
PLL FM Stereo Radio(Transmitter) Module

88MHZ ~ 108MHz

Related Products : NR-B108RM (PLL FM Stereo Radio Receiver Module)



1. PLL FM Stereo Radio(Transmitter) Module.

- * This is a PLL FM Stereo Audio Transmitter Module that can stereo-transmit voice/music signals wirelessly to FM Radios(Radio & Receiver).
- * While generally used transmitters work on a single or several pre-determined frequencies, it can transmit any stereo signals of any frequency within the range of 88-108MHz.
- * Miniature-sized to fit into any of your products, it is especially easy to install in electronic devices of compact size.
- * It can serve as a miniature transmitter itself.

2. Features.

- . Stereo transmission of all broadcast band(88-108MHz).
- . PLL system guarantees good frequency stability.
- . Miniature-sized(SMD Type), easy to apply to any of your products.
- . Controllable from CPU(MCU).
- . Works on a single voltage DC 3.3V.

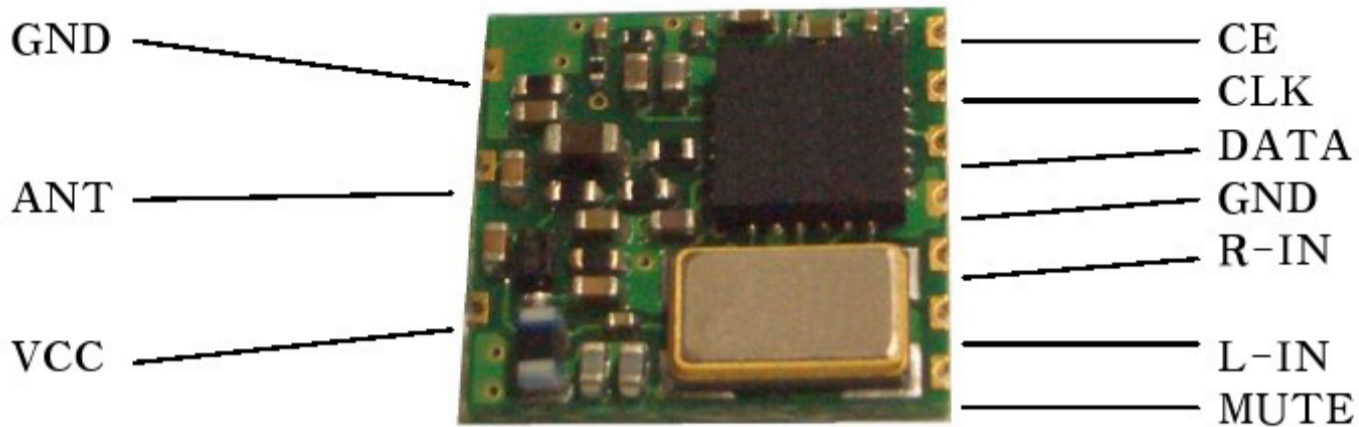
3. Applications

- . CD Changer, CAR TV, MP3, PDA.
- . Telephone & Mobile.
- . CAR Navigation.
- . Wireless Speakers.
- . Personal Computer(Sound Board), Game machine.

4. PLL FM Stereo Radio(Transmitter) Module Specification.

Item	Specification
Operating Voltage	DC 3.3V
Operating Current	Under 15mA
Transmission Frequency	88Mhz - 108Mhz
RF Output	Under -3dBm
Control	CPU(MCU) : 3-Wire Bus

5. PLL FM Stereo Radio(Transmitter) Module Pin Information.



- * ANT : Antenna
- * VCC : Power DC 3.3V (+)
- * R-IN : Audio Right Signal Input
- * L-IN : Audio Left Signal Input
- * GND : Power DC 3.3V (-).
- * C/E, CLK, DATA, MUTE : CPU (MCU) Control.

