

OUTLINE OF SYSTEM

The KIC9316F-001 is a digital tuning system optimum for portable sets such as pocket radios, headphone stereo sets, etc.... By combining KIC9316F-001 with prescaler KID7101F or KID6134AF, 4-band of FM/MW/LW (TV)/SW are provided compatibly with worldwide destinations.

RECEIVING BAND

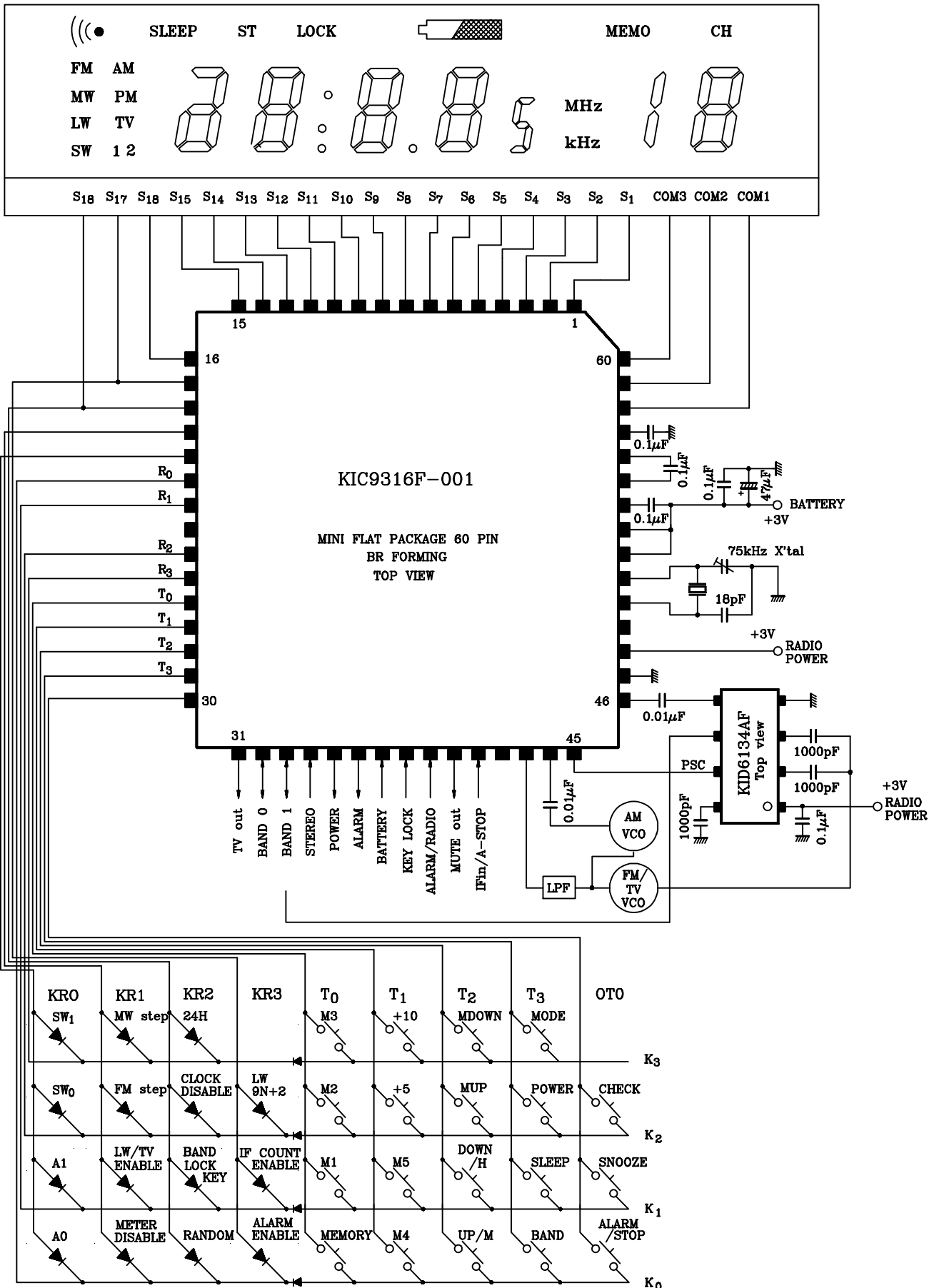
BAND	AREA	CODE		RECEIVING RANGE (Hz)	STEP (Hz)	f _{ref} (Hz)	IF (Hz)
		A1	A0				
FM	U.S.A	0	0	* 87.5 ~ 108.0 M	100/200 k	12.5 k	10.7 M
	General	0	1	87.5 ~ 108.0 M	50 / 100 k		
	East Eur.	1	0	65.0 ~ 74.0 M 87.5 ~ 108.0 M			
	China	1	1	87.0 ~ 108.0 M			
MW	U.S.A	0	0	522 ~ 1620 k	9 k	3 k	450 k
				520 ~ 1710 k	10 k	5 k	
	General East Eur.	-	-	522 ~ 1620 k	9 k	3 k	
				520 ~ 1620 k	10 k	5 k	
	China	1	1	531 ~ 1602 k	9 k	3 k	
				522 ~ 1611 k			
TV	U.S.A	0	0	2 ~ 13 ch	1 ch	3.125 k	10.7 M
LW	Gen, East E	-	-	144 ~ 281 k	1 / 9 k	1 k	450 k
SW	-	SW 1	SW 0		5 k	5 k	450 k
		1	0	5.95 ~ 15.6 M			
		0	1	3.8 ~ 12.5 M			
		1	1	2.3 ~ 6.2 M			
				7.1 ~ 21.85 M			

