BCD TO ONE-OF-TEN DECODER/DRIVERS

MC54145L · MC74145L,P *
MC5445L · MC7445L,P *
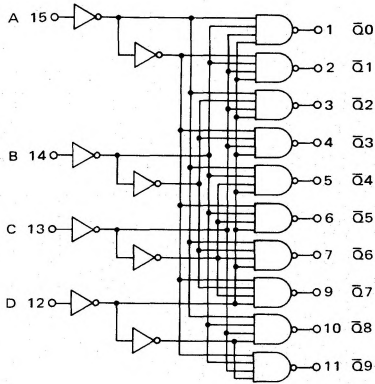
These devices are intended for use as drivers for indicators or relays, rather than drivers for MTTL logic gates, as is the case with the MC5442/7442, which is functionally identical. The output transistors of these devices are capable of sinking 80 mA, and have breakdown voltages of 30 V (MC5445/7445) and 15 V (MC54145/74145). The outputs are suitable for open-collector logic applications, and are compatible for interfacing with most MOS integrated circuits. Since full decoding is included, all outputs remain off for non-BCD inputs

V_{CC} = Pin 16
GND = Pin 8

Total Power Dissipation = 215 mW typ/pkg
Propagation Delay Time = 50 ns max

INPUTS				OUTPUTS									
D	C	B	A	$\overline{Q}9$	$\overline{Q}8$	$\overline{Q}7$	$\overline{Q}6$	$\overline{Q}5$	$\overline{Q}4$	$\overline{Q}3$	$\overline{Q}2$	$\overline{Q}1$	$\overline{Q}0$
0	0	0	0	1	1	1	1	1	1	1	1	1	0
0	0	0	1	1	1	1	1	1	1	1	1	0	1
0	0	1	0	1	1	1	1	1	1	1	0	1	1
0	0	1	1	1	1	1	1	1	1	0	1	1	1
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0	1	1	0	1	1	1	0	1	1	1	1	1	1
0	1	1	1	1	1	0	1	1	1	1	1	1	1
1	0	0	0	1	0	1	1	1	1	1	1	1	1
1	0	0	1	0	1	1	1	1	1	1	1	1	1
1	0	1	0	1	1	1	1	1	1	1	1	1	1
1	0	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0	0	1	1	1	1	1	1	1	1	1	1
1	1	0	1	1	1	1	1	1	1	1	1	1	1
1	1	1	0	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1

*L suffix = 16-pin dual in-line ceramic package (Case 620).
 P suffix = 16-pin dual in-line plastic package (Case 612).

MC54145L, MC74145L,P/MC5445L, MC7445L,P (continued)

ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one input and one output. Test other inputs and outputs in the same manner according to the truth table. Test all input-output combinations according to the truth table.

Pinout:

Pin	Signal
1	Q̄0
2	Q̄1
3	Q̄2
4	Q̄3
5	Q̄4
6	Q̄5
7	Q̄6
9	Q̄7
10	Q̄8
11	Q̄9
15	A
14	B
13	C
12	D
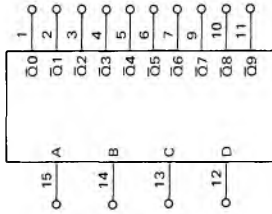
Characteristic	Symbol	Pin Under Test	MC5445/MC54145 Test Limits −55 to +125°C Min	Max	Unit	MC7445/MC74145 Test Limits 0 to +70°C Min	Max	Unit
Input								
Forward Current	I_F	12	—	−1.6	mAdc	—	−1.6	mAdc
Leakage Current	I_{R1}	12	—	40	µAdc	—	40	µAdc
	I_{R2}	12	—	1.0	mAdc	—	1.0	mAdc
Output								
Output Voltage	V_{OL}	1	—	0.9	Vdc	—	0.9	Vdc
		1	—	0.4	Vdc	—	0.4	Vdc
MC5445/7445	V_{CEX}	1	30	—	Vdc	30	—	Vdc
MC54145/74145		1	15	—	Vdc	15	—	Vdc
Power Requirements (Total Device)								
Power Supply Drain	I_{PD}	16	—	62	mAdc	—	70	mAdc
Switching Parameters								
Turn-On Delay	t_{pd-}	15,1	—	50#	ns	—	50#	ns
Turn-Off Delay	t_{pd+}	15,1	—	50#	ns	—	50#	ns

#Tested only at 25°C.

TEST CURRENT/VOLTAGE VALUES (All Temperatures)

	mA			Volts							
	I_{OL1}	I_{OL2}	I_{CEX}	V_{IL}	V_{IH}	V_{IHH}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}
MC5445, MC54145	20	80	0.25	0.4	2.4	5.5	2.0	0.8	5.0	4.5	5.5
MC7445, MC74145	20	80	0.25	0.4	2.4	5.5	2.0	0.8	5.0	4.75	5.25

TEST CURRENT/VOLTAGE APPLIED TO PINS LISTED BELOW:

Row	I_{OL1}	I_{OL2}	I_{CEX}	V_{IL}	V_{IH}	V_{IHH}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}	Gnd
I_F				12								8
I_{R1}					12							8
I_{R2}						12						8
V_{OL}	1	1						12,13,14,15		16		8
V_{OL}	1							12,13,14,15		16		8
V_{CEX} (5445/7445)			1				12,13,14,15				16	8
V_{CEX} (54145/74145)			1				12,13,14,15				16	8
I_{PD}											16	8,12,13,14,15
t_{pd-}	Pulse In 15		Pulse Out 1	12,13,14					16			8
t_{pd+}	Pulse In 15		Pulse Out 1	12,13,14					16			8

TYPICAL APPLICATIONS

Two MC5445/7445 or MC54145/74145 decoder/drivers (depending on drive requirements) may be used to perform 4-line to 16-line decoding. Data inputs A, B, and C are applied to both decoder/drivers, while input D is applied to one decoder and $\overline{D}$ to the other. (See Figure 1.)