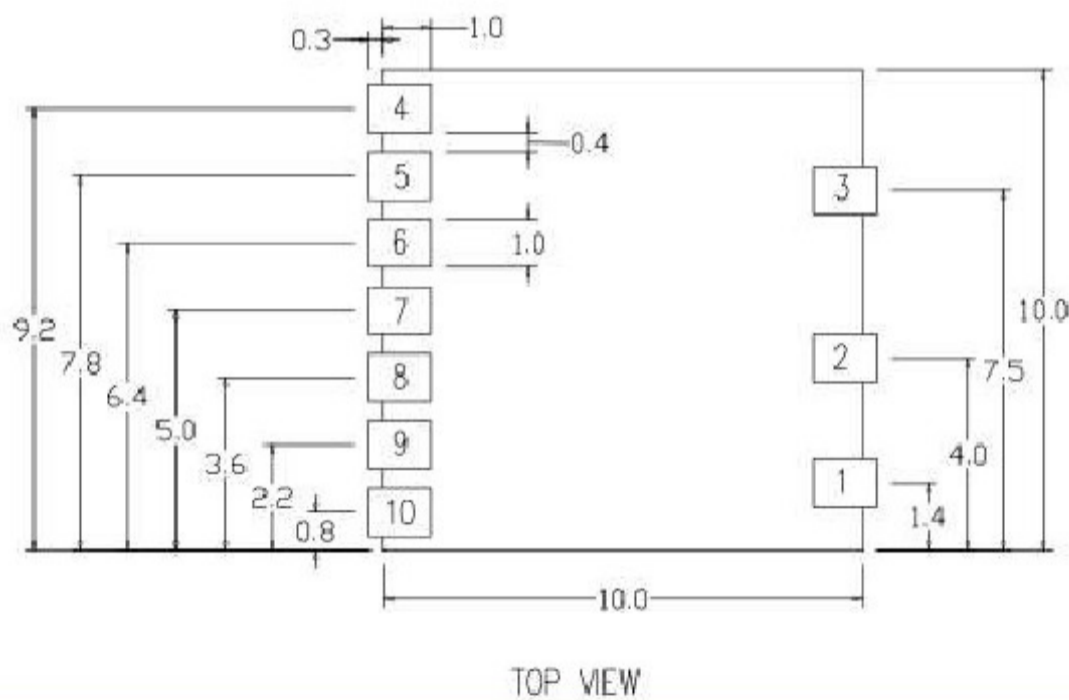
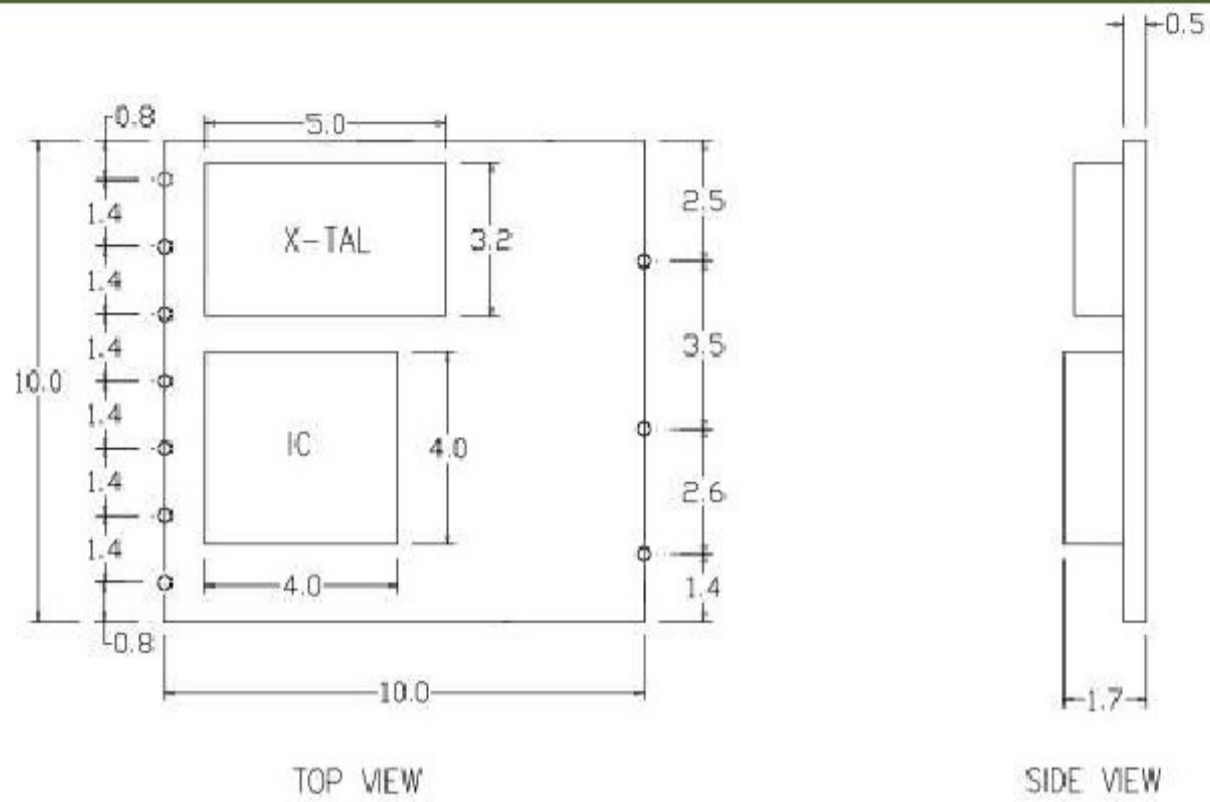
. Please use the NR-B108 Only Antenna(PN-ANT-FM) or FM Frequency Antenna.

