

3422618 EXAR CORP

EXAR

91D 04426

DT-51-19

XR-556

Dual Timer

GENERAL DESCRIPTION

The XR-556 dual timing circuit contains two independent 555-type timers on a single monolithic chip. It is a direct, pin-for-pin replacement for the SE/NE 556 dual timer. Each timer section is a highly stable controller capable of producing accurate time delays or oscillations. Independent output and control terminals are provided for each section as shown in the functional block diagram.

In the monostable mode of operation, the time delay for each section is precisely controlled by one external resistor and one capacitor. For astable operation as an oscillator, the free-running frequency and the duty cycle of each section are accurately controlled with two external resistors and one capacitor.

The XR-556 may be triggered or reset on falling waveforms. Each output can source or sink up to 150 mA or drive TTL circuits. The matching and temperature tracking characteristics between each timer section of the XR-556 are superior to those available from two separate timer packages.

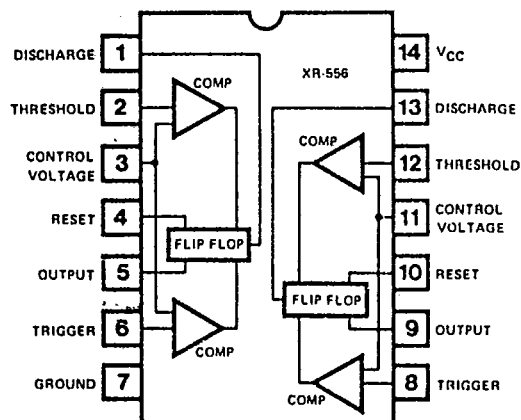
FEATURES

- Direct Replacement for SE/NE 556
- Replaces Two 555-Type Timers
- TTL Compatible Pinouts
- Timing from Microseconds Thru Hours
- Excellent Matching Between Timer Sections
- Operates in Both Monostable and Astable Modes
- High Current Drive Capability (150 mA each output)
- TTL and DTL Compatible Outputs
- Adjustable Duty Cycle
- Temperature Stability of 0.005%/°C

APPLICATIONS

- Precision Timing
- Pulse Generation
- Sequential Timing
- Pulse Shaping
- Time Delay Generation
- Clock Pattern Generation
- Missing Pulse Detection
- Pulse-Width Modulation
- Frequency Division
- Clock Synchronization
- Pulse-Position Modulation
- Appliance Timing

FUNCTIONAL BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Power Supply	18V
Power Dissipation	
Ceramic Dual-In-Line	750 mW
Derate above $T_A = 25^\circ\text{C}$	6 mW/°C
Plastic Dual-In-Line	625 mW
Derate above $T_A = 25^\circ\text{C}$	5 mW/°C
Storage Temperature Range	-65°C to +150°C

ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-556M *	Ceramic	-55°C to +125°C
XR-556CN	Ceramic	0°C to +70°C
XR-556CP	Plastic	0°C to +70°C