In addition to the obvious decoder applications, these circuits can also be used for data distribution (Figure 2). Inputs A, B, and C of the decoder/driver are used as control inputs, while the D input serves as the data input. In a typical compound data routing application, origin data is selected by the control inputs of the MC54151/74151 8-channel data selector. The data is then routed to the proper destination by means of the MC5445/7445 decoder/driver control lines.

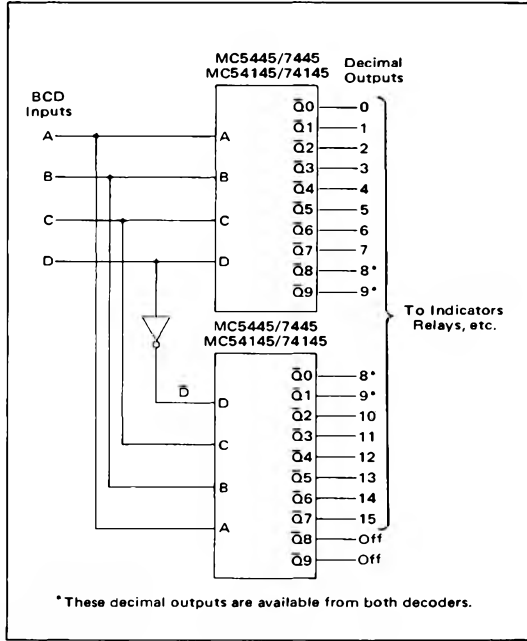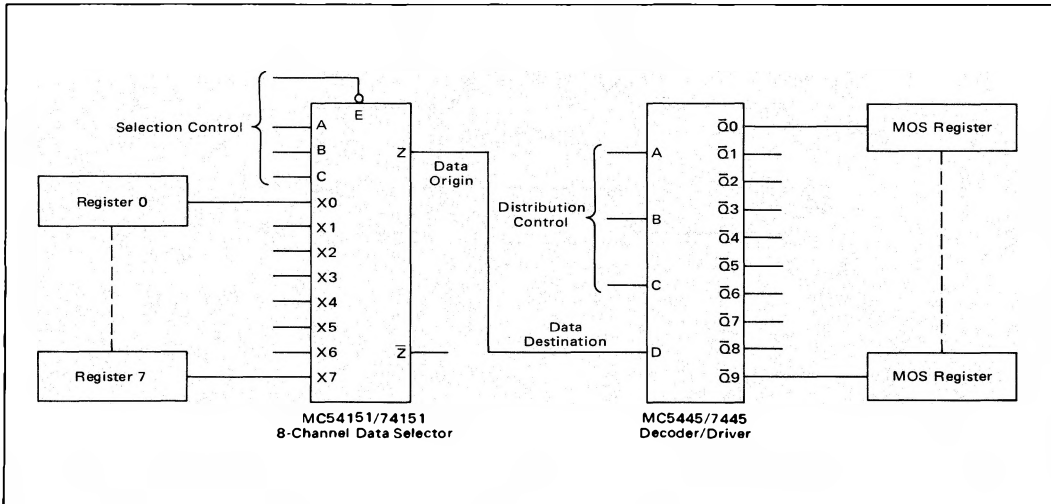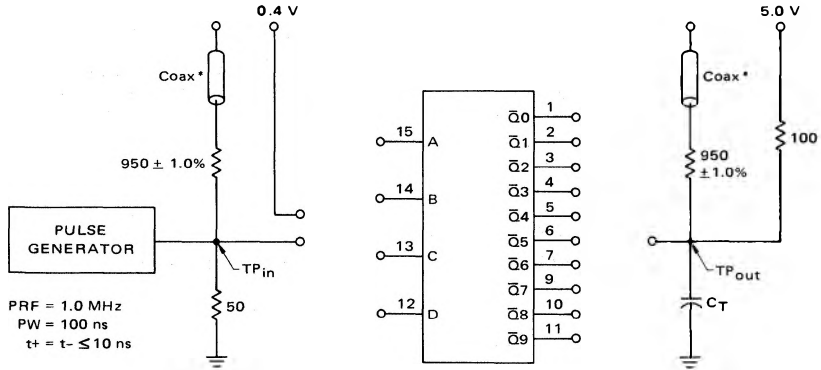FIGURE 1 – BINARY-TO-DECIMAL DECODING USING MC5445/7445 OR MC54145/74145

*These decimal outputs are available from both decoders.

FIGURE 2 – COMPOUND DATA ROUTING USING MC5445/7445

SWITCHING TIME TEST CIRCUIT AND VOLTAGE WAVEFORMS

C_T = 15 pF = total parasitic capacitance, which includes probe and wiring capacitances.

*The coax delays from input to scope and output to scope must be matched. The scope must be terminated in 50-ohm impedance. The 950-ohm resistor and the scope termination impedance constitute a 20:1 attenuator probe. Coax shall be CT-070-50 or equivalent.