EMI TEST REPORT

Test report no. : ERI-FCC-0101

Type of equipment : PC CAMERA

Model no. : DS200

Applicant. : DIGITAL SOLUTION CO.,LTD.

Test standards : FCC Part15 Subpart B (Class B)

Test Procedure and Items :

- AC Power line Conducted Emissions Measurement : ANSI C63.4-1992
- Radiated Emissions Measurement : ANSI C63.4-1992

Test result : Complied

This equipment has been tested to comply with the requirements of FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators.
The results in this report apply only to the sample tested.
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Date of test: 2002. 3. 12 – 3. 13 **Issued date: 2002. 3. 14**

Tested by : YOUNG-SIK, KIM

approved by: MIN-SEOK, CHUNG

This laboratory is registered by KOLAS, KOREA.

This test report have been performed in accordance with Its terms of registration.

80, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGGI-DO, KOREA
TEL: 82 31 336 1186 FAX : 82 31 336 1184 homepage : www.esak.or.kr

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6. Photographs

Radiated Emission Test
Conducted Emission test
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1. Client information

Applicant	: DIGITAL SOLUTION CO.,LTD.
Address	: 201, BIC-Center, KPU(Korea Polytechnic university)3-101, Jung-Wang-Dong, Shi-Hung-City, Kyunggi-Do, Korea
Telephone Number	: 81-31-497-8294
Facsimile Number	: 81-31-497-8295
Contact person	: Lee Jung Wook

Manufacturer	: DIGITAL SOLUTION CO.,LTD.
Address	: 201, BIC-Center, KPU(Korea Polytechnic university)3-101, Jung-Wang-Dong, Shi-Hung-City, Kyunggi-Do, Korea
Telephone Number	: 81-31-497-8294
Facsimile Number	: 81-31-497-8295

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2. Laboratory information

Address

The open area test site and EMC facilities are used for these testing.
This facility was accredited by KOLAS, EK of Korea, MIC, FCC.

EMC RESEARCH INSTITUTE .
80, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGGI-DO, KOREA

