OPTIMA 2 CONFIGURATOR HANDBOOK

UCM 277158

ISSUE 10

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1. Document Introduction

1.1 Notices

Throughout this document there are notices to emphasise important points or highlight points of interest. There are two types of notice used:

Warning notices are used to emphasise important points throughout this handbook.

Information notices are used to highlight points of interest. These use the blue information sign shown here.

1.2 Overview

This handbook covers the installation and operation of the Optima 2 Configurator and is not intended to give detailed descriptions of the facilities provided by the Optima 2 traffic signal controller. To aid understanding, a brief outline of the facilities will be included when relevant in this document.

For customers who have a software support agreement, when changes are made to the Configurator, new software and a release note will be issued along with a new version of this handbook, if applicable.

The main function of the Configurator is to produce a valid configuration file, which can be downloaded to the controller. The Configurator also produces a configuration printout as a PDF file.

Note: Although the Configurator supports all options available on the controller at the time of release, the controller software purchased may only be licenced for a subset.

Important! Any configuration produced using the Configurator should be fully tested to ensure correct operation prior to installation by means of Factory Acceptance Testing (FAT). This can be done on a physical controller with lamps and switches or by using the Optima 2 simulator. Lamp testing and conflicts should always be tested on the final controller prior to commissioning.

1.3 Purpose of Document

This document is intended to be an overview of the Configurator screens and act a reference for details required in configuring the controller.

1.4 Scope of the Document

This document is written with the understanding that the Configuration Engineer has knowledge of traffic principles and the TOPAS (Traffic Open Protocols and Specifications) 2500 specification [1], which has replaced the Highways Agency Specification for Traffic Signal Controllers, TR2500A.

This document assumes that the Configurator is running on the Microsoft Windows operating system.

2. I/O and Detector Limits

The total number of inputs that can be used in the Traffic Signal Engine (TSE) is **247**. This can be made up of a combination of parallel, virtual and loop inputs. The inputs are sorted into the following order:

- Parallel,
- Virtual,
- Loops.

To employ the maximum number of I/O boards (7 boards = 112 inputs) and the maximum number of loop packs (16 detector packs = 64 loops) whilst remaining within the 247 total, the **number of virtual inputs must be limited to 71**.

In Optima 2 firmware versions v2.18 and earlier, if the total number of inputs from digital I/O, virtual inputs (used by the TSE) and loop packs exceeds 247 then the later loops will be ignored by the TSE. Configurator v3.9 (and earlier) will not issue an error or warning if this limit is breached.

The number of detectors is limited to 254, the number of non-dummy detectors is subject to the 247 TSE limit. Note that Uni-directional detectors consume 2 inputs from this limit.

Configurator v3.10 (and later) will

- generate a compiler error if the number of TSE inputs exceeds 247,
- generate a compiler error if the number of detectors exceeds 254.

3. Installation

Note: The following instructions were re-written at Issue 9 of this document and refer to the dongle free versions of the Telent tools. Dongle free version of the tools (including previous versions) are available from Telent Engineering.

1. If a dongle protected Configurator has previously been used on the machine then it is necessary to clear the application cache by deleting the entire "*.Configurator*" directory in, for example:-

   C:\Users\076xxx\AppData\Roaming

   The location of the *.Configurator* directory can be established by clicking **Help → About**.

2. A Java Runtime Environment (JRE) which supports Java 8 is required to run the Configurator. Download and install or update Java to a version which can support Java 8 (e.g. https://docs.aws.amazon.com/corretto/latest/corretto-8-ug/downloads-list.html).
3. It is possible to have more than one version of the Configurator installed at the same time.
4. If it does not already exist, create the directory **C:\telent**.
5. Unzip the *Configurator vX.X.zip* file into **C:\telent**.
6. Unzip the *Licence Utils.zip* into **C:\telent**

   Note: If there is already a ***Licence Utils*** directory then there is no need to replace this.

8. **C:\telent** should now contain the following (the actual contents will depend on how many previous versions of the various tools have been installed):

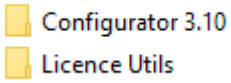


Figure 1 - Example of *C:\telent* directory

9. Create a shortcut to the "*Configurator.exe"* within the relevant directory for example: *C:\telent\Configurator 3.10\bin* and place it on the desktop.
10. To license the application, use the "*Register.exe*" utility which can be found in **C:\telent\Licence Utils**.

    Note: There is no need to re-license an application when a new version is released.

