

UP-APL1

Reliability Prediction Report (MTBF)

Summary	Failure Rate: 5765.478719 MTBF: 173,446 Hours
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Issue date	QE Manager	Test Engineer
2017/08/24	KJ Wang	Jack Huang

Reliability Prediction (MTBF)

I . Model Name: UP-APL1

II . Prediction Date: Aug. 24, 2017

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

IV . Predicted by: Jack Huang

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:

UP-APL1 (9697UPAP7T-D):

- Failure Rate:5765.478719

- MTBF: 173.446 Hours

**AAEON Reliability Prediction
Summary**

File Name: UP-APL1.rfp
Duty Cycle: 100
Calculation Model: Telcordia Issue 2
Method: Method I Case 3

Failure Rate: 5765.478719
MTBF (hrs): 173,446
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

Assembly Name	Part Number	Ref Des	Quantity	Failure Rate	MTBF
System	System		1	5765.478719	173,446

File Name: UP-APL1.rfp
Assembly: System
Ref Des:
Description:

Failure Rate: 5765.478719
MTBF (hrs): 173,446
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1050297624	Resistor	R599		2.547039	1	282340674.079668
1050501054	Resistor	R380,R393,R803, R804		2.547039	4	82309758.689546
1050501234	Resistor	R547		2.547039	1	282340674.079668
1050502004	Resistor	R55,R56,R57,R59,R60,R61,R62,R63		2.547039	8	43225424.698300
1050502734	Resistor	R686		2.547039	1	282340674.079668
1050505134	Resistor	R584,R585,R588, R711		2.547039	4	82309758.689546
1050508224	Resistor	R527		2.547039	1	282340674.079668
1050510034	Resistor	R512,R602,R712, R770		2.547039	4	82309758.689546
1050510504	Resistor	R1,R2		2.547039	2	154078778.388085
1050510524	Resistor	R519		2.547039	1	282340674.079668
1050511304	Resistor	R25		2.547039	1	282340674.079668
1050512734	Resistor	R601,R769		2.547039	2	154078778.388085
1050513034	Resistor	R514		2.547039	1	282340674.079668
1050518034	Resistor	R765		2.547039	1	282340674.079668
1050520004	Resistor	R103,R156,R48		2.547039	3	107020754.986850
1050520034	Resistor	R131,R774,R776,R807,R809,R839, R840		2.547039	7	48991237.965885
1050522004	Resistor	R104		2.547039	1	282340674.079668
1050524004	Resistor	R205,R206,R230,R231,R777,R778,R779,R780		2.547039	8	43225424.698300
1050524934	Resistor	R598		2.547039	1	282340674.079668
1050528734	Resistor	R511,R789		2.547039	2	154078778.388085
1050540204	Resistor	R10,R8,R9		2.547039	3	107020754.986850
1050541224	Resistor	R583		2.547039	1	282340674.079668
1050547004	Resistor	R674,R675,R676,R678,R679,R680,R681,R682		2.547039	8	43225424.698300
1050591034	Resistor	R508		2.547039	1	282340674.079668
1059700001	Resistor	R833		2.547039	1	282340674.079668
105A500139	Resistor	R388,R401		2.547039	2	154078778.388085
105A500173	Resistor	R183,R184,R188,R189,R190,R191, R766		2.547039	7	48991237.965885
105A501139	Resistor	R586		2.547039	1	282340674.079668

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105A501539	Resistor	R334,R390,R403		2.547039	3	107020754.986850
105A502039	Resistor	R517		2.547039	1	282340674.079668
105A502263	Resistor	R530,R552		2.547039	2	154078778.388085
105A510009	Resistor	R513,R520,R523, R533		2.547039	4	82309758.689546
105A513323	Resistor	R333		2.547039	1	282340674.079668
105A515009	Resistor	R11,R12,R13,R383,R384,R396,R397		2.547039	7	48991237.965885
105A524919	Resistor	R385,R398		2.547039	2	154078778.388085
105A538323	Resistor	R587		2.547039	1	282340674.079668
105A560469	Resistor	R22		2.547039	1	282340674.079668
105A700003	Resistor	R387,R400,R522,R528,R534,R553,R558,R582,R787,R788,R805		2.547039	11	32049696.385471
105A700009	Resistor	R140,R141,R142,R145,R169,R185,R186,R187,R26,R281,R282,R283,R285,R293,R294,R296,R314,R331,R338,R343,R382,R395,R428,R451,R452,R453,R455,R472,R473,R474,R475,R515,R518,R521,R524,R526,R529,R531,R532,R537,R540,R544,R548,R554,R556,R557,R559,R563,R		2.547039	89	4241898.161265

