

Quad Operational Amplifier

GENERAL DESCRIPTION

The XR-4741 is an array of four independent internally-compensated operational amplifiers on a single silicon chip, each similar to the popular 741. Each amplifier offers performance equal to or better than the 741 type in all respects. It has high slew rate, superior bandwidth, and low noise, which makes it excellent for audio amplifiers or active filter applications.

FEATURES

Short-Circuit Protection	
Internal Frequency Compensation	
No Latch-Up	
Wide Common-Mode and Differential Voltage Ranges	
Matched Gain-Bandwidth	
High Slew Rate	1.6V/ μ S(Typ)
Unity Gain-Bandwidth	3.5 MHz(Typ)
Low Noise Voltage	9 nV/ $\sqrt{\text{Hz}}$
Input Offset Current	60 nA(Typ)
Input Offset Voltage	.5 mV(Typ)
Supply Range	$\pm 2\text{V}$ to $\pm 20\text{V}$

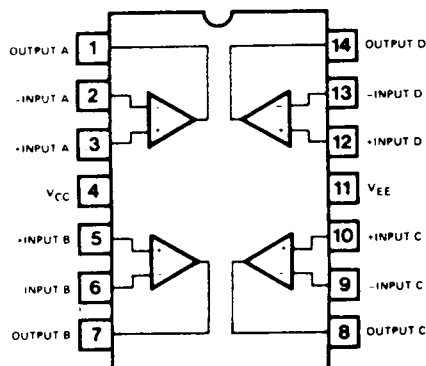
APPLICATIONS

Buffer Amplifiers
Summing/Differencing Amplifiers
Instrumentation Amplifiers
Active Filters
Signal Processing
Sample and Differencing
I to V Converters
Integrators
Simulated Components
Analog Computers

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	
XR-4741	± 20
Common Mode Voltage	V_{EE} to V_{CC}
Output Short-Circuit Duration	Indefinite
Differential Input Voltage	$\pm 30\text{V}$
Internal Power Dissipation	
Ceramic Package:	880 mW
Derate above $T_A = +25^\circ\text{C}$	5.8 mW/ $^\circ\text{C}$
Plastic Package:	625 mW
Derate above $T_A = +25^\circ\text{C}$	5 mW/ $^\circ\text{C}$
Storage Temperature Range:	-65°C to $+150^\circ\text{C}$

FUNCTIONAL BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-4741M*	Ceramic	-55°C to $+125^\circ\text{C}$
XR-4741CN	Ceramic	0°C to $+70^\circ\text{C}$
XR-4741CP	Plastic	0°C to $+70^\circ\text{C}$

*Consult factory for availability

SYSTEM DESCRIPTION

The XR-4741 is a quad operational amplifier featuring improved performance over industry standard devices such as the 741.

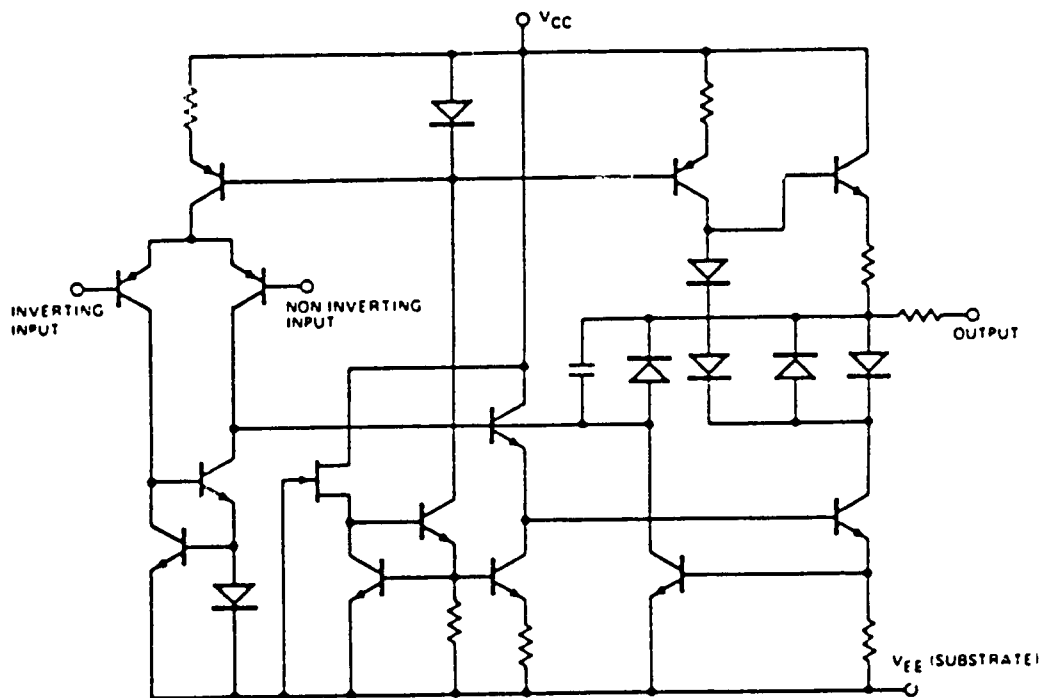
XR-4741

ELECTRICAL CHARACTERISTICS

Test Conditions: $T_A = +25^\circ\text{C}$, $V_S = \pm 15\text{ V}$ unless otherwise specified.

