

# HT604L/HT614/HT692 3<sup>18</sup> Series of Decoders

# **Features**

- Operating voltage: 2.4V~12V
- Low power and high noise immunity CMOS technology
- Low standby current
- Capable of decoding 18 bits of information Pairs with Holtek's 3<sup>18</sup> series of encoders
- 9~10 address pins
- 2~8 data pins
- Trinary address setting

## Applications

- Burglar alarm system
- Smoke and fire alarm system
- Garage door controllers
- Car door controllers

# **General Description**

The  $3^{18}$  decoders are a series of CMOS LSIs for remote control system applications. They are paired with the 3<sup>18</sup> series of encoders. For proper operation, a pair of encoder/decoder pair with the same number of address and data format should be selected (refer to the encoder/decoder cross reference tables).

The 3<sup>18</sup> series of decoders receive serial address and data from that series of encoders that are transmitted by a carrier using an RF or an IR transmission medium. It then compares the serial input data twice continuously with its local address. If no errors or unmatched codes are

- Two times of receiving check
- Built-in oscillator needs only a 5% resistor
- Valid transmission indicator
- Easy interface with an RF or an infrared transmission medium
- Minimal external components
- HT604L/HT614: 20-pin DIP/SOP package HT692: 18-pin DIP package
- Car alarm system
- Security system
- Cordless telephones
- Other remote control systems

encountered, the input data codes are decoded and then transferred to the output pins. The VT pin also goes high to indicate a valid transmission.

The 3<sup>18</sup> decoders are capable of decoding 18 bits of information that consists of N bits of address and 18-N bits of data. To meet various applications they are arranged to provide a number of data pins whose range is from 0 to 8 and an address pin whose range is from 8 to 18. In addition, the 3<sup>18</sup> decoders provide various combinations of address/data number in different packages.

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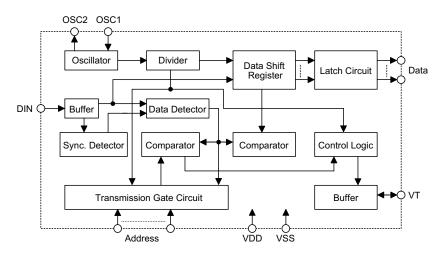
# **Selection Table**

Function	Address	Address Data		VТ	0		Deslassi	
Part No.	No.	No.	Туре	VI	Oscillator	Trigger	Package	
HT604L	10	4	L	$\checkmark$	RC oscillator	DIN active "Hi"	20 DIP/SOP	
HT614	10	4	М	$\checkmark$	RC oscillator	DIN active "Hi"	20 DIP/SOP	
HT692	10	2	М		RC oscillator	DIN active "Hi"	18 DIP	

Note: Data type: M stands for momentary type data output. L stands for latch type data output.

VT can be used as a momentary data output.

# **Block Diagram**



 $Note: \ The \ address/data \ pins \ are \ available \ in \ various \ combinations \ (refer \ to \ the \ address/data \ table).$ 

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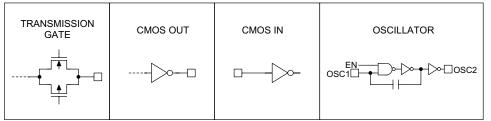
# **Pin Assignment**

Latch serie	es		5						
10-Addres 4-Data	<b>S</b> S		10-Addr 4-Data	ess		10-Addr 2-Data	ess		
A11 🗖 1 D12 🗖 2	20 19		A11 🗆 D12 🗖	2 1		A11			
D13	17	□ A8 □ A7 □ A6	D13 🗆 D14 🗆 D15 🗆	4 1	8 🗆 A8 7 🗆 A7 6 🗆 A6	A12 D14 D15	3	17 🗆 A9 16 🗆 A8 15 🗆 A7	
VT [] 6 DIN [] 7	15	□ A4 □ A3		6 1 7 1	5 🗆 A4 4 🗆 A3	VT [_ DIN [_	6	14 🗆 A6 13 🗆 A3	
OSC2 ☐ 8 OSC1 ☐ 9 VSS ☐ 10	12	□ A2 □ A1 □ A0	OSC2 □ OSC1 □ VSS □	9 1	3 🗆 A2 2 🗋 A1 1 🗋 A0	OSC2 □ OSC1 □ VSS □	8	12 🗆 A2 11 🗋 A1 10 🗋 A0	
-	HT604L 0 DIP/SO	P	-	HT614 20 DIP/S	_ OP	I	HT692 – 18 DIP		

# **Pin Description**

Pin Name	I/O	Internal Connection	Description
A0~A12	Ι	TRANSMISSION GATE	Input pins for address A0~A12 setting They can be externally set to VDD, VSS or left open.
D10~D17	0	CMOS OUT	Output data pins
DIN	Ι	CMOS IN	Serial data input pin
VT	0	CMOS OUT	Valid transmission, active high
OSC1	Ι	OSCILLATOR	Oscillator input pin
OSC2	0	OSCILLATOR	Oscillator output pin
VSS	_		Negative power supply, ground
VDD			Positive power supply

# Approximate internal connections



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# **Absolute Maximum Ratings**

Supply Voltage0.3V to 13V	Storage Temperature– $50^{\circ}$ C to $125^{\circ}$ C
Input VoltageV_{SS} – 0.3V to V_{DD} + 0.3V	Operating Temperature–20°C to $75^\circ C$

