Ordering number: EN1634G

CMOS LSI

LC7150

FCC 10-Channel Standard PLL For Cordless Telephone

Functions

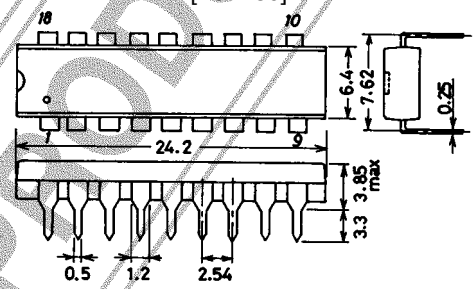
- On-chip PLL for transmission/reception
- On-chip digital unlock detector (only PLL for transmission)
- 5.0 kHz/4.4 kHz output pins for guard tone
- Standby function
- Pull-down resistance at channel select pins (D1 to D4)
  LC7150: With (for mechanical switch)
  LC7151: Without (for microcontroller)

Package Dimensions

unit : mm

3007A-DIP18

[LC7150]



SANYO : DIP18

Specifications

Absolute Maximum Ratings at Ta = 25°C, V_{SS} = 0 V

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{DD} max		–0.3 to +6.5	V
Maximum input voltage	V_I max	All input pins	–0.3 to V_{DD} +0.3	V
Maximum output voltage	V_O1 max	$\overline{F1}$,$\overline{F2}$ Output OFF	–0.3 to +6.5	V
	V_O2 max	Output pins other than V_O1	–0.3 to V_{DD} +0.3	V
Output current	I_{OUT}	$\overline{F1}$,$\overline{F2}$, LDT	0 to 3.0	mA
Allowable power dissipation	Pd max	Ta ≦ 75°C	350	mW
Operating temperature	Topr		–30 to +75	°C
Storage temperature	Tstg		–40 to +125	°C

Allowable Operating Conditions at Ta = 25°C, V_{SS} = 0 V

Parameter	Symbol	Conditions	min	typ	max	Unit
Supply voltage	V_{DD}		3.0		5.5	V
Input high-level voltage	$V_{IH}1$	D1 to D4, $\overline{SB}$	0.7 V_{DD}		V_{DD}	V
Input low-level voltage	$V_{IL}1$	D1 to D4, $\overline{SB}$	0		0.3V_{DD}	V
Input high-level voltage	$V_{IH}2$	$\overline{R}$/B	0.9 V_{DD}		V_{DD}	V
Input low-level voltage	$V_{IL}2$	$\overline{R}$/B	0		0.1V_{DD}	V
Input frequency	$f_{IN}1$	PIT; V_{IN} = 0.15 Vrms	10		27	MHz
	$f_{IN}2$	PIR; V_{IN} = 0.15 Vrms	30		42	MHz
	$f_{IN}3$	XIN; V_{IN} = 0.3 Vrms	5.0	10.24	11.0	MHz
Input amplitude	$V_{IN}1$	PIT; f_{IN} = 27 MHz	0.15		0.3V_{DD}	Vrms
	$V_{IN}2$	PIR; f_{IN} = 42 MHz	0.15		0.3V_{DD}	Vrms
	$V_{IN}3$	XIN; f_{IN} = 11 MHz	0.3		0.3V_{DD}	Vrms

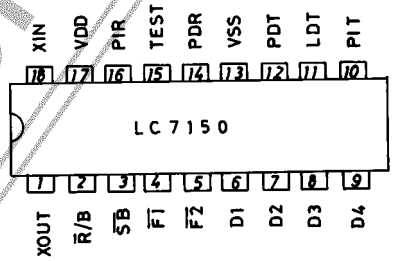
Electrical Characteristics at Ta = 25°C, under Allowable Operating Conditions

