

FM IF/AM TUNER SYSTEM

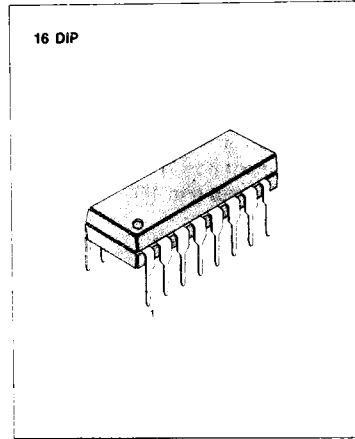
The KA2247 is a monolithic integrated circuit developed for the radio cassette tape recorder.

FUNCTIONS

- AM SECTION: RF amplifier, Mixer, OSC (with ALC), IF amplifier, Detector, AGC, Tuning indicator.
- FM SECTION: IF amplifier, Quadrature detector, AF preamplifier, Tuning indicator.

FEATURES

- Minimum number of external parts required.
- Very good S/N: FM (81dB), AM (53dB).
- AM oscillator circuit with ALC: Oscillation output voltage of pin 16. MW 130mV SW 70mV – 90mV (7MHz) – (24MHz)
- Excellent AM whistle performance: Whistle 1% at $V_t = 100\text{dB/m}$.
- Built-in tuning indicator.
- Built-in AM/FM function switch.
- Operating supply voltage range: $V_{cc} = 3V - 8V$.



ORDERING INFORMATION

| Device | Package | Operating Temperature |
|--------|---------|-----------------------|
| KA2247 | 16 DIP | -20°C ~ +70°C |

BLOCK DIAGRAM

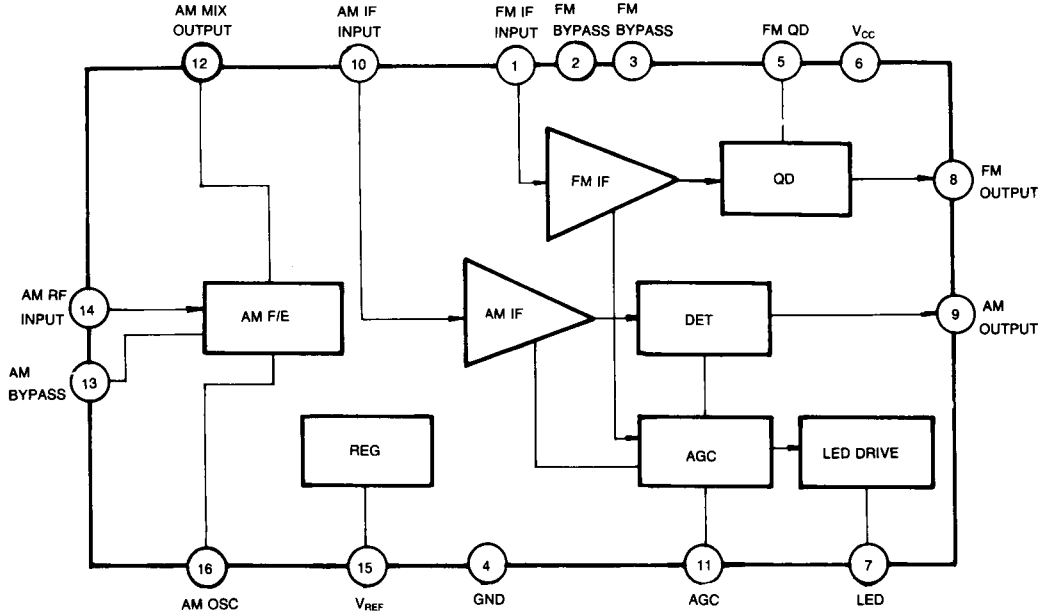


Fig. 1

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

| Characteristic | Symbol | Value | Unit |
|-------------------------|-----------|------------|------------------|
| Supply Voltage | V_{CC} | 9 | V |
| Circuit Current | I_{CC} | 50 | mA |
| Input Current (Pin 7) | I_7 | 20 | mA |
| Output Current (Pin 15) | I_{15} | 0.1 | mA |
| Power Dissipation | P_D | 450 | mW |
| Operating Temperature | T_{OPR} | -20 ~ +70 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -40 ~ +125 | $^\circ\text{C}$ |

