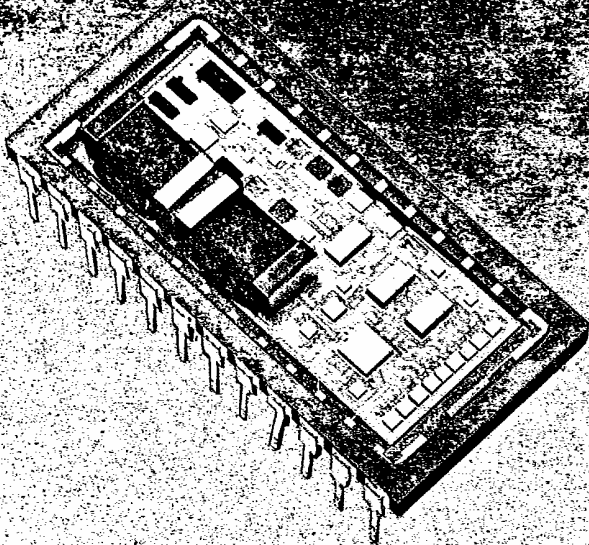


**White  
Technology, Inc.**

**DIGITALLY PROGRAMMED  
AMPLIFIER  
MODEL 8089**

Advance Information



**FEATURES**

- Operating Temperature Range  
-55 to +200° C
- Low Output Offset Voltage 2mV Typical
- Programmable Voltage Gains  
12, 24, 36, and 48dB
- Input Overvoltage Clamp  
Rated to 80V Peak
- Powerful Output Drive Capability  
±12V Into 50 Ohms
- High Input Impedance OP AMP  
Voltage Follower
- Gain Accuracy ±2.0%
- Gain Stability +0.5dB Over Temperature
- Bandwidth 0.1 to 1000Hz ±3dB

**DESCRIPTION**

The Model 8089 Digitally Programmable Amplifier has been designed for precision amplification applications where low output dc offset is critical. The Model 8089 is ideally suited to amplifying low level geophone signals and driving the signal cable directly. The Model 8089 is well suited to applications in high temperature environments such as found in oil wells and jet engine controls.

The Model 8089 features the ability to quickly change gain to one of four precision values ranging from 12 to 48dB. The gains are held to ±2% initially and feature a very low drift with temperature change. An overall high power gain is achieved by providing a very high input impedance of over 10 Megohms and a low output impedance of less than 10 ohms.

The module is equipped with an output driver stage that is capable of driving a 50 ohm load with a 24 volt peak to peak signal. The output stage is protected against short circuits. Further, the design of the 8089 provides for a very low output dc offset voltage that is virtually inde-

pendent of gain. At room temperature the offset is less than one millivolt and remains less than 10 millivolts even at 200 degrees C! This performance permits the amplifier to be directly coupled to a low impedance output transformer winding and maintain a low standby current.

The input stage is a high input impedance voltage follower operational amplifier equipped with an input clamp circuit to prevent damage in the presence of voltage spikes and overvoltage conditions. Such overvoltages may occur when geophones and other high output transducers are strongly excited.

The Model 8089 consumes a modest current of 15mA at ±15Vdc and the program inputs will interface with 5V logic inputs. The response time to gain changes is nearly instantaneous. The module is constructed with specially configured high temperature thick film technology to meet the demanding temperature and mechanical environmental needs common to oil logging and similar applications.

**White Technology, Inc.**

245 EAST WOOD STREET • PHOENIX, ARIZONA 85040  
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# DIGITALLY PROGRAMMED AMPLIFIER—MODEL 8089

## ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	MINIMUM	TYPICAL	MAXIMUM	UNIT
$T_{amb}$	Ambient Temperature	-55		+200	°C
$V_{supply}$	Supply Voltages, ( $\pm$ )	12	15	18	Vdc
$V_{input}$	Absolute Input Voltage			80	Volts
$T_{short}$	Short Circuit Time			10	sec

