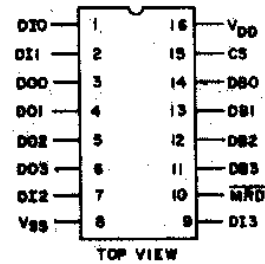


CDP1856, CDP1857 Types

4-Bit Bus Buffers/Separators

Features:

- Static Silicon-Gate CMOS circuitry — CD4000-series compatible
- Compatible with CDP1800-series microprocessors at maximum speed
- Provides easy connection of memory and I/O devices to CDP1800-series microprocessor data bus.
- Single voltage supply
- Full military-temperature range of -55°C to $+125^{\circ}\text{C}$ (ceramic package)
- Low quiescent and operating power
- Non-inverting fully buffered data transfer



92CS-28097

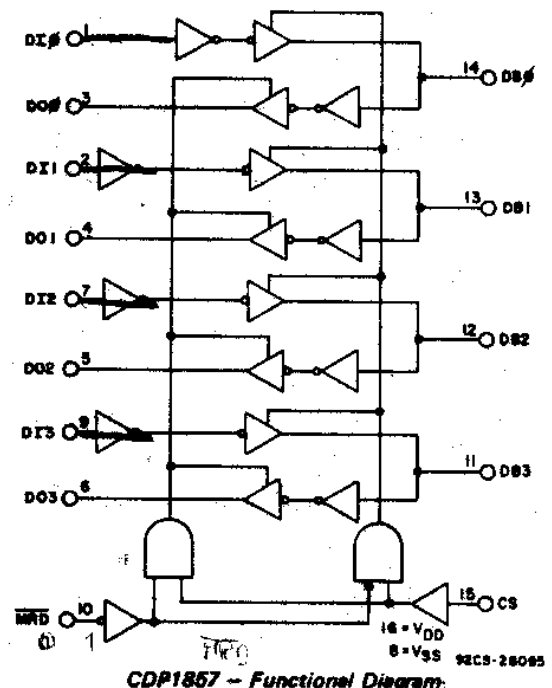
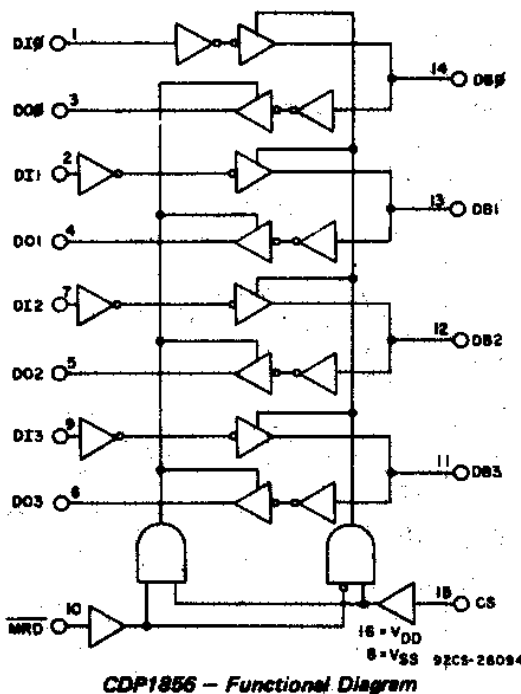
TERMINAL ASSIGNMENT

The RCA-CDP1856, CDP1856C, CDP1857, and CDP1857C are 4-bit COS/MOS non-inverting bus separators designed for use in CDP1800-series microprocessor systems. They can be controlled directly by CDP1802 or CDP1804 microprocessor without the use of additional components.

The CDP1856 is designed for use as a bus buffer or separator between the CDP1802 or CDP1804 data bus and memories. The

CDP1857 is designed for use as a bus buffer or separator between the CDP1802 or CDP1804 data bus and I/O devices. Both types provide 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 MRD input signal.

In the CDP1856, when the MRD signal = 0 (low), it enables the three-state bus drivers



CDP1856

CDP1856, CDP1857 Types

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

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 CDP1856 or CDP1857 can be used as a bi-directional bus buffer by connecting the corresponding DI and DO terminals (Fig.2). The $\overline{\text{MRD}}$ output signal from the CDP1802 or CDP1804 microprocessor has the correct polarity to control the CDP1856 when this

device is used as a memory data bus buffer/separator, or the CDP1857 when it is used as I/O bus buffer/separator. Therefore, the CDP1802 or CDP1804 $\overline{\text{MRD}}$ signal can be connected directly to the $\overline{\text{MRD}}$ input of either device. See Function Tables 1 and 2 in Fig. 3 for use of the CDP1856 as a memory data bus buffer/separator and CDP1857 as an I/O bus buffer/separator.