* If step is 200kHz, range is 87.5~108.1MHz

○ FUNCTIONAL OUTLINE

- Station Selection
 - Manual tuning
 - Auto-tuning
- Memory Function
 - Fixed FM/MW 10/10 stations
 - FM/AM/TV(LW) 10/10/5 stations
 - FM/AM/SW-A or -B 10/5/5 stations
 - FM/AM/SW1/SW2 5/5/5/5 stations
 - FM/AM/LW/SW 5/5/5/5 stations
- Random It has presetting memory of 15 stations at random, but it limit 10 stations when select of 4 band.
- 12/24 Hour Clock indication.
- Sleep/Alarm/Snooze function.

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I/O PORTS

PORT	NO.	NAME	I/O	FUNCTION	ACTIVE	INT.															
OT 0	30	T4	OUT	Key timing output port	H	H															
OT 1	31	TV out	OUT	TV/FM low frequency (CH) area output : It output "H" level when 2 to 6 ch of TV band in USA and 65.0 to 74.0MHz of FM band in East Europe.	-	L															
P 10	32	BAND 0	I/O	band in/output : BAND LOCK KEY JUMPER on : band input off : band output																	
P 11	33	BAND 1	I/O	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>FM</th> <th>MW</th> <th>LW (TV, SW1)</th> <th>SW(SW2)</th> </tr> </thead> <tbody> <tr> <td>BAND 0</td> <td>L</td> <td>H</td> <td>L</td> <td>H</td> </tr> <tr> <td>BAND 1</td> <td>L</td> <td>L</td> <td>H</td> <td>H</td> </tr> </tbody> </table>		FM	MW	LW (TV, SW1)	SW(SW2)	BAND 0	L	H	L	H	BAND 1	L	L	H	H		
	FM	MW	LW (TV, SW1)	SW(SW2)																	
BAND 0	L	H	L	H																	
BAND 1	L	L	H	H																	
P 12	34	STEREO	IN	stereo input : "H" input : ST indicator on "L" input : ST indicator off	H	-															
P 13	35	POWER	OUT	power output : "H" output : power on "L" output : power off	H	H															
P 20	36	ALARM	OUT	alarm output : alarm buzzer sound output at alarm period.	-	L															
P 21	37	Battery	IN	battery input : "L" input : no battery indicator on and off "H" input : no battery indicator off	L	-															
P 22	38	Key lock	IN	key lock input : Key input is unavailable when this terminal is "H" level.	H	-															
P 23	39	ALARM / RADIO	IN	alarm radio select input : To select alarm buzzer or power output at alarm period. "H" input : alarm buzzer "L" input : power output	-	-															
MUTE	40	MUTE	OUT	mute output	H	H															
IF IN	41	IF-IN A-STOP	IN	IF / auto stop input : To input auto stop signal during seek. IF count disable jumper off : IF input At FM band 10.7MHz, at AM band 450kHz is inputted by condenser coupling. IF count disable jumper on : Auto stop signal is inputted by DC. Seek is stopped by "H" level.	AC H	- -															

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KEY MAP

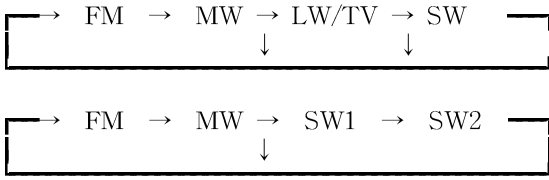
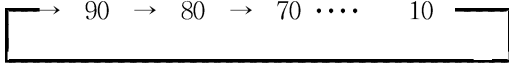
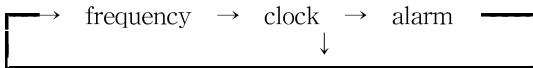
	K0	K1	K2	K3
T0	MEMORY	M1	M2	M3
T1	M4	M5	+5	+10
T2	UP / MIN	DOWN / HOUR	MUP	MDOWN
T3	BAND	SLEEP	POWER	MODE
OT0	ALARM / STOP	SNOOZE	CHECK	

KR0	* A0	* A1	* SW0	* SW1
KR1	* METER DISABLE	* LW/TV ENABLE	* FM STEP	* MW STEP
KR2	* RANDOM	* BAND LOCK KEY	* CLOCK DISABLE	* 24H
KR3	* ALARM ENABLE	* IF COUNT DISABLE	* LW 9N + 2	

