

## Hammer Driver

### GENERAL DESCRIPTION

The XR-2200 is an array of five Darlington transistor pairs which are capable of driving high-current loads such as solenoids, relays, and LED's. Each of the five circuits contained on the XR-2200 is capable of sinking up to 400 mA. The XR-2200 was specifically designed for use with 14 V to 25 V PMOS devices.

### FEATURES

- Output Capability of 400 mA for Each Driver
- Drivers may be used in parallel for increased output drive capability.
- Input is directly compatible with PMOS outputs

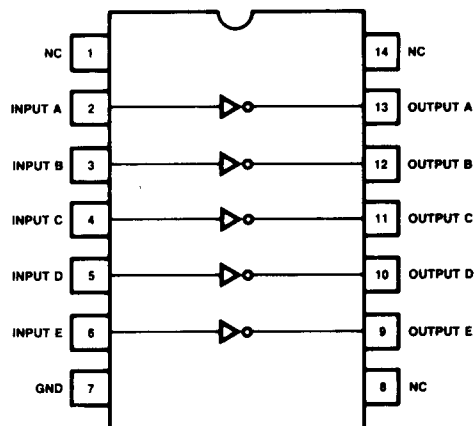
### APPLICATIONS

- Printing Calculator Hammer Driver
- High Current LED Driver
- Solenoid and Relay Driver
- Tungsten Lamp Driver
- High Current Switch

### ABSOLUTE MAXIMUM RATINGS

|                                          |        |
|------------------------------------------|--------|
| Collector to Base Voltage                | 30V    |
| Collector to Emitter Voltage             | 30V    |
| Emitter to Base Voltage                  | 5.5V   |
| Collector Current                        | 450 mA |
| Input Terminal Breakdown Voltage (plus)  | 30V    |
| Input Terminal Breakdown Voltage (minus) | -0.5V  |
| Power Dissipation                        | 550 mW |

### FUNCTIONAL BLOCK DIAGRAM



### ORDERING INFORMATION

| Part Number | Package Type | Operating Temperature |
|-------------|--------------|-----------------------|
| XR-2200 CP  | Plastic      | - 25°C to + 70°C      |

### SYSTEM DESCRIPTION

The XR-2200 hammer driver contains five Darlington connected transistor pairs, each capable of switching 30V. All five emitters are connected to a common ground (Pin 7). With a guaranteed current gain of 2000, each section of the XR-2200 can sink 400 mA.

# XR-2200

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

| PARAMETERS                   | LIMITS |     |     | UNITS         | CONDITIONS                                                                                                 |
|------------------------------|--------|-----|-----|---------------|------------------------------------------------------------------------------------------------------------|
|                              | MIN    | TYP | MAX |               |                                                                                                            |
| Power Supply Voltage         |        |     | 26  | Vdc           |                                                                                                            |
| Output Leakage Current       |        |     | 100 | $\mu\text{A}$ | $V_{CE} = 26\text{ V}, V_{IN} = 0\text{ V}$                                                                |
| Output Current<br>One Driver |        |     | 400 | mA            |                                                                                                            |
| Output Current<br>5 Drivers  |        |     |     |               | See Figure 2                                                                                               |
| Output Saturation Voltage    |        |     | 2.2 | Vdc           | $I_{OUT} = 400\text{ mA}$<br>$V_{IN} = 17\text{ V}$<br>$I_{OUT} = 200\text{ mA}$<br>$V_{IN} = 17\text{ V}$ |
| Current Gain                 | 2000   |     |     |               | $V_{CE} = 3\text{ V}$<br>$I_{OUT} = 200\text{ mA}$                                                         |
| Input Current                |        | 0.7 |     | mA            | $V_{IN} = 17\text{ V}$<br>$I_{OUT} = 0\text{ mA}$                                                          |

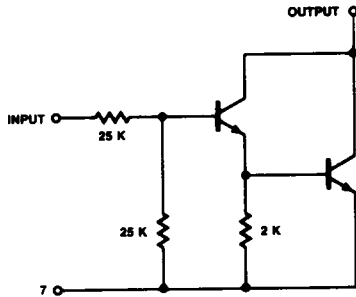


Figure 1. Schematic Diagram (1 of 5 Circuits Shown)

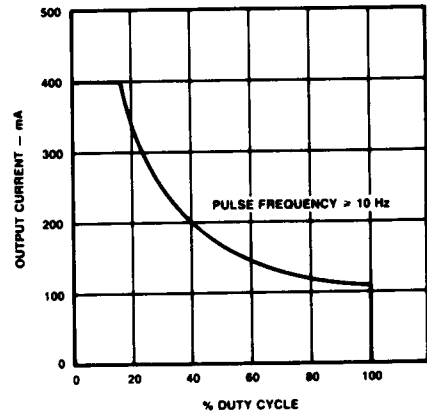


Figure 2. Maximum Permissible Output Current per Driver vs Duty Cycle with 5 Drivers Pulsed Simultaneously.

