

Quad Programmable Bipolar JFET Operational Amplifiers

GENERAL DESCRIPTION

The XR-094 and XR-095 bipolar JFET input quad programmable operational amplifiers consist of four independent, high gain, internally compensated amplifiers. Two external resistors (R_{SET}) allow the user to program supply current, slew-rate, and input noise without the usual sacrifice of gain bandwidth product. For example, the user can trade-off slew-rate for supply current or optimize the noise figure for a given source impedance. Except for the two programming pins at the end of the package, the XR-094 and XR-095 pin-out is the same as the popular 324, 3403, 124, 148 and 4741 operational amplifiers.

In the case of the XR-094, three of the op amps on the chip share a common programming pin; and the fourth op amp is programmed separately. In the case of the XR-095, each pair of op amps share a common programming pin.

FEATURES

- Same Pin Configuration as LM-346
- High-Impedance FET Input Stage
- Internal Frequency Compensation
- Low Power Consumption
- Wide Common-Mode and Differential Voltage Ranges
- Low Input Bias and Offset Currents
- Output Short-Circuit Protection
- High Slew-Rate . . . 13 V/ μ s, Typical
- Programmable Electrical Characteristics

APPLICATIONS

Total Supply Current = 5.6 mA ($I_{SET}/320 \mu A$)
 Slew Rate = 13 V/ μ s ($I_{SET}/320 \mu A$)
 I_{SET} = Current into set terminal

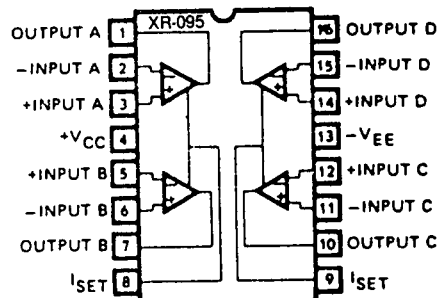
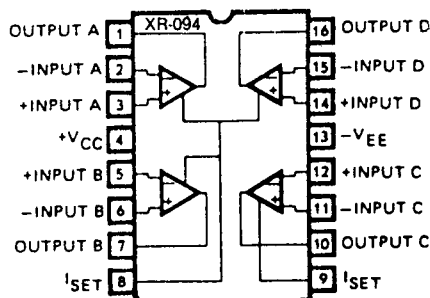
$$I_{SET} = \frac{V_{CC} - (V_{EE} - 0.6V)}{R_{SET}}$$

Note. I_{SET} must be $\leq 400 \mu A$

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	$\pm 18V$
Differential Input Voltage	$\pm 30V$
Input Voltage Range (Note 1)	$\pm 15V$
Output Short-Circuit Duration (Note 2)	Indefinite
Package Power Dissipation:	
Plastic Package	625 mW

FUNCTIONAL BLOCK DIAGRAMS



ABSOLUTE MAXIMUM RATINGS (Continued)

Derate Above $T_A = +25^\circ C$	5.0 mW/ $^\circ C$
Ceramic Package	750 mW
Derate Above $T_A = +25^\circ C$	6.0 mW/ $^\circ C$
Storage Temperature Range	$-65^\circ C$ to $+150^\circ C$

Note 1: For Supply Voltage less than $\pm 15V$, the absolute maximum input voltage is equal to the supply voltage.

Note 2: The output may be shorted to ground or to either supply. Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.

ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-094/XR-095N	Ceramic	$-25^\circ C$ to $+85^\circ C$
XR-094/XR-095P	Plastic	$-25^\circ C$ to $+85^\circ C$
XR-094/XR-095CN	Ceramic	$0^\circ C$ to $+70^\circ C$
XR-094/XR-095CP	Plastic	$0^\circ C$ to $+70^\circ C$

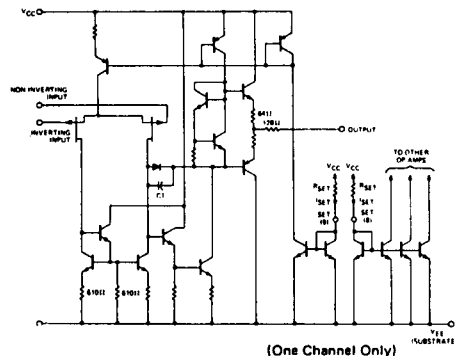
XR-094/095

ELECTRICAL CHARACTERISTICS

$T_A = 25^\circ\text{C}$, $V_{CC} = \pm 15\text{V}$, unless otherwise specified.