MOMENTARY KEY	* DIODE JUMPER
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KEY INPUT FUNCTIONS

SYMBOL	Description
MEMORY	This key is to write the preset memories. It select a hope to frequency of fast operation, and this key push of second operation. Next operation setup to want of preset cancel, and this key push of last operation.
M1 ~ M5 +5, +10	These keys are to call & write the preset memories.
UP / MIN	Frequency up. Adjusting minute in clock or alarm adjusting mode.
DOWN / HOUR	Frequency down. Adjusting hour in clock or alarm adjusting mode.
MUP	Preset memory number increment, and this key is able to call & write the preset memories.
MDOWN	Preset memory number decrement, and this key is able to call & write the preset memories.
BAND	Cyclically changes the receiving bands by tact switch. 
SLEEP	To set the sleep timer on/off. When key is pressed continuously, sleep time changed as follows. 
POWER	To switch the radio on/off.
MODE	To switch the LCD indication to frequency, clock and alarm mode.  When clock or alarm is indicated, pressed more than 0.5 sec continuously adjusting mode resulted.
ALARM / STOP	To switch the alarm function on/off. Stop the alarm buzzer at alarm on period.
SNOOZE	Pause alarm buzzer. After four minutes, alarm buzzer turn on again.
CHECK	To turn on all segments of LCD and to move faster clock.

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DIODE JUMPER

SYMBOL	Description			
A0 A1	To select the radio frequency receiving areas.			
	A 1	A 0	AREA	
	0	0	U.S.A	
	0	1	General	
	1	0	East Europe	
	1	1	China	
SW0 SW1	To select the SW frequency receiving range.			
	SW 1	SW 0	receiving band [MHz]	BAND
	0	0	SW disable	
	0	1	5.95 ~ 15.6 MHz	SW-A
	1	0	3.80 ~ 12.50 MHz	SW-B
	1	1	2.30 ~ 6.20 7.10 ~ 21.85 MHz	SW1 SW2
METER DISABLE	To select the seek method of SW band. Diode jumper on : meter band disable Diode jumper off. : meter band enable			
LW / TV ENABLE	To select TV band at U.S.A or LW band at East Europe, general. Diode jumper on : LW/TV enable Diode jumper off : LW/TV disable			
FM STEP	To select step of FM band. At East Europe and general 50/100k, at U.S.A 100/200k. Diode jumper on : 100k (East Europe, general) 200k (U.S.A) Diode jumper off : 50k (East Europe, general) 100k (U.S.A)			
MW STEP	To select step or receiving range of MW band. At East Europe, general and U.S.A 9/10k, at china wide or narrow. Diode jumper on : 10k (East Europe, general) 9k (U.S.A) Diode jumper off : 9k (East Europe, general) 10k (U.S.A) Diode jumper on : 531k~1602kHz (China) Diode jumper off : 522k~1611kHz (China)			

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DIODE JUMPER

SYMBOL	Description
RANDOM	<p>To select method of memory.</p> <p>Diode jumper on : 15 memories for 3 bands mode 10 memories for 4 bands mode</p> <p>Diode jumper off : fixed memory</p> <p>When band switch is lock switch, memory is fixed.</p>
BAND LOCK KEY	<p>To select band switch is lock or tact. The case of lock switch, band is inputted from I/O terminal.</p> <p>Diode jumper on : lock switch (input from I/O terminal.) Diode jumper off : tack switch (cyclically change)</p>
CLOCK DISABLE	<p>To select clock function on/off.</p> <p>Diode jumper on : clock disable Diode jumper off : clock enable</p>
24H	<p>To select format of clock.</p> <p>Diode jumper on : 24 hour format Diode jumper off : 12 hour format</p> <p>If clock function is disable this jumper is unavailable.</p>
ALARM ENABLE	<p>To select alarm function on/off.</p> <p>Diode jumper on : alarm enable Diode jumper off : alarm disable</p> <p>If clock function is disable this jumper is unavailable.</p>
IF COUNT DISABLE	<p>To select input method of auto stop signal.</p> <p>Diode jumper on : auto stop input (DC) Diode jumper off : IF input directly</p>
LW 9N+2	<p>To select the stopped frequency at LW band.</p> <p>Diode jumper on. : 9N+2 Diode jumper off : 9N</p> <p>If IF count is enable this jumper is unavailable.</p>

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BAND SWITCHING

1. Principal function

Bands are switched.

2. Input ports and keys to be used.

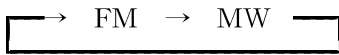
BAND 0, BAND 1, [BAND] key, [band lock] diode switch

3. Function

• When [band lock] diode switch is OFF.

a. When [band lock] jumper is invalid, briefly press this button will alter the radio in a cyclic function.

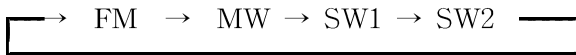
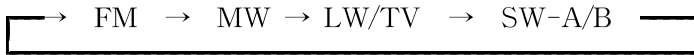
2 band selection



3 band selection



4 band selection



b. When MW receive of USA area, "AM" mark light in case of composition 2 band and "MW" mark light a case other.

c. The band output ports are as follows :

(It see a diagram of band I/O ports BAND 0 and BAND 1.)

