

ECB-920A

Reliability Prediction Report (MTBF)

Summary	Failure Rate: 8041.644623 ppm MTBF: 124,353 Hours
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Issue date	Approval	Test Engineer
2014/01/07	Tom Lin	Leo Liu

Reliability Prediction (MTBF)

I . Model Name: ECB-920A

II . Prediction Date: January. 07, 2014

III . Prediction Site: AAEON Q.E. Dept.

IV . Predicted by: Leo Liu

V . Equipment: Windchill Quality Solutions 10.1

VI. Simulation Environment:

- Temperature: 30 degrees C
- Standard: Telcordia (Bellcore) Standard

VII. Term and Definition:

- Unit : An assembly of device.
- Duty Cycle : Used to specify the percentage of time that the element is in an on state, and it is equal to the percentage of total time the item is in the active environment.
- Quantity : The quantity of the selected item.
- Failure Rate : Used to specify that the failure rate is to be calculated based the selected Calculation models. The Failure rate multiplier is 1000000000.
- MTBF : MTBF is always specified in hours.

VIII. Prediction Result:

ECB-920A (9697920A03-D):

- Failure Rate: 8041.644623 ppm
- MTBF: 124,353 Hours

**AAEON Reliability Prediction
Summary**

File Name: ECB-920A.rfp
Duty Cycle: 100
Calculation Model: Telcordia Issue 2
Method: Method I Case 3

Failure Rate: 8041.644623
MTBF (hrs): 124,353
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

Assembly Name	Part Number	Ref Des	Quantity	Failure Rate	MTBF
ECB-920A	9697920A03-D		1	8041.644623	124,353

File Name: ECB-920A.rfp
Assembly: 9697920A03-D
Ref Des:
Description:

Failure Rate: 8041.644623
MTBF (hrs): 124,353
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1054600289	Resistor	R334,R400,R401, R541,R548,R549		2.547039	6	56573956.677649
1059700001	Resistor	R573,R574		2.547039	2	154078778.388085
1059704703	Resistor	R442,R467,R469		2.547039	3	107020754.986850
1059710003	Resistor	R299,R355,R360, R371		2.547039	4	82309758.689546
105A500113	Resistor	R575		2.547039	1	282340674.079668
105A500133	Resistor	R369,R374,R408, R451		2.547039	4	82309758.689546
105A501033	Resistor	R80		2.547039	1	282340674.079668
105A501233	Resistor	R423		2.547039	1	282340674.079668
105A501413	Resistor	R452		2.547039	1	282340674.079668
105A501533	Resistor	R483		2.547039	1	282340674.079668
105A502033	Resistor	R75,R98		2.547039	2	154078778.388085
105A502200	Resistor	R147,R148,R167, R168		2.547039	4	82309758.689546
105A503300	Resistor	R171,R172,R173, R174,R175,R176, R177,R178,R232, R233,R234,R235		2.547039	12	29507083.749401
105A505123	Resistor	R433,R89		2.547039	2	154078778.388085
105A505133	Resistor	R484		2.547039	1	282340674.079668
105A507503	Resistor	R5,R6,R7		2.547039	3	107020754.986850
105A510033	Resistor	R417,R472,R476		2.547039	3	107020754.986850
105A512103	Resistor	R365,R555		2.547039	2	154078778.388085
105A515003	Resistor	R10,R11,R9		2.547039	3	107020754.986850
105A524933	Resistor	R481		2.547039	1	282340674.079668
105A524963	Resistor	R364,R554		2.547039	2	154078778.388085
105A530003	Resistor	R482		2.547039	1	282340674.079668
105A537413	Resistor	R463		2.547039	1	282340674.079668
105A547503	Resistor	R231		2.547039	1	282340674.079668
105A549913	Resistor	R103,R105,R268,R55, R57		2.547039	5	67008142.102588
105A549919	Resistor	R217		2.547039	1	282340674.079668

