



Features

- **Fast**
CY8C901-31 has a 31 ns (min.) Clock Cycle
CY8C901-32 has a 32 ns (min.) Clock Cycle
- **Battery backup operation**
— 2V data retention
— 20 mW Power
- **Low Power**
— I_{CC} (max.) = 26.5 mA; (commercial)
— I_{CCSB} (max.) = 10 mA; (commercial)
- **V_{CC} Margin 5V ±10%**
- **Eight Function ALU**
Infinitely expandable in 4-bit increments

- **Four status flags**
Carry, overflow, negative, zero
- **Capable of withstanding greater than 2000V static discharge voltage**
- **Pin compatible and functional equivalent to Am2901B, C**

Functional Description

The CY8C901 is a high-speed, expandable, 4-bit wide ALU that can be used to implement the arithmetic section of a CPU, peripheral controller, or programmable controller. The instruction set of the CY8C901 is basic but yet so versatile that it can emulate the ALU of almost any digital computer.

The CY8C901, as illustrated in the block diagram, consists of a 16-word by 4-bit dual-port RAM register file, a

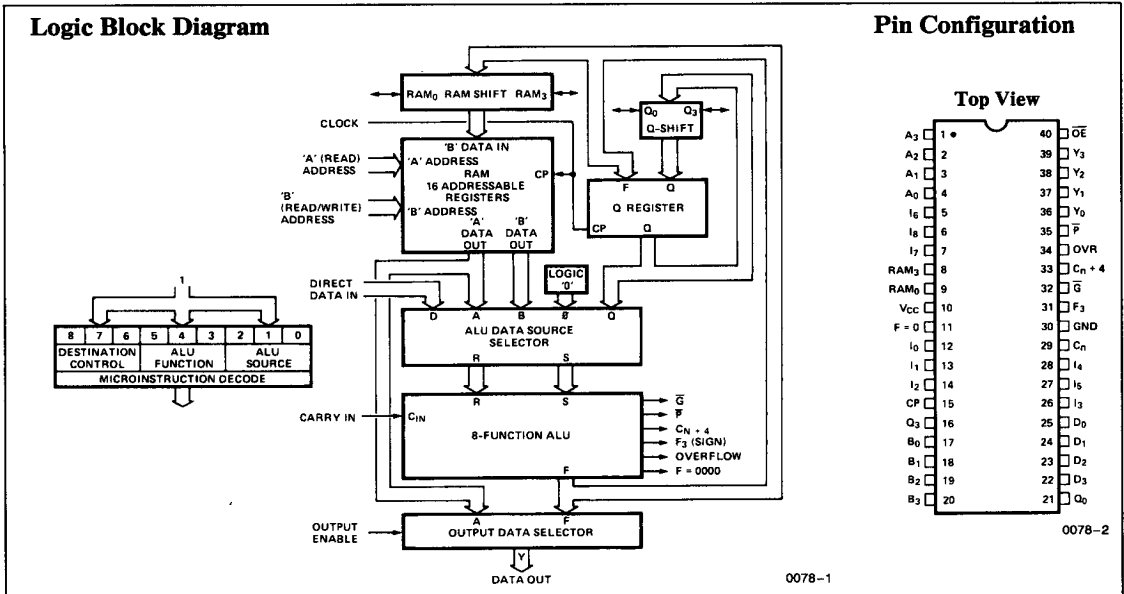
4-bit ALU and the required data manipulation and control logic.

The operation performed is determined by nine input control lines (I₀ to I₈) that are usually inputs from a microinstruction register.

The CY8C901 is expandable in 4-bit increments, has three-state data outputs as well as flag output, and can use either a full look ahead carry or a ripple carry.

The CY8C901 is a pin compatible, functional equivalent, improved performance replacement for the Am2901.

The CY8C901 is fabricated using an advanced 1.2 micron CMOS process that eliminates latchup, results in ESD protection over 2000V and achieves superior performance with low power dissipation.



Selection Guide See last page for ordering information.