• When [band out] diode switch is ON.

a. Selects receiving band according to combination of the band input ports BAND 0 and BAND 1.

b. Bands selected according to destination are as follows :

Input/Output port	FM	MW	LW(TV, SW1)	SW (SW2)
BAND 0 (P1-0)	L	H	L	H
BAND 1 (P1-1)	L	L	H	H

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SELECT AM/FM STEP

1. Principal function

SELECT AM/FM STEP

2. Input ports and keys to be used.

[FM step], [MW step], [LW 9N+2] diode switch

3. Function

a. FM band step selected by [FM step] diode are as follows :

[FM step] diode	U.S.A	General	East Eur.	China
ON	200 k	100 k	100 k	100 k
OFF	100 k	50 k	50 k	50 k

b. MW band step selected by [MW step] diode are as follows :

[MW step] diode	U.S.A	General	East Eur.	China
ON	9 k	10 k	10 k	531 ~ 1602 k
OFF	10 k	9 k	9 k	522 ~ 1611 k

However, china area change receiving range by [MW step] diode.

c. LW band step selected by [LW 9N+2] diode are as follows :

Without [LW 9N+2] diode : LW 9N step
With [LW 9N+2] diode : LW 9N+2 step

MANUAL TUNING

1. Principal function

1 push / 1 step tuning by [UP] / [DOWN] key.

2. Input ports and keys to be used.

[UP] key, [DOWN] key

3. Function

a. 1 push / 1 step tuning by [UP] / [DOWN] key.

b. Tuning is continuously carried out when [UP] / [DOWN] key is kept pushed continuously for more than 0.5 second.

And auto search tuning move by [UP] / [DOWN] key freed when tuning is continuously carried out.

c. When LW band select, auto or continuous tuning step is 9kHz and manual tuning step is 1kHz.

d. The continuous tuning up/down step frequency and a speed are as follows :

BAND	SCAN TIME	Step Frequency
FM	100 mS / STEP	100 kHz
		50 kHz
MW	200 mS / STEP	9 kHz
		10 kHz
LW	200 mS / STEP	9 kHz
TV	200 mS / STEP	1 ch
SW	200 mS / STEP	5 kHz

AUTO SEARCH TUNING

1. Principal function

Auto up tuning or auto down tuning.

2. Input ports and keys to be used.

[UP], [DOWN] Key, [IFdis] diode, [IFin] input port

3. Function

a. Auto search tuning move by [UP] / [DOWN] key release when tuning is continuously carried out.

b. The auto search tuning up/down step frequency and speed are as follows :

BAND	SCAN TIME	Step Frequency
FM	100 mS / STEP	100 kHz
		50 kHz
MW	200 mS / STEP	9 kHz
		10 kHz
LW	200 mS / STEP	9 kHz
TV	200 mS / STEP	1 ch
SW	200 mS / STEP	5 kHz

c. STOP signal cancel when tuning is continuously carried out.

d. STOP signal select [IFdis] diode jumper of a auto search tuning.

1. When without [IFdis] diode, STOP signal is detected by IF counter input.
2. When with [IFdis] diode, STOP signal is detected by DC input.

e. When the limit frequency is reached, the tuning shifts toward the opposite limit frequency and after stopping the auto search tuning for 500mS, the tuning is resumed.

f. The auto up search tuning stop by [UP] key pushed when auto up search tuning.

But the auto down search tuning start by [DOWN] key pushed when it's.
And when the down search tuning, action same.

g. In the following cases, auto search tuning is stopped.

- When any key other than [UP] or [DOWN] key is operated.
- When a band is being switched.
- When the INH input port change.

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h. With [METER dis] diode can all receiving of frequency the SW band.

And without [METER dis] diode, the auto search tuning stops for 500mS at the first step after shifted to next meter band.

Meter band frequencies in SW band are as follows :

BAND	Frequency	STEP
SW1	2.300 ~ 2.495	5kHz
	3.200 ~ 3.400	
	3.900 ~ 4.000	
	4.750 ~ 5.060	
	5.950 ~ 6.200	
SW2	7.100 ~ 7.300	5kHz
	9.500 ~ 9.900	
	11.650 ~ 12.050	
	13.600 ~ 13.800	
	15.100 ~ 15.600	
	17.550 ~ 17.900	
21.450 ~ 21.850		

BAND	Frequency	STEP
SW-A	5.950 ~ 6.200	5kHz
	7.100 ~ 7.300	
	9.500 ~ 9.900	
	11.650 ~ 12.050	
	13.600 ~ 13.800	
	15.100 ~ 15.600	

BAND	Frequency	STEP
SW-B	3.800 ~ 4.000	5kHz
	4.750 ~ 5.060	
	5.950 ~ 6.200	
	7.100 ~ 7.300	
	9.500 ~ 9.900	
	11.650 ~ 12.500	

PRESET MEMORY

1. Principal function

The number of preset memories set up by destination can be realized.