*Consult factory for availability

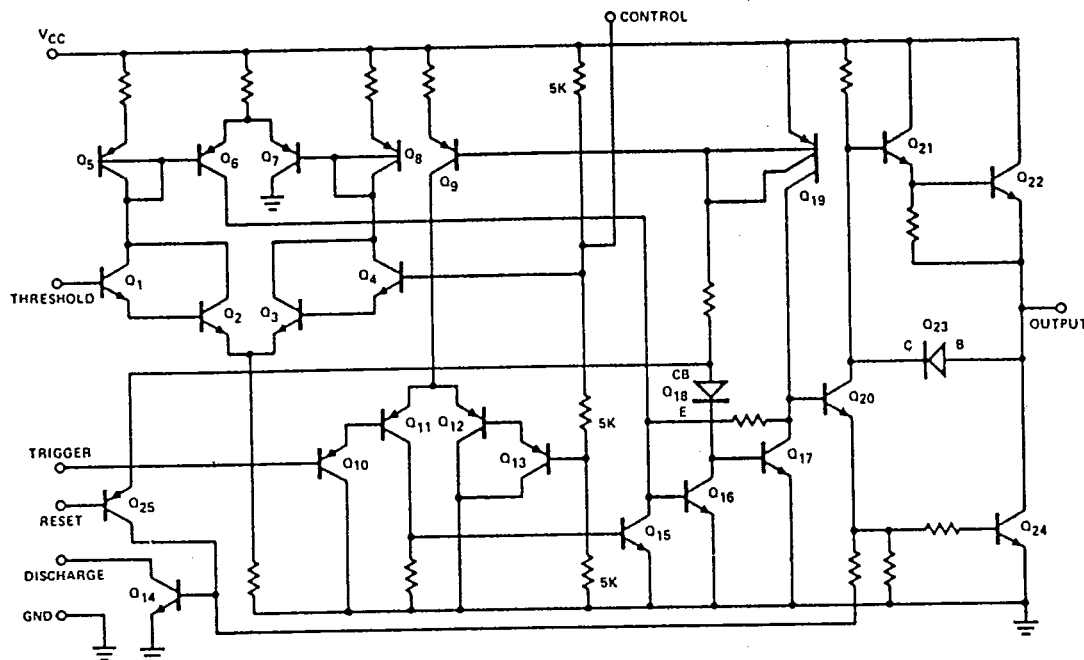
SYSTEM DESCRIPTION

The XR-556 is an industry standard dual timing circuit capable of both monostable and astable operation with timing intervals ranging from low microseconds up through several hours. Timing is independent of supply voltage, which may range from, 4.5 V to 18 V. The output stage can source or sink 150 mA. Each timer section is fully independent and similar to 555-type devices.

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XR-556

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EQUIVALENT SCHEMATIC DIAGRAM**SYSTEM DESCRIPTION (continued)**

In the monostable (one shot) mode, timing is determined by one resistor and capacitor. Astable operation (oscillation) requires an additional resistor, which controls duty cycle. An internal resistive divider provides a reference voltage of $2/3 V_{CC}$, which produces a timing interval of $1.1 RC$. As the reference is related to V_{CC} , the interval is independent of supply voltage; however, for maximum accuracy, the user should ensure V_{CC} does not vary during timing.

The output of the XR-556 is high during the timing interval, and pulls low at timeout. It is triggered and reset on falling waveforms. The control voltage inputs (Pins 3 and 11) may serve as pulse width modulation points. Matching between sections is typically better than 0.05% initially, with temperature drift tracking to ± 10 ppm/ $^{\circ}\text{C}$ and supply voltage drift tracking to 0.1%/V. For low voltage and/or low power drain applications, consider the XR-L556.

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XR-556**ELECTRICAL CHARACTERISTICS**Test Conditions: (Each timer section, $T_A = 25^\circ\text{C}$, $V_{CC} = +5\text{V}$ to $+15\text{V}$, unless otherwise specified.)

PARAMETERS	XR-556M			XR-556C			UNITS	CONDITIONS
	MIN	TYP	MAX	MIN	TYP	MAX		
Supply Voltage	4.5		18	4.5		16	V	
Supply Current (Each Timer Section)		3	5		3	6	mA	Low State Output, Note 1 $V_{CC} = 5\text{V}$, $R_L = \infty$ $V_{CC} = 15\text{V}$, $R_L = \infty$
		10	11		10	14	mA	
Total Supply Current (Both Timer Sections)		6	10		6	12	mA	Low State Output, Note 1 $V_{CC} = 5\text{V}$, $R_L = \infty$ $V_{CC} = 15\text{V}$, $R_L = \infty$
		20	22		20	28	mA	
Timing Error (Monostable)								Timing, $R = 1\text{K}\Omega$ to $100\text{K}\Omega$ Note 2, $C = 1.0\text{ }\mu\text{F}$ $0^\circ\text{C} \leq T_A \leq 75^\circ\text{C}$
Initial Accuracy		0.5	1.5		.75	3	%	$R_A, R_B = 1\text{K}\Omega$ to $100\text{K}\Omega$ $C = 0.1\text{ }\mu\text{F}$ $V_{CC} = 15\text{V}$
Drift with Temperature		30	100		50		ppm/ $^\circ\text{C}$	
Drift with Supply Voltage		0.05	0.2		0.1	0.5	%/V	
Timing Error (Astable)								$R_A, R_B = 1\text{K}\Omega$ to $100\text{K}\Omega$ $C = 0.1\text{ }\mu\text{F}$ $V_{CC} = 15\text{V}$
Initial Accuracy (Note 2)		1.5			2.25		%	
Drift with Temperature		90			150		ppm/ $^\circ\text{C}$	
Drift with Supply Voltage		0.15			0.3		%/V	
Threshold Voltage	9.4	10.0	10.6	8.8	10.0	11.2	V	$V_{CC} = 15\text{V}$ $V_{CC} = 5\text{V}$
	2.7	3.33	4.0	2.4	3.33	4.2	V	
Trigger Voltage	1.45	1.67	1.9		1.67		V	$V_{CC} = 5\text{V}$ $V_{CC} = 15\text{V}$
	4.8	5.0	5.2	4.5	5.0	5.6	V	
Trigger Current		0.5	0.9		0.5	2	μA	$V_{TRIG} = 0\text{V}$
Reset Voltage	0.4	0.7	1.0	0.4	0.7	1.0	V	V_{TRIG} High
Reset Current		0.4	1		0.4	1.5	mA	$V_{RESET} = 0\text{V}$
Threshold Current		0.03	0.1		0.03	0.1	μA	Note 3
Control Voltage Level	2.90	3.33	3.80	2.60	3.33	4.00		$V_{CC} = 5\text{V}$ $V_{CC} = 15\text{V}$
	9.6	10.0	10.4	9.0	10.0	11.0		
Output Voltage Drop (Low)		0.10	0.25		0.3		V	$V_{CC} = 5\text{V}$ $I_{\text{sink}} = 8.0\text{ mA}$ $I_{\text{sink}} = 5.0\text{ mA}$ $V_{CC} = 15\text{V}$ $I_{\text{sink}} = 10\text{ mA}$ $I_{\text{sink}} = 50\text{ mA}$ $I_{\text{sink}} = 100\text{ mA}$ $I_{\text{sink}} = 200\text{ mA}$
		0.05	0.20		0.25	0.35	V	
		0.1	0.15		0.1	0.25	V	
		0.4	0.5		0.4	0.75	V	
		2.0	2.25		2.0	2.75	V	
		2.5			2.5		V	
Output Voltage Drop (High)	3.0	3.3		2.75	3.3		V	$I_{\text{source}} = 100\text{ mA}$ $V_{CC} = 5\text{V}$ $V_{CC} = 15\text{V}$ $I_{\text{source}} = 200\text{ mA}$ $V_{CC} = 15\text{V}$
	13	13.3		12.75	13.3		V	
		12.5			12.5		V	
Rise Time of Output		100	200		100	300	nsec	
Fall Time of Output		100	200		100	300	nsec	
Matching Characteristic								Note 4
Initial Timing Accuracy		0.05	0.1		0.1	0.2	%	
Timing Drift with Temperature		± 10			± 10		ppm/ $^\circ\text{C}$	
Drift with Supply Voltage		0.1	0.2		0.2	0.5	%/V	

