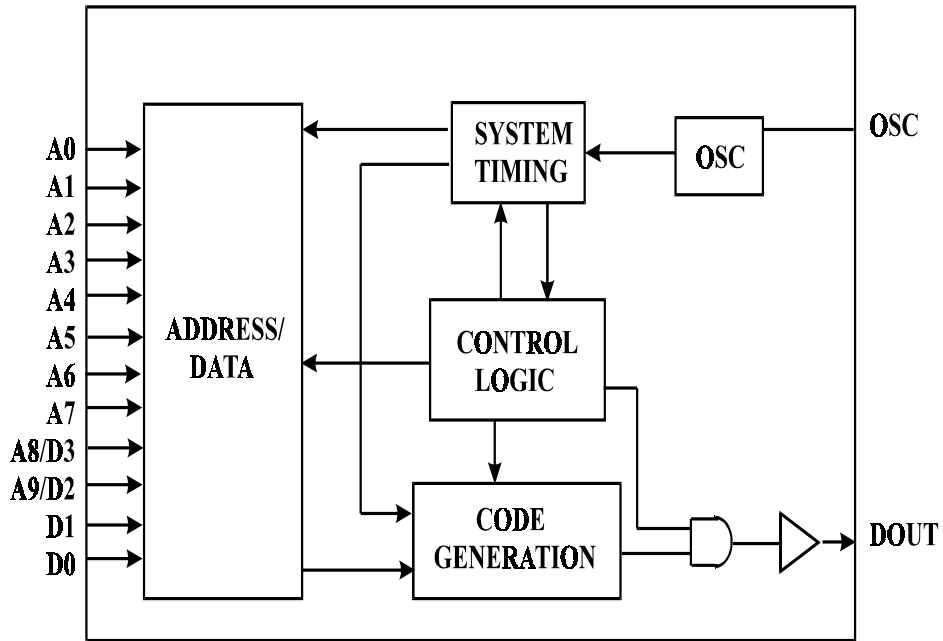
- High Performance CMOS Technology
- Low Power Consumption
- Very High Noise Immunity
- Wide Operating Temperature Range:  $-30^{\circ}\text{C} \sim 70^{\circ}\text{C}$
- 8 or 10 Tri-State Code Address Pins
- 2 or 4 Data Pins
- Wider Range of Operating Voltage: 1.8 ~ 10.0 Volts
- Single Resistor Oscillator
- Least External Components

## Applications

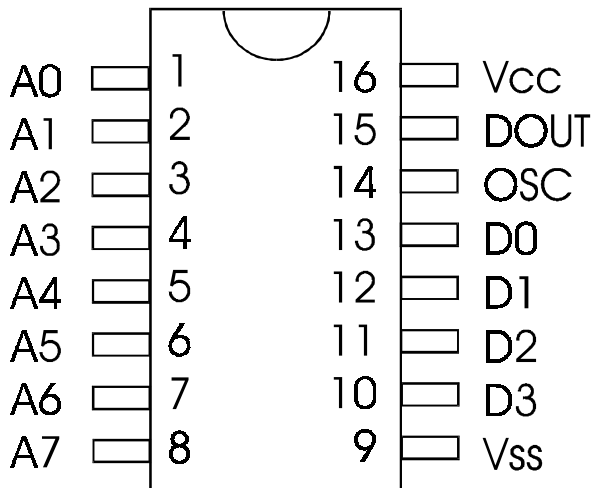
- Home/Car Security System
- Garage Door Controller
- Remote Fan Controller
- Remote Control Toys