2. Input ports and keys to be used.

[M1] ~ [M5] key, [MUP], [MDOWN] key, [+5], [+10] key, [MEMORY] key

3. Function

- a.. When [M1] ~ [M5] keys are pushed, the pushed preset memories are read out. [M6] ~ [M10] keys become effective by pushing [M1] ~ [M5] keys after pushing [+5] key.
In the same way, [M11] ~ [M15] keys become effective by pushing [M1] ~ [M5] keys after pushing [+10] key.
- b. When [+5] or [+10] key is pushed, "5" or "10" indication lights for 5 sec. and during this period.
- c. In the following cases, preset memory is recovered when shift indication lights.
 - When non operation for 5sec.
 - When any key other than preset keys or [ALARM stop] / [SNOOZE] key are operated.
 - When the INH input port change.
- d. When [MUP] / [MDOWN] key is pushed, this is called up by the preset memory up or down.
And the preset memory is up/down continuously carried out when [MUP] / [MDOWN] key is kept pushed continuously for more than 0.5 second. The continuous preset memory up/down speed is 500mS.
- e. When [MEMORY] key is pushed, "MEMORY" indication lights for 5 sec. and during this period if the preset key is pushed and after the [MEMORY] key is pushed, a frequency is written in that preset memory and lighting of "MEMORY" indication ends.
- f. In the following cases, a frequency writing condition is stopped.
 - When non operation for 5 sec.
 - When any key other than preset keys or [MEMORY] key are operated.
 - When the INH input port change.
- g. When a frequency end written, the mute output port isn't output data.
- h. The mute output port don't out of a same preset memory key pushed when a preset memory is receiving.

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i. Immediately after initialization, the preset memories are set up as shown below.

BAND	M1	M2	M3	M4	M5	Remark
F M	70.0	88.0	87.5	87.5	87.5	East-euro other
	90.1	98.1	87.5	87.5	87.5	
M W	603	999	lower	lower	lower	9 k
	600	1000	lower	lower	lower	10 k
L W	164	209	144	144	144	
T V	6 ch	7 ch	2 ch	2 ch	2 ch	USA
S W	6.50	10.00	5.95	5.95	5.95	SW-A
	5.00	7.00	3.80	3.80	3.80	SW-B
	3.00	4.50	2.30	2.30	2.30	SW1
	8.00	14.00	7.10	7.10	7.10	SW2

Without [METER dis] diode.

BAND	M1	M2	M3	M4	M5	Remark
S W	7.10	11.65	5.95	5.95	5.95	SW-A
	5.00	7.10	3.80	3.80	3.80	SW-B
	3.20	4.75	2.30	2.30	2.30	SW1
	9.50	15.10	7.10	7.10	7.10	SW2

And when random memory select, the FM band preset memories are set up for [M1] ~ [M2] the MW band preset memories are set up for [M3] ~ [M4], the LW/TV band preset

CLOCK FUNCTION

1. Principal function

Corrects a current time.

2. Input ports and keys to be used.

[MODE] key, [DOWN] key, [UP] key

3. Function

a. It select of 24-hour clock by with [24H] diode jumper, and it select of 12-hour clock by without [24H] diode jumper.

b. Sets the clock indication with the [MODE] key. When the [MODE] key is kept continuously pushing for more than 0.5 sec., "CLOCK" flashes for 5 sec. and the system is put in the clock correction mode.

c. When time is flashing, the following corrections can be made.

- [UP] key : correction of minute.
(1 min/push. Continuous pushing for more than 0.5 sec. changes to the speed 1 min/0.15 sec.)
- [DOWN] key : Correction of hour.
(1 hour/push. Continuous pushing for more than 0.5 sec. changes to the speed 1 hour/0.25 sec.)

d. When correcting "MIN.", sec. is cleared to "00" if any key input is made.

e. If any key other than the above is pushed during correction, the following status result.

- [+5] → Does not change.
- [+10] → Does not change.
- [MODE] → The correction mode is stopped.
- Others → The correction mode is released.

f. If there is no key input for 5 sec. the correction mode is released automatically and then, a current time or a frequency is indicated.

g. If a sleep time is became while the time correction can be mode, the radio power turn off and the time correction is kept.

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ALARM FUNCTION

1. Principal function

Setting of the alarm time and alarm operation.

2. Input ports and keys to be used.

[MODE] key, [UP] key, [DOWN] key

3. Function

a. When [CLOCK dis] without diode and [ALARM ena] with diode, can be set up of the alarm time and alarm operation.

b. Changing the mode to the clock indication mode with [MODE] key, set a time on the alarm by the following key operations. And a alarm caricature flashes for 5 second.

If there is no key input for 5 sec. or [MODE] key to push, the correction function is automatically released and a current time (-audio power off) or a frequency (-audio power on) is indicated.

c. At this time, when [MODE] key continuous pushing for more than 0.5 second, the alarm caricature and alarm time flashes for 5 sec. and the alarm time currently set is indicated.

d. While the alarm caricature and alarm times are flashing, the following corrections can be made.

