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SSI Applications Manual

SSI Graphical Replay Users Guide

Endorsement, Authorisation and Issue Record

For endorsement, authorisation and issue record for this document, please refer to the SSI Applications Manual Contents, NR/L2/SIG/17002

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1 Introduction

SSI Graphical Replay (SSI GR) is an application that reads SSI Technician's Terminal (TT) log files and displays them in a visual style on a trackside mimic diagram. This application can be used for investigation of signalling failures and other incidents, and for showing the time relationship of recorded events surrounding them.

SSI GR is intended to operate on a wide range of readily available PC hardware, including 'spare' SSI Technician's Terminal Logger Recorder (TTLR) hardware and standard office PCs with the Microsoft Windows XP™ operating system. Versions of the SSI GR previous to V2.1 have been run extensively on the Windows NT™ operating system. Since Windows NT is no longer supported, SSI GR V2.1 has not been tested on that operating system but it is expected to work on Windows NT.

NOTE SSI GR does not operate at the same time as the TTLR software due to different operating systems required. The SSI GR should not, under any circumstances, be activated on an 'active, in use' TTLR machine. Re-starting an active TTLR machine will both suspend logging and prevent control of the TT using the monitor feature of the TTLR.

When installed on TTLR hardware, SSI GR can read data recorded on TTLR Magneto-optical (MO) disk media, 3.5 inch floppy disk or on the hard disk. SSI GR is capable of reading and displaying TT data recorded with 1 minute time markers (TT software SSI4301-D4 or earlier) and 5 second time markers (TT software SSI4301-D5 onwards).

If necessary, data can be transferred from either TTLR MO disk or Penny and Giles (P&G) logger tape to appropriate file structures and media, for transfer to an office PC not equipped to read MO disk or P&G tapes. The TTLR is provided with a facility for copying P&G tape to MO disk, enabling tape records to be replayed. PC facilities such as Windows Explorer (SSI GR) and DOS copy and xcopy (TTLR) can be used to copy files to other media. SSI GR can also be configured to access current data being logged by an active TT on a TTLR or P&G logger by use of a suitable 'T' adapter. This configuration is known as 'live display'.

A TTLR machine can be used for live display with SSI GR or to download log files for use with the old DOS SSI Tape Analysis program with the DOS logger program. You should note that when you want to use the logger to download files, the connection with the TT should be disconnected from both COM1 and COM2 ports.

The main output interface of SSI GR is a graphical representation of an area of railway based on the 'Lynwood' VDU pictures prepared for design office data testing and on-site simulation. With the facilities provided, a user can select the scheme and log data to be used for the replay. A text report, equivalent to that provided by the SSI TT Tape Analysis program is also produced and can be reviewed on screen or printed by the user.

NOTE It is assumed that the user can operate a PC with Windows XP competently and is familiar with file handling and window control concepts. Competence in railway signalling terms and the SSI system will also be needed to understand and interpret the results of SSI TT log analysis.

This issue of the user guide is valid from software version 2.1 and all previous issues are superseded for this version.

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1.1 List of Changes in Version 1.1

SSI GR version 1.1 encompassed the following changes to rectify problems and add functionality:

- Windows crash when a picture not containing data for Technicians Terminal port 0 (e.g. MARBONE3-5) is loaded.
- Two errors with picture scroll bars; picture scrolled off window when zooming out and picture position not reset to scroll bars when resizing the picture.
- Display of corrupt enlarged characters when replaying with the picture zoomed.
- Addition of similar functionality to the old SSI tape replay program. This enables a report to be created without loading a picture (see open file guidance, Section 4.3.1.1). The report browser has been modified to enable any part of the report to be viewed on screen. Report printing for specified start and end times has been added, removing the necessity of printing reports minute by minute.
- Additional options for faster and slower replay speeds have been added. Speed selection is now on the replay pull down menu. At faster replay speeds the capabilities of the PC running the software can limit the actual ratio achieved, particularly with 'live display' server(s) running.
- Consistency of output bar telegram tab headings and telegram description fields.
- Pictures print as multiple A4 pages.
- Analysis of data that includes short files with missing long time markers.