PARAMETERS	XR-4741M			XR-4741C			UNITS	SYMBOLS	CONDITIONS
	MIN	TYP	MAX	MIN	TYP	MAX			
Input Offset Voltage		0.5	3.0		1.0	5.0	mV	$ V_{IO} $	$R_S \leq 10\text{ K}\Omega$
Input Offset Current		10	30		10	50	nA	$ I_{IO} $	
Input Bias Current		60	200		60	300	nA	$ I_B $	
Differential Input Resistance		5			5		M Ω	R_{in}	
Input Noise Voltage ($f = 1\text{ kHz}$)		9			9		nV/ $\sqrt{\text{Hz}}$		
Large Signal Voltage Gain	50	100		25	50		V/mV	A_{VOL}	$R_L \geq 2\text{ K}\Omega$ $V_{out} = \pm 10\text{ V}$
Output Voltage Swing	± 12 ± 10	± 13.7 ± 12.5		± 12 ± 10	± 13.7 ± 12.5		V V kHz	V_{out} V_{out}	$R_L \geq 10\text{ K}\Omega$ $R_L \geq 2\text{ K}\Omega$
Full Power Bandwidth		25			25				
Output Resistance		300			300		Ω		
Input Voltage Range	± 12	± 13.5		± 12	± 13.5		V	V_{ICM}	
Common Mode Rejection Ratio	80	100		80	100		dB	CMRR	$R_S \leq 10\text{ K}\Omega$
Supply Voltage Rejection Ratio		10	100		10	100	$\mu\text{V/V}$	PSRR	$R_S \leq 10\text{ K}\Omega$
Power Consumption			150			210	mW	P_i	
Transient Response (unity gain) Risetime Overshoot		.07 20			.07 20		μs %	t_r t_o	$V_{in} = 20\text{ mV}$ $R_L = 2\text{ K}\Omega$ $C_L \leq 100\text{ pF}$
Unit Gain Bandwidth		3.5			3.5		MHz	BW	
Slew Rate (unity gain)		1.6			1.6		V/ μs	dV_{out}/dt	$R_L \geq 2\text{ K}\Omega$
Channel Separation (open loop)		120			120		dB		$f = 10\text{ KHz}$ $R_S = 1\text{ K}\Omega$
(Gain of 100)		105			105		dB		$f = 10\text{ KHz}$ $R_S = 1\text{ K}\Omega$
The following specifications apply for $-55^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$ for XR-4741M; $0^\circ\text{C} \leq T_A \leq +70^\circ\text{C}$ for XR-4741C									
Input Offset Voltage		4.0	5.0		5.0	6.5	mV	$ V_{IO} $	$R_S \leq 10\text{ K}\Omega$
Input Offset Current			75			100	nA	$ I_{IO} $	
Input Bias Current			325			400	nA	I_B	
Input Voltage Range	± 12			± 12			V		
Common Mode Rejection Ratio	74			74			db		
Large-Signal Voltage Gain	25			15			V/mV	A_{VOL}	$R_L \geq 2\text{ K}\Omega$ $V_{out} = \pm 10\text{ V}$
Output Voltage Swing	± 10	± 12.5		± 10	± 12.5		V	V_{out}	$R_L = 2\text{ K}\Omega$
Power Consumption	± 12.0	± 13.7	150 200	± 12	± 13.7	150 200	mW mW	P_i P_i	$R_L \geq 10\text{ K}\Omega$ $V_S = \pm 15\text{ V}$ $T_A = \text{High}$ $T_A = \text{Low}$
Supply Voltage Rejection Ratio		100	$\mu\text{V/V}$		100	$\mu\text{V/V}$			
Output Short-Circuit Current	± 5	± 15		± 5	± 15		mA	I_{SC}	

XR-4741



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EQUIVALENT SCHEMATIC DIAGRAM

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XR-1488/1489A

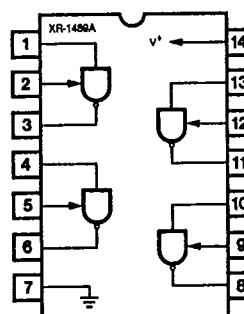
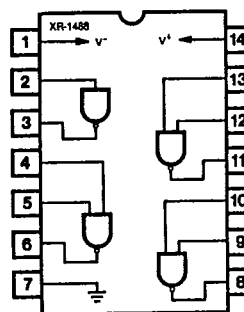
Quad Line Driver/Receiver

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.

FUNCTIONAL BLOCK DIAGRAMS



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

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.