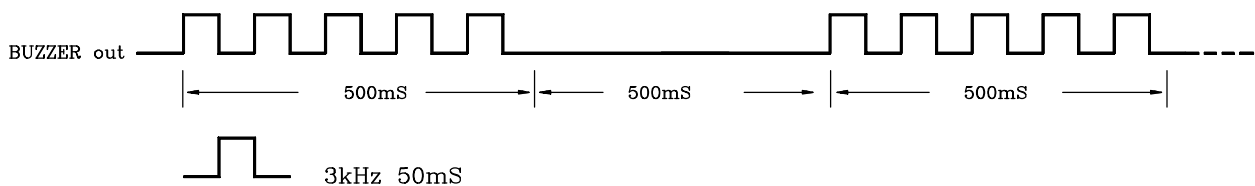
- [UP] key : Correction of minute.
(1 min/push. Continuous pushing for more than 0.5 sec. changes to the speed
1 min/0.15 sec.)
- [DOWN] key : Correction of hour.
(1 hour/push. Continuous pushing for more than 0.5 sec. changes to the speed
1 hour/0.25 sec.)

The time correction function is automatically released 5 sec. later from the no key input state or [MODE] key is pushed and then, a current time or a frequency is indicated.

e. This alarm can be establish alarm ON/OFF by [ALARM stop] key is pushed.

f. When it's state of alarm ON besides this alarm time has arrived, it become as following.

- When the alarm control terminal (This P23 terminal name is "ALARM/RADIO") is "H" level.
The alarm out terminal (P20) is a buzzer output. This wave is as following.



- When the alarm control terminal is "L" level.
The power control out terminal is kept at "H" level (-audio power on).
But when a radio power turn on before the alarm ON time became, this terminal don't change.

g. When [SNOOZE] key is pushed and a buzzer output is doing, this output is suspended for 4 min. and it's stopped by [ALARM] key to push.

h. When alarm ON time become at the time correction or the alarm time correction, the alarm isn't able to turn on.

SLEEP TIMER

1. Principal function

The 90 min. sleep timer can be set.

2. Input ports and keys to be used.

[SLEEP] key

3. Function

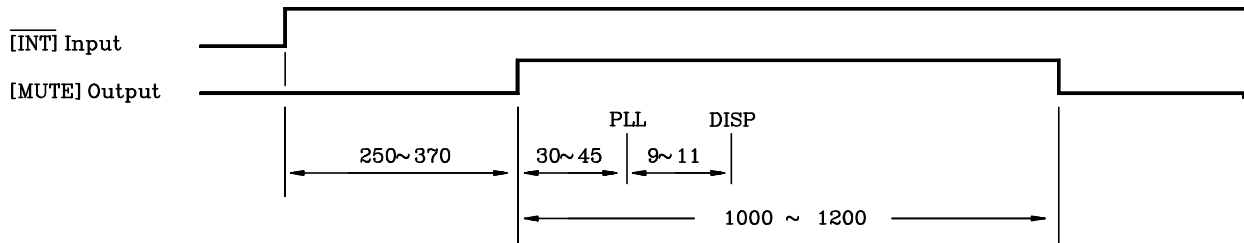
- a. If with [CLOCK dis] diode, sleep function is available.
- b. When [SLEEP] key is pushed, "SLEEP" and a sleep time are indicated on LCD, and a 90 min. sleep time is set up. Further, if [SLEEP] key is pushed again, the sleep operation is released.
- c. To change a sleep time, directly push [SLEEP] key continuously for more than 0.75 sec. when setting the sleep operation. A sleep time can be set up at intervals of 0.4 sec./step like 90, 80, 10, 90.
- d. If there is not [SLEEP] key input for 0.75 sec. while there is indication for residual sleep time, the system returns to a radio mode and "SLEEP" is kept indication.
- e. If any other key than [SLEEP] key is pushed while a sleep time is being indicated, the following status result.
 - [POWER] → The radio power turn off and a sleep mode cancel.
 - [TEST] → To turn on all segment of LCD and to move faster clock.
 - Others → In changed to the frequency indication mode.
- f. While the clock correction mode is being, a sleep time count is suspended.

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Mute output timing and PLL data set timing.

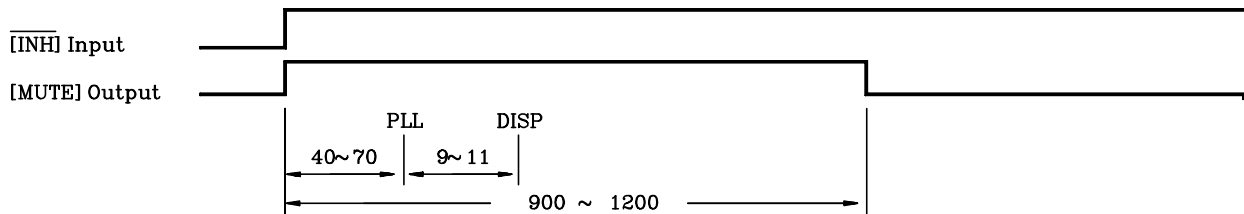
PLL : PLL data set timing
 IF : IF count start timing