Feedback from the Pilot installation at Marylebone and TTLR installation at Manchester North has resulted in the following changes to fix problems raised:

- Problems after closing one schema and opening another.
- Replay buttons appearing to stick and fast forward appearing to reverse its operation.
- Time differences in records when stepping forwards and backwards over the data.
- Time differences between the output bar and the status bar.
- Scrolling to the bottom line and right hand column of the picture when zoomed in.
- List of interlockings overflowing on the first page of the printed report.
- Internal Request equipment description missing from printed report.

1.2 List of Changes in Version 2.0

SSI GR Version 2.0 includes the following additional features:

- Enabling the software to establish at least four connections to separate TT to logger links. This allows live display from interlockings connected to up to four TTs.

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- Logging of 'live display' data to a disk file system on an SSI GR machine. SSI GR V2.0 connected for live display can record its own copy of the log records from up to four TTs, to enable analysis independently of the records kept by the TT logger.
- Remote access to an SSI GR machine via dial-up modem and analogue telephone line or Ethernet Wide Area or Local Area Network (WAN or LAN) for purposes of 'live display'. Analogue telephone connections are required for the live display 'analysis machine' located with the TT and a remote PC. The remote PC can run SSI GR V2.0 for remote live display or use Windows to download files. This facility may also be connected via WAN or LAN if IT service providers permit such connections.
- Enabling access from outside the SSI GR application to analysis reports output from replay sessions, (save report files). Report files can be saved in Rich Text Format for use in preparing annotated text for incident reports, enquiries etc.
- Modification of the Graphical Replay View to allow users to open more than one 'picture file' for a replay session. More than one single or multiple interlocking picture can be opened to replay the log data, or for live display from a TT.
- Additional filters for Alarms/Messages and Panel Requests. Each interlocking is provided with alarms/messages and panel requests selection in the filter tree, to remove unwanted detail in the output bar tabs and reports.
- Output bar pause button provided for live display to enable examination of data without it constantly scrolling to last item.
- Equipment descriptions in the watch tab are coloured red for telegram bits set to a 'one' and blue for bits that are 'zero'.
- Additional code 1A and code 3 text removed from common trackside fault information.
- SSI GR non-analysed data fault reported from Cambridge SCC (UR1261) rectified.

1.3 List of Changes in Version 2.1

The SSI GR software has been modified to add functionality and resolve minor errors as follows:

- The status of received trackside data link telegrams is displayed in the 'watch' tab.
- The information displayed in the 'watch' tab for each trackside data link telegram includes the interlocking identity, the TFM type and its address.
- The 'watch' tab data is now cleared when a picture is closed and when a new picture is loaded.
- The 'view' menu filter dialogue for selection of the trackside data link telegrams to display now includes the interlocking identity as part of the information provided for TFM inputs and outputs.

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- The 'view' menu 'find equipment' function search text entry is now 'case-insensitive' and will match an 'incomplete string' with equipment identifiers.
- Interlockings can now be allocated to non-adjacent Technician's Terminal ports with unused ports in between.
- The time period for which data can be displayed backwards has been significantly increased when compared with previous versions.
- The 'change-of-state' display in the 'report' tab shall be in alignment with the 'data' record.
- The 'File' menu 'open' dialogue now displays log time ranges with gaps or overlaps as separate lines for analysis. This avoids the previous situation where logs with overlapping time stamps were merged causing replay of events in an incorrect sequence.

2 System Requirements

You must have a PC with Windows XP installed. (The formal test documentation is not valid for any other environment). SSI GR is normally installed on a spare TTLR PC but cannot operate at the same time as the TTLR, which is a DOS based application.

A Pentium processor (or equivalent) with a clocking speed of at least 800 MHz is recommended.

