T-74-05-01

ECG® Semiconductors

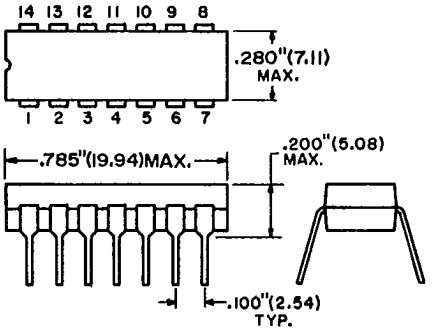
ECG1186

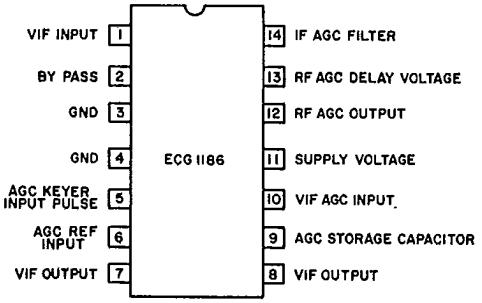
Video IF Amp and Keyed AGC

Features

- Power gain — 46 dB typ (f=58 MHz)
- Wide AGC Range — 60 dB min
- Control signal available for delayed AGC of tuner
- High-gain gated AGC system for either positive or negative-going video signals
- Nearly constant input and output admittance over AGC range
- Single-polarity power-supply operation

ECG1186 is s monolithic integrated circuit designed for use as a video IF amplifier and AGC keyer in color or monochrome TV receivers. The IF amp has a complete gated wide range AGC system for use as the 1st and 2nd IF stages.





Absolute Maximum Ratings (T_A = +25°C)

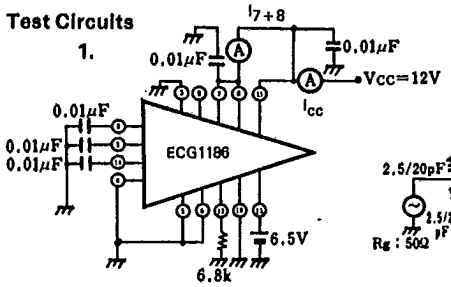
Characteristic	Symbol	Rating	Unit
Power Supply (Pin 11)	V_{11}	18	V
Output Supply (Pins 7 and 8)	V_7,V_8	18	V
Signal Input Voltage	V_{1-2}	10	V_{p-p}
AGC Input Voltage	V_6,V_{10}	6	V
Gating Voltage, Pin 5	V_5	+10, −20	V
Power Dissipation Derate above T_A = +25°C	P_d	400 (T_A = +70°C)	mW
Operating Temperature Range	T_{opg}	−20 to +70	°C
Storage Temperature Range	T_{stg}	−40 to +125	°C

Electrical Characteristics (V_{CC} = 12 V, T_A = +25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit	Test Ckt
Total Supply Current	I_{CC}	$I_{11}+I_7+I_8$	--	27	33	mA	1
Output Current	I_{7+8}	--	--	6.0	--	mA	1
Power Gain	P_G	f = 58 MHz, V_i = 1 mVrms	40	46	--	dB	2
Noise Factor	NF	f = 58 MHz, R_S = 50 Ω	--	8.5	--	dB	--
AGC Range	R_{AGC}	S_1 = A↔B, f = 58 MHz	60	70	--	dB	2
RF AGC Voltage (High)	V_{12H}	S;A	7.0	8.5	--	dB	3
RF AGC Voltage (Low)	V_{12L}	S;B	--	0.5	1.5	V	3
Input Resistance	R_{in}	f = 58 MHz	--	500	--	Ω	4
Input Capacitance	C_{in}	f = 58 MHz	--	13	--	pF	4
Output Resistance	R_{out}	f = 58 MHz, Pin 7 or 8	--	6	--	kΩ	5
Output Capacitance	C_{out}	f = 58 MHz, Pin 7 or 8	--	3	--	pF	5

Test Circuits

1.



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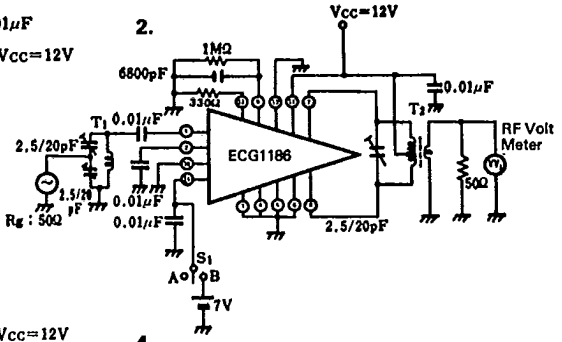

