CR-3 Inadequate Core Cooling Mitigation System

Reliability Assessment, Task 1

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0.0 EXECUTIVE SUMMARY

Progress Energy established desired availability/reliability goals of 0.999 over a 184 day period for 4 specified ICCMS functions, based on performing train surveillance testing every six months. The reliability analysis was performed in accordance with IEEE Standard 352-1987, "IEEE Guide for General Principles of Reliability Analysis of Nuclear Power Generating Station Safety Systems," and IEEE Standard 577-2004, "IEEE Standard Requirements for Reliability Analysis in the Design and Operation of Safety Systems for Nuclear Facilities". This analysis used the calculation model from MIL-HDBK-217F "Military Handbook Reliability Prediction of Electronic Equipment."

This analysis did not consider software failure, because the ICCMS is an analog system; it does not rely on software to perform any safety related function. The analysis did consider individual component failures. The availability analysis calculates an availability for each of the four evaluated ICCMS functions ranging from .99999371 to .99999919, using an estimated mean time to repair of 12 hours. This easily exceeds the .999 requirement. The reliability analysis calculates an availability for each of the four evaluated ICCMS functions ranging from .99925529 to .99989786, using the 184 day period. This exceeds the .999 reliability goal for 184 days, and, therefore, meets the requirements of IEEE 603 Clause 5.15.

1.0 INTRODUCTION

An extended power uprate (EPU) is being implemented for Progress Energy's Crystal River Unit 3 Nuclear Station (CR-3). As a component to the EPU, Progress Energy has initiated a project to design and install a new Inadequate Core Cooling Mitigation System (ICCMS). The ICCMS shall be utilized to perform three Loss of Coolant Accident (LOCA) mitigation actuations. Additionally, the ICCMS will provide selected Reg. Guide 1.97 Post Accident Monitoring Instruments.

The three LOCA mitigation actuations are: 1) automatic tripping of the RCPs within one minute of a reactor trip with a loss of sub cooling margin (LOSCM) in the Reactor Coolant System (RCS); 2) automatic raising of the SG level control to the ISCM set point within 20 minutes of a reactor trip and LOSCM in the RCS; and 3) automatic actuation of the Fast Cooldown System (FCS), which shall actuate the Atmospheric Dump Valves (ADVs) in Fast Cooldown mode. Actuation of the ADVs will occur within 10 minutes of a reactor trip and LOSCM, coupled with an inadequate High Pressure Injection (HPI) flow as measured by the ICCMS.

The three Reg. Guide 1.97 Accident Monitoring indications are 1) subcooling margin; 2) superheat; and 3) HPI flow margin.

The overall project includes a reliability program which includes the Reliability, Availability, and Maintainability (RAM) analyses consisting of Task 1: Reliability Assessment, Task 2: Failure Modes and Effects Analysis, and Task 3: Manufacturer's Data Collection. The purpose of this report is to document the Reliability Assessment performed for Task 1 at the 100% design phase.

2.0 INTENDED USE OF ANALYSIS RESULTS

As part of the CR-3 ICCMS Risk and Reliability effort, the Reliability Analysis is performed at two stages in the design, corresponding to the 60% design and the 100% final design and was performed following the guidance provided in ANS/IEEE Std. 352-1987 [1]. The goals of the analysis are to:

- Demonstrate that the system meets the desired availability value
- Demonstrate that the system meets the desired reliability value
- Determine the reliability of the system with a testing interval of 184 days

Additionally, the modeling methods utilized confirm that the ICCMS meets the single failure requirement.

This analysis was performed according to the guidelines established in the CR-3 ICCMS RAM Project Plan [2], Task Plan 1 [3], and Scientech Quality Assurance Manual [4].

3.0 TECHNICAL APPROACH

3.1 Availability and Reliability Assessment Methodology

The methodology employed is based upon and consistent with IEEE 603 and IEEE 352. An overview of the RAM Methodology is shown in Figure 1. Each of the activities in the Reliability Approach is discussed below (note that the number of each activity is also shown in the figure).

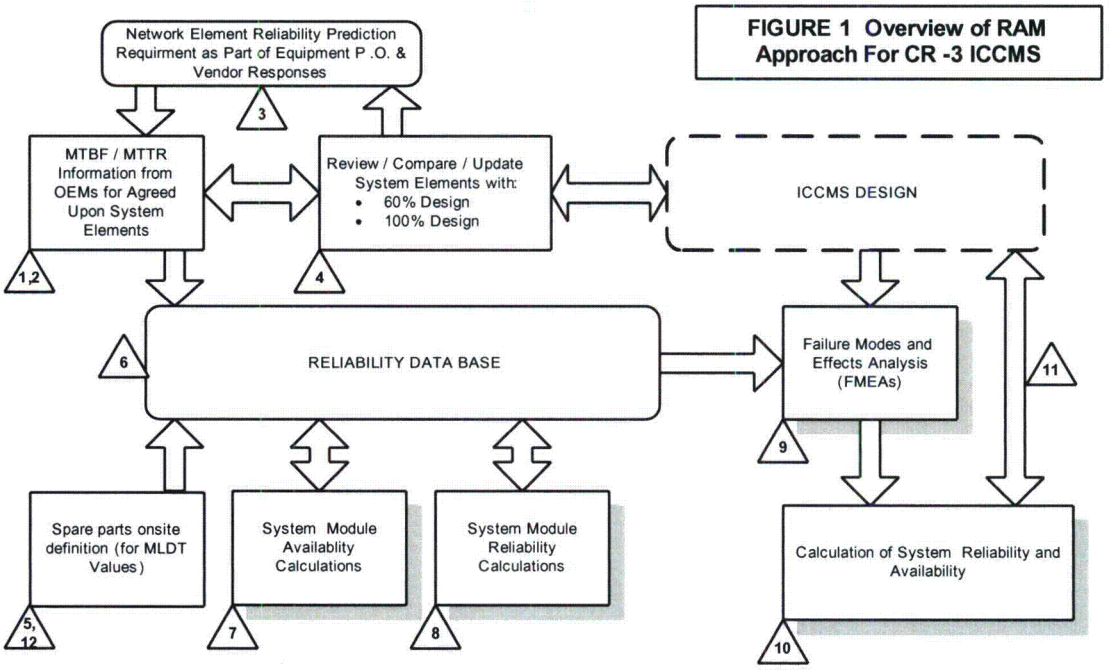


FIGURE 1 Overview of RAM Approach For CR -3 ICCMS

N **Symbol Refers to Activity "N" Described in Section 2.2**

1) The modules that form the system for RAM Analysis are defined as described in the system block diagram [5].

2) The Mean Time Between Failures (MTBF) / Mean Time To Repair (MTTR) information is documented for each system element; this information is to be provided by the component suppliers / OEMs. If this information is not available from the component suppliers / OEMs then it will be obtained from similar components or generic sources [1].

3) Each manufacturer providing parts for the system was requested to provide the reliability information on their supplied parts. The best available data for MTBF and MTTRs was used. Generic data is documented in the Task 1 30% Report [6] and the Task 3 Report [7].

4) The system module list was iteratively updated in conjunction with the maturation and refinement of the system design and selection of parts vendors. There are submittals of this to CR-3 at the 60% and 100% Design Approval stage.

5) CR-3 has provided the Mean Logistical Delay Times, MLDT[1], the expected delay time from fault identification to initiating maintenance is 4 hours and the expected delay time from the time that repair has been completed until the channel/train is restored to service is 2 hours. For all Availability calculations, Scientech used the provided MLDT values for all Network Elements.

6) The combination of the MTBF, MTTR, and MLDT values make up the Reliability Data Base. This data is maintained in an Excel table with version control.

7) The System Availability is calculated using the following method:

   Compute the availability of each network element by dividing the MTBF by the sum of MTBF, MTTR, and MLDT. For the i^{th} network element:

$$AVAILABILITY_i = \frac{MTBF_i}{MTBF_i + MTTR_i + MLDT_i}$$

8) The System Reliability will be calculated using the following method:

   Compute the Reliability of any single module by applying the exponential function to the negative of the quotient that results when the mission duration is divided by the MTBF for that network element. For the i^{th} network element:

$$RELIABILITY_i = e^{-\lambda_i t}$$

   Where $\lambda = 1/MTBF$ and t = Mission Duration

   The Mission Duration is the period of time during from when the system is "started" until the system is tested and verified as operable. When testing verifies that the system is

[1] Procurement specification

operable the exposure time of the system is reset. For example, if the system is only tested during refueling outages it is verified as operable at that interval and the time clock is reset. In this study the test interval has been defined as 184 days the CR-3.

9) Using the Module Design Single-Line Functional Block Wiring and System-Level Diagram (a 30% Design deliverable), Failure Modes and Effect Analysis [8], (FMEAs), were conducted by the Scientech design and reliability team at the 60% design stage and updated at the 100% design stage. The FMEAs were conducted in accordance with IEEE 352 (See R&R TP2-17877).

10) For the entire system, a reliability and availability (end to end) estimate is calculated using the Reliability Database and the module reliability and availability values generated in Activities 7 and 8.

11) During the evaluation of the system reliability and availability, there has been considerable dialog between the system design team and reliability team in order to assure that the Reliability and Availability requirements are met. This activity reflects that those interactions may result in design modifications.

12) The required quantities of reliability replacements (spares) will be calculated in accordance with the contract specification and additional clarification received from CR-3. This will be performed at the 60% and 100% Designs.

3.2 Model Development and Quantification

The following Sections describe the development of the availability and reliability models for the ICCMS, its quantification, and the results obtained.

3.2.1 System and Top Events

A block diagram of the ICCMS is presented in Appendix A. The block diagram is developed from NUS-A304DB, Rev. 3. Appendix A consists of 6 sheets. The first three sheets correspond to Trip Chanel Cabinets 1 through 3. Sheets 4 through 6 contain the Train A and Train B trip logic, which are physically located within cabinets 1 and 2. The MCB Display functions are shown in the first 2 sheets with the components located on the MCB indicated with shading. The ICCMS was evaluated for the following four system functions:

- Fast Cooldown System Initiation (FCS INIT)
- Emergency Feedwater Initiation and Control (EFIC) Inadequate Subcooling Margin (ISCM) Setpoint
- Reactor Coolant Pump Trip
- MCB Reg. Guide 1.97 Display Functions

3.2.2 *Success Criteria*

The success criteria defined for the four functions being evaluated are as follows:

- FCS Initiation – The success of either Trip Train A or Trip Train B to provide a signal to MSV-25 and MSV-26 such that both MSV-25 and MSV-26 receive a signal.
- EFIC ISCM Setpoint - The success of either Trip Train A or Trip Train B to provide the EFIC ISCM Level Trip signal.
- Reactor Coolant Pump Trip – The success of either Trip Train A or Trip Train B to provide a trip signal such that each of the four reactor coolant pumps receives a trip signal.
- MCB Reg. Guide 1.97 Display Functions – The success of either the Channel 1 or Channel 2 displays for each of the indicated functions.

3.2.3 *System Module Data and Databases*

Two separate databases were developed for use in this project; the first is the Availability Database and the second is the Reliability Database. The Availability Database is used to evaluate the system logic to determine the availability of the system. The availability data (WinNUPRA files AV-ICCMS.BED) is calculated as:

$$AVAILABILITY_i = \frac{MTBF_i}{MTBF_i + MTTR_i + MLDT_i}$$

The reliability data (WinNUPRA files RL-ICCMS.BED) is calculated as:

$$FAILURE\ RATE_i = 1 / MTBF_i$$

$$RELIABILITY_i = 1 - FAILURE\ RATE_i$$

Appendix B presents the data development for the standard modules. For each module, the parts list was converted to a worksheet in EXCEL. For each component the item number, part number, description, component manufacturer, the component count for the given module, the MTBF, and failure rate are also shown. The last column calculates the contribution by component to module failure. The contributions are summed to develop the failure rate for the module. Comments are presented in the last column. The first failure rate is for the module only and this value is used in the reliability analysis.

Some of the parts manufacturers do not track or maintain availability/reliability data for the parts that they manufacture. For these components generic data was used. A review of the generic data used in this analysis was performed to ensure the suitability of the date for this application.

The table presented below contains the components in the model that utilize generic data. The last column in the table describes the data source used.

Table of Components Utilizing Generic Data

Part No.	Description	Component Manufacturer	MTBF (hours)	Assumptions
Wire, 600V, Insulated	WIRE, INSULATED, 600V OR GREATER, RYPE B OR C, SIZE AND COLOR AS REQUIRED	N/A	1.00E+08	Generic data from Table 7-3, MIL-HDBK-217F
Wire, 22AWG, BARE	Jumper, 0Ohm	N/A	1.00E+08	Generic data from Table 7-3, MIL-HDBK-217F
3683S-1-105L	Precision Potentiometer, Value Display, 3 Digit, 1Meg	Bourns, Riverside, CA	8.76E+10	The QA manager stated component is sustainable for 20 million revolutions, considering component will rotate at 2 cycles per year, calculated MTBF as 8.76E10 hours.
6638S-1-103	Precision Potentiometer, 10KOhm, 1W Single Turn	Bourns, Riverside, CA	8.76E+10	The QA manager stated component is sustainable for 20 million revolutions, considering component will rotate at 2 cycles per year, calculated MTBF as 8.76E10 hours.
50058-8000	Crimp Terminal, Female	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
50058-8100	Crimp Terminal, Female	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
51021-0300	Connector, Female, 3 POS, 2.54MM	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.

Table of Components Utilizing Generic Data				
Part No.	**Description**	**Component Manufacturer**	**MTBF (hours)**	**Assumptions**
51021-0500	Connector, Female, 5 POS, 1.25 mm	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
51021-1000	Connector, Female 10 POS, 1.25MM	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
53047-0210	Connector, Male 2 POS, 1.25MM, Vertical Thru-Hole	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
53047-03	Connector, Male 3 POS, 2.54MM, Vertical Thru-Hole	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
53047-0310	Connector Header 3POS 1.25MM Vertical TIN	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
53047-0510	Connector, Male, 10 POS, 1.25mm, Vertical Thru Hole	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical

Table of Components Utilizing Generic Data				
Part No.	**Description**	**Component Manufacturer**	**MTBF (hours)**	**Assumptions**
				Specification Sheet, Phoenix Contact.
90120-0122	Connector Header 2POS 0.100" STR TIN	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
53047-10	Connector, Male 10 POS, 1.25mm, vertical Thru-hole	Molex Inc., Lisle, IL	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos	Samtec, New Albany, IN	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos	Samtec, New Albany, IN	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.

Table of Components Utilizing Generic Data				
Part No.	**Description**	**Component Manufacturer**	**MTBF (hours)**	**Assumptions**
EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos	Samtec, New Albany, IN	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
CGA6P3X7R1H335K	Capacitor, Ceramic, 3.3uF, 50V, X7R, 10%, 1210 SMD	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK207R1H105K	Capacitor, Ceramic, 10%, 1uF, 25V MIN	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 50V	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK22C0G1H224J	Capacitor, Ceramic, 10%, 0.22uF, 25V MIN	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK22X7R1E105K	Capacitor, Ceramic, 10%, 1uF, 50V	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK22X7R1E106K	Capacitor, Ceramic, 10%, 10uF, 25V	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK22X7R1H225K	Capacitor, Ceramic, 10%, 2.2uF, X7R, 25V	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3 uF, X7R, 50V	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK22Y5V1E226Z	Capacitor, Ceramic, 20%, 22uF, 25V	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK24C0G1H224J	Capacitor, Ceramic, 10%, 0.22uF, 50V	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK24X7R1E105K	Capacitor, Ceramic, 10%, 1 uF, X7R, 50V	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK28X7R1H103K	Capacitor, Ceramic, 10%, 0.01uF, 25V MIN	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, X7R, 50V	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
FK28X7R1H682K	Capacitor, Ceramic, 10%, 6.8uF, 50V	TDK, Uniondale, NY	3.52E+10	Based on similar capacitors from AVX Corp.
536385-5	Connector, DIN 41612 M 64 POS 2.54 mm Solder Right Angle Thru Hole	TE Connectivily, Belwyn, PA	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too

Table of Components Utilizing Generic Data				
Part No.	**Description**	**Component Manufacturer**	**MTBF (hours)**	**Assumptions**
				conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
3-1437667-1	Connector, Barrier Strip, 8 Pos, 0.325 Spacing, PTH	TE Connectivily, Belwyn, PA	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
3-1437667-4	Connector, Barrier Strip, 2 Pos, 0.325 Spacing, PTH	TE Connectivily, Belwyn, PA	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
3-1437667-3	Connector, Barrier Strip, 10 Pos, 0.325 Spacing, PTH	TE Connectivily, Belwyn, PA	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos	TE Connectivily, Belwyn, PA	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
8-1293640-5	Connector, DIN41612 Type c/2, Vertical, Femal, 48 pos	TE Connectivily, Belwyn, PA	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.

Table of Components Utilizing Generic Data				
Part No.	**Description**	**Component Manufacturer**	**MTBF (hours)**	**Assumptions**
492739-1	Connector, Lightray, Backplane Housing - Simplex	TE Connectivily, Belwyn, PA	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
492740-2	Retention Clip, Lightray, for Backplane Housing	TE Connectivily, Belwyn, PA	N/A	Values based off of Vishay Resistors
492234-1	Connector, Lightray, System Card Houseing - Simplex	TE Connectivily, Belwyn, PA	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
1676174-2	Resistor, Metal Film, 0.1%, 1/10W, 10PPM, 12.7KOhms, 0805	TE Connectivily, Belwyn, PA	1.09E+09	Values based off of Vishay Resistors
1676673-2	Resistor, Thin Film, 24.3kOhm, 1/10W, 0.1%, 10PPM/C, 0805 SMD	TE Connectivily, Belwyn, PA	1.09E+09	Values based off of Vishay Resistors
1676674-3	Resistor, Thin Film, 24.9kOhm, 1/10W, 0.1%, 10PPM/C, 0805 SMD	TE Connectivily, Belwyn, PA	1.09E+09	Values based off of Vishay Resistors
526285-5	Connector, DIN 41612 M 64 POS 2.54 mm, Solder Right Angle Thru-Hole	TE Connectivily, Belwyn, PA	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.
5650948-5	Connector, DIN 41612, TYPE C, 48 POS 2.54 mm, Solder Right Angle Thru-Hole	TE Connectivily, Belwyn, PA	7.69E+08	MTBF based off of component 3111-000(VME) from the PDF document titled 'Connectors.pdf' This was too conservative. Used MTBF of 769230769, Task 1 30% Report, Reference 7 (MINI-PS-100-240AC/24DC/1.3 Technical Specification Sheet, Phoenix Contact.

Table of Components Utilizing Generic Data				
Part No.	**Description**	**Component Manufacturer**	**MTBF (hours)**	**Assumptions**
RN73C2A14K7BTDF	Thin Film Resistor 0.1W, 1% 10PPM 14.7K Ohm, 0805, SMD	TE Connectivily, Belwyn, PA	1.00E+10	Values based off of Vishay Resistors
CMD333UWC	LED, White, T-1, 3/4	Chicago Miniature Lighting, Hackensack, NJ	1.00E+09	Generic data based on LED from Osram Opto Semi
534B1103JC	Precision Potentiometer, 10K, 15 Turn, 0.25" Shaft	Vishay Precision Group, Malvern, PA	8.76E+10	MTBF is pulled from similar component constructed at Bourns.
B516	Board, Adapter, TSSOP to DIP 16 PIN	Bellin	7.69E+08	Connector data from Molex Inc., Lisle, IL
MAZ30K000B	Resistor, Metal Film, 0.1%, 1/8W, 1PPM, 30KOhm, ThroughHole	Alpha Electronics Corp.	6.43E+08	Based on similar resistors
IN5239B	Diode, Zener, 9.1V	Central Semiconductor	4.38E+07	Based on Fairchild Zener Diode

As can be seen in from the above, generic data was used when manufacturer data was not available. In almost all cases data from similar components produced by either the same or other manufacturers was utilized. In some cases the MTBF was calculated based on raw performance data as noted above. Review of the MTBF values shows that numerous connectors has an MTBF of 7.69E+8, the lowest value, resulting in lowest availability, in the table. Review of the model results demonstrates that this component does not contribute significantly to system unavailability or reliability.

An additional calculation was performed to develop data for the availability model. The MTTR and MLDT for the module are used to calculate the module availability. This is presented in the last 3 rows of each worksheet. The dominant contributors to the unavailability of each module are indicated by the associated row being shaded.

The following versions of the parts lists were used for the 100% RAM evaluation [9-24]:

NUS-A323PA, Rev. A Red-Line, Analog Input Module Parts List
NUS-A324PA, Rev. A Red-Line, Analog Output Module Parts List
NUS-A325PA, Rev. 0, Contact Input Module Parts List
NUS-A326PA, Rev. 0, Contact Output Module Parts List
NUS-A327PA, Rev. A, Red-Line Functions Generator Module Parts List
NUS-A328PA, Rev. A Red-Line, Power Supply Monitor Module Part List
NUS-A329PA, Rev. A Red-Line, Alarm Module Parts List
NUS-A330PA, Rev. 0, Reactor Trip Module Parts List
NUS-A331PA, Rev. A Red-Line, Summer Module
NUS-A332PA, Rev. A Red-Line, Display Select Module Parts List
NUS-A333PA, Rev. 0, HI Auctioneer Module Parts List
NUS-A334PA, Rev. A Red-Line, Channel Trip Module Parts List

NUS-A335PA, Rev. 0, Train Trip Module Parts List
NUS-A339PA, Rev. A Red-Line, Difference Module
NUS-A341PA, Rev. 0, Filler Module Parts List
NUS-C099PA, Rev. C, ICCMS Rack Backplane Parts List

All modules were reviewed to identify components that do not contribute to module failure. Components found not to contribute are identified in the tables presented in Appendix B in the last column. Modules with a high importance were additionally reviewed to identify specific components that do not contribute (e.g., if there are 7 resistors of a given specification in a module, how many of them do not impact the operation of the module). The number of components found not to contribute is noted in the last column of the associated tables presented in Appendix B.

The resulting Availability and Failure Rate for each module is presented in the table below. The spreadsheets used to calculate these values are presented in Appendix B.

Module	ID	Availability	Failure Rate
Alarm Module	NUS-A329	0.999931	1.13E-05
Analog Input Module	NUS-A323	0.999943	9.38E-06
Analog Output Module	NUS-A324	0.999899	1.66E-05
HI Auctioneer Module	NUS-A333	0.999972	4.66E-06
Backplane-1	NUS-C099	0.999993	1.01E-06
Backplane-2	NUS-C099	0.999991	1.35E-06
Backplane-3	NUS-C099	0.999999	1.33E-07
Backplane-4	NUS-C099	0.999997	4.85E-07
Backplane-5	NUS-C099	0.999999	1.30E-07
Backplane-6	NUS-C099	0.999999	1.31E-07
Contact Input Module	NUS-A325	0.999972	4.59E-06
Contact Output Module	NUS-A326	0.999978	3.57E-06
Channel Trip Module	NUS-A334	0.999978	3.58E-06
Difference Module	NUS-A339	0.999973	4.44E-06
Display Select Module	NUS-A332	0.999925	1.23E-05
Function Generator Module	NUS-A327	0.999882	1.93E-05
Filler Module	NUS-A341	0.999999	1.68E-07
Power Supply Monitor Module	NUS-A328	0.999939	1.00E-05
Reactor Trip Module	NUS-A330	0.999987	2.17E-06
Summer Module	NUS-A331	0.999977	3.73E-06
Train Trip Module	NUS-A335	0.999972	4.65E-06

The above module values are used in the Availability Database and the Reliability Database in addition to the few single components used in the ICCMS.

3.2.4 Logic Model Development

A common logic model was developed to evaluate both availability and reliability. The model was developed using fault tree methodology in the software package WinNUPRA [25] which is subject to the Scientech QA requirements for safety related software. The fault tree model was evaluated using failure data corresponding to the availability data and the reliability data. Availability was then calculated by subtracting the failure rate from 1.0.

Fault trees were developed to represent the system logic. The same fault tree structure is used for both the availability and reliability calculations although the data used for these calculations differs. The fault trees were developed and solved in the software package WinNUPRA.

Appendix C presents the fault trees developed to represent the ICCMS logic. Eight separate fault trees were developed. These fault trees are presented in Appendix C.

In WinNUPRA, the fault tree gate name for each gate in the logic corresponds to a specific fault tree file known as a .LGC file. Each page name is unique. The first character is always "G" for gate. The next set of characters (up to 3) are the Fault Tree ID. The next set of characters is the Page Name and can consist of 1 to 4 characters. Each page of a fault tree is layed out on a grid. The last 2 positions correspond to the row and column where the gate is located. For this model, the following gate and page names are used:

Portion of Logic	Fault Tree Name	Fault Tree ID
Cabinet 1 Channel Logic	CHANNEL1.LGC	C1-
Cabinet 2 Channel Logic	CHANNEL2.LGC	C2-
Cabinet 3 Channel Logic	CHANNEL3.LGC	C3-
Cabinet Power Supplies	POWER.LGC	PW-
FCS Train Trip Logic	FCS.LGC	FCS
EFIC ISCM Setpoint Logic	EFIC-SET.LGC	EF-
RCP Train Trip Logic	RCP-TRP.LGC	TR-
MCB Display Logic	MCB-DISP.LGC	MCB

The fault trees are described in three groups presented below.

3.2.4.1 Group 1: Trip Channel Logic

3 fault trees represent the 3 sets of channel logic contained in cabinets 1, 2, and 3 (CHANNEL1.LGC, CHANNEL2.LGC, and CHANNEL3.LGC). These fault trees are presented in Appendix C as Figures C-1, C-2, and C-3. Specific areas of the model are presented below. The character "x" is used to indicate channel 1, 2, or 3 as appropriate. Each of the gates described below correspond to the signal at specific points in the system that are identified in the block diagram presented in Appendix A. For example:

Temperature In-core (Gate GCx-1240)

For the case where x indicates channel 1, this gate represents the logic to develop the signal shown coming out of IZ-01-08-14 (shown on the first page of the block diagram in Appendix A in the upper right of the figure) in a box with an angled right side containing the text "T_{incore} CH.1").

Temperature In-core CH. x (Fault Tree CHANNELx.LGC, Gate GCx-1240)

IZ-0x-08-14 processes the inputs from 8 channels of in-core temperature instrumentation. The temperature input is provided by eight channels, each with a single thermocouple (0°F to 2500°F) and temperature transmitter that send 4-20 mA signals. For the purposes of this study, these signals (provided by Incore T/C IM-5G-TE, IM-3L-TE, IM-6C-TE, IM-6O-TE, IM-9H-TE, IM-9E-TE, IM-10O-TE, and IM-13G-TE, shown in dashed boxes in the upper right edge of the first 3 pages of the block diagram presented in Appendix A) are defined as being outside of the established system boundaries and the first components within the system are the EMI/RFI filters that receive the signal. There are eight independent input channels to the ICCMS. Once the channels have processed the high temperature signals, the Hi Auctioneer Module determines which is the highest and passes the data along. Since the logic in IZ-0x-08-14 selects the highest temperature, only 1 of the 8 signals passing into IZ-0X-08-14 is required for success (failure is defined as 8 of 8 inputs failed).

Rx Trip CH. x (Gate GCx-1310)

When a reactor trip occurs there are four breaker combinations that are used to verify that the reactor has been tripped. The four combinations are as follows:

- "A" and "B" OPEN
- "A" and "D1D2" OPEN
- "B" and "C1C2" OPEN
- "C1C2" and "D1D2" OPEN

As long as one of these combinations is True, then the signal is sent to the Reactor Trip Logic Module to send the signal (failure is defined as all 4 combinations fail). These combinations are explicitly modeled in the fault trees under gate(s) GCx-1330.

HPIF REQ CH. 1 (Fault Tree CHANNELx.LGC, Gate GCx-1110)

The system collects data from the RCS Wide Range Pressure or the RCS Low Range Pressure instrumentation to determine the required HPI flow using the HPI flow margin curve. The HPI flow margin curve is defined in provided AREVA calculation 51-9144830-000 "CR-3 EPU Required SBLOCA HPI Flow without FCS". For the purposes of this evaluation only the components within the ICCMS are evaluated. It is assumed that the pressure sensors and any upstream signal processing devices are operable. The system boundary extends to the EMI/RFI filters that receive the pressure signals.

An EMI/RFI filter and Analog Input Module receives signals from each of the 2 pressure sensors and process these signals prior to passing them on to the Alarm Module (IZ-0x-06-

12) to be processed. Once the delay time has been satisfied, the signal is then passed onto the Function Generator Logic Module (IZ-0x-06-01).

TSAT(-err) (Fault Tree CHANNELx.LGC, Gate GCx-11A0)

TSAT(-err) is determined from pressure readings obtained from the RCS Wide Range Pressure and the RCS Low Range Pressure. The RCS Wide Range Pressure is acquired from a single 0-2500 psig instrument that provides a 4-20mA signal, whereas the RCS Low Range Pressure is acquired from a single 0-600 psig instrument that provides a 4-20mA signal.

An EMI/RFI filter and Analog Input Module receive signals for each of the 2 pressure sensors prior to passing them on to the Alarm Module (IZ-0x-06-12) to be processed. The signal is passed onto the Function Generator Logic Module (IZ-0x-06-03) to be processed for the LOSCM step.

TSAT(nom) (Fault Tree CHANNELx.LGC, Gate GCx-11A2)

TSAT(nom) is determined from pressure readings obtained from the RCS Wide Range Pressure and the RCS Low Range Pressure. The RCS Wide Range Pressure is acquired from a single 0-2500 psig instrument that provides a 4-20mA signal, whereas the RCS Low Range Pressure is acquired from a single 0-600 psig instrument that provides a 4-20mA signal.

An EMI/RFI filter and Analog Input Module receive signals for each of the 2 pressure sensors prior to passing them on to the Alarm Module (IZ-0x-06-12) to be processed. The signal is passed onto the DSM2500 Module (IZ-0x-05-07) to be processed for the MCB displays.

TSAT(+err) (Fault Tree CHANNELx.LGC, Gate GCx-11A4)

TSAT(+err) is determined from pressure readings obtained from the RCS Wide Range Pressure and the RCS Low Range Pressure. The RCS Wide Range Pressure is acquired from a single 0-2500 psig instrument that provides a 4-20mA signal, whereas the RCS Low Range Pressure is acquired from a single 0-600 psig instrument that provides a 4-20mA signal.

An EMI/RFI filter and Analog Input Module receives signals for each of the 2 pressure sensors prior to passing them on to the Alarm Module (IZ-0x-06-12) to be processed. The signal is passed onto the DSM2500 Module (IZ-0x-05-07) to be processed for the MCB displays.

HPIF CH. x (Fault Tree CHANNELx.LGC, Gate GCx-1050)

The HPI flow is calculated using instrumentation from four separate channels, each comprising of two EMI/RFI filters (IZ-0x-FILy, where y is 1, 2, 3, or 4), an Analog Input Module (IZ-0x-07-0y, where y is 1, 2, 3, or 4) and a Function Generator Module (IZ-0x-07-

0z, where z is 6, 7, 8, or 9). Using the flow rates gathered, the system sums the individual readings to generate a flow value. This flow value is compared against the required HPI flow to determine if additional cooling is needed. The comparison is performed by IZ-0x-07-13. For this step, it is assumed that the system will successfully provide the HPI Flow only if all four channels are operating.

LOSCM CH. x (Fault Tree CHANNELx.LGC, Gate GCx-1210)

The subcooling margin is calculated using the SCM curve and the instrumentation inputs from the RCS Wide Range Pressure, RCS Low Range Pressure, and the thermocouples. The SCM curve is defined in CR3 calculations I84-0003, SPDS Description Document and I96-0002, SPDS TSAT Display Errors. The SCM curve is based on ASME 1967 steam tables plus instrument uncertainty.

Once the RX Trips, T_{Incore} and $T_{SAT(-err)}$ signals are forwarded to the Alarm Module (IZ-0x-05-12), the logic will calculate the subcooling margin by subtracting T_{Incore} from $T_{SAT(-err)}$. If the value is positive, this will indicate that there is an adequate SCM, whereas a negative value will indicate that there is a LOSCM and the alarm module will be tripped. In order for this step to be successful, the three input signals must be received from their respective instruments and the Alarm Module must compute the logic correctly.

RCP Trip CH. x (Fault Tree CHANNELx.LGC, Gate GCx-1033)

Once the system has determined that there is a loss of subcooling margin, it initiates a series of steps to trip the RCPs. In order for this to happen a LOSCM signal must be sent or a channel trip signal must be sent (the channel trip signal only occurs when an upstream modules that would render the channel inoperable is removed). If either of these signals reaches the Channel Trip Module (IZ-0x-04-06), the system will send a signal to trip the RCPs within 1 minute of reactor trip.

LOHPIFM CH. x (Fault Tree CHANNELx.LGC, Gate GCx-1030)

There are three criteria that are considered; HPI Flow, HPI Flow Required, and RCP Trip. The system calculates the HPI Flow Margin in Alarm Module (IZ-0x-05-14) by subtracting the $HPIF_{Required}$ from the $HPIF_{Measured}$. If the value is positive, this will indicate that there is adequate HPI Flow, whereas a negative value will indicate that there is a lack of flow and that the FCS needs to be initiated. Once the Train Trip Module has determined whether FCS is needed and that the RCPs should be tripped, a signal is passed on to indicate a loss of HPI Flow Margin.

