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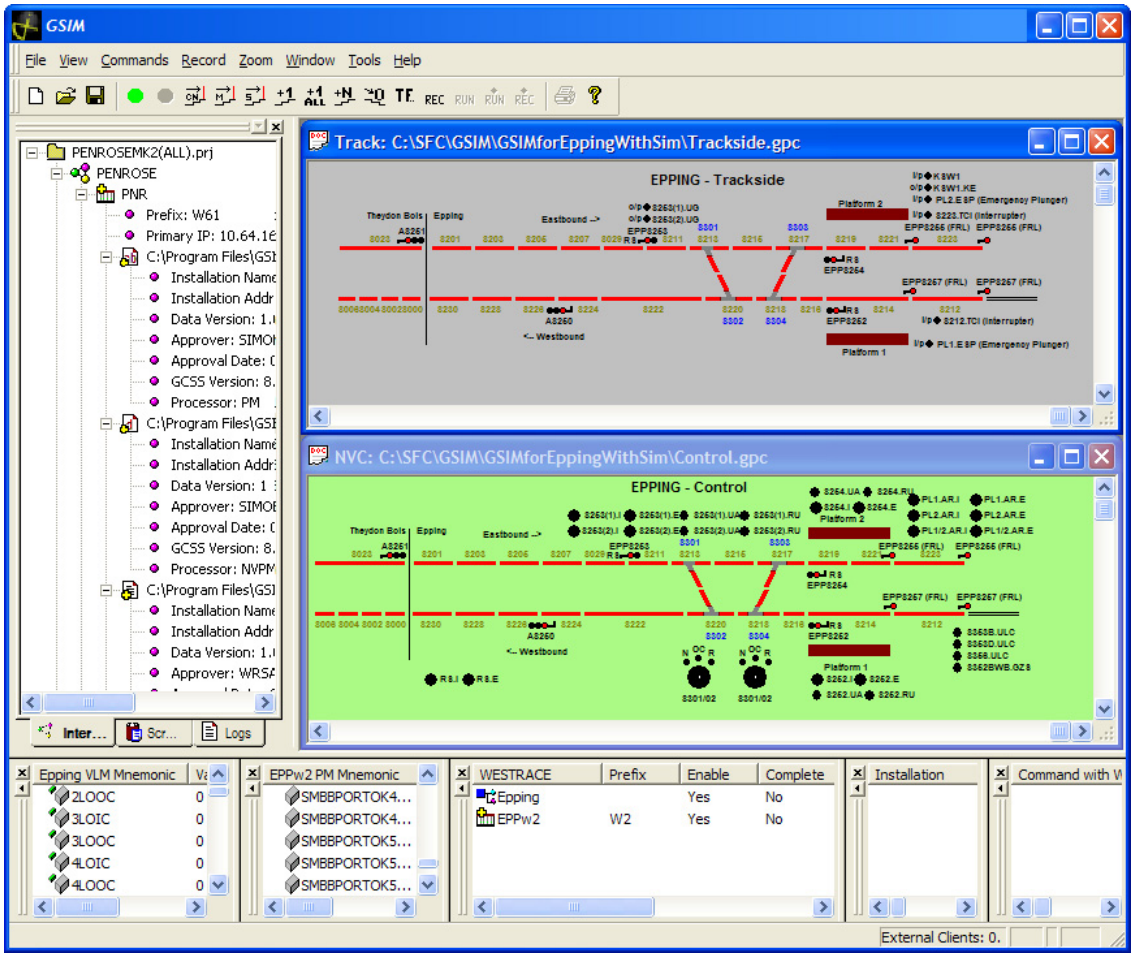
WESTRACE Graphical Simulator (GSIM) User Manual



WRTOGSIM
Issue 11.0 (for GSIM version 8.0)

Contacting Invensys Rail

W http://www.invensysrail.com

Asia Pacific - Mainline

ABN 78 000 102 483

380 Docklands Drive Docklands Victoria 3008 Australia

T +61 1300 724 518
F +61 3 9616 9001
E enquiries.asiapacific@invensysrail.com

Asia Pacific - Metro

Invensys Building Level 3 15 Changi Business Park Central 1 Singapore 486057

T +65 6829 8783
F +65 6829 8302
E enquiries.asiapacific@invensysrail.com

India

No. 112–114 Raheja Chambers 12 Museum Road Bangalore 560001 Karnataka India

T +91 80 3058 8763/64
F +91 80 3058 8765

North America

2400 Nelson Miller Parkway Louisville Kentucky 40223 USA

T +1 502 618 8800
F +1 502 618 8810
E sales@safetran.com

Spain, Portugal and Latin America

Avda. de Castilla Apartado de Correos 6 Parque Empresarial (Edif Grecia)
28830 San Fernando de Henares Madrid Spain

T +34 9 1675 4212
F +34 9 1656 9840
E marketing@dimetronic.com

UK and Northern Europe

PO Box 79 Pew Hill Chippenham Wiltshire SN15 1JD UK

T +44 1249 44 1441
F +44 1249 65 2322
E wrsl.marketing@wrsl.com

WESTRACE
Graphical Simulator (GSIM)
User Manual

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1. INTRODUCTION

This manual applies to GSIM version 8.0.

1.1 Introduction to GSIM

The WESTRACE Graphical Simulator (GSIM) is a PC tool used for office simulation of WESTRACE MkI and WESTRACE MkII.

GSIM is used to test the WESTRACE installation logic for WESTRACE installations using graphical on-screen computer simulations of railway signalling systems interacting with simulations of field equipment.

See Chapter 2 for a thorough overview of GSIM.

1.2 Introduction to This Manual

1.2.1 Purpose

This WESTRACE GSIM User Manual describes how to install and use GSIM version 8.0.

1.2.2 Overview

Chapter 1	introduces and describes this manual.
Chapter 2	is an overview of GSIM and its new features.
Chapter 3	describes the GSIM user interface.
Chapter 4	describes how to start and operate GSIM.
Chapter 5	describes the files and data preparation required to operate GSIM.
Chapter 6	describes how to install the GSIM software application on a PC and how to configure the PC.
Appendix A	contains an example of a log file.
Appendix B	contains examples of field file logic.
Appendix C	is a troubleshooting guide for using GSIM with client applications.
Appendix D	contains an example of a .TXT or .GUI file.
Appendix E	contains information on version management.
Appendix F	describes GSIMDriver's parameters (keys).
Appendix G	describes the script structure and commands.
Appendix H	describes the batch file structure.
Appendix I	contains an example of a script results file.
Glossary	explains specialised terms used in this manual.

1.2.3 Audience

GSIM and this manual are intended to be used by:

- Signal Design Engineers competent to prepare data files for use with GSIM
- Principles Test Engineers competent to test WESTRACE installations.

1.2.4 Scope

This manual describes GSIM version 8.0 –how it is installed, set up and used on a desktop PC. Although this manual may be used as a guide to earlier versions of GSIM, not all of the features described here are available in earlier versions of GSIM.

This manual does **not** describe how to:

- design WESTRACE installations
- design the logic used in field simulation files
- conduct testing on WESTRACE installations
- use or test PCGE (PC Graphic Editor), MoviolaW or WESTCAD.

1.2.5 References

	WESTRACE MkI	WESTRACE MkII	
Reference CI	[SOM] WRTOOVER	[SOM_II] WRTOOVDR	WESTRACE System Overview Manual: describes the WESTRACE system, what it is used for and what it consists of.
Reference CI	[APPM] WRTOAPPM	[APPM_II] WRTOAPDR	WESTRACE Application Manual: describes the design and application of a WESTRACE signalling system. It is the how-to document that must be followed by System Designers and Installers.
Reference CI	[GCSS] WRTOGCSS	[GCSS_II] WRTDGCSS	WESTRACE Graphical Configuration Sub-System User Manual for WESTRACE MkII, WRTDGCSS: describes how to use the configuration tools for the programming and checking of PM-based WESTRACE systems.
Reference CI	[ICS] WRTO_ICS	[ICS_II] WRTDICS	WESTRACE Installation Check System User Manual: describes the use and application of the ICS to check that the application logic is installed correctly in WESTRACE system.
Reference CI	[pcge] ID2303_UM	[pcge] ID2303_UM	PC Graphic Editor (PCGE) User Manual (Dimetronic), ID2303_UM: describes how to set up and use PCGE to create graphical screen layouts and the underlying logic associated with an interlocking's mnemonics; for use with GSIM and MoviolaW.
Reference CI	[mov] ID2704_UM	[mov] ID2704_UM	MoviolaW User Manual for MoviolaW 3 (Dimetronic), ID2704_UM: describes how to set up and use MoviolaW, which is a suite of Windows-based diagnostic and recording tools for WESTRACE and other railway systems.
Reference CI	[MOVC_D] ID2704_UM	[MOVC_D] ID2704_UM	MoviolaW Configuration Manual for MoviolaW 2 (Dimetronic), ID270_CM: describes how to install and configure MoviolaW. MoviolaW is a suite of Windows-based diagnostic and recording tools for WESTRACE and other railway systems.

1

Figure 1.1 shows the WESTRACE manual tree.

1.2.6 Relationship with Other Manuals

This manual is one of a family of documents designed to assist WESTRACE users. Figure 1.1 shows how the WESTRACE manuals are related. Higher level manuals are a prerequisite for the those below them.

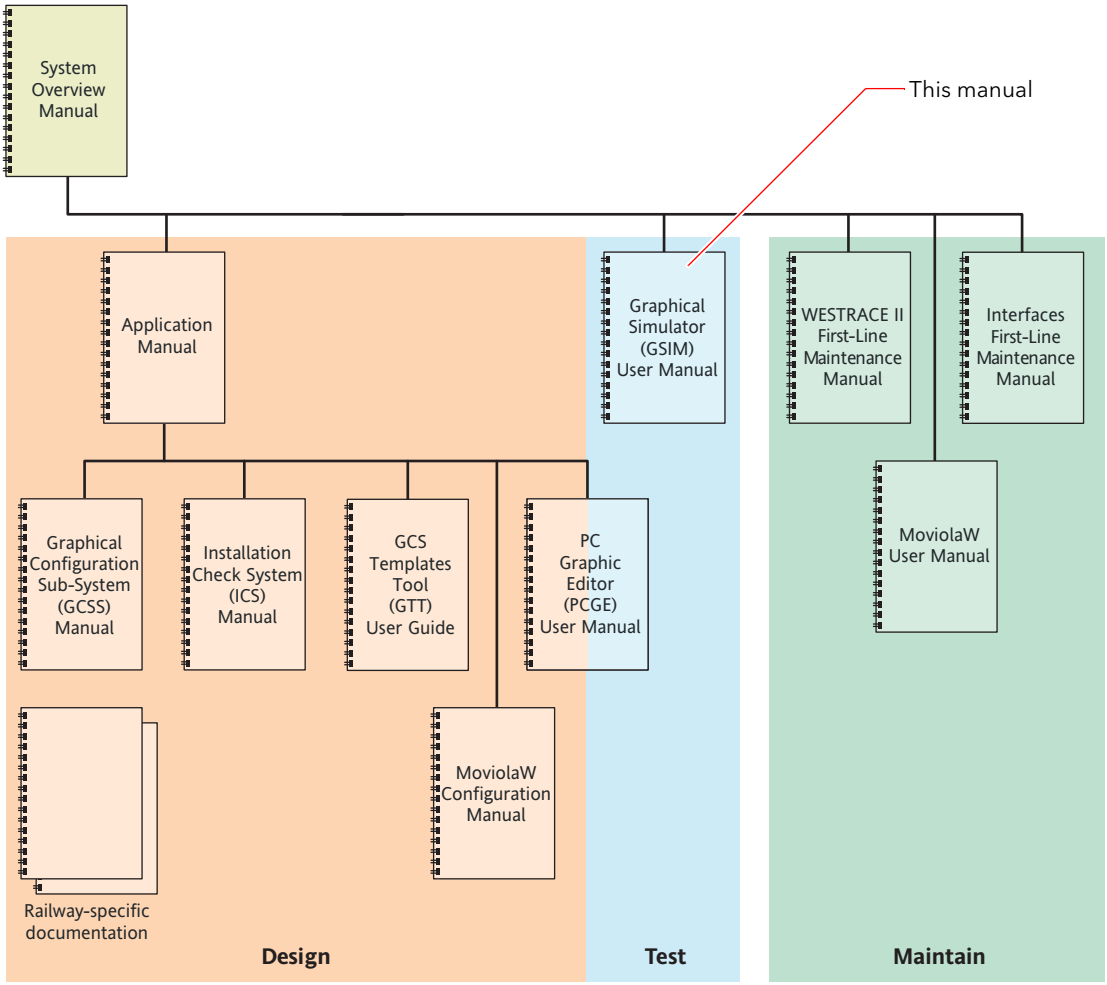


Figure 1.1 WESTRACE manuals

The manuals listed in figure 1.1 are described in the WESTRACE System Overview Manual [SOM], [SOM_II].

1.2.7 Terms and Conventions

Special terms are used in this manual. Please refer to the Glossary.

'Action Point'–action points are given to highlight a requirement for performing a task.

NOTE: "Note"–highlights important information.

Caution: "Caution"–highlights the possibility of damage to equipment, but not necessarily danger to personnel when handling, operating or maintaining equipment.

"Safety Warning"—highlights information relating to safety hazards. Failure to follow these warnings may lead directly or indirectly to serious equipment damage, or serious injury or death of personnel.

Change bars are placed in the left margin, next to any text that has been updated since the previous release of the manual.

1.3 How to Use This Manual

This manual describes the use of GSIM to test WESTRACE logic. The overall design process is described in the WESTRACE Application Manual [APPM, APPM_II] and the use of GCSS is described in the WESTRACE GCSS Manual [GCSS, GCSS_II].

GSIM is a part of the overall process of designing and commissioning a Railway Signalling system.

1.3.1 Process Map

Figure 1.2 is a flowchart that describes the design process, with the GSIM part of the process enclosed in a shaded rectangle.

NOTE: Figure 1.2 does not describe GSIM. An overview of GSIM is provided in Chapter 2.

Table 1.1 is a guide to finding topics in this manual and other WESTRACE manuals, as listed in figure 1.2.

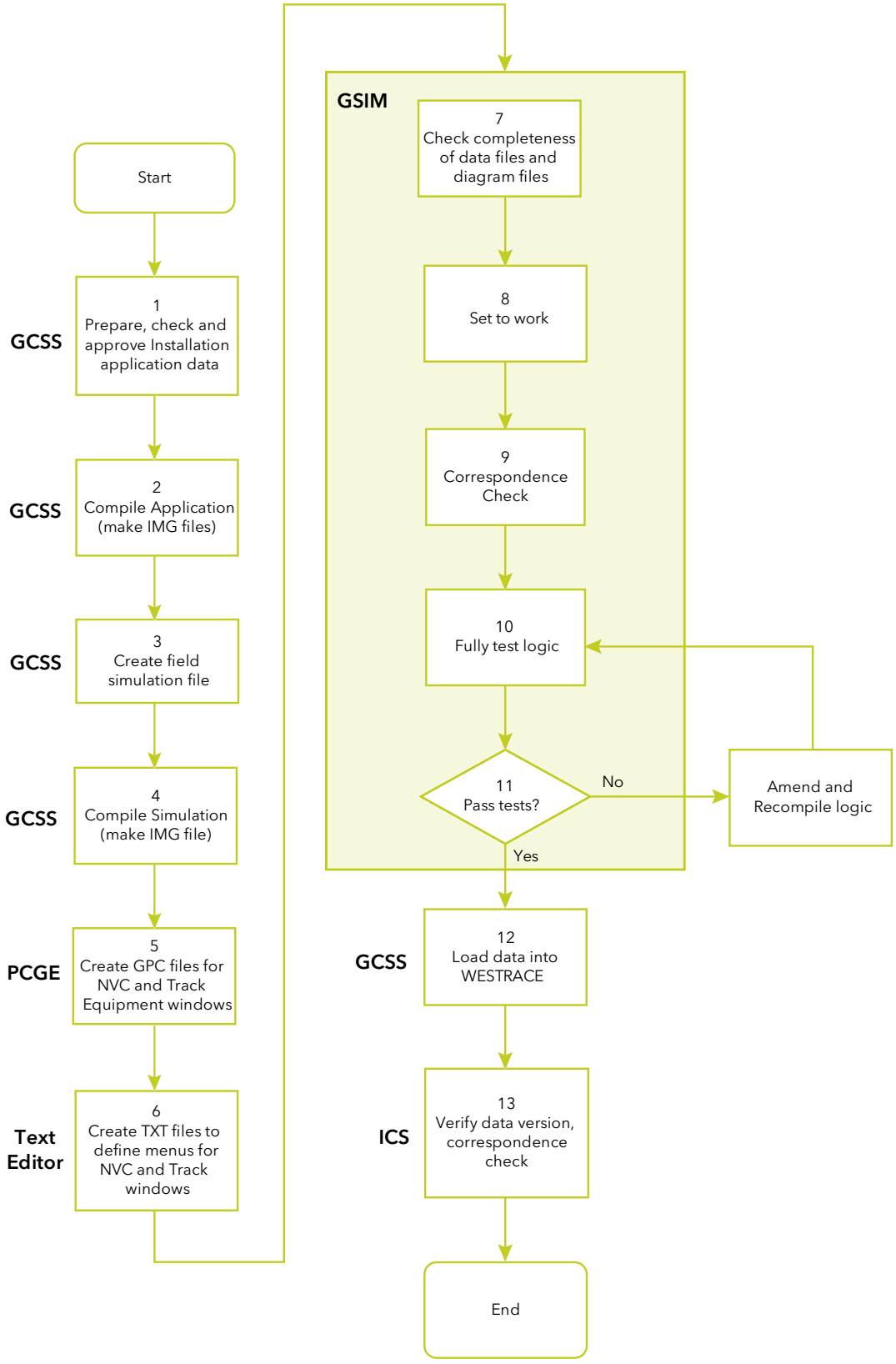


Figure 1.2 Flowchart: data preparation and testing

Table 1.1 Flowchart (figure 1.2) cross-reference

Item	Description	Reference to manual
1	The Signal Design Engineer uses GCSS to prepare and check the application data files for each VLM or PM, each NVC/DM (if applicable) and each NCDM (if applicable) used in the WESTRACE installation.	[GCSS, GCSS_II], [APPM, APPM_II]
2	The Signal Design Engineer uses GCSS to compile the application data files for each VLM or PM, each NVC/DM (if applicable) and each NCDM (if applicable) used in the WESTRACE installation.	section 5.6.1, [GCSS, GCSS_II]
3	The Signal Design Engineer uses GCSS to prepare field simulation files to simulate field equipment for each WESTRACE installation.	Appendix B, [GCSS, GCSS_II]
4	The Signal Design Engineer uses GCSS to compile the field simulation files for each WESTRACE installation. IMG files are created which are used in GSIM.	Section 5.6.3[GCSS, GCSS_II]
5	The Signal Design Engineer uses PCGE to prepare GPC (graphical display) files for the GSIM Non-Vital Control (NVC) and Track Equipment windows if required.	Section 2.3.4, Section 5.7, [pcge],
6	The Signal Design Engineer uses a text editor to create the text files that drive the menus for the GPC files and other files required for GSIM.	Section 5.8.1
7	An independent Design Engineer checks the data files and diagram files to ensure all inputs have been included.	[APPM, APPM_II]
8	The Signal Design Engineer prepares a GSIM project with all the components and ensures that it operates as expected, in preparation for the Principles test.	[APPM, APPM_II] [GCSS, GCSS_II]
9	The Principles Test Engineer performs a correspondence check by testing the diagram files for the NVC and Track windows and client applications to confirm that the commands and indications correspond to the logic mnemonics in the GSIM mnemonic viewer. The correct operation of the complete system is verified.	section 5.11
10	The Principles Test Engineer, typically working with an observer, uses GSIM to run full logic tests of the interlocking.	section 4.4 section 4.11
11	The Principles Test Engineer decides whether the logic passes the GSIM testing. If not approved, the Signal Design Engineer must revise the data.	[APPM, APPM_II]
12	Data that passes GSIM testing is installed into the WESTRACE.	[GCSS, GCSS_II] [ICS, ICS_II]
13	The Signal Design Engineer performs a correspondence check to ensure: • correspondence between the system and its inputs and outputs; • that field equipment such as signals and points operate to plan; • that no significant changes have occurred during the design process. The Signal Design Engineer produces and signs an ICS check sheet to verify that the WESTRACE contains the tested and approved version of the data. The diagram files and SIM.IMG files must be locked.	[APPM, APPM_II], [GCSS, GCSS_II], [ICS, ICS_II]

1.3.2 Organisation of Topics

There are three main parts to this manual:

- Chapters 1 through 4 and Appendix A and C are aimed primarily at Principles Test Engineers using GSIM for testing WESTRACE installations.
- Chapter 5 and Appendix B and D are aimed primarily at Signal Design Engineers preparing data files for use with GSIM (and possibly preparing a PC to use GSIM).
- Chapter 6 is aimed primarily at the System Installer setting up GSIM on a PC or network.

1.4 Prerequisites

NOTE: Ensure that the GSIM computer is not infected (and does not become infected) with a software virus.
Check the release notes provided with the GSIM application for important information.

1.4.1 Minimum System Requirements

Minimum system requirements for using GSIM:

- Personal computer with the following specifications:
  - Pentium® 4, 3 GHz
  - 512 MB RAM (Parity DRAM recommended)
  - 100 MB hard disk space (total required for installation and working)
  - mouse
- 17 inch colour monitor (or multiple colour monitors), 1024 x 768
- Microsoft® Windows® XP Service Pack 2
- local area network if client applications are to be run on a separate computer

Performance may be improved by using a computer that is faster, or has more memory or more free hard disk space than that listed above.

Use of a computer not meeting these minimum requirements is not covered by the GSIM Safety Certificate.

1.4.2 Other Prerequisites

- Anti-virus software—to ensure that each GSIM computer is virus-free prior to installation of GSIM and GSIMDriver.
- WESTRACE GCSS—to create the installation image (IMG) files.
- PCGE—to create the track layout diagram (GPC) files.
- GCSS and PCGE users must have a working knowledge of GCSS and PCGE to produce the necessary files for GSIM.
- The GSIM user must have:
  - a working knowledge of the Windows XP operating system
  - appropriate understanding of railway signal interlockings and WESTRACE
  - a working knowledge of any client applications that are to be used with GSIM to test a WESTRACE interlocking (eg MoviolaW)
  - training to conduct testing
  - authority to conduct testing
  - appropriate understanding of the English language (the GSIM documentation is produced in English).

Other software (a screensaver, for example) may interfere with GSIM. Therefore be sure to disable all unnecessary software when running GSIM.

1.5 Design Authority

Forward any questions relating to GSIM operation and report any operational problems to:

GSIM Design Authority
Invensys Rail Pty Ltd
380 Docklands Drive
Docklands
Victoria 3008
Australia

P +61 1300 724 518
F +61 3 9616 9001
E enquiries.asiapacific@invensysrail.com
W http://www.invensysrail.com

2. Overview of GSIM

Chapter Contents

2.1 Purpose of GSIM

Newly-designed or modified railway signal logic must be tested before it can be used in service. This has previously been achieved through testing the logic on a target system connected to switch inputs and lamp outputs. This process is time-consuming and expensive, especially when it cannot be done at the design location.
Also, rail service is interrupted when interlockings are shut down for modifications. These interruptions are costly, and annoying to customers.

The purpose of GSIM, the WESTRACE Graphical Simulator, is to allow Railway Signal Engineers to validate the railway signal logic and perform principle testing before installing the logic on the target hardware at the site.

GSIM is Windows software that simulates the operation of WESTRACE logic and trackside equipment. It enables Signal Engineers to functionally test WESTRACE vital application logic for a WESTRACE installation.

Client Applications

GSIM is able to connect with other WESTRACE software in order to test an interlocking system without using WESTRACE hardware. Such "client" software includes:

- PC-based control panels such as:
  - WESTCAD (WESTRACE MkI and WESTRACE MkII)
  - MCT (WESTRACE MkI only)
- the diagnostic tool MoviolaW (WESTRACE MkI only).

GSIM can also communicate with WATT (WESTRACE Automatic Testing Tool) to automate part of the GSIM pre-testing.

2.2 Limitations

- GSIM version 8.0 has only been validated for use on Windows XP Service Pack 2. The following may also be used provided no errors are found in the correspondence checks (see Table 1.1, item 9 and section 5.11):
  - Windows Vista
  - Windows XP—other versions
  - Windows 2000—all versions

  GSIM version 8.0 is not supported on Windows NT®, and cannot be installed on Windows 7.
- GSIM has not been validated with projects that contain more than 15 WESTRACE installations.
- WESTRACE installations are not changed by GSIM. WESTRACE installations may be edited from within GCSS, and the result of the changes can be tested and viewed by GSIM.
- The cycle time for each WESTRACE is only an estimate based on logic size (GCSS.IMG file). Do not rely on this where the cycle time or relative cycle times between WESTRACE systems is critical.
- WESTRACE installations that have been approved using GSIM require input-output correspondence checking in the installed application.
- GSIM only processes the controls and inputs to the WESTRACEs.
- GSIM must be executed from the PC's local hard disk.
- The mnemonic START_UP is reserved and can only be used to initialise simulation mnemonic states (section 4.4.6).
- GSIM must be started before client applications (section 4.4.4.) to capture all mnemonic state changes.
- GSIM can not display module information on MoviolaW.
- Logs created in previous versions of GSIM can not be re-run as tests in GSIM. GSIM project files (.prj) created in earlier versions of GSIM are compatible with GSIM version 8.0.
- Serial port connections must be manually connected when a project is created. This is because there is not enough information in the image file to determine which ports should be connected.
- GPC files may not be opened while a simulation is running.
- The version of GSIMDriver (see section 3.11) supplied with GSIM version 8.0 can be used as a loadable driver with WESTCAD.

  It can also be used as a driver with MoviolaW, but the use of MoviolaW with GSIM projects that contain WESTRACE MkIIs is not yet supported.

- The version of GSIMDriver (see section 3.11) supplied with GSIM version 8.0 can connect to external devices and applications using the following network protocols:

  For a WESTRACE MkI VLM6/NCDM
  - NCDM WSL/S2 network
  - S2oE[1] network (NCDM WSA/S2)
  - VLM6 WNC vital

  For a WESTRACE MkII
  - S2oE[1] non-vital network (PM WSA/S2) network
  - WNC+ vital

- When you open a project created in an early version of GSIM you may see the message: "The Network Port Sessions configuration of NCDM <name> has changed since the project was last saved." This message is not reliable and should be ignored.

  Check the project tree (figure 3.11) if you have any doubt that the correct NCDM image files have been loaded. The tree shows the full path to every NCDM image file loaded, and the configuration of the NCDM network port sessions simulated by GSIM.

Communications Protocols

- GSIM's simulation of communications protocols does not include modifying the state of mnemonics that represent Loss of Communications or NVLM Port and Module Status. GSIM's simulation of the NCDM WSL/S2 network protocol correctly simulates how the NCDM behaves in a timeout or other Loss of Communications situation *apart from* this aspect.
- GSIM's simulation of communications between NCDM WSL/S2 network sessions and client applications is limited in that the IP addresses and ports that would be used by the NCDM in the field cannot be used in the simulation situation. See section 5.10.4.1.

  Note that this is **not** true for WNC+ vital and S2oE. GSIM does use the same IP addresses and ports as the real WESTRACE.
- GSIM does not simulate NVLM WSL/S2 *serial* ports.
- GSIM simulates communications between the WESTRACEs in the GSIM project. For WESTRACEs connected by vital serial modules or network ports, GSIM automatically determines which of those ports and modules are connected to another WESTRACE in the simulation.

  The only exception to this is that any connections between NCDM WSA/S2 non-vital sessions and WESTRACE MkII S2oE non-vital sessions are not simulated and the sessions are shown as unconnected in the GSIM project tree view.

1. S2oE: S2 over Ethernet, the WSA/S2 non-vital network protocol used for both NCDM (MkI) and PM (MkII) S2 communication.

It is possible to use GCSS to configure non-vital port sessions of a WESTRACE MkII as WSA/S2 master sessions. GSIM simulates these sessions, but no such sessions are implemented in the WESTRACE MkII itself. Please be aware of this discrepancy when using GSIM.

2.3 Compatibility

NOTE: We recommend that you always use the latest version of GSIM. See section 6.1.4.

2.3.1 Compatibility with Previous Versions

Project files (.prj) created in earlier versions of GSIM are compatible with GSIM version 8.0.

Configuration files (GSIMDriver.cfg) created for version 5.0 of GSIM are compatible with GSIM version 8.0.

2.3.2 Compatibility with Other Products

GSIM version 8.0 is compatible with the following:

- NCDM version 9.0
- NVC/DM version 8.0
- MIMIC version 4.5.0
- GCS versions 7.0.0, 6.2.0, 6.1.0. 6.0.2 for WESTRACE MkI
- GCS (GCSS and ICS) version 8.0 (and later) for WESTRACE MkII
- PCGE version 3.6.3
- MoviolaW for Windows XP
- WESTCAD versions 1.0.0.6 to 2.4.6.0
- MCT versions using the WSL/S2 Protocol (for WESTRACE MkI configured with a VLM6/NCDM)
- IPCSM 4.0.0.0

2.3.3 GSIMDriver Compatibility

When using GSIM with GSIMDriver, both applications must be from this version 8.0 release. (Previous versions of GSIMDriver are not compatible with GSIM 8.)

Therefore, ensure you run the GSIM version 8.0 installer on the PC where GSIM will be running and on the PCs where GSIMDriver will be running.

2.3.4 GSIM-PCGE Compatibility

Each version of GSIM is compatible with only some versions of PCGE and its associated GPC file format—see figure 2.1.

The GPC file format version is stored in the GPC file as an integer number, eg the format 1.08 is stored in GPC files as 108.

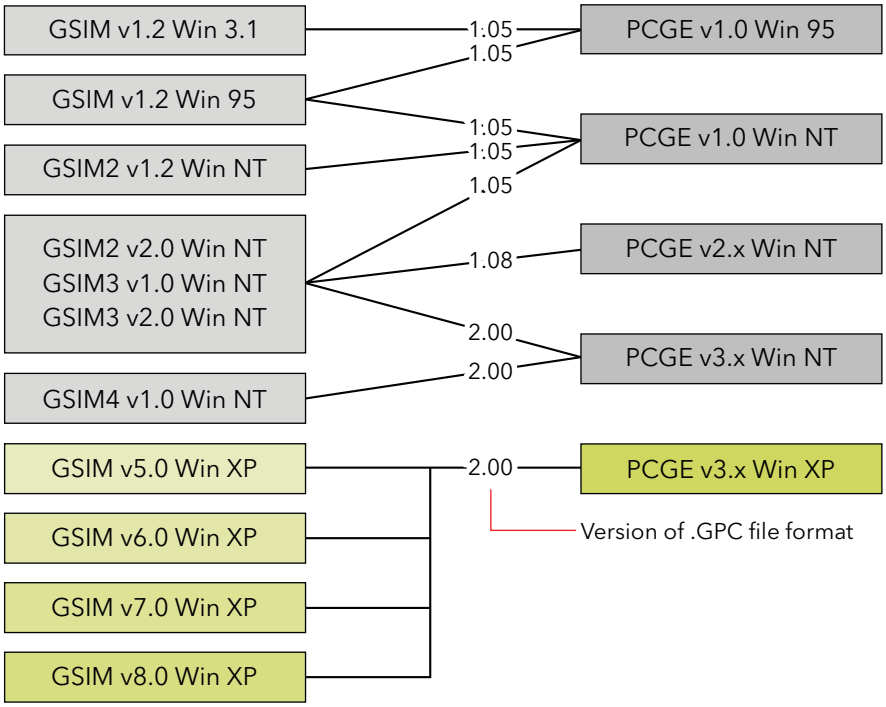


Figure 2.1 GSIM-PCGE compatibility

NOTE: Do not use static bitmaps (new entities), new "button" blocks or entity rotation features of PCGE.

Upgrading GPC Files

a) Check the GPC file version:
   i) Open the .GPC file in a text editor (eg Notepad).
   ii) Note the version number shown on the sixth line (eg **`VS=105`** means version 1.05).
   iii) Close the file without saving.
   See figure 3.1 for GPC/PCGE file compatibility.

b) If the version is older than 1.08, upgrade it to 2.00 so that it is compatible with PCGE v 3.x (figure 2.1):
   i) Open the file in PCGE v2.2 (requires Windows NT) and re-save it using **File** > **Save As**.
   The format of the re-saved .GPC file is now version 1.08 (**`VS=108`**).
   ii) Open the version 1.08 file in PCGE v3.x and save it again using **File** > **Save As**.
   The format of the GPC file is now version 2.00 (**`VS=200`**).

Version 2.00 GPC files are required by components of the PCGE tool suite v3.x (eg MAA, DtMC and GPCLibraryManager).

2.4 What's Changed in GSIM

2.4.1 New and Modified Features in GSIM version 7.0

- Creation of GSIM Projects that can contain either WESTRACE MkI, WESTRACE MkII, or a mixture of both types.
- Simulation of PM logic and timers functionality for the WESTRACE MkII.
- All GSIM's simulation commands, logging and script-based regression testing features work in the same way with both types of WESTRACEs.
- Simulation of communications between WESTRACE MkIIs within the GSIM project using the WNC+ vital protocol. Simulation of communications between WESTRACE MkI and WESTRACE MkII within the GSIM project using the WNC vital protocol only.
- Simulation of communications between WESTCAD and WESTRACE MkII WSA/S2 network sessions using GSIMDriver.

2.4.2 New Features in GSIM version 8.0

- Real external devices and applications can now connect to simulated PMs and NCDMs in GSIM via GSIMDriver using the WSA/S2 protocol, ie communication via GSIMDriver can now take place using the same network protocols as used by the WESTRACEs themselves.

  For example, a WESTCAD with a WSA/S2 network driver can now be connected to the simulated WESTRACEs in GSIM just as it would be connected to the real WESTRACE in the field.
- Real external devices and applications can now connect to simulated PMs and VLM6 NCDMs in GSIM via GSIMDriver using the WNC and WNC+ vital protocols, This is in addition to connections between simulated WESTRACEs within the GSIM project data.

  For example, an LEU, RBC or real WESTRACE PM can connect directly to GSIM.

  NOTE: Every simulation requires at least one simulated WESTRACE, even when GSIM is connected to an external WESTRACE.
- The logic in field files (*sim.img) associated with a simulated WESTRACE is now evaluated strictly once per WESTRACE cycle. (Previously the field logic was evaluated until no mnemonics changed state, which could have meant multiple cycles per cycle of the application logic.)

  NOTE: You should be careful to observe your field logic in GSIM version 8.0 and ensure that this change does not lead to any unexpected track turnback behaviour in your simulation.
- GSIMDriver version 8.0 now checks that the version of GSIM to which it is connecting is compatible, and raises an error message if it is not.

  NOTE: When you move to a new version of GSIM, ensure that the GSIM installer is run on each PC where GSIMDriver is to be deployed. Ensure that any instances of GSIMDriver used with client applications such as WESTCAD are replaced with the latest version of GSIMDriver.

- GSIM now includes a command to hide all reserved mnemonics and their aliases from Mnemonic Viewer windows. See section 4.8.5.2 "Filter Reserved Mnemonics".
- You can now filter mnemonic events in the Mnemonic Event Monitor window. See section 4.9.2 "Filtering Mnemonic Events".

2.4.3 Enhanced Functionality in GSIM version 8.0

- The allowed cycle time for a WESTRACE MkII has been adjusted to reflect the behaviour of a real PM. GSIM now allows a cycle time of between 250 and 600 ms. See section 4.5.5 "Changing a WESTRACE Cycle Time".
- GSIM now logs all changes to WESTRACE cycle times made using the Edit Cycle Time dialog box (figure 4.15).
- The DMC[2] has been restored as a WSL/S2 master application that can connect to GSIM via GSIMDriver.
- The GSIM Project Workspace window has been enhanced with new data items such as the destination installation address and IP for vital network ports (figures 3.11 and 3.12). This is intended to help diagnose problems where ports that should be connected internal to GSIM are not connected due to configuration errors made in GCSS.
- Mnemonic filters in mnemonic viewers can now be deleted. See section 4.8.5.1 "Name Filter".

2. DMC: Diverse Monitor Controller, a component of MCT (Maintenance Control Terminal)

2.5 Functional Description

2.5.1 GSIM Overview

GSIM simulates a complete control and interlocking system, allowing comprehensive testing to be accomplished remotely from the railway. GSIM version 8.0 can simulate both WESTRACE MkI and WESTRACE MkII, and GSIM projects can be created with a mixture of both types of WESTRACEs.

GSIM uses data files from the WESTRACE to simulate an interlocking. GSIM can also simulate track equipment, and this must be defined in a separate configuration file generated in the same way as a WESTRACE file.

GSIM can communicate with a wide variety of applications and devices using GSIMDriver, a driver that is provided as part of the GSIM release (see section 2.5.2 "GSIMDriver Overview"). Supported applications are:

- WESTCAD and MoviolaW, where GSIMDriver is loaded as part of the configured set of drivers;
- the MCT and DMC where GSIMDriver communicates over a network using the NCDM WNC WSL/S2 s protocol;
- any application, driver or device that implements an S2oE network interface;
- any application, driver or device that implements a WNC or WNC+ vital protocol interface and which can be configured as a source system type using GCSS.

GSIM provides an interactive graphical display of the track (figure 3.27) and, if required, an interactive Non-Vital Control graphical display (figure 3.25; not normally used if a PC-based Control Centre application is connected). Both displays are user-configurable.

Signal Engineers functionally test the system by:

- selecting a Run command (section 4.11.1) to start GSIM's logic execution cycle(s);
- creating the required field conditions by clicking on specific screen elements in the Track window (figure 3.27);
- issuing control commands to the WESTRACE by clicking on specific screen elements in the client application or Non-Vital Control windows (figure 3.25);
- observing the logic's intermediate and end states on the displays.

GSIM interacts with the Signal Engineer's inputs by:

- displaying all changes of state after each logic execution cycle;
- displaying the states of user-designated mnemonics;
- creating a Log file of all commands and changes of state (section 4.10).

GSIM incorporates an automated testing feature based on scripts and its own scripting language. The scripts and batch files—which are groups of scripts—may be used in regression testing of simulation data by:

- executing the scripts or batches, then;
- comparing the results against a set of benchmark results, then;
- determining the differences, if any.

Scripts and batch files are created with any text editor and added to the project. Script results and batch file reports are accessible from within the GSIM project.

2.5.2 GSIMDriver Overview

Four Network Protocols

GSIMDriver version 8.0 implements four WNC network protocols:

- the **NCDM WSL/S2** non-vital protocol
- **S2oE** (S2 over Ethernet), the WSA/S2 non-vital network protocol used for both NCDM (MkI) and PM (MkII) S2 communication
- the **VLM6 WNC** vital network protocol
- the **PM WNC+** vital network protocol

Sources of GSIMDriver Configuration

GSIMDriver obtains most of the configuration data for these network protocols from the simulated WESTRACEs in GSIM that own the network port being connected to. These parameters are configured using GCSS. Therefore, communication between an external device or application and a simulated device in GSIM is only successful when the configuration of the network ports in the simulated WESTRACEs match the configuration of the corresponding ports in the external device or application.

GSIMDriver also obtains configuration data from a simple text file called **GSIMDriver.cfg**. You must create this file, and locate it correctly, in order for GSIMDriver to work. Instructions for doing this are given in section 5.10 “Client Applications”.

Configurations Must Match

For the vital protocols in particular, configuration values such as port addresses, IP addresses, WESTRACE addresses, and source and destination system type must match across the link.

On the other hand, to help in the situation where test data and approved data are used in the same simulation, GSIMDriver does not require that Product Data versions and Compatibility Index values match across the link. However, be aware that a hardware device that implements the WNC or WNC+ protocol checks these values and will reject data from GSIM if they do not match.

Assign All Primary IP Addresses to the GSIMDriver Computer

You must also consider that GSIM acts as a network endpoint for the simulated NCDMs and PMs in the GSIM project. Therefore the computer that runs GSIMDriver must be assigned all the primary IP addresses of the NCDMs and PMs that are to be communicated with during the simulation.

Windows allows multiple IPs to be assigned to the same network card and this assignment must be made before GSIM is started.

The only exception to this is when using the NCDM WSL/S2 protocol (see section 5.10.4.1 “MCT and DMC”).

Install, Don’t Copy

GSIMDriver communicates with GSIM using the Microsoft DCOM[3] remote procedure call protocol. Microsoft DCOM requires that registry settings be added to the computers running GSIM and GSIMDriver. **This can only happen by running the GSIM installer; it is not possible to just copy GSIM or GSIMDriver between computers**.

Related topics:

- section 5.10.2 “Setting Up the GSIMDriver Configuration File”
- section 5.10.3 “Setting Up WESTCAD and MoviolaW Client Configuration Files”
- section 6.2.1 “Install GSIM and GSIMDriver on the GSIM Computer”
- section 6.2.2 “Install GSIMDriver on the Client Computer (if Required)”

2.5.3 Simulating a WESTRACE System

WESTRACE evaluates the application logic sequentially, following the order of the ladder rungs. The logic evaluation occurs one rung at a time starting from rung 1. The evaluation of all rungs once is called a **cycle**.

For a WESTRACE MkI, GSIM simulates vital, NVC/DM and NCDM logic and timers using identical algorithms to WESTRACE.

For a WESTRACE MkII, GSIM simulates PM logic and timers using identical algorithms to the WESTRACE.

GSIM estimates the cycle time of each WESTRACE and tries to show the order of events in systems with multiple WESTRACEs.

GSIM uses a field simulation file (SIM.IMG file) to simulate the field equipment such as trackside inputs and outputs.

3. DCOM: Distributed Component Object Model

External Client Applications and Internal Windows

GSIM's internal windows provide a way to control the WESTRACEs and to observe indications and internal latch states. When control panel or diagnostic applications such as WESTCAD or MoviolaW are connected using GSIMDriver, some of these windows become redundant since those applications provide similar views to GSIM.

In GSIM:

- The non-vital control client applications WESTCAD and MCT execute identically to an installed system and can provide local or remote control inputs and indications.
- MoviolaW can be connected as a client to validate the interface with the WESTRACE MkI (only) and as an additional indication display.
- The Non-Vital Control window represents a local control panel and includes control and indication facilities.
- The Mnemonic Viewer Windows can display, and under limited circumstances control, WESTRACE logic states.

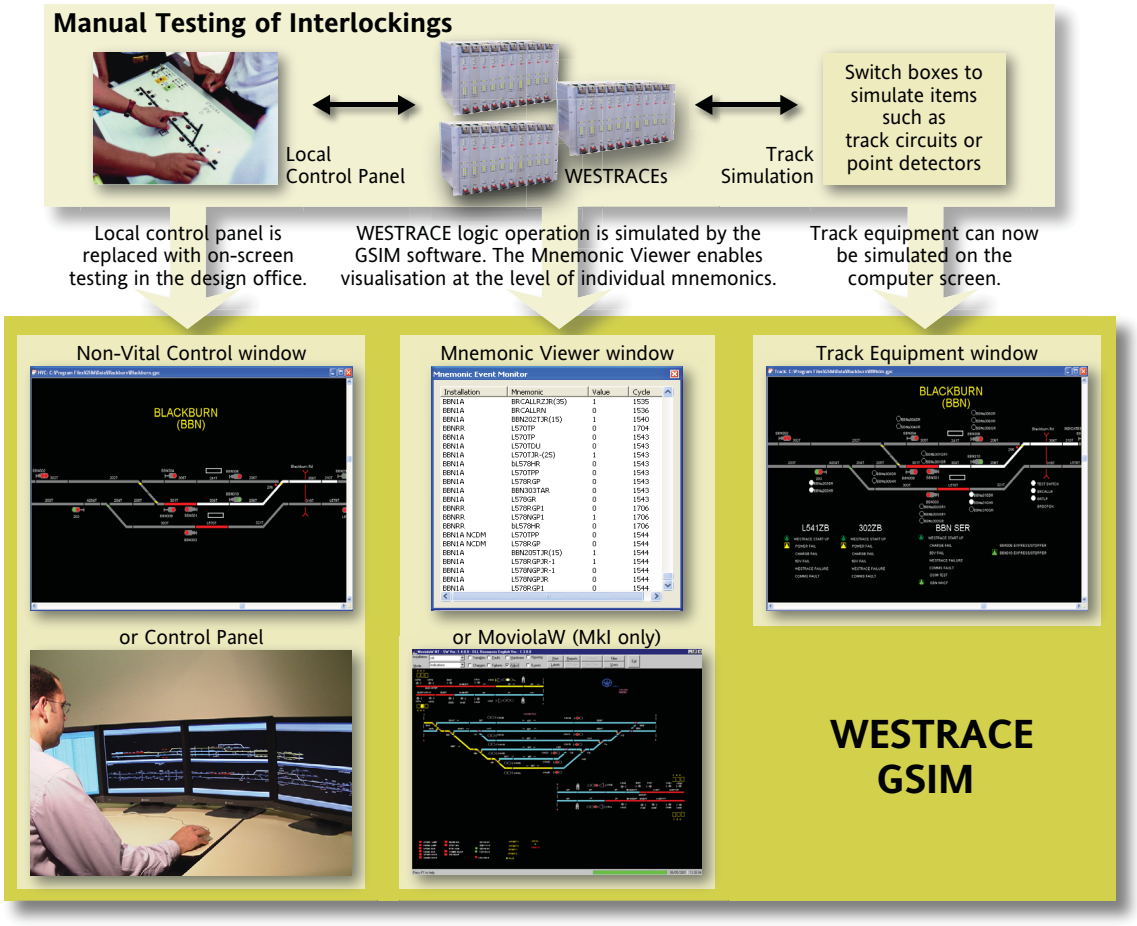


Figure 2.2 GSIM tools

NOTE: The same diagram file may be used for the Non-Vital Control window and the computer control panel.

2.5.4 Local Control Panel (NVC Window)

The NVC (Non-Vital Control) window typically simulates a hardwired panel that sends control to an interlocking and receives indications. It can directly produce any bits controls such as those required to set points and signals. It also has limited logic that can be used as a form of route setting (although for a WESTRACE MkI,route setting would normally be performed in the NVC/DM or NCDM for the WESTRACE MkI). See section 3.9.

Alternatively, some actual control systems can be used directly in the simulation.

2.5.5 Track Equipment

The Track window is a graphical representation of the track equipment and inputs such as point positions and lamp filaments.

Some of this information may also be available on a connected MoviolaW system.

See section 3.10.

2.5.6 WESTRACE

GSIM emulates the WESTRACE application logic on a PC and displays the results of each logic execution in its windows.

The Mnemonic Viewer window displays a list of all mnemonics used in the installation and provides facilities for searching or filtering long lists of mnemonics to quickly find the mnemonics of interest.

See section 3.7.

2.5.7 How GSIM Works

GSIM's main function is to evaluate the logic of multiple WESTRACE installations linked together via vital or non-vital, serial or network communications links. Figure 2.2 shows the relationship between multiple WESTRACE installations and their respective field simulation files.

To simulate multiple WESTRACE installations:

- GSIM estimates the time required to process all the rungs in the ladder logic (processing delay).

  This delay is then used to schedule the "cycle time". (See also section 4.5.5 "Changing a WESTRACE Cycle Time".)
- GSIM simulates all communications links specified in the GCSS image files that connect any two WESTRACEs within the simulation.
- GSIM (via GSIMDriver) simulates any configured communications links between WESTRACEs in the simulation and connected external applications, drivers and devices.
- GSIM evaluates the ladder logic for each WESTRACE in the simulation.

Cycle time is only an estimate and should not be used for critical system timing.

2.5.7.1 Non-Vital Logic Modules (WESTRACE MkI only)

Non-vital logic modules (NVC/DM or NCDM) also have their logic simulated in GSIM. Inputs to and outputs from the logic are simulated through the communications facilities and displays. NVC/DM or NCDM mnemonics must be prefixed to distinguish them from the VLM vital mnemonics.

The only simulation of parallel non-vital inputs and outputs is via the NVC window or specially-configured client applications.

2.5.7.2 Vital Communications

WESTRACE installations can be simulated as communicating with other installations via the following vital modules:

WESTRACE MkI:

- VTC (Vital Telemetry Continuous module; 300 ms delay);
- EVTC (Enhanced Vital Telemetry Continuous module; 600 ms delay);
- CCM (Configurable Communications Module; 900 ms delay);
- VCVM (Vital Communications Virtual Module; 0 ms delay).

WESTRACE MkII:

- PM Vital Ports using the WNC+ vital protocol

For WESTRACE MkI connected to WESTRACE MkII:

- PM Vital Ports to NCDM VCVMs in VLM6 using the vital protocol.

2.5.7.3 Non–Vital Communications

WESTRACE installations can be simulated as communicating with other installations via the following non-vital modules:

- WESTRACE MkI
  - WSA/S2 network communication using NCDMs
  - WSA/S2 serial communication using NVC/DMs or NCDMs
- WESTRACE MkII

  GCSS allows the configuration of both master and slave S2oE sessions, but master sessions are not implemented in WESTRACE MkII.
- WESTRACE MkI **connected to** WESTRACE MkII

  Communications links between an NCDM WSA/S2 master session and a WESTRACE MkII WSA/S2 slave session could be set up using the devices themselves but are not supported within the GSIM simulation.

2.5.7.4 Vital Logic

Vital logic is simulated directly from the VLM or PM application data. Inputs to and outputs from the logic are simulated through the communication facilities and displays.

2.5.7.5 Diagnostics

GSIM does not simulate the Diagnostic Protocol but does support connections to MoviolaW via GSIMDriver using IPCSM.

2.5.7.6 Test Tool

The WESTRACE Automatic Test Tool (WATT) is not provided with GSIM and is described separately in its own documentation.

2.5.7.7 Multi-WESTRACE Mnemonics

Interconnected WESTRACE systems typically use mnemonics that share the same name. GSIM is able to tell which WESTRACE system each mnemonic belongs to using a unique prefix code.

2.5.7.8 Client Applications

GSIM and the client applications (see "Client Applications" on page 2-1) are run as separate programs, just as local control panels and the WESTRACE vital processors run without precise synchronization. Mnemonic changes initiated from a remote application cannot be guaranteed to be processed in any particular cycle of ladder logic evaluation.

GSIM simulates the application data to be installed in the WESTRACE. GSIM only uses mnemonics in the WESTRACE application data. Client control panel applications often use extra mnemonics and logic for internal processing—GSIM does not see or respond to these mnemonics.

3. GSIM User Interface

This chapter describes the user interface and commands for:

GSIM commands are described in section 4.11.

NOTE: The design of user-configurable controls (such as pop-up menus for the Track and NVC windows) is described in section 5.8.

3.1 Main Window

Figure 3.1 shows the GSIM main window (without an open project). The main window is the working area of the GSIM application and can contain two types of sub-windows:

- docking windows (such as the sub-windows shown in figure 3.1);
- floating windows (NVC, Track and Log Viewer windows).

The GSIM docking windows can be left in their default docked positions, or floated so they can be moved around. Docking windows include:

- Project Workspace
- Command Monitor
- Simulation Summary
- Mnemonic Viewer
- Event Monitor

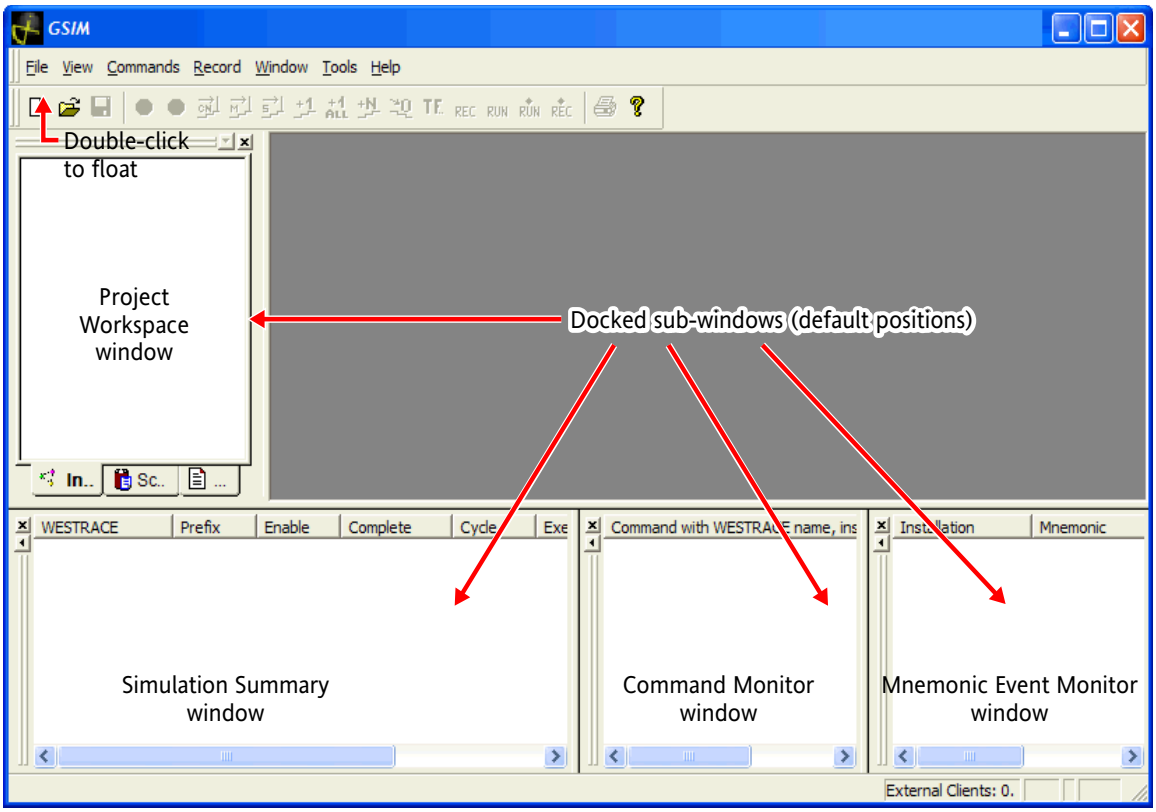


Figure 3.1 GSIM main window and sub-windows (without an open project)

Float a docked window by:

- double-clicking the double bar in the sub-window's margin; or
- clicking on the double bar in the sub-window's margin and dragging the window to a floating position; or
- right-clicking in the window to open the pop-up menu shown in figure 3.2, then clicking **Float in Main Window**

Figure 3.2 Sub-window right-click menu

NOTE: De-selecting the Allow Docking option allows the window to be dragged outside the main window (for example, to another monitor).