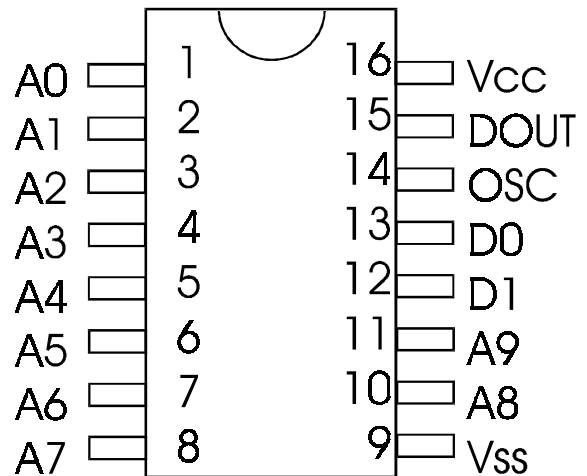
# Block Diagram



# Pin Configuration



**PT2260 - R4**



**PT2260 - R2**



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# Pin Description

Pin Name	I/O	Description	Pin No.
A0 ~ A7	I	Code Address Pin Nos. 0 ~ 7 These eight tri-state pins are detected by PT 2260 to determine the encoded waveform bit 0 ~ bit 7. Each bit can be set to "0", "1", or "f" (floating).	1 ~ 8
A8/D3 ~ A9/D2	I/PL*	Code Address Pin Nos. 8 ~ 9/Data Pin Nos. 3 ~ 2. These two tri-state pins are detected by PT 2260 to determine the encoded waveform bit 8 ~ bit 9. When these pins are used as address pins (as in PT2260-R2), they can be set to "0", "1", or "f" (floating). When these pins are used as data pins (as in PT2260-R4), they can only be set to "0" or "1".	10 ~ 11
D1, D0	I/PL	Data Pin Nos. 1/0. These pins can only be set to "0" or "1"	12, 13
OSC	I	Oscillator Pin A resistor connected between the Osc Pin and the Vcc determines the fundamental frequency of the PT 2260	14
DOUT	O	Data Output Pin. The encoded waveform is serially outputted to this pin. When PT 2260 is not transmitting, DOUT outputs low (Vss) voltage	15
Vcc		Positive Power Supply	16
Vss		Negative Power Supply	9

Note : PL -- Pull-low Resistor is connected internally

PL\* -- If those two pins are used as Data Pins (PT2260-R2), pull-low resistor is connected internally; otherwise, no pull-low resistor is connected.



# Functional Description

PT 2260 encodes the code address and data set at A0 ~ A7, A8/D3, A9/D2, D1 and D0 into a special waveform and outputs it to the DOUT when any of the data pins is tied to high. This waveform is fed to the RF modulator for transmission. The transmitted radio frequency is received by the RF demodulator and reshaped into the special waveform. PT 2270 (or PT 2272) is then used to decode the waveform and set the corresponding output pin(s). Thus completing a remote control encoding and decoding function.

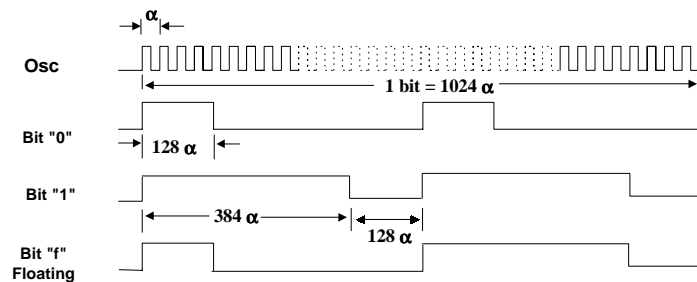
## RF Operation

### Code Bits

A Code Bit is the basic component of the encoded waveform, and can be classified as either an **AD (Address/Data) Bit** or a **SYNC (Synchronous) Bit**.

#### Address/Data (AD) Bit Waveform

An AD Bit can be designated as Bit "0", "1", or "f" if it is in low, high or floating state respectively. One bit waveform consists of 2 pulse cycles. Each pulse cycle has 512 oscillating clock periods. For further details, please refer to the diagram below:

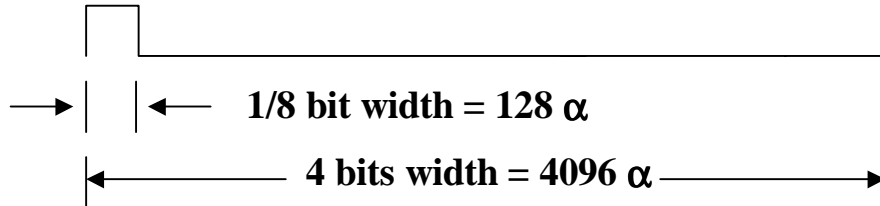


where :  $\alpha$  = Oscillating Clock Period



### Synchronous (Sync.) Bit Waveform

The Synchronous Bit Waveform is 4 bits long with 1/8 bit width pulse. Please refer to the diagram below:

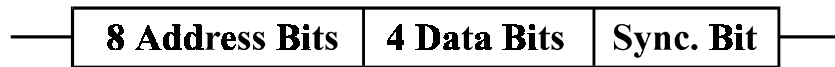


Note : 1 bit = 1024 α

### Code Word

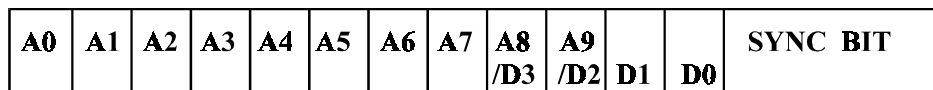
A group of Code Bits is called a Code Word. A Code Word consists of 12 AD bits followed by one Sync. Bit. The 12 AD bits are determined by the corresponding states of A0 ~ A7, A8/D3, A9/D2, D1 and D0 pins at the time of transmission. When the Data Type of PT 2260 is used, the address bits will decrease accordingly.

