



## **Software Migration Guide**

**Metrics I/CV**

**Version 3.9**

© Copyright 1999-2009, Metrics Technology, Inc.

All rights reserved.

Rev 01



# Table of Contents

Introduction.....	4
Changes to Metrics I/CV .....	5
New Instrument Support.....	5
Integrated VBScript Development.....	6
New Test Algorithms.....	6
Upgrading from Metrics I/CV version 3.0, 3.8.....	7
Step 1: Backup the Previous Metrics I/CV .....	7
Step 2: Installing Metrics I/CV Software.....	8
Upgrading from Metrics I/CV version 2.1 and Older.....	10
Step 1: Backup the Previous Metrics I/CV .....	10
Step 2: Installing Metrics I/CV Software.....	11
Step 3: Configuring I/CV .....	13
Step 4: Import Switch Patterns .....	21
Step 5: Convert Tests to Algorithms.....	22
Step 6: Modify Test Scripts .....	24
Using Legacy Mode to Run I/CV version 2.1 Scripts .....	25

# **Installation of Metrics I/CV 3.9**

## **Introduction**

The Metrics I/CV version 3.9 software product has undergone a significant change in its structure. These modifications were implemented based upon 5 years of email, support, and training observations regarding areas of past versions of Metrics I/CV that were confusing. The new version of Metrics I/CV makes a significant attempt to simplify the process of performing measurements. Duplicate features, difficulty of using a probe station for automation, and integration were addressed. The resulting product, Metrics Technology believes, is much easier to use.

Metrics I/CV version 3.9 also provide a suite of tests including open source VBScript algorithms which can be used as-is or modified for the customers particular purpose. A fully integrated VBScript Development Environment as well as multiple function libraries makes developing sophisticated custom test methods available to the administrator but password security provide the right level of control for the system's users.

# Changes to Metrics I/CV

The following discussion of the changes to Metrics I/CV includes information as to why the changes were made. In addition, replacement functions or procedures are listed.

## *New Instrument Support*

Metrics I/CV has added support for several new pieces of test and measurement hardware. These include:

### **Instruments**

- QualiTau DSPT9012 (Desktop Semiconductor Parametric Tester)
- Agilent E4980A (Precision LCR Meter)
- Agilent B1500A (Semiconductor Device Analyzer)
- Agilent 8110/81110 (Pulse Generator)
- Keithley 4200 SCS (Semiconductor Characterization System)

### **Thermal Controllers**

- TMMCO Controllers via pcTC
- Cascade controllers via Nucleus Thermal
- Suss controllers via ProberBench

### **Probe Stations**

All probe stations are supported via GPIB ONLY. The new VBScript drivers require purchase of the Metrics I/CV 3.9 Annual License product.

- VBScript source code to allow for user modifications
- Use VBScript source templates to create your own Probe or Thermal Drivers for non-supported equipment.
- Nucleus Vision support
- Suss Vision support

## ***Integrated VBScript Development***

The Metrics I/CV VBScript Algorithm support has undergone major enhancements. There is now a Integrated Development Environment with libraries of control for IV instruments. In addition a published interface is provided for the creation of new customer-designed probe and thermal drivers.

The new VBScript Development Kit requires purchase of the Metrics I/CV 3.9 “*Annual License*” product which provides a full year of technical support for customers developing their own test algorithms.

- New Integrated Development Environment
- New Instrument Control Library
- Source code for advanced test methods including CV, WLR and Non-Volatile Memory characterization.

Complex tests can be developed in the Integrated VBScript editor which provides a full-featured script editor with syntax assistance, an interactive test execution environment, and comprehensive debugger.

Metrics Technology provides high-level libraries which include functions for the low-level GPIB access to instrument-specific command strings, math functions which are available for performing most parameter extraction tasks and additional decision branch support.

