KB8527B 1 CHIP CLP SUBSYSTEM IC

INTRODUCTION

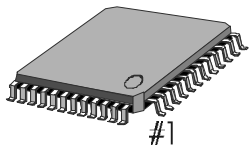
KB8527B is a monolithic circuit which can be used in high performance 60MHz MCA type CLP System.

The KB8527B is a subsystem IC for FM / FSK receiving systems and a complete one chip FM / FSK receiver IC for 60MHz system. It`s feature includes receiving functions for FM / FSK systems, a compandor to remove external noise, and PLL (Phase Lock Loop) of channel selection which blocks surrounding frequency interference.

The KB8527B can be used with a wide range of FM / FSK VHF bandwidth systems, including cordless phone, and the narrow band voice and data sending / receiving systems.

To make applications easily and simply, pheripheral parts are minimized.

48 -QFP- 1010E



ORDERING INFORMATION

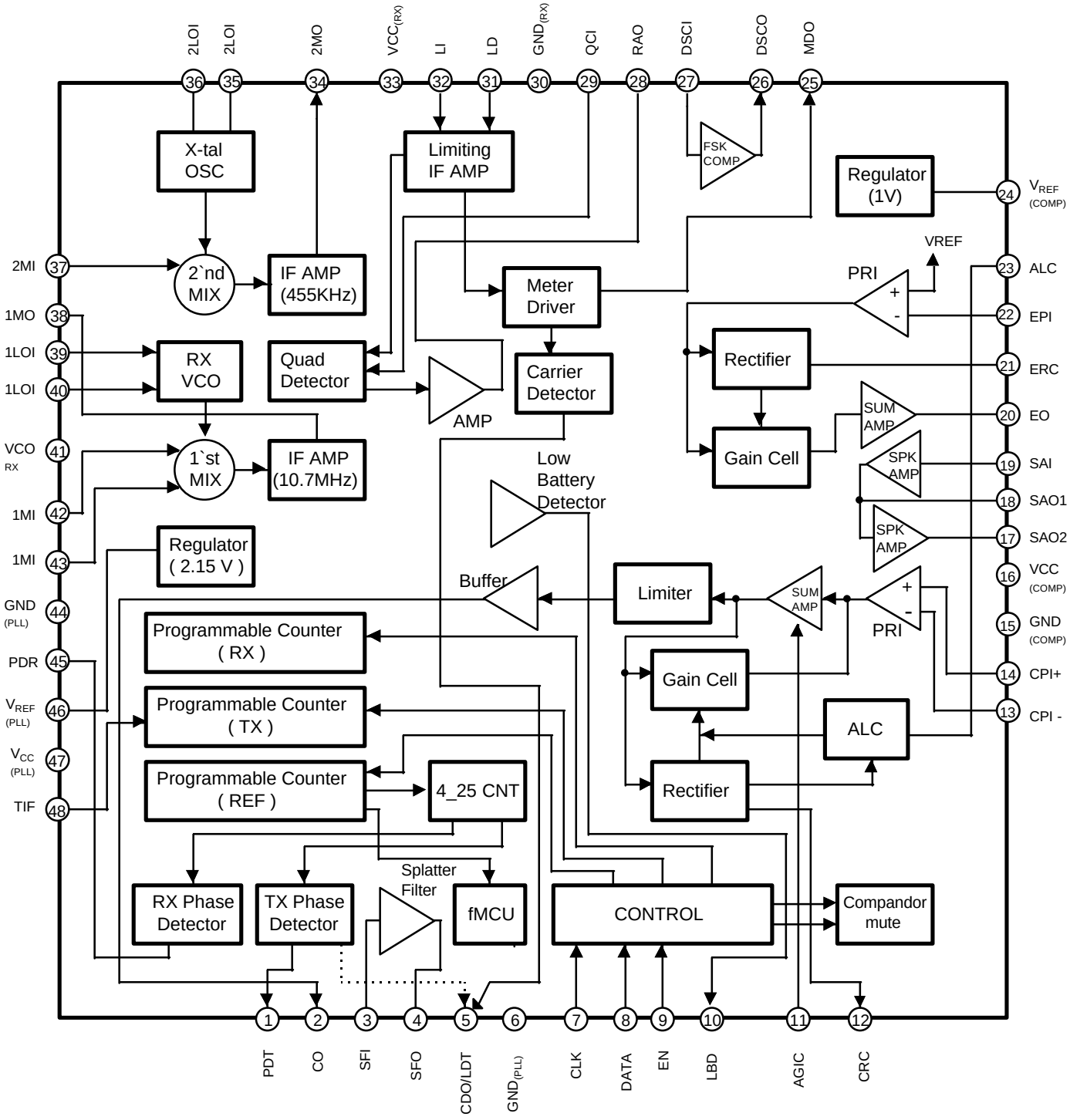
Device	Package	Operating Temperature
+ KB8527BQ	48 - QFP - 1010E	-20°C ~ + 70°C

+ : New product

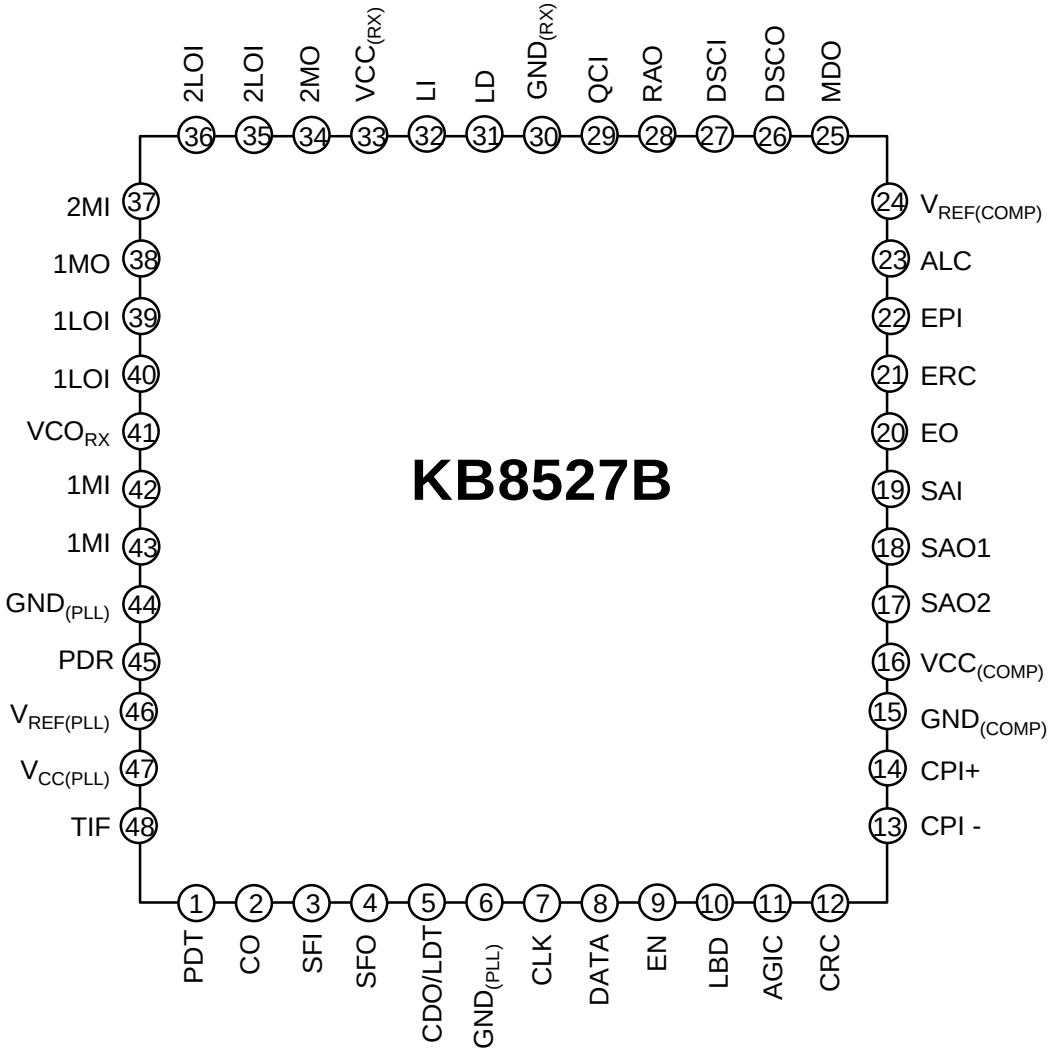
FEATURES

- Operating voltage range : 2.0V ~ 5.5V
- Typical supply current : 13.5mA at 3.6V
- Built - in low battery detection function (selectable 3.45V, 3.3V, 3.0V, 2.2V, 2.1V)
- Built - in speaker amplifier
- Built - in splatter filter
- Built - in dual conversion receiver, compandor and universal PLL
- FM Receiver
  - Complete dual coversion circuit
  - Excellent input sensitivity (0.7μVrms at 20dB SINAD)
- Compandor
  - Easy gain control to use external component
  - Included ALC (Automatic Level Control) circuit
  - Included Mute logic
- Universal PLL
  - RX (TX) divided counter range : 1/16 ~ 1/16383
  - Reference frequency divided counter range : 1/16 ~ 1/4095
  - Lock detector signal output
  - Serial interface with MICOM for controlling each block

