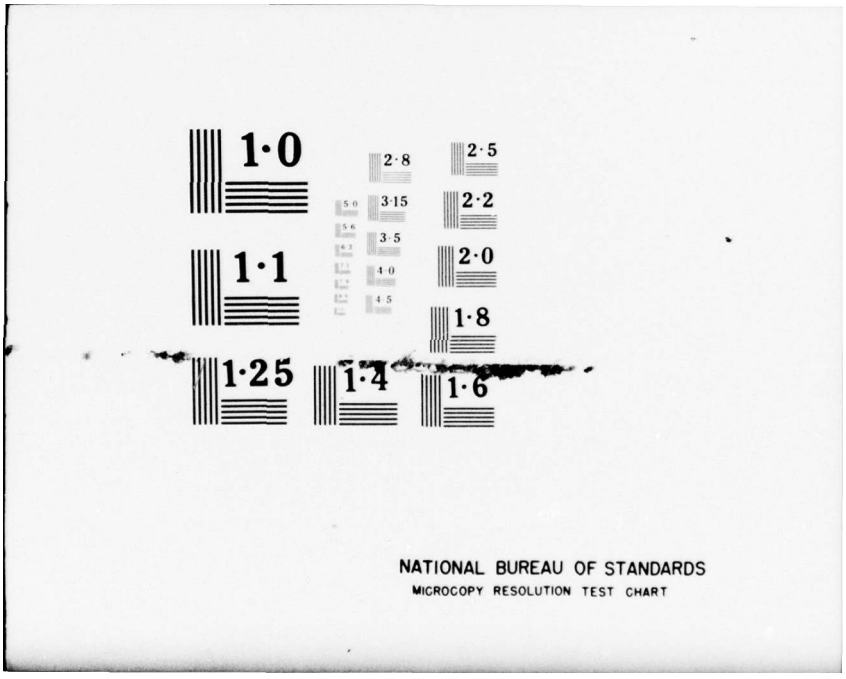
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RADC-TR-77-49
In-House Report
March 1977

IMPLEMENTATION OF OPERATIONAL PROCEDURES FOR OPTIMIZED RELIABILITY AND COMPONENT LIFE ESTIMATOR (ORACLE)

George W. Lyne

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This report has been reviewed and approved for publication.

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April 1977

RADC-TR-77-49 dated March 1977

TITLE: IMPLEMENTATION OF OPERATIONAL PROCEDURES FOR OPTIMIZED RELIABILITY AND COMPONENT LIFE ESTIMATOR (ORACLE)

Please add the following paragraph to the inside front cover:

Some of the pages of this report are not of the highest printing quality but because of economical consideration, it was determined in the best interest of the government that they be used in this publication.

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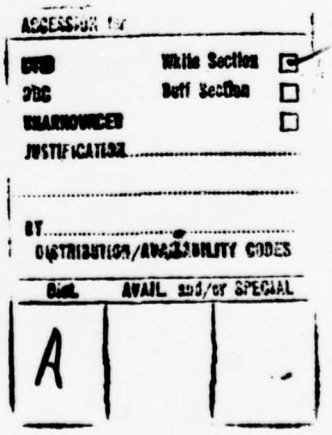
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Acknowledgment: The ORACLE program discussed herein was written under contract to the U.S. Army at Fort Monmouth, N.J. by W.W. Gaertner Research, Inc., Stamford, Connecticut. Through cooperation of project engineers and coordinators (Mr. D. Edwards, Mr. J. Kastning, Mr. J. Hess and others) of the U.S. Army Electronics Command the subject program was provided to the Rome Air Development Center, Griffiss Air Force Base, N.Y. for Air Force implementation.

Much of the writings contained in this report was obtained from the reports:

"Operational Procedures For Optimized Reliability And Component Life Estimator (ORACLE)", Jerry Kastning, Product Assurance Directorate, US Army Electronic Command, Fort Monmouth, N.J., Dec. 1975.

"System Manual For Automatic Component Failure-Rate Prediction Program According To "MIL-HdBk-2173", W. W. Gaertner, W. M. Schreyer, D. B. Ellingham, Jr., W. W. Gaertner Research Inc., 205 Saddle Hill Road, Stamford, Connecticut, July 1975



Introduction:

Almost all Government procurements of electronic systems and equipments require analyses/predictions to forecast and enhance the reliability and life-cycle cost of the system. Unfortunately, such analyses are often carried out too late in the development cycle, or not at all; occasionally resulting in costly systems which cannot be maintained in the field. This is usually due to the time required and the costs resulting from the laborious and repetitive work required in performing the analyses. Thus, to reduce the labor, cost and provide timely predictions, the reliability engineer is turning to the computer to mechanize electronic system reliability prediction models. Toward this end, this report presents instruction on the use of a computer program which has been developed for obtaining reliability predictions of electronic systems based on MIL-HdBk-217B.

The computer program discussed herein is written in fortran and has been placed on the RADC/Honeywell 6000 GCOS Computer System by RADC/RBRT/GAFB/NY.

Objective:

The objective of this in-house effort is to provide the U.S. Air Force with a computer program which may be utilized in obtaining reliability predictions of electronic systems/equipments based on MIL-HdBk-217B.

Approach:

At the onset of this effort it was found that the U.S. Army E' ctronics Command, Fort Monmouth, New Jersey, had a Study Program (DAABO7-72-C-0212) in existence to develop a computer program for the implementation of MIL-HdBk-217B. On review of the contents of this program it was found that with minor modifications the results of the program would fulfill the requirements of the Air Force. Thus an agreement was made with the Army to provide the Air Force with the resulting computer program.

On receiving the Army computer program, "Optimized Reliability And Component Life Estimator" (ORACLE), the program was modified to fulfill the requirements of the Air Force and placed on the RADC/Honeywell GCOS 6000 Computer System. The

primary modification was to construct the program such that trade off analyses or a complete reliability analysis of an electronic system could be performed in one run of the program.

The ORACLE Program:

Optimized Reliability And Component Life Estimator (ORACLE) is a software program which determines the failure rate of integrated circuits, semiconductors, capacitors, resistors, and inductors based on the procedures set forth in MIL-HdBk-217B. This program eliminates the majority of the tedious parts of performing a reliability analysis of an electronic equipment or system: namely, the look up of the individual device parameters and formulae needed to determine the device failure and equipment failure rates. A group of parts or components which constitute complete modules, equipments, and/or systems can be entered into the program at one time, thus allowing for a complete system analysis in one computer run of ORACLE.

Reliability measurements and other outputs resulting from ORACLE are:

Listings of individual failure rates of the devices making up the module, equipment and/or system.

The total failure rate of each module, equipment and/or system.

The mean time between failure (MTBF) of each module, equipment and/or system.

The total small and large quantity cost of the piece parts making up the module, equipment and/or system.

(Note: The cost information, although provided for, is not included in the data base associated with ORACLE and must be entered in the data base on an individual part basis. The cost information can best be entered in the Abstracted Data Base (columns 116-127 inclusive) through the use of the System Editor (see Appendix IV for format).)

Not all part types covered by MIL-HdBk-217B are included in the ORACLE program. However, in the near future it is planned to include, in addition to the above device types, hybrid devices, rotating devices, relays, switches, connectors and miscellaneous parts. The miscellaneous items will include tubes, lasers, quartz crystals, fuses, neon lamps, incandescent lamps, meters, wirewrap connection, and hand soldered connections.

Data Bases:

The ORACLE program has been designed such that it makes use of two data bases: a Primary Data Base which contains list of commonly used parts and their parameters (see Appendix IV) which are required to calculate the failure rate of the parts, in accordance with MIL-HdBk-217B, and a users Appended Data Base containing a list of parts not included in the Primary Data Base (and their respective parameters) which can be added to by the user on a continuing basis. The principle procedure for use of these data bases is to search the Primary Data Base for the parts contained on the input parts list and search the Appended Data Base for the parts not found in the Primary Data Base. In the event a part of interest is not contained on either the Primary or Appended Data Base it may be added to the Appended Data Base by the user. (The Appended Data Base is constructed, after an initial run of the program on a given part list, in accordance with the format presented in appendix IV.) Other characteristics and uses of the Appended Data Base are: the user may construct an Appended Data Base and use it in place of the Primary Data Base or the data placed on the data base may be used to update the Primary Data Base.

Primary Data Base Structure:

The Primary Data Base has been placed on a tape file in blocks of three hundred and one (301) physical records. The first physical record contains the part number of the first and last part and the number of parts for which device-dependent quantities are recorded on the block. The following records are sorted according to part number and contain the device-dependent quantities as described in Appendix IV. (Each record is 130 characters in length.)

Appended Data Base Structure

The Appended Data Base, as constructed by the user, contains one block of non-sorted records. Each record in this data base contains device-dependent information as presented in Appendix IV.

In the event the Appended Data Base is used in place of the Primary Data Base, as discussed above, the user must sort and structure the data base in accordance with the Primary Data Base structure.

Program Flow:

The flow of the ORACLE program can be broken down in the following steps (also see figures (1-4)):

Step-1: Sort/Merge (SORT Routine) - This step makes use of the Honeywell System Sort/Merge program. The raw parts list (input data) is sorted by module or equipment and part number, the part numbers being in the same sequence as the data base, to enable a binary search of the data base. (The result of this step is an output file (Sorted Input Parts List).)

Step-2: Data Base Search (BINNY Routine) - This step performs a binary search of the Primary Data Base to determine if each part contained in the Sorted Input Parts List can be matched to a line entry within the Primary Data Base. In the event a match is made, a line (or lines) of data contained within the data base is duplicated onto an output file (Abstracted Data Base), and the information contained in the Sorted Input Parts List, for the part, is duplicated onto an output file (Parts Found). In the event that a match is not made to the Primary Data Base, the Appended Data Base is then searched and the above duplications are made in the event of a match. If a match is not made to either data base the information contained on the Sorted Input Parts List for that part is duplicated onto an output file (Parts Not Found). A part, of a given part type, may not be found in the Primary Data Base because:

(IC's)

(1) The part is not a registered JEDEC Part.

(2) The part is not available with JAN, JANTX, or JANTXV screening.

(3) The user-designated package type is not available.

(Other Part Types)

(1) The part number has not been certified to MIL part requirements.

(3) The 8th, 9th or 10th characters of the part number is not valid.

(All Part Types)

(1) The user-designated part is no longer or never was manufactured by the user-designated manufacturer.

(2) The user-designated manufacturer part may not have been entered into the data base.

The reason for a part not being in the Appended Data Base is that the user has not entered the part therein.

Step-3: Reliability Analyses (RELIABN Routine) - This step consists of running a reliability analysis on the Parts Found List obtained in step 2.

The inputs to the reliability analysis program are the device application-dependent information and the device-dependent information which was generated and placed on the Abstracted Data Base and the Parts Found Files during step 2. Two outputs result from step 3, a processed parts list and diagnostics/part information. The processed part list duplicates the information contained in the Input Part List up to and including the screening level field followed by information from the Abstracted Data Base and the computed failure rate. The diagnostics/part information contains all the quantities used to calculate the failure rate. The diagnostics/part information will also contain comments, should they be required, which concern specific information which was not explicitly included, but should have been, in the Input Parts List. It also notes the

assumed values which were assigned (by the RELIABN routine) to the effected parameter or parameters.

Step-4: Summation Of Failure Rates (SUMFR Routine) - This step sums all of the part failure rates for each module or equipment and calculates the mean time between failure (MTBF) of the modules.

Step-1

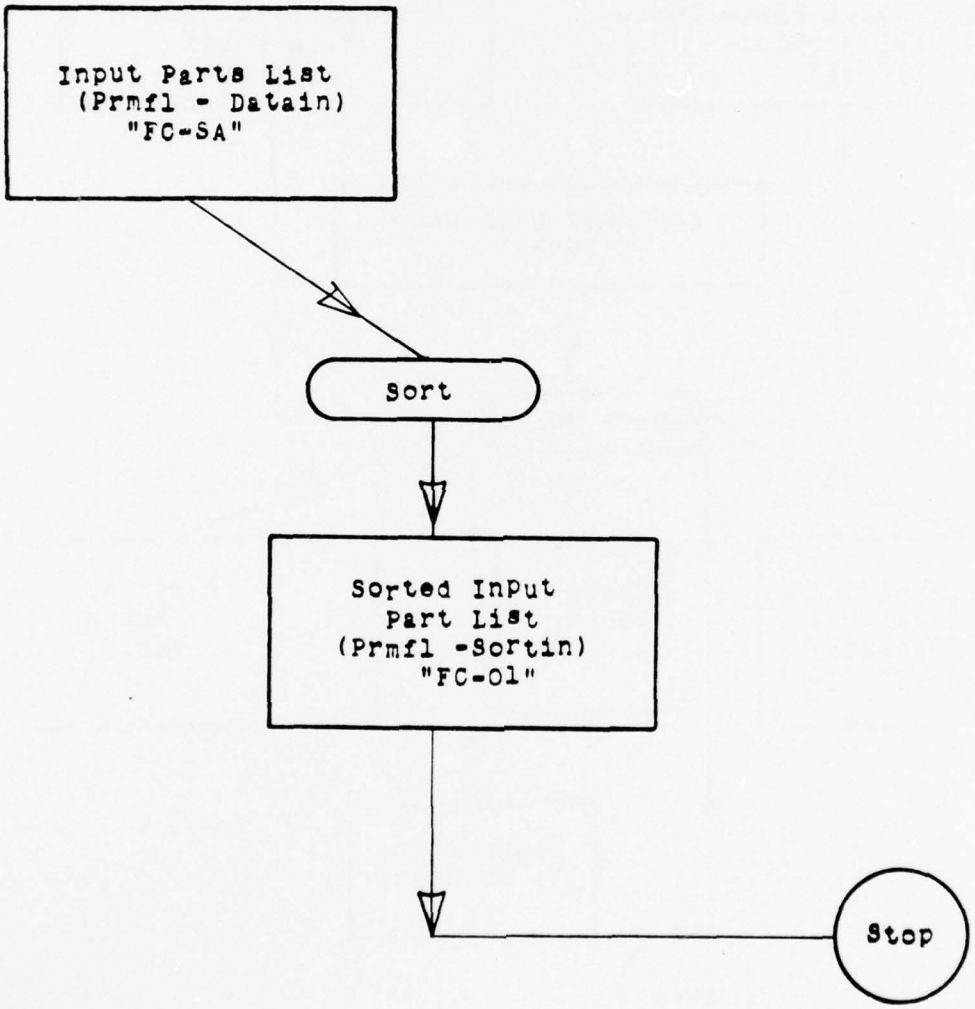


Figure 1. Flow Chart of Sort/Merge, Step-1

Step-2

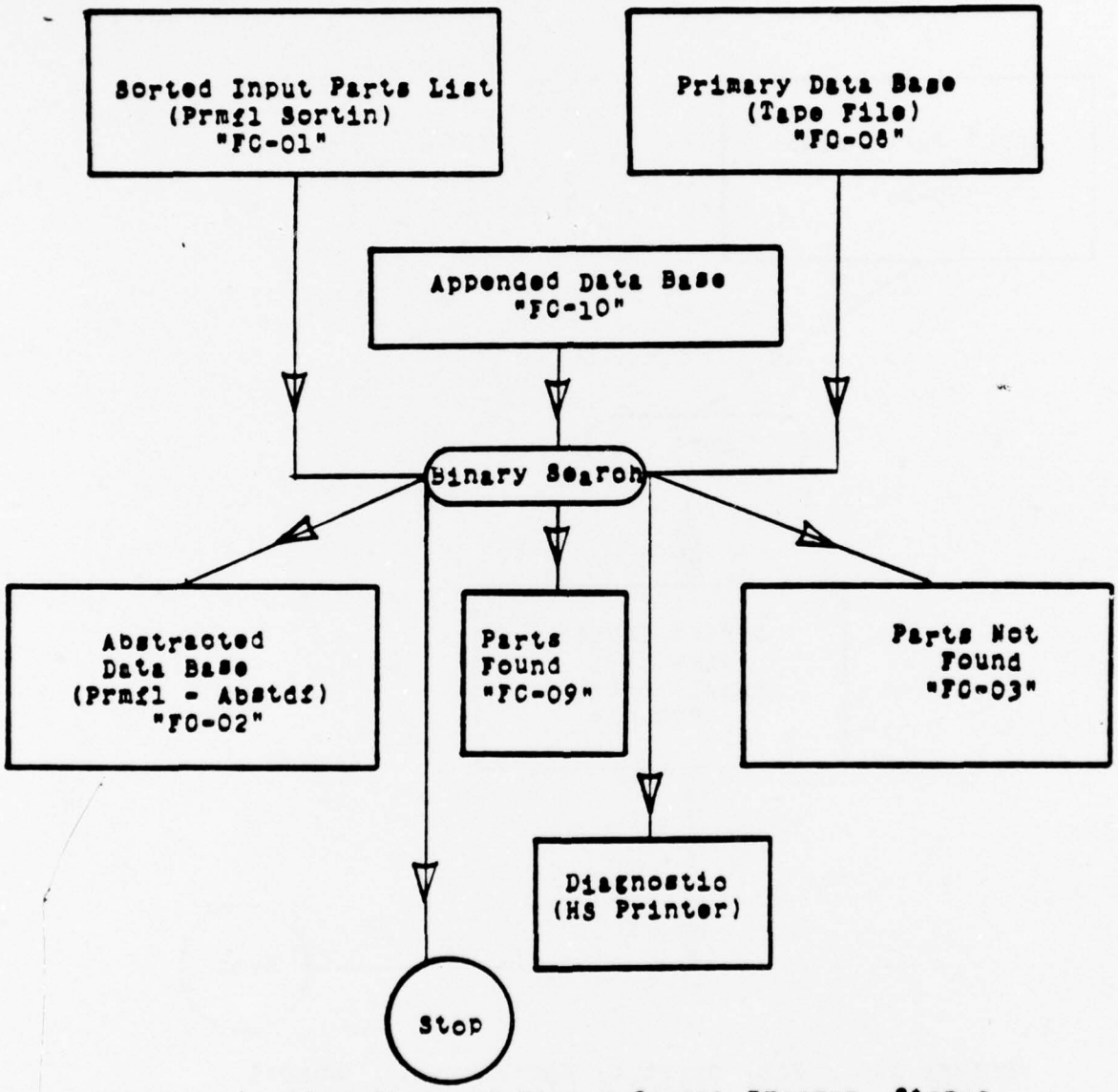


Figure 2. Flow Chart of Binary Search Program, Step-2

Step-3

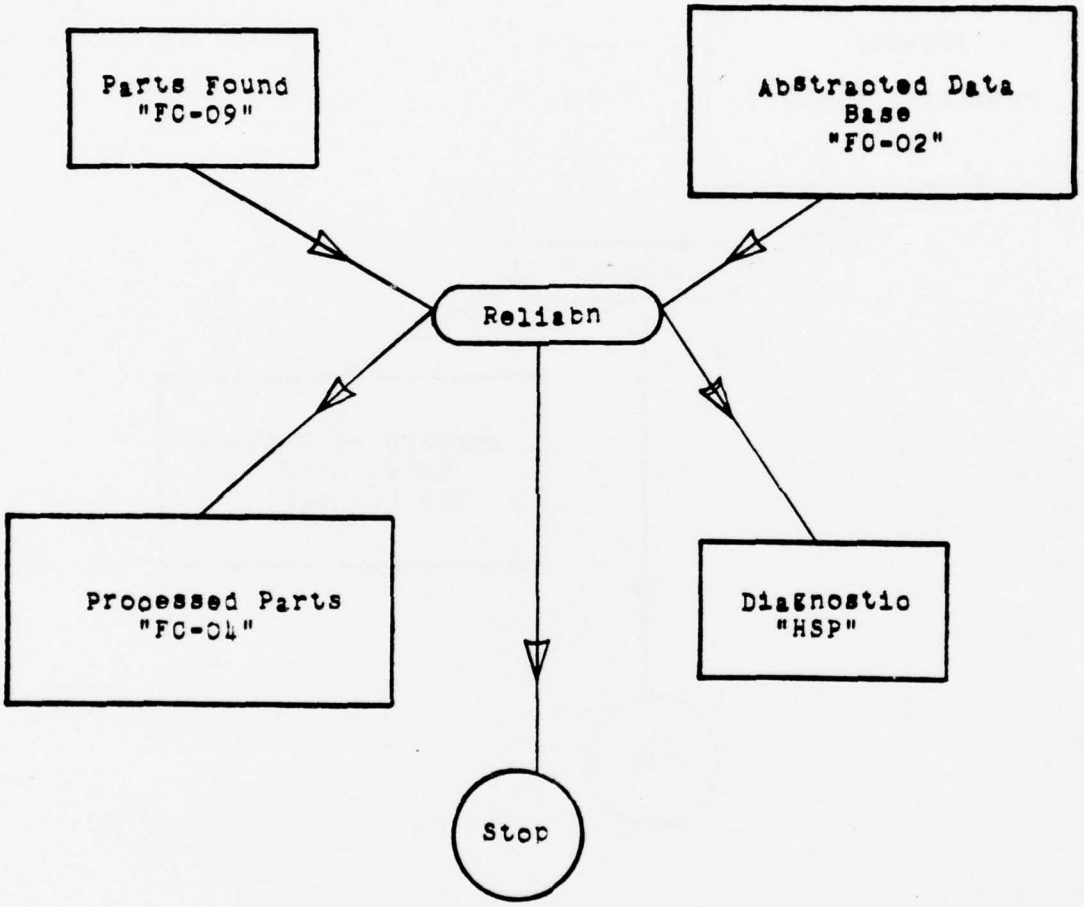


Figure 3. Flow chart of Reliability Analysis program, Step-3

Step-4

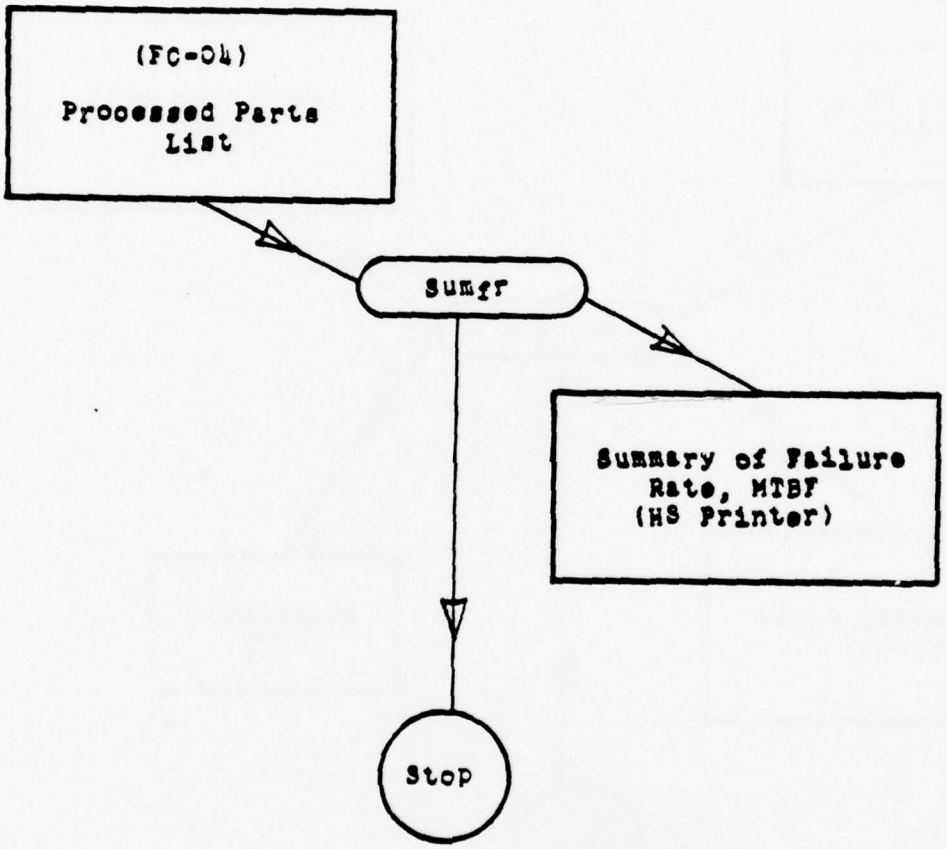


Figure 4. Flow chart of Summary of Failure Rate Program, Step-5

Input Data Requirements:

This section describes the part application-dependent quantities or parameters which are supplied by the user and make up the input parts list (input data). This data is supplied by recording the quantities on an input data format layout sheet (see figures 5-16) and entering the data in the computer via computer punched cards or a time-shared program for construction of an input data file. The fields delimited on the layout sheet must be strictly adhered to. The part numbers are entered left justified and all the other fields are entered right justified. Descriptions of the information to be included in the fields are as follows.

