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WESTTRACE

Installation Check System (ICS)

User Manual



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WESTRACE

Installation Check System (ICS)

User Manual

Document CI: **WRTO_ICS-WRSI**

Issue: **7.0**

Date of Issue: **13 February 2009**

Change History:

Issue	Date	Comment	Changed	Checked	Approved
1.0	11/12/95	First Release			
2.0	30/10/96	Revised for CR 326	DC		
3.0	18/12/02	Revised to Invensys style, and for CR 515	PGB		
4.0	23/03/04	CR629	PGB	EV	
5.0	29/06/05	Bug 2962, 2980, 3015, 3047, 3074, 3084, 3090, 3115, 3135, 3154 Revised for ICS 7.0.0	ML	LB, GW, HW	
6.0	25/01/08	Revised for ICS 7.1.x	ML	DC	
7.0	13/02/09	Updated branding	ML	ML	WMcD

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Preface

This is the User Manual for the WESTRACE Installation Check System (ICS) version 7.1.x.



The checking functions described in this manual are an integral part of assuring the system safety, and must be successfully carried out whenever configuration data is altered in an interlocking.

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1. INTRODUCTION

The Installation Check System (ICS) is a Windows®-based software tool for checking the railway signalling application data installed in WESTRACE equipment.

1.1 Changes Since Previous Release

Version 7.1.x of ICS contains the following changes:

Enhancements

- Installation check reports available for reference installation OR uploaded installation.
- Difference reporting of uploaded non-vital configurations aligned with objects actually decompiled.
- Guards added to prevent unapproved non-vital installations being downloaded via ICS.
- Complement version of pointer to first DPRAM module corrected when no DPRAM modules are present.
- Dependency on PC timezone for installation approval and checking reworked to increase portability.

Removals

- NCDM installations configured using GCSS 6.2.0 (or earlier) and extracted from archives no longer have mnemonic RESSTATEC automatically changed to INCLOK and their status subsequently reset to MODIFIED.

1.2 This Manual

This version of the *WESTRACE Installation Check System (ICS) User Manual* (WRTO_ICS-WRSI) applies to ICS version 7.1.x.

The purpose of this manual is to:

- introduce the operating concepts of the ICS;
- describe how to use the ICS for:
 - uploading Vital PROM Data from the vital logic module in the WESTRACE equipment;
 - uploading Non-Vital Configuration directly from the non-vital logic module in the WESTRACE equipment;
 - comparing uploaded data with the original approved source data created by the Graphical Configuration Sub-system (GCSS);
- provide:
 - installation and setup instructions;
 - assistance in getting started;
 - assistance with error messages.

1.3 Scope

This manual is intended for Signal Engineers who need to confirm that the correct railway signal logic is present in WESTRACE Vital Signalling Equipment.

It describes how to use the WESTRACE ICS. It does not describe:

- detailed design of a WESTRACE Application—see reference [APPM];
- how to create railway signal logic for WESTRACE Vital Signalling Equipment—see reference [CCSS].

1.4 References

This manual refers to the following WESTRACE manuals.
All are available from Westinghouse Rail Systems Australia.

- [APPM] WESTRACE Application Manual, WRTOAPPM: describes the application design of a WESTRACE signalling system. It is the “how to” document that must be followed by system designers and installers.
- [CCSS] WESTRACE Graphical Configuration Sub-System User Manual, WRTOGCSS: describes how to use the configuration tools for the programming and checking of HVLM (and later) based WESTRACE systems. This includes the configuration of the WESTECT Communications Module which may be installed in a WESTRACE system.
- [GTT] WESTRACE GCS Templates Tool User Manual, WRTO_GTT: describes the use and application of the GTT to create installation templates for later use with the GCSS.

1.5 Relationship with Other WESTRACE Manuals

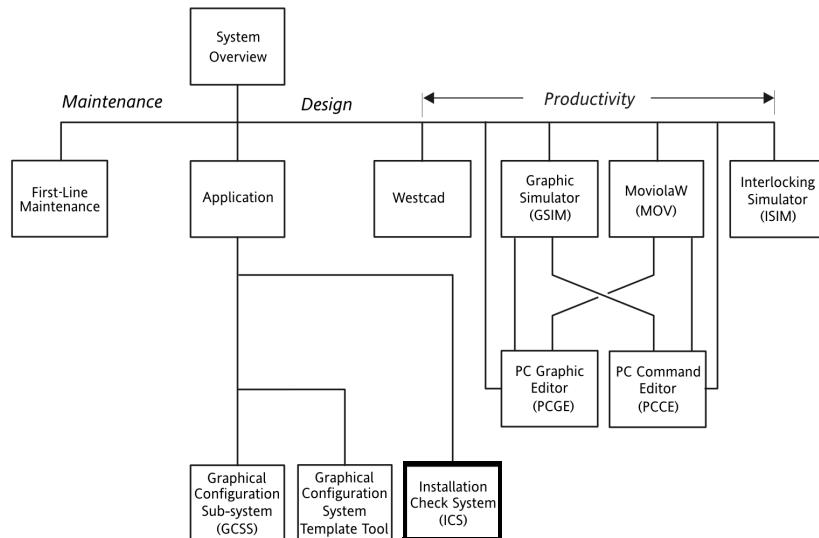


Figure 1.1 WESTRACE and related manuals

1.6 Organisation of This Manual

- Chapter 1** *Introduction*—introduces and describes this user manual. Provides an overview of the ICS data checking process.
- Chapter 2** *WESTRACE and the ICS*—provides a simple overview of WESTRACE and the application of the ICS.
- Chapter 3** *Starting*—discusses starting the ICS and basic operating procedures.
- Chapter 4** *ICS Viewers*—introduces the ICS Housing, Module and Ladder Logic viewers.
- Chapter 5** *ICS Installation and Setup*—explains how to install and set up the ICS software and how to connect the computer running ICS to the WESTRACE equipment.
- Appendix A** *Reports*—provides an overview of the reports the ICS can generate.
- Appendix B** *Decompiler Error Messages*—lists the Decompiler error messages with suggested remedies.

1.7 Conventions

1.7.1 Keystrokes

Nomenclature	Example	Action
Space between characters	Alt s f	Press the keys consecutively
+ sign between characters	Ctrl+Alt+p	Press all the keys simultaneously

1.7.2 Implementing Commands

Figure 1.2 shows alternative ways of implementing commands.

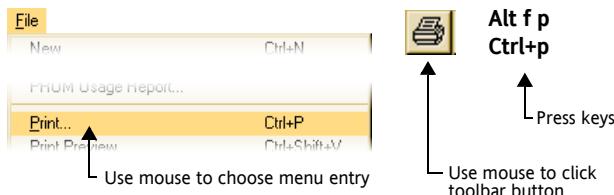


Figure 1.2 Implementing commands: menus, buttons and keystrokes

See also “Showing Menu Navigation Underlines” on page 52.

1.7.3 Important Information



“Action Point”—identifies a task or 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.

1.8 Terminology

This manual uses the word “installation” to define the functionality associated with VLM (ie. HVLM128, HVLM128a, VLM5 or VLM6) and NVLM (ie. NCDM or NVC/DM) modules. Do not confuse this with a physical installation (called an “Application” in this manual) that may contain both a VLM and one of the NVLM modules.

See the Glossary for other terminology used in this manual and by the ICS.

1.9 Prerequisites

1.9.1 ICS Operator Knowledge

The prerequisite knowledge for operating the ICS package is a user’s working knowledge of Windows.

Note: *Appropriate signal experience is required for approval of Railway Signal Interlockings.*

1.9.2 WESTRACE Information

To check a WESTRACE with the ICS you need:

- a computer (usually laptop; see section 5.1.1) that has:
 - a serial port (COM1 or COM 2);
 - ICS 7.1.x or later;
 - a copy of the original approved GCSS data (VLM installation and possibly an NVLM installation) for the particular WESTRACE;
- a serial cable as specified in section 5.1.3;
- the correct Compatibility Index for the WESTRACE—must be the same as that used by the GCSS when creating the original approved data (refer to [CCSS]);
- a copy of the signed Approval Report(s) that were generated by the GCSS for the original approved data (refer to [CCSS]).

1.10 How to Use This Manual

This section provides an overview of the Data Checking Process. There are three basic parts to checking the data installed in a WESTRACE system:

- a) Uploading data from the WESTRACE hardware.
- b) Comparing the uploaded and decompiled data with the original source data and verifying that the uploaded data is correct.
- c) Documenting data verification.

The table below:

- lists each task in the data checking process (in the usual order);
- provides a reference to the relevant section(s) in this manual.

Task	Comment	See Section
1. Connect a serial cable between the PC and the WESTRACE equipment, switch on the PC, then start the WESTRACE. (Ensure Maintenance Mode is selected for NVLM installations.)	Connect to the NVLM module or Diagnostic module.	5.1.3 5.1.4
2. Start ICS.	Use one of the usual Windows methods.	3.2
3. Enter the appropriate Compatibility Index.	Must be the same as that used by the GCSS when creating the original approved data.	3.3
4. Upload Vital PROM Data and decompile into a VLM installation.	Wait for the VLM's green and yellow Watchdog LEDs to flash before starting the Vital PROM upload.	3.4
5. Check the Vital PROM Data (DM128 and HVLM128 only)	Ensure the correct Vital PROM Data is present in the VLM PROMs before commencing uploading.	3.4
6. Complete the Vital PROM Data upload	The uploaded Vital PROM Data is automatically decompiled into a VLM installation.	3.4
7. View Upload and Decompilation Report	Uploaded Vital PROM Data must be successfully decompiled into a VLM installation before it can be used.	3.4
8. Open the original approved VLM installation.	The original approved VLM installation is to be compared with the VLM installation created in step 6.	3.5

Chapter 1: Introduction

How to Use This Manual

Task	Comment	See Section
9. Compare VLM installation created from uploaded Vital PROM Data with the original approved VLM installation.	They must be the same. INVESTIGATE ANY DIFFERENCES.	3.6
10. Create the Installation Check Report.	The Installation Check Report (Form) shows a recalculated check sum for the decompiled Vital PROM Data. Print or save the report.	3.7 Appendix A
11. Enter the check sum from the Approval Report for the original approved VLM installation.	In the space provided on the Installation Check Report.	
12. Compare the check sums on the Installation Check Report.	They must be the same.	
13. Sign the Installation Check Report when the check sums are the same.	Do not sign the report when the check sums are not the same.	
14. (Optional) View housing and modules		Chapter 4
15. (Optional) View vital logic ladder and rungs.		Chapter 4
16. (Optional) Create other reports	They document the verification process.	Appendix A

Steps **17** to **26** below are carried out when the WESTRACE has an NCDM or NVC/DM module. Step **17** is only carried out when the NVLM is to receive a new Non-Vital Configuration.

Task	Comment	See Section
17. Download the Non-Vital Configuration to the NVLM from an image file created by GCSS.	Only when the NVLM is to receive a new Non-Vital Configuration.	3.8
18. Upload Non-Vital Configuration and decompile into an NVLM installation.	The uploaded Non-Vital Configuration is automatically decompiled into an NVLM installation.	3.9
19. View Upload and Decomilation Report	Uploaded Non-Vital Configuration data must be successfully decompiled into an NVLM installation before it can be used.	page 38
20. Open the original approved NVLM installation.	The original approved NVLM installation is to be compared with the NVLM installation created in step 17 .	3.5

Task	Comment	See Section
21. Compare NVLM installation created from uploaded Non-Vital Configuration with the original approved NVLM installation.	They must be the same. Investigate any differences.	3.6
22. Create the Installation Check Report.	The Installation Check Report (Form) shows a recalculated check sum for the decompiled Non-Vital Configuration.	3.7
	Print or save the report.	Appendix A
23. Enter the check sum from the Approval Report for the original approved NVLM installation.	In the space provided on the Installation Check Report.	
24. Compare the check sums on the Installation Check Report.	They must be the same.	
25. Sign the Installation Check Report when the check sums are the same.	Do not sign the report when the check sums are not the same.	
26. (Optional) Create other reports	They document the verification process.	Appendix A

Hint Before installing new data, it may be necessary to upload the old data to validate the differences between it and the new approved data.

1.11 Other Functions

Some ICS viewer windows allow you to alter installation data but you cannot save such alterations.



Close the installation and re-open it whenever you accidentally alter any installation data.

1.12 Backwards Compatibility

ICS 7.1.x is backwards-compatible with installation image data created in GCSS revisions 7.0.0, 6.2.0, 6.1.0 and 6.0.2.

Table 1.1 shows ICS compatibility for installation image data created from previous GCSS revisions.

		Installations Created in GCSS Revision...								
		7.1.x ¹	7.0.0	6.2.0	6.1.0	6.0.2	6.0	5.2.1	5.0	3.1
ICS Revision	7.1.x ¹	Yes	Yes	Yes	Yes	Yes	No	No	No	No
	7.0.0		Yes	Yes	Yes	Yes	No	No	No	No
	6.2.0			Yes	Yes	Yes	No	No	No	No
	6.1.0				Yes	Yes	No	Yes	No	No
	6.0.2					Yes	No	Yes	No	No
	6.0						Yes ²	Yes	No	No
	5.2.1							Yes	No	No
	5.0								Yes	No
	3.1									Yes

Table 1.1 ICS 7.1.x backwards compatibility
(Yes = compatible, No = not compatible)

¹ x refers to the build version of GCS 7.1 actually released.

