

Wireless Audio Link IC

BH1417F

The BH1417F is a FM stereo transmitter IC that transmits simple configuration. The IC consists of a stereo modulator for generating stereo composite signals and a FM transmitter for broadcasting a FM signal on the air. The stereo modulator generates a composite signal which consists of the MAIN, SUB, and pilot signal from a 38kHz oscillator. The FM transmitter radiates FM wave on the air by modulating the carrier signal with a composite signal. Frequency is set for North America.

●Applications

Wireless speakers, Personal computer(sound board), Game machine, CD changer, Car TV, Car navigation

●Features

- 1) It is possible to improve the timbre because it has the pre-emphasis circuit, limiter circuit, and the low-pass filter circuit.
- 2) Built-in pilot-tone system FM stereo modulator circuit.
- 3) The transmission frequency is stable because it has a PLL system FM transmitter circuit.
- 4) PLL controls data input in parallel (4bits, 14ch for North America).

●Absolute maximum ratings (Ta = 25°C, In measurement circuit.)

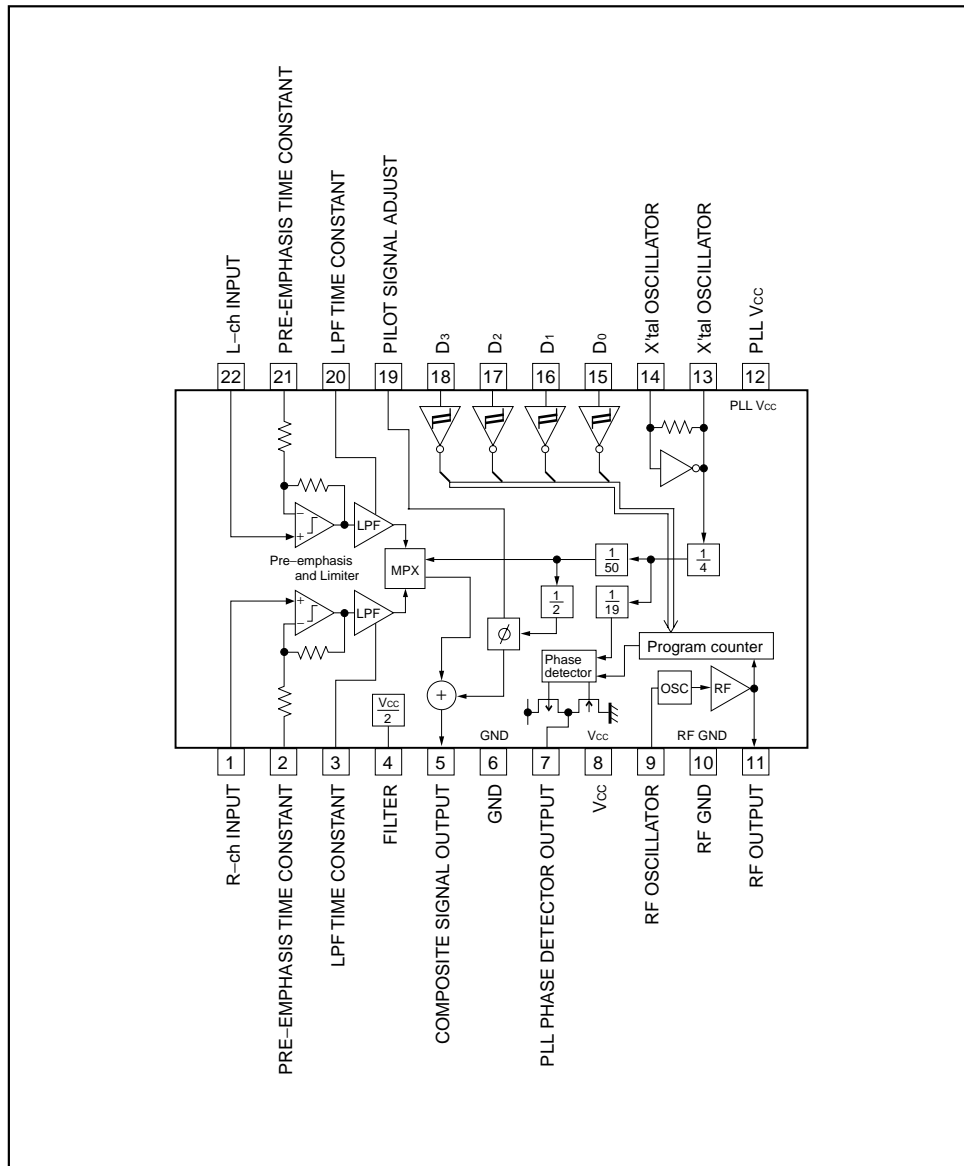
Parameter	Symbol	Limits	Unit	Conditions
Supply voltage	V _{CC}	+7.0	V	Pin8,12
Data input voltage	V _{IN-D}	-0.3~V _{CC} +0.3	V	Pin15,16,17,18
Phase comparator output voltage	V _{OUT-P}	-0.3~V _{CC} +0.3	V	Pin7
Power dissipation	P _d	450*	mW	
Storage temperature	T _{stg}	-55~+125	°C	

* Derating : 4.5mW/°C for operation above Ta=25°C.