ELECTRICAL CHARACTERISTICS

($T_a = 25^\circ\text{C}$, $V_{CC} = 4.5\text{V}$)FM Section ($f = 10.7\text{MHz}$, $\Delta f = \pm 75\text{KHz}$, $f_m = 400\text{Hz}$)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---------------------------|--------------|--|-----|------|------|----------------|
| Quiescent Circuit Current | I_{CCQ} | $V_i = 0$ | | 8.5 | 12.0 | mA |
| -3dB Limiting Sensitivity | $V_{i(LIM)}$ | $V_o (V_i = 80\text{dB}\mu) - 3\text{dB down}$ | | 35 | 42 | $\text{dB}\mu$ |
| Detector Output Voltage | $V_{O(DET)}$ | $V_i = 80\text{dB}\mu$ | 183 | 260 | 367 | mV |
| Total Harmonic Distortion | THD 1 | $V_i = 80\text{dB}\mu$ | | 0.55 | 1.2 | % |
| | THD 2 | $V_i = 80\text{dB}\mu$, $\Delta f = \pm 22.5\text{KHz}$ | | 0.05 | | |
| AM Rejection Ratio | AMR | $V_i = 80\text{dB}\mu$, AM: $f_m = 1\text{KHz}$, 30% Mod | | 60 | | dB |
| Signal to Noise Ratio | S/N 1 | $V_i = 80\text{dB}\mu$ | 77 | 81 | | dB |
| | S/N 2 | $V_i = 80\text{dB}\mu$, $\Delta f = \pm 22.5\text{KHz}$ | | 71 | | |
| Tuning Indication Voltage | V_L | $I_{LAMP} = 1\text{mA}$ | | 39 | 49 | $\text{dB}\mu$ |

AM Section ($f = 1\text{MHz}$, $f_m = 400\text{Hz}$, 30% Mod)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---------------------------|---------------|-------------------------|------|------|------|----------------|
| Quiescent Circuit Current | I_{CCQ} | $V_i = 0$ | | 7.5 | 10.5 | mA |
| Detector Output Voltage | $V_{O(DET)1}$ | $V_i = 23\text{dB}\mu$ | 17.3 | 31 | 55 | mV |
| Detector Output Voltage | $V_{O(DET)2}$ | $V_i = 60\text{dB}\mu$ | 87 | 122 | 174 | mV |
| Total Harmonic Distortion | THD 1 | $V_i = 60\text{dB}\mu$ | | 0.45 | 1.3 | % |
| | THD 2 | $V_i = 100\text{dB}\mu$ | | 1.5 | 3.0 | |
| Signal to Noise Ratio | S/N 1 | $V_i = 23\text{dB}\mu$ | 18.0 | 21.5 | | dB |
| | S/N 2 | $V_i = 60\text{dB}\mu$ | 48 | 53 | | |
| Tuning Indication Voltage | V_L | $I_{LAMP} = 1\text{mA}$ | 22 | 30 | 38 | $\text{dB}\mu$ |
| Oscillator Voltage | V_{OSC} | $f = 24\text{MHz}$ | 60 | 86 | 120 | mV |

TEST CIRCUIT

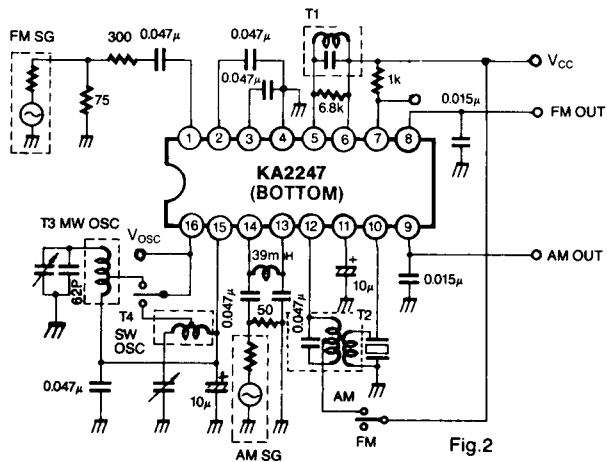
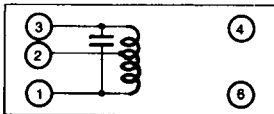


Fig.2

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COIL SPECIFICATIONS

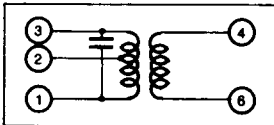
T1 FM IF (DET)



| C ₀ (PF) | f (MHz) | Q ₀ | TURNS |
|---------------------|---------|----------------|-------|
| 1-3 | | 1-3 | 1-3 |
| 56 | 10.7 | 95 | 12 |

Seoul Jupa
0.12mmφ UEW

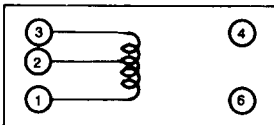
T2 AM IFT (MIX OUT)



| C ₀ (PF) | f (KHz) | Q ₀ | TURNS | | |
|---------------------|---------|----------------|-------|-----|-----|
| 1-3 | | 1-3 | 1-2 | 2-3 | 4-6 |
| 180 | 455 | 110 | 90 | 62 | 8 |

Seoul Jupa
0.07mmφ UEW

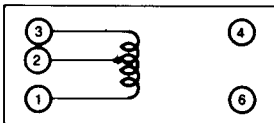
T3 (MW OSC)



| f (KHz) | L (μH) | Q ₀ | TURNS | |
|---------|--------|----------------|-------|-----|
| | 1-3 | 1-3 | 1-2 | 2-3 |
| 796 | 140 | 140 | 32 | 32 |

Seoul Jupa
0.07mmφ UEW

T4 (SW OSC)



| L (μH) | Q ₀ | TURNS | |
|--------|----------------|-------|-----|
| 1-3 | 1-3 | 1-2 | 2-3 |
| 12 | 80 | 12 | 12 |

Seoul Jupa
0.1mmφ UEW