² Not suitable for installations with WRSA Compatibility Index (see table 3.1).

Note:

Although ICS 7.1.x is able to decompile and produce installations for image data created using GCSS 6.0.2 and later, only image data created using GCSS 7.1.x should be used for formal installation checking; failure to do this will result in checksum mis-match between the installation check report and the approval report.

For further advice contact the GCS help desk:

wrsa.gchelpdesk@wrsa.com.au

Only GCSS 7.0.0 and later, and ICS 7.0.0 and later, support locked (template) rungs. See section 4.3.1.2.

1.13 About ICS

Choose **Help > About ICS** to open the About ICS dialog box.

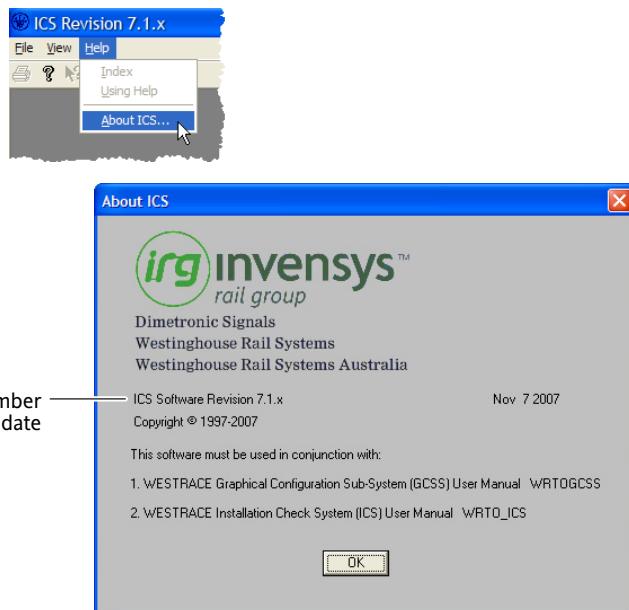


Figure 1.3 About ICS dialog box

2. WESTRACE AND THE ICS

The ICS is computer software used by Signal Engineers to check Railway Signal logic installed in WESTRACE Vital Signalling Equipment. It operates on a stand-alone personal computer.

The Railway Signal logic was designed by Signal Engineers using GCSS computer software. See reference [CCSS] for a detailed introduction to the GCSS and how it relates to WESTRACE Vital Signalling Equipment.

2.1 Overview

The ICS graphically depicts the WESTRACE modules, communication port configuration, external interfaces and the logical and temporal relationships between these inputs and outputs.

It enables Railway Signal Engineers to:

- Upload Railway Signalling installation data from VLM and NVLM modules installed in the WESTRACE equipment;
- Compare uploaded data with the original approved data;
- View graphical representation details of the uploaded data;
- Produce reports to verify and certify that the Railway Signalling installation data is correctly installed in the WESTRACE equipment.

ICS Representation of WESTRACE Application Data

The ICS divides the application data for a typical WESTRACE Application into parts:

- **Vital Logic (VLM) installation**—defines the structure of the WESTRACE Application:
 - Defines the modules and their physical placement in the WESTRACE housings;
 - Contains all the necessary application data excepting non-vital data used by any non-vital logic module that may be present;
 - Comprises the entire WESTRACE application data if a non-vital logic module is not present.

- **Non-vital Logic (NVLM) installation**—defines the structure that contains the necessary non-vital logic, timers, latches and port settings. Only required when an NCDM or NVC/DM is present.
- **VLM-NVLM Interface file**—defines mnemonic states passed between the VLM and NVLM installations for the same WESTRACE Application. Only required when an NCDM or NVC/DM is part of the VLM installation.
- **VLM6-VLM6 Interface file**—defines mnemonic states passed between two VLM6 module in different WESTRACES. A separate interface file is required for each instance of a VLM6 communicating with another VLM6.

2.2 Checking and Approval Control

Figure 2.1 shows:

- the checking and approval process performed by the Signal Engineers when the WESTRACE Application was developed using the GCSS;
- how the ICS should be used to verify that the actual WESTRACE equipment contains the intended data.

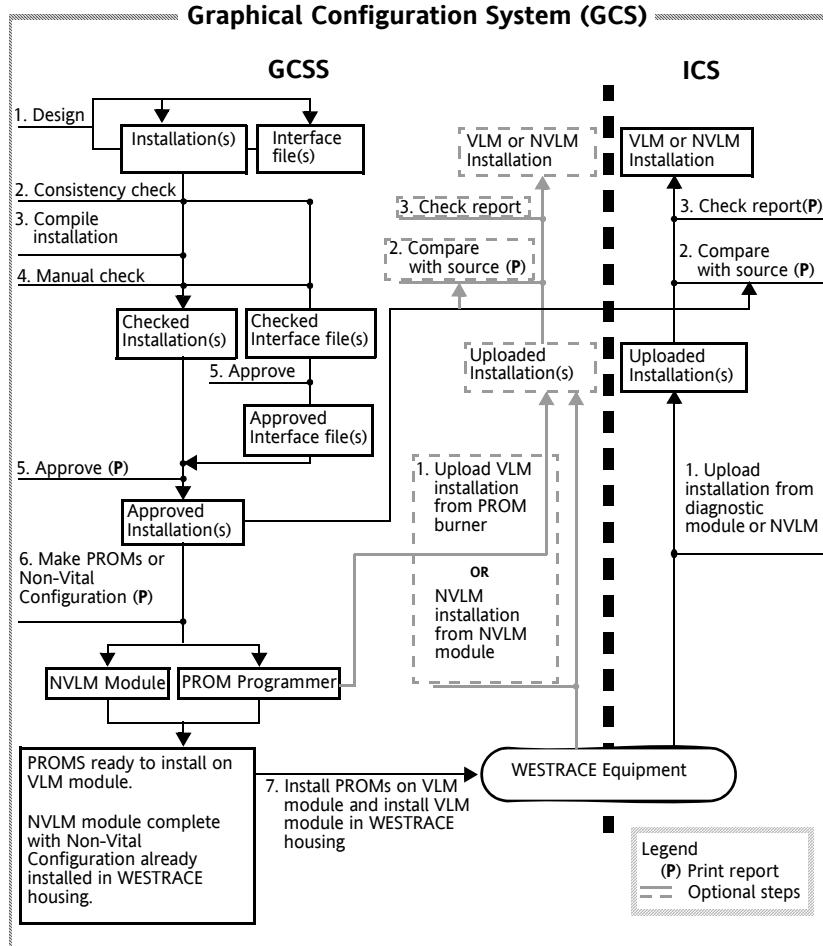


Figure 2.1 Checking and approval process

3. STARTING

This chapter gets you started with the ICS and guides you when checking downloaded WESTRACE data.

- Note:** You should read and understand the Release Notes that came with the ICS software. These contain:
- the latest changes not reflected in this manual;
 - any known problems with a recommended work-around;
 - any other information that may affect successful operation of the ICS.

3.1 The ICS User Interface

The ICS has a Multi Document Interface (MDI) which means that more than one installation can be open at any one time in a child window. Figure 3.1 illustrates the ICS main window with two child windows and a dialog box.

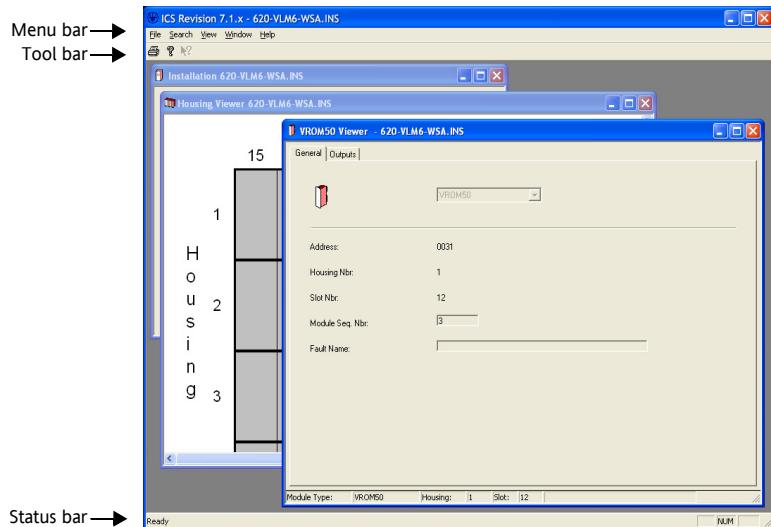


Figure 3.1 ICS window with child windows

See section 1.7 for basic assistance with the ICS user interface.

3.1.1 ICS Child Windows

Every open installation is displayed in an Installation Window (see section 3.1.2). Other child windows can be opened from each Installation window:

- Housing Viewer—introduced in Chapter 4
- Module Viewer—introduced in Chapter 4
- Ladder Viewer—introduced in Chapter 4
- Rung Viewer—introduced in Chapter 4
- Report Window—described in Appendix A

Note: *Only the Installation window has to be open.*

3.1.2 Installation Window

The installation window opened or created by the ICS is appropriate to the type of installation, VLM or NVLM. The visual differences between the types of installation window are limited to the labels on the window.

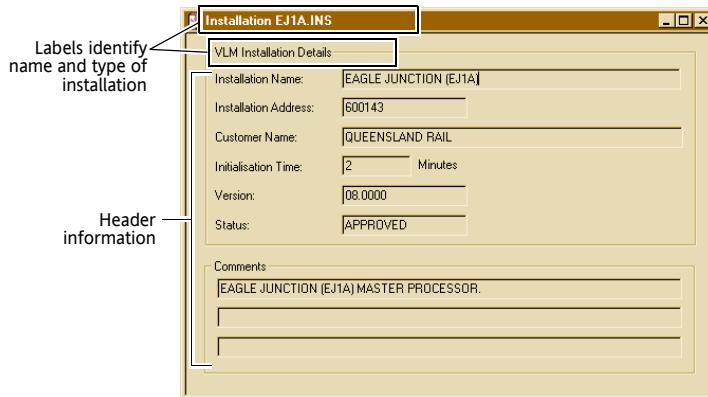


Figure 3.2 Installation window

- **Installation Name**—describes the installation
- **Installation Address**—unique for the WESTRACE
- **Customer Name**—usually the name of the railway
- **Initialisation Time**—the required Application Delay in minutes
- **Version**—the current version of the installation
- **Status**—must be “Approved”
- **Comments**—up to three lines of information

Note: *An uploaded installation does not show all of the header details contained in the original approved installation.*

Installation Report

This single-page printed report provides a record of the header information and details of installation address jumper settings and data version switches. See Appendix A for print options.

3.2 Starting the Software

Note: *The person (user account) starting ICS must have Windows XP Administrator privileges.*

Note: *Disable screen savers before starting ICS.*



Double-click the ICS icon on the computer desktop (or choose ICS from the Windows Start menu, or open the ICS folder in Windows Explorer and double-click ICS.exe).

The main ICS window opens to a full screen with the copyright panel in the centre.

3.2.1 ICS Self Check

The ICS generates and checks a checksum of the ICS executable file at startup. The ICS shuts down if:

- the checksum does not match the value in ICS.DAT;
- the ICS.DAT file is corrupted or not present.



Figure 3.3 Copyright screen

This screen closes automatically after 15 seconds (or you can close immediately it by pressing any key, or by clicking the left mouse button). Then the startup dialog box appears.

3.2.2 Startup Dialog Box



Figure 3.4 Startup dialog box



Click **OK** (or press **Enter**).

The ICS may ask you to enter a Compatibility Index. See section 3.3.

3.3 Compatibility Index

You must use the same Compatibility Index number in ICS as that used by the GCSS when creating the data.

The ICS must always have a compatibility index value stored in the ICS .ini file. The ICS automatically displays the compatibility index dialog box when this information is missing or incorrect. The Cancel button is disabled to enforce selection of a compatibility index value.

Similarly, this dialog box is displayed when the ICS is first started after installation.



a) Choose **File > Enter Compatibility Index**.



Alt f e
Ctrl+e



Figure 3.5 Enter Compatibility Index dialog box

- b) Select the Company Name and type the appropriate Compatibility Index value, then click **OK**.

Table 3.1 shows each company's default Compatibility Index (CI) value.

Company	CI Used	CI Range
WSA	3	3–31
DIMETRONIC	32	32–63
WSL	64	64–95
Safetran	96	96–127

Table 3.1 Compatibility Index (CI) values

Note: *Never use Compatibility Index 0 for a system used in service. (0 is reserved for testing.)*

3.4 Uploading Vital Installation from the VLM

Vital PROM Data is uploaded from WESTRACE equipment via a cable connection to the diagnostic module or NVLM and is then automatically decompiled into a VLM installation by the ICS.

Note: *A PROM does not store all installation data so certain data will be missing from an uploaded installation.*



- a) Attach a serial cable between the preferred serial port on the computer running ICS and the appropriate port on the diagnostic module or NVLM (see sections 5.1.3 and 5.1.4).