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Operating supply voltage	V _{CC}	4.0	–	6.0	V	Pin8,12
Operating temperature	T _{opr}	-40	–	+85	°C	
Audio input level	V _{IN-A}	–	–	-10	dBV	Pin1,22
Audio input frequency band	f _{IN-A}	20	–	15k	Hz	Pin1,22
Pre-emphasis time constant set up range	τ _{PRE}	–	–	155	μs	Pin2,21
Transmission frequency(200kHz step)	f _{TX}	87.7 106.7	–	88.9 107.9	MHz	Pin9,11
Control terminal "H" level input voltage	V _{IH}	0.8V _{CC}	–	V _{CC}	V	Pin15,16,17,18
Control terminal "L" level input voltage	V _{IL}	GND	–	0.2V _{CC}	V	Pin15,16,17,18

●Block diagram



Multimedia ICs

● Pin descriptions

Pin No.	Pin descriptions	Equivalent circuit	DC (V)
1	R-ch audio source input terminal It cuts DC with the capacitor and it inputs R-ch audio signal.		$\frac{1}{2}V_{CC}$
22	L-ch audio source input terminal It cuts DC with the capacitor and it inputs L-ch audio signal.		$\frac{1}{2}V_{CC}$
2,21	Pre-emphasis time constant terminal It connects a capacitor for the time constant of pre-emphasis. $\tau=22.7k\Omega \times C$		$\frac{1}{2}V_{CC}$
3,20	LPF time constant terminal This is 15kHz LPF. It connects a 150pF capacitor.		$\frac{1}{2}V_{CC}$
4	Filter terminal It is a ripple filter for the reference voltage of the audio part.		$\frac{1}{2}V_{CC}$
5	Composite signal output terminal It connects to the FM modulator.		$\frac{1}{2}V_{CC}$
6	GND	—	GND
7	PLL phase detector output terminal It connects to the PLL LPF circuit.		—
8	Power supply terminal	—	V_{CC}

Multimedia ICs

Pin No.	Pin descriptions	Equivalent circuit	DC (V)
9	RF oscillator terminal This is the base terminal of the colpitts oscillator. It connects time constant of the oscillation.		$\frac{4}{7}V_{CC}$
10	RF GND		GND
11	RF transmission output terminal It connects to the antenna through BPF.		$V_{CC} - 1.9$
12	PLL power supply terminal		V_{CC}
13,14	X'tal oscillator terminal It connects a 7.6MHz crystal oscillator.		—
15	Parallel data set up terminal D ₀		—
16	Parallel data set up terminal D ₁		
17	Parallel data set up terminal D ₂		
18	Parallel data set up terminal D ₃		
19	Pilot signal adjust terminal		$\frac{1}{2}V_{CC}$

Multimedia ICs

●Electrical characteristics (Unless otherwise noted, Ta = 25°C, V_{CC} = 5.0V Signal source : f_{IN} = 400Hz)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Quiescent current	I _Q	14	20	28	mA		Fig.1
Channel separation	Sep	25	40	—	dB	V _{IN} =-20dBV L→R,R→L	Fig.2
Total harmonic distortion	THD	—	0.1	0.3	%	V _{IN} =-20dBV L+R	Fig.3
Channel balance	C.B	-2	0	+2	dB	V _{IN} =-20dBV L+R	Fig.2
Input output gain	G _v	-2	0	+2	dB	V _{IN} =-20dBV L+R	Fig.3
Pilot modulation rate	M _P	12	15	18	%	V _{IN} =-20dBV,L+R Pin5	Fig.3
Sub carrier rejection ratio	SCR	—	-30	-20	dB	V _{IN} =-20dBV L+R	Fig.3
Pre-emphasis time constant	τ _{PRE}	40	50	60	μs	V _{IN} =-20dBV L+R	Fig.3
Limiter input level	V _{IN(LIM)}	-16	-13	-10	dBV	Output level at 1dB gain compression	Fig.4
LPF cut off frequency	f _{C(LPF)}	12	15	18	kHz	V _O =-3dB Pin2,21 Open	Fig.5
Transmission output level	V _{TX}	96	99	102	dBμV	f _{TX} =107.9MHz	Fig.6
"H" level input current	I _{IH}	—	—	1.0	μA	Pin15,16,17,18 V _{IN} =5V	Fig.7
"L" level input current	I _{IL}	-1.0	—	—	μA	Pin15,16,17,18 V _{IN} =0V	Fig.7
"H" level output voltage	V _{OH}	V _{CC} -1.0	V _{CC} -0.15	—	V	Pin7 I _{OUT} =-1.0mA	Fig.8
"L" level output voltage	V _{OL}	—	0.15	1.0	V	Pin7 I _{OUT} =1.0mA	Fig.8
"off" level leak current1	I _{OFF1}	—	—	100	nA	Pin7 V _{OUT} =5V	Fig.9
"off" level leak current2	I _{OFF2}	-100	—	—	nA	Pin7 V _{OUT} =GND	Fig.9

