

# Rapport d'estimation de fiabilité

## MTBF

Révision: 001



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## MTBF Rapport de Fiabilité

<b>Modèle :</b>	<b>Small 90 / Small 90R / Small 150</b>
<b>Description:</b>	<b>Rack 1U 6 ports Ethernet Giga dont 4 Switchés</b>
<b>Date d'analyse :</b>	27 Aout 2008
<b>Lieu d'analyse :</b>	Relex
<b>Standard utilisé</b>	Bellcore SR-332 Issue 1*
<b>Environnement:</b>	Température: 50°C
<b>Fréquence de panne:</b>	6043 (Pannes par million d'heures)
<b>MTBF:</b>	165 472 (heures)

**La valeur du temps moyen avant panne (MTBF) peut être calculée :**

- Grâce à la fréquence constatée de retours des produits livrés
- Par la stimulation intensive des composants clés pour avoir une valeur estimée de MTBF (Tests basés sur la méthode Bellcore SR-332 Issue 1 avec une température ambiante de fonctionnement du système à 50 degrés).

MTBF : **M**ean **T**ime **B**etween **F**ailure Temps moyen entre deux pannes

\*aussi connu sous le nom Telcordia SR 332

Le standard Bellcore SR-332 (publié par **Bell Communications Research** d'AT&T Bell Labs) utilise une série de tests pour des catégories aussi variées que l'électronique, les composants électriques et électromécaniques pour estimer les taux de pannes, qui sont liés aux conditions environnementales, aux niveaux de qualité et divers autres paramètres.



### Reliability Prediction Summary

File Name: RSEC-K1.rfp

Assembly: System

Ref Des:

Description:

Failure Rate: 6043.329975

MTBF (hrs): 165,472

Temperature: 50

Environment: GB, GC - Ground Benign, Controlled

Part Number	Category	Description	Unit Failure Rate	Quantity	Total Failure Rate
60RSEC03.G10	Connection	RSEC-K1,PCBA ASSY	6.962909	1	12.055620
06.00044.082	Optical Device	LED ARRAY GREEN GREEN DIP LA44B/2G-S2-PF	69.215484	1	134.844523
09.22713.L01	Capacitor	ALUMU ELECTROLYTIC CAPACITORS,DIP,220UF M,35V,P:5.0MM,10X12.5,EEUFM1- V221	22.154710	8	205.268382
22.13120.001	Optical Device	1*1 RJ45 LED JACK(1:G+Y 2:G) STP6U,DIP,8 PIN,N3J12-006-10	69.215484	2	231.546616
22.13420.001	Optical Device	JACK 1*4 RJ45 LED (1:G+Y 2:G) STP 6U,DIP,48 PIN,N3J42-004-10	69.215484	1	134.844523
23.22032.061	Miscellaneous	BATTERY LITHIUM 3V 190MAH HORIZONTAL MNT BR2032/1HE	51.000000	1	99.107065
63.00020.CAN	Resistor	CHIP RES 00HM 2A 0805	0.605790	11	7.421001
63.00034.L03	Resistor	ICHIP RES 0 J 1/16W 0402(TA-I) RM04JTN0	0.605790	35	22.553511
63.10034.L05	Resistor	ICHIP RES 10 J 1/16W 0402(TA-I)	0.605790	7	4.854762
63.10133.L01AX	Resistor	CHIP RES 100 J1608 1/10W RM06JTN101	0.605790	4	2.889582
63.15034.L02	Resistor	ICHIP RES 15 J 0402(TA-I)	0.605790	3	2.222380
63.1R031.16A	Resistor	ICHIP RES 1 1/8W J0805 RC0805-071RL	0.605790	1	0.842389
63.22034.1D1	Resistor	IR6 CHIP RES 22 J 1/16W 0402 RM04JTN220	0.605790	123	77.044539
63.24334.151	Resistor	ICHIP RES 24K J 1/16W 0603	0.605790	1	0.842389
63.2R233.151	Resistor	CERAMIC THICK FILM RESISTOR,SMT,2.2 J,0603,1/10W- RM06JTN2R2	0.605790	5	3.549432
63.33034.L01	Resistor	IR06 CHIP RES 33 J 1/16W 0402	0.605790	7	4.854762
63.47034.L03	Resistor	ICHIP RES 47 J 1/16W 0402(TA-I)	0.605790	12	8.060465
63.47434.151	Resistor	ICHIP RES 470K J 1/16W 0603	0.605790	1	0.842389
63.68334.151	Resistor	ICHIP RES 68K J 1/16W 0603 RM06JTN683	0.605790	3	2.222380
63.75034.L01	Resistor	CHIP RES 75 J 1/16W 0402(YAGEO)	0.605790	34	21.928283
64.10005.651	Resistor	IR6 CHIP RES 100 RC0603FR-07100R	0.605790	6	4.204069
64.10005.L03	Resistor	ICHIP RES 100 F 1/16W 0402(YAGEO) RC0402FR-07100RL	0.605790	23	15.028238
64.10015.6D1	Resistor	IR6 CHIP RES 1K F 1/16W 0402 RM04FTN1001	0.605790	18	11.872974
64.10025.651	Resistor	IR6 CHIP RES 10K F 1/16W 0603	0.605790	16	10.605990
64.10025.L03	Resistor	ICHIP RES 10K F1/16W 0402(TA-I)	0.605790	11	7.421001
64.10035.651	Resistor	IR6 CHIP RES 100K F 1/16W 0603	0.605790	3	2.222380
64.10045.L01	Resistor	CHIP RES 1M F 1/16W 0402(YAGEO)	0.605790	5	3.549432
64.10R05.651	Resistor	ICHIP RES 10F 1/16W 0603	0.605790	3	2.222380
64.12025.551	Resistor	CHIP RESISTOR 12K F 0603 1/10W RM06FT1202	0.605790	1	0.842389