The failure rate of resistors and many capacitors and inductors is calculated from the information contained in their individual part number. Thus in entering the part number of these device types one must follow the specified procedure described under "type designation" in:

MIL-Std-199A - for resistors,

MIL-Std-198B - for capacitors and

MIL-C-15305 and MIL-T-21038 for inductor styles LT and TP.

(Exceptions are capacitor styles CYR (MIL-C-23269), CSR (MIL-C-39003), CLR (MIL-C-39006) and CU (MIL-C-39018) and inductor style TF(MIL-T-27) which are included in the Data Base.)

(Note: Although many of the part types covered by MIL-HDBK-217B are not contained in ORACLE program, at the present, their required input data format has been included herein.)

General Input Information:

The following input information applies to all part types:

---

field 1 (column 1) - Left blank.

---

field 2 (columns 2-7 inclusive) - Module or Equipment Number: Up to six alpha-numeric characters assigned to a module are allowed. If there are less than six characters the entry must be consistently right or left justified for each part within the module.

---

field 3 (columns 8-11 inclusive) - Module reference part number or the number of a given device type within a module. If the parts are listed by module reference number up to 4 alpha-numeric numbers can be entered. If the number of parts are entered, any integer number between 0 and 9999 can be entered right justified. (if 0 - 1 is assumed)

---

field 4 (columns 12-14 inclusive) - Component type code: Three characters are allowed. If there are not three characters dash "-" fill the field, left justifying the entry in the field. This field may be left blank. Appendix III gives all component type codes recognized by the ORACLE program.

---

field 5 (columns 15-17 inclusive) - Manufacturer code: This field is for entry of the code for the manufacturer who is the supplier of the part. Three characters are allowed. Appendix II lists the codes recognized by the ORACLE program.

---

field 6 & field 7 (columns 18-32 inclusive) - Manufacturer's part number: These two fields are for the entry of the manufacturer part number. Fifteen characters are allowed and are

entered left justified.

---

field 8 (columns 33-37 inclusive) - Stress factor: The stress factor is entered in this field in decimal format, right justified.

---

field 9 (columns 38-41 inclusive) - Operating temperature: The operating ambient temperature in degrees centigrade is entered in this field, right justified. The sign of this data is entered in column 38.

---

field 10 (columns 42-45 inclusive) - Environmental classification code: The environmental classification code for the environment in which the part is to be used or applied is entered in this field. Appendix I contains a listing of the environmental classification codes recognized by the ORACLE program.

---

field 11 (columns 46-51 inclusive) - Screen Level Code: The screening level code used to indicate the type of quality controls used during the manufacture of the device is entered in this field, right justified.

---

field 12 (columns 52-80 inclusive) - This field is left blank or used for special data for a given device type.

Input Data For Module Or Equipment Characteristics:

The following information is required for each module and/or equipment being analyzed in a given computer run i.e., for each module and/or equipment, for which a listing of the parts is contained in an input parts list, one and only one line entry containing the following information must be entered in the Input Parts List.

---

field 1 (column 1) - Left blank.

---

field 2 (columns 2-7 inclusive) - Module or Equipment Number: Enter up to six alpha-numeric characters assigned to describe the module or equipment. (If less then six characters are entered the entry must be right or left justified to coincide with the entries in the same field in the parts list entries.)

---

field 3 (columns 8-11 inclusive) - Part Reference Number Designator: The user has the option of entering the Input Parts List according to the part reference number or the number of a given part type used in an equipment (not both in the same Input Parts List). This field is used to set the stage for the users option. If the field is left blank it is assumed that the reference number option is desired. If the field contains "NUMB" the number of parts option is assumed.

---

field 4 (columns 12-14 inclusive) - Number of Two-sided Printed Circuit Boards: Enter an integer number between 0 and 999, right justified, equal (=) to the number of PC boards making up the module, in this field. (if blank assumed zero)

---

field 5 (columns 15-17 inclusive) - Number of Multi-Layered Printed Circuit Boards: Enter an integer number between 0 and 999, right justified, equal (=) to the number of multi-layered PC boards making up the module, in this field. (if blank assumed zero)

---

field 6 (columns 18-32 inclusive) - This field must be zero (0) filled. (The zeros are used by the sort routine.)

Input Data For Capacitors:

The following describes all the exceptions to the general input information format for entering the application-dependent quantities for capacitors:

---

field 6 & field 7 (columns 18-32 inclusive) - (These two fields are used as one.) Part Number: Enter the part number left justified. (If the part number does not fill this field, do not dash (-) fill the field.)

---

field 8 (column 33-37 inclusive) - Stress: Enter the stress in voltage stress.

---

field 11 (columns 46-51 inclusive) - Screening Level Code: Enter one of the following codes, if one of the following capacitor types:

CB, CC, CE, CV or CP

is used. Otherwise leave blank.

Capacitor Screening Level Codes

Code	Screening Level Description
UPPER	Greater than MIL-SPEC quality level
MILSPC	MIL-SPEC quality level
LOWER	Lower than MIL-SPEC quality level

---

field 12 (columns 57-64 inclusive) - Operating Voltage: Enter the operating voltage if the stress was not entered in columns 33-37 (field 8).

---

field 13 (columns 65-72 inclusive) - Series Resistance: Enter the series resistance if the capacitor is of the type M39003/. Otherwise leave blank.

---

field 14 (columns 73-80 inclusive) - Duty Cycle or Usage: This field allows the user to enter the amount of total system time the part is in actual operation, or what portion of the device is in actual use. The quantity entered in this field should be in the range of .01 to 1.00, 1.00 indicating full duty cycle or usage.

Input Data For Connectors:

The following describes all the exceptions to the general input information format for entering the application-dependent quantities for connectors:

---

field 6 & field 7 (columns 18-32 inclusive) - (These two fields are used as one.) Part Number: Enter the part number left justified. (If the part number does not fill this field, do not dash (-) fill the field.)

---

field 8 (columns 33-37 inclusive) - Stress: Enter stress in current stress (load/rated). (If the stress is entered it is applied to the maximum rated amps/contact to determine the actual amps/contact used. The stress may be left blank and the amps/contact may be used - see field 17 below.)

---

field 11 (columns 46-51 inclusive) - Screening Level: Enter one of the following screening level codes - right justified.

CONNECTOR SCREENING LEVEL CODES

CODE	DESCRIPTION
MILSPC	Mil-SPEC quality level
LOWER	Lower than MIL-SPEC quality Level

---

field 12 (column 52) - Insert material code: This entry is used for MIL-C-5015 and MIL-C-26482 connectors only. The codes for the insert materials are A, B, C or D.

---

field 13 (columns 53-54 inclusive) - Left blank.

---

field 14 (column 55) - Usage indicator: Enter a U in this column if the usage is entered in field 16 (columns 57-64).

---

field 15 (column 56) - Left blank.

---

field 16 (columns 57-64 inclusive) - Number of Active Contacts or Usage. If U is not entered in field 14 (column 55) then the number of active contacts on the connector may be entered in this field. If U is entered in field 14 then the percentage of the total number of contacts on the connector used should be entered. If this field is left blank then it is assumed that all contacts on the connector are used.

---

field 17 (columns 65-72 inclusive) - Amps/Contacts: The largest value of amps applied across any of the connectors should be entered in this field if no stress is entered in field 8 (columns 33-37). If this field and field 8 are left blank then 5 amps/contact will be assumed.

---

field 18 (column 73-80 inclusive) - Re-plug cycling rate: The re-plug cycling rate refers to the number of times the connector will be unplugged and plugged during a 1000 hour period. For re-plug cycling rates less than or equal to 40 this field may be left blank.

Input Data For Integrated Circuits:

The following describes all the exceptions to the general input information format for entering the application-dependent quantities for integrated circuits:

---

field 6 (columns 18-27 inclusive) - Manufacturer's Part Number: The part number is entered left justified followed by dashes "-" (if required to fill the field) and the package type. Example: a MC1250 in a F type package would be entered:

```
                          MC1520--F
                          ^       ^
                col.      18      27
```

an UA710 in a 3FM package would be entered:

```
                          UA710--3FM
                          ^         ^
                col.      18        27
```

an CA3018A in package type 5GM would be entered:

```
                          CA3018A5GM
                          ^         ^
                col.      18        27
```

If the part number is from a series of parts which has different voltage ranges, include the voltage range as part of the part number. Example: LM340-xx series in package type K would be

```
entered:    LM340-05-K
            LM340-18-K
            ^       ^
      col.  18      27
```

(Note: The separation of the voltage range from the part number by the dash "-", and the use of the two digit voltage range quantity (05).

There is not a standard coding for package types. Each manufacturer has developed his own code for the package type descriptors.)

---

field 7 (columns (28-32 inclusive) - Duty cycle and usage: This field allows the user to enter the amount of total system time the part is in actual operation, or what portion of the device is in actual use. The quantity entered in this field should be in the range of .01 to 1.00, 1.00 indicating full duty cycle or usage.

---

field 8 (columns 33-37 inclusive) - Stress Field: Stress is entered as 1.00. The vast majority of IC's are operated at a fixed voltage. If a variable voltage IC is contained within an equipment, this is a special case, and the user must calculate the failure rate manually.

---

field 11 (columns 46-51 inclusive) - Screen level codes: The screening codes applicable to IC type is entered, right justified. The screening level codes applicable to IC's recognized by the ORACLE are:

Screening Level Codes Applicable to IC's

Code	Screening Level Description
A	MIL-M-38510, Class A (JAN)
B	MIL-M-38510, Class B (JAN)
B-1	MIL-Std-833, Method 5004, Class B
B-2	Vendor Equivalent of MIL-Std-883, Method 5004, Class B
C	MIL-M-38510, Class C (JAN)
D	Commercial (or non-MIL-Std) part, with no screening beyond the manufacturer's regular quality assurance practices.

Input Data For Discrete Semiconductors:

The following describes all exceptions to the general input format for entering the application-dependent quantities for discrete semiconductors:

---

field 6 (columns 18-27 inclusive) - Part Number: This field contains the manufacturer's part number. Ten characters are allowed. Enter the number left justified in the field.

---

field 7 (columns 28-32 inclusive) - Duty cycle and usage: The quantity entered in this field should be in the range of .01 to 1.00. 1.00 indicating a full duty cycle or usage, and a quantity less than 1.00 indicating a portion of a duty cycle or usage.

---

field 8 (columns 33-37 inclusive) - Stress: This field is provided for use in semiconductors. The stress ratio of operating electrical stress to rated electrical stress may be entered, or it may be left blank and appropriate values entered in fields 13 thru 18. (If field 8 is left blank the stress is calculated by ORACLE using the appropriate quantities recorded in fields 15 thru 18.)

---

field 11 (columns 46-51 inclusive) - Screening Level: The screening Level Codes for semiconductors are entered in this field, right justified. If the field is left blank the code JAN is assumed:

Codes for the Semiconductors Screening Level

JANTX
JANTXV
JAN
LOWER

field 12 (columns 52-54 inclusive) - Application: Enter one of the following Application Codes if the semiconductor is one of the types in the following table, otherwise leave the field blank.

Types of Semiconductors Requiring Application Codes:

Transistors:	Silicon: NPN and PNP Germanium: NPN and PNP Field Effect:
Diodes and Rectifiers:	Silicon (general) Germanium (general) Voltage Regulator Voltage Reference

Semiconductor Application Codes

Code:	Application Description
LIN	Linear
LGS	Logic Switch(ing)
HFQ	High Frequency (RF > 400MHz)
SMS	Small Signal (<500ma)
PRS	Power Rectifiers (> 500ma)
PRH	Power Rectifier (H.V. Stacks) Vmax > 600
VRG	Voltage Regulator
VRF	Voltage Reference (Temp. Compensated)

Notes: If the semiconductor is an NPN or PNP transistor or a general purpose diode, the applied voltage, in volts, must

be entered in columns 73-80, field 18, right justified.

If the stress ratio is not entered in the stress field, the following fields must be filled appropriately.

---

field 13 (column 55) - Heat Sink Code: Enter H if the device is used with a heat sink, otherwise leave blank.

---

field 14 (column 65) - Temperature Indicator Field: Enter an (A) if the operating temperature in columns 38-41 is ambient, or enter (C) if it is case temperature.

---

field 15 (columns 57-64 inclusive) - The entry in this field depends on the semiconductor type:

Transistors: Enter the power dissipated according to whether the device is single or dual. If the device is single enter the actual power dissipated in watts. If the device is dual in a single case equally rated, enter the power dissipated in watts of the side being evaluated, and enter the power dissipated in watts of the other side of the device in columns 67-72 (field 16). Note: If both sides of a dual device are to be evaluated, two input data records (one for each side of the device) must entered into the Input Data File.

General Purpose: Diode or Thyristor: Enter the average forward current in amperes.

Zener Diodes: Enter the actual power dissipated in watts or enter the actual operating Zener current in amperes in columns 65-72 (field 16).

Microwave Mixer Diode: Enter the operating spike leakage in ergs.

Microwave Detector Diode, Varactor diode or a Recovery Diode:

Enter the operating power dissipated in watts.

---

field 17 (columns 65-72 inclusive) - This field is used for two semiconductor types:

Dual Transistor: Enter the power dissipation in watts for the side of the device not being evaluated.

Zener Diode: Enter the Zener current in amperes if the actual power dissipated is not entered in columns 57-64 (field 16).

---

field 18 (columns 73-80 inclusive) - Applied Voltage: If the semiconductor is an NPN of PNP transistor or a general purpose diode the applied voltage, in volts, is entered in this field, right justified.

Input Data For Inductors:

The following describes all exceptions to the general input information format for entering the application-dependent quantities for inductors:

---

field 6 & field 7 (columns 18-32 inclusive) - Part Number: The part number field for inductors is 15 characters in length. Enter the part number left justified. (If the part number does not fill this field, do not dash (-) fill).

---

field 8 (columns 33-37 inclusive) - Stress (thermal): Stress is only applicable to type TF inductors from MIL-T-27. Enter the ambient temperature stress in degrees centigrade.

---

field 11 (columns 46-51 inclusive) - Screening Level Code: The screening level should be entered for all inductor types. The following codes are recognized by ORACLE:

Inductor Screening Level Codes

Code	Screen Level Description
UPPER	Greater than MIL-SPEC quality level
MILSPC	MIL-SPEC quality level
LOWER	Lower than MIL-SPEC quality level

---

field 12 (columns 57-64 - inclusive) - Duty Cycle of Usage: This field allows the user to enter the amount of total system time the part is in actual operation, or what portion of the device is in actual use. The quantity entered in this field should be in the range of .01 to 1.00, 1.00 indicating full duty cycle or usage.

Input Data For Relays:

The following describes all the exceptions to the general input information format for entering the application-dependent quantities for relays:

---

fields 6 & 7 (columns 18-32 inclusive) - Part Number: Enter the part number left justified. (If the part number does not fill this field, do not dash (-) fill the field.)

---

field 8 (columns 33-37 inclusive) - Stress: Enter the current stress. (Current Stress = operating load current divided by rated resistive load current.) If not within the range of .01 to 1.00 it will be assumed to be 1.00.

---

field 11 (columns 46-51 inclusive) - Screening level. Enter one of the following screening level codes right justified. Omitting or improperly entering the desired screening level code will invoke the default level of LOWER. Established Reliability relays that include the screening level as a letter code in the part number, such as MIL-R-39016 relays, must use the MILSP or LOWER notation since 217B does not allow for ER type screening levels.

Screening Level Codes For Relays

CODE	DESCRIPTION
MILSPC	MIL-SPEC Quality level
LOWER	lower than MIL-SPEC quality level

---

field 12 (columns 52-55 inclusive) - Contact Form and Quantity: The following codes are allowable. The maximum configuration used in the circuitry should be entered. If the field is not filled then the maximum configuration of the relay will be used.

Contact Form And Quantity Codes

CODE	DESCRIPTION
SPST	Single pole single throw
DPST	Double pole single throw
3PST	Three pole single throw
4PST	Four pole single throw
SPDT	Single pole double throw
DPDT	Double pole double throw
3PDT	Three pole double throw
4PDT	Four pole double throw
6PDT	Six pole double throw

---

field 13 (columns 57-64 inclusive) - Load Type Code: Enter one of the following load type codes: Load type refers to the type of circuit the relay is to be used in. If a load type is not entered, resistive is used as the default code.

LOAD TYPE CODES

CODE	DESCRIPTION
L	LAMP
I	Inductive
R	Resistive

---

field 14 (columns 57-64 inclusive) - Duty cycle or Usage: This field allows the user to enter the amount of total system time the part is in actual operation, or what portion of the device is in actual use. The quantity entered in this field should be in the range of .01 to 1.00, 1.00 indicating full duty cycle or usage.

---

field 15 (columns 65-72 inclusive) Cycling rate: (The number of times the relay will be activated per hour of equipment operation.) When the relay is used sporadically enter the maximum hourly rate. For relays experiencing a fixed number of operating cycles per hour or when the number of cycles follow a Poisson process enter the average hourly rate. If this field is left blank a cycle rate of 1000 cycles per hour will be assumed by the program.

Input Data For Resistors:

The following describes all exceptions to the general input information format for entering the application-dependent quantities for resistors:

---

field 6 & field 7 (columns 18-32 inclusive) - Part Number: Enter the resistor part number, left justified. (Up to 15 characters in length)

---

field 8 (columns 33-37 inclusive) - Stress: Enter the power stress ratio (applied power/rated power) for resistors. The stress must be entered for resistor types RB, RT, and RTR. Stress does not apply to resistor type RTH.

---

field 11 (columns 46-51 inclusive) - Screening Level: For non-established reliability resistors enter the following *screening level code, right justified. (screening level codes* are not applicable to established reliability resistors.)

Resistor Screen Level Codes

Code	Description
UPPER	Greater than MIL-SPEC quality level
MILSPC	MIL-SPEC quality level
LOWER	Lower than MIL-SPEC quality level

---

field 12 (column 55) - Mount Code: For type RER resistors enter an (A) if the device is free air mounted, enter a (B) if the device is chassis mounted.

---

field 13 (columns 57-64 inclusive) - Operating Power or Applied Voltage: If the stress ratio in field-8 was not entered then an entry must be made in this field. For resistor types RA, RJ, RK and RP the Operating Power must be entered. For resistor types RR, RT and RTR the Applied Voltage must be entered.

---

field 14 (columns 65-72 inclusive) - Duty Cycle or Usage: This field allows the user to enter the amount of total system time the part is in actual operation, or what portion of the device is in actual use. The quantity entered in this field should be in the range of .01 to 1.00, 1.00 indicating full duty cycle or usage.

---

field 15 (columns 73-80 inclusive) - Number of Taps: For resistor types RA, RJ, RK, RP and RR enter the number of taps if more than three (3) is used. (If left blank for these resistor types the minimum number three (3) is assumed.)

Input Data For Rotating Devices:

The following describes all the exceptions to the general input information format for entering the application-dependent quantities for rotating devices. The four types of rotating devices cover are: (1) high speed motors, (2) fans and blowers, (3) synchros and resolvers, and (4) elapsed time meters.

---

field 6 & field 7 (columns 18-32 inclusive) - Part Number: Enter the part number, left justifying the /entry.. Since no references are made in MIL-HDBK-217B to military specifications for rotating devices an appropriate part number must be selected from the following list for this entry:

PART NUMBER	DESCRIPTION
MOTHSNOBSH	Brushless high speed motor
MOTHSNOBSHSIL	Silicon-lubricated, Brushless high speed motor
MOTHSCOM	Commutator type, high speed motor
BLONOBSH	Brushless fan or Blower
BLONOBSHSIL	Silicon-lubricated, brushless fan or blower
BLOCOM	Commutator type fan or blower
SYNCHRO	Synchro
RESOLVER	Resolver
ETMAC	AC elapsed time meter
ETMINV	Inverted driver elapsed time meter
ETMCOMDC	Commutator DC elapsed time meter

---

field 8 (columns 33-37 inclusive) - Stress: For high speed motors enter mechanical load stress (load/rated load). For elapsed time meters enter temperature stress (operating/rates). Stress need not be entered for fans, blowers, synchros and resolvers.

---

field 11 (columns 46-51 inclusive) - Screening Level: Enter one of the following screening level codes, right justifying the entry:

Rotating Devices Screening Level Codes

Code	Description
UPPER	Upper level quality
LOWER	Lower level quality

---

field 12 (columns 52-54 inclusive) - Left Blank

---

field 13 (column 55) - For fans and blowers enter the number of pairs of windings. For synchros and resolvers enter the number of brushes. No entry is made in this field for motors and elapsed time meters.

---

field 14 (column 56) - For high speed motors only, enter A, B, or C to indicate the case wearout distribution of the motor. (Class B is most common.)

---

field 15 (columns 61-64 inclusive) - Duty Cycle or Usage: The quantity entered in this field should be in the range of .10 to 1.00. 1.00 indicating full duty cycle or usage, and a quantity less than 1.00 indicating a portion of a duty cycle or usage.

---

field 16 (columns 65-72 inclusive) - For motors, fans and blowers enter the operating hours. For synchros and resolvers enter the frame size.

---

field 17 (columns 73-80 inclusive) - For motors, fans and blowers enter the operating speed (RPM). This field is not used for the other rotating devices.

Input Data For Switches:

The following describes all the exceptions to the general input information format for entering the application-dependent quantities for switches.

REFERENCES

MIL-S-3786	Military Specification, Switches, Rotary (Circuit Selector, Low-Current Capacity), General Specification For, 7 June 1973, including Amendment 1, 24 January 1974, Supplement 1, 7 June 1973 and 32 detail specifications.
MIL-S-950	Military Specification, Switches, Toggels, Environmentally Seals, General Specification For, 16 March 1972, including Amendment 4, 19 June 1974, and 4 detail specifications.
MIL-S-8805	Military Specification, Switches, and Switch Assemblies, Sensitive, and Push (Snap Action), General Specification For, 7 Mar 1969, including Amendment 2, 16 February 1971, Supplement 1a, 22 May 1972 and 17 detail specifications.

---

field 6 and field 7 (columns 18-32 inclusive) - Part Number: Enter the switch part number left justified.

---

field 11 (columns 46-51 inclusive) - Screening Level: Enter one of the following screening level codes; right justify the entry.

Switch Screening Level Codes

Code	Description
MILSP	MIL-Spec quality level
LOWER	Lower than MIL-SPEC quality

---

field 1 (columns 57-64 inclusive) - Duty Cycle or Usage: The quantity entered in this field should be in the range of .10 to 1.00. 1.00 indicating full duty cycle or usage, and a quantity less than 1.00 indicating a portion of a duty cycle or usage.

---

field 13 (columns 65-72 inclusive) - Cycling Rate: Enter the cycling rate for the switch in cycles per hour.

---

field 14 (columns 73-80 inclusive) - Number of Contacts: Enter the number of contacts actually used.