Multimedia ICs

● Measurement circuits

Quiescent current

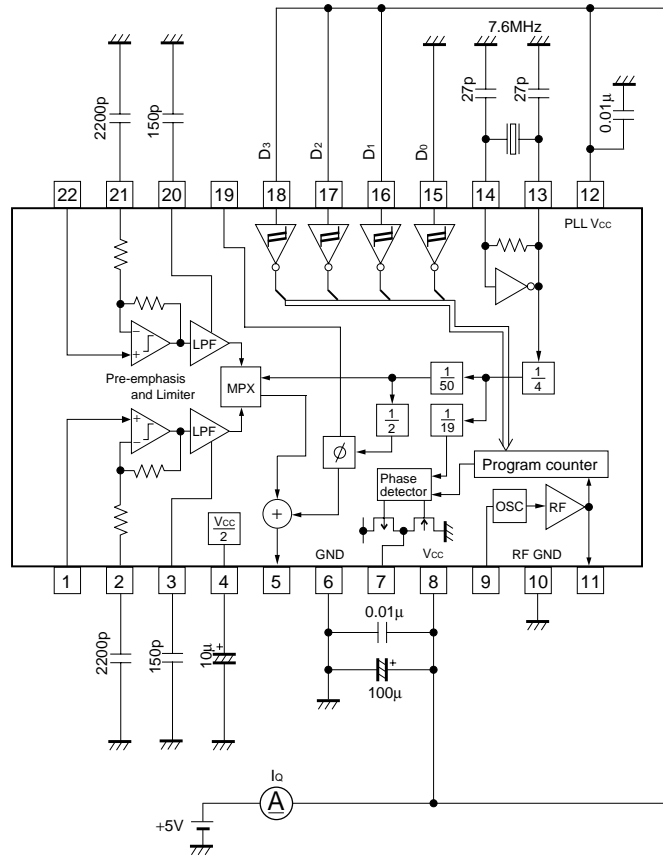


Fig.1

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- Total harmonic distortion
- Input output gain
- Pilot index of modulation
- Sub carrier rejection ratio
- Pre-emphasis time constant