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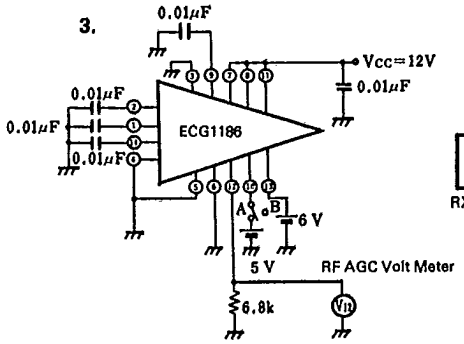

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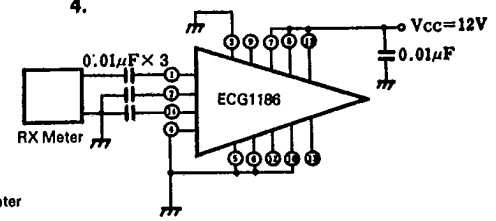

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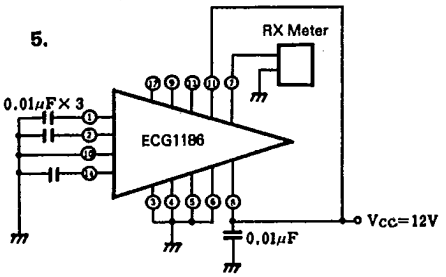
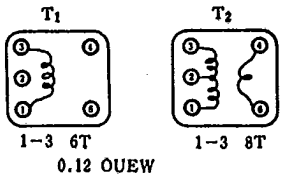


Coil Specifications



Circuit Schematic

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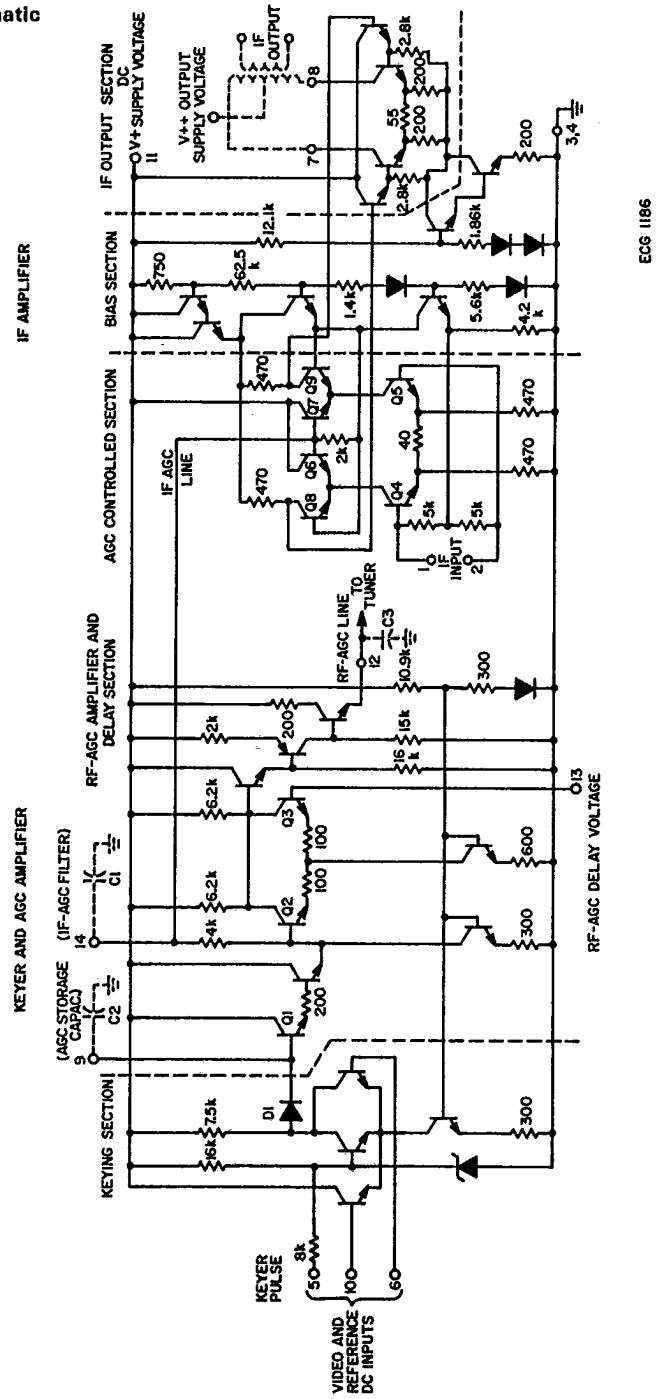

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Application Information

ECG1186 consists of an AGC section and an IF signal amplifier subdivided into different functions.