For example: In the 4-Data Type where the address has eight (8) bits, the transmitting format is:



PT 2260 has a maximum of ten (10) Address Bits. The following diagram shows the code bits with their corresponding pins.

First Bit Transmitted





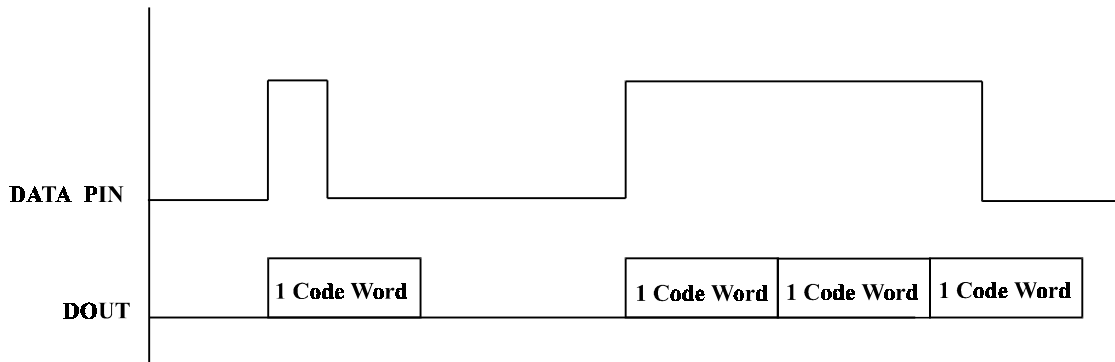
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2 Data :    A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 D1 D0 Sync Bit  
 4 Data :    A0 A1 A2 A3 A4 A5 A6 A7 D3 D2 D1 D0 Sync Bit

The Code Bits A0 ~ A7, A8/D3, A9/D2, D1 and D0 are determined by the states set at these pins. For example, when the A0 (Pin No.1) is set to "1" (Vcc), the Code Bit A0 is synthesized as "1" bit. In the same manner, when it (A0 Pin) is set to "0" (Vss) or left floating, the Code Bit A0 is synthesized as a "0" or "f" bit respectively.

When PT 2260 detects "1" on any of the Data pins, it outputs a Code Word at DOUT. If the Data Pin is still in high state ("1") the time the Code Word transmission ends, PT 2260 outputs the same Code Word. Please refer to the diagram below:



Single Resistor Oscillator

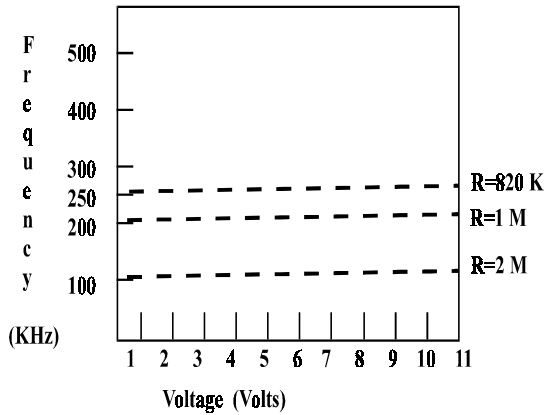
The built-in oscillator circuitry of PT 2260 allows a precision oscillator to be constructed by connecting an external resistor between OSC and Vcc pins. For PT 2270 (or PT 2272) to decode correctly the received waveform, the oscillator frequency of PT 2270 (or PT 2272) must be 1/16 ~ 4 (or 1/16 ~ 1/4) times that of the transmitting PT 2260. The typical oscillator frequency with various resistor values for PT 2260, PT 2270, and PT 2272 are shown below:



