



Universal Hexadecimal Counter

AVAILABLE AS MILITARY SPECIFICATIONS

- MIL-STD-883, Paragraph 1.2.2 Compliant

GENERAL DESCRIPTION

The AS10H536 is a high speed synchronous hexadecimal counter. This MECL 10H part which is a functional/pinout duplication of the standard MECL 10K family part, with 100% improvement in propagation delay, and no increase in powersupply current.

FEATURES

- Counting frequency, 250 MHz minimum
- 900 mW Max/Pkg (No Load)
- Improved Noise Margin 150 mV (Over Operating Voltage and Temperature Range)
- Voltage Compensated
- MECL 10K-Compatible
- Available in a 16-pin DIP package (C designator), CDIP2-T16 per MIL-STD-1835 and in a 16-pin Flatpack (F designator), CDFP4-F16 per MIL-STD-1835.

BURN-IN CONDITIONS:

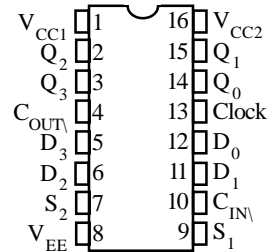
$V_{TT} = -2.0V \text{ MAX/ } -2.2V \text{ MIN}$

$V_{EE} = -5.7V \text{ MAX/ } -5.2V \text{ MIN}$

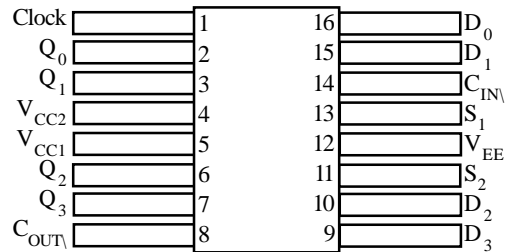
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PIN ASSIGNMENT (Top View)

16-Pin Side Brazed DIP (C Designator)



16-Pin Bottom Brazed FP (F Designator)



Function Select Table

$C_{IN\setminus}$	S_1	S_2	Operating Mode
Don't Care	L	L	Preset (Program)
L	L	H	Increment (Count Up)
H	L	H	Hold Count
L	H	L	Decrement (Count Down)
H	H	L	Hold Count
Don't Care	H	H	Hold (Stop Count)



PIN ASSIGNMENTS (Ceramic DIP)

FUNCTION	PIN #	BURN-IN (CONDITION C)
V _{CC1}	1	GND
Q ₂	2	51 Ω to V _{TT}
Q ₃	3	51 Ω to V _{TT}
C _{OUT} ∧	4	51 Ω to V _{TT}
D ₃	5	GND
D ₂	6	GND
S ₂	7	OPEN
V _{EE}	8	V _{EE}
S ₁	9	OPEN
C _{IN} ∧	10	OPEN
D ₁	11	GND
D ₀	12	GND
CLK	13	CP1
Q ₀	14	51 Ω to V _{TT}
Q ₁	15	51 Ω to V _{TT}
V _{CC2}	16	GND

PIN ASSIGNMENTS (Ceramic FP)

FUNCTION	PIN #	BURN-IN (CONDITION C)
CLK	1	CP1
Q ₀	2	51 Ω to V _{TT}
Q ₁	3	51 Ω to V _{TT}
V _{CC2}	4	GND
V _{CC1}	5	GND
Q ₂	6	51 Ω to V _{TT}
Q ₃	7	51 Ω to V _{TT}
C _{OUT} ∧	8	51 Ω to V _{TT}
D ₃	9	GND
D ₂	10	GND
S ₂	11	OPEN
V _{EE}	12	V _{EE}
S ₁	13	OPEN
C _{IN} ∧	14	OPEN
D ₁	15	GND
D ₀	16	GND

ORDERING INFORMATION

EXAMPLE: AS10H536C16MIL

Device Number	Package Type	Pin Count	Process*
AS10H536	C	16	MIL
AS10H536	F	16	MIL

