MTBF

General

What is meant by "MTBF"?

Mean Time Between Failure (MTBF) is a statistical average value of the time between two random failures. The MTBF value refers exclusively to the phase with statistically constant failure rate and applies only to this constant phase, which is shown by the bathtub curve in Figure 1.

It should be noted that the MTBF value is valid for the underlying ambient and operating conditions. If a device is operated outside its specification (for example, in the case of a greatly increased ambient temperature or if it is exposed to massive EMC loads), the MTBF values no longer apply and accumulated failures can occur.

Failure rate

λ is the failure rate (1 / MTBF x 10^6), a measure of the reliability of a component.

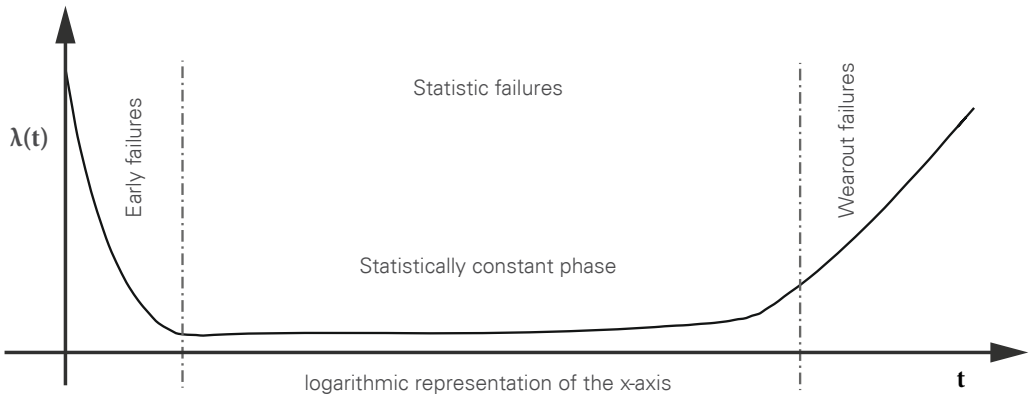

Figure 1: "Bathtub curve"

Although device manufacturers strive to minimize the number of outages, it is inevitable that a technical product will fail with a certain likelihood.

The MTBF value is often interpreted **wrongly** as the durability or operational life of a component or device (see details below).

Failure probability F(t)

The failure probability F(t) of electronic components is determined on the basis of the exponential distribution $F(t) = 1 - e^{(\lambda t)}$ exclusively during the statistically constant phase, in where λ is assumed to be constant. Thus, the failure probability of components during the statistically constant phase can be calculated, based on the manufacturer's MTBF specifications, as:

$F(t) = 1 - e^{(-t/MTBF)}$

MTBF

Failure probability sample calculation

During the first year of observation during the statistically constant phase, 20 devices each are in operation of 100 locations, i.e., 2000 devices are considered in total. The devices have an MTBF of 77 years.

What is the probability of failure? F(t)?

- t = 1 a, MTBF = 77 a
- $F(t) = 1 - e^{(-t/MTBF)}$
- $F(t) = 1 - e^{(-1/77)}$
- F(t) = 0.0129
- F(t) = 1.29%

The fault probability for the pattern component is 1.29%. Statistically, 26 of the 2,000 devices fail during the period of one observation year (during the statistically constant phase).
Experience shown, however, that electronic components, Despite the calculated statistical value F(t), are usually subject to a much lower probability of failure.

Explanations

MIL-HDBK-217 F N2

This is the most commonly used standard, which is also used for all of Commend's MTBF calculations.

SN29500

Values based on SN29500 typically deviate from MIL-HDBK-217 F N2 values. Some tests were performed based on this Siemens standard, as required by customers. New tests are all executed according to the MIL-HDBK-217 F N2 standard.

What is meant by "durability" or "operational life"?

The durability or operational life depends on a variety of mechanical, physical and chemical factors, as well as environmental conditions. For devices with electromechanical components, the service life is essentially determined by the number of switching cycles, which depends on the connected load type.

Based on values of this MTBF list, **no relationship can be derived** regarding to durability or operational life.