### Reliability Prediction Summary

**File Name:** RSEC-K1.rfp  
**Assembly:** System  
**Ref Des:**  
**Description:**

**Failure Rate:** 6043.329975  
**MTBF (hrs):** 165,472  
**Temperature:** 50  
**Environment:** GB, GC - Ground Benign, Controlled

Part Number	Category	Description	Unit Failure Rate	Quantity	Total Failure Rate
64.12415.L01	Resistor	CHIP RES 1.24K F0603 RM06FTN1241	0.605790	4	2.889582
64.12725.651	Resistor	ICHIP RES 12.7K F 1/16W 0603	0.605790	2	1.543631
64.15005.651	Resistor	ICHIP RES 150 F 1/16W 0603	0.605790	1	0.842389
64.15015.A51	Resistor	ICHIP RES 1.5K 1/10W F0603 RM0603FT1501	0.605790	3	2.222380
64.15425.551	Resistor	ICHIP RESISTOR 15.4K F 1/10W 0603	0.605790	3	2.222380
64.16025.L02	Resistor	CHIP RES 16K 1/10W F0603 RM06FTN1602	0.605790	1	0.842389
64.20005.L03	Resistor	IR6 CHIP RESISTOR 200 F 1/16W 0402(TA-I)	0.605790	4	2.889582
64.20025.651	Resistor	CHIP RES 20K F 1/16W 0603	0.605790	1	0.842389
64.21525.L01	Resistor	ICHIP RES 21.5K F0603 1/10W RC0603FR-0721K5L	0.605790	1	0.842389
64.22R05.651	Resistor	ICHIP RES 22 F 1/16W 0603	0.605790	2	1.543631
64.24335.6D1	Resistor	CHIP RES 243K F 1/16W 0402 RC0402FR-07243KL	0.605790	1	0.842389
64.30025.551	Resistor	GENERAL FIXED RESISTOR,SMT,30K,F,0603,1/10- W,RM06FTN3002	0.605790	1	0.842389
64.30125.551	Resistor	GENERAL FIXED RESISTOR,SMT,30K1,F,0603,1/1- 0W,RM06FTN3012	0.605790	1	0.842389
64.34015.551	Resistor	CHIP RES 3.4K F 1/10W 0603(YAGEO)	0.605790	1	0.842389
64.36025.651	Resistor	ICHIP RES 36K F 1/16W 0603	0.605790	2	1.543631
64.47015.551	Resistor	ICHIP RES 4.7K F0603 RC0603FR-074K7L	0.605790	30	19.424355
64.47025.L01	Resistor	ICHIP RES 47K F 1/10W 0603(TA-I) RM06FTN4702	0.605790	2	1.543631
64.49925.651	Resistor	ICHIP RES 49.9K F 1/16W 0603	0.605790	1	0.842389
64.49R95.L02	Resistor	CHIP RESISTOR 49.9 F 1/16W 0402(YAGEO)	0.605790	72	45.554380
64.51115.L02	Resistor	ICHIP RES 5.11K F 1/16W 0402(TA-I)	0.605790	4	2.889582
64.84525.L01	Resistor	ICHIP RES 84.5K F 0603 1/10W RM06FT8452	0.605790	1	0.842389
64.90915.6D1	Resistor	CHIP RES 9.09K F0402 RM04FTN9091	0.605790	4	2.889582
66.15036.080	Resistor	CHIP RES ARRAY 15R 8P4R 0402 1/16W 5 CN24JTN150	0.605790	3	2.222380
68.100T0.L01	Inductor	CHIP INDUCTOR 10UH +-30 SCDS6D38T-100T-S-N	1.175945	1	1.536827
68.24300.301	Inductor	DC TRANSFORMER,SMT,OVER 350UH,SIZEMAX=18.3X12.7*6.8- MM,PG243001G	3.563469	2	9.120088
68.48850.301	Inductor	DC TRANSFORMER,SMT,OVER 350UH,27.81*12.19*7.5MM,PG488- 508G	3.563469	2	9.120088