$I_{SET} = 320\ \mu\text{A}$.

PARAMETERS	XR-094/095			XR-094/095C			UNITS	SYMBOL	CONDITIONS
	MIN	TYP	MAX	MIN	TYP	MAX			
Input Offset Voltage		3	6 9		5	15 20	mV mV	V_{OS} V_{OS}	$R_S = 50\Omega$, $T_A = 25^\circ\text{C}$ $R_S = 50\Omega$, $T_A = \text{Full Range}$
Offset Voltage Temp. Coef.		10			10		$\mu\text{V}/^\circ\text{C}$	$\Delta V_{OS}/\Delta T$	$R_S = 50\Omega$, $T_A = \text{Full Range}$
Input Bias Current		80	600 20		80	800 20	pA nA	I_B	$T_A = 25^\circ\text{C}$ $T_A = \text{Full Range}$
Input Offset Current		40	300 10		40	500 5	pA nA	I_{OS}	$T_A = 25^\circ\text{C}$ $T_A = \text{Full Range}$
Supply Current (per amplifier)		1.4	2.8		1.4	2.8	mA	I_{CC}	No Load, No Input Signal
Input Common Mode Range	± 12			± 10			V	V_{ICM}	
Voltage Gain	50 25	200		25 15	200		V/mV	A_{VOL}	$R_L \geq 2\text{K}\Omega$, $V_O = \pm 10\text{V}$ $T_A = 25^\circ\text{C}$ $T_A = \text{Full Range}$
Max. Output Swing (peak-to-peak)	24 24	27		24 24	27		V	V_{OPP}	$R_L \geq 10\text{K}\Omega$ $T_A = 25^\circ\text{C}$ $T_A = \text{Full Range}$
Input Resistance		10^{12}			10^{12}		Ω	R_{in}	$T_A = 25^\circ\text{C}$
Unity-Gain Bandwidth		3			3		MHz	BW	$T_A = 25^\circ\text{C}$
Common-Mode Rejection	80	86		70	76		dB	CMRR	$R_S \leq 10\text{K}\Omega$
Supply-Voltage Rejection	80	86		70	76		dB	PSRR	
Channel Separation		120			120		dB		$A_V = 100$, Freq. = 1 kHz
Slew Rate		13			13		V/ μS	dV_{out}/dt	$A_V = 1$, $R_L = 2\text{K}\Omega$ $C_L = 100\text{pF}$, $V_1 = 10\text{V}$
Rise Time Overshoot		0.1 10			0.1 10		μsec %	t_r t_o	$A_V = 1$, $R_L = 2\text{K}\Omega$ $C_L = 100\text{pF}$, $V_1 = 20\text{mV}$
Equivalent Input Noise Voltage		18			18		nV/ $\sqrt{\text{Hz}}$	e_n	$R_S = 100\Omega$ $f = 1\text{kHz}$



EQUIVALENT SCHEMATIC DIAGRAM

3422618 EXAR CORP

EXAR

91D 04225

D7-75-45-05

XR-1488/1489A

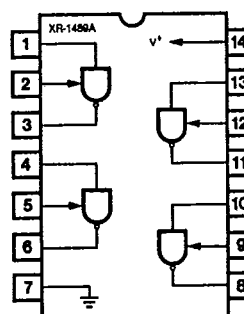
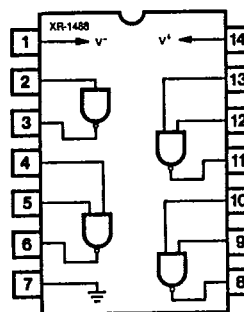
Quad Line Driver/Receiver

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.

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.