BLOCK DIAGRAM



PIN CONFIGURATION



PIN DESCRIPTION

Pin No	Symbol	Description
1	PDT	Phase detector output terminal of the transmitter at PLL. If $f_{TX} > f_{REF}$ or f_{TX} is leading → the output is negative pulse If $f_{TX} < f_{REF}$ or f_{TX} is lagging → the output is positive Pulse if $f_{TX} = f_{REF}$ and the same phase → the output is High Impedance
2	CO	Compressor output terminal of compandor ; connected to the splatter filter amp input terminal.
3	SFI	Input terminal of Splatter filter amp.
4	SFO	Output terminal of Splatter filter amp.
5	LDT/ CDO	LDT : Output terminal of transmitter lock detector in PLL block. Output is low if PLL is in lock state and is high if PLL is in unlock state. CDO : As an output terminal of the carrier detector buffer, connected to (RSSI) terminal of MICOM. This pin outputs the contents of Meter Driver buffer which is turned on / off, according to the signal level detected by Meter Driver.
6	GND_{PLL}	Ground. Ground of logic section at PLL.
7 8 9	CLK DATA EN	These pins are serial interface terminals for programming reference counter, auxiliary reference counter, TX channel counter, RX channel counter and control block that controls internal each block with test mode and power saving mode.
10	LBD	Low Battery Detecting output. (Selectable 3.45V, 3.3V, 3.0V, 2.2V, 2.0V). During the normal operation, output level is low, but it is high at low battery detection. As this pin is an open collector type, it requires a pull - up resister.
11	AGIC	This pin bypasses AC elements at the feedback loop which come from the SUM amp block of COMPRESSOR. A capacitor should be connected between this terminal and GND. (C = 2.2 uF)

Pin No	Symbol	Description
12	CRC	Converts waveform from the full wave rectifier to DC element at the rectifier block of Compressor. (RC = 33 msec)
13	CPI -	Pre - amp inverting input terminal of Compressor. Adjusts the negative feedback loop gain. (in application, gain is 5)
14	CPI +	Pre - amp non - inverting input terminal of Compressor. Used as an input terminal for voice signals.
15	GND (COMP)	Ground. Ground of Compandor.
16	Vcc (COMP)	Supply voltage. Power supply terminal of Compandor.
17	SAO 2	Output terminal of speaker amp 2. This signal is the same as SAO1 output, but phase difference is 180^{o} for SAO1. DC voltage level is (Vcc - 0.7V) / 2.
18	SAO 1	Output terminal of Speaker amp 1. DC voltage level is (Vcc - 0.7V) / 2.
19	SAI	Speaker Amp 1 input terminal. Between this terminal and Expander output terminal, uses a AC coupled.
20	EO	Output terminal of Expander, from which a regenerated voice signals are emitted.
21	ERC	Converts waveform from the full wave rectifier to DC element at the rectifier block of Expander. (RC = 33 msec)
22	EPI -	Pre - amp inverting input terminal of Expander. Adjusts the negative feedback loop gain. (in application, gain is 5)
23	ALC	Reference current input terminal of Automatic Level Control (ALC) ; Adjusts THD of compressor output voltage to less than 3 % or limites the frequency deviation of TX if the input is higher than a certain level. The ALC circuit may be turned off depending on the ALC reference current or the magnitude of output voltage may be limited if it is higher than a certain level. (Iref = 8uA, Ralc = 120KΩ)

Pin No	Symbol	Description
24	$V_{REF(COMP)}$	Reference voltage (V_{REF}= 1V). Supplies a regulator voltage to the Compressor and Expander of COMPANDER.
25	MDO	Output terminal of the Meter Driver. Amplitude of RF input signal for useful frequency is detected by Meter Driver circuit. The Meter Driver circuit has perfect linear characteristic of 60 dB range for input signal level. (0.1μV/ dB)
26	DSCO	Output terminal of Data Slicing comparator. Seperates Frequency Shift Keying (FSK) serial data and executes data shapping and limiting.
27	DSCI	Input terminal of Data slicing comparator. Non - inverting type with the negative input terminal biased to 1/2 Vcc.
28	RAO	Recovered Audio Output terminal. Voice signals detected by the Quadrature Detector are amplified and then output through this terminal.
29	QCI	Quadrature coil input terminal. The 455 KHz oscillator circuit is an Lp=680uH, Cp=180pF valued LC tank circuit. Voice signals are detected by mixture of 455 KHz (by phase difference) which is converted from mixer 2.
30	GND_{RX}	Ground . Ground for Receiver.
31 32	LD LI	Limiter input and decoupling terminal. Removes amplitude modulation elements caused by fading or FM signal noise. Limiting IF amplifies and limits the second intermediate frequency, 455 KHz. The input impedance of the limiting IF amplifier is set to 1.5 KΩ While FM waves are transmitted with constant magnitude, their magnitudes are slightly modulated due to reflection from obstacles, fading phenomenon, noise wave, and mixing with AM wave elements before entering the receiver`s antenna. The limiter makes amplitude uniform by removing these AM wave elements.

Pin No	Symbol	Description
33	$V_{CC(RX)}$	Supply voltage. Supplies power to the Receiver.
34	2MO	Output terminal of Mixer 2. Second intermediate frequency (455 KHz), generated by mixing first intermediate frequency (10.7 MHz) and Second Local Oscillator is output.
35 36	2LOI 2LOI	Input terminal of second local oscillator. Generates second local oscillator frequency to convert output from mixer 1 (10.7 MHz) into second intermediate frequency. It is an oscillator with crystal of 10.24 MHz and 10.245 MHz.
37	2MI	Input terminal of mixer 2. Output from mixer 1 is entered to mixer 2 input terminal via 10.7 MHz ceramic filter. Second mixer converts frequency to second inter-mediate frequency (455 KHz : AM IF).
38	1MO	Output terminal of mixer 1. The signal from mixer 1 and the frequency of the first local oscillator are mixed to produce the first intermediate frequency, which is the output through this terminal. The output terminal is an emitter follower with an output impedance of 330Ω to match the 330Ω input / output impedance of the 10.7 MHz ceramic filter.
39 40	1LOI 1LOI	Input terminal of the first local oscillator. The local oscillator is a voltage controlled oscillator. local oscillation frequency and received frequency are mixed at mixer 1 and then conerted to the first intermediate frequency of 10.7 MHz or 10.695 MHz.
41	VCO_{RX}	The terminal which variable capacitor is included in the chip. Used as an input terminal where 1`st local oscillation frequency is changed by varying the capacitor connected between 1`st local oscillator terminals. The internal variable capacitor has the value of 18.73 ~ 15.86 pF depending on the applied voltage. (1.0 ~ 2.0 V)
42 43	1MI 1MI	Input terminal of Mixer 1. This mixer is made of double balanced multiplier. The received signal amplied at RF AMP is input to this teminal.
44	GND (PLL)	Ground. Ground for analog at PLL.

Pin No	Symbol	Description
45	PDR	Phase detector output terminal of the receiver at PLL. If $f_{RX} > f_{REF}$ or f_{RX} is Leading → The output is negative pulse If $f_{RX} < f_{REF}$ or f_{RX} is Lagging → The output is positive pulse If $f_{RX} = f_{REF}$ and the same phase → The output is high impedance
46	$V_{REF(PLL)}$	PLL voltage reference output pin. An internal voltage regulator provides a stable power supply voltage for the RX and TX PLLs.
47	$V_{CC(PLL)}$	Power supply terminal of PLL.
48	TIF	Input terminal of TX channel counter. AC coupling with TX VCO. Minimum input level is 300 mVp-p (at 60MHz).