Telephone Number : 82- 31- 336- 1186
Facsimile Number : 82- 31- 336 -1184

KOLAS No. : 111
EK : J
MIC : KR0030
FCC Filing No. : 96753

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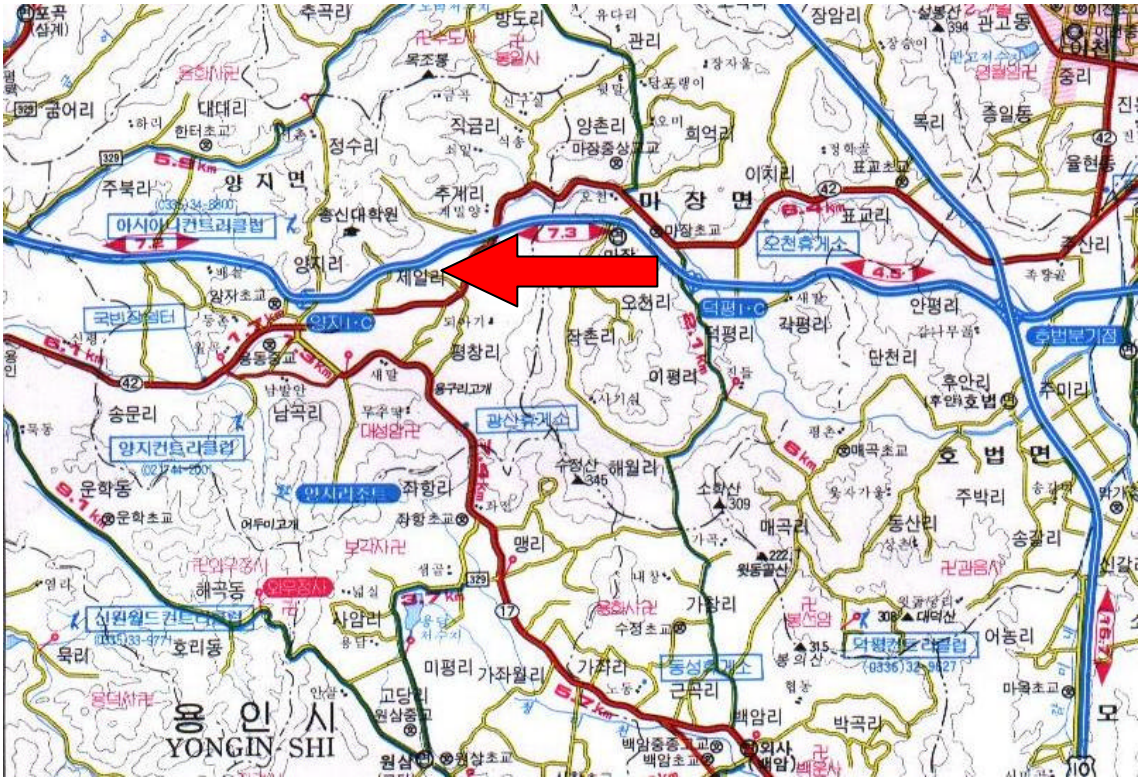
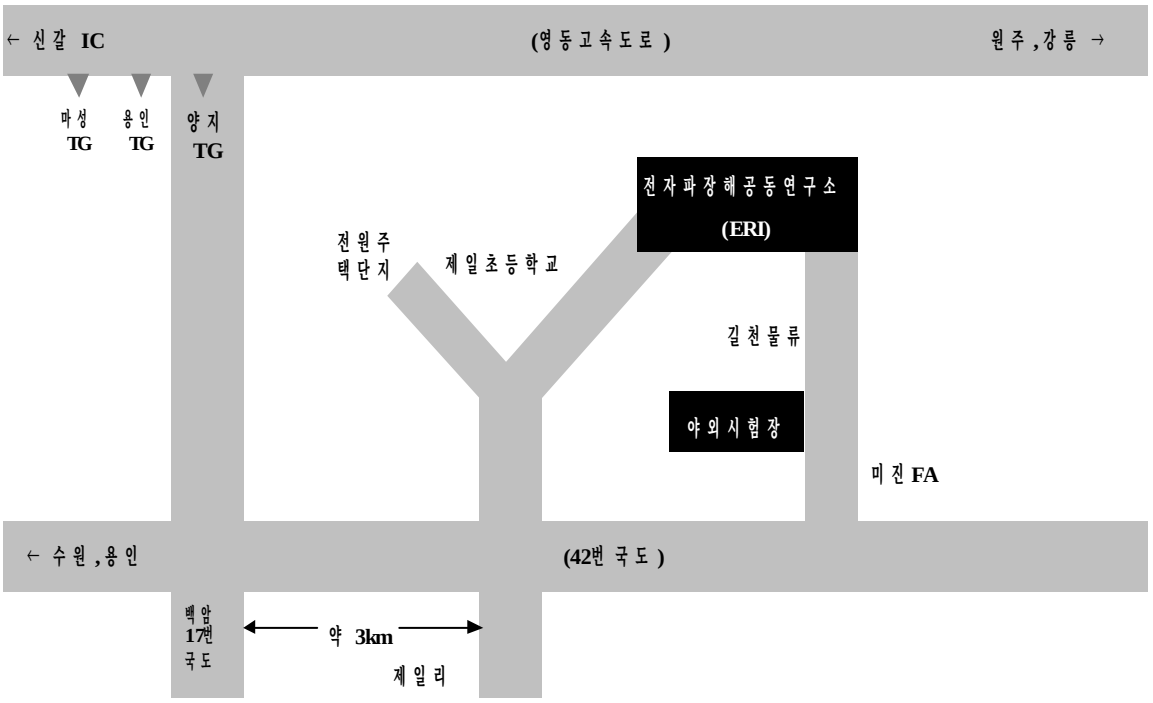
MAP





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3. TEST SYSTEM CONFIGURATION

3.1 Operation Environment

		Temperature	Humidity	Pressure
OATS	:	14° C	35 %	1003hPa
Shielded room	:	25° C	40%	1002hPa

3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, specially in field of EMC.
The factors contributing to uncertainties are test receiver, Cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna Frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability.

Based on NIS 80,81, The measurement uncertainty level with a 95% confidence level were applied.

3.3 sample calculation

radiated emission

The field strength is calculated by adding the antenna Factor, cable loss and, Antenna pad subtracting the amplifier gain from the measured reading.
The sample calculation is as follows :

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FS = MR + AF + CL + AT-AG

MR = Meter Reading
AF = Antenna Factor
CL = Cable Loss
AT = Antenna Pad
AG=Amplifier Gain

If MR is 30dB, AF 12dB, CL 5dB, AP 10dB, AG 35dB
The result (MR) is

30 + 12 + 5 + 10 –35 = 22dBuV/m

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4. Description of e.u.t.