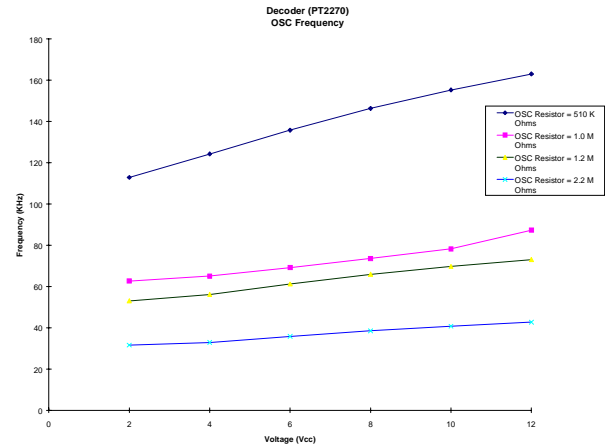
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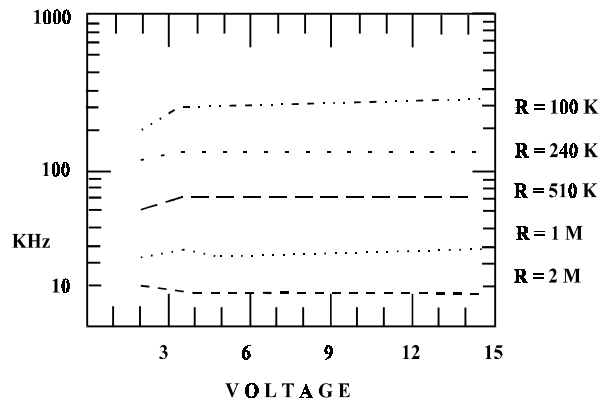
Encoder (PT2260)  
OSC Frequency



Decoder (PT2270)  
OSC Frequency



Decoder (PT2272)  
OSC Frequency

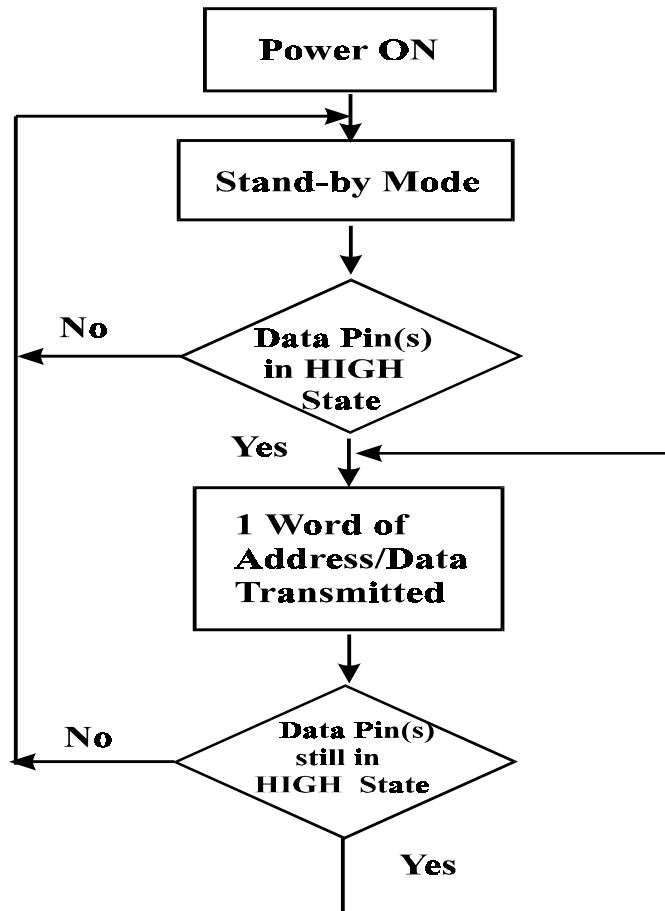


Suggested oscillator resistor values are shown below.

PT 2260	PT2270	PT2272
820 KΩ	510 KΩ	1 MΩ
1 MΩ	620 KΩ	1.2 MΩ
2 MΩ	1.2 MΩ	2.2 MΩ



# Operation Flowchart



## Absolute Maximum Rating

SYMBOL	PARAMETER	CONDITION	RATING	UNIT
V <sub>cc</sub>	Supply Voltage		-0.3 ~ 10.0	Volt
V <sub>I</sub>	Input Voltage		-0.3 ~ V <sub>cc</sub> +0.3	Volt
V <sub>O</sub>	Output Voltage		-0.3 ~ V <sub>cc</sub> +0.3	Volt
P <sub>a</sub>	Maximum Power Dissipation	V <sub>cc</sub> = 10 Volt	500	mW
T <sub>opr</sub>	Operating Temperature		-30 ~ 70	°C
T <sub>stg</sub>	Storage Temperature		-40 ~ 125	°C