. R-IN/L-IN can be directly connected with line signal of TV, radio etc.

In case of using condenser microphone, please input through Microphone-amp circuit.

Pin No.	Symbol	Description
1	GND	Ground (0V)
2	ANT	RF transmission output terminal
3	VCC	Supply voltage for module
4	MUTE	Audio mute control terminal Muting : High, Operating : Low
5	L-IN	L-ch audio source input terminal
6	R-IN	R-ch audio source input terminal
7	GND	Ground (0V)
8	DATA	Serial data input terminal
9	CLK	Serial clock input terminal
10	CE	Chip enable input terminal

6. PLL FM Stereo Radio(Transmitter) Module Size.



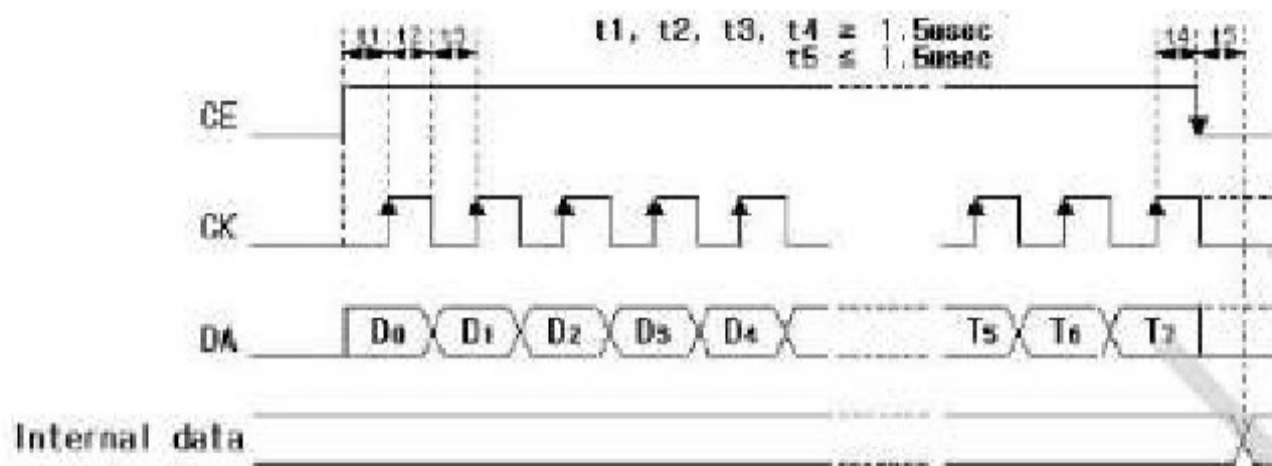
NOTE

1. ALLOWANCEN : +0.3
2. UNIT : mm

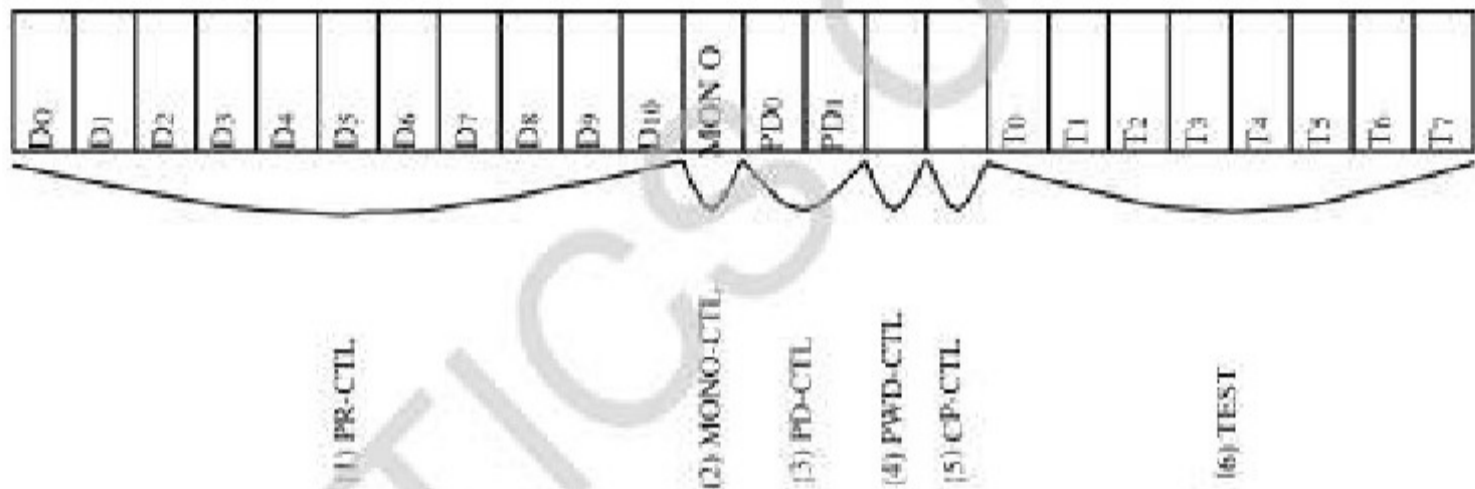
PIN No.	CONNECTION
1	GND
2	ANT
3	VCC
4	MUTE
5	L-IN
6	R-IN
7	GND
8	DATA
9	CLK
10	CE