At least 128 Megabytes of RAM is recommended to ensure an adequate response from the SSI GR software.

The basic installation needs approximately 3 Megabytes of available fixed (hard) drive space, which includes space for installation of the example scheme supplied on the installation disk. Additional space will be required for pictures, configuration data, log data and output file storage for additional schemes.

A colour monitor and graphical capability should provide a minimum of SVGA display with a resolution of at least 1024 by 768 pixels.

A CD-ROM drive is required to install the SSI GR software from the distribution disk.

Several options are available for moving data between the TT logger (P&G or TTLR) and the SSI GR. The minimum requirement of a 3.5 inch floppy drive will enable the transfer of TT Geographic data from DWS and TT logger data from a TTLR.

Optionally a MO drive, which is fitted as standard on TTLR PCs, can be used to read TTLR log records. Log records can be read from CD-ROM if required, but the standard TTLR CD-ROM drive is not able to write data to CD-R or CD-RW disks. If CDs are to be used for data backup, alternative facilities will be needed to copy data to this medium.

Microsoft Internet Explorer version 5 (IE5) is required to provide access to the HTML document viewer control.

SSI GR V2.1 may require additional RS232 serial ports to connect more than two TTs to a TTLR machine provided for log data analysis and used as a graphical replay server. The maximum requirement for four connected TTs can be accommodated if necessary, by fitting an additional two port serial board. A V92

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56Kbit/s or similar modem is required in both server and client PCs to implement dial up access.

3 Installation and Set Up

3.1 Installation

Internet Explorer 5, or later, should be installed on the PC prior to installation of SSI GR. This avoids a possible conflict with a library used to view HTML documents. For a company networked PC you may need assistance from your Network Administrator when installing SSI GR.

If you are upgrading SSI GR from an earlier version, you must uninstall the old version before trying to install a new one. Refer to Section 3.4.

Insert the distribution disk in the drive and the installation should run automatically. If auto-run is disabled then, using Windows Explorer, double click the SSI8314-A V2_1.exe file. The installer will initialise and guide the user through the installation process. Default installation is to the system drive, (on a TTLR it is G: but on general-purpose systems it is usually C:), in the 'Program Files\AEAT\Graphical Replay 2.1' folder. The installation process allows you to choose another location for the folder if preferred.

A start-up program group for the SSI GR application will be made in the Windows 'Start' menu. You can create an icon on the desktop if you wish.

Occasionally some of the operating system supplied libraries used by SSI GR are older, out of date versions. The correct versions are now packaged with the SSI GR installation. If 'DLL failed to register' error messages are received during installation, this indicates that a new version is being installed but the file is already in use by Windows. In this case you will be asked to reboot the machine either now or later. SSI GR will not work until this has been done. If messages like 'GraphicalReplay dll failed to self register' are received, then re-running the installation after rebooting the PC will resolve this problem.

The remote access connection services must be set up for the Graphical Replay Log Manager if these have not already been configured. See Appendix for step by step instructions on setting up services for the Graphical Replay Log Manager. The PC used for accessing the Graphical Replay Log Manager must either have a network (LAN or WAN) or a remote dial up connection established; Windows provides a Wizard for this. If a remote dial up connection is being used it must also have a suitable dial up modem (56Kbit V92). SSI GR V2.0 or later must be installed.