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Maximum Supply Voltage	V_{CC}	5.5	V
Power Dissipation	P_D	600	mW
Operating Temperature	T_{OPR}	-20 ~ + 70	°C
Storage Temperature	T_{STG}	- 55 ~ + 150	°C

CURRENT CONSUMPTION AT EACH MODE (Vcc = 3.6V)

Modes	Min.	Typ.	Max.
Inactive mode	-	350uA	600uA
RX mode	-	6.6mA	-
Communication mode (Active mode)	-	13.5mA	-

CURRENT CONSUMPTION IN EACH BLOCK (Vcc = 3.6V)

Modes		Min.	Typ.	Max.
Receiver part		-	5.0mA	7.5mA
Expander part		-	1.4mA	2.1mA
Speaker part		-	1.7mA	2.5mA
compressor part		-	3.0mA	4.5mA
PLL	RX part	-	1.6mA	2.4mA
	TX part	-	0.8mA	1.2mA

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Operating Voltage	Vcc		2.0	-	5.5	V

RECEIVER

(V_{CC} = 3.6V, f_C = 49.7MHz, f_{DEV} = ± 3KHz, f_{MOD} = 1KHz,Ta = 25°C, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Input for -3dB Sensitivity	V_{LIM}	-3dB Point	-	0.7	2.0	μVrms
Input for 20dB Sensitivity	$V_{I(SEN)}$	Modulation Input	-	0.7	2.0	μVrms
S/N Ratio	S/N	Modulation Input No Modulation Input	48	55	-	dB
Recovered Audio Output	$V_{O(RA)}$	RFin = 1mVrms	145	185	225	mVrms
Noise Output Level	V_{NO}	RFin = No Input	-	130	205	mVrms
Recovered Audio Output Voltage Drop	$V_{O(RAD)}$	Vcc = 5V→2V RFin = 1mVrms	-8	-3.3	-	dB
Detect Output Voltage	$V_{O(DET)}$	RFin = 1mVrms	1.0	1.5	2.0	V
Carrier Detector Threshold	$V_{TH(DET)}$	RFin = No Input	0.49	0.60	0.73	V
Comparator Threshold Voltage Difference	ΔV_{TH}	V_{COMP} = 150mVp-p R_L = 180KΩ	70	110	150	mV
Comparator Output Voltage 1	V_{OH}	V_{COMP} = 150mVp-p RL = 180KΩ	2.7	3.0	-	V
Comparator Output Voltage 2	V_{OL}	V_{COMP} = 150mVp-p R_L = 180KΩ	-	0.25	0.5	V
First Mixer Conversion Voltage Gain	$\Delta G_{V(1M)}$	$V_{I(43)}$ = 1mVrms $R_{L(38)}$ = 330Ω	14	18	22	dB
Second Mixer Conversion Voltage Gain	$\Delta G_{V(2M)}$	$V_{I(37)}$ = 1mVrms $R_{L(34)}$ = 1.5KΩ	17	21	25	dB

ELECTRICAL CHARACTERISTICS (Continued)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Detector Output Distortion	THD_{DET}	RFin = 1mVrms	-	1.5	2.5	%
Detector Output Resistance	$R_{O(DET)}$	RFin = 1mVrms	-	1.2	-	KΩ
Detector Output DC Voltage Change Ratio	$\Delta V_{O(DET)}$	RFin = 1mVrms	-	0.15	0.23	V/KHz
Meter Drive Slope	MDS		70	100	135	nA/dB
First Mixer Input Resistance	$R_{I(1M)}$	fc = 50MHz	500	690	-	Ω
First Mixer Input Capacitance	$C_{I(1M)}$	fc = 50MHz	-	7.2	10	pF
Limiter Input Sensitivity	$V_{I(LIM)}$	fc = 455KHz, 20dB SINAD	-	100	250	μV rms
Second Mixer Input Sensitivity	$S_{V(2M)}$	fc = 10.7MHz, 20dB SINAD	-	10	25	μV rms
First Mixer 3rd Order Sensitivity	3RD		-	-22	-	dBm
Low Battery Detector	LBD	LBD0 ~ LBD3 = 0 (Default) Only LBD2 = 0 Only LBD1 = 0 Only LBD3 = 0 LBD0 ~ LBD3 = 1	-0.15 - 0.1	3.45 3.3 3.0 2.2 2.1	0.1 0.075	V
AM Rejection Ratio	AMRR	RFin = 1mVrms ~ 10mVrms AM MOD = 30%	25	35	-	dB

Compressor

(Vcc = 3.6V, fc = 1KHz, Ta = 25°C, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Reference Voltage	V_{REF}	No Signal	0.9	1.0	1.1	V
Standard Output Voltage	Vo(com)	Vinc = 13mVrms → 0dB	255	300	345	mVrms
Compressor Gain	$\Delta G_{V1(COM)}$	Vinc = -20dB	-1.0	-0.5	0	dB
Difference	$\Delta G_{V2(COM)}$	Vinc = -40dB	-2.0	-1.0	0	dB

ELECTRICAL CHARACTERISTICS (Continued)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Compressor Output Distortion	THD_{COM}	Vinc = 0dB	-	0.5	1.0	%
Mute Attenuation Ratio	ATT_{MUTE}	Vinc = 0dB	60	80		dB
Compressor Limiting Voltage	$V_{LIM(COM)}$	Vinc = Variable	1.41	1.65	1.83	Vp-p
ALC	V_{ALC}	I_{ALC} = 8uA (R_{ALC} = 120KΩ)	280	330	380	mVrms
Splatter filter	Vo(SF)	V_{INC} = 13mVrms = 0 dB	255	300	345	mVrms

Expander

(Vcc = 3.6V, fc = 1KHz, Ta = 25°C, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Standard Output Voltage	$V_{O(EXP)}$	Vin_E = 30mVrms → 0dB	104	130	156	mVrms
Expander Gain Difference	$\Delta G_{V1(EXP)}$	Vin_E = -10dB	0	0.5	1.0	dB
	$\Delta G_{V2(EXP)}$	Vin_E = -20dB	0	1.0	2.0	dB
	$\Delta G_{V3(EXP)}$	Vin_E = -30dB	0	1.5	3.0	dB
Expander Output Distortion	THD_{EXP}	Vin_E = 0dB	-	0.5	1.0	%
Mute Attenuation Ratio	ATT_{MUTE}	Vin_E = 0dB	60	80	-	dB
Expander Maximum Output Voltage	$V_{OEXP(MAX)}$	Vin_E = Variable THD = 10%	500	600	-	mVrms
Speaker amp output 1	Vo(SA1)	V_{INE} = 30mVrms = 0 dB	104	130	156	mVrms
Speaker amp output 2	Vo(SA1)	V_{INE} = 30mVrms = 0 dB	104	130	156	mVrms

PLL

(Vcc = 3.6V, Ta = 25°C, unless otherwise specified)

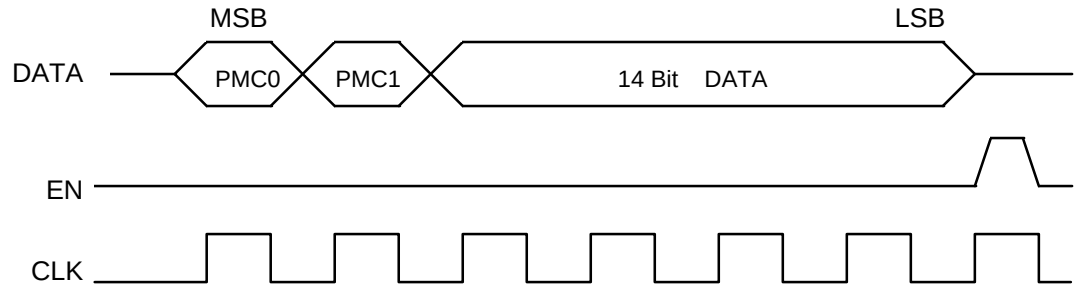
Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Operating Current	I_{CCPLL}	Vcc = 3.6V	-	2.0	3.5	mA
Input Current	I_{IH}	Vin = Vcc	-	-	5	μA
	I_{IL}	Vin = 0V	-5	-	-	μA
Input Voltage	V_{IH}		Vcc-0.3	-	-	V
	V_{IL}		-	-	0.3	V
Output Current	I_{OH}	Vout = Vcc	0.3	-	-	mA
	I_{OL}	Vout = 0V	0.3	-	-	mA
Output Voltage	V_{OH1}	PDT,PDR : Io = -0.3mA (Sourcing)	Vcc-0.4	-	-	V
	V_{OL1}	PDT,PDR : Io = 0.3mA (Sinking)	-	-	0.4	V
	V_{OH2}	LD,f_{MCU} : Io = -0.1mA (Sourcing)	Vcc-0.5	-	-	V
	V_{OL2}	LD,f_{MCU} : Io = 0.1mA (Sinking)	-	-	0.5	V
PLL regulator voltage	V_{PLLREG}	-	1.95	2.15	2.25	V