MTBF Values for products that do not appear in this list

This document provides a table with the current MTBF values of our products. For MTBF values of products not included in this list, please contact Customer Support:

support@commend.com

Allgemeines

Was versteht man unter „MTBF“?

Die MTBF (Mean Time Between Failure) ist ein statistischer Mittelwert für die Zeit zwischen zwei zufälligen Ausfällen. Der MTBF Wert bezieht sich ausschließlich auf die Phase mit statistisch konstanter Ausfallrate und gilt nur für diese konstante Phase, welche anhand der Badewannenkurve in Bild 1 ersichtlich ist.

Es ist zu beachten, dass der MTBF-Wert für die zugrunde gelegten Umgebungs- und Funktionsbedingungen gilt. Wird ein Gerät außerhalb seiner Spezifikation betrieben (z.B. bei stark erhöhter Umgebungstemperatur oder wenn es massiven EMV-Belastungen ausgesetzt ist), so gelten die MTBF-Werte nicht mehr und es kann zu gehäuften Ausfällen kommen.

Ausfallrate

λ ist die Ausfallrate (1 / MTBF x 10^6), ein Maß, das die Zuverlässigkeit einer Komponente angibt.

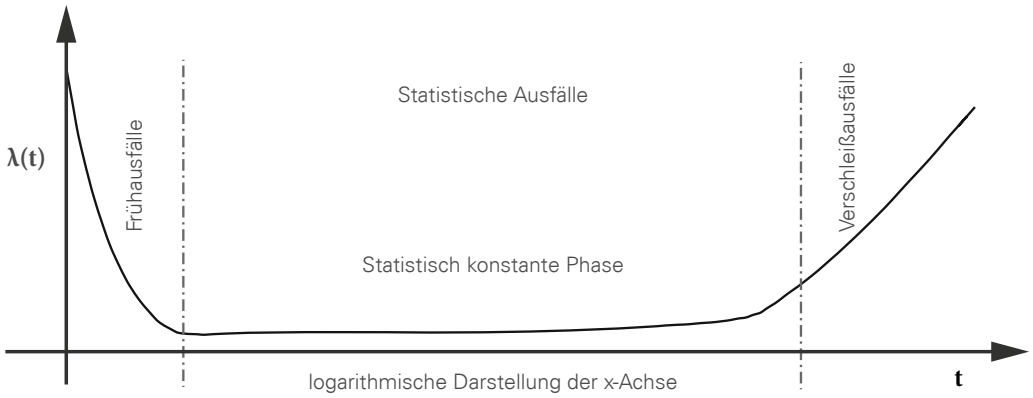

Bild 1: „Badewannenkurve“

Auch wenn jeder Gerätehersteller bestrebt ist, die Anzahl der Ausfälle so gering wie möglich zu halten, so ist es doch unvermeidbar, dass ein technisches Produkt mit einer gewissen Wahrscheinlichkeit ausfällt.

Fälschlicherweise wird der MTBF-Wert oft als Lebens- oder Gebrauchsdauer einer Komponente oder eines Gerätes interpretiert. Eine genauere Erklärung zu den Unterschieden MTBF und Lebens- bzw. Gebrauchsdauer finden Sie unten.

Ausfallwahrscheinlichkeit F(t)

Die Ausfallwahrscheinlichkeit F(t) von elektronischen Komponenten bestimmt man unter Zugrundelegung der Exponentialverteilung $F(t) = 1 - e^{(\lambda t)}$ ausschließlich während der statistisch konstanten Phase, bei der lt. Annahme λ konstant ist.
Somit lässt sich mit herstellerseitigen MTBF Angaben die Ausfallwahrscheinlichkeit von Komponenten während der statistisch konstanten Phase berechnen:

$F(t) = 1 - e^{(-t/MTBF)}$

Ausfallwahrscheinlichkeit Musterberechnung

Im ersten Betrachtungsjahr während der statistisch konstanten Phase befinden sich je 20 Geräte an insgesamt 100 Standorten im Einsatz. In Summe werden hier also 2000 Geräte betrachtet. Die Geräte weisen einen MTBF von 77 Jahren auf.

Wie hoch ist die Ausfallwahrscheinlichkeit F(t)?