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68.4R710.L15	Inductor	CHOKE,SMT,4.7UH,5.7A,12.5X12-5X4.5MM,SCDS124T-4R7M-N	1.175945	5	6.674944
68.60150.1D1	Inductor	CHIP IND 600OHM +-25 0603 BLM18AG601SN1D	1.175945	2	2.858627
69.12012.061	Inductor	FILTER,SMT,ACM2012-900-2P	1.175945	1	1.536827
69.40466.001	Miscellaneous	FUSE,SMT,0466005.NRHF	0.400000	1	0.654555
71.03010.00U	Integrated Circuit	IC CPU,SMT,HSBGA,564 BALL,CN3010-500SCPYG	24.883966	1	48.392394
71.05395.00U	Integrated Circuit	SWITCH IC,SMT,FBGA,457 BALL,BCM5395SKFBG	48.510311	1	72.968382
71.06254.000	Integrated Circuit	USB HUB CONTROLLER IC,LQFP,48PIN,AU6254K41-JBL-NP	48.510311	1	72.968382
71.41116.001	Integrated Circuit	IC RTC M41T11M6F SO-8	48.510311	1	72.968382
71.84329.00G	Integrated Circuit	IC FREQUENCY SYNTHESIZER ICS84329BYLF LQFP32	48.510311	1	72.968382
72.24256.E01	Integrated Circuit	EEPROM,SMT,SO8-200MIL,24LC-256-I/SN	12.682600	1	19.686439
72.41164.A0U	Integrated Circuit	DRAM,SMT,FBGA,84 BALL,K4T1G164QQ-HCE6	12.682600	2	35.200229
73.07414.L08	Integrated Circuit	IC CMOS 74LVC14APW TSSOP 14PCH	48.510311	1	72.968382
73.74244.A2B	Integrated Circuit	DRIVE RECEIVER IC,SMT,TSSOP,20 PIN,SN74LVC244APWT	48.510311	1	72.968382
74.00303.0BW	Integrated Circuit	VOLTAGE DETECTOR IC,SMT,TSOP,5 PIN,NCP303LSN09T1G	97.020622	3	374.781140
74.01212.09D		IC DUAL USB HIGH-SIDE POWER SWITCH,SMT,SOP,8 PIN,AP1212LSL-13	981.200204	1	981.200204
74.02544.030	Integrated Circuit	VOLTAGE REGULATOR IC,SMT,MLPQ,24 PIN,SC2544MLTRT	97.020622	2	262.704549
74.02608.031	Integrated Circuit	VOLTAGE REGULATOR IC,SMT,SO-8,8 PIN,SC2608STRT	97.020622	1	145.936764
74.03232.BE9	Integrated Circuit	R6 CHIP IC DRIVE/REC MAX3232CDBR SSOP-16	97.020622	1	145.936764
74.07080.04D	Integrated Circuit	VOTAGE CONVERTER,SMT,SOP,8,APW70-80KAI	97.020622	1	145.936764
74.08500.B3B	Integrated Circuit	IC VOLTAGE MONITOR AME8500CEETBE42Z SOT-23	97.020622	1	145.936764
74.08500.C3B	Integrated Circuit	PROCESSOR SUPERVISORY IC,SMT,SOT-23,3 PIN,AME8500AEETBE18Z	97.020622	1	145.936764
74.08500.D3B	Integrated Circuit	PROCESSOR SUPERVISORY IC,SMT,SOT-23,3 PIN,AME8500AEETBF29Z	97.020622	3	374.781140
74.09173.04D	Integrated Circuit	VOLTAGE REGULATOR IC,SMT,SOP,8 PIN,AT9173EG	97.020622	1	145.936764