### **New Libraries:**

- Control for parameter analyzers
- Switching control
- Thermal Control
- Probing Control

## ***New Test Algorithms***

The Metrics I/CV Annual license includes test algorithms for Wafer Level Reliability, Non-Volatile Memory, and general test algorithms. In addition libraries that support the 8110/81110 are provided. (Not included with the Perpetual License)

# Upgrading from Metrics I/CV version 3.0, 3.8

The process to upgrade Metrics I/CV requires that you backup the previous version, and then install version 3.9 on top of version 3.0. To do this, please perform the following steps:

## *Step 1: Backup the Previous Metrics I/CV*

The Metrics I/CV setup program requires that you backup and uninstall the previous version. To do this, please perform the following steps:

**DO NOT BACKUP YOUR SOFTWARE INTO THE METRICS DIRECTORY!  
BACKUP TO A DIFFERENT LOCATION.**

1. Go to the Tools Menu and select Backup
2. Allow the backup utility to save a backup on another drive.

## ***Step 2: Installing Metrics I/CV Software***

The installation program for the Metrics I/CV software installs all components necessary to run Metrics I/CV. During the installation you will be prompted to furnish a codeword for the various components of the software. If you install the software without the codeword, you will be able to run the software for 7 days, but will have to manually enter the codeword in both I/CV and ICS.

### **Obtain a Codeword**

This codeword is obtained by registering your software with Metrics Technology. Please submit the provided registration form via fax or visit our website at [www.metricstech.com](http://www.metricstech.com) to register your software and obtain the codeword.

The software will run for 7 days without the codeword

### **Procedure to Install I/CV (Upgrade Only)**

1. Insert the Metrics Applications CD into the CD-ROM drive of your computer.
2. The CD-ROM will automatically start the installation program.
3. Choose "Install Products" » "Install I/CV".
4. Click **Next** button on the "Welcome" panel.

5. Read the "Software License Agreement" and click the **Yes** button to agree to the terms.
  
6. Complete the User Information fields. The Codeword is found on the "Metrics Software Codeword Certificate" for I/CV. Click the **Next** button.
  
7. Choose "destination location" for installation and click the **Next** button.
  
8. Select "Typical" setup type and click the **Next** button.
  
9. After the installation is finished, re-start the computer.
  
10. Connect the Security plug to the USB port of your computer. **Note:** It is recommended the security plug be connected directly to the computer.

# Upgrading from Metrics I/CV version 2.1 and Older

The process to upgrade Metrics I/CV requires that you backup and uninstall the previous version, install and configure the new version, import switch settings (requires I/CV 3.8 intermediate conversion) or creation of new .DCI formatted ASCII file in I/CV 3.9, convert tests to Algorithms, and modify existing scripts. To do this, please perform the following steps:

## *Step 1: Backup the Previous Metrics I/CV*

The Metrics I/CV setup program requires that you backup and uninstall the previous version. To do this, please perform the following steps:

**DO NOT BACKUP YOUR SOFTWARE INTO THE METRICS DIRECTORY!  
BACKUP TO A DIFFERENT LOCATION.**

3. Install the latest Hot Fix for I/CV version 2.1 (at least Hot Fix 26).
4. Please backup your ICS database (\Metrics\ics\data).
5. Backup Module scripts (.scr).
6. Backup Die scripts (.die).
7. Backup Wafer Plans (.map)
8. Backup Module stepping lists (.mod)
9. Backup Probe Lists (.plist)
10. Backup Data files (.dat)
11. Open the Metrics Switch program and select Export. Enter a file name and location, then click OK. Then highlight the desired switch pattern names to be exported (Hold the CTRL key and select using the mouse). Select the Export as ASCII option and click the Export button. This file can be converted using I/CV 3.8 or used to create a .DCI formatted file for import into I/CV 3.9 (see Device Connections manual for details).
12. Run the Uninstall Programs from the Control Panel of Microsoft Windows. Delete all programs with Metrics in their name. Click yes to uninstall common components.
13. Delete the Metrics directory.

## ***Step 2: Installing Metrics I/CV Software***

The installation program for the Metrics I/CV software installs all components necessary to run Metrics I/CV. During the installation you will be prompted to furnish a codeword for the various components of the software. If you install the software without the codeword, you will be able to run the software for 7 days, but will have to manually enter the codeword in both I/CV and ICS.

### **Obtain a Codeword**

This codeword is obtained by registering your software with Metrics Technology. Please submit the provided registration form via fax or visit our website at [www.metricstech.com](http://www.metricstech.com) to register your software and obtain the codeword.

The software will run for 7 days without the codeword

### **Procedure to Install I/CV (Upgrade Only)**

11. Insert the Metrics Applications CD into the CD-ROM drive of your computer.
  
12. The CD-ROM will automatically start the installation program.
  
13. Choose "Install Products" » "Install I/CV".
  
14. Click **Next** button on the "Welcome" panel.

15. Read the "Software License Agreement" and click the **Yes** button to agree to the terms.
  
16. Complete the User Information fields. The Codeword is found on the "Metrics Software Codeword Certificate" for I/CV. Click the **Next** button.
  