Input Data For Tubes:

The following describes all the exceptions to the general input information format for entering the application-dependent quantities for tubes:

---

field 6 (columns 18-27 inclusive) - Part Number: Enter the tube part number left justified. (If the part number does not fill this field, do not dash (-) fill the field.)

---

field 7 (columns 28-32 inclusive) - Duty Cycle or Usage: This field allows the user to enter the amount of total system time the part is in actual operation, or what portion of the device is in actual use. The quantity entered in this field should be in the range of .01 to 1.00, 1.00 indicating full duty cycle or usage.

---

fields 8, 9 and 11 (columns 33-41 and columns 46-51) do not apply to tubes.

Input Data For Miscellaneous Devices:

The following describes all the exceptions to the general input information format for entering the application-dependent quantities for the miscellaneous devices.

Field 4 (columns 12-14 inclusive) - Component Type Code: For each miscellaneous device one of the following component type codes which describes the device must be entered in this field.

Miscellaneous Device Component Type Codes

Code	Description
VAC	Variable air capacitors
GOS	Gyroscope
VIB	Vibrator
XTL	Quartz Crystal
FUS	Fuse
LED	Light emitting diode
NL-	Neon lamp
INC	Incandescent lamp
MTR	Meter
HET	Heater (as used in crystal oven)
MTS	Microwave tuned stub
MTC	Microwave tuned cavity
MFD	Microwave ferrite device
MFR	Microwave ferrite device in receiver application
CSR	Reflow lap to P.C. board solder connector

CSW	Wave to P.C. board solder connection
HSC	Hand solder connection
CMP	Crimp connection
WLD	Weld connection
WW-	Wirewrap connection

---

field 6 and field 7 (columns 18-32 inclusive) - Part Number: These fields may be left blank.

---

fields 8, 9, 10 and 11 (columns 33-60 inclusive) - These fields covering stress, temperature, environment and screening, may be left blank. If the appropriate information is entered it will be ignored.

---

field 12 (column 61-64 inclusive) - Duty Cycle or Usage: The quantity entered in this field should be in the range of .10 to 1.00. 1.00 indicating full duty cycle or usage, and a quantity less than 1.00 indication a portion of a duty cycle or usage.

---

field 13 (columns 65-72 inclusive) - This field is used by vibrators only. Enter the vibrator frequency, if unknown 120 cycles will be assumed.

Input Data Layout Sheets:

The following layout sheets (figures 5-10) have been provided for recording the above input data:

MODULE OR EQUIPMENT CHARACTERISTICS

SYSTEM DATE

1	2–7 MODULE NUMBER	8–11 Part Ref Number or Number of Parts	12–14 NUMBER OF PCB	15–17 NUMBER OF MPCB	18–32	33–38	39–80
					0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		(NOTE: ONE ENTRY FOR EACH MODULE BEING ANALYZED MUST BE MADE ON THIS FORM)

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FIGURE 5

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CAPACITORS
INPUT DATA SHEET MIL-HDBK-217B

System_____ Date_____

MODULE NUMBER	MODULE PART NUMBER	COMPONENT TYPE	MANUFACT.	PART (15 cols.) NUMBER	STRESS	OPERATING TEMP.	OPERATING ENVIRONMENT	SCREENING LEVEL (NOTE 2)*		OPERATING VOLTAGE (NOTE 1)*	CAPACITORS SERIES RESISTANCE (NOTE 3)*	CAPACITORS DUTY CYCLE OR USAGE
1 2 3 4 5 6 7	8 9 10 11	12 13 14	15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	33 34 35 36 37	38 39 40 41	42 43 44 45	46 47 48 49 50	51 52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80
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*See User's Guide for Notes

FIGURE 6

CONNECTORS

INPUT DATA SHEET MIL-HDBK-217B System_____ Date_____

MODULE NUMBER	MODULE PART NUMBER	COMPONENT TYPE	MANUFACT. CODE	PART NUMBER	STRESS	TEMPERATURE	ENVIRONMENT	SCREENING LEVEL	MATERIAL CODE	USAGE INDICATOR	NUMBER OF ACTIVE CONTACTS OR USAGE	AMPS/CONTACTS	RE-PLUG CYCLING RATES
1 2 3 4 5 6 7	8 9 10 11	12 13 14	15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	33 34 35 36 37	38 39 40 41	42 43 44 45	46 47 48 49 50 51	52 53 54	55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

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INTEGRATED CIRCUITS
INPUT DATA SHEET MIL-HDBK-217B

System____ Date____

MODULE NUMBER	MODULE PART NUMBER	COMPONENT TYPE	MANUFACT. CODE	PART NUMBER	PACKAGE	DUTY CYCLE OR USAGE	STRESS	OPERATING TEMP	OPERATING ENVIRON.	SCREENING LEVEL	
1 2 3 4 5 6 7	8 9 10 11	12 13 14	15 16 17	18 19 20 21 22 23 24	25 26 27	28 29 30 31 32	33 34 35 36 37	38 39 40 41	42 43 44 45	46 47 48 49 50 51	52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
						+ -					
						+ -					
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FIGURE 7

DISCRETE SEMICONDUCTORS
INPUT DATA SHEET MIL-HDBK-217B

System _____ Date _____

MODULE NUMBER	MODULE PART NUMBER	COMPONENT TYPE	MANUFACT.	PART NUMBER	DUTY CYCLE OR USAGE	STRESS NOTE 3	OPERATING TEMP.	OPERATING ENVIRION.	SCREENING LEVEL	APPLICATION CODE, NOTE1	HEATSINK NOTE 4 TEMP, NOTE 5	DISCRETE SEMICONDUCTORS Q1 (NOTE 6)*	DISCRETE SEMICONDUCTORS Q2 (NOTE 6)*	APPLIED VOLTAGE (NOTE 2)*
1 2 3 4 5 6 7	8 9 10 11	12 13 14	15 16 17	18 19 20 21 22 23 24 25 26 27	28 29 30 31 32	33 34 35 36 37	38 39 40 41	42 43 44 45	46 47 48 49 50 51	52 53 54	55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

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*See User's Guide for Notes

FIGURE 8

Appendix VII

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INDUCTORS
INPUT DATA SHEET MIL-HDBK-217B System_____ Date_____

MODULE NUMBER	MODULE PART NUMBER	COMPONENT TYPE	MANUFACT.	PART (15 cols.) NUMBER	STRESS NOTE 1*	OPERATING TEMP.	OPERATING ENVIRONMENT	SCREENING LEVEL		DUTY CYCLE OR USAGE	INDUCTORS
1 2 3 4 5 6 7	8 9 10 11	12 13 14	15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	33 34 35 36 37	38 39 40 41	42 43 44 45	46 47 48 49 50 51	52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

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FIGURE 9

RELAYS

INPUT DATA SHEET MIL-HDBK-217B

SYSTEM _____ DATE _____

MODULE NUMBER	MODULE PART NUMBER	COMPONENT TYPE	MANUFACT. CODE	PART NUMBER	STRESS	OPERATING TEMPERATURE	OPERATING ENVIRONMENT	SCREENING LEVEL (1)	CONTACT FORM & QUANTITY	LOAD TYPE (3)	DUTY CYCLE OR USAGE	CYCLING RATES
1 2 3 4 5 6 7	8 9 10 11	12 13 14	15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	33 34 35 36 37	38 39 40 41	42 43 44 45	46 47 48 49 50 51	52 53 54 55	56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72

NOTES: 1. MILSPC or LOWER
2. SPST, DPST, 3PST, 4PST, SPDT, DPDT, 3PDT, 4PDT, 6PDT
3. E, I, R

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RESISTORS
INPUT DATA SHEET MIL-HDBK-217B

System _____ Date _____

MODULE NUMBER	MODULE PART NUMBER	COMPONENT TYPE	MANUFACT.	PART NUMBER	STRESS	OPERATING TEMP.	OPERATING ENVIRIONMENT	SCREENING LEVEL		NOTE 2	RESISTORS Q1 (NOTE 1,2)*	RESISTORS DUTY CYCLE OR USAGE	RESISTORS Q3 (NOTE 4)*
1 2 3 4 5 6 7	8 9 10 11	12 13 14	15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	33 34 35 36 37	38 39 40 41	42 43 44 45	46 47 48 49 50 51	52 53 54	55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

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FIGURE 10

*See User's Guide for Notes
Appendix VII

ROTATING DEVICES
INPUT DATA SHEET MIL-HDBK-217B System Date

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
MODULE NUMBER							QUANTITY OR MODULE PART NO.				PART TYPE (ROT)			MANUFACT. CODE			PART NUMBER						

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SWITCHES

INPUT DATA SHEET MIL-HDBK-217B SYSTEM DATE

	MODULE NUMBER	MODULE PART NO. OR QUANTITY	COMPONENT TYPE (SW-)	MANUFACT. CODE	PART NUMBER	STRESS	TEMPERATURE	ENVIRONMENT	SCREENING LEVEL	BLANK	DUTY CYCLE OR USAGE	CYCLING RATE PER HOUR	NUMBER OF CONTACTS USED
1	1 2 3 4 5 6 7	8 9 10 11	12 13 14	15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	33 34 35 36 37	38 39 40 41	42 43 44 45	46 47 48 49 50 51	52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80
05													

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TUBES

INPUT DATA SHEET MIL-HDBK-217B SYSTEM _____ DATE _____

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MODULE NUMBER	MODULE PART NUMBER	COMPONENT TYPE	MANUFACT. CODE	PART NUMBER (left justified)	DUTY CYCLE OR USAGE		OPERATING ENVIRON-MENT	
1 2 3 4 5 6 7	8 9 10 11	12 13 14	15 16 17	18 19 20 21 22 23 24 25 26 27	28 29 30 31 32	33 34 35 36 37 38 39 40 41	42 43 44 45	46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

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MISCELLANEOUS DEVICES
INPUT DATA SHEET MIL-HDBK-217B

SYSTEM

DATE

| MODULE NUMBER | QUANTITY OR MODULE PART NO. | PART TYPE | MANUFACT. CODE | OPTIONAL INFORMATION | | |

File Requirements:

The execution of the ORACLE program utilizes and/or manipulates the following input/output files.

File Description	File Code	Character Set	Device Type
Input Part List	SA	bcd	prmfl
Sorted Input Part List	01	ascii	prmfl
Data Base	08	bcd	tape
Appended Data Base	10	ascii	prmfl
Parts Found in the Data Base	09	ascii	disc
Parts Not Found In The Data Base	03	bcd	disc
Abstracted Data Base	02	ascii	prmfl
Failure Rate Output	04	bcd	disc

(The device types are presented as currently implemented on the RADC Computer System and are subject to change by the user. The prmfls which are in the ASCII character set are such that they can be edited with the time-share system editor. It is required that the Input Parts List be in BCD since the System Sort Program is used to sort the Input parts List. Reference is made to the Prmfl cards in the Job Streams (page 55) for the prmfl names currently being used at RADC for the various prmfls. (prmfl name for file 01 is sortin.)

Files which are utilized by the various activities of the ORACLE program are:

Activity	File Code	Input, Output or Scratch
Sort Merge	SA	Input
	01	Output
	02	Scratch
Binary Search	01	Input
	08	Input
	10	Input
	02	Output
	03	Output
	04	Output
	09	Output
Reliability	09	Input
	02	Input
	04	Output
Failure Rate Summary	04	Input

Job Stream and Execution:

The version of the ORACLE program discussed herein has been placed on the RADC/Honeywell GCOS 6000 Computer System such that the program executes via the Cardin System through the Time-Sharing System. Thus the following job stream allows the execution of all the activities of the program.

```
10**move  :,8,16
20$:ident:
30$:userid:userid$pass-word
40$:selecta:userid/sort,r
50$:prmfl:sa,r/w,s,userid/datain-file-name
60$:selecta:userid/sort1,r
70$:selecta:userid/binny$binny,r
80$:selecta:userid/reliabn$reliabn,r
90$:selecta:userid/sumfr$sumfr,r
100$:endjob
```

(Note: The user must supply the userid, pass-word and data-in-file-name and have loaded the appropriate source code in ASCII prmfls under his users catalog in order to execute this job stream. The users datain file must be in BCD since the System Sort/Merge program is used to sort the Input Part List. The Control Cards such as the object, fortran, limits, execute, prmfl, etc. are included in each of the activities source files.)

The advantage of this job stream is that it allows for the execution of the program as a whole or in a step-wise manner by deletion of line entries ($:Selecta cards) from the job stream. If it is desired to execute only the sort activity the lines 70,80, and 90 are deleted from the job stream. If a sort has been executed resulting in a sorted Input Part List or the sorted Input Part List or Abstracted Data Base has been changed through the use of the system editor, and one wishes to run the binary search, reliability analysis and a failure rate summary lines 40, 50 and 60 are deleted. If only a binary search is desired for a sorted Input Part List lines 40,50, 60, 80 and 90 are deleted.

It should be pointed out that the ORACLE program, as currently executed on the RADC/Honeywell Computer System, directs many of the outputs to the high-speed printer via write statements within the various routines or Conver Activities. (Conver Activities are Honeywell 6000 Computer System programs for input and/or output of files. Reference "Honeywell Bulk Media Conversion Series 600/6000 Software", BP30, December 1971)

However, these outputs can be directed to the users teletype by modification of the $ File control cards of the various activities to direct the outputs to either a perm file (prmfl) or Syst Out. Either will permit a listing of the files (prmfl and/or Syst Out) once the program has executed. In the event that the desired output is being directed to the high-speed printer via write statements, through file codes 6 and 42, the necessary changes must be made to the write statements through out the routine to direct the output to either a prmfl or Syst Out.

In the event the program is to be executed via the batch world the source code and control cards associated with the source code or deck for each of the activities (sort, sort1, binny, reliabn sumfr) replaces the $ Selecta cards in the above job stream.

ORACLE Outputs:

The ORACLE program, as implemented on the RADC/Honeywell GCOS Computer System, produces the following outputs. The various outputs are directed to the high-speed printer via three methods: (1) fortran programs included in the ORACLE Job Stream, (2) write statements within the BINNY, RELIABN and SUMFR routines and (3) Conver Activities (see figures 1-4.) Examples of the following outputs are presented in Appendix VI. The method via which each output is directed to the high-speed printer is included in the following output descriptions:

Summary Of Reasons Parts Not Found:

An output of the BINNY Routine (see Program Flow, Step-2) is a listing of reasons why parts were not matched to the Primary Data Base. This output provides information as to the number of:

parts not manufactured by specified manufacturer

parts not available in specified package type

parts which are not JAN part numbers

It also indicates the percent (%) of parts not found.

The BINNY Routine also outputs a Diagnostic Output listing which is of value to the user in that it provides a diagnostic of where or why the parts were or were not matched to the Primary Data Base according to part number. These outputs are directed to the high-speed printer via write statements within BINNY.

Sorted Input Parts List:

This output is a sorted listing of the Input Parts List, according to module and/or equipment and part number. The lines or records contained in this output have been formatted to 130 characters in length to provide the correct format to be read by the BINNY Routine. The information contained on the first 80 columns of each record coincide with the above Input Data Requirements (raw parts list) with the remaining columns zero (0) filled.

The Sorted Input Parts List is generated via the Sort/Merge activities (Sort & Sort1), see figure 1, and directed to PRMFL 01 and the high-speed printer via the activity Sort1.

Parts Found In The Data Base:

This output contains a listing of all the records contained in the Sorted Input Parts List for which the part number field was matched to a record in either the Primary or Appended Data Base. This output is directed to the output file (code 09) via write statements within the BINNY Routine and to the high-speed printer via the Conver Activity. (The Conver Activity outputs File 09.)

Parts Not Found In The Data Base:

This output contains a listing of all the records contained in the Sorted Input Parts List for which the part number field could not be matched to a record in either the Primary or Appended Data Base. This output is directed to the output file (code 04) via write statements within the BINNY routine and directed to the high-speed printer via a Conver Activity on file code 04.

Abstracted Data Base:

This output contains a listing of the records, obtained from the Primary or Appended Data Base and placed in the Abstracted Data Base, which contains the Application-dependent quantities for the input parts matched to the Primary or Appended Data Base. The information contained on these records is directed to PRMF 02 (file code 02) via write statements within the BINNY routine and to the high-speed printer via a Conver Activity on PRMFL 02.

Device Failure Rate Listing:

This output contains a listing of the individual failure rates of the parts as they are listed on the Sorted Input Parts List. The information contained in each field of a record in this listing is:

Information Common To All Parts:

field 1 - field 11: The information up to and including field 11 (screening level) from the Input Parts Listing.

field 15: Failure Rate

field 16: Duty Cycle or Usage

field 20: Number of pins eminenting from the physical package (This field will be zero for inductors)

field 23: The small quantity cost at the specified screening level.

field 24: The large quantity cost at the specified screening level.

(Note: Cost data has not been entered in the data base. If cost data is desired, this information (cost of each part) must be entered, by the user, into the Abstracted Data Base through the use of the Edit System or some other means. See Appendix IV for the appropriate cost fields of the Abstracted Data Base.)

Information Specific To Capacitors:

field 18: If -1 the capacitor has non-essential quality level

field 19: Temperature of the knee of the derating curve (degrees c)

field 21: Number of capacitors of type (Mxxxxx/xx-xxxx) in the data base which have the same first ten characters in the part number.

field 22: The number of devices contained in each package.

Information Specific to Integrated Circuits:

field 12: Supply Voltage

field 13: Nominal Current

field 14: Maximum Rated Voltage

field 17: Number of gates in each package

field 18: Number of internal leads eminenting from the chip

field 25: The number of supply voltages necessary

Information Specific to Discrete Semiconductors:

field 12: Maximum rated voltage

field 13: Maximum rated current

field 14: Maximum rated power

field 19: Complexity code

field 21: Knee of the derating curve in degrees c. (If zero the knee does not apply)

Summary of Failure Rates:

This output contains a listing of all the individual part failure rates recorded for each module and/or equipment being analyzed followed by the total failure rate, MTBF and, if the costing information has been placed in the Abstracted Data Base, the total cost of the equipment parts. The information contained on the individual part failure rate records is as described above (Device Failure Rate Listing) with the exception, if the module number field contains the number of parts in the equipment, field 15 (failure rate) is equal to the number of identical parts, for a given set of stress conditions, times the part failure rate. Following these listings is the total failure rate, MTBF and part cost for the total system. This output is directed to the high-speed printer via write statements within the SUMFR Routine.

Diagnostics:

This output lists all the device-dependent quantities which were used in the calculation of each failure rate by part number. It also contains comments concerning specific necessary information which was not included in the Input Parts List and notes the assumed values which were used in the calculation of the part failure rate. This output is directed to the high-speed printer via write statements within the RELIABN Routine (see fig 3).

Trade-Off Analyses:

Oft-times it is desirable, in reliability analysis of electronic systems, to determine the effect that varying various application-dependent quantities (stress, temperature, etc.) will have on the reliability of a module or equipment. The ORACLE program lends itself to this type of comparison (trade-off analysis) in that it does away with the majority of the tedious work involved in performing an analysis and allows for multiple analyses with little effort.

Once an initial Input Parts List for a given module or equipment has been prepared and entered into the computer system the stage is set for multiple-analysis. An approach to multiple-analysis is to create a number of Input Parts List files (through the use of the system editor) with various application-dependent quantities and make a number of individual runs of the ORACLE program. However, a more efficient use of the computer resources is to create one Input Parts List (raw or sorted) and make a single run of ORACLE. The following discussion describes the creation of a parts list to be used in multiple-analysis with one run of the ORACLE program.

Assume that an initial or raw Input Parts List has been entered into the computer on a prmfl. An approach for creating a Input Parts List file for multiple-analysis is presented in the following steps:

step 1: Call the prmfl containing the initial parts list to the current file and, through the use of the system editor,

change the module number and the values of the various application-dependent quantities (see following note).

Step 2: Catenate the current file to the initial prmfl, creating a new current file, and save the current file in a new prmfl, (file-name-xx).

Step 3: Repeat step 1.

Step 4: Catenate the current file to file-name-xx and resave in file-name-xx.

Step 5: Repeat steps 3 and 4 until the desired number of various stress conditions exist in file-name-xx.

(note: For each set of stress conditions a new number must be assigned to the module number field of all the records contained in the Input Parts List such that ORACLE will assume more than one analysis.)

The above procedure has been presented utilizing the initial Input Parts List. The same procedure could be applied to the Sorted Input Parts List enabling easier modification in that the Inputs Parts List is sorted according to the part number. However, in this case, the Abstracted Data Base must be catenated to itself as many times as there are analyses to be performed.

APPENDIX I

Environmental Classification Codes

The following Environmental Classification codes are recognized by the ORACLE Program:

Code	Description of Environment
AB-I	Airborne, Inhabited
AB-U	Airborne, Uninhabited
GD-B	Ground, Benign
GD-F	Ground, Fixed
GD-M	Ground, Mobile
NV-S	Naval, Sheltered
NV-U	Naval, Unsheltered
MS-L	Missile or Satellite
SPFL	Space Flight

APPENDIX II

Manufacturer Codes

The following list of manufacturer codes are recognized by the ORACLE Program:

Code	Manufacturer
AMI	American Micro-Systems, Inc.
APX	Amperx Electronic Crop.
AMC	Ampower Semiconductor Corp
AVA	Avantek, Inc.
CEI	Calvert Electronics International, inc.
CSI	Carter Semiconductor, Inc.
CLA	Clirex Electronics
CTR	Communications Transistor Corp.
CRI	Crimson Semiconductor, Inc.
CSR	CSR Industries, Inc.
DEL	Delco Electronic Div
ESI	Electro-State Industries, Inc.
ETC	Electronic Transistors, Corp.
FSC	Fairchild Semiconductor Corp.
GES	General Electric Co.
GIC	General Instrument Corp.
GSE	General Semiconductor Industries, Inc.
GSI	General Sensors, Inc.
GPD	Germanium Power Devices Corp.
HSC	Helios Semiconductor
HPA	Hewlett Packard
HZN	Horizon Semiconductor Corp.
INT	Intel
IDI	International Devices, Inc.
IDC	International Diode Corp.
INL	Intersil, Inc.
ITT	ITT Semiconductor

Code	Manufacturer
KER	Kertron, Inc.
KMC	KMC Semiconductor
MWS	Microwave Semiconductor Corp.
MOT	Motorola
NAT	National Semiconductor Corp.
NTR	National Transistor Corp.
NJS	New Jersey Semiconductor Products Co.
NPC	Nucleonic Products Co., Inc.
PPC	Power Physics Corp.
PTI	Power Tech, Inc.
PRE	Precision Semiconductors, Inc.
RTN	Raytheon
RCA	RCA Corp.
SCA	Semico
SDE	Semiconductor Devices
SEI	Semiconductor, Inc
STI	Semiconductor Technology, Inc.
SES	Semitronics Corp.
SEN	Sensitron Semiconductor
SIG	Signetics
STC	Silicon Transistor Corp
SIX	Siliconix, Inc
SPC	Solid Power Corp.
SST	Solid State, Inc.
SSI	Solid State Devices, Inc.
SSE	Solid State Electronics Co.
SLD	Solid State Industries, Inc.
SSS	Solid State Scientific, Inc.
SOD	Solitron Devices, Inc.
SPR	Sprague Electric Co.
STL	Stow Laboratories, Inc.
SWR	Swampscott Electronics Co.
TCY	Teledyne Crystalonics, Inc.
TSC	Teledyne Semiconductor
TI-	Texas Instrument, Inc.
TEC	Transitron Electronic Corp.
TRW	TRW Semiconductor, Inc.
UTS	Uni-Tran Semiconductor Corp.

UNI	Unitrode Corp.
UPI	UPI Semiconductor.
WAB	Walbern Devices, Inc.
WES	Westinghouse Electric Corp.