Chapter 3: Starting

Uploading Vital Installation from the VLM

- b) Ensure the NVLM is in Maintenance Mode (indicated as described in section 5.1.4).
- c) Choose **File > Upload from Diag. Module** to create a new empty installation and display the Upload Installation dialog box.

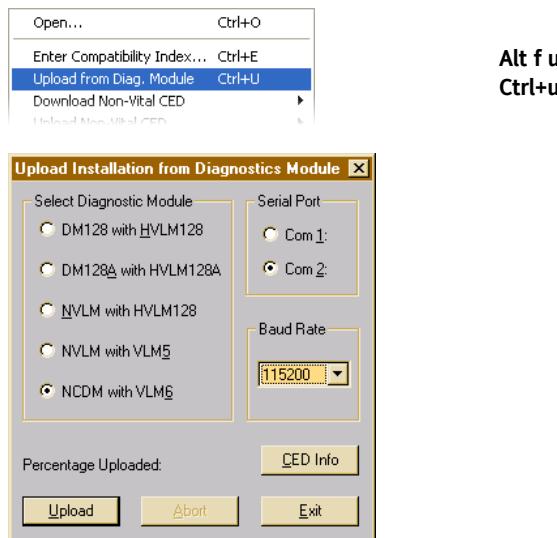


Figure 3.6 Upload from Diagnostic Module dialog box

- d) Select the appropriate:
 - diagnostic module and VLM combination;
 - serial port;
 - Baud rate:
 - 4800 is preferred for DM128 or DM128a;
 - 115200 is preferred for NVC/DM or NCDM.
- e) Ensure the VLM module is ready (indicated by the green Watchdog LED and the yellow Watchdog LED flashing on the VLM module).
This may take a minute or two from startup.
- f) Click **CED Info** (figure 3.6) to check and ensure the correct data is stored in the VLM PROMs (DM128 with HVLM128, or DM128A with HVLM128A only).
- g) Click **Upload** (figure 3.6).
A percentage uploaded figure is displayed as the data is uploaded. The upload can be abandoned at any time by selecting the **Abort** button.

Decompilation progress, including any decompilation errors (see Appendix B), is displayed in a report window while the ICS automatically decompiles the Vital PROM Data.

- h) View the automatically-generated Upload and Decompilation Report (figure A.1) to ensure the Vital PROM Data was successfully uploaded and decompiled into a VLM installation.
- i) File the report as a record of successful decompilation.

3.5 Opening Existing Installations



- a) Choose **File > Open** to display the Open dialog box.

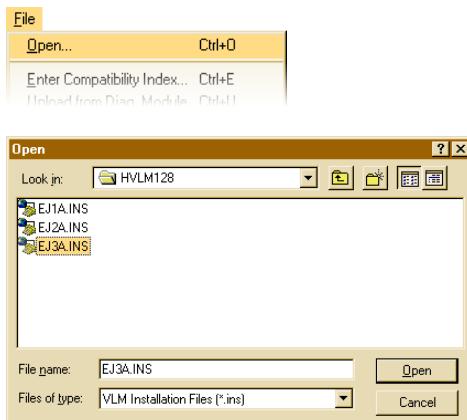


Figure 3.7 Open (installation) dialog box

- b) Select the desired type of installation from the Files of Type drop-down list:
 - VLM Installation Files (*.ins) for VLM installations
 - NVC/DM Installation Files (*.nvc) for NVC/DM installations
 - NCDM Installation Files (*.ncd) for NCDM installations

ICS reminds you (figure 3.8) to check consistency when using ICS version 7.1.x to open installation files prepared and approved using a GCSS version older than 6.1.0.



Figure 3.8 Reminder: consistency check

There is no reminder when an installation file saved in GCSS 6.1.0, 6.2.0 or 7.0.0 and later is opened in ICS 7.0.0 and later.

- c) Select the desired installation and click **Open**.
The ICS may ask you to change the compatibility index. See section 3.3.

3.5.1 Authentication Code

This is a checksum of all the information in the installation file. It is embedded within the installation file.

A new checksum is generated and compared to the embedded value when an installation is opened. The ICS will not open the installation file if the two checksums do not match.

3.5.2 Installations Created by Earlier Versions of GCSS

See section 1.12, “Backwards Compatibility” on page 20.

3.5.3 Recovering Previous Versions

Previous versions of an installation can be recovered by the ICS from the installation’s log file provided the log file is located in the same directory as the opened installation file. See reference [CCSS].

3.6 Comparing Vital PROM Data or Non-Vital Configuration Data

Uploaded and decompiled Vital PROM Data or Non-Vital Configuration data (see section 3.9) must be compared with the original approved installation data.



- Ensure that both installations are open, ie the reference VLM or NVLM installation, and the installation created from uploaded data.
- Select one to make it the primary comparator. An installation created from uploaded installation data will automatically become the primary comparator.
- Choose **Check > Compare PROM Data, Compare NVC/DM Upload or Compare NCDM Upload** to open the appropriate comparison dialog box.

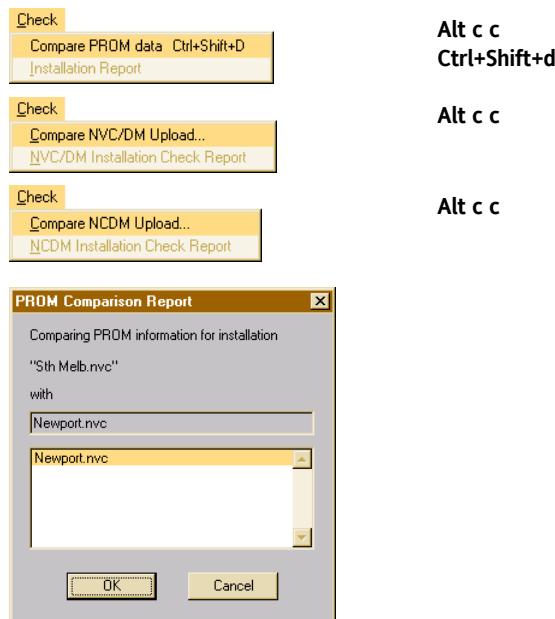


Figure 3.9 Comparison Report dialog box

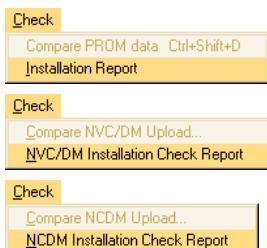
- Select the other comparator installation and click **OK**. The ICS generates the report and displays it in the Report Window. See Appendix A for an example (figure A.3) and print options.

3.7 Installation Check Report

This report should only be generated after an uploaded installation has been successfully compared to its reference installation, ie no difference found between the installation files (section 3.6).



- a) Ensure that both installations are open, ie the original (reference) installation, and the installation created from uploaded data.
- b) Click the reference installation window to ensure that it's active.
- c) Choose **Check > Installation Report, NVC/DM Installation Check Report or NCDM Installation Check Report** to generate the appropriate report.



This report contains a checksum of all Vital PROM Data (or Non-Vital Configuration data) held within the installation. This checksum must match the checksum on the Approval Report for the original installation generated by the GCSS. Space is provided on the Installation Check Report to enter the original checksum from the Approval Report, the checker's name and position.

See Appendix A for an example (figure A.4) and print options.

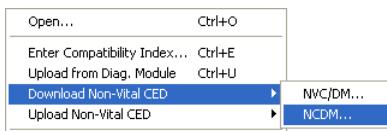
Caution: *The report should only be signed when the checksums match.*

3.8 Downloading Non-Vital Configuration Data to the NVLM

Non-Vital Configuration data can be downloaded to an NVLM via a cable connection to the NVLM.



- Attach a suitable serial cable between the preferred serial port on the computer and the Production Port on the front of the NVLM (see section 5.1.3.2).
- Ensure that the NVLM is in Maintenance Mode (see section 5.1.4).
- Choose **File > Download Non-Vital CED** and then select the type of NVLM.



- Select the desired image file from the list and click **Open**.
- ICS only displays image files that are relevant to the selected NVLM:
- ...nvcdm.img for NVC/DM
 - ...ncdm.img for NCDM

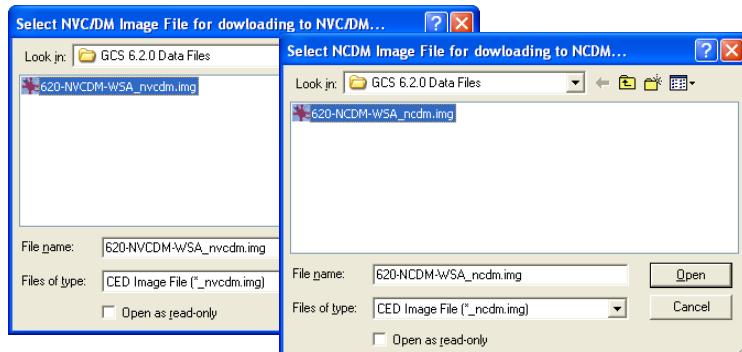
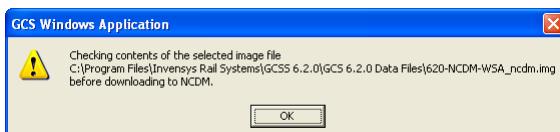


Figure 3.10 Select Image File dialog boxes

ICS reads the selected file and checks the integrity of its contents.



Chapter 3: Starting

Downloading Non-Vital Configuration Data to the NVLM

- e) Click **OK**.

ICS confirms that:

- the CRC is correct;
- the configuration element (NCDM or NVC/DM) is correct.
- the Non-Vital Configuration has the status of “Checked” and “Approved”.



- f) Click **OK** to continue.

The appropriate Download Data dialog box opens.

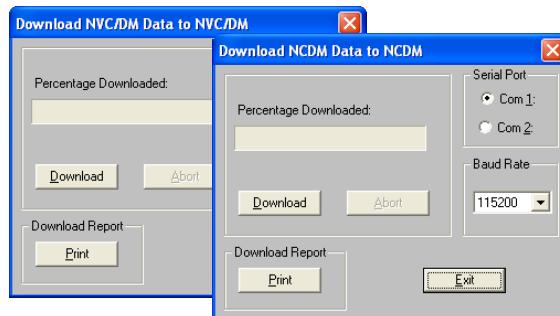


Figure 3.11 Download Data dialog boxes

- g) Select the **Serial Port** that is connected to the NVLM, and the **Baud Rate** (115200 preferred).
- h) Click **Print** to print the Download Report.
You should sign and date this report and keep it as a record of the Non-Vital Configuration that was downloaded to the NVLM.
- i) Click **Download** (figure 3.11).
The data download begins. Progress is monitored as a percentage of the data to be downloaded.
The upload can be stopped by clicking **Abort** (figure 3.11).
- j) If using a Standard Cable (see section 5.1.3.2), switch the NVLM out of Maintenance Mode after the download.

Check and File the Download Report



- View the report to ensure the correct Non-Vital Configuration was downloaded to the NVLM.
- File the report as a record.
See Appendix A for an example (figure A.2) and print options.

3.9 Uploading Non-Vital Configuration Data from the NVLM

Non-Vital Configuration data is uploaded from an NVLM via a cable connection to the NVLM, and is then automatically decompiled into an NVLM installation by the ICS.



- Attach a suitable serial cable between the preferred serial port on the computer and the Production Port on the front of the NVLM (see section 5.1.3.2).
- Ensure that the NVLM is in Maintenance Mode (see section 5.1.4).
- Choose **File > Upload Non-Vital CED** and then select the type of NVLM.

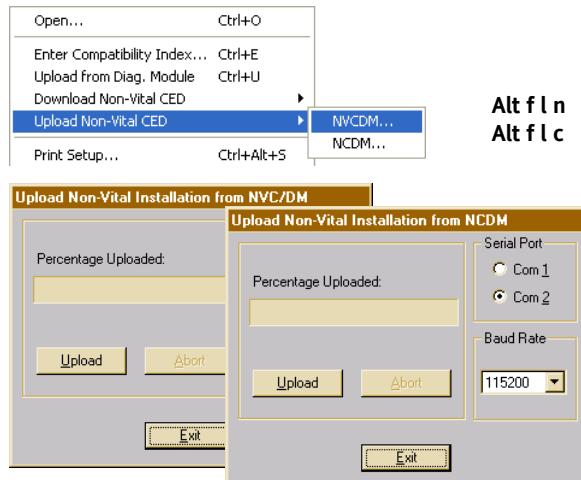


Figure 3.12 Upload Non-Vital Installation dialog boxes

- Select the **Serial Port** that is connected to the NVLM, and the **Baud Rate** (115200 preferred).

- e) Click **Upload** (figure 3.12).
The data upload begins. Progress is monitored as a percentage of the data to be uploaded.
The upload can be stopped by clicking **Abort** (figure 3.12).
- f) If using a standard cable (see section 5.1.3.2), switch the NVLM out of Maintenance Mode after the upload.

Decompilation of Non-Vital Configuration

Decompilation progress, including errors, is displayed in a Report Window while the ICS automatically decompiles the Non-Vital Configuration. See Appendix B for an explanation of possible decompilation errors.

