



CDP1857 CDP1857C

T-52-33-55

February 1992

4-Bit Bus Buffer/Separator

Features

- Provides Easy Connection of I/O to CDP1800-Series Microprocessor Data Bus.
- Non-Inverting Fully Buffered Data Transfer

Ordering Information

PACKAGE	TEMPERATURE RANGE	5V	10V
Plastic DIP	-40°C to +85°C	CDP1857CE	-
Ceramic DIP	-40°C to +85°C	CDP1857CD	-

TABLE 1. CDP1857 FUNCTION FOR I/O BUS SEPARATOR OPERATION

CS	$\overline{\text{MRD}}$	DATA BUS OUT DB0-DB3	DATA OUT DO0-DO3
0	X	High Impedance	High Impedance
1	0	High Impedance	Data Bus
1	1	Data In	High Impedance

Description

The CDP1857 and CDP1857C are 4 bit CMOS non-inverting bus separators designed for use in CDP1800-series microprocessor systems. They can be controlled directly by a 1800-series microprocessor without the use of additional components.

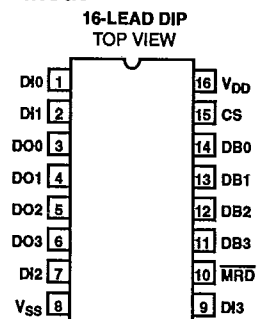
The CDP1857 is designed for use as a bus buffer or separator between the 1800-series microprocessor data bus and I/O devices. It provides a chip-select (CS) input signal which, when high (1), enables the bus-separator three-state output drivers. The direction of data flow, when enabled, is controlled by the $\overline{\text{MRD}}$ input signal.

In the CDP1857, when $\overline{\text{MRD}} = 1$, it enables the three-state bus drivers (DB0-DB3) and transfers data from the DATA-IN lines onto the data bus. When $\overline{\text{MRD}} = 0$, it disables the three-state bus drivers (DB0-DB3) and enables the three-state data output drivers (DO0-DO3), thus transferring data from the data bus to the DATA-OUT terminals.

The CDP1857 can be used as a bi-directional bus buffer by connecting the corresponding DI and DO terminals (Figure 1). The $\overline{\text{MRD}}$ output signal from the 1800-series microprocessor has the correct polarity to control the CDP1857 when it is used as I/O bus buffer/separator. Therefore, the 1800-series microprocessor $\overline{\text{MRD}}$ signal can be connected directly to the $\overline{\text{MRD}}$ input of CDP1857. See Function Table 1 for use of the CDP1857 as an I/O bus buffer/separator.

The CDP1857 is functionally identical to the CDP1857C. The CDP1857 has a recommended operating-voltage range of 4 to 10.5 volts, and the CDP1857C has recommended operating-voltage range of 4 to 6.5 volts. The CDP1857 and CDP1857C are supplied in 16-lead hermetic, dual-in-line ceramic packages (D suffix), and in 16-lead plastic packages (E suffix).

Pinout



Functional Diagram for CDP1857

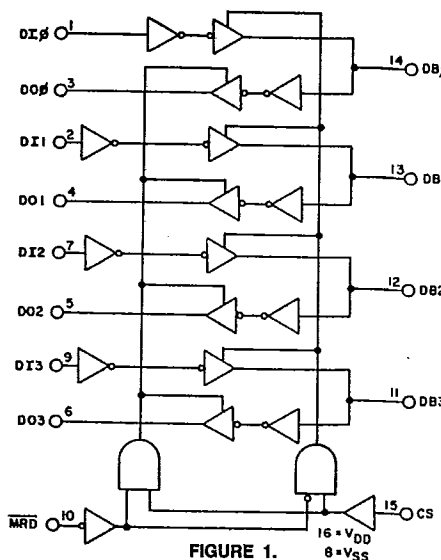


FIGURE 1.

CAUTION: These devices are sensitive to electrostatic discharge. Users should follow proper I.C. Handling Procedures.
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CMOS PERIPHERALS

Static Electrical Characteristics At $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, Except as Noted:

CHARACTERISTIC	SYMBOL	CONDITIONS			LIMITS						UNITS
		V_O (V)	V_{IN} (V)	V_{DD} (V)	CDP1857			CDP1857C			
					MIN	TYP (Note 1)	MAX	MIN	TYP (Note 1)	MAX	
Quiescent Device Current	I_{DD}	-	0, 5	5	-	1	10	-	5	50	μA
		-	0, 10	10	-	10	100	-	-	-	μA
Output Low Drive (Sink) Current	I_{OL}	0.4	0, 5	5	1.6	3.2	-	1.6	3.2	-	mA
		0.5	0, 10	10	2.6	5.2	-	-	-	-	mA
Output High Drive (Source) Current	I_{OH}	4.6	0, 5	5	-1.15	-2.3	-	-1.15	-2.3	-	mA
		9.5	0, 10	10	-2.6	-5.2	-	-	-	-	mA
Output Voltage Low-Level (Note 3)	V_{OL}	-	0, 5	5	-	0	0.1	-	0	0.1	V
		-	0, 10	10	-	0	0.1	-	-	-	V
Output Voltage High-Level (Note 3)	V_{OH}	-	0, 5	5	4.9	5	-	4.9	5	-	V
		-	0, 10	10	9.9	10	-	-	-	-	V
Input Low Voltage	V_{IL}	0.5, 4.5	-	5	-	-	1.5	-	-	1.5	V
		0.5, 9.5	-	10	-	-	3	-	-	-	V
Input High Voltage	V_{IH}	0.5, 9.5	-	5	3.5	-	-	3.5	-	-	V
		0.5, 9.5	-	10	7	-	-	-	-	-	V
Input Leakage Current	I_{IN}	Any Input	0, 5	5	-	-	1	-	-	1	μA
		-	0, 10	10	-	-	1	-	-	-	μA
Operating Current (Note 2)	I_{DD1}	0, 5	0, 5	5	-	50	100	-	50	100	μA
		0, 10	0, 10	10	-	150	300	-	-	-	μA
Input Capacitance	C_{IN}	-	-	-	-	5	7.5	-	5	7.5	pF
Output Capacitance	C_{OUT}	-	-	-	-	10	15	-	10	15	pF

NOTES:

- Typical values are for $T_A = +25^\circ\text{C}$ and nominal voltage.
- Operating current measured in a CDP1802 system at 3.2MHz with outputs floating.
- $I_{OL} = I_{OH} = 1\mu\text{A}$.

Dynamic Electrical Characteristics At $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{DD} = 5\%$, $V_{IH} = 0.7 V_{DD}$, $V_{IL} = 0.3 V_{DD}$, $t_r, t_f = 20\text{ns}$, $C_L = 100\text{pF}$

CHARACTERISTIC	SYMBOL	V_{DD} (V)	LIMITS				UNITS
			CDP1857		CDP1857C		
			TYP (Note 1)	MAX	TYP (Note 1)	MAX	
Propagation Delay Time: MRD or CS to DO	t_{ED}	5	150	225	150	225	ns
		10	75	125	-	-	ns
MRD or CS to DB	t_{EB}	5	150	225	150	225	ns
		10	75	125	-	-	ns
DI to DB	t_{IB}	5	100	150	100	150	ns
		10	50	75	-	-	ns
DB to DO	t_{BO}	5	100	150	100	150	ns
		10	50	75	-	-	ns

NOTE: 1. Typical values are for $T_A = 25^\circ\text{C}$ and nominal voltages.

Recommended Operating Conditions At $T_A = \text{Full Package Temperature Range}$. For maximum reliability, operating conditions should be selected so that operation is always within the following ranges:

CHARACTERISTIC	LIMITS				UNITS
	CDP1857		CDP1857C		
	MIN	MAX	MIN	MAX	
Supply-Voltage Range	4	10.5	4	6.5	V
Recommended Input voltage Range	V_{SS}	V_{DD}	V_{SS}	V_{DD}	V

Absolute Maximum Ratings

DC Supply Voltage Range, (V_{DD}):

(All Voltages Referenced to V_{SS} Terminal)
 CDP1857 -0.5V to +11V
 CDP1857C -0.5V to +7V

Input Voltage Range, All Inputs -0.5V to V_{DD} +0.5V

DC Input Current, Any One Input ±10mA

Power Dissipation Per Package (P_D)

T_A = -40°C to +60°C (Package Type E) 500mW

T_A = +60°C to +85°C (Package Type E) Derate Linearly at

12mW/°C to 200mW

T_A = -55°C to +100°C (Package Type D) 500mW

T_A = +100°C to +125°C (Package Type D) Derate Linearly at

12mW/°C to 200mW

Device Dissipation Per Output Transistor

T_A = Full Package Temperature Range
 (All Package Types) 100mW

Operating Temperature Range (T_A):

Package Type D -55°C to +125°C

Package Type E -40°C to +85°C

Storage Temperature Range (T_{stg}):

..... -65°C to +150°C

Lead Temperature (During Soldering):