12. To move an existing licence to a different machine, use the "*Transfer.exe*" utility.
13. If the following error messages are observed, then re-use the "*Register.exe*" utility.

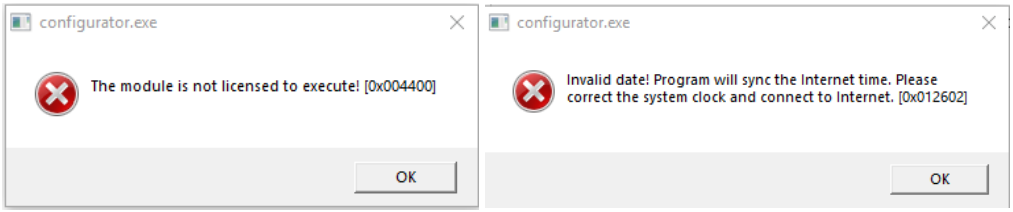


Figure 2 - Error Messages Indicating Re-Registration Required

4. Configuration Control

4.1.1 Issue History

Configurations are bound by a configuration issue history system which applies an issue number to the configuration. The issue number consists of a major value before the decimal point followed by minor value after the decimal point.

- New configurations are created with an issue number of 0.1 when they are saved for the first time.
- When a configuration is up issued (see section 5.6) the major number is incremented by 1 and the minor number is reset to 0.
- When a configuration is renamed, the issue number is reset to 0.1.
- When a configuration is saved the issue number is incremented by 1 minor number.

Configuration database files have the extension *".cnfg*" and the filename is **not** appended with the issue number. Compiled configurations for transfer to a controller have the file extension "*.cbn*" with the same file name as the configuration file, but **are** appended with the issue number.

For example, configuration file TEST002.cnfg, third saved edit, compiled successfully, would be given the name TEST002_0.3.cbn.

The current configuration file name and version is displayed in the main window as shown below:

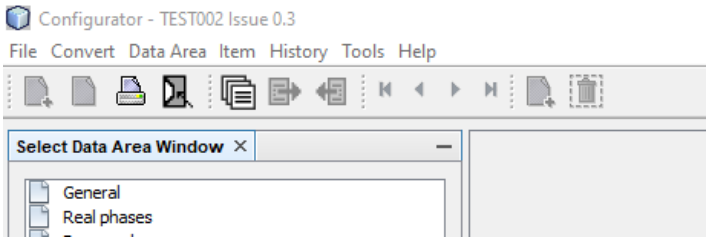


Figure 3 - Configurator Main Window Title, Showing File Name & Issue Number

- **File** → **Save** increments the minor issue number.
- **Convert** → **Compile configuration** loads a configuration and compiles as is without updating any issue number.
- **Convert** → **Save and compile configuration** increments the minor issue number and compiles the newly saved configuration.
- **Convert** → **Compile test version of configuration** builds a test version of the configuration in its current state without saving. The .cbn filename is appended with "*_Test*" by default, but this can be changed during the compilation process. See section 5.3.3.

Note: Since version 3.7 of the Configurator, if a configuration is being developed, it can be compiled for test without having to save it, this allows multiple errors to be fixed before saving and incrementing the issue number.

4.1.2 Considerations for Loading Configurations on the Optima Controller

It is recommended best practice that configurations are issued for on-site use with major issue numbers only, for example: 1.0, 2.0, 3.0 etc.

In general configurations should be developed as 0.x then up issued to 1.0 after Factory Acceptance Testing (FAT). The up-issued configuration **must** be used to perform the physical green conflicts and lamp monitoring tests prior to commissioning.

Whilst the controller handset command **RSN** will show the major and minor issue numbers for the current configuration, it should be noted that the **CAT** command used to load configuration files to the controller can only see the major issue number and not the minor number for configurations stored in the controller. This means that if a user wishes to change the running configuration for another with **the same name major issue number** but different minor number, the user must first change the running configuration for one with a different name or at least different major number.

Alternatively, the Optima Manager Software can be used to remove the previous version of the configuration. Refer to the *Package Manager Handbook*, UCM 369281.

Important! The controller can be sensitive to how USB storage is treated when used on a PC. Always safely eject the USB storage from the PC after copying the configuration file. If possible, check the USB storage works on a test controller before heading to site.