7. PLL FM Stereo Radio(Transmitter) Module Control Format.

- Input of the serial data



- Composition of the serial data



- Explanation of the serial data

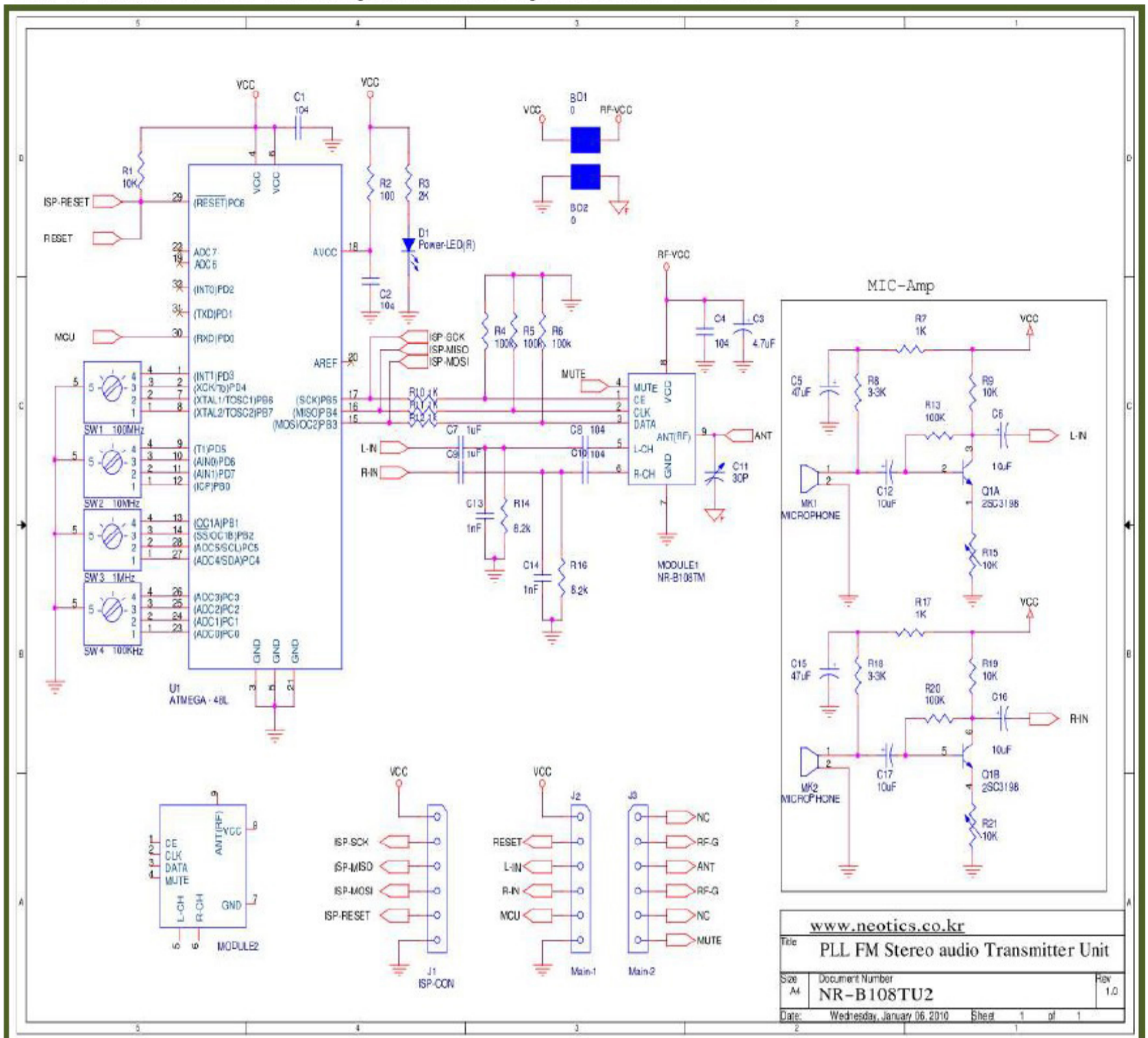
NO	Control unit / Data	Contents																																				
(1)	PROGRAM COUNTER D ₀ - D ₄	<p>It is the data which sets the program counter number of the dividing. This data can set a transmission frequency.</p> <p>It is binary value. It sets D₀ with MSB and it sets D₄ LSB.</p> <p>Example) In the case of 99.7MHz oscillation. $99.7\text{MHz} \div 100\text{kHz}(\text{freq}) = 997 \rightarrow 3\text{E}5(\text{HEX})$</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 0 15px;">5</td> <td style="padding: 0 15px;">E</td> <td style="padding: 0 15px;">3</td> </tr> </table> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 0 5px;">1</td><td style="padding: 0 5px;">0</td><td style="padding: 0 5px;">1</td><td style="padding: 0 5px;">0</td><td style="padding: 0 5px;">0</td><td style="padding: 0 5px;">1</td><td style="padding: 0 5px;">1</td><td style="padding: 0 5px;">1</td><td style="padding: 0 5px;">1</td><td style="padding: 0 5px;">1</td><td style="padding: 0 5px;">0</td> </tr> <tr> <td style="padding: 0 5px;">D₀</td><td style="padding: 0 5px;">D₁</td><td style="padding: 0 5px;">D₂</td><td style="padding: 0 5px;">D₃</td><td style="padding: 0 5px;">D₄</td><td style="padding: 0 5px;">D₅</td><td style="padding: 0 5px;">D₆</td><td style="padding: 0 5px;">D₇</td><td style="padding: 0 5px;">D₈</td><td style="padding: 0 5px;">D₉</td><td style="padding: 0 5px;">D₁₀</td> </tr> <tr> <td colspan="5" style="text-align: left;">LSB</td> <td colspan="6" style="text-align: right;">MSB</td> </tr> </table>	5	E	3	1	0	1	0	0	1	1	1	1	1	0	D ₀	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	LSB					MSB					
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(2)	MULTIPLEXER MONO	<p>It changes a stereo and monaural operation.</p> <table border="1"> <thead> <tr> <th>MONO</th> <th>Condition of the composite signal</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Monaural operation L+R, Pilot OFF</td> </tr> <tr> <td>1</td> <td>Stereo operation L+R+(L-R), $\sin\omega_c t + P\sin(\omega_c/2)t$</td> </tr> </tbody> </table>	MONO	Condition of the composite signal	0	Monaural operation L+R, Pilot OFF	1	Stereo operation L+R+(L-R), $\sin\omega_c t + P\sin(\omega_c/2)t$									