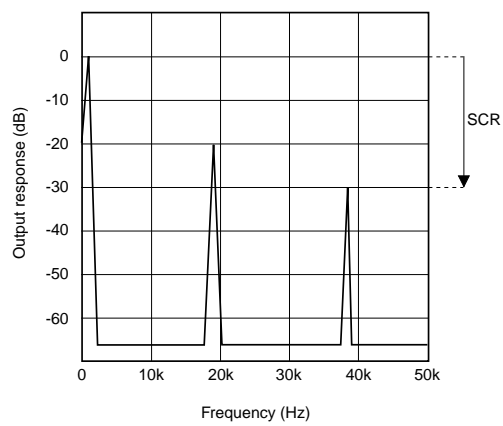
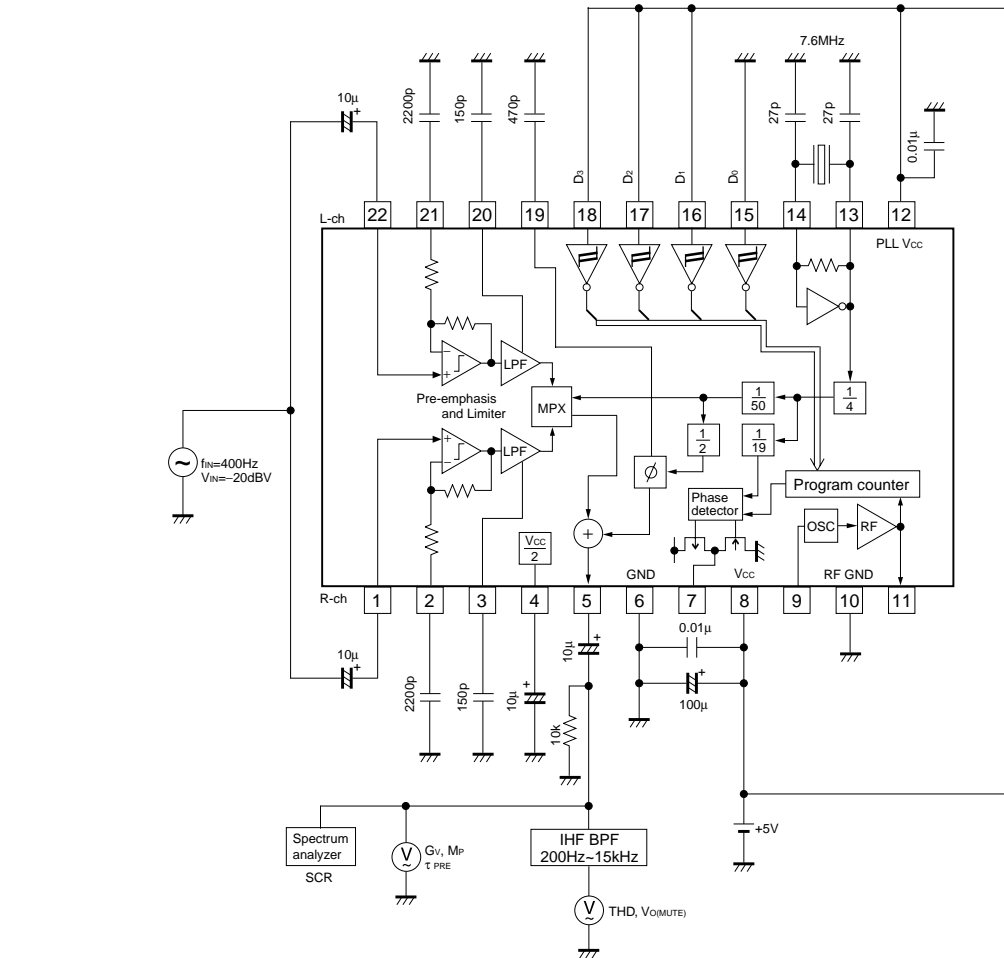


Fig.3

Limiter input level

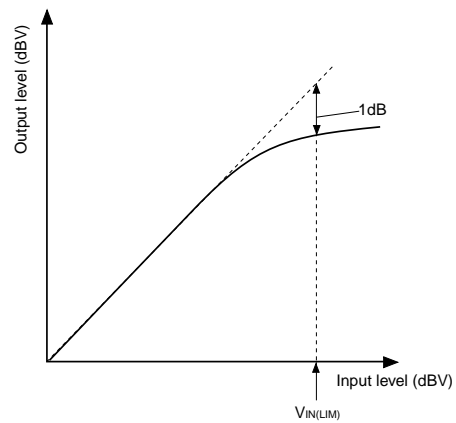
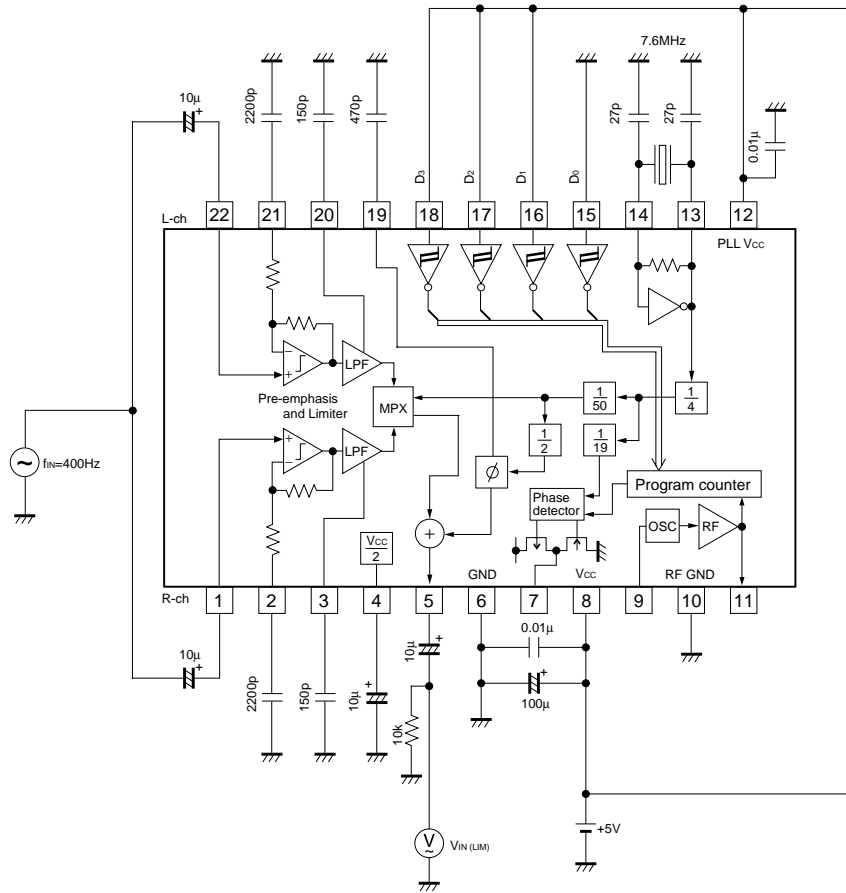