The CDP1856 and CDP1857 are functionally identical to the CDP1856C and CDP1857C, respectively. The CDP1856 and CDP1857 have a recommended operating-voltage range of 4 to 10.5 volts, and the CDP1856C and CDP1857C have a recommended operating-voltage range of 4 to 6.5 volts. The CDP1856 CDP1856C, CDP1857 and CDP1857C are supplied in 16-lead hermetic, dual-in-line ceramic (D suffix) or plastic (E suffix) packages.

MAXIMUM RATINGS, Absolute-Maximum Values:

DC SUPPLY-VOLTAGE RANGE, (V_{DD})

(All voltage values referenced to V_{SS} terminal)

CDP1856, CDP1857	-0.5 to +11 V
CDP1856C, CDP1857C	-0.5 to +7 V

INPUT VOLTAGE RANGE, ALL INPUTS

-0.5 to $V_{DD} + 0.5$ V

DC INPUT CURRENT, ANY ONE INPUT

± 10 mA

OPERATING-TEMPERATURE RANGE (T_A):

CERAMIC PACKAGES (D SUFFIX TYPES) -55 to +125°C

PLASTIC PACKAGES (E SUFFIX TYPES) -40 to +85°C

STORAGE TEMPERATURE RANGE (T_{stg})

-65 to +150°C

LEAD TEMPERATURE (DURING SOLDERING):

At distance $1/16 \pm 1/32$ inch (1.59 \pm 0.79 mm) from case for 10 s max. +265°C

DYNAMIC ELECTRICAL CHARACTERISTICS at $T_A = -40$ to +85°C, $V_{DD} = \pm 5\%$, $V_{IH} = 0.7 V_{DD}$, $V_{IL} = 0.3 V_{DD}$, $t_r, t_f = 20$ ns, $C_L = 100$ pF

CHARACTERISTIC	V_{DD} (V)	LIMITS				UNITS
		CDP1856 CDP1857		CDP1856C CDP1857C		
		Typ.	Max.	Typ.	Max.	
Propagation Delay Time: $\overline{\text{MRD}}$ or CS to DO, t_{ED}	5	150	225	150	225	ns
	10	75	125	-	-	
$\overline{\text{MRD}}$ or CS to DB, t_{EB}	5	150	225	150	225	ns
	10	75	125	-	-	
DI to DB, t_{IB}	5	100	150	100	150	ns
	10	50	75	-	-	
DB to DO t_{BD}	5	100	150	100	150	ns
	10	50	75	-	-	

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

CDP1856, CDP1857 Types

OPERATING CONDITIONS at T_A = Full Package-Temperature Range. For maximum reliability, operating conditions should be selected so that operation is always within the following ranges:

CHARACTERISTIC	LIMITS				UNITS
	CDP1856 CDP1857		CDP1856C 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

STATIC ELECTRICAL CHARACTERISTICS at $T_A = -40$ to $+85^\circ\text{C}$, Except as noted

CHARACTERISTIC	CONDITIONS			LIMITS						UNITS
	V_O (V)	V_{IN} (V)	V_{DD} (V)	CDP1856 CDP1857			CDP1856C CDP1857C			
				Min.	Typ. ⁺	Max.	Min.	Typ. ⁺	Max.	
Quiescent Device Current, I_L	—	—	5	—	1	10	—	5	50	μA
	—	—	10	—	10	100	—	—	—	
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	—	—	—	—	
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	—	—	—	—	
Output Voltage Low-Level [^] V_{OL}	—	0.5	5	—	0	0.1	—	0	0.1	V
	—	0.10	10	—	0	0.1	—	—	—	
Output Voltage High Level, V_{OH}	—	0.5	5	4.95	5	—	4.95	5	—	V
	—	0.10	10	9.95	10	—	—	—	—	
Input Low Voltage V_{IL}	0.5, 4.5	—	5	—	—	1.5	—	—	1.5	V
	0.5, 9.5	—	10	—	—	3	—	—	—	
Input High Voltage V_{IH}	0.5, 9.5	—	5	3.5	—	—	3.5	—	—	V
	0.5, 9.5	—	10	7	—	—	—	—	—	
Input Leakage Current, I_{IN}	Any Input	0.5	5	—	—	± 1	—	—	± 1	μA
		0.10	10	—	—	± 1	—	—	—	
Operating Current, I_{DD1}^*	0.5	0.5	5	—	50	100	—	50	100	μA
	0.10	0.10	10	—	150	300	—	—	—	
Input Capacitance, C_{IN}	—	—	—	—	5	7.5	—	5	7.5	pF
Output Capacitance, C_{OUT}	—	—	—	—	10	15	—	10	15	pF

⁺Typical values are for $T_A = 25^\circ\text{C}$ and nominal voltage.

