μA3089

FM IF LIMITER DETECTOR AUDIO PREAMPLIFIER

FAIRCHILD LINEAR INTEGRATED CIRCUIT

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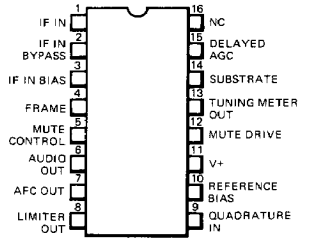
GENERAL DESCRIPTION – The 3089 is a multifunction FM IF detector subsystem. It contains a three stage FM IF amplifier, a detector and an audio buffer amplifier. Auxiliary functions of the device include AGC and AFC for the tuner, a muting circuit and a tuning meter circuit. The circuit is fabricated using the Fairchild Planar† epitaxial process.

- **3-STAGE FM IF AMPLIFIER PROVIDING A 12 μV (TYP) LIMITING SENSITIVITY**
- **LEVEL DETECTORS ON EACH STAGE WITH A COMMON DRIVE FOR A TUNING METER OR A STEREO THRESHOLD LOGIC CIRCUIT**
- **DELAYED AGC OUTPUT FOR THE TUNER**
- **DOUBLY BALANCED QUADRATURE DETECTOR PROVIDING LOW DISTORTION – TYPICALLY 0.1 % WITH DOUBLE TUNED CIRCUIT**
- **FLEXIBLE AFC CIRCUIT**
- **AUDIO PREAMPLIFIER PROVIDING 400 mV (TYP) OF DRIVE**
- **AUDIO MUTE (SQUELCH) CONTROL CIRCUITS**
- **INTERNAL VOLTAGE REGULATOR**

