

MC1747
MC1747C

(Dual MC1741)
Internally Compensated, High Performance Operational Amplifiers

The MC1747 and MC1747C were designed for use as summing amplifiers, integrators, or amplifiers with operating characteristics as a function of the external feedback components. The MC1747L and MC1747CL are functionally and electrically equivalent to the μ A747 and μ A747C respectively.

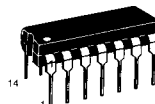
- No Frequency Compensation Required
- Short Circuit Protection
- Wide Common Mode and Differential Voltage Ranges
- Low-Power Consumption
- No Latch Up
- Offset Voltage Null Capability

(DUAL MC1741)
DUAL
OPERATIONAL AMPLIFIERS

SILICON MONOLITHIC
INTEGRATED CIRCUIT



D SUFFIX
PLASTIC PACKAGE
CASE 751A
(SO-14)



P2 SUFFIX
PLASTIC PACKAGE
CASE 646



L SUFFIX
CERAMIC PACKAGE
CASE 632

Figure 1. High-Impedance, High-Gain Inverting Amplifier

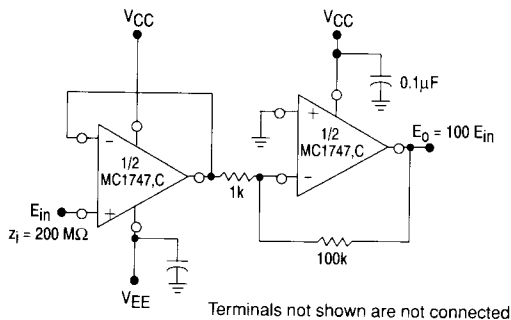
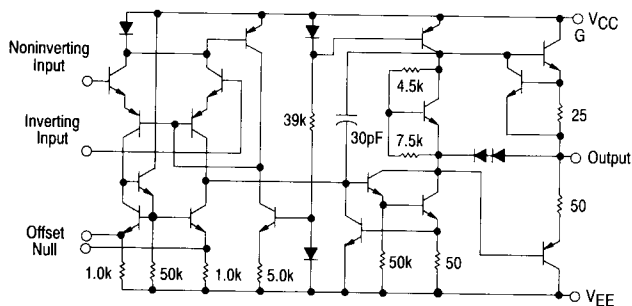
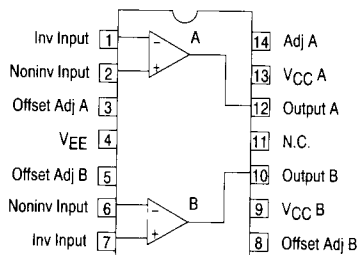


Figure 2. Circuit Schematic



PIN CONNECTIONS



VCC A and VCC B are not connected internally

ORDERING INFORMATION

| Device | Temperature Range | Package |
|-----------|-------------------|-------------|
| MC1747L | -55° to +125°C | Ceramic DIP |
| MC1747CD | | SO-14 |
| MC1747CL | 0° to +70°C | Ceramic DIP |
| MC1747CP2 | | Plastic DIP |

MC1747, MC1747C

MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$, unless otherwise noted.)

| Rating | Symbol | MC1747 | MC1747C | Unit |
|--|----------------------|-------------|-------------|------------------|
| Power Supply Voltages | V_{CC} V_{EE} | +22 -22 | +18 -18 | Vdc |
| Differential Input Signal Voltages (Note 1) | V_{ID} | ±30 | | V |
| Common Mode Input Swing Voltage (Note 2) | V_{ICR} | ±15 | | V |
| Output Short Circuit Duration | t_{SC} | Continuous | | |
| Voltage (Measurement between Offset Null and V_{EE}) | | ±0.5 | | V |
| Operating Ambient Temperature Range | T_A | -55 to +125 | 0 to +70 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -65 to +150 | -65 to +150 | $^\circ\text{C}$ |
| Junction Temperature Ceramic Package Plastic Package | T_J | 175 150 | | $^\circ\text{C}$ |

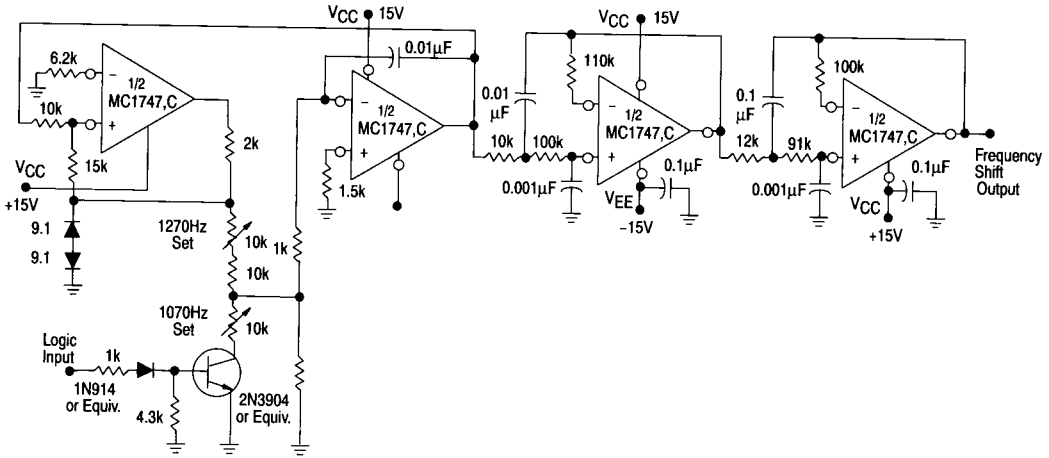
ELECTRICAL CHARACTERISTICS ($V_{CC} = +15\text{ V}$, $V_{EE} = -15\text{ V}$, $T_A = +25^\circ\text{C}$, unless otherwise noted.)