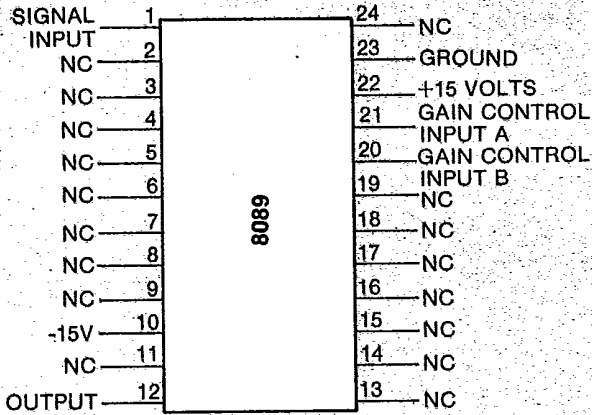
## OPERATING SPECIFICATIONS

+15Vdc, +25°C Unless Otherwise Noted

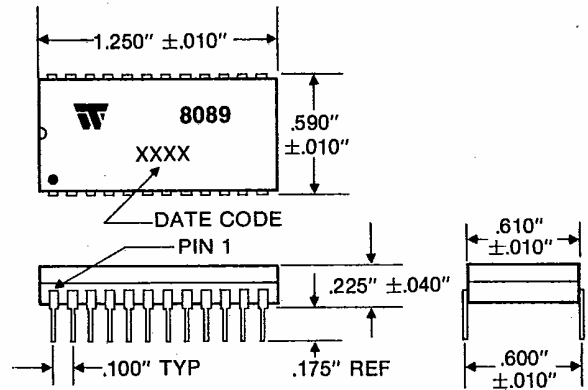
SYMBOL	PARAMETER	MINIMUM	TYPICAL	MAXIMUM	UNIT
$A_v$	Voltage Gain @ 100Hz	12dB	12	12.5	dB
		24dB	24	24.5	dB
		36dB	36	36.5	dB
		48dB	48	48.5	dB
$A_v$	Voltage Gain Stability Over Temperature - 55°C to +200°C	-0.5		0.5	dB
BW	Bandwidth $\pm 1$ dB	0.6		400	Hz
	Bandwidth $\pm 3$ dB	0.1		1000	
$V_{IN}$	Input Impedance	10			Megohms
$V_{IL}$ $V_{IH}$	Logic Threshold	3.75		1.5	Vdc
$V_{offset}$	Output Offset Voltage Offset Over Temperature		0.50	0.50	mVdc
			5.0	10	
$T_{settle}$	Initial Setting Time		30	50	sec
$V_{swing}$	Output Signal Range—50 Ohm Load	24	26		$V_{PEAK}$
$I_{sc}$	Output Current, Short Circuit	300	400	500	mAdc
$Z_{OUT}$	Output Impedance			3.0	Ohms
$I_{cc}$	Supply Current, No Load, $V_{IN} = 0$		15		mAdc