4.1 Product Description

Manufactured By:	DIGITAL SOLUTION CO., LTD.
Address:	201, BIC-Center, KPU(Korea Polytechnic university)3-101, Jung-Wang-Dong, Shi-Hung-City, Kyunggi-Do, Korea
Test Requested By:	DIGITAL SOLUTION CO., LTD.
Model:	DS200
Serial Number:	N/A
IMAGE SENSOR	320,000 Pixel (640×480 Pixel)
PC Interface	USB v1.0 & v1.1
Focus	Macro 10Cm, Normal 3m Infinity
Gain Control	AUTO
Supply Voltage	5V ~ 3.3V
General Description:	This EUT(Equipment Under Test) is PC CAMERA.

4.2 peripherals

Description	Model / Part #	Serial Number	Manufacture
PC CAMERA	DS200	N/A	DIGITAL SOLUTION CO., LTD.
NOTE PC	CM2080	N/A	COMPAQ
KEYBOARD	SDM4510UH	4M015720	SAMSUNG Electonics Co., Ltd
MOUSE	M-U48a	LZC10151483	SAMSUNG CO.,ltd
PRINTER	C6427A	CN17D1B0S9	JIT Electonics Co., Ltd
AC/DC ADAPTOR	ADP-60DB	MJD0124008510	COMPAQ

4.3 used cables

EUT Port	Type	Shield (Y/N)	Length (meters)	Pin	Connected To
USB	USB	Y	1.0	5	NOTE PC

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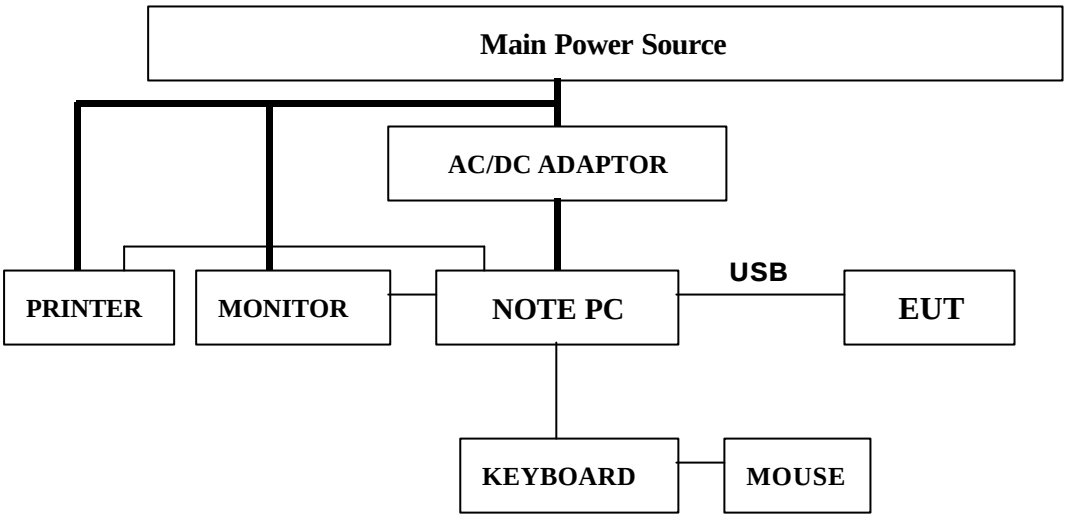
4.4 E.U.T Test Configuration



4.5 Operating conditions

Operating : Camera capture Mode

- The system was configured in typical fashion (as a customer would normally use it) for testing.
- The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

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5. TEST RESULTS

5.1 Conducted emission

5.1.1 Measurement procedure

Mains

The measurements were performed in a shielded room.
EUT was placed on a non-metallic table height of 0.8m above the reference ground plane.
The rear of tabletop was located 40Cm to the vertical conducted plane.
All other surfaces of tabletop was at least 80cm from any other grounded conducting surface.
I/O cables and AC cables that were connected to the peripherals were bundled in center.
They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.
Each EUT power lead, except ground (safety) lead, were individually connected through a LISN to input power source.
Both lines of power cord, hot and neutral, were measured.