*AVAILABLE PROCESSES

MIL = Military Processing

-55°C to +125°C



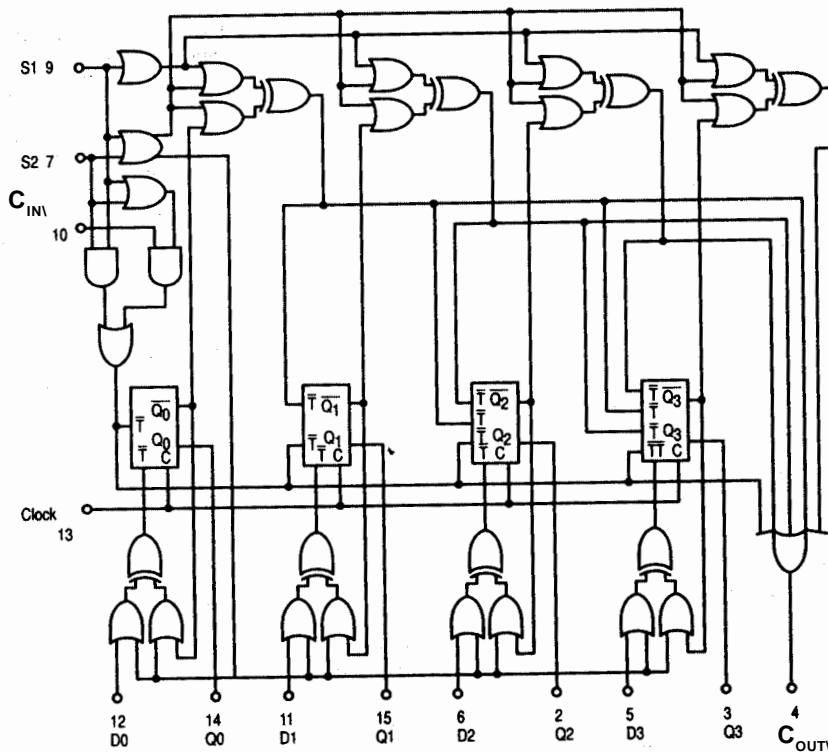
SEQUENTIAL TRUTH TABLE •												
S ₁	S ₂	D ₀	D ₁	D ₂	D ₃	Carry IN	Clock ●●	Q ₀	Q ₁	Q ₂	Q ₃	Carry OUT
L	L	L	L	H	H	∅	H	L	L	H	H	L
L	H	∅	∅	∅	∅	L	H	H	L	H	H	H
L	H	∅	∅	∅	∅	L	H	L	H	H	H	H
L	H	∅	∅	∅	∅	L	H	H	H	H	H	L
L	H	∅	∅	∅	∅	H	L	H	H	H	H	H
L	H	∅	∅	∅	∅	H	H	H	H	H	H	H
L	H	∅	∅	∅	∅	∅	H	H	H	H	H	H
L	L	H	H	L	L	∅	H	H	H	L	L	L
H	L	∅	∅	∅	∅	L	H	L	H	L	L	H
H	L	∅	∅	∅	∅	L	H	H	L	L	L	L
H	L	∅	∅	∅	∅	L	H	L	L	L	L	L
H	L	∅	∅	∅	∅	L	H	H	H	H	H	H

∅ = Don't Care

● Truth table shows logic states assuming inputs vary in sequence shown from top to bottom.

●● A clock H is defined as a clock input transition from a low to a high logic level.

FIGURE 1. Logic Diagram



NOTES: Flip flops will toggle when all T\ inputs are LOW.



QUIESCENT LIMIT TABLE*

*** ELECTRICAL CHARACTERISTICS**

Each MECL 10H series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are terminated through a 100 Ω resistor to -2.0 volts.

Test Temperature	Test Voltage Values (Volts)									
	V _{IH1}	V _{IL1}	V _{IH2}	V _{IL2}	PS1	PS2	VEE1	VEE2	VEEL	VEEL
T _A = 25 °C	-0.780	-1.950	-1.11	-1.48	+1.11	+0.31	-5.46	-4.94	-2.94	-2.94
T _A = 125 °C	-0.650	-1.950	-0.96	-1.465	+1.24	+0.36	-5.46	-4.94	-2.94	-2.94
T _A = -55 °C	-0.840	-1.950	-1.16	-1.51	+1.01	+0.28	-5.46	-4.94	-2.94	-2.94