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
105A549963	Resistor	R158,R159,R160, R161,R162,R163, R164,R166,R238, R239,R240,R241		2.547039	12	29507083.749401
105A560463	Resistor	R348,R349		2.547039	2	154078778.388085
105A700003	Resistor	FB2,R100,R102,R134, R135,R137,R138, R142,R151,R152, R169,R179,R182, R183,R184,R185, R186,R187,R188, R197,R200,R201, R204,R205,R206, R207,R208,R222, R242,R243,R245, R248,R250,R251, R252,R257,R259, R260,R269,R270,		2.547039	77	4888867.088938

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
105A700009	Resistor	R155,R157,R180, R181,R190,R191, R192,R196,R198, R211,R219,R224, R226,R228,R310, R312,R316,R317, R330,R331,R443, R449,R454,R457, R461,R517,R518, R519,R562,R563, R564,R565,R571, R572		2.547039	34	10846303.620910
105A700133	Resistor	R2,R236,R237,R256, R258,R273,R274, R337,R342,R354, R372,R395,R396, R402,R404,R409, R415,R418,R422, R425,R437,R450, R473,R51,R52,R53, R54		2.547039	27	13557741.157915

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
105A701033	Resistor	R1,R12,R143, R144, R145,R146,R 150, R189,R284,R 327, R335,R338,R 346, R350,R361,R 4,R403, R453,R486,R 487, R497,R508,R 509, R510,R511,R 512, R513,R514,R 516, R559,R568,R 569, R570,R8		2.547039	34	10846303.620910
105A701039	Resistor	R141		2.547039	1	282340674.079668
105A701053	Resistor	R478		2.547039	1	282340674.079668
105A702223	Resistor	R13,R14,R19 5,R203, R445,R456,R 502, R503		2.547039	8	43225424.698300
105A702233	Resistor	R15,R16		2.547039	2	154078778.388085
105A703303	Resistor	R101,R362,R 363, R398,R399		2.547039	5	67008142.102588
105A703333	Resistor	R540		2.547039	1	282340674.079668
105A703903	Resistor	R38,R43		2.547039	2	154078778.388085
105A704723	Resistor	R108,R314,R 340, R344,R356,R 386, R406,R410,R 419, R426,R428,R 439, R444,R448,R 458, R459,R460,R 464, R465		2.547039	19	19019185.781770
105A704733	Resistor	R107,R368,R 413, R414		2.547039	4	82309758.689546
105A705123	Resistor	R496		2.547039	1	282340674.079668
105A705133	Resistor	R367,R394,R 424, R432,R447		2.547039	5	67008142.102588

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105A705623	Resistor	R379		2.547039	1	282340674.079668
105A707503	Resistor	R39,R40		2.547039	2	154078778.388085
105A708223	Resistor	R357,R358,R373, R385,R390,R407		2.547039	6	56573956.677649
105A710033	Resistor	R199,R210,R220, R221,R223,R225, R336,R343,R411,R44, R477,R485,R523, R532,R561		2.547039	15	23852782.943395
105A710039	Resistor	R543,R545		2.547039	2	154078778.388085
105A712033	Resistor	R376		2.547039	1	282340674.079668
105A715003	Resistor	R47,R48,R49		2.547039	3	107020754.986850
105A722003	Resistor	R370,R556		2.547039	2	154078778.388085
105A733003	Resistor	R289,R300,R347, R353,R359,R366		2.547039	6	56573956.677649
1121501680	Capacitor	C1,C100,C101,C107, C108,C109,C110, C111,C112,C113, C114,C115,C116, C122,C123,C124, C125,C126,C127, C128,C129,C130, C131,C132,C137, C151,C157,C17,C170, C174,C179,C181, C183,C185,C191, C193,C194,C196, C197,C2,C203,C2		1.128806	106	8159419.398207

