

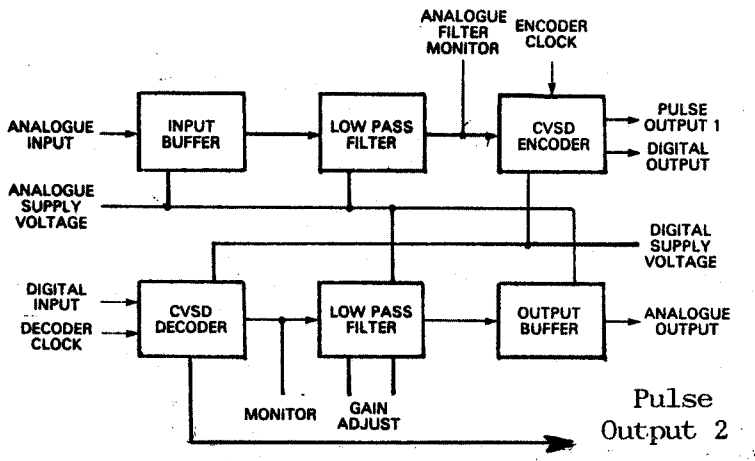
# CONSUMER MICROCIRCUITS LTD

**Obsolete Product  
- For Information Only -**

Publication D/3090/2 September 1984

## Features

- \* Meets Eurocom D1-IA8 Specification
- \* Delta Modulator Encoder & Decoder
- \* Includes Input and Output Filters
- \* Flexible Low-current Power Supply Requirements
- \* Built to Rigorous Mechanical Specification
- \* Perfect Idle Channel Pattern
- \* Gain Adjustment Facility



# FX3090

Fig. 1 Internal Block Diagram

## Brief Description

The FX3090 is a thick-film hybrid delta modulation encoder and decoder specifically designed to meet the Eurocom D1-1A8 specification.

The encoder section consists of an analogue input low-pass filter and a CMOS FX309 CVSD (Continuously Variable Slope Delta) modulator chip. The delta modulator encoder outputs a digital signal compatible with CMOS or TTL logic.

The delta modulator decoder incorporates

an FX309 chip feeding into a low-pass filter and gives analogue output via an output buffer amplifier.

Both input and output filter gains may be adjusted to match the device to other than Eurocom levels.

The FX3090 can be clocked at either 16kHz or 32kHz without adjustment. Separate encoder and decoder clock inputs are provided to further simplify the design of multiplex systems.