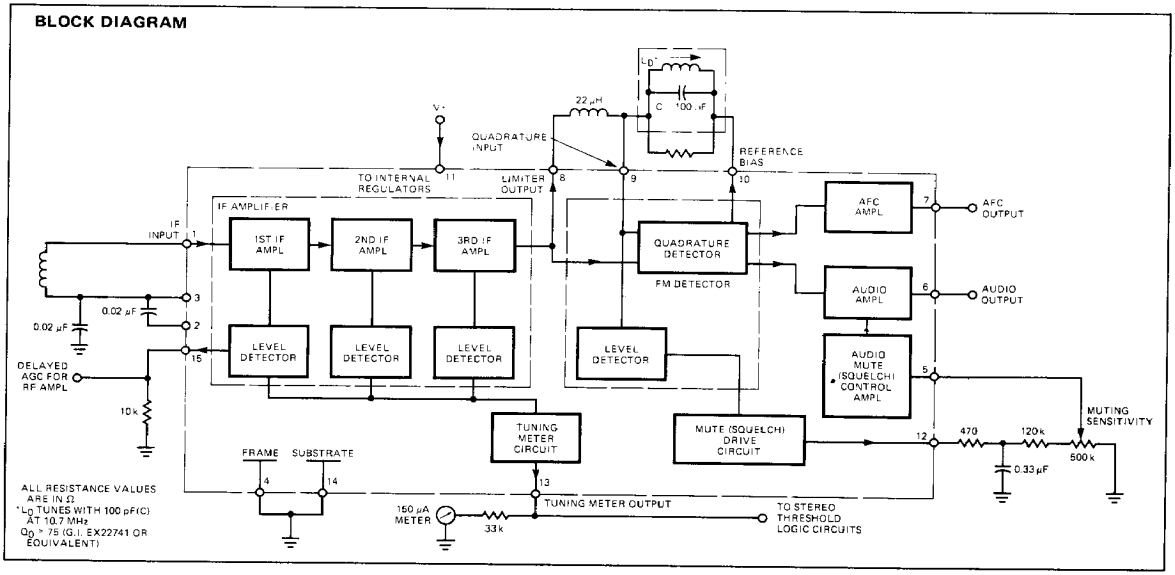
CONNECTION DIAGRAM
16-PIN DIP
(TOP VIEW)
PACKAGE OUTLINE 6B 9B
PACKAGE CODE D P



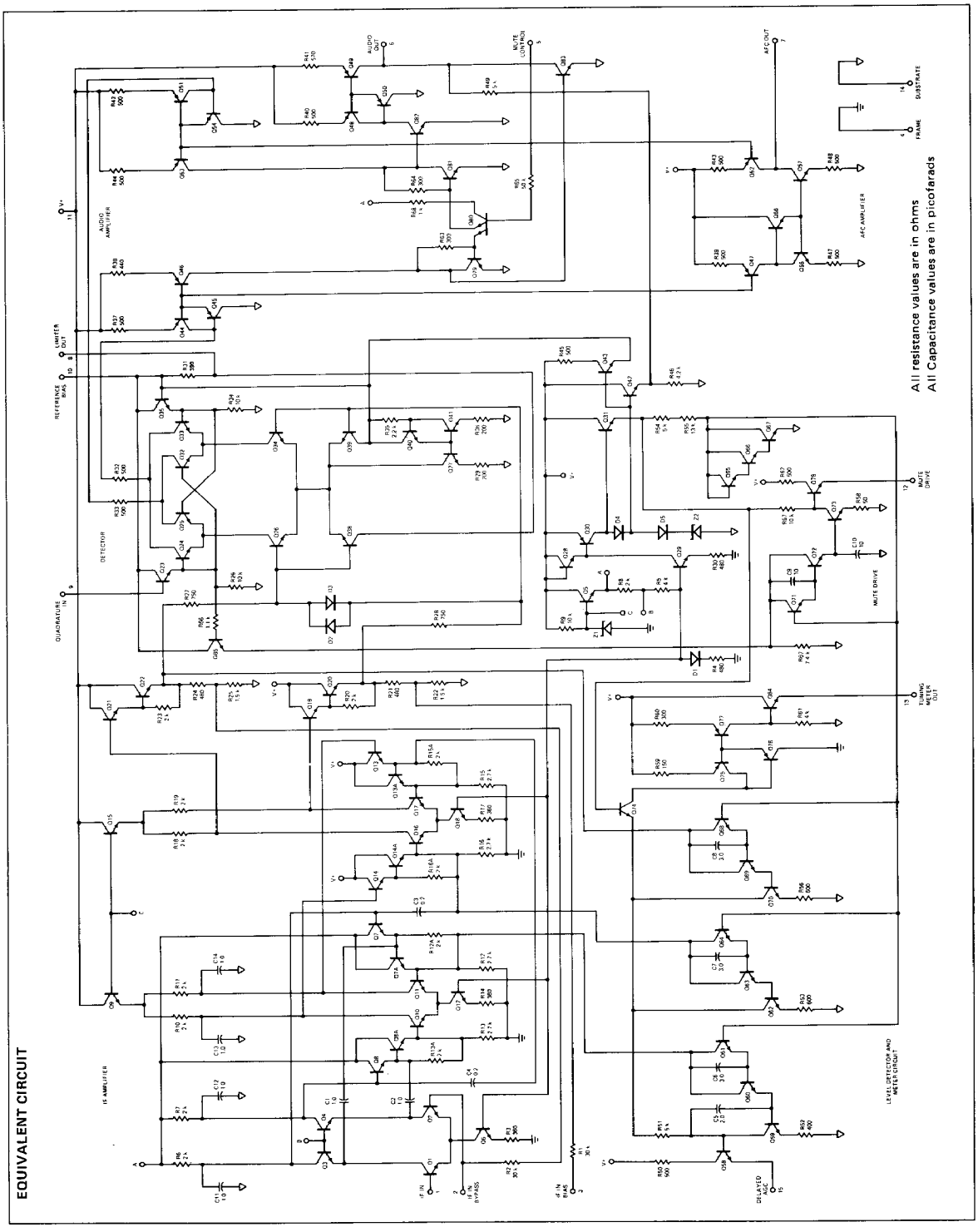
ORDER INFORMATION

TYPE	PART NO.
μA3089	μA3089DM
μA3089C	μA3089DC
μA3089C	μA3089PC

BLOCK DIAGRAM



†Planar is a patented Fairchild process.



