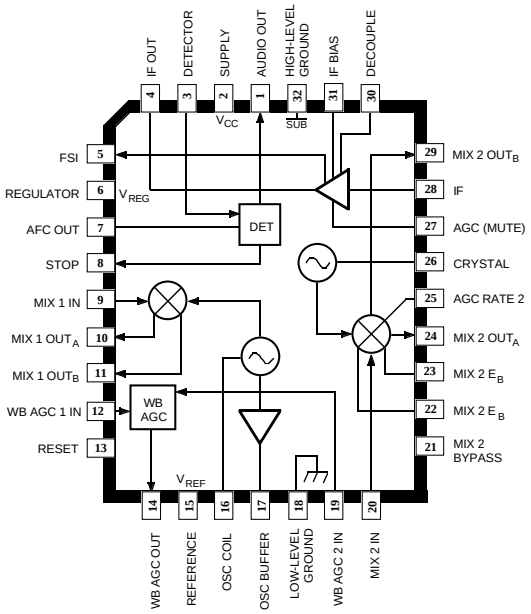
3848

Data Sheet
27121.15

DUAL-CONVERSION AM RECEIVER



Dwg. No. PS-012-1

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{CC} . . . . . **12 V**
Package Power Dissipation, P_D . . . . **1.2 W**
Operating Temperature Range,
T_A . . . . . **-40°C to +105°C**
Storage Temperature Range,
T_S . . . . . **-65°C to +150°C**

Providing the AM signal processing functions for an electronically tuned AM receiver (ETR), the A3848EEQ includes two balanced mixers, a crystal local oscillator, an L/C-tuned local oscillator, oscillator buffer, IF amplifier, AM detector, scan control detectors, and a switchable voltage regulator. This dual-conversion device typically mixes the incoming RF up to a first IF of 10.7 MHz, then down to 450 kHz, and then detects the audio. The addition of a JFET matched to a whip antenna, RF low-pass filter, IF selectivity, and audio stages gives a complete AM radio which can be used in automotive receivers. The frequency-detecting stop circuit is also capable of recovering narrow-band FM, making it useful for scanners or weather band radio applications. Two AGC and field-strength indicator modes provide special features for scanning.

The A3848EEQ uses the dual criteria of frequency and amplitude for establishing a valid stop. Tuning accuracy (frequency criterion) is established by evaluating phase shift across the detector coil. The circuitry is similar to that used in FM discriminators. Because this detection system is phase operated, it remains effective even in the presence of strong signals, which can cause false stops in systems using narrow-band filters. The amplitude criterion for stop is determined by evaluating the IF level. It includes a unique circuit that removes the effect of the AGC action. This allows the AGC tuning components to be selected for low-frequency audio performance without compromising scanning speed.

In the normal AGC mode (AGC RESET low), a slow, narrow-band field-strength indicator (FSI) is provided for controlling signal-dependent functions such as stereo blending. A fast AGC mode (AGC RESET high) resets the AGC holding capacitors to maximum gain. This mode allows cataloging station strengths quickly during a band sweep.

This AM signal processor is packaged in a rectangular, 32-lead, plastic, leaded chip carrier (PLCC) for surface-mount applications and is rated for operation over the temperature range of -40°C to +105°C are available on special order.

FEATURES

- Low Noise Figure
- Balanced Mixers
- High Dynamic Range First Mixer
- Field-Strength Indicator
- Buffered Oscillator
- Fast Scan Mode

Always order by complete part number: **A3848EEQ**.

ELECTRICAL CHARACTERISTICS at T_A = +25°C, V_{CC} = 10 V, f_o = 1 MHz, f_{if1} = 10.7 MHz, f_{if2} = 450 kHz, V_{in} = 10 mV; f_m = 1 kHz , Mod = 30% (except as noted).