- t = 1 a, MTBF = 77
- $F(t) = 1 - e^{(-t/MTBF)}$
- $F(t) = 1 - e^{(-1/77)}$
- F(t) = 0,0129
- F(t) = 1,29 %

Die Ausfallwahrscheinlichkeit für die Musterkomponente beträgt 1,29 %. Statistisch gesehen fallen 26 der 2.000 Geräte im Zeitraum eines Betrachtungsjahres (während der statistisch konstanten Phase) aus.
Erfahrungswerte zeigen jedoch, dass vor allem elektronischen Komponenten im Gegensatz zu dem errechneten statistischen Wert F(t) meist einer tatsächlich wesentlich geringeren Ausfallwahrscheinlichkeit unterliegen.

Erläuterungen

MIL-HDBK-217 F N2

Das ist der übliche Standard, auf dem auch alle neu berechneten MTBF-Werte seitens Commend basieren.

SN29500

Werte, die auf SN29500 basieren, weichen typischerweise von MIL-HDBK-217 F N2 Werten ab. Einige Tests wurden basierend auf diesem Siemens-Standard durchgeführt, da dies von den Kunden gefordert wurde. Neue Tests werden alle nach dem Standard MIL-HDBK-217 F N2 durchgeführt.

Was versteht man unter Lebens- bzw. Gebrauchsdauer?

Die Lebens- bzw. Gebrauchsdauer hängt von einer Vielzahl mechanischer, physikalischer, chemischer Faktoren und Umgebungsbedingungen ab. Bei Geräten mit elektromechanischen Komponenten wird die Lebensdauer im Wesentlichen durch die Zahl der Schaltspiele in Abhängigkeit der angeschlossenen Lastart bestimmt.

Aufgrund von Werten dieser MTBF-Liste kann **KEIN Zusammenhang** hinsichtlich Lebens- bzw. Gebrauchsdauer abgeleitet werden.

MTBF Werte für Produkte, die nicht in dieser Liste aufscheinen

Dieses Dokument enthält eine Tabelle mit den derzeit vorliegenden MTBF-Werten unserer Produkte. Für MTBF-Werte von Produkten, die nicht in dieser Liste aufgeführt sind, wenden Sie sich bitte an den Customer Support:

support@commend.com

MTBF list / MTBF Liste

CI-Type	MTBF (h)	Data Source
C-AF125H	249.661	MIL-HDBK-217 F N2
C-AF20A	9.027.275	MIL-HDBK-217 F N2
C-AF20AEB	11.016.200	MIL-HDBK-217 F N2
C-AF20D	491.585	MIL-HDBK-217 F N2
C-AF20H	826.043	MIL-HDBK-217 F N2
C-AF250H	243.572	MIL-HDBK-217 F N2
C-AF500H	316.557	MIL-HDBK-217 F N2
C-AF50A	2.379.880	MIL-HDBK-217 F N2
C-AF50D	672.605	MIL-HDBK-217 F N2
C-AF50H	665.151	MIL-HDBK-217 F N2
C-AFIL	5.131.596	MIL-HDBK-217 F N2
C-AFIL-USB	11.587.673	MIL-HDBK-217 F N2
C-AFILEB	3.745.697	MIL-HDBK-217 F N2
C-AFLS10HCW	749.467	MIL-HDBK-217 F N2
C-AFLS10HHG	588.491	MIL-HDBK-217 F N2
C-AFLS10HPW	568.414	MIL-HDBK-217 F N2
C-AFLS10HSCW	749.467	MIL-HDBK-217 F N2
C-AP509TP-E.C	1.663.214	MIL-HDBK-217 F N2
C-AP509TP-S.C	1.663.214	MIL-HDBK-217 F N2
C-AP862TP-E.C	752.916	MIL-HDBK-217 F N2
C-AP862TP-S.C	752.916	MIL-HDBK-217 F N2
C-ASK-DC-S3	43.478.261	MIL-HDBK-217 F N2
C-ASKHSLINK-03	21.739.130	MIL-HDBK-217 F N2
C-ASKHSLINK-05	21.739.130	MIL-HDBK-217 F N2
C-ASKHSLINK-10	21.739.130	MIL-HDBK-217 F N2
C-ASKHSLINK-30	21.739.130	MIL-HDBK-217 F N2
C-ASKKAT5-3S	21.689.951	MIL-HDBK-217 F N2
C-CD800PI	183.435	MIL-HDBK-217 F N2
C-CD810PI	99.980	MIL-HDBK-217 F N2
C-CDDD32P	218.160	MIL-HDBK-217 F N2
C-CDHD50P	21.739.130	MIL-HDBK-217 F N2
C-CDHS50P	1.805.408	MIL-HDBK-217 F N2
C-CDMI50PHD	8.695.652	MIL-HDBK-217 F N2
C-CM1	1.779.924	MIL-HDBK-217 F N2
C-EB1E1A	8.601.499	MIL-HDBK-217 F N2
C-EB2E2A	4.778.154	MIL-HDBK-217 F N2
C-EB3E2A-AUD	2.004.811	MIL-HDBK-217 F N2
C-EB8E8A	1.575.391	MIL-HDBK-217 F N2
C-EE-HS3	1.805.408	MIL-HDBK-217 F N2
C-EE380ACS.C	667.746	MIL-HDBK-217 F N2
C-EE7008DACH	353.890	MIL-HDBK-217 F N2
C-EE7008DACS	446.399	MIL-HDBK-217 F N2
C-EE7008DACSH	341.571	MIL-HDBK-217 F N2