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

# **Electrical Characteristics**

Ta=25°C

Symbol		Г	est Conditions	7.4.	-		<b>.</b>
	Parameter	V <sub>DD</sub>	Conditions	Min.	Тур.	Max.	Unit
$V_{DD}$	Operating Voltage			3		12	V
T	Store dhere Comment	5V		_	0.1	1	μΑ
$I_{STB}$	Standby Current	12V	Oscillator stops	_	2	4	μA
I <sub>DD</sub>	Operating Current	5V	No load f <sub>OSC</sub> =100kHz	_	0.2	1	mA
I <sub>O</sub>	Data Output Source Current (D10~D17) Data Output Sink Current (D10~D17)		V <sub>OH</sub> =4.5V	-0.5	-1		mA
			V <sub>OL</sub> =0.5V	0.25	1	_	mA
т	VT Output Source Current	- 5V	V <sub>OH</sub> =4.5V	-2	-4	_	mA
$I_{VT}$	VT Output Sink Current		$V_{OL}=0.5V$	0.25	1	_	mA
$V_{\rm IH}$	"H" Input Voltage	5V		3.5		5	V
$V_{\rm IL}$	"L" Input Voltage	5V		0		1	V
f <sub>OSC</sub>	Oscillator Frequency	10V	$R_{OSC}$ =330k $\Omega$	_	100	_	kHz

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# **Functional Description**

#### Operation

The 3<sup>18</sup> series of decoders provide various combinations of address and data pins in different packages. It is paired with the 3<sup>18</sup> series of encoders. The decoders receive data transmitted by the encoders and interpret the first N bits of the code period as address and the last 18-N bits as data (where N is the address code number). A signal on the DIN pin then activates the oscillator which in turns decodes the incoming address and data. The decoders will check the received address twice continuously. If all the received address codes match the contents of the decoder's local address, the 18-N bits of data are decoded to activate the output pins, and the VT pin is set high to indicate a valid transmission. That will last until the address code is incorrect or no signal has been received. The output of the VT pin is high only when the transmission is valid. Otherwise it is always low.

### Output type

There are two types of output to select from:

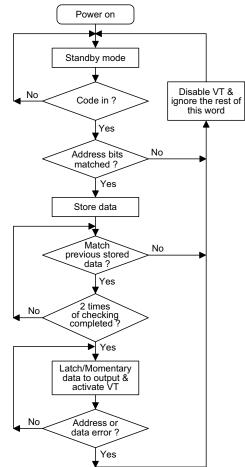
• Momentary type

The data outputs follow the encoder during a valid transmission and then reset.

• Latch type

The data outputs follow the encoder during a valid transmission, and are then latched in this state until the next valid transmission occurs.

#### Flowchart

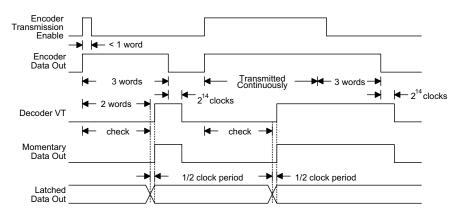


Note: The oscillator is disabled in the standby state and activated as long as a logic "high" signal is applied to the DIN pin. i.e., the DIN should be kept "low" if there is no signal input.

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## **Decoder timing**



# Encoder/Decoder selection tables

• Latch type of data output

							Package					
Part No.	art No. Data Address Pins Pins		VT	Pair Encoder	Encoder			Decoder				
					DIP	SOP	SKDIP	DIP	SOP	SKDIP		
HT604L 4	4	4 10		HT600	20	20		20	20			
	4			HT6207	20		_			_		

• Momentary type of data output

					Package						
Part No.	Data Pins	Address Pins	VT	Pair Encoder	Encoder			Decoder			
				DIP	SOP	SKDIP	DIP	SOP	SKDIP		
HT692	2	10	$\checkmark$	HT680	18			18			
IITC14	4	10	$\checkmark$	HT600	20	20		20	20		
HT614	4	10		HT6207	20						

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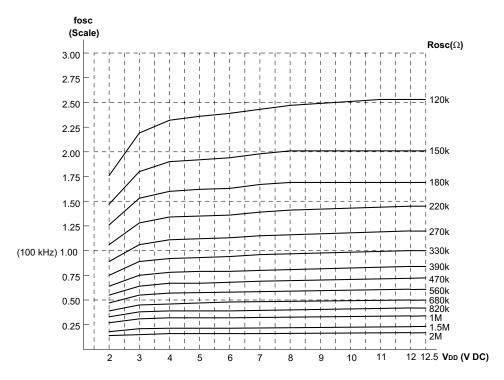
#### Address/Data sequence

The following provides a table of address/data sequence for various models of the  $3^{18}$  series decoders. A correct device should be selected according to the sindividual address and data requirements.

Part No.		Address/Data Bits												
	0~3	4	5	6~9	10	11	12	13	14	15	16	17		
HT604L	A0~A3	A4	_	A6~A9		A11	D12	D13	D14	D15				
HT614	A0~A3	A4		A6~A9		A11	D12	D13	D14	D15		_		
HT692	A0~A3			A6~A9		A11	A12		D14	D15				

Note: "-" is a dummy code which is left "open" and not bonded out.

## Oscillator frequency vs supply voltage



The recommended oscillator frequency is  $f_{OSCD}\left(decoder\right)\cong f_{OSCE}\left(encoder\right)$ 

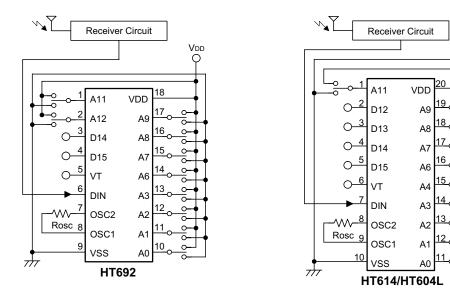
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Vdd

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# **Application Circuits**



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