EQUIVALENT CIRCUIT

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	
Between Pins 11 and 4	+16V
Between Pins 11 and 14	+16V
DC Current Out of Terminal 15 for AGC	2.0 mA
DC Current Out of Terminals 12 and 13	5.0 mA
Power Dissipation	
$T_A \leq 85°C$	670 mW
$T_A > 85°C$	Derate at 10 mW/°C
Operating Temperature Range	
Military	−55°C to +125°C
Commercial	−40°C to +85°C
Storage Temperature Range	−65°C to +150°C
Pin Temperature (Soldering, 10 s)	260°C

μA3089

ELECTRICAL CHARACTERISTICS: V+ = 12 V, T_A = −55°C to 125°C (Note 2)

CHARACTERISTICS		CONDITIONS	MIN	TYP	MAX	UNITS
DC CHARACTERISTICS: V_{IN} = 0, Non-Muted, Test 1 or 2						
Quiescent Circuit Current	I_{11}				27	mA
DC Voltages at:						
IF Input	V_1		1.2		3.0	V
IF Input Bypass	V_2		1.2		3.0	V
IF Input Bias	V_3		1.2		3.0	V
Audio Output	V_6		5.0		6.5	V
Reference Bias	V_{10}		5.0		6.5	V
AC CHARACTERISTICS: f_o = 10.7 MHz, f_{MOD} = 400 Hz, Deviation = ± 75 kHz, V_{IN} = 0.1 V, Figure 1 or 2						
Input Limiting Voltage (−3 dB Point)					40	μV
AM Rejection (Pin 6)			35			dB
Recovered AF Voltage (Pin 6)			300		600	mV
*Total Harmonic Distortion (Pin 6)						
Single Tuned					5	%
Signal Plus Noise to Noise Ratio			60			dB

*THD Characteristics are mainly a function of the phase characteristics of the circuit connected between pins 8, 9 and 10.

NOTE 2: Full Temperature Range Performance Guaranteed by 25°C Testing.

μA3089C

ELECTRICAL CHARACTERISTICS: T_A = 25°C, V+ = 12 V

CHARACTERISTICS		CONDITIONS	MIN	TYP	MAX	UNITS
DC CHARACTERISTICS: V_{IN} = 0, Non-Muted, Test Circuit 1 or 2						
Quiescent Circuit Current	I_{11}			23	30	mA
DC Voltages at:						
IF Input	V_1		1.2	1.9	2.4	V
IF Input Bypass	V_2		1.2	1.9	2.4	V
IF Input Bias	V_3		1.2	1.9	2.4	V
Audio Output	V_6		5.0	5.6	6.0	V
Reference Bias	V_{10}		5.0	5.6	6.0	V
AC CHARACTERISTICS: f_o = 10.7 MHz, f_{MOD} = 400 Hz, Deviation = ± 75 kHz, V_{IN} = 0.1 V, Figure 1 or 2, unless otherwise stated						
Input Limiting Voltage (−3 dB Point)		V_{IN} = Parameter		12	25	μV
AM Rejection (Lead 6)		400 Hz, 30 % MOD	45	55		dB
Recovered AF Voltage (Lead 6)			300	400	500	mV
*Total Harmonic Distortion (Lead 6)						
Single Tuned		See Fig. 1		0.5	1.0	%
Double Tuned		See Fig. 2		0.1		%
Signal Plus Noise to Noise Ratio			60	67		dB

*THD Characteristics are mainly a function of the phase characteristics of the circuit connected between pins 8, 9 and 10.

