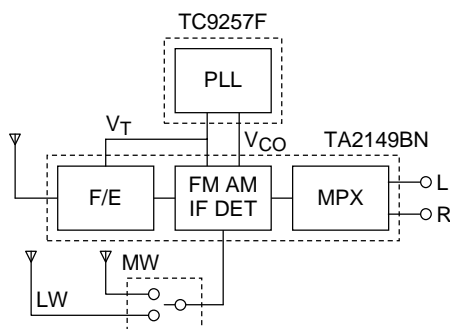


Audio IC Application Circuit

TAN-321

Application Circuit Example of 3-band (FM, MW and LW) 5-V Tuner
TA2149BN + TC9257F

1. Outline



The above is an application circuit example of a 3-band (FM, MW and LW) 5-V tuner. A separate 9-V power supply is required for V tune operation. The circuit incorporates the single-chip TA2149BN, and flat-type TC9257F for PLL block.

2. Ratings

Characteristic	Rating		
	FM	MW	LW
Supply Voltage	5 V		
Signal Frequency Range	87.5~108 MHz	522~1620 kHz	153~281 kHz
Intermediate Frequency	10.7 MHz	450 kHz	
Sensitivity	17.5 dB μ V EMF (S/N = 30 dB)	32 dB μ V/m ($V_o = 10$ mV _{rms})	42 dB μ V/m ($V_o = 10$ mV _{rms})

3. MW-LW Block

1) MW-LW circuit

The coil used in the oscillation circuit is designed for MW. For LW the oscillation frequency is lowered by attaching a capacitor in parallel. A transistor is used to allow switching between MW and LW.

In the same way, use of a transistor allows the antenna coil to be switched between MW and LW too.

2) MW-LW adjustment

<f cover adjustment>

MW: The coil should be adjusted so that V_T be 8 V at 1620 kHz (approximately 1.9 V at 522 kHz).

LW: The 30 pF trimmer should be adjusted so that V_T be 6 V at 281 kHz.

<MW/LW sensitivity adjustment>

- 1) Adjust tracking for MW at 600 kHz and 1400 kHz.
- 2) Adjust tracking for LW using a sweep generator so that sensitivity becomes highest around f cover area.
- 3) Adjust tracking for MW again so as to offset the effects of LW antenna coil.

3) TC9257F Software Specifications

<X'tal>

4.5 MHz

<IF terminal>

IF IN2 (16 pin)

<I/O ports>

- | | | |
|--------------------------------|---------------------|-----|
| 1) OT-4 (9 pin) : FM | "open" , MW. LW | "L" |
| 2) I/O-5 (10 pin) : FM | "L" , MW. LW | "H" |
| 3) I/O-6 (11 pin) : IF request | "H" , Normal tuning | "L" |
| 4) I/O-7 (18 pin) : MW | "H" , LW | "L" |
| 5) I/O-8 (17 pin) : LW | "H" , MW | "L" |