Output Gates

The following gates represent the Channel x signal outputs from Cabinet x:

Gate	Signal
GCx-CAB10	CH. x FCS to Train A
GCx-CAB13	CH. x FCS to Train B
GCx-CAB40	CH. x EFIC ISCM Level to Train A
GCx-CAB43	CH. x EFIC ISCM Level to Train B
GCx-CAB70	CH. x RCP Trip to Train A
GCx-CAB73	CH. x RCP Trip to Train B

Additionally, Cabinets 1 and 2 process signals for the MCB Display functions. The output gates for the MCB displays are:

Gate	Indication
GCx-2010	HPIFM -800 to +800 gpm
GCx-2110	SCM/SH -800 to +800 Deg F
GCx-2113	Incore Indicator Light
GCx-2150	RTD Indicator Light
GCx-2153	Superheat Indicator Light

3.2.4.2 Group 2: Trip Train and MCB Display Logic

Four fault trees develop the Train Trip A and B logic for the four ICCMS functions being evaluated (FCS.LGC, EFIC-SET.LGC, RCP-TRP.LGC, and MCB-DISP.LGC). These fault trees are presented in Appendix C as Figures C-4, C-5, C-6, and C-7 respectively.

The top fault tree gates for the 4 trip functions are:

Gate	Function
GFCS-00	Failure of FCS to open either MSV-25 or MSV-26
GEF-ISCM10	Failure of EFIC ISCM Setpoint Signal
GTR-RCP10	Failure to trip all 4 RCPs
GMCB DIS10	Failure of MCB Display

The Train Trip Logic for FCS, EFIC ISCM, and RCP Trip is essentially the same. The 3 channel trip signals are processed in TTM2500 (IZ-0x-03-10 for FCS and IZ-0x-03-08 for EFIC ISCM Setpoint and IZ-0x-03-06 for RCP Trip). 2 of the 3 signals are needed to generate a Train Trip.

Once the Train Trip signals are generated for these functions they are processed differently. For FCS function, the Train Trip A and B signals are both sent to MSV-25 and MSV-26; either the A or B signal is sufficient for success. For the EFIC ISCM Setpoint function, either the A or B signal is sufficient for success. For the RCP Trip function, the Train Trip A and B signals are sent to each of the 4 RCPs. Either signal will trip an RCP and success of the function requires that all 4 RCPs receive a trip signal.

3.2.4.3 Group 3: Power Supply Logic

The remaining fault tree represents the power supplies for the cabinets (POWER.LGC). This fault tree is presented in Appendix C as Figure C-8.

The power supply logic is straightforward. Each contains 2 redundant power supplies that feed into power supply Module (IZ-0x-04-01 for the cabinets x and IZ-0x-03-01 for Train Trip channels A and B). The top gates for these power supplies are:

Gate	Usage
GPW-CH110	Channel Power Cabinet 1
GPW-CH210	Channel Power Cabinet 2
GPW-CH310	Channel Power Cabinet 3
GPW-TTA10	Trip Train A Power Cabinet 1
GPW-TTB10	Trip Train B Power Cabinet 2

3.2.5 Quantification

The fault trees described above were linked and solved using the batch process in WinNUPRA. Each of the 4 top gates, corresponding to the 4 functions being evaluated in this analysis, was solved twice. The first solution for each function was performed with the Availability Database (WinNUPRA data file ICCMS-AV.BED) and the second solution was performed with the Reliability Database (WinNUPRA data file ICCMS-RL.BED). Note that the WinNUPRA results with the Reliability Database are calculated on a per hour basis. The results obtained are as follows (WinNUPRA file ICCMS-ALL.OUT).

Availability Quantification:

Equation	Database	Top Gate	Unavailability	# Cutsets
AV-FCS.EQN	ICCMS-AV	GFCS-00	6.295E-06	11,696
AV-EFIC.EQN	ICCMS-AV	GEF-ISCM10	8.649E-07	6,196
AV-RCPT.EQN	ICCMS-AV	GTR-RCP10	8.119E-07	6,201
AV-MCBD.EQN	ICCMS-AV	GMCB-0210	8.470E-07	2,128

Reliability Quantification:

Equation	Database	Top Gate	Failure Rate	# Cutsets
RL-FCS.EQN	ICCMS-RL	GFCS-00	1.687E-07	10,687
RL-EFIC.EQN	ICCMS-RL	GEF-ISCM10	2.313E-08	5,803
RL-RCPT.EQN	ICCMS-RL	GTR-RCP10	2.177E-08	5,814
RL-MCBD.EQN	ICCMS-RL	GMCB-0210	2.535E-08	1,935

The top 50 cutset combinations for each of the above functions are presented in Appendix D as Figures D-1 through D-8. These listings are EQD files generated in WinNUPRA.

The logic model is developed in and evaluates failure of the function. Thus, the availability for each function is then calculated as:

AVAILABILITY = 1.0 - UNAVAILABILITY

This calculation was performed in EXCEL with the following results:

AVAILABILITY		
FUNCTION/REQ	**FAILURE RATE**	**AVAILABILITY**
HPI FLOW (FCS INIT)	6.30E-06	0.99999371
SG LEVEL (EFIC ISCM)	8.65E-07	0.99999914
RCP TRIP	8.12E-07	0.99999919
REG 1.97	8.47E-07	0.99999915

The logic model is developed in and evaluates failure of the function. Thus, the reliability for each function is then calculated as:

$RELIABILITY_i = 1 / FAILURE\ RATE_i$

The Reliability model results were evaluated with 3 different mission times. These are a 184 day surveillance period, a 1 year period, and a 1.5 year period. These calculations were performed in EXCEL with the results presented in the tables below.

Reliability for 184 day surveillance period		
FUNCTION/REQ	**FAILURE RATE**	**RELIABILITY**
HPI FLOW (FCS INIT)	1.69E-07	0.999255298
SG LEVEL (EFIC ISCM)	2.31E-08	0.999897863
RCP TRIP	2.18E-08	0.999903868
REG 1.97	2.54E-08	0.999888061

Reliability for 1 yr. period		
FUNCTION/REQ	**FAILURE RATE**	**RELIABILITY**
HPI FLOW (FCS INIT)	1.69E-07	0.998523279
SG LEVEL (EFIC ISCM)	2.31E-08	0.999797402
RCP TRIP	2.18E-08	0.999809313
REG 1.97	2.54E-08	0.999777959

Reliability for 1.5 yr. period		
FUNCTION/REQ	**FAILURE RATE**	**RELIABILITY**
HPI FLOW (FCS INIT)	1.69E-07	0.997785737
SG LEVEL (EFIC ISCM)	2.31E-08	0.999696118
RCP TRIP	2.18E-08	0.999713983
REG 1.97	2.54E-08	0.999666956

4.0 APPLICABLE SCIENTECH QAM/SOPS

Scientech standards for performing all consulting services are subject to the Scientech Quality Assurance Manual [4]. The Scientech Quality Assurance Manual outlines the specific procedural requirements related to the control and assurance of technical quality. It is the policy of Scientech to perform all technical work in compliance with the Scientech Corporate Quality Assurance requirements, and to perform work related to nuclear power plant safety in accordance with the requirement of Title 10 of the Code of Federal Regulations, Part 50, Appendix B. Safety-related activities of the Generation Services Division personnel are subject to the reporting requirements of the Code of Federal Regulations, Title 10, Part 21. The Scientech Quality Assurance Manual documents a systematic program to assure that all activities affecting the quality of nuclear work implement that policy.

5.0 ASSUMPTIONS

The analysis presented in this report is based on the ICCMS Block Diagram presented in Appendix A. This diagram was used to provide insights into the operational impacts of system faults and following signal paths from beginning to end. The following assumptions were made in the development of the availability/reliability model for the ICCMS:

1. The data for all of the system modules is developed from the parts lists for each module and calculated with the manufacturer supplied data or, when manufacturer data was not available, data from a similar component or generic data. The module level data was assembled using the sum of the parts method.

2. The Class 1E external power sources to each of the 3 channel cabinets are assumed to be available. There are also non-safety power sources to the cabinets, which may or may not be available.

3. The external power sources to the MCB RG 1.97 display functions are assumed to be available. These power sources are class 1E.

4. The analysis does not consider room ventilation.

5. It is assumed that the instrumentation or the components that provide inputs to the ICCMS are available. Therefore, the following components are assumed to be available:

    a. Core Exit Thermocouples
    b. Wide Range RCS Pressure signal
    c. Low Range RCS Pressure signal
    d. Reactor Trip Breaker position signals
    e. HPI Flow Instrumentation

6. As provided by CR-3, the expected delay time from fault identification to initiating maintenance is assumed to be 4 hours and the expected delay time from the time that repair has been completed until the channel/train is restored to service is 2 hours. Therefore, it is assumed in this analysis that the MLDT is 6 hours.

7. The impact of the Channel Critical Module Withdrawal is not modeled. When activated, this function trips the associated channel logic when a critical module is removed. When this occurs, the trip logic changes from 2 of 3 to 1 of 2, thus the reliability of the system in accomplishing its safety function is increased.

8. It is assumed that failure of Backplane 1 (one located in Cabinet 1, one located in Cabinet 2) only impacts the associated Trip Train Logic (Trip Train A in Cabinet 1 or Trip Train B in Cabinet 2).

9. Since the components contained on Backplanes 1 through 6 differ significantly, unique data was developed for each of the 6 backplane types.

10. While it is recognized that the fiber optic transitions ("electric signal to light" and "light to electric") are physically mounted on a backplane, the failures of these components are included within the associated module. This better correlates the impact of the failure of these components.

11. The logic model develops signals for Channel 3 TSAT(nom) and Channel 3 TSAT(+err). However, these signals are not currently used in the system or the RAM model. This logic is being retained in the 100% model for potential future use.

12. To determine the correct In-Core temperature, it is assumed that only 1 of the 8 input signals must function for the system to respond properly. Since the Hi Auctioneer module selects the highest temperature and passes the information on to process, as long as one of the eight input signals is working, the system will be able to calculate the adequate amount of flow needed.

13. In the calculation for HPI flow, the flow is summed and averaged from the 4 trains. It is assumed that the system will respond properly only if all 4 trains are functioning.

14. It is assumed in the Uncertainty Analysis that all data are lognormal distributions with an Error Factor of 3.

6.0 RESULTS

The results can be divided into 2 groups; the Availability Model and the Reliability Model. These are discussed separately in the sections below following a discussion of Importance measures.

6.1 Measures of Importance

An importance measure gives a quantitative answer to the question: "How much do the point estimates of the various events contribute to the final estimate of the outcome (the outcome frequency)?" The following sections discuss the most common importance measures and how they are calculated. For the ICCMS analysis, Risk Reduction Worth (RRW) is the importance measure used.

Fussell-Vesely Importance

Various accepted measures of importance use different conceptual and computational approaches to answer this question. For example, the Fussell-Vesely Importance, which is one of the measures computed by WinNUPRA, defines the importance of a basic event ***i*** for top event **E** as the probability that ***i*** contributes to the occurrence of **E**, given that **E** has occurred. When applied to the cutset equation for the occurrence of **E**, this definition implies that a basic event's contribution to the sequence frequency is determined by the number of times that basic event appears, not by the point estimate of the event ***i***. Thus, if two basic events appear in exactly the same cutsets, their Fussell-Vesely Importance is the same, no matter how much their individual point estimates differ. This measure is shown below as:

$$I_i^{FV} = \frac{\sum_{j=1}^{J} S_{i,j}}{\sum_{k=1}^{K} S_k}$$

where:

I_i^{FV} = Fussell - Vesely Importance for basic event i
$S_{i,j}$ = Probability estimate for cutset j containing event i
S_k = Probability estimate for a minimal cutset of the outcome of interest
K = Total number cutsets in equation
J = Total number of cutsets containing event i

Risk Achievement Worth

Risk Achievement Worth (RAW) represents the change in outcome frequency for a worst-case scenario: one in which a component always fails. It is useful for identifying those system elements that are crucial in maintaining the current level of risk and that should not be allowed to deteriorate. This measure is shown below as:

$$RAW_i = 1 + I_i^{FV} \left(p_{i.o}^{-1} - 1\right)$$

where $p_{i.o}^{-1}$ = basic event unavailability for event i

Risk Reduction Worth

Similarly, Risk Reduction Worth (RRW), which represents the change in outcome frequency if the probability of basic event ***i*** is reduced to zero, aids in setting design improvement priorities. The greater the Risk Reduction Worth of a basic event, the greater will be the reduction in outcome frequency from an improvement in the failure rate associated with the event. Risk Reduction Worth is shown as:

$$RRW_i = \left(1 - I_i^{FV}\right)^{-1}$$

Birnbaum Importance

Birnbaum's Measure of Component Importance for non-coherent Systems, S. Beeson and J. D. Andrews, Department of Mathematical Sciences, Loughborough University; Loughborough, Leicestershire, UK.

When assessing a system, its performance is dependent on that of its components. Some components will play a more significant role in causing or contributing to system failure than others. The concept of importance measures is to numerically rank the contribution of each component or basic event to reflect the susceptibility of the system to the occurrence of this event.

In 1969 Birnbaum introduced the concept of importance and developed a probabilistic measure of component reliability importance. This measure is denoted by $G_i(q)$ and defined as the ***probability that component i is critical to system failure***, i.e. when ***i*** fails it causes the system to pass from a working to a failed state. Birnbaum's measure is also referred to as the criticality function and is expressed as:

$$G_i(q) = Q_{SYS}(1_i, q) - Q_{SYS}(0_i, q)$$

Where $Q_{SYS}(1_i,q)$ is the probability that the system fails with component i failed and $Q_{SYS}(0_i,q)$ is the probability that the system fails with component i working and q denotes the vector of component unreliabilities for the remaining components.

6.2 Availability Results

The results obtained in the evaluation of the Availability Models are as follows:

AVAILABILITY		
FUNCTION/REQ	**FAILURE RATE**	**AVAILABILITY**
HPI FLOW (FCS INIT)	6.30E-06	0.99999371
SG LEVEL (EFIC ISCM)	8.65E-07	0.99999914
RCP TRIP	8.12E-07	0.99999919
REG 1.97	8.47E-07	0.99999915

As can be seen from the above, the availability requirement of 0.999 availability is easily met by the system as designed. In fact, all 4 of the functions evaluated exceeded this value by about a factor of almost 1,000. When initially looking at the results, the higher failure rate/lower availability of the HPI FLOW (FCS INIT) function stands out. This is due to the fact that there are 3 parameters involved in this function (HPI calculated flow, HPI actual flow, and rector trip). SG LEVEL (EFIC ISCM) and RCP TRIP involve only one input (RCP Trip). The RG 1.97 MCB displays are each generated from only 2 partial functions resulting in a slightly lower failure rate/slightly higher availability than SG LEVEL (EFIC ISCM) and the RCP TRIP functions.

Dominant Contributors

The cutsets generated for the 4 cases evaluated are presented in Appendix D as Figures D-1 through D-4. The database used in quantifying these cases is presented in Appendix D as Figure D-9.

An Importance Analysis was performed for each case and these are presented in Appendix E as Figures E-1 through E-4. All contributors with a RRW of 1.050 or greater are presented below.

HPI FLOW (FCS INIT)

Based on the Importance Analysis presented in Appendix E, Figure E-1, the dominant contributors to safety function failure are failure of the GEN2500 Modules (RRW of 1.064)

The dominant contributor to failure in the GEN2500 Modules is item number 21, T491a225K016AT, Capacitor, Tantalum, 2.2uF, 16V, 10%, SMD, Case Size A. 2 are used with a MTBF of 1.82E+5 hours.

Note that each of the Modules was evaluated using the Sum of the Parts Method. The individual contributors to the failure of each module are shown in Appendix B.

SG Level (EFIC ISCM)

Based on the Importance Analysis presented in Appendix E, Figure E-2, the dominant contributors to safety function failure are failure of the GEN2500 Modules (RRW of 1.170) followed by followed by failure of the ALM2500 Modules (RRW of 1.093). This is followed by failure of the PSM2500 modules (RRW of 1.081), and failure of the AIM2500 Modules (RRW of 1.076).

The dominant contributor to failure in the GEN2500 Modules is item number 21, T491a225K016AT, Capacitor, Tantalum, 2.2uF, 16V, 10%, SMD, Case Size A. 2 are used with a MTBF of 1.82E+5 hours.

The dominant contributor to failure in the ALM2500 Modules is item number 40, CMF5510M000FHEK, Resistor, Carbon Film, 5%, 1/4W(MIN), 10MOhm with a MTBF of 1.38E+5 hours.

The dominant contributor to failure in the PSM2500 Modules is items number 29 (RS-2412DZ) and 30 (RS-2412S), DC to DC converters, each with a MTBF of 1.40E+6 hours.

The dominant contributor to failure in the AIM2500 Modules is item number 10, TAP105K035S Capacitor, Tantalum, 10%, 1uF, 35V with a MTBF of 3.35E+6, noting that 12 of this component are required per module.

Note that each of the Modules was evaluated using the Sum of the Parts Method. The individual contributors to the failure of each module are shown in Appendix B.

RCP Trip

Based on the Importance Analysis presented in Appendix E, Figure E-3, the dominant contributors to safety function failure are failure of the GEN2500 Modules (RRW of 1.174) followed by the failure of the ALM2500 Modules (RRW of 1.095). This is followed by failure of the PSM2500 modules (RRW of 1.083), and failure of the AIM2500 Modules (RRW of 1.077).

The dominant contributor to failure in the GEN2500 Modules is item number 21, T491a225K016AT, Capacitor, Tantalum, 2.2uF, 16V, 10%, SMD, Case Size A. 2 are used with a MTBF of 1.82E+5 hours.

The dominant contributor to failure in the ALM2500 Modules is item number 40, CMF5510M000FHEK, Resistor, Carbon Film, 5%, 1/4W(MIN), 10MOhm with a MTBF of 1.38E+5 hours.

Note that each of the Modules was evaluated using the Sum of the Parts Method. The individual contributors to the failure of each module are shown in Appendix B.

RG 1.97 MCB Display

Based on the Importance Analysis presented in Appendix E, Figure E-4, the dominant contributors to function failure are failure of the GEN2500 Modules (RRW of 1.147) followed failure of the DSM2500 modules (RRW of 1.088). This is followed by failure of the ALM2500 Modules (1.081), PSM2500 modules (RRW of 1.071), and failure of the AIM2500 Modules (RRW of 1.066).

The dominant contributor to failure in the GEN2500 Modules is item number 21, T491a225K016AT, Capacitor, Tantalum, 2.2uF, 16V, 10%, SMD, Case Size A. 2 are used with a MTBF of 1.82E+5 hours.

The dominant contributor to failure in the DSM2500 Modules is item number 37, CMF551CM000FHEK, Resistor, Carbon Film, 6%, 1/4W(MIN), 10kW with a MTBF of 1.38E+5 hours.

The dominant contributor to failure in the ALM2500 Modules is item number 40, CMF5510M000FHEK, Resistor, Carbon Film, 5%, 1/4W(MIN), 10MOhm with a MTBF of 1.38E+5 hours.

The dominant contributor to failure in the PSM2500 Modules is items number 29 (RS-2412DZ) and 30 (RS-2412S), DC to DC converters, each with a MTBF of 1.40E+6 hours.

The dominant contributor to failure in the AIM2500 Modules is item number 10, TAP105K035S Capacitor, Tantalum, 10%, 1uF, 35V with a MTBF of 3.35E+6, noting that 12 of this component are required per module.

Note that each of the Modules was evaluated using the Sum of the Parts Method. The individual contributors to the failure of each module are shown in Appendix B.

6.3 Reliability Results

The reliability was evaluated using the system wide failure rate as calculated using the fault tree analysis discussed above and the mission time equal to that of the Surveillance Test Interval wherein the system is verified operable. The Surveillance Test Interval had been defined by CR-3 as 184 days. Using this definition the system satisfies the 0.999 reliability requirement.

Reliability for 184 day surveillance period		
FUNCTION/REQ	**FAILURE RATE**	**RELIABILITY**
HPI FLOW (FCS INIT)	1.69E-07	0.999255298
SG LEVEL (EFIC ISCM)	2.31E-08	0.999897863
RCP TRIP	2.18E-08	0.999903868
REG 1.97	2.54E-08	0.999888061

It should be noted that the HPI FLOW (FCS INIT) function just exceeds the requirement of .999 by a slim margin.

Dominant Contributors

The cutsets generated for the 4 cases evaluated are presented in Appendix D as Figures D-5 through D-8. The database used in quantifying these cases is presented in Appendix D as Figure D-10.

An Importance Analysis was performed for each case and these are presented in Appendix E as Figures E-5 through E-8. All contributors with a RRW of 1.050 or greater are presented below.

HPI FLOW (FCS INIT)

Based on the Importance Analysis presented in Appendix E, Figure E-5, the dominant contributors to safety function failure is failure of the GEN2500 Modules (RRW of 1.057).

The dominant contributor to safety function failure in the GEN2500 Modules is item number 21, T491a225K016AT, Capacitor, Tantalum, 2.2uF, 16V, 10%, SMD, Case Size A. 2 are used with a failure rate of 1.10E-5 per hour.

Note that each of the Modules was evaluated using the Sum of the Parts Method. The individual contributors to the failure of each module are shown in Appendix B.

SG Level (EFIC ISCM)

Based on the Importance Analysis presented in Appendix E, Figure E-6, the dominant contributors to safety function failure are failure of the GEN2500 Modules (RRW of 1.170), failure of the ALM2500 Modules (RRW of 1.093), failure of the PSM2500 Modules (RRW of 1.081), and failure of the AIM2500 Modules (RRW of 1.076).

The dominant contributor to failure in the GEN2500 Modules is item number 21, T491a225K016AT, Capacitor, Tantalum, 2.2uF, 16V, 10%, SMD, Case Size A. 2 are used with a failure rate of 1.10E-5 per hour.

The dominant contributor to failure in the ALM2500 Modules is item number 40, CMF5510M000FHEK, Resistor, Carbon Film, 5%, 1/4W(MIN), 10MOhm with a failure rate of 7.23E-6 per hour.

The dominant contributor to failure in the PSM2500 Modules is items number 29 (RS-2412DZ) and 30 (RS-2412S), DC to DC converters, each with a MTBF of 7.15E-7 per hour, noting that there are several per module.

The dominant contributor to failure in the AIM2500 Modules is item number 24, RS-2412D, DC/DC Converter, 2W, 24VDC Input, +/- 12 VDC Output with a MTBF of 7.15E-7 per hour, noting that 5 of this component are required per module.

Note that each of the Modules was evaluated using the Sum of the Parts Method. The individual contributors to the failure of each module are shown in Appendix B.

RCP Trip

Based on the Importance Analysis presented in Appendix E, Figure E-7, the dominant contributors to safety function failure are failure of the GEM2500 Modules (RRW of 1.174) followed by failure of the ALM2500 Modules (RRW of 1.095), failure of the PSM2500 Modules (RRW of 1.083), and failure of the AIM2500 Modules (RRW of 1.078).

The dominant contributor to failure in the GEN2500 Modules is item number 21, T491a225K016AT, Capacitor, Tantalum, 2.2uF, 16V, 10%, SMD, Case Size A. 2 are used with a failure rate of 1.10E-5 per hour.

The dominant contributor to failure in the ALM2500 Modules is item number 40, CMF5510M000FHEK, Resistor, Carbon Film, 5%, 1/4W(MIN), 10MOhm with a failure rate of 7.23E-6 per hour.

The dominant contributor to failure in the PSM2500 Modules is items number 29 (RS-2412DZ) and 30 (RS-2412S), DC to DC converters, each with a MTBF of 7.15E-7 per hour, noting that there are several per module.

The dominant contributor to failure in the AIM2500 Modules is item number 24, RS-2412D, DC/DC Converter, 2W, 24VDC Input, +/- 12 VDC Output with a MTBF of 7.15E-7 per hour, noting that 5 of this component are required per module.

Note that each of the Modules was evaluated using the Sum of the Parts Method. The individual contributors to the failure of each module are shown in Appendix B.

RG 1.97 MCB Display

Based on the Importance Analysis presented in Appendix E, Figure E-8, the dominant contributors to function failure are failure of the GEN2500 Modules (RRW of 1.138) followed by failure of the DSM Modules (RRW of 1.084), failure of the ALM2500 modules (RRW of 1.076), failure of the PSM2500 Modules (RRW of 1.067), failure of the LEDs (RRW of 1.067), and failure of the AIM2500 Modules (RRW of 1.063).

The dominant contributor to failure in the GEN2500 Modules is item number 21, T491a225K016AT, Capacitor, Tantalum, 2.2uF, 16V, 10%, SMD, Case Size A. 2 are used with a failure rate of 1.10E-5 per hour.

The dominant contributor to failure in the DSM2500 Modules is item number 37, CMF551CM000FHEK, Resistor, Carbon Film, 6%, 1/4W(MIN), 10kW with a failure rate of 7.23E-6 per hour.

The dominant contributor to failure in the ALM2500 Modules is item number 40, CMF5510M000FHEK, Resistor, Carbon Film, 5%, 1/4W(MIN), 10MOhm with a failure rate of 7.23E-6 per hour.

The dominant contributor to failure in the PSM2500 Modules is items number 29 (RS-2412DZ) and 30 (RS-2412S), DC to DC converters, each with a MTBF of 7.15E-7 per hour, noting that there are several per module.

The dominant contributor to failure in the AIM2500 Modules is item number 24, RS-2412D, DC/DC Converter, 2W, 24VDC Input, +/- 12 VDC Output with a MTBF of 7.15E-7 per hour, noting that 5 of this component are required per module.

Note that each of the Modules was evaluated using the Sum of the Parts Method. The individual contributors to the failure of each module are shown in Appendix B.

Uncertainty Analysis

An uncertainty analysis was performed on system reliability to gain additional insight. Note that performing an uncertainty analysis is not required. This is presented at the 5%, Median, Mean, and 95% levels for each evaluated function.

HPI FLOW (FCS INIT)- Reliability for 184 day surveillance period		
FUNCTION/REQ	**FAILURE RATE**	**RELIABILITY**
5%	4.46E-08	0.999802933
Median	1.39E-07	0.999385923
Mean	1.96E-07	0.999136162
95%	5.17E-07	**0.997719973**

SG LEVEL (EFIC ISCM) - Reliability for 184 day surveillance period		
FUNCTION/REQ	**FAILURE RATE**	**RELIABILITY**
5%	8.15E-09	0.999964015
Median	2.07E-08	0.999908461
Mean	2.57E-08	0.999886427
95%	6.04E-08	0.999733353

RCP TRIP - Reliability for 184 day surveillance period		
FUNCTION/REQ	**FAILURE RATE**	**RELIABILITY**
5%	7.62E-09	0.999966373
Median	1.95E-08	0.999913980
Mean	2.43E-08	0.999892741
95%	5.61E-08	0.999752293

RG 1.97 - Reliability for 184 day surveillance period		
FUNCTION/REQ	**FAILURE RATE**	**RELIABILITY**
5%	9.19E-09	0.999959409
Median	2.22E-08	0.999902102
Mean	2.82E-08	0.999875565
95%	6.52E-08	0.999712030

As can be seen from the above, for the 184 day Surveillance Test Interval time period of the functions meet the 0.999 requirement for the distribution parameters with the exception of HPI FLOW (FCS INIT) at the 95% value. These results are consistent with the point estimate results.

The mean value calculated in the uncertainty estimate will vary between simulations due to the randomly selected seed value used in the Monte-Carlo simulation. Thus, given the small margin by which the .999 goal was achieved in the point estimate it is expected that on average the Monte-Carlo simulation mean value would exceed the point estimate value roughly half the time and roughly half the time it would be lower (meeting the .999 requirement). Given the slim margin at the mean value it is expected that the .999 requirement would not be met at the 95%.

7.0 CONCLUSIONS

As part of the task to determine the reliability of the Inadequate Core Cooling Mitigation System (ICCMS), a RAM model was developed and evaluated for the system functions. Review of the cutsets presented in Appendix D verifies that there are no single failures in the system as designed.

When considering these results for the 100% design, there are two factors that should first be considered.

1. System design revisions in response to the initial testing of the modules are nearly complete, but are still in progress. This could impact the availability and reliability of the modules. However, any impacts at this point are expected to be very minor.

2. The module parts lists have been revised, but are still under revision. This could impact the availability and reliability of the modules. However, any impacts at this point are expected to be minor.

Given the nearly final state of the system design and considering the above, there is only a slim opportunity for the results obtained in the 100% analysis to change when the remaining changes are finalized, and this should be considered when interpreting these results.

7.1.1 Availability Analysis Conclusions

For the Availability Analysis, the system was found to not only meet but to exceed by a factor of nearly 1,000 the availability goal of 0.999. The availability of the system was found to be very robust.

7.2.2 Reliability Analysis Conclusions

For the Reliability Analysis, the reliability goal of 0.999 was met. For the Reliability Analysis for a 184 day Surveillance Period, the system was found to satisfy the desired reliability of 0.999 for the point estimate (mean value calculation). The uncertainty analysis highlights the thin margin by which this reliability goal was met for the HPI FLOW (FCS INIT) function.

8.0 REFERENCES

1. ANS/IEEE Std 352-1987 "IEEE Guide for General Principles of Reliability Analysis of Nuclear Power Generating Station Safety Systems," November 21, 1987.

2. "CR-3 ICCMS Project Plan," Revision 1, Scientech, October, 2011.

3. "CR-3 ICCMS Task Plan 1," Revision 0, Scientech, October, 2011.

4. "Quality Assurance Manual," Scientech, Inc., Revision 8, September 31, 2011.

5. "ICCMS BLOCK DIAGRAM, GENERAL," file named: NUS-A304DB Revision 3 ICCMS Block Diagrams.pdf, 02-21-2012.

6. "CR-3 ICCMS RAM, Task 1 ICCMS 30% RAM", Revision 0, October 2011.

7. "CR-3 ICCMS RAM, Task 3 – Manufacturer's Data Collection," 17877-0001, Final Draft, January 2012.

8. "CR-3 ICCMS RAM, Task 3 – ICCMS 60% Design FMEA," 17877-0002-60, March, 2012.

9. "Analog Input Module Parts List," NUS-A323PA, Rev. B Red-Line, current as of June 12, 2012.

10. "Analog Output Module Parts List," NUS-A324PA, Rev. A Red-Line, current as of June 12, 2012.

11. "Contact Input Module Parts List," NUS-A325PA, Rev. 0, current as of June 12, 2012.

12. "Contact Output Module Parts List," NUS-A326PA, Rev. 0, current as of June 12, 2012.

13. "Functions Generator Module Parts List," NUS-A327PA, Rev. A Red-Line, current as of March 12, 2012.

14. "Power Supply Monitor Module Part List," NUS-A328PA, Rev. A Red-Line, current as of June 12, 2012.

15. "Alarm Module Parts List," NUS-A329PA, Rev. A Red-Line, current as of June 12, 2012.

16. "Reactor Trip Module Parts List," NUS-A330PA, Rev. 0, current as of June 12, 2012.

17. "Summer Module," NUS-A331PA, Rev. A Red-Line, current as of June 12, 2012.

18. "Display Select Module Parts List," NUS-A332PA, Rev. A Red-Line, current as of June 12, 2012.

19. "HI Auctioneer Module Parts List," NUS-A333PA, Rev. 0, current as of June 12, 2012.

20. 'Channel Trip Module Parts List," NUS-A334PA, Rev. A Red-Line, current as of June 12, 2012.

21. "Train Trip Module Parts List," NUS-A335PA, Rev. 0, current as of June 12, 2012.

22. "Difference Module," NUS-A339PA, Rev. A Red-Line, current as of June 12, 2012.

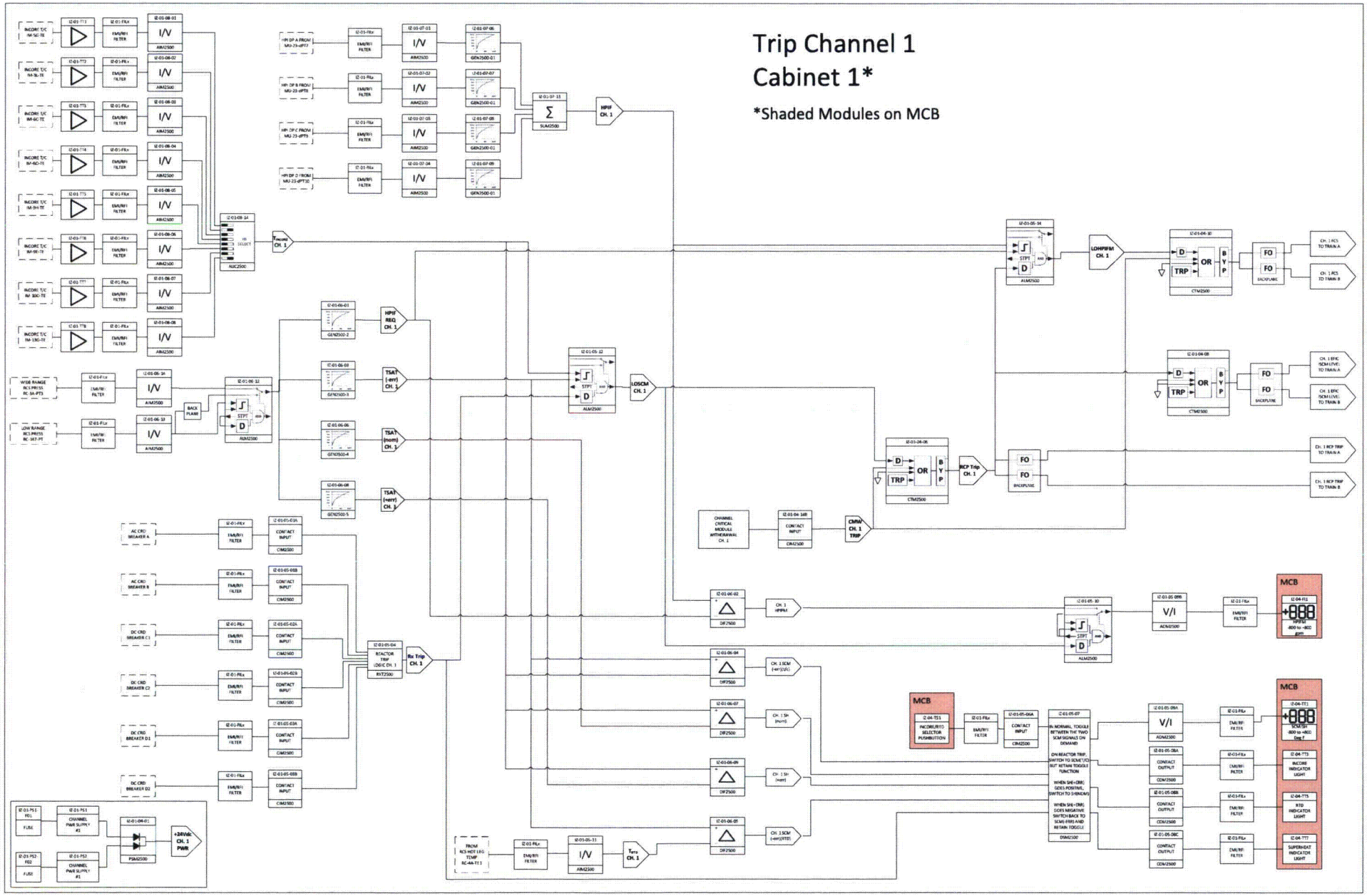
23. "Filler Module Parts List," NUS-A341PA, Rev. 0, current as of June 12, 2012.