3.2 Menu Bar and Toolbar

The main window contains a menu bar and a toolbar to provide access to commands.

The contents of the menu bar and toolbar are context-sensitive; that is, they change to suit the currently-active windows.

The menu bar is described in section 3.2.2.

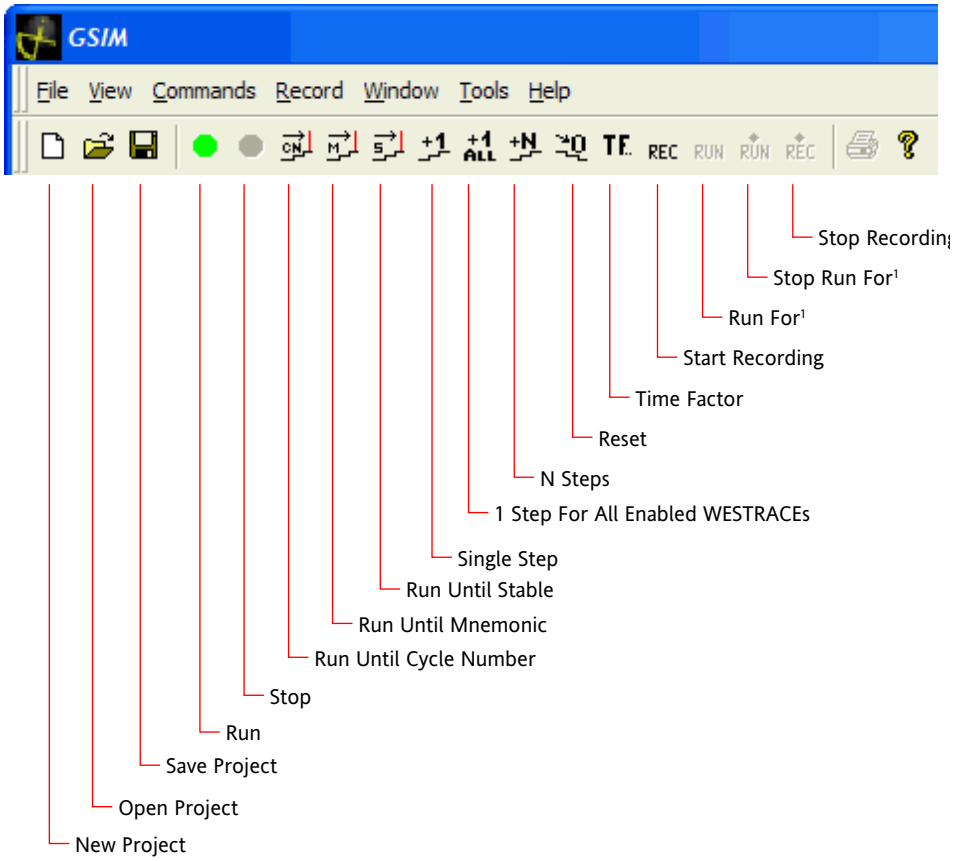


Figure 3.3 GSIM main menu bar and toolbar[1]

3.2.1 Toolbar Buttons

The toolbar buttons provide quick access to GSIM simulation commands (described in Section 4.11).

The GSIM toolbar buttons are shown in figure 3.3.

1. The actions of the RUN FOR and STOP RUN FOR commands are described in section 4.13.2.4 "Generate Run For Commands".

3.2.2 Menu Bar Options

To use the Menu bar, click on the menu title or use an accelerator key combination.

NOTE: Some GSIM commands are specific to particular windows or particular run-conditions. Unavailable commands are displayed in grey.

3.2.2.1 File Menu

The File menu contains the following commands for managing projects and printing documents:

- **New Project** creates a project (see section 4.5).
- **Open Project** opens an existing project (see section 4.6).
- **Close Project** closes an open project. This command is greyed (unavailable) when a simulation is running or a test is being logged (see section 4.15).
- **Save Project** saves an open project.
- **Save Project As…** saves an open project under a new name.
- **Print…** sends the contents of a Log View or Difference window to the printer. This command is greyed (unavailable) except when one of these windows is open.
- **Print Setup…** opens the Windows Print Setup dialog box.
- The six most recently saved projects are listed in the File menu.
- **Exit** closes the current project and quits GSIM. This command is greyed (unavailable) when a simulation is running or a test is being logged (see section 4.15).

The File menu is shown in figure 3.4.

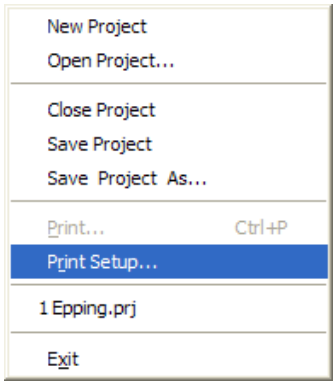


Figure 3.4 File menu

3.2.2.2 View Menu

The View menu shows or hides the following screen elements:

- toolbar;
- status bar;
- Simulation Summary window;
- Project Workspace window;
- Command Monitor window;
- Mnemonic Event Monitor window.

Items selected for viewing are marked with a check mark. The View menu is shown in figure 3.5.

Figure 3.5 View menu

3.2.2.3 Commands Menu

The Commands menu contains the following commands for controlling how a simulation is to be run:

- **Run…** (see section 4.11.1);
- **Stop…** (see section 4.11.2);
- **Run Until**
  - **Cycle…** (see section 4.11.3);
  - **Mnemonic…** (see section 4.11.4);
  - **Stable…** (see section 4.11.5);
- **Step…** (see section 4.11.6);
- **Step All** (see section 4.11.7);
- **N Steps…** (see section 4.11.8);
- **Reset…** (see section 4.11.9);
- **Modify TF…** (see section 4.11.10).

The Command menu is shown in figure 3.6.

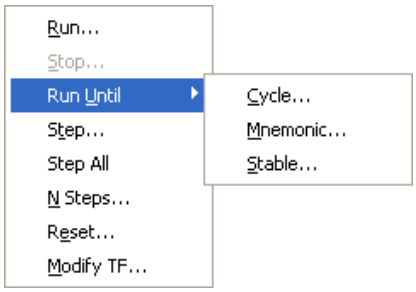


Figure 3.6 Commands menu

3.2.2.4 Record Menu

The Record menu contains the following commands for recording actions to scripts:

- **Start Recording** (see section 4.13.1);
- **Stop Recording** (see section);
- **Run For** (see section);
- **Stop Run For** (see section);

The Record menu is shown in figure 3.7.

Figure 3.7 Record menu

3.2.2.5 Zoom Menu

The Zoom menu is only available when a graphic file window is open. It contains nine magnification options for viewing the NVC window and the Track window.

The magnification options range from 6.25% (smallest) to 1600% (largest), and affect both windows simultaneously. A tick is placed next to the magnification currently being used. The Zoom menu is shown in figure 3.8.

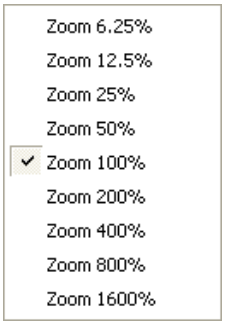


Figure 3.8 Zoom menu

3.2.2.6 Window Menu

The Window menu only appears whenever one or more graphic file windows or Text Viewer windows are open.

The Window menu offers the following options:

- **Cascade** arranges the child windows by cascading one behind another.
- **Tile** arranges the child windows in a tiled pattern to fill the main window;
- a list of open windows. Selecting a window from the list will activate that window and move it to the front so it can be viewed. The Window menu is shown in figure 3.9.

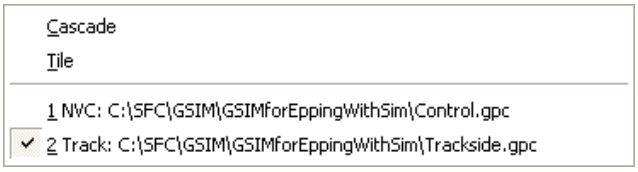


Figure 3.9 Window menu

3.2.2.7 Help Menu

The **About GSIM...** command on the Help menu opens a dialog box that contains the GSIM version number and release date.

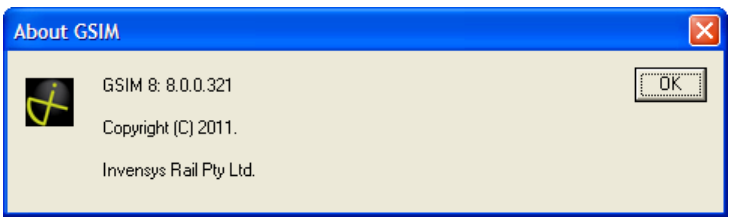


Figure 3.10 Help dialog box

3.3 Project Workspace Window

Use the Project Workspace window to view and manage:

- the file structure of a project;
- the scripts and batch files that may be used to test the project;
- the contents and status of Log files contained in the project.

GSIM displays the Project Workspace window for every session unless the window has been closed using the View menu or the window's Close box.

The Project Workspace window is a graphical display of a GSIM project in two "views" accessed by clicking the Interlockings, Scripts or Logs tab at the bottom of the window. See:

- section 3.3.1 for details of the Interlockings tab;
- section 3.3.2 for details of the Scripts tab;
- section 3.3.3 for details of the Logs tab.

3.3.1 Interlockings Tab

The Interlockings tab uses a tree view to display detailed project information, including details of NCDM WSL/S2 network sessions and client applications. See figures 3.11 and 3.12.

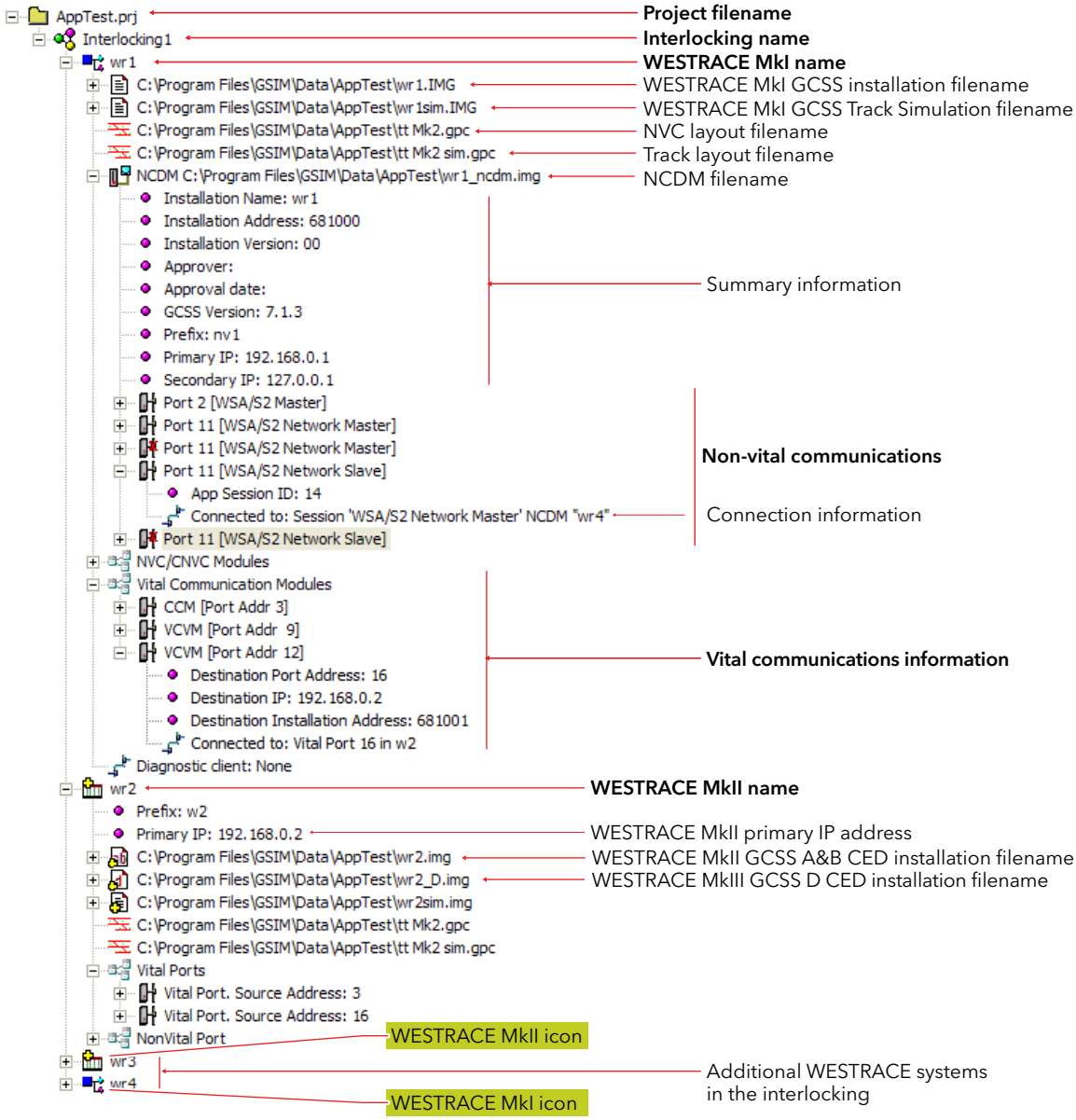


Figure 3.11 Project Workspace window: Interlockings tab (example 1)

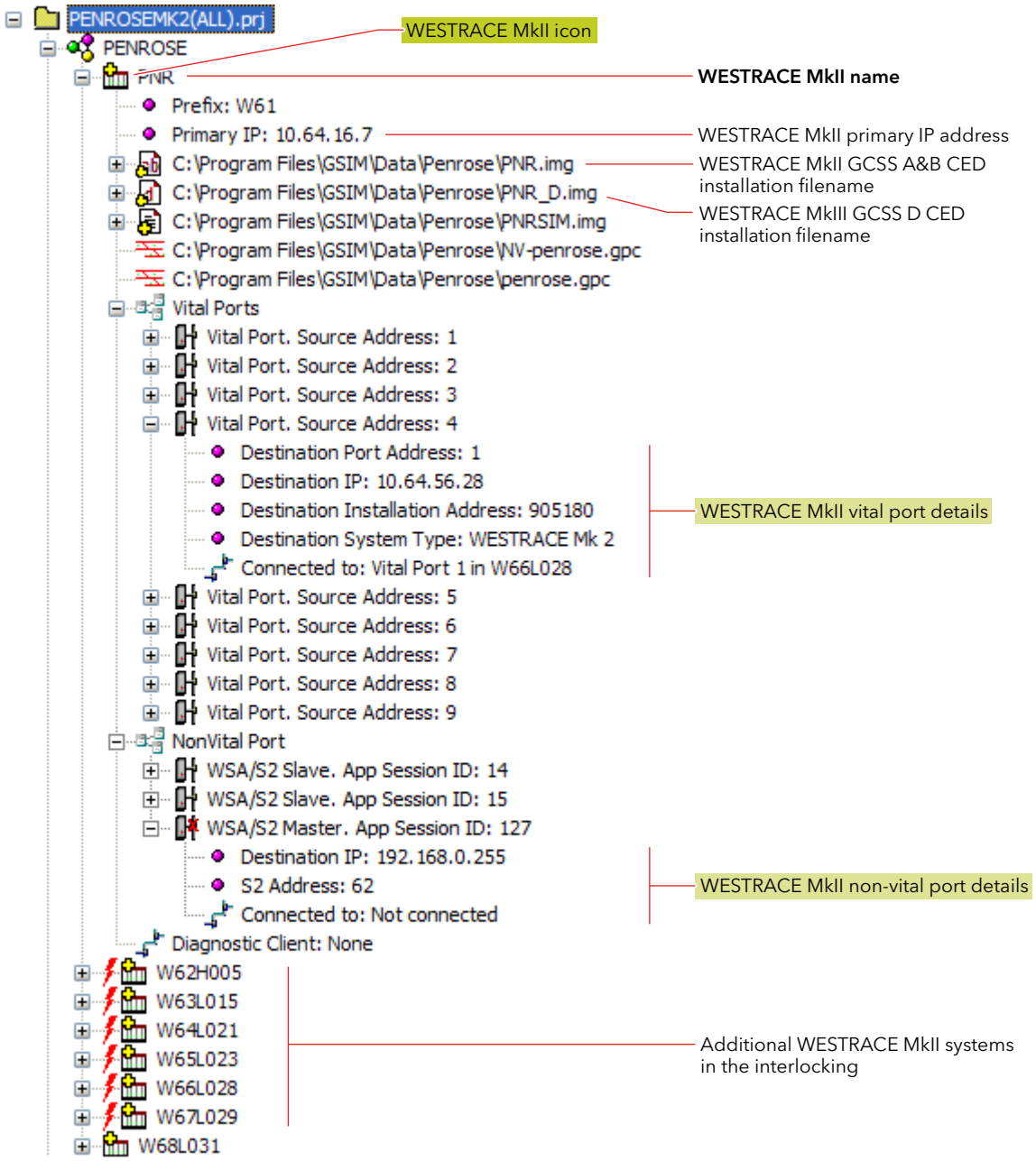


Figure 3.12 Project Workspace window: Interlockings tab (example 2)—vital port details

NOTE: The port numbers that GSIM assigns to NCDM serial and network ports do not correspond to the port numbers shown in GCSS. This reflects how the real NCDM operates. (Neither GSIM nor the NCDM use GCSS port numbers.) You must check the contents of ports (protocol types, housing and application session IDs, etc) against what is configured in GCSS.

A new or opened project is displayed in Project Workspace window with the project filename and a "+" box to the left of the folder. Click the "+" box to display the contents of the folder.

A project folder may contain one or more interlockings (which may contain one or more interconnected WESTRACE installations).

NOTE: GSIM shows the VLM and PM installation CED version number in decimal and the NVLM version number in hexadecimal. This reflects the way the information is stored in the image file.

NOTE: GSIM only displays the ports and network sessions that it simulates (therefore it does not display diagnostic port details).

Each WESTRACE MkI installation must contain the following:

- a vital logic image file (.img file)
- a field image file (sim.img file)
- a NVC layout file (.gpc file) which may be shared by all the WESTRACE installations (of either type) in the interlocking
- a track layout file (sim.gpc file) which likewise can be common to all WESTRACEs in the interlocking)
- a vital communications module (in multi-WESTRACE projects)

Each WESTRACE MkI installation may also contain:

- a non–vital logic image file (_nvcdm.img or _ncdm.img file)
- vital serial telemetry modules
- non–vital serial modules

Each WESTRACE MkII installation may contain:

- a PM image file (CED data for Processor A and B; .img file)
- a Processor D image file (non–vital communications data; _D.img file)
- an NVC layout file (.gpc file), which may be shared by all the WESTRACE installations (of either type) in the interlocking
- a track layout file (sim.gpc file), which likewise can be common to all WESTRACEs in the interlocking)

The red lightning bolt and cross shown in figure 3.13 are warnings that one or more of the vital or non-vital (respectively) communications modules in this WESTRACE are not connected to the modules at the other end of the link.

This may be because the WESTRACE at the other end of the link is not in the GSIM project, or because there is an error in the way that the modules have been configured in GCSS.

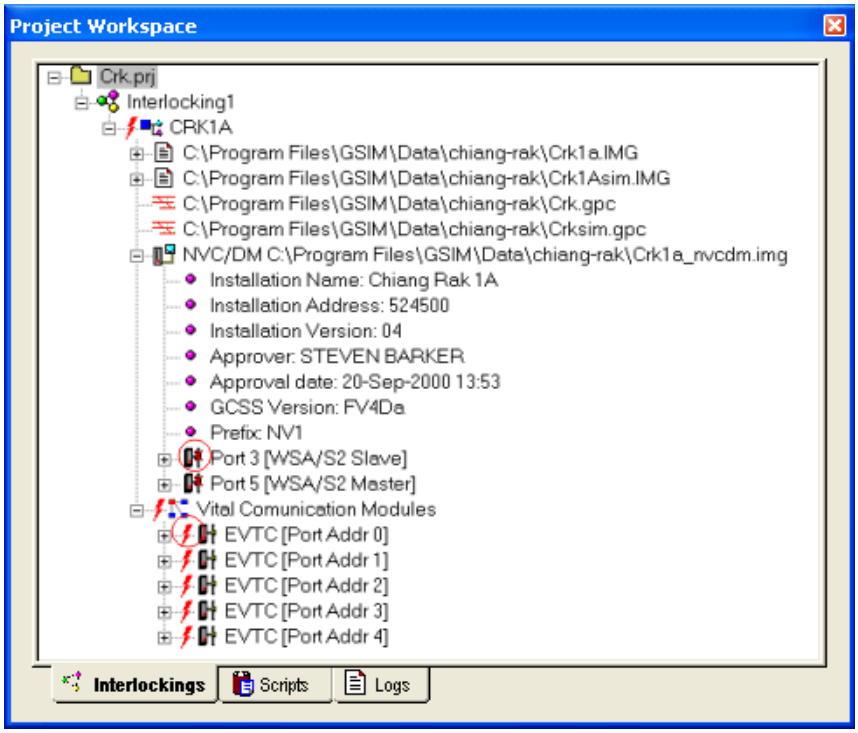


Figure 3.13 "Not connected" icons (circled)

3.3.2 Scripts Tab

The Scripts tab of the Project Workspace window displays the scripts and batch files associated with the project, and any results files generated from running the scripts and batches.

Click the "+" box to the left of a tree branch to display the contents of the branch.

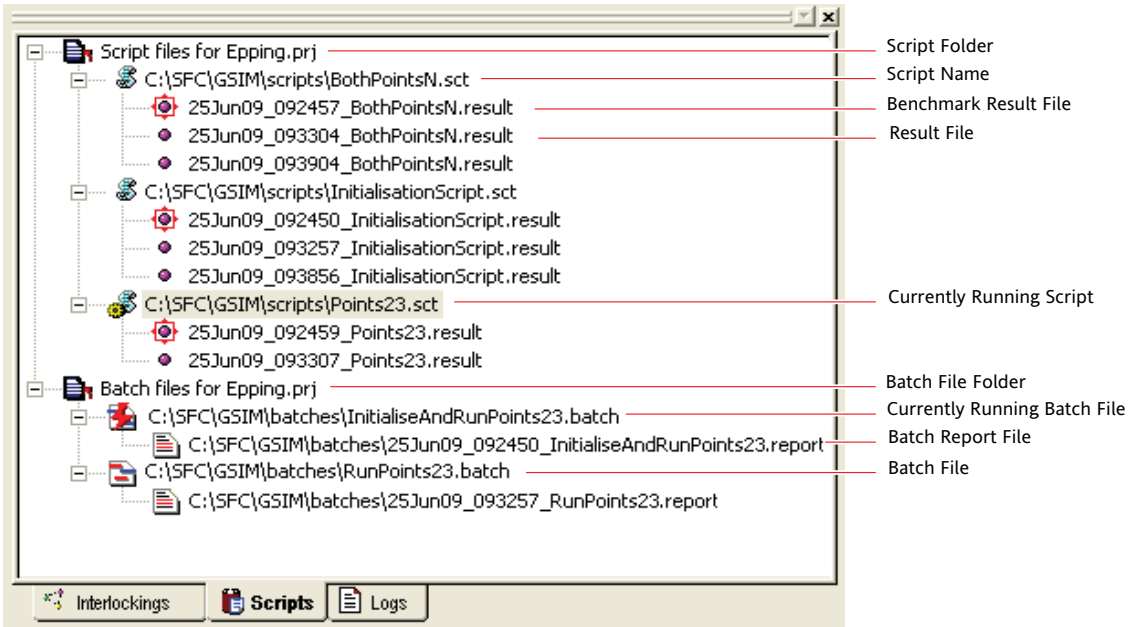


Figure 3.14 Project Workspace window: Scripts tab

The icons next to the file names indicate the type and status of the file. Table 3.1 lists the icons used.

Table 3.1 Scripts tab file type and status

Icon	Description
	Script file
	Currently running script file
	Result file
	Benchmark result file
	Batch File
	Currently running batch file
	Batch Summary Report file

3.3.3 Logs Tab

The Logs tab (formerly the Tests tab) of the Project Workspace window displays the project folder with the project filename.

Click the "+" box to the left of the folder to display the contents of the folder.

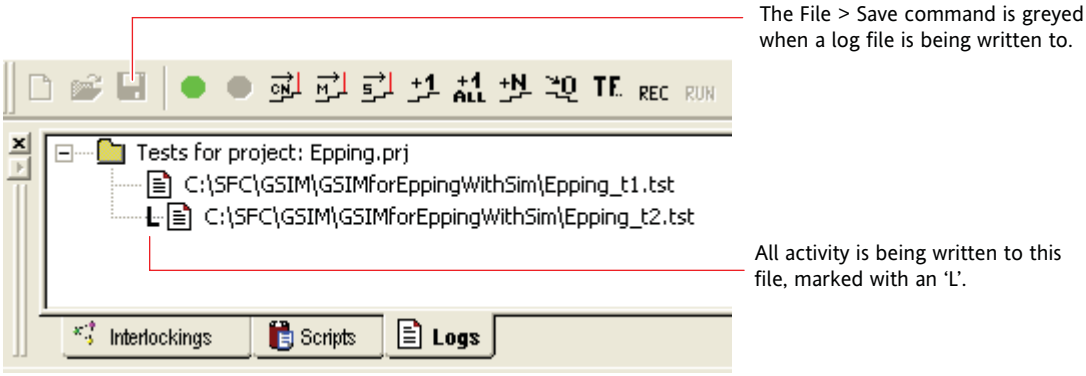


Figure 3.15 Project Workspace window: Logs tab

3.4 Simulation Summary Window

Use the Simulation Summary window to view the current condition of each WESTRACE installation in the project.

GSIM displays the Simulation Summary window for every session unless the window has been hidden using the View menu or the window's Close box.

Figure 3.16 shows a typical Simulation Summary window.

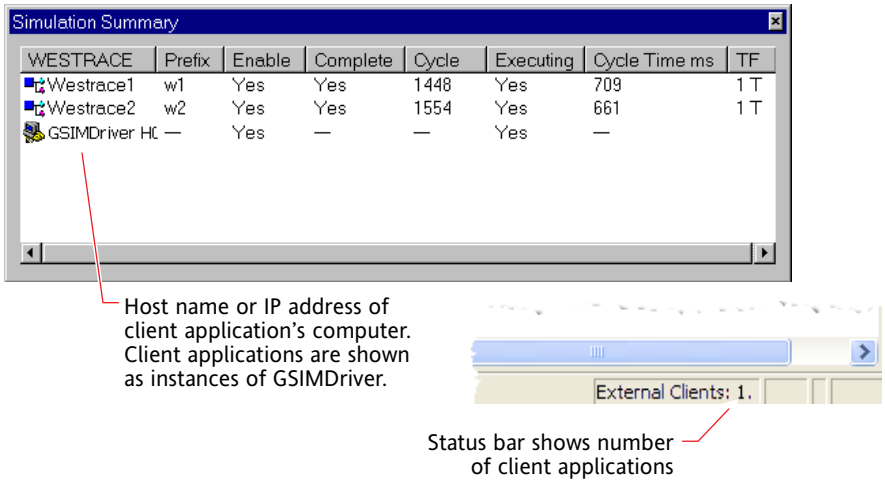


Figure 3.16 Simulation Summary window (and right-hand end of status bar)

Each WESTRACE installation is displayed in a row, with summary details arranged in columns. Table 3.2 describes the columns.

Table 3.2 Description of the Simulation Summary Window

Column Head	Explanation
WESTRACE	the name assigned to each WESTRACE installation. The WESTRACE name is typically the same as the installation name. Client applications will be shown in this column of the window even though they are not really WESTRACEs. They are shown there as a reminder that their mnemonic inputs (if any) may affect the simulation along with the WESTRACEs in the project.
Prefix	typically a "W" followed by a numeral (1, 2, 3 …). The mnemonic prefix (followed by a hyphen) is also used in the GPC and TXT files, for multi-WESTRACE installations, see section 2.5.7.7.
Enable	• "Yes" indicates that the WESTRACE is currently enabled (default setting). • "No" indicates that the WESTRACE is currently disabled. A disabled WESTRACE installation is isolated from receiving a Run command.
Complete	• "Yes" indicates that each of the WESTRACE's vital communications modules has a corresponding vital communications module in an adjacent WESTRACE. • "No" indicates that at least one of the WESTRACE's vital communications modules does not have a corresponding vital communications module in an adjacent WESTRACE.
Cycle	indicates for each WESTRACE the current number of logic cycles that have been executed.

Table 3.2 Description of the Simulation Summary Window *(Continued)*

Column Head	Explanation
Executing	• "Yes" indicates that one of the Run type commands has been issued to the WESTRACE, and the command is currently executing. Run type commands are described in section 4.11. • "No" indicates that one of the Run type commands is not currently executing. For example, if "Run Until …" conditions have been met, the indication changes from Yes to No to indicate that logic evaluation cycles are no longer occurring. See section 4.11 for details about Run type commands.
Cycle Time ms	The estimated number of milliseconds it takes for the WESTRACE to execute one logic cycle (see section 2.5.7).
TF	The time factor currently applied to the project (see section 4.11.10).

3.5 Command Monitor Window

Use the Command Monitor window to see the simulation commands that have been executed in the current session for each WESTRACE installation (see section 4.11 for details of each command). The most recent command appears at the bottom of the window.

GSIM displays the Command Monitor window for every session unless the window has been closed using the View menu or the window's Close box.

The Command Monitor window lists each command, followed by:

- the name assigned to the WESTRACE installation, with the installation ID in brackets;
- additional WESTRACE installations to which the command applies;
- the scheduler's timestamps to help analyse the timing of events.

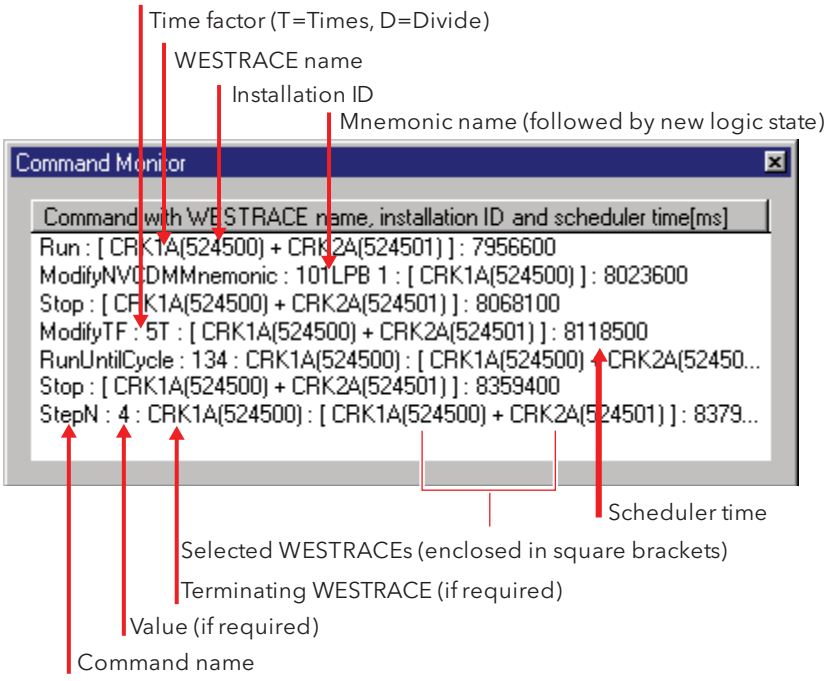


Figure 3.17 Command Monitor window

See section 4.11 for details about commands.

3.6 Mnemonic Event Monitor Window

The Mnemonic Event Monitor window is a real-time display that shows all mnemonic events (changes of state).

Input/Output type mnemonics are mnemonics that are inputs (via an input or communications module) that are also mapped as outputs (from an output module or communications module).

Only mnemonic events from the installation are displayed. (By default, track equipment mnemonics of interest are shown as part of the installation event display).

The Mnemonic Event Monitor window (figure 3.18) displays:

- WESTRACE installation name
- mnemonic name
- mnemonic value (state)
- cycle number in which the event occurred

A line down the left edge of the Event Monitor window shows when the event list may be incomplete due to one or more active mnemonic event filters (see section 4.9.2 “Filtering Mnemonic Events”):

- The brown dashed line indicates when at least one event filter was active. This serves as a reminder that changes in mnemonics which match the filters are not shown.
- The grey dashed line indicates when no event filters were active. Every mnemonic event is shown in this area of the window.

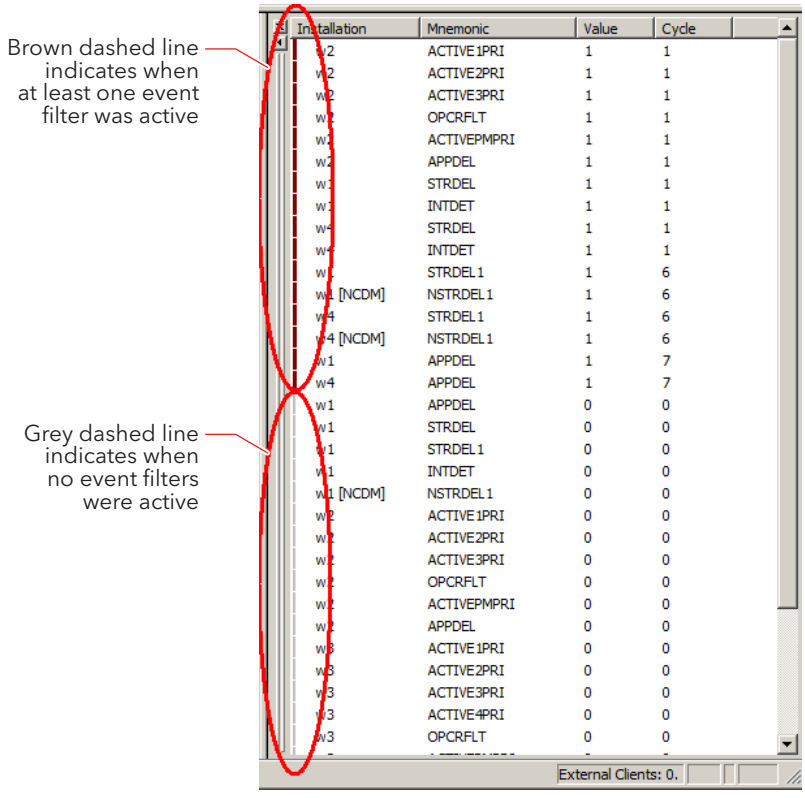


Figure 3.18 Mnemonic Event Monitor window

3.7 Mnemonic Viewer Windows

Use the Mnemonic Viewer window to view and modify (as applicable) the mnemonics of each WESTRACE installation.

The Mnemonic Viewer window gives the Signal Engineer access to an installation's mnemonics. During a simulation, mnemonics can be viewed and input mnemonics can be changed in order to test the operation of the logic.

The heading of the mnemonic column indicates the name of the WESTRACE, whether the module is a VLM, NVLM or PM and if the mnemonics are for an installation or a field.

The Mnemonic Viewer windows contain three columns:

- mnemonic name;
- value—to indicate the current logic state of the mnemonic (0 or 1);
- category—to indicate the following mnemonic types:
  - Input;
  - Output;
  - Input/Output;
  - Latch (includes timer);
  - Reserved;
  - TOD (Time of Day) Timer (This only applies to PM, NVC/DM and NCDM windows).

Typical Mnemonic viewer windows are displayed in the following figures:

- VLM: figure 3.19
- Field: figure 3.20
- NVC/DM: figure 3.21
- NCDM: figure 3.22
- PM: figure 3.23

Icons in the left side of the installation Mnemonic Viewer window indicate each mnemonic's toggling status (see section 4.8.4).

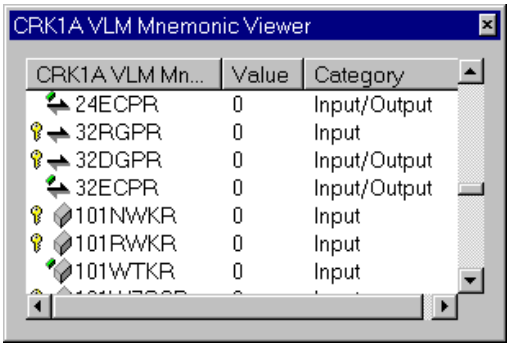


Figure 3.19 VLM Mnemonic Viewer window

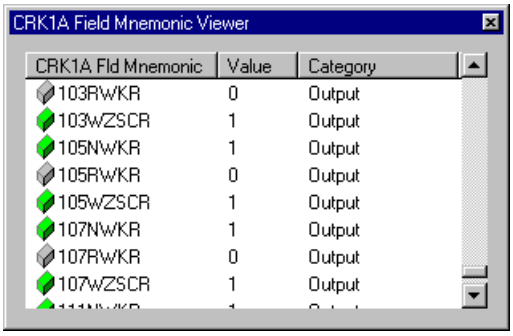


Figure 3.20 Field Mnemonic Viewer window

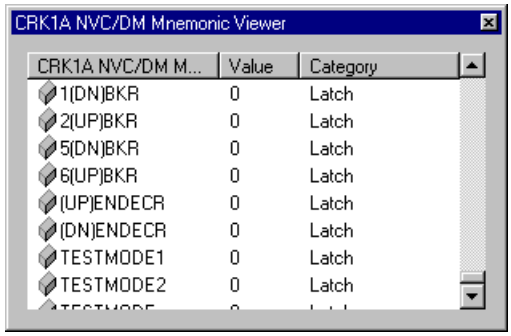


Figure 3.21 NVC/DM Mnemonic Viewer window

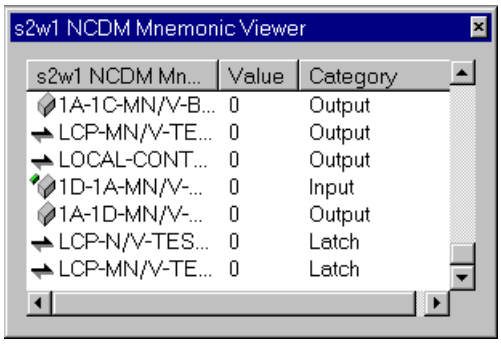


Figure 3.22 NCDM Mnemonic Viewer window

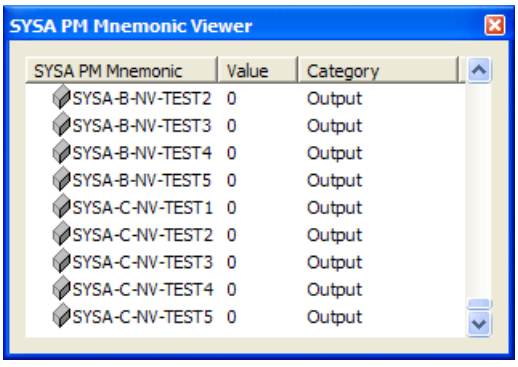


Figure 3.23 PM Mnemonic Viewer window

The Mnemonic Viewer icons are shown in figure 3.24.

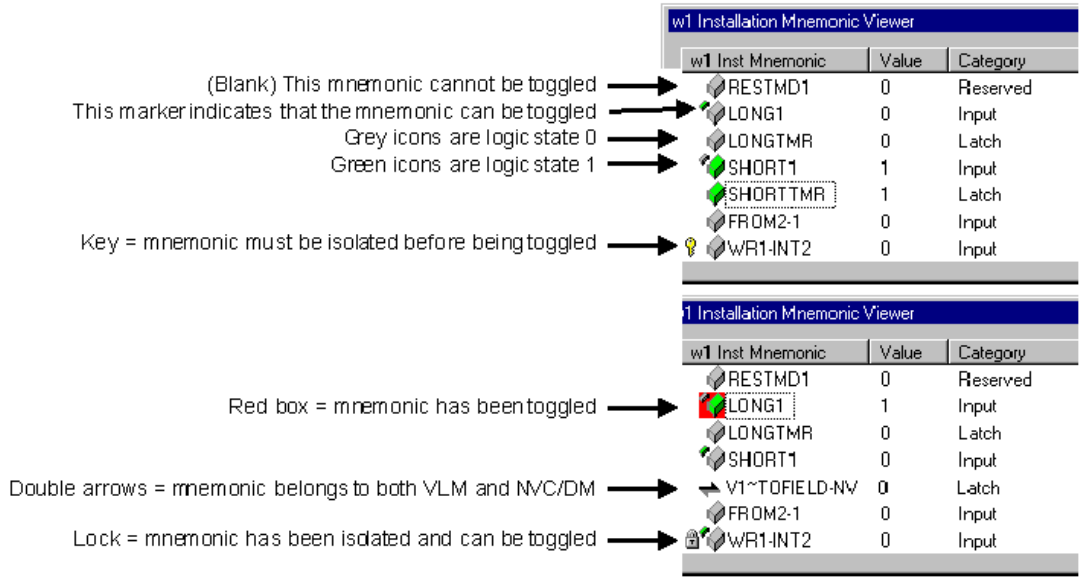


Figure 3.24 Mnemonic Viewer window icons

3.8 Log Viewer Window

Use the Log Viewer window to view or print the contents of the project's log files.

The Log Viewer window displays the contents of log files and enables the File > Print command.

A typical log file is described in Appendix A.

3.9 Non-Vital Control Window

Use the NVC window as a simulated LCP to view and control the WESTRACE installations being tested, where you are not using a client control application.

The NVC window contains the screen elements and controls that the Signal Engineer or designer chose to incorporate into the window when designing it. The following illustrations and descriptions are based on a typical example of design for the WESTRACE Graphical Simulator.

The NVC window can be set up to display:

- indications such as lamp aspects and points;
- route locking status;
- track occupancy;
- selected mnemonics with control boxes to toggle the mnemonics' states.

An example of a NVC window is shown in figure 3.25.

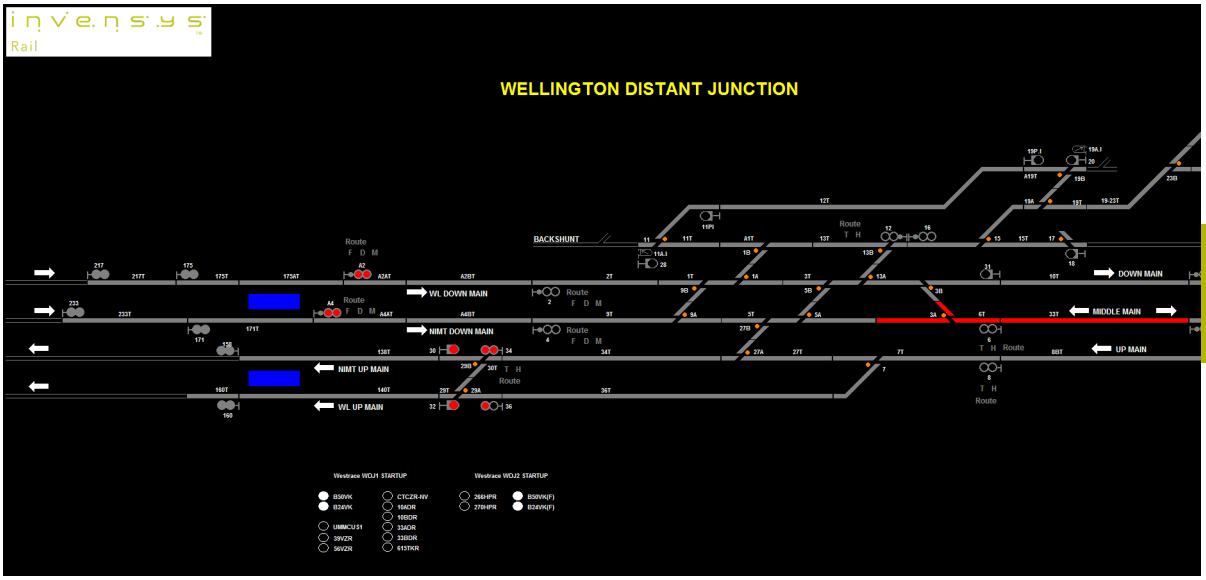


Figure 3.25 Non-Vital Control (NVC) window

3.9.1 Setting and Cancelling Routes

Click on a signal to open the Set or Cancel Route pop-up menu. A typical Set or Cancel Route pop-up menu can be seen on the left side of figure 3.26.

With the Set or Cancel Route pop-up menu, the user can:

- select Set Route to open a sub-menu of route options;
- select Cancel Route to open a sub-menu of route options;
- select Cancel to close the pop-up menu.

NOTE: Figure 3.26 is for illustration purposes. GSIM does not display a Set or Cancel Route pop-up menu at the same time as a Points dialog box.

The route options listed in the Set or Cancel Route pop-up menu will vary according to the needs of the Railway and is determined by the options incorporated into the diagram by the Signal Engineer or designer.

The routes that appear in the sub-menus are configurable for each application and are defined in the .TXT file (see section 5.8.1, Appendix D).

Clicking the option list will set or cancel the route, depending on the previous menu selection.

NOTE: These are not toggling commands. Double-clicking a route does not toggle between setting and cancelling.

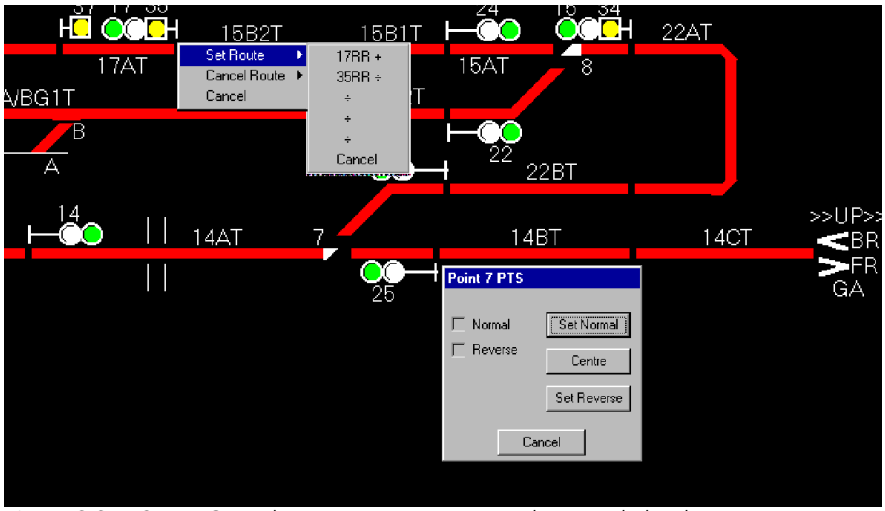


Figure 3.26 Set or Cancel Route pop-up menu and Points dialog box

3.9.2 Setting Points

Click on the screen element for points (at the intersection of two tracks) to open the Points dialog box. A typical Points dialog box can be seen on the right side of figure 3.26. The left side of the dialog box contains check boxes to indicate the current state of the points.

The buttons in the Points dialog box will either be active (black label text) or de-activated (grey label text). In a typical turnout, selecting an active button will produce the following results:

- Click the Normal button to set the points normal. If you view the Points dialog box again, the Normal button will be greyed.
- Click the Reverse button to set the points reverse. If you view the Points dialog box again, the Reverse button will be greyed.
- Click the Centre button to remove any points command to the interlocking. If you view the Points dialog box again, both the Normal and the Reverse buttons will be active.
- Click Cancel to exit the Points dialog box.

The Points dialog boxes are configurable for each application and are defined in the .TXT or .GUI file (see section 5.8.1 and Appendix D).

3.10 Track Window

Use the Track window as a simulated track layout to view and control the states of the field equipment.

The Track window represents the state of the field equipment and contains the screen elements and controls that the Signal Engineer or designer chose to incorporate into the window when designing it. The following illustrations and descriptions are based on a typical example of design for GSIM.

The Track window contains the controls designed by the Signal Engineer. These controls typically indicate:

- track occupancy;
- point detection;
- lamps filaments;
- lists of mnemonics with control boxes beside the names.

A typical Track window is shown in figure 3.27.

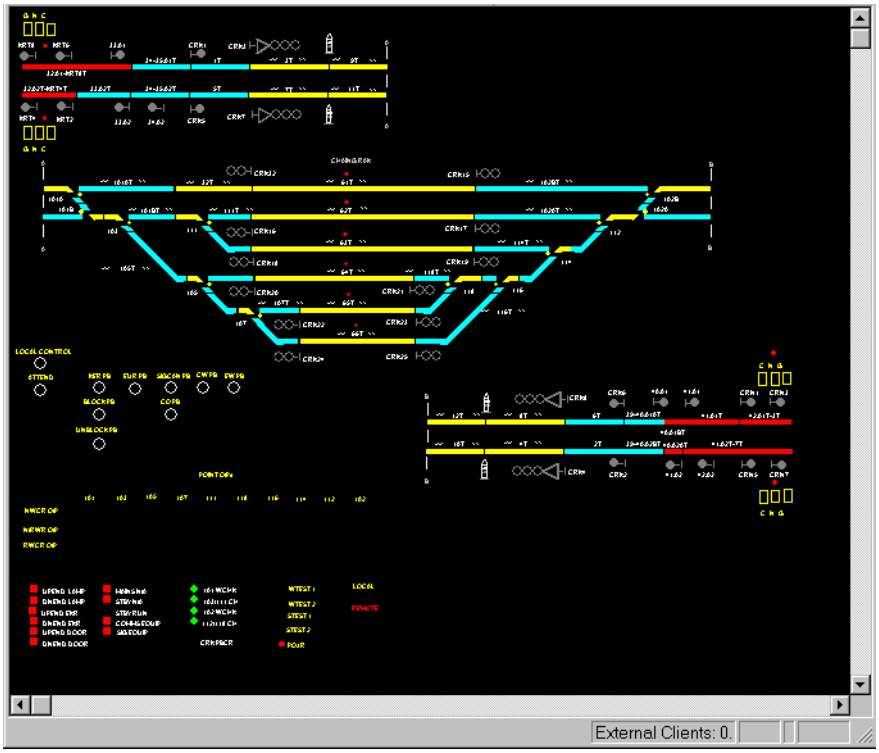


Figure 3.27 Track window

In the example shown in figure 3.27, users can toggle a logic state of tracks (for track occupancy) and boxes (for boundary indications) in the Track window by clicking the display element. Alternatively, the logic can be toggled if the toggle command has been defined accordingly in the TXT file (section 5.8.1).

The option also exists to toggle some input mnemonics in the field logic (SIM.IMG, section 5.6.3) using the Track window. Only inputs that are not mapped to installation outputs can be modified by the user. These mnemonics cannot be toggled via the SIM.IMG mnemonic viewer. They can

be toggled only using the track window and therefore the SIM.GPC file must contain a graphical element linked to each mnemonic that the Signal Engineer wants to make modifiable.

The SIM.GPC and SIM.TXT files are prepared as described in section 5.7 except that a special marker (an exclamation mark "**!**") is added to the front of the prefixed mnemonic to indicate to GSIM that the mnemonic is an input in the field logic and not in the installation logic.

Example: The field logic SIM.IMG of an installation with vital prefix "w1" contains a VPIM input **1HZR** that is not directly mapped to any installation output. To toggle this mnemonic from the Track window, use PCGE to add a graphic element linked to the mnemonic **!w1-1HZR** to the SIM.GPC file.

3.11 GSIMDriver

GSIMDriver is a GSIM application that exchanges mnemonic state changes with client applications. The GSIMDriver window contains:

- GSIM's location and connection status;
- GSIM's driver-to-client-application protocol;
- three tabs—Connection, Traffic and Statistics;
- a "configuration and startup" status bar.

3.11.1 Status Bar

The status bar (figure 3.28) changes from red to green only when:

- the GSIMDriver configuration file has been successfully processed, **and**;
- the external clients described in the configuration file have made initial contact with GSIMDriver.

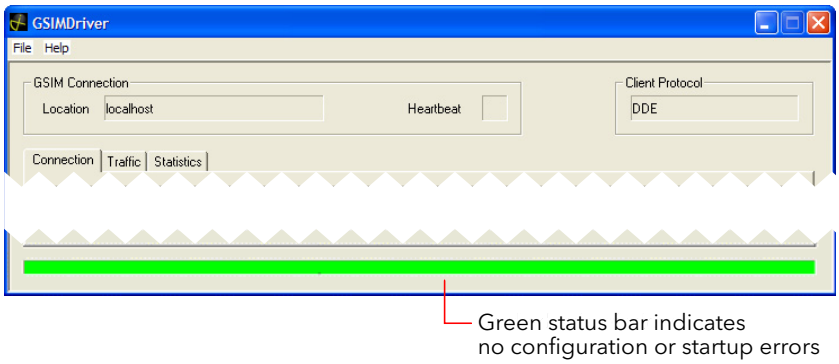


Figure 3.28 GSIMDriver: status bar

A green status bar indicates that there are no configuration or startup errors. It does not indicate other states (eg timeouts). These are shown by the Link State icons (figures 3.29 and 3.30).

