Software Life Cycle Document for the Discrete GPIA Device Library Test Application

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Revision level is indicated in the document header and the **Rev.** Column below, and is of one of the following types:

**Developmental:** Used for project drafts and not considered a “Formal Release”, and cannot be sent to a customer to fulfill a contractual delivery requirement. Revisions are indicated by X1, X2, X3, etc.

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Revision History

| **Change Order** | **Rev.** | **Rev. Date** | **Change Description** | **Release Date** | **Released By** |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 141121 | Pre-Production Release |  |  |
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# Introduction

GE AVIC Civil Avionics Systems Company Limited, hereinafter called AVIAGE SYSTEMS. This document establishes the software life cycle for the Discrete GPIA Device Library the part of VAIS interface.

## Purpose

This Software Life Cycle Document (SLCD) defines the software, requirements and test procedures associated with the Discrete GPIA Device Library that is intended to provide interface between GPIC hardware and VAIS.

## Scope

This document establishes the ~~software development plan, software requirements specification~~, and software test plans and procedures for the Discrete GPIA Device Library.

## Revision Level

This is a Pre-Production Release document with the following limitations:

Possible feedbacks on the software may come from the internal customers. It only includes test related parts.

## Acronyms and Abbreviations

The following acronyms and abbreviations are used throughout this document and are defined here for convenience.

|  |  |
| --- | --- |
| GPIA | General Purpose Interface Assembly |
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# Referenced Documents

The following documents of the exact issue shown form a part of this document to the extent specified herein. For those documents showing no date of issue, the latest issue applies.

Aeronautical Radio, Inc

|  |  |
| --- | --- |
| IEEE 802.3 | Fast Ethernet |
| RFC 768 | User Datagram Protocol |

AVIAGE SYSTEMS

|  |  |
| --- | --- |
| TS-PRO-002 | Test Systems Software Engineering Process |
| DSN00150 | Detailed Design Specification for the Ethernet Control Interface of the General Purpose Interface Controller |

# Software Development Plan

TBD

# Implementation Requirements

## Software Requirements Specification

## Software Design Specification

TBD

# Qualification Requirements

## Verification Plan

TBD,

## Test plan.

### Purpose.

The purpose of this test plan is to show links between S/W requirements and test cases of the verification tests for Discrete GPIA Device Library.

### Verification Traceability

Table 2 provides the Requirements to Verification Traceability Matrix

Table . Requirements to Verification Traceability Matrix

| **Requirement Identifier** | **Test Method** | **Test Name** | **Test Identifier** |
| --- | --- | --- | --- |
| DISDEV\_22 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase001  TestDiscreteDeviceLibraryTestcase002  TestDiscreteDeviceLibraryTestcase003  PARTLY |
| DISDEV\_23 |  |  | UNTESTABLE |
| DISDEV\_24 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase001  TestDiscreteDeviceLibraryTestcase002 |
| DISDEV\_27 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase004 |
| DISDEV\_28 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase003 |
| DISDEV\_29 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase001 |
| DISDEV\_30 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase001 |
| DISDEV\_31 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase001 |
| DISDEV\_32 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase003 |
| DISDEV\_33 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase004 |
| DISDEV\_35 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase004 |
| DISDEV\_36 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase001 |
| DISDEV\_38 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase003 |
| DISDEV\_39 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase003 |
| DISDEV\_40 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase003 |
| DISDEV\_41 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase003 |
| DISDEV\_44 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase004 |
| DISDEV\_45 | Test | TestDiscreteDeviceLibrary001 | TestDiscreteDeviceLibraryTestcase004 |

### Verification Environment

To facilitate testing of the product, it is necessary to have a minimal set of hardware and software available for the duration of the test. It is necessary to obtain items listed in

Table 3 and Table 4 These items, along with incidental items not mentioned in the tables, but still required, such as keyboard, mouse, etc., when combined with the software listed in Table 5 form the “Test Rig” on which the ETA and User Interface (if applicable) can be run, and thus formally tested using the test procedures described herein.

Installation and configuration of the hardware and software components is beyond the scope of this document. For further information, consult the reference manuals and installation guides associated with each product.

#### Test Hardware

Table . Computer Hardware Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Quantity** | **Units** | **Description** |
| Machine | 2 | EA | 32 bit, 2000 megahertz microprocessor or higher. |
| System Memory | 1024 | MB |  |
| Free Disk Space | 100 | MB | Minimal requirement for product installation. |
| Network Interface Card (NIC) | 1 | EA | This card is required to communicate through Ethernet with GPIC |

Table . Additional Hardware Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Quantity** | **Units** | **Description** |
| Switch(s) | 1 | EA | Local Network |
| Network Cables | 3 | EA | 3’ or longer |
| GPIA Controller Card | 2 | EA | P/N 762219-001 X3  General purpose Ethernet controller with standard interface |
| Discrete Card | 2 | EA | P/N 762222-016 X7  The card with 6 input ports and 6 output ports. Each port includes 8 pin connectors. |
| Power supply for GPIA and Discrete card | 1 | EA | MeanWell MP 450-LMI |

#### Test Software

The no special software is requied.