APPENDIX III

Component Type Codes

The following component type codes are recognized by the ORACLE program:

Code	Component Type Description
IC-	Integrated Circuit
XR-	Transistor
D--	Diode, General Purpose
ZD-	Diode, Zener
RD-	Diode, Voltage Reference
VD-	Diode, Varactor
DCR	Thyristor
RES	Resistor
CAP	Capacitor
IND	Inductor
PCB	Printed Circuit Board

Although not acceptable by ORACLE at this time the following have been provided for future use:

Code	Component Type Description
ROT	Rotating Device
RY-	Relay
SW-	Switch
CON	Connectors
TUB	Tube
LSR	Laser
XTL	Quartz Cyrstal
FUS	Fuse
NL-	Neon Lamp
INC	Incandescent Lamp
MTR	Meter
WW-	Wirewrap Connection
HSC	Hand Soldered Connection

APPENDIX IV

APPENDED DATA BASE CONSTRUCTION

This Appendix contains guidelines for entering data into the abstracted and the regular data base. Although the format is the same for both, for some column segments, that which is entered in one is slightly different from that which is entered in the other. The information given here is directed toward the entry of data into the abstracted data base.

Part Number: The part number is entered left justified in the field provided, all other data is right justified in the field.

The units to be used are given below:

Quantity	Unit
Voltage	Volts
Current	Amperes
Power	Watts
Temperature	Degrees Centigrade

Use scientific notation for fields between columns 52 and 77.

The following format is used to read a line of data from the database:

Column	Format	Column	Format
1	1X	49-51	F3.1
2-4	A3	52-60	E9.3
5-7	A3	61-69	E9.3
8-14	A7	70-77	E8.3
15-17	A3	78-101	3A8
18-21	A4	102-103	I2
22-25	A4	104-105	I2
26	A1	106-108	A3
27	A1	109-111	I3
28-31	A4	112-114	I3
32-36	I5	115	I1
37-40	F4.2	116-121	F6.2
41-44	F4.2	122-127	F6.2
45-48	F4.2	128	I1

Capacitors

The database for capacitors is not a full database. The majority of capacitor part numbers can be decoded by the software; however, part numbers starting with "M" must be entered in the database in the following manner:

Column	Use
1	Blank
2-4	Device code: CAP
5-7	Manufacturer code (See Appendix III for codes)
8-17	Part number; enter the first ten characters of the part number in this field. Example: if a part number is M39022/07-1022, you enter M39022/07- in this field.
18-36	Blank
37-40	Component length, right justified - in cm.(decimal pt.col.38)
41-44	Component width, right justified - in cm.(decimal pt. col.42)
45-48	Component height, right justified - in cm.(decimal pt. col.46)
49-51	Component weight, right justified - in grams(decimal pt. col. 50,
52-60	Rated voltage - use scientific notation e.g. 5.0 volts is entered as 0.500E+01
61-77	Blank
78-81	Quality level "L" last four digits of part number or -001 if none
82-85	Quality level "M" last four digits of part number or -001 if none
86-89	Quality level "P" last four digits of part number or -001 if none
90-93	Quality level "R" last four digits of part number or -001 if none
94-97	Quality level "S" last four digits of part number or -001 if none
98-101	Quality level "T" last four digits of part number or -001 if none

Column	Use
102-105	Non-established quality level last four digits of part number or -001 if none
106-109	Knee of derating curve temperature
109-111	Maximum rated temperature
112-114	Quantity, the number of continuous part numbers beginning with the last four digits of a part number in all of the quality level fields and ending with that number plus this quantity minus one. The voltage entered on this line must be for all the parts represented on the line. If a change in rated voltage occurs within a continuous group of part numbers, you must use a new line.
115	Blank
116-121	Cost of single quantity XXX.XX
122-127	Cost of 1000 quantity XXX.XX
128	Continuation characters, 1 means the next line is a continuation of information for the ten-digit part number entered in columns 8-17; 0 means the next line is not a continuation of information for the ten-digit part number entered in columns 8-17 of this line. On a continuation, the first 17 columns must be repeated.

Connectors

Column:	Use
1	Blank
2-4	Device type CON
5-7	Manufacturer code
8-21	Part number, left justify
22-31	Blank
32-36	Date part is entered (YMMDD) Y = last digit of year MM = two digit month, 01 = January DD = day of month, 01 = first
37-40	Package length, X.XX
41-44	Package width, X.XX
45-48	Package height, X.XX
49-51	Package weight, X.X
52-77	Blank
78-80	Number of pins for wire size in next field
81-82	Wire size
83-84	Number of pins for wire size in next field
85-86	Wire size
87-88	Number of pins for wire size in next field
89-90	Wire size
91-92	Number of pins for wire size in next field
93-94	Wire size
95-96	Number of pins for wire size in next field
97-98	Wire size

Connectors (Cont'd)

Column:	Use
99-115	Blank
116-121	Cost in single quantity, XXX.XX
122-127	Cost in 1000 quantity, XXX.XX
128	Continuation digit, blank if next line does not apply to this part 1-9 if next line applies to this part, also repeat columns 1 through 21 on next line with data

Integrated Circuits

Column	Use
1	Blank
2-4	Device type: IC-
5-7	Manufacturer Code (See Appendix III)
8-17	Part number and package Left justify part number (columns 8-14) Right justify package type (columns 15, 16, 17) Dash "-" fill between part number and package
18-21	Function code, all ICs are 0000 series function codes (this is a program definition, not a manufacturer definition)
22-26	Type of technology (BIPOL, RAM--)
27	Level of integration (L, M, S)
28-31	Logic type, left justify, dash fill (LIN-, TTL-, DTL-, MEMR, MOS)
32-36	Date part is entered (YMMDD) Y = last digit of year MM = two digit month, 01 = January DD = day of month, 01 = first
37-40	Package length, right justify - in cm. (decimal pt. col. 38)
41-44	Package width, right justify - in cm. (decimal pt. col. 42)
45-48	Package height, right justify - in cm. (decimal pt. col. 46)
49-51	Package weight, right justify - in grams (decimal pt. col. 50)
52-60	Supply voltage (if more than one line use a continuation line) 5. volts entered as 0.500E+01 -25. volts enterex as -.250E+02
61-69	Nominal current (if more than one line use a continuation line) 5. amps entered as 0.500E+01 2.5 amps entered as 0.250E+01

Column	Use
70-77	Maximum current (if more than one line use a continuation line) 5. amps entered as .500E+01 2.5 amps entered as .250E+01
78-101	Blank
102-105	Complexity, number of gates, assume 4 transistors per gate, right justify. For example, 400 transistors means that 100 is entered as a complexity factor
106-108	Leave blank
109-111	Number of leads, right justify
112-114	Number of wires, right justify
115	Number of metalization layers
116-121	Cost in single quantity XXX.XX, right justify
122-127	Cost in 1000 quantity XXX.XX, right justify
128	Continuation digit 0 if next line does not apply to this part also 1 if next line does apply to this part also
	The first 21 columns must be repeated on subsequent continuation lines

Relays

Columns:	Use
1	Blank
2-4	Device type RY-
5-7	Manufacturer code
8-21	Part number, left justify
22-27	Blank
28-31	Contact form and quantity
32-36	Date part is entered (YMMDD) Y = last digit of year MM = two digit month, 01 = January DD = day of month, 01 = first
37-40	Package length, X.XX
41-44	Package width, X.XX
45-48	Package height, X.XX
49-51	Package weight X.XX
52-60	Maximum DC voltage
61-69	Maximum DC current, resistive load
70-77	Maximum AC 400 Hz current, resistive load
78-80	Maximum AC 60 Hz current, resistive load
81-83	Maximum DC current inductive load
84-86	Maximum AC 400 Hz current, inductive load
87-89	Maximum AC 60 Hz current, inductive load
90-92	Maximum DC current, lamp load
93-95	Maximum AC 400 Hz current, lamp load
96-98	Maximum AC 60 Hz current, lamp load
99-101	Maximum rated temperature

Relays (Cont'd)

Columns:	Use
102-103	Year inactive for new design, last two digits of year
104-105	Blank
106-107	Application type code from following list:

Application Type	Code
Dry Circuit	DC
General Purpose	GP
Sensitive	SN
Polarized	PO
Vibrating Reed	VR
High Speed	HS
Thermal Time Delay	TT
Electronic Time Delay	ET
Latching (Magnetic)	LM
High Voltage	HV
Medium Power	MP
Contactors (High Current)	CO

108 Construction type code, from following list:

Construction Type	Code
Armature	A
Dry Reed	D
Mercury Wetted	W
Balanced Armature	B
Solenoid	S
Meter Movement	M
Bimetal	B
Vacuum (Glass)	G
Vacuum (Ceramic)	C
Mechanical or Magnetic Latching	L

109-111 Number of leads

Relays (Cont'd)

Columns:	Use
112-114	Quantity of parts this line represents, count port number in columns 8-21 as first part and add 1 for all additional contiguous part numbers
115	Blank
116-121	Cost in single quantity, XXX.XX
122-127	Cost in 1000 quantity, XXX.XX
128	Continuation character, blank if next line is unique within columns 8-17 1-9 if next line is not unique within columns 8-17 and repeat columns 1-17 on the line.

Rotating Devices

There is no database for rotating devices; it is not needed. All rotating device part numbers are decoded. All information that is component-dependent for the reliability analysis is included within the part number.

Discrete Semiconductors

Column	Use
1	Blank
2-4	Device type: XR- Transistor D-- Diode, general purpose RD- Reference diode ZD- Zener diode VD- Varactor diode THY Thyristor
5-7	Manufacturer code (See Appendix III)
8-17	Part number, left justify
18	Derating knee temperature code: A Ambient C Case
19-25	Blank
26-27	Material (SI, GE): SI Silicon GE Germanium
28-31	Device reference field, left justify entry NPN PNP COM Complementary pair UJT Unijunction SCR Silicon controlled rectifier NFT N channel field effect transistor PFT P channel field effect transistor DGP Diode, general purpose DMM Diode, microwave mixer DVM Diode, microwave varactor DTU Diode, tunnel VSD Diode, varactor and step recovery DUD Diode, UHF detector DUM Diode, UHF mixer
32-36	Date part is entered (YMMDD) Y = last digit of year MM = two digit month DD = day of month

Column	Use
37-40	Package length, right justify - in cm. (decimal pt. col. 38)
41-44	Package width, right justify - in cm. (decimal pt. col. 42)
45-48	Package height, right justify - in cm. (decimal pt. col. 46)
49-51	Package weight, right justify - in grams (decimal pt. col.50)
52-60	Enter the appropriate quantity according to the following table: (use scientific notation)

Cols. 2-4 incl. of part	Description of quantity
XR-	Maximum rated voltage
D--	Maximum rated voltage
ZD-	Rated Zener voltage
RD-	Rated Zener voltage
VD-	Maximum rated voltage
THY	Maximum rated voltage

61-69	Enter the appropriate quantity according to the following table: (use scientific notation)

Cols. 2-4 incl. of part	Description of quantity
XR- or D-- or THY	Maximum rated current
ZD- or RD- or VD	Zero

70-77	Enter the appropriate quantity according to the following table: (use scientific notation)

Cols. 2-4 incl. of part	Description of quantity
XR- or ZD- or RD- or VD-	Maximum rated power
D--	Zero, unless it is a microwave mixer or microwave detector, then enter the maximum spike leakage in ergs.

78-106	Blank

Columns	Use
107-108	Complexity code such as follows: SD Single device DM Dual matched DU Dual unmatched DT Darlington DE Dual emitter ME Multiple emitter CT Dual complementary DG Tetrode
109-111	Maximum rated temperature
112-114	Knee of derating cure temperature
115	Number of devices in package. Example: Dual transistor means a 2 is entered.
116-121	Cost in single quantity XXX.XX
122-127	Cost in 1000 quantitites XXX.XX
128	Continuation character, if needed 0 = no continuation 1 = next line is a continuation On a continuation, the first 17 columns must be repeated

Inductors

Column	Description
1	Blank
2-4	Device code: IND
5-7	Manufacturer code (See Appendix III)
8-21	Part number, left justified
22-27	Blank
28-31	Temperature rise, which can be calculated from the following formula: TRISE = (PLOSS X 125.)/AREA where TRISE = the temperature rise in degrees C PLOSS = the power loss in watts at 100% load AREA = the radiating area of the device in square inches.
32-36	Blank
37-40	Component length, right justified-in cm.(decimal pt. col. 38)
41-44	Component width, right justified-in cm.(decimal pt. col. 42)
45-48	Component height, right justified-in cm.(decimal pt. col. 46)
49-51	Component weight, right justified-in grams(decimal pt. col.50)
52-127	Blank
128	Continuation character, 1 means the next line is a non-unique part number within the first ten digits; 0 means the next part number of unique - i.e. no continuation. On a continuation, the first 21 columns must be repeated.

Switches

Columns:	Use
1	Blank
2-4	Device type SW-
5-7	Manufacturer code
8-21	Part number, left justify
22-25	Blank
26-27	Characteristic RF if ceramic RF wafer switch, or else blank
28-31	Description code, right justify

Code	Description
RCX	Rotary, closed, explosion proof
ROL	Rotary, open, lever actuated
RCC	Rotary, closed construction
ROT	Rotary
ROC	Rotary, open construction
RES	Rotary, electro-mechanical activated (solenoid)
T2P	Toggle, two pole
T4P	Toggle, four pole
T2L	Toggle, two pole, level lock
T4L	Toggle, four pole, lever lock
SDU	Sensitive, double throw, unsealed
P S	Push, blank, sealed (dust tight)
SMU	Sensitive, momentary, unsealed
SPU	Sensitive, push, unsealed
SLU	Sensitive, lever, unsealed
STU	Sensitive, toggle, unsealed
SRO	Sensitive, rotary

32-36	Date part entered (YMMDD) Y = last digit of year MM = two-digit month, 01 = January DD = two-digit day, 01 = first

37-40	Package length X.XX
41-44	Package width X.XX
45-48	Package height X.XX
49-51	Package weight X.X
52-60	Blank
61-69	Rated current +X.XXE+XX
70-77	Actuation differential X.XXE+XX
78-101	Blank
102-103	Number of poles XX
104-105	Number of decks XX
106-108	Blank
109-111	Number of positions per pole XXX
112-114	Quantity of parts this line represents, count part number in columns 8-21 as first part, add 1 for all additional contiguous part numbers
115	Blank
116-121	Cost each XXX.XX
122-127	Cost per 1000 XXX.XX
128	Continuation character, blank if next line is unique within columns 8-17; 1-9 if next line is not unique within columns 8-17 and repeat columns 1-17 on the line

Tubes

Column:	Use
1	Blank
2-4	Device type TUB
5-7	Manufacturer code
8-17	Part number, left justify
18-31	Blank
32-36	Date part is entered (YMMDD) Y = last digit of year MM = two digit month, -01 = January DD = day of month, 03 = third
37-51	Blank
52-60	Base failure rate, X.XXXE+XX
61-115	Blank
116-121	Cost in single quantity, XXX.XX
122-127	Cost in 1000 quantity, XXX.XX
128	Continuation character, blank if columns 8-17 are unique to this line 1-9 if columns 8-17 are repeated in next line.

Miscellaneous Devices

There is no database for miscellaneous devices; it is not needed. All miscellaneous device part numbers are decoded. All information that is component-dependent for the reliability analysis is included within the part number.

APPENDIX V

Although provided in the text of this report the following codes have been provided for users quick reference:

Capacitors Screening Level Codes

Code	Screening Level Description
UPPER	Greater than MIL-SPEC quality level
MISPC	MIL-SPEC quality level
LOWER	Lower than MIL-SPEC quality level

CONNECTOR SCREENING LEVEL CODES

Code	Description
MILSPC	MIL-SPEC quality level
LOWER	Lower than MIL-SPEC quality Level

Integrated Circuit Screening Level Codes

Code	Screening Level Description
A	MIL-M-38510, Class A (JAN)
B	MIL-M-38510, Class B (JAN)
B-1	MIL-STD-883, Method 5004, Class B
B-2	Vendor Equivalent of MIL-STD-883, Method 5004, Class B
C	Mil-M-38510, Class C (JAN)
D	Commercial (or Non-MIL-STD) part, with no screening beyond the manufacturer's regular quality assurance practices

Semiconductor Screening Level Codes

Code
JANTX
JANTXV
JAN
LOWER

Semiconductor Application Codes

Code	Application Description
LIN	Linear
LGS	Logic Switch(ing)
HFQ	High Frequency (RF > 400MHz)
SMS	Small Single (< 500Ma)
PRS	Power Rectifier (> 500Ma)
PRH	Power Rectifier (H.V. Stacks) Vmax > 600
VRG	Voltage Regulator
VRF	Voltage Reference (Temp. Compensated)

Relay Screening Level Codes

CODE	DESCRIPTION
MILSPC	MIL-SPEC Quality level
LOWER	Lower than MIL-SPEC quality level

AD-A039 344 ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y F/G 9/2
IMPLEMENTATION OF OPERATIONAL PROCEDURES FOR OPTIMIZED RELIABIL--ETC(U)
MAR 77 G W LYNE

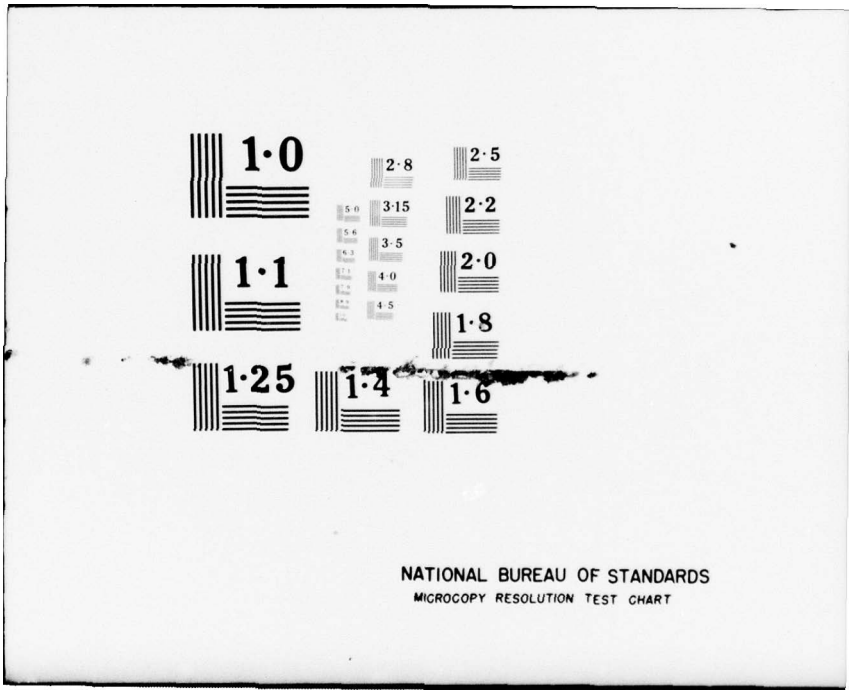
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NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

Relay Contact Form And Quantity Codes

Code	Description
SPST	Single pole single throw
DPST	Double pole single throw
3PST	Three pole single throw
4PST	Four pole single throw
SPDT	Single pole double throw
DPDT	Double pole double throw
3PDT	Three pole double throw
4PDT	Four pole double throw
6PDT	Six pole double throw

Relay Load Type Codes

Code	Description
L	LAMP
I	Inductive
R	Resistive

Resistor Screening Level Codes

Code	Description
UPPER	Greater than MIL-SPEC quality level
MILSPC	MIL-SPEC quality level
LOWER	Lower than MIL-SPEC quality level

Rotating Devices Screening Level Codes

Code	Description
UPPER	Upper quality level
LOWER	Lower quality level

Switch Screening Level Codes

Code	Description
MILSPC	MIL-SPEC quality level
LOWER	Lower than MIL-SPEC quality level

APPENDIX VI

Example ORACLE Inputs And Outputs

This appendix presents example inputs and outputs of the ORACLE program as currently being executed on the RADC/Honeywell Computer System. The example illustrates the use of ORACLE as a trade-off tool. (An assumed module has been analyzed with various part temperature stress conditions (95, 65, and 75 deg. c.).)

EXAMPLE INPUT PARTS LIST

```
GEQP05NUMB      00000000000000000001001
GEQP050001IC-TI-SN5440---W+1.00 1.00+095AB-U   B-1
GEQP050002IC-TI-SN5473---W+1.00 1.00+095AB-U   B-1
GEQP050001IC-FSCUA741--3FM+1.00 1.00+095AB-U   B-1
GEQP050003IC-TI-SN5400---W+1.00 1.00+095AB-U   B-1
GEQP050004IC-TI-SN5401---W+1.00 1.00+095AB-U   B-1
GEQP050005IC-TI-SN5402---W+1.00 1.00+095AB-U   B-1
GEQP050001D--FSC1N4306     +1.00   10+095AB-U   JANLGS                          50
GEQP050002D--TI-1N614      +1.00   10+095AB-U JANTXLGS                         600
GEQP050003D--TI-1N4153     +1.00   10+095AB-U   JANLGS                          50
GEQP050004D--TI-1N914      +1.00   10+095AB-U JANTXLGS                         100
GEQP050001XR-TI-2N4858     +1.00   10+095AB-U   JANLGS
GEQP050002XR-TI-2N3251A    +1.00   10+095AB-U   JANLIN                          27
GEQP050003XR-TI-2N2484A    +1.00   10+095AB-U   JANLIN                          36
GEQP050004XR-TI-2N2219     +1.00   10+095AB-U JANTXLIN                          30
GEQP050005XR-TI-2N706      +1.00   10+095AB-U   JANLIN                          15
GEQP050006XR-TI-2N2219     +1.00   10+095AB-U JANTXLIN                          30
GEQP050007XR-TI-2N2907     +1.00   10+095AB-U   JANLIN                          36
GEQP050008XR-TI-2N2907     +1.00   10+095AB-U JANTXLIN                          36
GEQP050009XR-NON2N4947     +1.00   10+095AB-U   JAN
GEQP050009XR-NON2N4947     +1.00   10+095AB-U   JAN
GEQP050001IND   LT4K032              +095AB-UMILSPC          1.00
GEQP050009XR-NON2N4947     +1.00   10+095AB-U   JAN
GEQP050002IND   LT4K032              +095AB-UMILSPC           .10
GEQP050001RES   RC08GF103K          10+095AB-UMILSPC                  1.00
GEQP050002RES   RC08GF203K          20+095AB-UMILSPC                  1.00
GEQP050003RES   00007G103JR         10+095AB-U                        1.00
GEQP050004RES   00007G103JR         10+095AB-U                        0.10
GEQP050005RES   RLR07CA03JP         10+095AB-U                        1.00
GEQP050006RES   RLR07C222JP         20+095AB-U                        1.00
GEQP050007RES   RLR07C473JP         40+095AB-U                        0.10
GEQP050008RES   RLR07C582JP         25+095AB-U                        0.10
GEQP050009RES   RLR07C203JP         10+095AB-U                        0.10
GEQP050010RES   RNR55C1002FR        30+095AB-U                        1.00
GEQP050011RES   RNR55C2202FR        15+095AB-U                        1.00
GEQP050012RES   RNR55C2001FR        20+095AB-U                        1.00
GEQP050013RES   RNR55C1003FR        10+095AB-U                        1.00
GEQP050014RES   RNR55C6802FR        10+070AB-U                        1.00
GEQP050015RES   RNR55C1002FR        10+095AB-U                        0.10
GEQP050016RES   RT12C2P202          10+095AB-UMILSPC      63          1.00
GEQP050001CAP   CK60BX470K          20+095AB-U                              +1.00
GEQP050002CAP   CK60BX101K          10+095AB-U                              +1.00
GEQP050003CAP   CK60BX101K          10+070AB-U                               0.10
GEQP050004CAP   M39003/02-0094      30+095AB-U                    3         +1.00
GEQP050005CAP   M39003/02-0094      50+095AB-U                    3.5       +1.00
GEQP050006CAP   M39003/02-0111      30+070AB-U                    5         +1.00
GEQP050007CAP   M39003/02-0111      60+070AB-U                    3         +1.00
GEQP050008CAP   M39003/02-0101      60+095AB-U                    4         +1.00
GEQP050009CAP   M39003/02-0096      50+095AB-U                    3.9       +1.00
GEQP050010CAP   M39003/02-0098      10+095AB-U                    4         +1.00
GEQP0YNUMB      00000000000000000001001
GEQP0Y0001IC-TI-SN5440---W+1.00 1.00+065AB-U   B-1
GEQP0Y0002IC-TI-SN5473---W+1.00 1.00+065AB-U   B-1
GEQP0Y0001IC-FSCUA741--3FM+1.00 1.00+065AB-U   B-1
GEQP0Y0003IC-TI-SN5400---W+1.00 1.00+065AB-U   B-1
GEQP0Y0004IC-TI-SN5401---W+1.00 1.00+065AB-U   B-1
GEQP0Y0005IC-TI-SN5402---W+1.00 1.00+065AB-U   B-1
GEQP0Y0001D--FSC1N4306     +1.00   10+065AB-U   JANLGS                          50
GEQP0Y0002D--TI-1N614      +1.00   10+065AB-U JANTXLGS                         600
```