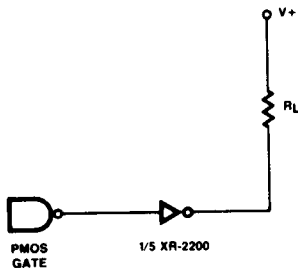


Figure 3. Circuit Connection for Driving Non-inductive Loads

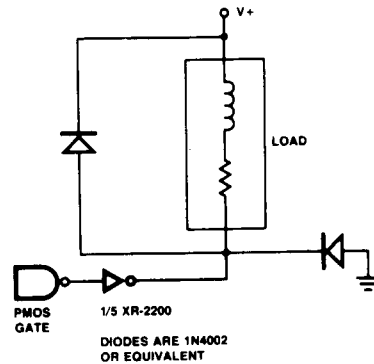


Figure 4. Circuit Connection for Driving Inductive Loads.  
NOTE: The XR-2200 may be damaged if the diodes are omitted when driving an inductive load.

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**EXAR**

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**XR-1488/1489A**

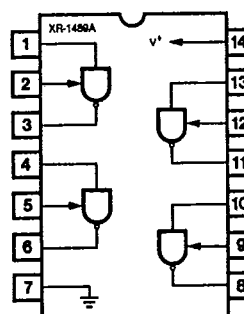
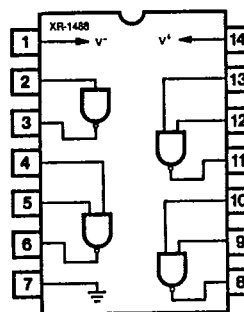
## Quad Line Driver/Receiver

### 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            | $\pm 15$ 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

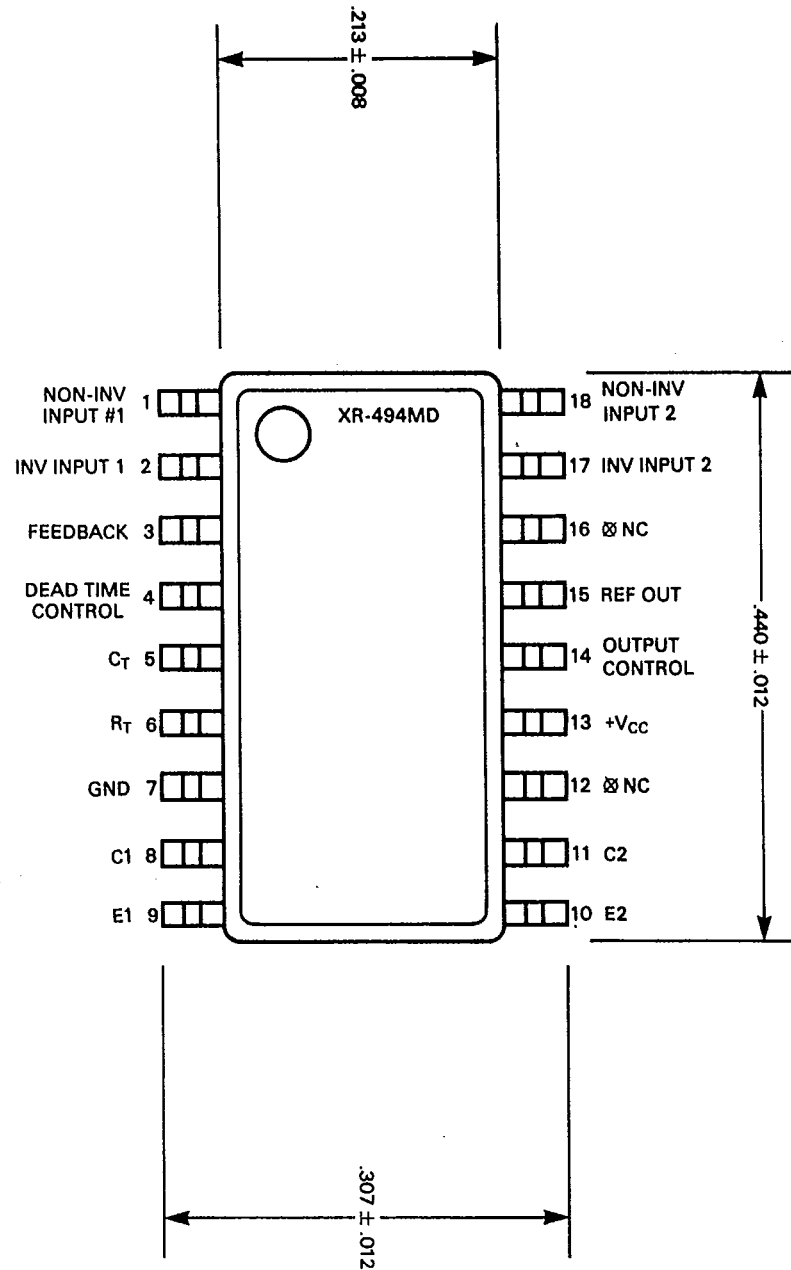
The XR-1488 and XR-1489A are a matched set of quad line drivers and line receivers designed for interfacing between TTL/DTL and RS232C data communication lines.