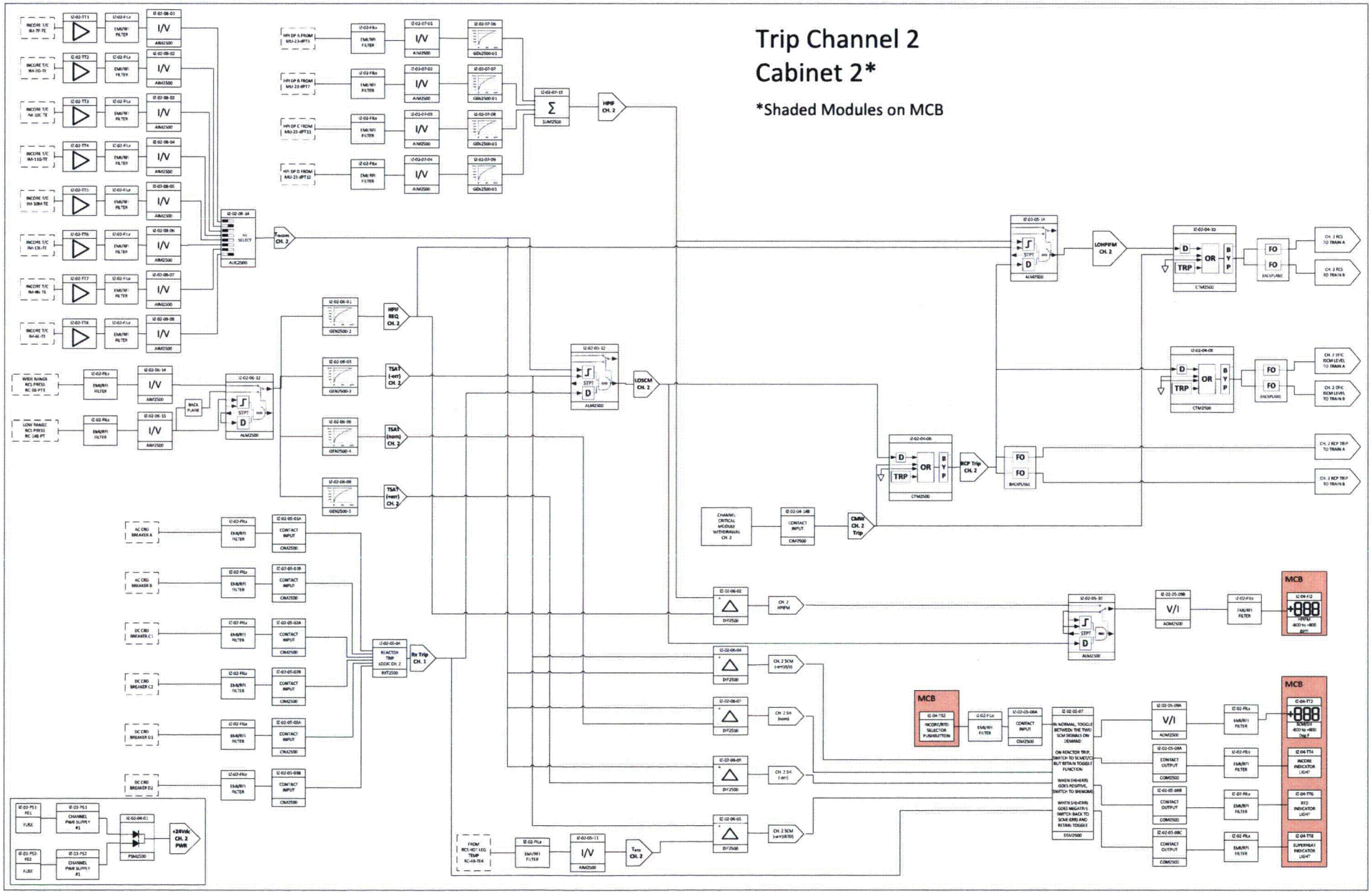
24. "ICCMS Rack Backplane Parts List," NUS-C099PA, Rev. C, current as of March 12, 2012.

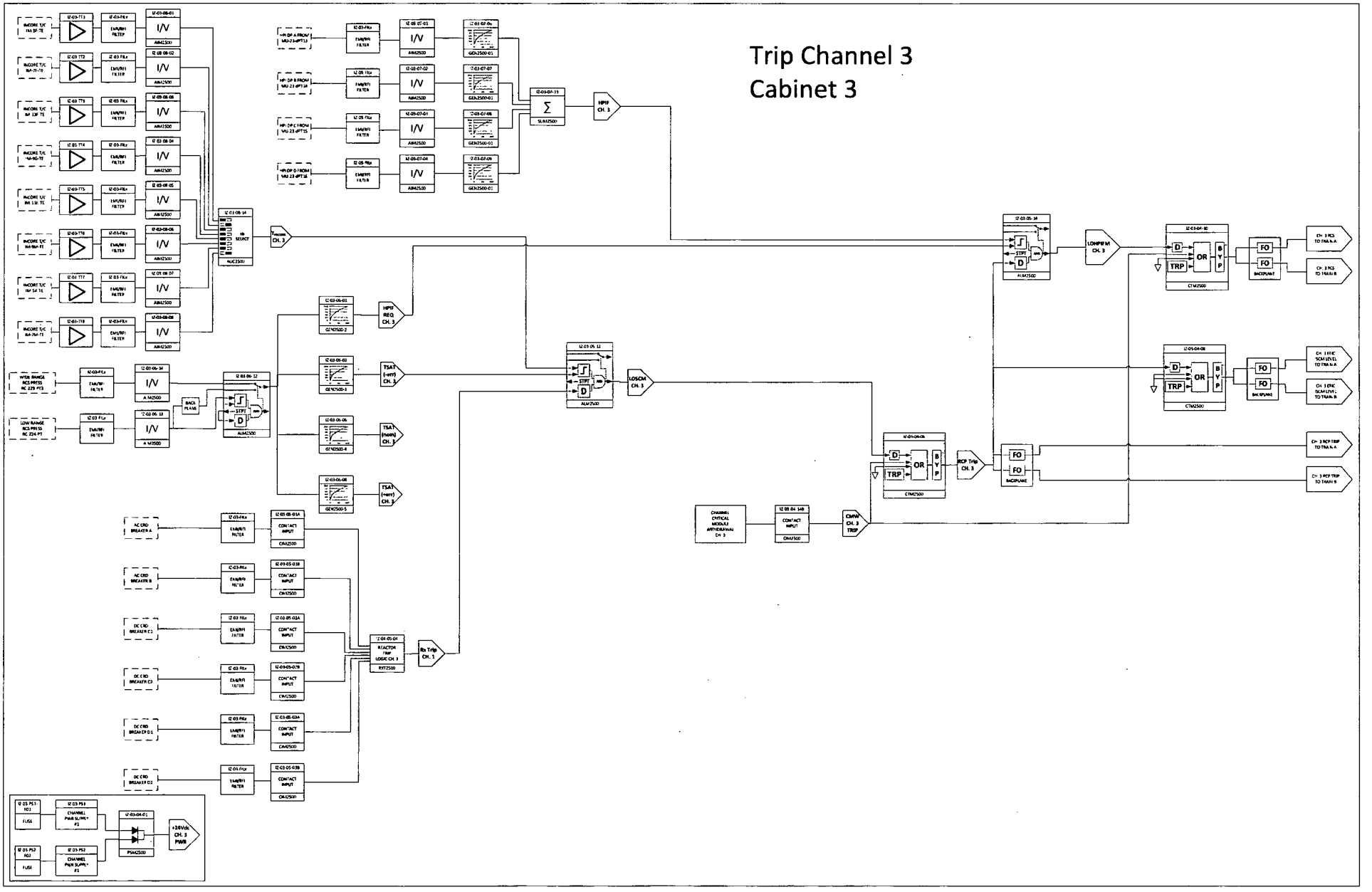
25. "WinNUPRA Version 4.0 Verification and Validation Project," Scientech Project 17279-0001, June 2011.

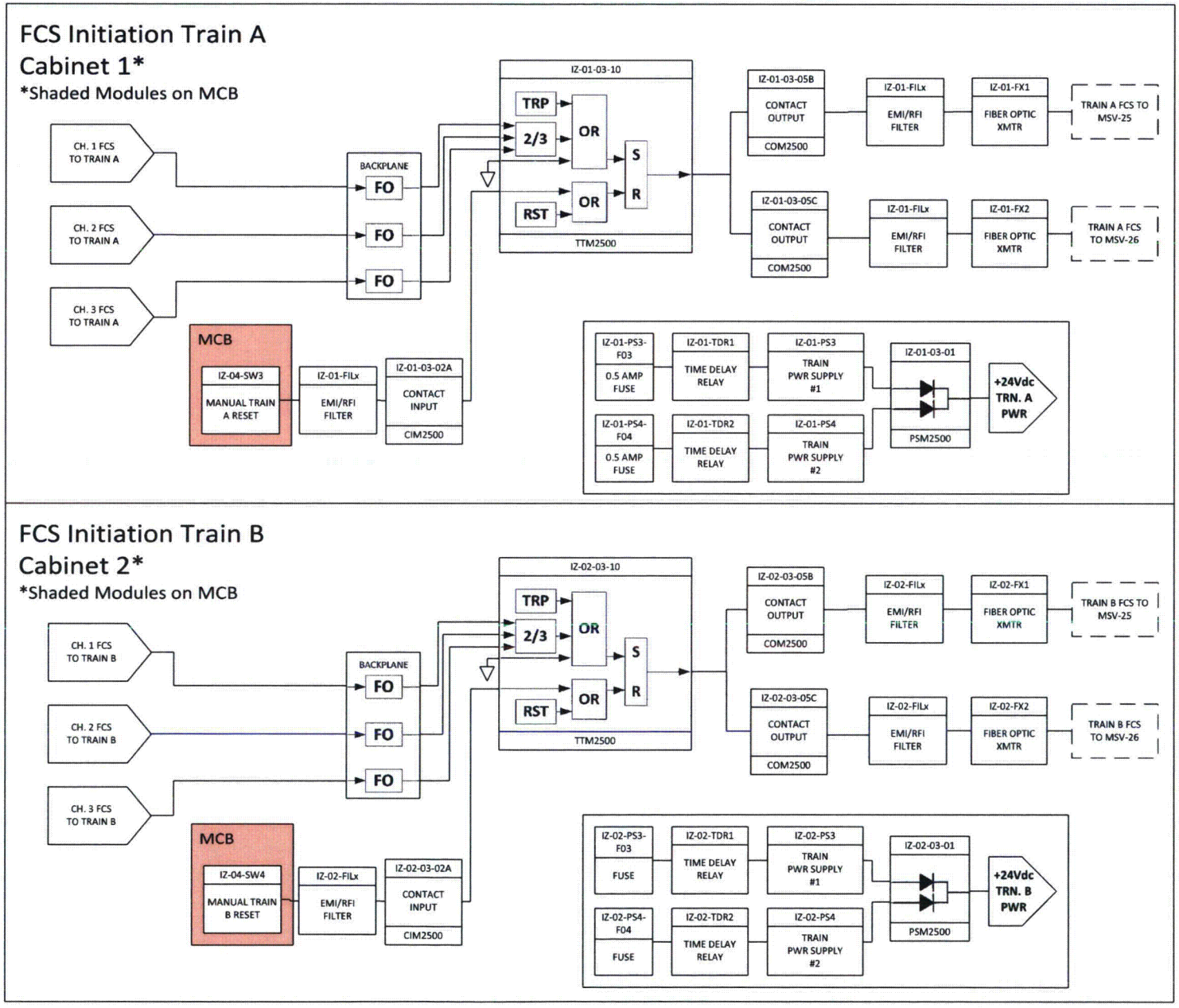
Appendix A

ICCMS Block Diagram


Trip Channel 1
Cabinet 1*
*Shaded Modules on MCB
HPIF CH. 1
LOHPIFM CH. 1
LOSCM CH. 1
CMM CH. 1 TRIP
RCP Trip CH. 1
Rx Trip CH. 1
MCB
+24Vdc CH. 1 PWR

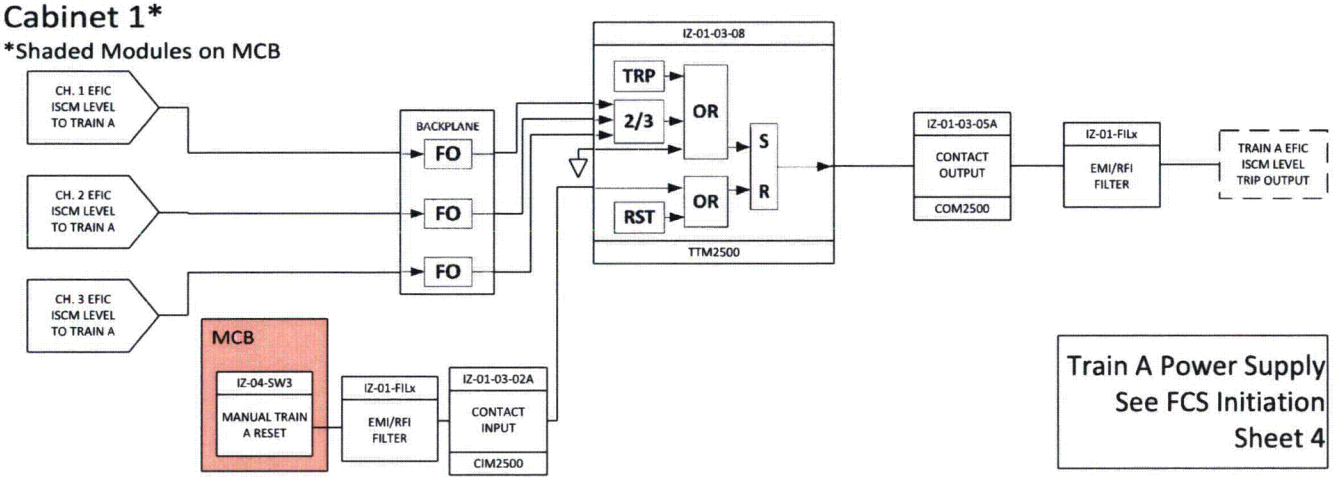

Trip Channel 2
Cabinet 2*
*Shaded Modules on MCB


Trip Channel 3
Cabinet 3


FCS Initiation Train A
Cabinet 1*
*Shaded Modules on MCB
CH. 1 FCS TO TRAIN A
CH. 2 FCS TO TRAIN A
CH. 3 FCS TO TRAIN A
BACKPLANE
FO
FO
FO
IZ-01-03-10
TRP
2/3
RST
OR
OR
S
R
TTM2500
IZ-01-03-05B
CONTACT OUTPUT
COM2500
IZ-01-03-05C
CONTACT OUTPUT
COM2500
IZ-01-FILx
EMI/RFI FILTER
IZ-01-FILx
EMI/RFI FILTER
IZ-01-FX1
FIBER OPTIC XMTR
IZ-01-FX2
FIBER OPTIC XMTR
TRAIN A FCS TO MSV-25
TRAIN A FCS TO MSV-26
MCB
IZ-04-SW3
MANUAL TRAIN A RESET
IZ-01-FILx
EMI/RFI FILTER
IZ-01-03-02A
CONTACT INPUT
CIM2500
IZ-01-PS3-F03
0.5 AMP FUSE
IZ-01-TDR1
TIME DELAY RELAY
IZ-01-PS3
TRAIN PWR SUPPLY #1
IZ-01-PS4-F04
0.5 AMP FUSE
IZ-01-TDR2
TIME DELAY RELAY
IZ-01-PS4
TRAIN PWR SUPPLY #2
IZ-01-03-01
PSM2500
+24Vdc TRN. A PWR
FCS Initiation Train B
Cabinet 2*
*Shaded Modules on MCB
CH. 1 FCS TO TRAIN B
CH. 2 FCS TO TRAIN B
CH. 3 FCS TO TRAIN B
BACKPLANE
FO
FO
FO
IZ-02-03-10
TRP
2/3
RST
OR
OR
S
R
TTM2500
IZ-02-03-05B
CONTACT OUTPUT
COM2500
IZ-02-03-05C
CONTACT OUTPUT
COM2500
IZ-02-FILx
EMI/RFI FILTER
IZ-02-FILx
EMI/RFI FILTER
IZ-02-FX1
FIBER OPTIC XMTR
IZ-02-FX2
FIBER OPTIC XMTR
TRAIN B FCS TO MSV-25
TRAIN B FCS TO MSV-26
MCB
IZ-04-SW4
MANUAL TRAIN B RESET
IZ-02-FILx
EMI/RFI FILTER
IZ-02-03-02A
CONTACT INPUT
CIM2500
IZ-02-PS3-F03
FUSE
IZ-02-TDR1
TIME DELAY RELAY
IZ-02-PS3
TRAIN PWR SUPPLY #1
IZ-02-PS4-F04
FUSE
IZ-02-TDR2
TIME DELAY RELAY
IZ-02-PS4
TRAIN PWR SUPPLY #2
IZ-02-03-01
PSM2500
+24Vdc TRN. B PWR

EFIC ISCM Setpoint Train A Cabinet 1*

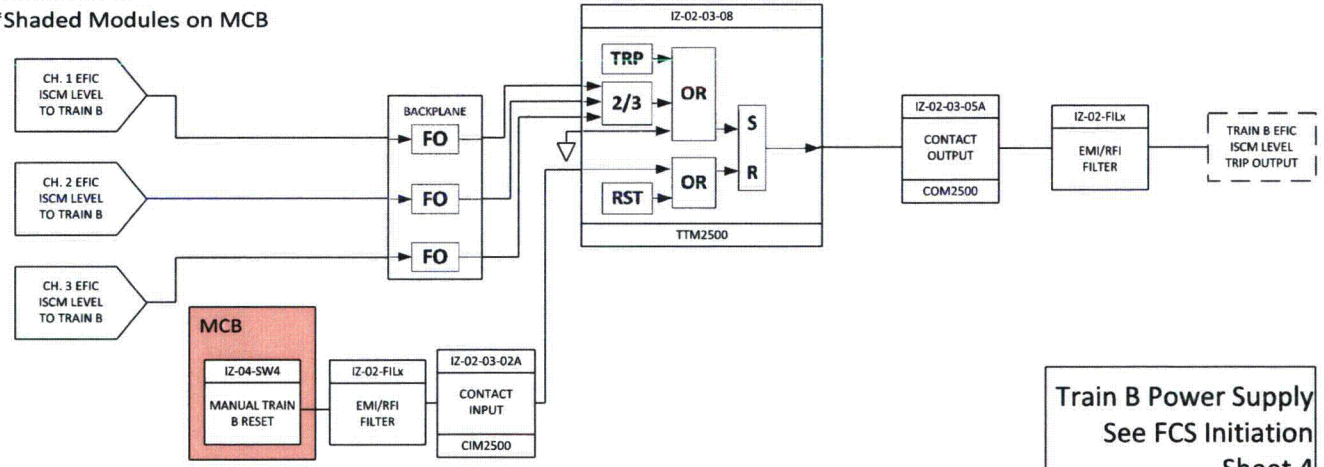
*Shaded Modules on MCB



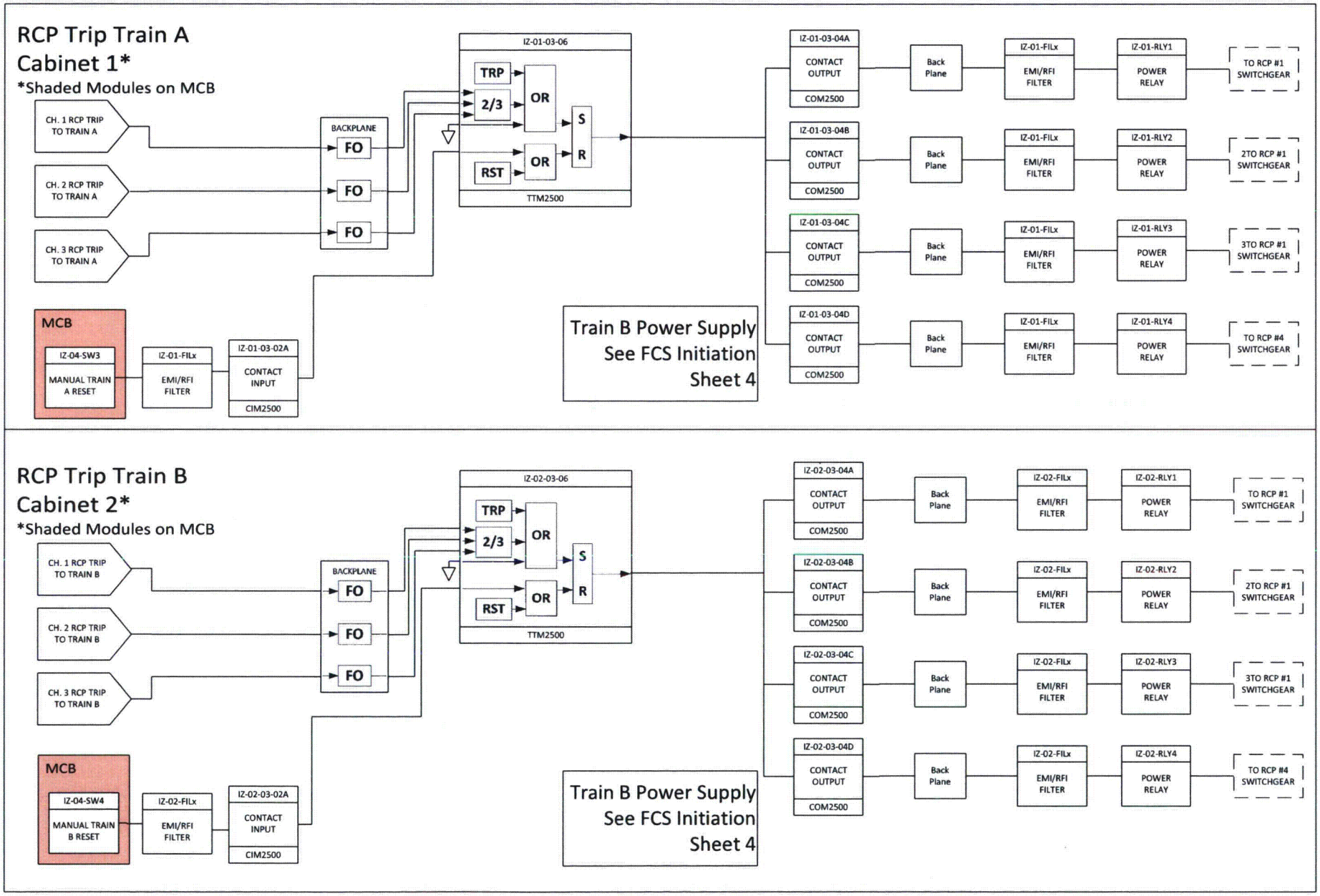
Train A Power Supply
See FCS Initiation
Sheet 4

EFIC ISCM Setpoint Train B Cabinet 2*

*Shaded Modules on MCB



Train B Power Supply
See FCS Initiation
Sheet 4


RCP Trip Train A
Cabinet 1*
*Shaded Modules on MCB
CH. 1 RCP TRIP TO TRAIN A
CH. 2 RCP TRIP TO TRAIN A
CH. 3 RCP TRIP TO TRAIN A
BACKPLANE
FO
FO
FO
IZ-01-03-06
TRP
2/3
RST
OR
OR
S
R
TTM2500
MCB
IZ-04-SW3
MANUAL TRAIN A RESET
IZ-01-FILx
EMI/RFI FILTER
IZ-01-03-02A
CONTACT INPUT
CIM2500
Train B Power Supply See FCS Initiation Sheet 4
IZ-01-03-04A
CONTACT OUTPUT
COM2500
IZ-01-03-04B
CONTACT OUTPUT
COM2500
IZ-01-03-04C
CONTACT OUTPUT
COM2500
IZ-01-03-04D
CONTACT OUTPUT
COM2500
Back Plane
Back Plane
Back Plane
Back Plane
IZ-01-FILx
EMI/RFI FILTER
IZ-01-FILx
EMI/RFI FILTER
IZ-01-FILx
EMI/RFI FILTER
IZ-01-FILx
EMI/RFI FILTER
IZ-01-RLY1
POWER RELAY
IZ-01-RLY2
POWER RELAY
IZ-01-RLY3
POWER RELAY
IZ-01-RLY4
POWER RELAY
TO RCP #1 SWITCHGEAR
2TO RCP #1 SWITCHGEAR
3TO RCP #1 SWITCHGEAR
TO RCP #4 SWITCHGEAR
RCP Trip Train B
Cabinet 2*
*Shaded Modules on MCB
CH. 1 RCP TRIP TO TRAIN B
CH. 2 RCP TRIP TO TRAIN B
CH. 3 RCP TRIP TO TRAIN B
BACKPLANE
FO
FO
FO
IZ-02-03-06
TRP
2/3
RST
OR
OR
S
R
TTM2500
MCB
IZ-04-SW4
MANUAL TRAIN B RESET
IZ-02-FILx
EMI/RFI FILTER
IZ-02-03-02A
CONTACT INPUT
CIM2500
Train B Power Supply See FCS Initiation Sheet 4
IZ-02-03-04A
CONTACT OUTPUT
COM2500
IZ-02-03-04B
CONTACT OUTPUT
COM2500
IZ-02-03-04C
CONTACT OUTPUT
COM2500
IZ-02-03-04D
CONTACT OUTPUT
COM2500
Back Plane
Back Plane
Back Plane
Back Plane
IZ-02-FILx
EMI/RFI FILTER
IZ-02-FILx
EMI/RFI FILTER
IZ-02-FILx
EMI/RFI FILTER
IZ-02-FILx
EMI/RFI FILTER
IZ-02-RLY1
POWER RELAY
IZ-02-RLY2
POWER RELAY
IZ-02-RLY3
POWER RELAY
IZ-02-RLY4
POWER RELAY
TO RCP #1 SWITCHGEAR
2TO RCP #1 SWITCHGEAR
3TO RCP #1 SWITCHGEAR
TO RCP #4 SWITCHGEAR

Appendix B

ICCMS Module Data

Module	ITEM No.	Part No.	Decription	Component Manufacturer	Task 3 Numbers
AIM	62	-	HeatShrink, 1/8", Black, Polyolefin	?	N/A
CTM	64	-	Heatshrink, 1/8", Black, Polyolefin	?	N/A
SM	50	-	WIRE, INSULATED, 600V OR GREATER, RYPE B OR C, SIZE AND COLOR AS REQUIRED	?	1.00E+08
TTM	61	-	HEATSHRINK, 1/8", BLACK, POLYOLEFIN	?	N/A
AIM	41	Wire, 22AWG, BARE	Jumper, 0Ohm	?	1.00E+08
FGM	32	AT27C1024-70JU	IC OPT 1MBIT 70NS 44PLCC	Atmel, San Jose, CA	1.64E+06
AIM	42	ADG1636BRU	IC, Dual, Analog Switch, SPDT, TSS0P16	Analog Devices, Bellevue, WA	5.71E+09
AM	57	ADG1636BRUZ	IC, Dual, Analog Switch, TSSOP16	Analog Devices, Bellevue, WA	5.82E+09
TTM	48	HFBR-2412TZ	IC, Fiber Optic, Receiver, ST Port	Avago Tech., San Jose, CA	1.09E+07
CTM	55	HFBR-1412TZ	IC, Fiber Optic, Emitter, ST Port	Avago Tech., San Jose, CA	4.92E+06
FGM	17	08055C104K4T2A	Capacitor, Ceramic, 0.10uF, 50V, X7R, 10%, 0805 SMD	AVX Corp., Fountain Inn, SC	3.52E+10
FGM	14	08055C473KAT2Q	Capacitor, Ceramic, 47uF, 50V, X7R, 10%, 0805 SMD	AVX Corp., Fountain Inn, SC	3.52E+10
FGM	18	08055D105KAT2A	Capacitor, Ceramic, 1.0uF, 50V, X5R, 10%, 0805 SMD	AVX Corp., Fountain Inn, SC	3.52E+10
HIAM	19	TAP105K035S	Capacitor, Tantalum, 10%, 1uF, 35V	AVX Corp., Fountain Inn, SC	3.35E+06
DM	15	TAP105K035SCS	Capacitor, Tantalum, 10%, 1uF, 35V	AVX Corp., Fountain Inn, SC	3.35E+06
PSMM	20	TAP476K025SCS	Capacitor, Tantalum, 10%, 47uF, 25V	AVX Corp., Fountain Inn, SC	3.35E+06
FGM	15	TLCR105M035RTA	Capacitor, Tantalum, 1uF, 35V, 20%, 0805 SMD	AVX Corp., Fountain Inn, SC	3.35E+06
DSM	21	TAP105K0358	Capacitor, Tantalum, 10%, 1uF, 35V MIN	AVX Corp., Fountain Inn, SC	3.35E+06
AIM	17	TAP155K035SCS	Capacitor, Tantalum, 10%, 1.5 uF, 35V	AVX Corp., Fountain Inn, SC	3.35E+06
AIM	14	TAP475K035SCS	Capacitor, Tantalum, 10%, 4.7 uF, 35V	AVX Corp., Fountain Inn, SC	3.35E+06
AIM	15	TAP685K035SCS	Capacitor, Tantlum, 10%, 6.8 uF, 35V	AVX Corp., Fountain Inn, SC	3.35E+06
CTM	26	H-278C-2	LED Holder 5mm, Dual Level	BIVAR Irvine, CA	N/A
PSMM	26	PCH175	LED Holder, 5mm, Single Level	BIVAR Irvine, CA	N/A
SM	46	3683S-1-105L	Precision Potentiometer, Value Display, 3 Digit, 1Meg	Bourns, Riverside, CA	8.76E+10
AIM	31	6638S-1-103	Precision Potentiometer, 10KOhm, 1W Single Turn	Bourns, Riverside, CA	8.76E+10
TTM	63	700302202	Lockwasher, 10/32	C&K Components, Newton, United States	N/A
TTM	64	707100201	Hex Nut, 15/32	C&K Components, Newton, United States	N/A
TTM	62	8532T1ZBE2	Switch, Pushbutton, Off-Momentary, Panel Mount	C&K Components, Newton, United States	4.20E+07
TTM	45	ET01MD1ABE	SWITCH, TOGGLE, ON-OFF-ON, TINY, HORIZONTAL TOGGLE, R/A PC MNT	C&K Components, Newton, United States	5.04E+06
CTM	46	ET03MD1ABE	Switch Toggle, ON-OFF-ON, Tiny, Horizontal Toggle, R/A PC MNT	C&K Components, Newton, United States	5.04E+06
AIM	43	ET21MD1AVQE	Switch, Toggle, On-On, Tiny, Vertical Toggle, R/A PC MNT	C&K Components, Newton, United States	5.04E+06
AIM	44	ET24MD1AVBE	Switch, Toggle, On-On-On, Tiny, Vertical Toggle, R/A PC MNT	C&K Components, Newton, United States	5.04E+06
AIM	45	TP-105-01-00	Test Point, Breakaway, Black	Components Corp., Denville, NJ	N/A
HIAM	35	206-8RAST	DIP Switch, 8 POS, Right Angle 2.54 MM	CTS Electrocomponents, Elkhart, IN	1.68E+06
AIM	55	ZVP4105A	MOSFET, P-CH, 50V, 175MA, TO92-3	Diodes Inc, San Jose, CA	1.71E+08
PSMM	21	SMAT70A-13-F	Transient Voltage Suppressor, 70V, 400W, SMA	Diodes Inc., Palno, TX	2.16E+07
AIM	18	1N4148	Diode SS Fast 100V 200MA DO35	Fairchild Semiconductor, San Jose, CA	2.19E+07
HIAM	47	1N5235	Diode, Zener, 6.8V	Fairchild Semiconductor, San Jose, CA	4.38E+07
TTM	66	1N5238B	Diode, Zener, 8.7V	Fairchild Semiconductor, San Jose, CA	4.38E+07
AIM	57	2N7000	N Channel Enhancement Mode FET, 60V, 0.2A, T092	Fairchild Semiconductor, San Jose, CA	1.56E+07
PSMM	33	2N7000	N Channel Enhancement Mode FET, 60V, 0.2A, T092	Fairchild Semiconductor, San Jose, CA	1.56E+07
DSM	28	2N7000_D26Z	N Channel FET, TO92	Fairchild Semiconductor, San Jose, CA	3.70E+08
AOM	25	2N7002	N Channel FET, 60V, 0.30A, SOT23	Fairchild Semiconductor, San Jose, CA	1.25E+08
PSMM	22	BAX16	High Voltage General Purpose Diode, 150V, 0.2A	Fairchild Semiconductor, San Jose, CA	1.96E+08
AOM	24	BSS84	MOSFET, P-Ch, 50V, 0.13A, SOT-23	Fairchild Semiconductor, San Jose, CA	1.25E+08
PSMM	31	FDB3632	N-Channel Power Trench MOSFET, 100V, 80A TO-263	Fairchild Semiconductor, San Jose, CA	1.54E+08
AIM	54	FOD3181	IC, 8 PIN DIP Optocoupler	Fairchild Semiconductor, San Jose, CA	7.03E+07
CIM	36	H11L1M	IC, Optocoupler, 8 PIN DIP	Fairchild Semiconductor, San Jose, CA	5.47E+06
TTM	51	LM555CN	IC, 555 Timer, 8 PIN DIP	Fairchild Semiconductor, San Jose, CA	2.00E+08
AOM	23	MMBT2907	PNP, General Purpose Amplifier, SOT-23	Fairchild Semiconductor, San Jose, CA	3.06E+08
AOM	17	SMBJ17CA	Transient Voltage Suppressor, 600W, 17V	Fairchild Semiconductor, San Jose, CA	2.19E+08
FGM	20	C085C330K5GACTU	Capacitor, Ceramic, 33uF, 50V, C0G, 10%, 0805 SMD	Kemet Corporation, Greenville, SC	2.65E+09
AOM	16	C0805C820K5GACTU	Capacitor, Ceramic, 82PF, 50V, C0G, 0805 SMD	Kemet Corporation, Greenville, SC	2.65E+09
FGM	16	T491A106K016AT	Capacitor, Tantalum, 10uF, 16V, 10%, SMD, Case Size A	Kemet Corporation, Greenville, SC	1.82E+05

