

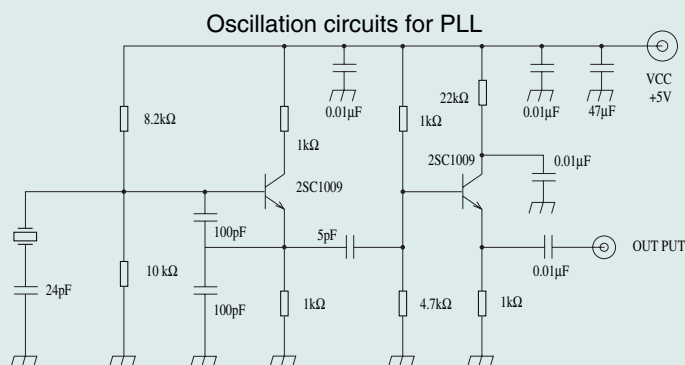
OSCILLATION CIRCUITS

The following circuits are standard oscillation circuits. After determining the frequency range and the overtone, the selection of either IC circuit or discrete transistor results in the determination of the conditions of various circuit elements.

The difference of IC circuit constants or circuit configuration due to the difference of IC makers may exert some influence upon the oscillation of a crystal unit.

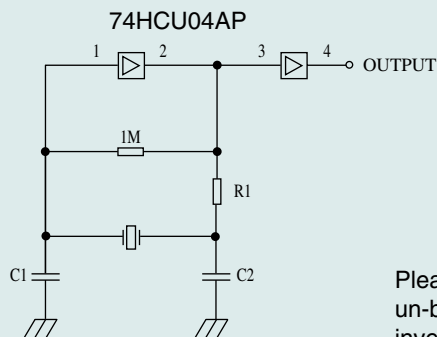
For further details, please contact us.

- Frequency Range : 12~20MHz
Overtone : Fundamental
Load Capacitance : 20pF



- Frequency Range : 3~25MHz
Overtone : Fundamental

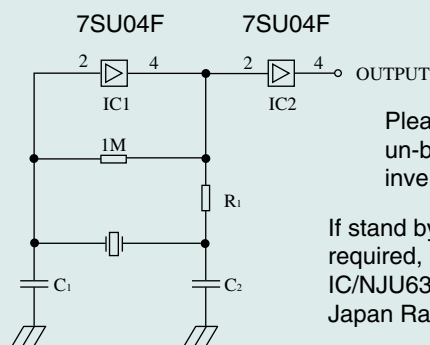
Frequency Range (MHz)	C ₁ = C ₂ (pF)	R ₁ (Ω)	Load Capacitance (pF)
3 ~ 4	33	4.7 k	20
4 ~ 5	33	3.3 k	20
5 ~ 6	33	2.2 k	20
6 ~ 9	22	1.0 k	16
9 ~ 10	22	470	16
10 ~ 15	15	470	12
15 ~ 20	15	470	12
20 ~ 25	10	470	10



Please use un-buffered type inverter.

- Frequency Range : 3~25MHz
Overtone : Fundamental

Frequency Range (MHz)	C ₁ = C ₂ (pF)	R ₁ (Ω)	Load Capacitance (pF)
3 ~ 4	33	6.8 k	20
4 ~ 5	33	4.7 k	20
5 ~ 6	33	3.3 k	20
6 ~ 9	22	2.2 k	16
9 ~ 10	22	1.0 k	16
10 ~ 15	15	470	12
15 ~ 20	10	330	12
20 ~ 25	7	330	10

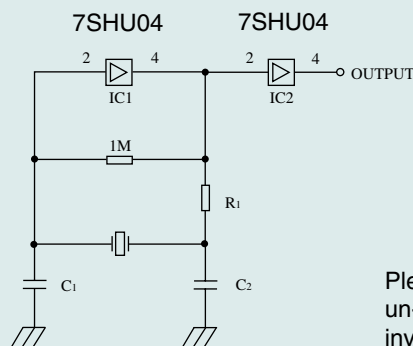


Please use un-buffered type inverter.

If stand by function is required, Please use IC/NJU6323P(New Japan Radio Co.,Ltd.)

- Frequency Range : 25~50MHz
Overtone : Fundamental

Frequency Range (MHz)	C ₁ = C ₂ (pF)	R ₁ (Ω)	Load Capacitance (pF)
25 ~ 30	15	1.0 k	12
30 ~ 40	10	680	10
40 ~ 50	7	330	8

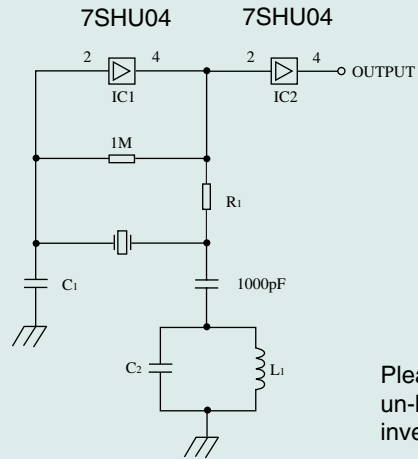


Please use un-buffered type inverter.