17. Choose "destination location" for installation and click the **Next** button.
  
18. Select "Typical" setup type and click the **Next** button.
  
19. After the installation is finished, re-start the computer.
  
20. Connect the Security plug to the USB port of your computer. **Note:** It is recommended the security plug be connected directly to the computer.

## ***Step 3: Configuring I/CV***

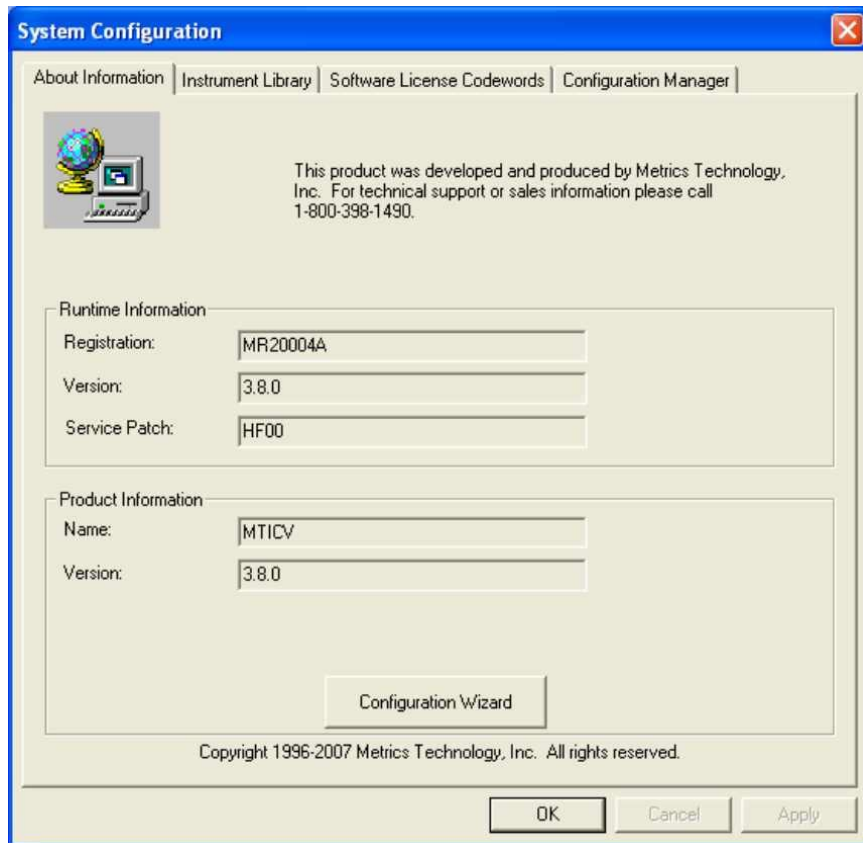
### **Probe Station Configuration**

After installing Metrics I/CV, it must be configured. The first time I/CV is started, it will automatically run the Configuration Wizard Utility. This utility will ask the operator a series of questions to determine the correct configuration for the probe station drivers of the Metrics I/CV software.

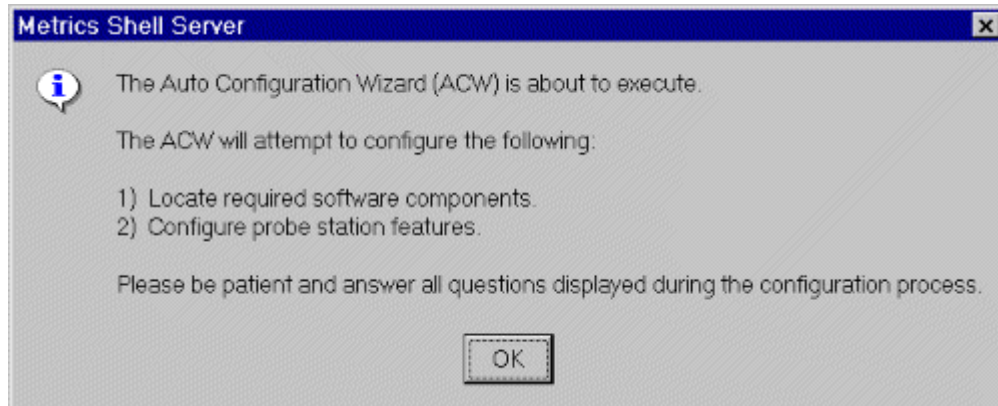
#### **Using the Configuration Wizard Utility**