FGM	21	T491A225K016AT	Capacitor, Tantalum, 2.2uF, 16V, 10%, SMD, Case Size A	Kemet Corporation, Greenville, SC	1.82E+05
AIM	61	8567	Potentiometer Knob	Keystone Electronics Corp, Astoria, NY	3.94E+08
RTM	30	WP57EGW	LED, 5mm, Bi-Color, Red/Green	KingBright, City of Industry, CA	N/A
PSMM	25	WP7113SEC	Orange, Round, 5MM, T-1, Clear Flanged	KingBright, City of Industry, CA	N/A
DSM	23	WP7113SRC/DU	Red, Round, 5mm, T-1 3/4, Clear	KingBright, City of Industry, CA	N/A
AM	26	WP7113QBC/D	Blue, Round, 5mm, T-1 3/4, Clear, Flanged	KingBright, City of Industry, CA	N/A
PSMM	24	WP711QBC/D	Blue, Round, 5MM, T-1, Clear Flanged	KingBright, City of Industry, CA	N/A
AOM	35	RN732ATTDK1000F25	Resistor, Thin Film, 100Ohm, 0.1W, 1 %, 0805 SMD	KOA Speer	1.09E+09
DM	50	LT1013CN8#PBF	IC, OPAMP, Dual Precision	Linear Technologies, Milpitas, CA	7.14E+09
DSM	49	LT1014ON#PBF	IC, OPAMP, QUAD, 1MHZ, 14 PIN DIP	Linear Technologies, Milpitas, CA	7.14E+09
PSMM	54	LT4356IDE-1#PBF	Surge Stopper, Power Line Voltage Regulator and Current Limiter, 60V, 12-PIN DFN	Linear Technologies, Milpitas, CA	1.03E+09
FGM	33	LTC1597AIG#PBF	IC D/A CONV 16 BIT PAR 28-SSOP	Linear Technologies, Milpitas, CA	2.49E+08
FGM	31	LTC1605AIG#PBF	IC A/D CONV 16 BIT Sampling 28SSOP	Linear Technologies, Milpitas, CA	5.48E+07
PSMM	55	LTC4416EMS#PBF	36V, Low Loss Dual Power Path Controllers For Large PFETS, 10-LEAD MSOP	Linear Technologies, Milpitas, CA	7.04E+08
COM	18	P6KE180CA	TVS Diode, Bidirectional, 600W, 180V	Littelfuse, Chicago, IL	2.78E+06
AIM	19	SMAJ17CA	Transient Voltage Suppressor, 400W, 18.9V	Littelfuse, Chicago, IL	2.78E+06
HIAM	41	DG528CJ+	IC, 8 Channel Latchable Multiplexer, 18 PIN DIP	Maxim, Sunnyvale, CA	2.39E+08
CTM	50	ICM7242IPA+	IC, Fixed counter, 8 PIN DIP	Maxim, Sunnyvale, CA	2.39E+08
CTM	63	-	Wire, Insulated, 600V or Greater, Type B or C, 28 AWG, Color as required	MIL-W16878D	1.00E+08
AIM	60	-	Wire, Insulated, 600V or Greater, Type B or C, Length and color as required, 28AWG	MIL-W16878D	1.00E+08
TTM	60	-	Wire, Insulated, 600V or Greater, Type B or C, 28AWG, Color as Required	MIL-W16878D	1.00E+08
PSMM	64	-	22 AWG Wire, STRANDED	MIL-W16878D	1.00E+08
AIM	63	-	Jumper Wire, 24 AWG, KYNAR	MIL-W16878D	1.00E+08
AIM	64	-	Wire BUS, 24 AWG Bare	MIL-W16878D	1.00E+08
CTM	68	-	Wire, 24 AWG, Wire Wrap, KYNAR, Insulated	MIL-W16878D	1.00E+08
SM	49	50058-8000	Crimp Terminal, Female	Molex Inc., Lisle, IL	7.69E+08
TTM	59	50058-8100	Crimp Terminal, Female	Molex Inc., Lisle, IL	7.69E+08
SM	48	51021-0300	Connector, Female, 3 POS, 2.54MM	Molex Inc., Lisle, IL	7.69E+08
AM	63	51021-0500	Connector, Female, 5 POS, 1.25 mm	Molex Inc., Lisle, IL	7.69E+08
TTM	58	51021-1000	Connector, Female 10 POS, 1.25MM	Molex Inc., Lisle, IL	7.69E+08
TTM	30	53047-0210	Connector, Male 2 POS, 1.25MM, Vertical Thru-Hole	Molex Inc., Lisle, IL	7.69E+08
DM	19	53047-03	Connector, Male 3 POS, 2.54MM, Vertical Thru-Hole	Molex Inc., Lisle, IL	7.69E+08
FGM	40	53047-0310	Connector Header 3POS 1.25MM Vertical TIN	Molex Inc., Lisle, IL	7.69E+08
AM	30	53047-0510	Connector, Male, 10 POS, 1.25mm, Vertical Thru Hole	Molex Inc., Lisle, IL	7.69E+08
FGM	63	90120-0122	Connector Header 2POS 0.100" STR TIN	Molex Inc., Lisle, IL	7.69E+08
BP	26	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos	Molex Inc., Lisle, IL	7.69E+08
CTM	30	53047-10	Connector, Male 10 POS, 1.25mm, vertical Thru-hole	Molex Inc., Lisle, IL	7.69E+08
BP	29	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos	Samtec, New Albany, IN	7.69E+08
BP	33	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos	Samtec, New Albany, IN	7.69E+08
BP	36	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos	Samtec, New Albany, IN	7.69E+08
AIM	21	11R154C	Inductor, 10%, 150 uH	Murata Power Solutions, Mansfield, MA	1.26E+08
FGM	26	11R104C	Inductor Radial, 100UH 0.35A	Murata Power Solutions, Mansfield, MA	1.26E+08
FGM	25	11R143C	Inductor Radial, 150UH 0.35A	Murata Power Solutions, Mansfield, MA	1.26E+08
FGM	37	7805SRH-C	Regulator Switch 5VDC 0.5A SIP, Horizontal	Murata Power Solutions, Mansfield, MA	1.13E+07
PSMM	59	LM2903N	Low Power Offset Voltage Dual Comparators, MDIP	National Semiconductor, Santa Clara, CA	1.00E+09
TM	24	LM35CAZ	IC, Sensor, Preciesion Temperature, TO92-3	National Semiconductor, Santa Clara, CA	1.00E+09
FGM	34	LM555CM	IC OSC Mono Timing 8-SOIC	National Semiconductor, Santa Clara, CA	1.00E+09
FGM	29	74HC221D	IC Dual Multi-Vibrator 16SOIC	NXP Semiconductors, Netherlands	1.51E+08
AIM	46	HEF40106BP	IC, Inverter,Schmitt Trigger, HEX, 14 DIP	NXP Semiconductors, Netherlands	3.34E+08
CTM	65	A7D-206-1	Thumbwheel, BCD, Front Mount	Omron Corp., Kyoto, Japan	N/A
CTM	67	A7D-2M-1	Thumbwheel, End Cap, Front Mount	Omron Corp., Kyoto, Japan	N/A
CTM	66	A7D-2PA-1	Thumbwheel, Spacer, Front Mount	Omron Corp., Kyoto, Japan	N/A
FGM	22	LS M67K-H2L1-1-Z	LED TOPLED 630NM SUP RED CLR SMD 0805	Osram Opto Semi, Regensburg, Germany	1.00E+09
COM	37	AQY212GH	IC, Photo Relay, Normally Open, 4 PIN DIP	Panasonic, Secaucus, NJ	4.98E+07

FGM	23	AQY272A	Relay OPTO AC/DC 60V 1.1A 4-SMD	Panasonic, Secaucus, NJ	4.98E+07
COM	35	NF2EB-12V	IC, Electricomechanical Relay, DPDT, Form 2C, 9 PIN	Panasonic, Secaucus, NJ	4.98E+07
FGM	23	AQY212GHA	Relay OPTO AC/DC 60V 1.1A 4-SMD	Panasonic, Secaucus, NJ	4.98E+07
FGM	54	ERA-6AEB202V	RES 2.0K Ohm 1/8W .1% 0805 SMD	Panasonic, Secaucus, NJ	3.33E+11
FGM	60	ERA-6AEB472V	RES 4.7K Ohm 1/8W, 0.1% 0805 SMD	Panasonic, Secaucus, NJ	3.33E+11
FGM	58	ERA-6AEB564V	RES 560K Ohm 1/8W .1% 0805 SMD	Panasonic, Secaucus, NJ	3.33E+11
FGM	53	ERJ-6ENG6492V	RES 64.9K Ohm 1/8W 1% 0805 SMD	Panasonic, Secaucus, NJ	5.88E+16
FGM	48	ERJ-GENF1201V	RES 1.20K Ohm 1/8W 1% 0805 SMD	Panasonic, Secaucus, NJ	5.88E+16
AIM	24	RS-2412D	DC/DC Converter, 2W, 24VDC Input, +/- 12 VDC Output	Recom, Brooklyn, NY	1.40E+06
DM	20	RS-2412DZ	DC/DC Converter, 2W, 24 VDC Input, +/-12 VDC Output	Recom, Brooklyn, NY	1.40E+06
PSMM	30	RS-2412S	DC/DC Converter, 2W, 24 VDC Input, +12 VDC Output	Recom, Brooklyn, NY	1.40E+06
AIM	8	RS-2415D	DC/DC Converter, 24 VDC IN, +/- 15 VDC OUT	Recom, Brooklyn, NY	1.40E+06
FGM	27	RS-2415DZ	DC/DC Converter, 2W, 24 VDC Input, +/-16 VDC Output	Recom, Brooklyn, NY	1.40E+06
AIM	3	RS-2405D	DC/DC Converter, 2W, 24 VDC Input, +/- 5 VDC Output	Recom, Brooklyn, NY	1.40E+06
CTM	32	RS-2405S	DC/DC Converter, 2W, 24 VDC Input, +/-5 VDC Output	Recom, Brooklyn, NY	1.40E+06
AIM	20	0040.1151	Test Jack PB 6.3A Black	Schurter Santa Rosa, CA	N/A
AOM	6	NUS-A324NB-1	Fabrication, Analog Output PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
COM	6	NUS-A326NB-1	Fabrication, Contact Output PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
FGM	7	NUS-A327NB-1	Fabrication, Contact Output PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
PSMM	6	NUS-A328NB-1	Fabrication, Power Supply Monitor PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
AM	6	NUS-A329NB-1	Fabrication, Alarm PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
RTM	7	NUS-A330NB-1	Fabrication, Reactor Trip PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
DM	6	NUS-A331NB-1	Fabrication, Difference Module PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
AIM	6	NUS-A323NB-1	Fabrication, Analog Input PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
HIAM	6	NUS-A333NB-1	Fabrication, HI Auctioneer PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
CTM	6	NUS-A334NB-1	Fabrication, Channel Trip PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
TTM	6	NUS-A335NB-1	Fabrication, HI Auctioneer PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
TM	6	NUS-A338NB-1	Fabrication, Temperature PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
SPM	3	NUS-CO97NB	Fabrication,MCB Status Panel PC Board	Scientech/NUSI Idaho Falls, ID	1.92E+07
AIM	7	NUS-C076PA-1	Assembly, Analog Input Face Plate	Scientech/NUSI Idaho Falls, ID	N/A
AOM	7	NUS-C077PA-1	Assembly, Analog Output Face Plate	Scientech/NUSI Idaho Falls, ID	N/A
COM	7	NUS-C079PA-1	Assembly, Contact Output Face Plate	Scientech/NUSI Idaho Falls, ID	N/A
FGM	8	NUS-C080PA-1	Assembly, Function Generator Face Plate, SQRT (-1)	Scientech/NUSI Idaho Falls, ID	N/A
FGM	9	NUS-C080PA-2	Assembly, Function Generator Face Plate, HPIF (-2)	Scientech/NUSI Idaho Falls, ID	N/A
FGM	10	NUS-C080PA-3	Assembly, Function Generator Face Plate, TSATscm (-3)	Scientech/NUSI Idaho Falls, ID	N/A
FGM	11	NUS-C080PA-4	Assembly, Function Generator Face Plate, TSAYsh.nom (-4)	Scientech/NUSI Idaho Falls, ID	N/A
FGM	12	NUS-C080PA-5	Assembly, Function Generator Face Plate, TSATsh.err (-5)	Scientech/NUSI Idaho Falls, ID	N/A
FGM	13	NUS-C080PA-6	Assembly, Function Generator Face Plate (-6)	Scientech/NUSI Idaho Falls, ID	N/A
PSMM	7	NUS-C081PA-1	Assembly, Power Supply Monitor Face Plate	Scientech/NUSI Idaho Falls, ID	N/A
AM	7	NUS-C082PA-1	Assembly, Alarm Face Plate	Scientech/NUSI Idaho Falls, ID	N/A
RTM	6	NUS-C083PA-1	Assembly, Reactor Tripr Face Plate	Scientech/NUSI Idaho Falls, ID	N/A
SM	7	NUS-C084PA-1	Assembly, Summer / Differencer Face Plate	Scientech/NUSI Idaho Falls, ID	N/A
CTM	7	NUS-C087PA-1	Assembley, Channel Trip Fce Plate	Scientech/NUSI Idaho Falls, ID	N/A
TTM	7	NUS-C088PA-1	Assembly, HI Auctioneer Face Plate, SQRT	Scientech/NUSI Idaho Falls, ID	N/A
TM	7	NUS-C089PA-1	Assembly, Temperature Face Plate	Scientech/NUSI Idaho Falls, ID	N/A
DM	7	NUS-C093PA-1	Assembly, Difference Module Face Plate	Scientech/NUSI Idaho Falls, ID	N/A
FGM	64	NUS-C100PA-1	PROM Programming ,SQRT, Programmed Into Part And Then Marked On Part	Scientech/NUSI Idaho Falls, ID	1.64E+06
FGM	65	NUS-C100PA-2	PROM Programming ,HPIF, Programmed Into Part And Then Marked On Part	Scientech/NUSI Idaho Falls, ID	1.64E+06
FGM	66	NUS-C100PA-3	PROM Programming ,TSATscm, Programmed Into Part And Then Marked On Part	Scientech/NUSI Idaho Falls, ID	1.64E+06
FGM	67	NUS-C100PA-4	PROM Programming ,TSATsh.nom, Programmed Into Part And Then Marked On Part	Scientech/NUSI Idaho Falls, ID	1.64E+06
FGM	68	NUS-C100PA-5	PROM Programming ,TSATsh.err, Programmed Into Part And Then Marked On Part	Scientech/NUSI Idaho Falls, ID	1.64E+06
FGM	69	NUS-C100PA-6	PROM Programming ,Future needs, Programmed Into Part And Then Marked On Part	Scientech/NUSI Idaho Falls, ID	1.64E+06
DSM	7	NUS-CO85PA-1	Assembly, Contact Output Face Plate	Scientech/NUSI Idaho Falls, ID	N/A
HIAM	7	NUS-CO86PA-1	Assembly, HI Auctioneer Face Plate, SQRT	Scientech/NUSI Idaho Falls, ID	N/A

BP		-1	Assembly, ICCMS Actuation Train Backplane (Cabinet Row 3)	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		-2	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 4)	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		-3	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 5)	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		-4	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 6)	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		-5	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 7)	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		-6	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 8)	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		NUS-C099NC-1	Fabrication, ICCMS Actuation Traine Backplane (Cabinet Row 3) PCB	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		NUS-C099NC-2	Fabrication, ICCMS Actuation Traine Backplane 1 (Cabinet Row 4) PCB	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		NUS-C099NC-3	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 5) PCB	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		NUS-C099NC-4	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 6) PCB	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		NUS-C099NC-5	Fabrication, ICCMS Actuation Traine Backplane 4 (Cabinet Row 7) PCB	Scientech/NUSI Idaho Falls, ID	1.92E+07
BP		NUS-C099NC-6	Fabrication, ICCMS Actuation Traine Backplane 5 (Cabinet Row 8) PCB	Scientech/NUSI Idaho Falls, ID	1.92E+07
PSMM	38	CSNL2512FT4L00	RESISTOR, METAL FOIL, 1%,2W, 0.004kOhm, SMD, 2512	Stackpole Electronics	3.65E+06
AIM	56	2N2905A	Transistor, PNP, -60V, -0.6A, TO-39	ST Micro, Santa Clara, CA	6.99E+09
FGM	51	RG2012N-142-W-T1	RES 1.3K Ohm 1/8W .05% 0805 SMD	Susumu, Palisades Park, NJ	1.09E+09
FGM	55	RG2012N-203-W-T1	RES 20.0K Ohm 1/8W .05% 0805 SMD	Susumu, Palisades Park, NJ	1.09E+09
AOM	36	RG2012N-221-W-T1	Resistor, Thin Film, 220Ohm, 1/8W, 0.05%, 0805 SMD	Susumu, Palisades Park, NJ	1.09E+09
AOM	28	RG2012N-222-W-T1	Resistor, Thin Film, 2.2kOhm, 1/8W, 0.05% 0805 SMD	Susumu, Palisades Park, NJ	1.09E+09
FGM	56	RG2012N-683-W-T1	RES 68K Ohm 1/8W .05% 0805 SMD	Susumu, Palisades Park, NJ	1.09E+09
AOM	33	RG2012P-134-B-T5	Resistor, Thin Film, 130kOhm, 1/8W, 0.1%, 0805 SMD	Susumu, Palisades Park, NJ	1.09E+09
AOM	32	RG2012P-4022-B-T5	Resistor, Thin Film, 40.2kOhm, 1/8W, 0.1%, 0805 SMD	Susumu, Palisades Park, NJ	1.09E+09
AOM	33	RR1220P-9532-D-M	Resistor, Thin Film, 95.3kOhm, 1/10W, 0.5%, 0805 SMD	Susumu, Palisades Park, NJ	1.09E+09
FGM	10	CGA6P3X7R1H335K	Capacitor, Ceramic, 3.3uF, 50V, X7R, 10%, 1210 SMD	TDK, Uniondale, NY	3.52E+10
CTM	16	FK207R1H105K	Capacitor, Ceramic, 10%, 1uF, 25V MIN	TDK, Uniondale, NY	3.52E+10
COM	15	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 50V	TDK, Uniondale, NY	3.52E+10
CTM	19	FK22C0G1H224J	Capacitor, Ceramic, 10%, 0.22uF, 25V MIN	TDK, Uniondale, NY	3.52E+10
PSMM	14	FK22X7R1E105K	Capacitor, Ceramic, 10%, 1uF, 50V	TDK, Uniondale, NY	3.52E+10
TTM	20	FK22X7R1E106K	Capacitor, Ceramic, 10%, 10uF, 25V	TDK, Uniondale, NY	3.52E+10
RTM	11	FK22X7R1H225K	Capacitor, Ceramic, 10%, 2.2uF, X7R, 25V	TDK, Uniondale, NY	3.52E+10
AIM	12	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3 uF, X7R, 50V	TDK, Uniondale, NY	3.52E+10
DM	16	FK22Y5V1E226Z	Capacitor, Ceramic, 20%, 22uF, 25V	TDK, Uniondale, NY	3.52E+10
PSMM	17	FK24C0G1H224J	Capacitor, Ceramic, 10%, 0.22uF, 50V	TDK, Uniondale, NY	3.52E+10
AIM	13	FK24X7R1E105K	Capacitor, Ceramic, 10%, 1 uF, X7R, 50V	TDK, Uniondale, NY	3.52E+10
CTM	20	FK28X7R1H103K	Capacitor, Ceramic, 10%, 0.01uF, 25V MIN	TDK, Uniondale, NY	3.52E+10
AIM	11	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, X7R, 50V	TDK, Uniondale, NY	3.52E+10
PSMM	19	FK28X7R1H682K	Capacitor, Ceramic, 10%, 6.8uF, 50V	TDK, Uniondale, NY	3.52E+10
AIM	22	536385-5	Connector, DIN 41612 M 64 POS 2.54 mm Solder Right Angle Thru Hole	TE Connectivily, Belwyn, PA	7.69E+08
SPM	13	3-1437667-1	Connector, Barrier Strip, 8 Pos, 0.325 Spacing, PTH	TE Connectivily, Belwyn, PA	7.69E+08
SPM	14	3-1437667-4	Connector, Barrier Strip, 2 Pos, 0.325 Spacing, PTH	TE Connectivily, Belwyn, PA	7.69E+08
SPM	15	3-1437667-3	Connector, Barrier Strip, 10 Pos, 0.325 Spacing, PTH	TE Connectivily, Belwyn, PA	7.69E+08
BP	13	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos	TE Connectivily, Belwyn, PA	7.69E+08
BP	22	8-1293640-5	Connector, DIN41612 Type c/2, Vertical, Femal, 48 pos	TE Connectivily, Belwyn, PA	7.69E+08
BP	46	492739-1	Connector, Lightray, Backplane Housing - Simplex	TE Connectivily, Belwyn, PA	7.69E+08
BP	47	492740-2	Retention Clip, Lightray, for Backplane Housing	TE Connectivily, Belwyn, PA	N/A
CTM	59	492234-1	Connector, Lightray, System Card Houseing - Simplex	TE Connectivily, Belwyn, PA	7.69E+08
AIM	37	1676174-2	Resistor, Metal Film, 0.1%, 1/10W, 10PPM, 12.7KOhms, 0805	TE Connectivily, Belwyn, PA	1.09E+09
AOM	34	1676673-2	Resistor, Thin Film, 24.3kOhm, 1/10W, 0.1%, 10PPM/C, 0805 SMD	TE Connectivily, Belwyn, PA	1.09E+09
AOM	34	1676674-3	Resistor, Thin Film, 24.9kOhm, 1/10W, 0.1%, 10PPM/C, 0805 SMD	TE Connectivily, Belwyn, PA	1.09E+09
CTM	28	526285-5	Connector, DIN 41612 M 64 POS 2.54 mm, Solder Right Angle Thru-Hole	TE Connectivily, Belwyn, PA	7.69E+08
PSMM	27	5650948-5	Connector, DIN 41612, TYPE C, 48 POS 2.54 mm, Solder Right Angle Thru-Hole	TE Connectivily, Belwyn, PA	7.69E+08
FGM	42	RN73C2A14K7BTDF	Thin Film Resistor 0.1W, 1% 10PPM 14.7K Ohm, 0805, SMD	TE Connectivily, Belwyn, PA	1.00E+10
RTM	25	CD4001BE	QUAD 2-Input NOR Gate, 14-DIP	Texas Instruments, Dallas, TX	3.71E+08
CTM	56	CD4002BE	IC, Dual 4-Input NOR Gate, 14 PIN DIP	Texas Instruments, Dallas, TX	3.71E+08

CTM	51	CD40102BE	IC, 8-Stage, Presettable, Down Counter, 16 PIN DIP	Texas Instruments, Dallas, TX	3.71E+08
AM	60	CD40103BE	IC, Sync Down Counter, 8 STG, 16 PIN DIP	Texas Instruments, Dallas, TX	3.71E+08
CTM	54	CD4027BE	IC, JK Flip Flop, 16 PIN DIP	Texas Instruments, Dallas, TX	3.71E+08
PSMM	58	CD4049UB	IC, CMOS HEX Buffer/Converters, 16DIP	Texas Instruments, Dallas, TX	3.71E+08
RTM	24	CD4071BE	QUAD 2-Input OR Gate, 14-DIP	Texas Instruments, Dallas, TX	3.71E+08
CTM	53	CD4072BE	IC, Dual 4-Input OR Gate, 14 PIN DIP	Texas Instruments, Dallas, TX	3.71E+08
CTM	57	CD4081BE	IC, Quad 2-Input AND Gate, 14 PIN DIP	Texas Instruments, Dallas, TX	3.71E+08
HIAM	42	CD4532BE	IC, 2:8 Encoder 16 PIN DIP	Texas Instruments, Dallas, TX	3.71E+08
AIM	50	INA128PA	IC, OPAMP, Instr, 1.3 MHz, SGL, 8DIP	Texas Instruments, Dallas, TX	3.68E+08
AOM	42	INA138NA	IC, Current Shunt Monitor, SOT23-5	Texas Instruments, Dallas, TX	3.68E+08
AIM	49	ISO124P	IC, Isolation Amp, 50 KHz, SGL, 16 DIP	Texas Instruments, Dallas, TX	3.68E+08
AOM	43	ISO124U	IC, OPAMP ISO, 50KHz SGL, S0-28	Texas Instruments, Dallas, TX	3.68E+08
HIAM	44	ISOP124P	IC, Isolation Amp, 60KHZ, SGL, 16PIN DIP	Texas Instruments, Dallas, TX	3.68E+08
AIM	51	OPA2277P	IC, OPAMP, GP, PREC, 1MHz, Dual, 8 PIN DIP	Texas Instruments, Dallas, TX	3.68E+08
FGM	30	OPA2277U	IC OPAMP GP 1MHZ Dual 8SOIC	Texas Instruments, Dallas, TX	3.68E+08
DM	44	OPA277P	IC, OPAMP, GP, [REC. 1MZ. SGL, 8 PIN DIP	Texas Instruments, Dallas, TX	3.68E+08
AIM	47	OPA277PA	IC, OPAMP, GP, Prec, 1MHz, SGL, 8 Pin DIP	Texas Instruments, Dallas, TX	3.68E+08
FGM	39	OPA277UA	IC OPAMP GP 1MHZ SGL PREC 8SOIC	Texas Instruments, Dallas, TX	3.68E+08
DSM	49	OPA4277PA	IC, OPAMP, QUAD, 1MHZ, 14 PIN DIP	Texas Instruments, Dallas, TX	3.68E+08
AOM	40	OPA4277UA	IC, OPAMP GP, Quad, S014	Texas Instruments, Dallas, TX	3.68E+08
AOM	41	REF102AU	IC, +10V Prec Reference, SO-8	Texas Instruments, Dallas, TX	3.68E+08
AIM	52	REF102BP	IC, Voltage Reference, 10V, 8 PIN DIP	Texas Instruments, Dallas, TX	3.68E+08
FGM	38	REF102BU	IC +10V PREC Reference 8-SOIC	Texas Instruments, Dallas, TX	3.68E+08
DM	43	REF102P	IC, Voltage Reference, 10V, 8 PIN DIP	Texas Instruments, Dallas, TX	3.68E+08
AIM	48	REF200AU	IC, Curr Source/Sink Mirror, 8SOIC	Texas Instruments, Dallas, TX	3.68E+08
FGM	35	SN74HC574PW	IC OCTAL D-Type F-F 20-TSSOP	Texas Instruments, Dallas, TX	3.08E+09
HIAM	42	SN74LS148N	IC, 2:8 ENCODER 16 PIN DIP	Texas Instruments, Dallas, TX	8.67E+08
HIAM	39	TLC372IP	IC, COMPARATOR, DUAL, 8 PIN DIP	Texas Instruments, Dallas, TX	2.44E+08
HIAM	39	TLC372MP	IC, Comparator, Dual, 8 PIN DIP	Texas Instruments, Dallas, TX	2.44E+08
AIM	37	PCF0805R-12K4BT1	Resistor, Metal Film, 0.1%, 1/10W, 25PPM, 12.4KOhm, 0805	TTElectrics/welwyn Corpus Christi, Texas	5.00E+10
CTM	24	VAOL-5LAE2	Red, Round, 5mm, T-1 3/4, Diffsed, Flanged	VCC Inc, San Marcos, CA	N/A
COM	21	VAOL-5LAED	Red, Round, 5mm, T-1 3/4, Duffused, Flanged	VCC Inc, San Marcos, CA	N/A
COM	22	VAOL-5LDE2	Green, Round, 5mm, T-1 3/4, Duffused, Flanged	VCC Inc, San Marcos, CA	N/A
CTM	23	VAOL-5MAE2	Red, Round, 5mm, T-1 3/4, Diffsed, Flangless	VCC Inc, San Marcos, CA	N/A
AM	23	VAOL-5MCE2	Yellow, Round, 5mm, T-1 3/4, Diffused, Flangeless	VCC Inc, San Marcos, CA	N/A
CTM	25	VAOL-5MDE2	Green, Round, 5mm, T-1 3/4, Diffused, Flangless	VCC Inc, San Marcos, CA	N/A
AM	25	VAOL-5MSBY2	Blue, Round, 5mm, T-1 3/4, Diffused, Flangeless	VCC Inc, San Marcos, CA	N/A
DSM	24	PCH75	LED Holder, 5mm, Single Level	VCC Inc, San Marcos, CA	N/A
SPM	12	CMD333UWC	LED, White, T-1, 3/4	Chicago Miniature Lighting, Hackensack, NJ	1.00E+09
AIM	26	TNPU0805100RBZEN00	Resistor, Thin Film, 0.1%, 1/8W, 5PPM, 100 Ohm, 0805	Vishay Precision Group, Malvern, PA	1.00E+10
BP	43	S102K19K000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 19KOhm, ThroughHole	Vishay Precision Group, Malvern, PA	1.00E+10
BP	44	S102K7K5000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 7.5KOhm, ThroughHole	Vishay Precision Group, Malvern, PA	1.00E+10
AIM	30	Y405310K0000J0L	Resistor, Variable, 10 KOhm, 10 PPM, 0.25W, 21 Turn, Through Hole	Vishay Precision Group, Malvern, PA	1.00E+10
SM	21	Y40531K0000J0L	Resistor, Variable, 1KW, 5%, 10PPM, 0.25W, 21 Turn, Through Hole	Vishay Precision Group, Malvern, PA	1.00E+10
AIM	28	Y40532K00000J0L	Resistor, Variable, 2 KOhm, 5%, 10PPM, 0.25W, 21 Turn, Through Hole	Vishay Precision Group, Malvern, PA	1.00E+10
SM	23	Y40532K0000J0L	Resistor, Variable, 2KW, 0.25W, 21 Turn, Through Hole	Vishay Precision Group, Malvern, PA	1.00E+10
AIM	39	Y40535K00000J0L	Resistor, Variable 5KOhm, 5%, 10PPM, 0.25W, 21 Turn, Through Hole	Vishay Precision Group, Malvern, PA	1.00E+10
TM	33	PTF56120R00BYEB	Resistor, Metal Film, 1%, 1/8W, 120W	Vishay Presision Group, Malvern, PA	1.38E+05
TM	20	PTF562K4000BZBF	Resistor, Metal Film, 1%, 1/8W, 1.4kW	Vishay Presision Group, Malvern, PA	1.38E+05
TM	34	PTF56794R00BTEB	Resistor, Metal Film, 1%, 1/8W, 794kW	Vishay Presision Group, Malvern, PA	1.38E+05
TM	22	PTF568K7500BYEB	Resistor, Metal Film, 1%, 1/8W, 8.75kW	Vishay Presision Group, Malvern, PA	1.38E+05
TM	21	PTF569K0900BYEB	Resistor, Metal Film, 1%, 1/8W, 9.09kW	Vishay Presision Group, Malvern, PA	1.38E+05
BP	43	PTF5647K500BY	Resistor, Metal Film, 0.1%, 1/8W, 10PPM, 47.50KOhm, ThroughHole	Vishay Presision Group, Malvern, PA	1.38E+05
BP	44	PTF5615K500BY	Resistor, Metal Film, 0.1%, 1/8W, 10PPM, 15.00KOhm, ThroughHole	Vishay Presision Group, Malvern, PA	1.38E+05