Fig.4

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LPF cut off frequency

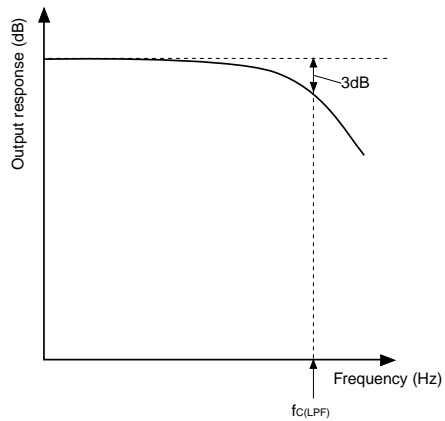
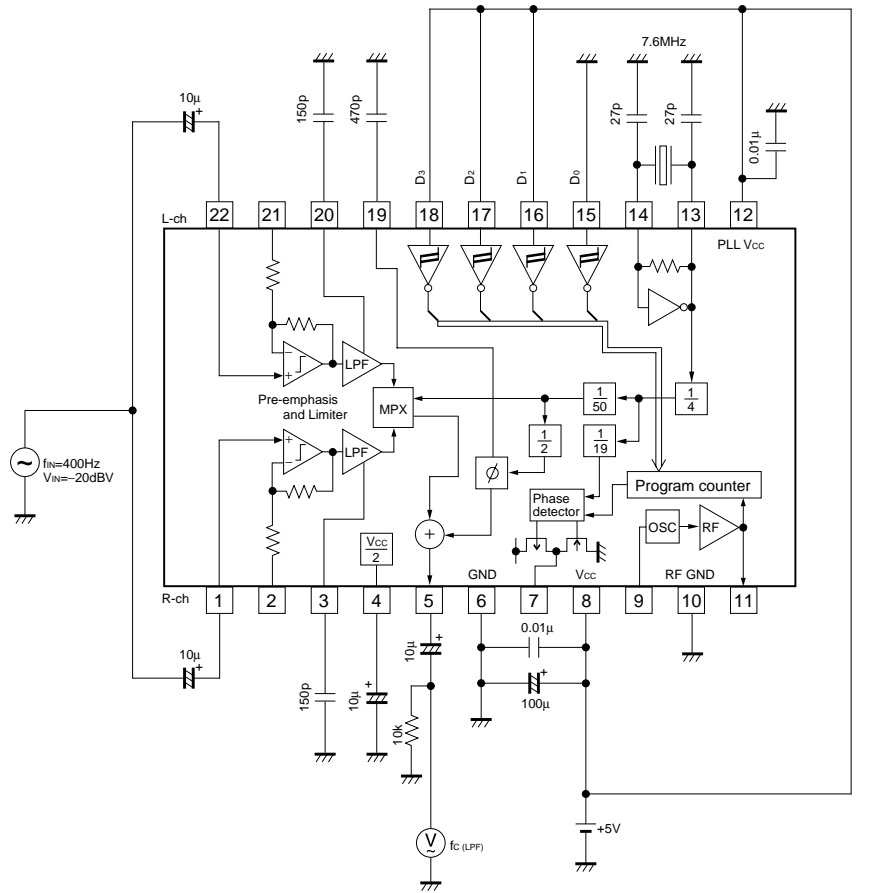