| Characteristics | Symbol | MC1747 | | | MC1747C | | | Unit |
|--|----------------|------------------|-------------------|-------------------|------------------|-------------------|-------------------|--------------------|
| | | Min | Typ | Max | Min | Typ | Max | |
| Input Bias Current $T_A = +25^\circ\text{C}$ $T_A = T_{high}$ (Note 3) $T_A = T_{low}$ (Note 3) | I_{IB} | — | 80 | 500 | — | 80 | 500 | nAdc |
| Input Offset Current $T_A = +25^\circ\text{C}$ $T_A = T_{high}$ $T_A = T_{low}$ | I_{IO} | — | 20 | 200 | — | 20 | 200 | nAdc |
| Input Offset Current $T_A = +25^\circ\text{C}$ $T_A = T_{low}$ to $T_A = T_{high}$ | V_{IO} | — | 1.0 | 5.0 | — | 1.0 | 6.0 | mVdc |
| Offset Voltage Adjustment Range | | — | ±15 | — | — | ±15 | — | mV |
| Differential Input Impedance (Open-loop, $f = 20\text{ Hz}$) Parallel Input Resistance Parallel Input Capacitance | r_i C_i | 0.3 | 2.0 | — | 0.3 | 2.0 | — | M Ω pF |
| Common Mode Input Voltage Swing $T_{low} \leq T_A \leq T_{high}$ | V_{ICR} | ±12 | ±13 | — | ±12 | ±13 | — | V |
| Common Mode Rejection ($R_S = 10\text{ k}\Omega$) $T_{low} \leq T_A \leq T_{high}$ | CMR | 70 | 90 | — | 70 | 90 | — | dB |
| Open-Loop Voltage Gain $T_A = +25^\circ\text{C}$ $T_A = T_{low}$ to $T_A = T_{high}$ ($V_O = \pm 10\text{ V}$, $R_L = 2.0\text{ k}\Omega$) | A_{VOL} | 50,000 25,000 | 200,000 — | — — | 25,000 15,000 | 200,000 — | — — | V |
| Transient Response (Unity Gain) ($V_{in} = 20\text{ mV}$, $R_L = 2.0\text{ k}\Omega$, $C_L \leq 100\text{ pF}$) Rise Time Overshoot Percentage | t_{PLH} | — | 0.3 5.0 | — — | — | 0.3 5.0 | — — | μs % |
| Slew Rate (Unity Gain) | SR | — | 0.5 | — | — | 0.5 | — | V/ μs |
| Output Impedance | z_o | — | 75 | — | — | 75 | — | Ω |
| Short Circuit Output Current | I_{SC} | — | 25 | — | — | 25 | — | mAdc |
| Channel Separation | | — | 120 | — | — | 120 | — | dB |
| Output Voltage Swing ($T_{low} \leq T_A \leq T_{high}$) $R_L = 10\text{ k}\Omega$ $R_L = 2.0\text{ k}\Omega$ | V_{OR} | ±12 ±10 | ±14 ±13 | — — | ±12 ±10 | ±14 ±13 | — — | Vpk |
| Power Supply Rejection (T_{low} to T_{high}) $V_{EE} = \text{Constant}$, $R_S \leq 10\text{ k}\Omega$ $V_{CC} = \text{Constant}$, $R_S \leq 10\text{ k}\Omega$ | PSR+ PSR- | 75 75 | — — | — — | 75 75 | — — | — — | dB |
| Power Supply Current (each amplifier) $T_A = +25^\circ\text{C}$ $T_A = T_{low}$ $T_A = T_{high}$ | $I_{CC,IEE}$ | — — — | 1.7 2.0 1.5 | 2.8 3.3 2.5 | — — — | 1.7 2.0 2.0 | 2.8 3.3 3.3 | mAdc |
| DC Power Consumption (each amplifier) $T_A = +25^\circ\text{C}$ $T_A = T_{low}$ $T_A = T_{high}$ | P_C | — — — | 50 60 45 | 85 100 75 | — — — | 50 60 60 | 85 100 100 | mW |

- NOTES:**
- For supply voltages of less than $\pm 15\text{ V}$, the maximum differential input voltage is equal to $\pm(V_{CC} + |V_{EE}|)$.
 - For supply voltages of less than $\pm 15\text{ V}$, the maximum input voltage is equal to the supply voltage ($+V_{CC}$, $-|V_{EE}|$).
 - $T_{low} = 0^\circ\text{C}$ for MC1747CL $T_{high} = +70^\circ\text{C}$ for MC1747CL
 -55°C for MC1747L $+125^\circ\text{C}$ for MC1747L

MC1747, MC1747C

Figure 3. Typical Frequency Shift Keyer Tone Generator Test Circuit



Terminals not shown are not connected.