PSMM	38	Y1480R00500B9W	Resistor, Metal Foil, 0.1%,1W, 0.0054W, SMD, 2512	Vishay Presision Group, Malvern, PA	1.00E+10
AOM	29	Y16291K00000TR9	Resistor, Metal Foil, 1.0kOhm, 1/10W, 0.01%, 0.2PPM/C, 0805 SMD	Vishay Presision Group, Malvern, PA	1.00E+10
AOM	26	Y4053500R000J0L	Resistor, Variable, 500, 5%, 10PPM, 1/4W, 21 Turn, Through Hole	Vishay Presision Group, Malvern, PA	1.00E+10
AOM	27	Y405310K0000J0L	Resistor, Variable, 10K, 0.25W, 21 Turn Through Hole	Vishay Presision Group, Malvern, PA	1.00E+10
HIAM	25	Y40351K00000J0L	Resistor, Variable, 5% 1/4W, 1KW	Vishay Presision Group, Malvern, PA	1.00E+10
DSM	35	Y505310K0000J0L	Resistor, Variable, 1/4W, 10kW	Vishay Presision Group, Malvern, PA	1.00E+10
AIM	16	K101K10X7RF5UH5	Capacitor, Ceramic, 10%, 100 pF, 50V	Vishay Shellon, CT	1.41E+08
AOM	31	PLT0805Z5001AST5	Resistor, Thin Film, 5.0kOhm, 1/4W, 0.05%, 0805 SMD	Vishay Shellon, CT	1.00E+10
PSMM	32	SI7139DP-TI-GE3	P Channel (D-S) MOSFET, 30V, 24A, Power PAK S0-8	Vishay Sillconix, Shellon, CT	9.76E+09
TM	30	CMF5510M000FHEK	Resistor, Carbon Film, 5%, 1/4W, (MIN), 10MW	Vishay/Dale Malvern, PA	1.38E+05
DSM	37	CMF551CM000FHEK	Resistor, Carbon Film, 6%, 1/4W, (MIN), 10kW	Vishay/Dale Malvern, PA	1.38E+05
FGM	59	CRCW0805100RFKEA	Resistor, 100 Ohm 1/8W 1% 0805 SMD	Vishay/Dale Malvern, PA	1.00E+10
FGM	57	CRCW08052K49FKEA	Resistor, 2.49K Ohm 1/8W 1% 0805 SMD	Vishay/Dale Malvern, PA	1.00E+10
FGM	52	TNPW080510K2BEEA	Resistor, 10.2K Ohm 1/8W 0.1% 0805 SMD	Vishay/Dale Malvern, PA	1.00E+10
AOM	30	TNPW08051K00BEEA	Resistor, Thin Film, 1.0kOhm, 1/8W, 0.1%, 25PPM/C, 0805 SMD	Vishay/Dale Malvern, PA	1.00E+10
AOM	45	TNP00805100RBZEN00	Resistor, Thin Film, 0805 SMD, 100 Ohm, 0.1%, 1/8W, 5ppm/C	Vishay/Dale Malvern, PA	1.00E+10
AOM	35	Y4022100R000Q0R	Resistor, Metal Foil, 100Ohm, 0.2W, 0.02%, 0.2PPM/C, 0805 SMD	Vishay/Dale Malvern, PA	1.00E+10
FGM	47	Y405310K0000J0	Trimmer Resistors - Multi Turn 1240W 10K Ohm 5.0%	Vishay/Dale Malvern, PA	1.00E+10
FGM	41	Y4053500R000J0	Trimmer Resistors - Multi Turn 1240W 600 Ohm 5.0%	Vishay/Dale Malvern, PA	1.00E+10
FGM	49	228-0805-7.68K-RC	Thin Film Resistor 7.68K Ohm 0.1% 10PPM 0805, SMD	Xicon, Fort Worth, Texas	6.42E+08
FGM	50	2288-0805-4.99K-RC	Thin Film Resistor 4.99K Ohm 0.1% 10PPM 0805, SMD	Xicon, Fort Worth, Texas	6.43E+08
HIAM	26	270-1.0K-RC	Resistor, Metal Film, 1%, 1/8W, 1KW	Xicon, Fort Worth, Texas	6.42E+08
AIM	34	270-1.2K-RC (RNC55H1201FS)	Resistor, Metal Film, 1%, 1/8W, 50 PPM, 1.2 KOhm	Xicon, Fort Worth, Texas	6.43E+08
DSM	34	270-1.5K-RC	Resistor, Metal Film, 1%, 1/8W, 1.5kW	Xicon, Fort Worth, Texas	6.42E+08
DSM	36	270-100K-RC (RNC55H4702FS)	Resistor, Metal Film, 1%, 1/8W, 100kW	Xicon, Fort Worth, Texas	6.42E+08
AIM	27	270-10K-RC (RNC55H1002FS)	Resistor, Metal Film, 1%, 1/8W, 50PPM, 10KOhm	Xicon, Fort Worth, Texas	6.42E+08
PSMM	34	270-10-RC	Resistor, Metal Film, 1%, 1/8W, 10W	Xicon, Fort Worth, Texas	6.54E+08
AIM	25	270-100-RC (RNC55H1000FS)	Resistor, Metal Film, 1%, 1/2W, 50PPM, 100 Ohm.	Xicon, Fort Worth, Texas	6.42E+08
DM	39	270-1.24K-RC	Resistor, Metal Film, 1%, 1/8W, 1.24KW, Thru-hole	Xicon, Fort Worth, Texas	6.43E+08
CTM	45	270-11K-RC	Resistor, Metal Film, 1%, 1/8W, 11kW	Xicon, Fort Worth, Texas	6.42E+08
AIM	35	270-120K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 120KOhm	Xicon, Fort Worth, Texas	6.42E+08
PSMM	44	270-150K-RC (RNC55H1503FS)	Resistor, Metal Film, 1%, 1/8W, 150W	Xicon, Fort Worth, Texas	6.42E+08
AIM	38	270-15K-RC (RNC55H1502FS)	Resistor, Metal Film, 1%, 1/8W, 50PPM, 15KOhm	Xicon, Fort Worth, Texas	6.42E+08
AIM	40	270-1K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 1KOhm	Xicon, Fort Worth, Texas	6.42E+08
AIM	36	270-2.2K-RC (RNC55H2201FS)	Resistor, Metal Film, 1%, 1/8W, 50PPM, 2.2KOhm	Xicon, Fort Worth, Texas	6.42E+08
DM	25	270-2.49K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 2.49kW, Thru-hole	Xicon, Fort Worth, Texas	6.42E+08
AIM	33	270-220-RC	Resistor, Metal Film, 1%, 1/2W, 50PPM, 220 Ohm	Xicon, Fort Worth, Texas	6.43E+08
RTM	21	270-2K-RC (RNC55H2001FS)	Resistor, Metal Film, 1%, 1/8W, 2kW	Xicon, Fort Worth, Texas	6.42E+08
COM	29	270-3.9K-RC (RNC55H3901FS)	Resistor, Metal Film, 1%, 1/8W, 3.9kW	Xicon, Fort Worth, Texas	6.43E+08
AIM	32	270-30K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 30 KOhm	Xicon, Fort Worth, Texas	6.42E+08
HIAM	30	270-330-RC (RNC55H3300FS)	Resistor, Metal Film, 1%, 1/8W, 330W	Xicon, Fort Worth, Texas	6.43E+08
PSMM	48	270-390K-RC	Resistor, Metal Film, 1%, 1/8W,3900W	Xicon, Fort Worth, Texas	8.11E+08
DM	31	270-4.02K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 4.02kW, Thru-hole	Xicon, Fort Worth, Texas	6.43E+08
PSMM	50	270-4.22K-RC	Resistor, Metal Film, 1%, 1/8W, 4.22W	Xicon, Fort Worth, Texas	6.43E+08
CTM	37	270-4.7K-RC	Resistor, Metal Film, 1%, 1/8W, 4.7kW	Xicon, Fort Worth, Texas	6.43E+08
CTM	39	270-4.99K-RC	Resistor, Metal Film, 1%, 1/8W, 4.99kW	Xicon, Fort Worth, Texas	6.42E+08
CTM	40	270-44.2K-RC	Resistor, Metal Film, 1%, 1/8W, 44.2kW	Xicon, Fort Worth, Texas	6.42E+08
DM	30	270-47.5K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 47.5kW, Thru-hole	Xicon, Fort Worth, Texas	6.42E+08
TTM	38	270-47K-RC (RNC55H1003FS)	Resistor, Metal Film, 1%, 1/8W, 47W	Xicon, Fort Worth, Texas	6.42E+08
DM	34	270-499K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 499W, Thru-hole	Xicon, Fort Worth, Texas	1.02E+09
PSMM	46	270-5.1K-RC	Resistor, Metal Film, 1%, 1/8W, 5.1W	Xicon, Fort Worth, Texas	6.43E+08
TTM	43	270-50K-RC	Resistor, Metal Film, 1%, 1/8W, 50kW	Xicon, Fort Worth, Texas	6.42E+08
DM	37	270-6.2K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 6.2KW, Thru-hole	Xicon, Fort Worth, Texas	6.43E+08
AIM	29	270-6.8K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 6.8KOhm	Xicon, Fort Worth, Texas	6.42E+08
CTM	41	270-68K-RC (RNC55H6802FS)	Resistor, Metal Film, 1%, 1/8W, 68kOhm	Xicon, Fort Worth, Texas	6.42E+08

PSMM	51	270-7.15K-RC	Resistor, Metal Film, 1%, 1/8W, 7.15W	Xicon, Fort Worth, Texas	6.42E+08
DM	32	270-7.5K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 7.5kW, Thru-hole	Xicon, Fort Worth, Texas	6.43E+08
DM	35	270-8.06K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 8.06kW, Thru-hole	Xicon, Fort Worth, Texas	6.42E+08
PSMM	37	270-86.6K-RC	Resistor, Metal Film, 1%, 1/8W, 8.68W	Xicon, Fort Worth, Texas	6.42E+08
DM	28	270-9.1K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 9.1kW, Thru-hole	Xicon, Fort Worth, Texas	6.42E+08
DSM	40	270-90K-RC	Resistor, Metal Film, 1%, 1/8W, 90kW	Xicon, Fort Worth, Texas	6.42E+08
RTM	21	270-2.0M-RC (RNC55H2004FS)	Resistor, Metal Film, 1%, 1/8W, 2.0MOhm	Xicon, Fort Worth, Texas	3.19E+08
BP	40	273-1K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 1KOhm, ThroughHole	Xicon, Fort Worth, Texas	6.42E+08
BP	41	273-100K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 100KOhm, ThroughHole	Xicon, Fort Worth, Texas	6.42E+08
CTM	43	273-150-RC	Resistor, Metal Film, 1%, 1/8W, 150kW	Xicon, Fort Worth, Texas	6.42E+08
FGM	43	288-0805-10K-RC	Thin Film Resistor 10W, 0.1% 10PPM 0805, SMD	Xicon, Fort Worth, Texas	6.42E+08
FGM	45	288-0805-200-RC	Thin Film Resistor 20 Ohm 0.1% 10PPM 0805, SMD	Xicon, Fort Worth, Texas	6.43E+08
AIM	4	RNC55H9761FS	Resistor, Metal Film, 9.76KOhm, 1%, 1/8W	Xicon, Fort Worth, Texas	6.42E+08
AIM	5	RNC55H6651FS	Resistor, Metal Film, 6.65KOhm, 1%, 1/8W	Xicon, Fort Worth, Texas	6.42E+08
				Xicon, Fort Worth, Texas	
FGM	46	288-0805-33.2K-RC	Thin Film Resistor 3.32 Ohm 0.1% 10PPM 0805, SMD	Xicon, Fort Worth, Texas	6.42E+08
NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	

Analog Input Module MTBF Data														
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
AIM	3	RS-2405D	DC/DC Converter, 24 VDC IN, +/- 5 VDC OUT	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
AIM	4	RNC55H9761FS	Resistor, Metal Film, 9.76KOhm, 1%, 1/8W	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
AIM	5	RNC55H6651FS	Resistor, Metal Film, 6.65KOhm, 1%, 1/8W	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
AIM	6	NUS-A323NB-1	Fabrication, Analog Input PC Board	1						NUS Instruments	1.92E+07	5.21E-08	5.21E-08	
AIM	7	NUS-C076PA-1	Assembly, Analog Input Face Plate	1						NUS Instruments	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AIM	8	RS-2415D	DC/DC Converter, 24 VDC IN, +/- 15 VDC OUT	2						Recom, Brooklyn, NY	1.40E+06	7.15E-07	1.43E-06	Generic Data or similar component
AIM	9	B516	Board, Adapter, TSSOP to DIP 16 PIN	1						Bellin	7.69E+08	1.30E-09	1.30E-09	
AIM	10	TAP105K035S	Capacitor, Tantalum, 10%, 1uF, 35V	12						AVX, Fountain Inn, SC	3.35E+06	2.99E-07	3.58E-06	4 of 16 do not contribute
AIM	11	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, X7R, 50V	20						TDK, Uniondale, NY	3.52E+10	2.84E-11	5.68E-10	
AIM	12	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3 uF, X7R, 50V	10						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.84E-10	
AIM	13	FK24X7R1E105K	Capacitor, Ceramic, 10%, 1 uF, X7R, 50V	12						TDK, Uniondale, NY	3.52E+10	2.84E-11	3.41E-10	
AIM	14	TAP475K035SCS	Capacitor, Tantalum, 10%, 4.7 uF, 35V	1						AVX, Fountain Inn, SC	3.35E+06	2.99E-07	2.99E-07	
AIM	15	TAP685K035SCS	Capacitor, Tantlum, 10%, 6.8 uF, 35V	1						AVX, Fountain Inn, SC	3.35E+06	2.99E-07	2.99E-07	
AIM	16	K101K10X7RF5UH5	Capacitor, Ceramic, 10%, 100 pF, 50V	1						Vishay Shellon, CT	1.41E+08	7.09E-09	7.09E-09	
AIM	17	TAP155K035SCS	Capacitor, Tantalum, 10%, 1.5 uF, 35V	1						AVX, Fountain Inn, SC	3.35E+06	2.99E-07	2.99E-07	
AIM	18	1N4148	Diode SS Fast 100V 200MA DO35	1						?	2.19E+07	4.57E-08	4.57E-08	
AIM	19	SMAJ17CA	Transient Voltage Suppressor, 400W, 18.9V	1						Littelfuse, Chicago, IL	2.78E+06	3.60E-07	3.60E-07	Treated as transistor.
AIM	20	0040.1151	Test Jack PB 6.3A Black	2						Schurler Santa Rosa, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AIM	21	11R1S4C	Inductor, 10%, 1S0 uH	10						Murata Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	7.96E-08	
AIM	22	536385-5	Conn. DIN 41612 M 64 POS 2.54 MM Solder Right Angle Thru Hole	1						TE Connecivily, Belwyn, PA	7.69E+08	1.30E-09	1.30E-09	
AIM	23	53047-03	Connector, Male, 3 Pos, 1.25 MM, Vertical Thru Hole	2						Molex, lisle, IL	7.69E+08	1.30E-09	2.60E-09	
AIM	24	RS-2412D	DC/DC Converter, 2W, 24VDC Input, +/- 12 VDC Output	2						Recoin, Brooklyn, NY	1.40E+06	7.15E-07	1.43E-06	
AIM	25	270-100-RC	Resistor, Metal Film, 1%, 1/2W, 50PPM, 100 Ohms.	4						Vishay Precision Group, Malvern, PA	6.42E+08	1.56E-09	6.23E-09	
AIM	26	TNPU0805100RBZEN00	Resistor, Then Film, 0.1%, 1/8W, 5PPM, 100 Ohms, 0805	1						Vishay Precision Group, Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
AIM	27	270-10K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 10KOhms	10						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-08	
AIM	28	Y40532K00000J0L	Resistor, Variable, 2 KOhms, 5%, 10PPM, 0.25W, 21 Turn, Through Hole	2						Vishay Precision Group, Malvern, PA	1.00E+10	1.00E-10	2.00E-10	
AIM	29	270-6.8K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 6.8KOhms	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
AIM	30	Y405310K0000J0L	Resistor, Variable, 10 Kohms, 10 PPM, 0.25W, 21 Turn, Through Hole	2						Vishay Precision Group, Malvern, PA	1.00E+10	1.00E-10	2.00E-10	
AIM	31	6638S-1-103	Precision Potentiometer, 10KOhm, 1W Single Turn	1						Bourns, Riverside, CA	8.76E+10	1.14E-11	1.14E-11	
AIM	32	270-30K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 30 KOhm	4						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	6.23E-09	
AIM	33	270-220-RC	Resistor, Metal Film, 1%, 1/2W, 50PPM, 220 Ohms	1						Xicon, Fort Worth, Texas	6.43E+08	1.55E-09	1.55E-09	
AIM	34	RNC55H8250FS	Resistor, Metal Film, 1%, 1/8W, 50 PPM, 825 Ohms	3						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	4.67E-09	
AIM	35	270-120K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 120KOhms	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
AIM	36	270-2.2K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 2.2KOhms	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
AIM	37	1676174-2	Resistor, Metal Film, 0.1%, 1/10W, 10PPM, 12.7KOhms, 0805	1						TE Connecivily, Belwyn, PA	1.09E+09	9.17E-10	9.17E-10	Generic Data or similar component
AIM	38	270-15K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 15KOhms	3						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	4.67E-09	
AIM	39	Y40535K00000J0L	Resistor, Variable 5KOhms, 5%, 10PPM, 0.25W, 21 Turn, Through Hole	1						Vishay Precision Group, Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
AIM	40	270-1K-RC	Resistor, Metal Film, 1%, 1/8W, 50PPM, 1KOhm	5						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	7.79E-09	
AIM	41	Wire, 22AWG, BARE	Jumper, 0Ohm	1						Wire, 22AWG, BARE	1.00E+08	1.00E-08	1.00E-08	
AIM	42	ADG1636BRU	IC, DUAL, Analog Switch, SPDT, TSSOP16	2						Analog Devices, Bellevue, WA	5.71E+09	1.75E-10	3.50E-10	
AIM	43	ET21MD1AVQE	Switch, Toggle, On-On, Tiny, Vertical Toggle, R/A PC MNT	1						C&K Components, Newton, United States	5.04E+06	1.98E-07	1.98E-07	
AIM	44	ET24MD1AVBE	Switch, Toggle, On-On-On, Tiny, Vertical Toggle, R/A PC MNT	1						C&K Components, Newton, United States	5.04E+06	1.98E-07	1.98E-07	
AIM	45	TP-105-01-00	Test Point, Breakaway, Black	32						Components Corp, Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AIM	46	HEF40106BP	IC, Inverter,Schmitt Trigger, HEX, 14 DIP	2						NXP Semiconductors, Netherlands	3.34E+08	2.99E-09	5.99E-09	
AIM	47	OPA277PA	IC, OPAMP, GP, Prec, 1MHz, SGL, 8 Pin DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
AIM	48	REF200AU	IC, Curr Source/Sink Mirror, 8SOIC	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
AIM	49	ISO124P	IC, Isolation Amp, 50 KHz, SGL, 16 DIP	3						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	8.15E-09	
AIM	50	INA128PA	IC, OPAMP, Instr, 1.3 MHz, SGL, 8DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
AIM	51	OPA2277P	IC, OPAMP, GP, PREC, 1MHz, Dual, 8 PIN DIP	3						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	8.15E-09	
AIM	52	REF102BP	IC, Voltage Reference, 10V, 8 PIN DIP	2						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	5.43E-09	
AIM	53	AQY212GH	IC, Photo Relay, 4 Pin DIP	1						Panasonic, New Providence, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AIM	54	FOD3181	IC, 8 PIN DIP Optocoupler	3						Fairchild Semiconductor San Jose, CA	7.03E+07	1.42E-08	4.27E-08	Generic Data or similar component
AIM	55	ZVP4105A	MOSFET, P-CH, 50V, 175MA, TO92-3	1						Diodes Inc, San Jose, CA	1.71E+08	5.85E-09	5.85E-09	
AIM	56	2N2905A	Transistor, PNP, -60V, -0.6A, TO-39	1						ST Micro, Santa Clara, CA	6.99E+09	1.43E-10	1.43E-10	
AIM	57	2N7000	N Channel Enhancement Mode FET, 60V, 0.2A, TO92	3						Fairchild Semiconductor San Jose, CA	1.56E+07	6.40E-08	1.92E-07	
AIM	58	51021-0300	Connector, Female, 3 Pos, 1.25MM	1						Molex, lisle, IL	7.69E+08	1.30E-09	1.30E-09	
AIM	59	50058-8100	Crimp Terminal, Female	3						Molex, lisle, IL	7.69E+08	1.30E-09	3.90E-09	Generic Data or similar component
AIM	60	AR	Wire, Insulated, 600V or Greater, Type B or C, Length and color as required,	1						MIL-W16878D	1.00E+08	1.00E-08	1.00E-08	
AIM	61	8567	Potentiometer Knob	1						Keystone Electronics Corp, Astoria, NY	3.94E+08	2.54E-09	2.54E-09	
AIM	62	AR	HeatShrink, 1/8", Black, Polyolefin	1						?	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AIM	63	AR	Jumper Wire, 24 AWG, KYNAR	1						MIL-W16878D	1.00E+08	1.00E-08	1.00E-08	Generic Data or similar component
AIM	64	AR	Wire BUS, 24 AWG Bare	1						MIL-W16878D	1.00E+08	1.00E-08	1.00E-08	Generic Data or similar component
											1.07E+05	**3.66E-06**	**9.38E-06**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
AIM										**TOTAL**	**0.999943**		**5.71E-05**	**AVAILABILITY for Module**

Alarm Module MTBF Data														
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
AM	6	NUS-A329NB-1	Fabrication, Alarm PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
AM	7	NUS-C082PA-1	Assembly, Alarm Face Plate	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	17	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1 uF, 50 V	16						TDK Uniondale, NY	3.52E+10	2.84E-11	4.55E-10	
AM	18	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1 uF, 50 V	5						TDK Uniondale, NY	3.52E+10	2.84E-11	1.42E-10	
AM	19	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3 uF, 50 V	6						TDK Uniondale, NY	3.52E+10	2.84E-11	1.70E-10	
AM	20	FK22C0G1H224J	Capacitor, Ceramic, 5%, 0.22 uF, 50V, COG	1						TDK Uniondale, NY	3.52E+10	2.84E-11	2.84E-11	
AM	21	TAP105K035S	Capacitor, Tantalum, 10%, 1 uF, 35V	5						AVX Fountain Inn, SC	3.35E+06	2.99E-07	1.49E-06	4 of 9 do not contrubute
AM	22	11R154C	Inductor, 10%, 150 uH	6						Murata Power Solutions Mansfield, MA	1.26E+08	7.96E-09	4.78E-08	
AM	23	VAOL-5MCE2	Yellow, Round, 5mm, T-1 3/4, Diffused, Flangeless	1						VCC, Inc. San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	24	H-278C-2	LED Holder 5mm, Dual Level	1						BIVAR Irvine, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	25	VAOL-5MSBY2	Blue, Round, 5mm, T-1 3/4, Diffused, Flangeless	1						VCC, Inc. San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	26	WP7113QBC/D	Blue, Round, 5mm, T-1 3/4, Clear, Flanged	1						KingBright City of Industry, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	27	PCH175	LED Holder 5mm, Single Level	1						VCC, Inc. San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	28	536385-5	Connector DIN 4161 M 64 POS 2.54mm Solder Right Angle Thru Hole	1						TE Connectivity Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
AM	29	53047-0310	Connector, Male, 3 POS, 1.25mm, Vertical Thru Hole	2						Molex Lisle, IL	7.69E+08	1.30E-09	2.60E-09	
AM	30	53047-0510	Connector, Male, 10 POS, 1.25mm, Vertical Thru Hole	3						Molex Lisle, IL	7.69E+08	1.30E-09	3.90E-09	Generic Data or similar component
AM	31	RS-2412D	DC/DC Converter, 2W, 24 VDC Input, +/-12 VDC Output	2						Recom Brooklyn, NY	1.40E+06	7.15E-07	1.43E-06	
AM	32	ZVP4105A	P Channel MOSFET, TO92, 50V, 175mA	1						Diodes Inc. Plano, TX	1.71E+08	5.85E-09	5.85E-09	
AM	33	2N7000	N Channel MOSFET, TO92, 60V, 200mA	3						Fairchild Semiconductor San Jose, CA	1.56E+07	6.40E-08	1.92E-07	
AM	34	270-15K-RC	Resistor, Metal Film, 1%, 1/8W, 15KOhm	3						Xicon Fort Worth, TX	6.42E+08	1.56E-09	4.67E-09	
AM	35	270-1K-RC	Resistor, Metal Film, 1%, 1/8W, 1KOhm	2						Xicon Fort Worth, TX	6.42E+08	1.56E-09	3.11E-09	
AM	36	270-10K-RC	Resistor, Metal Film, 1%, 1/8W, 10KOhm	5						Xicon Fort Worth, TX	6.42E+08	1.56E-09	7.78E-09	
AM	37	270-3.9K-RC	Resistor, Metal Film, 1%, 1/8W, 3.9KOhm	1						Xicon Fort Worth, TX	6.43E+08	1.56E-09	1.56E-09	
AM	38	RNC55H8250FS	Resistor, Metal Film, 1%, 1/8W, 50 PPM, 825 Ohms	1						Xicon Fort Worth, TX	6.43E+08	1.56E-09	1.56E-09	
AM	39	Y405310K0000J0L	Resistor, Variable, 10KOhm, 5%, 10PPM, 0.25W, 21 Turn, Through Hole	3						Vishay Precision Group Malvern, PA	1.00E+10	1.00E-10	3.00E-10	
AM	40	CMF5510M000FHEK	Resistor, Carbon Film, 5%, 1/4W(MIN), 10MOhm	1						Vishay Malvern, PA	1.38E+05	7.23E-06	7.23E-06	
AM	41	270-2.2K-RC	Resistor, Metal Film, 1%, 1/8W, 2.2KOhm	2						Xicon Fort Worth, TX	6.42E+08	1.56E-09	3.11E-09	
AM	42	270-2K-RC	Resistor, Metal Film, 1%, 1/8W, 2KOhm	2						Xicon Fort Worth, TX	6.42E+08	1.56E-09	3.11E-09	
AM	43	270-4.7K-RC	Resistor, Metal Film, 1%, 1/8W, 4.7KOhm	14						Xicon Fort Worth, TX	6.43E+08	1.56E-09	2.18E-08	
AM	44	270-4.99K-RC	Resistor, Metal Film, 1%, 1/8W, 4.99KOhm	1						Xicon Fort Worth, TX	6.42E+08	1.56E-09	1.56E-09	
AM	45	270-100-RC	Resistor, Metal Film, 1%, 1/8W, 100Ohm	4						Xicon Fort Worth, TX	6.42E+08	1.56E-09	6.23E-09	
AM	46	270-90K-RC	Resistor, Metal Film, 1%, 1/8W, 90KOhm	1						Xicon Fort Worth, TX	6.42E+08	1.56E-09	1.56E-09	
AM	47	270-100K-RC	Resistor, Metal Film, 1%, 1/8W, 100KOhm	1						Xicon Fort Worth, TX	6.42E+08	1.56E-09	1.56E-09	
AM	48	40.1151	Connector, Test Jack, Female 2 POW Right Angle Thru Hole	3						Schurter Santa Rosa, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	49	TP-105-01-00	Test Point, Breakaway, Black	24						Components Corp. Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	50	ISO124P	IC, Isolation Amp, 50KHz, SGL, 16 DIP	2						Texas Instruments, Dallas TX	3.68E+08	2.72E-09	5.43E-09	
AM	51	FOD3181	IC, 8 PIN DIP Optocoupler	1						Fairchild Semiconductor, San Jose, CA	7.03E+07	1.42E-08	1.42E-08	Generic Data or similar component
AM	52	CD4027BE	IC, JK Flip Flop, 16 PIN DIP	1						Texas Instruments, Dallas TX	3.71E+08	2.70E-09	2.70E-09	
AM	53	HEF40106BP	IC, Inverter, Schmitt Trigger, HEX, 14 DIP	1						NXP Semiconductors, Netherlands	3.34E+08	2.99E-09	2.99E-09	
AM	54	CD4081BE	IC, Quad, 2 Input, AND Gate, 14 PIN DIP	1						Texas Instruments, Dallas TX	3.71E+08	2.70E-09	2.70E-09	
AM	55	REF102BP	IC, Voltage Refereche, 10V, 8 PIN DIP	1						Texas Instruments, Dallas TX	3.68E+08	2.72E-09	2.72E-09	
AM	56	OPA2277P	IC, OPAMP, GP, PREC, 1MHz, Dual, 8 PIN DIP	1						Texas Instruments, Dallas TX	3.68E+08	2.72E-09	2.72E-09	
AM	57	ADG1636BRUZ	IC, Dual, Analog Switch, TSSOP16	1						Analog Devices Bellevue, WA	5.82E+09	1.72E-10	1.72E-10	Generic Data or similar component
AM	58	AQY212GH	IC, Photo Relay, 4 PIN DIP	1						Panasonic Electric Works Osaka, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	59	OPA277PA	IC, OPAMP, GP, PREC, 1MHz, SGL, 8 PIN DIP	1						Texas Instruments, Dallas TX	3.68E+08	2.72E-09	2.72E-09	
AM	60	CD40103BE	IC, Sync Down Counter, 8 STG, 16 PIN DIP	1						Texas Instruments, Dallas TX	3.71E+08	2.70E-09	2.70E-09	
AM	62	ICM7242IPA+	IC, OSC, Binary CTC, 15MHz, 8 PIN DIP	1						Maxim Integrated Products Sunnyvale, CA	2.39E+08	4.19E-09	4.19E-09	
AM	63	51021-0500	Connector, Female, 5 POS, 1.25 mm	3						Molex Lisle, IL	7.69E+08	1.30E-09	3.90E-09	Generic Data or similar component
AM	64	50058-8100	Crimp Terminal, Female	15						Molex Lisle, IL	7.69E+08	1.30E-09	1.95E-08	
AM	65	AR	Wire, Insulated, 600V or Greater, Type B or C, Color as Required, 28 AWG	1						MIL-W16878D	1.00E+08	1.00E-08	1.00E-08	
AM	66	AR	Heatshrink, 1/8", Black, Polyolefin	1							N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	67	A7D-206-1	Thumbwheel, BCD, Front Mount	3						Omron Corp. Kyoto, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	68	A7D-2M-1	Thumbwheel, End Cap, Front Mount, Pair	1						Omron Corp. Kyoto, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AM	69	51021-0300	Connector, Female, 3 POS, 1.25mm	1						Molex Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
AM	70	50058-8100	Crimp Terminal, Female	3						Molex Lisle, IL	7.69E+08	1.30E-09	3.90E-09	
AM	71	534B1103JC	Precision Potentiometer, 10K, 15 Turn, 0.25" Shaft	1						Vishay Spectrol Melville, NY	8.76E+10	1.14E-11	1.14E-11	
AM	72	18-A-11	Knob, Locking, 15 Turn Dial, 22.2mm Diameter	1						Vishay Spectrol Melville, NY	N/A	N/A	N/A	
AM	73	RS-2405D	DC/DC Converter, 2W, 24 VDC Input, +/-5 VDC Output	1						Recom Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component

		Total									8.84E+04	9.17E-06	1.13E-05	MTBF for Module (hours)
											5			MTTR for Module (minutes)
											360			MLDT for Module (minutes)
										TOTAL	0.999931		6.88E-05	AVAILABILITY for Module