The following information is decompiled from an uploaded Non-Vital Configuration:

- the Comment data
- the System Configuration data
- the VLM Port (if present)
- the names of all the logic states in the installation
- the Ladder Logic

Check and File the Upload and Decompilation Report

This report is automatically generated.



- a) View the report to ensure the Non-Vital Configuration was successfully uploaded and decompiled into an NVLM installation.
- b) File the report as a record of successful decompilation. See Appendix A for an example (figure A.1) and print options.

3.10 Exiting the ICS



Choose **File > Exit**.



Alt f x
Alt+F4

This is the preferred method because it guarantees all files are properly closed before the program terminates.

4. ICS VIEWERS

This chapter introduces the viewers available in ICS for examining the content of VLM and NVLM installations. The viewers are essentially read-only equivalents of the GCSS editors.

See reference [CCSS] for more information.

4.1 Housing Viewer

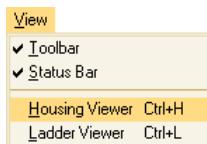
Use the Housing Viewer to view the location and type of modules in a VLM installation.

You can search the Housing Viewer. See section 4.4, “Finding Mnemonics”.

Housing Viewer Activation



- a) Click the VLM Installation window to make it active.
- b) Choose **View > Housing Viewer**.



Alt v h
Ctrl+h

Housing Viewer Reports

Two types of report are available:

- **Housing Report**—a diagram of the WESTRACE housing design showing the position of all modules as intended by the Design Signalling Engineer(s). View or print to check that all modules present are correctly located in the housings.
- **All Modules Report**—a multi-page report covering all modules in an installation; more convenient than opening each module in turn through the Module Viewer.

Closing the Housing Viewer

Closing the Housing Viewer also closes the associated Module Viewer.

4.2 Module Viewer

Use the Module Viewer to view:

- parameters for modules in a VLM installation;
- parameters for the NVLM module in an NVLM installation;
- details of the VLM-NVLM interface file;
- details of a VLM6-VLM6 interface file (if present).

You can search the Module Viewer. See section 4.4, “Finding Mnemonics”.

4.2.1 Activating the Module Viewer

Module Viewer Activation—VLM Installations



- a) Click the VLM installation Housing Viewer window to make it active.
- b) Double-click the required module to open the Module Viewer.

The Module Viewer must be closed before selecting another module from the same installation.

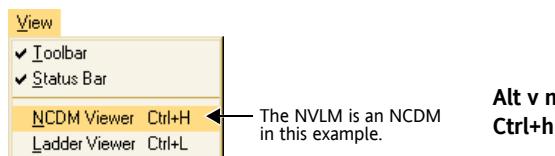
See also section 4.2.2, “Viewing Vital Communication Ports (VLM6 Only)”.

Module Viewer Activation—NVLM Installations

Only one module is viewed for NVLM installations; the NCDM or NVC/DM as the case may be.



- a) Click the NVLM installation window to make it active.
- b) Choose **View > NCDM Viewer or NVC/DM Viewer**.



Module Viewer Report

This printed report contains the information shown in the Module Viewer window. See table A.1 (page 65).

4.2.2 Viewing Vital Communication Ports (VLM6 Only)

For VLM6 modules, the details of vital communication ports can be seen in the Module Viewer.



- Click the VLM Installation window to make it active.
- Choose **View > Housing Viewer**.

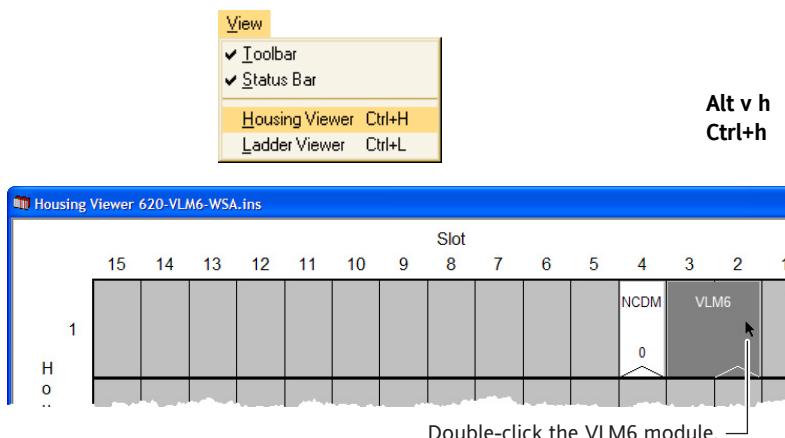


Figure 4.1 Housing Viewer

- In the Housing Viewer, double-click the VLM6 module to open the VLM6 viewer, then click the **Vital Comms Ports** tab.



Figure 4.2 VLM6 Viewer and Vital Comms Ports tab

- d) In the port selector, click a communications port to see its details.

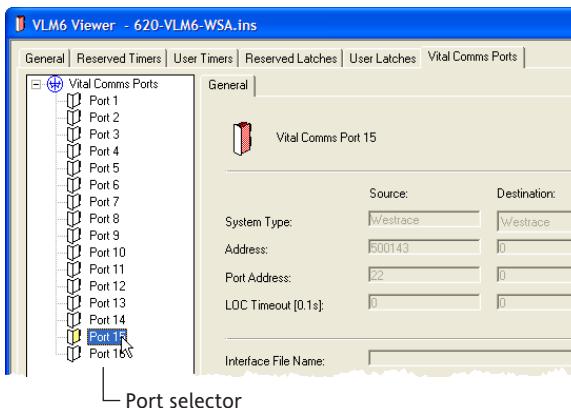


Figure 4.3 Viewing a port's details

The Module Viewer must be closed before double-clicking another module from the same installation.

Note: *During Find operations (section 4.4), ICS does not find matches within vital communications ports.*

4.3 Ladder Logic Viewers

A Ladder Logic Viewer comprises two parts:

- the Ladder Viewer—provides an overview of the entire logic ladder;
- the Rung Viewer—shows the underlying logic of a rung.

All Ladder Logic Viewers operate in the same manner but are differentiated by the colour of the ladder:

- the VLM viewers use black;
- the NVLM viewers use green.

Start the Ladder Logic Viewer after first opening the Ladder Viewer.

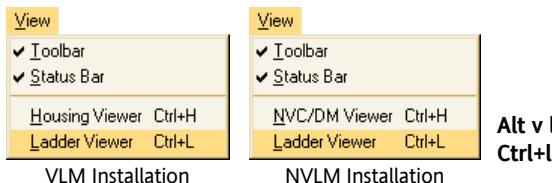
You can search the Ladder Viewer (but not the Rung Viewer). See section 4.4, “Finding Mnemonics”.

4.3.1 Ladder Viewer

4.3.1.1 Ladder Viewer Activation



- Click the Installation window to make it active.
- Choose **View > Ladder Viewer**.



4.3.1.2 Locked (Template) Rungs

Some of an installation's logic rungs may have been created in the GCS Templates Tool [GTT], which is used to create templates (standard logic ladders) for various signalling objects, and then to export each template to either a new or an existing GCSS installation. An installation containing these template rungs can then be opened in GCSS (where the rungs can be modified if required), or opened in ICS.

Template rungs created in GTT 3.0 are initially **locked**. In ICS 7.0.0 and later, these locked rungs are identified:

- in the Ladder Viewer window by the symbol shown in figure 4.4;
- in the Ladder Viewer Report (see page 66) by the letter **L** after the rung index number (**L = Locked**);
- in the Rung Viewer Report (see page 66) by the word **Locked** after the rung index number.

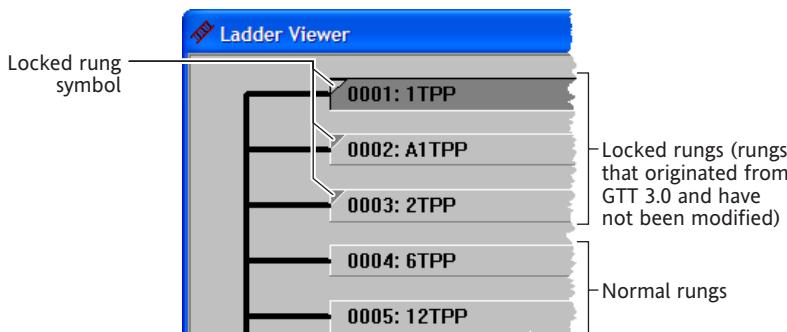


Figure 4.4 Locked and normal rungs in the Ladder Viewer

Only GTT 3.0, GCSS 7.0.0 and later, and ICS 7.0.0 and later support locked rungs.

4.3.1.3 Ladder Viewer Report

This printed report replicates the layout of the Ladder Viewer window.

Each locked rung is identified by the letter **L** after the rung index number.

4.3.1.4 Closing the Ladder Viewer Window

Closing the Ladder Viewer also closes the Rung Viewer.

4.3.2 Rung Viewer

The Rung Viewer displays the underlying logic of all ladder rungs.

4.3.2.1 Rung Viewer Activation



Choose **View > Rung Viewer** with the Ladder Viewer active.



Alternatively, **right-double-click** in the Ladder Viewer.

4.3.2.2 Rung Viewer Report

This report shows a graphical representation of all logic rungs in the logic ladder.

Each locked rung is identified by the word **Locked** after the rung index number.

4.3.2.3 Showing or Hiding Annotations (Notes)

Annotations¹ can be shown or hidden in the ICS Rung Viewer (figure 4.5) and in the Rung Viewer Report (see page 66).

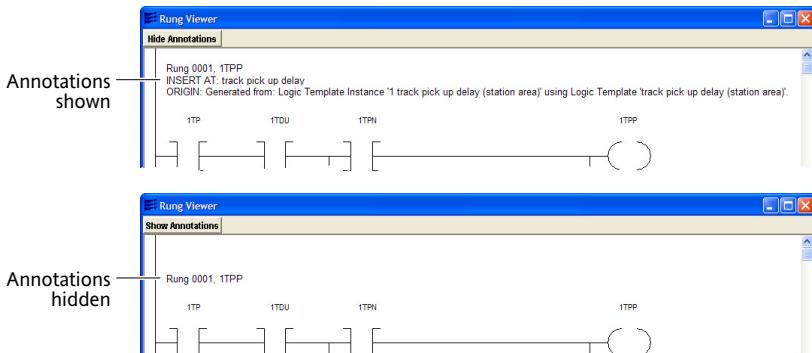


Figure 4.5 Shown and hidden annotations

To show annotations:



Click the **Show Annotations** button in the Rung Viewer.



To hide annotations:



Click the **Hide Annotations** button in the Rung Viewer.



¹ Annotations can be added to each rung using the GCS Templates Tool and the GCSS Rung Editor.

4.4 Finding Mnemonics

The ICS has the ability to find mnemonics when the viewers are active.

All find operations:

- are **case-sensitive**;
- are performed across a single installation only;
- retain the last search string (ie for quick re-use, the previous search string is “remembered” in the Find and the Find and Replace dialog boxes).

Table 4.1 shows the scope of the Find command within the ICS viewers.

Active Viewer	Scope
Housing Viewer	All modules within the installation
Module Viewer	Vital installation (*.ins)—current module NOTE: ICS does not find matches within vital communications ports.
	Non-vital installation (*.nvc and *.ncd)—current module—all ports, timers, latches and data fields
Ladder Viewer	Currently-selected rung or rungs (opens each rung in the Single Rung Viewer or Locked Rung Viewer) NOTE: In the Ladder Viewer, ICS only searches within rungs that are selected (see section 4.4.1).
Rung Viewer	None (Find is not supported)

Table 4.1 Scope of Find operations

Note:

ICS does not find matches within vital communications ports.

To find a mnemonic:



- a) Open the Housing Viewer, Module Viewer or Ladder Viewer.
- b) If searching the Ladder Viewer, select the rung or rungs to be searched (see section 4.4.1).

- c) Choose **Search > Find** to open the Find dialog box (figure 4.6).

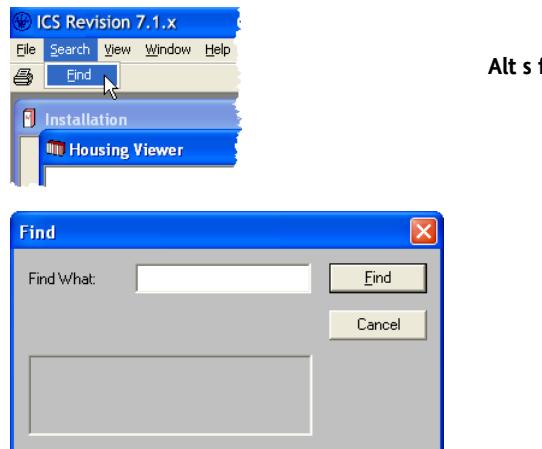


Figure 4.6 Find dialog box

- d) Type the search text in the **Find What** field (case-sensitive).
Use wildcard characters to broaden the search (see section 4.4.2).

- e) Click **Find** (figure 4.6).
ICS searches for the first occurrence of the search text.