3.2 Data Structures

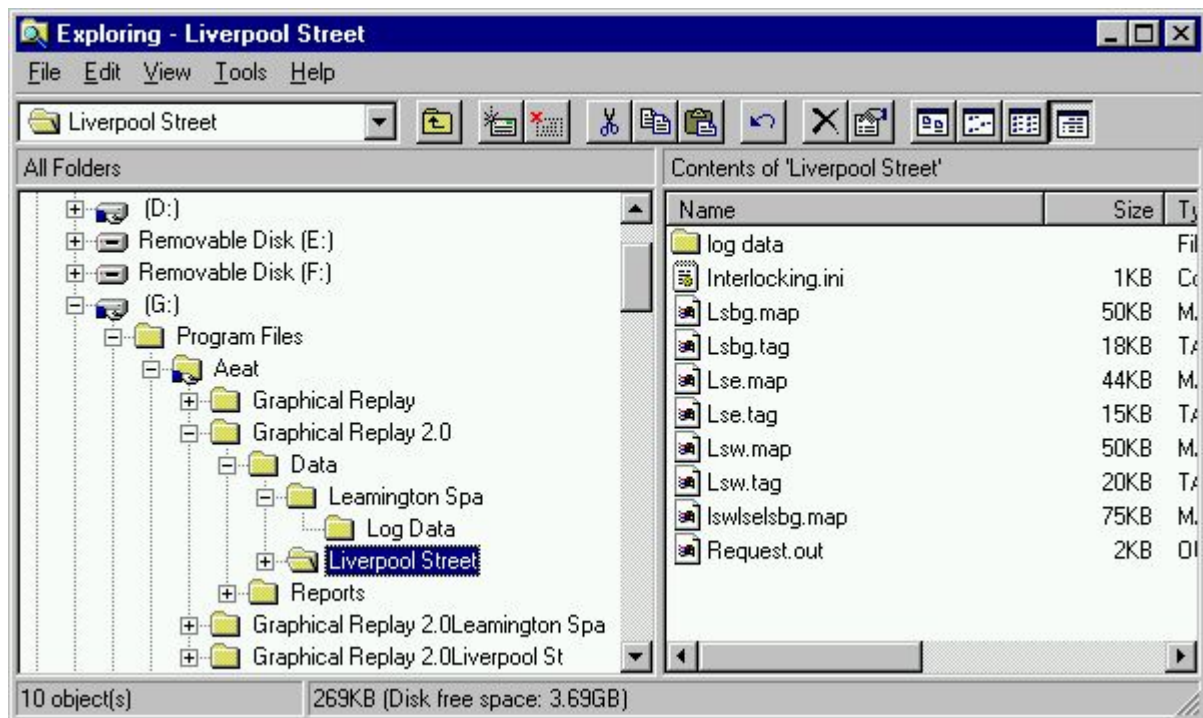


Figure 1 – SSI GR Installed Data Structure

The installer creates a folder structure in the chosen installation folder similar to the one shown in Figure 1 –, with folders for the program and the data it uses. This data structure is a template for adding your own scheme specific data. It contains an example replay configuration (known as a schema) for you to practice on. The recommended structure is made up of the folders and files outlined below.

A 'Data' folder, to hold replay schemas.

A 'Leamington Spa' schema folder, containing the following files and folders for the Leamington Spa example:

- One or more composite on-site simulation TT or single interlocking map files; this was a change from version 2.1 onwards. Map files are the same as the picture (File.001) in earlier versions, but they must now have unique names as there may be more than one Map in a schema;
- TT port configuration and identities of connected interlockings (Interlocking.ini);
- TAG files with interlocking TFM allocations (*.tag);
- A file (Request.out) with internal request allocations similar to a tag file but for the internal data link requests for all the interlockings in a scheme.
- A 'Log Data' folder containing some Leamington Spa example logger files (File.nnn).

Finally a 'Reports' folder, containing the templates for report production. It will also hold the output report files for the latest replay session in XML form, these files are

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only readable by the Graphical Replay Report Viewer within SSI GR during an analysis.

The Leamington Spa example data is provided for familiarisation with the application. It has been recorded from a development installation and not from the real Leamington Spa scheme, therefore the track layout and data provided are not valid for the actual scheme and must not be used for real replay purposes.

The structure of the Interlocking.ini file has also changed from SSI GR V2.1 onwards. (For more information the format see Section 5.1.) The interlocking.ini file supplied on the distribution disk is in the format required by earlier versions of the SSI GR program. This demonstrates the error message produced when version 2.1 is operated with ini files created for earlier versions.