3.11.2 Connection Tab

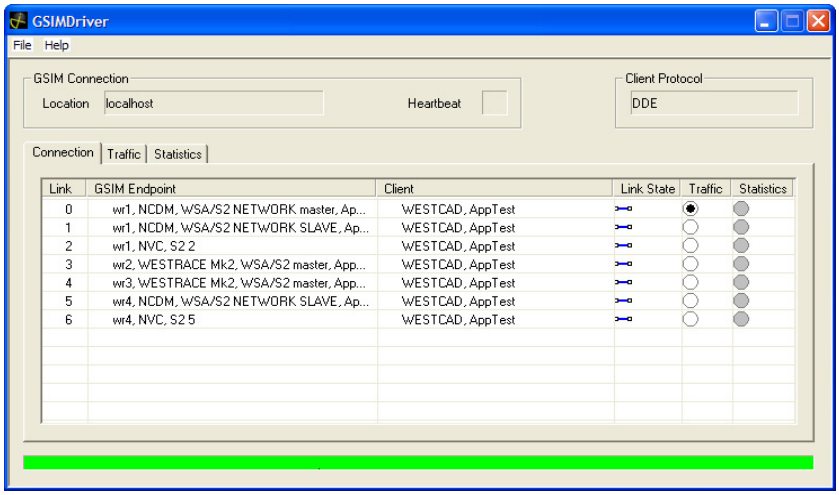


Figure 3.29 GSIMDriver: Connection tab

The Connection tab shows all the connections between GSIM endpoints and client applications. The information can be used to confirm that the GSIMDriver configuration file has been processed as expected.

Each connection is assigned a Link number in the Connection tab that you can use to identify it in the other tabs. For example, the number you choose in the Link control on the Traffic tab (figure 3.31) or the Statistics tab (figure 3.32) refers to the Link number assigned in the Connection tab.

The Connection tab also shows the state of individual driver-to-application connections (figure 3.30).

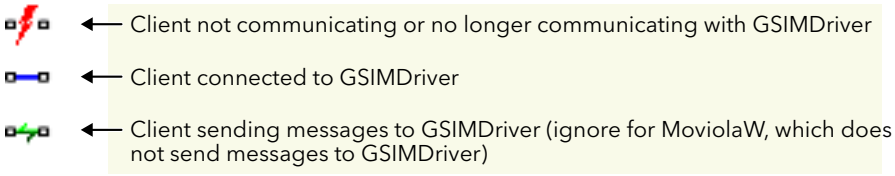


Figure 3.30 Connection tab: Link State icons

The Connection tab allows the user to choose a connection for display on the other two tabs. On the Connection tab:

- Click a Traffic radio button to choose which connection's traffic you want displayed on the Traffic tab (equivalent to using the Link control on the Traffic tab).
  When no radio button is selected, the Traffic tab displays the change of state of all mnemonics for all connections (equivalent to ticking **Show All** on the Traffic tab).
- Click a Statistics radio button to choose which connection's network statistics you want displayed on the Statistics tab (equivalent to using the Link control on the Statistics tab).

3.11.3 Traffic Tab

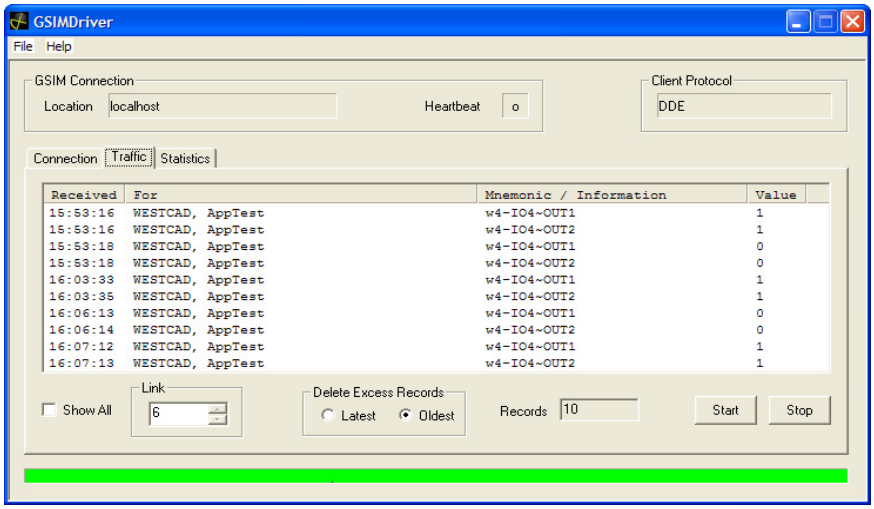


Figure 3.31 GSIMDriver: Traffic tab

The Traffic tab shows the mnemonics exchanged between GSIM and GSIMDriver for:

- all connections—tick **Show All** (ticked by default);
- one connection—un-tick **Show All** and use the **Link** control to select the connection (or click the connection's Traffic radio button on the Connection tab).

The Traffic tab keeps 10000 records (lines) for display. The counter becomes highlighted when the limit is reached.

The default behaviour of the display is to discard the earliest records and keep the **Latest** records. You can also choose to keep the **Oldest** records (useful to record startup traffic).

Click **Stop** to stop the display of new mnemonics. Click **Start** to clear the records and start displaying again.

3.11.4 Statistics Tab

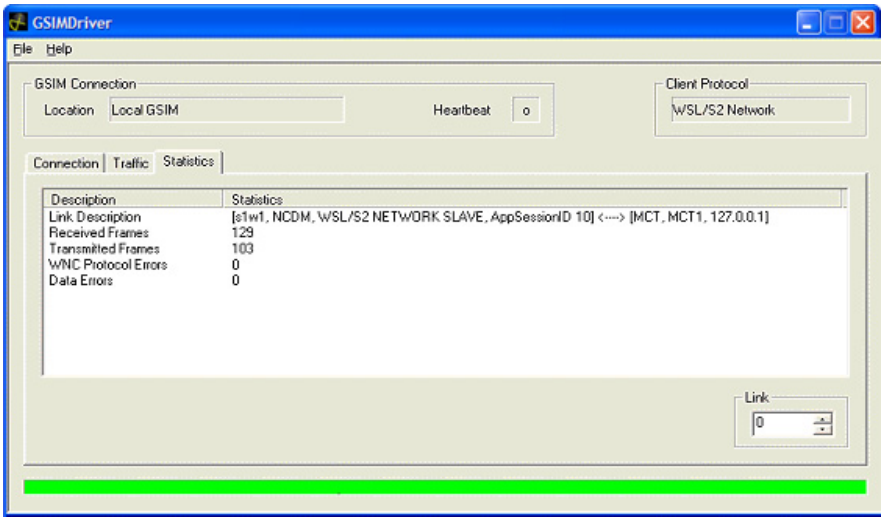


Figure 3.32 GSIMDriver: Statistics tab

The Statistics tab displays a connection's network statistics.

Use the Link control to select the connection (or click the connection's Statistics radio button on the Connection tab).The link number is determined in the Connection tab.

4. USING GSIM

Chapter Contents

NOTE: Application-specific files must be stored in appropriate drives and directories before GSIM can be run. This chapter assumes that these files are correctly located. (See section 5.4 for details about the location of simulation files.)

4.1 Appropriate Use of GSIM

The warnings in this section apply to the use of the GSIM tool for testing WESTRACE installations.

- The use of GSIM for testing WESTRACE installations is limited to staff defined in section 1.2.3 of this manual.
- GSIM must only be used for formal approval testing in accordance with the responsible organisation's safety and work practices, agreed with end user railway, where required.
- GSIM is a computer-based simulation suite, replacing some hardwired functions of conventional testing. GSIM will have minor impact on testing processes previously used for testing interlocking equipment. The organisation using GSIM is responsible for ensuring that processes are defined and appropriate to both the testing function and the GSIM tool and that they are correctly followed. Information in this manual is primarily limited to how to use the tool and some guidelines for consideration in defining the testing process.
- The tester responsible must verify that the Non-Vital Control and the Track window icons correspond correctly with the commands and

indications of the logic mnemonics in GSIM mnemonic viewer before using GSIM for testing (correspondence check—section 5.11).

- Do not use GSIM for testing of timings or response times for WESTRACE installations.
- Discard results and report any incidents that may be due to incorrect functioning of the GSIM tool to the GSIM Design Authority—see section 1.5.

4.2 Startup Order

1. Start GSIM, load the GSIM project that you want to use, then start the simulation.
2. Start GSIMDriver.
   The GSIMDriver GUI shows all the configured vital ports and indicates whether communication is taking place with each port.
3. If GSIMDriver is configured as a loadable driver for WESTCAD or MoviolaW, start the application.
   If GSIMDriver is configured as a network driver for the WNC protocols, start GSIMDriver, then start the external device or application.

The recommended shutdown order is the reverse of the startup order.

4.3 Getting Ready

A GSIM project uses a collection of files that relate to one or more WESTRACE installations. These files are described in table 5.1.

Some files may be common to all the WESTRACE installations in the project. For example, the graphics files for the NVC and Track windows (GPC and SIM.GPC files) are typically used by each of the WESTRACE installations of either type in the interlocking.

The installation image files and field simulation image files (IMG file and SIM.IMG file) are specific to each WESTRACE installation.

Assemble the files for each WESTRACE installation to be contained in a project and store them in an appropriate location. See Chapter 5 for details.

NOTE: The graphic's CFG file must reside in the same folder as the project's GPC file, and the project's SIM.CFG file must reside in the same folder as the project's SIM.GPC file

NOTE: GSIM requires at least 100 MB of free hard disk space to run. GSIM warns you if there is less than 100 MB of free space.

NOTE: GSIM has not been validated with projects that contain more than 15 WESTRACE installations, and warns you when you exceed this number.

4.4 Testing WESTRACE Logic

This section is an overview of testing WESTRACE application logic using GSIM.

4.4.1 Prerequisites

Before testing WESTRACE logic ensure:

- GSIM is correctly installed (see Chapter 6);
- GSIMDriver and its configuration file have been installed on the same computer as the client application (see section 6.2) and correctly configured (see section 5.10.2);
- any client applications to be used to communicate with GSIM during the tests—WESTCAD, MoviolaW or MCT—are correctly installed and configured (see section 5.10);
- computers for GSIM and client applications are connected over a network;
- a GSIM project has been prepared (see Chapter 5);
- matching data has been created for any application to be used with GSIM in the simulation session.

  Mnemonic names must be the same in both GSIM and all client applications. Otherwise the mnemonic states will not be passed between GSIM and the interlocking application. For interlockings with multiple WESTRACEs, the mnemonics must be prefixed in the graphic data (see section 2.5.7.7) for both the GSIM and the interlocking application.

NOTE: Exit all other applications and disable screen-savers prior to using GSIM.

4.4.2 Stand-Alone GSIM

To use GSIM by itself (without client applications):

a) Start GSIM by double-clicking its icon on the desktop or through the windows start menu. GSIM displays the main window (figure 3.1).

b) Create a new project if required. See section 4.5.

c) Open the GSIM project to be used in the simulation. See section 4.6.

d) Carry out a correspondence check if required. See section 5.11.

e) Start logging to an appropriate log file. See section 4.10.

In each session, GSIM displays the following items:

- Toolbar (see section 3.2);
- Status bar (see section 3.2);
- Project Workspace Window (see section 3.3);
- Simulation Summary Window (see section 3.4);
- Command Monitor Window (see section 3.5);
- Mnemonic Event Monitor Window (see section 3.6).

4.4.3 GSIM and the WESTRACE Automatic Testing Tool (WATT)

This section describes the use of GSIM with the WESTRACE Automatic Testing Tool (WATT). See section 4.4.4 for the use of GSIM with all other supported client applications.

WATT uses GSIM as a logic engine and makes no use of the GSIM GUI (Graphical User Interface). To guarantee that the WATT has exclusive use of GSIM, GSIM will not accept a connection from a WATT external application if it has already been started manually by a local user. GSIM will not be visible when it is running under the control of the WATT.

NOTE: The WATT does not use GSIMDriver and does not require any GSIMDriver configuration files to be edited.

To use GSIM with WATT:

a) Start WATT.

   Refer to the troubleshooting guide located in Appendix C if GSIM fails to start on command from WATT.

   GSIM places an icon in Windows' system tray (figure 4.1). to show that GSIM is successfully initialised. (GSIM error messages are displayed in the WATT GUI.)

Figure 4.1 GSIM icon

b) Check for correct communication and operation.

   If any checks fail, consult the troubleshooting table in Appendix C.

c) Run a simulation session using WATT.

NOTE: At the end of a WATT session, be sure to stop logging (if you are logging) and close the project BEFORE exiting GSIM.

4.4.4 GSIM and Client Applications

GSIM can talk to the client applications listed in section 2.1. GSIM does this via GSIMDriver, which must be on the same PC as the client. GSIM itself does not have to be on the same PC providing the two PCs are connected by a local network.

NOTE: The client applications must use GSIMDriver to talk to GSIM even if GSIM and the application are both on the same PC.

NOTE: If you wish to log all mnemonic changes, always start GSIM, open a project and start logging BEFORE starting the remote application.

To use GSIM with client applications:

a) start GSIM by double-clicking its icon on the desktop or through the windows start menu. GSIM will display the main window (figure 3.1);
   See also section 4.2 “Startup Order”.

b) create a new project if required. See section 4.5;

c) open the GSIM project to be used in the simulation and start logging to an appropriate log file;

d) run GSIMDriver.exe and wait until the display indicates it has connected to GSIM. (See section 3.11 for GSIMDriver interface);
   If the main status bar is red, note any error message shown and take appropriate action (see Appendix C).

e) run the client application;

f) carry out the Remote Application Check in section 4.4.5, before proceeding to run any tests. This confirms that GSIM and its client applications have successfully established communication. If any of the checks in section 4.4.5 fail, consult the troubleshooting table in Appendix C.

g) after the simulation session is finished, close the client application before closing GSIM. This guarantees that GSIM's log is complete (if you are logging in GSIM).

NOTE: Timing may not be correctly simulated.

4.4.5 Remote Application Check

After a client application connects to GSIM, carry out the following checks to ensure the setup is correct:

a) Check that the GSIMDriver status bar (figure 3.28) is green.

If the GSIMDriver status bar is red and there is an error message describing the problem, you must fix the problem (see Appendix C) then re-start GSIMDriver.

If the GSIMDriver status bar is red but there is no error message, GSIMDriver is unsure of the state of the client application. You must confirm that the client application is correctly configured and is operating before going to the next step. Do this as follows:

- **MoviolaW** Toggle a mnemonic in GSIM and check that it changes in MoviolaW. Also check that the GSIMDriver status bar changes to green (verifies that GSIMDriver has successfully processed the change of state).
- **WESTCAD** Toggle a control in WESTCAD and confirm the change in GSIM. Also check that the GSIMDriver status bar changes to green when the first control is toggled (verifies that GSIMDriver has successfully processed the change of state).
- **WSL/S2 network clients (MCT and DMC clients)** Check the IP and UDP port configurations at both ends of all links.
  (Each WSL/S2 master session must configure its slave housing according to the protocol. A red status bar means that one or more slave sessions has not been sent a cardfit message; GSIMDriver is unsure if all master sessions are correctly configured in the MCT, or reachable across the network.)
- **WNC and WNC+ Vital network clients** Check the IP addresses that were configured for the vital port using GCSS. Check that the external client's configuration data matches that in the vital port in GSIM. Because this is a vital protocol, **all** port addresses as well as data items like Compatibility Index and Product Data Version must match across the link. Otherwise either GSIMDriver or the external device or application will reject the data frame.
- **S2oE (WSA/S2) network clients** Check that IP addresses are correct at both the GSIM and external application ends. The S2oE master end in GSIMDriver needs to see a reply from its slave before it indicates that a connection has been achieved.

b) Check that the GSIM location is correct in the Location field (figure 3.29).

c) Check that the protocol shown in the Client Protocol field of the GSIMDriver Connection tab (figure 3.29) matches the protocol of the client application (WESTCAD, MoviolaW or MCT).

d) Check that the Simulation Summary window (figure 3.16) shows the client application(s) as part of the open project.

The GSIM status bar (figure 3.16) shows the number of connected client applications.

e) Confirm that the interlocking data in the open GSIM project matches that in the other application.

GSIM's NVC window should show an interlocking that matches the one in the client application.

f) Minimise the GSIMDriver window or hide it behind the application's main window.

   There is no need to watch the GSIMDriver display during the simulation.

g) Toggle some mnemonics to check that they respond as expected in both GSIM and the client application.

4.4.6 Simulation Session

A typical GSIM simulation session involves:

a) open the NVC and Track windows (if present, see section 4.7);

b) initialize the simulation by one of:
   - Running a designated script to initialize the simulation (this is the preferred option); or
   - Opening the appropriate mnemonic viewers (see section 4.8) and toggling the required mnemonics to establish the required starting point. Alternatively, some or all of the required mnemonics may be toggled by clicking the appropriate on-screen elements; or
   - Opening a track graphic file that has initialised states in its GUI or TXT file; or
   - Using the reserved name "Start_up" in the .TXT or .GUI file

c) GSIM only simulates WESTRACE applications. A connected client application only shows mnemonic changes from WESTRACE or those changed internally by the application;

d) Modify the Time Factor if required (see section 4.11.10);

e) Select a Run-type command to begin the simulation process. This causes the selected WESTRACE(s) to begin cycling. GSIM has a number of Run-type command options to suit various testing requirements (see section 4.11);

f) Conduct simulations by:
   - running designated test scripts;
   - using GSIM's graphic windows;
   - using an attached control panel application to manipulate mnemonics in GSIM.

   Installation control mnemonics can be modified either from the client application or from within GSIM.

g) Observe the results of the simulation on GSIM's graphic windows or mnemonic viewers and on the display of any connected client applications.

4.5 Creating a New Project

a) Right-click the Project Workspace and choose **New Project** (or choose **File** > **New Project**).

GSIM creates a project folder named "Untitled".

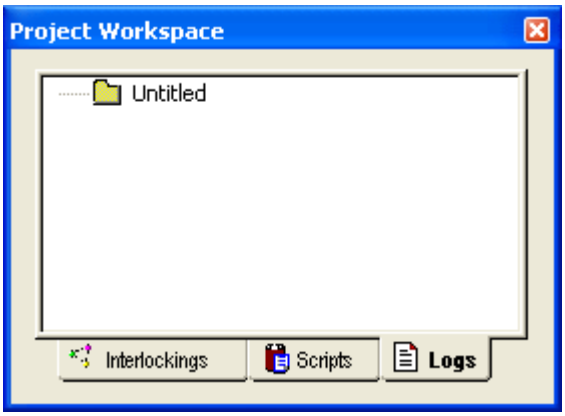


Figure 4.2 New project icon

b) Choose **File** > **Save Project** to save the project file using an appropriate filename.

Projects can be built up over any number of GSIM sessions by adding, deleting or renaming project components as described below.

4.5.1 Adding an Interlocking

a) Right-click the project folder.

b) Choose **New Interlocking** from the pop-up menu.

GSIM adds an interlocking icon to the projects folder—see figure 3.11.

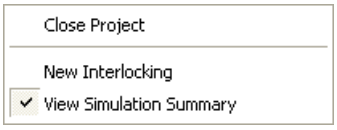


Figure 4.3 Project folder right-click menu

4.5.2 Editing an Interlocking Name

a) Right-click the interlocking icon.

b) Choose **Edit Interlocking** from the pop-up menu.

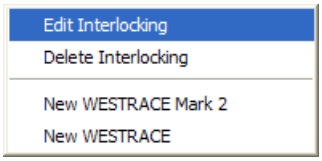


Figure 4.4 Interlocking icon right-click menu

c) In the "Enter new name…" dialog box, edit the interlocking name then click **OK**.

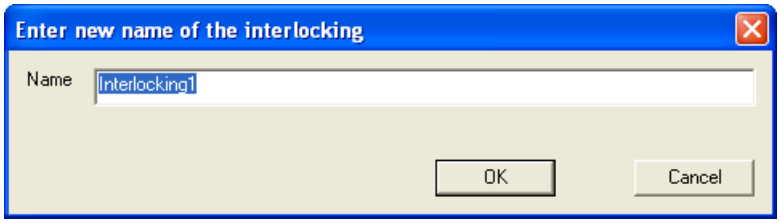


Figure 4.5 "Enter new name…" dialog box

d) Repeat for additional interlockings if required.

4.5.3 Adding a WESTRACE

NOTE: GSIM has not been validated with projects that contain more than 15 WESTRACE installations, and warns you when you exceed this number.

Add a WESTRACE installation by:

a) right-clicking the interlocking icon to invoke the pop-up menu shown in figure 4.4;

b) clicking:

- NEW WESTRACE MARK 2 to create a new WESTRACE MkII. See section 4.5.3.1 for details, or
- NEW WESTRACE to create a new WESTRACE MkI. See section 4.5.3.2 for details.

WESTRACE installations can be added to a project any time a simulation is not running.

NOTES: When adding WESTRACEs, keep in mind the following:

- Prefix codes are not required for single WESTRACE Installations that do not include a NVC/DM or NCDM. In such cases, leave the PREFIX field blank.
- Each WESTRACE must have a unique name. GSIM will provide a dialog box similar to figure 4.6 if a user tries to give two WESTRACEs the same name.

Figure 4.6 "Name already exists" warning

- A WESTRACE installation that contains a vital communications module is considered to be "incomplete" until the adjacent WESTRACE installation is added to the project.
  Figure 4.7 shows a Project Workspace window indicating "w1" as incomplete.

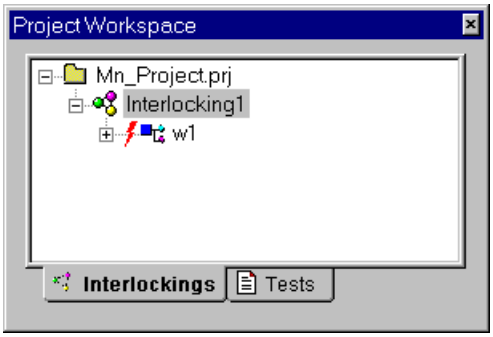


Figure 4.7 Icon for "incomplete" WESTRACE

4.5.3.1 Adding a WESTRACE MkII

GSIM will display a blank WESTRACE Mark 2 dialog box similar to figure 4.8.

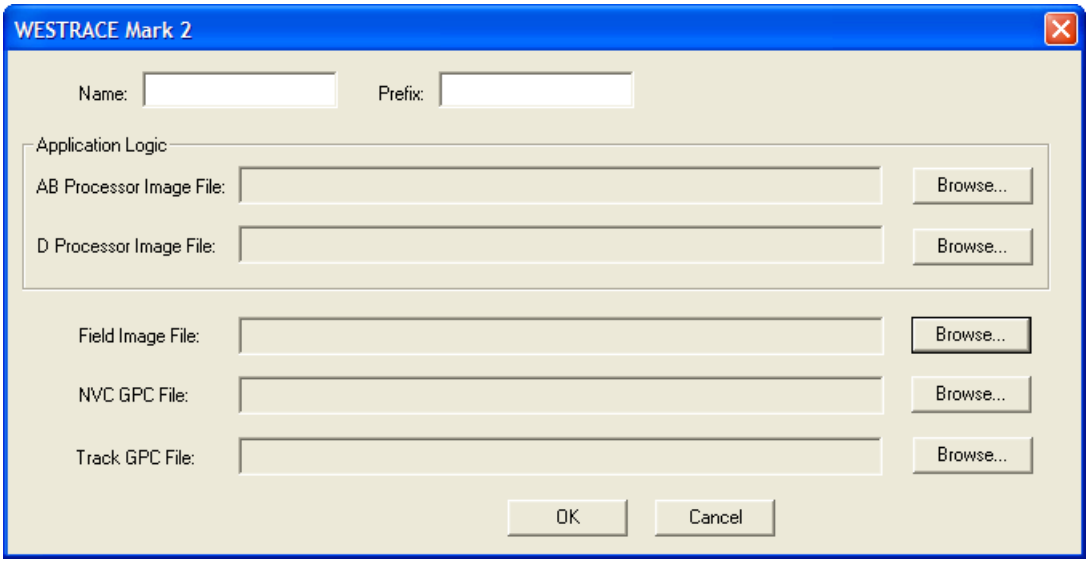


Figure 4.8 WESTRACE Mark 2 dialog box

NOTE: File names in the WESTRACE dialog box are "read-only". Use the Browse button to select an existing file.

a) Type the name of the WESTRACE MkII in the Name text box; Each WESTRACE must have a unique name.

b) Type the identifying prefix (without the separating hyphen) in the PREFIX text box. A prefix is not required for single WESTRACE applications.

See section 2.5.7.7 for details about using a separating hyphen in the mnemonics for multi-WESTRACE applications.

c) Browse and select the GCSS AB Processor Image file (.IMG file, see section 5.6.1);

d) Browse and select the GCSS D Processor Image file (_D.IMG file, see section 5.6.1);

e) Browse and select the GCSS Field file (SIM.IMG file, see section 5.6.3);

f) Browse and select the PCGE NVC Layout file (.GPC file, see section 5.7.2);

g) Browse and select the PCGE Track Layout file (SIM.GPC file, section 5.7.3);

h) Click OK.

Repeat for additional WESTRACE MkII installations as required.

Figure 4.9 shows a WESTRACE Mark 2 dialog box after entering data.

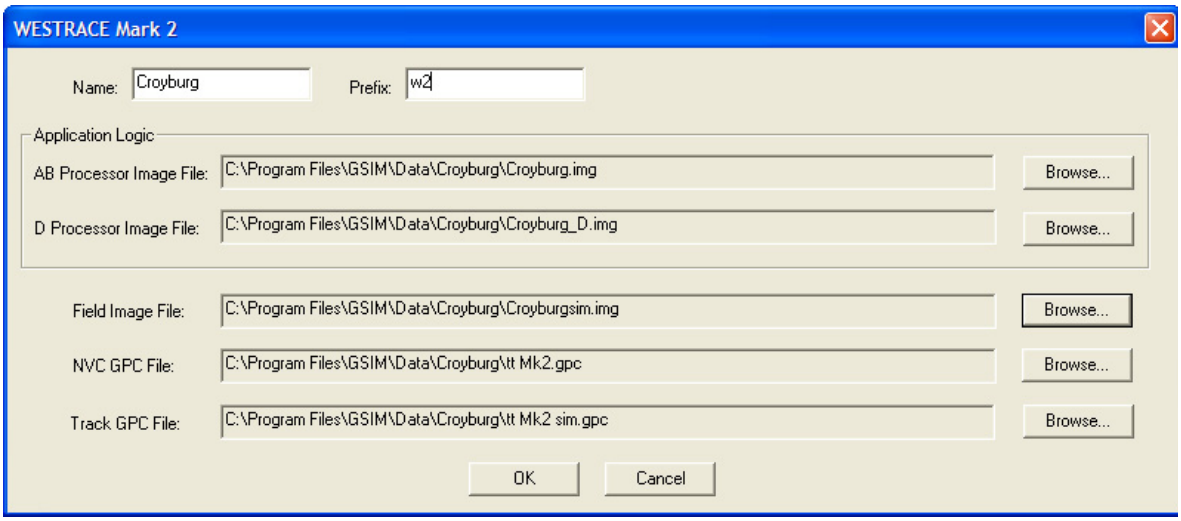


Figure 4.9 WESTRACE Mark 2 dialog box (completed)

4.5.3.2 Adding a WESTRACE MkI

GSIM will display a blank WESTRACE dialog box similar to figure 4.10.

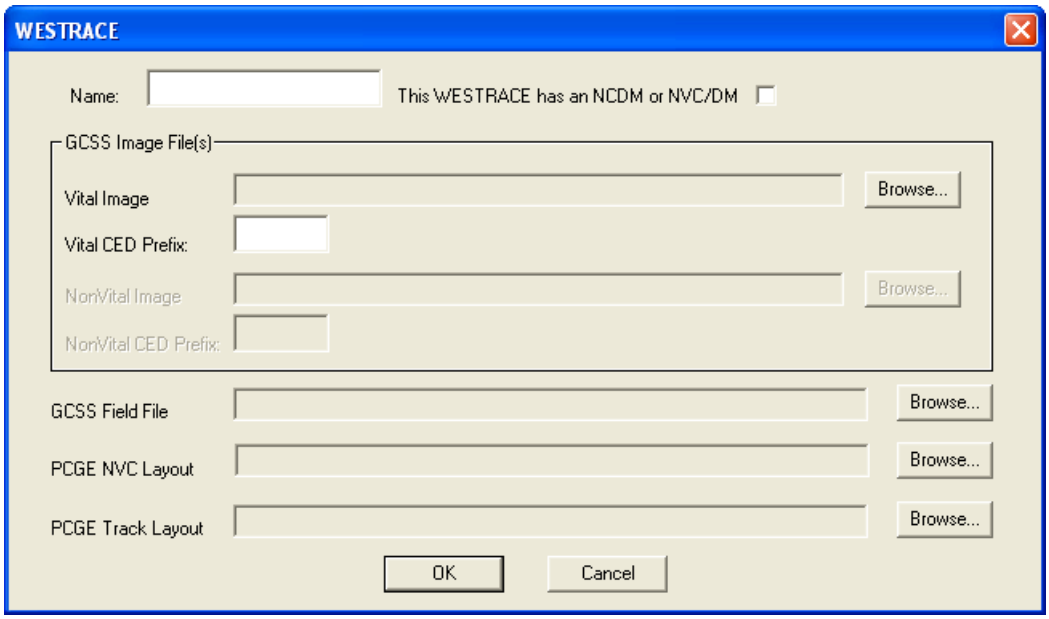


Figure 4.10 WESTRACE dialog box

NOTE: File names in the WESTRACE dialog box are "read-only". Use the Browse button to select an existing file.

a) Type the name of the WESTRACE in the Name text box (maximum of 15 characters for WESTRACE MkI);

b) Select "this WESTRACE has an NVC/DM" if necessary;

c) Browse and select the GCSS Vital Image file (.IMG file, see section 5.6.1);

d) Type the identifying prefix (without the separating hyphen) in the Vital CED Prefix text box.

See section 2.5.7.7 for details about using a separating hyphen in the mnemonics for multi-WESTRACE applications. See note (below) for details about single WESTRACE applications;

e) Browse and select the GCSS Non-Vital Image file (_nvcdm.IMG or _ncdm.IMG file, see section 5.6.1), then enter the Non-Vital CED prefix., if the WESTRACE has an NVC/DM;

Ensure the Vital and Non-Vital CED prefixes are different and unique across project. The warning message in figure 4.11 will be displayed if the Vital and Non-Vital prefixes are the same.

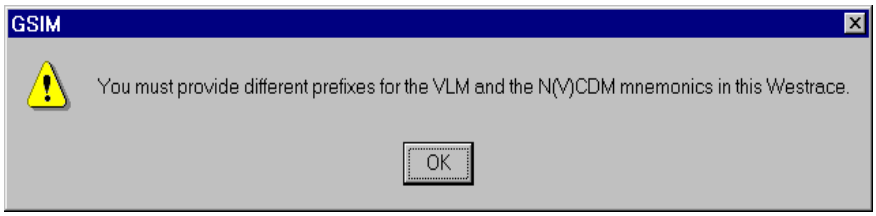


Figure 4.11 "Same prefix" warning

f) Browse and select the GCSS Field file (SIM.IMG file, see section 5.6.3);

g) Browse and select the PCGE NVC Layout file (.GPC file, see section 5.7.2);

h) Browse and select the PCGE Track Layout file (SIM.GPC file, section 5.7.3);

i) Click OK.

Repeat for additional WESTRACE installations as required.

Figure 4.12 shows a WESTRACE dialog box after entering data.

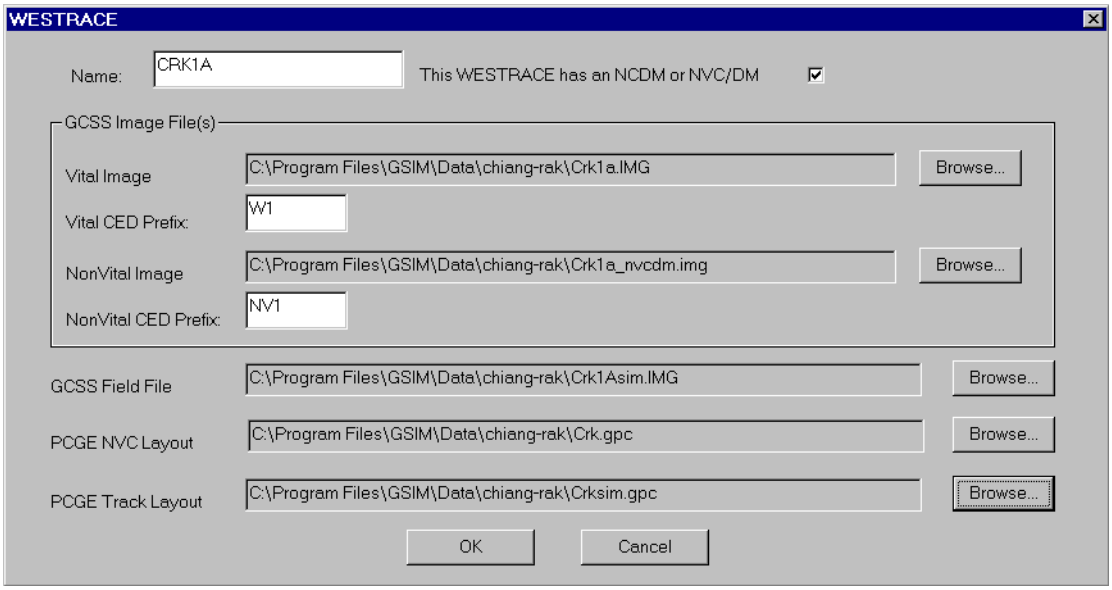


Figure 4.12 WESTRACE dialog box (completed)

4.5.4 Editing a WESTRACE

Change the details of a project's WESTRACE installation by editing the WESTRACE.

To edit a WESTRACE:

a) Right-click the WESTRACE icon to open the pop-up menu shown in figure 4.13.

Figure 4.13 WESTRACE icon right-click menu

b) Click **Edit WESTRACE**.
GSIM displays a WESTRACE dialog box similar to figure 4.12.

GSIM does not allow you to change the filename or the path of an IMG file. Change the name or path of an IMG file by deleting the WESTRACE and re-adding it using the new name or path.

4.5.5 Changing a WESTRACE Cycle Time

Although GSIM estimates the cycle time for each WESTRACE based on its logic size (GCSS.IMG file), you can specify a different cycle time if required—for example, where you want to record a script with a specific cycle time.

To set a WESTRACE's cycle time:

a) Right-click the WESTRACE name in the Simulation Summary Window (section 3.4) to open the pop-up menu (figure 4.14).

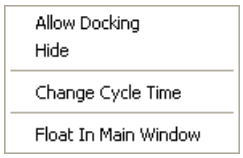


Figure 4.14 Simulation Summary Window WESTRACE right-click menu

b) Choose **Change Cycle Time** to open the dialog box shown in figure 4.15.

Figure 4.15 Edit Cycle Time dialog box

c) Type the new cycle time (ms).
GSIM restricts the range to 250–600 ms.

d) Click **OK**.

Alternatively, you can use the SetCycleTime script command to set the cycle time from within a script.

Figure 4.16 shows a WESTRACE with a user- or script-modified cycle time, which appears in red.

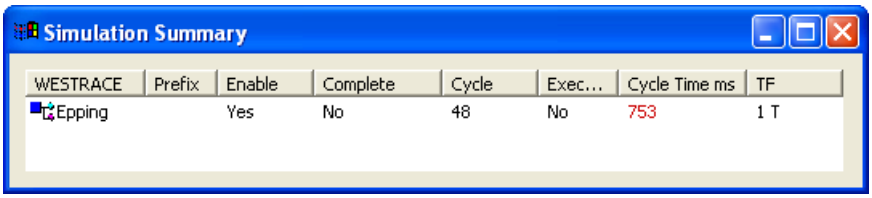


Figure 4.16 Modified WESTRACE cycle times appear in red.

NOTE: The changed cycle times are not retained between GSIM sessions. When you re-open a project, the original cycle times are restored for each WESTRACE in the project. The modified cycle times do, however, persist within a GSIM session.

4.5.6 Disabling a WESTRACE

GSIM provides the option of running simulations with one or more WESTRACE installations temporarily disabled. You must disable a complete WESTRACE installation (VLM and NVC/DM or NCDM).

To disable a complete WESTRACE installation (when the simulation and logging are stopped):

a) Right-click the WESTRACE icon to open the pop-up menu shown in figure 4.13.

b) Click **Disable WESTRACE**.

Figure 4.17 shows a Project Workspace window indicating "w1" as disabled.

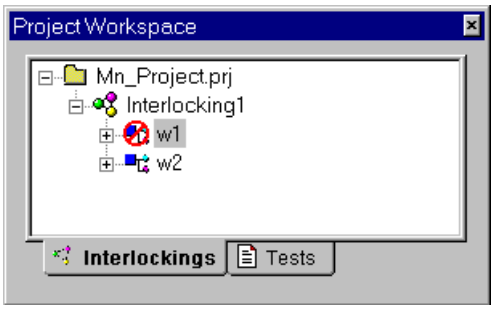


Figure 4.17 Disabled WESTRACE installation

The disabled WESTRACE icon (figure 4.17) is shown in the modules of a WESTRACE that is connected to a disabled WESTRACE. This serves as a reminder that a port is connected to a disabled WESTRACE and will not send or receive changes of state.

Important: ***Do not disable WESTRACEs when using scripts or batch files. Inconsistencies between script commands and disabled WESTRACEs will be treated as fatal by GSIM.***

4.5.7 Enabling a WESTRACE

All WESTRACE installations are enabled by default.

Enable a disabled WESTRACE (when the simulation and logging are stopped) by:

a) right-clicking the WESTRACE icon to invoke the WESTRACE pop-up menu;

b) clicking ENABLE WESTRACE.

4.5.8 Connecting NVC/DM and NCDM WSA/S2 Serial Ports

GSIM can not work out which serial ports are supposed to be connected between NVC/DMs or NCDMs because there is not enough information in the image file. The user must connect serial ports within GSIM when a project is created.

Serial ports must be connected prior to commencement of logging and running.

To connect serial ports:

a) Expand the project tree view (see figure 3.11) until the NCDM or NVC/DM ports are visible.

b) Right-click the required port to open the menu shown in figure 4.18.

Figure 4.18 Port right-click menu

c) Select "Connect Port". The following dialog box opens:

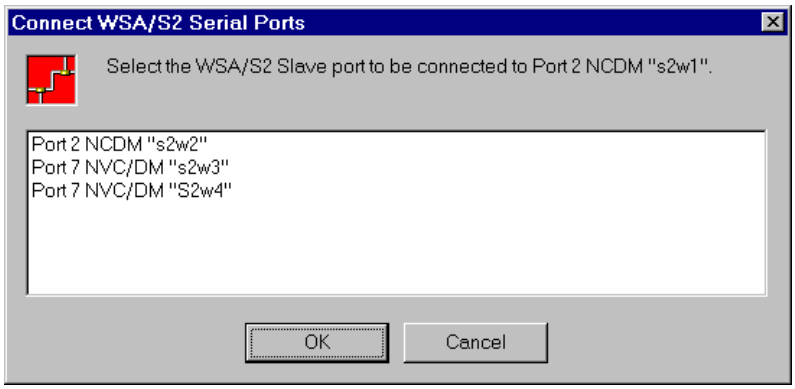


Figure 4.19 Connect Port dialog box

d) Select the port you want to connect to.

Port menu commands that are greyed out are not available because:

- port connections can not be changed during logging or running;
- there is no suitable port to connect to.

e) Click **OK**.

f) Repeat steps a) to e) until all required ports have been connected.

NOTE: NVLM WSL/S2 serial ports are not simulated within GSIM.

4.5.9 Verify Communications Links

When GSIM simulates communication between ports, it ensures the integrity of transferred data by comparing a variety of communications attributes at each end of the link. GSIM generates an error message if it detects a mismatch.

4.5.10 Set Field (S2) Address of an NVC Module

Set the field (S2) address for all NVC modules before attempting to connect them to GSIMDriver. The S2 address is required when making an external connection via GSIMDriver (for example, GSIMDriver to WESTCAD).

There is no need to set the field address when running a simulation completely internally in GSIM.

If the field address is not set, a red question mark "?" is displayed next to the NVC icon in the project workspace window. This can be seen in figure 4.20.

Figure 4.20 Warning icon: S2 address not set

To set the field (S2) address:

a) Expand the tree view in the Project Workspace Window until the required VLM module is showing.

b) Expand the VLM module to show the address.

c) Right-click the address to open the menu shown in figure 4.21.

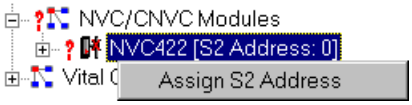


Figure 4.21 Address right-click menu

d) Select "Assign S2 Address" to open the dialog box shown in figure 4.22.

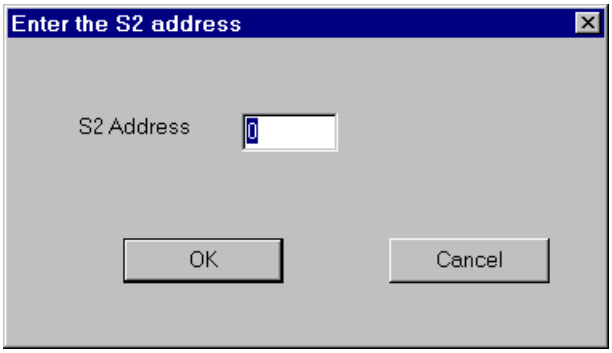


Figure 4.22 S2 Address dialog box

e) Type the required address then click **OK**.

4.6 Opening an Existing Project

a) Right-click in the Project Workspace window (figure 3.1) and choose **Open Project** from the pop-up menu (or choose **File** > **Open Project**).

b) Use the Open dialog box to locate and open the .PRJ file you want.

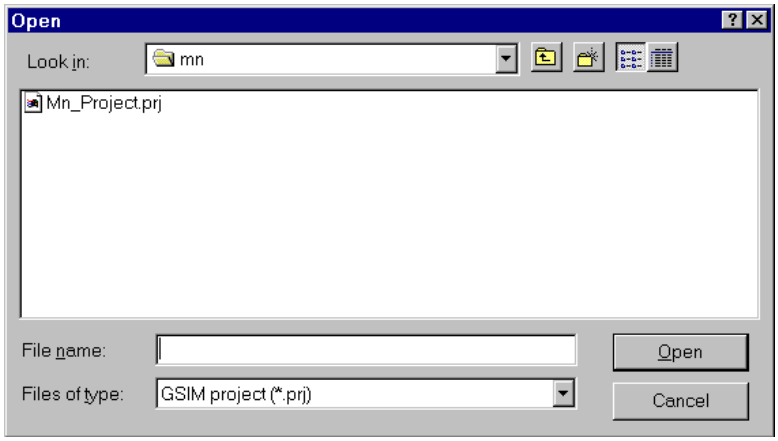


Figure 4.23 Open dialog box

GSIM checks the menu command files (*.TXT or *.GUI) for invalid mnemonics whenever:

- a project is opened;
- a WESTRACE is added or edited;
- a graphic file is opened;
- when actions taken could lead to a mnemonic change.

A mnemonic must be one that GSIM allows users to toggle to be a valid command. Also GSIM tries to detect mnemonic names that have been wrongly identified, for example by leaving off a prefix.

The dialog box in figure 4.24 is displayed if GSIM detects invalid mnemonics. Invalid mnemonics and description are logged to the CheckMenuCommand.log file. Check this file and correct the menu command file before continuing simulation.

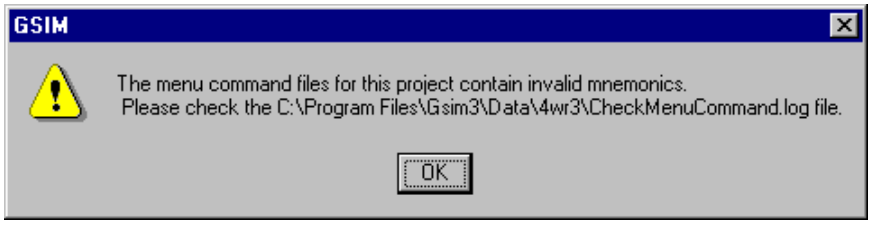


Figure 4.24 "Invalid mnemonics" warning

4.7 Viewing NVC and Track Windows

To view an NVC or Track window (GPC or SIM.GPC file):

a) Right-click the GPC or SIM.GPC file in the Project Workspace window to open the pop-up menu shown in figure 4.25.

b) Click **View Graphic File** to display the appropriate layout file.

The NVC or Track windows are the primary means of viewing and testing a WESTRACE installation.

Figure 4.25 Graphic layout file right-click menu

4.8 Viewing Mnemonics

View the mnemonics of a PM or VLM logic image file (.IMG), a Field image file (SIM.IMG) or a non-vital logic image file (_nvcdm.IMG or _ncdm.IMG) by:

a) right-clicking the filename in the Project Workspace window to invoke the pop-up menu shown in figure 4.26;

b) clicking View Mnemonics.

GSIM's mnemonic viewers provide access to the logic states of every mnemonic in the installation, and enable some mnemonics to be changed in order to conduct simulations.

Figure 4.26 GCSS image file right-click menu

4.8.1 Sorting Mnemonics

Mnemonics may be sorted by name, value (state), or category.

Sort mnemonics by clicking on the column heading you wish to sort by.

4.8.2 Searching for a Mnemonic

Search for a mnemonic by:

a) clicking on any mnemonic name;

b) typing the name of the mnemonic you want to find.

The first character typed moves the cursor down the list to the next instance of a mnemonic starting with the typed letter or number. Additional characters narrow the search.

Do not pause between characters, or GSIM will interpret the pause as a new search.

4.8.3 Isolating a Mnemonic

Some mnemonics in the installation under test will need to be linked logically to mnemonics in the Field (_SIM.IMG) so that changes of state can be exchanged between the installation and the simulated track. This is done by using input and output mnemonics in the field logic that have the same name as the corresponding output or input in the installation.

An input mnemonic in the installation will have its state updated by the corresponding output in the field each time GSIM evaluates a cycle of logic. To stop this happening, and to allow direct control of the value of such an installation input mnemonic, the mnemonic must be “isolated”. Otherwise whatever state is set from the GUI will just be overwritten by the state determined by the field logic.

PM and VLM Installation mnemonics that are marked with a key icon must be isolated before the state of the mnemonic can be set from GSIM's user interface. Mnemonics that are isolated are identified by a lock icon (see figure 3.24).

Isolate a mnemonic by:

a) right-clicking the name to invoke the pop-up menu similar to figure 4.27;

b) selecting Isolate.

4.8.4 Toggling Mnemonics

Some mnemonics can be toggled (switched between logic states 1 and 0) to generate inputs to the WESTRACE. Mnemonics that can be toggled are marked with a mini-icon to the upper left of the mnemonic's icon (see figure 3.24).

Toggle a mnemonic by:

a) right-clicking the mnemonic in the mnemonic viewer to invoke the pop-up menu shown in figure 4.27;

b) selecting Toggle.

Alternatively, toggle a mnemonic by double-clicking the mnemonic in the mnemonic viewer.

Each time a mnemonic is toggled, GSIM records a "Modify Mnemonic" command in the Command Monitor window and in the log.

Figure 4.27 Installation mnemonic right-click menu

4.8.5 Filtering Mnemonics

The mnemonics displayed in the mnemonic viewers can be reduced in number to make the task of finding specific mnemonics much easier.

You can filter the display of mnemonics by:

- creating and applying a Name Filter—section 4.8.5.1;
- using the Filter Reserved Mnemonics command—section 4.8.5.2.

4.8.5.1 Name Filter

Applying one or more Name Filters causes GSIM to display only the mnemonics that meet the filter criteria.

a) Right-click anywhere in the mnemonic viewer to show the **Filters** pop-up menu command.

Figure 4.28 Mnemonic viewer right-click menu: Filters command

b) Choose **Filters** to open the Name Filter dialog box.

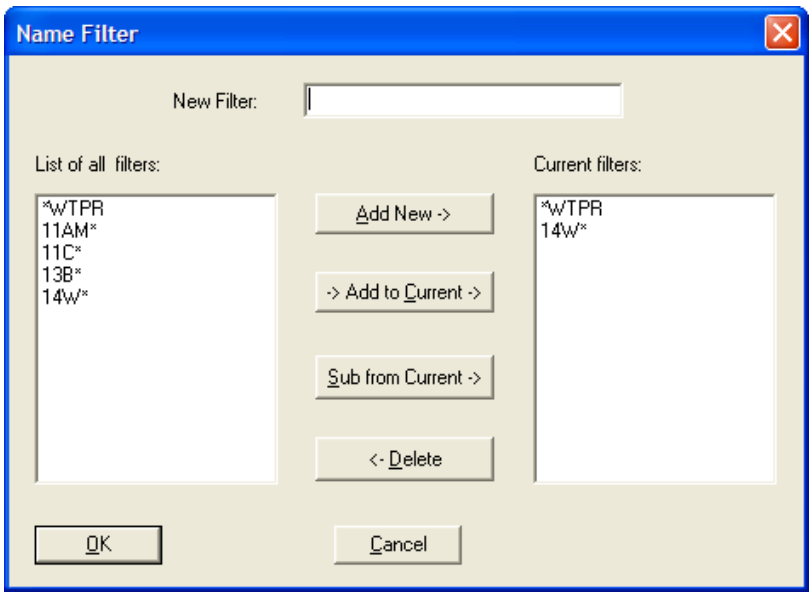


Figure 4.29 Name Filter dialog box

Define and add filters as required. Name filters added to the project become part of the project and may be re-used.

A typical Name Filter dialog box is shown in figure 4.29. In the example, a total of five filters have been defined, and two of these filters have been added to the Current filters list.

A filter must be visible in the Current filters list box before it can be applied. There are two ways to add filters to the Current filters list box:

- **Add New**: to add a new filter to both the List of all Filters and the Current filters list box—section 4.8.5.1.1.
- **Add to Current**: to copy a filter from the List of all Filters to the Current filters list box—section 4.8.5.1.2.

4.8.5.1.1 Add New

To add a new filter to the List of all Filters *and* the Current filters list boxes:

a) Type the filter parameters in the New Filter text box (it is case-sensitive).

b) Click **Add New** (or press Enter).

The wildcard character * can be used only at the start or end of a character string, not in the middle. Use * as follows:

- *xxx means select all mnemonics ending with xxx.
- xxx* means select all mnemonics beginning with xxx.

4.8.5.1.2 Add to Current

To copy a filter from the List of all Filters to the Current filters list box:

a) Click one or more filters in the List of all Filters.

b) Click **Add to Current**.

Alternatively, double-click the filter.

To de-select a filter (in the List of all Filters) click the filter a second time (slower than a double-click).

NOTE: Double-clicking on any un-selected mnemonic in the List of all Filters copies the mnemonic to the Current filters list box along with any mnemonics that are currently highlighted in the List of all Filters.

4.8.5.1.3 Sub from Current

Click **Sub from Current** to subtract a highlighted mnemonic from the Current filters list box.

4.8.5.1.4 Delete

Click **Delete** to permanently remove the highlighted mnemonic from both list boxes.

4.8.5.1.5 OK Button

Click **OK** to apply the Name Filters shown in the Current filters list.

4.8.5.2 Filter Reserved Mnemonics

Mnemonic Viewer windows have a right-click command to filter out all reserved mnemonics and their aliases from GSIM's mnemonic viewers (figure 4.30).

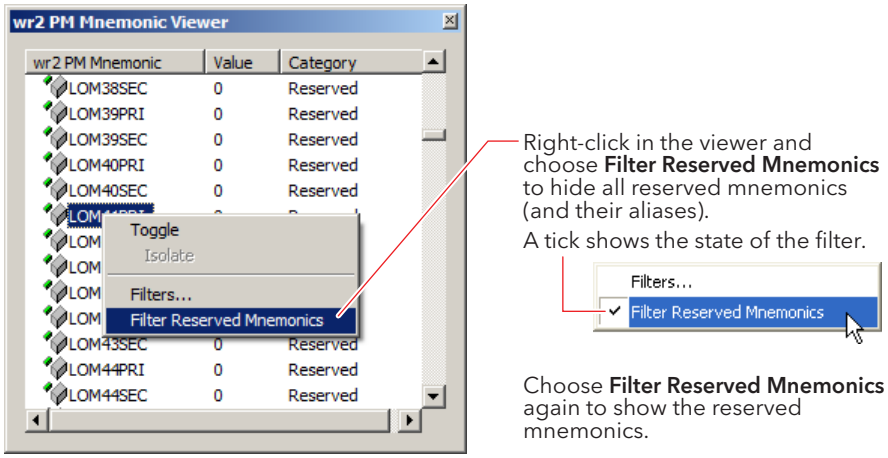


Figure 4.30 Mnemonic Viewer right-click menu: Filter Reserved Mnemonics

This is most useful with WESTRACE MkII, which is likely to have a large number of reserved mnemonics.