The Configuration Wizard presents a series of questions to the user. The user-supplied responses allow the software to automatically configure. The Configuration Wizard can be re-run at any time to change the setup. To manually start the Configuration Wizard, follow these steps:

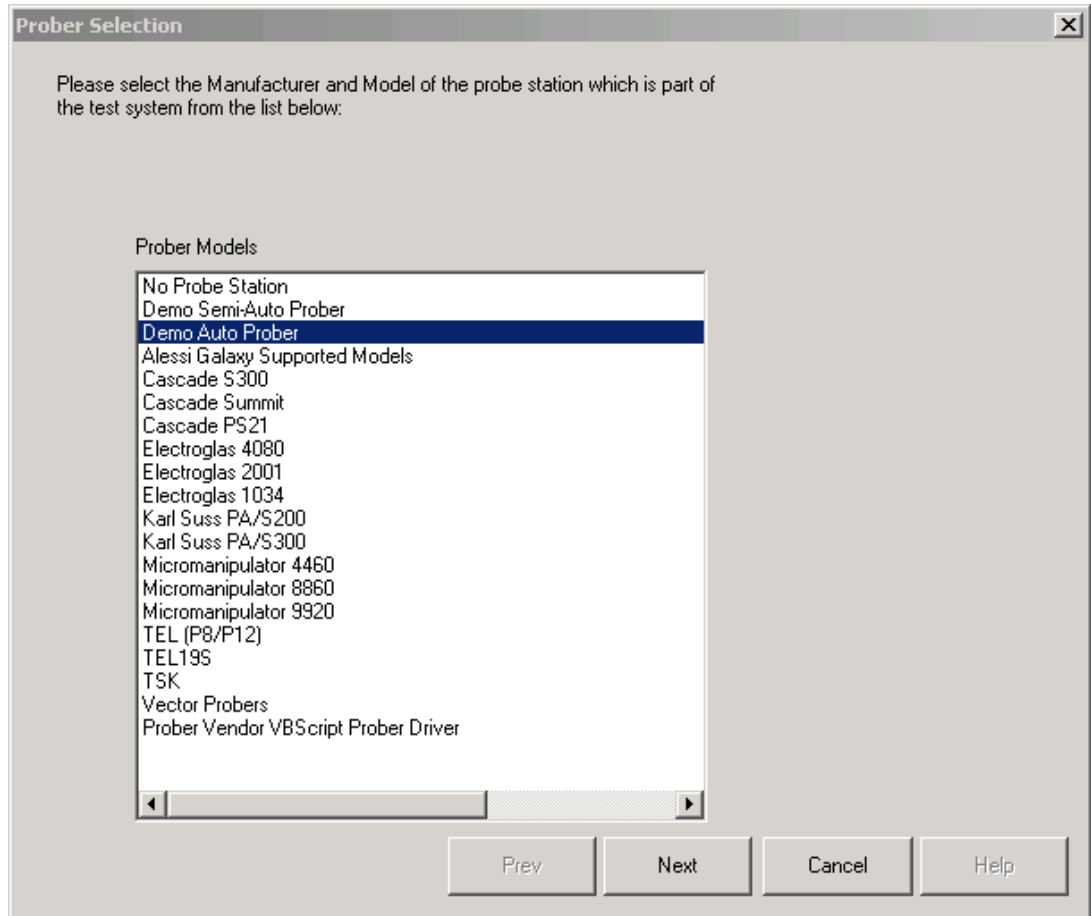
1. Start the Metrics I/CV Software.
2. Open the *System Configuration* window by selecting Tools » System Configuration.
3. Click on the Configuration Wizard button found on the "About Information" Tab.



4. Click the "OK" button.



5. Select the Probe Station you are using.
6. Provide the GPIB address of the station.



## **Instrument Configuration**

The Configuration Wizard Utility will setup the probe station information, however typically other components must also be setup in order to run the testing. These components are setup manually by the user the first time the system is run. These configurations are then saved and automatically loaded each time the software is started.

### **Instrument Library**

The Metrics I/CV Instrument Library contains setup information for the instruments used by:

- The Device Connection Control (Switch Matrix).
- Instruments used by the Metrics I/CV supplied algorithms.
- Probe Station Control.