Read Modify-Write Cycle (Min.) in ns	Operating I _{CC} (Max.) in mA	Operating Range	Part Number
31	26.5	Commercial	CY8C901-31
32	31.0	Military	CY8C901-32

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Maximum Ratings

(Above which the useful life may be impaired)
 Storage Temperature -65°C to +150°C
 Ambient Temperature with
 Power Applied -55°C to +125°C
 Supply Voltage to Ground Potential
 (Pin 10 to Pin 30) -0.5V to +7.0V
 DC Voltage Applied to Outputs
 in High Z State -0.5V to +7.0V
 DC Input Voltage -3.0V to +7.0V

Output Current into Outputs (Low) 30 mA
 Static Discharge Voltage > 2001V
 (Per MIL-STD-883 Method 3015.2)
 Latchup Current (Outputs) > 200 mA

Operating Range

Range	Ambient Temperature	V _{CC}
Commercial	0°C to +70°C	5V ± 10%
Military	-55°C to +125°C	5V ± 10%

Electrical Characteristics Over Commercial and Military Operating Range

V_{CC} Min. = 4.5V, V_{CC} Max. = 5.5V

Parameters	Description	Test Conditions	Min.	Max.	Units	
V _{OH2}	Output HIGH Voltage	V _{CC} = Min., I _{OH} = -100 μA V _{IN} = V _{IH2} or V _{IL2}	V _{CC} - 1.2		V	
V _{OH1}		V _{CC} = Min., I _{OH} = -3.4 mA V _{IN} = V _{IH1} or V _{IL1}		2.4		
V _{OL2}	Output LOW Voltage	V _{CC} = Min., I _{OL} = 100 μA V _{IN} = V _{IH2} or V _{IL2}	Commercial		0.2	V
V _{OL1}		V _{CC} = Min., I _{OL} = 20 mA V _{IN} = V _{IH1} or V _{IL1}			0.4	
V _{OL2}		V _{CC} = Min., I _{OL} = 100 μA V _{IN} = V _{IH2} or V _{IL2}	Military		0.2	
V _{OL1}		V _{CC} = Min., I _{OL} = 16 mA V _{IN} = V _{IH1} or V _{IL1}			0.4	
V _{IH1}	Input HIGH Levels	TTL Level	2.0	V _{CC}	V	
V _{IH2}		BridgeMOS Level	V _{CC} - 1.6	V _{CC}		
V _{IL1}	Input LOW Levels	TTL Level	-3.0	0.8	V	
V _{IL2}		BridgeMOS Level	-3.0	0.4		
I _{IX}	Input Leakage Current	GND ≤ V _{IN} ≤ V _{CC}	-10	+10	μA	
I _{OZ}	Output Leakage Current	GND ≤ V _O ≤ V _{CC} , Output Disabled	-40	+40	μA	
I _{OS}	Output Short Circuit Current	V _{CC} = Max., V _{OUT} = 0.0V ^[1]		-85	mA	
I _{CC1}	Power Supply Current (V _{CC} = Max.)	V _{IH} ≥ V _{CC} - 1.2V, 10 MHz V _{IL} ≤ 0.4V	Commercial		26.5	mA
I _{CC2}		V _{IH} ≥ 2.0, V _{IL} ≤ 0.8	Military		31	
			Commercial		70	
I _{CCSB}		Standby Current	V _{CC} = Max. D.C., V _{IH} = V _{CC} , V _{IL} ≤ 0.4V	Military		
	Commercial				10	
I _{CCDR}	Data Retention Current	V _{CC} = 2.0V V _{IN} ≥ V _{CC} - 0.2V, or ≤ 0.2V	Military		12	
			Commercial		10	

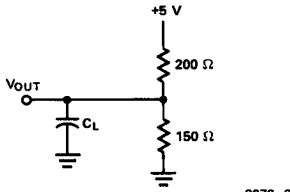
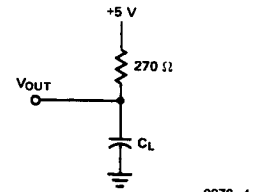
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Capacitance [2]

Parameters	Description	Test Conditions	Max.	Units
C _{IN}	Input Capacitance	T _A = 25°C, f = 1 MHz V _{CC} = 5.0V	5	pF
C _{OUT}	Output Capacitance		7	

Notes:

- Not more than one output should be tested at a time. Duration of the short circuit should not be more than one second.
- Tested on a sample basis.

TTL Output Loads used for AC Performance Characteristics

All outputs except open drain

Open drain (F = 0)
Notes:

- C_L = 50 pF includes scope probe, wiring and stray capacitance.
- C_L = 5 pF for output disable tests.

Ordering Information

Read Modify-Write Cycle (ns)	Ordering Code	Package Type	Operating Range
31	CY8C901-31PC	P17	Commercial
	CY8C901-31DC	D18	
	CY8C901-31JC	J67	
	CY8C901-31LC	L67	
32	CY8C901-32DMB	D18	Military
	CY8C901-32LMB	L67	

Pin Configuration