4.9 Viewing Mnemonic Events

GSIM's Mnemonic Event Monitor window provides a list of all mnemonic events, and the cycle at which they occurred. You can clear past events to see current events more clearly, and you can filter events.

Only mnemonic events from the installation are displayed. (By default, track equipment mnemonics of interest are shown as part of the installation event display).

4.9.1 Clearing Mnemonic Events

To clear mnemonic events:

a) Right-click anywhere in the Mnemonic Event Monitor window to open the pop-up menu (figure 4.31).

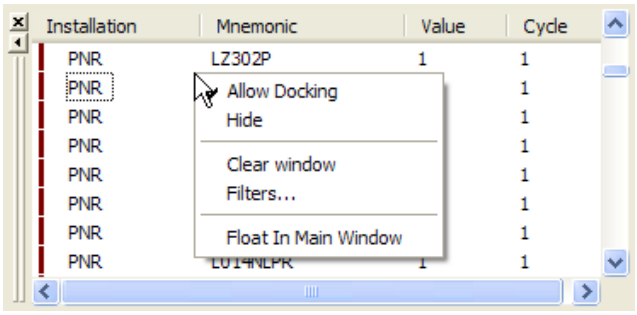


Figure 4.31 Mnemonic Event Monitor right-click menu

b) Click **Clear window**.

The Clear window command is greyed out if a simulation command like "Run" is executing.

4.9.2 Filtering Mnemonic Events

You can filter events in the Mnemonic Event Viewer so that only events that meet the filter criteria are shown. Use this, for example, to prevent rapidly-changing events such as watchdogs appearing in the viewer.

Events hidden by the filter are still logged (if a log is open), so that a complete report can be obtained via the log.

Mnemonic event filters are saved in the project.

To filter mnemonic events:

a) Right-click anywhere in the Mnemonic Event Viewer window to open the pop-up menu (figure 4.31).

b) Choose **Filters** to open the Mnemonic Event Filter dialog box (figure 4.32).

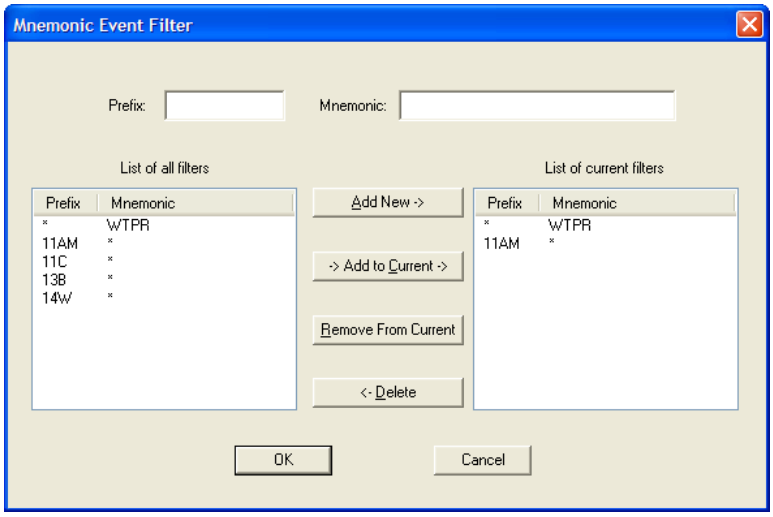


Figure 4.32 Mnemonic Event Filter dialog box

c) Define and add filters as required (see section 4.9.2.1).

Note the separate Prefix and Mnemonic fields in figure 4.32.

A filter must be visible in the Current filters list box before it can be applied. There are two ways to add filters to the Current filters list box:

- **Add New**: adds a new filter to both the List of all Filters and the Current filters list box—section 4.9.2.1.
- **Add to Current**: copies a filter from the List of all Filters to the Current filters list box—section 4.9.2.2.

4.9.2.1 Add New

To add a new filter to both the All Filters and the Current Filters lists:

a) Type the filter parameters in the Prefix and Mnemonic fields (case-sensitive).

b) Click **Add New** (or press Enter).

The wildcard character * can be used only at the start or end of a character string, not in the middle. Use * as follows:

- *xxx means select all mnemonics ending with xxx.
- xxx* means select all mnemonics beginning with xxx.

4.9.2.2 Add to Current

To copy a filter from the All Filters list to the Current Filters list:

a) Click the filter in the All Filters list.

b) Click **Add to Current**.

To de-select a filter, click it again.

To copy a contiguous group of filters from the All Filters list to the Current Filters list:

a) Click the first filter you want to copy.

b) Hold down the Shift key while you click the last filter in the group you want to copy.

c) Click **Add to Current**.

To copy a non-contiguous group of filters from the All Filters list to the Current Filters list:

a) Click the first filter you want to copy.

b) Hold down the Ctrl key while you click the other filters you want to copy.

c) Click **Add to Current**.

4.9.2.3 Remove from Current

Click **Remove from Current** to clear a highlighted mnemonic from the Current Filters list.

4.9.2.4 Delete

Click **Delete** to permanently remove the highlighted mnemonic from both lists.

4.9.2.5 OK Button

Click **OK** to close the dialog box and apply the filters shown in the Current Filters list.

4.10 Managing Logs

GSIM can make recordings of all simulation sessions as log files. The log file contains:

- details of all WESTRACE systems in the project
- logic and timer values (as of the time the log file was started)
- all simulation commands (such as Run, Reset or Modify Mnemonics)

4.10.1 Optional Logging

GSIM will log activities such as simulations and script results to a log file if a log file is open.

NOTE: In previous versions, GSIM would not run a simulation without first creating a log file. From version 6.0, logging is optional.

You are prompted to start a log file the first time that you perform any action that would lead to a change in the state of the simulation. If you don't want to log, select CANCEL on the Start Logging File dialog box and you will be able to run the simulation without a log open.

GSIM will not continue to prompt you to log after the first time you cancel logging. You can always manually start and stop logging later if you need a log of any part of the simulation. See section 4.10.2 for details on starting logging manually.

4.10.2 Creating a Log File

Log a simulation by:

a) right-clicking the Project folder in the Project Workspace window (Logs tab) to invoke the pop-up menu shown in figure 4.33;

b) clicking Start New Log. GSIM will display a Start Logging dialog box similar to figure 4.34.

All GSIM sessions (simulations or scripts) can be logged to a log file.

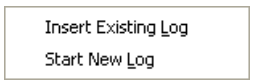


Figure 4.33 Project folder right-click menu

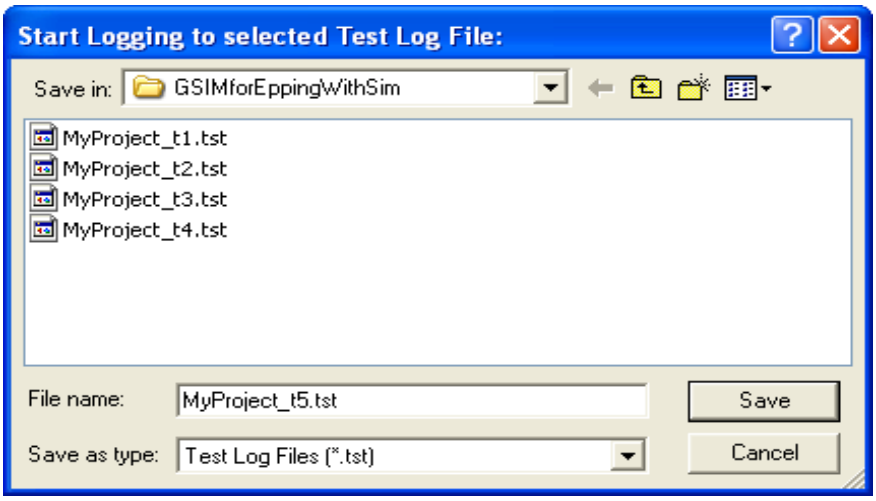


Figure 4.34 Start Logging dialog box

GSIM suggests a filename for the log file based on the project name followed by **"_t1.tst"**. Accept the suggested filename or specify a new name for the log file and click the Save button.

NOTE: The filename must be different from an existing log file in the project.

If you attempt to use a filename that is currently part of the project, GSIM displays the warning shown in figure 4.35.

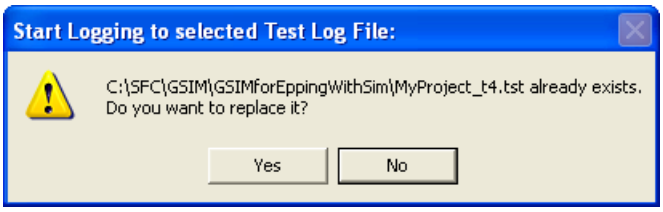


Figure 4.35 "Replace log file" warning

If you click Yes, and the log file already exists in the project, GSIM prohibits the file creation and displays the warning shown in figure 4.36. See section 4.10.3 for details of how to remove a log file from the project if it is no longer needed.

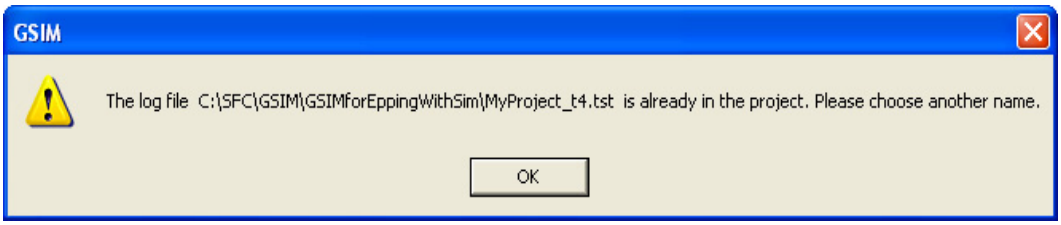


Figure 4.36 "Overwrite log file" warning

Click OK and specify a new filename.

4.10.3 Overwriting or Deleting Log Files

You might want to overwrite a log file (for example, if the logged simulation isn't worth saving).

To overwrite an existing log file:

a) In the Project Workspace window (Logs tab) right-click on the log file you want to overwrite and select Remove from the Project. The file is disconnected (removed) from the project, however it still resides in its original location.

b) Create a new log file as described in section 4.10.2.

c) If you select an existing filename (even if no longer part of the project), GSIM displays the warning shown in figure 4.35.

d) Click Yes. GSIM overwrites the file with the new log.

To permanently delete an existing log file:

a) in the Project Workspace window (Logs tab) right-click on the log file you want to delete to invoke the pop-up menu shown in figure 4.37;

b) select Remove from the project.

c) use Windows Explorer (or equivalent) to delete the file.

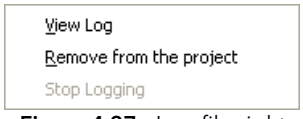


Figure 4.37 Log file right-click menu

4.10.4 Adding Existing Log Files

You can add an existing Log file to a project.

To add an existing Log file to a project:

a) right-click the Project folder in the Project Workspace window (Logs tab) to invoke the pop-up menu shown in figure 4.33;

b) click Insert Existing Log. GSIM will invoke a dialog box similar to figure 4.38;

c) browse for an existing log file. The filename will be displayed in the read-only text box. Figure 4.38 shows adding a log file named "**Run a train in DOWN direction.tst**";

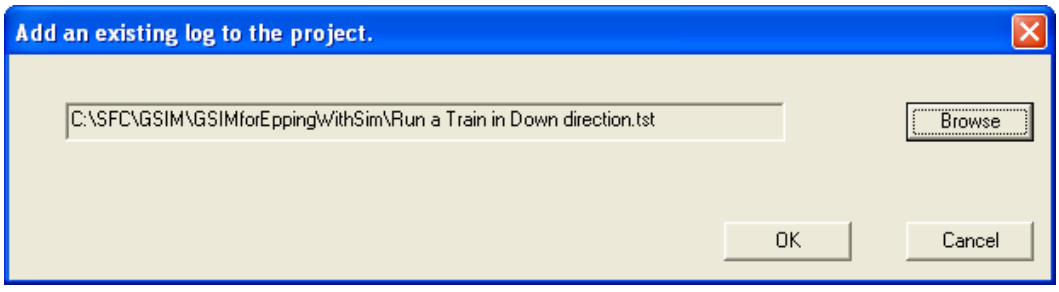


Figure 4.38 "Add existing log to project" dialog box

d) click OK.

4.10.5 Viewing Log Files

You may want to view a log file to display its contents or to print the file.

View a log file by:

a) right-clicking a log file in the Project Workspace window (Logs tab) to invoke the pop-up menu shown in figure 4.37;

b) click View Log.

4.10.6 Stopping Logging

If a simulation, script or batch is running, stop the simulation, script or batch before closing a log.

Stop logging by:

a) right-clicking the log file marked with an "L" in the Project Workspace window (Logs tab) to invoke the pop-up menu similar to figure 4.37;

b) clicking Stop Logging.

You must stop logging before closing a project.

Figure 4.39 shows the Logs tab of the Project Workspace window with an open log file.

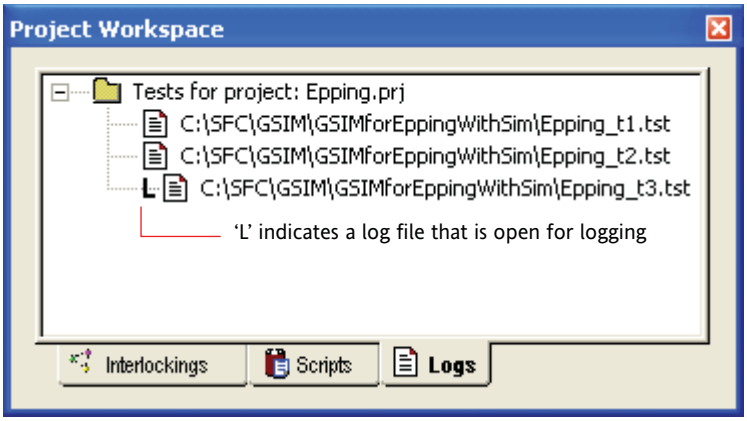


Figure 4.39 Project Workspace window: Logs tab

4.11 Simulation Commands

The following sections describe the GSIM simulation commands that control how a test runs.

Any of the run-type commands will cause GSIM perform evaluation cycles ("steps") of the application logic and timer cycles for selected WESTRACE installations. The number of steps depends on the type of command used.

All commands work in the same way for WESTRACE MkI and WESTRACE MkII.

The run-type commands include the following:

- Run
- Run Until Cycle
- Run Until Mnemonic
- Run Until Stable
- Step
- Step All
- N Steps

A simulation can be stopped at any time by using the Stop command or button.

All run-type commands can be run from the tool or the Commands menu. See figure 3.3 for the toolbar.

4.11.1 Run 

Run a simulation by:

a) clicking the Run button to invoke a dialog box similar to figure 4.40;

b) clicking OK to apply the command to the selected WESTRACE installations.

The Run command:

- starts the evaluation of logic and timer cycles to the selected WESTRACE installations;
- disables all of the Simulation commands except for the Stop command.

The dialog box displays a list of all enabled WESTRACE installations selected.

NOTE: By default, all WESTRACE installations are enabled and all WESTRACE installations are selected for running.

Change a selection by:

a) clicking on any WESTRACE installation to select it. (If you click the wrong one, click on a different WESTRACE installation to change the selection.)

b) selecting an additional WESTRACE installation by pressing the CTRL key and clicking a different WESTRACE installation. The second selection will be added to the first.

c) Repeat as needed.

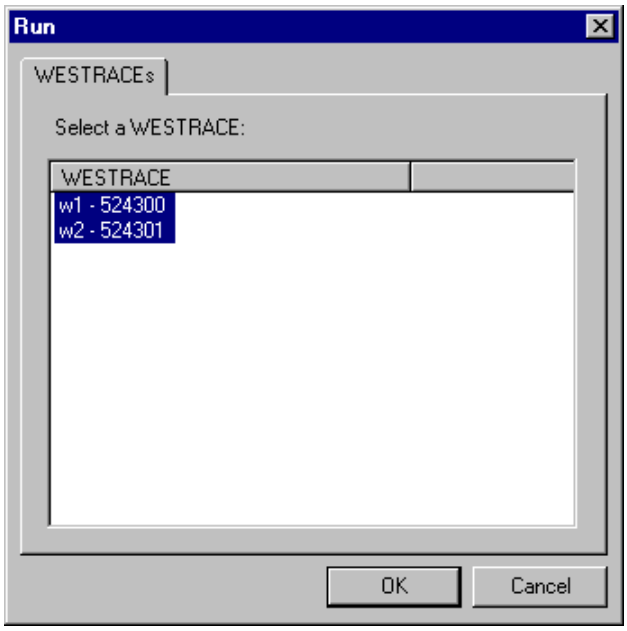


Figure 4.40 Run dialog box

4.11.2 Stop

Stop a simulation by:

a) clicking the Stop button to invoke a dialog box similar to figure 4.41;

b) clicking OK.

When a simulation is running, the Stop command halts the evaluation of logic and timer cycles for selected WESTRACE installations.

The dialog box displays a list of all enabled WESTRACE installations (with all systems selected).

NOTE: By default, all WESTRACE installations are selected for stopping.

To change the selection:

a) Click on any WESTRACE installation to select it. (If you click the wrong one, click on a different WESTRACE installation to change the selection.)

b) Select an additional WESTRACE installation by pressing the CTRL key and clicking a different WESTRACE installation. The second selection will be added to the first.

c) Repeat as needed.

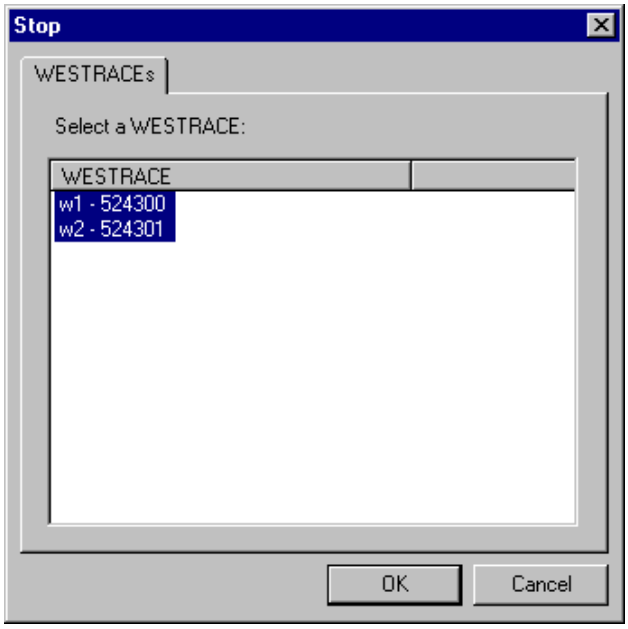


Figure 4.41 Stop dialog box

4.11.3 Run Until Cycle

The Run Until Cycle command invokes the Run Until Cycle dialog box, shown in figure 4.42, figure 4.43 and figure 4.44.

The Run Until Cycle command causes GSIM to run from the current cycle number until a selected WESTRACE (called the Terminating WESTRACE) reaches a specified cycle number.

For example, you might want to run GSIM until a particular WESTRACE installation reaches cycle number 69. The Run Until Cycle command causes GSIM to execute as many steps of logic evaluation cycles as it takes until the terminating WESTRACE reached cycle 69.

Select the Run Until Cycle command options:

a) Select the Run Until Cycle command.

b) Click the Terminating WESTRACE tab (see figure 4.43). Click the down arrow in the Terminating WESTRACE tab to display a pull-down list of enabled WESTRACE installations. Select a system.

c) Click the WESTRACEs tab. The dialog box displays a list of all enabled WESTRACE installations (with all systems selected). To change the selection, use the following procedure:

   i) Click on any WESTRACE installation to select it. (If you click the wrong one, click on a different WESTRACE installation to change the selection.)

   ii) Select additional WESTRACE installations by pressing the CTRL key while you click on additional WESTRACE installations. The additional selections will be added.

d) Click the Cycle Number tab.

e) Enter the cycle number that you want the terminating WESTRACE to reach. One cycle above the current cycle is shown by default.

f) Click OK.

If the terminating WESTRACE is currently past the selected cycle number (the number is too low), GSIM displays the warning dialog box shown in figure 4.45.

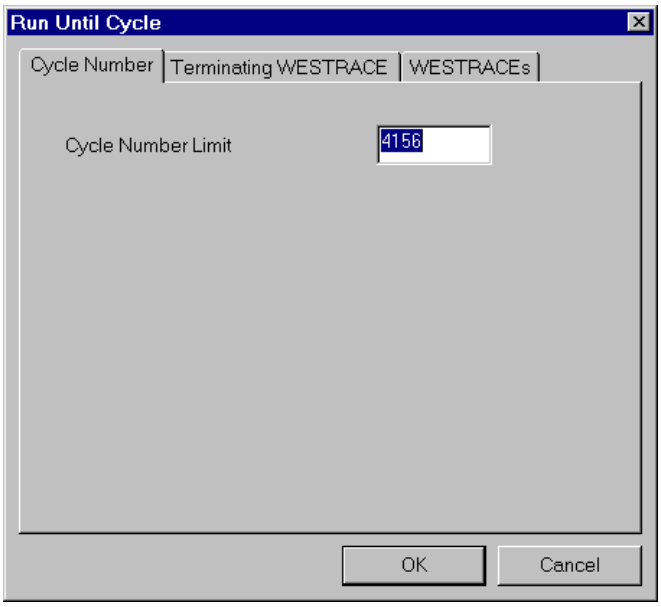


Figure 4.42 Run Until Cycle dialog box: Cycle Number tab

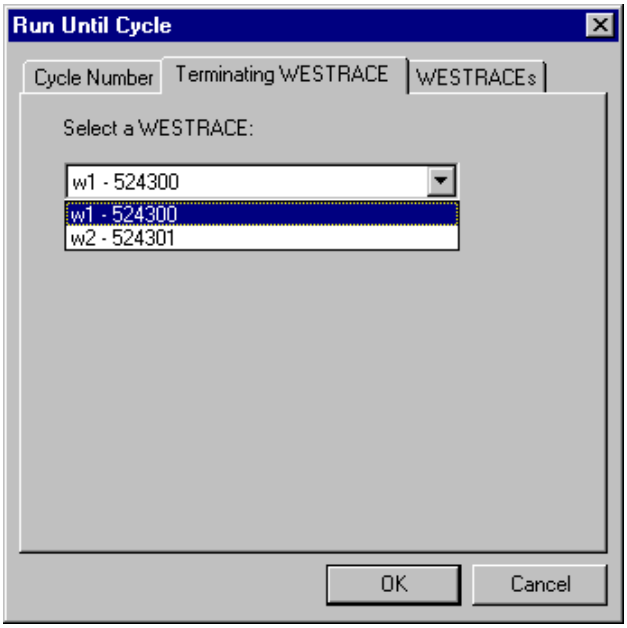


Figure 4.43 Run Until Cycle dialog box: Terminating WESTRACE tab

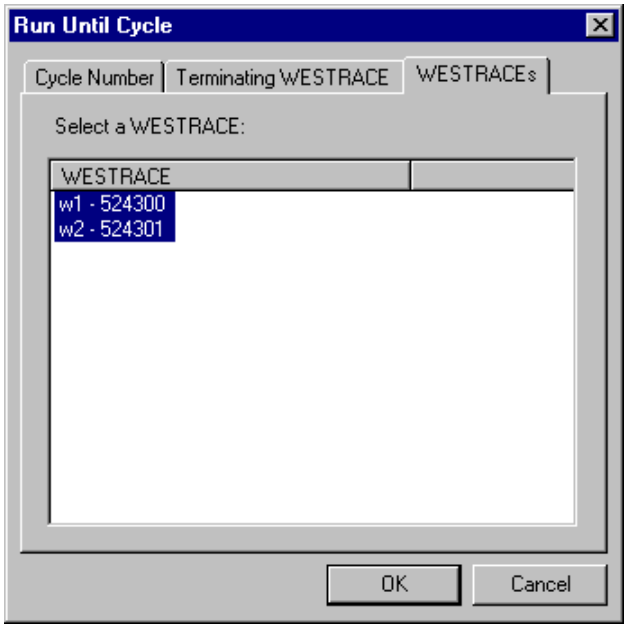


Figure 4.44 Run Until Cycle dialog box: WESTRACEs tab

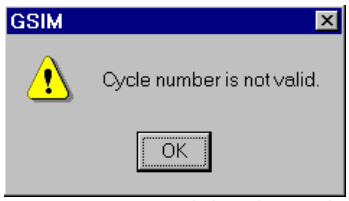


Figure 4.45 "Invalid cycle number" warning

4.11.4 Run Until Mnemonic

The Run Until Mnemonic command causes GSIM to run

from the current cycle number until a specified mnemonic for a selected WESTRACE (called the Terminating WESTRACE) reaches a target logic state.

The Run Until Mnemonic command invokes the Run Until Mnemonic dialog box, shown in figure 4.46 (only the Mnemonic view is shown—the other views are similar to figure 4.43 and figure 4.44).

Select the Run Until Mnemonic command options:

a) Select the Run Until Mnemonic command.

b) Type a valid mnemonic name in the text window (mnemonic names are case-sensitive).

c) Click the Mnemonic is in NVC/DM CED check box if mnemonic is in NVC/DM or NCDM CEDs.

d) Click the Logic State check box to select logic state 1, leave it unchecked for logic state 0.

e) Click the Terminating WESTRACEs tab (see figure 4.43). Click the down arrow in the Terminating WESTRACE view to display a pull-down list of enabled WESTRACE installations. Select a system. If an NVC/DM mnemonic is selected as the target mnemonic, only WESTRACEs that contain NVC/DMs will be available for selection.

f) Click the WESTRACEs tab. The dialog box displays a list of all enabled WESTRACE installations (with all systems selected). If an NVC/DM mnemonic is selected as the target mnemonic, only WESTRACEs that contain NVC/DMs will be available for selection.

To change the selection, use the following procedure:

i) Click on any WESTRACE installation to select it. (If you click the wrong one, click on a different WESTRACE installation to change the selection.)

ii) Select additional WESTRACE installations by pressing the CTRL key while you click on additional WESTRACE installations. The additional selections will be added.

g) Click OK.

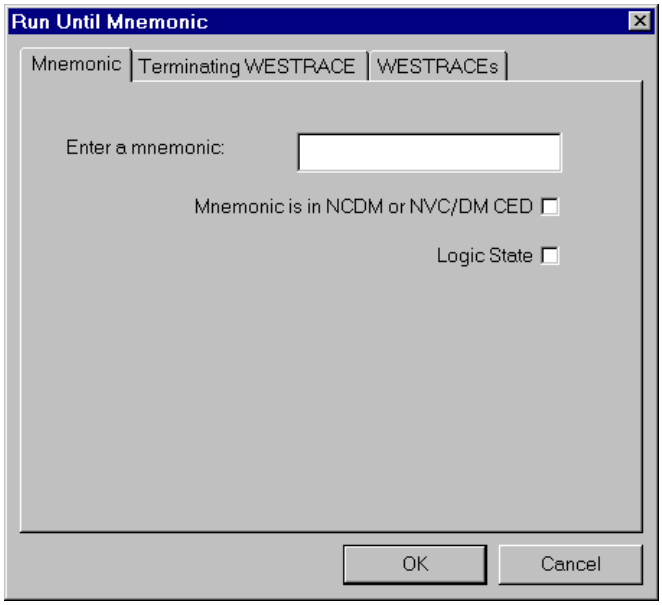


Figure 4.46 Run Until Mnemonic dialog box

4.11.5 Run Until Stable

The Run Until Stable command invokes the Run Until Stable dialog box (figure 4.47).

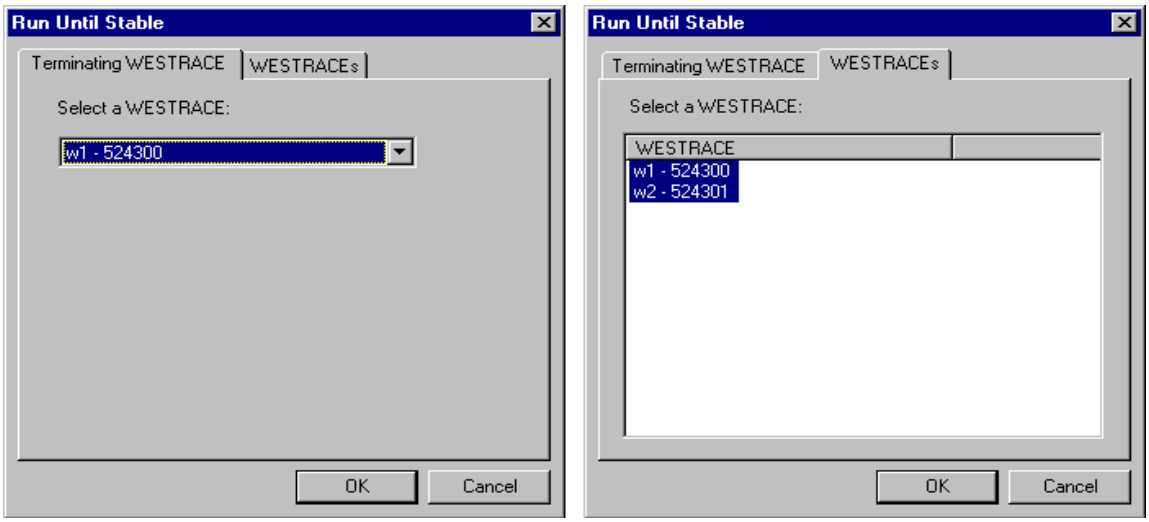


Figure 4.47 Run Until Stable dialog box

The Run Until Stable command causes GSIM to run until there are no changes in logic states the application logic (which will include the application logic in the NVLM of a WESTRACE MkI) for two consecutive cycles on a selected WESTRACE (called the Terminating WESTRACE).

Select the Run Until Stable command options:

a) Select the Run Until Stable command.

b) Click the down arrow in the Terminating WESTRACE view to display a pull-down list of enabled WESTRACE installations. Select a system.

c) Click the WESTRACEs tab. The dialog box displays a list of all enabled WESTRACE installations (with all systems selected). To change the selection, use the following procedure:

   i) Click on any WESTRACE installation to select it. (If you click the wrong one, click on a different WESTRACE installation to change the selection.)

   ii) Select additional WESTRACE installations by pressing the CTRL key while you click on additional WESTRACE installations. The additional selections will be added.

d) Click OK.

4.11.6 Step

The Step command or button causes GSIM to immediately execute one logic and timer evaluation cycle for the selected WESTRACE installations and advance to the next cycle number.

Use the Step command or button to run one complete logic and timer evaluation cycle. The process of selecting WESTRACE installations is described in section 4.11.1.

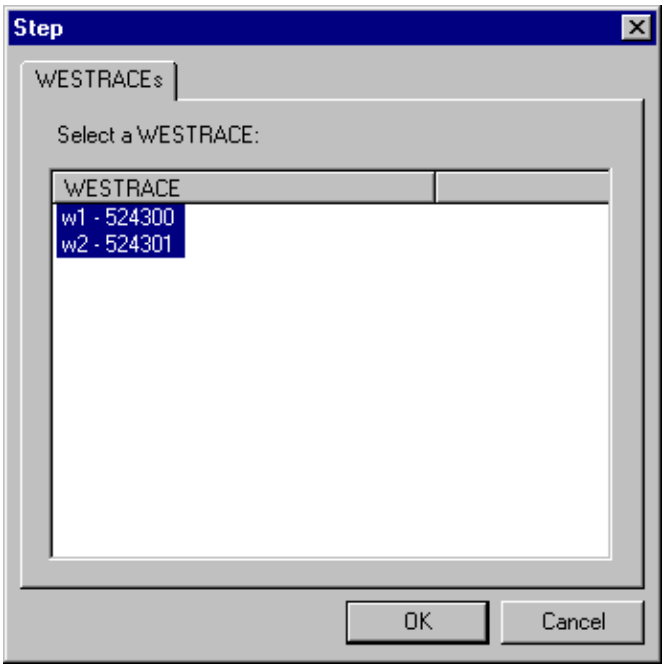


Figure 4.48 Step dialog box

4.11.7 Step All

Use the Step All command to run one complete logic and timer evaluation cycle.

The Step All command causes GSIM to immediately execute one logic and timer evaluation cycle for all enabled WESTRACE installations and advance to the next cycle number.

You can not select individual WESTRACE installations with this command.

4.11.8 N Steps

The N Steps command or button causes GSIM to immediately begin executing N logic and timer evaluation cycles for the selected WESTRACE installations until the terminating WESTRACE has cycled N times.

Figure 4.49 shows the N Steps dialog box (one of three views). The two views for selecting the WESTRACE installations are similar to figure 4.47.

Select the N Steps command options:

a) Click the arrow on the selection box in the Terminating WESTRACE view to select a single WESTRACE installation.

b) On the WESTRACEs tab, click a single WESTRACE to select it. (GSIM's default setting is to apply the N Steps command to all enabled WESTRACE installations.)

   Hold the CTRL key to select additional WESTRACE installations.

c) On the Cycle Number tab, type the specified number of steps for the terminating WESTRACE.

d) Click OK.

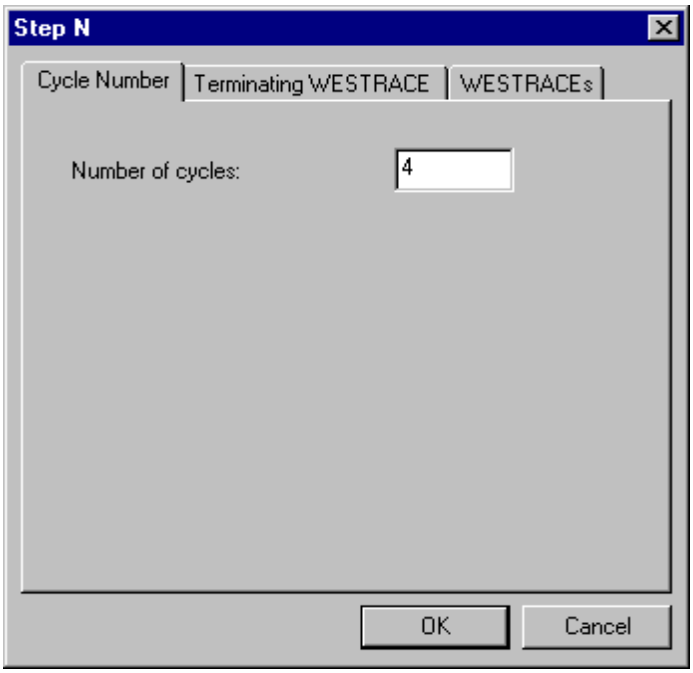


Figure 4.49 N Step N dialog box

4.11.9 Reset

Use the Reset command or button to immediately return all the VLM and NVLM mnemonics in a WESTRACE MkI to their default start-up states (as set in GCSS) and to return all PM mnemonics to 0 for selected WESTRACE installations.

The Reset command or button invokes the Reset dialog box, shown in figure 4.50.

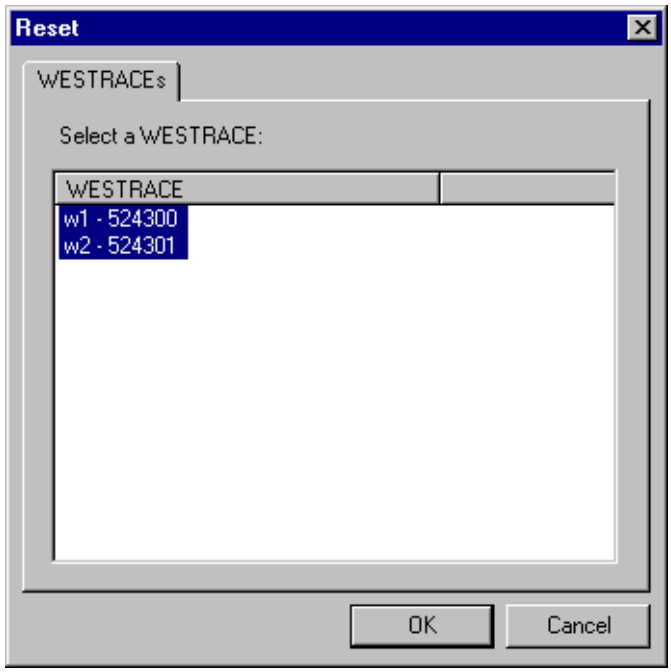


Figure 4.50 Reset dialog box

4.11.10 Modify TF (Time Factor)

Use the Modify TF command or button to control the rate at which GSIM runs timer evaluations.

The Time Factor can be changed at any time that a Run command is not in effect. GSIM evaluates logic and timer cycles using the following constraints:

- For logic evaluations, GSIM estimates the time required for 1 cycle.
- For timer evaluations, users can specify the rate that GSIM runs timer evaluations by varying the Time Factor.

The Time Factor is a number by which GSIM either multiplies or divides the Timer Time to either accelerate or slow the rate of timer evaluations.

- The **multiply** radio button makes the timers run faster.
- The **divide** radio button makes the timers run slower.

NOTE: When Divide is selected and a large value (eg 100) is entered, the value applied and displayed in the Simulation Summary window may vary by a small amount.

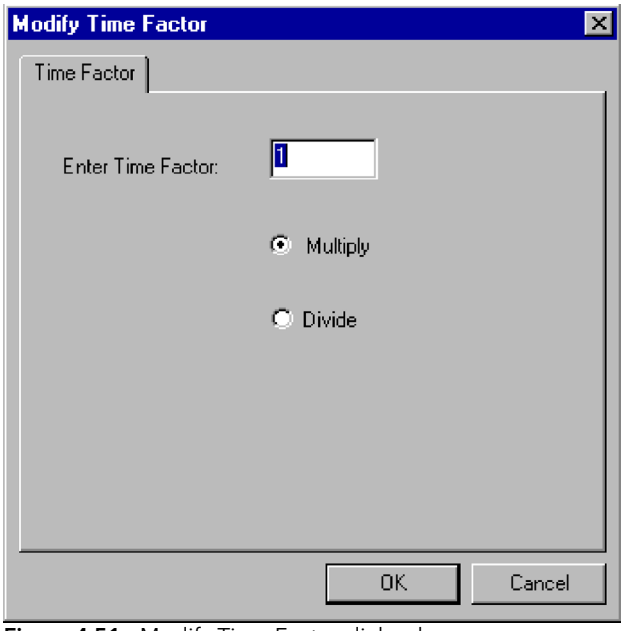


Figure 4.51 Modify Time Factor dialog box

4.12 Working with Scripts and Batches

GSIM offers a full regression testing feature based on scripts and batch files. GSIM users are able to write or record scripts, then execute those scripts against the set of WESTRACE interlocking data in a GSIM project. This produces results files that you can inspect and can confirm as representing the expected behaviour of the interlockings.

You must mark a set of results files as "benchmark" results; that is, as representing the expected behaviour of the system in the conditions simulated by the scripts. Results files from subsequent runs of any script can be compared against its benchmark results file and a summary report of the differences generated. For additional information on the comparison process, see section 4.12.1

The scripts can be re-executed, in an automated batch mode, whenever the test data changes. This will produce a new set of results files. GSIM will automatically compare these results against the original benchmark results for each script, and will generate a Batch Summary Report which shows whether the system behaviour has changed as a result of the changes to the data under test.

Scripts can be written outside GSIM using a text editor (see section 4.12.2) and added to a project (see section 4.12.3), or recorded from the GSIM user interface (see section 4.13).

Batch files, which are sets of scripts to be executed in a single session, can be created using a text editor (see section 4.12.15) and added to the GSIM project (see section 4.12.16). Running a batch file both executes the set of scripts specified by the batch file and generates a Batch Summary Report

indicating whether each script produced behaviour that matched the benchmark results for that script.

The following sections describe how to work with scripts and batch files in GSIM.

Important:

Verify Script Simulation testing by ensuring:

1. ***The script file is valid and correct.***
2. ***The result file accurately reflects the associated script file.***
3. ***The result file provides evidence the test has passed.***
4. ***Carry out steps 1 to 3 before marking a results file as a benchmark results file.***

Results files from different runs of a script can be compared using GSIM's internal differencing algorithm or using any text-differencing tool.

Use an external differencing tool (for example, Compare It! from Grig Software[1]) whenever you would like to view the differences in context: in a multi-cycle run, an external tool is able to indicate where exactly in the sequence the difference occurs.

Use the internal differencing tool as a quick check or when you expect no, or almost no, differences (for example, where you have defined the test and have a clear expectation of the results).

NOTE: The internal differencing report is designed to give a consolidated list of the differences that prevent a test being marked as a Pass. It is not intended as an aid to debugging or reviewing scripts. Use this report only when your script and application data is reasonably stable, otherwise the report may contain more detail than is useful.

NOTE: The difference report algorithm is also very sensitive to small changes in script commands and to some other scenarios and may fail to generate a detailed list in these situations, although it will always state that the two files are different. You can always use an external differencing program in these situations.

GSIM compares script results files using a built–in differencing algorithm. The process is as follows:

- Nominate a results file as the benchmark results file (see section 4.12.9). This is a file that contains a record of the system behaviour that is considered to be correct. You must nominate one benchmark result file per script.
- Run the script to generate a new set of results (see section 4.12.6).
- Compare the new results to the benchmark result file (see section 4.12.11). The Differences Report (figure 4.58) displays the differences found in the files (if any).

1. Available from http://www.grigsoft.com/wincmp3.htm.

In a batch process, GSIM automatically compares the new result data against the benchmark results for each script, and presents the difference information in the Batch Summary Report (see section 4.12.18).

Regression testing is achieved by re-running a script when the project data changes. If the script then produces a results file which contains no difference in results from the benchmark file, then the test has demonstrated that the system behaviour has not changed.

As results files will always contain some pieces of information that vary between each run, a purely text comparison algorithm will always report some differences. GSIM implements a comparison algorithm that compares system behaviour and response and only reports differences that are significant.

4.12.1 Pass and Fail Criteria

If two results files contain the same script commands (demonstrating that the input stimuli are the same) and contain the same mnemonic changes of state on a cycle-by-cycle comparison, then the results of the test are considered to be the same. This is the definition of a regression test "PASS".

GSIM also allows the use of an external text comparison program as a way of viewing all differences across the two results files. This is intended as a way of seeing differences in the context of the overall system behaviour as recorded in the files. For additional information, see sections 4.12.12 and 4.12.13.

4.12.2 Creating a Script

Create a script using any text editor such as Notepad. Scripts must conform to the structure specified in Appendix G, "Script Structure and Language". Appendix G also lists the commands available for the scripts.

Once completed a script must be imported into a GSIM project (section 4.12.3) before it can be executed.

Alternately, you may generate a script by recording user actions from the GSIM user interface. For more information, see section 4.13.

4.12.3 Adding a Script to the Project

To add a script file to a project:

a) right-click on the Script files for <Project name> branch in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.52;

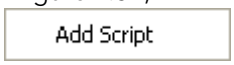


Figure 4.52 IScript branch right-click menu

b) click Add Script. GSIM will invoke a dialog box similar to figure 4.53;

c) browse for the script file. The filename will be displayed in the read-only text box.

d) click OK.

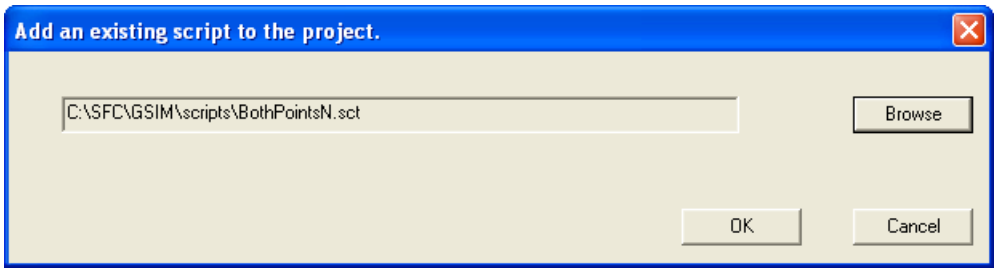


Figure 4.53 "Add an existing script to the project" dialog box

The file appears below the Script files for <Project name> branch in the Project Workspace window (Scripts tab).

4.12.4 Viewing or Editing a Script

You may open a script file from within the GSIM project to display its contents, edit the script or print the file.

Open a script file by:

a) right-clicking a Script file in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.54;

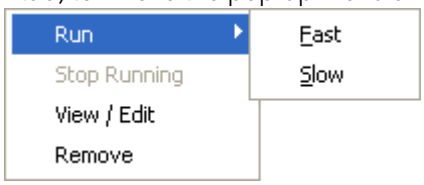


Figure 4.54 Script right-click menu

b) clicking View / Edit.

Review or edit the script in Notepad.

4.12.5 Removing a Script from the Project

Remove a script file from a project by:

a) right-clicking on the script to remove in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.54.

b) clicking Remove.

NOTE: The script is removed from the project but is not deleted from the file system.

4.12.6 Running a Script

Run a script by:

a) right-clicking the Script file in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.54.

b) clicking either:
- Run >Fast, to run the script at regular speed.
- Run >Slow, to run the script in slow mode so that you have more time to observe events.

NOTE: These speeds have nothing to do with the simulated cycle times of the WESTRACEs and are completely arbitrary. Script execution never takes place in real time. The slow option is provided as a script debugging aid.

You may be prompted to start logging at this point. Either create a new log or cancel logging, as you require, then proceed.

GSIM executes the script and generates a result file. The results file appears in the Project Workspace window (Scripts tab), underneath the script name.

NOTE: Script result files are only shown in the scripts tab tree if the script runs successfully. But a results file is always generated, even if the script stopped early due to an error or due to a cancelled run. You can find these result files on the file system, in the same directory as the script, if you need to look at them.

4.12.7 Stopping a Running Script

You may stop a running script at any time. When being run as part of a batch, you must stop the batch (see section 4.12.19) which will then stop any running scripts associated with the batch.

Stop a running script by:

a) right-clicking the running Script file in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.54.

b) clicking Stop Running.

4.12.8 Viewing Script Result Files

You may view the results of the script by opening the script results file.

View a script result file by:

a) right-clicking the script result file in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.55;

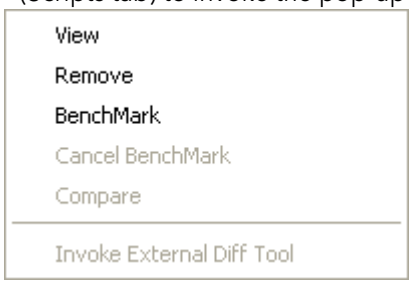


Figure 4.55 Script Result File right-click menu

b) clicking View.

View the contents of the file.

Caution: ***Although you can edit a result file and save the changes, GSIM will detect modified files and will not open them. GSIM generates an error similar to that shown in figure 4.56.***

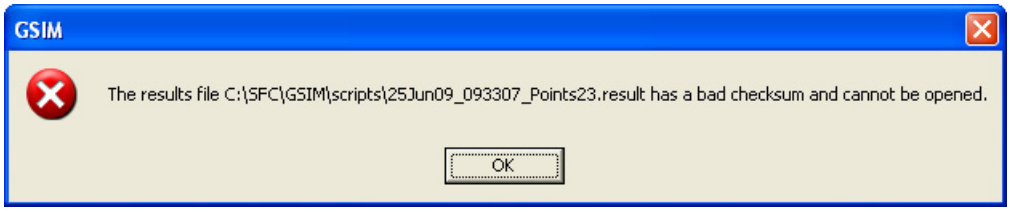


Figure 4.56 Modified script result file error message

4.12.9 Setting a Benchmark Result File

Set a benchmark result file to use when comparing the results of a script in regression testing.

Set a results file as the benchmark for the script by:

a) right-clicking the result file in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.55.

b) clicking Benchmark.

The result file is marked as the benchmark result file for that script as shown in figure 3.14. In result comparisons, the selected result file is compared against the benchmark result file for that script.

4.12.10 Cancelling a Benchmark Result File

Cancel the benchmark setting for a result file to remove its benchmark status.

Clear the benchmark setting for a result file by:

a) right-clicking the benchmark result file in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.55.

b) clicking Cancel BenchMark.

The result file is no longer marked as a benchmark result file as shown in figure 3.14.

4.12.11 Comparing Results Files for a Script

You may only compare results files for scripts where the scripts have:

- more than one result file associated with them, and
- one of the results files has been set at the benchmark (see section 4.12.9).

Compare a selected result file to the benchmark result file for that script by:

a) right-clicking the result file that you wish to compare in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.55.

b) clicking Compare. The Difference Report dialog box shown in figure figure 4.57 appears.

c) selecting a comparison option:
   - Select Show All Differences to compare the whole report and show all differences.
   - Select Show only the first <number> differences, and specify the number. This option will compare the results files until the specified number of differences are found and then stop. The report shows only the specified number of differences.

d) clicking OK.

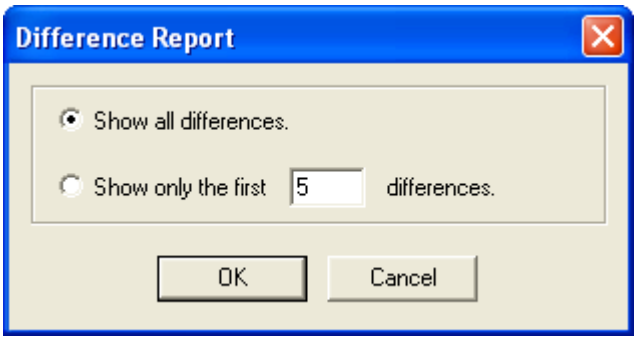


Figure 4.57 Difference Report dialog box

The files are compared using GSIM's algorithm to determine if there are any differences. The report is displayed in the a dialog box similar to the one shown in figure 4.58:

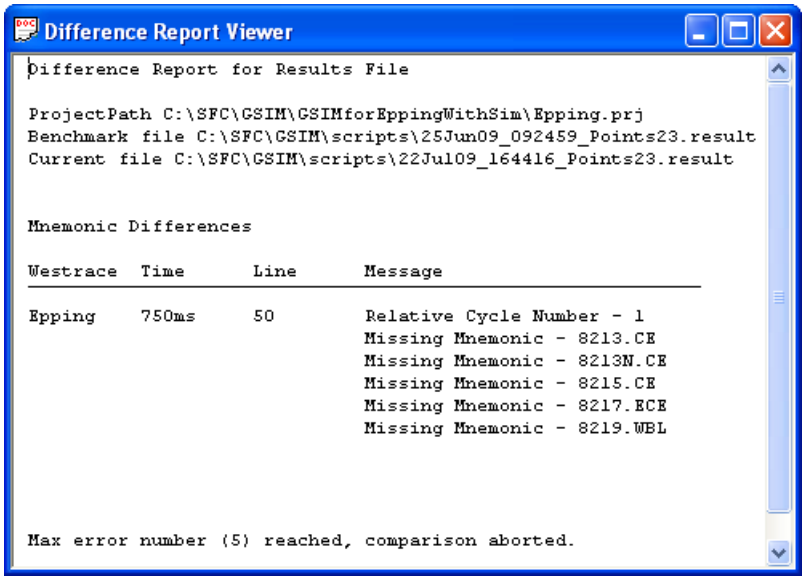


Figure 4.58 Example of a difference report in the Difference Report Viewer

4.12.12 Configuring an External Differencing Program

You can use an external file comparison program to compare results files against the benchmark. An external differencing program allows you to view the individual differences in context and the whole results file, so that you can see the script commands and prior mnemonic changes that lead up to the different behaviour. To do this, you must first configure GSIM to use the external program.

NOTE: Please ensure that you have installed and tested the external diff program before continuing.

Configure GSIM to use the external differencing program by:

a) selecting **Tools > Options** from the menu. An Options dialog box similar to the one shown in figure 4.59 appears.

b) specifying the path to the program in the Executable field. Alternatively, click ... to display a browse window where you can navigate to and select the program file.

c) specifying any command line parameters in the Parameters field. Use the place holders %1 and %2 in place of the filenames, as shown in as shown in figure 4.59. For more information and an example of how to set parameters, see section .

d) clicking OK.

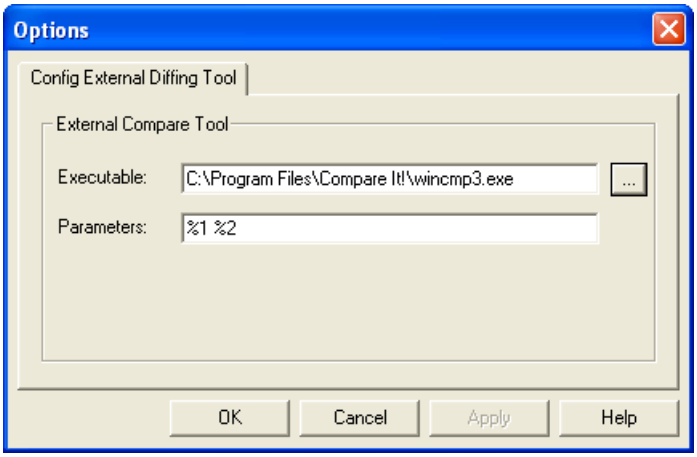


Figure 4.59 Options dialog box

Specifying Parameters for an External Differencing Program

Each differencing program has its own set of command line parameters used when comparing files. Refer to the documentation supplied with your differencing program for details on the available command line parameters.

At a minimum, a differencing program requires the names of the two files to compare. In GSIM, these are specified using the filename placeholders **%1** and **%2** respectively, as shown in figure 4.59.

In another example, a file differencing program called wincmp3.exe accepts a command line that takes the names of two files to compare and a set of switches that control the comparison:

```
wincmp3.exe FirstFile.result SecondFile.result /x /y /Z
```

In this case, the command line parameters to enter in the Options dialog box Parameters field are:

```
%1 %2 /x /y /z
```

where the place holders %1 %2 represent the filenames and x, y and z are optional parameters used by the differencing tool.