For more information about loading configurations, and configuration management, refer to the **RSN** and **CAT** commands in the *Optima Handset Command Manual*, UCM 239138

4.1.3 Up Issuing and Printing Tips

When up issuing and printing there is a simple method to ensure that the minor number remains at zero:

1. When the configuration has been successfully tested with the current issue number, for example: 0.5, use the **History** → **Up issue** menu to open the "*Up issue configuration*" window.
2. Check that the **new issue number** is as expected, for example: 1.0.
3. Enter a reason for the up issue in the **Comment** field, for example: "*Up issue after customer FAT*."
4. Make sure that the **Finish Editing** check box is ticked.
5. Click **Finish** and the configuration will be saved as issue 1.0 and closed.
6. Click **Convert** → **Compile configuration** and select the newly up issued configuration
7. Optionally download the config via IP to the controller
8. Click **Next** to choose a location to save the compiled configuration .cbn file to.
9. Click **Finish** complete the compilation.

Printing is to Portable Document Format (PDF). Hard copy can then be printed from the PDF file.

1. Click **File** → **Edit configuration** the load the configuration file saved in the steps above.
2. When loaded, click **File** → **Print** and choose a location to save the PDF file to.
3. The PDF file is automatically named the same as the configuration .cnfg file. On Configurator versions prior to 3.7, append the filename with _issue number for example: "*_1.0*" before saving. Configurator 3.7 and later does this automatically.
4. Most importantly close the configuration **without** saving by choosing **File** → **Close Configuration**.

Since version 3.7 (for Optima 2.17 firmware) a PDF copy of the configuration is automatically stored in the .cbn file and can be accessed from the Optima Web Pages. Refer to the *Optima Web Page Interface Manual,* UCM 433443.

5. Using the Configurator

5.1 Configurator start up screen

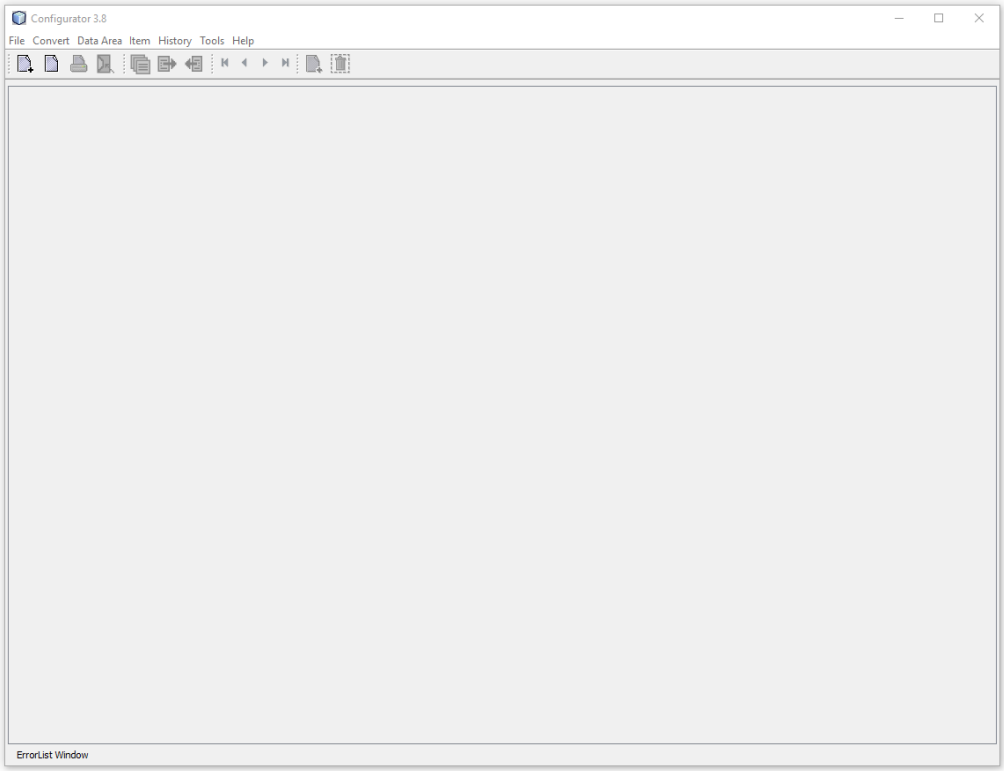


Figure 4 - Start Up Screen

This screen consists of several drop-down menus at the top, below them a toolbar containing useful shortcut functions, and at the bottom an Error List Window button.

The toolbar buttons provide shortcuts to the following functions:

- New Configuration
- Edit Configuration
- Print Configuration
- Save and Close Configuration
- Change Area
- Next Screen
- Previous Screen
- First Item
- Previous Item
- Next Item
- Last Item
- Add Item
- Delete Item

5.2 File Menu

The following sub-sections describe each of the options under the **File** drop-down menu.