Fig.5

Transmission output level

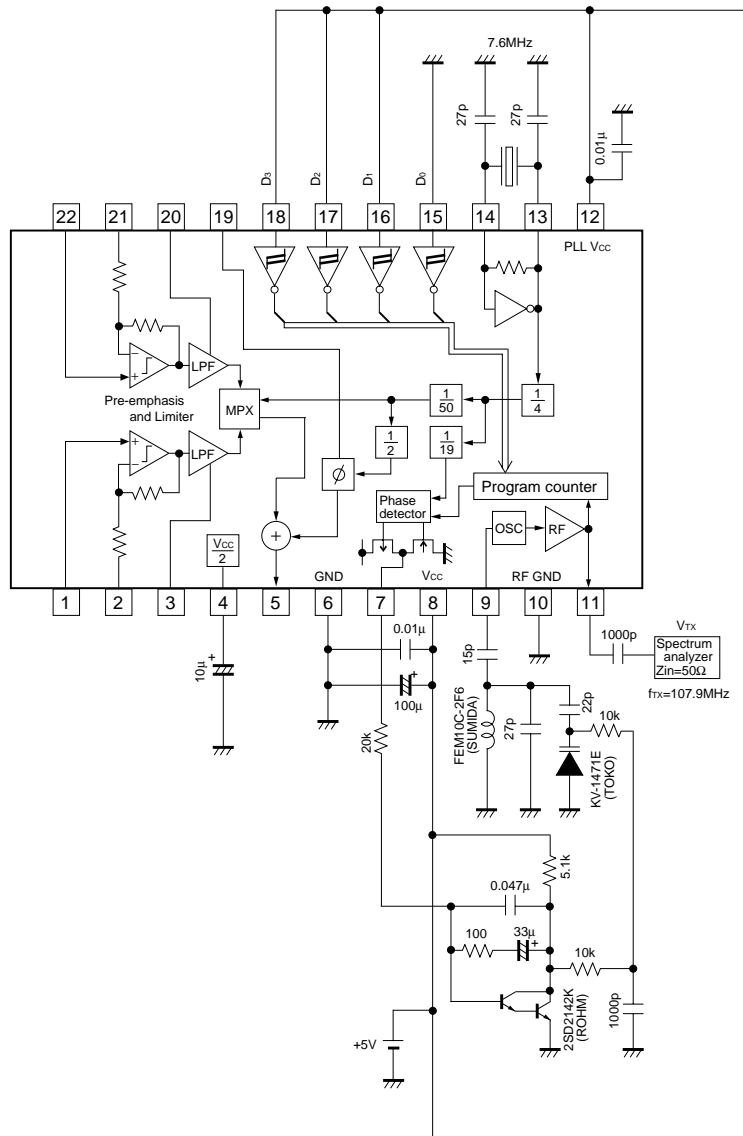


Fig.6

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“H” level input current
 “L” level input current