Parameter	Symbol	Conditions	min	typ	max	Unit
Input high-level current	$I_{IH}1$	XIN; $V_I = V_{DD}$			20	µA
Input low-level current	$I_{IL}1$	XIN; $V_I = V_{SS}$			20	µA
Input high-level current	$I_{IH}2$	PIT, PIR; $V_I = V_{DD}$			40	µA
Input low-level current	$I_{IL}2$	PIT, PIR; $V_I = V_{SS}$			40	µA
Input high-level current	$I_{IH}3$	$\overline{SB}$,R/B; $V_I = V_{DD}$			10	µA
Input low-level current	$I_{IL}3$	$\overline{SB}$, R/B; $V_I = V_{SS}$			10	µA
Input pull-down resistance	Rd	D1 to D4	10	20	40	kΩ
Input floating voltage	V_{IF}	D1 to D4; Open			$0.1V_{DD}$	V
Feedback resistance	Rf1	XIN; V_{DD} = 4.3 V		1.0		MΩ
	Rf2	PIT, PIR; V_{DD} = 4.3 V		0.5		MΩ
Output high-level voltage	$V_{OH}1$	PDT, PDR; I_O = 0.5mA	V_{DD}–1.0			V
Output low-level voltage	$V_{OL}1$	PDT, PDR; V_O = 0.5 mA			1.0	V
Output OFF leak current	Ioff1	PDT,PDR; $V_O = V_{DD}/V_{SS}$		0.01	1.0	nA
Output high-level voltage	$V_{OH}2$	LDT; I_O = 1 mA	V_{DD}–1.0			V
Output OFF leak current	Ioff2	LDT; Output OFF $V_O = V_{SS}$			5.0	µA
Output low-level voltage	$V_{OL}2$	$\overline{F1}$,$\overline{F2}$; I_O = 1 mA			1.0	V
Output OFF leak current	Ioff3	$\overline{F1}$,$\overline{F2}$; Output OFF V_O = 5.5 V			5.0	µA
Supply current	$I_{DD}1$	(C3) V_{DD} = 3.0 V		4		mA
	$I_{DD}2$	(C3) V_{DD} = 4.5 V		7		mA
	$I_{DD}3$	(C3) V_{DD} = 5.5 V		13		mA
	$I_{DD}4$	(C2) V_{DD} = 3.0 V		3		mA
	$I_{DD}5$	(C2) V_{DD} = 4.5 V		5		mA
	$I_{DD}6$	(C2) V_{DD} = 5.5 V		10		mA

(C3): XIN = 10.24 MHz, xtal connected
PIT = 27 MHz 150 mVrms
PIR = 42 MHz 150 mVrms
$\overline{R}$/B= V_{DD}, $\overline{SB}$ = V_{DD}, Other pin open
(C2): XIN = 10.24 MHz, xtal connected
PIR = 42 MHz, 150 mVrms
$\overline{R}$/B= V_{DD}, $\overline{SB}$ = V_{SS}, Other pin open

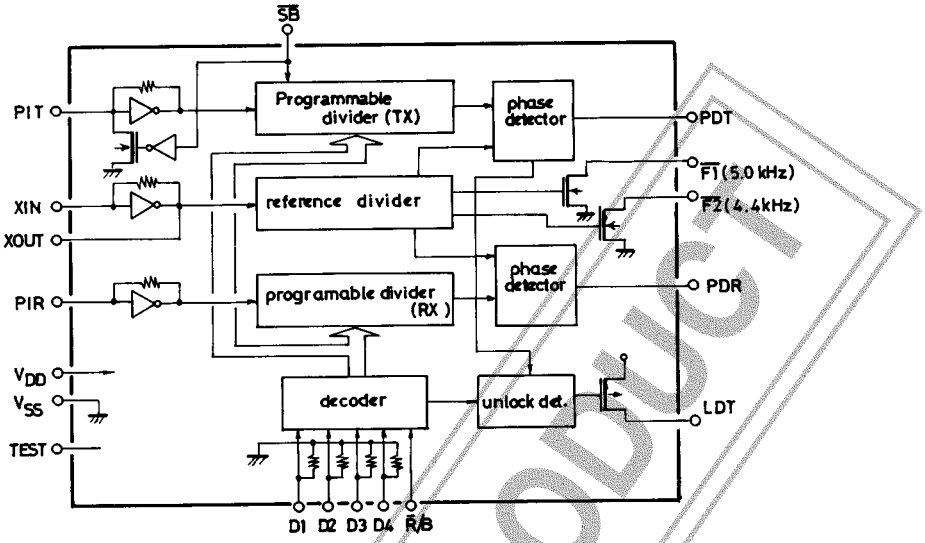
(Note) Power supply $V_{DD} - V_{SS}$: Insert a capacitor of 2000 pF or greater.