*Operating current measured in a CDP1802 system at 2 MHz with outputs floating.

[^] $I_{OL} = I_{OH} = 1 \mu\text{A}$.

CDP1856, CDP1857 Types

→ 1858

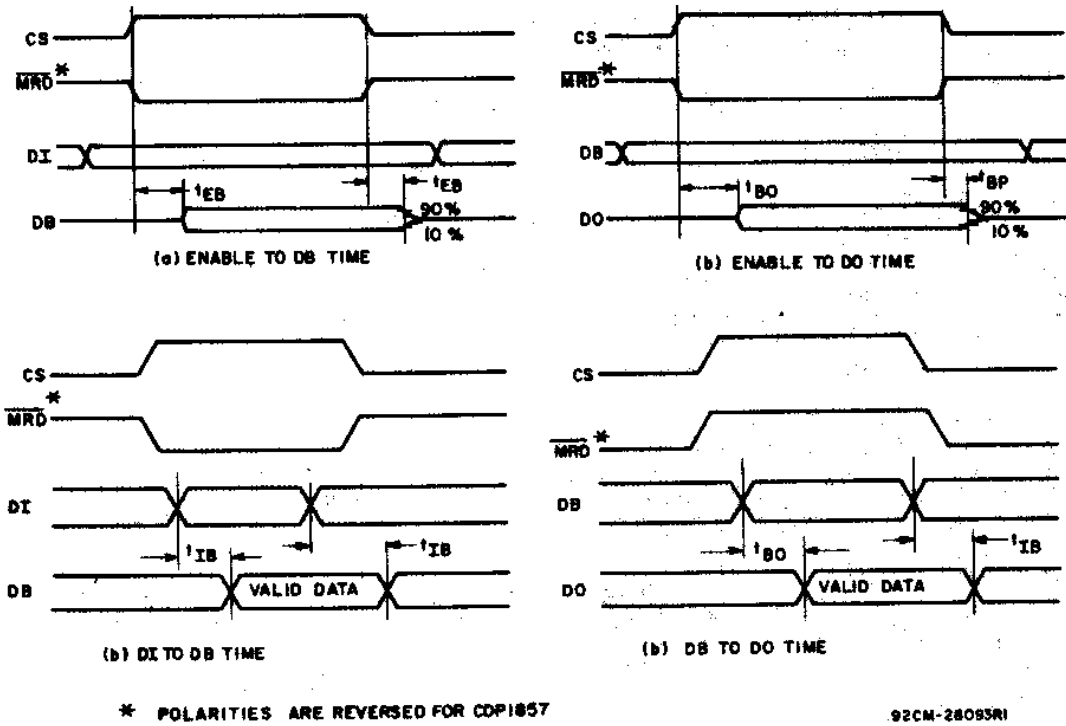


Fig. 1 - Timing Diagrams for CDP1856.

OPERATING AND HANDLING CONSIDERATIONS

1. Handling

All inputs and outputs of RCA COS/MOS devices have a network for electrostatic protection during handling. Recommended handling practices for COS/MOS devices are described in ICAN-6525, "Guide to Better Handling and Operation of CMOS Integrated Circuits."

2. Operating

Operating Voltage

During operation near the maximum supply voltage limit, care should be taken to avoid or suppress power supply turn-on and turn-off transients, power supply ripple, or ground noise; any of these conditions must not cause VDD-

VSS to exceed the absolute maximum rating.

Input Signals

To prevent damage to the input protection circuit, input signals should never be greater than VDD nor less than VSS. Input currents must not exceed 10 mA even when the power supply is off.

Unused Inputs

A connection must be provided at every input terminal. All unused input terminals must be connected to either VDD or VSS, whichever is appropriate.

Output Short Circuits

Shorting of outputs to VDD or VSS may damage COS/MOS devices by exceeding the maximum device dissipation.