5.1.2 Used equipment

Equipment	Model	Serial No.	Makers	Cal.Date	Used
Test receiver	ESS	848588/006	R&S	01. 6. 08	x
	ESHS30	831332/002	R&S	01. 1. 29	
L.I.S.N.	ESH3-Z5	827246/008	R&S	01. 2. 27	x
	ESH3-Z5	100029	R&S	01.5. 21	

5.1.3 measurement uncertainty

Conducted Emission measurement : ± 2.4 (K=2)

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5.1.4 test data

Frequency Range	Tested Freq.	LISN Pol.	Meter Reading[A] QP	Total Loss [B]	Results QP [A]+[B]	Margin [C]-[A+B]	Limits [C]
[MHz]	[MHz]		[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]
0.45-30	0.486	H	32.3	0.18	32.48	15.52	**48.0**
	0.492	N	23.3	0.18	23.48	24.52	**48.0**
	0.627	H	25.7	0.18	25.88	22.12	**48.0**
	0.696	H	29.3	0.18	29.48	18.52	**48.0**
	1.251	N	27.2	0.19	27.39	20.61	**48.0**
	1.527	N	27.2	0.20	27.4	20.60	**48.0**
	1.806	N	27.1	0.21	27.31	20.69	**48.0**
	2.082	N	26.4	0.22	26.62	21.38	**48.0**
	5.210	N	28.1	0.43	28.53	19.47	**48.0**
	5.900	N	27.6	0.47	28.07	19.93	**48.0**
	15.070	N	26.5	1.02	27.52	20.48	**48.0**
	16.250	N	25.8	1.05	26.85	21.15	**48.0**
	17.640	N	26.5	1.10	27.6	20.40	**48.0**
	18.820	N	27.3	1.13	28.43	19.57	**48.0**
	20.210	N	26.8	1.17	27.97	20.03	**48.0**
	21.460	N	26.4	1.18	27.58	20.42	**48.0**

* Results = Meter Reading(QP) + Total Loss(LISN Insertion loss + Cable loss)

* Margin = Limits - Result

* IF Bandwidth = 9kHz

* Detecting Mode : Quasi-Peak

* Used receiver : ESCS30 (Rohde & Schwarz)

5.1.5 Result

Complied

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5.2 Radiated Emission

5.2.1 Measurement procedure

A pretest was performed at 3m distance in an semi-anechoic chamber for searching correct frequency.
The final test was done at a 10m open area test site with a quasi-peak detector.
EUT was placed on a non-metallic table height of 0.8m above the reference ground plane.
Cables connected to EUT were fixed to cause maximum emission.
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.
The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

5.2.2 Used equipment

Equipment	Model No.	Serial No.	Makers	Cal Date
Test receiver	ESMI	826210/007	R&S	01. 6. 8
	ESCS30	830986/015	R&S	01.1.29
	ESS	848588/006	R&S	01.6. 4
Biconnical antenna	HK116	825177/013	R&S	01. 6. 4
Log-Periodic antenna	HL223	825032/017	R&S	01. 6. 4
Antenna Mast	EMAT2014	N/A	EM	-
Turn Table	EMRT2015	N/A	EM	-
Test site	OATS (10m)	Test site	EM	-
	chamber(3m)		EM	-

5.2.3 measurement uncertainty

Radiated Emission measurement :

30-300MHz +3.96dB / -4.04dB
300-1000MHz +3.04dB / -3.00dB

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5.2.4 test data

Frequency Range [MHz]	Tested Frequency [MHz]	ANT Pol.	Meter Reading [A] [dBuV/m]	Total Loss [B] [dB]	Results [A+B] [dBuV/m]	Margine	Limits [dBuV/m]
30 - 88	75.34	V	17.4	10.80	28.20	11.8	**40.0**
88-216	151.41	V	12.13	15.53	27.66	15.85	**43.5**
	172.68	H	12.95	16.65	29.60	13.90	
	190.01	V	13.70	17.70	31.40	12.10	
216-960	279.78	V	17.10	22.60	39.70	6.30	**46.0**
	575.11	V	14.30	25.90	40.20	5.80	
	624.15	V	12.50	27.38	39.88	6.12	
	672.59	V	12.40	28.41	40.81	5.19	
	684.81	V	12.90	28.65	41.55	4.45	
	696.67	V	10.20	28.85	39.05	6.95	
	708.97	V	11.00	29.00	40.00	6.00	
	721.24	V	12.80	29.16	41.96	4.04	
	733.32	V	12.10	29.33	41.43	4.57	
	745.39	V	11.40	29.53	40.93	5.07	
	755.45	V	10.10	29.64	39.74	6.26	
960-above							**54.0**