The XR-1488 contains four independent split supply line drivers, each with a  $\pm 10$  mA current limited output. For RS232C applications, the slew rate can be reduced to the 30 V/ $\mu$ 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  $\pm 30$  V. The output can typically source 3 mA and sink 20 mA.

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**XR-494**

91D 04470 D

T-58-11-31



91D 04475

DT-58-11-03

# XR-1468/1568

## Dual-Polarity Tracking Voltage Regulator

### GENERAL DESCRIPTION

The XR-1468/1568 is a dual polarity tracking voltage regulator, internally trimmed for symmetrical positive and negative 15V outputs. Current output capability is 100 mA, and may be increased by adding external pass transistors. The device is intended for local "on-card" regulation, which eliminates the distribution problems associated with single point regulation.

The XR-1468CN and XR-1568N are guaranteed over the 0°C to 70°C commercial temperature range. The XR-1568M is rated over the full military temperature range of -55°C to +125°C.

### FEATURES

- Internally Set for  $\pm 15V$  Outputs
- $\pm 100$  mA Peak Output Current
- Output Voltages Balanced Within 1% (XR-1568)
- 0.06% Line and Load Regulation
- Low Stand-By Current
- Output Externally Adjustable from  $\pm 8$  to  $\pm 20$  Volts
- Externally Adjustable Current Limiting
- Remote Sensing

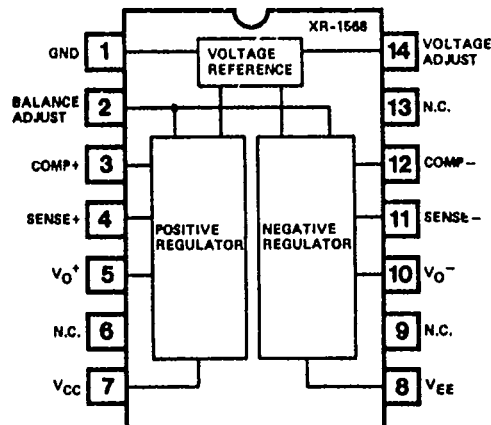
### APPLICATIONS

- Main Regulation in Small Instruments
- On-Card Regulation in Analog and Digital Systems
- Point-of-Load Precision Regulation

### ABSOLUTE MAXIMUM RATINGS

|                                  |                 |
|----------------------------------|-----------------|
| Power Supply                     | $\pm 30$ Volts  |
| Minimum Short-Circuit Resistance | 4.0 Ohms        |
| Load Current, Peak               | $\pm 100$ mA    |
| Power Dissipation                |                 |
| Ceramic (N) Package              | 1.0 Watt        |
| Derate Above +25°C               | 6.7 mW/°C       |
| Operating Temperature            |                 |
| XR-1568M                         | -55°C to +125°C |
| XR-1568/XR-1468C                 | 0°C to +70°C    |
| Storage Temperature              | -65°C to +150°C |

### FUNCTIONAL BLOCK DIAGRAM



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### ORDERING INFORMATION

| Part Number | Temperature     | Output Offset    | Package |
|-------------|-----------------|------------------|---------|
| XR-1568M    | -55°C to +125°C | $\pm 150$ mV max | Ceramic |
| XR-1568N    | 0°C to +70°C    | $\pm 150$ mV max | Ceramic |
| XR-1468CN   | 0°C to +70°C    | $\pm 300$ mV max | Ceramic |

### SYSTEM DESCRIPTION

The XR-1468/1568 is a dual polarity tracking voltage regulator combining two separate regulators with a common reference element in a single monolithic circuit, thus providing a very close balance between the positive and negative output voltages. Outputs are internally set to  $\pm 15$  Volts but can be externally adjusted between  $\pm 8.0$  to  $\pm 20$  Volts with a single control. The circuit features  $\pm 100$  mA output current, with externally adjustable current limiting, and provision for remote voltage sensing.