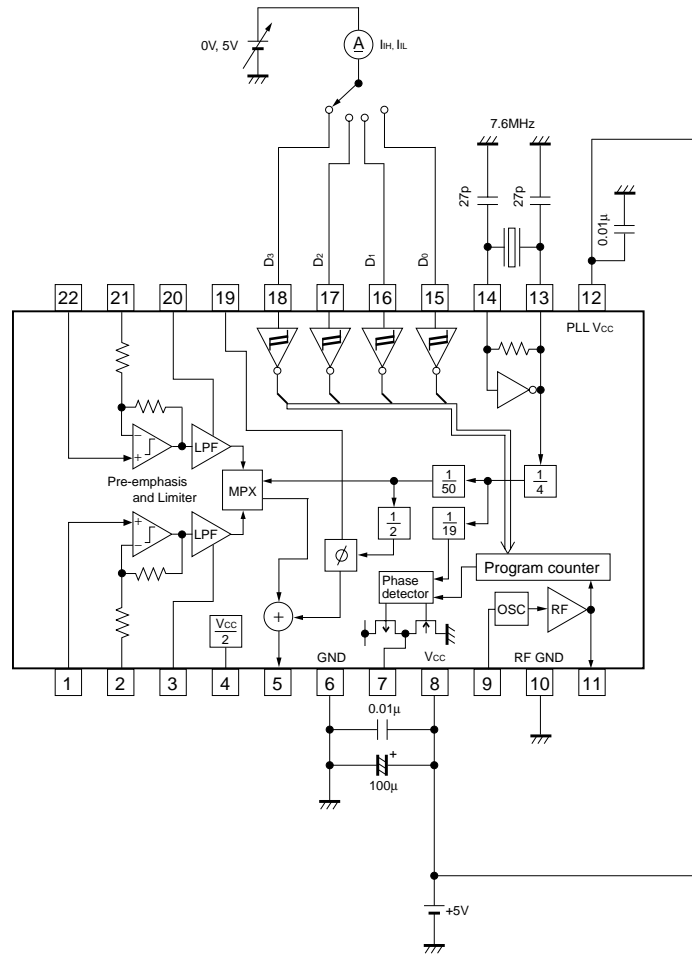


Fig.7

Multimedia ICs

“H” level output voltage
 “L” level output voltage

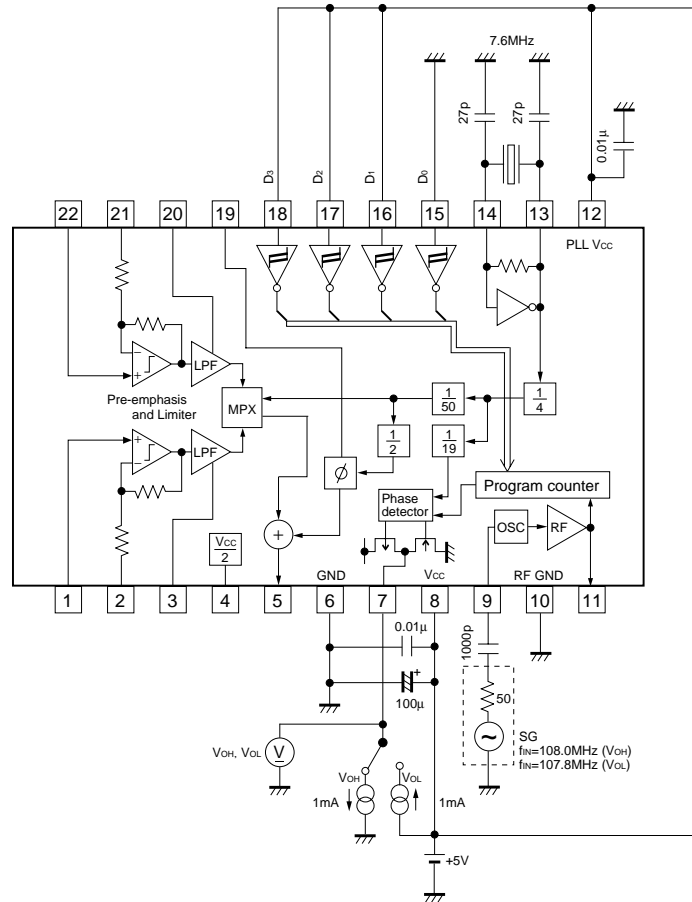


Fig.8

“off” level leak input current

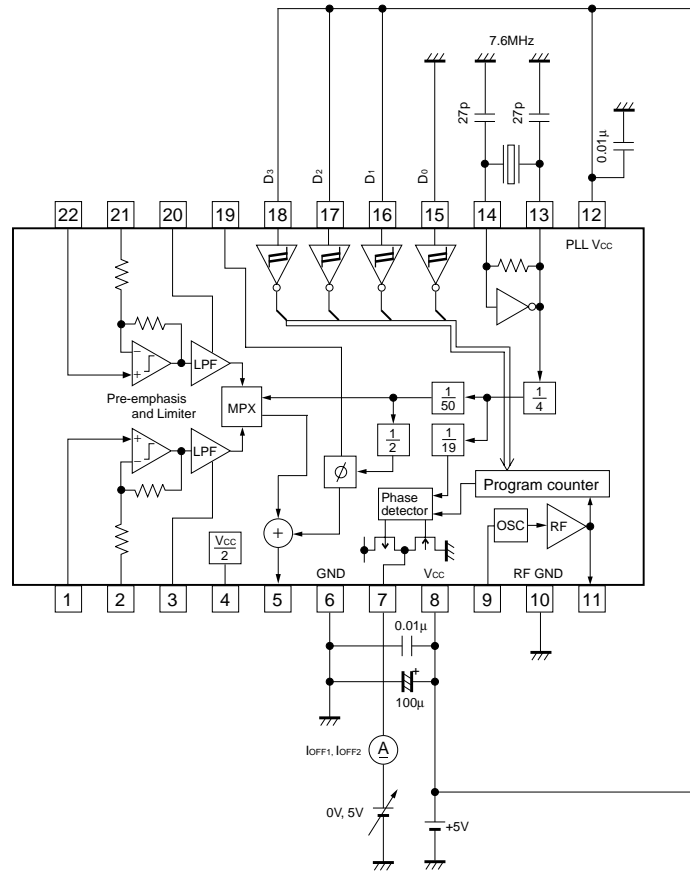


Fig.9

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● Application circuit

US BAND (88.0MHz~89.2MHz)