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105A700139	Resistor	R109,R115,R116, R117,R118,R123, R124,R125,R127, R135,R161,R300, R301,R467,R468, R469,R470,R487, R697,R749,R757, R758		2.547039	22	16518584.576317
105A701039	Resistor	R108,R111,R112, R114,R128,R130, R133,R134,R162, R163,R164,R166, R167,R171,R178,R24, R297,R303,R304, R309,R316,R317, R323,R327,R336,R37, R381,R39,R394,R41, R42,R429,R430,R44, R45,R476,R478,R479, R481,R483,R485, R486,R488,R489,R49, R490,R52,R53,R58, R590,R5		2.547039	92	4106168.814407
105A701069	Resistor	R132		2.547039	1	282340674.079668
105A702039	Resistor	R160,R165		2.547039	2	154078778.388085

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105A702229	Resistor	R119,R120,R121,R3,R4,R412,R413,R492,R493,R494,R495,R5,R6,R790,R793,R794,R798		2.547039	17	21160422.299251
105A703309	Resistor	R138		2.547039	1	282340674.079668
105A703329	Resistor	R436,R437		2.547039	2	154078778.388085
105A704729	Resistor	R100,R101,R102,R110,R35,R36,R377,R38,R40,R600,R699, R71		2.547039	12	29507083.749401
105A704763	Resistor	R509		2.547039	1	282340674.079668
105A710039	Resistor	R136,R180,R195,R298,R299,R374,R376,R560,R561,R565,R572,R574,R578,R670,R673,R696,R764,R771,R772,R801,R802		2.547039	21	17274945.076062
105A733009	Resistor	R386,R399		2.547039	2	154078778.388085
105B700009	Resistor	R630,R730,R731		2.547039	3	107020754.986850
105B702205	Resistor	R751,R752,R753, R754		2.547039	4	82309758.689546
105B702225	Resistor	R440,R441,R442, R443		2.547039	4	82309758.689546

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1121501691	Capacitor	C107,C110,C116,C12,C122,C126,C148,C149,C151,C152,C153,C155,C156,C158,C170,C171,C172,C173,C176,C177,C178,C179,C180,C181,C185,C2,C206,C208,C212,C219,C225,C227,C260,C270,C276,C278,C279,C293,C299,C3,C301,C302,C314,C327,C328,C331,C332,C334,C335,		1.128806	113	7659680.663840
1121622780	Capacitor	C427		1.128806	1	704977644.692287
1124418090	Capacitor	C11,C9		1.128806	2	375289731.076049
1124547290	Capacitor	C447,C474		1.128806	2	375289731.076049
1129522790	Capacitor	C272,C280,C281,C295,C303,C304		1.128806	6	133979725.056342
1129701790	Capacitor	C189		1.128806	1	704977644.692287
1129701791	Capacitor	C484		1.128806	1	704977644.692287
1129710090	Capacitor	C10,C368,C369,C370,C371,C8		1.128806	6	133979725.056342
118C6331B0	Capacitor	TC1,TC2		4.744484	2	86049450.747498
11A2422190	Capacitor	C425		1.128806	1	704977644.692287
11C4510240	Capacitor	C476		1.128806	1	704977644.692287
11C4510480	Capacitor	C430,C446,C469		1.128806	3	257514172.353070
11C4515230	Capacitor	C499		1.128806	1	704977644.692287
11C4533380	Capacitor	C497		1.128806	1	704977644.692287

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11CB510350	Capacitor	C195,C196,C197, C199,C586,C587, C588,C589,C590, C591,C592		1.128806	11	74892583.279796
11E1501040	Capacitor	C100,C101,C102, C104,C105,C103,C14, C15,C169,C184,C207, C213,C220,C23,C24, C25,C26,C261,C27, C28,C284,C29,C30, C307,C31,C32,C33, C352,C373,C374, C375,C376,C377, C378,C379,C38,C380, C39,C40,C41,C42, C421,C43,C479,C488, C50,C51,C52,C53, C564,C565,C607,C63, C		1.128806	72	11952050.229308
11E2501030	Capacitor	C493		1.128806	1	704977644.692287
11E2501690	Capacitor	C266,C289,C496		1.128806	3	257514172.353070
11E2522060	Capacitor	C494,C500		1.128806	2	375289731.076049
11E4433090	Capacitor	C267,C268,C290, C291,C492		1.128806	5	159367490.199266
11E9547630	Capacitor	C489,C490		1.128806	2	375289731.076049