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CI-Type	MTBF (h)	Data Source
C-EE7008DDCH	311.340	MIL-HDBK-217 F N2
C-EE7008DDCS	380.758	MIL-HDBK-217 F N2
C-EE7008DDCSH	301.765	MIL-HDBK-217 F N2
C-EE7504DACH	353.890	MIL-HDBK-217 F N2
C-EE7504DACS	446.399	MIL-HDBK-217 F N2
C-EE7504DACSH	341.571	MIL-HDBK-217 F N2
C-EE7504DDCH	311.340	MIL-HDBK-217 F N2
C-EE7504DDCS	380.758	MIL-HDBK-217 F N2
C-EE7504DDCSH	301.765	MIL-HDBK-217 F N2
C-EE7P04DACH	353.890	MIL-HDBK-217 F N2
C-EE7P04DACS	446.399	MIL-HDBK-217 F N2
C-EE7P04DACSH	341.571	MIL-HDBK-217 F N2
C-EE7P04DDCH	311.340	MIL-HDBK-217 F N2
C-EE7P04DDCS	380.758	MIL-HDBK-217 F N2
C-EE7P04DDCSH	301.765	MIL-HDBK-217 F N2
C-EE8108M.C	573.752	MIL-HDBK-217 F N2
C-EE811AS.C	137.510	MIL-HDBK-217 F N2
C-EE8148M.C	355.411	MIL-HDBK-217 F N2
C-EE8158M.C	348.972	MIL-HDBK-217 F N2
C-EE81ADMSOS.C	573.752	MIL-HDBK-217 F N2
C-EE8238M.C	264.664	MIL-HDBK-217 F N2
C-EE872AEGS.C	607.593	MIL-HDBK-217 F N2
C-EE872AS.C	137.077	MIL-HDBK-217 F N2
C-EE8999M	969.750	MIL-HDBK-217 F N2
C-EE8999M-SOS	969.750	MIL-HDBK-217 F N2
C-EE8999S	4.046.236	MIL-HDBK-217 F N2
C-EE900AS.C	808.385	MIL-HDBK-217 F N2
C-EE972AS.C	140.604	MIL-HDBK-217 F N2
C-EE980	642.770	MIL-HDBK-217 F N2
C-EEHS9	1.542.136	MIL-HDBK-217 F N2
C-EF311AS.C	842.352	MIL-HDBK-217 F N1, N2
C-EF401G	381.303	MIL-HDBK-217 F N2
C-EF401S	381.303	MIL-HDBK-217 F N1, N2
C-EF862A	686.515	MIL-HDBK-217 F N2
C-EF862AM	686.515	MIL-HDBK-217 F N2
C-EF870AEN81.C	752.769	MIL-HDBK-217 F N2
C-EF962H	642.732	MIL-HDBK-217 F N2
C-EF962HM	642.732	MIL-HDBK-217 F N2
C-EM302EGS	236.329	MIL-HDBK-217 F N2
C-EM302S	236.580	MIL-HDBK-217 F N2
C-EM602	933.941	MIL-HDBK-217 F N2
C-EM603	933.941	MIL-HDBK-217 F N2
C-EM605	890.749	MIL-HDBK-217 F N2

