



Document No: QJL-9616

Date: 29. Oct. 2010

Investigation Report of Oscillation Circuit

[1] **Customer** : Messrs. ENDRICH

[2] **Object** : Investigation a matching between your PWB s/n. ATmega64/128/169 and CM315 32.768kHz.
(IC No. ATMEGA16L)

[3] **Results** : See the data in the following Table-1.

Table-1.Circuit investigation

CM315 32.768kHz	Circuit Parameters		CL (Load capacitance) (pF)	Vdd (V)	Frequency Gap (ppm)	Negative Resistance (k ohm)	Safety factor (times)	DL (uW)	Startup Time (ms)
	Cin (pF)	Cout (pF)							
Our Investigating rameters	OPEN	OPEN	12.5	1.8	-40.2	280	4.0	0.1	700
				2.7	-33.5	350	5.0	0.1	600
				3.3	-32.1	350	5.0	0.1	600
				4.5	-31.1	360	5.1	0.1	580
				5.0	-30.4	380	5.4	0.1	580
				5.5	-30.1	390	5.6	0.1	580

* Our Recommendable Negative Resistance Value : over 200 k ohm

[4] **Conclusion** :

1. At Our Investigated Parameters, Frequency Gap of the circuit is -30.4ppm,
and its Negative Resistance satisfies Our Recommendable Negative Resistance Value.
Because internal capacity of IC was large, the frequency was not able to be adjusted by the load capacitance of the crystal.

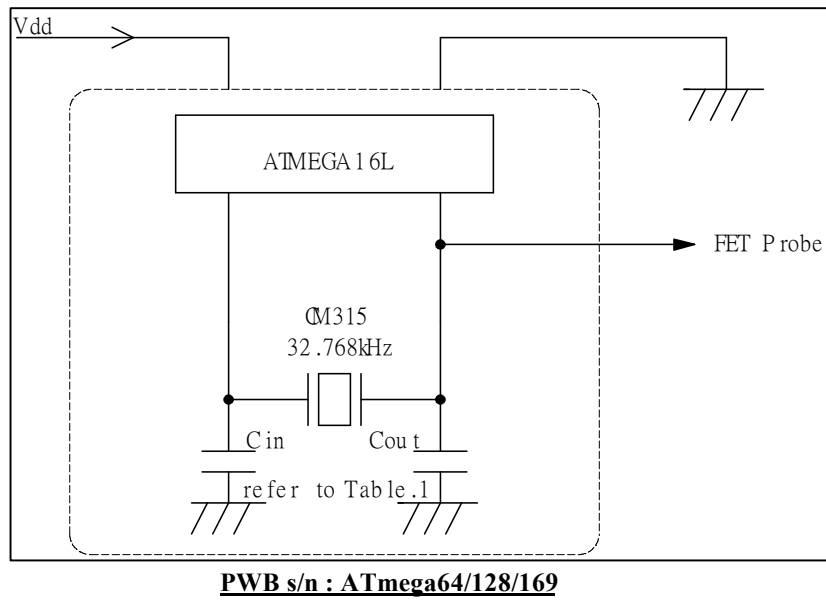
[5] **Caution** :

1. We would advise you to check a condition of performance with your whole sets for sure because the investigation was made the only condition of the oscillation circuit (Fig-1.)
2. The investigation report won't guarantee whole of your products and the results would be subject to change when the parameter of oscillation circuit was changed for some reason or other so that we advise you to re-investigate the oscillation circuit whenever it was changed .

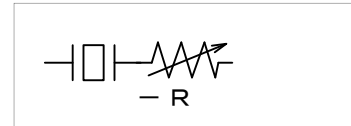
Please feel free to contact us if you have any question.

Yours faithfully.