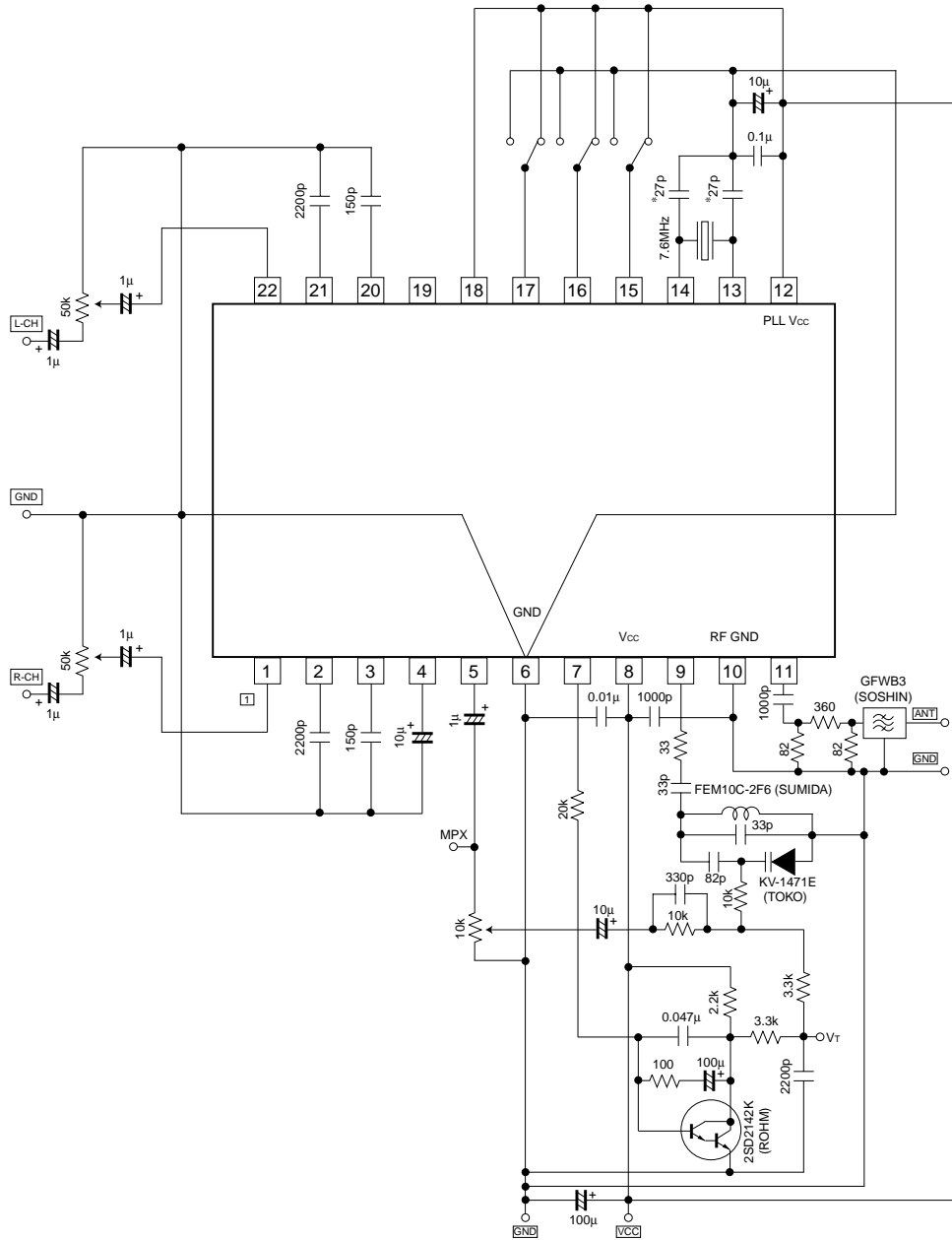


Fig.10

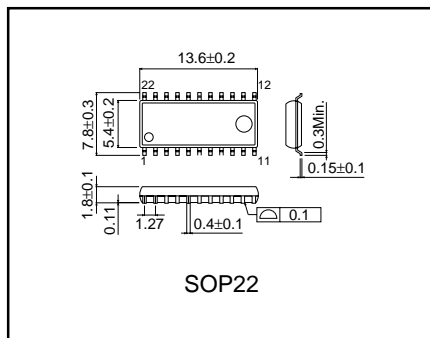
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●Circuit operation

Parallel data

Control data				Frequency
D ₀ (Pin15)	D ₁ (Pin16)	D ₂ (Pin17)	D ₃ (Pin18)	
L	L	L	L	87.7MHz
H	L	L	L	87.9MHz
L	H	L	L	88.1MHz
H	H	L	L	88.3MHz
L	L	H	L	88.5MHz
H	L	H	L	88.7MHz
L	H	H	L	88.9MHz
H	H	H	L	PLL stops. Phase comparator terminal supports high impedance.
L	L	L	H	106.7MHz
H	L	L	H	106.9MHz
L	H	L	H	107.1MHz
H	H	L	H	107.3MHz
L	L	H	H	107.5MHz
H	L	H	H	107.7MHz
L	H	H	H	107.9MHz
H	H	H	H	PLL stops. Phase comparator terminal supports high impedance.

●External dimensions (Units : mm)



This datasheet has been download from:

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Datasheets for electronics components.