# DIGITALLY PROGRAMMED AMPLIFIER—MODEL 8089

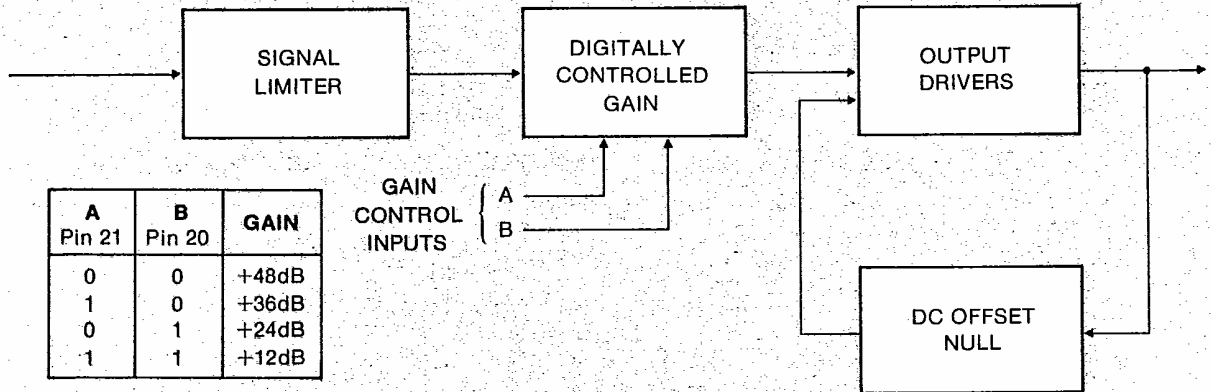
## PIN DESCRIPTION



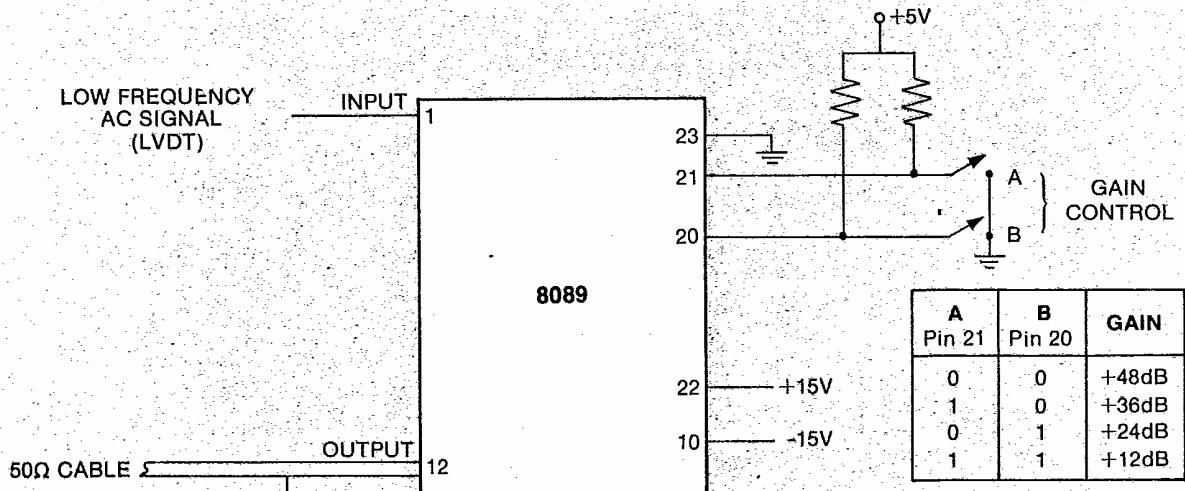
## CASE OUTLINE



## BLOCK DIAGRAM

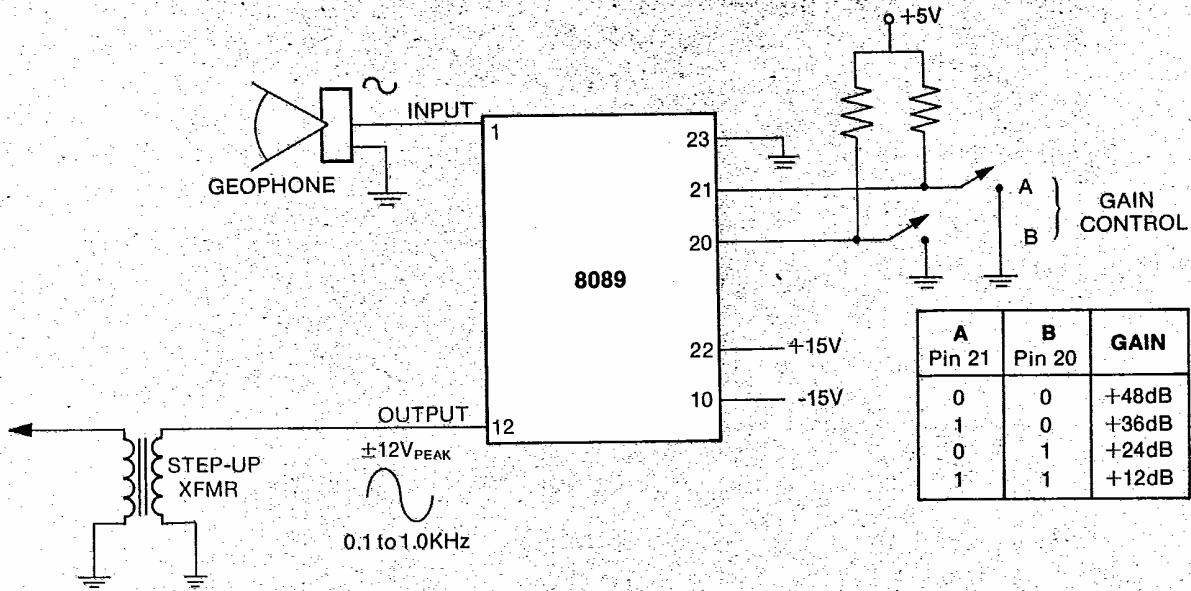


