



ELECTRONICS, INC.  
 44 FARRAND STREET  
 BLOOMFIELD, NJ 07003  
 (973) 748-5089  
<http://www.nteinc.com>

## NTE1486 Integrated Circuit FM/AM Tuner System

**Description:**

The NTE1486 is an integrated circuit in a 16+2-Lead DIP type package designed for use in stereo applications. This high performance device integrates all the functions necessary for FM IF and detection by AM IF amplifiers.

**Functions:**

**FM**

- IF Amplifier
- Detector Circuit
- Low Noise Audio Amplifier
- Signal Meter Circuit
- Center Meter Circuit
- Muting Circuit
- AFC Circuit

**AM**

- IF Amplifier
- AGC Circuit

**Features:**

- Labor Saving and Miniaturization are Possible, since the FM IF Amplifier Detection and AM IF Amplifiers are Enclosed in the Same Package.
- FM IF Amplifiers have High Stability due to the Adoption of the Full Balance Three Stage Direct Coupled Differential Amplifier.
- Utilizes the Quadrature Detection Circuit.
- High Sensitivity (Input limiting sensitivity: 15V Typ)
- Large Detection Output: 450mV<sub>rms</sub> Typ @ 100% modulation
- Low Distortion Factor: 0.04% Typ, when the double tuning detection coil is used
- High Signal-to-Noise Ratio: 79dB Typ
- Muting Circuit which does not Produce the Unbalance at Right or Left when Detuning.
- Muting Attenuation is Large: 80dB Typ
- AM Rejection Ratio is Good: 55dB @ 100dB<sub>μ</sub> Input
- Signal-to-Noise Ratio of AM IF is Good: 50dB @ 64dB<sub>μ</sub> Input
- AGC FOM of AM IF is Good: 48dB
- Electrodynamic Range for the Input of the Signal Meter is Large: 43dB<sub>μ</sub> to 115dB<sub>μ</sub> Typ

**Absolute Maximum Ratings:** (T<sub>A</sub> = +25°C unless otherwise specified)

|  |                |
|--|----------------|
| Supply Voltage, V <sub>CC</sub> .....                            | 13V            |
| Power Dissipation (T <sub>A</sub> = +60°C), P <sub>T</sub> ..... | 730mW          |
| Operating Temperature Range, T <sub>opr</sub> .....              | -20° to +70°C  |
| Storage Temperature range, T <sub>stg</sub> .....                | -55° to +125°C |

**DC Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = 12\text{V}$ , Non-Signal unless otherwise specified)

| Parameter                      | Symbol   | Test Conditions | Min | Typ | Max | Unit |
|--------------------------------|----------|-----------------|-----|-----|-----|------|
| AM IF Bypass (Pin1)            | $V_1$    |                 | -   | 2.7 | -   | V    |
| AM IF Input (Pin4)             | $V_4$    |                 | -   | 0.7 | -   | V    |
| FM IF Input DC Feedback (Pin6) | $V_6$    |                 | -   | 1.9 | -   | V    |
| FM IF Input DC Feedback (Pin7) | $V_7$    |                 | -   | 1.9 | -   | V    |
| FM IF Input (Pin8)             | $V_8$    |                 | -   | 1.9 | -   | V    |
| Muting Control Voltage (Pin10) | $V_{10}$ |                 | -   | 5.4 | -   | V    |
| Reference (Pin12)              | $V_{12}$ |                 | -   | 5.6 | -   | V    |
| AFC (Pin15)                    | $V_{15}$ |                 | -   | 5.6 | -   | V    |
| Audio Output (Pin16)           | $V_{16}$ |                 | -   | 5.6 | -   | V    |