Characteristic	Symbol	Test Conditions	Limits			
			Min	Typ	Max	Units
Supply Current	I_{CC}	I_2, V_{in} = 0	—	50	65	mA
		I_2, V_{in} = 0, V_{27} = 0 (Muted)	—	1.0	6.0	mA
Sensitivity	V_{in}	V_{out} = 50 mV	—	6.0	10	µV
Usable Sensitivity	V_{in}	S + N/N = 20 dB	—	14	21	µV
Recovered Audio	V_{out}		165	215	265	mV
Total Harmonic Dist.	THD	Mod = 90%	—	0.4	2.0	%
Oscillator Output	V_o	V_{17}	80	120	—	mV
Stop Output Voltage	V_{STP}	V_8, V_{in} = 0	4.7	5.0	—	V
		V_8, Mod = 0%	—	0.10	0.16	V
Stop Sensitivity	V_{stp}	V_{12} = 2.5 V, Mod = 0%	30	45	60	µV
Stop Bandwidth	BW_{STP}	V_8 = 2.5 V, = 0%	5.0	6.5	8.0	kHz
Wide-Band AGC	V_{AGC}	V_{in} = 0	5.0	6.7	8.0	V
		V_{in} = 11 mV, Mod = 0%	3.7	5.0	—	V
		V_{in} = 26 mV, Mod = 0%	—	—	1.0	V
Field-Strength Indicator Output Voltage (unmodulated, AGC Reset Low)	V_{FSI}	V_{in} = 0	—	0.1	0.4	V
		V_{in} = 30 µV, Mod = 0%	0.25	0.60	1.05	V
		V_{in} = 100 µV, Mod = 0%	1.1	1.6	2.2	V
		V_{in} = 1 mV, Mod = 0%	1.8	2.5	3.2	V
		V_{in} = 10 mV, Mod = 0%	3.1	3.7	4.4	V
Field-Strength Indicator Output Voltage (unmodulated, AGC Reset High)	V_{FSI}	V_{in} = 0	—	—	0.5	V
		V_{in} = 30 µV, Mod = 0%	0.9	1.1	1.5	V
		V_{in} = 100 µV, Mod 0%	1.3	1.6	2.0	V
		V_{in} = 1 mV, Mod = 0%	2.3	2.9	3.5	V
		V_{in} = 10 mV, Mod = 0%	2.5	3.7	4.0	V
Overload	V_{in}	V_{out} = 3% THD, Mod = 90%	60	100	—	mV
		First Mixer (Note 2)	350	450	—	mV
-3dB Limiting	V_{in}	Mod = 3 kHz peak deviation	—	12	—	µV
IF Output Voltage	V_{out}	V_{in} = 1 mV	200	250	320	mV
FM Recovered Audio	V_{out}	V_7, Mod = 3 kHz peak deviation	—	380	—	mV
Signal to Noise Ratio	S+N/N	V_{in} = 1 mV	50	53	—	dB
		V_{in} = 10 mV	53	56	—	dB
AGC Figure of Merit	FOM	Ref. at V_{in} = 10 mV, V_{in} for V_{out} = -10 dB	7.0	10	14	µV

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ELECTRICAL CHARACTERISTICS at T_A = +25°C, V_{CC} = 10 V, f_o = 1 MHz, f_{if1} = 10.7 MHz, f_{if2} = 450 kHz, V_{in} = 10mV; f_m = 1 kHz, Mod = 30% (except as noted) (concluded)

Characteristic	Symbol	Test Conditions	Limits			
			Min	Typ	Max	Units
Regulator Voltage	V_{REG}	V_6	4.7	5.0	5.3	V
		V_6, V_{27} = 0 (Muted)	—	0	0.3	V
Reference Voltage	V_{REF}	V_{15}	3.2	3.4	3.6	V

NOTES: 1. Typical data is for design information only.
2. Attenuate MIXER 1 output with 50 Ω load on mixer coil secondary, V_{out} =3% THD, Mod = 90%