Data for replaying log data from actual signalling schemes should be set up as described above. The schema folder name should be set to the required name. Folders for new schemas containing the geographic data files, following the Leamington Spa template, must be added in the 'Data' folder; otherwise the software will not be able to find your geographic data for replay or analysis. It is not essential to place TT log data in this structure. Data located in more convenient locations, including MO disk drives, can be selected using the file open navigation window. You will need to use Windows Explorer or a similar file management program to create folders and copy files.

3.3 Printer

A suitable printer will be required to use the printing facilities of the application. A printer driver for the chosen printer must be installed in the Windows system using the Windows distribution media or a disk supplied with your printer. Networked printers may be used, in case of difficulty contact your Network System Manager for assistance with this. See Section 4.3.1.4 on the print menu option for more information.

Text reports can be printed on most printers supplied for Windows text processing applications. If you want to print screen pictures Windows printer drivers will convert coloured images into shades of grey but a colour printer will produce a better result.

3.4 Uninstallation

When updating SSI GR to a new version, it is essential that you uninstall the original version first to remove out of date components and registry entries before installing the new version. Versions of the SSI GR software earlier than V2.1 can be uninstalled from the Windows Control Panel, Add or Remove programs. Select Graphical Replay and click Change/Remove. If it is necessary to uninstall SSI GR V2.1 an 'Uninstall' icon is provided in the 'Graphical Replay 2.1' program group in the 'All Programs' option of the Windows 'Start' menu. It should be noted that this option removes the entire 'Graphical Replay 2.1' directory including all the schemas. You may wish to copy these to a backup location before uninstalling the program.

During un-installation, in the unlikely event that you are asked if you want to delete files shared with other programs, you should select either the 'No' or 'No to All' option. As the dialogue says, selecting 'Yes' or 'Yes to All' can stop other programs, including Windows itself, from working.

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4 Using the Application

4.1 Starting SSI Graphical Replay

When booting up a TTLR machine, the default is to boot in DOS mode. You will need to monitor the boot progress and manually select the installed Windows option from the three 'Operating system to start' options offered. If no selection is made the TTLR PC will automatically boot into MS-DOS after a few seconds and start the TT Logger program. Refer to the TTLR User manual [Ref. 1] for instructions on how to close the TT Logger program if it is already running.

Once Windows NT has started, you are instructed to press Ctrl / Alt / Del to 'log in'. Find these three keys on the keyboard, press all three together and release. A login dialogue is displayed next. TTLR machines are not delivered with a password installed so just press the enter key. If you have set up a user name and password for remote access these will need to be entered to log in.