PLL Program summary

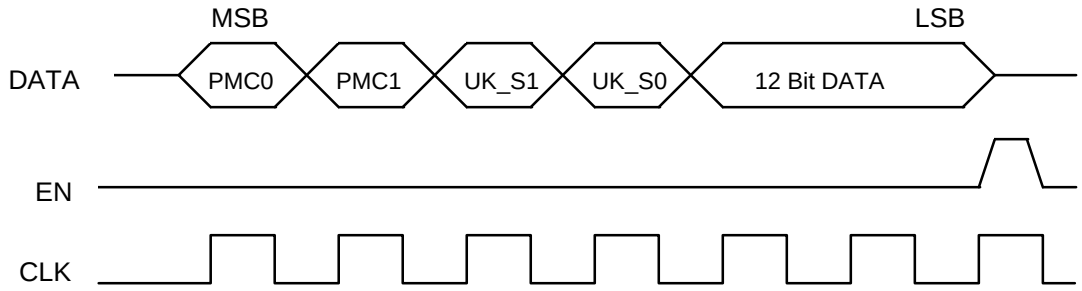
• MCU (MICOM) Serial Interface (MSB : 1'st INPUT)

Use CLK (Pin 7), DATA (Pin 8) , EN (Pin 9) terminals for program.
DATA and CLK terminals are used for loading data to internal Shift - Register. When EN terminal is ` Low `, It is possible to program TX-Channel Counter, RX - Channel Counter and various control functions of PLL. When EN terminal is ` High`, Program 1`st Local Oscillator Capacitor Selection in receiver for U.S.A - 25 CH function.

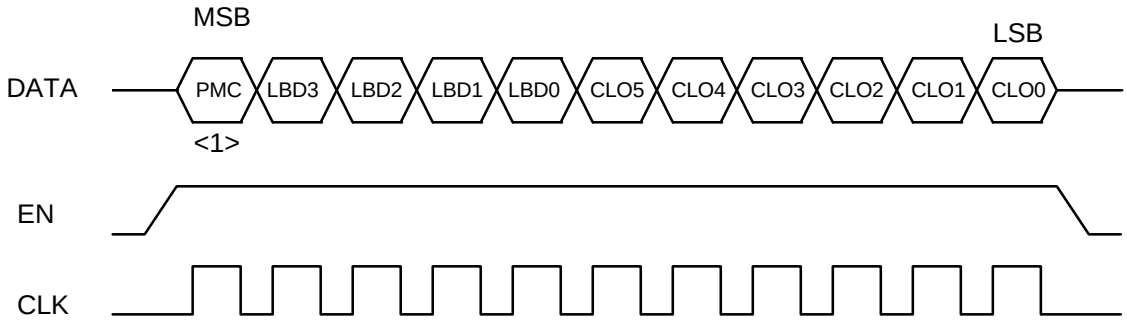
- TX - Register, RX-Register, Control Register



- Reference - Register



- RECEIVER -1`st local oscillator internal capacitor selection register & low battery detector voltage register [CLO _ LBD - Register]



• Programmable Counter

- RX - counter : Setting frequency for RX.VCO (14 Bits --> 1/16 ~ 1/16383)
  [Default_CH. = USA_#21 (REMOTE) : 36.075MHz (Div._NO = 7215)]

< RX. Register (16bits) >

Bit	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Name	PMC0	PMC1	D13	D12	D11	D10	D9	D8
Default value 7215	*		0	1	1	1	0	0

Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Name	D7	D6	D5	D4	D3	D2	D1	D0
Default value 7215	0	0	1	0	1	1	1	1

- TX - counter : Setting frequency for TX.VCO (14 Bits --> 1/16 ~ 1/16383)
  [Default_CH. = USA_#21 (REMOTE) : 49.830MHz (Div._NO = 9966)]

< TX. Register (16 bits) >

Bit	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Name	PMC0	PMC1	D13	D12	D11	D10	D9	D8
Default value 9966	*		1	0	0	1	1	0

Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Name	D7	D6	D5	D4	D3	D2	D1	D0
Default value 9966	1	1	1	0	1	1	1	0

* Program mode control

PMC0	PMC1	Program mode	PMC0	PMC1	Program mode
0	0	Control Block	0	1	UPLL_RX. Block
1	0	UPLL_Ref. Block	1	1	UPLL_TX. Block

- Ref - counter : Setting reference frequency for phase detector (12 Bits --> 1/16 ~ 1/4095)
[Default_Divider = 2048, X-tal_OSC = 10.240 MHz -->Fref = 5KHz]

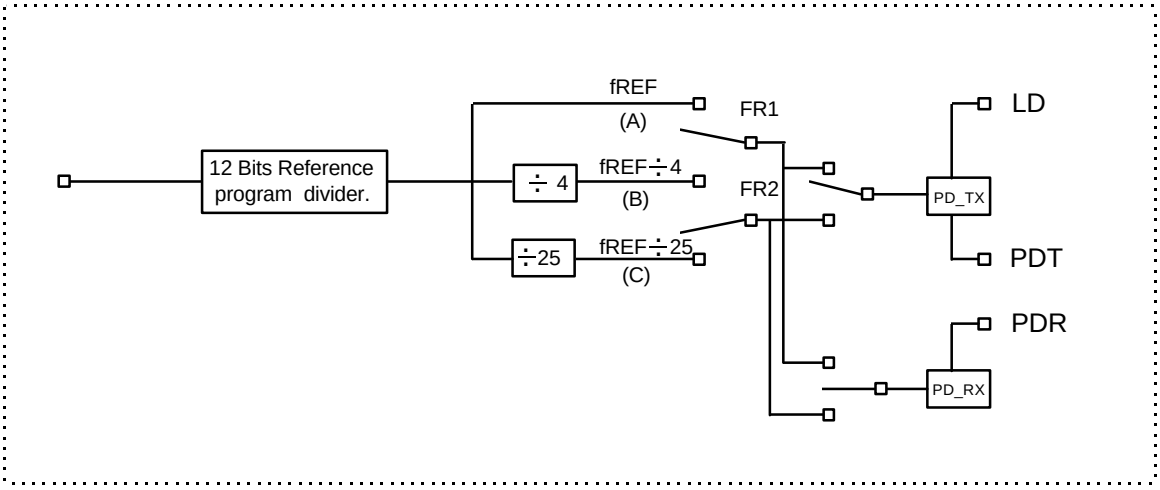
< Ref. Register (16bits) >

Bit	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Name	PMC0	PMC1	UK_S1	UK_S0	D11	D10	D9	D8
Default value 2048	*		Ref.freq. selection for United Kingdom		1	0	0	0

Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Name	D7	D6	D5	D4	D3	D2	D1	D0
Default value 2048	0	0	0	0	0	0	0	0

-UK_Selection

UK_S0	UK_S1	FR1	FR2	FrefTX	FrefRX
0	0	fREF (A)	-	fREF (A)	fREF (A)
1	0	fREF (A)	fREF/4 (B)	fREF/4 (B)	fREF/4 (B)
0	1	fREF/4 (B)	fREF/25 (C)	fREF/4 (B)	fREF/25 (C)
1	1	fREF/4 (B)	fREF/25 (C)	fREF/25 (C)	fREF/4 (B)



< Reference frequency selection >

• Control program

Control register (16 Bits)

Bit	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Name	PMC0	PMC1	-	PLL_{TX}-BS	CO_M	CO_BS	EX_M	EX_BS
Description	Program Mode Control_0	Program Mode Control_1	Don`t Care	PLL_Tx Battery Save	Compressor Mute Selection	Compressor Battery Save	Expander Mute Selection	Expander Battery Save
Function	* Program Latch Assign		Don`t Care	0:Normal (PLL_TX-On) 1:PLL_TX Power-Off	0:Normal 1:Mute	0: CO-On 1: Normal (CO-part Power-Off)	0:Normal 1:Mute	0: EX-On 1: Normal (EX-part Power-Off)

Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Name	LDT_CDO	LBD-BS	Rx-BS	-	-	-	TEST2	TEST1
Description	LDT or CDO Select	Low Battery Detector Battery Save	RX Battery Save	Don`t care	Don`t care	Don`t care	TEST Mode 2	TEST Mode 1
Function	0:Normal (CDO) 1:LDT	0:Normal (LBD-ON) 1:LBD-Part Power-Off	0:Normal (RX-ON) 1:RX-Part Power-Off	-			* * * Function Test On each block of UPLL	

*** TEST Mode & LDT-CDO Mode

LDT/CDO	TEST1	TEST2	LDT / CDO	Remark
0	0	0	Rx block CDO	Default
	1	0	Rx block CDO	
	0	1	4_25cnt block FR2	
	1	1	4_25cnt block FR2	
1	0	0	PLL block LDT	
	1	0	PLL block LDT	
	0	1	Test PLL_RX	
	1	1	Test PLL_TX	

• Operating internal circuit blocks in each mode

Mode (state)	Operating circuit blocks
Active state (Communication mode)	PLL regulator / MICOM I/F (Data, CLK, EN) / 2`nd local oscillator / Receiver / 1`st local oscillator / RX PLL / Carrier detector / FSK comparator / Low battery detector / TX PLL / Expander & speaker amp / Compressor / Splatter filter amp
Receiving mode	PLL regulator / MICOM I/F (Data, CLK, EN) / 2`nd local oscillator / Receiver / 1`st local oscillator / RX PLL / Carrier detector / FSK comparator / Low battery detector.
Inactive state	PLL regulator / MICOM I/F (Data, CLK, EN)

• CLO_LBD - Register Program

[Rx - 1`st local oscillation internal cap. for U.S.A - 25CH & Low battery detect voltage]

- CLO register (6 bits) : Receiver 1`st local oscillator internal capacitor selection

Bit	Bit10 (MSB)	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Name	PMC	CLO5	CLO4	CLO3	CLO2	CLO1	CLO0
Default Value 0	1 * * * * *	0	0	0	0	0	0
Function	-	0:Normal 1:Internal Cap. for USA 25 Channel =4.4pF	0:Normal 1:Internal Cap. for USA 25 Channel =1.0pF	0:Normal 1:Internal Cap. for USA 25 Channel =3.6pF	0:Normal 1:Internal Cap. for USA 25 Channel =2.4pF	0:Normal 1:Internal Cap. for USA 25 Channel =1.2pF	0:Normal 1:Internal Cap. for USA 25 Channel =0.6pF

*****

PMC (Program Mode Control)

PMC = `HIGH` & EN = `HIGH` ---> CLO_LBD Register Program Mode

- Rx - Low Battery Detect Voltage

Bit	Bit 10 (MSB)	Bit 9	Bit 8	Bit 7	Bit 6	Low Battery Detector Voltage	Remark
Name	PMC	LBD3	LBD2	LBD1	LBD0		
Default Value	1 * * * * *	0	0	0	0	-	Default
Function	1	0	0	0	0	3.45V	-
		1	0	1	1	3.3V	-
		1	1	0	1	3.0V	-
		0	1	1	1	2.2V	-
		1	1	1	1	2.1V	-

***** PMC (Program Mode Control)

PMC = `HIGH` & EN = `HIGH` ---> CLO - LBD Register Program Mode

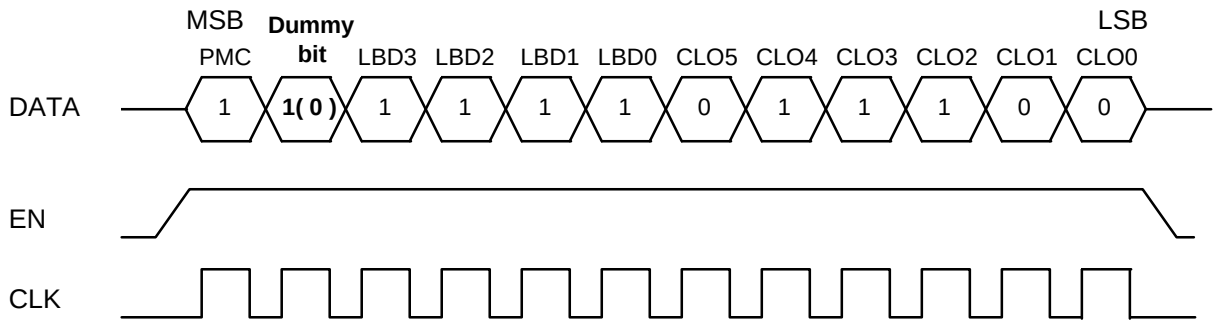
* Example 1 >

Low battery detector voltage : 2.1V

U.S.A _CH-#1 (REMOTE) ---> 1`st local osc. varicap value =15.86pF, Internal cap = 7.0pF

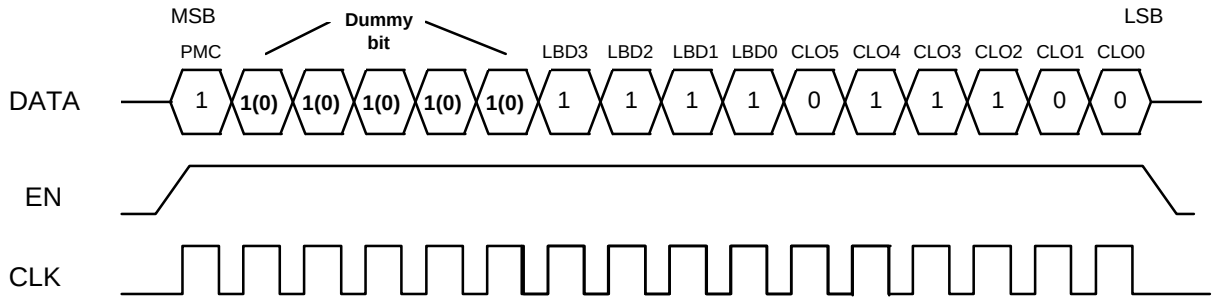
(Ext_L = 0.45uH, EXT_C = 30pF)

- 12 bit data format



In case the 12 bits programming, insert 1 don`t care bit (Dummy bit) between PMC and LBD3.

