



# CD4519BM/CD4519BC 4-Bit AND/OR Selector

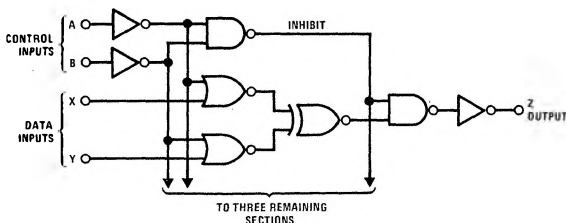
## General Description

The CD4519B is a monolithic complementary MOS (CMOS) integrated circuit constructed with N- and P-channel enhancement mode transistors. Depending on the condition of the control inputs, this part provides three functions in one package: a 4-bit AND/OR selector, a quad 2-channel Data Selector, or a Quad Exclusive-NOR Gate. The device outputs have equal source and sink current capabilities and conform to the standard B series output drive and supply voltage ratings.

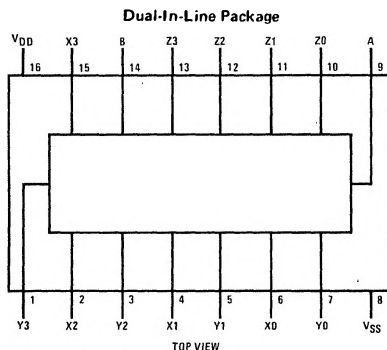
## Features

- Wide supply voltage range 3.0V to 15V
- High noise immunity 0.45 V<sub>DD</sub> (typ.)
- Low power TTL compatibility fan out of 2 driving 74L or 1 driving 74LS
- 5V-10V-15V parametric ratings
- Symmetrical output characteristics
- Maximum input leakage 1μA at 15V over full temperature range
- Second source of Motorola MC14519

## Logic Diagram



## Connection Diagram



## Truth Table

CONTROL INPUTS		OUTPUT
A	B	Z <sub>n</sub>
0	0	0
0	1	Y <sub>n</sub>
1	0	X <sub>n</sub>
1	1	X <sub>n</sub> ⊙ Y <sub>n</sub>

Note:  $X_i \odot Y_n = \overline{X_n} \odot \overline{Y_n} = X_n Y_n + \overline{X_n} \overline{Y_n}$

## Absolute Maximum Ratings

(Notes 1 and 2)

V <sub>DD</sub> dc Supply Voltage	-0.5 to +18 V <sub>DC</sub>
V <sub>IN</sub> Input Voltage	-0.5 to V <sub>DD</sub> +0.5 V <sub>DC</sub>
T <sub>S</sub> Storage Temperature Range	-65°C to +150°C
P <sub>D</sub> Package Dissipation	500 mW
T <sub>L</sub> Lead Temperature (Soldering, 10 seconds)	300°C

## Recommended Operating Conditions

(Note 2)

V <sub>DD</sub> dc Supply Voltage	3 to 15 V <sub>DC</sub>
V <sub>IN</sub> Input Voltage	0 to V <sub>DD</sub> V <sub>DC</sub>
T <sub>A</sub> Operating Temperature Range	-55°C to +125°C
CD4519BM	-40°C to +85°C
CD4519BC	

### DC Electrical Characteristics CD4519BM (Note 2)

PARAMETER	CONDITIONS	-55°C		25°C			125°C		UNITS
		MIN	MAX	MIN	TYP	MAX	MIN	MAX	
I <sub>DD</sub> Quiescent Device Current	V <sub>DD</sub> = 5V		1		0.005	1		30	μA
	V <sub>DD</sub> = 10V		2		0.006	2		60	μA
	V <sub>DD</sub> = 15V		4		0.007	4		120	μA
V <sub>OL</sub> Low Level Output Voltage	I <sub>O</sub> < 1μA								
	V <sub>DD</sub> = 5V		0.05		0	0.05		0.05	V
	V <sub>DD</sub> = 10V		0.05		0	0.05		0.05	V
V <sub>OH</sub> High Level Output Voltage	I <sub>O</sub> < 1μA								
	V <sub>DD</sub> = 5V	4.95		4.95	5		4.95		V
	V <sub>DD</sub> = 10V	9.95		9.95	10		9.95		V
V <sub>IL</sub> Low Level Input Voltage	I <sub>O</sub> < 1μA								
	V <sub>DD</sub> = 5V, V <sub>O</sub> = 0.5V or 4.5V		1.5		2	1.5		1.5	V
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 1V or 9V		3.0		4	3.0		3.0	V
V <sub>IH</sub> High Level Input Voltage	I <sub>O</sub> < 1μA								
	V <sub>DD</sub> = 5V, V <sub>O</sub> = 0.5V or 4.5V	3.5		3.5	3		3.5		V
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 1V or 9V	7.0		7.0	6		7.0		V
I <sub>OL</sub> Low Level Output Current	V <sub>DD</sub> = 5V, V <sub>O</sub> = 0.4V	0.64		0.51	0.88		0.36		mA
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 0.5V	1.6		1.3	2.25		0.9		mA
	V <sub>DD</sub> = 15V, V <sub>O</sub> = 1.5V	4.2		3.4	8.8		2.4		mA
I <sub>OH</sub> High Level Output Current	V <sub>DD</sub> = 5V, V <sub>O</sub> = 4.6V	-0.64		-0.51	-0.88		-0.36		mA
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 9.5V	-1.6		-1.3	-2.25		-0.9		mA
	V <sub>DD</sub> = 15V, V <sub>O</sub> = 13.5V	-4.2		-3.4	-8.8		-2.4		mA
I <sub>IN</sub> Input Current	V <sub>DD</sub> = 15V, V <sub>IN</sub> = 0V		-0.1		-10 <sup>-5</sup>	-0.1		-1.0	μA
	V <sub>DD</sub> = 15V, V <sub>IN</sub> = 15V		0.1		10 <sup>-5</sup>	0.1		1.0	μA