5.2.5 Result

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6. TEST PHOTOGRAPHS

Conducted Emission

[FRONT]

[REAR]

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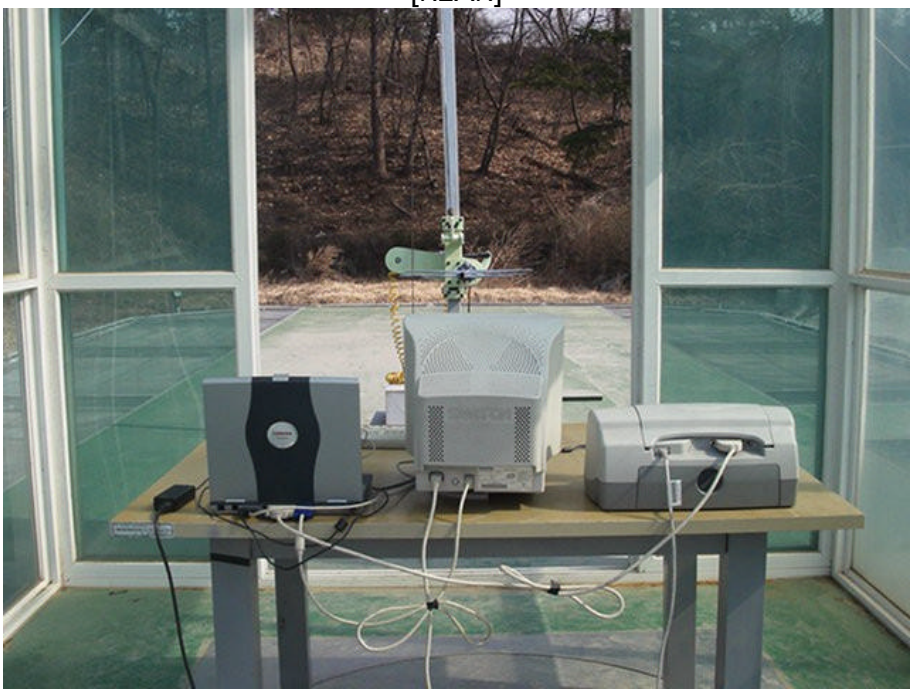
Radiated Emission

[FRONT]

[REAR]



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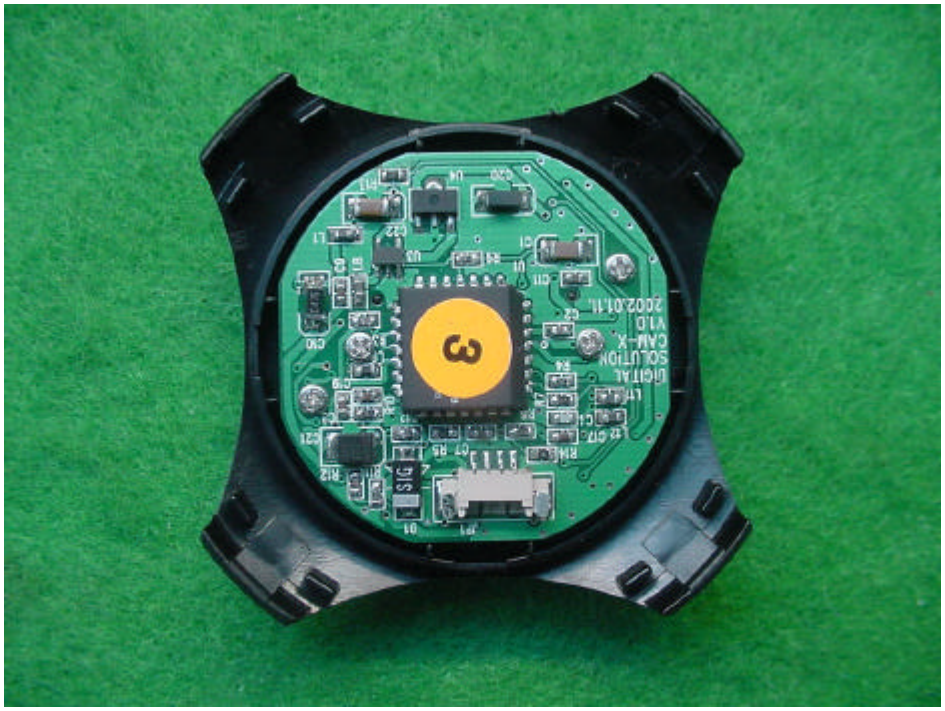
[Inside]