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1121610180	Capacitor	C212,C213,C234, C235,C251,C29,C296, C297,C298,C299,C30		1.128806	11	74892583.279796
1122501780	Capacitor	C163,C164,C167, C168,C178,C186, C190,C221,C222, C225,C226,C227, C228,C270,C31		1.128806	15	55479656.844874
1122722080	Capacitor	C20,C21,C22,C97		1.128806	4	196873384.410843
1124410080	Capacitor	C133,C14,C15,C16, C46,C6		1.128806	6	133979725.056342
1124427080	Capacitor	C25,C32,C35,C45		1.128806	4	196873384.410843
1124447180	Capacitor	C207		1.128806	1	704977644.692287
1124510280	Capacitor	C281,C284		1.128806	2	375289731.076049
1124522180	Capacitor	C260		1.128806	1	704977644.692287
1124522680	Capacitor	C26,C28,C44		1.128806	3	257514172.353070
1142547080	Capacitor	C200		1.128806	1	704977644.692287
1181627191	Capacitor	C250,C280		1.128806	2	375289731.076049
1189615151	Capacitor	C12,C13,C198,C294, C295,C4		1.128806	6	133979725.056342
1189615154	Capacitor	C102,C103,C104, C105,C106,C47,C48		1.128806	7	115633865.771428
1189633181	Capacitor	C210,C215		1.128806	2	375289731.076049
1189633193	Capacitor	C239,C240,C265		1.128806	3	257514172.353070
1189656194	Capacitor	C249		1.128806	1	704977644.692287
11C1501080	Capacitor	C180,C192,C202,C24, C268,C269,C272, C289,C93		1.128806	9	90863428.080946

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11C1510390	Capacitor	C134,C135,C136, C138,C139,C141, C142,C143,C145, C146,C147,C148, C149,C150,C153, C155,C313,C314, C315		1.128806	19	44097696.883526
11C2510480	Capacitor	C266		1.128806	1	704977644.692287
11C2539290	Capacitor	C248		1.128806	1	704977644.692287
11C9501050	Capacitor	C243		1.128806	1	704977644.692287
11C9510490	Capacitor	C140,C154,C316, C317,C318,C319, C320,C321,C322, C323,C325,C326, C327,C328,C329, C330,C331,C332, C333,C334,C335, C337,C338,C339, C340,C341,C342, C343,C344,C345, C346,C347,C348, C349,C36,C37,C38, C39,C40,C41,C42		1.128806	42	20309512.293448

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
11E1510050	Capacitor	C182,C195,C244, C253,C264,C267, C288,C57,C58,C59, C60,C63,C64,C65, C66,C69,C70,C71, C72,C75,C76,C77, C78,C81,C82,C83, C84		1.128806	27	31305223.485317
11E9610080	Capacitor	C10,C117,C118,C119, C120,C121,C144, C152,C19,C199,C201, C205,C216,C219, C229,C254,C258, C261,C263,C27,C282, C290,C291,C3,C300, C301,C307,C308, C310,C51,C52,C53, C54,C55,C56,C95, C96		1.128806	37	22998172.632301
11E9622080	Capacitor	C11,C161,C162,C165, C166,C18,C209,C23, C7		1.128806	9	90863428.080946
121110106W	Inductor	L1		4.944252	1	154760964.143460
121110156R	Inductor	L2		4.944252	1	154760964.143460
1212306030	Inductor	FB18,FB20,FB21, FB22,FB23,FB27, FB28,FB29,FB3		4.944252	9	20443842.451049
1212306035	Inductor	FB12,FB13,FB14, FB15,FB16,FB17,FB5, FB7,FB8		4.944252	9	20443842.451049