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11E9622052	Capacitor	C198,C205,C211, C218,C226,C392, C417,C418,C422, C426,C431,C433, C438,C467,C491		1.128806	15	55479656.844874
11E9622080	Capacitor	C103,C106,C114, C115,C120,C121, C125,C129,C182,C19, C20,C21,C22,C428, C44,C442,C443,C45, C450,C451,C455,C46, C461,C463,C47,C471, C475,C478,C48,C49, C501,C54,C55,C56, C57,C570,C571,C575, C58,C580,C581,C585, C59,C67,C73,C77, C78,C79,C80,C81, C82,C83,C84,C85		1.128806	57	15044000.029504
11E9647690	Capacitor	C111,C112,C117, C118,C123,C127, C269,C275,C277, C292,C298,C300, C483,C485,C567, C568,C573,C577, C578,C583,C599		1.128806	21	40003791.624280

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
11EA510450	Capacitor	C159,C160,C161, C162,C163,C164, C165,C166,C167, C168,C174,C175, C209,C210,C214, C215,C216,C217, C221,C222,C262, C263,C264,C265, C285,C286,C287, C288,C308,C309, C310,C311,C312, C313,C315,C316, C319,C320,C321, C322,C323,C324, C325,C326,C533, C534,C593,C594		1.128806	48	17813540.224875
11EA610040	Capacitor	C271,C294,C330, C333,C503,C539, C544,C547,C550, C554,C555,C556, C557		1.128806	13	63728475.410842
11EA610120	Capacitor	C429,C436,C472, C473		1.128806	4	196873384.410843
11EA647010	Capacitor	C60,C61,C62		1.128806	3	257514172.353070
11EB522640	Capacitor	C329,C486,C487		1.128806	3	257514172.353070
11EB610050	Capacitor	C113,C119,C124, C128,C341,C342, C448,C457,C462, C569,C574,C579, C584		1.128806	13	63728475.410842

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
121110156T	Inductor	L16		4.944252	1	154760964.143460
1211102272	Inductor	L18		4.944252	1	154760964.143460
1211104779	Inductor	L17,L19,L20, L21, L22		4.944252	5	35631881.582999
1211147078	Inductor	L23		4.944252	1	154760964.143460
121230603N	Inductor	FB10,FB15,F B16, FB20,FB7,FB 8		4.944252	6	30055900.223009
12123C0001	Inductor	FB27,FB28,F B29, FB30		4.944252	4	43912872.424775
1214109000	Inductor	CH13,CH23,C H24, CH25,CH26,C H27, CH28,CH29,C H30,CH4, CH7,CH8		4.944252	12	15520616.516984
1214109004	Inductor	CH10,CH11,C H12, CH15,CH16,C H2,CH3, CH9		4.944252	8	22874049.098230
12310025A5	Miscellaneous	Y8,Y9		19.200000	2	8854051.752197
12310192A0	Miscellaneous	Y1		19.200000	1	23844262.770939
1231332726	Miscellaneous	Y2		19.200000	1	23844262.770939
1301005444	Semiconductor	D21		7.793411	1	92807310.010983
1301005450	Semiconductor	D1		7.793411	1	92807310.010983
1301020400	Semiconductor	D18		7.793411	1	92807310.010983
1301053040	Semiconductor	D23		7.793411	1	92807310.010983
1302052320	Semiconductor	D22		7.793411	1	92807310.010983
1304000043	Optical Device	LED4		79.003355	1	6497172.749112
1304101440	Optical Device	LED3		79.003355	1	6497172.749112
1304200043	Optical Device	LED2		79.003355	1	6497172.749112
1304300140	Optical Device	LED1,LED5		79.003355	2	3783722.582110
1305040241	Semiconductor	D10,D15,D6, D8,D9		7.793411	5	21965031.404253
1305050040	Semiconductor	D14		7.793411	1	92807310.010983
1310390410	Semiconductor	Q19		22.463360	1	31642600.748419
1311009210	Semiconductor	Q40		22.463360	1	31642600.748419
1315013810	Semiconductor	Q15,Q37		22.463360	2	17315095.066101
1315036640	Semiconductor	Q23		22.463360	1	31642600.748419
1315066810	Semiconductor	Q39		22.463360	1	31642600.748419
1315230111	Semiconductor	Q18		22.463360	1	31642600.748419
1315443512	Semiconductor	Q25,Q27,Q2 9		22.463360	3	12043329.789539
1315700216	Semiconductor	Q26,Q28,Q3 0,Q50		22.463360	4	9270607.712006
1315720010	Semiconductor	Q22		22.463360	1	31642600.748419