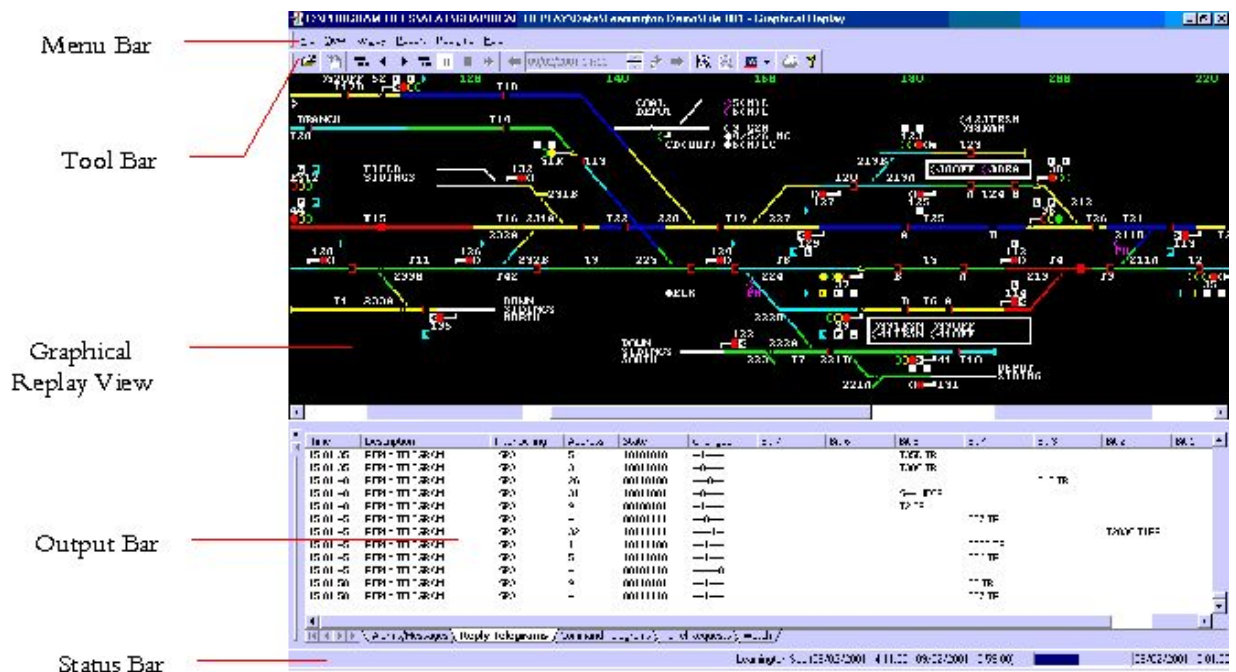
Desktop and laptop PCs usually boot into Windows directly. You need to use your normal login procedures to get to your Windows 'Desktop'.

You start the SSI GR application by double clicking the Graphical Replay desktop icon or running from the 'Start' button programs menu.

4.2 Working with SSI Graphical Replay

The main output interface of SSI GR is a graphical representation of an area of railway using the 'Lynwood' VDU pictures prepared for on-site simulation. Text output equivalent to that provided by the SSI TT Tape Analysis program can also be displayed and printed.

The SSI GR enables the data logged by a SSI TT to be displayed for an interlocking scheme. The scheme (set) in this connection is a group of up to six interlockings attached to a single TT for diagnostic and logging purposes. The interlocking groups are set up during the SSI data preparation process and used during the testing and commissioning of the SSI using the on-site simulation facility.



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Figure 2 – SSI GR User Interface Basic Screen Layout

The User Interface of the SSI GR, see **Figure 2** –, contains the following controls:

- Menu bar
- Tool bar
- Status bar
- Output bar
- Graphical Replay View

SSI GR V2.0 or later can load more than one trackside ‘Map’ into the Graphical Replay view. These maps can be individually sized, moved and closed as required. All the loaded maps will be updated from the log data.

In the following guidance on SSI GR operation, use of a mouse is assumed, other methods of selecting and operating window controls that you are familiar with can be used if you wish.

4.3 Menu Bar

There are seven top-level menus accessible from the menu bar. These enable you to perform all the functionality offered by the application. The menus and their options are described in the following sections:

4.3.1 File Menu

The ‘file’ menu has the following options:

4.3.1.1 Open

When you choose the ‘open’ option, an open dialogue is displayed. The open file dialogue has the appearance of a wizard, Figure 3 –, allowing you to select the folder where the log files (file.nnn) for analysis are located by clicking the browse folder button. Alternatively the live data button can be selected to receive data direct from the TT to logger link. Having selected live data, the only remaining action is to select ‘next’ to move to the next page of the Wizard or ‘cancel’.