Pin Assignment

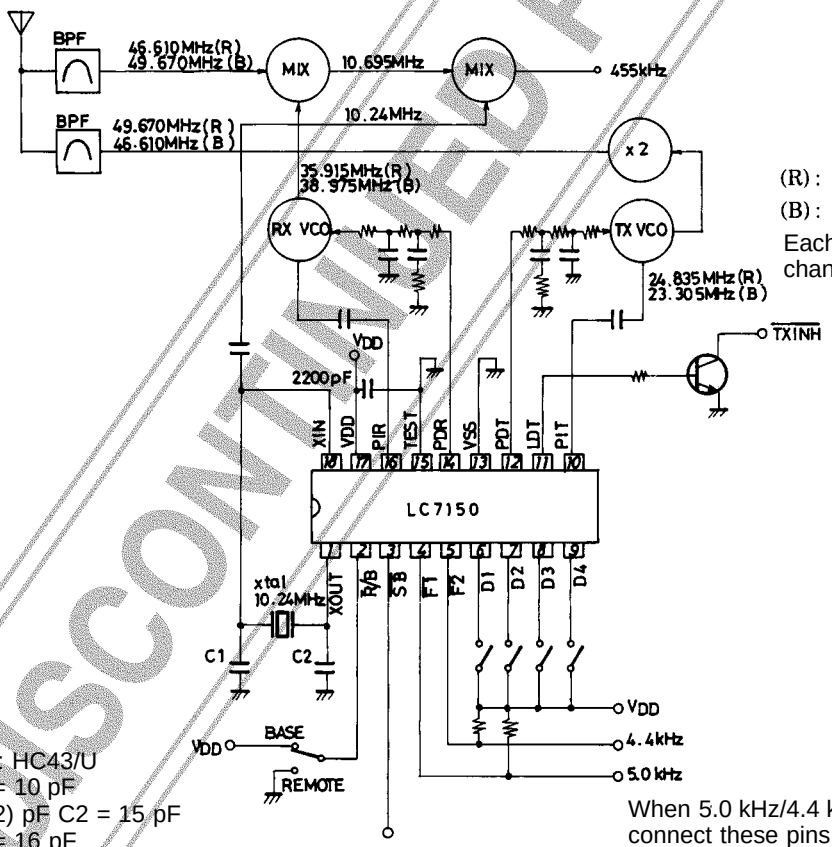


Top view

Equivalent Circuit Block Diagram



Sample Application Circuit



(R): REMOTE UNIT
(B): BASE UNIT
Each value (Hz) is for 1 channel.

Crystal resonator: HC43/U
2114-85501: CL = 10 pF
C1 = 15 (10 to 22) pF C2 = 15 pF
2114-85502: CL = 16 pF
C1 = 22 (15 to 33) pF C2 = 33 pF
KINSEKI, LTD.

When 5.0 kHz/4.4 kHz pins are not used, connect these pins to V_{SS}.

V_{DD}: TX, RX and PLL are operated.
V_{SS}: Only RX and PLL are operated.

Pin Description

Pin	Description
$\overline{F1}$	5.0 kHz output. When not used, connect to V_{SS}.
$\overline{F2}$	4.4 kHz output (10.24 MHz ÷ 2304). When not used, connect to V_{SS}.
V_{DD}, V_{SS}	Power supply.
XIN, XOUT	Crystal resonator (10.24 MHz).
D1 to D4	Channel select pin.
$\overline{R}$/B	Base unit/remote unit select pin. $\overline{R}$/B = "0" (V_{SS}) ..... Remote unit $\overline{R}$/B = "1" (V_{DD}) ..... Base unit
$\overline{SB}$	Used to stop the TX PLL at the standby mode to minimize current dissipation. $\overline{SB}$ = "0" (V_{SS}) ..... Standby mode. Only the RX and PLL are operated. The charge pump enters a high-impedance mode. $\overline{SB}$ = "1" (V_{DD}) ..... The TX, RX and PLL are operated.
PIT	TX programmable divider input pin.
PIR	RX programmable divider input pin.
PDT	TX charge pump output pin.
PDR	RX charge pump output pin.
TEST	LSI test input pin. Connected to V_{SS}.
LDT	TX PLL unlock signal output pin.