- In case of setting 16 bit data format

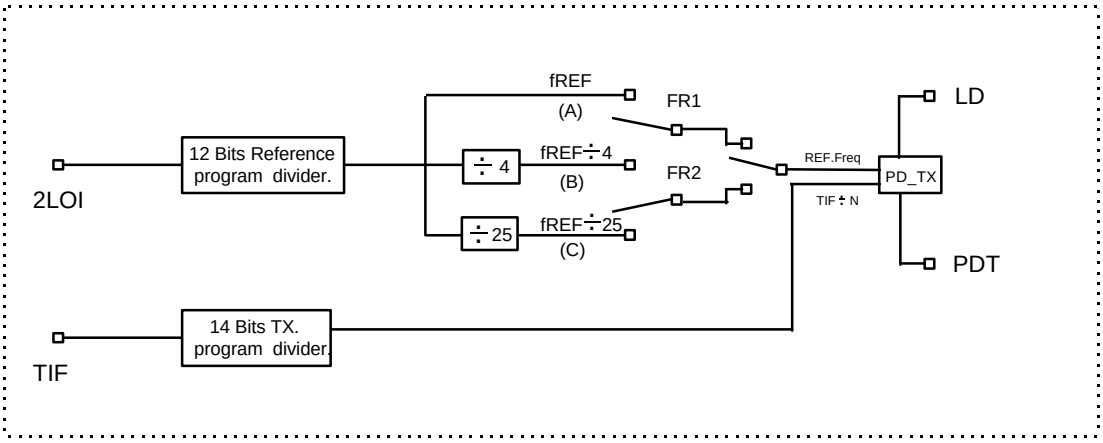


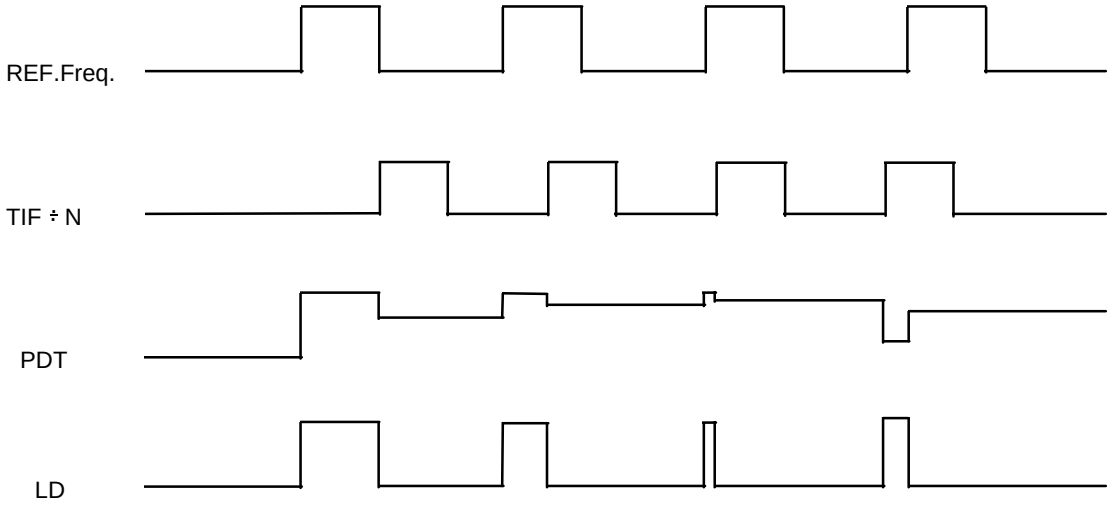
In case of 16 bits programming, insert 5 don`t care bits between the PMC and LBD3

*** EXAMPLE DATA FOR U.S.A 25_CHANNEL SELECTION**

1`st Local Osc. Internal Capacitor Select						Base Channels	Hand Channels	Varicap Value	External C	External L	Internal C
Bit5 (CLO5)	Bit4 (CLO4)	Bit3 (CLO3)	Bit2 (CLO2)	Bit1 (CLO1)	Bit0 (CLO0)	1 ~ 25CH.	1 ~ 25CH.	1.0V ~ 2.0V TYP 1.5V	27pF (30pF)	0.45uH	pF
0	0	0	0	0	0	16 ~ 25CH.	-	18.73 ~ 15.86pF	27pF	0.45uH	-
0	0	0	0	0	1	-	16 ~ 25CH.	18.73 ~ 15.86pF	30pF	0.45uH	0.6
0	1	0	0	0	1	01 ~ 04CH.	-	18.73 ~ 15.86pF	27pF	0.45uH	1.6
0	0	0	0	1	0	05 ~ 10CH.	-	18.73 ~ 15.86pF	27pF	0.45uH	1.2
0	0	0	0	0	1	11 ~ 15CH	-	18.73 ~ 15.86pF	27pF	0.45uH	0.6
0	1	1	1	0	0	-	01 ~ 06CH.	18.73 ~ 15.86pF	30pF	0.45uH	7.0
0	1	1	0	1	0	-	07 ~ 15CH.	18.73 ~ 15.86pF	30pF	0.45uH	5.8

• **Phase detector / Lock Detector Output Waveforms**





(Phase Detector / Lock Detector Output Waveform)

TABLE 1 : Channel & Frequency table to Base / Romote (KOREA)

BASE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	49.695	39.000	7800	46.510	46.510	9302
2	49.710	39.015	7803	46.530	46.530	9306
3	49.725	39.030	7806	46.550	46.550	9310
4	49.740	39.045	7809	46.570	46.570	9314
5	49.755	39.060	7812	46.590	46.590	9318
6	49.670	39.975	7795	46.610	46.610	9322
7	49.845	39.150	7830	46.630	46.630	9326
8	49.860	39.165	7833	46.670	46.670	9334
9	49.770	39.075	7815	46.710	46.710	9342
10	49.875	39.180	7836	46.730	46.730	9346
11	49.830	39.135	7827	46.770	46.770	9354
12	49.890	39.195	7839	46.830	46.830	9366
13	49.930	39.235	7847	46.870	46.870	9374
14	49.990	39.295	7859	46.930	46.930	9386
15	49.970	39.275	7855	46.970	46.970	9394

REMOTE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	46.510	35.815	7163	49.695	49.695	9939
2	46.530	35.835	7167	49.710	49.710	9942
3	46.550	35.855	7171	49.725	49.725	9945
4	46.570	35.875	7175	49.740	49.740	9948
5	46.590	35.895	7179	49.755	49.755	9951
6	46.610	35.915	7183	49.670	49.670	9934
7	46.630	35.935	7187	49.845	49.845	9969
8	46.670	35.975	7195	49.860	49.860	9972
9	46.710	36.015	7203	49.770	49.770	9954
10	46.730	36.035	7207	49.875	49.875	9975
11	46.770	36.075	7215	49.830	49.830	9966
12	46830	36.135	7227	49.890	49.890	9978
13	46870	36.175	7235	49.930	49.930	9986
14	46930	36.235	7247	49.990	49.990	9998
15	46970	36.275	7255	49.970	49.970	9994

TABLE 2 : Channel & Frequency table to Base / Remote (USA 1)

BASE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	49.670	38.975	7795	46.610	46.610	9322
2	49.845	39.150	7830	46.630	46.630	9326
3	49.860	39.165	7833	46.670	46.670	9334
4	49.770	39.075	7815	46.710	46.710	9342
5	49.875	39.180	7836	46.730	46.730	9346
6	49.830	39.135	7827	46.770	46.770	9354
7	49.890	39.195	7839	46.830	46.830	9366
8	49.930	39.235	7847	46.870	46.870	9374
9	49.990	39.295	7859	46.930	46.930	9386
10	49.970	39.275	7855	46.970	46.970	9394

REMOTE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	46.610	35.915	7183	49.670	49.670	9934
2	46.630	35.935	7187	49.845	49.845	9969
3	46.670	35.975	7195	49.860	49.860	9972
4	46.710	36.015	7203	49.770	49.770	9954
5	46.730	36.035	7207	49.875	49.875	9975
6	46.770	36.075	7215	49.830	49.830	9966
7	46.830	36.135	7227	49.890	49.890	9978
8	46.870	36.175	7235	49.930	49.930	9986
9	46.930	36.235	7247	49.990	49.990	9998
10	46.970	36.275	7255	49.970	49.970	9994

TABLE 3 : Channel & Frequency table to Base / Remote (USA 2)

BASE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	48.760	38.065	7613	43.720	43.720	8744
2	48.840	38.145	7629	43.740	43.740	8748
3	48.860	38.165	7633	43.820	43.820	8764
4	48.920	38.225	7645	43.840	43.840	8768
5	49.020	38.325	7665	43.920	43.920	8784
6	49.080	38.385	7677	43.960	43.960	8792
7	49.100	38.405	7681	44.120	44.120	8824
8	49.160	38.465	7693	44.160	44.160	8832
9	49.200	38.505	7701	44.180	44.180	8836
10	49.240	38.545	7709	44.200	44.200	8840
11	49.280	38.585	7717	44.320	44.320	8864
12	49.360	38.665	7733	44.360	44.360	8872
13	49.400	38.705	7741	44.400	44.400	8880
14	49.460	38.765	7753	44.460	44.460	8892
15	49.500	38.805	7761	44.480	44.480	8896
16	49.670	38.975	7795	46.610	46.610	9322
17	49.845	39.150	7830	46.630	46.630	9326
18	49.860	39.165	7833	46.670	46.670	9334
19	49.770	39.075	7815	46.710	46.710	9342
20	49.875	39.180	7836	46.730	46.730	9346
21	49.830	39.135	7827	46.770	46.770	9354
22	49.890	39.195	7839	46.830	46.830	9366
23	49.930	39.235	7847	46.870	46.870	9374
24	49.990	39.295	7859	46.930	46.930	9386
25	49.970	39.275	7855	46.970	46.970	9394

TABLE 3 : Channel & Frequency table to Base / Remote (USA 2)