μA3089
TEST CIRCUITS

TEST CIRCUIT USING
A SINGLE TUNED DETECTOR COIL

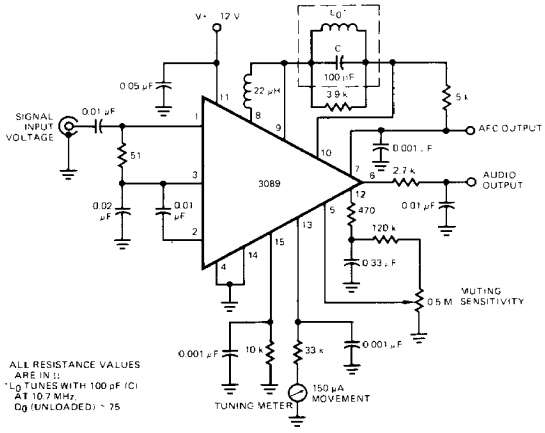


Fig. 1

TEST CIRCUIT USING
A DOUBLE TUNED DETECTOR COIL

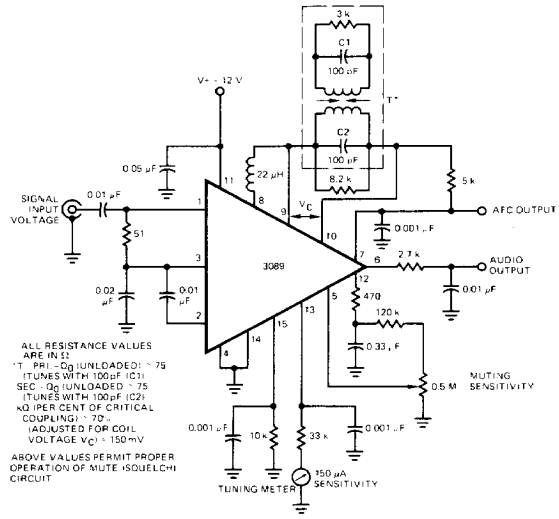
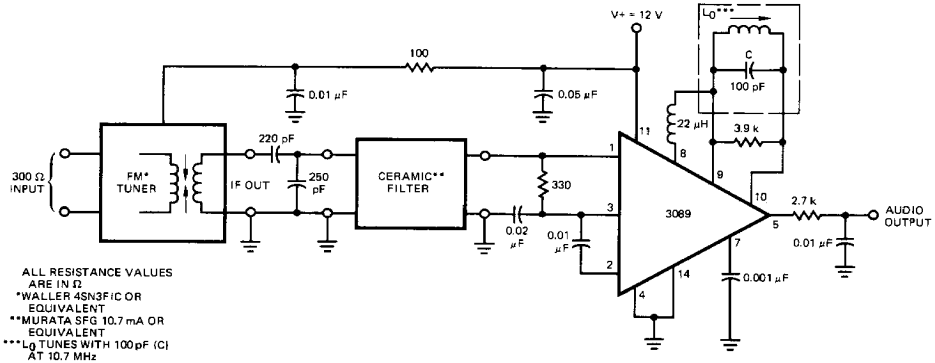


Fig. 2

TYPICAL FM SUBSYSTEM USING THE μA3089
WITH A SINGLE TUNED DETECTOR COIL



Performance data at f_O = 98 MHz, f_{MOD} = 400 Hz,
Deviation = ±75 kHz:
−3 dB Limiting Sensitivity . . . . . 2 μV (Antenna Level)
20 dB Quieting Sensitivity . . . . . 1 μV (Antenna Level)
30 dB Quieting Sensitivity . . . . . 1.5 μV (Antenna Level)
Alternate channel rejection . . . . . 60 dB

Fig. 3

TYPICAL PERFORMANCE CURVES FOR μA3089

MUTING ACTION, TUNER AGC, AND TUNING METER OUTPUT AS A FUNCTION OF INPUT SIGNAL VOLTAGE

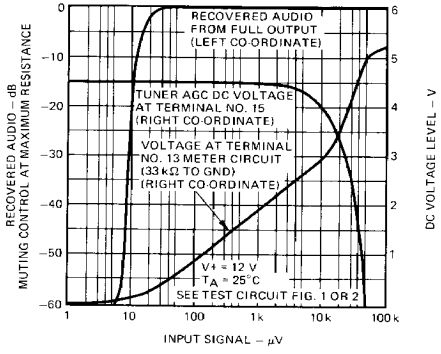


Fig. 4

AFC CHARACTERISTICS (CURRENT AT TERM. 7 AS A FUNCTION OF CHANGE IN FREQUENCY)

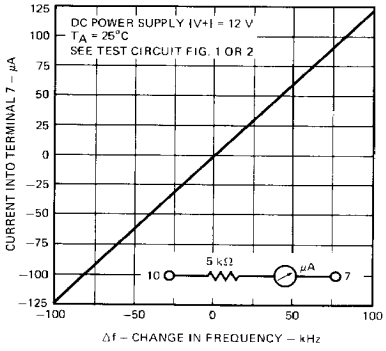


Fig. 5