When the phase difference becomes t_D (= 6.25 µs.) or more, 5.6 ms. output pulse is delivered at the LDT pin.

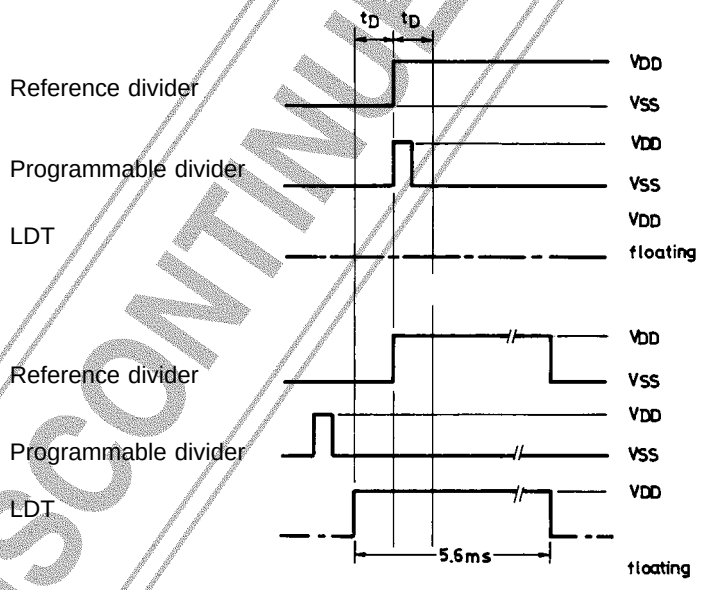


Table of Frequency Division

INPUT				CH	REMOTE ($\overline{R}$/B = "0")					BASE ($\overline{R}$/B="1")				
					TX (fref = 2.5 kHz)			RX (fref = 5 kHz)		TX (fref = 2.5 kHz)			RX (fref = 5 kHz)	
D1	D2	D3	D4		f_{TX} (MHz)	f_{VCO} (MHz)	N	f_{VCO} (MHz)	N	f_{TX} (MHz)	f_{VCO} (MHz)	N	f_{VCO} (MHz)	N
1	0	0	0	1	49.670	24.8350	9934	35.915	7183	46.610	23.305	9322	38.975	7795
0	1	0	0	2	49.845	24.9225	9969	35.935	7187	46.630	23.315	9326	39.150	7830
1	1	0	0	3	49.860	24.9300	9972	35.975	7195	46.670	23.335	9334	39.165	7833
0	0	1	0	4	49.770	24.8850	9954	36.015	7203	46.710	23.355	9342	39.075	7815
1	0	1	0	5	49.875	24.9375	9975	36.035	7207	46.730	23.365	9346	39.180	7836
0	1	1	0	6	49.830	24.9150	9966	36.075	7215	46.770	23.385	9354	39.135	7827
1	1	1	0	7	49.890	24.9450	9978	36.135	7227	46.830	23.415	9366	39.195	7839
0	0	0	1	8	49.930	24.9650	9986	36.175	7235	46.870	23.435	9374	39.235	7847
1	0	0	1	9	49.990	24.9950	9998	36.235	7247	46.930	23.465	9386	39.295	7859
0	1	0	1	10	49.970	24.9850	9994	36.275	7255	46.970	23.485	9394	39.275	7855
1	1	0	1	10	49.970	23.9850	9994	36.275	7255	46.970	23.485	9394	39.275	7855
0	0	1	1	10	49.970	23.9850	9994	36.275	7255	46.970	23.485	9394	39.275	7855
1	0	1	1	10	49.970	23.9850	9994	36.275	7255	46.970	23.485	9394	39.275	7855
0	1	1	1	10	49.970	23.9850	9994	36.275	7255	46.970	23.485	9394	39.275	7855
1	1	1	1	10	49.970	23.9850	9994	36.275	7255	46.970	23.485	9394	39.275	7855
0	0	0	0	10	49.970	23.9850	9994	36.275	7255	46.970	23.485	9394	39.275	7855