1. When initializing.

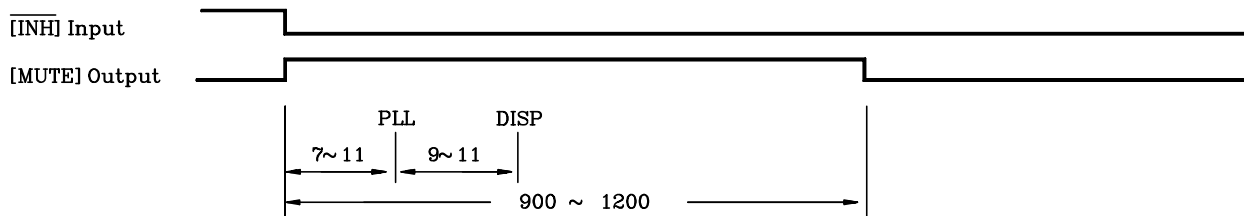


2. When the inhibit ON/OFF. (With clock)

\overline{INH} OFF to ON

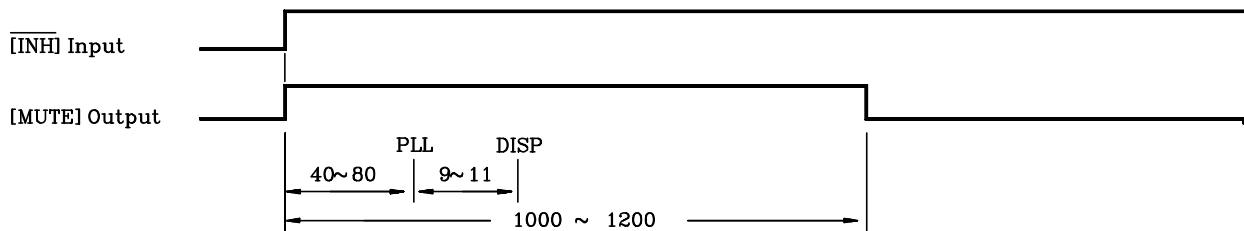


\overline{INH} ON to OFF

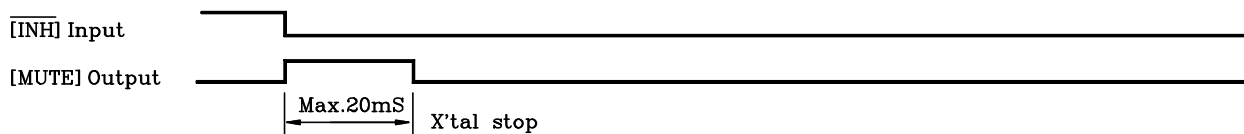


3. When the inhibit ON/OFF. (Without clock)

\overline{INH} OFF to ON

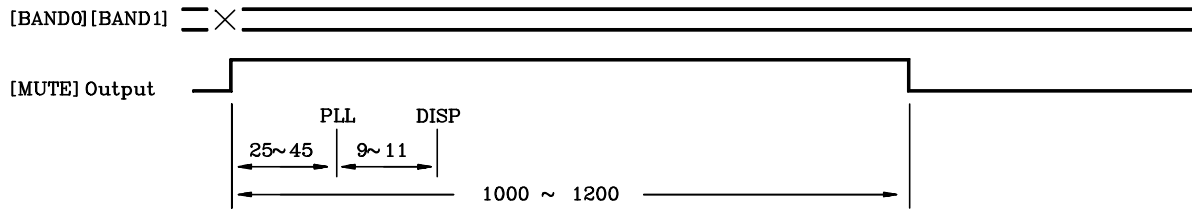


\overline{INH} ON to OFF

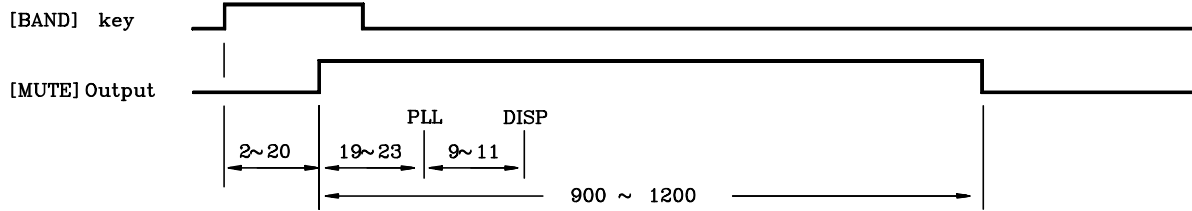


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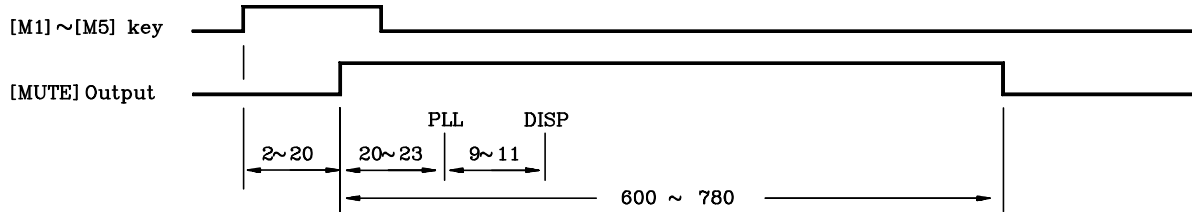
4. When switching a receiving band. (by slide switch)