Input Parts List Cont.

```
GEQP0Y0003D--TI-1N4153     +1.00   10+065AB-U   JANLGS                          50
GEQP0Y0004D--TI-1N914      +1.00   10+065AB-U JANTXLGS                          100
GEQP0Y0001XR-TI-2N4858     +1.00   10+065AB-U   JANLGS
GEQP0Y0002XR-TI-2N3251A    +1.00   10+065AB-U   JANLIN                          27
GEQP0Y0003XR-TI-2N2484A    +1.00   10+065AB-U   JANLIN                          36
GEQP0Y0004XR-TI-2N2219     +1.00   10+065AB-U JANTXLIN                          30
GEQP0Y0005XR-TI-2N706      +1.00   10+065AB-U   JANLIN                          15
GEQP0Y0006XR-TI-2N2219     +1.00   10+065AB-U JANTXLIN                          30
GEQP0Y0007XR-TI-2N2907     +1.00   10+065AB-U   JANLIN                          36
GEQP0Y0008XR-TI-2N2907     +1.00   10+065AB-U JANTXLIN                          36
GEQP0Y0009XR-NON2N4947     +1.00   10+065AB-U   JAN
GEQP0Y0009XR-NON2N4947     +1.00   10+065AB-U   JAN
GEQP0Y0001IND   LT4K032             +065AB-UMILSPC        1.00
GEQP0Y0009XR-NON2N4947     +1.00   10+065AB-U   JAN
GEQP0Y0002IND   LT4K032             +065AB-UMILSPC         .10
GEQP0Y0001RES   RC08GF103K         10+065AB-UMILSPC                1.00
GEQP0Y0002RES   RC08GF203K         20+065AB-UMILSPC                1.00
GEQP0Y0003RES   00007G103JR        10+065AB-U                      1.00
GEQP0Y0004RES   00007G103JR        10+065AB-U                      0.10
GEQP0Y0005RES   RLR07CA03JP        10+065AB-U                      1.00
GEQP0Y0006RES   RLR07C222JP        20+065AB-U                      1.00
GEQP0Y0007RES   RLR07C473JP        40+065AB-U                      0.10
GEQP0Y0008RES   RLR07C582JP        25+065AB-U                      0.10
GEQP0Y0009RES   RLR07C203JP        10+065AB-U                      0.10
GEQP0Y0010RES   RNR55C1002FR       30+065AB-U                      1.00
GEQP0Y0011RES   RNR55C2202FR       15+065AB-U                      1.00
GEQP0Y0012RES   RNR55C2001FR       20+065AB-U                      1.00
GEQP0Y0013RES   RNR55C1003FR       10+065AB-U                      1.00
GEQP0Y0014RES   RNR55C6802FR       10+070AB-U                      1.00
GEQP0Y0015RES   RNR55C1002FR       10+065AB-U                      0.10
GEQP0Y0016RES   RT12C2P202         10+065AB-UMILSPC      63        1.00
GEQP0Y0001CAP   CK60BX470K         20+065AB-U                           +1.00
GEQP0Y0002CAP   CK60BX101K         10+065AB-U                           +1.00
GEQP0Y0003CAP   CK60BX101K         10+070AB-U                            0.10
GEQP0Y0004CAP   M39003/02-0094     30+065AB-U                3          +1.00
GEQP0Y0005CAP   M39003/02-0094     50+065AB-U                3.5        +1.00
GEQP0Y0006CAP   M39003/02-0111     30+070AB-U                5          +1.00
GEQP0Y0007CAP   M39003/02-0111     60+070AB-U                3          +1.00
GEQP0Y0008CAP   M39003/02-0101     60+065AB-U                4          +1.00
GEQP0Y0009CAP   M39003/02-0096     50+065AB-U                3.9        +1.00
GEQP0Y0010CAP   M39003/02-0098     10+065AB-U                4          +1.00
GEQP0XNUMB      00000000000000000001001
GEQP0X0001IC-TI-SN5440---W+1.00 1.00+075AB-U   B-1
GEQP0X0002IC-TI-SN5473---W+1.00 1.00+075AB-U   B-1
GEQP0X0001IC-FSCUA741--3FM+1.00 1.00+075AB-U   B-1
GEQP0X0003IC-TI-SN5400---W+1.00 1.00+075AB-U   B-1
GEQP0X0004IC-TI-SN5401---W+1.00 1.00+075AB-U   B-1
GEQP0X0005IC-TI-SN5402---W+1.00 1.00+075AB-U   B-1
GEQP0X0001D--FSC1N4306     +1.00   10+075AB-U   JANLGS                          50
GEQP0X0002D--TI-1N614      +1.00   10+075AB-U JANTXLGS                          600
GEQP0X0003D--TI-1N4153     +1.00   10+075AB-U   JANLGS                          50
GEQP0X0004D--TI-1N914      +1.00   10+075AB-U JANTXLGS                          100
GEQP0X0001XR-TI-2N4858     +1.00   10+075AB-U   JANLGS
GEQP0X0002XR-TI-2N3251A    +1.00   10+075AB-U   JANLIN                          27
GEQP0X0003XR-TI-2N2484A    +1.00   10+075AB-U   JANLIN                          36
GEQP0X0004XR-TI-2N2219     +1.00   10+075AB-U JANTXLIN                          30
GEQP0X0005XR-TI-2N706      +1.00   10+075AB-U   JANLIN                          15
GEQP0X0006XR-TI-2N2219     +1.00   10+075AB-U JANTXLIN                          30
GEQP0X0007XR-TI-2N2907     +1.00   10+075AB-U   JANLIN                          36
GEQP0X0008XR-TI-2N2907     +1.00   10+075AB-U JANTXLIN                          36
GEQP0X0009XR-NON2N4947     +1.00   10+075AB-U   JAN
```

Input Parts List Cont.

GEQPOX0009	XR-NON2N4947	+1.00	10+075AB-U JAN			
GEQPOX0001	IND LT4K032		+075AB-UMILSPC	1.00		
GEQPOX0009	XR-NON2N4947	+1.00	10+075AB-U JAN			
GEQPOX0002	IND LT4K032		+075AB-UMILSPC	.10		
GEQPOX0001	RES RC08GF103K		10+075AB-UMILSPC		1.00	
GEQPOX0002	RES RC08GF203K		20+075AB-UMILSPC		1.00	
GEQPOX0003	RES 00007G103JR		10+075AB-U		1.00	
GEQPOX0004	RES 00007G103JR		10+075AB-U		0.10	
GEQPOX0005	RES RLR07CA03JP		10+075AB-U		1.00	
GEQPOX0006	RES RLR07C222JP		20+075AB-U		1.00	
GEQPOX0007	RES RLR07C473JP		40+075AB-U		0.10	
GEQPOX0008	RES RLR07C582JP		25+075AB-U		0.10	
GEQPOX0009	RES RLR07C203JP		10+075AB-U		0.10	
GEQPOX0010	RES RNR55C1002FR		30+075AB-U		1.00	
GEQPOX0011	RES RNR55C2202FR		15+075AB-U		1.00	
GEQPOX0012	RES RNR55C2001FR		20+075AB-U		1.00	
GEQPOX0013	RES RNR55C1003FR		10+075AB-U		1.00	
GEQPOX0014	RES RNR55C6802FR		10+070AB-U		1.00	
GEQPOX0015	RES RNR55C1002FR		10+075AB-U		0.10	
GEQPOX0016	RES RT12C2P202		10+075AB-UMILSPC	63	1.00	
GEQPOX0001	CAP CK60BX470K		20+075AB-U			+1.00
GEQPOX0002	CAP CK60BX101K		10+075AB-U			+1.00
GEQPOX0003	CAP CK60BX101K		10+070AB-U			0.10
GEQPOX0004	CAP M39003/02-0094		30+075AB-U	3		+1.00
GEQPOX0005	CAP M39003/02-0094		50+075AB-U	3.5		+1.00
GEQPOX0006	CAP M39003/02-0111		30+070AB-U	5		+1.00
GEQPOX0007	CAP M39003/02-0111		60+070AB-U	3		+1.00
GEQPOX0008	CAP M39003/02-0101		60+075AB-U	4		+1.00
GEQPOX0009	CAP M39003/02-0096		50+075AB-U	3.9		+1.00
GEQPOX0010	CAP M39003/02-0098		10+075AB-U	4		+1.00

EXAMPLE SORTED INPUT PARTS LIST

```
GEQP05NUMB      00000000000000000001001                                                
```

Example Sorted Input Parts List Cont.

```
GEQP050006CAP   M39003/02-0111     30+070AB-U                    5      +1.00     00000000000000000000000000000000000000000000000000
GEQP050001RES   RC08GF103K         10+095AB-UMILSPC                    1.00      00000000000000000000000000000000000000000000000000
GEQP050002RES   RC08GF203K         20+095AB-UMILSPC                    1.00      00000000000000000000000000000000000000000000000000
GEQP050009RES   RLR07C203JP        10+095AB-U                          0.10      00000000000000000000000000000000000000000000000000
GEQP050006RES   RLR07C222JP        20+095AB-U                          1.00      00000000000000000000000000000000000000000000000000
GEQP050007RES   RLR07C473JP        40+095AB-U                          0.10      00000000000000000000000000000000000000000000000000
GEQP050008RES   RLR07C582JP        25+095AB-U                          0.10      00000000000000000000000000000000000000000000000000
GEQP050005RES   RLR07CA03JP        10+095AB-U                          1.00      00000000000000000000000000000000000000000000000000
GEQP050010RES   RNR55C1002FR       30+095AB-U                          1.00      00000000000000000000000000000000000000000000000000
GEQP050015RES   RNR55C1002FR       10+095AB-U                          0.10      00000000000000000000000000000000000000000000000000
GEQP050013RES   RNR55C1003FR       10+095AB-U                          1.00      00000000000000000000000000000000000000000000000000
GEQP050012RES   RNR55C2001FR       20+095AB-U                          1.00      00000000000000000000000000000000000000000000000000
GEQP050011RES   RNR55C2202FR       15+095AB-U                          1.00      00000000000000000000000000000000000000000000000000
GEQP050014RES   RNR55C6802FR       10+070AB-U                          1.00      00000000000000000000000000000000000000000000000000
GEQP050016RES   RT12C2P202         10+095AB-UMILSPC      63            1.00      00000000000000000000000000000000000000000000000000
GEQP050003IC-TI-SN5400---W+1.00 1.00+095AB-U   B-1                              00000000000000000000000000000000000000000000000000
GEQP050004IC-TI-SN5401---W+1.00 1.00+095AB-U   B-1                              00000000000000000000000000000000000000000000000000
GEQP050005IC-TI-SN5402---W+1.00 1.00+095AB-U   B-1                              00000000000000000000000000000000000000000000000000
GEQP050001IC-TI-SN5440---W+1.00 1.00+095AB-U   B-1                              00000000000000000000000000000000000000000000000000
GEQP050002IC-TI-SN5473---W+1.00 1.00+095AB-U   B-1                              00000000000000000000000000000000000000000000000000
GEQP050001IC-FSCUA741--3FM+1.00 1.00+095AB-U   B-1                              00000000000000000000000000000000000000000000000000
GEQP0YNUMB      00000000000000000001001                                         00000000000000000000000000000000000000000000000000
GEQP0Y0004RES   00007G103JR        10+065AB-U                          0.10      00000000000000000000000000000000000000000000000000
GEQP0Y0003RES   00007G103JR        10+065AB-U                          1.00      00000000000000000000000000000000000000000000000000
GEQP0Y0003D---TI-1N4153    +1.00   10+065AB-U   JANLGS                        50000000000000000000000000000000000000000000000000
GEQP0Y0001D---FSC1N4306    +1.00   10+065AB-U   JANLGS                        50000000000000000000000000000000000000000000000000
GEQP0Y0002D---TI-1N614     +1.00   10+065AB-U JANTXLGS                         60000000000000000000000000000000000000000000000000
GEQP0Y0004D---TI-1N914     +1.00   10+065AB-U JANTXLGS                         10000000000000000000000000000000000000000000000000
GEQP0Y0006XR-TI-2N2219     +1.00   10+065AB-U JANTXLIN                         30000000000000000000000000000000000000000000000000
GEQP0Y0004XR-TI-2N2219     +1.00   10+065AB-U JANTXLIN                         30000000000000000000000000000000000000000000000000
GEQP0Y0003XR-TI-2N2484A    +1.00   10+065AB-U   JANLIN                        36000000000000000000000000000000000000000000000000
```

Example Sorted Input Parts List Cont.

```
GEQP0Y0008XR-TI-2N2907     +1.00   10+065AB-U JANTXLIN                          360000000000000000000000000000000000000000000000000000
GEQP0Y0002XR-TI-2N3251A    +1.00   10+065AB-U   JANLIN                         270000000000000000000000000000000000000000000000000000
GEQP0Y0001XR-TI-2N4858     +1.00   10+065AB-U   JANLGS                           000000000000000000000000000000000000000000000000000000
GEQP0Y0009XR-NON2N4947     +1.00   10+065AB-U   JAN                              000000000000000000000000000000000000000000000000000000
GEQP0Y0009XR-NON2N4947     +1.00   10+065AB-U   JAN                              000000000000000000000000000000000000000000000000000000
GEQP0Y0009XR-NON2N4947     +1.00   10+065AB-U   JAN                              000000000000000000000000000000000000000000000000000000
GEQP0Y0005XR-TI-2N706      +1.00   10+065AB-U   JANLIN                           150000000000000000000000000000000000000000000000000000
GEQP0Y0002CAP    CK60BX101K        10+065AB-U                        +1.00        000000000000000000000000000000000000000000000000000000
GEQP0Y0003CAP    CK60BX101K        10+070AB-U                         0.10        000000000000000000000000000000000000000000000000000000
GEQP0Y0001CAP    CK60BX470K        20+065AB-U                        +1.00        000000000000000000000000000000000000000000000000000000
GEQP0Y0002IND    LT4K032             +065AB-UMILSPC      .10                    000000000000000000000000000000000000000000000000000000
GEQP0Y0001IND    LT4K032             +065AB-UMILSPC     1.00                    000000000000000000000000000000000000000000000000000000
GEQP0Y0004CAP    M39003/02-0094    30+065AB-U              3       +1.00        000000000000000000000000000000000000000000000000000000
GEQP0Y0005CAP    M39003/02-0094    50+065AB-U            3.5       +1.00        000000000000000000000000000000000000000000000000000000
GEQP0Y0009CAP    M39003/02-0096    50+065AB-U            3.9       +1.00        000000000000000000000000000000000000000000000000000000
GEQP0Y0010CAP    M39003/02-0098    10+065AB-U              4       +1.00        000000000000000000000000000000000000000000000000000000
GEQP0Y0008CAP    M39003/02-0101    60+065AB-U              4       +1.00        000000000000000000000000000000000000000000000000000000
GEQP0Y0007CAP    M39003/02-0111    60+070AB-U              3       +1.00        000000000000000000000000000000000000000000000000000000
GEQP0Y0006CAP    M39003/02-0111    30+070AB-U              5       +1.00        000000000000000000000000000000000000000000000000000000
GEQP0Y0001RES    RC08GF103K        10+065AB-UMILSPC              1.00           000000000000000000000000000000000000000000000000000000
GEQP0Y0002RES    RC08GF203K        20+065AB-UMILSPC              1.00           000000000000000000000000000000000000000000000000000000
GEQP0Y0009RES    RLR07C203JP       10+065AB-U                    0.10           000000000000000000000000000000000000000000000000000000
GEQP0Y0006RES    RLR07C222JP       20+065AB-U                    1.00           000000000000000000000000000000000000000000000000000000
GEQP0Y0007RES    RLR07C473JP       40+065AB-U                    0.10           000000000000000000000000000000000000000000000000000000
GEQP0Y0008RES    RLR07C582JP       25+065AB-U                    0.10           000000000000000000000000000000000000000000000000000000
GEQP0Y0005RES    RLR07CA03JP       10+065AB-U                    1.00           000000000000000000000000000000000000000000000000000000
GEQP0Y0010RES    RNR55C1002FR      30+065AB-U                    1.00           000000000000000000000000000000000000000000000000000000
GEQP0Y0015RES    RNR55C1002FR      10+065AB-U                    0.10           000000000000000000000000000000000000000000000000000000
GEQP0Y0013RES    RNR55C1003FR      10+065AB-U                    1.00           000000000000000000000000000000000000000000000000000000
GEQP0Y0012RES    RNR55C2001FR      20+065AB-U                    1.00           000000000000000000000000000000000000000000000000000000
GEQP0Y0011RES    RNR55C2202FR      15+065AB-U                    1.00           000000000000000000000000000000000000000000000000000000
```

Example Sorted Input Parts List Cont.

```
GEQP0Y0014RES   RNR55C6802FR      10+070AB-U                          1.00        00000000000000000000000000000000000000000000000000
GEQP0Y0016RES   RT12C2P202        10+065AB-UMILSPC     63             1.00        00000000000000000000000000000000000000000000000000
GEQP0Y0003IC-TI-SN5400---W+1.00 1.00+065AB-U   B-1                               00000000000000000000000000000000000000000000000000
GEQP0Y0004IC-TI-SN5401---W+1.00 1.00+065AB-U   B-1                               00000000000000000000000000000000000000000000000000
GEQP0Y0005IC-TI-SN5402---W+1.00 1.00+065AB-U   B-1                               00000000000000000000000000000000000000000000000000
GEQP0Y0001IC-TI-SN5440---W+1.00 1.00+065AB-U   B-1                               00000000000000000000000000000000000000000000000000
GEQP0Y0002IC-TI-SN5473---W+1.00 1.00+065AB-U   B-1                               00000000000000000000000000000000000000000000000000
GEQP0Y0001IC-FSCUA741--3FM+1.00 1.00+065AB-U   B-1                               00000000000000000000000000000000000000000000000000
GEQP0X0001B     00000000000000000001001                                          00000000000000000000000000000000000000000000000000
GEQP0X0004RES   00007G103JR       10+075AB-U                          0.10        00000000000000000000000000000000000000000000000000
GEQP0X0003RES   00007G103JR       10+075AB-U                          1.00        00000000000000000000000000000000000000000000000000
GEQP0X0003D--TI-1N4153    +1.00   10+075AB-U   JANLGS                           50000000000000000000000000000000000000000000000000
GEQP0X0001D--FSC1N4306    +1.00   10+075AB-U   JANLGS                           50000000000000000000000000000000000000000000000000
GEQP0X0002D--TI-1N614     +1.00   10+075AB-U JANTXLGS                           60000000000000000000000000000000000000000000000000
GEQP0X0004D--TI-1N914     +1.00   10+075AB-U JANTXLGS                           10000000000000000000000000000000000000000000000000
GEQP0X0004XR-TI-2N2219    +1.00   10+075AB-U JANTXLIN                           30000000000000000000000000000000000000000000000000
GEQP0X0006XR-TI-2N2219    +1.00   10+075AB-U JANTXLIN                           30000000000000000000000000000000000000000000000000
GEQP0X0003XR-TI-2N2484A   +1.00   10+075AB-U   JANLIN                          36000000000000000000000000000000000000000000000000
GEQP0X0007XR-TI-2N2907    +1.00   10+075AB-U   JANLIN                          36000000000000000000000000000000000000000000000000
GEQP0X0008XR-TI-2N2907    +1.00   10+075AB-U JANTXLIN                           36000000000000000000000000000000000000000000000000
GEQP0X0002XR-TI-2N3251A   +1.00   10+075AB-U   JANLIN                          27000000000000000000000000000000000000000000000000
GEQP0X0001XR-TI-2N4858    +1.00   10+075AB-U   JANLGS                            00000000000000000000000000000000000000000000000000
GEQP0X0009XR-NON2N4947    +1.00   10+075AB-U   JAN                               00000000000000000000000000000000000000000000000000
GEQP0X0009XR-NON2N4947    +1.00   10+075AB-U   JAN                               00000000000000000000000000000000000000000000000000
GEQP0X0009XR-NON2N4947    +1.00   10+075AB-U   JAN                               00000000000000000000000000000000000000000000000000
GEQP0X0005XR-TI-2N706     +1.00   10+075AB-U   JANLIN                          15000000000000000000000000000000000000000000000000
GEQP0X0003CAP   CK60BX101K        10+070AB-U                            0.10      00000000000000000000000000000000000000000000000000
GEQP0X0002CAP   CK60BX101K        10+075AB-U                           +1.00      00000000000000000000000000000000000000000000000000
GEQP0X0001CAP   CK60BX470K        20+075AB-U                           +1.00      00000000000000000000000000000000000000000000000000
GEQP0X0001IND   LT4K032             +075AB-UMILSPC          1.00                00000000000000000000000000000000000000000000000000
GEQP0X0002IND   LT4K032             +075AB-UMILSPC           .10                00000000000000000000000000000000000000000000000000
```

