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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_{rms} 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_μ Input
- Signal-to-Noise Ratio of AM IF is Good: 50dB @ 64dB_μ Input
- AGC FOM of AM IF is Good: 48dB
- Electrodynamic Range for the Input of the Signal Meter is Large: 43dB_μ to 115dB_μ Typ

Absolute Maximum Ratings: (T_A = +25°C unless otherwise specified)

Supply Voltage, V _{CC}	13V
Power Dissipation (T _A = +60°C), P _T	730mW
Operating Temperature Range, T _{opr}	-20° to +70°C
Storage Temperature range, T _{stg}	-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
FM						
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	mV_{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; 400Hz , $\Delta f = 75\text{kHz}$, AM; 1kHz , $m = 0.3$	–	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
AM						
Recovered AF Voltage	$V_{02(AF)}$		55	82	125	mV_{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 10dB 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	17		
AM IF Amp Filter	1		16 Audio Output
AM IF Output	2		15 AFC Output
AM IF AGC Input	3		14 Limiter Output
AM IF Input	4		13 Quad Det Input
GND	5		12 Quad Det Output
FM Decouple	6		11 V _{CC}
AM/FM Switch	7		10 MPX Cont Output
FM IF Input	8		9 Tune Meter Output
GND	18		