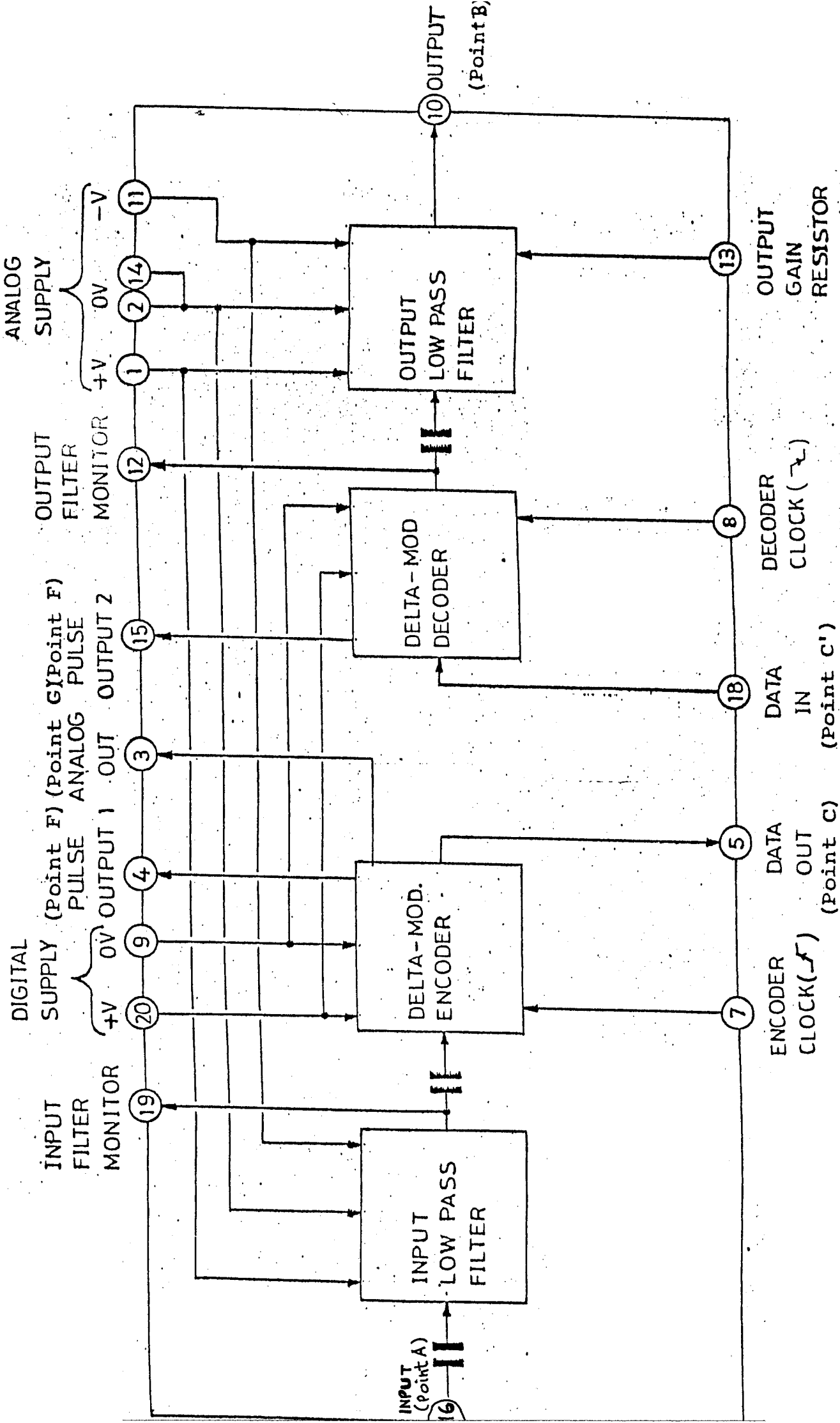


FIG. 1A  
 DELTA-CODEC HYBRID  
 BLOCK SCHEMATIC

## SPECIFICATION FOR DELTA-CODEC HYBRID

### Package

20 Lead + case

Dual in Line

Hermetic

Size approx. 14mm x 20mm x 30mm

Lead length 5mm

Pin separation 2.54mm pitch x 15.14mm

### 1. General

The hybrid shall comply with Eurocom D1-IA8

### 2. Process control according to Mil. std. 883B

- a) Leak test, fine  
Method 1014
- b) Burn in  
168 hours, 85°C at nominal working voltage
- c) High temperature storage  
Method 1008, 48 hours
- d) Temperature cycling  
Method 1010 B, 10 cycles

### 3. Mechanical Specifications according to BS 9450

#### Vibration:

Section 1.2.6.8.1                      55 Hz - 500 Hz    98 m/s<sup>2</sup>

#### Shock:

Section 1.2.6.6.                      (3) 981 m/s<sup>2</sup>        6 ms

#### Low pressure:

Section 1.2.6.12

Transport and Storage:              9000m or 225mm Hg

Working:                                2400m or 600mm Hg

#### Humidity:

Section 1.2.6.4.

95% RH, plus condensed water 45°C for 4 days

#### Temperature

Working:                                -40°C to +85°C

Storage:                                -55°C to +125°C

#### 4. Electrical Specifications

Digital supply:

Absolute maximum working voltage: +8V

Normal supply voltage: +4.5V to +7.5V

Dynamic range specified at +5V

Analog supply:

Absolute maximum working voltage: 30V (ie +15)

Minimum supply voltage: 4.5V

Dynamic range specified at 5V

Clockwidth: 1  $\mu$ s to 40  $\mu$ s positive pulse

Maximum set-up time from data, to clock: 450 ns \*(Typically 400ns)

Maximum set-up time, clock to data out: 750 ns \*(Typically 450ns)

\* Vcc = +4.5 to +7.5V

Nominal test level analogue input: -4dBm  
(with two external resistors programming the gain)

Max. output impedance analog output: 600 ohm @ 5V supply

Test level: Ref. to table 1, IA8-5, in  
Eurocom specifications.