Example Sorted Input Parts List Cont.

```
GEQPOX0004CAP   M39003/02-0094     30+075AB-U                        3       +1.00    0000000000000000000000000000000000000000000000000000
GEQPOX0005CAP   M39003/02-0094     50+075AB-U                        3.5     +1.00    0000000000000000000000000000000000000000000000000000
GEQPOX0009CAP   M39003/02-0096     50+075AB-U                        3.9     +1.00    0000000000000000000000000000000000000000000000000000
GEQPOX0010CAP   M39003/02-0098     10+075AB-U                        4       +1.00    0000000000000000000000000000000000000000000000000000
GEQPOX0008CAP   M39003/02-0101     60+075AB-U                        4       +1.00    0000000000000000000000000000000000000000000000000000
GEQPOX0007CAP   M39003/02-0111     60+070AB-U                        3       +1.00    0000000000000000000000000000000000000000000000000000
GEQPOX0006CAP   M39003/02-0111     30+070AB-U                        5       +1.00    0000000000000000000000000000000000000000000000000000
GEQPOX0001RES   RC08GF103K         10+075AB-UMILSPC                        1.00     0000000000000000000000000000000000000000000000000000
GEQPOX0002RES   RC08GF203K         20+075AB-UMILSPC                        1.00     0000000000000000000000000000000000000000000000000000
GEQPOX0009RES   RLR07C203JP        10+075AB-U                              0.10     0000000000000000000000000000000000000000000000000000
GEQPOX0006RES   RLR07C222JP        20+075AB-U                              1.00     0000000000000000000000000000000000000000000000000000
GEQPOX0007RES   RLR07C473JP        40+075AB-U                              0.10     0000000000000000000000000000000000000000000000000000
GEQPOX0008RES   RLR07C582JP        25+075AB-U                              0.10     0000000000000000000000000000000000000000000000000000
GEQPOX0005RES   RLR07CA03JP        10+075AB-U                              1.00     0000000000000000000000000000000000000000000000000000
GEQPOX0010RES   RNR55C1002FR       30+075AB-U                              1.00     0000000000000000000000000000000000000000000000000000
GEQPOX0015RES   RNR55C1002FR       10+075AB-U                              0.10     0000000000000000000000000000000000000000000000000000
GEQPOX0013RES   RNR55C1003FR       10+075AB-U                              1.00     0000000000000000000000000000000000000000000000000000
GEQPOX0012RES   RNR55C2001FR       20+075AB-U                              1.00     0000000000000000000000000000000000000000000000000000
GEQPOX0011RES   RNR55C2202FR       15+075AB-U                              1.00     0000000000000000000000000000000000000000000000000000
GEQPOX0014RES   RNR55C6802FR       10+070AB-U                              1.00     0000000000000000000000000000000000000000000000000000
GEQPOX0016RES   RT12C2P202         10+075AB-UMILSPC          63            1.00     0000000000000000000000000000000000000000000000000000
GEQPOX0003IC-TI-SN5400---W+1.00 1.00+075AB-U   B-1                                 0000000000000000000000000000000000000000000000000000
GEQPOX0004IC-TI-SN5401---W+1.00 1.00+075AB-U   B-1                                 0000000000000000000000000000000000000000000000000000
GEQPOX0005IC-TI-SN5402---W+1.00 1.00+075AB-U   B-1                                 0000000000000000000000000000000000000000000000000000
GEQPOX0001IC-TI-SN5440---W+1.00 1.00+075AB-U   B-1                                 0000000000000000000000000000000000000000000000000000
GEQPOX0002IC-TI-SN5473---W+1.00 1.00+075AB-U   B-1                                 0000000000000000000000000000000000000000000000000000
GEQPOX0001IC-FSCUA741--3FM+1.00 1.00+075AB-U   B-1                                 0000000000000000000000000000000000000000000000000000
```

EXAMPLE ABSTRACTED DATA FILE

```
D--TI-1N4153      A      SIDGP 4061399999999999999990.750E 020.150E 00.500E 00RELIABILITY INFORMATION-     SD2000251
D--FSC1N4306      A      SIDGP 4061399999999999999990.500E 020.200E 00.0      RELIABILITY INFORMATION-     SD1501501
D--TI-1N914       A      SIDGP 4061399999999999999990.100E 030.750E-01.250E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N2219      A      SINPN 4061399999999999999990.300E 020.800E 00.800E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N2219      C      SINPN 4061399999999999999990.300E 020.800E 00.300E 01RELIABILITY INFORMATION-     SD2000251
XR-FSC2N2484A     A      SINPN 4061399999999999999990.600E 020.500E-01.360E 00RELIABILITY INFORMATION-     SD1700251
XR-TSC2N2484A     A      SINPN 4061399999999999999990.600E 020.500E-01.360E 00RELIABILITY INFORMATION-     SD1700251
XR-RTN2N2484A     A      SINPN 4061399999999999999990.600E 020.500E-01.360E 00RELIABILITY INFORMATION-     SD1700251
XR-TI-2N2907      A      SIPNP 4061399999999999999990.400E 020.600E 00.400E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N3251A     A      SIPNP 4061399999999999999990.600E 020.200E 00.360E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N3251A     C      SIPNP 4061399999999999999990.600E 020.200E 00.120E 01RELIABILITY INFORMATION-     SD2000251
XR-TI-2N4858      A      SINFT 4061399999999999999990.400E 020.0      .360E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N4858      C      SINFT 4061399999999999999990.400E 020.0      .180E 01RELIABILITY INFORMATION-     SD2000251
XR-NON2N4947      A      SIUJT 4061399999999999999990.300E 020.0      .360E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N706       A      SINPN 4061399999999999999990.150E 020.0      .300E 00RELIABILITY INFORMATION-     SD1750251
CAP    CK60BX101K
CAP    CK60BX470K
IND    LT4K032
CAP    M39003/02-                    0.500E 02                -10030009001500210  -1  -1125125004    1
CAP    M39003/02-                    0.100E 02                -10007006701270187  -1  -1125125005    1
CAP    M39003/02-                    0.600E 01                -10001006101210181  -1  -1125125002    1
CAP    M39003/02-                    0.350E 02                -10025008501450205  -1  -1125125005    1
CAP    M39003/02-                    0.200E 02                -10016007601360196  -1  -1125125009    1
CAP    M39003/02-                    0.150E 02                -10012007201320192  -1  -1125125004    1
CAP    M39003/02-                    0.750E 02                -10034009401540214  -1  -1125125018
RES    RC08GF103K
RES    RC08GF203K
RES    RLR07C203JP
RES    RLR07C222JP
RES    RLR07C473JP
```

Example Abstracted Data File Cont.

```
RES    RLR07C582JP
RES    RLR07CA03JP
RES    RNR55C1002FR
RES    RNR55C1003FR
RES    RNR55C2001FR
RES    RNR55C2202FR
RES    RNR55C6802FR
RES    RT12C2P202
IC-TI-SN5400---W0081BIPOLSTTL-2111599999999999999990.500E+010.800E-02.220E-01RELIABILITY INFO--      0004   014
IC-TI-SN5401---W0082BIPOLSTTL-2111599999999999999990.500E+010.800E-02.220E-01RELIABILITY INFO--      0004   014
IC-TI-SN5402---W0098BIPOLSTTL-2111599999999999999990.500E+010.110E-01.270E-01RELIABILITY INFO--      0004   014
IC-TI-SN5440---W0090BIPOLSTTL-2111599999999999999990.500E+010.105E-01.270E-01RELIABILITY INFO--      0002   014
IC-TI-SN5473---W0118BIPOLSTTL-2111599999999999999990.500E+010.200E-01.400E-01RELIABILITY INFO--      0020   014
IC-FSCUA741--3FM5019BIPOLLLIN-4061499999999999999990.150E 020.170E-02.280E-02RELIABILITY INFO--      1115   010          2
IC-FSCUA741--3FM5019BIPOLLLIN-40614                  -.150E 020.170E-02.280E-02
D--TI-1N4153     A       SIDGP 4061399999999999999990.750E 020.150E 00.500E 00RELIABILITY INFORMATION-     SD2000251
D--FSC1N4306     A       SIDGP 4061399999999999999990.500E 020.200E 00.0      RELIABILITY INFORMATION-     SD1501501
D--TI-1N914      A       SIDGP 4061399999999999999990.100E 030.750E-01.250E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N2219     A       SINPN 4061399999999999999990.300E 020.800E 00.800E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N2219     C       SINPN 4061399999999999999990.300E 020.800E 00.300E 01RELIABILITY INFORMATION-     SD2000251
XR-FSC2N2484A    A       SINPN 4061399999999999999990.600E 020.500E-01.360E 00RELIABILITY INFORMATION-     SD1700251
XR-TSC2N2484A    A       SINPN 4061399999999999999990.600E 020.500E-01.360E 00RELIABILITY INFORMATION-     SD1700251
XR-RTN2N2484A    A       SINPN 4061399999999999999990.600E 020.500E-01.360E 00RELIABILITY INFORMATION-     SD1700251
XR-TI-2N2907     A       SIPNP 4061399999999999999990.400E 020.600E 00.400E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N3251A    A       SIPNP 4061399999999999999990.600E 020.200E 00.360E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N3251A    C       SIPNP 4061399999999999999990.600E 020.200E 00.120E 01RELIABILITY INFORMATION-     SD2000251
XR-TI-2N4858     A       SINFT 4061399999999999999990.400E 020.0      .360E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N4858     C       SINFT 4061399999999999999990.400E 020.0      .180E 01RELIABILITY INFORMATION-     SD2000251
XR-NON2N4947     A       SIUJT 4061399999999999999990.300E 020.0      .360E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N706      A       SINPN 4061399999999999999990.150E 020.0      .300E 00RELIABILITY INFORMATION-     SD1750251
CAP    CK60BX101K
```

Example Abstracted Data File Cont.

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CAP   CK60BX470K
IND   LT4K032
CAP   M39003/02-                    0.500E 02          -10030009001500210  -1  -1125125004          1
CAP   M39003/02-                    0.100E 02          -10007006701270187  -1  -1125125005          1
CAP   M39003/02-                    0.600E 01          -10001006101210181  -1  -1125125002          1
CAP   M39003/02-                    0.350E 02          -10025008501450205  -1  -1125125005          1
CAP   M39003/02-                    0.200E 02          -10016007601360196  -1  -1125125009          1
CAP   M39003/02-                    0.150E 02          -10012007201320192  -1  -1125125004          1
CAP   M39003/02-                    0.750E 02          -10034009401540214  -1  -1125125018
RES   RC08GF103K
RES   RC08GF203K
RES   RLR07C203JP
RES   RLR07C222JP
RES   RLR07C473JP
RES   RLR07C582JP
RES   RLR07CA03JP
RES   RNR55C1002FR
RES   RNR55C1003FR
RES   RNR55C2001FR
RES   RNR55C2202FR
RES   RNR55C6802FR
RES   RT12C2P202
IC-TI-SN5400---W0081BIPOLSTTL-2111599999999999999990.500E+010.800E-02.220E-01RELIABILITY INFO—      0004   014
IC-TI-SN5401---W0082BIPOLSTTL-2111599999999999999990.500E+010.800E-02.220E-01RELIABILITY INFO—      0004   014
IC-TI-SN5402---W0098BIPOLSTTL-2111599999999999999990.500E+010.110E-01.270E-01RELIABILITY INFO—      0004   014
IC-TI-SN5440---W0090BIPOLSTTL-2111599999999999999990.500E+010.105E-01.270E-01RELIABILITY INFO—      0002   014
IC-TI-SN5473---W0118BIPOLSTTL-2111599999999999999990.500E+010.200E-01.400E-01RELIABILITY INFO—      0020   014
IC-FSCUA741--3FM5019BIPOLLLIN-4061499999999999999990.150E 020.170E-02.280E-02RELIABILITY INFO—      1115   010          2
IC-FSCUA741--3FM5019BIPOLLLIN-40614                -.150E 020.170E-02.280E02
D—TI-1N4153    A       SIDGP 4061399999999999999990.750E 020.150E 00.500E 00RELIABILITY INFORMATION-     SD2000251
D—FSC1N4306    A       SIDGP 4061399999999999999990.500E 020.200E 00.0      RELIABILITY INFORMATION-     SD1501501
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Example Abstracted Data File Cont.

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D--TI-1N914      A      SIDGP 406139999999999999990.100E 030.750E-01.250E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N2219     A      SINPN 406139999999999999990.300E 020.800E 00.800E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N2219     C      SINPN 406139999999999999990.300E 020.800E 00.300E 01RELIABILITY INFORMATION-     SD2000251
XR-FSC2N2484A    A      SINPN 406139999999999999990.600E 020.500E-01.360E 00RELIABILITY INFORMATION-     SD1700251
XR-TSC2N2484A    A      SINPN 406139999999999999990.600E 020.500E-01.360E 00RELIABILITY INFORMATION-     SD1700251
XR-RTN2N2484A    A      SINPN 406139999999999999990.600E 020.500E-01.360E 00RELIABILITY INFORMATION-     SD1700251
XR-TI-2N2907     A      SIPNP 406139999999999999990.400E 020.600E 00.400E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N3251A    A      SIPNP 406139999999999999990.600E 020.200E 00.360E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N3251A    C      SIPNP 406139999999999999990.600E 020.200E 00.120E 01RELIABILITY INFORMATION-     SD2000251
XR-TI-2N4858     A      SINFT 406139999999999999990.400E 020.0      .360E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N4858     C      SINFT 406139999999999999990.400E 020.0      .180E 01RELIABILITY INFORMATION-     SD2000251
XR-NON2N4947     A      SIUJT 406139999999999999990.300E 020.0      .360E 00RELIABILITY INFORMATION-     SD2000251
XR-TI-2N706      A      SINPN 406139999999999999990.150E 020.0      .300E 00RELIABILITY INFORMATION-     SD1750251
CAP   CK60BX101K
CAP   CK60BX470K
IND   LT4K032
CAP   M39003/02-                    0.500E 02                -10030009001500210  -1  -1125125004          1
CAP   M39003/02-                    0.100E 02                -10007006701270187  -1  -1125125005          1
CAP   M39003/02-                    0.600E 01                -10001006101210181  -1  -1125125002          1
CAP   M39003/02-                    0.350E 02                -10025008501450205  -1  -1125125005          1
CAP   M39003/02-                    0.200E 02                -10016007601360196  -1  -1125125009          1
CAP   M39003/02-                    0.150E 02                -10012007201320192  -1  -1125125004          1
CAP   M39003/02-                    0.750E 02                -10034009401540214  -1  -1125125018
RES   RC08GF103K
RES   RC08GF203K
RES   RLR07C203JP
RES   RLR07C222JP
RES   RLR07C473JP
RES   RLR07C582JP
RES   RLR07CA03JP
RES   RNR55C1002FR
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Example Abstracted Data File Cont.