REMOTE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	43.720	33.025	6605	48.760	48.760	9752
2	43.740	33.045	6609	48.840	48.840	9768
3	43.820	33.125	6625	48.860	48.860	9772
4	43.840	33.145	6629	48.920	48.920	9784
5	43.920	33.225	6645	49.020	49.020	9804
6	43.960	33.265	6653	49.080	49.080	9816
7	44.120	33.425	6685	49.100	49.100	9820
8	44.160	33.465	6693	49.160	49.160	9832
9	44.180	33.485	6697	49.200	49.200	9840
10	44.200	33.505	6701	49.240	49.240	9848
11	44.320	33.625	6725	49.280	49.280	9856
12	44.360	33.665	6733	49.360	49.360	9872
13	44.400	33.705	6741	49.400	49.400	9880
14	44.460	33.765	6753	49.460	49.460	9892
15	44.480	33.785	6757	49.500	49.500	9900
16	46.610	35.915	7183	49.670	49.670	9934
17	46.630	35.935	7187	49.845	49.845	9969
18	46.670	35.975	7195	49.860	49.860	9972
19	46.710	36.015	7203	49.770	49.770	9954
20	46.730	36.035	7207	49.875	49.875	9975
21	46.770	36.075	7215	49.830	49.830	9966
22	46.830	36.135	7227	49.890	49.890	9978
23	46.870	36.175	7235	49.930	49.930	9986
24	46.930	36.235	7247	49.990	49.990	9998
25	46.970	36.275	7255	49.970	49.970	9994

TABLE 4 : Channel & Frequency table to Base / Remote (NEW ZEALAND)

BASE

CH	Rx (f_{REF} = 6.25KHz)			Tx (f_{REF} = 1,6.25KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	40.4625	29.7625	4762	1.7820	1.7820	1782
2	40.4500	29.7500	4760	1.7620	1.7620	1762
3	40.4375	29.7375	4758	1.7420	1.7420	1742
4	40.4250	29.7250	4756	1.7220	1.7220	1722
5	40.4125	29.7125	4754	1.7020	1.7020	1702
6	40.4000	29.7000	4752	34.3500	34.3500	5496
7	40.3875	29.6875	4750	34.3625	34.3625	5498
8	40.3750	29.6750	4748	34.3750	34.3750	5500
9	40.3625	29.6625	4746	34.3875	34.3875	5502
10	40.3500	29.6500	4744	34.4000	34.4000	5504

REMOTE

CH	Rx (f_{REF} = 1,6.25KHz)			Tx (f_{REF} = 6.25KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	1.7820	2.2370	2237	40.4625	40.4625	6474
2	1.7620	2.2170	2217	40.4500	40.4500	6472
3	1.7420	2.1970	2197	40.4375	40.4375	6470
4	1.7220	2.1770	2177	40.4250	40.4250	6468
5	1.7020	2.1570	2157	40.4125	40.4125	6466
6	34.3500	23.6500	3784	40.4000	40.4000	6464
7	34.3625	23.6625	3786	40.3875	40.3875	6462
8	34.3750	23.6750	3788	40.3750	40.3750	6460
9	34.3875	66.6875	3790	40.3625	40.3625	6458
10	34.4000	23.7000	3792	40.3500	40.3500	6456

TABLE 5 : Channel & Frequency table to Base / Remote (HOLAND)

BASE

CH	Rx (f_{REF} = 6.25KHz)			Tx (f_{REF} = 1,6.25KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	39.9375	29.2375	4678	31.0375	31.0375	4966
2	39.9625	29.2625	4682	31.0625	31.0625	4970
3	39.9875	29.2875	4686	31.0875	31.0875	4974
4	40.0125	29.3125	4690	31.1125	31.1125	4978
5	40.0375	29.3375	4694	31.1375	31.1375	4982
6	40.0625	29.3625	4698	31.1625	31.1625	4986
7	40.0875	29.3875	4702	31.1875	31.1875	4990
8	40.1125	29.4125	4706	31.2125	31.2125	4994
9	40.1375	29.4375	4710	31.2375	31.2375	4998
10	40.1625	29.4625	4714	31.2625	31.2625	5002
11	40.1875	29.4875	4718	31.2875	31.2875	5006
12	40.2125	29.5125	4722	31.3125	31.3125	5010

REMOTE

CH	Rx (f_{REF} = 6.25KHz)			Tx (f_{REF} = 1,6.25KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	31.0375	20.3375	3254	39.9375	39.9375	6390
2	31.0625	20.3625	3258	39.9625	39.9625	6394
3	31.0875	20.3875	3262	39.9875	39.9875	6398
4	31.1125	20.4125	3266	40.0125	40.0125	6402
5	31.1375	20.4375	3270	40.0375	40.0375	6406
6	31.1625	20.4625	3274	40.0625	40.0625	6410
7	31.1875	20.4875	3278	40.0875	40.0875	6414
8	31.2125	20.5125	3282	40.1125	40.1125	6418
9	31.2375	20.5375	3286	40.1375	40.1375	6422
10	31.2625	20.5625	3290	40.1625	40.1625	6426
11	31.2875	20.5875	3294	40.1875	40.1875	6430
12	31.3125	20.6125	3298	40.2125	40.2125	6434

TABLE 6 : Channel & Frequency table to Base / Remote (FRANCE)

BASE

CH	Rx (f_{REF} = 6.25KHz)			Tx (f_{REF} = 6.25KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	41.4875	30.7875	4926	26.4875	26.4875	4238
2	41.4750	30.7750	4924	26.4750	26.4750	4236
3	41.4625	30.7625	4922	26.4625	26.4625	4234
4	41.4500	30.7500	4232	26.4500	26.4500	4232
5	41.4375	30.7375	4918	26.4375	26.4375	4230
6	41.4250	30.7250	4916	26.4250	26.4250	4228
7	41.4125	30.7125	4914	26.4125	26.4125	4226
8	41.4000	30.7000	4912	26.4000	26.4000	4224
9	41.3875	30.6875	4910	26.3875	26.3875	4222
10	41.3750	30.6750	4908	26.3750	26.3750	4220
11	41.3625	30.6625	4906	26.3625	26.3625	4218
12	41.3500	30.6500	4904	26.3500	26.3500	4216
13	41.3375	30.6375	4902	26.3375	26.3375	4214
14	41.3250	30.6250	4900	26.3250	26.3250	4212
15	41.3125	30.6125	4898	26.3125	26.3125	4210

REMOTE

CH	Rx (f_{REF} = 6.25KHz)			Tx (f_{REF} = 6.25KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	26.4875	37.1875	5950	41.4875	41.4875	6638
2	26.4750	37.1750	5948	41.4750	41.4750	6636
3	26.4625	37.1625	5946	41.4625	41.4625	6634
4	26.4500	37.1500	5944	41.4500	41.4500	6632
5	26.4375	37.1375	5942	41.4375	41.4375	6630
6	26.4250	37.1250	5940	41.4250	41.4250	6628
7	26.4125	37.1125	5938	41.4125	41.4125	6626
8	26.4000	37.1000	5936	41.4000	41.4000	6624
9	26.3875	37.0875	5934	41.3875	41.3875	6622
10	26.3750	37.0750	5932	41.3750	41.3750	6620
11	26.3625	37.0625	5930	41.3625	41.3625	6618
12	26.3500	37.0500	5928	41.3500	41.3500	6616
13	26.3375	37.0375	5926	41.3375	41.3375	6614
14	26.3250	37.0250	5924	41.3250	41.3250	6612
15	26.3125	37.0125	5922	41.3125	41.3125	6610

TABLE 7 : Channel & Frequency table to Base / Remote (SPAIN)

BASE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	39.9250	29.2300	7985	31.0250	31.0250	6205
2	39.9500	29.2550	7990	31.0500	31.0500	6210
3	39.9750	29.2800	7995	31.0750	31.0750	6215
4	40.0000	29.3050	8000	31.1000	31.1000	6220
5	40.0250	29.3300	8005	31.1250	31.1250	6225
6	40.0500	29.3550	8010	31.1500	31.1500	6230
7	40.0750	29.3800	8015	31.1750	31.1750	6235
8	40.1000	29.4050	8020	31.2000	31.2000	6240
9	40.1500	29.4550	8030	31.2500	31.2500	6250
10	40.1750	29.4800	8035	31.2750	31.2750	6255
11	40.2000	29.5050	8040	31.3000	31.3000	6260
12	40.2250	29.5300	8045	31.3250	31.3250	6265

REMOTE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	31.0250	20.3300	4066	39.9250	39.9250	7985
2	31.0500	20.3550	4071	39.9500	39.9500	7990
3	31.0750	20.3800	4076	39.9750	39.9750	7995
4	31.1000	20.4050	4081	40.0000	400.000	8000
5	31.1250	20.4300	4086	40.0250	40.0250	8005
6	31.1500	20.4550	4091	40.0500	40.0500	8010
7	31.1750	20.4800	4096	40.0750	40.0750	8015
8	31.2000	20.5050	4101	40.1000	40.1000	8020
9	31.2500	20.5550	4111	40.1500	40.1500	8030
10	31.2750	20.5800	4116	40.1750	40.1750	8035
11	31.3000	20.6050	4121	40.2000	40.2000	8040
12	31.3250	20.6300	4126	40.2250	40.2250	8045