## APPLICATION CIRCUIT: LINE DRIVER

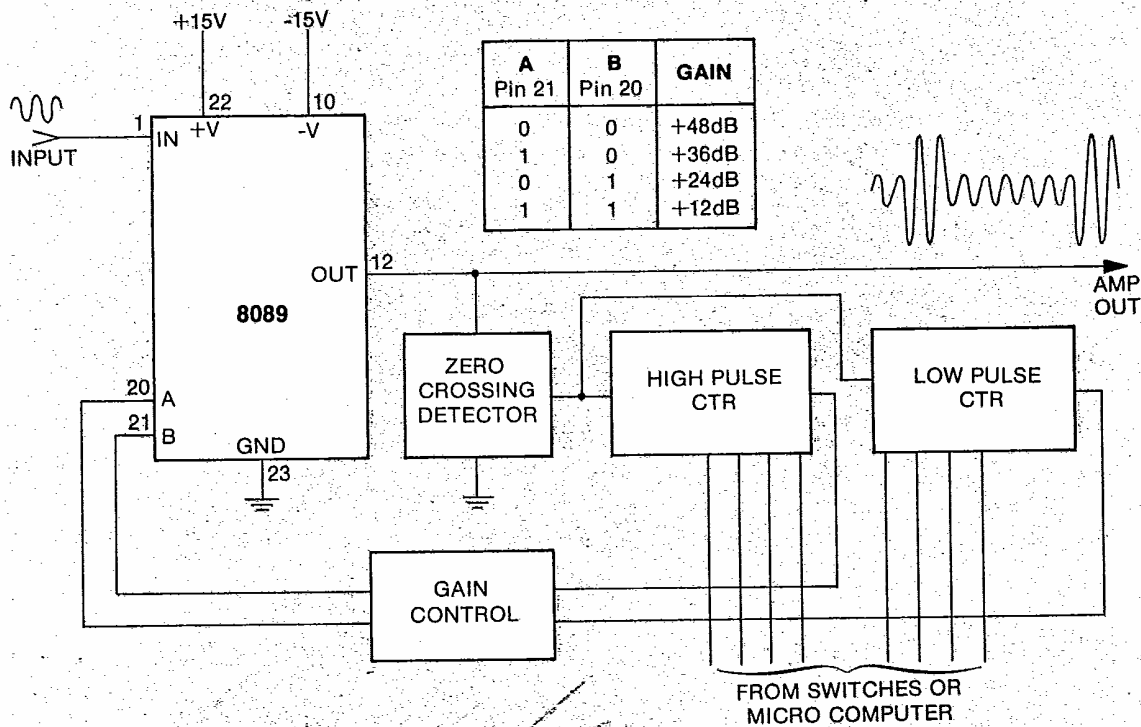


# DIGITALLY PROGRAMMED AMPLIFIER—MODEL 8089

## APPLICATION CIRCUIT: GEOPHONE AMPLIFIER



## APPLICATION CIRCUIT: PULSE AMPLITUDE MODULATOR (PAM)



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