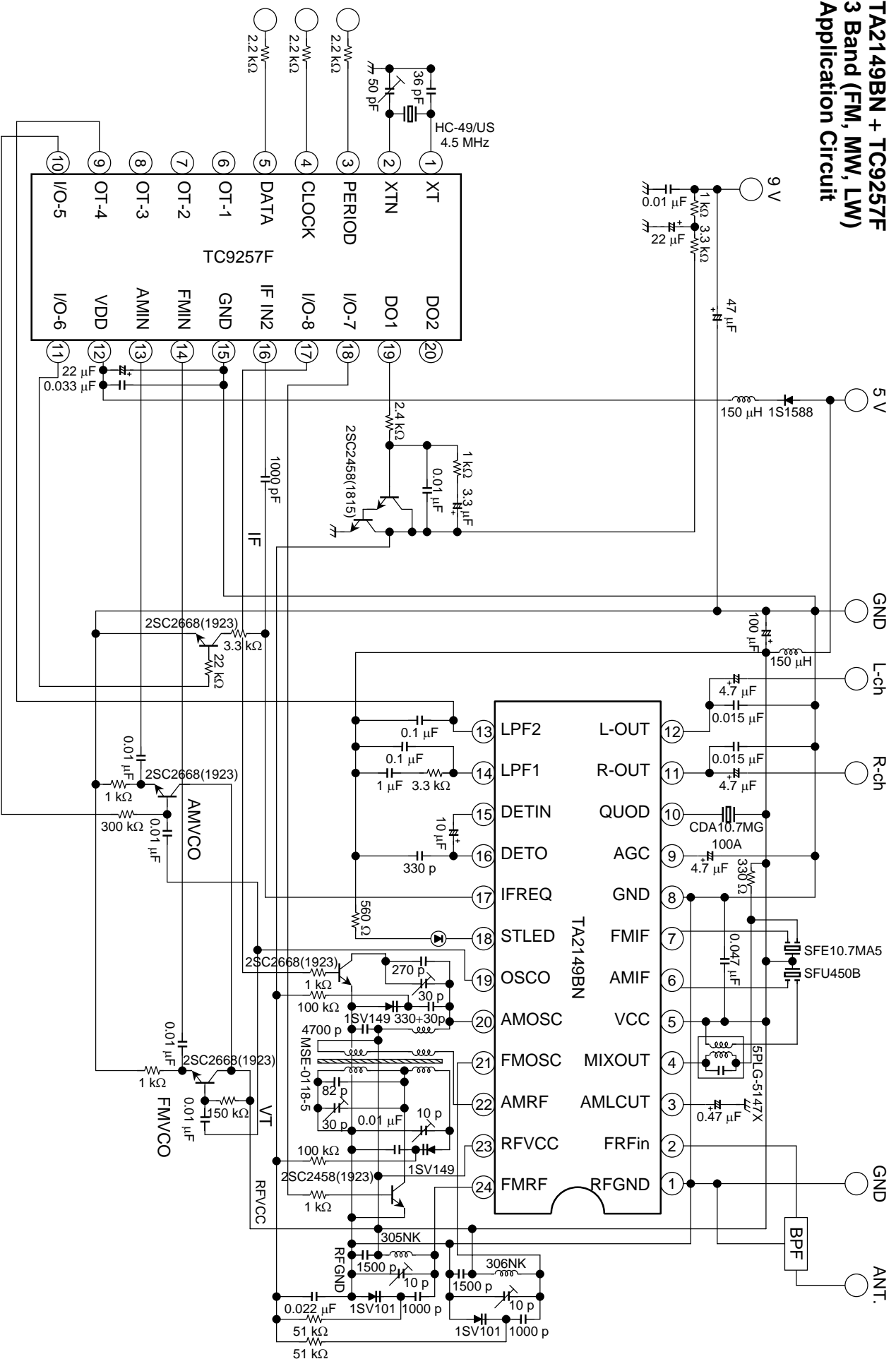
<Reference frequency>

FM : 50 kHz

MW : 9 kHz

LW : 1 kHz

TA2149BN + TC9257F 3 Band (FM, MW, LW) Application Circuit



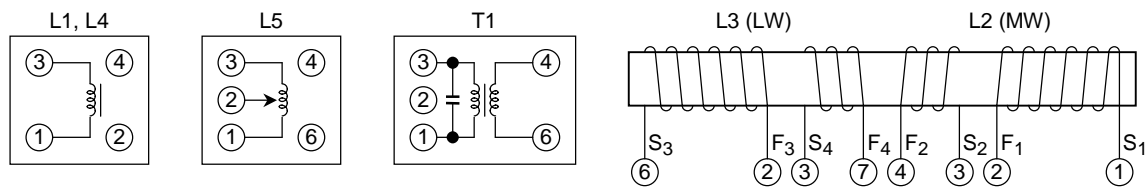
TA2149BN-3 Band (FM, MW and LW) Coil Specification

No.	Stage	f (Hz)	L (μH)	C (pF)	Q	Turns					Wire (mm)	Note
						1-2	2-3	1-3	1-4	4-6		
L1	FM RF	100M	—	—	79	—	—	—	2½	—	0.16 UEW	666SNF-305NK@T
L2	MW ANT	796k	285	—	200	69	—	—	13 (3-4)	—	7/0.07 USTC	MSE-0118-5@M
L3	LW ANT	252k	1660	—	100	—	160 (2-6)	16 (7-3)	—	—	4/0.07 USTC	MSE-0118-5@M
L4	FM OSC	100M	—	—	76	—	—	—	2	—	0.16 UEW	666SNF-306NK@T
L5	MW OSC	796k	120	—	120	13	56	—	—	—	0.07 UEW	A7BRS-12552Y@T
T1	MW IFT	455k	—	470	60	—	—	109	—	7	0.05 UEW	5PLG-5147X@T

M: MITSUMI (SEGAMAT) SDN. BHD

T: Toko, inc

(Bottom view)