CDP1856, CDP1857 Types

TYPICAL APPLICATIONS

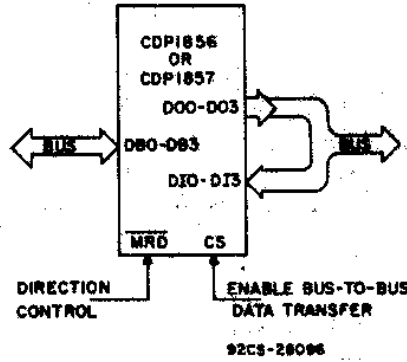
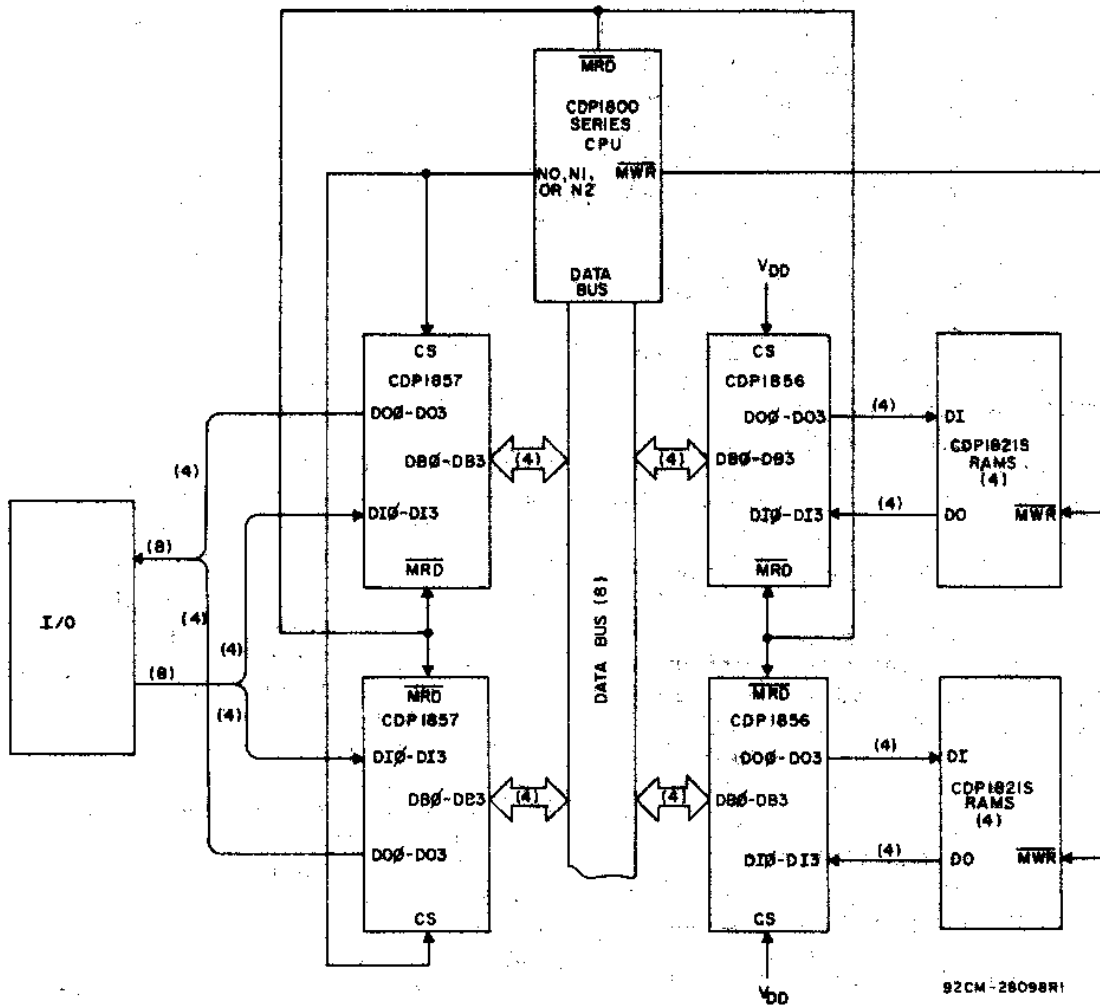


Fig. 2 - CDP1856, CDP1857 Bidirectional Bus Buffer Operation.



CDP1857 FUNCTION TABLE
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

CDP1856 FUNCTION TABLE
For Memory Data Bus Separator Operation

CS	$\overline{\text{MRD}}$	DATA BUS OUT DB0 - DB3	DATA OUT DO0 - DO3
0	X	HIGH IMPEDANCE	HIGH IMPEDANCE
1	0	DATA IN	HIGH IMPEDANCE
1	1	HIGH IMPEDANCE	DATA BUS

Fig. 3 - CDP1856 and CDP1857 Bus Separator Operation.