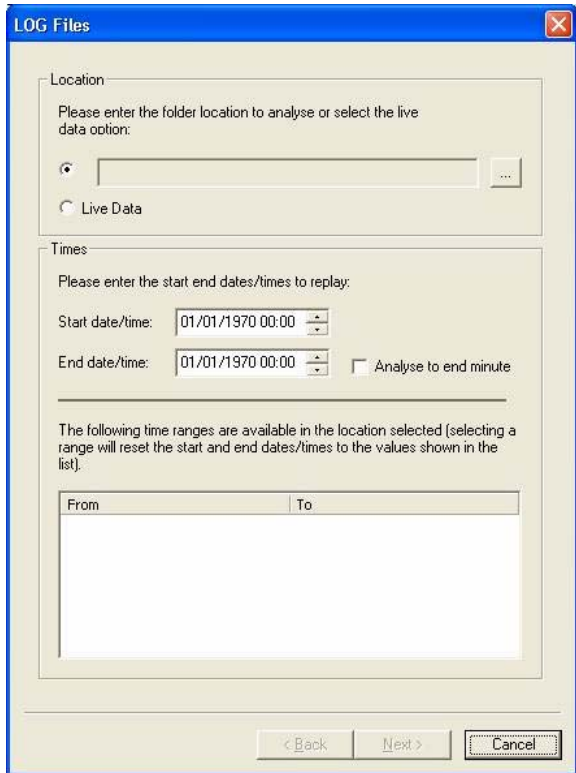


Figure 3 – Open Wizard – Log Files

Once you have used the [...] button to browse the PC folders and have a log file folder selected, the start and end times for continuous sets (i.e. no gap or overlap in the data time stamps) of log files in the folder are shown in the 'Times' dialogue. Prior to version 2.1 data with overlapping time stamps were merged and could be displayed in an incorrect order. From version 2.1, overlapping data, usually caused by changes to the time displayed by the TT clock will need to be replayed separately.

After you have selected a set, the start and end times are shown in the replay start and end selection boxes. These can be edited by selecting hours or minutes and typing new values or using the up and down arrow buttons to change the replay duration. An 'Analyse to end minute' tick box is provided to make the replay pass the final short time marker in a log file set, (usually minute :59) in a complete log file. When choosing the replay duration, you need to select a time up to one hour before the event of interest to be sure that all the states have been updated. If the necessary log data is not available you should satisfy yourself that the item has been updated before relying on the display or output bar listings.

Having selected the log file options, click 'Next' and the wizard goes on to display the 'Geographic Data' dialogue, Figure 4 –. The folder containing the replay picture, interlocking.ini and TT tag files should be selected from the pull down list displayed. This list is restricted to the sites set up during installation of your SSI GR; the default path is Drive:\Program Files\AEAT\Graphical Replay\Data; an alternative path cannot be selected after installation.

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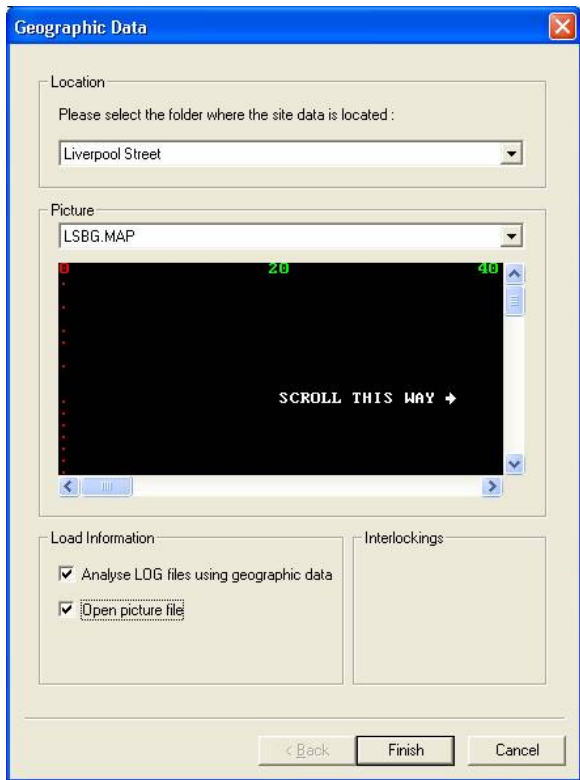


Figure 4 – Open Wizard - Geographic Data

When the location folder is selected, the alternative map files in the schema are displayed in the pull down box of the picture section of the dialogue; you should select the required map for loading. A preview of the selected map file (e.g. LSPA.MAP) is displayed (if one has been provided), together with a list of TT configuration interlocking names from the log data. The valid interlockings for the selected picture are shown in black, the rest are grey. If all the interlocking names are grey then the picture is not valid for the TT log files.

