T-77-05-07

# CA3209

## FM-IF System

For Search and Scan

**Features:**

- *Exceptional limiting sensitivity: 12 μV typ. at -3 dB point*
- *Exceptional temperature stability of tuning and stop-pulse window*
- *Single-coil tuning capability*
- *Externally programmable stop-pulse window width*
- *Programmable level for AGC action*
- *Forward AGC for pin-diode or bipolar rf amplifier*
- *Required input level to generate a stop-pulse is programmable*

The RCA CA3209E• is a monolithic integrated circuit that provides all the functions of a comprehensive FM-IF system. It is intended for use in FM—IF amplifier applications in high-fidelity, automotive, and communications receivers where the synthesizer counter can be controlled by a stop-pulse for scan and search operation.

•Formerly Developmental Type No. TA10493B

Fig. 1 shows the CA3209E features, which include a three-stage FM-IF amplifier/limiter configuration with level detectors for each stage, a doubly-balanced quadrature FM detector and an audio amplifier.

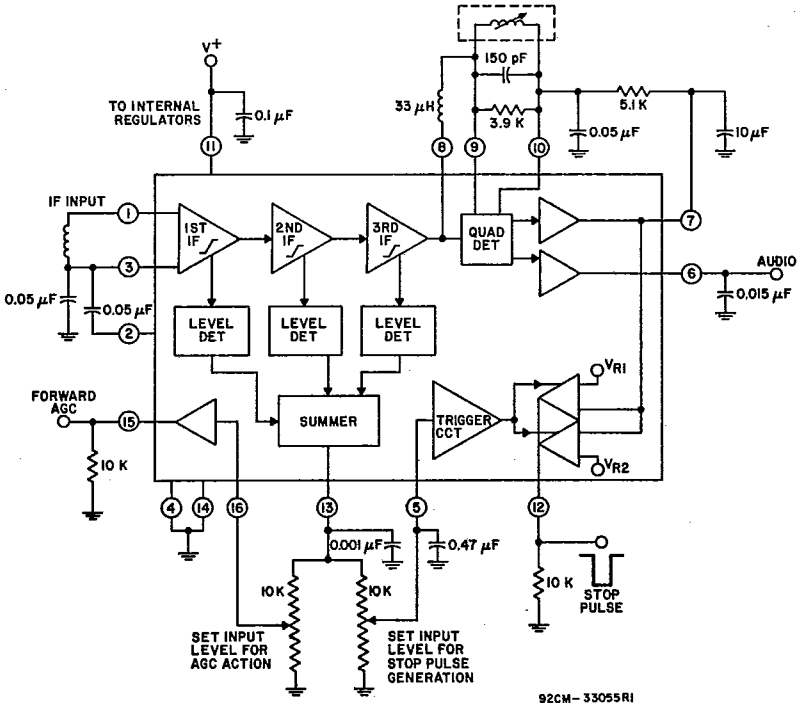


*Fig. 1 - Block diagram of CA3209E.*

File Number **1343**

The advanced circuit design of the if system includes desirable deluxe features such as delayed AGC for the rf tuner, and an output signal to drive a tuning meter and/or provide stereo switching logic control of stop pulse and AGC thyristors. In addition, internal power supply regulators maintain a nearly constant current drain over the voltage supply range of +8.5 to +16 volts.

The CA3209E is ideal for high-fidelity operation. Distortion in a CA3209E FM-IF System is primarily a function of the phase linearity characteristic of the outboard detector coil.

The CA3209E utilizes the 16-lead dual-in-line plastic package and can operate over the ambient temperature range of -40° C to +85° C.