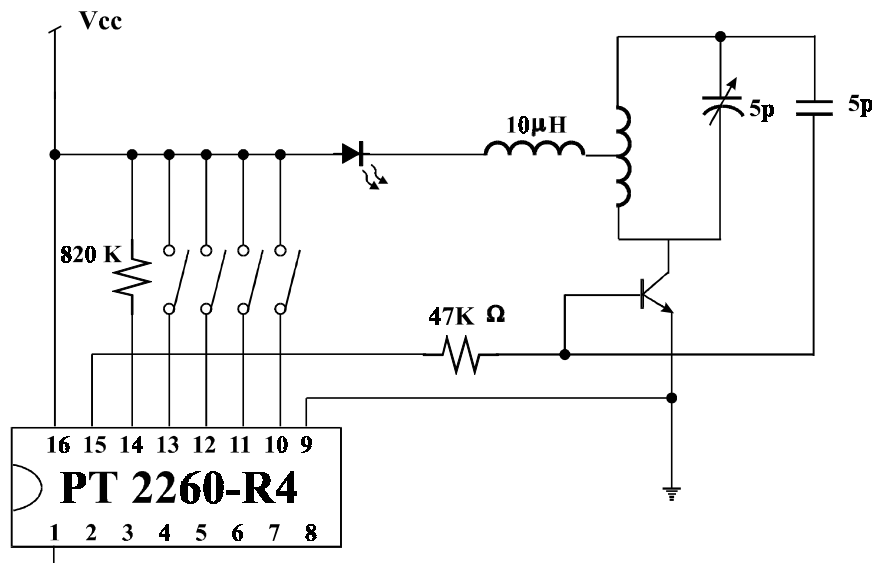




# DC Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V <sub>CC</sub>		1.8		10	Volt
Stand-by Current	I <sub>sb</sub>	V <sub>CC</sub> =5 V OSC stops All input pins open	0.2	0.5	0.8	μA
DOUT Output Driving Current	I <sub>OH</sub>	V <sub>CC</sub> = 3 V V <sub>OH</sub> = 1.5 V V <sub>CC</sub> = 10 V V <sub>OH</sub> = 5 V	2.5 20			mA
DOUT Output Sinking Current	I <sub>OL</sub>	V <sub>CC</sub> = 3 V V <sub>OL</sub> = 1.5 V V <sub>CC</sub> = 10 V V <sub>OL</sub> = 5V	4.6 24			mA
Operation Current	I <sub>op</sub>	V <sub>CC</sub> =1.8V V <sub>CC</sub> =6.0V V <sub>CC</sub> =10V	0.01 0.50 1.60			mA

# Application Circuit

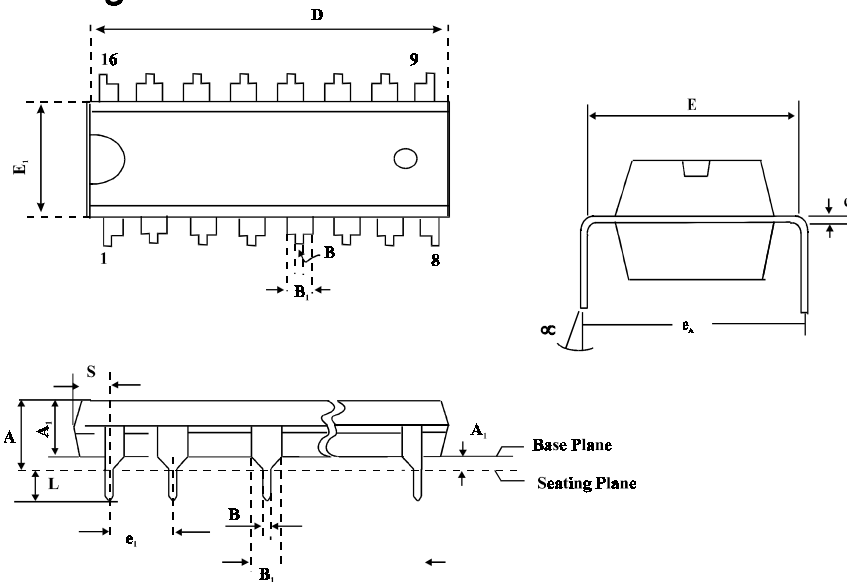


UHF Band 4-Data Transmitter Circuit is recommended.