Due to the way the Technician's Terminal trackside display has been created by the data preparers or restrictions on the size of the co-ordinate data, frequently a map is only valid for a single interlocking or for a smaller group of interlockings than are in the TT configuration. This means that more than one map may be needed to display items of interest in log records. The user should carefully check the validity of each map and that it is compatible with the specific interlockings and signalling equipment required for replay.

A tick box is provided to select 'Analyse log files using geographic data'. When the box is ticked, TT tag files are used to translate telegram changes into signalling equipment identities as used in the TFM database (wiring schedules). With the box un-ticked, no identities are added to the report for telegram bit changes. If there are no TT tag files in the selected configuration, the 'Analyse log files using geographic data' tick box is greyed out and un-ticked to indicate that a picture cannot be loaded.

A second tick box is provided to 'open picture file', this allows loading of a picture to be bypassed where not required or when a suitable picture is not available. This enables log data analysis reports to be prepared without first replaying the data. If there is no picture file in the selected configuration, the preview is blank and the

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'open picture file' tick box is greyed out and un-ticked to indicate that a picture cannot be loaded.

When the geographical data options have been selected as required, clicking finish loads the map, if selected, and prepares for replay or analysis.

Note that the tick boxes will remain un-ticked after a configuration with missing files has been selected. When a configuration with the appropriate files is selected from the list, the box(es) will no longer be greyed out but you will need to click the box to restore the tick.

If additional map files are to be loaded, the open dialogue is selected again and the 'Extra Geographic Data' dialogue will open. Additional pictures can be opened at any time after loading the schema.

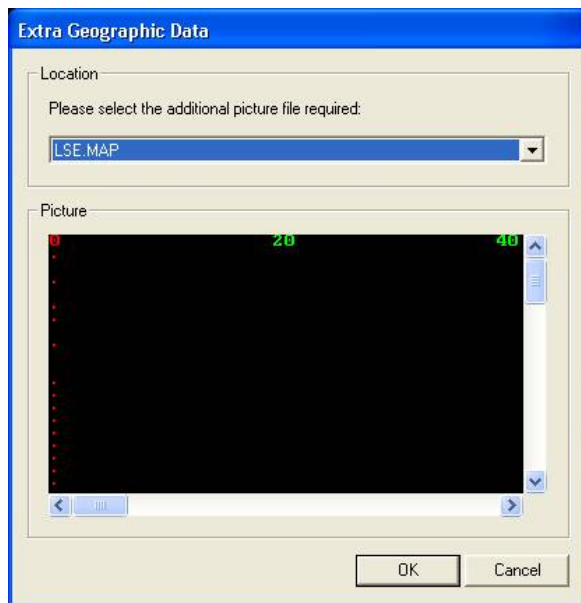


Figure 5 – Open Wizard – Extra Geographic Data

This dialogue is similar to the 'Geographic Data' dialogue, but will only allow additional maps in the currently selected schema to be selected for loading. The 'Location' section has a pull down list containing the names of available maps. When a map name is selected, a preview of the map is displayed. Once the correct map has been selected, clicking OK will load it for the current session.

If you need to open a different schema (map file, Tag files etc.) then the 'close all' option should be selected, before opening a new schema.

4.3.1.2 Close All

The 'close all' option closes all the currently loaded map files, geographic data and the associated log files. Once the action has completed the application is ready to open a new schema. This option must always be used when swapping to a different schema to analyse new data.

4.3.1.3 Save

Save has one option in V2.0 or later, to save the current report as a Rich Text File (RTF). The option is only active after completing a replay of a log file and selecting stop, displaying the report tab. Rich text files tend to be large so you are advised to choose the range of data analysed carefully. If necessary the data can be replayed