A gating pulse, a reference level, and a composite video signal are required for proper operation of the AGC section. Either positive or negative-going video may be used. The essential difference is that the video is fed into Pin 10 and the AGC reference level is applied to Pin 6 for a video signal with positive-going sync while the input connections are reversed for negative-going sync.

The action of the gating section is such that the proper voltage, is maintained across the external capacitor, C2, for a particular video level and dc reference setting. The voltage is the result of the charge delivered through D1 and the charge drained by Q1. The charge delivered occurs during the time of the gating pulse, and its magnitude is determined by the amplitude of the video signal relative to the dc reference level. The voltage is delivered via the IF-AGC amplifier and applied to the variable gain stage of the IF signal amplifier and is also applied to the RF-AGC amplifier, where it is compared to the fixed RF-AGC delay voltage reference by the differential amplifier, Q2 and Q3. The following stages amplify the output signal of Q2 and shift the dc levels causing the RF-AGC voltage to vary.

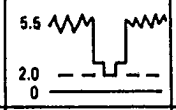
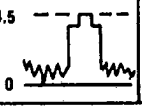
The input amplifiers (Q4 and Q5) operate at constant emitter currents so that input impedance remains independent of AGC action. Input signals may be applied single-ended or differentially (for ac). Terminals 1 and 2 may be driven from a transformer, but a dc path from either terminal to ground is not permitted.

AGC action occurs as a result of an increasing voltage on the base of Q6 and Q7 causing those transistors to conduct more heavily thereby shunting signal current from the interstage amplifiers Q8 and Q9. The output amplifiers are fed from an active current source to maintain constant quiescent bias thereby holding output admittance nearly constant.

Notes:

1. The 12-V supply must have a low ac impedance to prevent low-frequency instability in the RF-AGC loop. This can be achieved by a 12-V zener diode and a large decoupling capacitor. (5 μF).
2. Choices of C1, C2 and C3 depend somewhat on the set designers' preference concerning AGC stability versus AGC recovery speed. Typical values are C1 = 0.1 μF, C2 = 0.25 μF, C3 = 10 μF.
3. To set a fixed IF-AGC operating point (e.g., for receiver alignment) connect a 22 kΩ resistor from pin 9 to pin 11 to give minimum gain, then bias pin 14 to give the correct operating point using a 200 kΩ variable resistor to ground.
4. Although the unit will normally be operating with a very high power gain, the pin configuration has been carefully chosen so that shielding between input and output terminals will not normally be necessary even when a standard socket is used.

Typical AGC Application Chart

Video Polarity	Pin 6 Voltage	Pin 10 Voltage	Pin 5 R1 (Ω)
Negative-Going Sync.		Adj. 1.0–4.0 Vdc Nom 2.0 V	0
Positive-Going Sync.	Adj. 1.0–8.0 Vdc Nom 4.5 V		3.9 k

Applications

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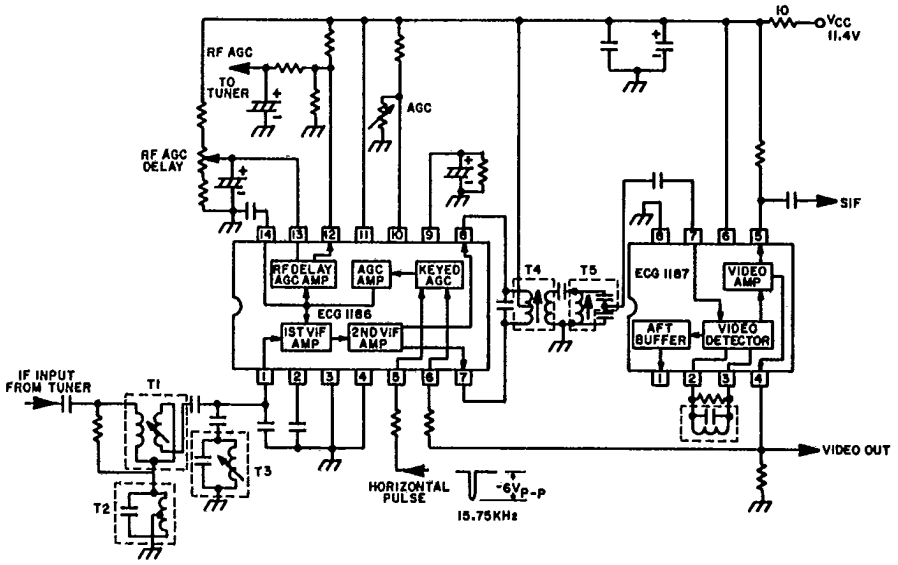
Monochrome Television Receiver



Color Television Receiver