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CI-Type	MTBF (h)	Data Source
C-EM606	933.941	MIL-HDBK-217 F N2
C-EM650	11.198.208	MIL-HDBK-217 F N2
C-EM660.C	1.839.064	MIL-HDBK-217 F N2
C-EM680.C	1.650.931	MIL-HDBK-217 F N2
C-EM681.C	2.733.435	MIL-HDBK-217 F N2
C-EM6B0.C	1.839.064	MIL-HDBK-217 F N2
C-EM80	2.352.941	MIL-HDBK-217 F N2
C-ES831A	554.999	MIL-HDBK-217 F N2
C-ES833A	686.515	MIL-HDBK-217 F N2
C-ES962H	662.151	MIL-HDBK-217 F N2
C-ES962HM	662.151	MIL-HDBK-217 F N2
C-ET509	1.640.322	MIL-HDBK-217 F N2
C-ET570	801.025	MIL-HDBK-217 F N2
C-ET808A	674.734	MIL-HDBK-217 F N2
C-ET808AME	946.015	MIL-HDBK-217 F N2
C-ET862A	597.862	MIL-HDBK-217 F N2
C-ET870A	819.393	MIL-HDBK-217 F N2
C-ET871A	752.809	MIL-HDBK-217 F N2
C-ET8E8A	921.417	MIL-HDBK-217 F N2
C-ET8E8A-IP	83.090	MIL-HDBK-217 F N2
C-ET901-A.C	1.127.686	MIL-HDBK-217 F N2
C-ET901-D.C	1.093.722	MIL-HDBK-217 F N2
C-ET901HE-A	1.127.686	MIL-HDBK-217 F N2
C-ET901HE-D	1.093.722	MIL-HDBK-217 F N2
C-ET908H	921.218	MIL-HDBK-217 F N2
C-ET908H-1	925.139	MIL-HDBK-217 F N2
C-ET908HMI	662.024	MIL-HDBK-217 F N2
C-ET908HMI-1	664.046	MIL-HDBK-217 F N2
C-ET962H	723.714	MIL-HDBK-217 F N2
C-ET962HR	723.552	MIL-HDBK-217 F N2
C-ET970H	588.484	MIL-HDBK-217 F N2
C-ET970HR	588.377	MIL-HDBK-217 F N2
C-EW401G	15.151.515	MIL-HDBK-217 F N2
C-EW401S	15.151.515	MIL-HDBK-217 F N2
C-EX7008D1ACH	327.013	MIL-HDBK-217 F N2
C-EX7008D1ACS	404.467	MIL-HDBK-217 F N2
C-EX7008D1DCH	290.343	MIL-HDBK-217 F N2
C-EX7008D1DCS	349.820	MIL-HDBK-217 F N2
C-EX7008D1DCSH	281.999	MIL-HDBK-217 F N2
C-EX7008D2ACS	445.446	MIL-HDBK-217 F N2
C-EX7008D2DCH	310.873	MIL-HDBK-217 F N2
C-EX7008D2DCS	380.060	MIL-HDBK-217 F N2
C-EX7008D2DCSH	301.326	MIL-HDBK-217 F N2