**AC Electrical Characteristics:** ( $V_{CC} = 12\text{V}$ , Note 1 unless otherwise specified)

| Parameter                 | Symbol                | Test Conditions   | Min | Typ  | Max  | Unit                     |
|---------------------------|-----------------------|---|-----|------|------|--------------------------|
| Total Current Drain       | $I_{11}$              | $V_{in} = 100\text{dB}\mu$ , Mute; ON   | -   | 38.5 | 56.2 | mA                       |
| <b>FM</b>                 |                       |   |     |      |      |                          |
| Limiting Sensitivity      | $V_{in(lim)}$         | $V_{in} = -3\text{dB}$ point from output voltage when $100\text{dB}\mu$ input                               | -   | 31   | 37   | $\text{dB}\mu$           |
| Recovered AF Voltage      | $V_{01(AF)}$          |   | 270 | 450  | 700  | $\text{mV}_{\text{rms}}$ |
| Total Harmonic Distortion | THD                   |   | -   | 0.04 | 0.1  | %                        |
| Signal-to-Noise Ratio     | (S+N/N)               |   | 73  | 79   | -    | dB                       |
| AM Rejection Ratio        | AMR                   | $V_{in} = 100\text{dB}\mu$ , FM; $400\text{Hz}$ , $\Delta f = 75\text{kHz}$ , AM; $1\text{kHz}$ , $m = 0.3$ | -   | 55   | -    | dB                       |
| Muting Sensitivity        | $V_{in}(\text{Mute})$ | $V_{10} = 1.4\text{V}$  | 42  | 48   | 53   | $\text{dB}\mu$           |
| Muting Attenuation        | $M_{ute(ATT)}$        | $V_{17} = 2\text{V}$  | 73  | 80   | -    | dB                       |
| Muting Bandwidth          | BW(Mute)              | $V_{10} = 1.4\text{V}$ , Note 2   | 78  | 130  | 220  | kHz                      |
| Meter Swing               | $V_{9-70}$            | $V_{in} = 70\text{dB}\mu$   | 0.5 | 1.8  | -    | V                        |
|                           | $V_{9-100}$           | $V_{in} = 100\text{dB}\mu$  | 3.0 | 4.4  | -    | V                        |
| <b>AM</b>                 |                       |   |     |      |      |                          |
| Recovered AF Voltage      | $V_{02(AF)}$          |   | 55  | 82   | 125  | $\text{mV}_{\text{rms}}$ |
| Total Harmonic Distortion | THD                   |   | -   | 0.5  | 2.0  | %                        |
| Signal-to-Noise Ratio     | (S+N/N)               |   | 44  | 50   | -    | dB                       |
| IF AGC Figure of Merit    | AGC(FOM)              | $V_{in} =$ Voltage difference from $84\text{dB}\mu$ input, when $10\text{dB}$ output down                   | -   | 48   | -    | dB                       |
| Input Impedance           | $R_{in}$              |   | -   | 0.9  | -    | $\text{k}\Omega$         |

Note 1. Unless otherwise specified, test conditions are as follows:

FM:  $f_{(IF)} = 10.7\text{MHz}$ ,  $f_{(MOD)} = 400\text{Hz}$ ,  $\Delta f = 75\text{kHz}$ ,  $V_{in} = 100\text{dB}\mu$

AM:  $f_{(IF)} = 455\text{kHz}$ ,  $f_{(MOD)} = 400\text{Hz}$ ,  $m = 0.3$ ,  $V_{in} = 64\text{dB}\mu$

Note 2.  $BW_{(mute)}$  is tested under sampling of  $ALQ = 1.0\%$ .

### Pin Connection Diagram

|                  |           |  |                            |
|------------------|-----------|--|----------------------------|
| Mute             | <b>17</b> |  |                            |
| AM IF Amp Filter | <b>1</b>  |  | <b>16</b> Audio Output     |
| AM IF Output     | <b>2</b>  |  | <b>15</b> AFC Output       |
| AM IF AGC Input  | <b>3</b>  |  | <b>14</b> Limiter Output   |
| AM IF Input      | <b>4</b>  |  | <b>13</b> Quad Det Input   |
| GND              | <b>5</b>  |  | <b>12</b> Quad Det Output  |
| FM Decouple      | <b>6</b>  |  | <b>11</b> V <sub>CC</sub>  |
| AM/FM Switch     | <b>7</b>  |  | <b>10</b> MPX Cont Output  |
| FM IF Input      | <b>8</b>  |  | <b>9</b> Tune Meter Output |
| GND              | <b>18</b> |  |                            |