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RES    RNR55C1003FR
RES    RNR55C2001FR
RES    RNR55C2202FR
RES    RNR55C6802FR
RES    RT12C2P202
IC-TI-SN5400---W0081BIPOLSTTL-211159999999999999990.500E+010.800E-02.220E-01RELIABILITY INFO--      0004   014
IC-TI-SN5401---W0082BIPOLSTTL-211159999999999999990.500E+010.800E-02.220E-01RELIABILITY INFO--      0004   014
IC-TI-SN5402---W0098BIPOLSTTL-211159999999999999990.500E+010.110E-01.270E-01RELIABILITY INFO--      0004   014
IC-TI-SN5440---W0090BIPOLSTTL-211159999999999999990.500E+010.105E-01.270E-01RELIABILITY INFO--      0002   014
IC-TI-SN5473---W0118BIPOLSTTL-211159999999999999990.500E+010.200E-01.400E-01RELIABILITY INFO--      0020   014
IC-FSCUA741--3FM5019BIPOLLLIN-406149999999999999990.150E 020.170E-02.280E-02RELIABILITY INFO--      1115   010   2
IC-FSCUA741--3FM5019BIPOLLLIN-40614                  -.150E 020.170E-02.280E-02
```

EXAMPLE DEVICE FAILURE RATE LISTING

MOD#	NPT#	TYP	FG	PRT#	PKTUSFC	TESFC	TEM	ENV	SCRLV	SUPVOL	NOMCUR	MAXCUR	F.R.	INTCOMPX	#OFPINS				
1																			
GEQP05	3D	TI		1N4153	+1.00	0.10	95	AB-U	JAN	0.500E 020.		0.	3.03E-01	1.00	0	0	SD	2 251	0. 0.0
GEQP05	1D	FSC		1N4306	+1.00	0.10	95	AB-U	JAN	0.500E 020.		0.	4.33E-01	1.00	0	0	SD	21501	0. 0.0
GEQP05	4D	TI		1N914	+1.00	0.10	95	AB-U	JANTX	0.100E 030.		0.	8.65E-02	1.00	0	0	SD	2 251	0. 0.0
GEQP05	6XR	TI		2N2219	+1.00	0.10	95	AB-U	JANTX	0.300E 020.		0.	7.28E-01	1.00	0	0	SD	3 251	0. 0.0
GEQP05	4XR	TI		2N2219	+1.00	0.10	95	AB-U	JANTX	0.300E 020.		0.	7.28E-01	1.00	0	0	SD	3 251	0. 0.0
GEQP05	7XR	TI		2N2907	+1.00	0.10	95	AB-U	JAN	0.360E 020.		0.	4.27E 00	1.00	0	0	SD	3 251	0. 0.0
GEQP05	8XR	TI		2N2907	+1.00	0.10	95	AB-U	JANTX	0.360E 020.		0.	8.53E-01	1.00	0	0	SD	3 251	0. 0.0
GEQP05	2XR	TI		2N3251A	+1.00	0.10	95	AB-U	JAN	0.270E 020.		0.	9.10E-01	1.00	0	0	SD	3 251	0. 0.0
GEQP05	1XR	TI		2N4858	+1.00	0.10	95	AB-U	JAN	0. 0.		0.	1.57E 00	1.00	0	0	SD	3 251	0. 0.0
GEQP05	9XR	NON		2N4947	+1.00	0.10	95	AB-U	JAN	0. 0.		0.	1.08E 01	1.00	0	0	SD	3 251	0. 0.0
GEQP05	3XR	NON		2N4947	+1.00	0.10	95	AB-U	JAN	0. 0.		0.	1.08E 01	1.00	0	0	SD	3 251	0. 0.0
GEQP05	9XR	NON		2N4947	+1.00	0.10	95	AB-U	JAN	0. 0.		0.	1.08E 01	1.00	0	0	SD	3 251	0. 0.0
GEQP05	5XR	TI		2N706	+1.00	0.10	95	AB-U	JAN	0.150E 020.		0.	3.64E 00	1.00	0	0	SD	3 251	0. 0.0
GEQP05	3CAP			CK60BX101K		0.10	70	AB-U		0.150E 020.		0.	2.19E-02	0.10	0	0		2 00	0. 0.0
GEQP05	2CAP			CK60BX101K		0.10	95	AB-U		0.150E 020.		0.	2.33E-01	1.00	0	0		2 00	0. 0.0
GEQP05	1CAP			CK60BX470K		0.20	95	AB-U		0.150E 020.		0.	2.91E-01	1.00	0	0		2 00	0. 0.0
GEQP05	1IND			LT4K032		1.00	95	AB-UM	ILSPC	0. 0.		0.	1.53E-01	1.00	0	0		0 00	0. 0.0
GEQP05	2IND			LT4K032		1.00	95	AB-UM	ILSPC	0. 0.		0.	1.53E-02	0.10	0	0		0 00	0. 0.0
GEQP05	4CAP			M39003/02-0094		0.30	95	AB-U		0.	0.	0.	4.84E-03	1.00	0-1125			2 180	0. 0.0
GEQP05	5CAP			M39003/02-0094		0.50	95	AB-U		0.	0.	0.	1.01E-02	1.00	0-1125			2 180	0. 0.0
GEQP05	9CAP			M39003/02-0096		0.50	95	AB-U		0.	0.	0.	1.01E-02	1.00	0-1125			2 180	0. 0.0
GEQP05	10CAP			M39003/02-0098		0.10	95	AB-U		0.	0.	0.	3.46E-03	1.00	0-1125			2 180	0. 0.0
GEQP05	8CAP			M39003/02-0101		0.60	95	AB-U		0.	0.	0.	1.49E-02	1.00	0-1125			2 180	0. 0.0
GEQP05	7CAP			M39003/02-0111		0.60	70	AB-U		0.	0.	0.	8.16E-03	1.00	0-1125			2 180	0. 0.0
GEQP05	6CAP			M39003/02-0111		0.30	70	AB-U		0.	0.	0.	2.65E-03	1.00	0-1125			2 180	0. 0.0
GEQP05	1RES			RC08GF103K		0.10	95	AB-UM	ILSPC	0.	0.	0.	8.79E-02	1.00	0	0		2 00	0. 0.0

EXAMPLE DEVICE FAILURE RATE LISTING CONT.

GEQP05	2RES	RC08GF203K	0.20	95AB-UMILSPC0.		0.	0.	1.10E-01	1.00	0 0	2	00	0.	0.0
GEQP05	9RES	RLR07C203JP	0.10	95AB-U	0.	0.	0.	1.15E-03	0.10	0 0	2	00	0.	0.0
GEQP05	6RES	RLR07C222JP	0.20	95AB-U	0.	0.	0.	1.32E-02	1.00	0 0	2	00	0.	0.0
GEQP05	7RES	RLR07C473JP	0.40	95AB-U	0.	0.	0.	1.72E-03	0.10	0 0	2	00	0.	0.0
GEQP05	8RES	RLR07C582JP	0.25	95AB-U	0.	0.	0.	1.41E-03	0.10	0 0	2	00	0.	0.0
GEQP05	5RES	RLR07CA03JP	0.10	95AB-U	0.	0.	0.	1.15E-02	1.00	0 0	2	00	0.	0.0
GEQP05	10RES	RNR55C1002FR	0.30	95AB-U	0.	0.	0.	4.57E-03	1.00	0 0	2	00	0.	0.0
GEQP05	15RES	RNR55C1002FR	0.10	95AB-U	0.	0.	0.	3.49E-04	0.10	0 0	2	00	0.	0.0
GEQP05	13RES	RNR55C1003FR	0.10	95AB-U	0.	0.	0.	3.84E-03	1.00	0 0	2	00	0.	0.0
GEQP05	12RES	RNR55C2001FR	0.20	95AB-U	0.	0.	0.	4.00E-03	1.00	0 0	2	00	0.	0.0
GEQP05	11RES	RNR55C2202FR	0.15	95AB-U	0.	0.	0.	3.74E-03	1.00	0 0	2	00	0.	0.0
GEQP05	14RES	RNR55C6802FR	0.10	70AB-U	0.	0.	0.	2.78E-03	1.00	0 0	2	00	0.	0.0
GEQP05	16RES	RT12C2P202	0.10	95AB-UMILSPC0.		0.	0.	3.76E 00	1.00	0 0	2	00	0.	0.0
GEQP05	3IC-TI-SN5400---W+1.00		1.00	95AB-U	B-10.500E	010.800E-02	0.220E-01	2.42E-01	1.00	4 4	14	00	0.	0.0
GEQP05	4IC-TI-SN5401---W+1.00		1.00	95AB-U	B-10.500E	010.800E-02	0.220E-01	2.42E-01	1.00	4 4	14	00	0.	0.0
GEQP05	5IC-TI-SN5402---W+1.00		1.00	95AB-U	B-10.500E	010.110E-01	0.270E-01	2.42E-01	1.00	4 4	14	00	0.	0.0
GEQP05	1IC-TI-SN5440---W+1.00		1.00	95AB-U	B-10.500E	010.105E-01	0.270E-01	1.81E-01	1.00	2 2	14	00	0.	0.0
GEQP05	2IC-TI-SN5473---W+1.00		1.00	95AB-U	B-10.500E	010.200E-01	0.400E-01	4.90E-01	1.00	2020	14	00	0.	0.0
GEQP05	1IC-FSCUA741--3FM+1.00		1.00	95AB-U	B-10.150E	020.170E-02	0.280E-02	2.23E 00	1.00	1115	10	00	0.	0.2
GEQP05	1IC-FSCUA741--3FM+1.00		1.00	95AB-U	B-10.150E	020.170E-02	0.280E-02			0 0	0	00		0
GEQP05	PCB	PCBXXCXXXXX		100				0.17E 01	0.17E 01	0.169E 03				
GEQP0Y	3D--TI-1N4153	+1.00	0.10	65AB-U	JAN0.500E	020.	0.	1.80E-01	1.00	0 0 SD	2	251	0.	0.0
GEQP0Y	1D--FSC1N4306	+1.00	0.10	65AB-U	JAN0.500E	020.	0.	2.57E-01	1.00	0 0 SD	21	501	0.	0.0
GEQP0Y	4D--TI-1N914	+1.00	0.10	65AB-U	JANTX0.100E	030.	0.	5.13E-02	1.00	0 0 SD	2	251	0.	0.0
GEQP0Y	6XR-TI-2N2219	+1.00	0.10	65AB-U	JANTX0.300E	020.	0.	5.16E-01	1.00	0 0 SD	3	251	0.	0.0
GEQP0Y	4XR-TI-2N2219	+1.00	0.10	65AB-U	JANTX0.300E	020.	0.	5.16E-01	1.00	0 0 SD	3	251	0.	0.0
GEQP0Y	7XR-TI-2N2907	+1.00	0.10	65AB-U	JAN0.360E	020.	0.	2.95E 00	1.00	0 0 SD	3	251	0.	0.0
GEQP0Y	8XR-TI-2N2907	+1.00	0.10	65AB-U	JANTX0.360E	020.	0.	5.91E-01	1.00	0 0 SD	3	251	0.	0.0
GEQP0Y	2XR-TI-2N3251A	+1.00	0.10	65AB-U	JAN0.270E	020.	0.	6.30E-01	1.00	0 0 SD	3	251	0.	0.0
GEQP0Y	1XR-TI-2N4858	+1.00	0.10	65AB-U	JAN0.	0.	0.	1.12E 00	1.00	0 0 SD	3	251	0.	0.0
GEQP0Y	9XR-NON2N4947	+1.00	0.10	65AB-U	JAN0.	0.	0.	6.71E 00	1.00	0 0 SD	3	251	0.	0.0

EXAMPLE DEVICE FAILURE RATE LISTING CONT.

GEQP0Y	5IC-TI-SN5402---W+1.00	1.00	65AB-U	B-10.500E	010.110E-01	0.270E-01	2.09E-01	1.00		4 4	14	00	0.	0.0
GEQP0Y	1IC-TI-SN5440---W+1.00	1.00	65AB-U	B-10.500E	010.105E-01	0.270E-01	1.60E-01	1.00		2 2	14	00	0.	0.0
GEQP0Y	2IC-TI-SN5473---W+1.00	1.00	65AB-U	B-10.500E	010.200E-01	0.400E-01	3.92E-01	1.00		2020	14	00	0.	0.0
GEQP0Y	1IC-FSCUA741--3FM+1.00	1.00	65AB-U	B-10.150E	020.170E-02	0.280E-02	8.70E-01	1.00		1115	10	00	0.	0.2
GEQP0Y	1IC-FSCUA741--3FM+1.00	1.00	65AB-U	B-10.150E	020.170E-02	0.280E-02				0 0	0	00		0
GEQP0Y	PCB PCBXXXXXXX		100				0.17E 01	0.17E 01	0.169E 03					
GEQP0X	3D--TI-1N4153 +1.00	0.10	75AB-U	JAN0.500E	020.	0.	2.14E-01	1.00		0 0 SD	2	251	0.	0.0
GEQP0X	1D--FSC1N4306 +1.00	0.10	75AB-U	JAN0.500E	020.	0.	3.06E-01	1.00		0 0 SD	21	501	0.	0.0
GEQP0X	4D--TI-1N914 +1.00	0.10	75AB-U	JANTX0.100E	030.	0.	6.12E-02	1.00		0 0 SD	2	251	0.	0.0
GEQP0X	4XR-TI-2N2219 +1.00	0.10	75AB-U	JANTX0.300E	020.	0.	5.76E-01	1.00		0 0 SD	3	251	0.	0.0
GEQP0X	6XR-TI-2N2219 +1.00	0.10	75AB-U	JANTX0.300E	020.	0.	5.76E-01	1.00		0 0 SD	3	251	0.	0.0
GEQP0X	7XR-TI-2N2907 +1.00	0.10	75AB-U	JAN0.360E	020.	0.	3.33E 00	1.00		0 0 SD	3	251	0.	0.0
GEQP0X	8XR-TI-2N2907 +1.00	0.10	75AB-U	JANTX0.360E	020.	0.	6.66E-01	1.00		0 0 SD	3	251	0.	0.0
GEQP0X	2XR-TI-2N3251A +1.00	0.10	75AB-U	JAN0.270E	020.	0.	7.10E-01	1.00		0 0 SD	3	251	0.	0.0
GEQP0X	1XR-TI-2N4858 +1.00	0.10	75AB-U	JAN0.	0.	0.	1.25E 00	1.00		0 0 SD	3	251	0.	0.0
GEQP0X	9XR-NON2N4947 +1.00	0.10	75AB-U	JAN0.	0.	0.	7.85E 00	1.00		0 0 SD	3	251	0.	0.0
GEQP0X	9XR-NON2N4947 +1.00	0.10	75AB-U	JAN0.	0.	0.	7.85E 00	1.00		0 0 SD	3	251	0.	0.0
GEQP0X	9XR-NON2N4947 +1.00	0.10	75AB-U	JAN0.	0.	0.	7.85E 00	1.00		0 0 SD	3	251	0.	0.0
GEQP0X	5XR-TI-2N706 +1.00	0.10	75AB-U	JAN0.150E	020.	0.	2.88E 00	1.00		0 0 SD	3	251	0.	0.0
GEQP0X	3CAP CK60BX101K	0.10	70AB-U	0.150E	020.	0.	2.19E-02	0.10		0 0	2	00	0.	0.0
GEQP0X	2CAP CK60BX101K	0.10	75AB-U	0.150E	020.	0.	2.21E-01	1.00		0 0	2	00	0.	0.0
GEQP0X	1CAP CK60BX470K	0.20	75AB-U	0.150E	020.	0.	2.77E-01	1.00		0 0	2	00	0.	0.0
GEQP0X	1IND LT4K032	1.00	75AB-UMILSPC0.		0.	0.	1.00E-01	1.00		0 0	0	00	0.	0.0
GEQP0X	2IND LT4K032	1.00	75AB-UMILSPC0.		0.	0.	1.00E-02	0.10		0 0	0	00	0.	0.0
GEQP0X	4CAP M39003/02-0094	0.30	75AB-U	0.	0.	0.	2.92E-03	1.00		0-1125	2	180	0.	0.0
GEQP0X	5CAP M39003/02-0094	0.50	75AB-U	0.	0.	0.	6.06E-03	1.00		0-1125	2	180	0.	0.0
GEQP0X	9CAP M39003/02-0096	0.50	75AB-U	0.	0.	0.	6.06E-03	1.00		0-1125	2	180	0.	0.0
GEQP0X	10CAP M39003/02-0098	0.10	75AB-U	0.	0.	0.	2.08E-03	1.00		0-1125	2	180	0.	0.0
GEQP0X	8CAP M39003/02-0101	0.60	75AB-U	0.	0.	0.	8.97E-03	1.00		0-1125	2	180	0.	0.0
GEQP0X	7CAP M39003/02-0111	0.60	70AB-U	0.	0.	0.	8.16E-03	1.00		0-1125	2	180	0.	0.0
GEQP0X	6CAP M39003/02-0111	0.30	70AB-U	0.	0.	0.	2.65E-03	1.00		0-1125	2	180	0.	0.0

EXAMPLE DEVICE FAILURE RATE LISTING CONT.

GEQPOY	9XR-NON2N4947	+1.00	0.10	65AB-U	JAN0.		0.		0.	6.71E 00	1.00	0	0	SD	3	251	0.	0.0
GEQPOY	9XR-NON2N4947	+1.00	0.10	65AB-U	JAN0.		0.		0.	6.71E 00	1.00	0	0	SD	3	251	0.	0.0
GEQPOY	5XR-TI-2N706	+1.00	0.10	65AB-U	JAN0.	150E 020.			0.	2.58E 00	1.00	0	0	SD	3	251	0.	0.0
GEQPOY	2CAP	CK60BX101K	0.10	65AB-U		0.150E 020.			0.	2.16E-01	1.00	0	0		2	00	0.	0.0
GEQPOY	3CAP	CK60BX101K	0.10	70AB-U		0.150E 020.			0.	2.19E-02	0.10	0	0		2	00	0.	0.0
GEQPOY	1CAP	CK60BX470K	0.20	65AB-U		0.150E 020.			0.	2.70E-01	1.00	0	0		2	00	0.	0.0
GEQPOY	2IND	LT4K032	1.00	65AB-U	MILSPC0.		0.		0.	8.60E-03	0.10	0	0		0	00	0.	0.0
GEQPOY	1IND	LT4K032	1.00	65AB-U	MILSPC0.		0.		0.	8.60E-02	1.00	0	0		0	00	0.	0.0
GEQPOY	4CAP	M39003/02-0094	0.30	65AB-U		0.	0.		0.	2.44E-03	1.00	0-1125			2	180	0.	0.0
GEQPOY	5CAP	M39003/02-0094	0.50	65AB-U		0.	0.		0.	5.07E-03	1.00	0-1125			2	180	0.	0.0
GEQPOY	9CAP	M39003/02-0096	0.50	65AB-U		0.	0.		0.	5.07E-03	1.00	0-1125			2	180	0.	0.0
GEQPOY	10CAP	M39003/02-0098	0.10	65AB-U		0.	0.		0.	1.74E-03	1.00	0-1125			2	180	0.	0.0
GEQPOY	8CAP	M39003/02-0101	0.60	65AB-U		0.	0.		0.	7.50E-03	1.00	0-1125			2	180	0.	0.0
GEQPOY	7CAP	M39003/02-0111	0.60	70AB-U		0.	0.		0.	8.16E-03	1.00	0-1125			2	180	0.	0.0
GEQPOY	6CAP	M39003/02-0111	0.30	70AB-U		0.	0.		0.	2.65E-03	1.00	0-1125			2	180	0.	0.0
GEQPOY	1RES	RC08GF103K	0.10	65AB-U	MILSPC0.		0.		0.	3.02E-02	1.00	0	0		2	00	0.	0.0
GEQPOY	2RES	RC08GF203K	0.20	65AB-U	MILSPC0.		0.		0.	3.72E-02	1.00	0	0		2	00	0.	0.0
GEQPOY	9RES	RLR07C203JP	0.10	65AB-U		0.	0.		0.	8.62E-04	0.10	0	0		2	00	0.	0.0
GEQPOY	6RES	RLR07C222JP	0.20	65AB-U		0.	0.		0.	9.76E-03	1.00	0	0		2	00	0.	0.0
GEQPOY	7RES	RLR07C473JP	0.40	65AB-U		0.	0.		0.	1.25E-03	0.10	0	0		2	00	0.	0.0
GEQPOY	8RES	RLR07C582JP	0.25	65AB-U		0.	0.		0.	1.04E-03	0.10	0	0		2	00	0.	0.0
GEQPOY	5RES	RLR07CA03JP	0.10	65AB-U		0.	0.		0.	8.62E-03	1.00	0	0		2	00	0.	0.0
GEQPOY	10RES	RNR55C1002FR	0.30	65AB-U		0.	0.		0.	3.40E-03	1.00	0	0		2	00	0.	0.0
GEQPOY	15RES	RNR55C1002FR	0.10	65AB-U		0.	0.		0.	2.65E-04	0.10	0	0		2	00	0.	0.0
GEQPOY	13RES	RNR55C1003FR	0.10	65AB-U		0.	0.		0.	2.92E-03	1.00	0	0		2	00	0.	0.0
GEQPOY	12RES	RNR55C2001FR	0.20	65AB-U		0.	0.		0.	3.00E-03	1.00	0	0		2	00	0.	0.0
GEQPOY	11RES	RNR55C2202FR	0.15	65AB-U		0.	0.		0.	2.82E-03	1.00	0	0		2	00	0.	0.0
GEQPOY	14RES	RNR55C6802FR	0.10	70AB-U		0.	0.		0.	2.78E-03	1.00	0	0		2	00	0.	0.0
GEQPOY	16RES	RT12C2P202	0.10	65AB-U	MILSPC0.		0.		0.	2.50E 00	1.00	0	0		2	00	0.	0.0
GEQPOY	3IC-TI-SN5400---W+1.00		1.00	65AB-U	B-10.500E	010.800E-02		0.220E-01		2.09E-01	1.00	4	4		14	00	0.	0.0
GEQPOY	4IC-TI-SN5401---W+1.00		1.00	65AB-U	B-10.500E	010.800E-02		0.220E-01		2.09E-01	1.00	4	4		14	00	0.	0.0

EXAMPLE DEVICE FAILURE RATE LISTING CONT.

GEQPOX	1RES	RC08GF103K	0.10	75AB-UMILSPC	0.	0.	0.	4.32E-02	1.00	0	0	2	00	0.	0.0
GEQPOX	2RES	RC08GF203K	0.20	75AB-UMILSPC	0.	0.	0.	5.34E-02	1.00	0	0	2	00	0.	0.0
GEQPOX	9RES	RLR07C203JP	0.10	75AB-U	0.	0.	0.	9.44E-04	0.10	0	0	2	00	0.	0.0
GEQPOX	6RES	RLR07C222JP	0.20	75AB-U	0.	0.	0.	1.07E-02	1.00	0	0	2	00	0.	0.0
GEQPOX	7RES	RLR07C473JP	0.40	75AB-U	0.	0.	0.	1.38E-03	0.10	0	0	2	00	0.	0.0
GEQPOX	8RES	RLR07C582JP	0.25	75AB-U	0.	0.	0.	1.14E-03	0.10	0	0	2	00	0.	0.0
GEQPOX	5RES	RLR07CA03JP	0.10	75AB-U	0.	0.	0.	9.44E-03	1.00	0	0	2	00	0.	0.0
GEQPOX	10RES	RNR55C1002FR	0.30	75AB-U	0.	0.	0.	3.75E-03	1.00	0	0	2	00	0.	0.0
GEQPOX	15RES	RNR55C1002FR	0.10	75AB-U	0.	0.	0.	2.91E-04	0.10	0	0	2	00	0.	0.0
GEQPOX	13RES	RNR55C1003FR	0.10	75AB-U	0.	0.	0.	3.20E-03	1.00	0	0	2	00	0.	0.0
GEQPOX	12RES	RNR55C2001FR	0.20	75AB-U	0.	0.	0.	3.30E-03	1.00	0	0	2	00	0.	0.0
GEQPOX	11RES	RNR55C2202FR	0.15	75AB-U	0.	0.	0.	3.10E-03	1.00	0	0	2	00	0.	0.0
GEQPOX	14RES	RNR55C6802FR	0.10	70AB-U	0.	0.	0.	2.78E-03	1.00	0	0	2	00	0.	0.0
GEQPOX	16RES	RT12C2P202	0.10	75AB-UMILSPC	0.	0.	0.	2.82E 00	1.00	0	0	2	00	0.	0.0
GEQPOX	3IC-TI-SN5400---W+1.00		1.00	75AB-U	B-10.500E	010.800E-02	0.220E-01	2.16E-01	1.00	4	4	14	00	0.	0.0
GEQPOX	4IC-TI-SN5401---W+1.00		1.00	75AB-U	B-10.500E	010.800E-02	0.220E-01	2.16E-01	1.00	4	4	14	00	0.	0.0
GEQPOX	5IC-TI-SN5402---W+1.00		1.00	75AB-U	B-10.500E	010.110E-01	0.270E-01	2.16E-01	1.00	4	4	14	00	0.	0.0
GEQPOX	1IC-TI-SN5440---W+1.00		1.00	75AB-U	B-10.500E	010.105E-01	0.270E-01	1.65E-01	1.00	2	2	14	00	0.	0.0
GEQPOX	2IC-TI-SN5473---W+1.00		1.00	75AB-U	B-10.500E	010.200E-01	0.400E-01	4.15E-01	1.00	20	20	14	00	0.	0.0
GEQPOX	1IC-FSCUA741--3FM+1.00		1.00	75AB-U	B-10.150E	020.170E-02	0.280E-02	1.10E 00	1.00	11	15	10	00	0.	0.2
GEQPOX	1IC-FSCUA741--3FM+1.00		1.00	75AB-U	B-10.150E	020.170E-02	0.280E-02			0	0	0	00		0
GEQPOX	PCB	PCBXXXXXXX		75AB-U				0.17E 01	0.17E 01	0.169E 03					

EXAMPLE SUMMARY OF FAILURE RATES

MOD#	MPT#	TYP	MFG	PRT#	PKG	USFC	TESFC	TEM	ENV	SCRLV	SUPVOL	NOMCUR	MAXCUR	F.R.	INTCOMPX	#OFPINS					
GEQP05	3D	--	TI	-1N4153		+1.00	0.10	95	AB	-U	JAN	0.500E	020.	0.	9.09E-01	1.00	0	0	SD	2 251	0.	0.0
GEQP05	1D	--	FSC	1N4306		+1.00	0.10	95	AB	-U	JAN	0.500E	020.	0.	4.33E-01	1.00	0	0	SD	21501	0.	0.0
GEQP05	4D	--	TI	-1N914		+1.00	0.10	95	AB	-U	JANTX	0.100E	030.	0.	3.46E-01	1.00	0	0	SD	2 251	0.	0.0
GEQP05	6XR	-TI-	2N2219			+1.00	0.10	95	AB	-U	JANTX	0.300E	020.	0.	4.37E 00	1.00	0	0	SD	3 251	0.	0. 0
GEQP05	4XR	-TI-	2N2219			+1.00	0.10	95	AB	-U	JANTX	0.300E	020.	0.	2.91E 00	1.00	0	0	SD	3 251	0.	0. 0
GEQP05	7XR	-TI-	2N2907			+1.00	0.10	95	AB	-U	JAN	0.360E	020.	0.	2.99E 01	1.00	0	0	SD	3 251	0.	0. 0
GEQP05	8XR	-TI-	2N2907			+1.00	0.10	95	AB	-U	JANTX	0.360E	020.	0.	6.82E 00	1.00	0	0	SD	3 251	0.	0. 0
GEQP05	2XR	-TI-	2N3251A			+1.00	0.10	95	AB	-U	JAN	0.270E	020.	0.	1.82E 00	1.00	0	0	SD	3 251	0.	0. 0
GEQP05	1XR	-TI-	2N4858			+1.00	0.10	95	AB	-U	JAN	0.	0.	0.	1.57E 00	1.00	0	0	SD	3 251	0.	0. 0
GEQP05	9XR	-NON	2N4947			+1.00	0.10	95	AB	-U	JAN	0.	0.	0.	9.72E 01	1.00	0	0	SD	3 251	0.	0. 0
GEQP05	9XR	-NON	2N4947			+1.00	0.10	95	AB	-U	JAN	0.	0.	0.	9.72E 01	1.00	0	0	SD	3 251	0.	0. 0
GEQP05	9XR	-NON	2N4947			+1.00	0.10	95	AB	-U	JAN	0.	0.	0.	9.72E 01	1.00	0	0	SD	3 251	0.	0. 0
GEQP05	5XR	-TI-	2N706			+1.00	0.10	95	AB	-U	JAN	0.150E	020.	0.	1.82E 01	1.00	0	0	SD	3 251	0.	0. 0
GEQP05	3CAP		CK60	BX101K			0.10	70	AB	-U		0.150E	020.	0.	6.57E-02	0.10	0	0		2 00	0.	0. 0
GEQP05	2CAP		CK60	BX101K			0.10	95	AB	-U		0.150E	020.	0.	4.66E-01	1.00	0	0		2 00	0.	0. 0
GEQP05	1CAP		CK60	BX470K			0.20	95	AB	-U		0.150E	020.	0.	2.91E-01	1.00	0	0		2 00	0.	0. 0
GEQP05	1IND		LT4K	032			1.00	95	AB	-UMIL	SPC	0.		0.	1.53E-01	1.00	0	0		0 00	0.	0. 0
GEQP05	2IND		LT4K	032			1.00	95	AB	-UMIL	SPC	0.		0.	3.06E-02	0.10	0	0		0 00	0.	0. 0
GEQP05	4CAP		M39003	/02-0094			0.30	95	AB	-U		0.		0.	1.94E-02	1.00	0-1125			2 180	0.	0. 0
GEQP05	5CAP		M39003	/02-0094			0.50	95	AB	-U		0.		0.	5.05E-02	1.00	0-1125			2 180	0.	0. 0
GEQP05	9CAP		M39003	/02-0096			0.50	95	AB	-U		0.		0.	9.09E-02	1.00	0-1125			2 180	0.	0. 0
GEQP05	10CAP		M39003	/02-0098			0.10	95	AB	-U		0.		0.	3.46E-02	1.00	0-1125			2 180	0.	0. 0
GEQP05	8CAP		M39003	/02-0101			0.60	95	AB	-U		0.		0.	1.19E-01	1.00	0-1125			2 180	0.	0. 0
GEQP05	7CAP		M39003	/02-0111			0.60	70	AB	-U		0.		0.	5.71E-02	1.00	0-1125			2 180	0.	0. 0
GEQP05	6CAP		M39003	/02-0111			0.30	70	AB	-U		0.		0.	1.59E-02	1.00	0-1125			2 180	0.	0. 0
GEQP05	1RES		RC08	GF103K			0.10	95	AB	-UMIL	SPC	0.		0.	8.79E-02	1.00	0	0		2 00	0.	0. 0
GEQP05	2RES		RC08	GF203K			0.20	95	AB	-UMIL	SPC	0.		0.	2.20E-01	1.00	0	0		2 00	0.	0. 0
GEQP05	9RES		RLR07	C203JP			0.10	95	AB	-U		0.		0.	1.03E-02	0.10	0	0		2 00	0.	0. 0

EXAMPLE SUMMARY OF FAILURE RATES CONT.

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GEQP05   6RES   RLR07C222JP      0.20  95AB-U      0.       0.       0.       7.92E-02 1.00          0 0     2  00  0.    0. 0
GEQP05   7RES   RLR07C473JP      0.40  95AB-U      0.       0.       0.       1.20E-02 0.10          0 0     2  00  0.    0. 0
GEQP05   8RES   RLR07C582JP      0.25  95AB-U      0.       0.       0.       1.13E-02 0.10          0 0     2  00  0.    0. 0
GEQP05   5RES   RLR07CA03JP      0.10  95AB-U      0.       0.       0.       5.75E-02 1.00          0 0     2  00  0.    0. 0
GEQP05  10RES   RNR55C1002FR     0.30  95AB-U      0.       0.       0.       4.57E-02 1.00          0 0     2  00  0.    0. 0
GEQP05  15RES   RNR55C1002FR     0.10  95AB-U      0.       0.       0.       5.24E-03 0.10          0 0     2  00  0.    0. 0
GEQP05  13RES   RNR55C1003FR     0.10  95AB-U      0.       0.       0.       4.99E-02 1.00          0 0     2  00  0.    0. 0
GEQP05  12RES   RNR55C2001FR     0.20  95AB-U      0.       0.       0.       4.80E-02 1.00          0 0     2  00  0.    0. 0
GEQP05  11RES   RNR55C2202FR     0.15  95AB-U      0.       0.       0.       4.11E-02 1.00          0 0     2  00  0.    0. 0
GEQP05  14RES   RNR55C6802FR     0.10  70AB-U      0.       0.       0.       3.89E-02 1.00          0 0     2  00  0.    0. 0
GEQP05  16RES   RT12C2P202       0.10  95AB-UMILSPC0.       0.       0.       6.02E 01 1.00          0 0     2  00  0.    0. 0
GEQP05   3IC-TI-SN5400---W+1.00 1.00  95AB-U   B-10.500E 010.800E-02 0.220E-01 7.26E-01 1.00          4 4    14  00  0.    0. 0
GEQP05   4IC-TI-SN5401---W+1.00 1.00  95AB-U   B-10.500E 010.800E-02 0.220E-01 9.68E-01 1.00          4 4    14  00  0.    0. 0
GEQP05   5IC-TI-SN5402---W+1.00 1.00  95AB-U   B-10.500E 010.110E-01 0.270E-01 1.21E 00 1.00          4 4    14  00  0.    0. 0
GEQP05   1IC-TI-SN5440---W+1.00 1.00  95AB-U   B-10.500E 010.105E-01 0.270E-01 1.81E-01 1.00          2 2    14  00  0.    0. 0
GEQP05   2IC-TI-SN5473---W+1.00 1.00  95AB-U   B-10.500E 010.200E-01 0.400E-01 9.80E-01 1.00         2020    14  00  0.    0. 0
GEQP05   1IC-FSCUA741--3FM+1.00 1.00  95AB-U   B-10.150E 020.170E-02 0.280E-02 2.23E 00 1.00         1115    10  00  0.    0. 2
GEQP05   1IC-FSCUA741--3FM+1.00 1.00  95AB-U   B-10.150E 020.170E-02 0.280E-02 0.                    0 0     0  00  0.    0. 0
GEQP05   0PCB    PCBXXXXXXX      0.   100        0.       0.       0.       1.70E 00 0.17E 01 0.169E 03    0  0   0.    0.
CASE NO.0 GEQP05
TOTAL FAILURE RATE FOR CASE GEQP050      429.13 FAILURES PER MILLION HOURS
EQUIPMENT MTBF FOR CASE   00      2330.3 HOURS
TOTAL COMPONENT PRICE IN SMALL QUANTITIES FOR CASE   00 $        0.
TOTAL COMPONENT PRICE IN 1000 QUANTITIES  FOR CASE   00 $        0.
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EXAMPLE SUMMARY OF FAILURE RATES CONT.

GEQP0Y	3D—TI-1N4153		+1.00	0.10	65AB-U	JAN0.500E	020.	0.	5.40E-01	1.00	0	0	SD	2 251	0.	0. 0
GEQP0Y	1D—FSC1N4306		+1.00	0.10	65AB-U	JAN0.500E	020.	0.	2.57E-01	1.00	0	0	SD	21501	0.	0. 0
GEQP0Y	4D—TI-1N914		+1.00	0.10	65AB-U	JANTX0.100E	030.	0.	2.05E-01	1.00	0	0	SD	2 251	0.	0. 0
GEQP0Y	6XR-TI-2N2219		+1.00	0.10	65AB-U	JANTX0.300E	020.	0.	3.10E 00	1.00	0	0	SD	3 251	0.	0. 0
GEQP0Y	4XR-TI-2N2219		+1.00	0.10	65AB-U	JANTX0.300E	020.	0.	2.06E 00	1.00	0	0	SD	3 251	0.	0. 0
GEQP0Y	7XR-TI-2N2907		+1.00	0.10	65AB-U	JAN0.360E	020.	0.	2.06E 01	1.00	0	0	SD	3 251	0.	0. 0
GEQP0Y	8XR-TI-2N2907		+1.00	0.10	65AB-U	JANTX0.360E	020.	0.	4.73E 00	1.00	0	0	SD	3 251	0.	0. 0
GEQP0Y	2XR-TI-2N3251A		+1.00	0.10	65AB-U	JAN0.270E	020.	0.	1.26E 00	1.00	0	0	SD	3 251	0.	0. 0
GEQP0Y	1XR-TI-2N4858		+1.00	0.10	65AB-U	JAN0.	0.	0.	1.12E 00	1.00	0	0	SD	3 251	0.	0. 0
GEQP0Y	9XR-MON2N4947		+1.00	0.10	65AB-U	JAN0.	0.	0.	6.04E 01	1.00	0	0	SD	3 251	0.	0. 0
GEQP0Y	9XR-MON2N4947		+1.00	0.10	65AB-U	JAN0.	0.	0.	6.04E 01	1.00	0	0	SD	3 251	0.	0. 0
GEQP0Y	9XR-MON2N4947		+1.00	0.10	65AB-U	JAN0.	0.	0.	6.04E 01	1.00	0	0	SD	3 251	0.	0. 0
GEQP0Y	5XR-TI-2N706		+1.00	0.10	65AB-U	JAN0.150E	020.	0.	1.29E 01	1.00	0	0	SD	3 251	0.	0. 0
GEQP0Y	2CAP	CK60BX101K		0.10	65AB-U	0.150E	020.	0.	4.32E-01	1.00	0	0		2 00	0.	0. 0
GEQP0Y	3CAP	CK60BX101K		0.10	70AB-U	0.150E	020.	0.	8.57E-02	0.10	0	0		2 00	0.	0. 0
GEQP0Y	1CAP	CK60BX470K		0.20	65AB-U	0.150E	020.	0.	2.70E-01	1.00	0	0		2 00	0.	0. 0
GEQP0Y	2IND	LT4K032		1.00	65AB-UM	ILSPC0.	0.	0.	1.72E-02	0.10	0	0		0 00	0.	0. 0
GEQP0Y	1IND	LT4K032		1.00	65AB-UM	ILSPC0.	0.	0.	8.60E-02	1.00	0	0		0 00	0.	0. 0
GEQP0Y	4CAP	M39003/02-0034		0.30	65AB-U	0.	0.	0.	9.76E-03	1.00	0-1125			2 180	0.	0. 0
GEQP0Y	5CAP	M39003/02-0094		0.50	65AB-U	0.	0.	0.	2.54E-02	1.00	0-1125			2 180	0.	0. 0
GEQP0Y	9CAP	M39003/02-0096		0.50	65AB-U	0.	0.	0.	4.56E-02	1.00	0-1125			2 180	0.	0. 0
GEQP0Y	10CAP	M39003/02-0098		0.10	65AB-U	0.	0.	0.	1.74E-02	1.00	0-1125			2 180	0.	0. 0
GEQP0Y	8CAP	M39003/02-0101		0.60	65AB-U	0.	0.	0.	6.00E-02	1.00	0-1125			2 180	0.	0. 0
GEQP0Y	7CAP	M39003/02-0111		0.60	70AB-U	0.	0.	0.	5.71E-02	1.00	0-1125			2 180	0.	0. 0
GEQP0Y	6CAP	M39003/02-0111		0.30	70AB-U	0.	0.	0.	1.59E-02	1.00	0-1125			2 180	0.	0. 0
GEQP0Y	1RES	RC08GF103K		0.10	65AB-UM	ILSPC0.	0.	0.	3.02E-02	1.00	0	0		2 00	0.	0. 0
GEQP0Y	2RES	RC08GF203K		0.20	65AB-UM	ILSPC0.	0.	0.	7.44E-02	1.00	0	0		2 00	0.	0. 0
GEQP0Y	9RES	RLR07C203JP		0.10	65AB-U	0.	0.	0.	7.76E-03	0.10	0	0		2 00	0.	0. 0
GEQP0Y	6RES	RLR07C222JP		0.20	65AB-U	0.	0.	0.	5.86E-02	1.00	0	0		2 00	0.	0. 0
GEQP0Y	7RES	RLR07C473JP		0.40	65AB-U	0.	0.	0.	8.75E-03	0.10	0	0		2 00	0.	0. 0

EXAMPLE SUMMARY OF FAILURE RATES CONT.

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GEQP0Y   8RES   RLR07C582JP      0.25  65AB-U      0.       0.       0.       8.32E-03 0.10          0 0     2  00  0.    0. 0
GEQP0Y   5RES   RLR07CA03JP      0.10  65AB-U      0.       0.       0.       4.31E-02 1.00          0 0     2  00  0.    0. 0
GEQP0Y  10RES   RNR55C1002FR     0.30  65AB-U      0.       0.       0.       3.40E-02 1.00          0 0     2  00  0.    0. 0
GEQP0Y  15RES   RNR55C1002FR     0.10  65AB-U      0.       0.       0.       3.98E-03 0.10          0 0     2  00  0.    0. 0
GEQP0Y  13RES   RNR55C1003FR     0.10  65AB-U      0.       0.       0.       3.80E-02 1.00          0 0     2  00  0.    0. 0
GEQP0Y  12RES   RNR55C2001FR     0.20  65AB-U      0.       0.       0.       3.60E-02 1.00          0 0     2  00  0.    0. 0
GEQP0Y  11RES   RNR55C2202FR     0.15  65AB-U      0.       0.       0.       3.10E-02 1.00          0 0     2  00  0.    0. 0
GEQP0Y  14RES   RNR55C6802FR     0.10  70AB-U      0.       0.       0.       3.89E-02 1.00          0 0     2  00  0.    0. 0
GEQP0Y  16RES   RT12C2P202       0.10  65AB-UMILSPC0.       0.       0.       4.00E 01 1.00          0 0     2  00  0.    0. 0
GEQP0Y   3IC-TI-SN5400---W+1.00 1.00  65AB-U   B-10.500E 010.800E-02 0.220E-01 6.27E-01 1.00          4 4    14  00  0.    0. 0
GEQP0Y   4IC-TI-SN5401---W+1.00 1.00  65AB-U   B-10.500E 010.800E-02 0.220E-01 8.36E-01 1.00          4 4    14  00  0.    0. 0
GEQP0Y   5IC-TI-SN5402---W+1.00 1.00  65AB-U   B-10.500E 010.110E-01 0.270E-01 1.05E 00 1.00          4 4    14  00  0.    0. 0
GEQP0Y   1IC-TI-SN5440---W+1.00 1.00  65AB-U   B-10.500E 010.105E-01 0.270E-01 1.60E-01 1.00          2 2    14  00  0.    0. 0
GEQP0Y   2IC-TI-SN5473---W+1.00 1.00  65AB-U   B-10.500L 010.200E-01 0.400E-01 7.84E-01 1.00         2020    14  00  0.    0. 0
GEQP0Y   1IC-FSCUA741--3FM+1.00 1.00  65AB-U   B-10.150E 020.170E-02 0.280E-02 8.70E-01 1.00         1115    10  00  0.    0. 2
GEQP0Y   1IC-FSCUA741--3FM+1.00 1.00  65AB-U   B-10.150E 020.170E-02 0.280E-02 0.                    0 0     0  00  0.    0. 0
GEQP0Y   0PCB    PCBXCCCCCC      0.    100         0.       0.       0.       1.70E 00 0.17E 01 0.169E 03   0  0   0.    0.
CASE NO.0 GEQP0Y
TOTAL FAILURE RATE FOR CASE GEQP0Y0       275.53 FAILURES PER MILLION HOURS
EQUIPMENT MTBF FOR CASE   00       3629.4 HOURS
TOTAL COMPONENT PRICE IN SMALL QUANTITIES FOR CASE   00 $         0.
TOTAL COMPONENT PRICE IN 1000 QUANTITIES  FOR CASE   00 $         0.
```