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CI-Type	MTBF (h)	Data Source
C-EX7504D1ACH	327.013	MIL-HDBK-217 F N2
C-EX7504D1ACS	404.467	MIL-HDBK-217 F N2
C-EX7504D1ACSH	316.467	MIL-HDBK-217 F N2
C-EX7504D1DCH	290.343	MIL-HDBK-217 F N2
C-EX7504D1DCS	349.820	MIL-HDBK-217 F N2
C-EX7504D1DCSH	281.999	MIL-HDBK-217 F N2
C-EX7504D2ACS	445.446	MIL-HDBK-217 F N2
C-EX7504D2ACSH	341.013	MIL-HDBK-217 F N2
C-EX7504D2DCH	310.873	MIL-HDBK-217 F N2
C-EX7504D2DCS	380.060	MIL-HDBK-217 F N2
C-EX7504D2DCSH	301.326	MIL-HDBK-217 F N2
C-EX7P04D1ACSH	316.467	MIL-HDBK-217 F N2
C-EX7P04D1DCH	290.343	MIL-HDBK-217 F N2
C-EX7P04D1DCS	349.820	MIL-HDBK-217 F N2
C-EX7P04D1DCSH	281.999	MIL-HDBK-217 F N2
C-EX7P04D2DCH	310.873	MIL-HDBK-217 F N2
C-EX7P04D2DCS	380.060	MIL-HDBK-217 F N2
C-EX7P04D2DCSH	301.326	MIL-HDBK-217 F N2
C-G3-16A	1.930.285	MIL-HDBK-217 F N2
C-G3-8E8A	1.939.645	MIL-HDBK-217 F N2
C-G3-GED-4B	1.168.190	MIL-HDBK-217 F N2
C-G3-GET-4B	919.800	MIL-HDBK-217 F N2
C-G3-IAX-2B	2.159.182	MIL-HDBK-217 F N2
C-G3-IF	2.056.992	MIL-HDBK-217 F N2
C-G3-IP-4B	2.159.182	MIL-HDBK-217 F N2
C-G3-LAN-8	2.170.571	MIL-HDBK-217 F N2
C-G3-TEL	1.183.012	MIL-HDBK-217 F N2
C-G8-16A	6.744.062	MIL-HDBK-217 F N2
C-G8-16E	10.032.626	MIL-HDBK-217 F N2
C-G8-8E8A	7.191.653	MIL-HDBK-217 F N2
C-G8-AUD-4B	955.556	MIL-HDBK-217 F N2
C-G8-GED-4B	1.285.235	MIL-HDBK-217 F N2
C-G8-IAX-4B	2.140.257	MIL-HDBK-217 F N2
C-G8-IF	1.703.224	MIL-HDBK-217 F N2
C-G8-IP-32	1.279.283	MIL-HDBK-217 F N2
C-G8-IP-4B	2.140.257	MIL-HDBK-217 F N2
C-G8-LAN-8	2.151.446	MIL-HDBK-217 F N2
C-G8-TEL	1.343.477	MIL-HDBK-217 F N2
C-G8-VIRT	43.478.261	MIL-HDBK-217 F N2
C-G8A-C	6.793.478	MIL-HDBK-217 F N2
C-G8A-CP	1.743.375	MIL-HDBK-217 F N2
C-G8A-GEN2	3.337.367	MIL-HDBK-217 F N2
C-G8A-I	8.163.265	MIL-HDBK-217 F N2