If a match is found:

- when searching the Housing Viewer, ICS opens the Module Viewer and highlights the found mnemonic (figure 4.7);
- when searching the Module Viewer, ICS highlights the found mnemonic;
- when searching the Ladder Viewer, ICS opens the appropriate Rung Viewer and highlights the cell containing the found mnemonic (figures 4.7 and 4.8).

Chapter 4: ICS Viewers

Finding Mnemonics

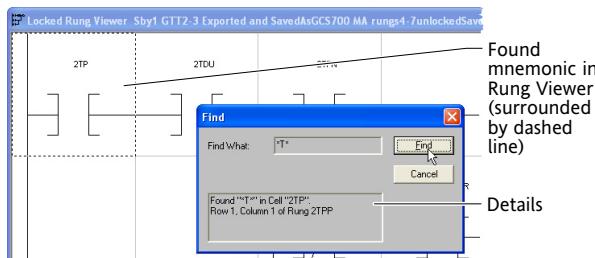
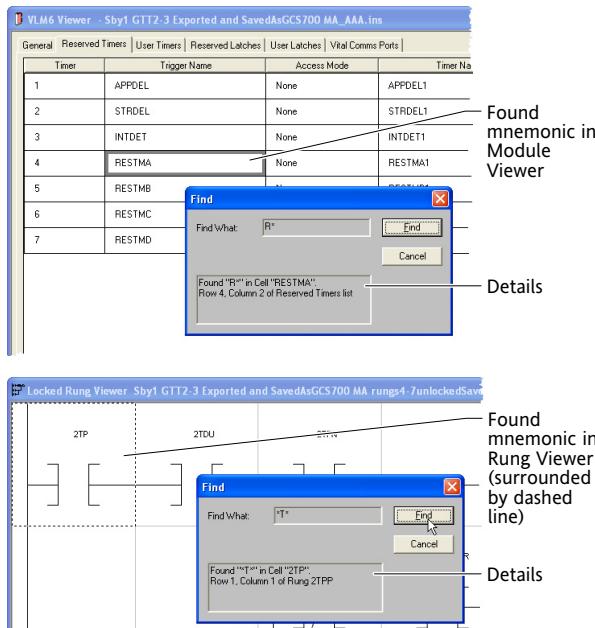


Figure 4.7 Found mnemonics—vital installation example

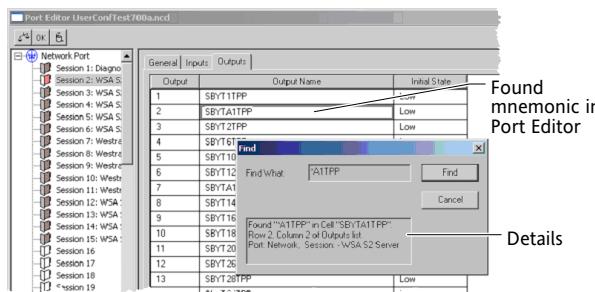


Figure 4.8 Found mnemonics—non-vital installation example

- Click **Find** again (or press **Enter**).
ICS displays the next match.

- g) Repeat until one of the following occurs:
- You locate the mnemonic you want.
Click **Cancel** to close the Find dialog box.
 - ICS finds the last match (shows the total number of matches found—figure 4.9).
Click **OK**. Both dialog boxes close.

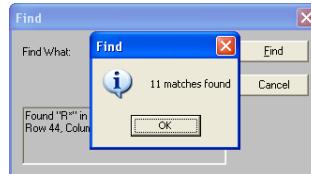


Figure 4.9 “Last match found” dialog box

4.4.1 Selecting Rungs

In the Ladder Viewer, ICS searches within *selected* rungs only.

4.4.1.1 Selecting a Single Rung



To select a single rung, click the rung with the mouse.
(Then you can also use the **Up Arrow** and **Down Arrow** keys to move the selection rectangle.)

4.4.1.2 Selecting Contiguous Rungs



To select a group of rungs, click an initial rung then hold down the **Shift** key and click the last rung of the group. All rungs between and including the first and the last clicked rung are selected.

4.4.2 Wildcard Characters

Find operations only find mnemonics that exactly match the search pattern. For example, if the search pattern is **ab** then occurrences of **abc**, **cab** and **acb** are ignored.

The scope of a search or replacement can be broadened by including the wildcard character * (asterisk) in the search text. The asterisk character represents zero or more characters of any value in the found mnemonic. It can be used at the beginning, end or middle of a search pattern.

Table 4.2 illustrates wildcard matches in a find operation. A tick signifies a match; a cross signifies no match.

Chapter 4: ICS Viewers

Finding Mnemonics

Search Pattern	Mnemonic										
	abc	abc1e	d1abc	ad1bc	ad1be2c	deabcfg	deaf2bc	axybcz	raxbcyt	abcabc	cba
abc	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
abc*	✓	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
*abc	✓	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗
a*bc	✓	✗	✗	✓	✗	✗	✗	✗	✗	✓	✗
a*b*c	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓	✗
abc	✓	✓	✓	✗	✗	✓	✗	✗	✗	✓	✗
*a*bc	✓	✗	✓	✓	✗	✗	✓	✗	✗	✓	✗
a*bc*	✓	✓	✗	✓	✗	✗	✗	✓	✗	✓	✗
*a*bc*	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✗
a*	✓	✓	✗	✓	✓	✗	✗	✓	✗	✓	✗
*a	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
a	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 4.2 Wildcard matches in Find operation—examples

5. ICS INSTALLATION AND SETUP

This chapter describes how to:

- Install the ICS software;
- Connect the computer running the ICS to the WESTRACE equipment.

Note: *ICS must not be installed on the same computer as GCSS.*

5.1 Workstation Requirements

The ICS requires:

- a computer complying with the minimum specifications listed in section 5.1.1;
- a printer—see section 5.1.2;
- a serial cable—see section 5.1.3.

Note: *Having a printer on-site is optional. (Reports can be written to a file for printing back at the office.)*

5.1.1 Computer for ICS

The minimum specifications required of a computer to operate the ICS are:

- 500 MHz Intel Pentium P3 (or compatible) processor
- 256 Mb RAM
- 1 Gb hard disk with a least 100 Mb of free space
- SVGA display (800 x 600 or better)
- Microsoft Windows XP—Service Pack 2
- serial port (9 pin)
- CD drive or access to the Design Tools Authority—Tools Database

The minimum possible Windows configuration should be used with only essential background applications running (eg virus protection and firewall software).

Note: *Do not use a screensaver.*

Note: We recommend that you enable Windows XP Automatic Updates to maximise the security of your computer and minimise operating system intrusions. (The safety of GCS is embodied in the GCSS and ICS software, and is achieved by following the defined application design process. It is not affected by updates to the Windows XP operating system.)

Showing Menu Navigation Underlines

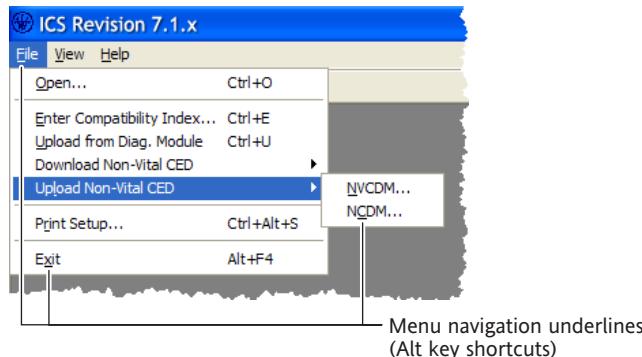


Figure 5.1 Menu underlines

You can choose whether menu navigation keys are:

- always underlined or;
 - underlined only when you press the Alt key.
- a) Choose Start menu > (Settings >) Control Panel > Display (or right-click the Windows desktop and choose Properties from the context menu).
- b) In the Display Properties dialog box (figure 5.2), click the Appearance tab then the Effects button.



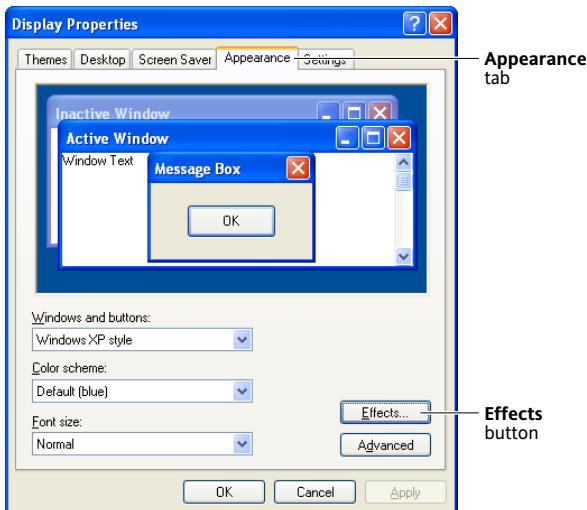


Figure 5.2 Display Properties dialog box

- In the Effects dialog box (figure 5.3), tick or clear the **Hide underlined letters for keyboard navigation until I press the Alt key** checkbox as required.

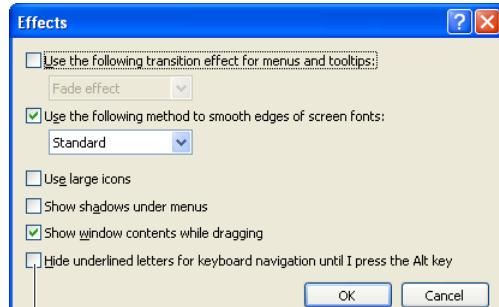


Figure 5.3 Effects dialog box

- Click **OK** to close the Effects dialog box.
- Click **OK** to close the Display Properties dialog box.

5.1.2 Printer

A local printer is required. A portable type is suggested.

5.1.3 Connecting the Computer to WESTRACE

5.1.3.1 Diagnostic Module

5.1.3.1.1 Serial Cable

DM128 Module DB25 Female Pin	Personal Computer DB9 Female Pin
2	2
3	3
7	5

Figure 5.4 Serial cable—DM128 or DM128a module

This cable is connected between the computer running ICS and the diagnostic module's diagnostic port.

5.1.3.1.2 Diagnostic Port

The diagnostic port is located at the rear of the WESTRACE housing.

On some WESTRACE housings, this port is also brought out to the front panel (figure 5.5).

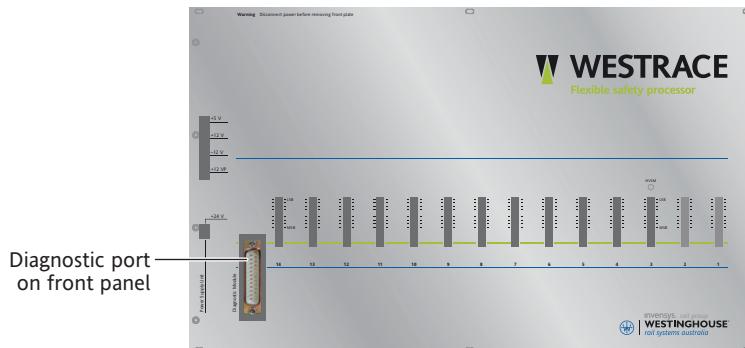


Figure 5.5 Front diagnostic port—DM128 or DM128a module

5.1.3.2 NVLM

5.1.3.2.1 Serial Cables

Two types of serial cable may be used for uploading Non-Vital Configuration data from the NVLM module:

- maintenance cable—automatically switches the NVLM to Maintenance Mode;
- standard cable—use when the NVLM is manually switched to Maintenance Mode.

These cables are connected to the Production Port on the front edge of the NVLM module (figure 5.8).

Maintenance Cable

This is an RS232 cable with female DB9 connectors at both ends. Links at the Production Port connection select options (figure 5.6). The NVLM must be restarted after the cable is connected for the maintenance settings to take affect.

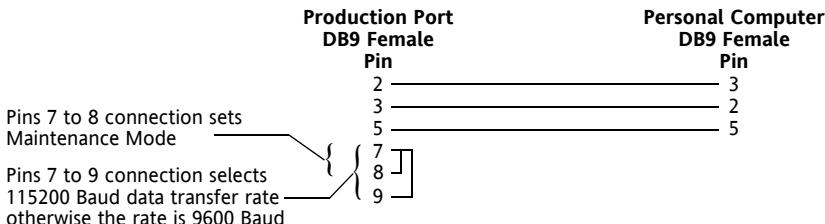


Figure 5.6 Serial cable—NVLM maintenance cable

Standard Cable

This is an RS232 cable with female DB9 connectors at both ends (see figure 5.7). When this cable is used:

- the data transfer rate for the NVLM Production Port must be selected manually;
- the NVLM must be switched manually to Maintenance Mode, and;
- the NVLM must be restarted for the setting to take affect.

See tables 5.1 and 5.2 in section 5.1.4 for Maintenance Mode and the data transfer rate switch settings.