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74.09183.03D	Integrated Circuit	IC VOLTAGE REGULATOR,SMT,SOP-8,RT918- 3H-PS	97.020622	1	145.936764
74.54812.005	Integrated Circuit	TRANSCIEVER IC,SMT,QFP,100 PIN,BCM5481A2KQMG	97.020622	2	262.704549
78.10044.1B1	Capacitor	G6 CHIP CAP 10PF G0603 50V C1608NPO100GGT	0.211810	2	0.499990
78.10222.2F1	Capacitor	*ICHIP CAPACITOR 1000P 25V K0402 X7R	0.211810	60	13.118632
78.1022S.L04	Capacitor	GRM155R71H102KA01D CHIP CAP 1NF X7R K 2KV 1808	0.211810	6	1.400519
78.10322.L01	Capacitor	C1808X102K202T CHIP CAP X7R 0.01UF 25V K 0402	0.211810	56	12.257488
78.10421.L01	Capacitor	C1005X7R103KFT G6 CHIP CAP 0.1U K0402 16V	0.211810	207	44.606308
78.10421.L04	Capacitor	X7R C1005X7R104KET CHIP CAP 0.1UF 16V K0603 X7R	0.211810	20	4.472927
78.10424.L01	Capacitor	C1608X7R104KET *ICHIP CAP 0.1U K0603 50V	0.211810	11	2.505470
78.10522.211	Capacitor	GRM188R71H104KA93D *ICHIP CAP 1UF 25V K0805 X7R	0.211810	11	2.505470
78.10523.L02	Capacitor	GRM21BR71E105KA99L CHIP CAP 1UF 10V K0603 X7R	0.211810	5	1.177411
78.10620.511	Capacitor	GRM188R71A105KA61 *ICHIP CAP C 10UF 6.3V K0805	0.211810	35	7.726513
78.10622.L01AX	Capacitor	GRM21BR60J106KE19L CHIP CAP 10UF X5R 25V K1206	0.211810	18	4.037158
78.10623.2H1	Capacitor	GRM31CR61E106K CHIP CAP 10UF 10V K0805 X7R	0.211810	15	3.382160
78.15041.1F1	Capacitor	GRM21BR71A106KE51 G6 CHIP CAP 0402 NPO 15PF	0.211810	10	2.285489
78.22034.1B1AX	Capacitor	C1005NPO150GGT DARFON *ICHIP CAP 22PF 50V J 1608	0.211810	1	0.266166
78.22324.L06	Capacitor	GRM1885C1H220JA01D CHIP CAP 22NF 50V 10 X7R	0.211810	1	0.266166
78.22422.5B1	Capacitor	0805 C2012X7R223KGT CHIP CAP 0.22U 25V K0603 X5R	0.211810	1	0.266166
78.22523.5B1	Capacitor	GRM188R61E224KA01E CHIP CAP 2.2U K0603	0.211810	4	0.953105
78.22621.5I1	Capacitor	LMK107BJ225KA CHIP CAP 22UF 16V K1206 X5R	0.211810	1	0.266166
78.22623.L01	Capacitor	GRM31CR61C226KE15L CHIP CAP 22UF 10V X5R 1206	0.211810	1	0.266166
78.33124.201	Capacitor	GRM31CR61A226KE19L *ICHIP CAP C330P 50V K0402	0.211810	4	0.953105
78.47224.2F1	Capacitor	X7R GRM155R71H331KA01D CHIP CAP X7R 4700PF 50V K	0.211810	4	0.953105
78.47423.L02	Capacitor	0402 C1005X7R472KGT ICHIP CAP 0.47U 10V X7R K0603	0.211810	1	0.266166
		C1608X7R474KDT			