**MAXIMUM RATINGS,** *Absolute-Maximum Values:*

DC SUPPLY VOLTAGE:
- Between terminals 11 and 4 ..... 16 V
- Between terminals 11 and 14 ..... 16 V

DC CURRENT (Out of Terminal 15) ..... 2 mA

DEVICE DISSIPATION:
- Up to $T_A$ = 85° C ..... 735 mW
- Above $T_A$ = 85° C ..... Derate linearly 11.4 mW/° C

AMBIENT TEMPERATURE RANGE:
- Operating ..... -40 to +85° C
- Storage ..... -65 to +150° C

LEAD TEMPERATURE (During Soldering):
- At distance not less than 1/32" (0.79 mm) from case for 10 seconds max. ..... +265° C

**ELECTRICAL CHARACTERISTICS at $T_A$ = 25° C, V+ = 12 Volts**
**(See Fig. 3 for Test Circuit)**

| CHARACTERISTIC | TEST CONDITIONS | LIMITS | | | UNITS |
|---|---|---|---|---|---|
| | | MIN. | TYP. | MAX. | |
| **Static (DC) Characteristics** | | | | | |
| Quiescent Circuit Current | | 20 | 31 | 44 | mA |
| DC Voltages: | | | | | |
| $V_1$, $V_2$, $V_3$ | | 1.2 | 1.9 | 2.4 | V |
| $V_{10}$ | | 4.9 | 5.6 | 6.1 | V |
| $V_{15}$ | $V_{16}$ = 0 V | — | 0.005 | 0.4 | V |
| $V_{15}$ | $V_{16}$ = 1.4 V | 4.1 | 5.1 | 5.6 | V |
| $V_{16}$ | $V_{15}$ = 1-2 V | — | 1.22 | — | V |
| $V_{12}$ | $V_5 \leq$ 0.24 V | 4.3 | 5.7 | 6.6 | V |
| $V_{12}$ | $V_5 \geq$ 0.53 V | — | 0.06 | 0.4 | V |
| $V_5$ to cause transition of trigger ($V_{12}$) high to low | | — | 0.45 | — | V |
| $V_5$ to cause transition of trigger ($V_{12}$) low to high | | — | 0.40 | — | V |
| **Dynamic Characteristics** | | | | | |
| Input Limiting Voltage (-3 dB point) | | — | 12 | 25 | μV |
| Recovered Audio Voltage | 400 Hz Input ≧ 1 mV ±75 kHz Deviation | 350 | 520 | 700 | mV |
| Frequency Window of Stop Pulse | $V_5$ = 0.6 V, Input = 100 μV, $R_7$ -10 = 5.1 K | 70 | 120 | 200 | kHz |
| | $R_7$ -10 = 8.2 K | 45 | 75 | 125 | |
| Total Harmonic Distortion, THD: * | | | 0.50 | 1.0 | % |
| AM Rejection | 30% AM 100 mV Input | 50 | 65 | — | dB |
| | 100 μV Input | 35 | 42 | — | |
| S/N Ratio ** | 100 mV Input | 70 | 80 | — | dB |
| | 100 μV Input | 55 | 65 | — | |
| $V_{13}$ | No Signal | 0 | 0.2 | 0.8 | V |
| | 100 μV Input | 1.4 | 2.2 | 3.2 | |
| | 100 mV Input | 4.9 | 6.5 | 8.5 | |

* THD characteristics are essentially a function of the phase characteristics of the network connected between terminals 8, 9, and 10.