### DC Electrical Characteristics CD4519BC (Note 2)

PARAMETER	CONDITIONS	-40°C		25°C			85°C		UNITS
		MIN	MAX	MIN	TYP	MAX	MIN	MAX	
I <sub>DD</sub> Quiescent Device Current	V <sub>DD</sub> = 5V		4			4		30	μA
	V <sub>DD</sub> = 10V		8			8		60	μA
	V <sub>DD</sub> = 15V		16			16		120	μA
V <sub>OL</sub> Low Level Output Voltage	I <sub>O</sub> < 1μA								
	V <sub>DD</sub> = 5V		0.05		0	0.05		0.05	V
	V <sub>DD</sub> = 10V		0.05		0	0.05		0.05	V
V <sub>OH</sub> High Level Output Voltage	I <sub>O</sub> < 1μA								
	V <sub>DD</sub> = 5V	4.95		4.95	5		4.95		V
	V <sub>DD</sub> = 10V	9.95		9.95	10		9.95		V
V <sub>IL</sub> Low Level Input Voltage	I <sub>O</sub> < 1μA								
	V <sub>DD</sub> = 5V, V <sub>O</sub> = 0.5V or 4.5V		1.5		2	1.5		1.5	V
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 1V or 9V		3.0		4	3.0		3.0	V
V <sub>IH</sub> High Level Input Voltage	I <sub>O</sub> < 1μA								
	V <sub>DD</sub> = 5V, V <sub>O</sub> = 0.5V or 4.5V	3.5		3.5	3		3.5		V
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 1V or 9V	7.0		7.0	6		7.0		V
I <sub>OL</sub> Low Level Output Current	V <sub>DD</sub> = 5V, V <sub>O</sub> = 0.4V	0.64		0.51	0.88		0.36		mA
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 0.5V	1.6		1.3	2.25		0.9		mA
	V <sub>DD</sub> = 15V, V <sub>O</sub> = 1.5V	4.2		3.4	8.8		2.4		mA
I <sub>OH</sub> High Level Output Current	V <sub>DD</sub> = 5V, V <sub>O</sub> = 4.6V	-0.64		-0.51	-0.88		-0.36		mA
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 9.5V	-1.6		-1.3	-2.25		-0.9		mA
	V <sub>DD</sub> = 15V, V <sub>O</sub> = 13.5V	-4.2		-3.4	-8.8		-2.4		mA
I <sub>IN</sub> Input Current	V <sub>DD</sub> = 15V, V <sub>IN</sub> = 0V		-0.1		-10 <sup>-5</sup>	-0.1		-1.0	μA
	V <sub>DD</sub> = 15V, V <sub>IN</sub> = 15V		0.1		10 <sup>-5</sup>	0.1		1.0	μA