5.2.1 New Configuration

Use to create a new configuration. A window will appear where the configuration number and description should be entered. Since version 3.7, the configuration name has a restriction on characters allowed in a configuration name. Valid characters are:

- A to Z
- a to z
- 0 to 9
- Underscore _
- Minus –
- Full stop .

The **Next** button will be greyed out until a valid name has been entered.

Configuration Format should also be selected from the drop-down list. Available options are:

- Optima (for first generation Optima controllers)
- iOptima (generally 2.14 software and later)

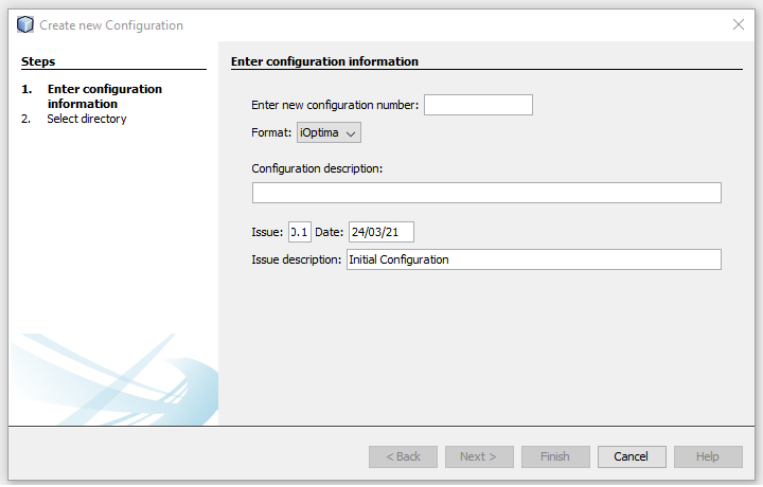


Figure 5 - Create new Configuration Window

Warning! The configuration file "*.cnfg*" is **NOT** created until the configuration has been saved for the first time.

5.2.2 Edit Configuration

Use to edit an existing configuration. A window will appear with a drop-down combo box from which to choose the required configuration for editing.

Use main menu **Tools** → **Options** → **Configurator** tab to set the default location for opening configurations in this combo box. See section 5.7.2 for more information.

Folders inside the selected location can be double-clicked to open, and any configuration files of type "*.cnfg*" will be listed. Clicking on a configuration file will load some information about it in the fields on the right-hand side of the window.

The **Description** field is the short **Configuration description** given when the configuration was created (see section 5.2.1). The file issue version, date and reason for last change are also provided.

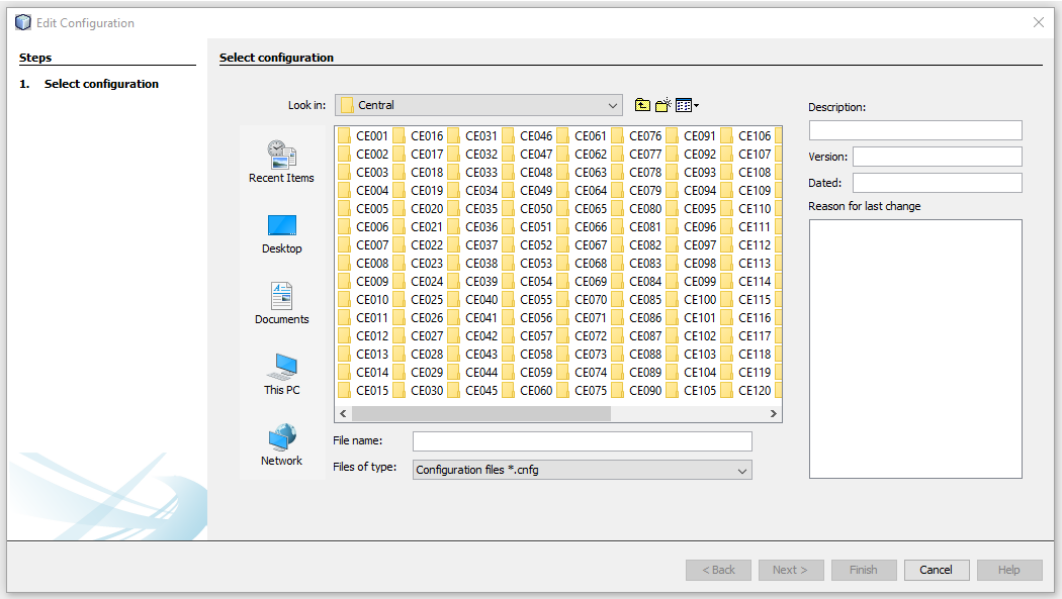


Figure 6 - The Edit Configuration Window

5.2.3 Rename Configuration

Use to rename an open configuration.