Fig-1. Circuit parameters



The way of measuring Negative Resistance (-R)



CITIZEN FINETECH MIYOTA CO., LTD.
 Crystal Devices Division
 Toshiki Satoh

Fig.2 Frequency-Temperature Characteristics

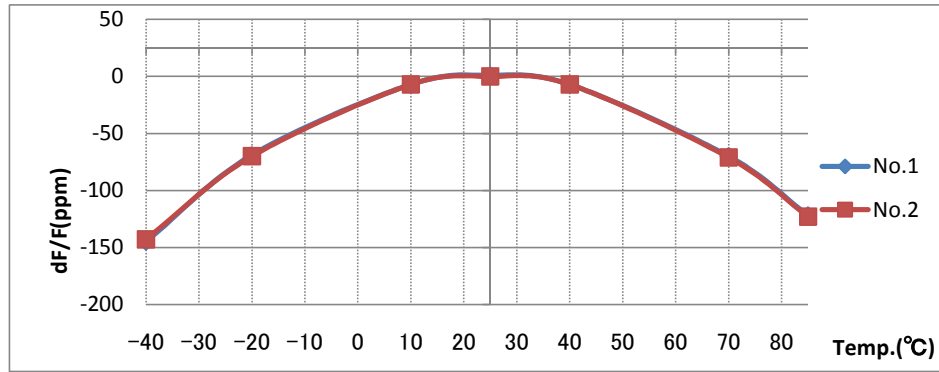


Fig.3 Negative Resistance – Temperature Characteristics

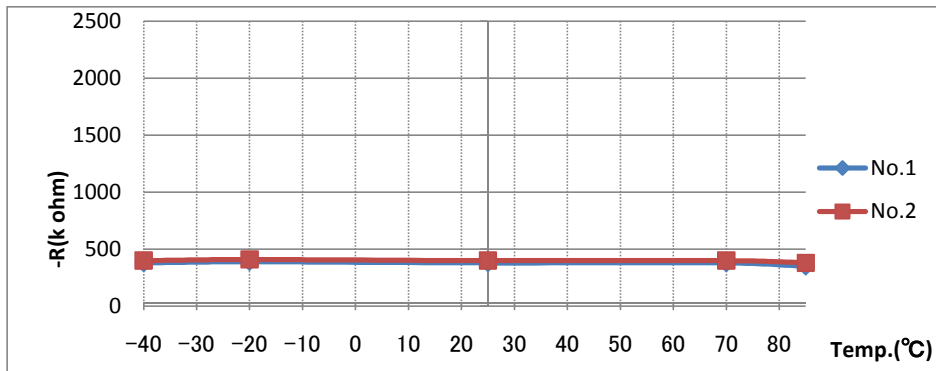


Fig.4 Safety Factor – Temperature Characteristics

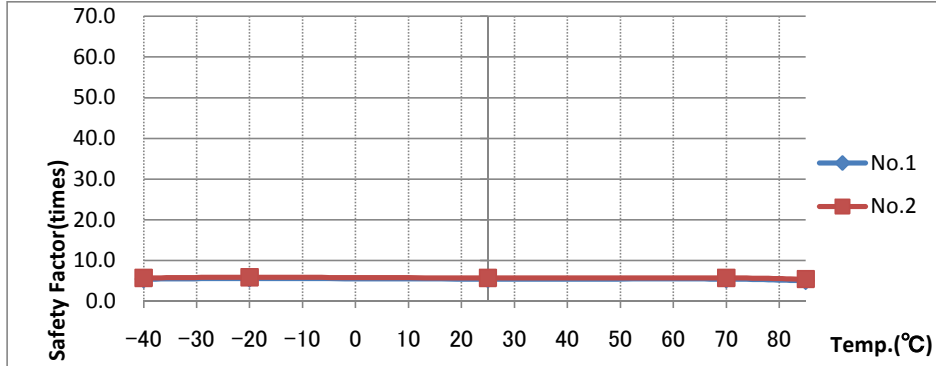


Fig.5 Startup Time – Temperature Characteristics