Analog Output Module MTBF Data														
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
AOM	6	NUS-A324NB-1	Fabrication, Analog Output PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
AOM	7	NUS-C077PA-1	Assembly, Analog Output Face Plate	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A		Does not contribute to the failure rate of the ICCMS
AOM	12	08055C104K4T2A	Capacitor, Ceramic, 0.10uF, 50V, X7R, 10%, 0805 SMD	13						AVX Corp. Fountain Inn, SC	3.52E+10	2.84E-11	3.69E-10	
AOM	13	08055D105KAT2A	Capacitor, Ceramic, 1.0uF, 50V, X5R, 10%, 0805 SMD	6						AVX Corp. Fountain Inn, SC	3.52E+10	2.84E-11	1.70E-10	
AOM	14	CGA6P3X7R1H335K	Capacitor, Ceramic, 3.3uF, 50V, X7R, 1210 SMD	12						Kemet Corporation Greenville, SC	3.52E+10	2.84E-11	3.41E-10	
AOM	15	TLCR105M035RTA	Capacitor, Tantalum, 1uF, 35V, 20%, 0805 SMD	40						AVX Corp. Fountain Inn, SC	3.35E+06	2.99E-07	1.19E-05	8 of 48 do not contribute
AOM	16	C0805C820K5GACTU	Capacitor, Ceramic, 82PF, 50V, C0G, 0805 SMD	8						Kemet Corporation Greenville, SC	2.65E+09	3.77E-10	3.02E-09	
AOM	17	SMBJ17CA	Transient Voltage Suppressor, 600W, 17V	8						Fairchild Semiconductor San Jose, CA	2.19E+08	4.57E-09	3.66E-08	
AOM	18	11R154C	Inductor, 10%, 150uH	12						Murata Power Solutions Mansfield, MA	1.26E+08	7.96E-09	9.55E-08	
AOM	19	536385-5	Connector DIN 41612 M 64 POS 2.54mm Solder Right Angle Thru Hole	1						TE Connectivity Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
AOM	20	53047-03	Connector Header 3 POS 1.25mm Vert TIN	1						Molex Inc. Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
AOM	21	RS-2412D	DC/DC Converter, 2W, 24 VDC Input, +/-12 VDC Output	2						Recom Brooklyn, NY	1.40E+06	7.15E-07	1.43E-06	
AOM	22	RS-2415D	DC/DC Converter, 2W, 24 VDC Input, +/-15 VDC Output	4						Recom Brooklyn, NY	1.40E+06	7.15E-07	2.86E-06	
AOM	23	MMBT2907	PNP, General Purpose Amplifier, SOT-23	4						Fairchild Semiconductor San Jose, CA	3.06E+08	3.26E-09	1.31E-08	
AOM	24	BSS84	MOSFET, P-Ch, 50V, 0.13A, SOT-23	4						Fairchild Semiconductor San Jose, CA	1.25E+08	8.00E-09	3.20E-08	
AOM	25	2N7002	N Channel FET, 60V, 0.30A, SOT23	4						Fairchild Semiconductor San Jose, CA	1.25E+08	8.00E-09	3.20E-08	
AOM	26	Y4053500R000J0L	Resistor, Variable, 500, 5%, 10PPM, 1/4W, 21 Turn, Through Hole	4						Vishay Precision Group Malvern, PA	1.00E+10	1.00E-10	4.00E-10	
AOM	27	Y405310K0000J0L	Resistor, Variable, 10K, 0.25W, 21 Turn Through Hole	8						Vishay Precision Group Malvern, PA	1.00E+10	1.00E-10	8.00E-10	
AOM	28	RG2012N-222-W-T1	Resistor, Thin Film, 2.2kOhm, 1/8W, 0.05% 0805 SMD	1						Susumu Palisades Park, NJ	1.09E+09	9.17E-10	9.17E-10	
AOM	29	Y16291K00000T9	Resistor, Metal Foil, 1.0kOhm, 1/10W, 0.01%, 0.2PPM/C, 0805 SMD	4						Vishay Precision Group Malvern, PA	1.00E+10	1.00E-10	4.00E-10	
AOM	30	TNPW08051K00BEEA	Resistor, Thin Film, 1.0kOhm, 1/8W, 0.1%, 25PPM/C, 0805 SMD	12						Vishay/Dale Malvern, PA	1.00E+10	1.00E-10	1.20E-09	
AOM	31	PLT0805Z5001AST5	Resistor, Thin Film, 5.0kOhm, 1/4W, 0.05%, 0805 SMD	4						Vishay Shelton, CT	1.00E+10	1.00E-10	4.00E-10	
AOM	32	RG2012P-4022-B-T5	Resistor, Thin Film, 40.2kOhm, 1/8W, 0.1%, 0805 SMD	8						Susumu Palisades Park, NJ	1.09E+09	9.17E-10	7.34E-09	
AOM	33	RG2012P-134-B-T5	Resistor, Thin Film, 130kOhm, 1/8W, 0.1%, 0805 SMD	4						Susumu Palisades Park, NJ	1.09E+09	9.17E-10	3.67E-09	Generic Data or similar component
AOM	34	1676673-2	Resistor, Thin Film, 24.3kOhm, 1/10W, 0.1%, 10PPM/C, 0805 SMD	4						TE Connectivity Berwyn, PA	1.09E+09	9.17E-10	3.67E-09	Generic Data or similar component
AOM	35	RN732ATTDK1000F25	Resistor, Thin Film, 100Ohm, 0.1W, 1 %, 0805 SMD	8						KOA Speer	1.09E+09	9.17E-10	7.34E-09	Generic Data or similar component
AOM	36	RG2012N-221-W-T1	Resistor, Thin Film, 220Ohm, 1/8W, 0.05%, 0805 SMD	4						Susumu Palisades Park, NJ	1.09E+09	9.17E-10	3.67E-09	
AOM	37	288-0805-10K-RC	Resistor, Thin Film, 10kOhm, 0.1%, 10PPM, 0805 SMD	24						Xicon Fort Worth, TX	6.42E+08	1.56E-09	3.74E-08	
AOM	38	0040.1151	Connector, Test Jack, Female 2 POW Right Angle Thru Hole	8						Schurter Santa Rosa, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AOM	39	TP-105-01-00	Test Point, Breakaway, Black	59						Component Corp. Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AOM	40	OPA4277UA	IC, OPAMP GP, Quad, S014	4						Texas Instruments Dallas, TX	3.68E+08	2.72E-09	1.09E-08	
AOM	41	REF102AU	IC, +10V Prec Reference, SO-8	4						Texas Instruments Dallas, TX	3.68E+08	2.72E-09	1.09E-08	
AOM	42	INA138NA	IC, Current Shunt Monitor, SOT23-5	4						Texas Instruments Dallas, TX	3.68E+08	2.72E-09	1.09E-08	
AOM	43	ISO124U	IC, OPAMP ISO, 50KHz SGL, S0-28	8						Texas Instruments Dallas, TX	3.68E+08	2.72E-09	2.17E-08	
AOM	44	AQY212GH	IC, Photo Relay, 4 PIN DIP	1						Panaonic New Providence, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
AOM	45	TNP00805100RBZEN00	Resistor, Thin Film, 0805 SMD, 100 Ohm, 0.1%, 1/8W, 5ppm/C	4						Vishay/Dale Malvern, PA	1.00E+10	1.00E-10	4.00E-10	Generic Data or similar component
AOM	46	288-0805-16.5K-RC	Resistor, Thin Film, 0805 SMD, 16.5 Kohm, 0.1%, 1/10W, 10ppm/C	4						Xicon Fort Worth, TX	1.00E+10	1.00E-10	4.00E-10	
AOM	47	AR	Jumper Wire, 24 AWG, KYNAR	1						MIL-W16878D	1.00E+08	1.00E-08	1.00E-08	Generic Data or similar component
											6.01E+04	**1.84E-06**	**1.66E-05**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
										TOTAL	**0.999899**		**1.01E-04**	**AVAILABILITY for Module**

Hi Auctioneer Module MTBF Data															
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
HIAM	6	NUS-A333NB-1	Fabrication, HI Auctioneer PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
HIAM	7	NUS-CO86PA-1	Assembly, HI Auctioneer Face Plate, SQRT	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
HIAM	17	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 50V	5						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.42E-10	
HIAM	18	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3uF, 50V	6						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.70E-10	
HIAM	19	TAP105K035S	Capacitor, Tantalum, 10%, 1uF, 35V	3						AVX Corp., Fountain Inn, SC	3.35E+06	2.99E-07	8.96E-07	2 of 5 do not contribute
HIAM	20	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	21						TDK, Uniondale, NY	3.52E+10	2.84E-11	5.97E-10	
HIAM	21	11R154C	inductor, 10%, 150uH	6						Murala Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	4.78E-08	
HIAM	22	536385-5	Conn DIN 41612 M 64 POS 2.54mm, Solder Right Angle Thru-hole	1						TE Connectivily, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
HIAM	23	53047-0310	Connector, Male 3 POS, 2.54mm, Right Angle! Thru-hole	1						Molex, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
HIAM	24	RS-2412D	DC/DC CONVERTER, 2W, 24 VDC INPUT, +/-12 VDC OUTPUT	3						Recom, Brooklyn, NY	1.40E+06	7.15E-07	2.15E-06	
HIAM	25	Y40351K00000J0L	Resistor, Variable, 5% 1/4W, 1KΩ	2						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	2.00E-10	
HIAM	26	RNC55H4990FS	Resistor, Metal Film, 1%, 1/8W, 499Ω	9						Xicon, Fort Worth, Texas	6.44E+08	1.55E-09	1.40E-08	
HIAM	27	RNC55H1501FS	Resistor, Metal Film, 1%, 1/8W, 1.5KΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
HIAM	28	RNC55H2103FS	Resistor, Metal Film, 1%, 1/8W, 210KΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
HIAM	29	RNC55H1003FS	Resistor, Metal Film, 1%, 1/8W, 100KΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
HIAM	30	RNC55H3300FS	Resistor, Metal Film, 1%, 1/8W, 330Ω	8						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.24E-08	
HIAM	31	Y40535K00000J0L	Resistor, Variable, 5%, 1/4W, 5kΩ	1						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
HIAM	32	RNC55H2201FS	Resistor, Metal Film, 1%, 1/8W, 2.2KΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
HIAM	33	RNC55H1002FS	Resistor, Metal Film, 1%, 1/8W, 10KΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
HIAM	34	RNC55H1000FS	Resistor, Metal Film, 1%, 1/8W, 100Ω	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
HIAM	35	206-8RAST	DIP SWITCH, 8 POS, RIGHT ANGLE 2.54 MM	1						CTS e;ECTRPCPIMPOENTS, Elkhart, IN	1.68E+06	5.95E-07	5.95E-07	
HIAM	36	0040.1151	CONNECTOR, TEST JACK, FEMALE 2 ROW RIGHT ANGLE THRU-HOLE	1						Schurler, Santa Rosa, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
HIAM	37	TP-105-01-00	TEST POINT, BREAAWAY, BLACK	35						Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
HIAM	38	ADG1636BRUZ	IC, DUAL ANALOG SWITCH, TSSOP16	4						Analog Devices, Bellevue, WA	5.82E+09	1.72E-10	6.87E-10	Generic Data or similar component
HIAM	39	TLC372IP	IC, COMPARATOR, DUAL, 8 PIN DIP	4						Texas Instruments, Dallas, TX	2.44E+08	4.10E-09	1.64E-08	Generic Data or similar component
HIAM	40	REF102P	IC, VOLTAGE REFERENCE, 10V. 8 PIN DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
HIAM	41	DG528CJ+	IC, 8 CHANNEL LATCHABLE MULTIPLEXER, 18 PIN DIP	1						Maxim, Sunnyvale, CA	2.39E+08	4.19E-09	4.19E-09	
HIAM	42	SN74LS148N	IC, 2:8 ENCODER 16 PIN DIP	1						Texas Instruments, Dallas, TX	8.67E+08	1.15E-09	1.15E-09	Generic Data or similar component
HIAM	43	OPA2277P	IC, OPAMP, DUAL, 8 PIN DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
HIAM	44	ISOP124P	IC, ISOLATION AMP, 60KHZ, SGL, 16PIN DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
HIAM	45	FOD3181	IC, 8 PIN DIP Optocoupler	8						Fairchild Semiconductor, San Jose, CA	7.03E+07	1.42E-08	1.14E-07	Generic Data or similar component
HIAM	46	AQY212GH	IC, PHOTO RELAY, 4 PIN DIP	1						Panasonic Electric, Works, Osaka, Japan	N/A	N/A	N/A	
HIAM	47	1N5235	Diode, Zener, 6.8V	1						Fairchild Semiconductor, San Jose, CA	4.38E+07	2.28E-08	2.28E-08	Generic Data or similar component
HIAM	50	Y4053500R000J0L	Resistor, Variable, Precision, 5%, 1/4W, 500 Ohm	1						Visahy Precision Malvern, PA	1.00E+10	1.00E-10	1.00E-10	Generic Data or similar component
HIAM	52	RS-2405D	DC/DC CONVERTER, 2W, 24 VDC INPUT, +/-5 VDC OUTPUT	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
											2.15E+05	**2.45E-06**	**4.66E-06**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
										Total	**0.999972**		**2.83E-05**	**AVAILABILITY for Module**

Backplane MTBF Data (1)

Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
BP	1	-1	Assembly, ICCMS Actuation Train Backplane (Cabinet Row 3)	1			1			?	1.92E+07	5.21E-08	5.21E-08	
BP	2	-2	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 4)		1					?	1.92E+07	5.21E-08	0.00E+00	
BP	3	-3	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 5)			1				?	1.92E+07	5.21E-08	0.00E+00	
BP	4	-4	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 6)				1			?	1.92E+07	5.21E-08	0.00E+00	
BP	5	-5	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 7)					1		?	1.92E+07	5.21E-08	0.00E+00	
BP	6	-6	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 8)						1	?	1.92E+07	5.21E-08	0.00E+00	
BP	10	NUS-C099NC-1	Fabrication, ICCMS Actuation Traine Backplane (Cabinet Row 3) PCB	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
BP	11	NUS-C099NC-2	Fabrication, ICCMS Actuation Traine Backplane 1 (Cabinet Row 4) PCB		1					Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	12	NUS-C099NC-3	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 5) PCB			1				Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	13	NUS-C099NC-4	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 6) PCB				1			Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	14	NUS-C099NC-5	Fabrication, ICCMS Actuation Traine Backplane 4 (Cabinet Row 7) PCB					1		Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	15	NUS-C099NC-6	Fabrication, ICCMS Actuation Traine Backplane 5 (Cabinet Row 8) PCB						1	Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	20	56S0859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos			14	14	14	14	TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	0.00E+00	
BP	21	56S0859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos	7	7					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	9.10E-09	
BP	22	8-1393640-5	Connector, DIN41612 Type c/2, Vertical, Femal, 48 pos	4	4					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	5.20E-09	
BP	26	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos			1	1	1	1	Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	27	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos	2						Moles, Lisle, IL	7.69E+08	1.30E-09	2.60E-09	
BP	28	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos		3					Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	29	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos		2	2			2	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	30	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos				1	1		Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	31	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos	3						Samtec, New Albany, IN	7.69E+08	1.30E-09	3.90E-09	
BP	33	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos	3		3			3	Samtec, New Albany, IN	7.69E+08	1.30E-09	3.90E-09	
BP	34	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos		2		2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	36	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos			2	2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	37	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos						1	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	38	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos		1					Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	40	273-1K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 1KOhm, ThroughHole	4						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	6.23E-09	
BP	41	273-100K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 100KOhm, ThroughHole	1						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	1.56E-09	
BP	42	Wire	Jumper, 0Ohm, 22WAG	5						22AWG	1.00E+08	1.00E-08	5.00E-08	
BP	43	S102K19K000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 19KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	0.00E+00	Generic Data or similar component
BP	44	S102K7K5000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 7.5KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	0.00E+00	Generic Data or similar component
BP	45	MAZ30K000B	Resistor, Metal Film, 0.1%, 1/8W, 1PPM, 30KOhm, ThroughHole				1			Alpha Electronics Corp.	6.43E+08	1.56E-09	0.00E+00	
BP	46	REF102BP	IC, Voltage Reference, 10V, 8 PIN DIP				1			Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	0.00E+00	Generic Data or similar component
BP	47	TAP105K035SCS	Capacitor, Tantalum, 10%, 1uF, 35V MIN				1			AVX, Fountain Inn, SC	3.35E+06	2.99E-07	0.00E+00	Generic Data or similar component
BP	48	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 25V MIN				1			TDK, Uniondale, NY	3.52E+10	2.84E-11	0.00E+00	Generic Data or similar component
BP	49	HFBR-1412TZ	IC, Fiber Optic, Emitter, ST Port		6					Avago Tech., San Jose, CA	4.92E+06	2.03E-07	0.00E+00	Generic Data or similar component
BP	50	HFBR-2412TZ	IC, Fiber Optic, Receiver, ST Port	9						Avago Tech., San Jose, CA	1.09E+07	9.17E-08	8.26E-07	Generic Data or similar component
BP	51	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	9						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.56E-10	Generic Data or similar component
											9.88E+05	**1.25E-06**	**1.01E-06**	**MTBF Backplane (hours)**
											60			**MTTR Backplane (minutes)**
											360			**MLDT Backplane (minutes)**
										TOTAL	**0.999993**		**7.09E-06**	**AVAILABILITY Backplane**

Backplane MTBF Data (2)

Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
BP	1	-1	Assembly, ICCMS Actuation Train Backplane (Cabinet Row 3)	1			1			?	1.92E+07	5.21E-08	0.00E+00	
BP	2	-2	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 4)		1					?	1.92E+07	5.21E-08	5.21E-08	
BP	3	-3	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 5)			1				?	1.92E+07	5.21E-08	0.00E+00	
BP	4	-4	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 6)				1			?	1.92E+07	5.21E-08	0.00E+00	
BP	5	-5	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 7)					1		?	1.92E+07	5.21E-08	0.00E+00	
BP	6	-6	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 8)						1	?	1.92E+07	5.21E-08	0.00E+00	
BP	10	NUS-C099NC-1	Fabrication, ICCMS Actuation Traine Backplane (Cabinet Row 3) PCB	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	11	NUS-C099NC-2	Fabrication, ICCMS Actuation Traine Backplane 1 (Cabinet Row 4) PCB		1					Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
BP	12	NUS-C099NC-3	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 5) PCB			1				Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	13	NUS-C099NC-4	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 6) PCB				1			Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	14	NUS-C099NC-5	Fabrication, ICCMS Actuation Traine Backplane 4 (Cabinet Row 7) PCB					1		Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	15	NUS-C099NC-6	Fabrication, ICCMS Actuation Traine Backplane 5 (Cabinet Row 8) PCB						1	Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	20	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos			14	14	14	14	TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	0.00E+00	
BP	21	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos	7	7					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	9.10E-09	
BP	22	8-1393640-5	Connector, DIN41612 Type c/2, Vertical, Femal, 48 pos	4	4					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	5.20E-09	
BP	26	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos			1	1	1	1	Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	27	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos	2						Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	28	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos		3					Moles, Lisle, IL	7.69E+08	1.30E-09	3.90E-09	
BP	29	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos		2	2			2	Samtec, New Albany, IN	7.69E+08	1.30E-09	2.60E-09	
BP	30	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos				1	1		Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	31	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos	3						Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	33	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos	3		3			3	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	34	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos		2		2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	2.60E-09	
BP	36	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos			2	2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	37	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos						1	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	38	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos		1					Samtec, New Albany, IN	7.69E+08	1.30E-09	1.30E-09	
BP	40	273-1K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 1KOhm, ThroughHole	4						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	0.00E+00	
BP	41	273-100K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 100KOhm, ThroughHole	1						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	0.00E+00	
BP	42	Wire	Jumper, 0Ohm, 22WAG	5						22AWG	1.00E+08	1.00E-08	0.00E+00	
BP	43	S102K19K000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 19KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	0.00E+00	Generic Data or similar component
BP	44	S102K7K5000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 7.5KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	0.00E+00	Generic Data or similar component
BP	45	MAZ30K000B	Resistor, Metal Film, 0.1%, 1/8W, 1PPM, 30KOhm, ThroughHole				1			Alpha Electronics Corp.	6.43E+08	1.56E-09	0.00E+00	
BP	46	REF102BP	IC, Voltage Reference, 10V, 8 PIN DIP				1			Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	0.00E+00	Generic Data or similar component
BP	47	TAP105K035SCS	Capacitor, Tantalum, 10%, 1uF, 35V MIN				1			AVX, Fountain Inn, SC	3.35E+06	2.99E-07	0.00E+00	Generic Data or similar component
BP	48	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 25V MIN				1			TDK, Uniondale, NY	3.52E+10	2.84E-11	0.00E+00	Generic Data or similar component
BP	49	HFBR-1412TZ	IC, Fiber Optic, Emitter, ST Port		6					Avago Tech., San Jose, CA	4.92E+06	2.03E-07	1.22E-06	Generic Data or similar component
BP	50	HFBR-2412TZ	IC, Fiber Optic, Receiver, ST Port	9						Avago Tech., San Jose, CA	1.09E+07	9.17E-08	0.00E+00	Generic Data or similar component
BP	51	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	9						TDK, Uniondale, NY	3.52E+10	2.84E-11	0.00E+00	Generic Data or similar component
											7.42E+05	**1.25E-06**	**1.35E-06**	**MTBF Backplane (hours)**
											60			**MTTR Backplane (minutes)**
											360			**MLDT Backplane (minutes)**
										TOTAL	**0.999991**		**9.44E-06**	**AVAILABILITY Backplane**

Backplane MTBF Data (3)

Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
BP	1	-1	Assembly, ICCMS Actuation Train Backplane (Cabinet Row 3)	1			1			?	1.92E+07	5.21E-08	0.00E+00	
BP	2	-2	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 4)		1					?	1.92E+07	5.21E-08	0.00E+00	
BP	3	-3	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 5)			1				?	1.92E+07	5.21E-08	5.21E-08	
BP	4	-4	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 6)				1			?	1.92E+07	5.21E-08	0.00E+00	
BP	5	-5	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 7)					1		?	1.92E+07	5.21E-08	0.00E+00	
BP	6	-6	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 8)						1	?	1.92E+07	5.21E-08	0.00E+00	
BP	10	NUS-C099NC-1	Fabrication, ICCMS Actuation Traine Backplane (Cabinet Row 3) PCB	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	11	NUS-C099NC-2	Fabrication, ICCMS Actuation Traine Backplane 1 (Cabinet Row 4) PCB		1					Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	12	NUS-C099NC-3	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 5) PCB			1				Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
BP	13	NUS-C099NC-4	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 6) PCB				1			Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	14	NUS-C099NC-5	Fabrication, ICCMS Actuation Traine Backplane 4 (Cabinet Row 7) PCB					1		Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	15	NUS-C099NC-6	Fabrication, ICCMS Actuation Traine Backplane 5 (Cabinet Row 8) PCB						1	Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	20	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos			14	14	14	14	TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	1.82E-08	
BP	21	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos	7	7					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	0.00E+00	
BP	22	8-1393640-5	Connector, DIN41612 Type c/2, Vertical, Femal, 48 pos	4	4					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	0.00E+00	
BP	26	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos			1	1	1	1	Moles, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
BP	27	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos	2						Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	28	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos		3					Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	29	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos		2	2			2	Samtec, New Albany, IN	7.69E+08	1.30E-09	2.60E-09	
BP	30	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos				1	1		Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	31	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos	3						Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	33	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos	3		3			3	Samtec, New Albany, IN	7.69E+08	1.30E-09	3.90E-09	
BP	34	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos		2		2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	36	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos			2	2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	2.60E-09	
BP	37	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos						1	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	38	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos		1					Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	40	273-1K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 1KOhm, ThroughHole	4						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	0.00E+00	
BP	41	273-100K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 100KOhm, ThroughHole	1						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	0.00E+00	
BP	42	Wire	Jumper, 0Ohm, 22WAG	5						22AWG	1.00E+08	1.00E-08	0.00E+00	
BP	43	S102K19K000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 19KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	0.00E+00	Generic Data or similar component
BP	44	S102K7K5000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 7.5KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	0.00E+00	Generic Data or similar component
BP	45	MAZ30K000B	Resistor, Metal Film, 0.1%, 1/8W, 1PPM, 30KOhm, ThroughHole				1			Alpha Electronics Corp.	6.43E+08	1.56E-09	0.00E+00	
BP	46	REF102BP	IC, Voltage Reference, 10V, 8 PIN DIP				1			Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	0.00E+00	Generic Data or similar component
BP	47	TAP105K035SCS	Capacitor, Tantalum, 10%, 1uF, 35V MIN				1			AVX, Fountain Inn, SC	3.35E+06	2.99E-07	0.00E+00	Generic Data or similar component
BP	48	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 25V MIN				1			TDK, Uniondale, NY	3.52E+10	2.84E-11	0.00E+00	Generic Data or similar component
BP	49	HFBR-1412TZ	IC, Fiber Optic, Emitter, ST Port		6					Avago Tech., San Jose, CA	4.92E+06	2.03E-07	0.00E+00	Generic Data or similar component
BP	50	HFBR-2412TZ	IC, Fiber Optic, Receiver, ST Port	9						Avago Tech., San Jose, CA	1.09E+07	9.17E-08	0.00E+00	Generic Data or similar component
BP	51	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	9						TDK, Uniondale, NY	3.52E+10	2.84E-11	0.00E+00	Generic Data or similar component
											7.53E+06	**1.25E-06**	**1.33E-07**	**MTBF Backplane (hours)**
											60			**MTTR Backplane (minutes)**
											360			**MLDT Backplane (minutes)**
										TOTAL	**0.999999**		**9.30E-07**	**AVAILABILITY Backplane**

Backplane MTBF Data (4)

Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
BP	1	-1	Assembly, ICCMS Actuation Train Backplane (Cabinet Row 3)	1			1			?	1.92E+07	5.21E-08	5.21E-08	
BP	2	-2	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 4)		1					?	1.92E+07	5.21E-08	0.00E+00	
BP	3	-3	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 5)			1				?	1.92E+07	5.21E-08	0.00E+00	
BP	4	-4	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 6)				1			?	1.92E+07	5.21E-08	5.21E-08	
BP	5	-5	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 7)					1		?	1.92E+07	5.21E-08	0.00E+00	
BP	6	-6	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 8)						1	?	1.92E+07	5.21E-08	0.00E+00	
BP	10	NUS-C099NC-1	Fabrication, ICCMS Actuation Traine Backplane (Cabinet Row 3) PCB	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	11	NUS-C099NC-2	Fabrication, ICCMS Actuation Traine Backplane 1 (Cabinet Row 4) PCB		1					Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	12	NUS-C099NC-3	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 5) PCB			1				Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	13	NUS-C099NC-4	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 6) PCB				1			Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
BP	14	NUS-C099NC-5	Fabrication, ICCMS Actuation Traine Backplane 4 (Cabinet Row 7) PCB					1		Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	15	NUS-C099NC-6	Fabrication, ICCMS Actuation Traine Backplane 5 (Cabinet Row 8) PCB						1	Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	20	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos			14	14	14	14	TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	1.82E-08	
BP	21	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos	7	7					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	0.00E+00	
BP	22	8-1393640-5	Connector, DIN41612 Type c/2, Vertical, Femal, 48 pos	4	4					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	0.00E+00	
BP	26	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos			1	1	1	1	Moles, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
BP	27	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos	2						Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	28	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos		3					Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	29	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos		2	2			2	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	30	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos				1	1		Samtec, New Albany, IN	7.69E+08	1.30E-09	1.30E-09	
BP	31	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos	3						Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	33	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos	3		3			3	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	34	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos		2		2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	2.60E-09	
BP	36	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos			2	2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	2.60E-09	
BP	37	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos						1	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	38	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos		1					Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	40	273-1K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 1KOhm, ThroughHole	4						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	0.00E+00	
BP	41	273-100K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 100KOhm, ThroughHole	1						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	0.00E+00	
BP	42	Wire	Jumper, 0Ohm, 22WAG	5						22AWG	1.00E+08	1.00E-08	0.00E+00	
BP	43	S102K19K000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 19KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	1.00E-10	Generic Data or similar component
BP	44	S102K7K5000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 7.5KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	1.00E-10	Generic Data or similar component
BP	45	MAZ30K000B	Resistor, Metal Film, 0.1%, 1/8W, 1PPM, 30KOhm, ThroughHole				1			Alpha Electronics Corp.	6.43E+08	1.56E-09	1.56E-09	
BP	46	REF102BP	IC, Voltage Reference, 10V, 8 PIN DIP				1			Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	Generic Data or similar component
BP	47	TAP105K035SCS	Capacitor, Tantalum, 10%, 1uF, 35V MIN				1			AVX, Fountain Inn, SC	3.35E+06	2.99E-07	2.99E-07	Generic Data or similar component
BP	48	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 25V MIN				1			TDK, Uniondale, NY	3.52E+10	2.84E-11	2.84E-11	Generic Data or similar component
BP	49	HFBR-1412TZ	IC, Fiber Optic, Emitter, ST Port		6					Avago Tech., San Jose, CA	4.92E+06	2.03E-07	0.00E+00	Generic Data or similar component
BP	50	HFBR-2412TZ	IC, Fiber Optic, Receiver, ST Port	9						Avago Tech., San Jose, CA	1.09E+07	9.17E-08	0.00E+00	Generic Data or similar component
BP	51	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	9						TDK, Uniondale, NY	3.52E+10	2.84E-11	0.00E+00	Generic Data or similar component
											2.06E+06	**1.25E-06**	**4.85E-07**	**MTBF Backplane (hours)**
											60			**MTTR Backplane (minutes)**
											360			**MLDT Backplane (minutes)**
										TOTAL	**0.999997**		**3.40E-06**	**AVAILABILITY Backplane**

Backplane MTBF Data (5)

Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
BP	1	-1	Assembly, ICCMS Actuation Train Backplane (Cabinet Row 3)	1			1			?	1.92E+07	5.21E-08	0.00E+00	
BP	2	-2	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 4)		1					?	1.92E+07	5.21E-08	0.00E+00	
BP	3	-3	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 5)			1				?	1.92E+07	5.21E-08	0.00E+00	
BP	4	-4	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 6)				1			?	1.92E+07	5.21E-08	0.00E+00	
BP	5	-5	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 7)					1		?	1.92E+07	5.21E-08	5.21E-08	
BP	6	-6	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 8)						1	?	1.92E+07	5.21E-08	0.00E+00	
BP	10	NUS-C099NC-1	Fabrication, ICCMS Actuation Traine Backplane (Cabinet Row 3) PCB	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	11	NUS-C099NC-2	Fabrication, ICCMS Actuation Traine Backplane 1 (Cabinet Row 4) PCB		1					Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	12	NUS-C099NC-3	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 5) PCB			1				Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	13	NUS-C099NC-4	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 6) PCB				1			Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	14	NUS-C099NC-5	Fabrication, ICCMS Actuation Traine Backplane 4 (Cabinet Row 7) PCB					1		Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
BP	15	NUS-C099NC-6	Fabrication, ICCMS Actuation Traine Backplane 5 (Cabinet Row 8) PCB						1	Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	20	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos			14	14	14	14	TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	1.82E-08	
BP	21	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos	7	7					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	0.00E+00	
BP	22	8-1393640-5	Connector, DIN41612 Type c/2, Vertical, Femal, 48 pos	4	4					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	0.00E+00	
BP	26	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos			1	1	1	1	Moles, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
BP	27	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos	2						Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	28	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos		3					Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	29	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos		2	2			2	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	30	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos				1	1		Samtec, New Albany, IN	7.69E+08	1.30E-09	1.30E-09	
BP	31	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos	3						Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	33	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos	3		3			3	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	34	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos		2		2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	2.60E-09	
BP	36	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos			2	2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	2.60E-09	
BP	37	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos						1	Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	38	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos		1					Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	40	273-1K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 1KOhm, ThroughHole	4						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	0.00E+00	
BP	41	273-100K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 100KOhm, ThroughHole	1						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	0.00E+00	
BP	42	Wire	Jumper, 0Ohm, 22WAG	5						22AWG	1.00E+08	1.00E-08	0.00E+00	
BP	43	S102K19K000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 19KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	0.00E+00	Generic Data or similar component
BP	44	S102K7K5000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 7.5KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	0.00E+00	Generic Data or similar component
BP	45	MAZ30K000B	Resistor, Metal Film, 0.1%, 1/8W, 1PPM, 30KOhm, ThroughHole				1			Alpha Electronics Corp.	6.43E+08	1.56E-09	0.00E+00	
BP	46	REF102BP	IC, Voltage Reference, 10V, 8 PIN DIP				1			Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	0.00E+00	Generic Data or similar component
BP	47	TAP105K035SCS	Capacitor, Tantalum, 10%, 1uF, 35V MIN				1			AVX, Fountain Inn, SC	3.35E+06	2.99E-07	0.00E+00	Generic Data or similar component
BP	48	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 25V MIN				1			TDK, Uniondale, NY	3.52E+10	2.84E-11	0.00E+00	Generic Data or similar component
BP	49	HFBR-1412TZ	IC, Fiber Optic, Emitter, ST Port		6					Avago Tech., San Jose, CA	4.92E+06	2.03E-07	0.00E+00	Generic Data or similar component
BP	50	HFBR-2412TZ	IC, Fiber Optic, Receiver, ST Port	9						Avago Tech., San Jose, CA	1.09E+07	9.17E-08	0.00E+00	Generic Data or similar component
BP	51	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	9						TDK, Uniondale, NY	3.52E+10	2.84E-11	0.00E+00	Generic Data or similar component
											7.68E+06	**1.25E-06**	**1.30E-07**	**MTBF Backplane (hours)**
											60			**MTTR Backplane (minutes)**
											360			**MLDT Backplane (minutes)**
										TOTAL	**0.999999**		**9.11E-07**	**AVAILABILITY Backplane**

Backplane MTBF Data (6)

Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
BP	1	-1	Assembly, ICCMS Actuation Train Backplane (Cabinet Row 3)	1			1			?	1.92E+07	5.21E-08	0.00E+00	
BP	2	-2	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 4)		1					?	1.92E+07	5.21E-08	0.00E+00	
BP	3	-3	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 5)			1				?	1.92E+07	5.21E-08	0.00E+00	
BP	4	-4	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 6)				1			?	1.92E+07	5.21E-08	0.00E+00	
BP	5	-5	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 7)					1		?	1.92E+07	5.21E-08	0.00E+00	
BP	6	-6	Assembly, ICCMS Initiation Channel Backplane (Cabinet Row 8)						1	?	1.92E+07	5.21E-08	5.21E-08	
BP	10	NUS-C099NC-1	Fabrication, ICCMS Actuation Traine Backplane (Cabinet Row 3) PCB	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	11	NUS-C099NC-2	Fabrication, ICCMS Actuation Traine Backplane 1 (Cabinet Row 4) PCB		1					Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	12	NUS-C099NC-3	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 5) PCB			1				Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	13	NUS-C099NC-4	Fabrication, ICCMS Actuation Traine Backplane 2 (Cabinet Row 6) PCB				1			Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	14	NUS-C099NC-5	Fabrication, ICCMS Actuation Traine Backplane 4 (Cabinet Row 7) PCB					1		Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	0.00E+00	
BP	15	NUS-C099NC-6	Fabrication, ICCMS Actuation Traine Backplane 5 (Cabinet Row 8) PCB						1	Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
BP	20	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos			14	14	14	14	TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	1.82E-08	
BP	21	5650859-5	Connector, DIN41612 Type B, Vertical, Femal, 64 pos	7	7					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	0.00E+00	
BP	22	8-1393640-5	Connector, DIN41612 Type c/2, Vertical, Femal, 48 pos	4	4					TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	0.00E+00	
BP	26	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos			1	1	1	1	Moles, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
BP	27	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos	2						Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	28	42819-2212	Connector, Header, 10mm, Vertical, Male, 2 pos		3					Moles, Lisle, IL	7.69E+08	1.30E-09	0.00E+00	
BP	29	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos		2	2			2	Samtec, New Albany, IN	7.69E+08	1.30E-09	2.60E-09	
BP	30	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos				1	1		Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	31	EJH-125-01-S-D-SM-LC	Connector, Header, 0.1", Vertical, Male, SMT, Locking Clip, 50 pos	3						Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	33	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos	3		3			3	Samtec, New Albany, IN	7.69E+08	1.30E-09	3.90E-09	
BP	34	EJH-125-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 50 pos		2		2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	36	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos			2	2	2		Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	37	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos						1	Samtec, New Albany, IN	7.69E+08	1.30E-09	1.30E-09	
BP	38	EJH-113-01-F-D-SM-LC	Connector, Header, 0.05", Vertical, Male, SMT, Locking Clip, 26 pos		1					Samtec, New Albany, IN	7.69E+08	1.30E-09	0.00E+00	
BP	40	273-1K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 1KOhm, ThroughHole	4						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	0.00E+00	
BP	41	273-100K-RC	Resistor, Metal Film, 1%, 1/2W, 50ppm, 100KOhm, ThroughHole	1						Xicon, Fort Worth, TX	6.42E+08	1.56E-09	0.00E+00	
BP	42	Wire	Jumper, 0Ohm, 22WAG	5						22AWG	1.00E+08	1.00E-08	0.00E+00	
BP	43	S102K19K000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 19KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	0.00E+00	Generic Data or similar component
BP	44	S102K7K5000B	Resistor, Metal Film, 0.1%, 1/8W, 2.5PPM, 7.5KOhm, ThroughHole				1			Vishay	1.00E+10	1.00E-10	0.00E+00	Generic Data or similar component
BP	45	MAZ30K000B	Resistor, Metal Film, 0.1%, 1/8W, 1PPM, 30KOhm, ThroughHole				1			Alpha Electronics Corp.	6.43E+08	1.56E-09	0.00E+00	
BP	46	REF102BP	IC, Voltage Reference, 10V, 8 PIN DIP				1			Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	0.00E+00	Generic Data or similar component
BP	47	TAP105K035SCS	Capacitor, Tantalum, 10%, 1uF, 35V MIN				1			AVX, Fountain Inn, SC	3.35E+06	2.99E-07	0.00E+00	Generic Data or similar component
BP	48	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 25V MIN				1			TDK, Uniondale, NY	3.52E+10	2.84E-11	0.00E+00	Generic Data or similar component
BP	49	HFBR-1412TZ	IC, Fiber Optic, Emitter, ST Port		6					Avago Tech., San Jose, CA	4.92E+06	2.03E-07	0.00E+00	Generic Data or similar component
BP	50	HFBR-2412TZ	IC, Fiber Optic, Receiver, ST Port	9						Avago Tech., San Jose, CA	1.09E+07	9.17E-08	0.00E+00	Generic Data or similar component
BP	51	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	9						TDK, Uniondale, NY	3.52E+10	2.84E-11	0.00E+00	Generic Data or similar component
											7.60E+06	**1.25E-06**	**1.31E-07**	**MTBF Backplane (hours)**
											60			**MTTR Backplane (minutes)**
											360			**MLDT Backplane (minutes)**
										TOTAL	**0.999999**		**9.20E-07**	**AVAILABILITY Backplane**