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CI-Type	MTBF (h)	Data Source
C-G8A-K	2.267.903	MIL-HDBK-217 F N2
C-G8A-T	4.374.453	MIL-HDBK-217 F N1, N2
C-GE300	705.747	MIL-HDBK-217 F N2
C-GE300CA	152.461	MIL-HDBK-217 F N2
C-GE300EU	152.461	MIL-HDBK-217 F N2
C-GE300WR	560.814	MIL-HDBK-217 F N2
C-GE800.C	279.278	MIL-HDBK-217 F N2
C-GE800AU.C	277.727	MIL-HDBK-217 F N2
C-GE800EU.C	277.727	MIL-HDBK-217 F N2
C-GE800UK.C	279.278	MIL-HDBK-217 F N2
C-GE800UL.C	282.913	MIL-HDBK-217 F N2
C-GEC881S.C	333.050	MIL-HDBK-217 F N2
C-HS10A	7.255.216	MIL-HDBK-217 F N2
C-ID5-DKGM	3.086.316	MIL-HDBK-217 F N2
C-ID5-DKHS	2.046.591	MIL-HDBK-217 F N2
C-ID5-DKHSGM	1.226.650	MIL-HDBK-217 F N2
C-ID5-TD	160.379	MIL-HDBK-217 F N2
C-ID5-TD-B	160.379	MIL-HDBK-217 F N2
C-ID5-TDCM	151.941	MIL-HDBK-217 F N2
C-ID5-TDCM-B	151.941	MIL-HDBK-217 F N2
C-ID5-WMHS	2.046.591	MIL-HDBK-217 F N2
C-ID8-DKDDM	420.630	MIL-HDBK-217 F N2
C-ID8-DKDDM-B	420.630	MIL-HDBK-217 F N2
C-ID8-DKDDS	428.929	MIL-HDBK-217 F N2
C-ID8-DKDDS-B	428.929	MIL-HDBK-217 F N2
C-ID8-DKHS	2.046.591	MIL-HDBK-217 F N2
C-ID8-GM	43.478.261	MIL-HDBK-217 F N2
C-ID8-TD	222.410	MIL-HDBK-217 F N2
C-ID8-TD-B	222.410	MIL-HDBK-217 F N2
C-ID8-TDCM	208.492	MIL-HDBK-217 F N2
C-ID8-TDCM-B	208.492	MIL-HDBK-217 F N2
C-IM3	838.397	MIL-HDBK-217 F N2
C-IM6	578.434	MIL-HDBK-217 F N2
C-IP-BRIDGE	3.081.303	MIL-HDBK-217 F N2
C-IP-CON	975.353	MIL-HDBK-217 F N2
C-LED3	2.557.544.757	MIL-HDBK-217 F N2
C-LSM	15.151.515	MIL-HDBK-217 F N2
C-MIC-Q400	2.352.941	MIL-HDBK-217 F N2
C-MIC473	2.352.941	MIL-HDBK-217 F N2
C-MIC480	2.352.941	MIL-HDBK-217 F N2
C-MIC480S-08	2.352.941	MIL-HDBK-217 F N2
C-MIC480S-12	2.352.941	MIL-HDBK-217 F N2
C-MIC800SW	2.352.941	MIL-HDBK-217 F N2

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CI-Type	MTBF (h)	Data Source
C-MIC800SWJ	2.352.941	MIL-HDBK-217 F N2
C-OD1-CM	467.354	MIL-HDBK-217 F N2
C-OD1-CM-B	553.166	MIL-HDBK-217 F N2
C-OD1-VCM	467.354	MIL-HDBK-217 F N2
C-OD10-TDCM	58.033	MIL-HDBK-217 F N2
C-OD10-TDCM-B	145.635	MIL-HDBK-217 F N2
C-OD5-TDCM	151.941	MIL-HDBK-217 F N2
C-OD5-TDCM-B	151.941	MIL-HDBK-217 F N2
C-PA1-230V	50.000.000	MIL-HDBK-217 F N2
C-PA1-S3	100.000	Telcordia SR-332
C-PA1-S6	100.000	Telcordia SR-332
C-PA24W15V-CA	194.472	MIL-HDBK-217 F N1, N2
C-PA24W30V-CA	194.472	MIL-HDBK-217 F N1, N2
C-PA24W30V-EU	194.472	MIL-HDBK-217 F N1, N2
C-PA30W15V	194.472	MIL-HDBK-217 F N1, N2
C-PA30W24V-CA	194.472	MIL-HDBK-217 F N1, N2
C-PA30W24V-EU	194.472	MIL-HDBK-217 F N1, N2
C-PA60W24V	325.872	MIL-HDBK-217 F N1, N2
C-PA65W48V	300.000	Telcordia SR-332
C-PA7-230VEU	50.000.000	MIL-HDBK-217 F N2
C-PA7-240VUK	50.000.000	MIL-HDBK-217 F N2
C-POE-SPLIT	2.290.558	MIL-HDBK-217 F N2
C-S3	78.404	Telcordia SR-332
C-S6	23.916	Telcordia SR-332
C-SIP-WS201V	465.935	MIL-HDBK-217 F N2
C-SIP-WS203P	421.768	MIL-HDBK-217 F N2
C-SIP-WS203V	421.768	MIL-HDBK-217 F N2
C-SIP-WS211V	430.897	MIL-HDBK-217 F N2
C-SIP-WS211VDA	374.841	MIL-HDBK-217 F N2
C-SIP-WS212V	430.560	MIL-HDBK-217 F N2
C-SIP-WS800F	407.512	MIL-HDBK-217 F N2
C-SIP-WS800FMD	407.512	MIL-HDBK-217 F N2
C-SIP-WS800P	407.512	MIL-HDBK-217 F N2
C-SIP-WS800V	407.512	MIL-HDBK-217 F N2
C-SIS-DONGLE	784.756	MIL-HDBK-217 F N2
C-WS201PA.C	1.278.095	MIL-HDBK-217 F N2
C-WS201PD.C	549.013	MIL-HDBK-217 F N2
C-WS201PI.C	522.333	MIL-HDBK-217 F N2
C-WS201PICA	82.814	MIL-HDBK-217 F N2
C-WS201VA.C	1.278.095	MIL-HDBK-217 F N2
C-WS201VD.C	549.013	MIL-HDBK-217 F N2
C-WS201VI.C	522.333	MIL-HDBK-217 F N2
C-WS201VICA	81.520	MIL-HDBK-217 F N2