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78.47520.511	Capacitor	*ICHP CAPACITOR CERAMIC 4.7UF 6.3V 0805 X5R	0.211810	9	2.065089
78.47610.L01	Capacitor	CHIP CAP 47UF X5R M 6.3V 1210 GRM32ER60J476M	0.211810	1	0.266166
78.82134.L01	Capacitor	*ICHP CAP 820PF 50V J 0805 (MURATA)GRM2165C1H821JA01D	0.211810	1	0.266166
79.1071D.401	Capacitor	CHIP CAP EL 100UF 16V EEE1CA101WP	22.154710	2	58.512685
79.47710.L01	Capacitor	R6 CHIP CAP AL 470U 6.3V 6.3CE470EX	22.154710	8	205.268382
80.22710.321	Capacitor	CHIP CAP T 220UF 3528 2.5V +/-20 T520B227M2R5ATE035	1.128432	1	1.489642
82.23330.001	Miscellaneous	OSCILLATOR,SMT,33.333MHZ,15- PF,5*3.2*1.2MM,FD3330001	14.000000	1	42.344909
82.24800.001	Miscellaneous	OSCILLATOR,SMT,4 PIN,3.3V,FD4800005	14.000000	1	42.344909
82.25004.001	Miscellaneous	OSCILLATOR,SMT,125MHZ,+50- PPM,3.3V,FD500004	14.000000	1	42.344909
82.31200.001	Miscellaneous	XTAL 12MHZ FF1200015	3.200000	1	6.989802
82.31332.001	Miscellaneous	XTAL 32.768KHZ 20PPM 12.5PF SM ABS13-32.768KHZ-T	3.200000	1	6.989802
82.32513.001	Miscellaneous	QUARTZ CRYSTAL,SMT,25MHZ,+30PPM, 18PF,FL2500013	3.200000	4	37.980356
83.00014.08M	Semiconductor	DIODE SCHOTTKY BARRIER LS14 SMA	2.188189	1	3.025346
83.00190.Q70	Optical Device	LED GREEN LTST-C190GKT SMD	69.215484	3	321.394584
84.04818.037	Semiconductor	MOSFET N-CHANNEL 30V 18A AO4818 SO-8	14.158870	5	85.506821
63.R0004.151	Resistor	*IR6 CHIP RES 0 J 1/10W 0603	0.605790	33	21.302767
64.30R15.551	Resistor	ICHP RES 30.1 1/10W F0603 RM06FT30R1	0.605790	1	0.842389
73.12629.A90	Integrated Circuit	CMOS IC,SMT,SOIC,8 PIN,PIC12F629-I/SN-021	48.510311	1	72.968382
72.29640.K09	Integrated Circuit	IC FEROM MEMORY,SMT,TSOP,48,MX29LV- 640DBTC-90G	12.682600	1	19.686439
72.00002.00X	Integrated Circuit	SOLID STATE DRIVE,SMT,2G,LOW PROFILE,36.9*26.6*5.88MM,10PIN- ,SSDUSMS0002GL	200.000000	1	200.000000
56.32RSE.011	Integrated Circuit	CF CARD,256MB,CFC-50SU256MBP- CX	1000.000000	1	1000.000000