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(3)	PHASE DETECTOR PD ₁ , PD ₂	<p>It Controls charge pump output by the phase comparator compulorily.</p> <table border="1"> <thead> <tr> <th>PD₁</th> <th>PD₂</th> <th>Charge pump out</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Usual operation</td> </tr> <tr> <td>0</td> <td>1</td> <td>Compulsion by Low</td> </tr> <tr> <td>1</td> <td>0</td> <td>Compulsion by High</td> </tr> <tr> <td>1</td> <td>1</td> <td>High impedance</td> </tr> </tbody> </table>	PD ₁	PD ₂	Charge pump out	0	0	Usual operation	0	1	Compulsion by Low	1	0	Compulsion by High	1	1	High impedance
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(4)	POWER DOWN MODE PWD	<p>It Controls soft power on / off</p> <table border="1"> <thead> <tr> <th>PWD</th> <th>Condition of power</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Power off</td> </tr> <tr> <td>0</td> <td>Power on</td> </tr> </tbody> </table>	PWD	Condition of power	1	Power off	0	Power on									
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(5)	CHARGE PUMP POLARITY CP	<p>It changes charge pump polarity</p> <table border="1"> <thead> <tr> <th>CP</th> <th>Polarity of VCO</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Positive (Passive Loop Filter)</td> </tr> <tr> <td>1</td> <td>Negative (Active Loop Filter)</td> </tr> </tbody> </table> <p style="text-align: right;">Negative Positive VCO input voltage</p>	CP	Polarity of VCO	0	Positive (Passive Loop Filter)	1	Negative (Active Loop Filter)									
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(6)	TEST MODE T ₀ , T ₁ , T ₂ , T ₃ T ₄ , T ₅ , T ₆ , T ₇	<p>It is data for the LSI test</p> <p>T₀, T₁, T₂, T₃, T₄, T₅, T₆, T₇ : 00110011 or 01110011</p>															

- Function Of test pins (T₀ ~ T₇)

Pin	Function
T ₀	Charge pump current control pin
T ₁	VCO tail current control pin
T ₂ , T ₃	RF Buffer current control pin
T ₄ , T ₅	Pilot signal level control pin
T ₆ , T ₇	Bias current control pin

8. PLL FM Stereo Radio(Transmitter) Module Circuit.



***** Caution*****

1. Check the features first to connect with other equipment.
2. This circuit is strictly tested.
3. The developer, manufacturer or dealer is not responsible for any malfunctioning/damage caused by connection with other equipment.
4. Appropriate permit /approval is required for some products utilizing this module, depending on functions and usages.