OSCILLATION CIRCUITS

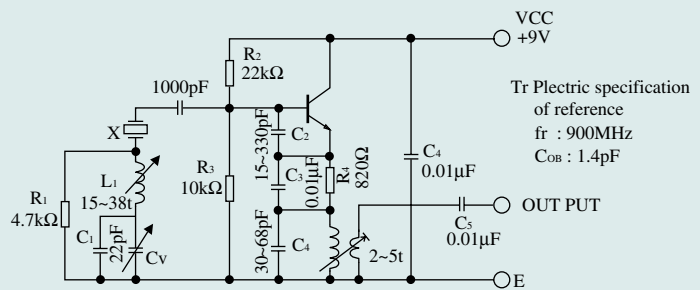
5. Frequency Range : 30~60MHz
Overtone : 3rd overtone

Frequency Range (MHz)	C ₁ (pF)	C ₂ (pF)	L ₁ (μH)	R ₁ (Ω)	Load Capacitance (pF)
30 ~ 40	10	18~10	2.2	820	10
40 ~ 50	7	15~10	1.5	470	8
50 ~ 60	5	15~10	1.0	330	8

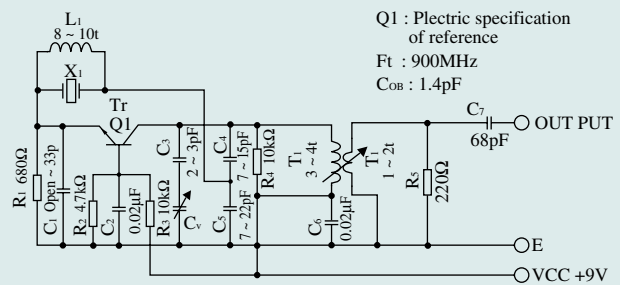


Please use un-buffered type inverter.

6. Frequency Range : 16~80MHz max
Overtone : 3rd, 5th overtone
Load Capacitance C_L : Series Resonance



7. Frequency Range : 80~140MHz max
Overtone : 3rd, 5th overtone
Load Capacitance C_L : Series Resonance

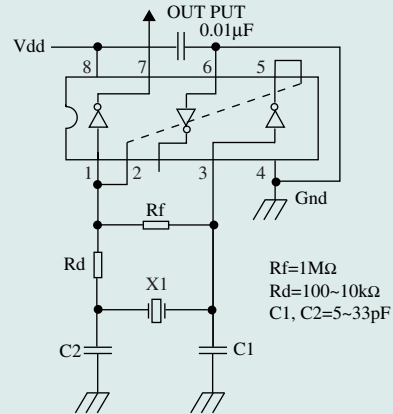


OSCILLATION CIRCUITS

8. Example of 7WU04 Oscillating Circuit Connection

To prevent coupling between input and output:

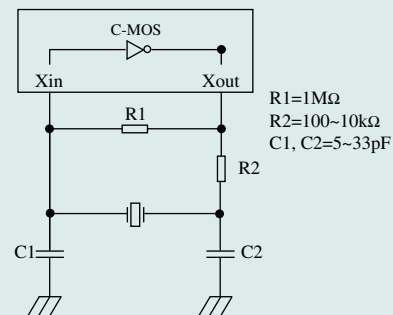
1. Position input pin 3 at a distance from output pin 7.
2. Inactivate the inverter at the center.



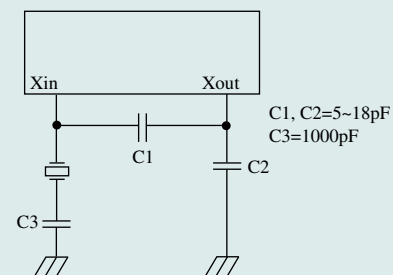
9. Example of IC Internal Oscillating Circuit Connection

To achieve correct operation:

1. When IC has resistance R1 already embedded, its mounting is unnecessary.
2. R2 is necessary for the prevention of abnormal oscillation.
3. Use this circuitry as the base pattern.



10. Use the configuration in the right figure as the base pattern for the MC68HC912D series.



Note for Mounting:

1. Allow the shortest distance to lines connecting parts in order to prevent the inclusion of unnecessary stray capacitance.
2. Do not allow any part of the oscillating circuit to cross over a signal line on the same circuit board.