Description of Operation

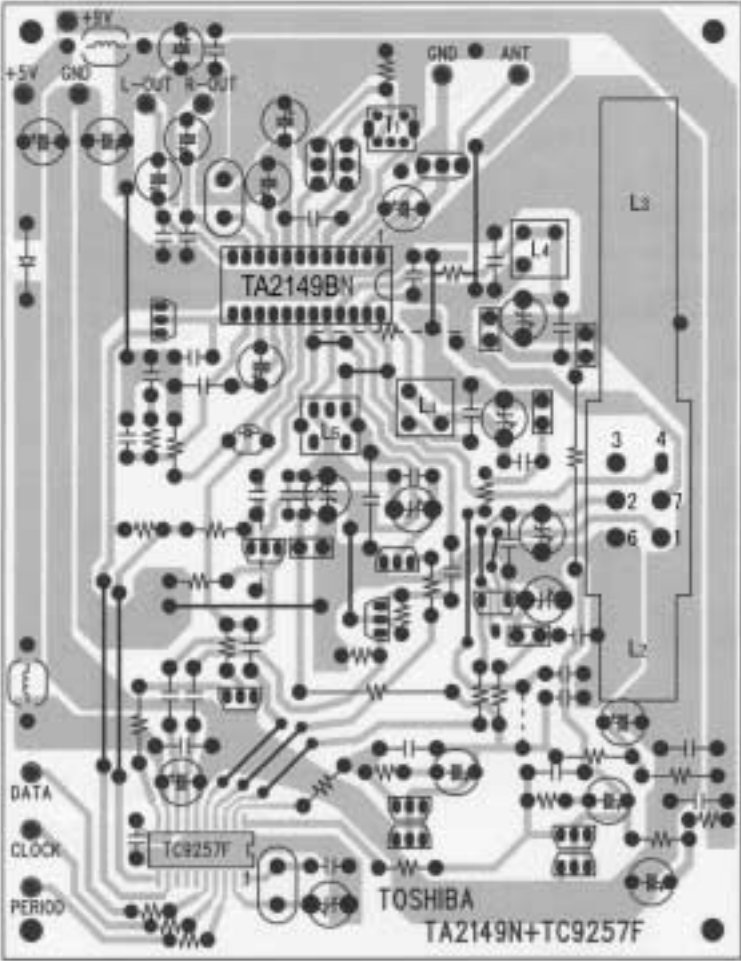
In the printed circuit board pattern example, the oscillation at the lower frequency and the lower impedance may become parasitic oscillation frequency because the distance from this IC to the FM and RF tank circuits is long.