4.12.13 Comparing Results using an External Differencing Program

You may only compare results files using an external differencing program where:

- the script has more than one result file associated with it
- one of the results files has been set as the benchmark (see section 4.12.9), and
- you have configured GSIM to use an external differencing program (see section 4.12.12).

Compare a selected result file to the benchmark result file for that script using an external differencing program by:

a) right-clicking the result file that you wish to compare in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.55.

b) clicking Invoke External Diff Tool.

The files are compared using the external diferencing tool.

4.12.14 Removing a Script Result File from the Project

Remove a script result file from a project by:

a) right-clicking on the result file to remove in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.54.

b) clicking Remove.

NOTE: The result file is removed from the project but is not deleted from the file system.

4.12.15 Creating a Batch File

Create a batch file using any text editor such as Notepad. Batch files must conform to the structure specified in Appendix H, "Batch File Structure".

Once completed a batch file must be imported into a GSIM project (section 4.12.16) before it can be executed.

4.12.16 Adding a Batch File to the Project

To add a batch file to a project:

a) right-click on the Batch files for <Project name> branch in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.60;

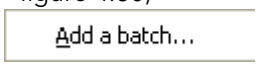


Figure 4.60 Batch branch right-click menu

b) click Add a batch. GSIM will invoke a dialog box similar to figure 4.61;

c) browse for the batch file. The filename will be displayed in the read-only text box.

d) click OK.

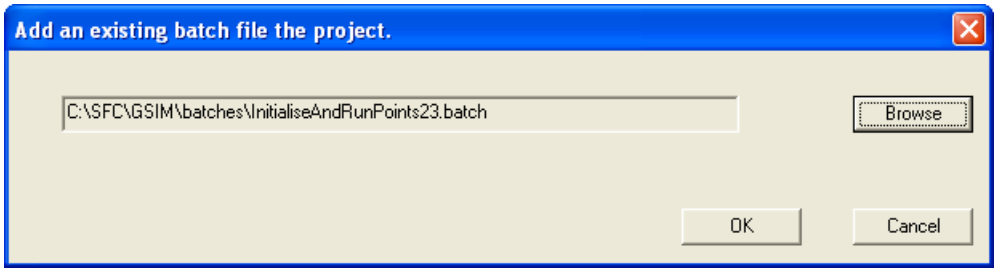


Figure 4.61 "Add an existing batch file to the project" dialog box

The file appears below the Batch files for <Project name> branch in the Project Workspace window (Scripts tab).

4.12.17 Viewing or Editing a Batch File

You may open a Batch file from within the GSIM project to display its contents, edit the script or print the file.

Open a Batch file by:

a) right-clicking a Batch file in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.62;

Figure 4.62 Batch file right-click menu

b) click View/Edit.

4.12.18 Running a Batch File

Run a batch file by:

a) right-clicking the batch file in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.62.

b) clicking Run.

You may be prompted to start logging at this point. Either create a new log or cancel logging, as you require, then proceed.

GSIM executes the batch file, running each script in the order in which they appear in the batch. If a script cannot be invoked (because it is not present at the expected location on the file system, or because it contains a syntax error) then the batch file moves onto the next script. A script that cannot be invoked is marked as 'Skipped' in the Batch Summary Report.

Any error in the simulation caused by a running script is considered fatal and terminates the batch processing, but script errors detected before the script starts running just cause that script to be skipped.

The results file from each script is compared against the benchmark results file set for that script (section 4.12.1). If a benchmarked results file has not been set for a script, no comparison can be performed, and the script is marked as 'Invalid' in the Batch Summary Report. Results files which fail the CRC check, or which cannot be opened for other reasons, also lead to an 'Invalid' outcome being registered for the script.

If the script runs without error and if a valid benchmark results file has been set, then the internal differencing algorithm runs and a 'Passed' or 'Failed' statement is added to the Batch Summary Report for the script. 'Passed' has the meaning defined in section Pass and Fail criteria (section 4.12.1).

The Batch Summary Report name is added to the Scripts tab, under the batch file name, when the batch file runs to completion.

NOTE: Batch Summary Reports are only shown in the Scripts tab tree if the batch file successfully ran to conclusion. But a batch summary report is always generated, even if the batch processing stopped early due to an error during the simulation or due to the user cancelling the run. You can find these batch summary reports on the file system, in the same directory as the batch file, if you need to look at them.

Important:

Batch Summary Reports are not protected by a checksum since that are not read back into GSIM at any stage. We recommend that you print the report as test evidence. This protects against accidental alteration of the report contents.

4.12.19 Stopping a Running Batch

You may stop a running batch at any time.

Stop a running batch by:

a) right-clicking the running batch file in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.62.

b) clicking Stop Running.
If a script is running when you stop a batch, the script will stop.

4.12.20 Removing a Batch from the Project

Remove a batch file from a project by:

a) right-clicking on the batch file to remove in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.62.

b) clicking Remove.

NOTE: The batch file is removed from the project but is not deleted from the file system.

4.12.21 Viewing Batch File Reports

The execution of a batch file produces a Batch Summary Report that contains:

- The names of each script in the batch
- The names of the benchmark results file and of the results file generated during the batch run
- An error message if the script could not be successfully executed
- An error message if the script does not have a benchmark results file set.
- A Pass/Fail message indicating whether or not the execution of the script produced the same system behaviour as the benchmark.
- A brief statistics summary at the end of the report.

The Batch Summary Report appears in the Project Workspace window (Scripts tab) under the batch file for which it was generated.

You may view the Batch Summary Reports by opening the Batch Summary Report file.

View a Batch Summary Report file by:

a) right-clicking the Batch Summary Report file in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.63;

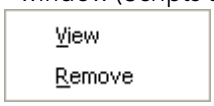


Figure 4.63 Batch Summary Report File right-click menu

b) clicking View.

View the contents of the file.

SAFETY WARNING

Batch Summary Report files are a record of the outcome of the regression test. Do not modify the contents of the file.

4.12.22 Removing a Batch Summary Report from the Project

Remove a Batch Summary Report file from a project by:

a) right-clicking on the Batch Summary Report file to remove in the Project Workspace window (Scripts tab) to invoke the pop-up menu shown in figure 4.63.

b) clicking Remove.

NOTE: The Batch Summary Report file is removed from the project but is not deleted from the file system.

4.13 Script Recording Commands and Actions

You may generate a script by recording user actions from the GSIM interface.

Before recording a script, choose to use the calculated WESTRACE cycle time (no action required) or set the WESTRACE cycle time for each WESTRACE as described in section 4.5.5).

Record a script by:

a) clicking Start Recording from the Record menu or toolbar. Follow the prompts to specify a logging file (if required) and create the script file (see section 4.13.1).

SETCYCLETIME commands are automatically generated when the new script is opened for recording.

b) issuing a RESET command if required (see section 4.13.2.1). You may not wish to include RESET commands if you would like one script to start

straight after another, starting the next script at the simulation state which the first one established.

c) modifying or isolating all mnemonics that need to be changed at a particular stage of the simulation (see sections 4.13.2.2 and 4.13.2.2)

d) clicking Run For from the Record menu or toolbar to start simulation cycling (see section).

e) clicking Stop Run For to stop the simulation cycling when the WESTRACEs have reached the expected state based on the issued mnemonic commands. This adds a RUNFOR command to the script (see section).

f) repeating steps c–e to run and record additional simulation scenarios as required.

g) clicking Stop Recording from the Record menu or toolbar to stop recording and close the script (see section).

The script recording commands include the following:

- Start Recording
- Run For
- Stop Run For
- Stop Recording

4.13.1 Start Recording REC

To start recording a script:

a) Click the Start Recording button or select Start Recording from the Record menu.

You may be prompted to start logging at this point. Either create a new log or cancel logging, as you require, then proceed.

The Record New Script dialog box appears (figure 4.34).

b) Enter a name for the new script.

NOTE: All script file names must include the extension ".SCT".

The script name must be unique within the project. If a script with that name already exists, a warning appears and cancels the start recording process.

If required, enter additional information (such as the author's name) that will be included in the Script Header.

c) Click OK to start recording the script.

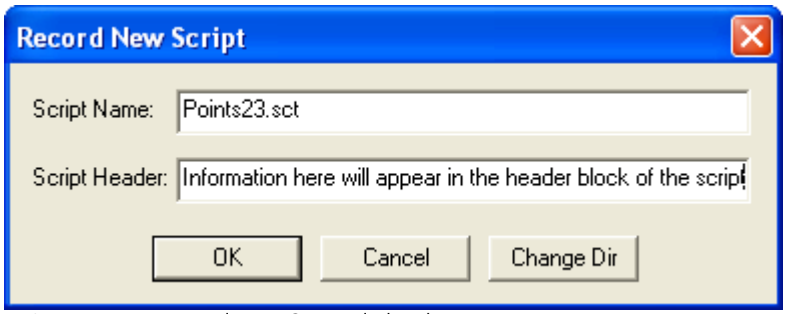


Figure 4.64 Record New Script dialog box

4.13.2 Add Commands to the Script

Script commands are generated in much the same way as they would be in a normal interactive simulation session.

4.13.2.1 Generate a Reset Command

Generate a Reset command by press the Reset button on the toolbar. A Reset command is inserted in the script.

4.13.2.2 Generate SetMnemonic or SetFieldMnemonic Commands

Modify installation and field mnemonics in the normal GSIM fashion—from the Mnemonic Viewer (section 3.7) or from the MIMIC views. The appropriate commands are inserted into the script.

4.13.2.3 Generate Isolate and Unisolate Commands

Isolate and unisolate mnemonics in the normal GSIM fashion (see section 4.8.3) and the appropriate commands will be inserted into the script.

4.13.2.4 Generate Run For Commands

When you have modified all the mnemonics you need to change at a particular point in the script, click Run For to start the simulation cycling.

When the WESTRACEs have reached the state that you expect to follow from the issued mnemonic modification commands, click Stop Run For to pause the WESTRACEs cycling. A single RUNFOR command is then inserted into the script.

You can generate the next RUNFOR command by specifying a new set of mnemonics, clicking Run For to start the cycling process and then clicking Stop Run For to end the cycling process.

Run For 

Start running a simulation while recording a script by clicking Run For on the Record menu or toolbar.

The simulation begins cycling, using the specified conditions. The simulation continues until it is stopped using the Stop Run For command.

Stop Run For 

Stop running a simulation while recording a script by clicking Stop Run For on the Record menu or toolbar.

This stops the running simulation started with the Run For menu option or button, and places a RunFor command in the script.

Stop Recording 

You can only finish recording a script if you stop the cycling of the WESTRACEs first. Click Stop Run For on the Record menu or toolbar to stop any running simulation.

Stop recording the script by clicking Stop Recording on the Record menu or Toolbar.

The script file appears in the Script files for <Project name> branch in the Project Workspace window (Scripts tab). You may view, edit and execute the script from the Project Workspace window.

4.14 Time of Day (TOD) Timer

Time Of Day (TOD) timer mnemonics are provided in the NVC/DM and NCDM modules of a WESTRACE MkI and in the PM of a WESTRACE MkII. GSIM simulates these mnemonics differently to the actual WESTRACE operation. In a WESTRACE, these mnemonics are triggered automatically at a configured time of day.

GSIM has changed this to make it easier to test the logic associated with these timers. In GSIM, Time of Day Timers act like input mnemonics—they only trigger when a user toggles the mnemonic. This also means that they do not trigger when the computer's clock reaches the configured time of day.

GSIM will hold the mnemonic high for one cycle only, just as the real hardware does.

There is no need to be aware of the computer's time when testing these mnemonics. Simply toggle them from within GSIM (through the Nonvital Control window or the mnemonic viewer of the NVC/DM, NCDM or PM) or from a script. Use of mnemonic viewers is covered in section 3.7 and toggling mnemonics is covered in section 4.8.4. Set the timer in the same way as other mnemonics are toggled (section 4.8.4).

4.15 Closing a Project

To end a GSIM simulation:

a) Stop any run-type command for all WESTRACE installations by using the Stop command or button. The Stop command or button invokes the Stop dialog box, shown in figure 4.41. See section 4.11.2.

b) Stop any running script or batch file. In the Project Workspace window (Scripts tab) right-click on any running script or batch file and select Stop Running from the pop-up menu. See section 4.10.6.

c) If logging, stop the logging of the current test. In the Project Workspace window (Logs tab) right-click on the current log file and select Stop from the pop-up menu. See section 4.10.6.

d) Save the project.

e) Exit.

Attempting to close a project while a simulation or script is running will invoke the dialog box shown in figure 4.65.

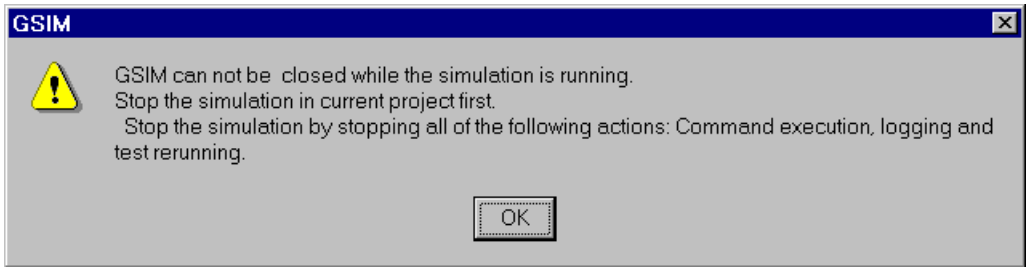


Figure 4.65 "Improper project closure" warning

5. GSIM Data Preparation

This chapter describes:

We recommend that you create a separate project directory for each installation and keep only the files related to that installation in the project directory.

5.1 File Types

Table 5.1 lists the filenames used in GSIM for each WESTRACE installation and describes how the files are used.

The Prefix column displays the variable portion of the filenames coloured in green. For example, a NVC/DM data filename, **WESTRACE**_NVCDM.img, is made up of:

- the prefix with a variable portion (**WESTRACE**) and fixed portion (_NVCDM), and
- an extension IMG.

Table 5.1 GSIM file types

Prefix	Extension	Description of file
WESTRACE	IMG	Installation data files created using GCSS to compile a WESTRACE installation (section 5.6.1)
WESTRACESIM	IMG	Installation Field file created using GCSS to compile a WESTRACE field simulation (section 5.6.3)
WESTRACE_D	IMG	Non-vital comms configuration data for the D processor of a WESTRACE MkII created using GCSS.
WESTRACE_NVCDM	IMG	NVC/DM data file created using GCSS to compile NVC/DM data
WESTRACE_NCDM	IMG	NCDM data file created using GCSS to compile NCDM data
Project	GPC	Graphic display file for the Non-Vital Control window, created using the PCGE application (section 5.7.2)
ProjectSIM	GPC	Graphic display file for the Track Equipment window, created using the PCGE application (section 5.7.3)
Project	TXT	Files containing the control menus for the Non-Vital Control window, created by the Designer using a text editor (section 5.8.1)

Table 5.1 GSIM file types *(Continued)*

Prefix	Extension	Description of file
ProjectSIM	TXT	Files containing the control menus for the Track Equipment window, created by the Designer using a text editor (section 5.8.2)
Project	CFG	A GSIM configuration file to indicate the location of the TXT file, created by the Designer using a text editor (section 5.8.3) This file must be stored in the same folder as the corresponding GPC file.
ProjectSIM	CFG	A GSIM configuration file to indicate the location of the SIM.TXT file, created by the Designer using a text editor (section 5.8.4) This file must be stored in the same folder as the corresponding SIM.GPC file.

5.2 File Naming Conventions

The following naming conventions are suggested:

- "WESTRACE" represents an individual WESTRACE installation.
- "WESTRACE**SIM**" represents the field file for an individual WESTRACE installation.
- "Project" represents the files for the Non-Vital Control window in a GSIM project.
- "*Project***SIM**" represents the files for the Track Equipment window in a GSIM project.
- "WESTRACE_**NVCDM**" represents the logic data file for the NVC/DM module.
- "WESTRACE_**NCDM**" represents the logic data file for the NCDM module.

5.3 Prefixing

A prefix is used to uniquely identify a mnemonic in situations where a client application may see the same mnemonic from different WESTRACEs.

A prefix must be specified for VLM or PM mnemonics in a GSIM project which contains more than one WESTRACE installation.

A prefix must be specified for VLM and NVLM mnemonics in a WESTRACE MkI which contains a NVC/DM or NCDM.

The required prefix(es) are specified for each type of WESTRACE when adding a WESTRACE (see section 4.5.3).

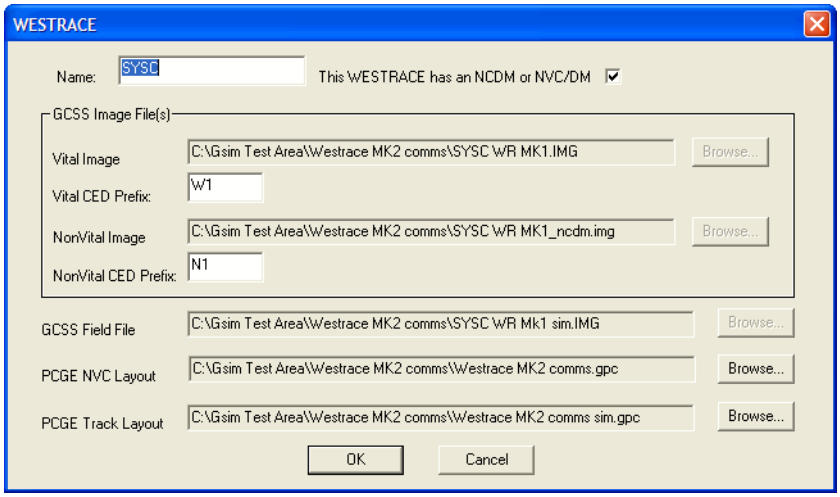


Figure 5.1 Prefix example (WESTRACE MkI)

Figure 5.1 shows an example of WESTRACE MkI configured with 'W1' as the vital CED prefix and 'N1' as the non–vital CED prefix.

With GSIMDriver configured to pass prefixed mnemonics, a mnemonic in the vital CED labelled "INOUT1" corresponds to the mnemonic "W1-INOUT1"in the client application.

5.4 File Location Rules

The CFG file defines the location of the TXT file; and the SIM.CFG file defines the location of the SIM.TXT file.

Ensure that the CFG and SIM.CFG files correctly identify the appropriate folder. See section 5.8.3 and section 5.8.4 for details.

NOTE: The graphic's CFG file must reside in the same folder as the project's GPC file, and the project's SIM.CFG file must reside in the same folder as the project's SIM.GPC file

Create a *project* directory for each installation, and keep all files related to that installation in this directory. This ensures that each project is kept separate and the files are not confused with other installations.

Script and batch files may be stored anywhere. To function within a project, however, the files must be in the location expected by the project. If you import a script or batch file into a project and then move the file to another location, GSIM will not be able to locate the file.

5.5 Mnemonic Naming Conventions

Mnemonics must be identical in GSIM and any client applications connected via GSIMDriver.

Mnemonics in the client application data may need to include the GSIM prefix if GSIMDriver is configured to pass prefixed mnemonics (see the example in section 5.3).

Use prefixed mnemonics wherever a client application may observe the same mnemonic in more than one WESTRACE. This situation may arise, for example, when MoviolaW is configured to observe multiple WESTRACEs. Ensure a hyphen "-" is used as the separator between the prefix and the mnemonic in the client application.

NOTE: Mnemonic names must be compatible with all applications being used. The maximum prefix length in GSIM is 4 characters (not including the separator). PCGE will not allow underscores (_) in mnemonic names.

5.6 Installation Image Files

The application logic for each WESTRACE MkI installation and associated field equipment simulation are contained in the .IMG, SIM.IMG, _NVCDM.IMG and _NCDM.IMG files. The application logic for each WESTRACE MkII installation and associated field equipment simulation are contained in the .IMG, _D.IMG and SIM.IMG files.

NOTE: The vital logic image file and field image filenames must have a matching naming convention. A vital logic image file called crk1a.IMG must have an associated field image file called crk1asim.IMG.

Figure 4.12 shows a WESTRACE dialog box with .IMG, SIM.IMG and _NVCDM.IMG files defined.

The Vital Logic Module types supported are HVLM128, HVLM128A, VLM5 and VLM6.

IMG, SIM.IMG, _NCVDM.IMG and NCDM.IMG files are generated using GCSS. These files are described in the following sections.

5.6.1 IMG Files

The Signal Engineer uses GCSS to create an Installation file, compiles it and produces the IMG file(s). For file naming conventions, see section 5.1.

WESTRACE MkI installations produce a single IMG file.

WESTRACE MkII installations produce two IMG files: one for Processor A and B containing most of the configuration data and one for Processor D containing the non-vital communications configuration data.

5.6.2 _NVCDM.IMG and _NCDM.IMG (WESTRACE MkI only)

Use GCSS to create a _NVCDM.IMG or _NCDM.IMG file.

GCSS names the file using:

- the installation name for the first part of the filename;
- _NVCDM to identify it as an NVC/DM file or NCDM to identify it as an NCDM file; and
- "IMG" for the filename extension.

Save the file in the project directory.

5.6.3 SIM.IMG Files

Create and compile a separate installation file (SIM.IMG) in GCSS for the field simulation.

The SIM.IMG file uses WESTRACE logic to simulate the operation of each item of field equipment. This logic takes outputs from the WESTRACE installation under test and turns these around as inputs to the WESTRACE installation under test—so, in effect, emulates the normal operation of field equipment.

The SIM.IMG file should match the type of the WESTRACE being simulated, ie. for a WESTRACE MkI, the SIM.IMG should use a VLM and be compiled using GCSS for the WESTRACE MkI. For a WESTRACE MkII, the SIM.IMG should use a PM and be compiled using GCSS for WESTRACE MkII.

For example, WESTRACE would set outputs to call a set of points. The field simulation would detect the valid outputs required (for example, NLR and WZR) to commence point movement. When setting points normal, reverse detection would be removed immediately, and normal detection would be applied after a short delay.

NOTE: We recommend that you minimise the number of rungs in the logic, and ensure that the logic does not depend on timer precision or on communication modules connecting fields of an adjacent WESTRACE in the project. (Errors in setting the delays in field logic may cause incorrect evaluation of time-based events.)

Appendix B shows typical examples of logic for point, signals and ground frames.

NOTE: The mnemonics in the SIM.IMG file that are used to link the field logic to the WESTRACE installation must appear in the SIM.IMG file as either an input or an output only. Do not create field logic that uses these mnemonic as both input and output in modules in the field.

Use GCSS to design, check and approve one set of logic for each type of field equipment and then cut and paste it to represent the total number of items required. The mnemonics have to be updated for each instance.

a) Insert a supported VLM or PM into the installation.

b) Insert VPIM modules for simulation inputs. The positions of the VPIMs and of the input mnemonics in them do not matter. A VPIM input in the SIM.IMG can be an input from any output mnemonic in the WESTRACE installation.

c) Assign the identical mnemonic to inputs as is used for the outputs of the WESTRACE installation under test.

d) Use VROM modules for outputs to the installation. The position of the VROMS and of the output mnemonics in them do not matter. A VROM output in the SIM.IMG can drive an input from any output mnemonic in the WESTRACE installation.

e) Assign the identical mnemonic to the outputs as is used for the inputs of the WESTRACE installation under test.

f) Use any appropriate mnemonics for the internal latches and timers.

Check and compile the IMG file according the process described in the GCSS manual.

Name the field Installation file ending with the letters SIM (a maximum of five preceding characters is permitted, for example: XXXXXSIM). When compiled, GCSS produces a SIM.IMG file. If more than five characters are used before the letters SIM in the filename, some characters will be lost.

Save the file in the project directory.

5.6.4 Installation IP Addresses

Each WESTRACE MkII and VLM6+NCDM installation must have a unique (within the GSIM project) primary IP address. Set the primary IP address for each WESTRACE in GCSS before creating the IMG file. GSIM uses that address to determine which communications ports and modules are connected to each other.

NOTE: GSIM only uses the primary IP address for NCDMs and for WESTRACE MkIIs. Any secondary IP address is ignored.

You cannot create a GSIM project containing two or more WESTRACEs with the same primary IP address. The only exception is where the WESTRACEs are configured with the standard loopback address 127.0.0.1, which is the default IP set in GCSS.

If an installation has a primary IP address of 127.0.0.1 then it cannot communicate over a network. GSIM will load the installation but will ignore all configured network ports in the installation.

GSIM will simulate the WNC vital protocol and WNC$^+$ successfully only if the network and communication properties of the WESTRACE MkII and VLM6+NCDM installation are configured correctly in GCSS.

5.7 Diagram Files

The diagram files to display the NVC and Track Equipment windows are the GPC and SIM.GPC files created using PCGE (PC Graphic Editor).

NOTE: The NVC and field graphic filenames must have a matching naming convention. A NVC graphic file called crk.GPC must have an associated field graphic file called crksim.IMG.

To provide a visual interface of the simulation, the Signal Engineer must create diagram files for the Non-Vital Control and the Track Equipment windows for each WESTRACE installation.

The Signal Engineer creates diagrams to represent the entire installation. All items such as signals, points, tracks and ground frames must be represented in the diagrams so they can be accessed during the simulation.

Each diagram file required a corresponding .TXT or .GUI file to operate the window's menus, dialog boxes and other on-screen elements (see section 5.8)

NOTE: Always make backup copy of your GPC file before opening in PCGE.

NOTE: Never attempt to open a GPC file in a previous version of PCGE if the GPC file format version is not compatible, or the file may be permanently corrupted.

NOTE: See section 2.3.4 for compatibility between GSIM and PCGE.

5.7.1 Overview

The Signal Engineer or designer creates the NVC and Track windows:

a) create and place graphic elements using PCGE;

b) assign WESTRACE mnemonics to on-screen graphic elements;

c) assign mnemonics to logic states;

d) assign different colours to indicate different logic states;

e) use the position of the mouse-pointer (when clicked) to modify a mnemonic's state;

f) assign behaviours to graphic elements.

The diagram file will contain the following elements to meet GSIM's requirements for displaying information:

- groups of graphic elements on the screen (called insertions);
- mnemonics assigned to each graphic element;
- logic tables to define the behaviours and logic states assigned to each graphic element;
- labels to identify the graphic elements.

Using PCGE to create GPC files is described in [pcge].

5.7.2 GPC Files

A GPC file defines the Non-Vital Control window and contains the screen elements and controls that the Signal Engineer or designer chose to incorporate into the window when designing it.

The GPC extension identifies the file as having been produced using the PCGE software tool. Details about creating GPC files are provided in [pcge].

- use PCGE to create a diagram file and assign mnemonics for the NVC window (section 5.7.4);
- save the GPC file in the project directory;
- you will also need:
  - TXT or GUI file;
  - CFG file.

NOTE: You may see the following warning when working with an old GPC file: "The data integrity of this file is compromised. The file version is 2.00, but has been converted from an earlier version." This is a message from MIMIC, not GSIM. Consult the MIMIC user documentation for more details on this message.

5.7.3 SIM.GPC Files

A SIM.GPC file defines the Track Equipment window and is produced in the same manner as GPC files.

- use PCGE to create a diagram file and assign mnemonics for the TRACK window (section 5.7.4);
- save the GPC file in the project directory;
- you will also need:
  - SIM.TXT or SIM.GUI file;
  - SIM.CFG file.

5.7.4 Assigning Mnemonics in PCGE

GSIM uses GPC files with the installation's mnemonics in the PCGE Insertion Properties dialog box. An insertion property will default to direct bits, which must then be assigned to mnemonics.

There are numerous different ways to assign mnemonics to bits depending on the version of your .GPC file and the version of PCGE you are using. The following sections step through these different methods.

- To create a new graphic using the latest version of PGCE, follow section 5.7.4.1.
- To convert an existing .GPC file from direct bits to mnemonics, follow section 5.7.4.2.
- To edit an existing .GPC file that uses mnemonics, follow section 5.7.4.3 (covers all versions of .GPC and PCGE).

5.7.4.1 Creating a New GPC File

The MGR file contains the list of mnemonics that will appear on the PCGE diagram.

Do not use the following features when creating or editing the GPC file for GSIM with the PCGE v3.x:

- static bitmaps (new entities)
- new “button” blocks
- entity rotation

To create a GPC file:

a) Create station layout in PCGE v3.x;
   Do not change Insertion Properties;

b) Open the GPC file in DtMC. Use the Direct->Mnemonics option;

c) Open the GPC file and the MGR file in MAA and replace 'NOT_ASSIGNED' with the relevant mnemonic names.

The MGR file is manually generated and contains all mnemonics that you want to appear on the diagram, one per line. The prefix of each of the WESTRACEs specified in the GSIM project has to match the prefix in the GPC file.

5.7.4.2 Convert a GPC file from a Direct Bits Installation

The DtMC tool from the PCGE TOOL SUITE v3.x will automatically convert the bits to mnemonics using the .GPC file and the .MGR file. The MGR file from in the original installation (must have bits and mnemonics in correct order) must be used:

a) convert your .GPC file to version 2.00. see section for details;

b) open the .GPC file and the .MGR in DtMC;

c) select Direct->Assignation button. This will transfer direct bits with filled fields L, H, C, B (Line, Housing, Card, Bit) to mnemonics according to their list order in the .MGR file.

NOTE: Do not select the Directs>Mnemonics button before selecting the Directs>Assignation button. If you do so, you will loose the direct bits and no assignment will be done.

5.7.4.3 Editing an Existing GPC File

In PCGE the following procedure can be followed to assign mnemonics to bits (for more detail, see the PCGE user manual [pcge]):

a) Select an insertion;
   Double-click on an insertion to invoke the Insertion Properties dialog box. PCGE will display the dialog box in the Direct Bits view by default (see figure 5.2, taken from PCGE v1.0). A column of check boxes appears on the left side for selecting bits.

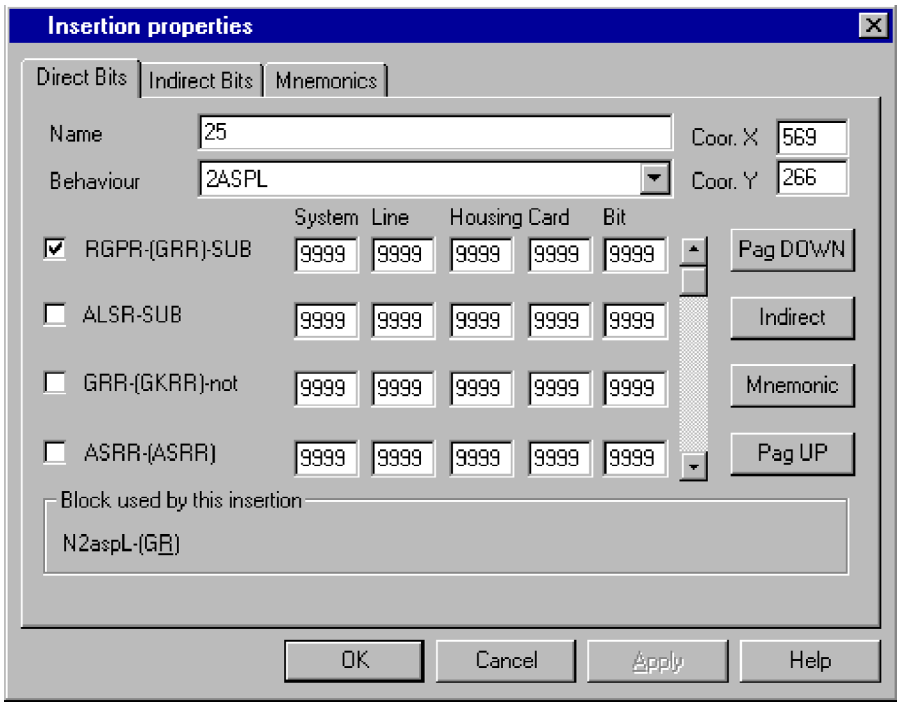


Figure 5.2 PCGE Insertion Properties dialog box: Direct Bits tab

b) Convert Direct Bits to default mnemonic names;

- PCGE **v1.0** check the box beside each bit to be assigned a mnemonic (the first box in figure 5.2 is checked to demonstrate). Checked boxes indicate selected bits.

  Click the Mnemonic button to move the selected bits to the Mnemonics View.

  Click the Mnemonics tab to select the Mnemonics view (see figure 5.3, taken from PCGE v1.0).
- PCGE **2.2 and** PCGE **v3.x** there is additional button "All Mnemonics" that converts all direct bits to mnemonics at once. In PCGE 2.2 the mnemonic names will be set to "Default Mnemonic" as default.
- PCGE **3.x** the mnemonic names will be set to "NOT_ASSIGNED" as default.

Use the DtMC tool to convert all the direct bits to mnemonics by using the Directs>Mnemonics button.

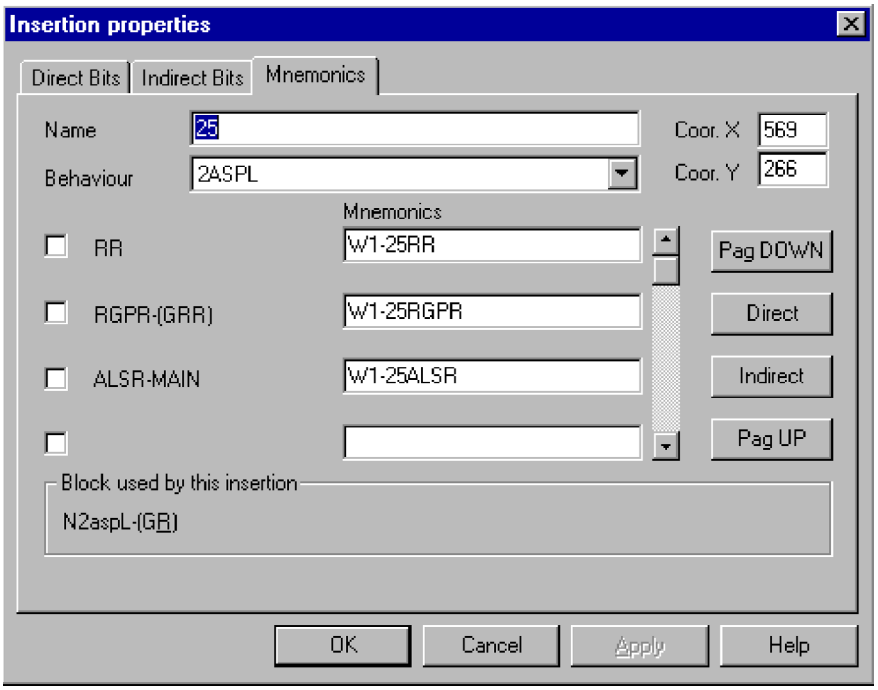


Figure 5.3 PCGE Insertion Properties dialog box: Mnemonics tab

c) Assign mnemonic names.

For PCGE **up to version 2.2** type the mnemonic name in the Mnemonics text window for each bit (replacing the text 'Default Mnemonic'). Click OK when finished.

For PCGE **version 3.x** use MAA tool to select mnemonics from MGR file so the mnemonic names do not need to be typed in manually

NOTE: You must prefix multi-WESTRACE mnemonics as described in section 2.5.7.7.

5.8 Configuring the User Interface

The NVC and Track windows are part of the user interface, allowing interaction via pop-up menus as shown in figure 5.4.

NOTE: Figure 5.4 is for illustration purposes only—GSIM does not display a Set or Cancel Route pop-up menu at the same time as a Points dialog box.

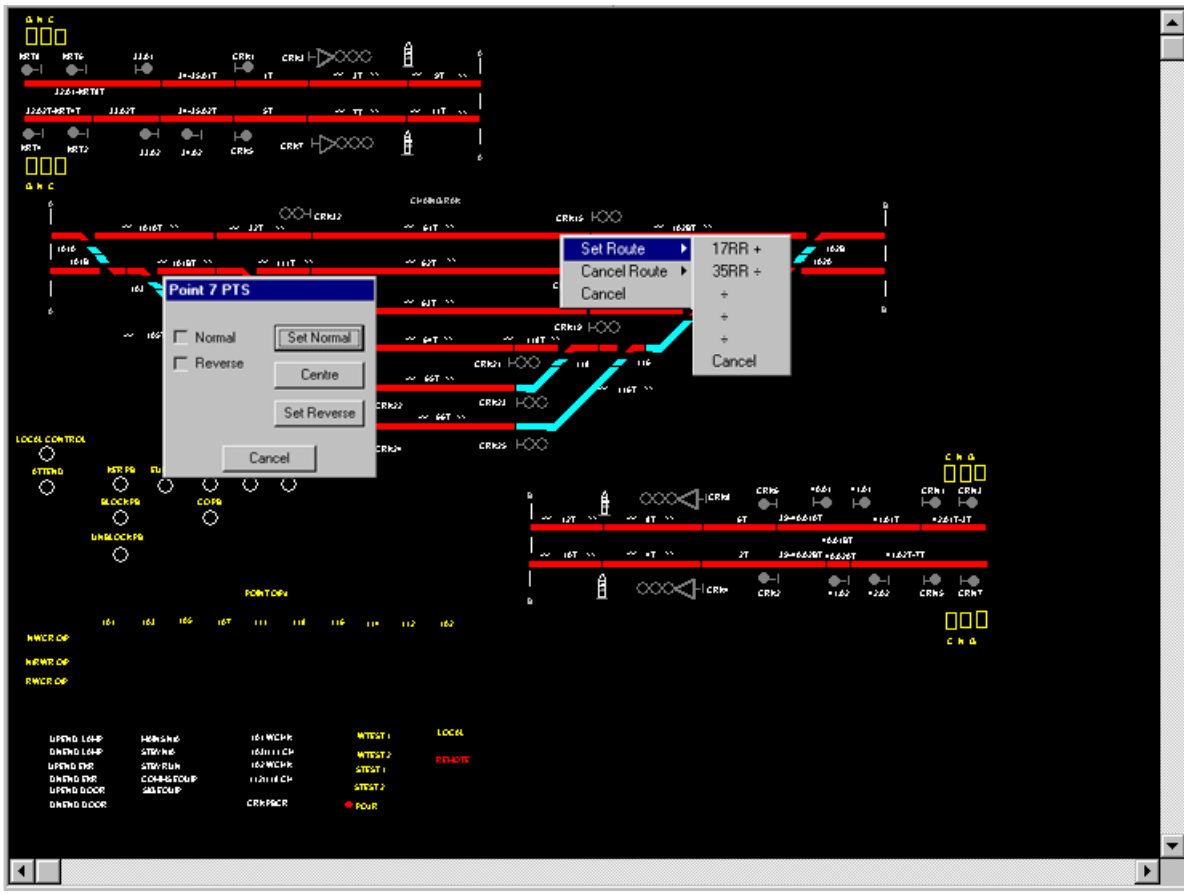


Figure 5.4 Sample NVC window

The pop-up menus for each window are defined by the .TXT and SIM.TXT files, and associated with the GPC and SIM.GPC files, respectively (see section 5.8.2). See Appendix D for a sample .TXT file.

The GPC, SIM.GPC, .TXT and SIM.TXT files must be used with corresponding .CFG and SIM.CFG files. The .CFG and SIM.CFG files are configuration files that GSIM uses to find the .TXT and SIM.TXT files.

The designer creates or modifies the .TXT, SIM.TXT, .CFG and SIM.CFG files using a word processor or text editor.

These files are described in the following sections.

5.8.1 TXT or GUI Files

A TXT or GUI file is a set of instructions that the GSIM uses to operate the menus and dialog boxes for the NVC and Track windows. TXT and GUI files are identical, however the extension must match the extension specified in the .CFG file (see section 5.8.3).

The NVC and Track windows are part of the graphic user interface (GUI) and contains the screen elements and controls that the Signal Engineer or designer chose to incorporate into the windows when designing them.

The TXT or GUI file contains sections to define the window's menus, dialog boxes and events (such as when an object is selected).

Use a text editor to change the .TXT or .GUI file, then save the file in the *project* directory using the extension .TXT or .GUI.

Appendix D contains a sample .TXT file with explanatory notes added in the left margin. Any lines in the file beginning with "*" are explanatory comments contained in the file.

NOTE: You must prefix multi-WESTRACE mnemonics as described in section 2.5.7.7.

5.8.2 SIM.TXT Files

A SIM.TXT (or SIM.GUI) file is a set of instructions that the GSIM uses to operate the Track Equipment window and is similar to a TXT file. See Section 5.8.1 for details.

Use a text editor to edit the SIM.TXT file to correspond to the SIM.CFG file. Save in the *project* directory.

5.8.3 CFG (Configuration) Files

The CFG (configuration) files are text files that point to the path that GSIM uses to find specified .TXT and SIM.TXT files.

Use a text editor to add the correct path to the CFG file. Change nothing but the path (appears in bold in the following example for clarity only).

The file MN.CFG is an example of a CFG file. The file contains four lines of text:

```
DRIVER GUI 0
CONFIG = "CONFIG c:\Program Files\GSIM\Data\Mn\mn.txt"
END_DATA
END_DRIVER
```

NOTE: The CFG file and the GPC file must be stored in the same folder as each other.

Save this file in the *project* directory.

5.8.4 SIM.CFG Files

A SIM.CFG file contains the instructions that the GSIM uses to find the SIM.TXT file and is similar to a CFG file.

See Section 5.8.3 for details.

5.9 Multi-WESTRACE Mnemonics

Interconnected WESTRACE systems typically use mnemonics that share the same name. GSIM must be able to tell which WESTRACE system each mnemonic belongs to.

Make the mnemonics unique for each WESTRACE by:

- adding a prefix code (for example “W1”), followed by a hyphen as a separator, to the front of each mnemonic in PCGE;
- specifying the required prefix or prefixes (two for a WESTRACE MkI with a NVLM and one for a WESTRACE MkII) when adding the WESTRACEs to the project (see section 4.5.3). Each prefix must be unique in a GSIM project.
- Up to 4 alpha-numeric characters may be used for prefix codes, but W1, W2, W3 and W4 are recommended for VLM and PM mnemonics.

NOTE: The MoviolaW installation process sets the default prefix separator for MoviolaW as '#' in the Windows Registry. This may cause problems when MoviolaW and GSIM try to communicate. See section 6.4 for information on how to change the MoviolaW prefix separator to match GSIM's prefix separator (–).

The renamed mnemonics are used in the following files:

- the GPC file diagram files for the NVC and Track windows (prepare using PCGE, see section 5.7.4);
- the TXT file (or GUI file) which defines the pop-up menus for the NVC and Track windows (prepare using a text editor, see section 5.8.1).

NOTE: The prefix used in GSIM must be identical (including upper and lower case) to the prefix used in PCGE (and the TXT file). For a WESTRACE MkI with VLM and NVLM, the two prefixes must be different.

5.10 Client Applications

Two Client Types

Client applications (see page 2-1) are of two basic types:

- **WESTCAD and MoviolaW** GSIMDriver is loaded by these client applications as one of a set of drivers.
- **WNC network protocol clients** GSIMDriver acts as a network endpoint for clients that communicate using one of the WNC suite of protocols, eg WSL/S2 network, S2oE, WNC/WNC+ vital network.

Required GSIMDriver Files

To deploy GSIMDriver, three files must be present:

- GSIMDriver.exe, which manages communications between GSIM and the client
- GSIMDriver.dat, which is the checksum file for the executable
- GSIMDriver.cfg, which defines the interface

For WESTCAD and MoviolaW, these three files must be located in the same directory as the client application's executable.
For WNC network protocol clients, GSIMDriver may be deployed on the same PC as GSIM, or on another PC on the LAN. It is not always possible to deploy GSIMDriver on the same PC as a WNC network protocol client application, because both GSIMDriver and that client may try to use the same network addressing parameters (which is not possible on a single PC).

Important: ***Note that it is possible to use a single instance of GSIMDriver to connect to clients using a mixture of WNC/WNC+ vital and S2oE. For all other clients, one instance of GSIMDriver is required for each protocol that needs to be used between GSIM and the clients.***

Files Supplied

GSIMDriver.exe, GSIMDriver.dat and example GSIMDriver configuration files are installed with GSIM (figure 5.5).

Example GSIMDriver configuration files are installed into C:\Program Files\GSIM\GSIMDriver\Standard CFG (figure 5.5). They are named according to the application GSIM is to be used with, for example:

- **GSIMDriver.westcad** for connecting WESTCAD to GSIM
- **GSIMDriver.MoviolaW** for connecting MoviolaW to GSIM
- **GSIMDriver.WslS2Net** for connecting applications such as the MCT and DMC to GSIM
- **GSIMDriver.WsaS2Net** for connecting applications that use S2oE to GSIM
- **GSIMDriver.wncvital** for connecting applications that use WNC or WNC+ vital to GSIM

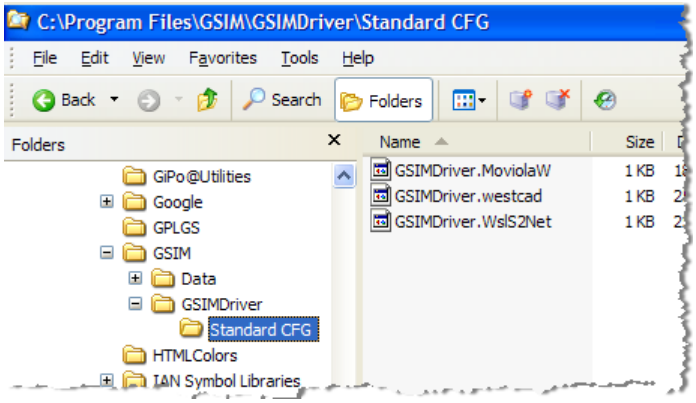


Figure 5.5 Contents of C:\Program Files\GSIM\GSIMDriver\Standard CFG

See also:

- section 5.10.2.3 “Example GSIMDriver Configuration Files”;
- section 6.2.4 “Installed GSIMDriver Configuration Files”.

5.10.1 Setting Up a Client Application

Setting up GSIM to work with a client is a two-stage procedure:

a) Firstly, set up the GSIMDriver configuration file as described in section 5.10.2.

b) Secondly:

- For WESTCAD or MoviolaW, set up the client configuration file as described in section 5.10.3.
- For WNC network protocol clients, assign IP addresses to the PC running GSIMDriver as described insection 5.10.4.
  The client device or application may also require configuration.

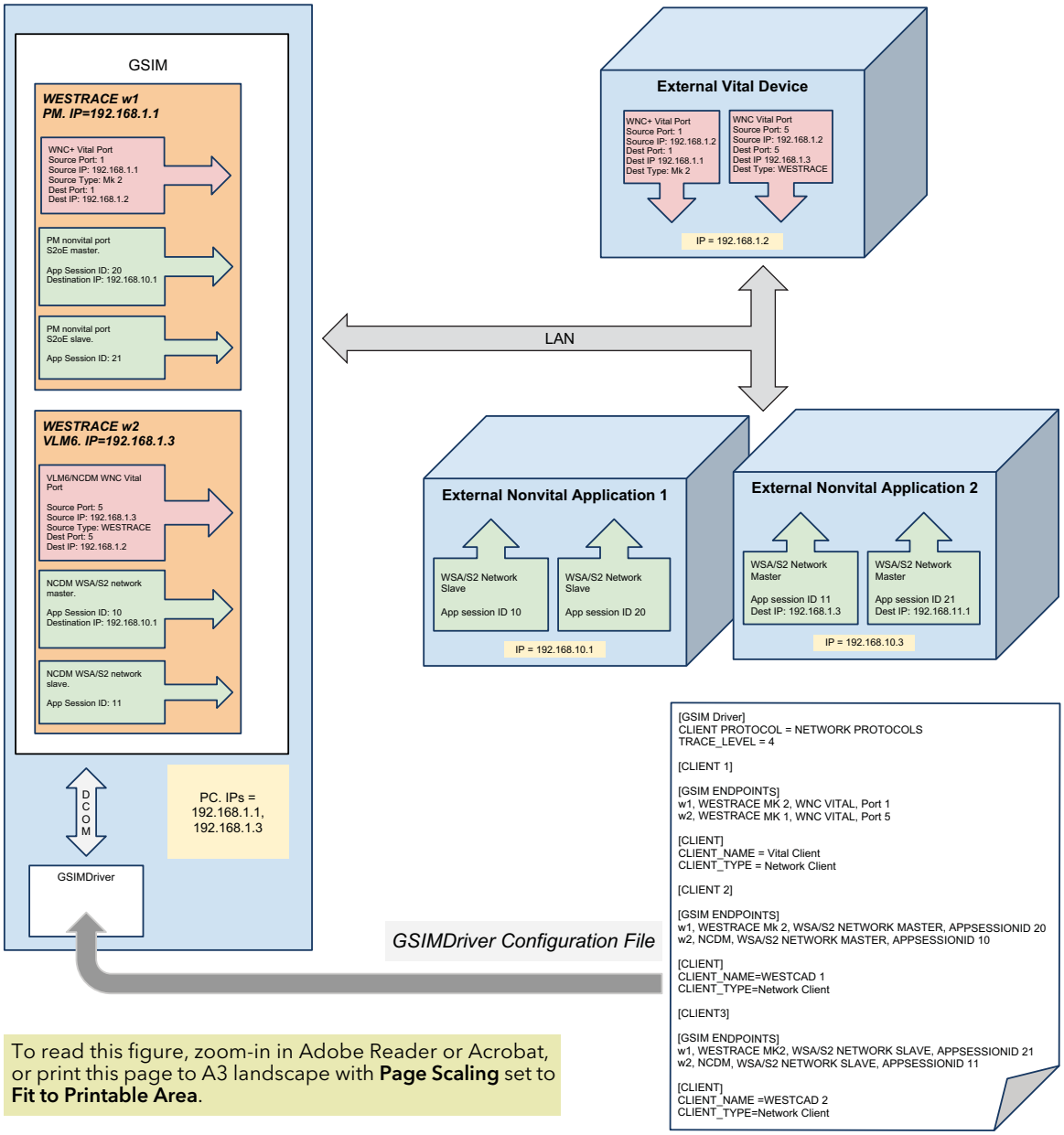
5.10.2 Setting Up the GSIMDriver Configuration File

5.10.2.1 Example

The following example shows the configuration of GSIMDriver to connect GSIM to a set of external devices via WNC+ vital and S2oE.

The example GSIM has two simulated WESTRACEs, each with one vital port, one WSA/S2 master session and one WSA/S2 slave session (figure 5.6). Multiple external devices and applications are intended to connect to those ports. The GSIMDriver configuration file must tell GSIMDriver:

- which ports and sessions in
- which WESTRACEs are to be “connected” to
- which external device or application.



To read this figure, zoom-in in Adobe Reader or Acrobat, or print this page to A3 landscape with **Page Scaling** set to **Fit to Printable Area**.

Figure 5.6 Example GSIMDriver configuration

You must add one line for each port or session that you wish to connect, in the [GSIM ENDPOINTS] sections of the configuration file, as shown infigure 5.6. The formats of the endpoints lines are:

WNC/WNC+ Vital Ports

[WESTRACE NAME], WESTRACE Mk**[1/2]**, WNC VITAL, Port **[PORT NUMBER]**

where:

- **[WESTRACE NAME]** is the name configured in the GSIM project and not the name in the GCSS data;
- **[1/2]** indicates whether the WESTRACE is MkI or MkII;
- **[PORT NUMBER]** is the source vital port number as configured in GCSS.

S2oE (WSA/S2) Non-Vital Sessions

NOTE: Although PM master sessions are included in this example, real PMs do not support master sessions; real PMs only support slave sessions. (Current versions of GSIM and GCSS allow you to configure and simulate S2oE master sessions in the PM non-vital port.)

For PM non-vital port sessions:

[WESTRACE NAME], WESTRACE MK2, WSA/S2 NETWORK **[Master/Slave]**, APPSESSIONID **[ID]**

For NCDM network port WSA/S2 sessions:

[WESTRACE NAME], NCDM, WSA/S2 NETWORK **[Master/Slave]**, APPSESSIONID **[ID]**

where:

- **[WESTRACE NAME]** is the name configured in the GSIM project and not the name in the GCSS data;
- **[Master/Slave]** indicates whether the PM or NCDM session is a client (Master) or server (Slave);
- **[ID]** is the application session ID, as configured in GCSS.

Everything else in the configuration file is "standard" and does not need to change. You can base your configuration file on the supplied **GSIMDriver.wncvital** sample configuration file found in a subdirectory under the GSIMDriver directory created by the installer.

Sample GSIMDriver configuration files are provided with GSIM. See "Files Supplied" on page 5-15.

5.10.2.2 Procedure

a) Use a text editor such as Notepad to open the appropriate sample GSIMDriver configuration file that was installed with GSIMDriver.exe (see "Files Supplied" above).

b) Edit the file as required. Refer to:
   - Appendix F, "GSIMDriver.cfg Parameters";
   - section 5.10.2.3 "Example GSIMDriver Configuration Files";
   - section 5.10.2.4 "Allowed Combinations of Clients, Protocols and Endpoints";
   - section 5.10.2.5 "GSIMDriver.cfg Validation Rules".

   You may have to change the GSIM_LOCATION and CONNECTION_STRING parameters—see Appendix F.

c) Deploy the GSIMDriver files:
   - For WESTCAD or MoviolaW:
     i) Save the file as GSIMDriver.cfg to the same directory as the client's executable file.
     ii) Copy GSIMDriver.exe and GSIMDriver.dat to the same directory as the client's executable file.

iii) Set up the client application's configuration file as described in section 5.10.3.