# Package Dimension

## DIP Package



Symbol	Dimensions in Inch	Dimensions in mm
A	0.175 Max	4.45 Max
A <sub>1</sub>	0.010 Min	0.25 Min
A <sub>2</sub>	0.130 + 0.005	3.30 + 0.13
B	0.018 + 0.004	0.46 + 0.10
	0.018 - 0.002	0.46 - 0.05
B <sub>1</sub>	0.060 + 0.004	1.52 + 0.10
	0.060 - 0.002	1.52 - 0.05
c	0.010 + 0.004	0.25 + 0.10
	0.010 - 0.002	0.25 - 0.05
D	0.750 TYP (0.770 Max)	19.05 TYP (19.56 Max)
E	0.300 + 0.010	7.62 + 0.25
E <sub>1</sub>	0.250 + 0.005	6.35 + 0.13
e <sub>1</sub>	0.100 + 0.010	2.54 + 0.25
L	0.130 + 0.010	3.30 + 0.25
$\alpha$	0° ~ 15°	0° ~ 15°
e <sub>A</sub>	0.355 + 0.020	9.02 + 0.51
S	0.040 Max	1.02 Max

Note:

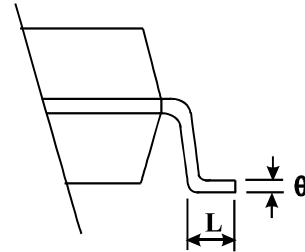
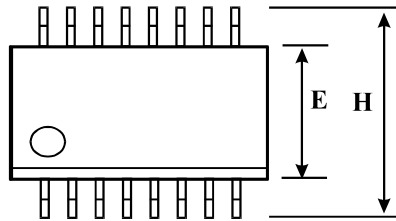
1. The max. value of dimension D includes end flash.
2. The dimension E<sub>1</sub> doesn't include resin fins
3. The dimension S includes end flash.
4. All dimensions are based on British system



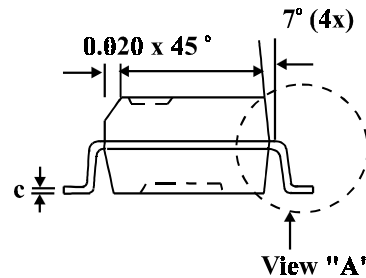
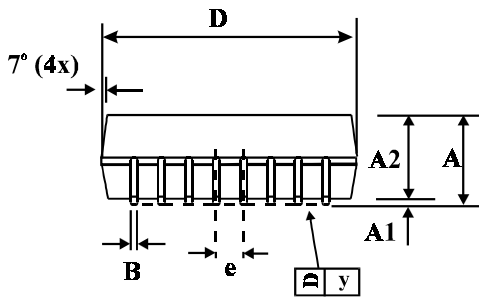
REMOTE CONTROL ENCODER

PT 2260

SOP Package



VIEW "A"



View "A"

Symbols	Dimensions in Millimeters			Dimensions in Inches			
	Min.	Nom.	Max.	Min.	Nom.	Max.	
A	1.47	1.60	1.73	0.058	0.063	0.068	
A1	0.10	-	0.25	0.004	-	0.010	
A2	-	1.45	-	-	0.057	-	
B	0.33	0.41	0.51	0.013	0.016	0.020	
C	0.19	0.20	0.25	0.0075	0.008	0.0098	
D	9.80	9.91	10.01	0.386	0.390	0.394	
E	3.81	3.91	3.99	0.150	0.154	0.157	
e	-	1.27	-	-	0.050	-	
H	5.79	5.99	6.20	0.228	0.236	0.244	
L	0.38	0.71	1.27	0.015	0.028	0.050	
y	-	-	0.10	-	-	0.004	
theta	0°	-	8°	0°	-	8°	

- Note:
1. Controlling Dimension : Inch
  2. Lead Frame Material : Copper 194
  3. After solder plating lead thickness will be 0.013" max.
  4. Dimension "D" does not include mold flash, protrusions or gate burrs.
  5. Dimension "E" does not include interlead flash or protrusions.
  6. Tolerance : ± 0.010" unless otherwise specified.
  7. Otherwise, dimensions follow acceptable spec.



# Ordering Information

Valid Product No.	Package
PT 2260-R4 (S)	16 Pins, DIP (SO)
PT 2260-R2 (S)	16 Pins, DIP (SO)

## PT 2260 - W - X - Y - Z