EXAMPLE SUMMARY OF FAILURE RATES CONT.

GEQPOX	3D--TI-1N4153		+1.00	0.10	75AB-U	JAN	0.500E	020.	0.	6.42E-01	1.00	0	0	SD	2 251	0.	0.0
GEQPOX	1D--FSC1N4306		+1.00	0.10	75AB-U	JAN	0.500E	020.	0.	3.06E-01	1.00	0	0	SD	21501	0.	0.0
GEQPOX	4D--TI-LM314		+1.00	0.10	75AB-U	JANTX	0.100E	030.	0.	2.45E-01	1.00	0	0	SD	2 251	0.	0.0
GEQPOX	4XR-TI-2N2219		+1.00	0.10	75AB-U	JANTX	0.300E	020.	0.	2.30E 00	1.00	0	0	SD	3 251	0.	0.0
GEQPOX	6XR-TI-2N2219		+1.00	0.10	75AB-U	JANTX	0.300E	020.	0.	3.46E 00	1.00	0	0	SD	3 251	0.	0.0
GEQPOX	7XR-TI-2N2907		+1.00	0.10	75AB-U	JAN	0.360E	020.	0.	2.33E 01	1.00	0	0	SD	3 251	0.	0.0
GEQPOX	8XR-TI-2N2907		+1.00	0.10	75AB-U	JANTX	0.360E	020.	0.	5.33E 00	1.00	0	0	SD	3 251	0.	0.0
GEQPOX	2XR-TI-2N3251A		+1.00	0.10	75AB-U	JAN	0.270E	020.	0.	1.42E 00	1.00	0	0	SD	3 251	0.	0.0
GEQPOX	1XR-TI-2N4858		+1.00	0.10	75AB-U	JAN	0.	0.	0.	1.25E 00	1.00	0	0	SD	3 251	0.	0.0
GEQPOX	9XR-MOT2N4947		+1.00	0.10	75AB-U	JAN	0.	0.	0.	7.07E 01	1.00	0	0	SD	3 251	0.	0.0
GEQPOX	9XR-MOT2N4947		+1.00	0.10	75AB-U	JAN	0.	0.	0.	7.07E 01	1.00	0	0	SD	3 251	0.	0.0
GEQPOX	9XR-MOT2N4947		+1.00	0.10	75AB-U	JAN	0.	0.	0.	7.07E 01	1.00	0	0	SD	3 251	0.	0.0
GEQPOX	5XR-TI-2N706		+1.00	0.10	75AB-U	JAN	0.150E	020.	0.	1.44E 01	1.00	0	0	SD	3 251	0.	0.0
GEQPOX	3CAP	CK60BX101K		0.10	70AB-U		0.150E	020.	0.	6.57E-02	0.10	0	0		2 00	0.	0.0
GEQPOX	2CAP	CK60BX101K		0.10	75AB-U		0.150E	020.	0.	4.42E-01	1.00	0	0		2 00	0.	0.0
GEQPOX	1CAP	CK60BX470K		0.20	75AB-U		0.150E	020.	0.	2.77E-01	1.00	0	0		2 00	0.	0.0
GEQPOX	1IND	LT4K032		1.00	75AB-UMIL	SPC	0.	0.	0.	1.00E-01	1.00	0	0		0 00	0.	0.0
GEQPOX	2IND	LT4K032		1.00	75AB-UMIL	SPC	0.	0.	0.	2.00E-02	0.10	0	0		0 00	0.	0.0
GEQPOX	4CAP	M39003/02-0094		0.30	75AB-U		0.	0.	0.	1.17E-02	1.00	0-1125			2 180	0.	0.0
GEQPOX	5CAP	M39003/02-0094		0.50	75AB-U		0.	0.	0.	3.03E-02	1.00	0-1125			2 180	0.	0.0
GEQPOX	9CAP	M39003/02-0096		0.50	75AB-U		0.	0.	0.	5.45E-02	1.00	0-1125			2 180	0.	0.0
GEQPOX	10CAP	M39003/02-0098		0.10	75AB-U		0.	0.	0.	2.08E-02	1.00	0-1125			2 180	0.	0.0
GEQPOX	8CAP	M39003/02-0101		0.60	75AB-U		0.	0.	0.	7.18E-02	1.00	0-1125			2 180	0.	0.0
GEQPOX	7CAP	M39003/02-0111		0.60	70AB-U		0.	0.	0.	5.71E-02	1.00	0-1125			2 180	0.	0.0
GEQPOX	6CAP	M39003/02-0111		0.30	70AB-U		0.	0.	0.	1.59E-02	1.00	0-1125			2 180	0.	0.0
GEQPOX	1RLS	RC08GF103K		0.10	75AB-UMIL	SPC	0.	0.	0.	4.32E-02	1.00	0	0		2 00	0.	0.0
GEQPOX	2RLS	RC08GF203K		0.20	75AB-UMIL	SPC	0.	0.	0.	1.07E-01	1.00	0	0		2 00	0.	0.0
GEQPOX	3RLS	RLR07C203JP		0.10	75AB-U		0.	0.	0.	8.50E-03	0.10	0	0		2 00	0.	0.0
GEQPOX	6RLS	RLR07C222JP		0.20	75AB-U		0.	0.	0.	6.42E-02	1.00	0	0		2 00	0.	0.0
GEQPOX	7RLS	RLR07C473JP		0.40	75AB-U		0.	0.	0.	9.66E-03	0.10	0	0		2 00	0.	0.0
GEQPOX	8RLS	RLR07C582JP		0.25	75AB-U		0.	0.	0.	9.12E-03	0.10	0	0		2 00	0.	0.0

EXAMPLE SUMMARY OF FAILURE RATES CONT.

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GEQPOX   5RES    RLR07CA03JP      0.10  75AB-U      0.        0.        0.        4.72E-02 1.00            0 0     2  00  0.    0.0
GEQPOX  10RES    RNR55C1002FR     0.30  75AB-U      0.        0.        0.        3.75E-02 1.00            0 0     2  00  0.    0.0
GEQPOX  15RES    RNR55C1002FR     0.10  75AB-U      0.        0.        0.        4.37E-03 0.10            0 0     2  00  0.    0.0
GEQPOX  13RES    RNR55C1003FR     0.10  75AB-U      0.        0.        0.        4.16E-02 1.00            0 0     2  00  0.    0.0
GEQPOX  12RES    RNR55C2001FR     0.20  75AB-U      0.        0.        0.        3.96E-02 1.00            0 0     2  00  0.    0.0
GEQPOX  11RES    RNR55C2202FR     0.15  75AB-U      0.        0.        0.        3.41E-02 1.00            0 0     2  00  0.    0.0
GEQPOX  14RES    RNR55C6802FR     0.10  70AB-U      0.        0.        0.        3.89E-02 1.00            0 0     2  00  0.    0.0
GEQPOX  16RES    RT12C2P202       0.10  75AB-UMILSPC0.        0.        0.        4.51E 01 1.00            0 0     2  00  0.    0.0
GEQPOX   3IC-TI-SN5400---W+1.00 1.00  75AB-U   B-10.500E 010.800E-02 0.220E-01 6.48E-01 1.00            4 4    14  00  0.    0.0
GEQPOX   4IC-TI-SN5401---W+1.00 1.00  75AB-U   B-10.500E 010.800E-02 0.220E-01 8.64E-01 1.00            4 4    14  00  0.    0.0
GEQPOX   5IC-TI-SN5402---W+1.00 1.00  75AB-U   B-10.500E 010.110E-01 0.270E-01 1.08E 00 1.00            4 4    14  00  0.    0.0
GEQPOX   1IC-TI-SN5440---W+1.00 1.00  75AB-U   B-10.500E 010.105E-01 0.270E-01 1.65E-01 1.00            2 2    14  00  0.    0.0
GEQPOX   2IC-TI-SN5473---W+1.00 1.00  75AB-U   B-10.500E 010.200E-01 0.400E-01 8.30E-01 1.00         2020    14  00  0.    0.0
GEQPOX   1IC-FSCUA741--3FM+1.00 1.00  75AB-U   B-10.150E 020.170E-02 0.280E-02 1.10E 00 1.00         1115    10  00  0.    0.2
GEQPOX   1IC-FSCUA741--3FM+1.00 1.00  75AB-U   B-10.150E 020.170E-02 0.280E-02 0.                      0 0     0  00  0.    0.0
GEQPOX   0PCB    PCBXXXXXXX       0.    75AB-U      0.        0.        0.        1.70E 00 0.17E 01 0.169E 03   0 0     0  0   0.    0.
CASE NO.0 GEQPOX
TOTAL FAILURE RATE FOR CASE GEQPOX0      317.77 FAILURES PER MILLION HOURS
EQUIPMENT MTBF FOR CASE   00      3146.9 HOURS
TOTAL COMPONENT PRICE IN SMALL QUANTITIES FOR CASE   00 $        0.
TOTAL COMPONENT PRICE IN 1000 QUANTITIES  FOR CASE   00 $        0.
```

APPENDIX VII

Notes On Input Data Format

This appendix has been provided for quick reference to the notes called out on the input data layout sheets.

Notes For Capacitors

1. If stress is not entered, enter the operating voltage in volts.

2. Screening level is necessary on type CB, CC, CV, and PC only. All other types include the screening level as a code in the part number.

3. For type M39003/— the series resistance must be entered.

Notes For Discrete Semiconductors

1. Enter the application code if the device falls into Groups I, II, IV, and V only.

2. Enter the applied voltage, in volts, for Groups I and IV only.

3. If stress is entered, there is no need to fill in Cols. 56 through 80 (except for applied voltage for Groups I and IV, as per Note 2).

4. If stress is not entered, enter "H" if the device is used with a heatsink.

5. If stress is not entered, enter "A" for ambient or "C" for case, indicating which temperature is given in the operating temperature field.

6. If stress is not entered, and the device is in the group:

a. I, II, or III, enter in field Q1 the power dissipated in watts for the side being evaluated. If a dual device, enter in field Q2 the power dissipated in watts for the side not being evaluated. (If both sides of a dual device are to be evaluated, two input data records (one for each side of the device) must be entered into the Input Data File.)

b. IV or VI enter in field Q1 the average forward current in amps.

c. V, enter either the power dissipated in watts in field Q1, or the operating current in amps in field Q2.

d. VII, enter in field Q1 the operating spike leakage in ergs.

e. VIII, enter in field Q1 the power dissipated in watts.

Notes For Inductors

1. Stress is applicable to type "TF" only.

Notes For Resistors

1. For all types except RTH, if stress is not entered, enter the operating power in watts in field Q1.

2. For type RA, enter the operating power in watts in field Q1 even if the stress is entered.

3. For type RER, enter in Clo 55 "A" for free air mount, or "b" for chassis mount.

4. For types RA, RK, RJ, RP, and RR, enter in field Q3 the number of taps, if greater than 3.

Notes For Rotating Devices

1a. For fans and blowers enter the number of pairs of windings (1-6).

b. For synchros and resolvers enter the number of brushes (2-4).

2. For high speed motors enter case characteristic (A,B,C).

3a. For fans, blowers and high speed motors enter operating hours.

b. For synchros and resolvers enter size.

METRIC SYSTEM

BASE UNITS:

Quantity	Unit	SI Symbol	Formula
length	metre	m	...
mass	kilogram	kg	...
time	second	s	...
electric current	ampere	A	...
thermodynamic temperature	kelvin	K	...
amount of substance	mole	mol	...
luminous intensity	candela	cd	...

SUPPLEMENTARY UNITS:

plane angle	radian	rad	...
solid angle	steradian	sr	...

DERIVED UNITS:

Acceleration	metre per second squared	...	m/s
activity (of a radioactive source)	disintegration per second	...	(disintegration)/s
angular acceleration	radian per second squared	...	rad/s
angular velocity	radian per second	...	rad/s
area	square metre	...	m
density	kilogram per cubic metre	...	kg/m
electric capacitance	farad	F	A·s/V
electrical conductance	siemens	S	A/V
electric field strength	volt per metre	...	V/m
electric inductance	henry	H	V·s/A
electric potential difference	volt	V	W/A
electric resistance	ohm	...	V/A
electromotive force	volt	V	W/A
energy	joule	J	N·m
entropy	joule per kelvin	...	J/K
force	newton	N	kg·m/s
frequency	hertz	Hz	(cycle)/s
illuminance	lux	lx	lm/m
luminance	candela per square metre	...	cd/m
luminous flux	lumen	lm	cd·sr
magnetic field strength	ampere per metre	...	A/m
magnetic flux	weber	Wb	V·s
magnetic flux density	tesla	T	Wb/m
magnetomotive force	ampere	A	...
power	watt	W	J/s
pressure	pascal	Pa	N/m
quantity of electricity	coulomb	C	A·s
quantity of heat	joule	J	N·m
radiant intensity	watt per steradian	...	W/sr
specific heat	joule per kilogram-kelvin	...	J/kg·K
stress	pascal	Pa	N/m
thermal conductivity	watt per metre-kelvin	...	W/m·K
velocity	metre per second	...	m/s
viscosity, dynamic	pascal-second	...	Pa·s
viscosity, kinematic	square metre per second	...	m/s
voltage	volt	V	W/A
volume	cubic metre	...	m
wavenumber	reciprocal metre	...	(wave)/m
work	joule	J	N·m

SI PREFIXES:

Multiplication Factors	Prefix	SI Symbol
1 000 000 000 000 = 10^{12}	tera	T
1 000 000 000 = 10^{9}	giga	G
1 000 000 = 10^{6}	mega	M
1 000 = 10^{3}	kilo	k
100 = 10^{2}	hecto*	h
10 = 10^{1}	deka*	da
0.1 = 10^{-1}	deci*	d
0.01 = 10^{-2}	centi*	c
0.001 = 10^{-3}	milli	m
0.000 001 = 10^{-6}	micro	μ
0.000 000 001 = 10^{-9}	nano	n
0.000 000 000 001 = 10^{-12}	pico	p
0.000 000 000 000 001 = 10^{-15}	femto	f
0.000 000 000 000 000 001 = 10^{-18}	atto	a

* To be avoided where possible.

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This report presents instructions for the implementation of the ORACLE Computer Program, as developed by the US Army, on the RADC/Honeywell GCOS 6000 Computer System. This version of the ORACLE Program is a software package which determines:

The failure rate of electronic piece-parts based on the procedures set forth in MIL-HDBK-217B. → next page

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