- For WNC network protocol clients, the most simple deployment option is to use GSIMDriver on the same PC as GSIM and place the files in the same area as the GSIM project data files.
  If GSIMDriver is deployed on the same PC as a networked client application, they are likely to try to open the same network connection(s) which is not allowed by the PC operating system.

5.10.2.3 Example GSIMDriver Configuration Files

Note:

- The characters ";", "//" or "REM" at the start of a line signify that the line is a comment only and will not be recognised by the computer.
- Keys and values are not case-sensitive.
- Use "DELAY" to simulate a communication delay for serial protocols—see table F.1 (page F-2).

See also:

- Appendix F, "GSIMDriver.cfg Parameters";
- section 6.2.4 "Installed GSIMDriver Configuration Files".

5.10.2.3.1 Example GSIMDriver.cfg for WESTCAD (WSL DDE)

Typical GSIMDriver configuration file for connecting to a WESTCAD:

```
[GSIM Driver]
;GSIM_LOCATION = H02709
;GSIM_LOCATION = 10.61.67.116
CLIENT_PROTOCOL = DDE
TRACE_ON = TRUE

[GSIM ENDPOINTS]
w2, NVC, S2 0
w4, CNVC, S2 5
w3, WESTRACE Mk2, WSA/S2 MASTER, AppsessionID 9
w3, WESTRACE Mk2, WSA/S2 SLAVE, AppsessionID 10
w3, WESTRACE Mk2, WSA/S2 MASTER, AppsessionID 127
w4, NCDM, WSA/S2 SERIAL SLAVE, Instance 1, Module 1

[CLIENT]
CLIENT_TYPE = WESTCAD
CLIENT_NAME = westcad1
DELAY = 100
USE_PREFIXES = false
```

5.10.2.3.2 Example GSIMDriver.cfg for MoviolaW (IPCSM)

Typical GSIMDriver configuration file for connecting to a MoviolaW:

```
[GSIM Driver]
;GSIM_LOCATION = 10.61.67.116
CLIENT_PROTOCOL = IPCSM

[GSIM ENDPOINTS]
w2
```

```
w3

[CLIENT]
CLIENT_TYPE = MoviolaW
CLIENT_NAME = moviolaw1
CONNECTION_STRING = sck:127.0.0.1,5001
DELAY = 100
USE_PREFIXES = true
```

5.10.2.3.3 Example GSIMDriver.cfg for MCT and DMC (WSL/S2)

Typical GSIMDriver configuration file for connecting to an MCT:

```
[GSIM DRIVER]
;GSIM_LOCATION = H02709
CLIENT_PROTOCOL = WSL/S2 Network

[CLIENT1]

[GSIM ENDPOINTS]
s1w1, NCDM, WSL/S2 NETWORK SLAVE, AppSessionID 10
s1w2, NCDM, WSL/S2 NETWORK SLAVE, AppSessionID 10

[CLIENT]
CLIENT_TYPE = MCT
CLIENT_NAME = MCT1
CLIENT_IP = 10.61.67.116

[NCDM IP PORT MAP]
s1w1 = 3700
s1w2 = 3701

[CLIENT2]

[GSIM ENDPOINTS]
s1w1, NCDM, WSL/S2 NETWORK SLAVE, AppSessionID 11

[CLIENT]
CLIENT_TYPE = MCT
CLIENT_NAME = MCT2
CLIENT_IP = 127.0.0.1

[NCDM IP PORT MAP]
s1w1 = 3702
```

5.10.2.3.4 Example GSIMDriver.cfg for S2oE

```
[GSIM Driver]
CLIENT_PROTOCOL = NETWORK PROTOCOLS

[CLIENT1]

[GSIM ENDPOINTS]
wr1, NCDM, WSA/S2 NETWORK SLAVE, AppSessionID 1
wr2, WESTRACE MK2, WSA/S2 NETWORK SLAVE, AppSessionID 10

[CLIENT]
CLIENT_NAME = Control Panel 1
CLIENT_TYPE = Network Client

[CLIENT2]

[GSIM ENDPOINTS]
wr1, NCDM, WSA/S2 NETWORK SLAVE, AppSessionID 48
wr2, WESTRACE MK2, WSA/S2 NETWORK SLAVE, AppSessionID 128

[CLIENT]
CLIENT_NAME = Control Panel 2
```

5.10.2.3.5 CLIENT_TYPE = Network ClientExample GSIMDriver.cfg for WNC+ Vital

```
[GSIM Driver]
CLIENT_PROTOCOL = NETWORK PROTOCOLS

[CLIENT1]

[GSIM ENDPOINTS]
wr1, WESTRACE MK2, WNC VITAL, Port 2
wr1, WESTRACE MK2, WNC VITAL, Port 6
wr2, WESTRACE MK2, WNC VITAL, Port 2
wr3, WESTRACE MK1, WNC VITAL, Port 10

[CLIENT]
CLIENT_NAME = WESTRACE 2
CLIENT_TYPE = Network Client

[CLIENT2]

[GSIM ENDPOINTS]
wr2, WESTRACE MK2, WNC VITAL, Port 3
wr3, WESTRACE MK1, WNC VITAL, Port 11

[CLIENT]
CLIENT_NAME = RBC 1
CLIENT_TYPE = Network Client
```

5.10.2.4 Allowed Combinations of Clients, Protocols and Endpoints

Table 5.2 shows the allowed combinations of clients, protocols and GSIM endpoints.

Table 5.2 Client application and its supported protocol

Client	Client-to-Driver Protocol	WESTRACE MkI endpoints allowed (table F.2 on page F-3)	WESTRACE MkII endpoints allowed (table F.2 on page F-3)
WESTCAD	WSL DDE	2, 3, 4, 5, 6	7
MoviolaW	IPCSM	1	Not supported
MCT and DMC	WSL/S2 network	5	Not supported
S2oE sessions	Network protocols	8	7
WNC/WNC+ vital	Network protocols	10	9

5.10.2.5 GSIMDriver.cfg Validation Rules

Ensure the following rules are met when creating a GSIMDriver configuration file:

- There must be only one GSIM ENDPOINTS section and one CLIENT section for the IPCSM and DDE protocols.
- Each endpoint string must be unique.
- For the WESTRACE MkI, configured as a VLM6 + NCDM, and communicating using the WSL/S2 network protocol with one or more MCT, all inbound communication with a specific WESTRACE MkI must take place on the unique UDP port number. The inbound UDP ports on the client side for multiple MCTs trying to talk to the same WESTRACE MkI must be different. Each WESTRACE MkI in the GSIM simulation that is to be simulated as being connected to MCTs must have a nominated UDP port in the [NCDM IP PORT MAP] section of the configuration file.
- The protocol type of GSIM endpoints must be consistent with the client type using that protocol, as per table 5.2. So MoviolaWs can only talk to WESTRACE MkIs, MCTs can only talk to WSL/S2 sessions in the network port of an NCDM.

5.10.2.6 Instance Number

GSIM uses an ordinal number called “instance number” to identify serial NVLM ports.

In the example shown (figure 5.7), there are two serial WSA/S2 Master ports in the NVC/DM of WESTRACE “w3”. Port 5 is the first WSA/S2 Master and so it is identified as instance 1. Port 6 is instance 2, and so on. This is required because the port number as shown in GCSS is not available in the image file read by GSIM.

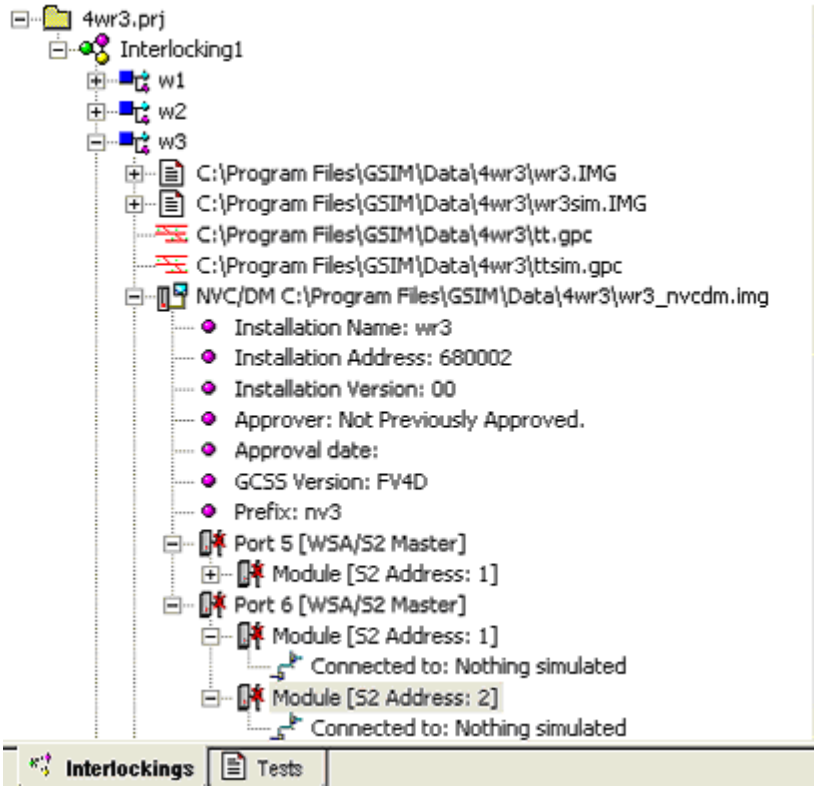


Figure 5.7 Instances of serial modules

Since there is only one network port, the instance numbers are not required for network port sessions.

5.10.3 Setting Up WESTCAD and MoviolaW Client Configuration Files

The WESTCAD or MoviolaW configuration file must be edited to match GSIMDriver's configuration file.

5.10.3.1 WESTCAD

The WESTCAD configuration file is called *Projectname*.cfg. This file is found in the directory of the WESTCAD project.

Edit *projectname*.cfg in a text editor such as notepad. A sample WESTCAD configuration file is shown below:

```
DRIVER GENERIC 1
  EXENAME = "GSIMDriver.exe"
  TOPIC = "GSIMDriver"
  CONFIG = "CONFIG"
  INPUTS_REQUIRED
  OUTPUTS_REQUIRED
END_DATA
END_DRIVER

DRIVER GUI 0
  CONFIG = "CONFIG tt.txt"
END_DATA
END_DRIVER
```

NOTE: To use WESTCAD without GSIM at a later date, simply comment-out each unwanted line in the WESTCAD configuration file.

5.10.3.2 MoviolaW

Refer to the MoviolaW User Manual [mov].

5.10.4 Setting Up WNC Network Protocol Client Configuration Files

The WNC network protocol client's configuration file must be edited to match GSIMDriver's configuration file.

5.10.4.1 MCT and DMC

Create a functional system of IP and UDP ports that allows the MCT to communicate with a **single** target IP address using different ports (figure 5.8 shows an example), then carry out a remote application check (section 4.4.5).

NOTE: The configuration to be used in the operational deployment cannot be used when testing with GSIM—you must plan and assign a separate set of ports for testing with GSIMDriver.

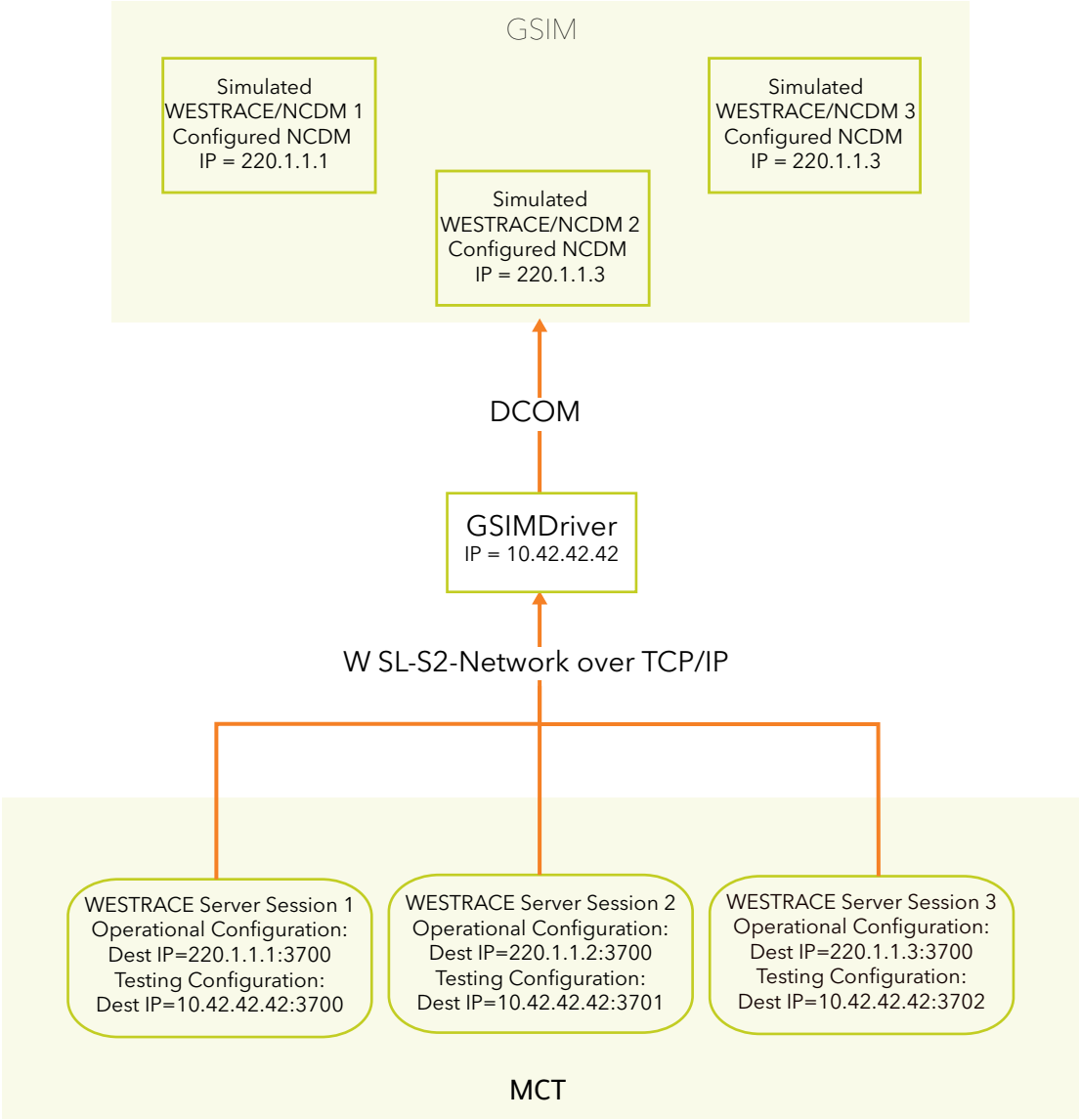


Figure 5.8 Example IP and UDP port configuration

5.10.4.2 WNC/WNC+ and S2oE Clients

GSIMDriver obtains configuration data for the network ports in the simulated WESTRACEs from GSIM. These parameters in turn are set using GCSS. GSIMDriver uses the actual source and destination IP addresses that will be used by the WESTRACEs being simulated. So, these IP addresses must be available on the network in order for the simulation to work.

The PC that is running GSIMDriver must have all the source IP addresses set for the simulated PMs and NCDMs in the GSIM project that are to communicate via GSIMDriver. It is possible to set multiple IPs for a single network interface card on a Windows PC. Consult the Microsoft documentation for instructions on how to do this.

For the vital protocol all addressing and configuration data must match across the link otherwise communications will not be successful. To help when combining test and approved data in a simulation, GSIMDriver ignores the Product Data Version and Compatibility Index fields used in the vital protocol. But remember that a real WNC vital device or driver will compare these values and reject any incoming data where the values do not match the values configured for the device.

5.11 Correspondence Check

The GCS data preparation process (section 1.3.1) includes testing the GCS data using GSIM. A correspondence check must be performed on GSIM before testing is started, to verify the correctness of the graphical displays against the WESTRACE data (vital and non-vital).

Check that the correct CED (version number and Designer) is being used for the simulation before performing the correspondence check.

Carry out the correspondence check as follows:

a) Systematically toggle every input mnemonic and observe the correct change of logic states. This is done once for each set of logic data. In doing so, the correspondence check exercises GSIM and verifies that the graphical display and GUI is correct (but not the logic), and that any anomalies with the host machine or GSIM would be detected.

b) Check that all NVC/DM and NCDM WSA/S2 serial ports are connected as expected:

   i) Expand the tree view for each network protocol in each NCDM.

   ii) Check that all ports are connected.

Figure 5.9"Connected" icon (left) and "Disconnected" icon (right)

   iii) Inspect the "Connected to" string.

Beware: the host machine's applications, operating systems, component files and libraries may be changed due to upgrades in hardware (drivers), software or operating system service packs, and by the Windows XP Automatic Updates utility.

SAFETY WARNING

Carry out a correspondence check every time you make a change to a computer's hardware or software in any way, to verify that GSIM still operates correctly.

SAFETY WARNING

Do NOT set the Automatic Updates feature of Windows XP to "Automatic". Choose one of the other options (figure 5.10) to ensure that the computer is not modified without your knowledge.

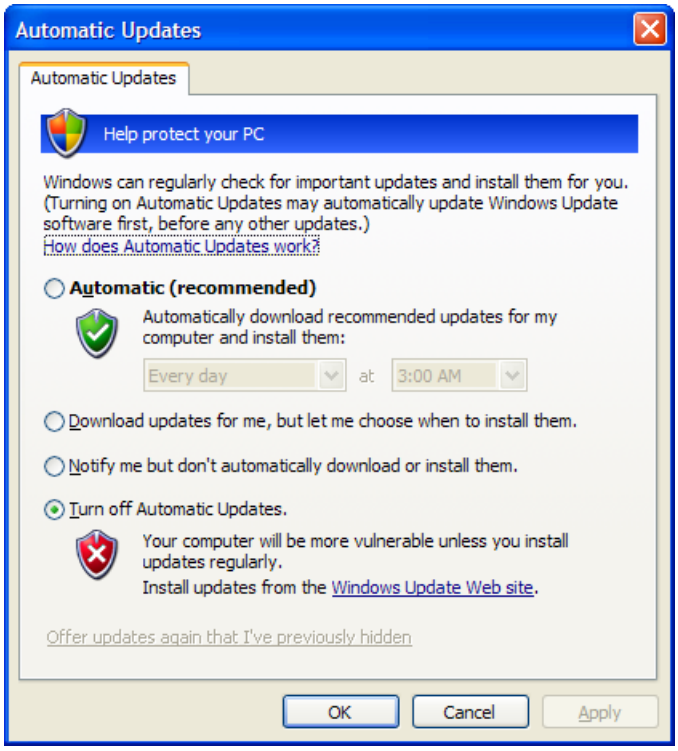


Figure 5.10 Windows' Automatic Updates dialog box

6. GSIM Installation and Setup

This chapter describes:

- important preliminaries (page 6-1)
- the installation and setup of GSIM (page 6-3)
- IPCSM Compatibility (MoviolaW Only) (page 6-16)
- IPCSM Prefix Separator (page 6-17)

6.1 Preliminaries

6.1.1 Release Notes

Prior to installation, read the GSIM release notes. This document is provided on your GSIM CD, and available from the Design Tools Authority Notes database.

NOTE: The disk label and version must match the information given in the release notes. Do not install GSIM if there is any discrepancy. Contact the GSIM Design Authority—see section 1.5.

6.1.2 Virus Check

Before installing GSIM and GSIMDriver you must use appropriate software to clear each computer of viruses. You are reminded to do this in the installation procedures below.

6.1.3 Operating System Check (Carried Out by GSIM)

GSIMversion 8.0 is validated for Windows XP Service Pack 2 **only**. (Although it may run on other operating systems, it has not been fully tested on such configurations and will therefore require appropriate validation—see “Minimum Validation” on page 6-2.)

When GSIM version 8.0 is launched, it firstly checks the computer’s operating system and displays a warning if detects anything other than Windows XP Service Pack 2. See table 6.1.

Table 6.1 GSIM version 8.0 operating system compatibility

Windows 7	GSIM version 8.0 cannot be installed (figure 6.2).
Windows XP Service Pack 2	No operating system warning is displayed. GSIM version 8.0 runs. GSIM version 8.0 has been validated for operation on Windows XP Service Pack 2 (ie all formal testing has been conducted on this build).
Windows XP above or below Service Pack 2 Below Windows XP Windows 2000	GSIM version 8.0 displays an operating system warning on startup. You may then choose to undertake your own validation—see "Minimum Validation" below. GSIM version 8.0 has NOT been validated for these operating systems.
Windows NT (all variants) Below WIndows NT	GSIM version 8.0 does not run on these operating systems.

GSIMDriver also checks the operating system when it starts. If it detects an unvalidated operating system, it displays a warning in the title bar of the GSIMDriver window. (GSIMDriver cannot display a warning message box because applications such as WESTCAD and MoviolaW do not allow drivers to delay startup.)

Minimum Validation

You may choose to undertake your own validation to ascertain that a particular installation of GSIM executes correctly. A minimum validation comprises:

- setting up a typical target system;
- running a full correspondence test on all variables that are passed between the screens and applications (something that you would do anyway);
- executing functions that are to be used and confirming correct operation.

We recommend that you formally log any such validation, and also log any anomalies that are found with use on other than the validated version of the operating system.

6.1.4 Software Updates

Invensys Rail announces software updates by means of Product Bulletins. Go to **http://www.invensysrail.com** > Signal Group > Customer Service > Product Bulletins.

IRG (Invensys Rail Group) users can also check the Design Tools Authority Lotus Notes® database.

NOTE: We recommend that you always use the latest version of GSIM.

6.2 GSIM Installation

The GSIM installer is available from either:

- a CD-ROM labelled "GSIM Version x.xx", where x.xx = major and minor revision numbers;
- the Design Tools Authority Lotus Notes database (Design Tools Coordination Authority.nsf) that is accessible to all major Invensys Rail Offices. Please refer to your IT department if you cannot locate the database.

NOTE: You must be logged in with Administrator rights to install GSIM.

You must also check that Windows' DCOM (Distributed Component Object Model) security and the Windows Firewall are configured correctly. This is covered in sections 6.2.3.1 and 6.2.3.2.

6.2.1 Install GSIM and GSIMDriver on the GSIM Computer

a) Log in to the GSIM computer with Administrator rights.

b) If you are installing GSIM on Windows XP Service Pack 2 or above, enable Windows' DEP (Data Execution Prevention) feature for all programs on the computer:

i) Choose **Start** menu > **Control Panel** > **System**.

ii) On the **Advanced** tab of the System Properties dialog box, click the **Performance** area's **Settings** button.

iii) On the **Data Execution Prevention** tab of the **Performance Options** dialog box, click **Turn on DEP for all programs and services except those I select** (figure 6.1)

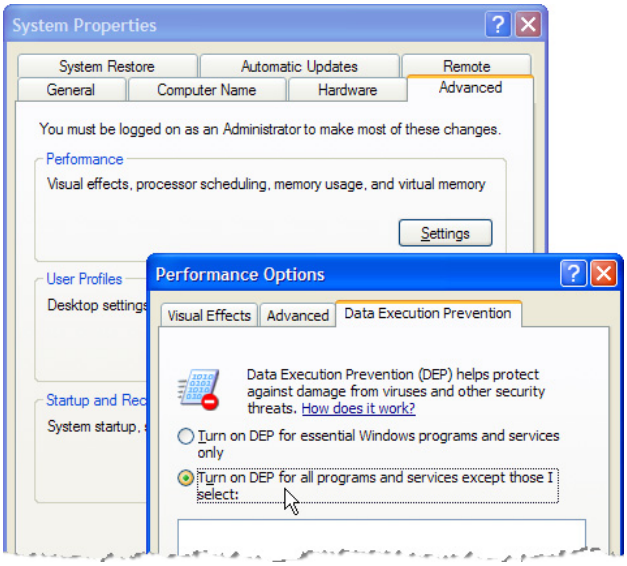


Figure 6.1 Enabling DEP for all programs (XP SP2 only)

iv) Click **Apply**, then click **OK** to close the Performance Options dialog box.

v) Click **OK** to close the System Properties dialog box.

vi) Restart the computer when instructed to do so, then once again log in with Administrator rights.

c) Use appropriate software to scan the computer for viruses and remove any that are found.

d) Close down all applications. Disable all unnecessary software (eg virus and spyware scanners).

e) If a client application is to be used with GSIM on the GSIM computer[1], install the client application.

f) If installing GSIM from the CD:

   i) Insert the CD into the computer's CD drive.

   ii) In Windows Explorer, locate the file **GSIM8.x.x.exe** (eg GSIM8.0.0) on the CD and double-click it.

   iii) Go to step **i**.

g) If installing GSIM from the Lotus Notes database:

   i) On the **Design Tools Authority** > **Tool Versions** pane, locate **Graphical Simulator** (either by scrolling or by typing the first few letters).

   ii) Double-click the version required.

   iii) In the Version pane, review the information, then right-click the **GSIM8.x.x.exe** icon below the **Software** heading.

   iv) Choose **Save** (or **Detach**) and use the dialog box that opens to copy GSIM8.x.x.exe to an appropriate location on the computer's hard drive.

   v) In Windows Explorer, locate the GSIM8.x.x.exe file that you just copied to the hard disk and double-click it.

h) If the "unsupported operating system" dialog box opens, click **OK** to stop installation on this computer.

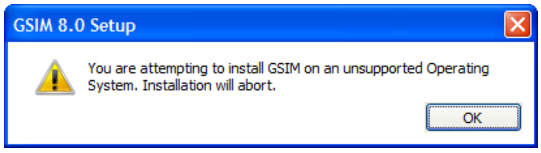


Figure 6.2 "Unsupported operating system" dialog box

i) If the installer detects existing GSIM components on the computer (figure 6.3), click **OK** to close the dialog box, remove the existing GSIM components (use **Control Panel** > **Add or Remove Programs**), then run GSIM8.x.x.exe again.

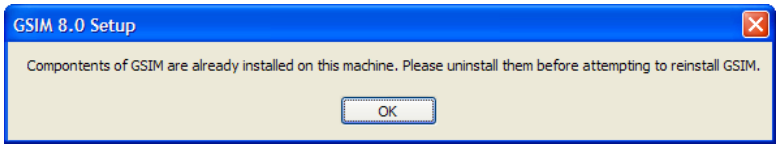


Figure 6.3 Installer "existing GSIM components" dialog box

j) In the opening screen of the installer wizard (figure 6.4), click **Next**.

[1] A client application running on a separate computer is covered in section 6.2.2.

Figure 6.4 Installer opening screen

k) Read the terms of the License Agreement (figure 6.5). If you accept them, click **I Agree**.

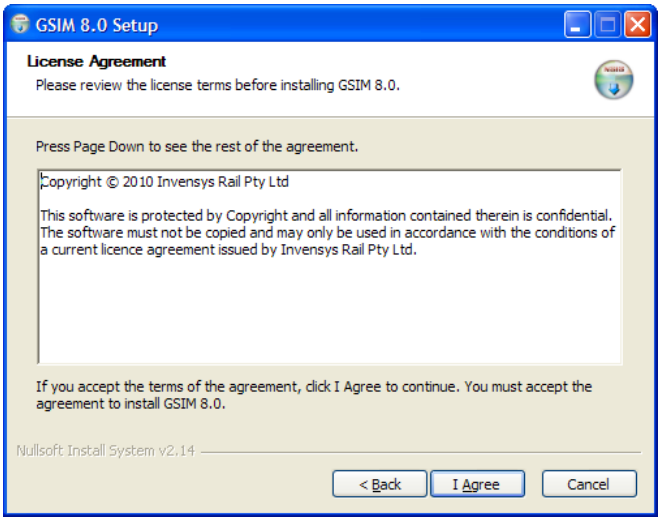


Figure 6.5 License Agreement screen

l) Ensure that both **GSIM Application** and **GSIMDriver** are ticked, then click **Next**.

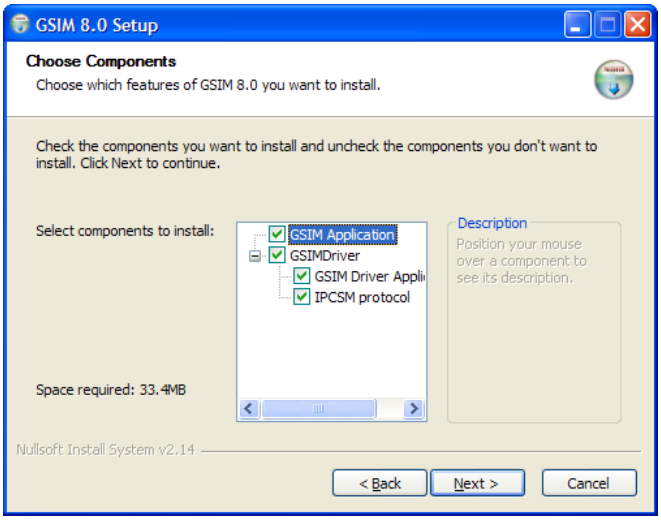


Figure 6.6 Choose Components screen

m) Check that the destination folder is **C:\Program Files\GSIM** (the default) and click **Install**.

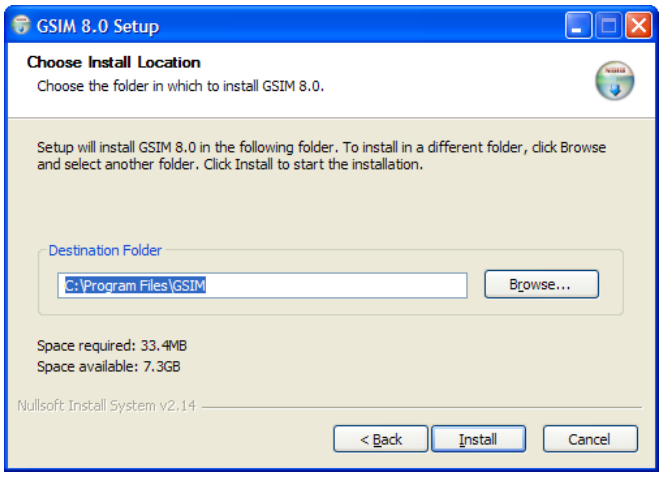


Figure 6.7 Choose Install Location screen

The installer extracts the GSIM files to their correct locations.

n) If the Registered Server dialog box opens, click **OK**.

Figure 6.8 "Registered Server" confirmation

o) Click **Finish**.

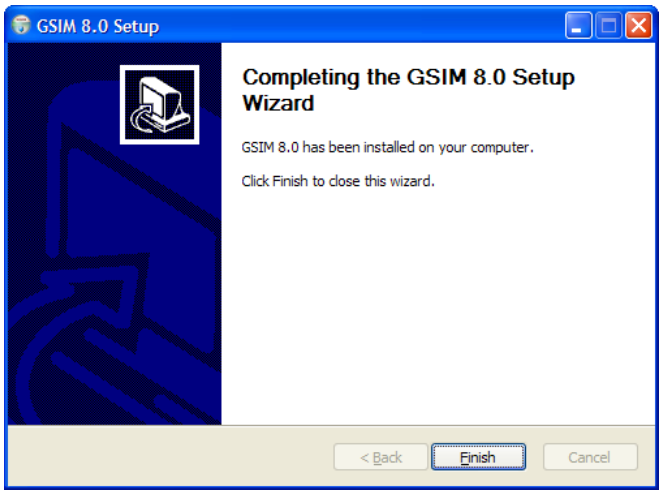


Figure 6.9 Installer final screen

The newly-created **GSIM** directory contains a **GSIMDriver** subdirectory, which contains:

- EnableDCOM & Launch&AccessPermissions.reg
- GSIM.tlb
- GSIMDriver.exe
- GSIMDriver.dat
- GSIMDriver.pdb
- IPCM.dll
- sample GSIMDriver configuration files (in the Standard CFG subdirectory; figure 5.5)

p) Check the IPs of the computer where you have installed GSIM and GSIMDriver.

The computer must have all the destination IP addresses configured in the ports of the external applications. The computer must also have all the source IP addresses set for the PMs and NCDMs in the GSIM project that are to communicate via GSIMDriver. (The source IP address of a WESTRACE in GSIM should be the same as the destination IP set in the external application that is to communicate with it.)

It is possible to set multiple IP addresses for each network interface on a Windows computer. Consult the Microsoft documentation for instructions.

q) If a client application is to be used with GSIM on the GSIM computer:

i) Modify C:\Program Files\GSIM\GSIMDriver**GSIMDriver.cfg** as described in section 5.10.2.

ii) Copy the files:
- GSIMDriver.exe
- GSIMDriver.cfg
- GSIMDriver.dat

from C:\Program Files\GSIM\GSIM Driver to the client application directory[2].

iii) Modify the client application's configuration file as described in section 5.10.3.

Make sure that the relevant keys in the client application's configuration file match the appropriate keys in GSIMDriver.cfg.

r) Start GSIMDriver, then the client application and make sure that the GSIMDriver display is as expected (section 3.11).

s) Carry out a correspondence check as described in section 5.11.

You must complete a correspondence check (section 5.11) after the installation of GSIM and before you start any work.

We also recommend that you carry out a correspondence check after the computer is modified in any way (eg hardware, software or operating system upgrades).

2. You can manually copy GSIMDriver.exe, GSIMDriver.cfg and GSIMDriver.dat to a more suitable location on the same computer, if you want to maintain separate GSIMDriver configurations for separate GCSS data sets or for different client applications.
You can also run more than one GSIMDriver instance on the same computer, as long as they don't need to send to the same IP/UDP Port address.

6.2.2 Install GSIMDriver on the Client Computer (if Required)

Do the following if GSIMDriver is to be used as a driver to be deployed with WESTCAD or MoviolaW, or if GSIMDriver and GSIM are to be run on different PCs for any reason.

a) Ensure that GSIM is installed on the GSIM computer (section 6.2.1).

b) Log in to the client application computer with Administrator rights.

c) If you are installing GSIM on Windows XP Service Pack 2 or above, enable Windows' DEP (Data Execution Prevention) feature for all programs on the computer:

   i) Choose **Start** menu > **Control Panel** > **System**.

   ii) On the **Advanced** tab of the System Properties dialog box, click the **Performance** area's **Settings** button.

   iii) On the **Data Execution Prevention** tab of the **Performance Options** dialog box, click **Turn on DEP for all programs and services except those I select** (figure 6.1).

   iv) Click **Apply**, then click **OK** to close the Performance Options dialog box.

   v) Click **OK** to close the System Properties dialog box.

   vi) Restart the computer when instructed to do so, then once again log in with Administrator rights.

d) Use appropriate software to scan the client computer for viruses and remove any that are found.

e) Close down all applications. Disable all unnecessary software (eg virus and spyware scanners).

f) Install the client application if not already done.

g) Check that the client computer is networked to the GSIM computer (eg by pinging).

h) Repeat step **f** (page 6-4) to step **k** in section 6.2.1, this time on the client computer.

i) In the Choose Components screen (figure 6.10), ensure that only **GSIMDriver** is ticked, then click **Next**.

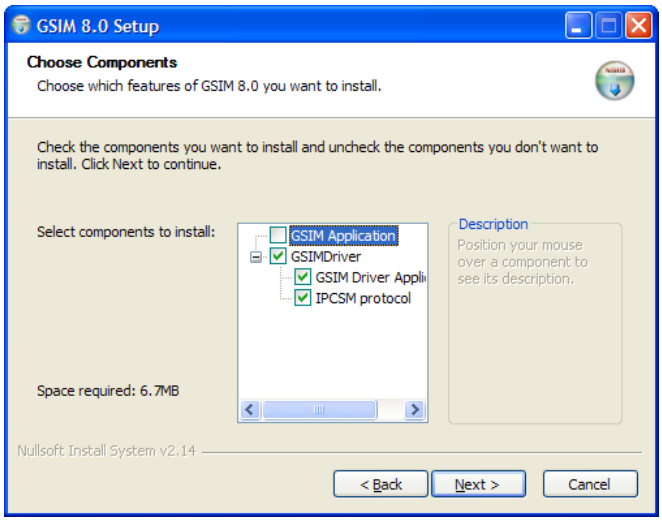


Figure 6.10 Choose Components screen: GSIMDriver only

j) Repeat step **m** (page 6-6) to step **o** in section 6.2.1.

The newly-created **GSIM** directory contains a **GSIMDriver** subdirectory, which contains:

- EnableDCOM & Launch&AccessPermissions.reg
- GSIM.tlb
- GSIMDriver.exe
- GSIMDriver.dat
- GSIMDriver.pdb
- IPCM.dll
- sample GSIMDriver configuration files (in the Standard CFG subdirectory; figure 5.5)

k) Check the IPs of the computer where you have installed GSIMDriver.

The source IP address of a WESTRACE in GSIM should be the same as the destination IP set in the external application that is to communicate with it.

l) On the client computer:

i) Modify C:\Program Files\GSIM\GSIMDriver**GSIMDriver.cfg** as described in section 5.10.2.

ii) For WESTCAD or MoviolaW, copy the files:
- GSIMDriver.exe
- GSIMDriver.cfg
- GSIMDriver.dat

from C:\Program Files\GSIM\GSIM Driver to the client application directory[3].

For WNC network protocol clients, place GSIMDriver and its associated flies in any convenient location on the PC.

iii) Modify the client application's configuration file as described in section 5.10.3.

Make sure that the relevant keys in the client application's configuration file match the appropriate keys in GSIMDriver.cfg.

m) Start GSIMDriver, then the client application and make sure that the GSIMDriver display is as expected (section 3.11).

n) Carry out a correspondence check as described in section 5.11.

A correspondence check (section 5.11) must be completed after the installation of GSIM and before any work is commenced.

We also recommend that you carry out a correspondence check after the computer is modified in any way (eg hardware, software or operating system upgrades).

3. You can manually copy GSIMDriver.exe, GSIMDriver.cfg and GSIMDriver.dat to a more suitable location on the same computer, if you want to maintain separate GSIMDriver configurations for separate GCSS data sets or for different client applications.
You can also run more than one GSIMDriver instance on the same computer, as long as they don't need to send to the same IP/UDP Port address.

6.2.3 Configure Security

6.2.3.1 Configure DCOM Security

NOTE: In an office network environment, any local computer's DCOM security settings can be overridden by the network administrator. It is up to the GSIM user to ensure that GSIM computers retain the necessary DCOM security settings. Therefore—during formal testing—the GSIM computers must be isolated from the LAN. If GSIM is used informally on a networked computer, the security policies applied by the network administrator must not conflict with the security policies required by GSIM.

Do the following on the GSIM computer, and on the client computer if one is used:

a) On the Start menu, choose **Run**. Type **dcomcnfg** and click **OK**.

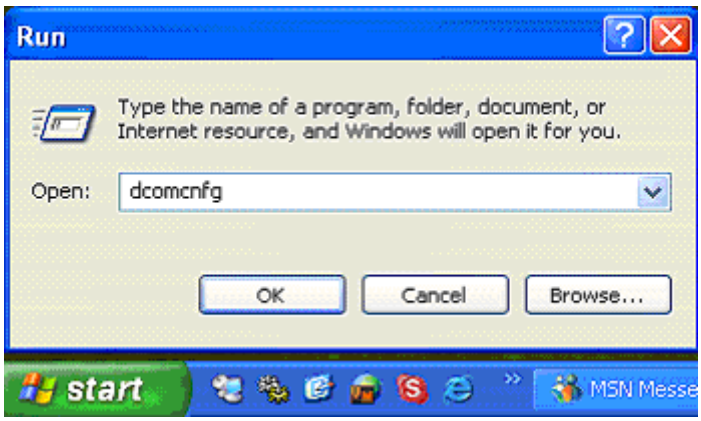


Figure 6.11 Run dcomcnfg

b) In the tree list, double-click **Component Services**. Under Component Services, double-click **Computers**. Right click **My Computer** and choose **Properties**.

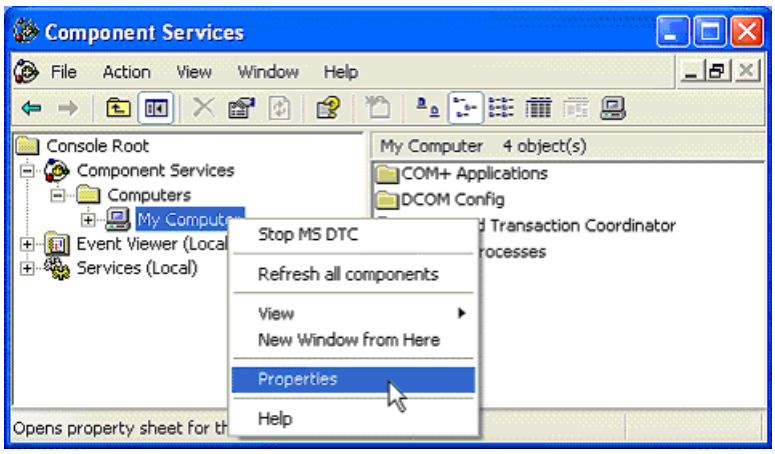


Figure 6.12 Accessing the computer's Properties

c) On the COM Security tab, configure permission limits:

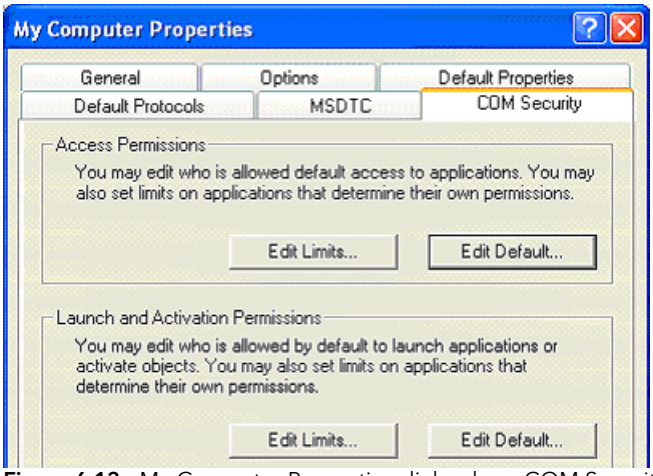


Figure 6.13 My Computer Properties dialog box: COM Security tab

i) In the Access Permissions area, click **Edit Limits**.

ii) Ensure that the **ANONYMOUS LOGON** account is given **Remote Access** permissions, then click **OK**.

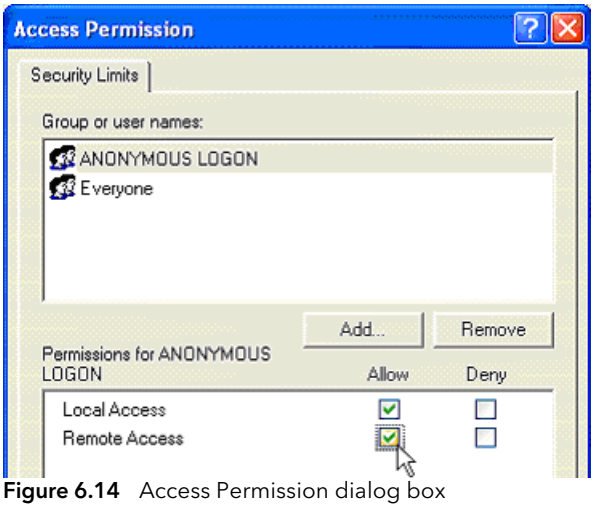


Figure 6.14 Access Permission dialog box

iii) In the Launch and Activation Permissions area, click **Edit Limits**.

iv) Ensure that **Everyone** is given **Remote Launch** and **Remote Activation** permissions, then click **OK**.

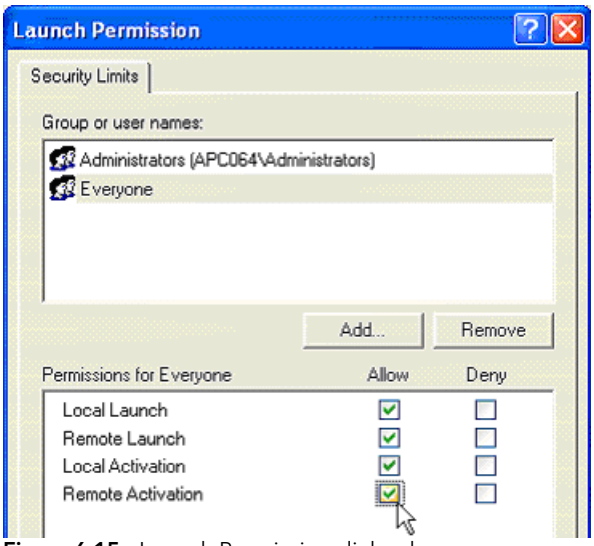


Figure 6.15 Launch Permission dialog box

d) On the COM Security tab, configure permission defaults:

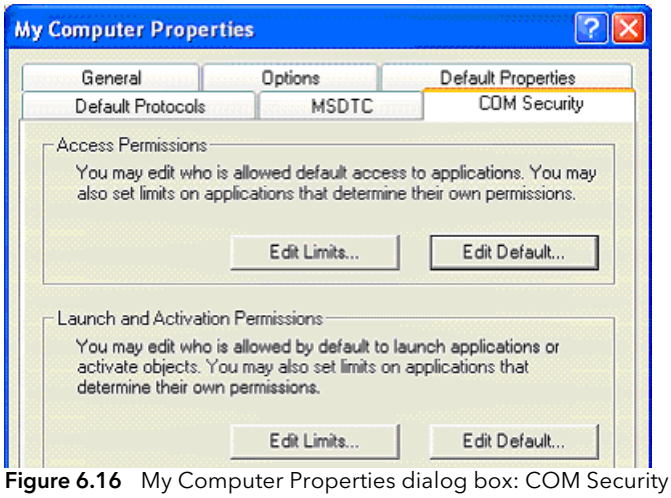


Figure 6.16 My Computer Properties dialog box: COM Security tab

i) In the Access Permissions area, click **Edit Default**.

ii) In the Access Permission dialog box, click **Add**.

iii) Type **Everyone** then click **OK**.

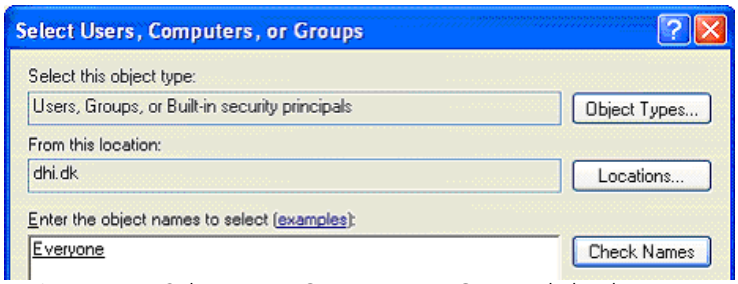


Figure 6.17 Select Users, Computers, or Groups dialog box

iv) Ensure that **Everyone** is given **Remote Access** permissions, then click **OK**.

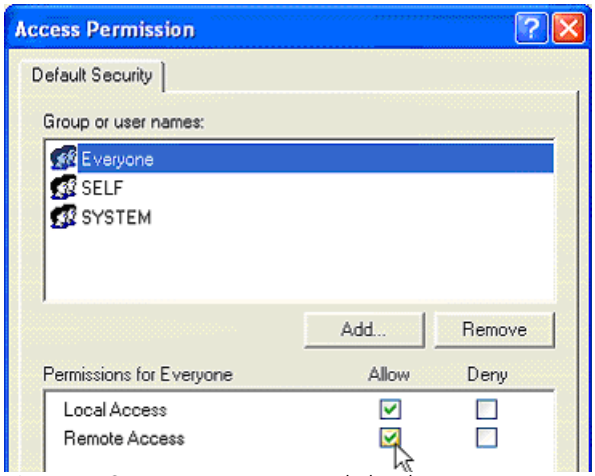


Figure 6.18 Access Permission dialog box

v) In the Launch and Activation Permissions area, click **Edit Default**.

vi) In the Launch Permission dialog box, click **Add**.

vii) Type **Everyone** then click **OK**.

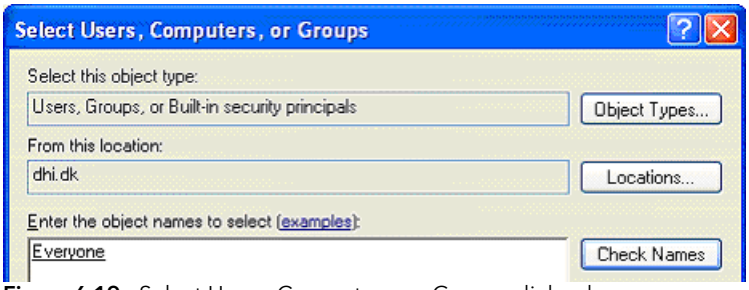


Figure 6.19 Select Users, Computers, or Groups dialog box

e) Ensure that **Everyone** has **Remote Launch** and **Remote Activation** permissions, then click **OK**.

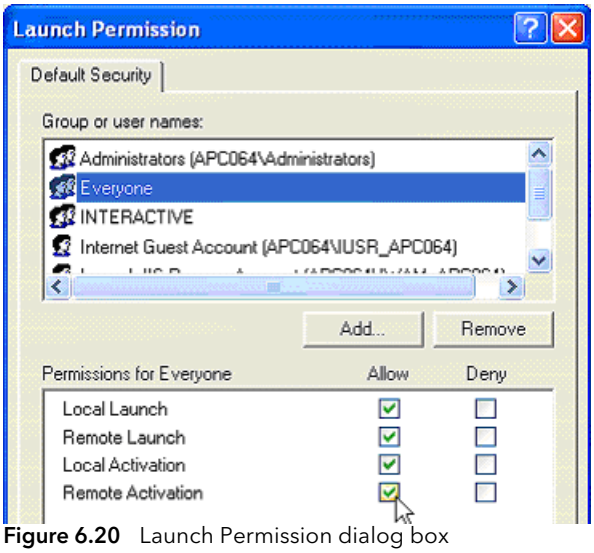
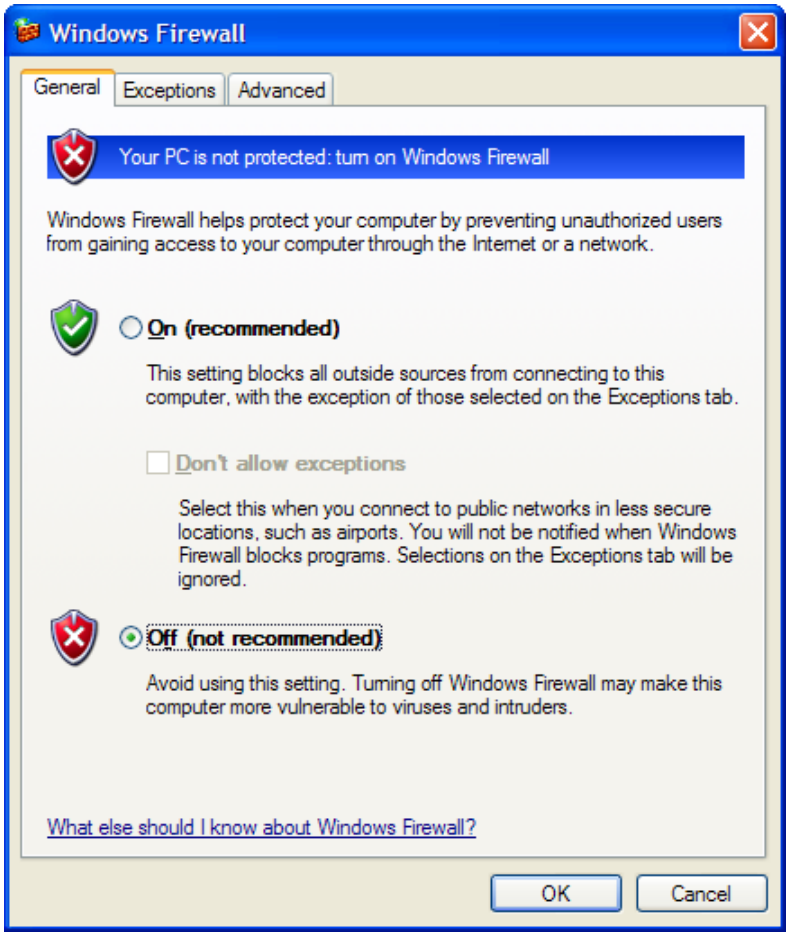


Figure 6.20 Launch Permission dialog box

f) Click **OK** to finish the DCOM configuration.

g) Reboot the computer.

6.2.3.2 Configure the Windows Firewall



NOTE: In an office network environment, any local computer's Windows Firewall settings can be overridden by the network administrator. It is up to the GSIM user to ensure that GSIM computers retain the necessary Windows Firewall settings. Therefore—during formal testing—the GSIM computers must be isolated from the LAN.If GSIM is used informally on a networked computer, the security policies applied by the network administrator must not conflict with the security policies required by GSIM.

Do the following on the GSIM computer, and on the client computer if one is used:

a) If the Windows Firewall is off, leave it off.

b) If the Windows Firewall is on, add GSIM, GSIMDriver and DCOM port settings to the Windows Firewall exceptions list as follows:

   i) Open Windows Firewall from the Control Panel.

   ii) On the Exceptions tab, click **Add Program**.

   iii) Select **GSIM** and **GSIMDriver,** or browse to search for them if not listed.

   iv) Click **OK**.

   v) Click **Add Port**.

   vi) Type **DCOM** in the Name field and **135** in the Port Number field, then click **OK**.