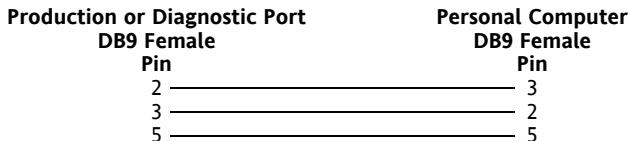


Figure 5.7 Serial cable—NVLM standard cable

5.1.3.2.2 NVLM Production Port

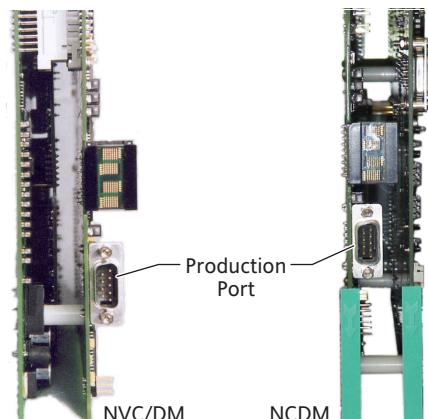


Figure 5.8 Production port—NVLM modules

5.1.4 NVLM Maintenance Mode Switch Settings

5.1.4.1 NCDM

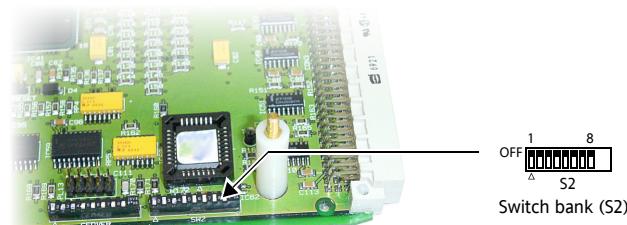


Figure 5.9 Maintenance Mode switches—NCDM

Set the S2 switch bank as follows:

Switch	Setting
1	OFF for Normal Mode ON to select Maintenance Mode
2	OFF for 9600 bits per second ON for 115200 bits per second
3–8	Leave as is, or see reference [APPM]

Table 5.1 Switch bank S2—valid settings—NCDM

The NCDM stays in Maintenance Mode until switch 1 is returned to OFF and the system is rebooted.

THE NCDM Watchdog LED flashes red and the display shows MNT to indicate when the module is in Maintenance Mode.

5.1.4.2 NVC/DM

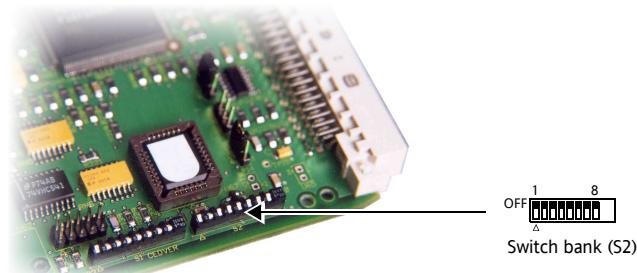


Figure 5.10 Maintenance Mode switches—NVC/DM

Set the S2 switch bank as follows:

Switch	Setting
1	OFF for Normal Mode ON to select Maintenance Mode
2	OFF for 9600 bits per second ON for 115200 bits per second
3–8	Not used; normally left in the OFF position

Table 5.2 Switch bank S2—valid settings—NVC/DM

The NVC/DM stays in Maintenance Mode until switch 1 is returned to OFF and the system is rebooted.

THE NVC/DM Watchdog LED flashes red to indicate when the module is in Maintenance Mode.

5.2 Installing the ICS Software

The ICS is installed directly from an installation file in the Design Tools Authority—Tools Database, or from CD. The installation file in the tools database can be detached and copied to a local hard drive if preferred.

Note:

The person (user account) installing ICS must have Windows XP Administrator privileges.

5.2.1 Installing from the Design Tools Authority—Tools Database



- In Lotus Notes, open the Design Tools Authority—Tools Database, then open the entry for Graphical Configuration System (GCS) version 7.1.x.
- Scroll down to the **Software** section (figure 5.11).
- Double-click the ICS 7.1.x installation file icon, then choose **Launch** or **Detach** as shown below.

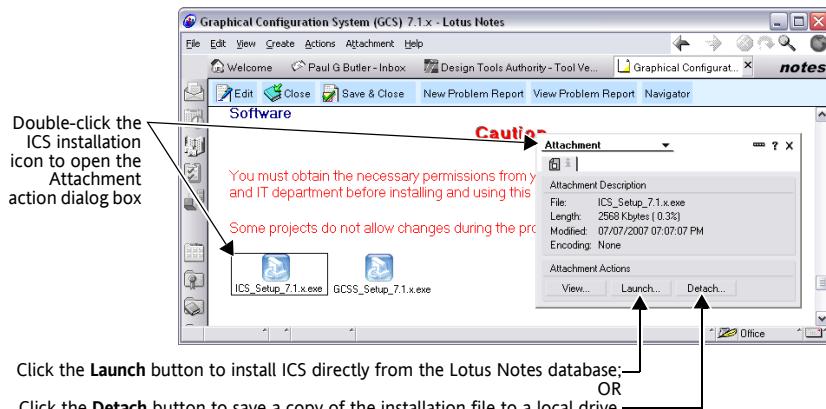


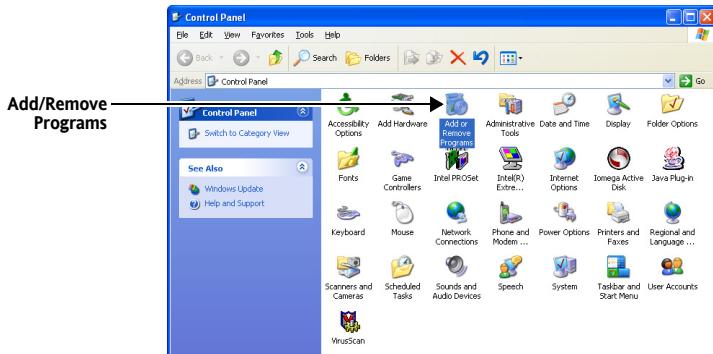
Figure 5.11 GCS entry in Lotus Notes

- Continue as follows:
 - at step h on page 60 when installing directly from Lotus Notes;
 - at step a below when installing from a saved copy of the installation file. You will need to browse for the saved file as shown in figure 5.12 (page 60).

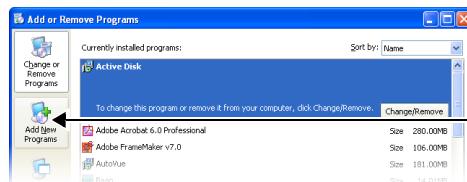
5.2.2 Installing from a CD ROM or a Saved Copy of the Installation File



- Click the Add/Remove Programs icon in the Windows Control Panel.

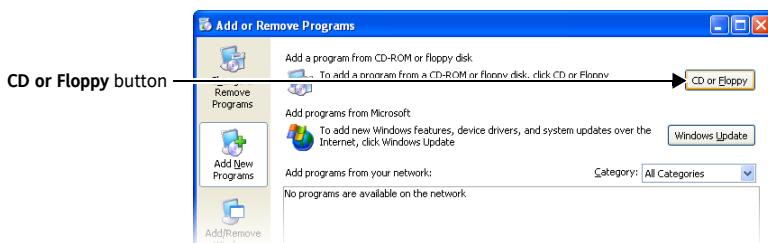


- Click the Add New Programs button.



Add New Programs

- Click the CD or Floppy button to start program installation.



- Insert the installation disk and click Next.

Chapter 5: ICS Installation and Setup

Installing the ICS Software

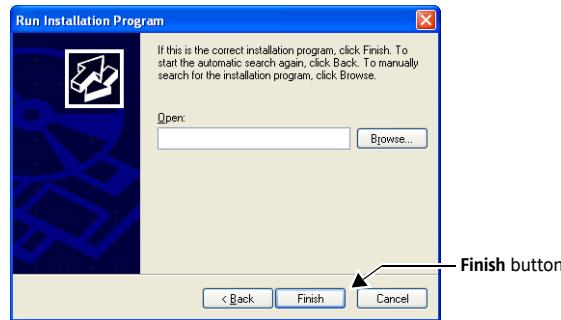


- e) Jump to step h below if Windows finds an installation program and displays the Setup Wizard "Welcome" dialog box (figure 5.13). Otherwise, continue with step f.
- f) Enter the path to the installation program or use the **Browse** button to find the installation program.



Figure 5.12 Locating the ICS installation file

- g) Click **Finish**.

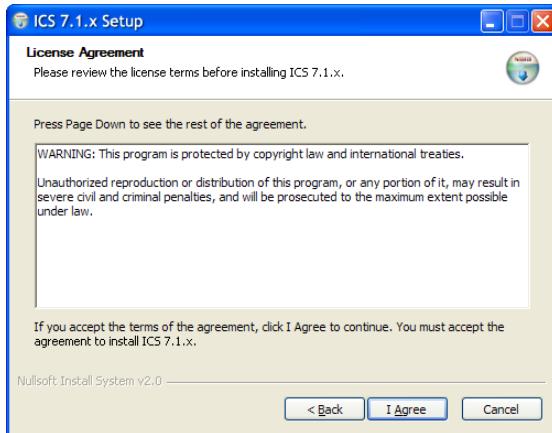


- h) In the Setup Wizard dialog box, confirm continuation of the installation process by clicking **Next**, or terminate the process by clicking **Cancel** if you have another program running. Restart at step a after closing the other program(s).

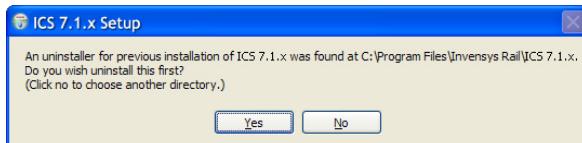


Figure 5.13 Setup Wizard “Welcome” dialog box

- i) In the License Agreement dialog box, review the license terms then click **I Agree** if you accept them.



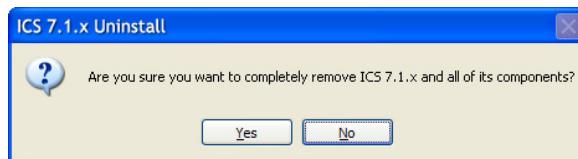
- j) If the following dialog box opens:
 - click **Yes** to overwrite the existing installation of ICS 7.1.x—go to step k, or;
 - click **No** to install the new version in a different location—go to step m.



Chapter 5: ICS Installation and Setup

Installing the ICS Software

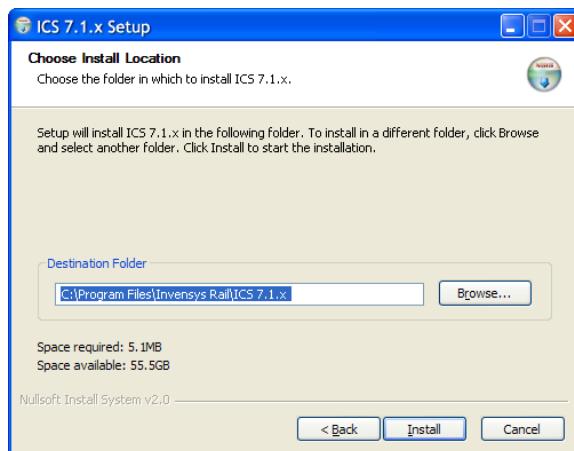
- k) Click **Yes** to confirm that you want to overwrite the existing installation.



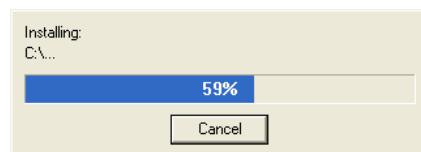
- l) Click **OK** in the “successfully removed” dialog box.



The installation program proposes a location for installing the ICS software.



- m) Accept the proposed location, or change it by clicking **Browse**. Then continue by clicking **Next**.
The installer displays a progress bar.



- n) Click **Finish** to complete the installation.



The installer places a shortcut to ICS 7.1.x on the desktop.

APPENDIX A: REPORTS

This Appendix summarises the ICS reporting tools and directs the reader to where further information is available. Some reports are directed to the default printer and others are displayed on screen, typically in the Report Window.

A.1 The Report Window

This window is automatically activated when required. It remains open until closed by clicking the close box or by closing the installation. The current contents of the window are overwritten if an operation that writes to the Report Window is performed while the window is open.

The contents of the Report Window can be:

- **Print Previewed**—by selecting **Print Preview** from the File menu to display an image of the report as it would appear when printed.
- **Printed**—by sending it to the default printer defined for the network or user PC. See Section A.2.
- **Written to an ASCII text file**—by selecting **Write Contents to File** from the File menu.

This displays a standard file selector dialog box that allows you to select or enter an appropriate file name.

A.2 Printed Report Format

The format of a printed report is usually similar to the on-screen version and each page usually has a header and footer containing relevant information.

Printing Reports



Use one of the following options to print a report:

- Select **Print** from the File menu;
- Click on the printer icon in the main toolbar;
- Use the accelerator key **Ctrl+p**;
- Select the **Print** button from the print preview display;
- Right-click on the appropriate window and select **Print** from the Context menu.

All options display the standard Microsoft Windows print dialog which allows selection of pages to be printed and if need be, changes to the printer settings.