** Measured with a 30-kHz low-pass filter (-3 dB at 30 kHz, 18 dB/octave).

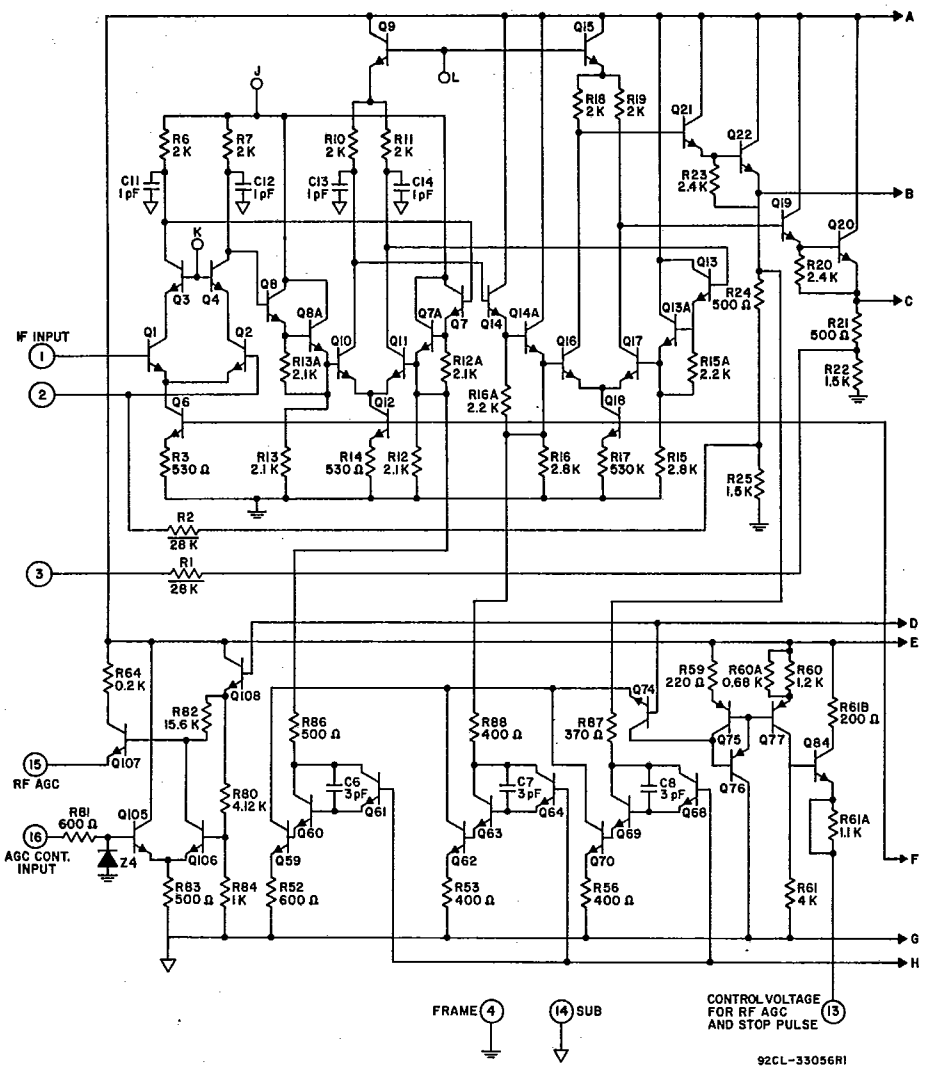


*Fig. 2 - Schematic diagram of CA3209E*
*(continued on next page).*

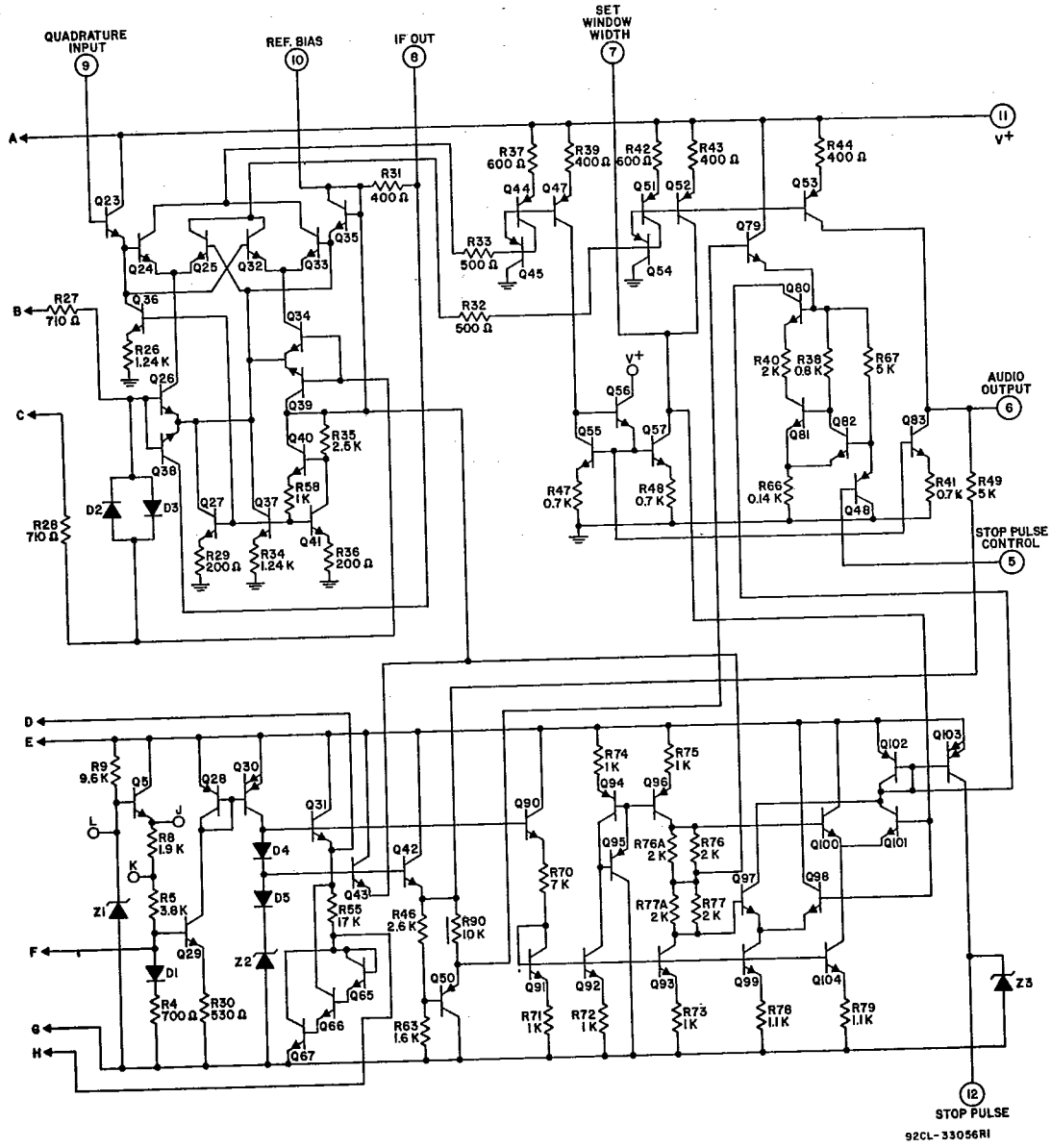


*Fig. 2 - Schematic diagram of CA3209E (continued from previous page).*

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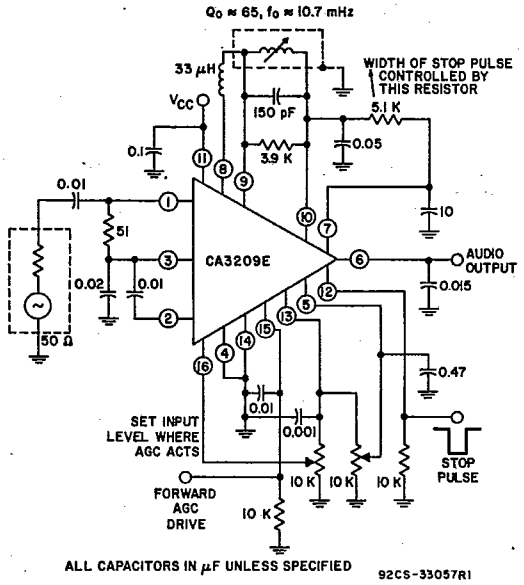


*Fig. 3 - Test circuit.*