TABLE 8 : Channel & Frequency table to Base / Remote (AUSTRALIA)

BASE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	39.7750	29.0800	5816	30.0750	30.0750	6015
2	39.8250	29.1300	5826	30.1250	30.1250	6025
3	39.8750	29.1800	5836	30.1750	30.1750	6035
4	39.9250	29.2300	5846	30.2250	30.2250	6045
5	39.9750	29.2800	5856	30.2750	30.2750	6055
6	39.8000	29.1050	5821	30.1000	30.1000	6020
7	39.8500	29.1550	5831	30.1500	30.1500	6030
8	39.9000	29.2050	5841	30.2000	30.2000	6040
9	39.9500	29.2550	5851	30.2500	30.2500	6050
10	40.0000	29.3050	5861	30.3000	30.3000	6060

REMOTE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	30.0750	19.3800	3876	39.7750	39.7750	7955
2	30.1250	19.4300	3886	39.8250	39.8250	7965
3	30.1750	19.4800	3896	39.8750	39.8750	7975
4	30.2250	19.5300	3906	39.9250	39.9250	7985
5	30.2750	19.5800	3916	39.9750	39.9750	7995
6	30.1000	19.4050	3881	39.8000	39.8000	7960
7	30.1500	19.4550	3891	39.8500	39.8500	7970
8	30.2000	19.5050	3901	39.9000	39.9000	7980
9	30.2500	19.5550	3911	39.9500	39.9500	7990
10	30.3000	19.6050	3921	40.0000	40.0000	8000

TABLE 9 : Channel & Frequency table to Base / Remote (CHINA 2)

BASE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	48.250	37.555	7511	45.250	45.250	9050
2	48.275	37.580	7516	45.275	45.275	9055
3	48.300	37.605	7521	45.300	45.300	9060
4	48.325	37.630	7526	45.325	45.325	9065
5	48.350	37.655	7531	45.350	45.350	9070
6	48.375	37.680	7536	45.375	45.375	9075
7	48.400	37.705	7541	45.400	45.400	9080
8	48.425	37.730	7546	45.425	45.425	9085
9	48.450	37.755	7551	45.450	45.450	9090
10	48.475	37.780	7556	45.475	45.475	9095

REMOTE

CH	Rx (f_{REF} = 5KHz)			Tx (f_{REF} = 5KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	45.250	34.555	6911	48.250	48.250	9650
2	45.275	34.580	6916	48.275	48.275	9655
3	45.300	34.605	6921	48.300	48.300	9660
4	45.325	34.630	6926	48.325	48.325	9665
5	45.350	34.655	6931	48.350	48.350	9670
6	45.375	34.680	6936	48.375	48.375	9675
7	45.400	34.705	6941	48.400	48.400	9680
8	45.425	34.730	6946	48.425	48.425	9685
9	45.450	34.755	6951	48.450	48.450	9690
10	45.475	34.780	6956	48.475	48.475	9695

TABLE 10 : Channel & Frequency table to Base / Remote (U.K)

BASE

*1st IF = 10.7MHz

CH	Rx (f_{REF} = 6.25KHz)			Tx (f_{REF} = 1.0KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	47.45625	36.75625	5881	1.6420	1.6420	1642
2	47.46875	36.76875	5883	1.6620	1.6620	1662
3	47.48125	36.78125	5885	1.6820	1.6820	1682
4	47.49375	36.79375	5887	1.7020	1.7020	1702
5	47.50625	36.80625	5889	1.7220	1.7220	1722
6	47.51875	36.81875	5891	1.7420	1.7420	1742
7	47.53125	36.83125	5893	1.7620	1.7620	1762
8	47.54375	36.84375	5894	1.7820	1.7820	1782

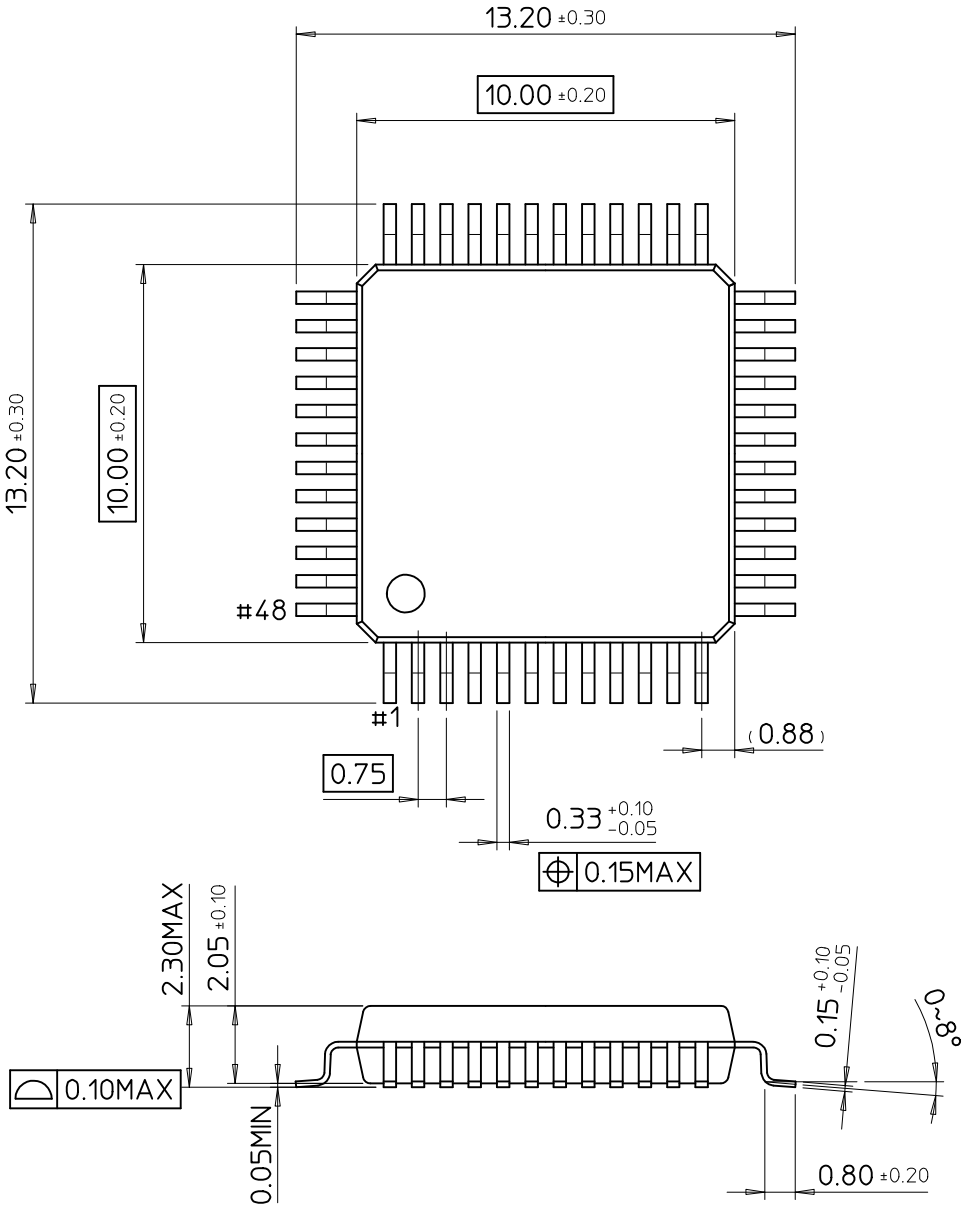
REMOTE

* 1st IF = 455KHz

CH	Rx (f_{REF} = 1KHz)			Tx (f_{REF} = 6.25KHz)		
	f_{RX} (MHz)	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N
1	1.6420	2.097	2097	47.45625	47.45625	7593
2	1.6620	2.117	2117	47.46875	47.46875	7595
3	1.6820	2.137	2137	47.48125	47.48125	7597
4	1.7020	2.157	2157	47.49375	47.49375	7599
5	1.7220	2.177	2177	47.50625	47.50625	7601
6	1.7420	2.197	2197	47.51875	47.51875	7603
7	1.7620	2.217	2217	47.53125	47.53125	7605
8	1.7820	2.237	2237	47.54375	47.54375	7607

48-QFP-1010E

Dimensions in Milimeters



SAMSUNG ELECTRONICS CO.,LTD.