Contact Input Module MTBF Data															
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
CIM	6	NUS-A326NB-1	Fabrication, Contact Input PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
CIM	7	NUS-C079PA-1	Assembly, Contact Input Face Plate	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CIM	15	RNC55H1821FS	Resistor, Metla Film, 1%, 1/8W, 1.82kOhm	4						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	6.23E-09	
CIM	16	RS-2405D	DC/DC Converter, 24 VDC IN, +/- 5 VDC OUT	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
CIM	17	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 50V	6						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.70E-10	
CIM	18	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	7						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.99E-10	
CIM	19	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3uF, 50V	10						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.84E-10	
CIM	20	11R154C	Inductor, 10%, 150uH	8						Murala Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	6.37E-08	
CIM	21	WP57EGW	Bi-color, Red-Green, Round, 5mm, T-1 3/4, clear Flanged	2						KingBright, City of Industry, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CIM	22	ET21MD1AVQE	Switch, Toggle, On-On, Tiny, Vertical Toggle, R/A PC MNT	4						C&K Components, Newton, United States	5.04E+06	1.98E-07	7.94E-07	
CIM	23	PCH175	LED Holder, 5mm, Single Level	2						VCC Inc, San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CIM	24	536385-5	Conn DIN 41612 M 64 POS 2.54mm, solder Right Angle Thru-hole	1						TE Connectivily, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
CIM	25	53047-03	Connector, Male 3 POS, 1.25mm, vertical Thru-hole	1						Molex, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
CIM	26	RS-2412D	DC/DC Converter, 2W, 24 VDC Input, +/-12 VDC Output	3						Recom, Brooklyn, NY	1.40E+06	7.15E-07	2.15E-06	
CIM	27	2N7000	N Channel FET, TO92, 60V, 200mA	4						Fairchild Semiconductor, San Jose, CA	1.56E+07	6.40E-08	2.56E-07	
CIM	28	ZVP4105A	P Channel FET, TO92, 50V, 175mA	2						Diodes Inc., Palno, TX	1.71E+08	5.85E-09	1.17E-08	
CIM	29	RNC55H3901FS	Resistor, Metal Film, 1%, 1/8W, 3.9kΩ	4						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	6.22E-09	
CIM	30	RNC55H1502FS	Resistor, Metal Film, 1%, 1/8W, 15kΩ	8						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.25E-08	
CIM	32	RNC55H8250FS	Resistor, Metal Film, 1%, 1/8W, 50 PPM, 825 Ohms	2						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	3.11E-09	
CIM	33	RNC55H2201FS	Resistor, Metal Film, 1%, 1/8W, 2.2kΩ	5						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	7.78E-09	
CIM	34	TP-105-01-00	Test Point, Breakaway, Black	22						Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CIM	35	FOD3181	IC, 8 PIN DIP Optocoupler	6						Fairchild Semiconductor, San Jose, CA	7.03E+07	1.42E-08	8.54E-08	Generic Data or similar component
CIM	36	H11L1M	IC, OPTOCUPLER, 8 PIN DIP	2						Fairchild Semiconductor, San Jose, CA	5.47E+06	1.83E-07	3.66E-07	
CIM	38	AQY212GH	IC, Photo Relay, Normally Open, 4 PIN DIP	3						Panasonic Electric, Works, Osaka, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CIM	39	HEF40106BP	IC, Inverter, Schmitt Trigger, HEX, 14 PIN DIP	1						NXP Semiconductors, Netherlands	3.34E+08	2.99E-09	2.99E-09	
CIM	40	P6KE51CA	TVS DIODE, BIDIRECTIONAL, 600W, 48.5V	2						Diodes Inc., Plano TX	3.48E+07	2.88E-08	5.75E-08	
											2.18E+05	2.00E-06	4.59E-06	MTBF for Module (hours)
											5			MTTR for Module (minutes)
											360			MLDT for Module (minutes)
CIM										TOTAL	0.999972		2.79E-05	AVAILABILITY for Module

Contact Output Module MTBF Data															
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
COM	6	NUS-A326NB-1	Fabrication, Contact Output PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
COM	7	NUS-C079PA-1	Assembly, Contact Output Face Plate	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
COM	15	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 50V	2						TDK, Uniondale, NY	3.52E+10	2.84E-11	5.68E-11	
COM	16	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	14						TDK, Uniondale, NY	3.52E+10	2.84E-11	3.98E-10	
COM	17	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3uF, 50V	4						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.14E-10	
COM	18	P6KE180CA	TVS Diode, Bidirectional, 600W, 180V	4						Littelfuse, Chicago, IL	2.78E+06	3.60E-07	1.44E-06	4 Of 8 do not contribute
COM	19	1N4148	Diode, SS Fast 100V 200 MA, DO35	8						Fairchild Semiconductor, San Jose, CA	2.19E+07	4.57E-08	3.66E-07	
COM	20	11R154C	Inductor, 10%, 150uH	4						Murala Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	3.18E-08	
COM	21	VAOL-5LAED	RED, Round, 5mm, T-1 3/4, Duffused, Flanged	4						VCC Inc, San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
COM	22	VAOL-5LDE2	GREEN, Round, 5mm, T-1 3/4, Duffused, Flanged	4						VCC Inc, San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
COM	23	PCH175	LED Holder, 5mm, Single Level	8						VCC Inc, San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
COM	24	536385-5	Conn DIN 41612 M 64 POS 2.54mm, solder Right Angle Thru-hole	1						TE Connectivily, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
COM	25	53047-03	Connector, Male 3 POS, 1.25mm, vertical Thru-hole	1						Molex, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
COM	26	RS-2412D	DC/DC Converter, 2W, 24 VDC Input, +/-12 VDC Output	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	
COM	27	2N7000	N Channel FET, TO92, 60V, 200mA	4						Fairchild Semiconductor, San Jose, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
COM	28	ZVP4105A	P Channel FET, TO92, 50V, 175mA	8						Diodes Inc., Palno, TX	1.71E+08	5.85E-09	4.68E-08	4 of 12 do not contribute
COM	29	RNC55H3901FS	Resistor, Metal Film, 1%, 1/8W, 3.9kΩ	8						Xicon, Fort Worth, Texas	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
COM	30	RNC55H1502FS	Resistor, Metal Film, 1%, 1/8W, 15kΩ	12						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.87E-08	
COM	31	RNC55H8250FS	Resistor, Metal Film, 1%, 1/8W,825Ω	4						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	6.22E-09	
COM	32	RNC55H2201FS	Resistor, Metal Film, 1%, 1/8W, 2.2kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
COM	33	TP-105-01-00	Test Point, Breakaway, Black	25						Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
COM	34	FOD3181	IC, 8 PIN DIP Optocoupler	6						Fairchild Semiconductor, San Jose, CA	7.03E+07	1.42E-08	8.54E-08	Generic Data or similar component
COM	35	NF2EB-12V	IC, Electricomechanical Relay, DPDT, Form 2C, 9 PIN	4						Panasonic Electric, Works, Osaka, Japan	4.98E+07	2.01E-08	8.04E-08	
COM	36	HEF40106BP	IC, Inverter, Schmitt Trigger, HEX, 14 PIN DIP	1						NXP Semiconductors, Netherlands	3.34E+08	2.99E-09	2.99E-09	
COM	37	AQY212GH	IC, Photo Relay, Normally Open, 4 PIN DIP	1						Panasonic Electric, Works, Osaka, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
COM	38	RS-2405D	DC/DC Converter, 2W, 24 VDC Input, +/-5 VDC Output	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
											2.80E+05	**1.95E-06**	**3.57E-06**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
COM										**TOTAL**	**0.999978**		**2.17E-05**	**AVAILABILITY for Module**

Channel Trip Module MTBF Data														
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
CTM	6	NUS-A334NB-1	Fabrication, Channel Trip PC Board	1						Scientech/NUSI Idaho falls, ID	1.92E+07	5.21E-08	5.21E-08	
CTM	7	NUS-C087PA-1	Assembley, Channel Trip Fce Plate	1						Scientech/NUSI Idaho falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	16	FK207R1H105K	Capacitor, Ceramic, 10%, 1uF, 50V MIN	5						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.42E-10	
CTM	17	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V MIN	15						TDK, Uniondale, NY	3.52E+10	2.84E-11	4.26E-10	
CTM	18	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3uF, 50V MIN	5						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.42E-10	
CTM	19	FK22C0G1H224J	Capacitor, Ceramic, 10%, 0.22uF, 50V MIN	4						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.14E-10	
CTM	20	FK28X7R1H103K	Capacitor, Ceramic, 10%, 0.01uF, 50V MIN	2						TDK, Uniondale, NY	3.52E+10	2.84E-11	5.68E-11	
CTM	21	1N4148	Diode, SGL JUNC< 100V, 4.0NS, DO-35	1						Fairchild Semiconductor, San Jose, CA	2.19E+07	4.57E-08	4.57E-08	
CTM	22	11R154C	Inductor, 10%, 150uF	5						Murala Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	3.98E-08	
CTM	23	VAOL-5MAE2	RED, Round, 5mm, T-1 3/4, Diffsed, Flangless	3						VCC Inc, San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	24	VAOL-5LAE2	RED, Round, 5mm, T-1 3/4, Diffsed, Flanged	2						VCC Inc, San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	25	VAOL-5MDE2	GREEN, Round, 5mm, t-1 3/4, Diffused, Flangless	3						VCC Inc, San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	26	H-278C-2	LED Holder 5mm, Dual Level	3						BIVAR Irvine, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	27	PCH175	LED Holder, 5mm, Single Level	2						VCC Inc, San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	28	5650948-5	Conn DIN 41612 M 64 POS 2.54mm, solder Right Angle Thru-hole	1						TE Connectivily, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
CTM	29	53047-0310	Connector, Male 3 POS, 1.25mm, vertical Thru-hole	1						Molex, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
CTM	30	53047-1010	Connector, Male 10 POS, 1.25mm, vertical Thru-hole	1						Molex, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
CTM	31	RS-2412D	DC/DC Converter, 2W, 24 VDC Input, +/-12 VDC Output	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	
CTM	32	RS-2405S	DC/DC Converter, 2W, 24 VDC Input, +/-5 VDC Output	1						Remcom, Broklyn, NY	1.40E+06	7.15E-07	7.15E-07	
CTM	33	2N7000	N Channel FET, TO92, 60V, 200mA	11						Fairchild Semiconductor, San Jose, CA	1.56E+07	6.40E-08	7.04E-07	
CTM	34	ZVP4105A	P Channel FET, TO92, 50V, 175mA	3						Diodes Inc., Palno, TX	1.71E+08	5.85E-09	1.76E-08	
CTM	35	270-3.9K-RC	Resistor, Metal Film, 1%, 1/8W, 3.9kΩ	8						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.24E-08	
CTM	36	270-15K-RC	Resistor, Metal Film, 1%, 1/8W, 15k9Ω	18						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	2.80E-08	
CTM	37	270-4.7K-RC	Resistor, Metal Film, 1%, 1/8W, 4.7kΩ	9						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.40E-08	
CTM	38	270-1.2K-RC	Resistor, Metal Film, 1%, 1/8W, 1.2kΩ	1						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.56E-09	
CTM	39	270-4.99K-RC	Resistor, Metal Film, 1%, 1/8W, 4.99kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
CTM	40	270-44.2K-RC	Resistor, Metal Film, 1%, 1/8W, 44.2kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
CTM	41	270-68K-RC	Resistor, Metal Film, 1%, 1/8W, 68kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
CTM	42	270-2.2K-RC	Resistor, Metal Film, 1%, 1/8W, 2.2kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
CTM	43	273-150-RC	Resistor, Metal Film, 1%, 1/8W, 150kΩ	2						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	3.11E-09	
CTM	44	270-10K-RC	Resistor, Metal Film, 1%, 1/8W, 10kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
CTM	45	270-11K-RC	Resistor, Metal Film, 1%, 1/8W, 11kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
CTM	46	ET03MD1ABE	Switch Toggle, ON-OFF-ON, Tiny, Horizontal Toggle, R/A PC MNT	1						C&K Components, Newton, United States	5.04E+06	1.98E-07	1.98E-07	
CTM	47	ET24MD1AVBE	Switch Toggle, ON-OFF-ON, Tiny, Vertical Toggle, R/A PC MNT	1						C&K Components, Newton, United States	5.04E+06	1.98E-07	1.98E-07	
CTM	48	TP-105-01-00	Test Point, Breakaway, Black	26						Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	49	FOD3181	IC, 8 PIN DIP Optocoupler	3						Fairchild Semiconductor, San Jose, CA	7.03E+07	1.42E-08	4.27E-08	Generic Data or similar component
CTM	50	ICM7242IPA+	IC, Fixed counter, 8 PIN DIP	1						Maxim, Sunnyvale, CA	2.39E+08	4.19E-09	4.19E-09	
CTM	51	CD40102BE	IC, 8-Stage, Presettable, Down Counter, 16 PIN DIP	1						Panasonic Electric, Works, Osaka, Japan	3.71E+08	2.70E-09	2.70E-09	
CTM	52	HEF40106BP	IC, Inverter, Schmitt Trigger, HEX, 14 PIN DIP	3						NXP Semiconductors, Netherlands	3.34E+08	2.99E-09	8.98E-09	
CTM	53	CD4072BE	IC, Dual 4-Input OR Gate, 14 PIN DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
CTM	54	CD4027BE	IC, JK Flip Flop, 16 PIN DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
CTM	56	CD4002BE	IC, Dual 4-Input NOR Gate, 14 PIN DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
CTM	57	CD4081BE	IC, Quad 2-Input AND Gate, 14 PIN DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
CTM	58	AQY212GH	IC, Photo Relay, Normally Open, 4 PIN DIP	1						Panasonic Electric, Works, Osaka, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	61	51021-1000	Connector, Female, 10 POS 1.25mm	1						Molex, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
CTM	62	50058-8100	Crimp Terminal , Female	10						Molex, Lisle, IL	7.69E+08	1.30E-09	1.30E-08	
CTM	63	AR	Wire, Insulated, 600V or Greater, Type B or C, 28 AWG, Color as required	1						MIL-W`6878D	1.00E+08	1.00E-08	1.00E-08	
CTM	64	AR	Heatshrink, 1/8", Black, Polyolefin	1						?	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	65	A7D-206-1	Thumbwheel, BCD, Front Mount	2						Omron Corp., Kyoto, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	66	A7D-2PA-1	Thumbwheel, Spacer, Front Mount	1						Omron Corp., Kyoto, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	67	A7D-2M-1	Thumbwheel, End Cap, Front Mount	1						Omron Corp., Kyoto, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
CTM	68	-	Wire, 24 AWG, Wire Wrap, KYNAR, Insulated	1						MIL-W16878D	1.00E+08	1.00E-08	1.00E-08	Generic Data or similar component
CTM	69	RNC5521210FS	Resistor, Metal Film, 121 Ohm, 1/8W, 1%	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
CTM	70	RS-2405D	DC/DC Converter, 2W, 24 VDC Input, +/-5 VDC Output	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
CTM	71	RNC55H8250FS	Resistor, Metal Film, 825 Ohm, 1/8W, 1%	3						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	4.67E-09	
											2.79E+05	**2.80E-06**	**3.58E-06**	**MTBF for Module (hours)**

											5			MTTR for Module (minutes)
											360			MLDT for Module (minutes)
										TOTAL	0.999978		2.18E-05	AVAILABILITY for Module

Display Select Module MTBF Data															
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
DSM	6	NUS-A332NB-1	Fabrication, Contact Output PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
DSM	7	NUS-CO85PA-1	Assembly, Contact Output Face Plate	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
DSM	17	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V MIN	12						TDK, Uniondale, NY	3.52E+10	2.84E-11	3.41E-10	
DSM	18	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 50V MIN	5						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.42E-10	
DSM	19	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3uF, 50V MIN	6						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.70E-10	
DSM	20	FK28X7R1H103K	Capacitor, Ceramic, 10%, 10uF, 50V MIN	1						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.84E-11	
DSM	21	TAP105K035S	Capacitor, Tantalum, 10%, 1uF, 35V MIN	9						AVX, Fountain Inn, SC	3.35E+06	2.99E-07	2.69E-06	
DSM	22	11R154C	Inductor, 10%, 150uH	6						Murala Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	4.78E-08	
DSM	23	WP7113SRC/DU	RED, Round, 5mm, T-1 3/4, Clear	3						KingBright, City of Industry, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
DSM	24	PCH75	LED Holder, 5mm, Single Level	3						VCC Inc., San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
DSM	25	536385-5	Conn DIN 41612 M 64 POS 2.54mm, solder Right Angle Thru-hole	1						TE Connectivily, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
DSM	26	53047-03	Connector, Male 3 POS, 1.25mm, vertical Thru-hole	1						Molex, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
DSM	27	RS-2412D	DC/DC Converter, 2W, 24 VDC Input, +/-12 VDC Output	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	
DSM	28	2N7000_D26Z	N Channel FET, TO92	6						Fairchild Semiconductor, San Jose, CA	3.70E+08	2.70E-09	1.62E-08	
DSM	29	270-15K-RC	Resistor, Metal Film, 1%, 1/8W, 15kΩ	6						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	9.34E-09	
DSM	30	Y40535K00000J0L	Resistor, Variable, 1/4E, 5kΩ	1						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
DSM	31	270-1K-RC	Resistor, Metal Film, 1%, 1/8W, 1kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DSM	32	270-10K-RC	Resistor, Metal Film, 1%, 1/8W, 10kΩ	3						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	4.67E-09	
DSM	33	270-3.9K-RC	Resistor, Metal Film, 1%, 1/8W, 3.9kΩ	3						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	4.67E-09	
DSM	34	RNC55H8250FS	Resistor, Metal Film, 1%, 1/8W,825Ω	3						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	4.67E-09	
DSM	35	Y405310K0000J0L	Resistor, Variable, 1/4W, 10kΩ	2						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	2.00E-10	
DSM	36	270-100K-RC	Resistor, Metal Film, 1%, 1/8W, 100kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DSM	37	CMF551CM000FHEK	Resistor, Carbon Film, 6%, 1/4W(MIN), 10kΩ	1						Vishay, Malvern, PA	1.38E+05	7.23E-06	7.23E-06	
DSM	38	270-100-RC	Resistor, Metal Film, 1%, 1/8W, 100kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DSM	39	270-4.99K-RC	Resistor, Metal Film, 1%, 1/8W, 4.99kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DSM	40	270-90K-RC	Resistor, Metal Film, 1%, 1/8W, 90kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DSM	41	270-2.2K-RC	Resistor, Metal Film, 1%, 1/8W, 2.2kΩ	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DSM	42	TP-105-01-00	Test Point, Breakaway, Black	29						Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
DSM	43	ISO124P	IC, Isolation AMP, 50KHZ, SGL, 16DIP	2						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	5.43E-09	
DSM	44	FOD3181	IC, 8 PIN DIP Optocoupler	3						Fairchild Semiconductor, San Jose, CA	7.03E+07	1.42E-08	4.27E-08	Generic Data or similar component
DSM	45	CD4027BE	IC, JK Flip Flop, 16 PIN DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
DSM	46	HEF40106BP	IC, Inverter, Schmitt Trigger, HEX, 14 PIN DIP	1						NXP Semiconductors, Netherlands	3.34E+08	2.99E-09	2.99E-09	
DSM	47	CD4081BE	IC, Quad 2-Input AND Gate, 14 PIN DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
DSM	48	REF102BP	IC, Voltage Reference, 10V, 8 PIN DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	Generic Data or similar component
DSM	49	LT1014ON#PBF	IC, OPAMP, QUAD, 1MHZ, 14 PIN DIP	1						Linear Technologies, Milpitas, CA	7.14E+09	1.40E-10	1.40E-10	Generic Data or similar component
DSM	50	ADG1636BRU	IC, Dual Analog Switch, TSSOP16	1						Analog Devices, Bellevue, WA	5.71E+09	1.75E-10	1.75E-10	
DSM	51	AQY212GH	IC, Photo Relay, 4 PIN DIP	1						Panasonic Electric, Works, Osaka, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
DSM	52	OPA2277P	IC, OPAMP, GP, PREC, 1MHZ, SGL, 8 PIN DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
DSM	53	RNC55J1822FS	Resistor, 18.2KOhm, 1/8W, 1%	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DSM	54	RNC55H1152FS	Resistor, 11.5KOhm, 1/8W, 1%	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DSM	55	RS-2415D	DC/DC Converter, 2W, 24 VDC Input, +/-15 VDC Output	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
DSM	56	RS-2405D	DC/DC Converter, 2W, 24 VDC Input, +/-5 VDC Output	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
DSM	57	270-15K-RC	Resistor, Metal Film, 1%, 15kW	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DSM	58	IN5239B	diode, Zener, 9.1V	1						?	4.38E+07	2.28E-08	2.28E-08	
											8.13E+04	**9.81E-06**	**1.23E-05**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
										Total	**0.999925**		**7.48E-05**	**AVAILABILITY for Module**

Difference Module MTBF Data															
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
DM	6	NUS-A331NB-1	Fabrication, Difference Module PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
DM	7	NUS-C093PA-1	Assembly, Difference Module Face Plate	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
DM	12	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	17						TDK, Uniondale, NY	3.52E+10	2.84E-11	4.83E-10	
DM	13	FK24X7R1E105K	Capacitor, Ceramic, 10%, 1uF, X7R, 50V	2						TDK, Uniondale, NY	3.52E+10	2.84E-11	5.68E-11	
DM	14	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3uF, X7R, 50V	4						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.14E-10	
DM	15	TAP105K035SCS	Capacitor, Tantalum, 10%, 1uF, 35V	7						AVX Corp., Fountain Inn, SC	3.35E+06	2.99E-07	2.09E-06	2 of 9 do not contribute
DM	16	FK22Y5V1E226Z	Capacitor, Ceramic, 20%, 22uF, 25V	1						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.84E-11	
DM	17	11R154C	Inductor, 10%, 150uH	4						Murala Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	3.18E-08	
DM	18	536385-5	Conn DIN 41612 M 64 POS 2.54mm, Solder Right Angle Thru-hole	1						TE Connectivily, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
DM	19	53047-03	CONNECTOR, MALE 3 POS, 1.25MM, VERTICAL THRU-HOLE	2						Molex Inc., Lisle, IL	7.69E+08	1.30E-09	2.60E-09	
DM	20	RS-2412D	DC/DC CONVERTER, 2W, 24 VDC INPUT, +/-12 VDC OUTPUT	2						Recom, Brooklyn, NY	1.40E+06	7.15E-07	1.43E-06	
DM	21	Y40531K0000J0L	Resistor, Variable, 1KΩ, 5%, 10PPM, 0.25W, 21 TURN, THROUGH HOLE	1						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
DM	22	Y405310K0000J0L	Resistor, Variable, 10KΩ, 0.25W, 21 TURN, THROUGH HOLE	2						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	2.00E-10	
DM	23	Y40532K0000J0L	Resistor, Variable, 2KΩ, 0.25W, 21 TURN, THROUGH HOLE	4						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	4.00E-10	
DM	24	270-2.2K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 2.2kΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DM	25	270-2.49K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 2.49kΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DM	26	270-15K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50ppm, 15Ω, Though-hole	4						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	6.23E-09	
DM	27	WIRE, 22AWG, BARE	JUMPER, 0 OHM	3						MIL-W16878D	1.00E+08	1.00E-08	3.00E-08	
DM	28	270-9.1K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 9.1kΩ, Thru-hole	4						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	6.23E-09	
DM	29	270-10K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 10kΩ, Thru-hole	7						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.09E-08	
DM	30	270-47.5K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 47.5kΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
DM	31	270-4.02K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 4.02kΩ, Thru-hole	4						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	6.23E-09	
DM	32	270-7.5K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 7.5kΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.56E-09	
DM	33	270-100-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 100Ω, Thru-hole	5						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	7.79E-09	
DM	34	270-499K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 499Ω, Thru-hole	1						Xicon, Fort Worth, Texas	1.02E+09	9.77E-10	9.77E-10	
DM	35	270-8.06K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 8.06kΩ, Thru-hole	2						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	3.11E-09	
DM	36	Y40535K00000J0L	Resistor, Variable, 5K, 0.5W, 25 TURN, THROUGH HOLE	1						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
DM	37	270-6.2K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 6.2KΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.56E-09	
DM	38	270-4.99K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 4.99KΩ, Thru-hole	4						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	6.23E-09	
DM	39	270-1.24K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 1.24KΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.43E+08	1.55E-09	1.55E-09	
DM	40	0040.1151	TEST JACK, PB 6.3A BLACK	3						Schurler, Santa Rosa, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
DM	41	TP-105-01-00	TEST POINT, BREAKAWAY, BLACK	17						Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
DM	42	OPA2277P	IC, OPAMP, GP, PREC, 1MZ, DUAL, 8 PIN DIP	3						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	8.15E-09	
DM	43	REF102BP	IC, VOLTAGE REFERENCE, 10V, 8 PIN DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	Generic Data or similar component
DM	44	OPA277P	IC, OPAMP, GP, [REC. 1MZ. SGL, 8 PIN DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
DM	45	AQY212GH	IC, PHOTO RELAY, 4 PIN DIP	1						Panasonic, New Providence, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
DM	46	ISO124P	IC, ISOLATION AMP, 50kHZ, SGL, 16DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
DM	47	RS-2415D	DC/DC CONVERTER, 2W, 24 VDC INPUT, +/-15 VDC OUTPUT	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
DM	48	AR	Jumper Wire, 24 AWG, KYNAR	1						N/A	1.00E+08	1.00E-08	1.00E-08	Generic Data or similar component
DM	50	LT1013CN8#PBF	IC, OPAMP, Dual Precision	2						Linear Tech	7.14E+09	1.40E-10	2.80E-10	Generic Data or similar component
											2.25E+05	**1.12E-06**	**4.44E-06**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
										Total	**0.999973**		**2.70E-05**	**AVAILABILITY for Module**

Function Generator Module MTBF Data														
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
FGM	7	NUS-A327NB-1	Fabrication, Contact Output PC Board	1	1	1	1	1	1	Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
FGM	8	NUS-C080PA-1	Assembly, Function Generator Face Plate, SQRT (-1)	1	0	0	0	0	0	Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
FGM	9	NUS-C080PA-2	Assembly, Function Generator Face Plate, HPIF (-2)	0	1	0	0	0	0	Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
FGM	10	NUS-C080PA-3	Assembly, Function Generator Face Plate, TSATscm (-3)	0	0	1	0	0	0	Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
FGM	11	NUS-C080PA-4	Assembly, Function Generator Face Plate, TSAYsh.nom (-4)	0	0	0	1	0	0	Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
FGM	12	NUS-C080PA-5	Assembly, Function Generator Face Plate, TSATsh.err (-5)	0	0	0	0	1	0	Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
FGM	13	NUS-C080PA-6	Assembly, Function Generator Face Plate (-6)	0	0	0	0	0	1	Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
FGM	14	08055C473KAT2Q	Capacitor, Ceramic, 47uF, 50V, X7R, 10%, 0805 SMD	1	1	1	1	1	1	AVX Corp., Fountain Inn, SC	3.52E+10	2.84E-11	2.84E-11	
FGM	15	TLCR105M035RTA	Capacitor, Tantalum, 1uF, 35V, 20%, 0805 SMD	2	4	4	4	4	4	AVX Corp., Fountain Inn, SC	3.35E+06	2.99E-07	5.97E-07	2 of 4 contibuite
FGM	16	T491A106K016AT	Capacitor, Tantalum, 10uF, 16V, 10%, SMD, Case Size A	1	1	1	1	1	1	Kemet Corporation, Greenville, SC	1.82E+05	5.48E-06	5.48E-06	
FGM	17	08055C104K4T2A	Capacitor, Ceramic, 0.10uF, 50V, X7R, 10%, 0805 SMD	16	16	16	16	16	16	AVX Corp., Fountain Inn, SC	3.52E+10	2.84E-11	4.55E-10	
FGM	18	08055D105KAT2A	Capacitor, Ceramic, 1.0uF, 50V, X5R, 10%, 0805 SMD	6	6	6	6	6	6	AVX Corp., Fountain Inn, SC	3.52E+10	2.84E-11	1.70E-10	
FGM	19	CGA6P3X7R1H335K	Capacitor, Ceramic, 3.3uF, 50V, X7R, 10%, 1210 SMD	4	4	4	4	4	4	TDK, Uniondale, NY	3.52E+10	2.84E-11	1.14E-10	
FGM	20	C085C330K5GACTU	Capacitor, Ceramic, 33uF, 50V, C0G, 10%, 0805 SMD	1	1	1	1	1	1	Kemet Corporation, Greenville, SC	2.65E+09	3.77E-10	3.77E-10	
FGM	21	T491A225K016AT	Capacitor, Tantalum, 2.2uF, 16V, 10%, SMD, Case Size A	2	2	2	2	2	2	Kemet Corporation, Greenville, SC	1.82E+05	5.48E-06	1.10E-05	Does not contribute to the failure rate of the ICCMS
FGM	22	LS M67K-H2L1-1-Z	LED TOPLED 630NM SUP RED CLR SMD 0805	16	16	16	16	16	16	Osram Opto Semi, Regensburg, Germany	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
FGM	23	AQY272A	Relay OPTO AC/DC 60V 1.1A 4-SMD	1	1	1	1	1	1	Panasonic, Secaucus, NJ	N/A	N/A	N/A	Generic Data or similar component
FGM	24	536385-5	Conn DIN Plug 46 POS RT ANG PCB	1	1	1	1	1	1	TE Connectivily, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
FGM	25	11R143C	Inductor Radial, 150UH 0.35A	2	2	2	2	2	2	Murata Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	1.59E-08	
FGM	26	11R104C	Inductor Radial, 100UH 0.35A	2	2	2	2	2	2	Murata Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	1.59E-08	
FGM	27	RS-2415D	DC/DC Converter, 2W, 24 VDC Input, +/-16 VDC Output	1	1	1	1	1	1	Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	
FGM	28	RS-2412D	DC/DC Converter, 2W, 24 VDC Input, +/-12 VDC Output	1	1	1	1	1	1	Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	
FGM	29	74HC221D	IC Dual MUTLIVIBRATR 16SOIC	1	1	1	1	1	1	NXP Semiconductors, Netherlands	1.51E+08	6.62E-09	6.62E-09	
FGM	30	OPA2277U	IC OPAMP GP 1MHZ Dual 8SOIC	1	1	1	1	1	1	Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
FGM	31	LTC1605AIG#PBF	IC A/D CONV 16 BIT SAMPLNG 28SSOP	1	1	1	1	1	1	Linear Technologies, Milpitas, CA	5.48E+07	1.83E-08	1.83E-08	
FGM	33	LTC1597AIG#PBF	IC D/A CONV 16BIT PAR 28-SSOP	1	1	1	1	1	1	Linear Technologies, Milpitas, CA	2.49E+08	4.02E-09	4.02E-09	
FGM	34	LM555CM	IC OSC MONO TIMING 8-SOIC	1	1	1	1	1	1	National Semiconductor, Santa Clara, CA	1.00E+09	9.98E-10	9.98E-10	
FGM	35	SN74HC574PW	IC OCTAL D-Type F-F 20-TSSOP	2	2	2	2	2	2	Texas Instruments, Dallas, TX	3.08E+09	3.25E-10	6.49E-10	
FGM	36	ISO124P	IC OPAMP ISO 50kHZ SGL 16DIP	1	1	1	1	1	1	Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
FGM	37	7805SRH-C	REGULATOR SWITCH 5VDC 0.5A SIP, HORIZONTAL	1	1	1	1	1	1	Murata Power Solutions, Mansfield, MA	1.13E+07	8.87E-08	8.87E-08	
FGM	38	REF102BU	IC +10V PREC REFERENCE 8-SOIC	1	1	1	1	1	1	Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
FGM	39	OPA277UA	IC OPAMP GP 1MHZ SGL PREC 8SOIC	2	2	2	2	2	2	Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	5.43E-09	
FGM	40	53047-0310	CONN HEADER 3POS 1.25MM VERT TIN	1	1	1	1	1	1	Molex Inc., Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
FGM	41	Y4053500R000J0L	Trimmer Resistors - Multi Turn 1240W 600 OHM 5.0%	4	4	4	4	4	4	Vishay/Dale Malvern, PA	1.00E+10	1.00E-10	4.00E-10	Generic Data or similar component
FGM	42	RN73C2A14K7BTDF	Thin Film Resistor 0.1W, 1% 10PPM 14.7K OHM, 0805, SMD	1	1	1	1	1	1	TE Connectivily, Berwyn, PA	1.00E+10	1.00E-10	1.00E-10	
FGM	43	288-0805-10K-RC	Thin Film Resistor 10W, 0.1% 10PPM 0805, SMD	8	8	8	8	8	8	Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.25E-08	
FGM	45	288-0805-200-RC	Thin Film Resistor 20 OHM 0.1% 10PPM 0805, SMD	1	1	1	1	1	1	Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.56E-09	
FGM	46	288-0805-33.2K-RC	Thin Film Resistor 3.32 OHM 0.1% 10PPM 0805, SMD	1	1	1	1	1	1	Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
FGM	47	Y405310K0000J0	Trimmer Resistors - Multi Turn 1240W 10K OHM 5.0%	1	1	1	1	1	1	Vishay/Dale Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
FGM	48	ERJ-GENF1201V	RES 1.20K OHM 1/8W 1% 0805 SMD	16	16	16	16	16	16	Panasonic, Secaucus, NJ	5.88E+16	1.70E-17	2.72E-16	
FGM	49	228-0805-7.68K-RC	Thin Film Resistor 7.68K OHM 0.1% 10PPM 0805, SMD	1	1	1	1	1	1	Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
FGM	50	2288-0805-4.99K-RC	Thin Film Resistor 4.99K OHM 0.1% 10PPM 0805, SMD	1	1	1	1	1	1	Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.56E-09	
FGM	51	RG2012N-142-W-T1	RES 1.3K OHM 1/8W .05% 0805 SMD	1	1	1	1	1	1	Susumu, Palisades Park, NJ	1.09E+09	9.17E-10	9.17E-10	
FGM	52	TNPW080510K2BEEA	RES 10.2K OHM 1/8W 0.1% 0805 SMD	1	1	1	1	1	1	Vishay/Dale Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
FGM	53	ERJ-6ENG6492V	RES 64.9K OHM 1/8W 1% 0805 SMD	1	1	1	1	1	1	Panasonic, Secaucus, NJ	5.88E+16	1.70E-17	1.70E-17	
FGM	54	ERA-6AEB202V	RES 2.0K OHM 1/8W .1% 0805 SMD	2	2	2	2	2	2	Panasonic, Secaucus, NJ	3.33E+11	3.00E-12	6.00E-12	
FGM	55	RG2012N-203-W-T1	RES 20.0K OHM 1/8W .05% 0805 SMD	2	2	2	2	2	2	Susumu, Palisades Park, NJ	1.09E+09	9.17E-10	1.83E-09	
FGM	56	RG2012N-683-W-T1	RES 68K OHM 1/8W .05% 0805 SMD	1	1	1	1	1	1	Susumu, Palisades Park, NJ	1.09E+09	9.17E-10	9.17E-10	
FGM	57	CRCW08052K49FKEA	RES 2.49K OHM 1/8W 1% 0805 SMD	1	1	1	1	1	1	Vishay/Dale Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
FGM	59	CRCW0805100RFKEA	RES 100 OHM 1/8W 1% 0805 SMD	1	1	1	1	1	1	Vishay/Dale Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
FGM	60	ERA-6AEB472V	RES 4.7K OHM 1/8W, 0.1% 0805 SMD	1	1	1	1	1	1	Panasonic, Secaucus, NJ	3.33E+11	3.00E-12	3.00E-12	