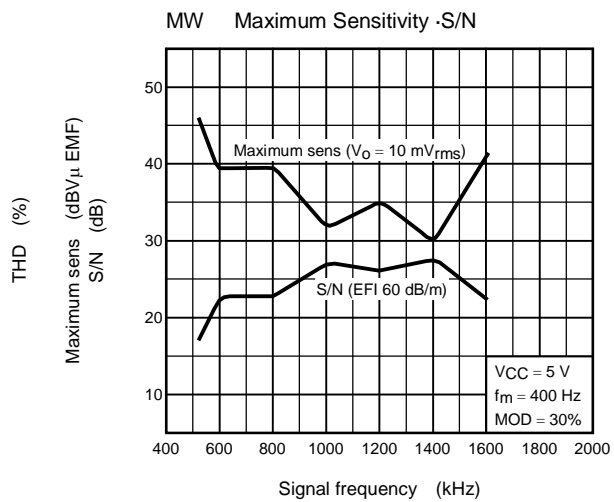
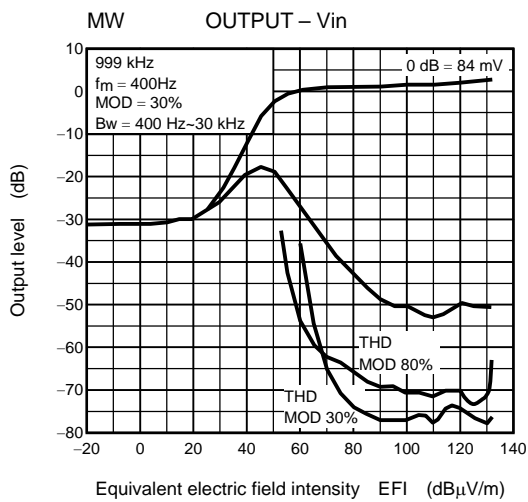
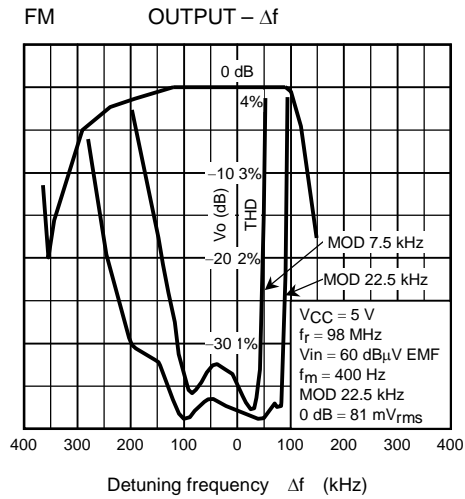
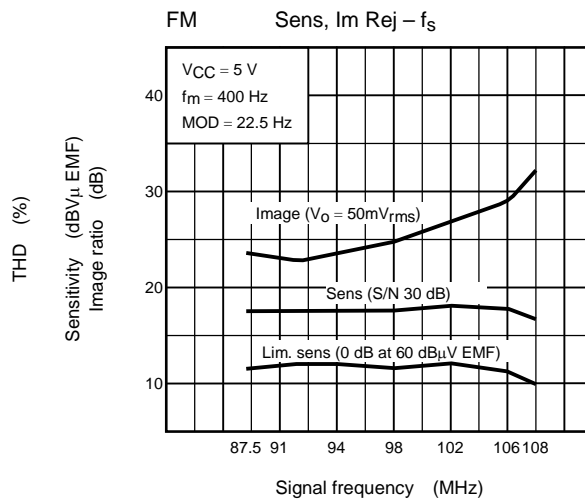
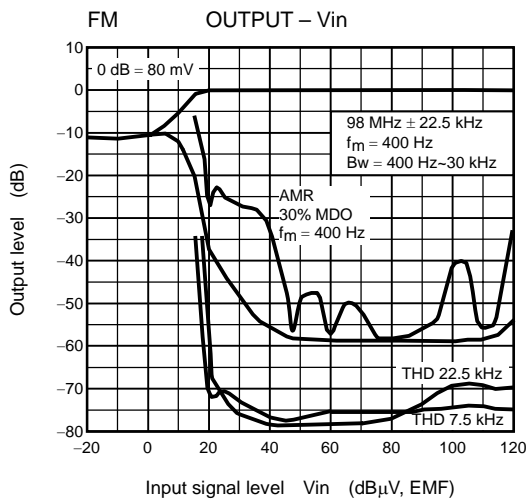
This tendency is particularly evident in 1/16 VCO mode.

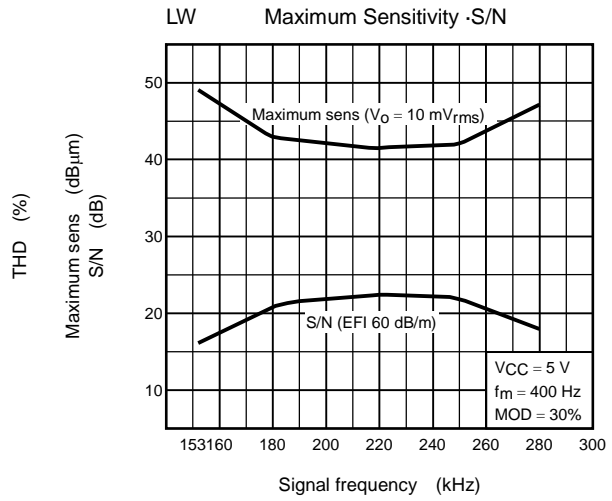
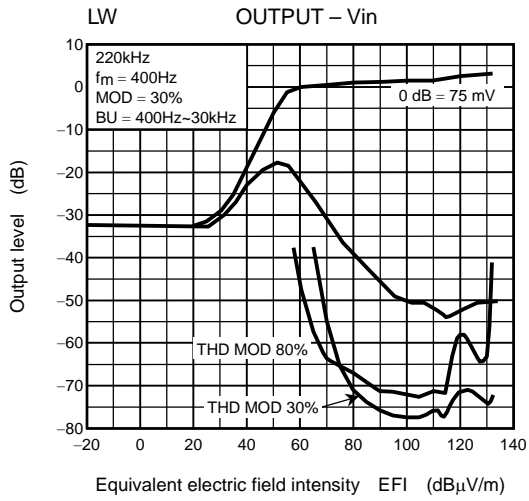
To prevent the parasitic oscillation, insert a resistor of around 7.5 Ω between pin 21 and L4.

This measure reduces parasitic oscillating impedance, narrowing the parasitic oscillation range. The FM and RF tank circuits should be located as near the IC as possible.

Example of Printed Circuit Board Pattern







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