Note 1: Supply current when output is high is typically 1.0 mA less.

Note 2: Tested at $V_{CC} = 5\text{V}$ and $V_{CC} = 15\text{V}$.Note 3: This will determine the maximum value of $R_A + R_B$ for 15V operation. The maximum total $R = 10$ megohms, and for 5V operation, the maximum $R = 3.4$ megohms.

Note 4: Matching characteristics refer to the difference between performance characteristics of each timer section.

3422618 EXAR CORP

EXAR

91D 04225

D7-75-45-05

XR-1488/1489A

Quad Line Driver/Receiver

GENERAL DESCRIPTION

The XR-1488 is a monolithic quad line driver designed to interface data terminal equipment with data communications equipment in conformance with the specifications of EIA Standard No. RS232C. This extremely versatile integrated circuit can be used to perform a wide range of applications. Features such as output current limiting, independent positive and negative power supply driving elements, and compatibility with all DTL and TTL logic families greatly enhance the versatility of the circuit.

The XR-1489A is a monolithic quad line receiver designed to interface data terminal equipment with data communications equipment. The XR-1489A quad receiver along with its companion circuit, the XR-1488 quad driver, provide a complete interface system between DTL or TTL logic levels and the RS232C defined voltage and impedance levels.

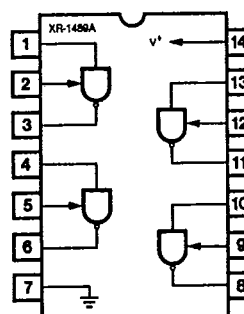
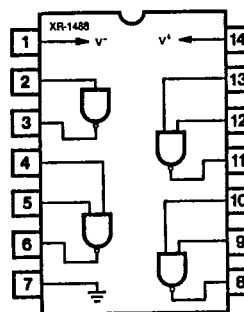
ABSOLUTE MAXIMUM RATINGS

Power Supply	
XR-1488	± 15 Vdc
XR-1489A	+ 10 Vdc
Power Dissipation	
Ceramic Package	1000 mW
Derate above +25°C	6.7 mW/°C
Plastic Package	650 mW/°C
Derate above +25°C	5 mW/°C

ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-1488N	Ceramic	0°C to +70°C
XR-1488P	Plastic	0°C to +70°C
XR-1489AN	Ceramic	0°C to +70°C
XR-1489AP	Plastic	0°C to +70°C

FUNCTIONAL BLOCK DIAGRAMS



SYSTEM DESCRIPTION

The XR-1488 and XR-1489A are a matched set of quad line drivers and line receivers designed for interfacing between TTL/DTL and RS232C data communication lines.

The XR-1488 contains four independent split supply line drivers, each with a ± 10 mA current limited output. For RS232C applications, the slew rate can be reduced to the 30 V/ μ S limit by shunting the output to ground with a 410 pF capacitor. The XR-1489A contains four independent line receivers, designed for interfacing RS232C to TTL/DTL. Each receiver features independently programmable switching thresholds with hysteresis, and input protection to ± 30 V. The output can typically source 3 mA and sink 20 mA.