Total current consumption: Less than 3mA at 5V  
(Typically 0.7 mA)

Supply ripple: Less than 6mV peak to peak

Max. voltage on any pin: VDD + 0.3 volts

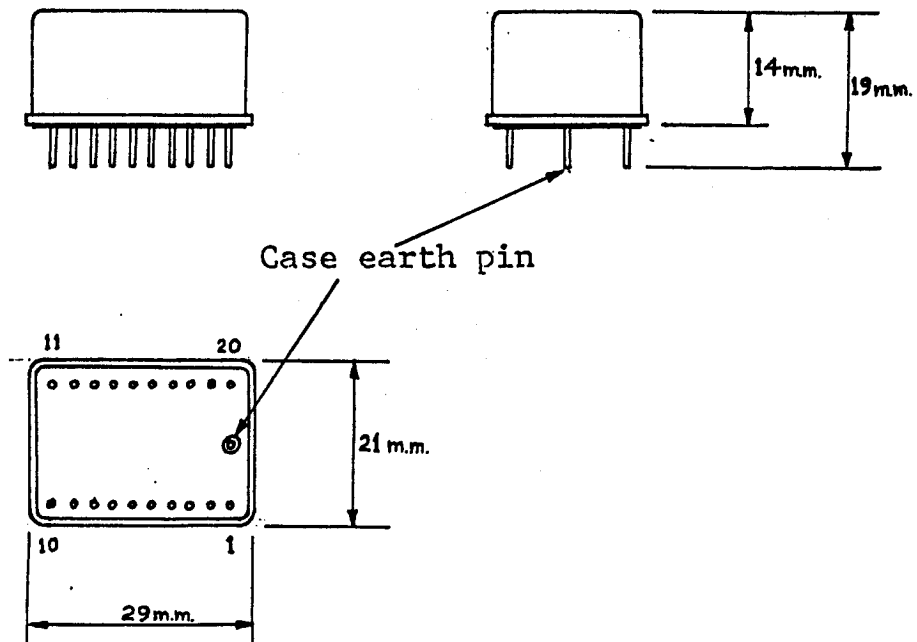
Min. Voltage on any pin: VSS - 0.3 volts

## Package Information

### Pin functions

- |                   |                           |
|-------------------|---------------------------|
| 1. +V Analog      | 11. -V Analog             |
| 2. OV Analog      | 12. Output filter monitor |
| 3. Analog out     | 13. Output gain resistor  |
| 4. Pulse output 1 | 14. OV Analog             |
| 5. Data out       | 15. Pulse output 2        |
| 6. N/C            | 16. Input                 |
| 7. Encoder clock  | 17. Internally connected  |
| 8. Decoder clock  | 18. Data in               |
| 9. OV Digital     | 19. Input filter monitor  |
| 10. Output        | 20. +V digital            |

Fig 1 B Package dimensions (actual size)



## Practical use

### Power supply

The hybrid contains two 10K ohm resistors acting as a potential divider between the +V Analog and -V Analog supplies, to establish a 0V Analog. This means that with the addition of two 47 $\mu$ f supply decoupling capacitors, the filters can operate from a single power supply.

Also, because the Encoder and Decoder are A.C. coupled to the filters, the same single power supply can be used for both digital and analog supplies. Thus, there are four basic supply configurations that can be considered for this device as in Figs. 2 to 5. It must be remembered however, that in order to comply to the Eurocom D1-IA8 specifications, the digital supply must always ideally be 5V.