A.3 Summary of ICS Reports

Name	Description	Format	See...
Installation Report	A single page containing header information and details of Installation Address Jumper Settings and Data Version Switches.	Printed or previewed	page 3-27
Installation Check Report	Must be generated, printed and filed when an uploaded installation compares successfully (ie no differences) with the original installation source file.	Printed	page 3-34
Upload and Decompilation Report	Provides a printed record of a successful upload and decompilation. This report can be very long so it may be preferable to view this report and print the Data Comparison Report.	Printed	page 3-31 page 3-38
Non-Vital Configuration Download Report	Provides a printed record of a successful Non-Vital Configuration download.	Printed	page 3-36
Data Comparison Report	Compares two installations for differences in their respective data fields (only the information that can be reproduced from the upload is compared). The main use of the report is to compare an uploaded installation with the original approved source used to program the VLM PROMs or create the Non-Vital Configuration in the NCDM or NVC/DM module.	Printed or previewed	page 3-33
Housing Configuration Report	A single-page printout containing an illustration of the housings and modules plus the standard header and footer information. It is printed from the Housing Viewer window.	Printed or previewed	page 4-39
Module Report	Presents the information displayed by the Module Viewer. Two formats are available: <ul style="list-style-type: none">• Full—contains all fields on the module regardless of whether they contain information or not;• Brief—only contains the data entered by the user. Printed from the Module Viewer window.	Printed or previewed	page 4-40

Table A.1 ICS reports—summary (1 of 2)

Appendix A: Reports

Summary of ICS Reports

Name	Description	Format	See...
All Modules Report	Prints details of all modules in a housing automatically. Saves having to activate the Module Viewer for each module. Can select between a Full or Brief report. Printed from the Housing Viewer window.	Printed or previewed	[CCSS]
Ladder Viewer Report	A textual list of all the rungs in the ladder showing the rung order, rung names, and their consistency. Printed from the Ladder Viewer window. Section 4.3.1.2 explains the letter L that appears after the rung index number for some rungs.	Printed or previewed	page 4-44
Rung Viewer Report	The Rung Viewer Report consists of a title page followed by a graphical representation of all rungs in the ladder. Printed from the Rung Viewer window. Section 4.3.1.2 explains the word Locked that appears after the rung index number for some rungs. Show or hide rung annotations as described in section 4.3.2.3.	Printed or previewed	page 4-44
Mnemonic Usage Report	Lists all the names in an installation and where they are defined and used in alphabetical order. A search pattern can be entered for the report so that only names corresponding to the pattern are listed. This can be used to effectively search for a single name or group of names.	Report Window	[CCSS]
PROM Usage Report	Accessible when a VLM installation is selected. Provides details of the PROM space used by the VLM installation.	Report Window	[CCSS]
Non-vital CED Usage Report	Accessible when an NVLM installation is selected. Provides details of the Non-Vital Configuration space used by the NVLM installation.	Report Window	[CCSS]

Table A.1 ICS reports—summary (2 of 2)

```
START DECOMPILATION...
12/02/02 10:16:36

Verifying prom checksums...
.. Checksums OK
Decompiling Comment Data...
.. Comment Data OK
Decompiling Mnemonics...
...Mnemonics Deccompilation : OK!
Decompiling System Configuration data...
.. System Configuration data OK
Decompiling Initialisation data...
.. Initialisation data OK
Decompiling Timers...
.. Timers OK
-----
```

VLM Installation

```
... vp12
.. vp13
.. vp14
.. vp15
.. vp16
.. vrom1
.. Ladder Logic OK
Checking for User Latches...
.. User Latches OK
Checking for NVC/DM or NCDM...
NVC/DM or NCDM Ok...
Installation Decompiled successfully.

END DECOMPILATION
12/02/02 10:16:37
```

```
START DECOMPILATION...
12/02/02 10:27:32

Checking CRC ...
...CRC Checking : OK!
Decompiling Pointer Data...
.. Pointer decompilation : OK!
Decompiling Comment Data...
...Comment Data Deccompilation : OK!
Decompiling System Configuration Data...
...Configuration Data Deccompilation: OK!
Decompiling Mnemonics...
...Mnemonics Deccompilation : OK!
Decompiling Application Logic Data...
...Application Logic Data Deccompilation : OK!
Installation Decompiled successfully.
```

NVLM Installation

```
END DECOMPILATION
12/02/02 10:27:32
```

Figure A.1 Upload and Decompile Reports

Appendix A: Reports

Summary of ICS Reports

ICS Revision 7.1.x	
Installation Name	620-NCDM-WSA
Installation Address	1
Customer	V&V
Approver	APPROVER, Mar 18 2007 15:52:00
Source File Checksum	Not applicable

RECORD OF NCDM DOWNLOAD FROM IMG FILE

CED CRC 0FA51C30

Details of Person Performing Download

Name : Signature :

Position : Date :

Filename: 620-NCDM-WSA_ncdm.img
Version 01.0000 Status: Approved 13:11:48, Tue, Mar 23, 2007 Page 1 of 1

Figure A.2 Non-Vital Configuration Download Report

Comparing information which is sent to PROM for installation
VLM6NCDM_16vitalports.ins
with that for installation untitled : 1 ...

Filename:	VLM6NCDM_16vitalports.ins	untitled : 1
Installation Name:	VLM6NCDM_16vitalport	
VLM6NCDM_16vitalport		
Installation Address:	1	1
Approval Details:	Apr 10 2002 10:01:55	Not Approved
Checksums:	0x077478B8	NEW

At 10:20:58, on 12/02/02.

Comparing Housing No. 1 ...

Comparing VLM6 Modules in slot position ?.

VLM Installation

Comparing Housing No. 2 ...

Comparing Housing No. 3 ...

Comparing Housing No. 4 ...

Comparing Configuration Information ...

Comparing Header ...

Comparing Ladder ...

Building Ladder Comparison Tables ...

Comparing Rungs ...

VLM6NCDM_16vitalports.ins Installation Checksum
untitled : 1 Installation Checksum

= 92C9C1ED
= 92C9C1ED

Installation Comparison complete: No Differences Found.

Comparing information sent to NonVital CED for installation VLM6NCDM_16vitalports.ncd
with that for installation untitled : 1 ...

Filename:	VLM6NCDM_16vitalports.ncd	untitled : 1
Installation Name:	VLM6NCDM_16vitalport	VLM6NCDM_16vitalport
Installation Address:	1	1
Approval Details:	Apr 08 2002 09:34:53	Not Approved
Checksums:	0x12C925FD	0x00000000

At 10:29:15, on 12/02/02.

Comparing Header ...

Comparing Ladder ...

Building Ladder Comparison Tables ...

Comparing Rungs ...

Comparing NVCDM module ...

Comparing Ports...

Comparing VLM Port on port 2...

>> Port Number Changed from 2 to 1

>> LOC Timeout changed from 2 to 1

Comparing list of Inputs.

Comparing list of Outputs.

NVLM Installation

VLM6NCDM_16vitalports.ncd Installation Checksum
untitled : 1 Installation Checksum

= E68C32AB
= E68C32AB

Installation Comparison complete: No Differences Found.

Figure A.3 Configuration Comparison Reports

Appendix A: Reports

Summary of ICS Reports

INSTALLATION CHECK FORM	
The automatic GCSS checks have all passed	
Installation Compiled by GCSS version:	7.1
Recalculated Installation checksum:	92C9C1ED
Approved Form Installation Checksum:
CAUTION	: This form should only be signed if the recalculated : installation checksum is identical to the Approval : form installation checksum
VLM Installation	
Date and time	: 12/03/07 10:23:51
Name	:
Position	:
Signature	:
NCDM INSTALLATION CHECK FORM	
The automatic GCSS checks have all passed	
Installation Compiled by GCSS version:	7.1
Recalculated Installation checksum:	E68C32AB
Approved Form Installation Checksum:
CAUTION	: This form should only be signed if the recalculated : NCDM Data checksum is identical to the Approval : form NCDM Data checksum
NVLM Installation	
Date and time	: 12/03/07 10:23:51
Name	:
Position	:
Signature	:

Figure A.4 Installation Check Reports

APPENDIX B: DECOMPILER ERROR MESSAGES

This appendix describes the errors for the 128 kb EPROM that may appear in the Report Window during decompilation.

The list below summarises the types of errors and where they are described:

Table B.1, page 72 Decompilation—Checksum Errors

Table B.2, page 72 Decompilation—Mnemonic Errors

Table B.3, page 72 Decompilation—Comment Errors

Table B.4, page 72 Decompilation—Configuration Data Errors

Table B.5, page 73 Decompilation—Initialisation Data Errors

Table B.6, page 73 Decompilation—Timer Data Errors

Table B.7, page 73 Decompilation—Module I/O Mapping Data Errors

Table B.8, page 75 Decompilation—Rung Errors

Table B.9, page 76 Decompilation—GPOM Errors

Table B.10, page 77 Decompilation—Other Module Errors

Appendix B: Decompiler Error Messages

Table B.1 Decompilation—Checksum Errors

Error	Definition
1	Error in comment data checksum
2	Error in true data checksum
3	Error in mnemonic data checksum
4	Error in complement data checksum
5	Error in bytewise checksum
6	Not used

Table B.2 Decompilation—Mnemonic Errors

Error	Definition
7	Unexpected NULL character in mnemonic
8	Unexpected NULL character in padding of mnemonic
9	Unexpected character in padding of mnemonic
10	Unexpected padding character in mnemonic NULL area
11	Unexpected character in mnemonic NULL area
12	Mnemonic not contiguous

Table B.3 Decompilation—Comment Errors (1 of 2)

Error	Definition
13	Comment different in high byte EPROM and low byte EPROM
14	Unexpected title in comment data
15	Comment text improperly terminated
16	Comment text data field empty
17	Comment data colon missing
18	Installation name empty or too big
19	Invalid configuration element type
20	Installation address out of range in comment data
21	Version out of range in comment data
22	Customer name undefined or too long
23	Designer name undefined or too long
24	Checker name undefined or too long

Table B.3 Decompilation—Comment Errors (2 of 2)

Error	Definition
25	Approver name undefined or too long
26	Invalid approval date or time
27	Initialisation time out of range
28	High byte text inconsistent
29	Low byte text inconsistent
30	Incompatible CSS version
31	Incomprehensible comment
32	Unexpected comment title
33	Non null characters in empty comment data

Table B.4 Decompilation—Configuration Data Errors

Error	Definition
34	True and complement installation addresses are different
35	True installation address parity error
36	The Non-Vital Configuration version numbers in the true and complement data are different.
37	The true Non-Vital Configuration version number is out of range
38	The true and complement compatibility indices are different
39	True compatibility index parity error
40	True system configuration logical state undefined (neither hot stand-by or stand-alone)
41	Complement system configuration logical state undefined
42	True and complement system configurations (hot stand-by or stand-alone) are different
43	True flash sync signal logical state undefined
44	Complement flash sync signal logical state undefined
45	True and complement flash sync signals are different
46	Configuration data filler byte error

Table B.5 Decompilation—Initialisation Data Errors

Error	Definition
47	True and complement number of reserved mnemonics are different
48	Initialisation data filler byte missing
49	True initial state of logic state is undefined
50	Complement initial state of logic state is undefined
51	True and complement initial states of logic states are different
52	Unused logic state has non zero initial state
53	Installation address in true data differs from that in complement data
54	Data version in true data differs from that in the complement data
55	EPROM compatibility index incompatible with ICS
56	Unexpected reserved latch initial state

Table B.6 Decompilation—Timer Data Errors (1 of 2)

Error	Definition
57	True and complement number of timers used are different
58	Number of timers used is invalid
59	Filler byte after number of timers used is invalid
60	True and complement number of reserved timers are different
61	Invalid number of reserved timers used
62	Filler byte after number of reserved timers used invalid
63	True and complement timer durations are different
64	True timer duration is out of range
65	True and complement timer durations are different for unused timer
66	Invalid unused timer duration
67	Invalid timer trigger or timer output initial state

Table B.6 Decompilation—Timer Data Errors (2 of 2)

Error	Definition
68	Unexpected reserved timer trigger name
69	Unexpected reserved timer output name
70	Unexpected reserved latch name

Table B.7 Decompilation—Module I/O Mapping Data Errors (1 of 5)

Error	Definition
71	True and complement number of logic states used are different
72	True number of logic states used is out of range
73	Number of logic states differs from number of mnemonics
74	True and complement primary NVC number are different
75	True Primary NVC number out of range
76	True and complement secondary NVC number are different
77	True secondary NVC number out of range
78	Secondary NVC defined without primary
79	Secondary NVC before primary NVC
80	Primary NVC defined without secondary
81	True and complement number of modules different
82	True number of modules out of range
83	True and complement backplane addresses are different
84	Invalid backplane address
85	True and complement module numbers are different
86	True and complement module types are different
87	Unknown module type
88	True and complement slave kinds are different
89	True and complement input message lengths are different

Appendix B: Decompiler Error Messages

Table B.7 Decompilation—Module I/O Mapping Data Errors (2 of 5)