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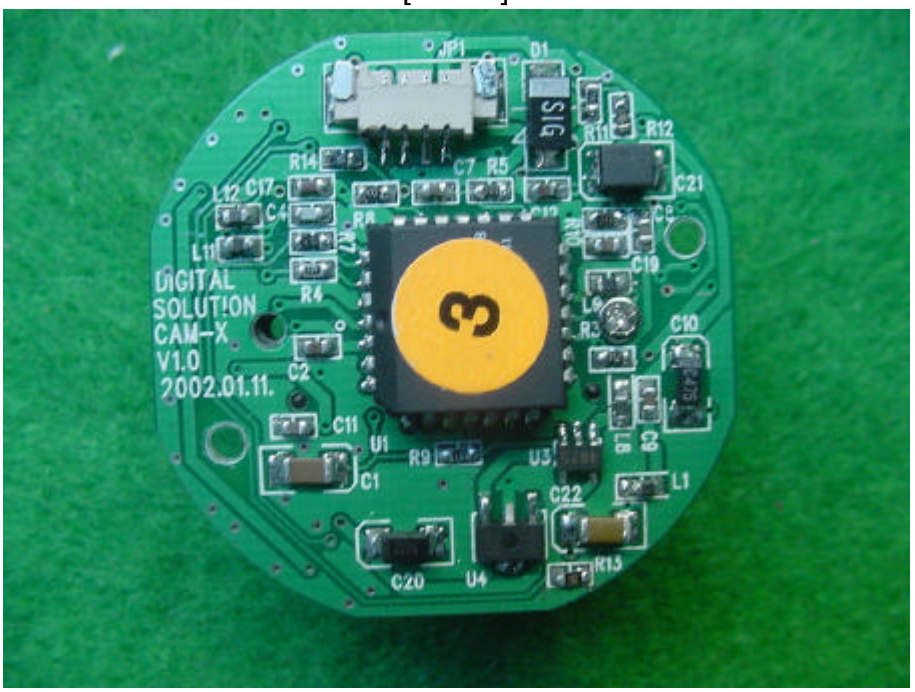
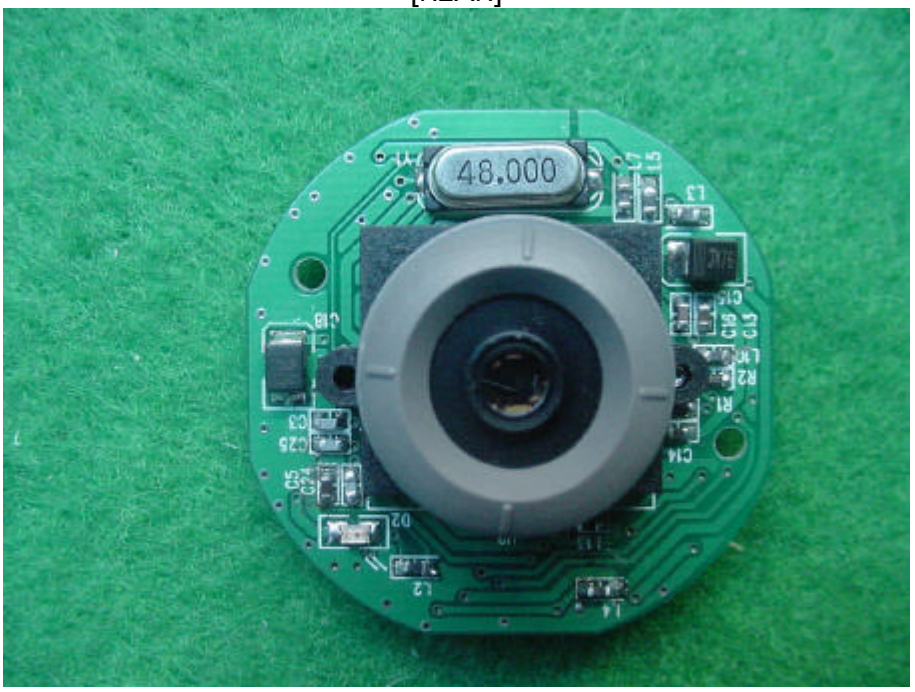
Main Board

[FRONT]



[REAR]



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