### Gain adjustment

As it stands the output gain of the FX-3090 conforms to the Eurocom levels but the input gain is 9dB  $\pm$  1dB greater. In order to reduce the gain of the input to Eurocom levels (i.e. to conform to the Eurocom D1-IA8 specifications) the input signal is attenuated by 10dB using two resistors as shown in Fig. 6. Any value of gain from 0dB to 10dB greater than Eurocom levels can be programmed by varying these two resistors or eliminating them altogether (for 10dB extra gain). But in order to maintain correct operation at low input signal levels the impedance from the input pin to ground must always be lower than 10k ohms. The output filter has similar adjustments but the gain is increased from that of the Eurocom levels to 10dB greater by putting a resistor of value 1.1K $\Omega$  from pin 13 (output gain resistor) to 0V Analog supply. Again, any intermediate value of gain can be obtained by varying the resistor from 1.1K $\Omega$  to infinity.

Although it is possible to vary the gains of these two filters beyond the 10dB limits specified, correct operation is not guaranteed. Also, when operating outside the Eurocom specifications (i.e. increase in gains) combined with a low voltage analog supply, clipping may occur to the input or output signal.

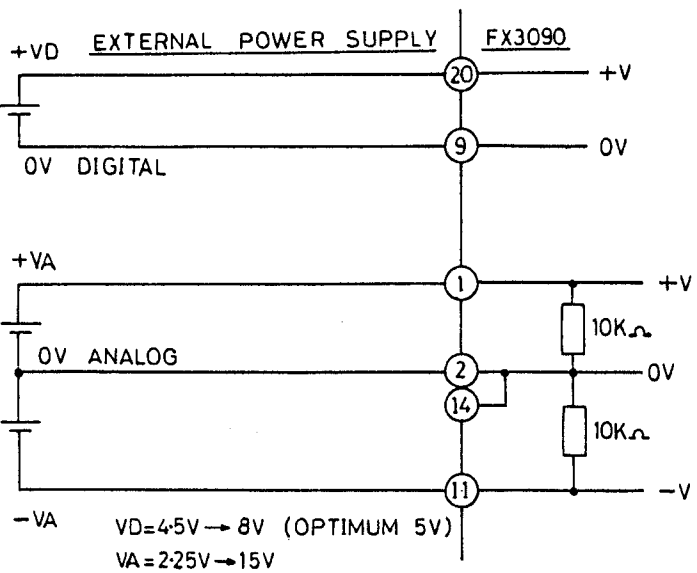


FIG. 2

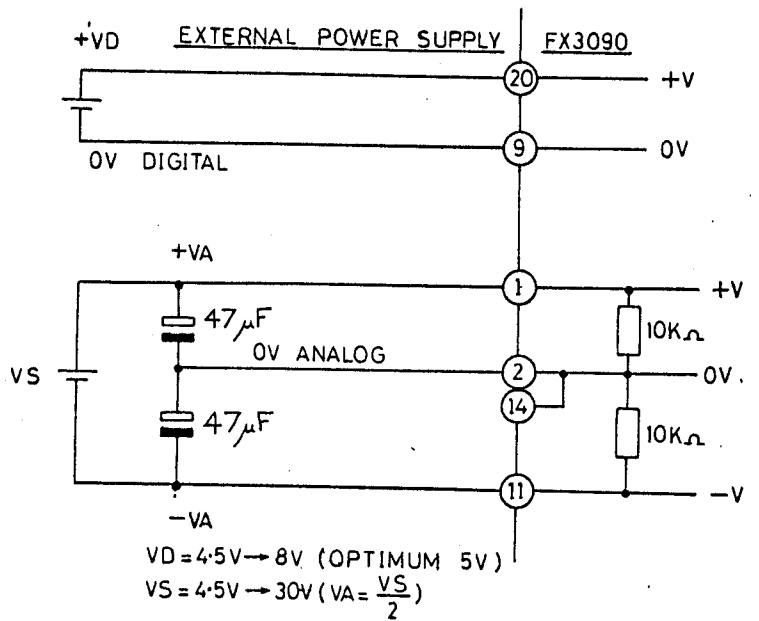


FIG. 3

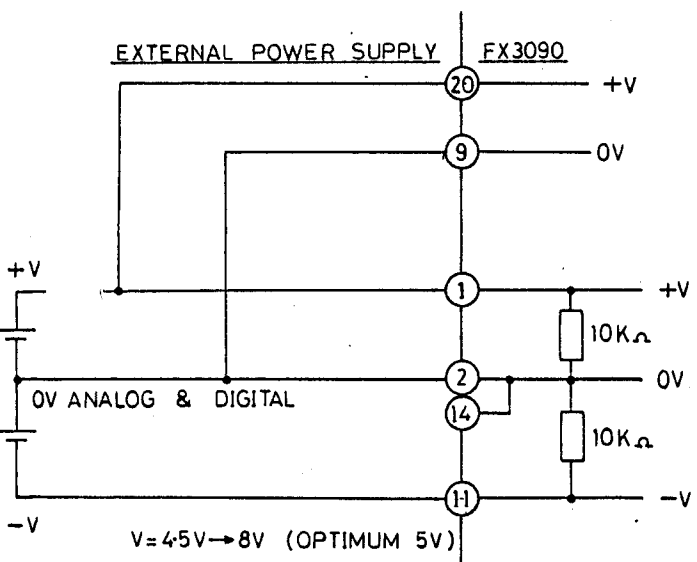


FIG. 4

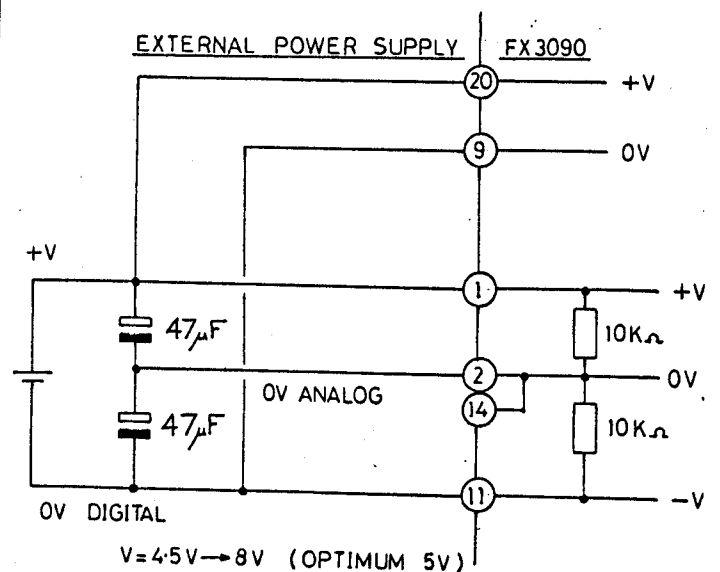
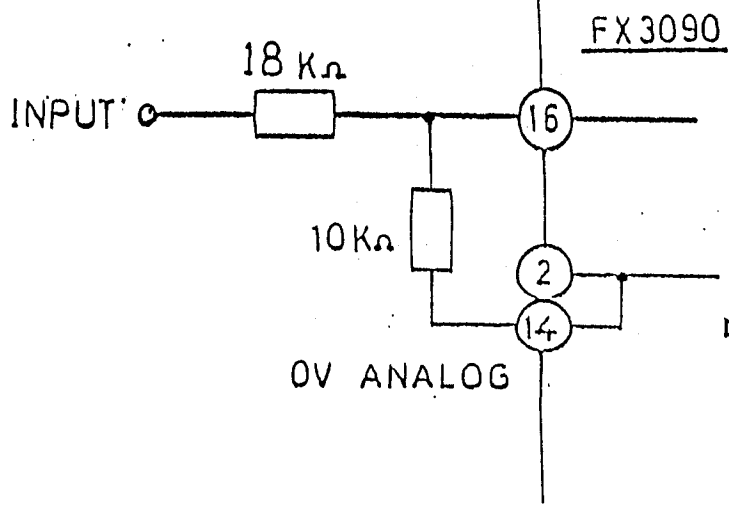


FIG. 5

EXTERNAL INPUT GAIN ADJUSTMENT



Note: If a single analog supply is used, the 10k resistor should be taken to pin 11 not pins 14 or 2.

FIG. 6

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