Figure 4. Typical Frequency Shift Keyer Tone Generator

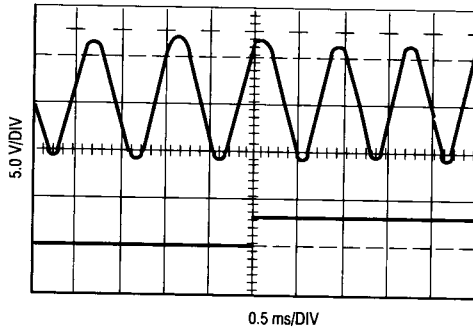


Figure 5. Open-Loop Voltage Gain versus Power-Supply Voltage

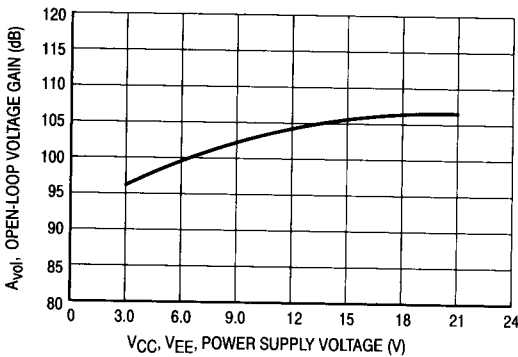
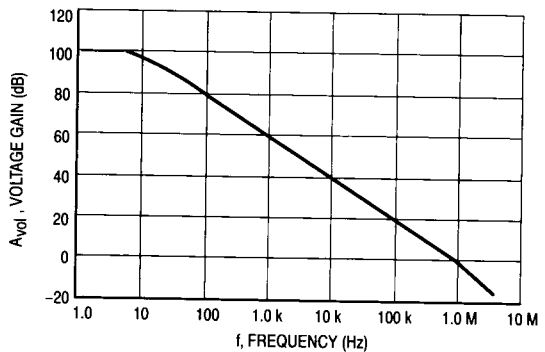


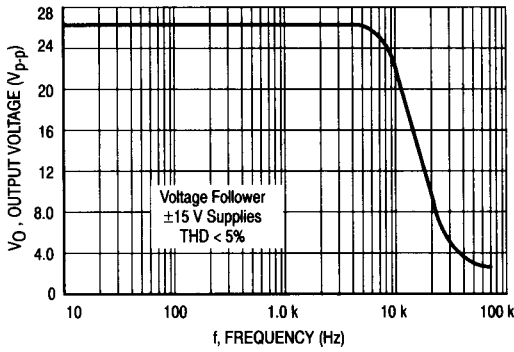
Figure 6. Open-Loop Frequency Response



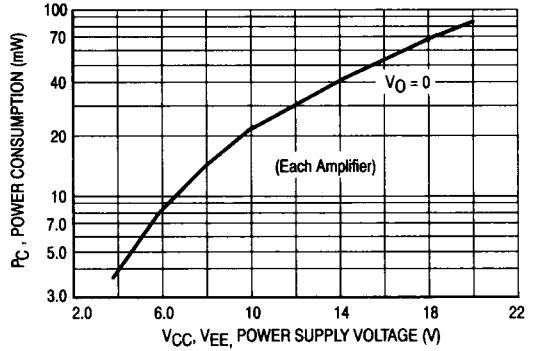
MC1747, MC1747C

2

**Figure 7. Power Bandwidth
(Large Signal Swing versus Frequency)**



**Figure 8. Power Consumption
versus Power Supply Voltage**



**Figure 9. Output Voltage Swing
versus Load Resistance**

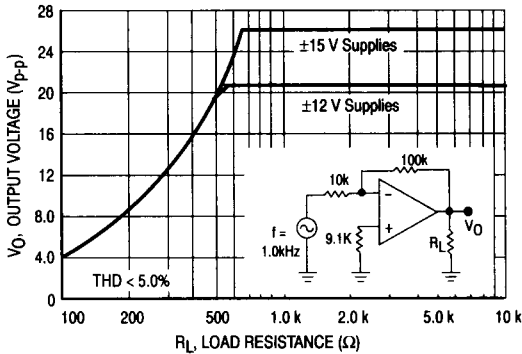


Figure 10. Output Noise versus Source Resistance