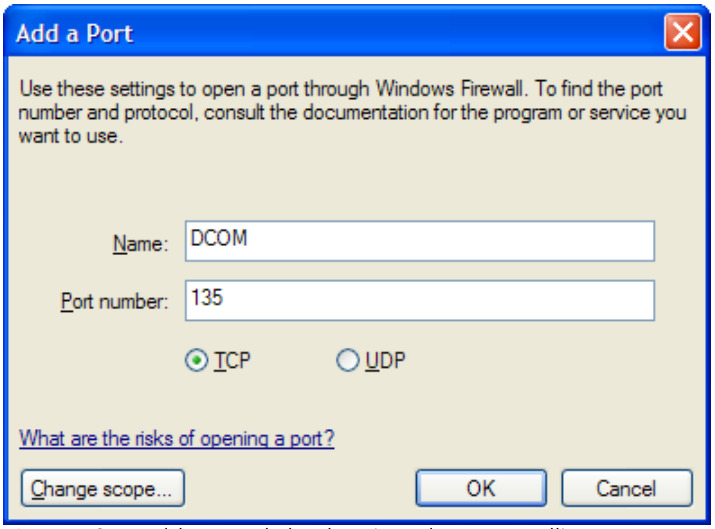


Figure 6.21 Add a Port dialog box (Windows Firewall)

vii) Click **OK** to save the Windows Firewall settings.

6.2.4 Installed GSIMDriver Configuration Files

The installation also installs sample GSIMDriver configuration files in the default directory. These files can be copied and modified to set up each test. See "Files Supplied" on page 5-15 and "Example GSIMDriver Configuration Files" on page 5-19.

These files are uninstalled when GSIM is uninstalled. If the user chooses a different directory, then they must also update the path in the .CFG file accordingly.

See also:

- "Files Supplied" on page 5-15;
- section 5.10.2.3 "Example GSIMDriver Configuration Files".

6.3 IPCSM Compatibility (MoviolaW Only)

When GSIMDriver version 8.0 starts up, it checks the version of the active IPCSM.DLL on the computer on which it is running. If the version is:

- 4.0.0.0—the version with whichGSIMDriver version 8.0 has been validated—GSIMDriver starts, ready for a fully-validated session;
- unusable, GSIMDriver warns you (figure 6.22) and exits when you click OK;
- usable but not 4.0.0.0, GSIMDriver warns you (figure 6.23) but allows you to continue—unvalidated.

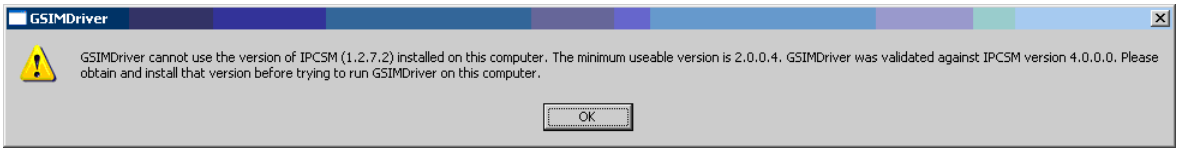


Figure 6.22 IPCSM warning: unusable

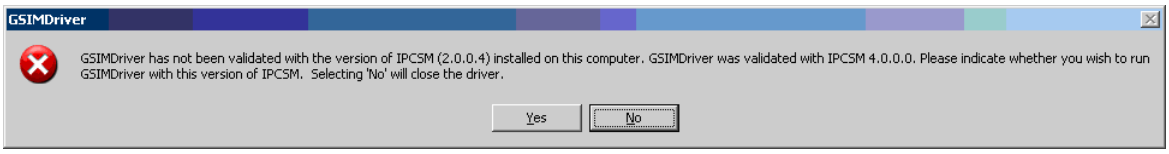


Figure 6.23 IPCSM warning: usable but below 4.0.0.0

This "wrong IPCSM" situation arises because other applications (such as MoviolaW) may install other versions of IPCSM.DLL. A computer with MoviolaW and GSIMDriver installed will have two separate versions of IPCSM.DLL in different directories. But only one of these can be "active"; that is, registered as the DLL for all applications to use. You can set which IPCSM.DLL is active.

NOTE: Changing the active version of IPCSM.DLL impacts on all applications that use IPCSM.

To change the active version of IPCSM to the one supplied with GSIM:

a) Choose **Run** from Windows **Start** menu.

b) Type **Regsvr32 "*directory name*\IPCSM.dll"** then click **OK**.

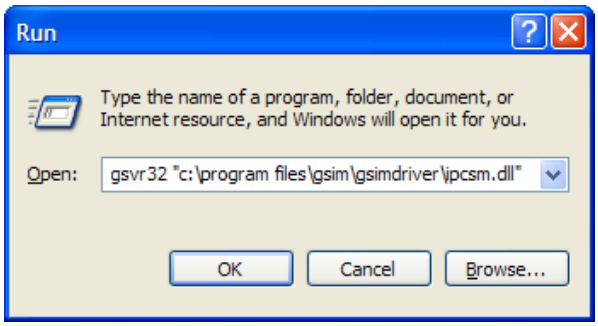


Figure 6.24 Run dialog box

The full text in figure 6.24 is
`regsvr32 "c:\program files\gsim\gsimdriver\ipcsm.dll"`
Windows acknowledges successful registration of the DLL (figure 6.25).

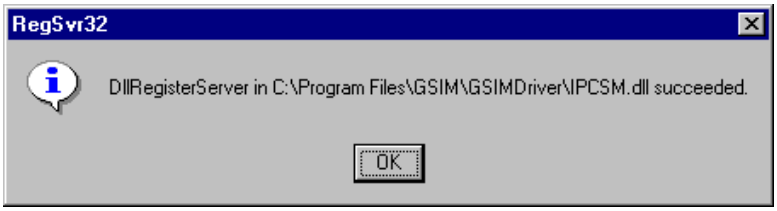


Figure 6.25 "DLL registration succeeded" dialog box

To change the active version of IPCSM to the version supplied with MoviolaW:

a) Choose **Run** from the Windows start menu;

b) Type Regsvr32 "*directory name*\IPCSM.dll"

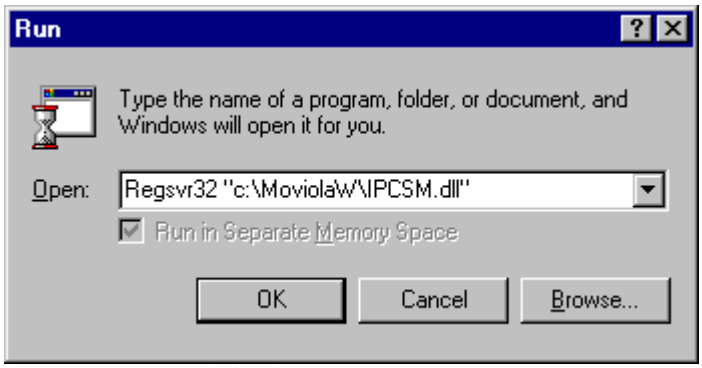


Figure 6.26 Run dialog box

Windows acknowledges the successful registration of the file (figure 6.25).

6.4 IPCSM Prefix Separator

MoviolaW installation sets the default prefix separator as a hash (#) in the registry. GSIM requires this to be a dash (-). When using MoviolaW to work with multiple WESTRACEs in conjunction with GSIM, you must set the prefix separator to be a dash and not a hash.

NOTE: Ensure you have write access to the registry, before attempting to edit the default prefix separator.

To change the prefix separator:

a) Select **Run** from the Windows **Start** menu.

b) Type **regedit** and click **OK**.

c) Find the key:
HKEY_CURRENT_USER\Software\Dimetronic\IPCSM\Settings

d) Double-click **PREFIX_SEP** and change the value to a dash (-).

Appendix A: Log Files

A log file is a record of the conditions that existed for a specific test.

GSIM provides a read-only viewer for log files—right-click on a log file and select View from the pop-up window). Use the viewer to:

- verify that the log file is the one you want;
- diagnose problems with tests that produce unexpected results.

The following pages describe the contents of a sample log file.

The first WESTRACE "w1" which is a WESTRACE MkI and the second WESTRACE "w2", which is a WESTRACE MkII, have been annotated. Annotations appear in *italics*.

```
Project: AppTest.prj
Date: 29/04/10 14:50:58
LogStartTime: 18300
NumWestraces: 4
```

Project Name

Date and time log was created

Number of WESTRACEs (of both types) in the project

GSIM name *Enabled status*

```
WESTRACE (Original) : wr1 0xffea6428 Enabled NVLM=Yes.
```

Start of the configuration of the first WESTRACE.

Type: Original or MarkII *Internal ID* *Presence of a NVLM*

```
Installation
Cycle Time: 675
==================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr1.IMG
Name          : wr1
VLM Type      : VLM6
Data Version  : 0
Address       : 681000
GCSS Version  : 7.1.3
Approver      : Not Previously Approved.
Approval Date : 02-Jan-1970 01:00
--------------------------------------------------
```

Installation Image File summary

```
NVC File: C:\Program Files\GSIM\Data\AppTest\tt Mk2.gpc
Modified: 03/02/10 14:49:53
```

NVC Layout file details

```
Field
==================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr1sim.IMG
Name          : WR1SIM
VLM Type      : HVLM128
Data Version  : 1
Address       : 681004
GCSS Version  : 7.1.3
Approver      : APPROVER
Approval Date : 07-Mar-2006 10:48
--------------------------------------------------
```

Field Simulation Image File summary

```
Track File: C:\Program Files\GSIM\Data\AppTest\tt Mk2 sim.gpc
Modified: 17/12/09 13:02:00
```

Field Layout File details

```
NCDM
==================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr1_ncdm.img
Name          : wr1
Data Version  : 00
Address       : 681000
GCSS Version  : 7.1.3
Approver      :
Approval Date :
Primary IP    : 192.168.0.1
Secondary IP  : 127.0.0.1
--------------------------------------------------
```

NVLM type: NCDM or NVC/DM

NVLM Image File summary

```
--------------------------------------------------
WESTRACE Communications Modules:
--------------------------------------------------
Vital Serial Modules [Count = 0] :
```

List of all simulated communications modules in the WESTRACE.

Count of vital serial telemetry modules.

```
VCVMs [Count = 2] :
Module: [0xa642809, 1], -> Connected to: 0xe20a6429
Module: [0xa64280c, 1], -> Connected to: 0xa642b08
```

If a module is present: module type and internal identifier ID, plus the internal identifier ID of the connected module if one is also present in GSIM

```
C/NVC Modules [Count = 1] :
NVC422  S2Address: 2  WestraceId: 0xffea6428  ModuleIndex: 3
```

Count of non-vital serial communications modules in the WESTRACE

If a module is present: module type and internal identifier ID, plus the internal identifier ID of the connected module if one is also present in GSIM

```
-------------------------------------------------
NCDM Ports and Modules:
-------------------------------------------------
Configured WSA/S2 Serial Ports [Count = 0] :

Configured Network Sessions [Count = 6] :
Network Connections:
Session Id 0xf [0x16a6428000f0104, 1, 1], WSA/S2 Network Master
 -> Connected to Session 'WSA/S2 Network Slave' NCDM "wr4"
[0x16a642b000f0105]
Session Id 0x5 [0x16a642800050204, 1, 0], WSA/S2 Network Master
 -> Not connected.
Session Id 0xe [0x16a6428000e0105, 1, 1], WSA/S2 Network Slave
 -> Connected to Session 'WSA/S2 Network Master' NCDM "wr4"
[0x16a642b000e0104]
Session Id 0x2 [0x16a642800020205, 1, 0], WSA/S2 Network Slave
 -> Not connected.
Session Id 0x1ffff [0x16a642800000107, 1, 0], WESTRACE Network Vital
 -> Simulated by VCVM.
Session Id 0x1ffff [0x16a642800000207, 1, 0], WESTRACE Network Vital
 -> Simulated by VCVM.

END wr1.
```

List of all simulated communications ports, S2 modules and network port sessions in the NVLM.

Count of simulated serial ports If a port is simulated, protocol, addressing details, internal identifier ID, plus identifiers for the connected port if one is present.

Count of simulated network sessions

For each simulated session, displays: session ID, internal identifier ID, protocol plus identifiers for the connected port if one is present.

End marker for the configuration details of the named WESTRACE.

GSIM name *Enabled status*

```
WESTRACE Mark2 : wr2 0xffea6429 Enabled
```

Type: Mark II in this case *Internal ID*

Start of the configuration of the second WESTRACE.

```
Installation
Cycle Time: 150
==================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr2.img
Name          : wr2
VLM Type      : PM
Data Version  : 0.21
Address       : 681001
GCSS Version  : 8.0.0
Approver      : Not Previously Approved.
Approval Date : 02-Jan-1970 00:00
--------------------------------------------------
D Processor CED
==================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr2_D.img
Name          : wr2
VLM Type      : NVPM
Data Version  : 0
Address       : 681001
GCSS Version  : 8.0.0
Approver      : Not Previously Approved.
Approval Date : 02-Jan-1970 00:00
--------------------------------------------------
NVC File: C:\Program Files\GSIM\Data\AppTest\tt Mk2.gpc
Modified: 03/02/10 14:49:53

Field
==================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr2sim.img
Name          : WR2SIM
VLM Type      : PM
Data Version  : 0.3
Address       : 681005
GCSS Version  : 8.0.0
Approver      : Not Previously Approved.
Approval Date : 02-Jan-1970 00:00
--------------------------------------------------
Track File: C:\Program Files\GSIM\Data\AppTest\tt Mk2 sim.gpc
Modified: 17/12/09 13:02:00
```

AB CED Image File summary

D CED Image File summary

NVC Layout file details

Field Simulation Image File summary

Field Layout File details

A

```
------------------------------------------------
Vital Ports:
 Vital Port 3 in wr2. Connection: Vital Port 2 in wr3
 Vital Port 16 in wr2. Connection: VCVM [Port Addr  9] in wr1
 Vital Port 20 in wr2. Connection: Vital Port 30 in wr3
------------------------------------------------

NonVital Port Sessions:
 WSA/S2 Master Session 24 in wr2. Connection: WSA/S2 Slave
Session 24 in wr3
 WSA/S2 Master Session 127 in wr2. Connection: Not connected
 WSA/S2 Slave Session 14 in wr2. Connection: WSA/S2 Master
Session 14 in wr3
 WSA/S2 Slave Session 15 in wr2. Connection: WSA/S2 Master
Session 15 in wr3
END wr2.

WESTRACE Mark 2 : wr3 0xffea642a Enabled

Installation
Cycle Time: 150
================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr3.img
Name          : wr3
VLM Type      : PM
Data Version  : 2.22
Address       : 681002
GCSS Version  : 8.0.0
Approver      : H ACKER
Approval Date : 19-Nov-2009 14:23
------------------------------------------------
D Processor CED
================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr3_D.img
Name          : wr3
VLM Type      : NVPM
Data Version  : 1
Address       : 681002
GCSS Version  : 8.0.0
Approver      : H ACKER
Approval Date : 19-Nov-2009 14:23
------------------------------------------------
NVC File: C:\Program Files\GSIM\Data\AppTest\tt Mk2.gpc
Modified: 03/02/10 14:49:53

Field
================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr3sim.img
Name          : WR3SIM
VLM Type      : PM
Data Version  : 1.3
Address       : 681006
GCSS Version  : 8.0.0
Approver      : H ACKER
Approval Date : 19-Nov-2009 14:24
------------------------------------------------
Track File: C:\Program Files\GSIM\Data\AppTest\tt Mk2 sim.gpc
Modified: 17/12/09 13:02:00

------------------------------------------------
Vital Ports:
 Vital Port 2 in wr3. Connection: Vital Port 3 in wr2
 Vital Port 12 in wr3. Connection: VCVM [Port Addr 11] in wr4
 Vital Port 30 in wr3. Connection: Vital Port 20 in wr2
------------------------------------------------
NonVital Port Sessions:
 WSA/S2 Master Session 9 in wr3. Connection: Not connected
 WSA/S2 Master Session 14 in wr3. Connection: WSA/S2 Slave
Session 14 in wr2
 WSA/S2 Master Session 15 in wr3. Connection: WSA/S2 Slave
Session 15 in wr2
 WSA/S2 Slave Session 24 in wr3. Connection: WSA/S2 Master
Session 24 in wr2
END wr3.
```

List of all configured vital ports. For each port, displays the port number, name of the local WESTRACE plus the vital port number and WESTRACE name for the connected port if that port is present in GSIM.

List of all non-vital simulated network port sessions. For each session, displays the protocol, app session id, and the protocol app session id and WESTRACE name for the connected session if that session is present in GSIM.

End marker for the configuration details of the named WESTRACE.

```
WESTRACE (Original) : wr4 0xffea642b Enabled NVLM=Yes.

Installation
Cycle Time: 675
================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr4.IMG
Name          : wr4
VLM Type      : VLM6
Data Version  : 0
Address       : 681003
GCSS Version  : 7.1.3
Approver      : Not Previously Approved.
Approval Date : 02-Jan-1970 01:00
------------------------------------------------
NVC File: C:\Program Files\GSIM\Data\AppTest\tt Mk2.gpc
Modified: 03/02/10 14:49:53

Field
================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr4sim.IMG
Name          : WR4SIM
VLM Type      : VLM6
Data Version  : 0
Address       : 681007
GCSS Version  : 7.1.3
Approver      : Not Previously Approved.
Approval Date : 02-Jan-1970 01:00
------------------------------------------------
Track File: C:\Program Files\GSIM\Data\AppTest\tt Mk2 sim.gpc
Modified: 17/12/09 13:02:00

NCDM
================================================
FileName      : C:\Program Files\GSIM\Data\AppTest\wr4_ncdm.img
Name          : wr4
Data Version  : 00
Address       : 681003
GCSS Version  : 7.1.3
Approver      :
Approval Date :
Primary IP    : 192.168.0.4
Secondary IP  : 127.0.0.1
------------------------------------------------


------------------------------------------------
WESTRACE Communications Modules:
------------------------------------------------
Vital Serial Modules [Count = 0] :


VCVMs [Count = 2] :
Module: [0xa642b08, 1], -> Connected to: 0xa64280c
Module: [0xa642b0b, 1], -> Connected to: 0xe18a642a


C/NVC Modules [Count = 1] :
NVC422  S2Address: 5  WestraceId: 0xffea642b  ModuleIndex: 3


------------------------------------------------
NCDM Ports and Modules:
------------------------------------------------
Configured WSA/S2 Serial Ports [Count = 0] :


Configured Network Sessions [Count = 5] :
Network Connections:
Session Id 0xe [0x16a642b000e0104, 1, 1], WSA/S2 Network Master
 -> Connected to Session 'WSA/S2 Network Slave' NCDM "wr1"
[0x16a6428000e0105]
Session Id 0xf [0x16a642b000f0105, 1, 1], WSA/S2 Network Slave
 -> Connected to Session 'WSA/S2 Network Master' NCDM "wr1"
[0x16a6428000f0104]
Session Id 0x30 [0x16a642b00300205, 1, 0], WSA/S2 Network Slave
 -> Not connected.
Session Id 0x1ffff [0x16a642b00000107, 1, 0], WESTRACE Network
Vital
 -> Simulated by VCVM.
Session Id 0x1ffff [0x16a642b00000207, 1, 0], WESTRACE Network
Vital
 -> Simulated by VCVM.


END wr4.
```

```
ModifyFieldMnemonic : V FIELD BREAKER 1 : [ wr2(681001) ] : 22000
ModifyFieldMnemonic : NV FIELD BREAKER 1 : [ wr2(681001) ] : 22000

wr2 681001. Cycle No: 0.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
 V FIELD BREAKER                 : 1 |                                        |
=============================================================================================================

wr2 681001. Cycle No: 0.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
 NV FIELD BREAKER                : 1 |                                        |
=============================================================================================================
ModifyMnemonic : IO1~GENESIS 1 : [ wr1(681000) ] : 33600

wr1 681000. Cycle No: 0.
=============================================================================================================
  Inputs             | Outputs            | InputOutput        | Latches            | Reserved
=============================================================================================================
  IO1~GENESIS     :1 |                    |                    |                    |
                     |                    |                    |                    |
=============================================================================================================
Run : [ wr1(681000) + wr2(681001) + wr3(681002) + wr4(681003) ] : 38400

wr2 681001. Cycle No: 1.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
                                       |                                        | ACTIVE1PRI         : 1
                                       |                                        | ACTIVE2PRI         : 1
                                       |                                        | ACTIVE3PRI         : 1
                                       |                                        | OPCRFLT            : 1
                                       |                                        | ACTIVEPMPRI        : 1
                                       |                                        | APPDEL             : 1
=============================================================================================================

wr3 681002. Cycle No: 1.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
                                       | IO-DIFF-OUTPUT          : 1            | ACTIVE1PRI         : 1
                                       | NV-DIFF-OUTPUT          : 1            | ACTIVE2PRI         : 1
                                       |                                        | ACTIVE3PRI         : 1
                                       |                                        | ACTIVE4PRI         : 1
                                       |                                        | OPCRFLT            : 1
                                       |                                        | ACTIVEPMPRI        : 1
                                       |                                        | APPDEL             : 1
=============================================================================================================

wr1 681000. Cycle No: 1.
=============================================================================================================
  Inputs             | Outputs            | InputOutput        | Latches            | Reserved
=============================================================================================================
  W1-IO-FROMFIELD :1 | W1-IO-TOFIELD   :1 |                    |                    | STRDEL  :1
                     |                    |                    |                    | INTDET  :1
                     |                    |                    |                    |
=============================================================================================================

wr4 681003. Cycle No: 1.
=============================================================================================================
  Inputs             | Outputs            | InputOutput        | Latches            | Reserved
=============================================================================================================
                     |                    |                    |                    | STRDEL  :1
                     |                    |                    |                    | INTDET  :1
                     |                    |                    |                    |
=============================================================================================================
```

Start of logging

User-issued simulation command. (These commands also appear in the command monitor).

WESTRACE name, Installation address, Cycle number

This is the format for logging mnemonic changes from a WESTRACE MkII. Inputs and outputs are shown in separate columns, A mnemonic that is both input and output will appear in both columns, latches, time-of-day timers and reserved mnemonics appear in the 'Others' column. This table format is needed to support 32 character mnemonics.

```
wr1 681000. Cycle No: 2.   <-- WESTRACE name, Installation address, Cycle number
=============================================================================================================
  Inputs              | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
                      | IO1~OUT1         :1 |                     | W1-IO LATCH      :1 |
                      | IO1~OUT2         :1 |                     |                     |
                      |                     |                     |                     |
=============================================================================================================
```

This is the format for logging mnemonic changes from the VLM of a WESTRACE MkI.

```
wr1 681000. Cycle No: 3.
=============================================================================================================
  Inputs              | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
                      |                     |                     | IO1 DELAY 1      :1 |
                      |                     |                     |                     |
=============================================================================================================

wr1 681000. Cycle No: 4.
=============================================================================================================
  Inputs              | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
                      |                     |                     | IO1 DELAY 2      :1 |
                      |                     |                     |                     |
=============================================================================================================

wr1 681000. Cycle No: 5.
=============================================================================================================
  Inputs              | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
                      | TO41 Vital       :1 |                     |                     |
                      |                     |                     |                     |
=============================================================================================================

wr1 681000. Cycle No: 6.
=============================================================================================================
  Inputs              | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
                      |                     |                     |                     | STRDEL   :1
                      |                     |                     |                     |
=============================================================================================================
 NVLM Inputs          | NVLM Outputs        | NVLM InputOutput    | NVLM Latches        | NVLM Reserved
=============================================================================================================
                      |                     |                     |                     | NSTRDEL1 :1
                      |                     |                     |                     |
=============================================================================================================

wr4 681003. Cycle No: 6.   <-- WESTRACE name, Installation address, Cycle number
=============================================================================================================
  Inputs              | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
  FROM11 Vital     :1 | W4-IO-TOFIELD    :1 |                     |                     | STRDEL   :1
  W4-IO-FROMFIELD  :1 | V4~OUT1          :1 |                     |                     |
                      | IO4~OUT1         :1 |                     |                     |
                      |                     |                     |                     |
=============================================================================================================
 NVLM Inputs          | NVLM Outputs        | NVLM InputOutput    | NVLM Latches        | NVLM Reserved
=============================================================================================================
                      |                     |                     |                     | NSTRDEL1 :1
                      |                     |                     |                     |
=============================================================================================================
```

This is the format for logging mnemonic changes from a cycle where both VLM and NVLM mnemonics in a WESTRACE MkI changed.

```
wr1 681000. Cycle No: 7.
=============================================================================================================
  Inputs              | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
                      |                     |                     |                     | APPDEL   :1
                      |                     |                     |                     |
=============================================================================================================

wr4 681003. Cycle No: 7.
=============================================================================================================
  Inputs              | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
                      |                     |                     | W4-IO LATCH      :1 | APPDEL   :1
                      |                     |                     |                     |
=============================================================================================================
```

```
wr4 681003. Cycle No: 8.
=============================================================================================================
  Inputs             | Outputs            | InputOutput        | Latches            | Reserved
=============================================================================================================
                     | IO4~OUT2        :1 |                    |                    |
                     | TO31 Vital      :1 |                    |                    |
                     |                    |                    |                    |
=============================================================================================================

wr3 681002. Cycle No: 41.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
 FROM41 Vital                    : 1 | V3~OUT1                          : 1 |
 W3-IO-FROMFIELD                 : 1 | W3-IO-TOFIELD                    : 1 |
                                       | IO3~OUT1                         : 1 |
=============================================================================================================

wr3 681002. Cycle No: 42.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
                                       |                                        | W3-IO-FIELD CIRCUIT
LATCH : 1
=============================================================================================================

wr3 681002. Cycle No: 43.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
                                       | IO3~OUT2                         : 1 | IO3 DELAY 1       : 1
=============================================================================================================

wr3 681002. Cycle No: 44.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
                                       |                                        | IO3 DELAY 2       : 1
=============================================================================================================

wr3 681002. Cycle No: 45.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
                                       | TO21 Vital                       : 1 |
=============================================================================================================

wr2 681001. Cycle No: 47.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
 FROM31 Vital                    : 1 | W2-IO-TOFIELD                    : 1 |
 W2-IO-FROMFIELD                 : 1 | V2~OUT1                          : 1 |
                                       | IO2~OUT1                         : 1 |
=============================================================================================================

wr2 681001. Cycle No: 48.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
                                       |                                        | W2-IO-FIELD CIRCUIT
LATCH : 1
=============================================================================================================

wr2 681001. Cycle No: 49.
=============================================================================================================
 Inputs                                | Outputs                                | Others
=============================================================================================================
                                       | TO11 Vital                       : 1 |
                                       | IO2~OUT2                         : 1 |
=============================================================================================================

wr1 681000. Cycle No: 12.
=============================================================================================================
  Inputs             | Outputs            | InputOutput        | Latches            | Reserved
=============================================================================================================
  FROM21 Vital    :1 | IO1~RESULT      :1 |                    |                    |
                     |                    |                    |                    |
=============================================================================================================
Stop : [ wr1(681000) + wr2(681001) + wr3(681002) + wr4(681003) ] : 49200

ModifyNVCDMMnemonic : NV1~GENESIS 1 : [ wr1(681000) ] : 67500
```

```
wr1 681000. Cycle No: 16.   <-- WESTRACE name, Installation address, Cycle number
=============================================================================================================
 NVLM Inputs          | NVLM Outputs        | NVLM InputOutput    | NVLM Latches        | NVLM Reserved
=============================================================================================================
  NV1~GENESIS     :1 |                     |                     |                     |
                     |                     |                     |                     |
=============================================================================================================
```

This is the format for logging mnemonic changes from the NCDM or NVC/DM of a WESTRACE MkI.

```
Run : [ wr1(681000) + wr2(681001) + wr3(681002) + wr4(681003) ] : 71700

wr1 681000. Cycle No: 17.
=============================================================================================================
 NVLM Inputs          | NVLM Outputs        | NVLM InputOutput    | NVLM Latches        | NVLM Reserved
=============================================================================================================
                     | NV1~OUT1        :1 |                     | NCDM TOFIELD    :1 |
                     |                    |                     |                    |
=============================================================================================================

wr1 681000. Cycle No: 18.
=============================================================================================================
  Inputs             | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
  W1-NV-FROMFIELD :1 | W1-NV-TOFIELD   :1 |                     | NCDM TOFIELD    :1 |
                     |                    |                     |                    |
=============================================================================================================

wr1 681000. Cycle No: 19.
=============================================================================================================
  Inputs             | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
                     |                     |                     | NCDM FROMFIELD  :1 |
                     |                     |                     |                    |
=============================================================================================================

wr1 681000. Cycle No: 20.
=============================================================================================================
 NVLM Inputs          | NVLM Outputs        | NVLM InputOutput    | NVLM Latches        | NVLM Reserved
=============================================================================================================
                     |                     |                     | W1-NV LATCH     :1 |
                     |                     |                     | NCDM FROMFIELD  :1 |
                     |                     |                     |                    |
=============================================================================================================

wr1 681000. Cycle No: 21.
=============================================================================================================
 NVLM Inputs          | NVLM Outputs        | NVLM InputOutput    | NVLM Latches        | NVLM Reserved
=============================================================================================================
                     | TO41 NonVital   :1 |                     |                     |
                     | NV1~OUT2        :1 |                     |                     |
                     |                    |                     |                     |
=============================================================================================================

wr4 681003. Cycle No: 21.
=============================================================================================================
 NVLM Inputs          | NVLM Outputs        | NVLM InputOutput    | NVLM Latches        | NVLM Reserved
=============================================================================================================
  FROM11 NonVital :1 | NV4~OUT1        :1 |                     | NCDM TOFIELD    :1 |
                     |                    |                     |                    |
=============================================================================================================

wr4 681003. Cycle No: 22.
=============================================================================================================
  Inputs             | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
  W4-NV-FROMFIELD :1 | W4-NV-TOFIELD   :1 |                     | NCDM TOFIELD    :1 |
                     |                    |                     |                    |
=============================================================================================================

wr4 681003. Cycle No: 23.
=============================================================================================================
  Inputs             | Outputs             | InputOutput         | Latches             | Reserved
=============================================================================================================
                     |                     |                     | NCDM FROMFIELD  :1 |
                     |                     |                     |                    |
=============================================================================================================

wr4 681003. Cycle No: 24.
=============================================================================================================
 NVLM Inputs          | NVLM Outputs        | NVLM InputOutput    | NVLM Latches        | NVLM Reserved
=============================================================================================================
                     | V4~changerole2  :1 |                     | W4-NV LATCH     :1 |
                     |                    |                     | NCDM FROMFIELD  :1 |
                     |                    |                     |                    |
```

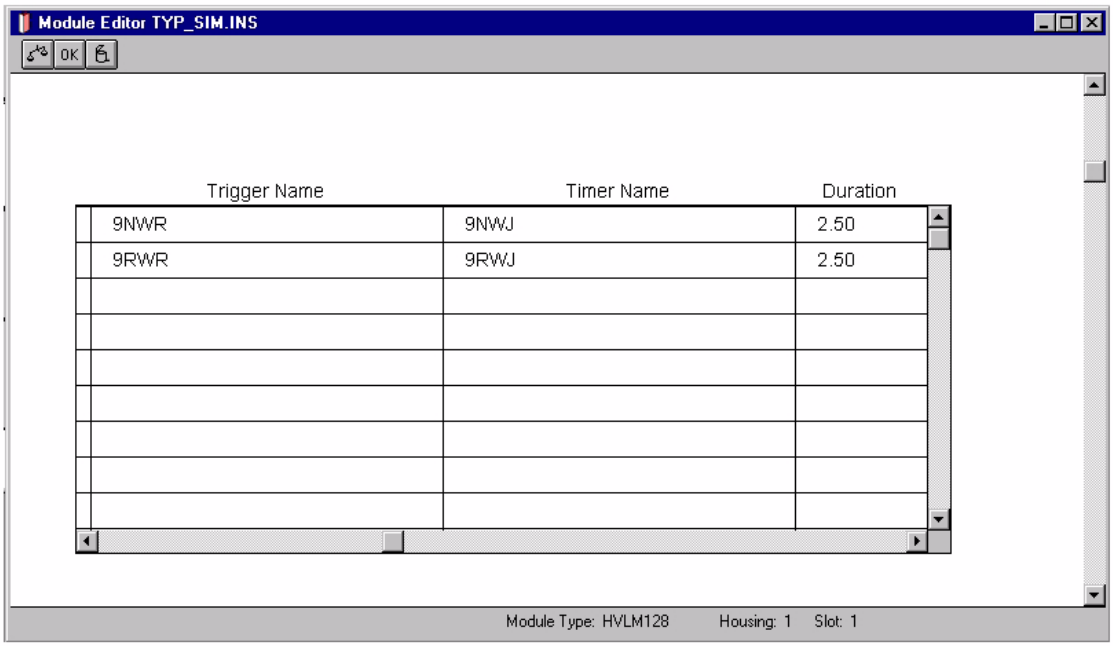
```
================================================================================================================

wr4 681003. Cycle No: 25.
================================================================================================================
 NVLM Inputs          | NVLM Outputs         | NVLM InputOutput    | NVLM Latches       | NVLM Reserved
================================================================================================================
                      | TO11 NonVital    :1 |                     |                    |
                      | NV4~OUT2         :1 |                     |                    |
                      |                     |                     |                    |
================================================================================================================

wr1 681000. Cycle No: 26.
================================================================================================================
 NVLM Inputs          | NVLM Outputs         | NVLM InputOutput    | NVLM Latches       | NVLM Reserved
================================================================================================================
  FROM41 NonVital :1 | NV1~RESULT       :1 |                     |                    |
                      |                     |                     |                    |
================================================================================================================
Stop : [ wr1(681000) + wr2(681001) + wr3(681002) + wr4(681003) ] : 85600

CheckSum -> 2107532
```

A checksum is used to verify file integrity.

Appendix B: Field File Logic

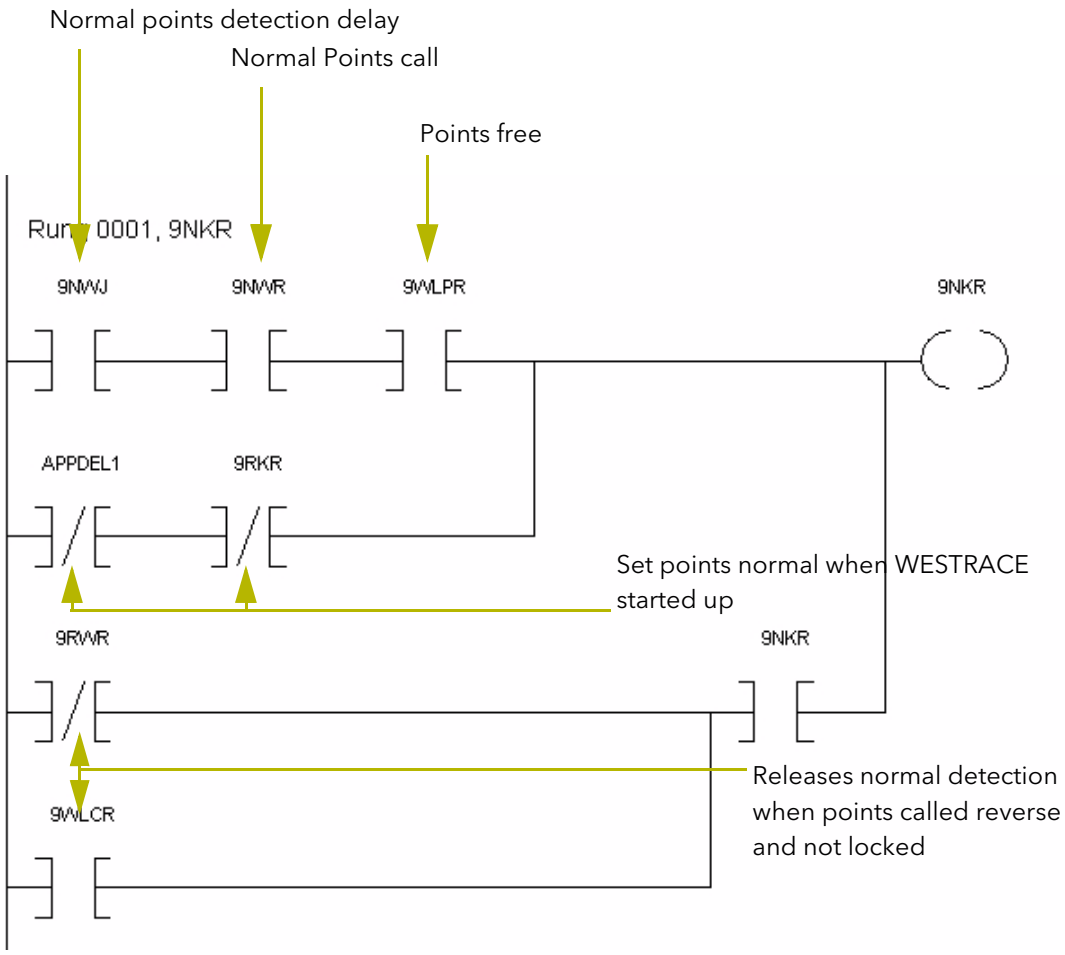
The following diagrams are representations of GCSS ladder logic rungs that could typically be used to simulate field equipment.

Notes have been added to describe the functions of the field file logic.

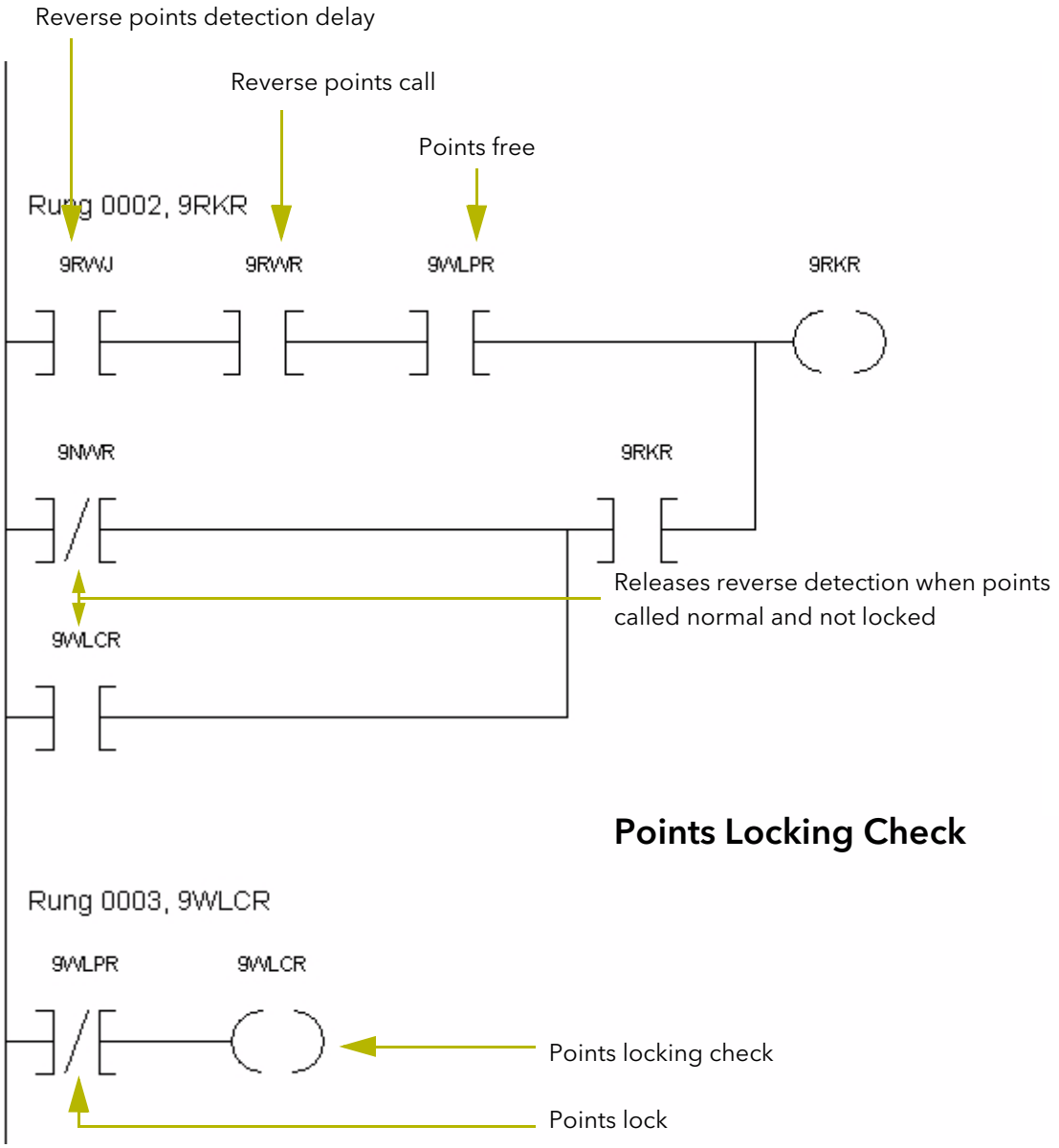


B

Normal Points Detection

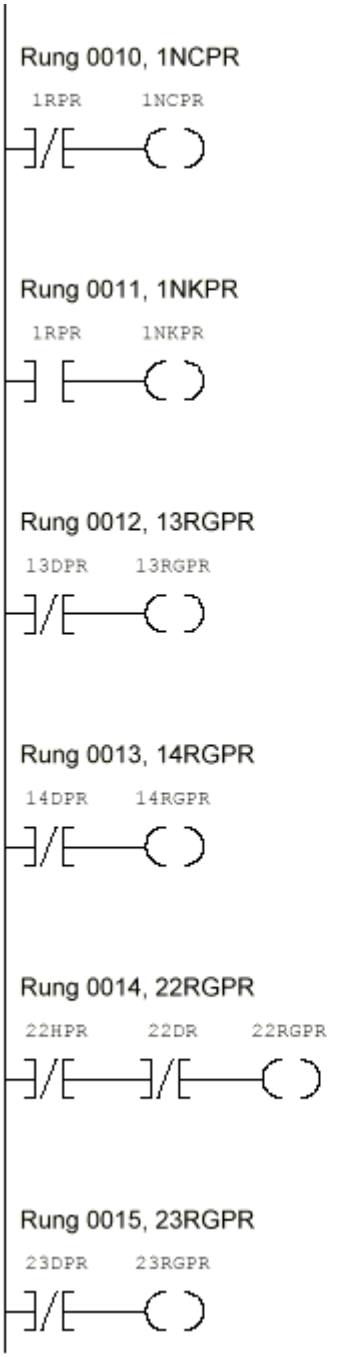


Reverse Points Detection



Points Locking Check

B



Ground Frame Normal Checking

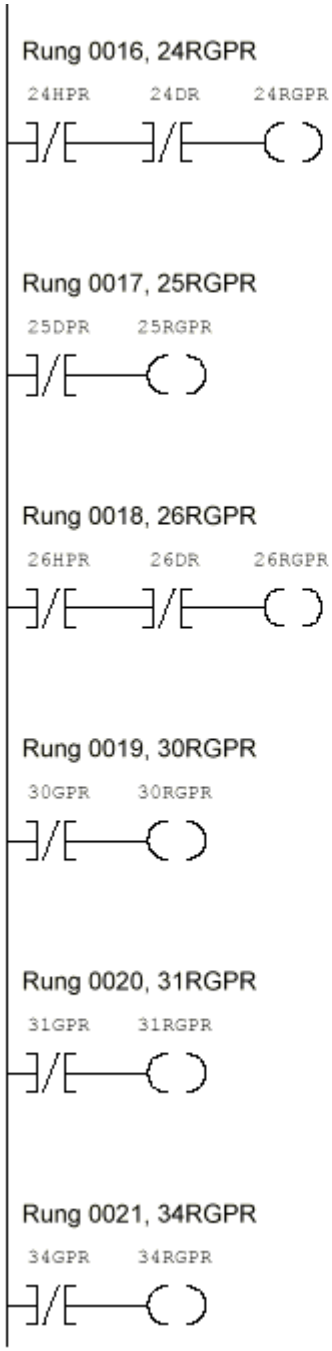
Ground Frame Normal Detection

Two Aspect Signal

Two Aspect Signal

Three Aspect Signal

Two Aspect Signal



Three Aspect Signal

Two Aspect Signal

Three Aspect Signal

Shunt Signal

Shunt Signal

Shunt Signal

B

Level Crossing

Level Crossing

Alternator Run

APPENDIX C: TROUBLESHOOTING

C.1 Troubleshooting GSIM and the WESTRACE Automatic Testing Tool

Table C.1 Troubleshooting: GSIM and WATT

Problem	Solution
GSIM is visible but the GUI does not show the WATT being connected.	GSIM will not accept a connection from the WATT if it is already running. Close GSIM then try again to invoke it from the WATT. A new (invisible) copy of GSIM will start.
I finished a session with the WATT then later tried to start GSIM manually. The message box in figure C.1 appeared instead of GSIM.	GSIM and WATT failed to disconnect cleanly after ending the previous simulation session and a copy of GSIM, invisible, has been left running. • Close the message box. • Use the Windows task manager to quit the running GSIM process. Consult your computer systems manager if in doubt about how to do this.
Operating system error code indicating "Access Denied".	Should only occur when GSIM is being accessed from another PC. Check that the remote user's account has the correct Windows XP security settings on GSIM's PC. Also check that: • the user has the right to start GSIM as well as to access it (these are separate rights within Windows XP security); • DCOM security and Windows Firewall are correctly configured (see section 6.2.3). Contact your network administrator if you need help.
Operating system error code indicating "Interface not found" or "Identifier not found".	Invoke GSIM manually as a local user and make sure GSIM starts normally. If GSIM fails a startup check (for example due to a corrupt file component of GSIM) Windows can mistakenly report this as a failure to find all the GSIM information required in the Registry. Reinstall GSIM (Chapter 6). If GSIM is running on a PC with Windows XP SP2 and you are trying to contact it over a network, you must make sure that the PC's DCOM security and Windows Firewall settings match those shown in section 6.2.3. Contact your network administrator if you need help.
Operating system error code "Failure to load DLL/Type Library."	Reinstall GSIM.

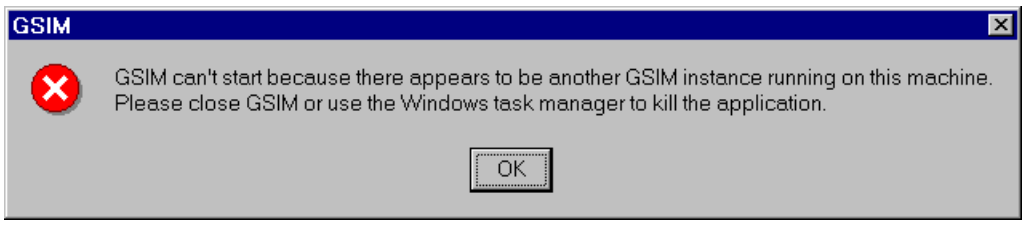


Figure C.1 GSIM "multiple instances" error message

C

C.2 Troubleshooting GSIM and Client Applications

GSIMDriver will try to contact GSIM while it is running. This means the same error message may be displayed repeatedly in the status window.

Make a note of any error message then close the application and the driver. The cause of the error must be resolved before starting again.

Table C.2 Troubleshooting: GSIM and client applications

Problem	Solution
I want to use a client application without connecting to GSIM, but whenever I start the client, GSIMDriver starts automatically.	Comment out the GSIMDriver entries in the client's configuration file.
GSIMDriver fails to start and instead a message appears reporting that the GSIMDriver CRC check has failed.	Remove and reinstall GSIMDriver.
GSIM is connected to a client application, but will not exchange mnemonic changes with it.	Ensure that mnemonic names and prefixes, if used, are the same in both GSIM and the client applications. If prefixes are not used in the client application data, configure GSIMDriver to exchange unprefixed mnemonics externally, using the USE_PREFIXES entry in the GSIMDriver configuration file (page F-2).
GSIMDriver shows a successful connection to GSIM but not to the client application.	• Check the GSIMDriver.cfg file and the configuration file(s) of the application are configured as per section 5.10. • Check that the version of the client application is the latest released. • For clients that communicate using one of the WNC protocols (WSL/S2 network, S2oE or WNC/ WNC+ vital), check that the client configuration (IP addresses, UDP ports, WESTRACE installation addresses and port or session numbers) match across the link. • For the WNC/WNC+ vital protocol, check that the client configuration data has the appropriate Product Data Version and Compatibility Index values. Report any consistent failures to the GSIM Design Authority.
GSIMDriver window shows no error message, but the Remote Application Check shows that mnemonic states are not being exchanged.	GSIMDriver can only detect a very limited range of faults with the connection to client applications. • Check that the client application is ready to send and/or receive data, just as you would if that application was connected to a real interlocking. • Close all applications and try the set-up procedure again. Be sure to start GSIMDriver before starting the client application. Report any consistent failures to the GSIM Design Authority.
GSIMDriver Status bar is Red, indicating that GSIMDriver is not connected to GSIM or client application.	• Check for a GSIMDriver error message in a windows message box. • Check that GSIM is at the PC location configured in the GSIMDriver configuration file and that it is running, with an open project. • Check that the client application is correctly configured and running.

Table C.2 Troubleshooting: GSIM and client applications *(Continued)*

Problem	Solution
Error message in the GSIMDriver window at startup.	• Check that the installation instructions in section 6.2 have been followed fully, both on the PC where GSIM is and on the PC where GSIMDriver is running. The instructions for BOTH require manual steps as well as just running the installation routine. • Check that the GSIMDriver.cfg file correctly identifies the PC where GSIM is located (section 5.10.2). • Check the DCOM security settings (section 6.2.3.1). • Reinstall GSIMDriver.
Error message: "… open project and logging …"	GSIMDriver will only exchange mnemonic states with GSIM if GSIM has an open project and is logging. Start GSIM before starting the client application.
GSIM GUI stops responding to user input. A message box reading "Server Busy" may appear in the GSIM main window or at the GSIMDriver window.	• The driver or GSIM has experienced an application crash. • The network connection has failed. Check the status of the network. In both cases, use the Windows task manager to close the frozen application(s), then retry the startup procedure.
When trying to run GSIMDriver, I receive a message saying the wrong version of IPCSM.DLL is registered.	Register the correct IPCSM.DLL (section 6.3).

Appendix D: Sample TXT (GUI) File

NOTE: Some text in the following example file wraps around to the next line. When editing file, ensure that text remains on the correct line, and is not separated by carriage return.

Sections are introduced with headings.

Do not change this portion of the TXT file.

```
*****************************************************************
* Toolbar definition section
*****************************************************************
TOOLBAR_SECTION
 SYSTEM_BUTTON "Close" CAPTION "Exit"
 SYSTEM_BUTTON "Users"
 SYSTEM_BUTTON "Menu"
 SYSTEM_BUTTON "Status"
 SYSTEM_BUTTON "Tools"
 USER_BUTTON "Diagram" CAPTION "Diagram"
 SYSTEM_BUTTON "Size"
 SYSTEM_BUTTON "Test"

END_TOOLBAR_SECTION
* Start of GUI item definitions
* diagram selection menu from maintoolbar
MENU "diagram menu"
 OPTION 1
                 PROMPT "Line 16 Overview"
                 DIAGRAM 0
 END_OPTION 1
 OPTION 2
                 PROMPT "GUI_SEPARATOR"
 END_OPTION 2
 OPTION 3
                 PROMPT "Osteras"
                 DIAGRAM 0
 END_OPTION 3
 OPTION 4
                 PROMPT "Eiksmarka"
                 DIAGRAM 0 AT 700, 0
 END_OPTION 4
 OPTION 5
                 PROMPT "Hovseter"
                 DIAGRAM 0 AT 1300, 0
 END_OPTION 5
 OPTION 6
                 PROMPT "Makrellbekken"
                 DIAGRAM 0 AT 2300, 0
 END_OPTION 6
 OPTION 7
                 PROMPT "GUI_SEPARATOR"
 END_OPTION 7
 OPTION 8
                 PROMPT "Exit"
 END_OPTION 8
END_MENU "diagram menu"
```

D

Change the following portions of the TXT file to edit the sub-menus.