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CI-Type	MTBF (h)	Data Source
C-WS203PD.C	547.844	MIL-HDBK-217 F N2
C-WS203PI.C	512.275	MIL-HDBK-217 F N2
C-WS203PICA	80.578	MIL-HDBK-217 F N2
C-WS203VD.C	547.844	MIL-HDBK-217 F N2
C-WS203VI.C	521.275	MIL-HDBK-217 F N2
C-WS203VICA	80.053	MIL-HDBK-217 F N2
C-WS211VD.C	474.751	MIL-HDBK-217 F N2
C-WS211VDDA	407.593	MIL-HDBK-217 F N2
C-WS211VDM	479.970	MIL-HDBK-217 F N2
C-WS211VI.C	454.669	MIL-HDBK-217 F N2
C-WS211VICA	80.376	MIL-HDBK-217 F N2
C-WS211VIDA	392.702	MIL-HDBK-217 F N2
C-WS211VIM	459.454	MIL-HDBK-217 F N2
C-WS212VD.C	474.342	MIL-HDBK-217 F N2
C-WS212VI.C	454.294	MIL-HDBK-217 F N2
C-WS301VCM	415.064	MIL-HDBK-217 F N2
C-WS303VCM	415.064	MIL-HDBK-217 F N2
C-WS311VCM	423.828	MIL-HDBK-217 F N2
C-WS311VCMDA	411.282	MIL-HDBK-217 F N2
C-WS800FA.C	558.246	MIL-HDBK-217 F N2
C-WS800FD.C	446.520	MIL-HDBK-217 F N2
C-WS800FDMD.C	358.133	MIL-HDBK-217 F N2
C-WS800FI.C	428.711	MIL-HDBK-217 F N2
C-WS800PA.C	558.246	MIL-HDBK-217 F N2
C-WS800PD.C	446.520	MIL-HDBK-217 F N2
C-WS800PI.C	428.711	MIL-HDBK-217 F N2
C-WS800VD.C	446.520	MIL-HDBK-217 F N2
C-WS800VI.C	428.711	MIL-HDBK-217 F N2
C-WS810FI.C	144.708	MIL-HDBK-217 F N2
C-WS810PI.C	144.708	MIL-HDBK-217 F N2
C-WSEBIL	3.645.052	MIL-HDBK-217 F N2
C-WSHS50P-JST	1.805.408	MIL-HDBK-217 F N2
C-WSIL50P	3.749.050	MIL-HDBK-217 F N2
C-WSIL50V	3.749.050	MIL-HDBK-217 F N2
C-WSLM52F.C	2.171.529	MIL-HDBK-217 F N2
C-WSLM52P.C	2.171.529	MIL-HDBK-217 F N2
C-WSLM52V.C	2.171.529	MIL-HDBK-217 F N2
C-WSLM56F.C	1.757.346	MIL-HDBK-217 F N2
C-WSLM56P.C	1.757.346	MIL-HDBK-217 F N2
C-WSLM56V.C	1.757.346	MIL-HDBK-217 F N2