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1315762010	Semiconductor	Q24		22.463360	1	31642600.748419
1315EM6K10	Semiconductor	Q20,Q36,Q38,Q4,Q41,Q42,Q46,Q48,Q49,Q5,Q6		22.463360	11	3618924.681337
1430034250	Integrated Circuit	U57		43.803003	1	11739202.588727
1430053250	Integrated Circuit	U59,U60,U67,U70		43.803003	4	3879156.910661
1430087620	Integrated Circuit	U55		43.803003	1	11739202.588727
1430091100	Integrated Circuit	U68		43.803003	1	11739202.588727
1430097420	Integrated Circuit	U18,U21,U25		43.803003	3	4923240.069161
1436509400	Integrated Circuit	U56		43.803003	1	11739202.588727
1440N42000	Integrated Circuit	U1		21.706765	1	23689035.791249
1448111GC0	Integrated Circuit	U33,U34		43.803003	2	6834791.244197
1462251281	Integrated Circuit	U43		11.063278	1	58231413.220643
1468MT53B1	Integrated Circuit	U10,U11,U71,U72		43.803003	4	3879156.910661
1469G8JEN0	Integrated Circuit	U41		43.803003	1	11739202.588727
148210M023	Integrated Circuit	U52		43.803003	1	11739202.588727
149TS01040	Integrated Circuit	U3,U46,U69		43.803003	3	4923240.069161
14S2204200	Integrated Circuit	U73		43.803003	1	11739202.588727
14S3104500	Integrated Circuit	U19,U20,U22,U23,U24,U26,U27,U29,U35,U36,U38,U39,U74		43.803003	13	1395864.544354
14S5A00821	Integrated Circuit	U65,U9		26.018600	2	14194252.866846
14S5A30601	Integrated Circuit	U16,U40,U75,U76,U78,U79		26.018600	6	5329254.552198
14S6324640	Integrated Circuit	U6		26.018600	1	25551442.237972
1601000990	Connection	SW1		16.184835	1	35685591.360212
1652503109	Connection	CN23		16.184835	1	35685591.360212
1652828200	Connection	CN18		16.184835	1	35685591.360212
165300210C	Connection	CN2,CN3		16.184835	2	20390152.380746
1653006205	Connection	CN22		16.184835	1	35685591.360212
165302020L	Connection	CN20		16.184835	1	35685591.360212
1654006000	Connection	CN21		16.184835	1	35685591.360212
1654207539	Connection	CN7		16.184835	1	35685591.360212
1654226303	Connection	CN8		16.184835	1	35685591.360212
1654403931	Connection	CN24		16.184835	1	35685591.360212
1654801010	Connection	CN13		16.184835	1	35685591.360212
1654801833	Connection	CN14		16.184835	1	35685591.360212
1654809302	Connection	CN15		16.184835	1	35685591.360212
1654902130	Connection	CN5		16.184835	1	35685591.360212
1654903130	Connection	CN4		16.184835	1	35685591.360212

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1654904130	Connection	CN6		16.184835	1	35685591.360212
1654907009	Connection	CN9		16.184835	1	35685591.360212
1655302025	Connection	CN10		16.184835	1	35685591.360212
1655802020	Connection	CN17		16.184835	1	35685591.360212
1655810131	Connection	CN16		16.184835	1	35685591.360212
1655902034	Connection	CN1		16.184835	1	35685591.360212
175011301K	Miscellaneous	M1		306.000000	1	1681683.006787
1752011002	Miscellaneous	F2,F3		2.400000	2	143944727.196625
1752300001	Miscellaneous	F1		2.400000	1	254626042.602335