

FCC ID: NS634822-27

Technical Description :

The brief circuit description is listed as follows :

The Keyboard input is fed into the MCU U1 GPL61A then the MCU will output corresponding digital signal to LCD display and Signal Amplifier Q2 and fed into the RF module U2 TRCM8157. Inside the RF module, the digital is fed into the FSK transmitter IC GPRF2719B. Inside the FSK transmitter IC, the digital signal is fed to the VCO then modulated into the carrier frequency which is generated by a 10.24 MHz crystal, 13-bit programmable counter and decoder(PLL). Then the modulated RF signal is fed to a frequency doubler and a RF Power Amplifier. After this, the signal will output to the FSK transmitter IC. Finally, the transmission signal (26.995 MHz/27.195 MHz) is output to antenna through a power amplifier and band pass filter in the RF module.

Antenna Used :

An integral antenna (non-extendable) has been used.

- Designed for Short-Range Wireless Data Communications
- Supports up to 4.8 kbps Data Transmissions
- DC 4.5v~6v Operation Voltage
- Ready to Use OEM Module

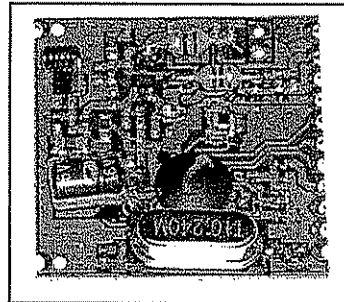
27MHz

TRANSMITTER MODULE

TRCM8157

The TRCM8157 transmitter module is ideal for short-range wireless data applications where robust operation, small size and low power consumption are required.

The TRCM8157 transmitter module includes all configuration components in a ready-to-use PCB assembly excellent for prototyping and intermediate volume production runs.



Absolute Ratings

Rating	Value	Units
VDD 4.5v~6v	6	V
DC 3v	3.3	V
Storage Temperature	-50 to +100	°C
Soldering Temperature (10 seconds)	230	°C

Electrical Characteristics at 1.2 kbps FSK @ 4.5v with 50 ohm load

Characteristic	Minimum	Typical	Maximum	Units
Frequency tolerance			±200	Hz
Modulation type	FSK			
Data rate			4.8	Kbps
Power supply voltage range VDD 4.5v~6v	3		6	V
Power supply voltage range DC 3V	2.8	3	3.3	V
Operating ambient temperature	0		60	°C
Output power		40		mW
Operating current(Transmission)		50		mA
PLL lock up time		30 (NQL=LOW) 110 (NQL=HIGH)		ms ms
Harmonic		-50		dBc

TRCM8157-001-02

Using TRCM8157-001-02 for transmitter (Tx)

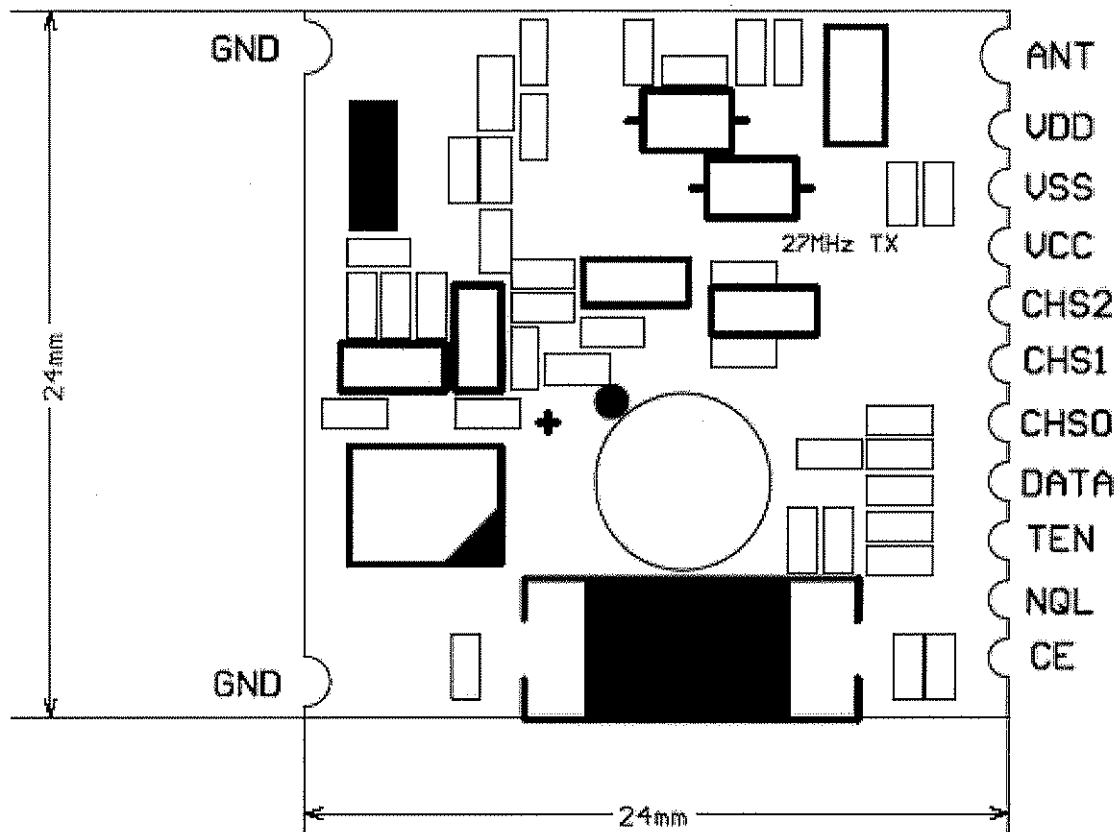
Coding Table			Tx
CHS2	CHS1	CHS0	MHz
0	0	0	27.195
0	0	1	27.145
0	1	0	27.095
0	1	1	27.045
1	0	0	27.255
1	0	1	27.225
1	1	0	26.975
1	1	1	26.995