## DC Electrical Characteristics (Cont'd.) CD4519BC (Note 2)

PARAMETER	CONDITIONS	-40°C		25°C			85°C		UNITS
		MIN	MAX	MIN	TYP	MAX	MIN	MAX	
V <sub>IL</sub> Low Level Input Voltage	$ I_O  < 1\mu A$								
	V <sub>DD</sub> = 5V, V <sub>O</sub> = 0.5V or 4.5V		1.5		2	1.5		1.5	V
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 1V or 9V		3.0		4	3.0		3.0	V
	V <sub>DD</sub> = 15V, V <sub>O</sub> = 1.5V or 13.5V		4.0		6	4.0		4.0	V
V <sub>IH</sub> High Level Input Voltage	$ I_O  < 1\mu A$								
	V <sub>DD</sub> = 5V, V <sub>O</sub> = 0.5V or 4.5V	3.5		3.5	3		3.5		V
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 1V or 9V	7.0		7.0	6		7.0		V
	V <sub>DD</sub> = 15V, V <sub>O</sub> = 1.5V or 13.5V	11.0		11.0	9		11.0		V
I <sub>OL</sub> Low Level Output Current	V <sub>DD</sub> = 5V, V <sub>O</sub> = 0.4V	0.52		0.44	0.88		0.36		mA
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 0.5V	1.3		1.1	2.25		0.9		mA
	V <sub>DD</sub> = 15V, V <sub>O</sub> = 1.5V	3.6		3.0	8.8		2.4		mA
I <sub>OH</sub> High Level Output Current	V <sub>DD</sub> = 5V, V <sub>O</sub> = 4.6V	-0.52		-0.44	-0.88		-0.36		mA
	V <sub>DD</sub> = 10V, V <sub>O</sub> = 9.5V	-1.3		-1.1	-2.25		-0.9		mA
	V <sub>DD</sub> = 15V, V <sub>O</sub> = 13.5V	-3.6		-3.0	-8.8		-2.4		mA
I <sub>IN</sub> Input Current	V <sub>DD</sub> = 15V, V <sub>IN</sub> = 0V		-0.3		-10 <sup>-5</sup>	-0.3		-1.0	μA
	V <sub>DD</sub> = 15V, V <sub>IN</sub> = 15V		0.3		10 <sup>-5</sup>	0.3		1.0	μA

## AC Electrical Characteristics T<sub>A</sub> = 25°C, C<sub>L</sub> = 50 pF, R<sub>L</sub> = 200 kΩ, t<sub>r</sub> = t<sub>f</sub> = 20 ns, unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
t <sub>PHL</sub> , t <sub>PLH</sub> Propagation Delay High-to-Low Level or Low-to-High Level	(Figure 1) V <sub>DD</sub> = 5V		180	360	ns
	V <sub>DD</sub> = 10V		75	150	ns
	V <sub>DD</sub> = 15V		60	120	ns
t <sub>THL</sub> , t <sub>TLH</sub> Transition Time	(Figure 1) V <sub>DD</sub> = 5V		90	200	ns
	V <sub>DD</sub> = 10V		50	100	ns
	V <sub>DD</sub> = 15V		40	80	ns
C <sub>IN</sub> Average Input Capacitance	Any Input (Note 3)		5	7.5	pF
C <sub>pD</sub> Power Dissipation Capacity	Any Gate (Note 4)		25		pF

**Note 1:** "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed; they are not meant to imply that the devices should be operated at these limits. The table of "Recommended Operating Conditions" and "Electrical Characteristics" provides conditions for actual device operation.

**Note 2:** V<sub>SS</sub> = 0V unless otherwise specified.

**Note 3:** Capacitance is guaranteed by periodic testing.

**Note 4:** C<sub>pD</sub> determines the no load ac power consumption of any CMOS device. For complete explanation, see 54C/74C Family characteristics application note AN-90.

## AC Test Circuit and Switching Time Waveforms

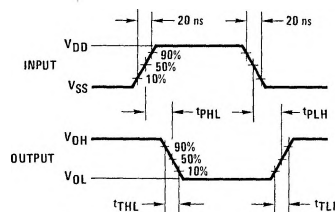
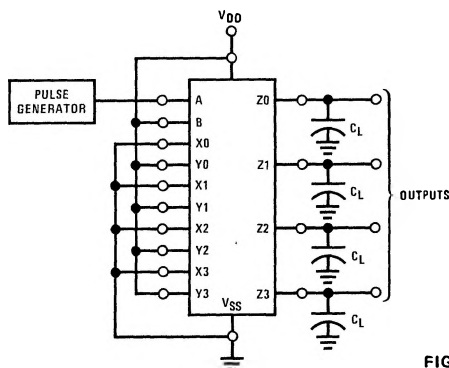
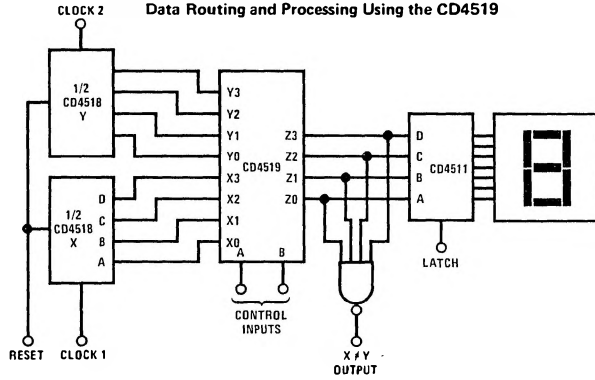


FIGURE 1

# Typical Application

Data Routing and Processing Using the CD4519



CONTROL INPUTS		FUNCTION
A	B	
0	0	Display Zero
0	1	Display Counter Y
1	0	Display Counter X
1	1	Compare Counters