## Switch Matrix Configuration

Version 3.9 of Metrics I/CV has completely integrated the Switch Matrix Control within I/CV. Therefore the configuration of a switch matrix is now provided within the Metrics I/CV System Configuration.

**Instrument Definition**

Instrument definitions define parameters required to communicate with an instrument connected to the PC.

Name:

Description:

Group:

Driver:

Communications Setup

Physical Interface:

Primary Address:

Communications Verification (Not Required)

ID Query Command:

Append CR/LF to Query Command

Read Query Response

### To configure a switch matrix:

1. Start the Metrics I/CV Software.
2. Open the *System Configuration* window by selecting Tools » System Configuration.
3. Click the *Instrument Library* tab to display a list of configured instruments.
4. Click the **Add** button to open the *Instrument Definition* window. Enter the following:
  - a. **Name-** A unique name that identifies the instrument.

- b. **Description (optional)**- Additional description of the instrument.
  - c. **Group**- Select “Switch” from the pull-down list.
  - d. **Driver**- Select the driver for your instrument from the list.
  - e. **Physical Interface**- Select the GPIB device you will connect to the switch matrix through.
5. **Primary Address**- Enter the GPIB address of the switch matrix.
  6. Click the **Next** button to open the *Instrument Configuration* window. Confirm the instrument is connected to the GPIB bus and click the **Poll Configuration** button.
  7. Click the **Finish** button to complete the addition of the switch matrix.

## Instrument (SPA, CMU) Configuration

Metrics I/CV Version 3.9 includes a collection of pre-written test algorithms. These algorithms control selected CV and IV instruments. These instruments must be configured in this section.

Note: If you are using the ICS Tool you will need to configure the instrument in that Tool as well.

**Instrument Definition**

Instrument definitions define parameters required to communicate with an instrument connected to the PC.

Name: SPA1

Description:

Group: Instrument

Driver: iitemo

Communications Setup

Physical Interface: hpib7 (HP GPIB)

Primary Address: 0

Communications Verification (Not Required)

ID Query Command: [ ] [ Verify ]

Append CR/LF to Query Command

Read Query Response

Prev Next Cancel Help

### To configure an Instrument:

1. Start the Metrics I/CV Software.
2. Open the *System Configuration* window by selecting Tools » System Configuration.
3. Click the *Instrument Library* tab to display a list of configured instruments.
4. Click the **Add** button to open the *Instrument Definition* window. Enter the following:

- a. **Name-** A unique name that identifies the instrument. If you will be using the I/CV algorithms provided by Metrics Technology, you MUST name the parameter analyzer “SPA1” and the Capacitance Meter “CMU1”.
  - b. **Description (optional)-** Additional description of the instrument.
  - c. **Group-** Select “Instrument” from the pull-down list.
  - d. **Driver-** Select the driver for your instrument from the list.
  - e. **Physical Interface-** Select the GPIB device you will connect to the switch matrix through.
5. **Primary Address-** Enter the GPIB address of the instrument.
  6. Click the **Next** button to open the *Instrument Configuration* window. Confirm the instrument is connected to the GPIB bus and click the **Poll Configuration** button.
  7. Click the **Finish** button to complete the addition of the instrument.

## ***Step 4: Import Switch Patterns***

After the Switch is configured in the System Configuration, you can import the patterns to the new Device Connections Editor. The import of the patterns requires that the switch be configured exactly the same. The import conversion for I/CV 3.8 works from the file directly. **AFTER IMPORTING THE SWITCH PATTERNS THEY MUST BE TESTED TO CONFIRM THEY WORK PROPERLY.**

### **To import the switch file**

1. Make sure the latest HotFix of Metrics I/CV version 3.9 is installed (at least version HF09).
2. Start Metrics I/CV and then select Development >> Device Connections Editor.
3. Click the Import button and select the file that you exported.
4. The patterns will be imported.

**Note:** The switch must be configured prior to importing.

Bulk import of switch device connections is covered in the in line manual for the Device Connections Editor. See the Help page for more details. After the .DCI ASCII formatted file is created you can import the patterns to the new Device Connections Editor. The import of the patterns requires that the switch be configured exactly the same as defined in the .DCI file.