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1212308054	Inductor	FB1,FB10,FB11,FB24,FB25,FB26,FB4,FB6, FB9		4.944252	9	20443842.451049
1214309008	Inductor	CH10,CH13,CH14,CH15,CH16,CH17,CH2,CH4,CH7		4.944252	9	20443842.451049
1214309009	Inductor	CH1,CH11,CH12,CH3,CH5,CH6,CH8,CH9		4.944252	8	22874049.098230
1301005440	Semiconductor	D31		7.793411	1	92807310.010983
1301005441	Semiconductor	D32		7.793411	1	92807310.010983
1301005442	Semiconductor	D16,D17,D37		7.793411	3	35106858.962001
1301005443	Semiconductor	D3		7.793411	1	92807310.010983
1301005444	Semiconductor	D33,D34		7.793411	2	50578095.223398
1301013040	Semiconductor	D2,D36		7.793411	2	50578095.223398
1304001340	Optical Device	LED3,LED4,LED8, LED9		79.003355	4	2148119.082046
1304021660	Optical Device	LED1,LED2		79.003355	2	3783722.582110
1304101340	Optical Device	LED5,LED6,LED7		79.003355	3	2725958.067754
1305080040	Semiconductor	D1,D10,D11,D12,D13,D14,D15,D18,D19,D20,D21,D22,D23,D24,D25,D26,D27,D28,D29,D4,D5,D6,D7,D8,D9,U36,U38		7.793411	27	4436936.250266
1310390413	Semiconductor	Q1		22.463360	1	31642600.748419
1314111713	Integrated Circuit	U39,U58		43.803003	2	6834791.244197
1315030110	Semiconductor	Q5,Q6		22.463360	2	17315095.066101
1315230511	Semiconductor	Q44,Q47,Q48		22.463360	3	12043329.789539
1315422410	Semiconductor	Q38		22.463360	1	31642600.748419
1315667910	Semiconductor	Q14,Q20,Q21,Q28,Q39,Q40		22.463360	6	6378891.324740

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1315700216	Semiconductor	Q11,Q13,Q16,Q17,Q2,Q22,Q23,Q24,Q25,Q26,Q27,Q29,Q3,Q30,Q31,Q32,Q33,Q34,Q36,Q37,Q4,Q43,Q45,Q46,Q50,Q51,Q52,Q53,Q54,Q55,Q56,Q57,Q7		22.463360	33	1262760.774886
1315805710	Semiconductor	Q35,Q42		22.463360	2	17315095.066101
1315806511	Semiconductor	Q41		22.463360	1	31642600.748419
1315970211	Integrated Circuit	U1,U2,U3,U34,U56, U57		43.803003	6	2750969.191556
1420020430	Integrated Circuit	U22,U23,U26,U27,U44,U45		43.803003	6	2750969.191556
1423DV2210	Integrated Circuit	U59		43.803003	1	11739202.588727
1439DB8330	Integrated Circuit	U25		43.803003	1	11739202.588727
143ALC8920	Integrated Circuit	U18		43.803003	1	11739202.588727
1490V1T340	Integrated Circuit	U68,U69		43.803003	2	6834791.244197
14S2200900	Integrated Circuit	U14		43.803003	1	11739202.588727
14S2204200	Integrated Circuit	U32,U60		43.803003	2	6834791.244197
14S2362400	Integrated Circuit	U49		43.803003	1	11739202.588727
14S3104500	Integrated Circuit	U10,U11,U12,U13,U4,U5,U6,U62,U63,U64,U65,U66,U67,U7,U8, U9		43.803003	16	1158014.242339
14S3111701	Integrated Circuit	U54		43.803003	1	11739202.588727
14S3524700	Integrated Circuit	U50		43.803003	1	11739202.588727
14S4105001	Integrated Circuit	U37		43.803003	1	11739202.588727
14S4322200	Integrated Circuit	U42		43.803003	1	11739202.588727
14S4519500	Integrated Circuit	U48		43.803003	1	11739202.588727
14S4852001	Integrated Circuit	U24,U29		43.803003	2	6834791.244197
14S4871300	Integrated Circuit	U16,U17,U19,U20		43.803003	4	3879156.910661
14S4911216	Integrated Circuit	U21		43.803003	1	11739202.588727
14S5A00401	Integrated Circuit	U40,U41,U43,U47		43.803003	4	3879156.910661
14S5A00703	Integrated Circuit	U30		43.803003	1	11739202.588727
14S5A00704	Integrated Circuit	U46		43.803003	1	11739202.588727
14S5A00821	Integrated Circuit	U35,U51		43.803003	2	6834791.244197