Table 5. Computer Software Requirements

|  |  |  |
| --- | --- | --- |
| **Tool Name** | **Vendor** | **Tool Description** |
| None |  |  |

#### Bench Scheme

Figure 1 provides a visual guide depicting the physical connections, and is intended to assist in setting the Test Rig up for performing the procedures outlined in this testing suite.

ENET Port

Ethernet Cable

Simulation PC

Ethernet Switch

Discrete Card 2

GPIA Controller 2

Ethernet

Discrete Card 1

99999

GPIA Controller 1

Ethernet

Port 0

Port 0

Port 1

Port 1

Port 6

Port 6

Port 7

Port 7

Pin 0

Pin 0

Pin 0

Pin 0

Pin 0

Pin 0

Pin 0

Pin 0

Pin 1

Pin 1

Pin 1

Pin 1

Ethernet

Wire

Figure . Test Rig General Arrangement

### Test Setup

#### S/W under test preparation

|  |  |
| --- | --- |
| Objective | Preparing S/W under test |
| Prerequisites | None |
| Method | 1. Upload DiscreteGPIADeviceLibrary.dll on the Simulation PC 2. Configure location of the DiscreteGPIADeviceLibrary.dll in the TestSettings.inf file located in the test folder (e.g. PATH="C:/IMA/bin/DiscreteGPIADeviceLibrary.dll" after [DISCRETEDL]) 3. Define discrete cards properties (e.g.)   [DISCRETECARD1]  IP=192.168.1.1  INPORT0=0  INPORT1=0  INPORT2=1  INPORT3=3  INPORT4=4  INPORT5=5  OUTPORT0=6  OUTPORT1=6  OUTPORT2=7  OUTPORT3=9  OUTPORT4=10  OUTPORT5=11  PINSPERPORT=8    Note: TestSettings.inf file should be located in the same folder with executable file of test |
| Expected Results | The Test Software can run Discrete GPIA Device Library and can get control on Discrete cards |

## Test procedures.

The all test cases, test procedures and implementation including requirements traceability, requirements satisfied, actual and expected results are embedded in the target test files \*.cpp. This is TestDiscreteDeviceLibrary001.cpp

Test Cases and Test Procedures structure is as showed below:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

[TESTCASE] 001

[NAME] None

[TEST TYPE] Normal range testing

[EXECUTION TYPE] Automatic

[OBJECTIVE]

Verify by test that:

1) The Discrete Device Library supports the Discrete GPIA device

2) The Discrete Device Library supports multiple discretes

3) The Discrete Device Library allows to configure 1 output discrete and 1 input discrete on 1 connector

4) The Discrete Device Library allows to configure output discretes and inputs discretes on different connectors at the same time

5) The Discrete Device Library allows to set 1 output discrete and read 1 input discrete using one interface control

6) The Discrete Device Library allows to set output discretes and read input discretes on different connectors at the same time

7) The Discrete Device Library provides a method of configuring a discrete as an output discrete

8) The Discrete Device Library provides a method of configuring a discrete as an input discrete

9) The Discrete Device Library provides a method of setting the state of an output discrete

10) The Discrete Device Library provides a method of reading the state of an input discrete

[PRECONDITIONS] None

[LIMITATIONS] DISDEV\_22 has been tested partly

[TRUTH TABLE] Not required

[PROCEDURE]

1.Load Discrete device library to get Device library control interface

2.Open Discrete card 1 based on IP address using Device library control interface

3.Open Discrete card 2 based on IP address using Device library control interface

4.Define OUTPUT DISCRETE OUT1-1-1 using opened card 1 control interface with settings:

ID = 1

PORT = 1 (Output)

POSITION = 1

DIRECTION = Transmit

12.Activate control interfaces

13.Set discrete OUT1-1-1 state to GROUND

14.Read discrete IN2-1-1 state

[VERIFY] The state of IN2-1-1 discrete is GROUND

[SOURCE] DISDEV\_22

[SOURCE] DISDEV\_29

[SOURCE] DISDEV\_30

[SOURCE] DISDEV\_31

[SOURCE] DISDEV\_36

[SOURCE] DISDEV\_24

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Test case consists from test objectivities related for this test case under [OBJECTIVE] tag. This test case also includes test procedure for this test case which is located under [PROCEDURE] tag. Each test procedure is divided on test steps and each test step contains expected result and requirements satisfied. ([VERIFY] and [SOURCE] tags). All I/O manipulation in each test procedure have numbers (e.g. “12.Activate control interfaces”)

The following supplement data is part of the this document



## Test report.

The test report will be prepared and issued separately for this software in the SVR document.