## ***Step 5: Convert Tests to Algorithms***

In version 2.1 VBScript and ICS tests were treated as separate types of tests. The tests are generated using different tools, but the result is the same, an Algorithm to perform a measurement. Beginning with I/CV version 3.9 all such tests are referred to as Algorithms, regardless of the tool (ICS or VBScript) used to generate them. As result, the Algorithms are saved using the windows file system. The location of Algorithms is within the Metrics\algs directory. Note that sub-directories may be used for organizing the groups of Algorithms.

The first step for creating an Algorithm from an ICS version 3.6.0 or older test is to use ICS version 3.7.0 to save it in the windows file system.

### **To Convert an ICS Test to an Algorithm**

1. From your backup created in Step 1: Backup the Previous Metrics I/CV, find the ICS database. By default the ICS database was in the Metrics\ICS directory. It was a folder named Data and contained many sub-folders.
2. Copy this folder (with all sub-folders) to the Metrics\ICS directory on the new installation of I/CV.
3. Start I/CV and select Development -> Algorithm Editors -> ICS.
4. Once ICS starts, select File -> Legacy Database -> Open. You will see the contents of the ICS database. Select the database file to be converted using its Attributes and click **OK**.
5. After the file opens, select File -> Save As.
6. Navigate to the Metrics\algs directory. Provide a name for the file. Either save the file in this directory or create a New Folder within this directory and save the file.
7. Repeat steps 4-6 for the other tests you wish to convert.

**Note:** It may seem like a lot of entries from the ICS database may need to be converted. However, the ICS database contains a combination of Both the Test Method and Data generated. You only need the Test Method for use with I/CV. This will result in the number of old ICS tests to be converted to actually be very small relative to the number of data files that are contained in the old ICS database.

### **To Convert a VBScript Test to an Algorithm**

1. From your backup created in Step 1: Backup the Previous Metrics I/CV, find the VBScript algorithm.
2. Copy the algorithm to the Metrics\algs directory. Either copy the file in this directory or create a New Folder within this directory and copy the file to that directory.

## ***Step 6: Modify Test Scripts***

In version 2.1 Module and Die Scripts included some functions that have been replaced. The changed functions and their replacements are listed in the section preceding this one. To run in a true I/CV 3.9 mode all of these functions must be replaced. An additional Mode has been created called **Legacy Mode** which allows the use of many of the replaced functions. More information about Legacy Mode can be found in the next section of this document.

### **To Convert an Obsolete Function**

1. From I/CV open a Module Test by selecting Development -> Module Test Editor and selecting the Module Script of interest.
2. Click the obsolete line in the script.
3. Click **Delete** and confirm that you wish to delete the line.
4. Click **Insert**.
5. Select the replacement function
6. Configure the replacement function that you wish to use.
7. Save the script when all functions are converted.

# Using Legacy Mode to Run I/CV version 2.1 Scripts

Several functions from I/CV version 2.1 have been moved for the purpose of improving the software, providing operator safety, or improving the stability of the software. The result is that some I/CV version 2.1 scripts will require modification to run in I/CV version 3.9. As an intermediate step to completely porting scripts to working in I/CV, the user may opt to enable the **Legacy Mode**. This will allow I/CV version 2.1 scripts to run in I/CV version 3.9 with a minimum number of modifications. **If you were previously using Compatibility Mode, please deactivate it as it will expire on October 31, 2005. If Compatibility Mode is not disabled, the software will continue to run but display messages about the expired Compatibility Mode.**

The following functions must still be ported to use I/CV version 2.1 scripts:

- Switching Control- Change to the Device Connections Editor.
- Run ICS Test and Run ICS Sequence are replaced by Execute Algorithm.
- Inputs to ICS Tests accessed by the Execute Algorithm function will continue to be available, the values are limited to +/- 20V and +/- 100 mA. If a value is passed to the test that exceeds this level, the default value for the test will be used instead. For tests that require larger values to be received as Inputs, the ICS algorithm must be called by a VBScript algorithm (please see the VBScript documentation for instructions on how to do this).
- Run LabView- Delete, this function is no longer supported.
- Run VEE- This function is supported in a limited manner. Note that VEE has a memory leak in it and if you try to run a large number of VEE tests across the wafer it will eventually crash the PC. This is a known defect in VEE and the user acknowledges this when using the function and when accepting the software license. Due to this defect Metrics Technology does not provide any support for this function or guarantee it will work.

To activate Legacy Mode, select Tools -> System Config. Click the Configuration Manager tab and highlight the Legacy Mode entry. Change the Value to ON and click the Set button.