FGM	61	0040/1161	CONNECTOR, TEST JACK, FEMALE 2 ROW RIGHT ANGLE THRU-HOLE	2	2	2	2	2	2	Schurler, Santa Rosa, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
FGM	62	TP-105-01-00	TEST POINT, BREAKWAY, BLACK	15	15	15	15	15	15	Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
FGM	63	90120-0122	CONN HEADER 2POS 0.100" STR TIN	1	1	1	1	1	1	Molex Inc., Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
FGM	64	NUS-C100PA-1	PROM PROGRAMMING ,SQRT, PROGRAMMED INTO PART AND THEN	1						Scientech/NUSI Idaho Falls, ID	1.64E+06	6.11E-07	6.11E-07	Atmel AT27C1024-70JU
FGM	65	NUS-C100PA-2	PROM PROGRAMMING ,HPIF, PROGRAMMED INTO PART AND THEN		1					Scientech/NUSI Idaho Falls, ID	1.64E+06	6.11E-07	0.00E+00	Atmel AT27C1024-70JU
FGM	66	NUS-C100PA-3	PROM PROGRAMMING ,TSAT(NOM), PROGRAMMED INTO PART AND			1				Scientech/NUSI Idaho Falls, ID	1.64E+06	6.11E-07	0.00E+00	Atmel AT27C1024-70JU
FGM	67	NUS-C100PA-4	PROM PROGRAMMING ,TSAT(-ERR).nom, PROGRAMMED INTO PART AND				1			Scientech/NUSI Idaho Falls, ID	1.64E+06	6.11E-07	0.00E+00	Atmel AT27C1024-70JU
FGM	68	NUS-C100PA-5	PROM PROGRAMMING ,TSAT(+ERR).err, PROGRAMMED INTO PART AND					1		Scientech/NUSI Idaho Falls, ID	1.64E+06	6.11E-07	0.00E+00	Atmel AT27C1024-70JU
FGM	69	NUS-C100PA-6	PROM PROGRAMMING ,Future needs, PROGRAMMED INTO PART AND THEN MARKED ON PART						1	Scientech/NUSI Idaho Falls, ID	1.64E+06	6.11E-07	0.00E+00	Atmel AT27C1024-70JU
FGM	70	AR	Jumper Wire, 24 AWG, KYNAR	1	1	1	1	1	1	N/A	1.00E+08	1.00E-08	1.00E-08	Generic Data or similar component
											5.17E+04	**1.66E-05**	**1.93E-05**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
										Total	**0.999882**		**1.18E-04**	**AVAILABILITY for Module**

Filler Module MTBF Data														
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	ATY 5	QTY 6	Component Manufacturer	Task 3 Numbers	Task 3 Failures	Task 3 Failure Rate	Comments
FM	6	NUS-A341NB-1	Fabrication, Filter PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
FM	7	NUS-C122PA-1	Assembly, Blank Face Plate	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
FM	11	53047-0310	Connector, Male 3 POS, 1.25mm, vertical Thru-hole	1						Molex, Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
FM	12	536385-5	Connector, DIN 41612 M 64 POS 2.54 mm Solder Right Angle Thru Hole	1						TE Connectivily, Belwyn, PA	7.69E+08	1.30E-09	1.30E-09	
FM	13	RNC55H2004FS	Resistor, Metal Film, 1%, 1/8W, 2.0MOhm	36						Xicon, Fort Worth, Texas	3.19E+08	3.14E-09	1.13E-07	
											5.97E+06	5.78E-08	1.68E-07	MTBF for Module (hours)
											5			MTTR for Module (minutes)
											360			MLDT for Module (minutes)
		Total									0.999999		1.02E-06	AVAILABILITY for Module

Power Supply Monitor Module MTBF Data														
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
PSMM	6	NUS-A328NB-1	Fabrication, Power Supply Monitor PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
PSMM	7	NUS-C081PA-1	Assembly, Power Supply Monitor Face Plate	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
PSMM	13	RS-2405D	DC/DC Converter, 2W, 24 VDC Input, +/-5 VDC Output	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
PSMM	14	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 50V	5						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.42E-10	
PSMM	15	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3uF, 50V	8						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.27E-10	
PSMM	16	TAP105K035SCS	Capacitor, Tantalum, 10%, 1uF, 35V	16						AVX Corp., Fountain Inn, SC	3.35E+06	2.99E-07	4.78E-06	6 of 22 do not contribute
PSMM	17	FK22C0G1H224J	Capacitor, Ceramic, 10%, 0.22uF, 50V	1						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.84E-11	
PSMM	18	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, X7R, 50V	4						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.14E-10	
PSMM	19	FK28X7R1H682K	Capacitor, Ceramic, 10%, 6.8uF, 50V	2						TDK, Uniondale, NY	3.52E+10	2.84E-11	5.68E-11	
PSMM	20	TAP476K025SCS	Capacitor, Tantalum, 10%, 47uF, 25V	2						AVX Corp., Fountain Inn, SC	3.35E+06	2.99E-07	5.97E-07	
PSMM	21	SMAT70A-13-F	TRANSIENT VOLTATE SUPPRESSOR, 70V, 400W, SMA	2						Diodes Inc., Palno, TX	2.16E+07	4.63E-08	9.27E-08	Generic Data or similar component
PSMM	22	BAX16	HIGH VOLTAGE GENERAL PURPOSE DIODE, 150V, 0.2A	4						Fairchild Semiconductor, San Jose, CA	1.96E+08	5.10E-09	2.04E-08	
PSMM	23	11R154C	Inductor, 10%, 150uH	8						Murala Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	6.37E-08	
PSMM	24	WP711QBC/D	BLUE, ROUND, 5MM, T-1, CLEAR FLANGED	2						KingBright, City of Industry, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
PSMM	25	WP7113SEC	ORANGE, ROUND, 5MM, T-1, CLEAR FLANGED	2						KingBright, City of Industry, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
PSMM	26	PCH175	LED HOLDER, 5MM, SINGLE LEVEL	4						BIVAR Irvine, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
PSMM	27	5650948-5	CONNECTOR DIN 41612, TYPE C, 48 POS 2.54MM, SODER RIGHT ANGLE THRU-HOLE	1						TE Connectivily, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
PSMM	28	53047-0310	CONNECTOR, MALE 3 POS, 2.54MM, VERTICAL THRU-HOLE	1						Molex Inc., Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
PSMM	29	RS-2412D	DC/DC CONVERTER, 2W, 24 VDC INPUT, +/-12 VDC OUTPUT	2						Recom, Brooklyn, NY	1.40E+06	7.15E-07	1.43E-06	
PSMM	30	RS-2412S	DC/DC CONVERTER, 2W, 24 VDC INPUT, +12 VDC OUTPUT	2						Recom, Brooklyn, NY	1.40E+06	7.15E-07	1.43E-06	
PSMM	31	FDB3632	N-CHANNEL POWER TRENCH MOSFET, 100V, 80A TO-263	2						Fairchild Semiconductor, San Jose, CA	1.54E+08	6.50E-09	1.30E-08	
PSMM	32	SI7139DP-TI-GE3	P-CHANNEL (D-S) MOSFET, 30V, 14A, POWER PAK SO-8	4						Vishay Sillconix, Shellon, CT	9.76E+09	1.02E-10	4.10E-10	Generic Data or similar component
PSMM	33	2N7000	N-CHANNEL, ENHANCEMENT NODE FIELD EFFECT TRANSISTOR, 60V, 0.2A, TO-92	2						Fairchild Semiconductor, San Jose, CA	1.56E+07	6.40E-08	1.28E-07	4 0 6 do not contribute
PSMM	34	270-10-RC	RESISTOR, METAL FILM, 1%, 1/8W, 10Ω	2						Xicon, Fort Worth, Texas	6.54E+08	1.53E-09	3.06E-09	
PSMM	35	270-4.99K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 4.99Ω	2						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	3.11E-09	
PSMM	36	Y405310K0000J0L	Resistor, Variable, 10KΩ, 5%, 10PPM, 0.25W, 21 TURN, THROUGH HOLE	2						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	2.00E-10	
PSMM	37	270-84.5K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 84.5kΩ	2						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	3.11E-09	
PSMM	38	CSNL2512FT4L00	RESISTOR, METAL FOIL, 1%,2W, 0.004kOhm, SMD, 2512	2						Stackpole Electronics	3.65E+06	2.74E-07	5.48E-07	Generic Data or similar component
PSMM	39	270-2.2K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 2.2Ω	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
PSMM	40	270-3.9K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 3.9Ω	4						Xicon, Fort Worth, Texas	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
PSMM	41	270-100-RC	RESISTOR, METAL FILM, 1%, 1/8W, 100Ω	3						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	4.67E-09	
PSMM	42	RNC55H8250FS	Resistor, Metal Film, 1%, 1/8W,825Ω	2						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	3.11E-09	
PSMM	43	270-15K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 15Ω	9						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.40E-08	
PSMM	44	270-150K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 150Ω	2						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	3.12E-09	
PSMM	45	Y40535K0000J0L	Resistor, Variable, 5K, 5%, 10PPM, 0.25W, 21 TURN, THROUGH HOLE	2						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	2.00E-10	
PSMM	46	270-5.1K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 5.1Ω	3						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	4.67E-09	
PSMM	47	270-10K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 10Ω	13						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	2.02E-08	
PSMM	48	271-1.5M-RC	RESISTOR, METAL FILM, 1%, 1/4W,1.5MΩ	2						Xicon, Fort Worth, Texas	3.16E+08	3.16E-09	6.33E-09	
PSMM	49	Y40532K0000J0L	Resistor, Variable, 2K, 5%, 10PPM, 0.25W, 21 TURN, THROUGH HOLE	2						Vishay Presision Group, Malvern, PA	1.00E+10	1.00E-10	2.00E-10	
PSMM	50	270-4.22K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 4.22Ω	2						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	3.11E-09	
PSMM	51	270-7.15K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 7.15Ω	2						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	3.11E-09	
PSMM	52	0040.1151	CONNECTOR, TEST JACK, FEMALE 2 ROW RIGHT ANGLE THRU-HOLE	3						Schurler Luzern, Switzerland	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
PSMM	53	TP-105-01-00	TEST POINT, BREAKAWAY, BLACK	26						Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
PSMM	54	LT4356IDE-1#PBF	SURGE STOPPER, POWER LINE VOLTAGE REGULATOR AND CURRENT LIMITER, 60V, 12-PIN DFN	2						Linear Technologies, Milpitas, CA	1.03E+09	9.71E-10	1.94E-09	
PSMM	55	LTC4416EMS#PBF	36V, LOW LOSS DUAL POWER PATH CONTROLLERS FOR LARGE PFETS, 10-LEAD MSOP	1						Linear Technologies, Milpitas, CA	7.04E+08	1.42E-09	1.42E-09	
PSMM	56	REF102BP	IC, VOLTAGE REFERENCE, 10V, 8 PIN DIP	2						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	5.43E-09	
PSMM	57	ISO124P	IC, ISOLATION AMP, 50kHZ, SGL, 16DIP	3						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	8.15E-09	
PSMM	58	CD4049UB	IC, CMOS HEX BUFFER/CONVERTERS, 16DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
PSMM	59	LM2903N	LOW POWER LOW OFFSET VOLTAGE DUAL COMPARATORS, MDIP	2						National Semiconductor, Santa Clara, CA	1.00E+09	9.98E-10	2.00E-09	
PSMM	60	AQY212GH	IC, PHOTO RELAY, 4 PIN DIP	1						Panasonic, New Providence, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
PSMM	61	FOD3181	IC, 8 PIN DIP Optocoupler	2						Fairchild Semiconductor, San Jose, CA	7.03E+07	1.42E-08	2.85E-08	Generic Data or similar component
PSMM	63	270-2.0M-RC	RESISTOR, METAL FILM, 1%, 1/4W,2.0MΩ	2						Xicon, Fort Worth, Texas	3.19E+08	3.14E-09	6.27E-09	
PSMM	64	-	22 AWG Wire, STRANDED	1						MIL-W16878D	1.00E+08	1.00E-08	1.00E-08	Generic Data or similar component
											9.99E+04	**3.25E-06**	**1.00E-05**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
										Total	**0.999939**		**6.09E-05**	**AVAILABILITY for Module**

Reactor Trip Module MTBF Data															
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
RTM	6	NUS-A330NB-1	Fabrication, Reactor Trip PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
RTM	7	NUS-C083PA-1	Assembly, Reactor Tripr Face Plate	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
RTM	11	FK22X7R1H225K	Capacitor, Ceramic, 10%, 2.2uF, X7R, 25V	2						TDK, Uniondale, NY	3.52E+10	2.84E-11	5.68E-11	
RTM	12	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3uF, 50V	4						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.14E-10	
RTM	13	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	5						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.42E-10	
RTM	14	11R154C	Inductor, 10%, 150uH	4						Murala Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	3.18E-08	
RTM	15	536385-5	Conn DIN 41612 M 64 POS 2.54mm, Solder Right Angle Thru-hole	1						TE Connectivily, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
RTM	16	53047-0310	CONNECTOR, MALE 3 POS, 2.54MM, VERTICAL THRU-HOLE	1						Molex Inc., Lisle, IL	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
RTM	17	RS-2412D	DC/DC CONVERTER, 2W, 24 VDC INPUT, +/-12 VDC OUTPUT	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	1 of 2 does not contribute
RTM	18	2N7000	N-Channel MOSFET, TO92, 60V, 200mA	8						Fairchild Semiconductor, San Jose, CA	1.56E+07	6.40E-08	5.12E-07	
RTM	19	ZVP410SA	P-Channel MOSFET, TO92, 50V, 175mA	7						Diodes Inc., Palno, TX	1.71E+08	5.85E-09	4.10E-08	
RTM	20	RNC55H1502FS	RESISTOR, METAL FILM, 1%, 1/8W, 15kΩ	8						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.25E-08	
RTM	21	RNC55H2001FS	RESISTOR, METAL FILM, 1%, 1/8W, 2kΩ	14						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	2.18E-08	
RTM	22	RNC55H8250FS	RESISTOR, METAL FILM, 1%, 1/8W, 825Ω	1						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.56E-09	
RTM	23	TP-105-01-00	TEST POINT, BREAKAWAY, BLACK	16						Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
RTM	24	CD4071BE	QUAD 2-INPUT OR GATE, 14-DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
RTM	25	CD4001BE	QUAD 2-INPUT NOR GATE, 14-DIP	1						Texas Instruments, Dallas, TX	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
RTM	26	CD4072BE	DUAL 4-INPUT OR GATE, 14-DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
RTM	27	FOD3181	IC, 8 PIN DIP Optocoupler	4						Fairchild Semiconductor, San Jose, CA	7.03E+07	1.42E-08	5.69E-08	Generic Data or similar component
RTM	28	AQY212GH	IC, PHOTO RELAY, NORMALLY OPEN, 4 PIN DIP	1						Panasonic Electric, Works, Osaka, Japan	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
RTM	29	PCH175	LED HOLDER, 5mm, SINGLE LEVEL	3						VCC Inc., San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
RTM	30	WP57EGW	LED, 5mm, BI-COLOR, RED/GREEN	7						KingBright, City of Industry, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
RTM	31	H-278C-2	LED HOLDER 5mm, DUAL LEVEL	2						BIVAR Irvine, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
RTM	32	RNC55H2201FS	RESISTOR, METAL FILM, 1%, 1/8W, 2.2Ω	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
RTM	33	RS-2405D	DC/DC Converter, 2W, 24 VDC Input, +/-5 VDC Output	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
											4.61E+05	**8.72E-07**	**2.17E-06**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
										Total	**0.999987**		**1.32E-05**	**AVAILABILITY for Module**

Summer Module MTBF Data															
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
SM	6	NUS-A331NB-1	Fabrication, Summer / Differencer PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
SM	7	NUS-C084PA-1	Assembly, Summer / Differencer Face Plate	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
SM	12	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	17						TDK, Uniondale, NY	3.52E+10	2.84E-11	4.83E-10	
SM	13	FK24X7R1E105K	Capacitor, Ceramic, 10%, 1uF, X7R, 25V	2						TDK, Uniondale, NY	3.52E+10	2.84E-11	5.68E-11	
SM	14	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3uF, X7R, 50V	4						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.14E-10	
SM	15	TAP105K035SCS	Capacitor, Tantalum, 10%, 1uF, 35V	7						AVX, Fountain Inn, SC	3.35E+06	2.99E-07	2.09E-06	2 of 9 do not contribute
SM	16	FK22Y5V1E226Z	Capacitor, Ceramic, 20%, 22uF, 25V	1						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.84E-11	
SM	17	11R154C	Inductor, 10%, 150uH	4						Murala Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	3.18E-08	
SM	18	536385-5	Conn DIN 41612 M 64 POS 2.54mm, Solder Right Angle Thru-hole	1						TE Connectivily, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	
SM	19	53047-0310	CONNECTOR, MALE 3 POS, 1.25MM, VERTICAL THRU-HOLE	2						Molex Inc., Lisle, IL	7.69E+08	1.30E-09	2.60E-09	
SM	20	RS-2412D	DC/DC CONVERTER, 2W, 24 VDC INPUT, +/-12 VDC OUTPUT	2						Recom, Brooklyn, NY	1.40E+06	7.15E-07	1.43E-06	
SM	21	Y40531K0000J0L	Resistor, Variable, 1KΩ, 5%, 10PPM, 0.25W, 21 TURN, THROUGH HOLE	1						Vishay Precision Group, Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
SM	22	Y405310K0000J0L	Resistor, Variable, 10KΩ, 0.25W, 21 TURN, THROUGH HOLE	1						Vishay Precision Group, Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
SM	23	Y40532K0000J0L	Resistor, Variable, 2KΩ, 0.25W, 21 TURN, THROUGH HOLE	4						Vishay Precision Group, Malvern, PA	1.00E+10	1.00E-10	4.00E-10	
SM	24	270-2.2K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 2.2kΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
SM	25	270-2.49K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 2.49kΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
SM	26	270-15K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50ppm, 15Ω, Though-hole	4						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	6.23E-09	
SM	27	WIRE, 22AWG, BARE	JUMPER, 0 OHM	3						22AWG	1.00E+08	1.00E-08	3.00E-08	
SM	28	270-9.1K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 9.1kΩ, Thru-hole	4						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	6.23E-09	
SM	29	270-10K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 10kΩ, Thru-hole	7						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.09E-08	
SM	30	270-47.5K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 47.5kΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
SM	31	270-4.02K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 4.02kΩ, Thru-hole	4						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	6.23E-09	
SM	32	270-7.5K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 7.5kΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.56E-09	
SM	33	270-100-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 100Ω, Thru-hole	5						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	7.79E-09	
SM	34	270-499K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 499Ω, Thru-hole	1						Xicon, Fort Worth, Texas	1.02E+09	9.77E-10	9.77E-10	
SM	35	270-8.06K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 8.06kΩ, Thru-hole	2						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	3.11E-09	
SM	36	Y40535K00000J0L	Resistor, Variable, 5K, 0.25W, 21 TURN, THROUGH HOLE	1						Vishay Precision Group, Malvern, PA	1.00E+10	1.00E-10	1.00E-10	
SM	37	270-6.2K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 50PPM, 6.2KΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.56E-09	
SM	38	270-4.99K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 4.99KΩ, Thru-hole	4						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	6.23E-09	
SM	39	270-1.24K-RC	RESISTOR, METAL FILM, 1%, 1/8W, 1.24KΩ, Thru-hole	1						Xicon, Fort Worth, Texas	6.43E+08	1.55E-09	1.55E-09	
SM	40	0040.1151	TEST JACK, PB 6.3A BLACK	5						Schurler, Santa Rosa, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
SM	41	TP-105-01-00	TEST POINT, BREAKAWAY, BLACK	17						Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
SM	42	OPA2277P	IC, OPAMP, GP, PREC, 1MZ, DUAL, 8 PIN DIP	5						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	1.36E-08	
SM	43	REF102BP	IC, VOLTAGE REFERENCE, 10V, 8 PIN DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	Generic Data or similar component
SM	44	OPA277P	IC, OPAMP, GP, [REC. 1MZ. SGL, 16DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
SM	45	AQY212GH	IC, PHOTO RELAY, 4 PIN DIP	1						Panasonic, New Providence, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
SM	47	3683S-1-105L	Precision Potentiometer, Value Display, 3 Digit, 1Meg	1						Bourns, Riverside, CA	8.76E+10	1.14E-11	1.14E-11	
SM	46	ISO124P	IC, ISOLATION AMP, 50kHZ, SGL, 16DIP	1						Texas Instruments, Dallas, TX	3.68E+08	2.72E-09	2.72E-09	
SM	48	51021-0300	CONNECTOR, FEMALE, 3 POS, 2.54MM	1						Molex Inc., Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
SM	49	50058-8100	CRIMP, TERMINAL, FEMALE	3						Molex Inc., Lisle, IL	7.69E+08	1.30E-09	3.90E-09	
SM	50	AR	WIRE, INSULATED, 600V OR GREATER, RYPE B OR C, SIZE AND COLOR AS REQUIRED	1						MIL-W16878D	1.00E+08	1.00E-08	1.00E-08	
											2.68E+05	**1.13E-06**	**3.73E-06**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
										Total	**0.999977**		**2.27E-05**	**AVAILABILITY for Module**

Train Trip Module MTBF Data															
Module	ITEM No.	Part No.	Decription	QTY 1	QTY 2	QTY 3	QTY 4	QTY 5	QTY 6	Component Manufacturer	MTBF (Hours)	Failure Rate (per hour)	Total Failure Rate (per hour)	Comments
TTM	6	NUS-A335NB-1	Fabrication, HI Auctioneer PC Board	1						Scientech/NUSI Idaho Falls, ID	1.92E+07	5.21E-08	5.21E-08	
TTM	7	NUS-C088PA-1	Assembly, HI Auctioneer Face Plate, SQRT	1						Scientech/NUSI Idaho Falls, ID	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
TTM	15	RS-2405D	DC/DC CONVERTER, 2W, 24 VDC INPUT, +/-5 VDC OUTPUT	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	Generic Data or similar component
TTM	16	FK20X7R1H105K	Capacitor, Ceramic, 10%, 1uF, 50V	6						TDK, Uniondale, NY	3.52E+10	2.84E-11	1.70E-10	
TTM	17	FK28X7R1H104K	Capacitor, Ceramic, 10%, 0.1uF, 50V	16						TDK, Uniondale, NY	3.52E+10	2.84E-11	4.55E-10	
TTM	18	FK22X7R1H335K	Capacitor, Ceramic, 10%, 3.3uF, 50V	8						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.27E-10	
TTM	19	FK28X7R1H103K	Capacitor, Ceramic, 10%, 10uF, 50V	1						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.84E-11	
TTM	20	FK22X7R1E106K	Capacitor, Ceramic, 10%, 10uF, 25V	1						TDK, Uniondale, NY	3.52E+10	2.84E-11	2.84E-11	
TTM	21	1N4148	DIODE, SGL, JUNC, 100V, 4.0NS, DO-35	1						Fairchild Semiconductor, San Jose, CA	2.19E+07	4.57E-08	4.57E-08	
TTM	22	11R154C	Inductor, 10%, 150uH	7						Murala Power Solutions, Mansfield, MA	1.26E+08	7.96E-09	5.57E-08	
TTM	25	VAOL-5MAE2	RED, Round, 5mm, T-1 3/4, Diffused, Flangless	6						VCC Inc., San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
TTM	26	VAOL-5MDE2	GREEN, Round, 5mm, T-1 3/4, Diffused, Flangless	6						VCC Inc., San Marcos, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
TTM	27	H-278C-2	LED HOLDER, 5mm, DUAL LEVEL	2						BIVAR Irvine, CA	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
TTM	28	5650948-5	Connector, Plug, 3x16 POS. 2.54MM, Right Angle, Through Hole	1						TE Connectivity, Berwyn, PA	7.69E+08	1.30E-09	1.30E-09	Generic Data or similar component
TTM	29	53047-0310	CONNECTOR, MALE 3 POS, 1.25MM, VERTICAL THRU-HOLE	1						Molex Inc., Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
TTM	30	53047-0210	CONNECTOR, MALE 2 POS, 1.25MM, VERTICAL THRU-HOLE	4						Molex Inc., Lisle, IL	7.69E+08	1.30E-09	5.20E-09	
TTM	31	RS-2412D	DC/DC CONVERTER, 2W, 24 VDC INPUT, +/-12 VDC OUTPUT	2						Recom, Brooklyn, NY	1.40E+06	7.15E-07	1.43E-06	
TTM	32	RS-2405S	DC/DC CONVERTER, 2W, 24 VDC INPUT, +5 VDC OUTPUT	1						Recom, Brooklyn, NY	1.40E+06	7.15E-07	7.15E-07	
TTM	33	2N7000	N-Channel MOSFET, TO92, 60V, 200mA	17						Fairchild Semiconductor, San Jose, CA	1.56E+07	6.40E-08	1.09E-06	
TTM	34	ZVP4105A	P-Channel MOSFET, TO92, 50V, 175mA	7						Diodes Inc, San Jose, CA	1.71E+08	5.85E-09	4.10E-08	
TTM	35	RNC55H1502FS	Resistor, Metal Film, 1%, 1/8W, 15kOhm	23						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	3.58E-08	
TTM	36	RNC55H1201FS	Resistor, Metal Film, 1%, 1/8W, 1.2kOhm	5						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	7.78E-09	
TTM	37	RNC55H4702FS	Resistor, Metal Film, 1%, 1/8W, 100kOhm	4						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	6.23E-09	
TTM	38	RNC55H1003FS	Resistor, Metal Film, 1%, 1/8W, 47kOhm	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
TTM	39	RNC55H6802FS	Resistor, Metal Film, 1%, 1/8W, 68kOhm	2						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	3.11E-09	
TTM	40	RNC55H1002FS	Resistor, Metal Film, 1%, 1/8W, 10kOhm	3						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	4.67E-09	
TTM	41	RNC55H3901FS	Resistor, Metal Film, 1%, 1/8W, 3.9kOhm	12						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.87E-08	
TTM	42	RNC55H2201FS	Resistor, Metal Film, 1%, 1/8W, 2.2kOhm	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
TTM	43	RNC55H4992FS	Resistor, Metal Film, 1%, 1/8W, 49.9kOhm	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
TTM	44	RNC55H1503FS	Resistor, Metal Film, 1%, 1/8W, 150kOhm	1						Xicon, Fort Worth, Texas	6.42E+08	1.56E-09	1.56E-09	
TTM	45	ET01MD1ABE	SWITCH, TOGGLE, ON-OFF-ON, TINY, HORIZONTAL TOGGLE, R/A PC MNT	1						C&K Components, Newton, United States	5.04E+06	1.98E-07	1.98E-07	
TTM	46	TP-105-01-00	TEST POINT, BREAKAWAY, BLACK	37						Components Corp., Denville, NJ	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
TTM	47	FOD3181	IC, 8 PIN DIP Optocoupler	7						Fairchild Semiconductor, San Jose, CA	7.03E+07	1.42E-08	9.96E-08	Generic Data or similar component
TTM	49	HEF40106BP	IC, INVERTER, SCHMITT TRIGGER, HEX, 14 PIN DIP	2						NXP Semiconductors, Netherlands	3.34E+08	2.99E-09	5.99E-09	
TTM	50	CD4027BE	IC, JK FLIP FLOP, 10 PIN DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
TTM	51	LM555CN	IC, 555 TIMER, 8 PIN DIP	1						Fairchild Semiconductor, San Jose, CA	2.00E+08	5.00E-09	5.00E-09	
TTM	52	CD4071BE	IC, QUAD, 2-INPUT OR GATE, 14 PIN DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
TTM	53	CD4081BE	IC, QUAD, 2-INPUT AND GATE, 14 PIN DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
TTM	54	CD4072BE	IC, DUAP 4-INPUT OR GATE, 14 PIN DIP	1						Texas Instruments, Dallas, TX	3.71E+08	2.70E-09	2.70E-09	
TTM	55	AQY212GH	IC, PHOTO RELAY, NORMALY OPEN, 4 PIN DIP	1						Panasonic Electric, Works, Osaka, Japan	4.98E+07	2.01E-08	2.01E-08	
TTM	58	51021-1000	CONNECTOR, FEMALE 10 POS, 1.25MM	1						Molex Inc., Lisle, IL	7.69E+08	1.30E-09	1.30E-09	
TTM	59	50058-8100	CRIMP TERMINAL, FEMALE	2						Molex Inc., Lisle, IL	7.69E+08	1.30E-09	2.60E-09	
TTM	60	AR	WIRE, INSULATED 600V OR GREATER, TYPE B OR C, 28AWG, COLOR AS REQUIRED	1						MIL-W16878D	1.00E+08	1.00E-08	1.00E-08	
TTM	61	AR	HEATSHRINK, 1/8", BLACK, POLYOLEFIN	1						?	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
TTM	62	8532T12BE2	SWITCH, PUSHBUTTON, OFF-MOMENTARY, PANEL MOUNT	1						C&K Components, Newton, United States	4.20E+07	2.38E-08	2.38E-08	
TTM	66	1N5238B	Diode, Zener, 8.7V	1						Fairchild Semiconductor, San Jose, CA	4.38E+07	2.28E-08	2.28E-08	Generic Data or similar component
TTM	67	AR	Wire Tie	1						Nylon	N/A	N/A	N/A	Does not contribute to the failure rate of the ICCMS
TTM	68	RNC55H8250FS	Resistor, Metal Film, 1%	7						Xicon, Fort Worth, Texas	6.43E+08	1.56E-09	1.09E-08	
											2.15E+05	**2.63E-06**	**4.65E-06**	**MTBF for Module (hours)**
											5			**MTTR for Module (minutes)**
											360			**MLDT for Module (minutes)**
										Total	**0.999972**		**2.83E-05**	**AVAILABILITY for Module**