At distance 1/16 ± 1/32 in. (1.59 ± 0.79mm)

from case for 10s max +265°C

Timing Diagrams

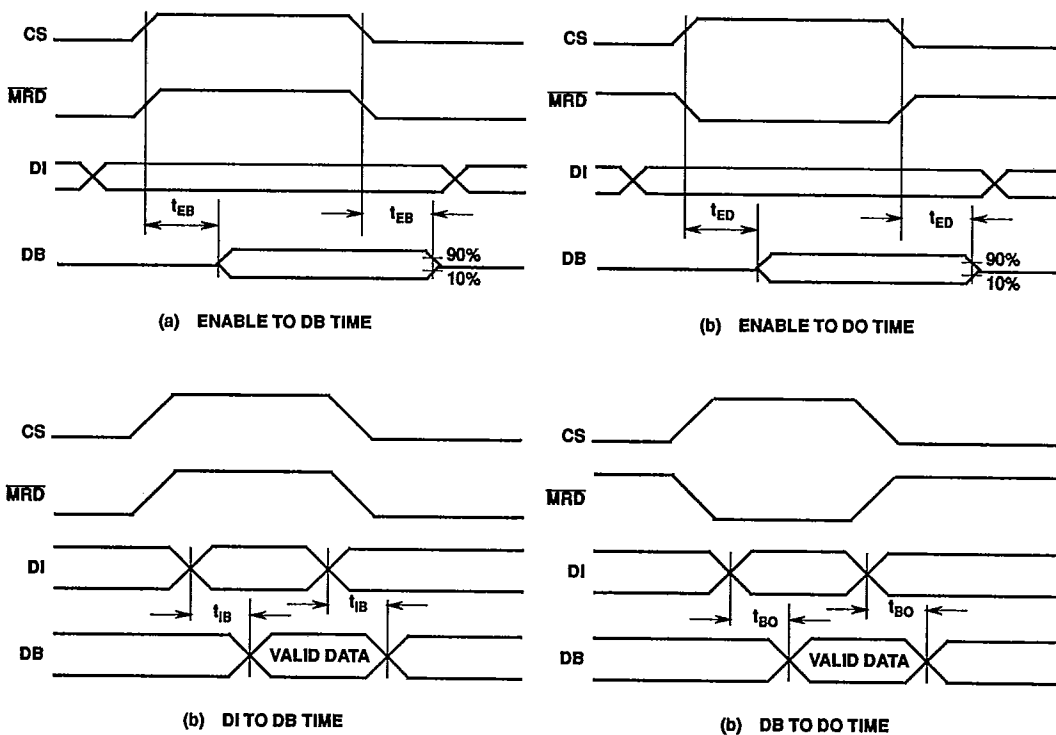


FIGURE 2. TIMING DIAGRAMS FOR CDP1857

Typical Applications

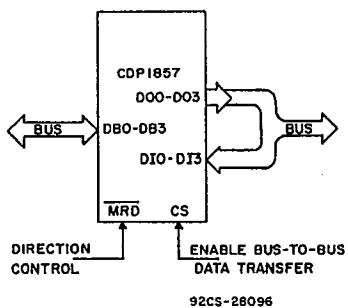


FIGURE 3. CDP1857 BIDIRECTIONAL BUS BUFFER OPERATION

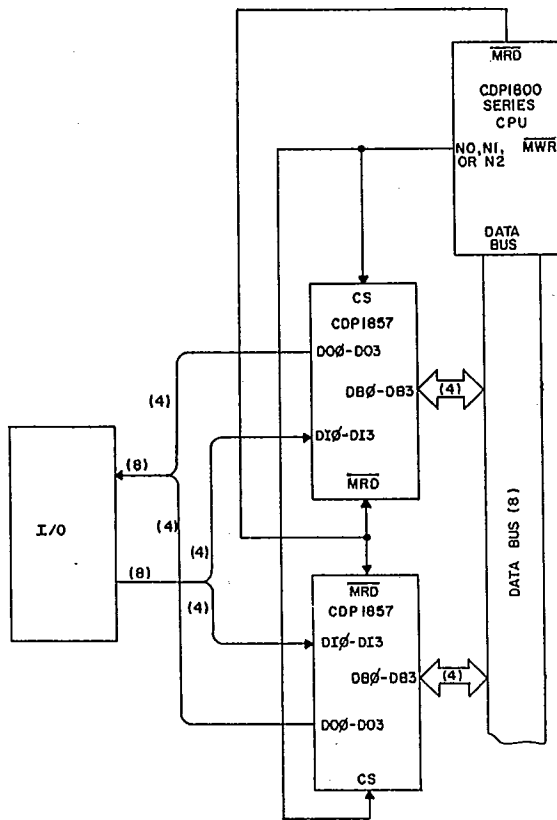


FIGURE 4. CDP1857 BUS SEPARATOR OPERATION