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14S8253609	Integrated Circuit	U15		43.803003	1	11739202.588727
1540712180	Resistor	RP1,RP2,RP3,RP4		9.971436	4	17049357.262242
1600000403	Switching Device	SW1		23.541578	1	23887758.027611
1600030803	Switching Device	SW7		23.541578	1	23887758.027611
1601123000	Switching Device	SW2,SW3,SW4,SW5		23.541578	4	7665990.963763
1652517207	Connection	CN3		16.184835	1	35685591.360212
1652522209	Connection	CN6		16.184835	1	35685591.360212
165300310F	Connection	CN39,CN40,CN43,CN53,CN58,CN59,CN61,CN64,CN67		16.184835	9	5541152.623690
165300310G	Connection	CN17,CN50,CN8,CN9		16.184835	4	11344857.509064
1653003200	Connection	CN23,CN38,CN48,CN55		16.184835	4	11344857.509064
165300410B	Connection	CN20,CN25,CN47		16.184835	3	14515880.849373
165300520W	Connection	CN35		16.184835	1	35685591.360212
1653006100	Connection	CN7		16.184835	1	35685591.360212
1653205203	Connection	CN49,CN54		16.184835	2	20390152.380746
165320520W	Connection	CN41		16.184835	1	35685591.360212
1653212100	Connection	CN18		16.184835	1	35685591.360212
1653300100	Connection	CN23(1-3),CN23(2-4),CN39(1-2),CN43(2-3),CN48(1-3),CN48(2-4),CN55(1-3),CN58(2-3),CN67(1-2)		16.184835	9	5541152.623690
1653300101	Connection	CN38(1-3),CN38(2-4),CN40(1-2),CN53(2-3),CN55(2-4),CN59(1-2),CN61(2-3),CN64(2-3)		16.184835	8	6160226.269180
1653300102	Connection	CN17(1-2),CN50(1-2),CN8(1-2),CN9(1-2)		16.184835	4	11344857.509064
1654030003	Connection	CN56		16.184835	1	35685591.360212
16540M0201	Connection	CN31,CN32		16.184835	2	20390152.380746

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MTBF (hrs): 124,353
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1654203623	Connection	CN13		16.184835	1	35685591.360212
1654203624	Connection	CN14,CN15		16.184835	2	20390152.380746
1654206421	Connection	CN19		16.184835	1	35685591.360212
1654218200	Connection	CN16		16.184835	1	35685591.360212
1654226303	Connection	CN44		16.184835	1	35685591.360212
1654282201	Connection	CN28		16.184835	1	35685591.360212
1654404030	Connection	CN2		16.184835	1	35685591.360212
1654415305	Connection	CN1		16.184835	1	35685591.360212
1654804203	Connection	CN42,CN46		16.184835	2	20390152.380746
1654818301	Connection	CN4,CN5		16.184835	2	20390152.380746
1654900700	Connection	CN34,CN37		16.184835	2	20390152.380746
1654907003	Connection	CN29,CN33		16.184835	2	20390152.380746
1654912303	Connection	CN36		16.184835	1	35685591.360212
1654920302	Connection	CN30,CN57		16.184835	2	20390152.380746
1654926900	Connection	CN45		16.184835	1	35685591.360212
1655004014	Connection	CN51		16.184835	1	35685591.360212
1655305020	Connection	CN63		16.184835	1	35685591.360212
1655404020	Connection	CN60		16.184835	1	35685591.360212
1655424020	Connection	CN62		16.184835	1	35685591.360212
1750220326	Connection	BT1		16.184835	1	35685591.360212
1752001603	Miscellaneous	FS1		2.400000	1	254626042.602335
1752015003	Miscellaneous	FS2,FS4,FS6, FS8		2.400000	4	79281882.025954
1752316000	Miscellaneous	FS3		2.400000	1	254626042.602335