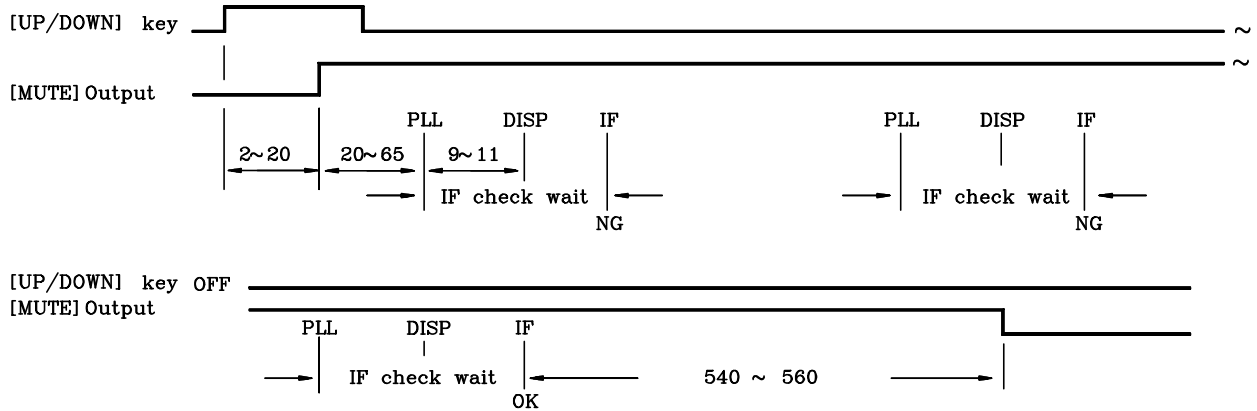
5. When switching a receiving band. (by push switch)



6. When calling a preset memory.



7. Auto search tuning.

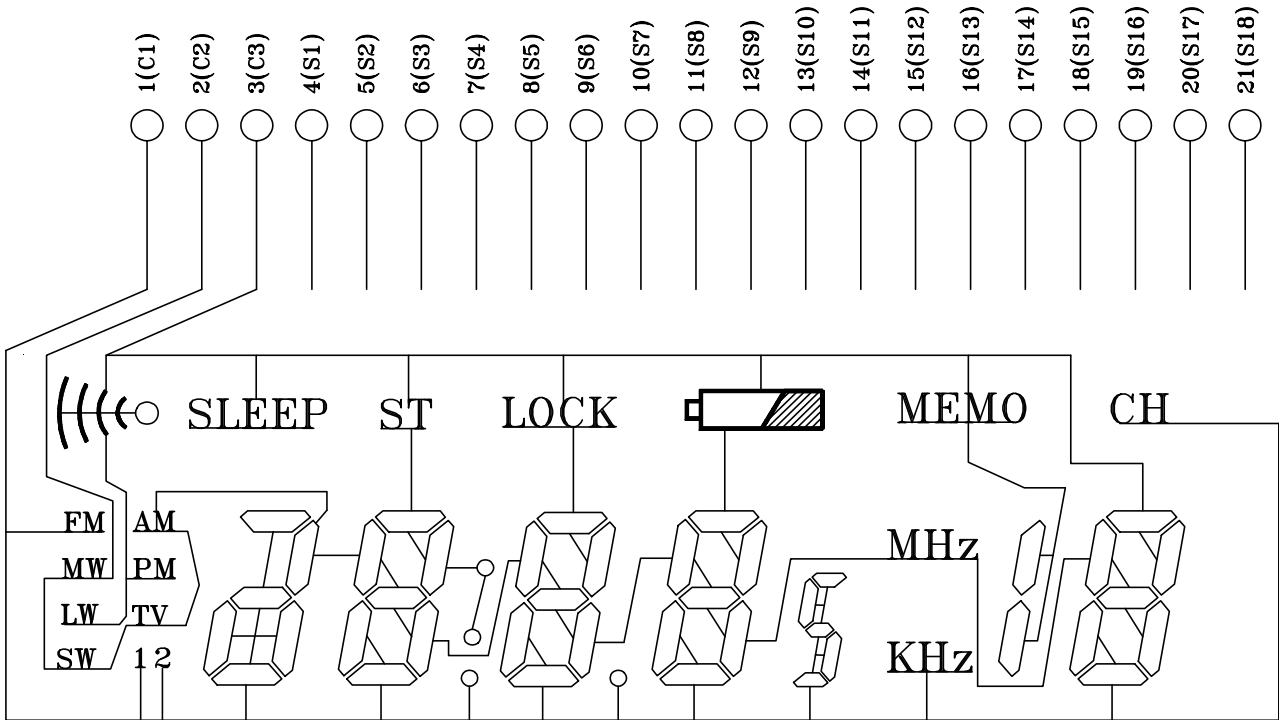


BAND	gate time wide	gate time narrow	IF check wait [ms]
FM	gate time 1mS + / -60kHz	gate time 64mS + / -15kHz	65 ~ 85
TV	gate time 1mS + / -60kHz	gate time 64mS + / -30kHz	155 ~ 175
MW SW LW	gate time 4mS + / -1kHz	gate time 4mS + / -1kHz	155 ~ 175

narrow : count gate time at narrow accuracy
wide : count gate time at wide accuracy

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COMMON



SEGMENT