Pin Descriptions

Pin	Name	Description
1	ANT	This pin is connected directly to the transmitter Antenna.
2	VDD DC 4.5v~6v	This pin is positive transmitting power supply voltage pin for the module. The operating voltage range is 4.5v~6v.
3	VSS	This is the supply return pin.
4	VCC DC 3v	This pin is positive supply voltage pin for the module. The operating voltage range is 2.8v~3.3v.
5	CHS2	This pin is the frequency selection pin, internal pull low.
6	CHS1	This pin is the frequency selection pin, internal pull low.
7	CHS0	This pin is the frequency selection pin, internal pull low.
8	MODI	This pin is the data input pin, 0V=Low and 3V=High.
9	TEN	This pin is the transmission control pin, High for transmission.
10	NQL	PLL lock up time control pin, normally pull low.
11	CE	Normally connected to pin 4 VCC DC 3V

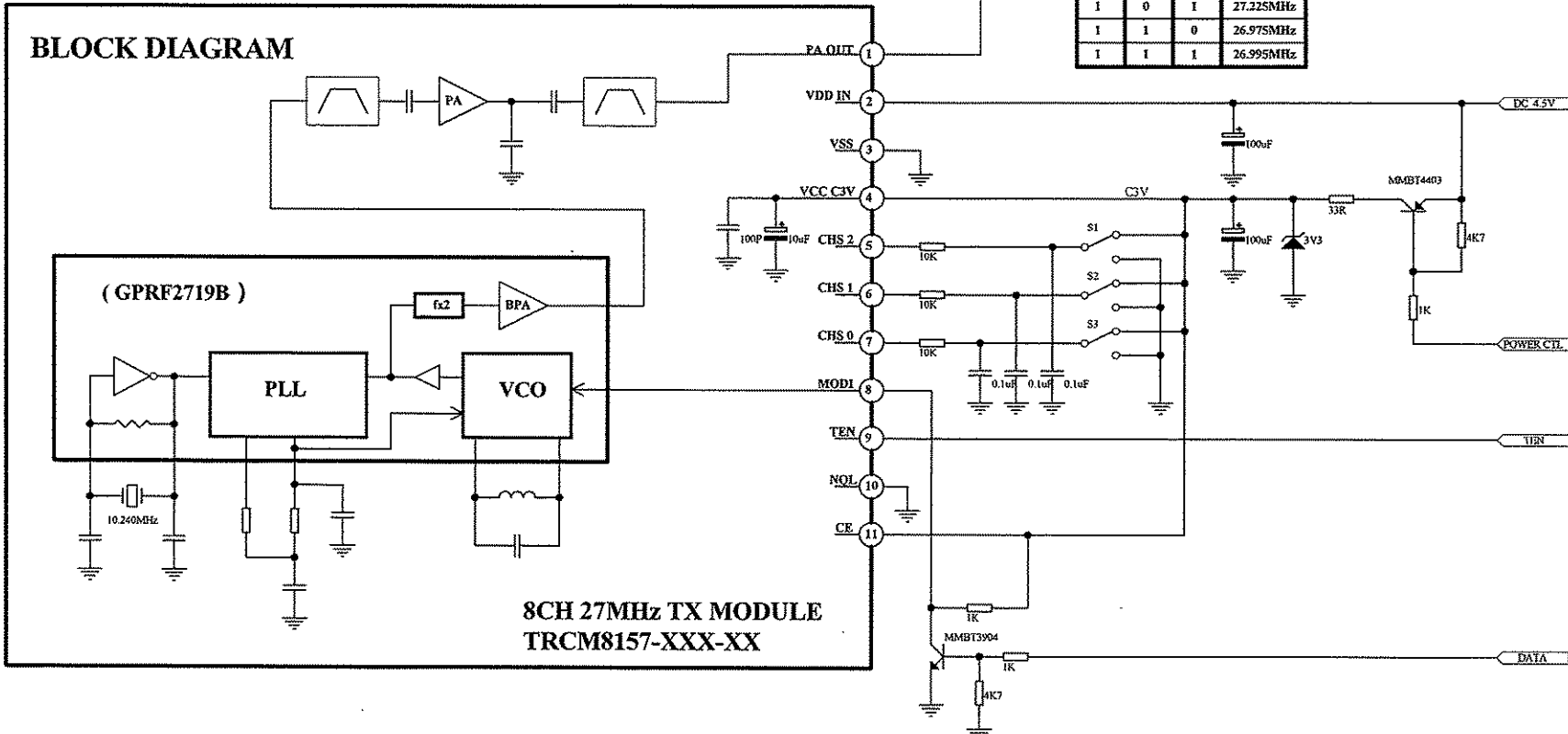
TRCM8157-27M-01

27MHZ TX MODULE



Test Circuit

Coding Table			TX
CHS2	CHS1	CHS0	MHz
0	0	0	27.195MHz
0	0	1	27.145MHz
0	1	0	27.095MHz
0	1	1	27.045MHz
1	0	0	27.255MHz
1	0	1	27.225MHz
1	1	0	26.975MHz
1	1	1	26.995MHz



27MHZ MULTI-CHANNEL FM/FSK/OOK TRANSMITTER

1. GENERAL DESCRIPTION

GPRF2719B is a highly integrated 27MHz FM / FSK (Frequency Modulation / Frequency-Shift Keying) transmitter IC for the short distance wireless communication. It supports eight channels operation via three-pin configurations -CHS2, CHS1, and CHS0. Users may choose any 8 channels combination from an internal PLL frequency synthesizer with metal code option. It offers a microphone amplifier and an independent frequency modulation input for constructing a FM/FSK application easily. The chip also provides a built-in 10mW RF output amplifier. GPRF2719B needs only a few passive components such as a 10.24MHz crystal for reference clock, a 2.2 μ H inductor for VCO, a LC π matching filter for RF power amplifier, and a few RC components to implement a transmitter. The GPRF2719B employs a half frequency oscillator & a frequency doubler for RF power amplifier to resolve the PLL pulling difficulty. It is a low-cost, high-performance, and fast-time-to-market solution for your RF applications.

2. APPLICATION FIELD

- Short distance voice/data communication.
- Radio control car and toy.
- Wireless mouse and keyboard.