SYM	PARAMETER	LIMITS						UNITS	TEST VOLTAGE APPLIED TO PINS BELOW					
		+25°C		+125°C		-55°C			Pinouts referenced are for DIP Package, Check Pin Assignments V _{CC} =0V, Output Load=100Ω to -2.0V					
		Subgroup 1	Subgroup 2	Subgroup 1	Subgroup 2	Subgroup 1	Subgroup 2		V _{IH1}	V _{IL1}	V _{EE2}	V _{EE1}	V _{CC}	P.U.T.
V _{OH}	High Output Voltage	MIN	MAX	MIN	MAX	MIN	MAX	V	3-6, 11-14	13	8	1, 16	2, 3, 4, 14, 15	
V _{OL}	Low Output Voltage	-1.046	-1.819	-0.899	-0.692	-1.099	-0.882	V	13	13	8	1, 16	2, 3, 4, 14, 15	
V _{OH1}	High Output Voltage	-1.046	-0.819	-0.899	-0.692	-1.099	-0.882	V			8	1, 16	2, 3, 4, 14, 15	
V _{OL1}	Low Output Voltage	-1.95	-1.592	-1.95	-1.578	-1.95	-1.623	V			8	1, 16	2, 3, 4, 14, 15	
I _{EE}	Power Supply Current	-149		-164		-164		mA			8	1, 16	8	
I _{IH}	Input Current High	225		365		365		µA	9		8	1, 16	10	
I _{IH1}	Input Current High	260		415		415		µA	10		8	1, 16	5, 6, 11, 12, 13 CLK, D ₀ -D ₃	
I _{IH2}	Input Current High	320		520		520		µA	5, 6, 11-13		8	1, 16	7	
I _{IH3}	Input Current High	405		655		655		µA	7		8	1, 16	S ₂	
I _{IL}	Input Current Low	0.5		0.3		0.5		µA	5-7, 10-13	8		1, 16	S ₁	
								µA				1, 16	5, 6, 11 - 13	



QUIESCENT LIMIT TABLE*

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T _A = -55 °C	-0.840	-1.950	-1.16	-1.51	+1.01	+0.28	-5.46	-4.94	-2.94	-2.94

Symbol	Parameter	Limits						Units	TEST VOLTAGE APPLIED TO PINS BELOW							
		+25 °C		+125 °C		-55 °C			Pinouts referenced are for DIL package, check Pin Assignments V _{CC} = 2.0 V, Output Load = 100 Ω to GND							
		Subgroup 9	Subgroup 10	Subgroup 10	Subgroup 11	Subgroup 11	Subgroup 11		V _{IN}	V _{OUT}	PS1	PS2	V _{CC}	VEEL	P.U.T.	
t _{TLH}	Rise Time	0.7	2.1	0.7	2.3	0.7	2.3	ns	7, 13	4	11, 12	9, 10	1, 16	8	2, 3, 14, 15	
t _{FHL}	Fall Time	0.7	2.1	0.7	2.3	0.7	2.3	ns	7, 13	4	11, 12	9, 10	1, 16	8	2, 3, 14, 15	
t _{pd}	Propagation Delay															
	Clk to Q	0.7	3.2	0.7	3.5	0.7	3.5	ns	10	4	11, 12	9, 13	1, 16	8	2, 3, 14, 15	
	Clk to Carry Out	0.7	7.0	0.7	7.7	0.7	7.7	ns	10	4	11, 12	9, 13	1, 16	8	2, 3, 14, 15	
	Carry In to Carry Out	0.7	3.0	0.7	3.5	0.7	3.5	ns	10	4	11, 12	9, 13	1, 16	8	2, 3, 14, 15	
t _{SET}	Setup Time															
	Data (D ₀ to C)	2.0		2.0		2.0		ns	12, 13	14		7, 9	1, 16	8	2, 3, 14, 15	
	Select (S to C)	3.5		3.5		3.5		ns	12, 13	14		7, 9	1, 16	8	2, 3, 14, 15	
	Carry In (C _{IN} to C)	2.0		2.0		2.0		ns	12, 13	14		7, 9	1, 16	8	2, 3, 14, 15	
	(C to C _{IN})	0.0		0.0		0.0		ns	12, 13	14		7, 9	1, 16	8	2, 3, 14, 15	
t _{HOLD}	Hold Time															
	Data (D ₀ to C)	0.0		0.0		0.0		ns	12, 13	14		7, 9	1, 16	8	2, 3, 14, 15	
	Select (S to C)	-0.5		-0.5		-0.5		ns	12, 13	14		7, 9	1, 16	8	2, 3, 14, 15	
	Carry In (C _{IN} to C)	150		150		150		ns	12, 13	14		7, 9	1, 16	8	2, 3, 14, 15	
	(C to C _{IN})	2.0		2.2		2.2		ns	12, 13	14		7, 9	1, 16	8	2, 3, 14, 15	
f _{Count}	Count Frequency	250		250		250		MHZ	12	13	9		1, 16	8	3, 14	