SUB-MENU name → *PARAMETERS* → *defines 5 routes and route labels.*

```
MENU "set route option"
PARAMETERS "route1", "route2", "route3", "route4", "route5",
"route1 name", "route2 name", "route3 name", "route4 name",
"route5 name"
```

"route1" is the mnemonic, and "route1 name" is the label to appear on the screen (should be the same as "route1").

```
OPTION 1
                    PROMPT "%s[route1 name] +"
*                      ENABLED_WHEN "%s[route1]"
                    STEADY "%s[route1]" TO 1
 END_OPTION 1

 OPTION 2
                    PROMPT "%s[route2 name] ÷"
*                      ENABLED_WHEN "%s[route2]"
                    STEADY "%s[route2]" TO 1
 END_OPTION 2
```

Start of option → *Display label* → *Ignore this line* → *Set logic to 1* → *End of option*

```
 OPTION 3
                    PROMPT "%s[route3 name] ÷"
*                      ENABLED_WHEN "%s[route3]"
                    STEADY "%s[route3]" TO 1
 END_OPTION 3
```

Each menu option is defined in a similar manner.)
Steady to 1 sets the logic state of the mnemonic.

```
 OPTION 4
                    PROMPT "%s[route4 name] ÷"
*                      ENABLED_WHEN "%s[route4]"
                    STEADY "%s[route4]" TO 1
 END_OPTION 4
```

Mnemonics, such as for "route1" must correspond to the mnemonics entered in GCSS.

```
 OPTION 5
                    PROMPT "%s[route5 name] ÷"
*                      ENABLED_WHEN "%s[route5]"
                    STEADY "%s[route5]" TO 1
 END_OPTION 5

 OPTION 6
                    PROMPT "Cancel"
 END_OPTION 6
```

End of SUB-MENU definition. →

```
END_MENU "set route option"
```

Start of next sub-menu definition. →

```
MENU "clear route option"
 PARAMETERS "route1", "route2", "route3", "route4", "route5",
"route1 name", "route2 name", "route3 name", "route4 name",
"route5 name"
 OPTION 1
                    PROMPT "%s[route1 name] +"
*                      ENABLED_WHEN NOT "%s[route1]"
```

Steady to 0 clears the mnemonic. →

```
                    STEADY "%s[route1]" TO 0
 END_OPTION 1

 OPTION 2
                    PROMPT "%s[route2 name] ÷"
*                      ENABLED_WHEN NOT "%s[route2]"
                    STEADY "%s[route2]" TO 0
 END_OPTION 2

 OPTION 3
                    PROMPT "%s[route3 name] ÷"
*                      ENABLED_WHEN NOT "%s[route3]"
                    STEADY "%s[route3]" TO 0
 END_OPTION 3

 OPTION 4
                    PROMPT "%s[route4 name] ÷"
*                      ENABLED_WHEN NOT "%s[route4]"
                    STEADY "%s[route4]" TO 0
 END_OPTION 4

 OPTION 5
                    PROMPT "%s[route5 name] ÷"
*                      ENABLED_WHEN NOT "%s[route5]"
                    STEADY "%s[route5]" TO 0
 END_OPTION 5

 OPTION 6
                    PROMPT "Cancel"
 END_OPTION 6

END_MENU "clear route option"
```

Start of next sub-menu definition.

```
MENU "lock signal option"
 PARAMETERS "signal name"
 OPTION 1
                PROMPT "OK"
                STEADY "<S%s[signal name]_COL" TO 1
 END_OPTION 1

 OPTION 2
                PROMPT "Cancel"
 END_OPTION 2
END_MENU "lock signal option"


MENU "unlock signal option"
 PARAMETERS "signal name"
 OPTION 1
                PROMPT "OK"
                STEADY "<S%s[signal name]_COL" TO 0
 END_OPTION 1

 OPTION 2
                PROMPT "Cancel"
 END_OPTION 2
END_MENU "unlock signal option"
```

MENU name
In the parameters section, names, such as "signal name" must correspond to the names entered in PCGE.

```
MENU "signal menu"
 PARAMETERS "signal name", "route normal", "route reverse",
"route three", "route four", "route five", "normal route",
"reverse route", "three route", "four route", "five route"
 OPTION 1
                PROMPT "Set Route"
```

SUB-MENU name
The sub-menu must have the same number of names as in the parameters section.

A typical Set Route sub-menu is displayed in ***figure 5.4****.*

```
                SUB_MENU "set route option" WITH "route normal",
"route reverse", "route three", "route four", "route five",
"normal route", "reverse route", "three route", "four route",
"five route"

 END_OPTION 1

 OPTION 2
                PROMPT "Clear Route"
```

The mnemonics and labels for each signal are defined in the EVENTS section.

```
                SUB_MENU "clear route option" WITH "route
normal", "route reverse", "route three", "route four", "route
five", "normal route", "reverse route", "three route", "four
route", "five route"
 END_OPTION 2

*                OPTION 3
*                          PROMPT "Lock Signal"
*                          SUB_MENU "lock signal option" WITH
"signal name"
*                END_OPTION 3
*
*                OPTION 4
*                          PROMPT "Unlock Signal"
*                          SUB_MENU "unlock signal option" WITH
"signal name"
*                END_OPTION 4

 OPTION 5
                PROMPT "Cancel"
 END_OPTION 5

END_MENU "signal menu"
```

MENU name

```
MENU "single signal menu"
 PARAMETERS "route"
 OPTION 1
                PROMPT "Set %s[route]"
                ENABLED_WHEN ">S%s[route]_UA"
                PULSE "<S%s[route]_F" FOR 2 FROM 0
 END_OPTION 1

 OPTION 2
                PROMPT "Clear %s[route]"
                PULSE "<S%s[route]_FM" FOR 2 FROM 1
 END_OPTION 2

 OPTION 3
                PROMPT "Lock Signal"
                SUB_MENU "lock signal option" WITH "route"
 END_OPTION 3

 OPTION 4
                PROMPT "Unlock Signal"
                SUB_MENU "unlock signal option" WITH "route"
 END OPTION 4
```

D

```
 OPTION 5
                    PROMPT "Cancel"
 END_OPTION 5

END_MENU "single signal menu"

* point
dialogue

DIALOGUE "point"
 BASED_ON "POINT"
 PARAMETERS "point number", "normal indication",
            "reverse indication","normal control",
            "emerg control", "reverse control"

 USING_TEXT "Point %s[point number]", "Normal", "Reverse", "Set
Normal", "Centre", "Set Reverse", "Cancel"

 CONTROLS_ENABLED_WHEN
                    "normal indication"
                    "reverse indication"
                    NOT "normal control"
                    NOT "emerg control"
                    NOT "reverse control"
 ACTIONS
                    STEADY "centre control" TO 0
                    STEADY "reverse control" TO 0
                    STEADY "normal control" TO 1
 ACTIONS
                    STEADY "normal control" TO 0
                    STEADY "reverse control" TO 0
                    STEADY "centre control" TO 0
 ACTIONS
                    STEADY "normal control" TO 0
                    STEADY "centre control" TO 0
                    STEADY "reverse control" TO 1
 ACTIONS
                    NO_ACTION
END_DIALOGUE "point"


* link signal menus with signals

EVENT
 SELECTION "SJL22A"

MENU "signal menu" AT 0, 0
                    WITH "SJL22A", "J2A1U", "EJ2AU", "L2A1U",
 "L2A2U", " ", "J2A1U", "EJ2AU", "L2A1U", "L2A2U", " "
END_EVENT

EVENT
 SELECTION "SJL12A"
 MENU "signal menu" AT 0, 0
                    WITH "SJL12A", "J2A1U", "EJ2AU", "L2A1U",
 " ", " ", "J2A1U", "EJ2AU", "L2A1U", " ", " "
END_EVENT

EVENT
 SELECTION "SJL32A"
 MENU "signal menu" AT 0, 0
                    WITH "SJL32A", "J2A1U", "EJ2AU", "L2A1U",
"L2A3U", " ", "J2A1U", "EJ2AU", "L2A1U", "L2A3U", " "
END_EVENT

EVENT
 SELECTION "SJL52A"
 MENU "signal menu" AT 0, 0
                    WITH "SJL52A", "J2A1U", "EJ2AU", "L2A1U",
"L2A3U", " ", "J2A1U", "EJ2AU", "L2A1U", "L2A3U", " "
END_EVENT

EVENT
 SELECTION "SJL72A"
 MENU "signal menu" AT 0, 0
                    WITH "SL72A", "J2A1U", "EJ2AU", "L2A1U", "L2A3U",
" ", "J2A1U", "EJ2AU", "L2A1U", "L2A3U", " "
END_EVENT
```

Points DIALOGUE name Names, such as "point number" must correspond to the names entered in PCGE.

USING_TEXT, such as "Normal" defines the text that appears on the points dialogue box.

ACTIONS for "Set Normal button selection":
- *clears centre control*
- *clears reverse control*
- *sets normal control*

ACTIONS for "Centre button selection".

ACTIONS for "Set Reverse button selection"

ACTIONS for "Cancel button selection".

End of Point DIALOGUE

EVENT name Signal name "SJL22A" as entered in PCGE.
Note: Event names must match those used in PCGE.

MENU name The menu lists 5 mnemonics, followed by their labels.

End of EVENT
Note: Labels must match the mnemonic names used in GCSS.

Next EVENT Menus contain a set of mnemonics and labels as defined in the parameters section for the Signal Menu.

Each EVENT defines the menu that will be displayed when a signal is selected.

Blanks " " are used when the particular signal does not have five routes.

```
EVENT
 SELECTION "SL92A"
 MENU "signal menu" AT 0, 0
                    WITH "SL92A", "L2A1U", "L2A3U", " ", " ", " ",
"L2A1U", "L2A3U", " ", " ", " "
END_EVENT

EVENT
 SELECTION "SJL22B"
 MENU "signal menu" AT 0, 0
                    WITH "SJL22B", "J2B1U", "EJ2B1U", "L2B1U",
"L2B4U", " ", "J2B1U", "EJ2B1U", "L2B1U", "L2B4U", " "
END_EVENT

EVENT
 SELECTION "SJL12B"
 MENU "signal menu" AT 0, 0
                    WITH "SJL12B", "J2B1U", "EJ2B1U", "L2B1U",
"L2B4U", " ", "J2B1U", "EJ2B1U", "L2B1U", "L2B4U", " "
END_EVENT

EVENT
 SELECTION "SJL32B"
 MENU "signal menu" AT 0, 0
                    WITH "SJL32B", "J2B1U", "EJ2B1U", "L2B1U",
"L2B3U", "L2B4U", "J2B1U", "EJ2B1U", "L2B1U", "L2B3U", "L2B4U"
END_EVENT

EVENT
 SELECTION "SJL52B"
 MENU "signal menu" AT 0, 0
                    WITH "SJL52B", "J2B1U", "EJ2B1U", "L2B1U",
"L2B3U", "L2B4U", "J2B1U", "EJ2B1U", "L2B1U", "L2B3U", "L2B4U"
END_EVENT

EVENT
 SELECTION "SJL72B"
 MENU "signal menu" AT 0, 0
                    WITH "SJL72B", "J2B1U", "EJ2B1U", "L2B1U",
"L2B3U", "L2B4U", "J2B1U", "EJ2B1U", "L2B1U", "L2B3U", "L2B4U"
END_EVENT

EVENT
 SELECTION "SL92B"
 MENU "signal menu" AT 0, 0
                    WITH "SL92B", "L2B1U", "L2B3U", "L2B4U", " ", "
", "L2B1U", "L2B3U", "L2B4U", " ", " "
END_EVENT
```

Selection "SJ10" refers to the mnemonic of the selected signal.

See the marginal note "SUB-MENU name" on **page D-3**.

The parameters defined for MENU "signal menu", option 1 "Set Route" are:

- *"set route option" WITH*
- *"route normal"*
- *"route reverse"*
- *"route three"*
- *"route four"*
- *"route five"*
- *"normal route"*
- *"reverse route"*
- *"three route"*
- *"four route"*
- *"five route"*

```
EVENT
 SELECTION "SJ10"
 MENU "signal menu" AT 0, 0
                    WITH "SJ10", "J10U", "EJ10U", "J10TU", " ", " ",
"J10U", "EJ10U", "J10TU", " ", " "
END_EVENT

EVENT
 SELECTION "SL10"
 MENU "signal menu" AT 0, 0
                    WITH "SL10", "L10U", " ", " ", " ", " ", "L10U",
" ", " ", " ", " "
END_EVENT

EVENT
 SELECTION "SL20"
 MENU "signal menu" AT 0, 0
                    WITH "SL20", "L20U", " ", " ", " ", " ", "L20U",
" ", " ", " ", " "
END_EVENT

EVENT
 SELECTION "SL30"
 MENU "signal menu" AT 0, 0
                    WITH "SL30", "L30U", " ", " ", " ", " ", "L30U",
" ", " ", " ", " "
END_EVENT

EVENT
 SELECTION "SJ14"
 MENU "signal menu" AT 0, 0
                    WITH "SJ14", "J14U", "EJ14U", "J14TU", " ", " ",
"J14U", "EJ14U", "J14TU", " ", " "
END_EVENT
```

D

```
EVENT
 SELECTION "SL14"
 MENU "signal menu" AT 0, 0
                WITH "SL14", "L14U", " ", " ", " ", " ", "L14U",
" ", " ", " ", " "
END_EVENT

EVENT
 SELECTION "SL34"
 MENU "signal menu" AT 0, 0
                WITH "SL34", "L34U", " ", " ", " ", " ", "L34U",
" ", " ", " ", " "
END_EVENT

EVENT
 SELECTION "SL44"
 MENU "signal menu" AT 0, 0
                WITH "SL44", "L44U", " ", " ", " ", " ", "L44U",
" ", " ", " ", " "
END_EVENT
```

Cross-over points section

INSTANCE
The parameter section of the Points Dialogue defined 6 parameters. (See the marginal note "Points DIALOGUE name" on page D-4.)

The first EVENT for points "11B" identifies one mnemonic in a cross-over.

The second EVENT for points "31A" identifies the other mnemonic in a cross-over.

"P11B" and "P31A" must match the names in PCGE.

```
* instance for 31A & 11B points

INSTANCE "11B points" BASED_ON "point"
 WITH "P11B", "11BPWK", "11BMWK", "11BP", "11BE", "11BM"
END_INSTANCE "11B points"

EVENT
 SELECTION "P11B"
 DIALOGUE_INSTANCE "11B points"
END_EVENT

EVENT
 SELECTION "P31A"
 DIALOGUE_INSTANCE "11B points"
END_EVENT

* instance for 21 & 11C points

INSTANCE "11C points" BASED_ON "point"
 WITH "P11C", "11CPWK", "11CMWK", "11CP", "11CE", "11CM"
END_INSTANCE "11C points"

EVENT
 SELECTION "P11C"
 DIALOGUE_INSTANCE "11C points"
END_EVENT

EVENT
 SELECTION "P21"
 DIALOGUE_INSTANCE "11C points"
END_EVENT

* instance for 23A & 13A points

INSTANCE "13A points" BASED_ON "point"
 WITH "P13A", "13APWK", "13AMWK", "13AP", "13AE", "13AM"
END_INSTANCE "13A points"

EVENT
 SELECTION "P13A"
 DIALOGUE_INSTANCE "13A points"
END_EVENT

EVENT
 SELECTION "P23A"
 DIALOGUE_INSTANCE "13A points"
END_EVENT

* instance for 33B & 13B points

INSTANCE "13B points" BASED_ON "point"
 WITH "P13B", "13BPWK", "13BMWK", "13BP", "13BE", "13BM"
END_INSTANCE "13B points"

EVENT
 SELECTION "P13B"
 DIALOGUE_INSTANCE "13B points"
END_EVENT

EVENT
 SELECTION "P33B"
 DIALOGUE_INSTANCE "13B points"
END_EVENT
```

```
* instance for 23B & 13C points

INSTANCE "13C points" BASED_ON "point"
 WITH "P13C", "13CPWK", "13CMWK", "13CP", "13CE", "13CM"
END_INSTANCE "13C points"

EVENT
 SELECTION "P13C"
 DIALOGUE_INSTANCE "13C points"
END_EVENT

EVENT
 SELECTION "P23B"
 DIALOGUE_INSTANCE "13C points"
END_EVENT


* link point dialogue with selection of 11A

EVENT
 SELECTION "P11A"
 DIALOGUE "point"
 WITH "P11A", "11APWKZ", "11AMWK", "11AP", "11AE", "11AM"
END_EVENT
```

Single points section

The parameter section of the Points Dialogue defined 6 parameters. (See the marginal note 'Points DIALOGUE name' on page D-4.)

```
* link point dialogue with selection of 31B

EVENT
 SELECTION "P31B"
 DIALOGUE "point"
 WITH "P31B", "31BPWK", "31BMWK", "31BP", "31BE", "31BM"
END_EVENT

* link point dialogue with selection of 51
```

The EVENT defines the mnemonics to be linked with a selection.

```
EVENT
 SELECTION "P51"
 DIALOGUE "point"
 WITH "P51", "51PWK", "51MWK", "51P", "51E", "51M"
END_EVENT

* link point dialogue with selection of 71

EVENT
 SELECTION "P71"
 DIALOGUE "point"
 WITH "P71", "71PWK", "71MWK", "71P", "71E", "71M"
END_EVENT

* link point dialogue with selection of 53

EVENT
 SELECTION "P53"
 DIALOGUE "point"
 WITH "P53", "53PWK", "53MWK", "53P", "53E", "53M"
END_EVENT

* link point dialogue with selection of 73

EVENT
 SELECTION "P73"
 DIALOGUE "point"
 WITH "P73", "73PWK", "73MWK", "73P", "73E", "73M"
END_EVENT

* link point dialogue with selection of 33A

EVENT
 SELECTION "P33A"
 DIALOGUE "point"
 WITH "P33A", "33APWK", "33AMWK", "33AP", "33AE", "33AM"
END_EVENT
```

Toggle mnemonic
Track name used in PCGE

```
* toggle track circuit

EVENT
 SELECTION "17B3TPR"
 TOGGLE "W1-17B3TPR"
END_EVENT
```

Track circuit mnemonic to toggle

Appendix E: Version Management

E.1 Introduction

WESTRACE GCSS does not include the minor version in all the *.IMG files that GSIM uses for simulation. Only the AB CED image file for the WESTRACE MkII contains both major and minor version numbers, and these numbers are shown in the GSIM GUI.

For all other image files, this appendix defines a manual procedure that ensures the tester uses GSIM to test the intended and compiled version of the application data.

E.2 Prepare the Image file

Use GCSS to obtain the version and checksum of the image file to be simulated. Refer to the GCSS manual for details of how to use GCSS.

a) Prepare the application data in the normal way

b) Approve the file

NOTE: You must do the next step immediately after approving the file

c) Compile the approved file but do not program PROM
   - Select *Make PROM* from the Compilation menu
   - Select OK from the dialog box *This installation does not have a PROM Image. Recompile*
   - Select *Print* in the *Download Installation to PROM Programmer* dialog box and print the EPROM form

d) Open the *.IMG file as read only using a text editor (eg Notepad) and print the first page.

Caution: ***Exit the text editor without saving the file***

e) Find the approval date and time in the header of the *.IMG file just opened, and verify that it is identical to the date and time recorded on the header of the PROM programming form.

f) Print a screen dump of the project or installation directory that shows the filesize and date of the *.IMG file.

g) Attach the screen dump print and *.IMG printed first page to the EPROM form. Change the line above the signature to *Details of Person creating IMG file for simulation* and sign the form

E

E.3 Check the GSIM File

Check that you have the correct version of the *.IMG file before and after simulation.

a) Print a screen dump of the project or installation directory that shows the file size and date of the image file.

b) Verify that these are identical to those recorded in point f) above.

c) Open the *.IMG file with a text editor (eg Notepad). Verify that the
   - Major Version
   - Date and Time

   are identical to that recorded in point e), above.

Caution: ***Exit the text editor without saving the file***

d) Sign the printout as evidence and attach to the simulation record

APPENDIX F: GSIMDRIVER.CFG PARAMETERS

The values of the keys in the following table are strings unless specified otherwise.

Keys and values are not case-sensitive.

Table F.1 GSIMDriver configuration file: parameters

Key	Usage
[GSIM DRIVER]	This section contains the keys **GSIM_LOCATION**, **CLIENT_PROTOCOL** and **TRACE_ON**.
GSIM_LOCATION	The host name or IP address of the PC running GSIM. This key is optional if GSIM and GSIMDriver are running on the same PC. See "GSIM_LOCATION" on page F-2.
CLIENT_PROTOCOL	The driver-to-client protocol. This key is required. Allowed values: **IPCSM, DDE, WSL/S2 network, Network protocols** See the supported protocol of specific client applications in table 5.2.
TRACE_ON	Turns on or off the generation of trace strings that can be read at run time by a suitable utility. The default is not to generate trace data. This key is optional. Allowed values: **TRUE**, **FALSE**
[CLIENTx]	When GSIMDriver is configured for one of the WNC network protocols (WSL/S2 network, S2oE or WNC/ WNC+ vital) it can connect to multiple client applications and devices. One **[CLIENTx]** section is required for each external client. Parent section for **[GSIM ENDPOINTS]**, **[CLIENT]** and **[NCDM IP PORT MAP]**.
[GSIM ENDPOINTS]	This section contains one or more comma-delimited strings identifying the target communications ports and modules in the GSIM project. Format is specified in table 5.2. There must be at least one such string in a configuration file. See "GSIM ENDPOINTS" on page F-3.
[CLIENT]	This section configures the connection and identification of the client.
CLIENT_TYPE	This key is required. Set this key to one of: • **MCT** • **DMC** • **WESTCAD** • **MoviolaW** • **Network client**

F

Table F.1 GSIMDriver configuration file: parameters *(Continued)*

Key	Usage
CLIENT_NAME	This is displayed by the GSIMDriver and allows identification when multiple drivers are running on the same PC. This key is required.
CLIENT_IP	Client's IP address in dotted decimal format. This key is required only if the client protocol is WSL/S2 Network.
DELAY	A transmission delay to be simulated for endpoints that are serial ports and modules. No delays are simulated if there are both serial and network endpoints. The default is not to simulate a serial line delay. This key is optional. Allowed values: integers from 0 to 5000 Units: milliseconds
USE_PREFIXES	Only applicable to MoviolaW. This key indicates whether GSIM should send mnemonics to the client in prefixed or un-prefixed form. This key is optional. In its absence the default behaviour will be to not use prefixes. Allowed values: **TRUE**, **FALSE**
CONNECTION_STRING	Only required when connecting to MoviolaW using IPCSM protocol. See "CONNECTION_STRING" on page F-5.
[NCDM IP PORT MAP]	This key is required for MCT and DMC clients only. Sub-Section of [CLIENTx]. This is a mapping of each distinct target WESTRACE specified in the GSIM Endpoints section to the UDP port on which GSIM Driver will expect to receive UDP frames targeted at the NCDM in that WESTRACE. This section is required if the client protocol is WSL/S2. A single, unique port must be nominated for every WESTRACE named in the GSIM Endpoints section.

See also section 5.10.2.5 "GSIMDriver.cfg Validation Rules".

GSIM_LOCATION

GSIM_LOCATION=*ComputerName* (Preferred)

or

GSIM_LOCATION=*Computer_IP_Address*

- Use the GSIM computer's Computer Name or IP Address
- Remove or comment-out this line if all clients are running on the same PC as GSIM.

NOTE: Ensure you use the computer name or IP of the computer that GSIM is running on, and NOT of the computer that the client and GSIMDriver are running on.

To find *Computer Name* or *Computer_IP_Address*:

a) In a Command Prompt window (**Start** menu > **Programs** > **Accessories** > **Command Prompt**), type **`ipconfig /all`** and press Enter.

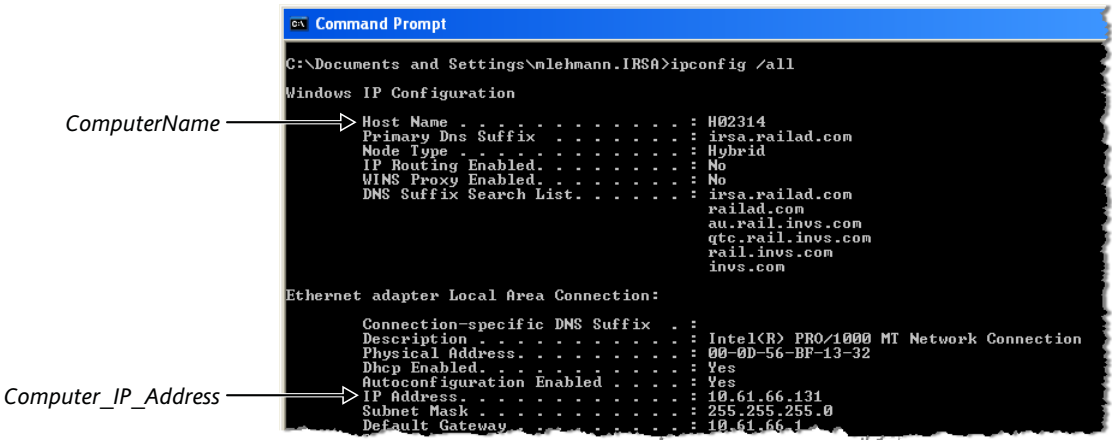


Figure F.1 Command Prompt window (ipconfig)

b) Locate *Computer Name* or *Computer_IP_Address* as shown in figure F.1.

NOTE: Only use the IP address if your computer has a static IP. Some networks use a DHCP server to dynamically set IP addresses.

GSIM ENDPOINTS

A GSIM endpoint uniquely identifies the communication module within the installation loaded in GSIM.

The formats of GSIM endpoint strings are defined as follows:

Table F.2 GSIM endpoints: definition and examples

Number	GSIM Endpoint	Examples in Section 5.10.2.3
1	To connect MoviolaW to a WESTRACE MkI. This simulates all possible diagnostic protocol connections. {WR_Mk1_Name}	w2
2	To connect an application to an NVC module in a WESTRACE MkI. {WR_Mk1_Name}, NVC, S2 {S2_Addr}	w2, NVC, S2 4
3	To connect an application to a WSA/S2 serial port in the NVC/DM of a WESTRACE MkI. {WR_Mark1_Name}, NVC/DM, {SERIAL_PROTOCOL}, INSTANCE {INSTANCE_NUM}, MODULE {MODULE_NUM}	w3, NVC/DM, WSA/S2 SERIAL MASTER, Instance 1, Module 3

Table F.2 GSIM endpoints: definition and examples *(Continued)*

Number	GSIM Endpoint	Examples in Section 5.10.2.3
4	To connect an application to a WSA/S2 serial port in the NCDM of a WESTRACE MkI: {WR_Mark1_Name}, NCDM, {SERIAL_PROTOCOL}, [INSTANCE {INSTANCE_NUM},] MODULE {MODULE_NUM}	w1, NCDM, WSA/S2 SERIAL SLAVE, Instance 2, Module 6
5	To connect an application to WSL/S2 network sessions in the network port of an NCDM: {WR_Mk1_Name}, NCDM, WSL/S2 NETWORK SLAVE, APPSESSIONID {APPSESSIONID_NUM}	w4, NCDM, WSL/S2 NETWORK SLAVE, APPSESSIONID 12
6	To connect an application to a CNVC module in a WESTRACE MkI. {WR_Mk1_Name}, CNVC, S2 {S2_Addr}	w4, CNVC, S2 12
7	To connect an application to WSA/S2 network (S2oE) slave sessions in the non-vital network port of a WESTRACE MkII: {WR_Mk2_Name}, WESTRACE MK2, WSA/S2 NETWORK SLAVE, APPSESSIONID {APPSESSIONID_NUM}	w1, WESTRACE MK2, WSA/S2 NETWORK SLAVE, APPSESSIONID 127
8	To connect an application to WSA/S2 network (S2oE) sessions in the network port of an NCDM: {WR_MK1_Name}, NCDM, {NETWORK_PROTOCOL}, APPSESSIONID 10	w4, NCDM, WSA/S2 NETWORK MASTER, APPSESSIONID 10
9	To connect an application to WNC+ vital network ports of a WESTRACE MkII: {WR_Mk2_Name}, WESTRACE MK2, WNC VITAL, PORT {PORT_ADDRESS}	w1, WESTRACE MK2, WNC VITAL, PORT 5
10	To connect an application to WNC vital network ports of a VLM6/NCDM: {WR_Mk1_Name}, WESTRACE MK1, WNC VITAL, PORT {PORT_ADDRESS}	w1, WESTRACE MK1, WNC VITAL, PORT 5

Where:

{WR_Mk1_Name} is the name assigned in GSIM to a WESTRACE MkI.

{S2_Addr} is a valid S2 Address for the named module.

{SERIAL_PROTOCOL} is one of:

- WSA/S2 SERIAL MASTER
- WSA/S2 SERIAL SLAVE

{NETWORK_PROTOCOL} is one of:

- WSA/S2 NETWORK MASTER
- WSA/S2 NETWORK SLAVE

{INSTANCE_NUM} is a number that identifies the specific port when an NCDM or NVC/DM is configured with multiple serial ports of the same protocol type.

{MODULE_NUM} is the module number (ie the S2 housing address) in the port.

{Serial_Port_Protocol} is one of:

- WSA/S2 SERIAL MASTER
- WSA/S2 SERIAL SLAVE

{Network_Port_Protocol} is one of:

- WSA/S2 NETWORK MASTER
- WSA/S2 NETWORK SLAVE
- WSL/S2 NETWORK SLAVE

{APPSESSIONID_NUM} is the Application Session ID of the non-vital network port session.

{PORT_ADDRESS} is the source port address as configured in GCSS.

CONNECTION_STRING

This key is only required when using MoviolaW.

CONNECTION_STRING=sck:127.0.0.1,*IP Port*

NOTE: For consistency between tools, when GSIM communicates by IPCSM, it uses only the socket (sck) protocol. GSIM does not support the wsl, wsllong, old or ext protocols.

The socket protocol defines the connection using TCP/IP (via sockets), with the hostname of the machine where the server is running (or its IP address), and a valid socket port.

NOTE: A different socket port must be used for each tool connected using the sck protocol. WRSA recommends the use of ports above 5000.

Section 5.10.2.3 contains example GSIMDriver.cfg files.

Appendix G: Script Structure and Language

- Scripts must contain one command per WESTRACE to specify the estimated cycle time of the installation. This is required because GSIM's simulation works by reference to the cycle time of each WESTRACE in a multiple WESTRACE project. Write your script so that the commands to set the WESTRACE cycle times appear first, before any other commands.

  If the cycle time changes then the results files from previous script runs may not be comparable. Placing the estimated cycle time in the script documents is one of the key assumptions on which the system behaviour is based. If you make major changes to your application data, such that the estimated cycle time changes significantly, you may need to alter your script and create a new benchmark results file.
- The script syntax is not case sensitive. However, GSIM prefixes are case-sensitive and you must be careful to use exactly the same prefixes as you have configured in the GSIM project.
- Not all script errors can be detected before the script runs. For example, it is possible to write combinations of isolation and set mnemonic commands that cause an error because an isolatable mnemonic that is not in an isolated state cannot be toggled by the user. If an error occurs during a script run, the results files will not be shown in the project tree view but will be placed on the file system, in the same directory as the script. You can use the results file to identify the sequence of script commands that is causing the problem.

G.1 Script example

The script example below shows the layout of a GSIM script:

The header block contains text that is not read by GSIM but may be required (for example, by a version control system)

```
Header

    Project         : Epping.prj
    Script          : Points.sct
    Author          : A N Engineer
    Date            : 29Jun2009
    Version         : 1.0

    Change History :  V1.0  29Jun2009  ANE  Created.

EndHeader
```

Start of the script block

```
Script

    SetCycleTime w1-Epping 748
```

Initialization commands set initial parameters.

```
    /* ------------------------------------------------*/
    /* Reset the simulation before doing anything else so that */
    /* effects of past activity do not impact on this test. */
    /* ------------------------------------------------ */
    Reset
```

```
 /* ------------------------------------------------
   ---- */
/* Filter some mnemonic changes from the results.
   */
/* Watchdogs and the like can be removed.              */
 /* ------------------------------------------------
   ---- */
 Ignore w1-DUMMY
 Ignore w1-CCTEST

 /* ------------------------------------------------
   ---- */
/* Key 8301/02 normal                                  */
 /* ------------------------------------------------
   ---- */
 SetMnemonic  w1-8301/02.NC : 1
 SetMnemonic  w1-8301/02.CC : 0
 SetMnemonic  w1-8301/02.RC : 0
```

Action commands determine the action of the script

```
 RunFor 10000

 /* ------------------------------------------------
   ---- */
/* Key back to centre                                  */
 /* ------------------------------------------------
   ---- */
 SetMnemonic  w1-8301/02.NC : 0
 SetMnemonic  w1-8301/02.CC : 1
 SetMnemonic  w1-8301/02.RC : 0

 /* ------------------------------------------------
   ---- */
/* Simulate points failure                             */
 /* ------------------------------------------------
   ---- */
 Isolate  w1-8301.NWK
 Isolate  w1-8301.RWK

 SetMnemonic        w1-8301.NWK : 0
 SetFieldMnemonic   w1-8301.FAILTEST : 1

 SetMnemonic  w1-8301/02.NC : 1
 SetMnemonic  w1-8301/02.CC : 0
 SetMnemonic  w1-8301/02.RC : 0

 RunFor 50000

 /* ------------------------------------------------
   ---- */
/* Back to normal operation                            */
 /* ------------------------------------------------
   ---- */
 SetFieldMnemonic w1-8301.FAILTEST : 0
 Unisolate        w1-8301.NWK
 Unisolate        w1-8301.RWK

 RunFor 50000

 /* ------------------------------------------------
   ---- */
/* Resets can be used anywhere in the script           */
/* if there is a need to do so                         */
 /* ------------------------------------------------
   ---- */
 Reset
```

End of the script

```
Endscript
```

G.2 Script Structural Blocks and Commands

Table G.1 Script Structural Blocks and Commands

Name	Optional	Syntax	Comments
Header EndHeader	Yes	**Header** **<free form text>** **EndHeader**	The header block encloses all text that does not need to be understood by GSIM. You must use both the HEADER and ENDHEADER reserved words together and each must appear on separate lines. You can only use a header block as the first block in a script. You do not need to provide a header block in a script. You can use one or more comments at the top of the script instead. The purpose of the header block is to allow large-scale inclusion of reserved words and mnemonic names, and to protect lines with specific formatting requirements such as version control system (VCS) macros.
Script EndScript	No	**SCRIPT** **<comments and valid script commands>** **EndScript**	The script block marks the start and end of the script. You must use both the SCRIPT and ENDSCRIPT reserved words together and each must appear on separate lines. A valid script must contain at least one command.
Comments	Yes	**/* <text>** **<text> */**	Comments start with a /* and end with a */. Comments can contain any alphanumeric text. Comments can span multiple lines. Note that the is a space between the comment start and end symbols and the text of the comment. Do not omit the space: comments such as the one below will not be recognised as a comment: /*Don't write comments like this*/

G

G.3 Script Initialization Commands

Table G.2 Script Initialization Commands

Name	Optional	Syntax	Comments
SetCycleTime	No	**`SetCycleTime <WESTRACE name> <valid cycle time (500 to 1300) in msec>`** Example: **`SetCycleTime w1 662`**	SETCYCLETIME commands must be the first commands in the script. There must be one such command per WESTRACE in the project. Be sure to use the name and not the prefix of the WESTRACE as set up in the GSIM project data. You cannot use a cycle time outside the valid range for a WESTRACE MkI (500 - 1300 ms) or WESTRACE MkII (150 - 400 ms).
Ignore	Yes	**`Ignore <WESTRACE or NVLM prefix>-<mnemonic>`** Example: **`Ignore n1-WATCHDOG_1`**	Use IGNORE commands to prevent specific mnemonic changes of state from being recorded in results files. This feature helps control the complexity of results files by filtering out mnemonics that change in a regular fashion (such as watchdogs). Ignored mnemonics still participate in the simulation and changes of state for these ignored mnemonics are recorded in GSIM's log. You can place IGNORE commands anywhere in the script. However, the commands always apply for the whole of the script. It is not possible to ignore mnemonics for parts of the script only.

G.4 Script Action Commands

Table G.3 Script Action Commands

Name	Optional	Syntax/ Example	Comments
SetMnemonic	Yes	**SetMnemonic <WESTRACE or NVLM prefix>-<mnemonic> : <0|1>** Examples: **SetMnemonic w1-16NLPR : 1** **SetMnemonic n1-NVIO 1 : 0**	Be sure to use the correct prefix: mnemonics in an NCDM have a different prefix to the WESTRACE that contains it. Prefixes are only required if the GSIM project data uses them. When using this command, prefixes are separated from the mnemonic by a hyphen (-) and the new mnemonic state is separated from the name by a colon (:). This command can only be used for mnemonics that GSIM allows you to modify from the GSIM user interface.
SetFieldMnemonic	Yes	SetFieldMnemonic <WESTRACE prefix>-<mnemonic> : <0|1> Examples: **SetFieldMnemonic w1-PWRFAIL : 1** **SetFieldMnemonic w1-GATECLOSED : 0**	This command allows input mnemonics in the "field" or track (*sim.img) to be modified. Ensure you use the correct WESTRACE prefix and follow the correct spacing and punctuation marks in the command. Prefixes are only required if the GSIM project data uses them. This command can only be used for mnemonics that GSIM allows to be modified from the MIMIC track view. See section 3.10 for more information.
Isolate	Yes	**Isolate** Example: **Isolate w1-R11**	The ISOLATE command allows VLM input mnemonics, whose state is set from outputs in the simulated track (*sim.img) logic, to be isolated from the track so that the value of the mnemonic can be set from the script. See section 4.8.3 for information on the Isolate feature.

Table G.3 Script Action Commands *(Continued)*

Name	Optional	Syntax/ Example	Comments
Unisolate	Yes	Unisolate Example: `Unisolate w1-R11`	The UNISOLATE command reverses the effect of an Isolate command.
Reset	Yes	RESET	Resets all WESTRACEs in the project to the initial mnemonic states as set in GCSS. It is used to ensure the script starts from the same simulation state each time it is run. Reset commands can be placed anywhere in the script after the SETCYCLETIME commands. You do not have to use any Reset commands. This allows multiple scripts to be run sequentially so that one script can start from the simulation state established by a previous script.
RUNFOR	Yes	`Runfor <time in msec>` Example: Runfor 50000	Runs the simulation for a period of time. The resolution of GSIM is 10 ms. This means that the commands RUNFOR 111 MS and RUNFOR 119 MS will both cause the simulation to run for 120 ms. There is no upper limit on the time parameter in a RUNFOR command. If you make a mistake, the script can always be stopped through the user interface (see section 4.12.7) The RunFor command works like the interactive Run commands in that all WESTRACEs complete their current cycle before the simulation stops. The RunFor command does not make reference to the state of the WESTRACEs; that is, it cannot be used to runt the WESTRACEs until a WESTRACE is stable nor until a particular cycle nor until a specific mnemonic change occurs.

Appendix H: Batch File Structure

Batch files can be created in any text editor. The batch file contains:

- an optional header block. This may be used to include text that GSIM does not need to process
- a list of scripts to be run. This block can contain script names and comments.

Do not use file system paths in these batch files. The scripts are always assumed to be at the location shown in the scripts tab of the GSIM project window.

We recommend that you do not use tabs in batch files and that you do not put comments on the same line as a script file name. It was found during testing that these may cause batch file parsing errors.

H.1 Batch File Example

The script example below shows the layout of a GSIM script:

Use the header block to enter meta information about the batch.

```
Header

      A simple batch file example.

EndHeader
```

Start of the scripts block

End of the scripts block.

```
Scripts
      /* Initialize the system */
      InitialisationScript.sct
      /* This keys both points normal */
      BothPointsN.sct
      /* Run test */
      Points23.sct

Endscripts
```

H.2 Batch File Structural Blocks and Commands

Table H.1 Batch File Structural Blocks and Commands

Name	Optional	Syntax	Comments
Header EndHeader	Yes	**Header** **<free form text>** **EndHeader**	The header block encloses all text that does not need to be understood by GSIM. You must use both the HEADER and ENDHEADER reserved words together and each must appear on separate lines. You can only use a header block as the first block in a batch file. You do not need to provide a header block in a batch file. You can use one or more comments at the top of the script instead.
Scripts EndScripts	No	**Scripts** **<comments and script names>** **EndScripts**	Encloses the list of scripts to be run. The scripts are assumed to be at the location that is shown in the GSIM project window.
Comments	Yes	**/* <text>** **<text> */**	Comments start with a /* and end with a */. Comments can contain any alphanumeric text. Comments can span multiple lines. Note that the is a space between the comment start and end symbols and the text of the comment. Do not omit the space: comments such as the one below will not be recognised as a comment: /*Don't write comments like this*/

Appendix I: Script Results File Example

I

The following shows an example of a results file that is generated when you run a script.

```
Header

    File     : 03May10_134812_PlayingTrains.result
    Script   : C:\SFC\GSIM\scripts\PlayingTrains.sct
    Project  : Epping.prj
    Run Date : 03 May 2010, 13:48:12
    Format   : 1

Endheader
```

The header shows details of the script that produced the results file including the run date and time.

```
Configuration

    Epping
        Type: Mark 1
        Installation: C:\SFC\GSIM\GSIMforEppingWithSim\EPP0M700.IMG;
Version: 0; Last Modified: 16 May 2008 17:49:56
        Field: C:\SFC\GSIM\GSIMforEppingWithSim\EPPSim.IMG; Version: 0;
Last Modified: 05 Sep 2006 14:22:14

        Cycle Time: 748

        Starting Cycle: 92

        Simulated Communications:
        [CNVC S2 Address 2 Module No 6] <--> [Connected via GSIMDriver]
        [CNVC S2 Address 3 Module No 7] <--> [Connected via GSIMDriver]


EndConfiguration
```

The configuration section describes the significant configuration details of all the WESTRACEs in the GSIM project. The name of the WESTRACE, as assigned in the GSIM, the type (WESTRACE MkI or WESTRACE MkII) and the GCSS image file names and versions are recorded.

GSIM's estimate of the cycle time for the WESTRACE.This GSIM-estimated value does not have to be used in the test and can be overridden by a script command.

The starting cycle number for the WESTRACE. This is provided for situations where scripts without reset commands are run after each other.

This section shows only the communications ports and modules that are simulated as being connected — either to another WESTRACE in the project or to an external application via GSIMDriver. Only connected comms ports potentially play a role in the simulation.

```
Results

SetCycleTime Epping 748

/* ------------------------------------------------------  */
/* First train in  */
/* ------------------------------------------------------  */
/* Set the route  */
SetMnemonic 8253(1).IF : 1

Epping (66). Relative Cycle: 0. Time: 0 msec.

 Inputs                 |  Outputs               |  Others
 8253(1).IF        : 1 |                        |
 NVLM Inputs            |  NVLM Outputs          |  NVLM Others
                        |                        |
```

The results of the script start here.

Comments from the script are echoed into the results file.

Commands from the script are echoed into the results file.

```
RunFor 1000

Epping (66). Relative Cycle: 1. Time: 750 msec.

 Inputs                  |  Outputs                 |  Others
 8253.GRC          : 0 |  8253.D            : 1 |  8253(1).F         : 1
                       |  8253.R            : 0 |  8253(1).U         : 1
                       |  8253(1).UG        : 1 |  8301/02.RWZ       : 0
                       |  8219.WBL          : 0 |  8301/02.FREE      : 0
                       |  8253(2).UA        : 0 |  8301/02.RLZ       : 0
                       |  8253(1).NL        : 0 |  8302.NKL          : 1
                       |  8253(1).RU        : 1 |  8303/04.C         : 1
                       |  8301.NKL          : 1 |  8303/04.CZ        : 1
                       |  8213N.CE          : 1 |  8303/04.WZ        : 1
                       |  8215.CE           : 1 |  8303/04.N         : 0
                       |  8217.ECE          : 1 |  8253.UC(1)        : 1
                       |                        |  8253.UC           : 1
                       |                        |  8253.GN           : 0
                       |                        |  8253.ALS(60)      : 0
                       |                        |  8353AEB.GZS       : 1
                       |                        |  8353BEB.GZS       : 1
                       |                        |  8213.CE           : 1
 NVLM Inputs           |  NVLM Outputs          |  NVLM Others
                       |                        |
 ==========================================================================

SetMnemonic 8253(1).IF : 0

Epping (66). Relative Cycle: 1. Time: 1000 msec.

 Inputs                  |  Outputs                 |  Others
 8253(1).IF        : 0 |                        |
 NVLM Inputs           |  NVLM Outputs          |  NVLM Others
                       |                        |
 ==========================================================================

RunFor 10000

Epping (66). Relative Cycle: 2. Time: 1500 msec.

 Inputs                  |  Outputs                 |  Others
                       |  8219.EBL          : 1 |  8353A.UJS(10)     : 0
                       |  8353B.ULC         : 0 |  8353A.ULC         : 0
                       |                        |  8253(1).F         : 0
                       |                        |  8253(1).U         : 0
 NVLM Inputs           |  NVLM Outputs          |  NVLM Others
                       |                        |
 ==========================================================================
```

The WESTRACE name and installation address

The cycle number relative to the start of the script is recorded. So if the WESTRACE was at cycle 42 before the script ran, then all mnemonics that toggle during the first cycle following the start of the script, 63, will be shown as 'relative cycle 1'. Mnemonics that toggle before the first run command in the script are logged at 'relative cycle 0'.

A millisecond timestamp, relative to the start of the script, is also provided. This value is not compared between results files: it is there just as a debugging aid.

A table is generated for each cycle where mnemonics changed state.

```
Epping (66). Relative Cycle: 3. Time: 2250 msec.
 ____________________________________________________________________________
 Inputs                  |  Outputs                |  Others
 ____________________________________________________________________________
                         |                         |  8353A.UJR(10)      : 0
                         |                         |  8353B.UJS(10)      : 0
 ____________________________________________________________________________
 NVLM Inputs             |  NVLM Outputs           |  NVLM Others
 ____________________________________________________________________________
                         |                         |
 ============================================================================

Epping (66). Relative Cycle: 4. Time: 3000 msec.
 ____________________________________________________________________________
 Inputs                  |  Outputs                |  Others
 ____________________________________________________________________________
                         |  PL2.CCTV           : 1 |  8353B.UJR(10)      : 0
 ____________________________________________________________________________
 NVLM Inputs             |  NVLM Outputs           |  NVLM Others
 ____________________________________________________________________________
                         |                         |
 ============================================================================

/* Drive the train  */
SetMnemonic 8023.T : 0

Epping (66). Relative Cycle: 14. Time: 11000 msec.
 ____________________________________________________________________________
 Inputs                  |  Outputs                |  Others
 ____________________________________________________________________________
  8023.T             : 0 |  8023.T             : 0 |
 ____________________________________________________________________________
 NVLM Inputs             |  NVLM Outputs           |  NVLM Others
 ____________________________________________________________________________
                         |                         |
 ============================================================================

RunFor 10000

SetMnemonic 8201.RX : 0

Epping (66). Relative Cycle: 28. Time: 21000 msec.
 ____________________________________________________________________________
 Inputs                  |  Outputs                |  Others
 ____________________________________________________________________________
  8201.RX            : 0 |                         |
 ____________________________________________________________________________
 NVLM Inputs             |  NVLM Outputs           |  NVLM Others
 ____________________________________________________________________________
                         |                         |
 ============================================================================

-----------------------//   Truncated    //------------------------------

EndResults
CRC Checksum: 2B082EF3
```

The results file is checksum-protected and must not be edited.

Glossary

Item	Description
_ncdm.IMG file _nvcdm.IMG file	Non-vital installation data files created using GCSS to compile a WESTRACE installation
CFG file	A GSIM configuration file to indicate the location of the TXT file
COM	Component Object Model. Microsoft standard used for providing interaction between software processes
cycle	Complete evaluation of every ladder logic rung once from top to bottom
cycle time (ms)	GSIM estimates the time required to process all the rungs in the ladder logic (processing delay). This delay is then used to schedule the "cycle time". Note that this cycle time is only an estimate and should not be used for critical system timing.
DEP	Data Execution Prevention (a Windows XP SP2 feature that helps stop viruses and other security threats from running harmful code from certain memory locations)
DCOM	Distributed Component Object Model: a Microsoft standard used for providing interaction between software components across a network
DDE	Dynamic Data Exchange
DLL	Dynamic Link Library
DMC	Diverse Monitor Controller (*MCT* component)
DtMC	Direct to Mnemonic Converter (converts all direct bits to mnemonics, and automatically assigns mnemonics from an MGR list; a component of the PCGE Tool Suite)
DSM	Display Software Module
ERTMS	European Rail Traffic Management System
EVTC	WESTRACE Extended Vital Telemetry Continuous
field simulation file	Data file used to simulate field equipment. Also called turn-around file.
GCSS	Graphical Configuration Sub-System: software used by Railway Signal Engineers to design railway signal interlockings using WESTRACE Vital Logic Equipment (WESTRACE)
GPC file	Graphic display file for the NVC window, created using PCGE
GPCCompare	Compares two GPC files based on GPC format, not line-by-line (a component of the PCGE Tool Suite)
GPCLibraryManager	Manages the import of block library elements from one GPC file to another (a component of the PCGE Tool Suite)
GSIM	WESTRACE Graphical Simulator
GSIMDriver.cfg	Sets up the GSIMDriver to communicate with the client applications
GUI	Graphical User Interface
GUI file	Graphical User Interface file that defines the GSIM's response to user input (Sometimes referred to as a TXT file)
HVLM	WESTRACE Vital Logic Module (Sometimes called more specifically HVLM128 or HVLM128A)
IMG file	Installation data files created using GCSS to compile a WESTRACE Installation
installation	A WESTRACE system
interlocking	One or more interconnected installations
IP	Internet Protocol

Item	Description
IPCSM	Inter-Process Communication Software Module
IR	Invensys Rail
IRG	Invensys Rail Group
LEU	Lineside Electronic Unit (*ERTMS* component)
MAA	Mnemonic Assignment Assistant (a PCGE sub-window)
MCT	Maintenance Control Terminal
MGR	Mnemonic GRaphic file
MIMIC	Software library that displays graphical elements on the GSIM graphic displays
MoviolaW	A PC-based diagnostic tool for WESTRACE (developed by Dimetronic)
NCDM	Network Communication & Diagnostic Module. Similar to NVC/DM, but includes network communications
NVC window	A simulated local control panel
NVC/DM	Non-Vital Communication & Diagnostic Module. A WESTRACE module that includes several non-vital communication ports, non-vital logic evaluation, WESTRACE diagnostics and diagnostic serial ports.
NVLM	A general term that includes NVC/DM and NCDM modules
PC	IBM or IBM-compatible computer
PCGE	PC Graphic Editor software used to create station layout diagrams for railway signalling application data (a component of the PCGE Tool Suite)
PCGE Tool Suite	Comprises PCGE, DtMC, GPCLibraryManager and GPCCompare
PM	Processor Module (for a WESTRACE MkII)
project	A GSIM file containing one or more interlockings
PROM	Programmable Read Only Memory. Also used for Erasable PROM and Flash PROM.
RBC	Radio Block Centre (*ERTMS* component)
S2	A serial telemetry system developed by Invensys Rail; see also *WSA/S2* and *WSL/S2*.
S2oE	S2 over Ethernet; the *WSA/S2* non-vital network protocol used for both *NCDM* (MkI) and *PM* (MkII) S2 communication
Scheduler	Part of GSIM that coordinates the running of multiple WESTRACE systems and modules. The simulation scheduler coordinates the execution of the WESTRACEs and modules based on the delays calculated for each one.
scheduler time	The scheduler time is reported in the Command Monitor window and is listed as part of the command line in the log file.
SIM.CFG file	A GSIM configuration file to indicate the location of the SIM.TXT file
SIM.GPC file	Graphic display file for the Track Equipment window, created in PCGE
SIM.GUI file	Same as a SIM.TXT file
SIM.IMG file	Installation data files created using GCSS to compile a Field Simulation
SIM.TXT file	Files containing the control menus for the Track Equipment window (also called a SIM.GUI file)
simulation	A set of dynamic tests of WESTRACE installation logic conducted on a PC using GSIM
simulation files	The set of graphics files and configuration files required by GSIM
Terminating WESTRACE	A WESTRACE installation that is controlling how a test runs. In other words, it's the WESTRACE that "terminates" the run command when the specified conditions have been met. For example, the The Run Until Cycle command causes GSIM to run from the current cycle number until a selected WESTRACE (called the Terminating WESTRACE) reaches a specified cycle number.

Item	Description
test script	A log file used to repeat a sequence of commands
Track Equipment window	Shows the state of the field equipment
turn-around file	Field simulation file (SIM.IMG file)
TXT file	Files containing the control menus for the Non-Vital Control window (also called a GUI file)
UDP	User Datagram Protocol. One of the core protocols of the Internet protocol (IP) suite.
VCVM	Vital Communications Virtual Module. A set of mnemonics defined in a VLM6, which are exchanged with another VLM6 using NCDMs as a transport. The NCDM does no processing of these mnemonic states.
VLM	WESTRACE Vital Logic Module (a generic term that covers the complete range of modules)
VLOM	WESTRACE Vital Lamp Output Module; also known as LOM in WESTRACE MkII
VPIM	WESTRACE Vital Parallel Input Module; also known as PIM in WESTRACE MkII
VROM	WESTRACE Vital Relay Output Module; also known as ROM in WESTRACE MkII
VTC	WESTRACE Vital Telemetry Continuous
WATT	WESTRACE Automatic Test Tool
WESTCAD	WESTRACE Control and Display. A PC-based control panel developed by Westinghouse Signals Limited (WSL)
WESTRACE	acronym for **WES**tinghouse **T**rain **R**adio **A**dvanced **C**ontrol **E**quipment
WNC	WESTRACE Network Communications vital protocol for Ethernet; see also *WNC+*
WNC+	Enhanced *WNC*; vital protocol for WESTRACE Ethernet communication; incorporates *WNC* protocol
WRSA	Westinghouse Rail Systems Australia; now known as Invensys Rail
WRSL	Westinghouse Rail Systems Limited; now known as Invensys Rail
WSA/S2	A non-vital serial telemetry protocol designed by Invensys Rail in Asia-Pacific; see *S2oE*
WSL	Westinghouse Signals Limited; now known as Invensys Rail
WSL/S2	A non-vital serial telemetry protocol designed by Invensys Rail in Europe

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The Manager, Technology and Training
Invensys Rail
380 Docklands Drive, Docklands, Victoria 3008, Australia

Phone +61 1300 724 518 Fax +61 3 9616 9001
E-mail enquiries.asiapacific@invensysrail.com

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WRTOGSIM, Issue 11.0

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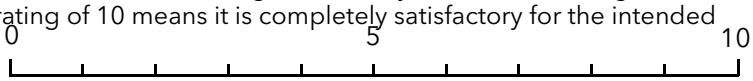

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