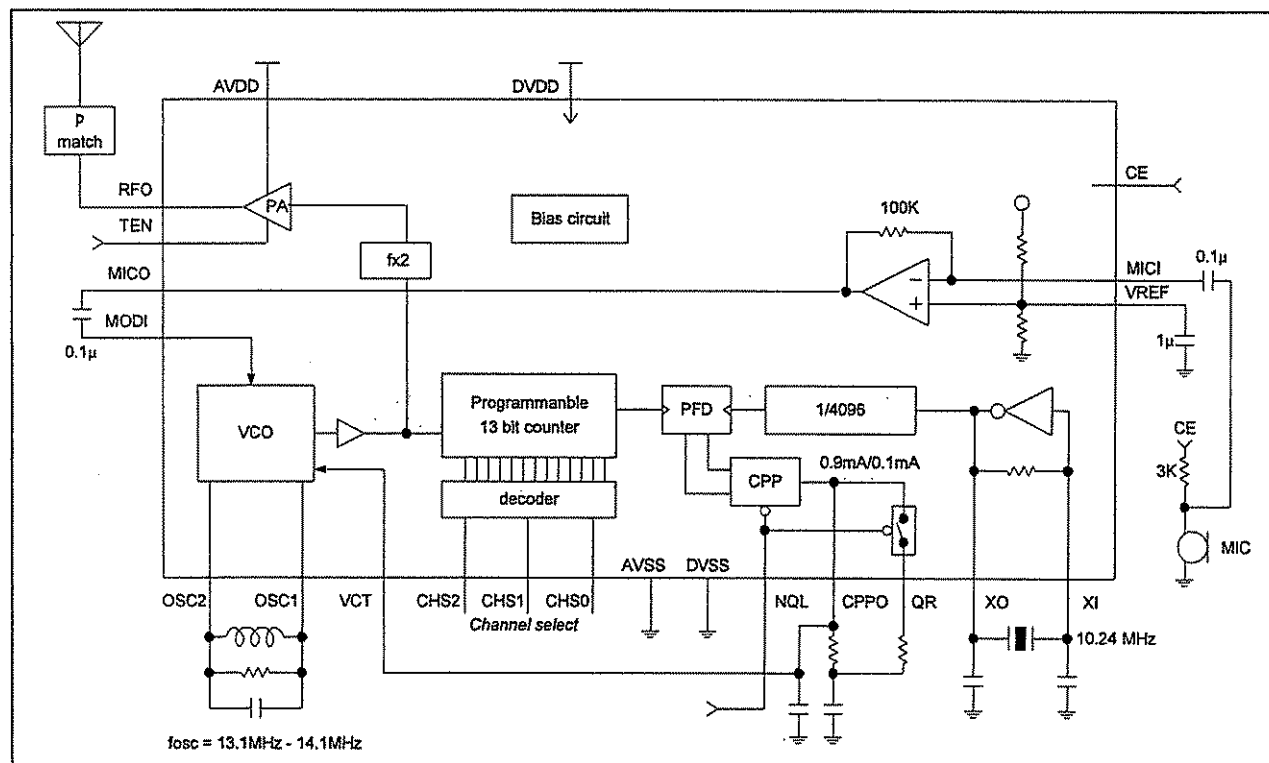
3. FEATURES

- Operating voltage: 2.2V - 3.6V
- Low current consumption: 3 - 12mA/3.0V.
- Single chip FM/FSK transmitter.
- Eight channels selectable via 3 pins; other channels can be optioned by metal code option.
- Built-in quick lock function for wireless mouse application.
- Built-in microphone amplifier.
- Chip power-down function
- -10dBm ~ +10dBm RF output power depends on external matching circuit
- Full ESD protection

4. PACKAGES

- SOP 16: GPRF2719B - PS032
- SOP 24: GPRF2719B - PS101
- Die form: 22 pins

5. BLOCK DIAGRAM



5.1. Block Functional Descriptions

The GPRF2719B is a single chip RF transmitter IC featuring frequency synthesizer, voltage control oscillator, crystal oscillator, microphone amplifier, and RF power amplifier.

5.1.1. Crystal oscillator

Two input pins, XI and XO, are connected with a 10.240MHz (30ppm is recommended) crystal to produce 2.5KHz reference frequency (generated by 1/4096 divider).

5.1.2. Decoder

It decodes CHS0, CHS1, and CHS2 to acquire 8 different channels defined by metal option.

5.1.3. 13-bit programmable counter

It divides the VCO with the numbers of 5306 - 5449 from decoder, as shown in the 27MHz channel table.

If 13-bit counter $N = 5400$, $X'TAL = 10.240\text{MHz}$, we get, RF out frequency = $2 * N * X'TAL / 4096 = 27.000\text{MHz}$.

5.1.4. PFD

Phase Frequency Detector with internal charge pump (CPP) circuit. The PLL is built in with a quick lock function. While NQL = "0", the CPP driving current is increased to 0.9mA and then PLL

works in wide loop bandwidth, i.e. the loop bandwidth increases 3 times while NQL = "0". Once the internal switch between QR & CPPO is turned on, the loop Q may be optimized with an extra resistance in QUICK_LOCK interval.

5.1.5. VCO

OSC1, and OSC2. Use external LC tank ($L = 2.7\mu\text{H}$, $C = 30\text{pF}$) to complete voltage control oscillator. It also provides a closed loop modulation. The VCO operates in one half of designated frequency.

5.1.6. PA

RF Power Amplifier. It is driven by a frequency doubler to offer a 10mW output power to antenna with very low harmonic distortion. User may use various impedance match filter to obtain 10mW RF or a lower RF power output. The PA drains a supply current 8.0mA when it outputs 10mW RF power, and it will drain a lower supply current when it is matched for a lower RF output power. The supply voltage of PA predriver is controlled by TEN, which pull high resistance should be less than $1.0\text{K}\Omega$.

5.1.7. Microphone amplifier

MICI, and MICO. It is an inverted-amplifier with limiter output.