Error	Definition
90	True and complement output message lengths are different
91	True and complement local port addresses are different
92	True and complement adjacent port addresses are different
93	True and complement number of inputs used are different
94	True and complement number of outputs used are different
95	Number of inputs and outputs are both zero
96	True and complement number of initialisation bytes are different
97	True and complement init. data are different
98	True and complement input byte numbers are different
99	True and complement input bit numbers are different
100	True and complement input logic state numbers are different
101	True and complement output byte numbers are different
102	True and complement output bit numbers are different
103	True and complement output logic state numbers are different
104	Module not found in module type table
105	Input message not found in input message table
106	Invalid number of bytes in input message
107	Invalid number of bits in input message
108	Invalid number of bytes in output message
109	Invalid number of bits in output message
110	Error in filler data after module inputs
111	Error in filler data after module outputs
112	Unused

Table B.7 Decompilation—Module I/O Mapping Data Errors (3 of 5)

Error	Definition
113	Fixed module data filler error
114	Error in filler data after fixed module data
115	Error in filler data after module init. data
116	Error in module linked list
117	Module linked list is improperly terminated
118	Invalid filler bytes after module header data
119	Unsupported VPIM module
120	Unsupported VLOM module
121	Unsupported VRDM module
122	Unsupported VTI module
123	Unsupported VTC module
124	Unsupported NVC module
125	Unsupported TPM module
126	Unsupported DM module
127	Unsupported WCM module
128	Invalid module type
129	Invalid byte and bit address for VPIM
130	Undefined or inappropriate input type for VPIM
131	Fixed module data invalid for VPIM
132	Invalid byte and bit address for VLOMFT input
133	Undefined or inappropriate input type for VLOMFT
134	Invalid byte and bit address for VLOMFT output
135	Undefined or inappropriate output type for VLOMFT
136	Fixed module data invalid for VLOMFT
137	Invalid byte and bit address for VRDM input
138	Undefined or inappropriate input type for VRDM
139	Invalid byte and bit address for VRDM output
140	Undefined or inappropriate output type for VRDM

Table B.7 Decompilation—Module I/O Mapping Data Errors (4 of 5)

Error	Definition
141	Fixed module data invalid for VROM
142	Invalid byte and bit address for VROM input
143	Undefined or inappropriate input type for VTC
144	Invalid byte and bit address for VTC output
145	Undefined or inappropriate output type for VTC
146	Fixed module data invalid for VTC
147	Invalid byte and bit address for EVTC input
148	Undefined or inappropriate input type for EVTC
149	Invalid byte and bit address for EVTC output
150	Undefined or inappropriate output type for EVTC
151	Fixed module data invalid for NVC
152	Invalid byte and bit address for NVC input
153	Invalid byte and bit address for NVC output
154	Fixed module data invalid for NVC
155	Fixed module data invalid for DM
156	Invalid byte and bit address for GPOM
157	Undefined or inappropriate input type for GPOM
158	Invalid byte and bit address for GPOM output
159	Undefined or inappropriate output type for GPOM
160	Fixed module data invalid for GPOM
161	Invalid byte and bit address for GPOMSU
162	Undefined or inappropriate input type for GPOMSU
163	Invalid byte and bit address for GPOMSU output
164	Undefined or inappropriate output type for GPOMSU
165	Fixed module data invalid for GPOMSU

Table B.7 Decompilation—Module I/O Mapping Data Errors (5 of 5)

Error	Definition
166	Rung decompiler error
167	Unexpected token in application logic
168	True and complement unused adjacent installation addresses are different

Table B.8 Decompilation—Rung Errors

Error	Definition
169	Cannot insert a row into the rung grid
170	Cannot insert a column into the rung grid
171	Failed to create the end rung
172	Failed to create rung
173	Invalid end rung operator
174	Invalid root operator
175	Invalid operator
176	Invalid left right
177	Invalid contact assignment
178	Compress failed
179	Invalid link add
180	Invalid link remove
181	Invalid link test
182	Invalid constant symbol
183	No down connection
184	No corresponding top left corner
185	Invalid start for top left corner
186	Invalid cell for top left corner

Appendix B: Decompiler Error Messages

Table B.9 Decompilation—GPOM Errors (1 of 2)

Error	Definition
187	Illegal GPOM type
188	Initialisation data incorrect parity in GPOM status byte
189	Unused initialisation bits not zero
190	Minimum FONZ current parity error
191	Maximum FONZ current parity error
192	Minimum dim energised current parity error
193	Maximum dim energised current parity error
194	Minimum normal energised current parity error
195	Maximum normal energised current parity error
196	Minimum FONZ current greater than maximum FONZ current
197	Minimum dim current greater than maximum dim current
198	Minimum normal current greater than maximum normal current
199	Maximum FONZ current greater than minimum normal current
200	Maximum FONZ current greater than minimum dimmed current
201	Minimum flash proving period out of range
202	Maximum flash proving period out of range
203	Minimum flash proving byte parity error
204	Maximum flash proving byte parity error
205	Minimum flash percent on out of range
206	Unused
207	Minimum flash percent on byte parity error
208	Maximum flash percent on out of range
209	Unused
210	Maximum flash percent on byte parity error

Table B.9 Decompilation—GPOM Errors (2 of 2)

Error	Definition
211	Dimming power level percent on out of range
212	Unused
213	Dimming power level percent byte parity error
214	Flash off percent on out of range
215	Flash off percent on byte parity error
216	GPOMSU unused initialisation bits not zero
217	GPOMSU initialisation data incorrect parity in control byte
218	GPOMSU non zero minimum FONZ byte
219	GPOMSU non zero maximum FONZ byte
220	GPOMSU non zero minimum dim energised current byte
221	GPOMSU non zero maximum dim energised current byte
222	Parity error in GPOMSU initialisation bytes 28 through 33

Table B.10 Decompilation—Other Module Errors (1 of 3)

Error	Definition
223	Comment configuration element type wrong size
224	High and low comment headers different
225	Undefined or inappropriate input type for NVC
226	Undefined or inappropriate output type for NVC
227	Invalid byte and bit address for VLOMFS input
228	Undefined or inappropriate input type for VLOMFS
229	Invalid byte and bit address for VLOMFS output
230	Undefined or inappropriate output type for VLOMFS
231	Fixed module data invalid for VLOMFS
232	Invalid byte and bit address for TCOM input
233	Undefined or inappropriate input type for TCOM
234	Invalid byte and bit address for TCOM output
235	Undefined or inappropriate output type for TCOM
236	Fixed module data invalid for TCOM
237	Invalid byte and bit address for WCM
238	Fixed module data invalid for WCM
239	Invalid byte and bit address for CCM input
240	Undefined or inappropriate input type for CCM
241	Invalid byte and bit address for CCM output
242	Undefined or inappropriate output type for CCM
243	Fixed module data invalid for CCM
244	Configuration message data invalid for CCM
245	Link information invalid for CCM

Table B.10 Decompilation—Other Module Errors (2 of 3)

Error	Definition
246	Undefined or inappropriate input type for VLOMSS
247	Invalid byte and bit address for VLOMSS output
248	Undefined or inappropriate output type for VLOMSS
249	Fixed module data invalid for VLOMSS
250	Undefined or inappropriate input type for VLOMST
251	Invalid byte and bit address for VLOMST output
252	Undefined or inappropriate output type for VLOMST
253	Fixed module data invalid for VLOMST
254	Invalid byte and bit address for VLOMST input
255	Undefined or inappropriate input type for CNVC
256	Invalid byte and bit address for CNVC output
257	Undefined or inappropriate output type for CNVC
258	Invalid byte and bit address for CNVC input
259	Fixed module data invalid for CNVC
260	Data rate invalid for CNVC
261	Invalid byte and bit address for VLOMSS input
262	Invalid NVC pairing
263	Invalid TRUE Non-Vital Configuration layout information
264	Invalid COMP Non-Vital Configuration layout information
265	Invalid NVC/DM housing data
266	Invalid NVC/DM position data
267	Invalid NVC/DM right slot data
268	Invalid NVC/DM left slot data
269	Invalid NVC/DM interface present flag
270	Invalid comment VLM interface version

Appendix B: Decompiler Error Messages

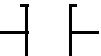
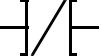
Table B.10 Decompilation—Other Module Errors (3 of 3)

Error	Definition
271	CRM mismatch error
272	OFF set out of range
273	Config element type error
274	Invalid comment Non-Vital Configuration format version
275	VLM Interface version in CONFIG data differs from comment data
276	Non-Vital Configuration format version in CONFIG data differs from comment data
277	True and complement No of DPRAM modules different
278	True of DPRAM modules out of range
279	True and complement first DPRAM module address different
280	True first DPRAM module address out of range
281	Decompile fixed DPRAM module data Filler error
282	True and complement DPRAM module type are different
283	True and complement LOC Timeouts are different
284	Unrecognised DPRAM module type
285	DPRAM module number out of range
286	Network port already exists
287	Network port destination system type different
288	Network port destination system address different
289	Network port source system type different
290	Network port source system address different
291	Network port product data version different
292	Network port compatibility data index different
293	True and complement rung data different
294	There has been an error in the error reporting system

GLOSSARY

Application Data	The logic, information and data component of a complete WESTRACE Application. The other component is the WESTRACE hardware.
Application Logic	Logic that defines how the inputs and outputs for a particular WESTRACE Application are related. See also <i>Ladder Logic</i> .
CED	Configuration Element Data—was synonymous with Application Data in the early days of WESTRACE. The <i>ICS</i> uses the term when referring to the Non-Vital Configuration.
Compilation	The process of creating the installation data from the source file information.
EVTC	See <i>VTC</i> .
GCS	Graphical Configuration System—comprises the <i>ICS</i> and the <i>GCSS</i> .
GCSS	Graphical Configuration Sub-System—a computer software package used by Railway Signal Engineers to design Railway Signal Interlockings using WESTRACE Vital Logic Equipment.
Housings	The physical unit used to hold the WESTRACE modules in an Installation.
HVLM	Hot-Standby Vital Logic Module—an improved hot-standby version of the original VLM.
I/O	Input or Output
ICS	Installation Check System—a software program used to check WESTRACE configuration data in an installed WESTRACE system.
Initialisation (System)	This is a time prior to normal operation when the WESTRACE Application determines the current state of the external inputs.
Installation	Denotes a part of a full WESTRACE application dataset. Often preceded by VLM or NVLM. A complete WESTRACE Application Dataset can comprise: <ul style="list-style-type: none">• a VLM installation alone;• a VLM installation, an NVLM installation, and one or more interface files.

Glossary

Ladder Logic	The system by which Application Logic is expressed. The ladder logic symbols used by the ICS are:  Relay Coil  [] Normally-open contact with relay coil in the de-energised state. A “front” contact in relay terminology.  [] / [] Normally-closed contact with relay closed in the de-energised state. A “back” contact in relay terminology. The ICS provides alternative representations of these contacts. To change to the alternative representations, choose the appropriate option from the View menu or use the accelerator keys Ctrl+W and Ctrl+J .  for   for 
Latches	Internal logic states within the Application Logic. They do not have a physical input or output.
Mnemonic	An abbreviated name that consists of numbers and letters to represent a particular logic state or function.
NCDM	Network Communication and Diagnostic Module
Non-Vital Configuration	The compiled data that is downloaded to the non-vital logic module.
NVC	Non-Vital Communication Modules—a serial data module used for communicating serially between a WESTRACE Application and a non-vital control system.
NVC/DM	Non-vital Communications and Diagnostic Module
NVLM	An acronym representing non-vital logic modules such as the <i>NCDM</i> or <i>NVC/DM</i> .
Output	The output of the WESTRACE such as a relay or lamp output.
PROM	Programmable Read-Only Memory
RAM	Random Access Memory

Rung	An element of logic in <i>Ladder Logic</i> , expressed as a set of Boolean logic equations.
Slot	A space in a housing where WESTRACE modules are inserted.
Source Files	A collection of files containing the data used by the GCSS.
Timer	A device or circuit that provides time signals at regular, specified intervals for purposes of controlling a sequence of events or synchronising events in separate operations.
Vital	Describes a process that can cause or lead to an accident should it fail.
Vital PROM Data	The compiled data that is downloaded to PROMs for insertion in the vital logic module.
VLM	An acronym representing vital logic modules such as the original VLM module plus later modules such as the HVLM128, HVLM128a, VLM5 and VLM6.
VLM-NVLM Interface File	Contains information passed between a VLM installation and an NVLM installation.
VLM6-VLM6 Interface File	Contains information passed between two VLM6 installations.
VLOM	Vital Lamp Output Module—for switching an external lamp supply to signal lamps under control of the VLM logic.
VPIM	Vital Parallel Input Module—used for inputting vital parallel inputs into a WESTRACE Application.
VROM	Vital Relay Output Module—for switching an external signalling supply to drive signalling relays under control of the configuration logic.
VTC	Vital Telemetry Continuous Module—provides an interface to other WESTRACE systems over dedicated serial communications channels.
WESTRACE Application	Comprises WESTRACE modules (hardware) installed in one to four housings plus application data to control the WESTRACE modules.
WESTECT ATP	WESTECT Automatic Train Protection—a WRSA proprietary system used to automatically protect a train.
WCM	WESTECT Communication Module—a WESTRACE module used to transmit serial data to a train. Part of the WESTECT ATP system.
WRSA	Westinghouse Rail Systems Australia

Glossary

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