Note: The configuration to be renamed must be already open in the Configurator.

The **Rename Configuration** window shows the existing configuration number, configuration description and issue description. These fields can then be edited as required. The issue number will be reset to 0.1, and the issue description will appear next to this number on **Form 2C - Configuration history**, in the configuration printout. The same valid character restrictions are used here as for a new configuration.

After making changes, click on the **Next** button to select which directory the configuration will be stored. After selecting, click **Finish**. This closes the **Rename Configuration** window and returns to the Configurator main window, which is now editing the renamed configuration.

Warning! The configuration file "*.cnfg*" is **NOT** created until the configuration has been saved for the first time.

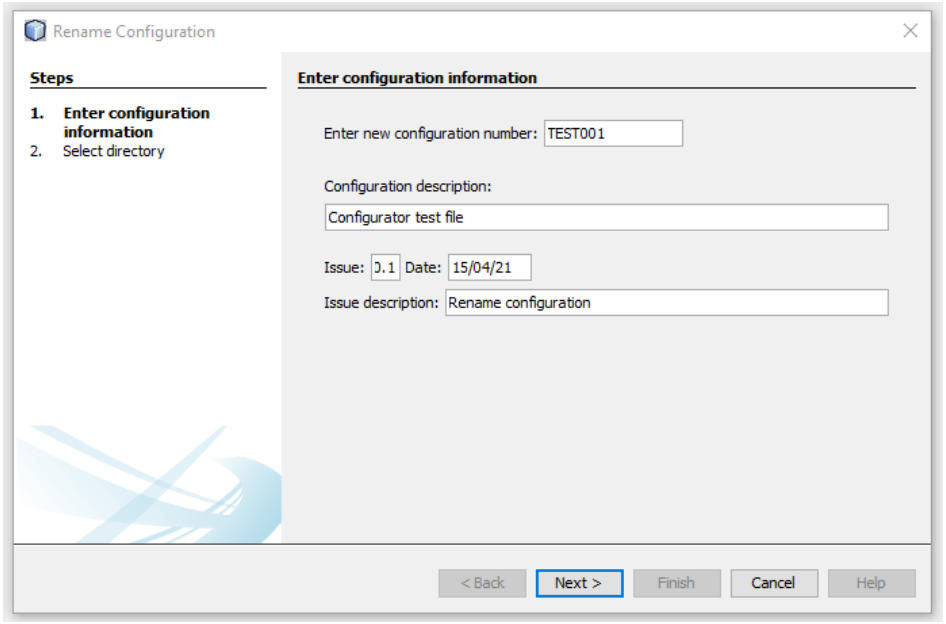


Figure 7 - Rename Configuration Window

5.2.4 Save Configuration

Use to save any changes made to the open configuration. Saving a configuration will increase the **minor** version number, for example if the open configuration was 0.3, saving will increment to 0.4.

Important! The configuration file minor issue number is always incremented when a configuration saved.

5.2.5 Close Configuration

Use to close the open configuration, losing any changes since previous save. A confirmation message box will appear warning that all changes since last save will be lost and asks the user to confirm yes or no. Clicking **Yes** closes the configuration, clicking **No** returns the user to the Configurator main window to continue the edit.

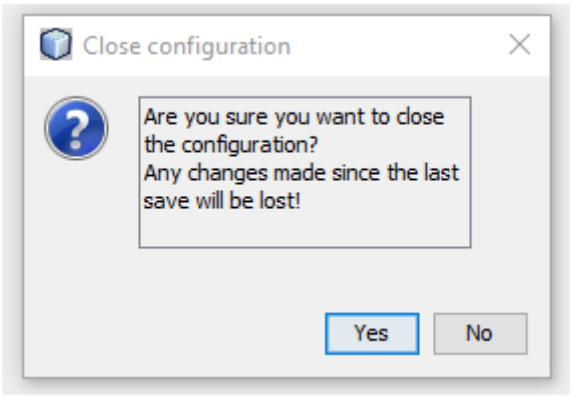


Figure 8 - Close Configuration Message

Important! Closing the Configurator with the cross on the top-right of the Configurator main window in versions 3.7 and earlier will **exit immediately losing changes**. Since version 3.8 a message box will ask the user to confirm the closure of the program.

5.2.6 Save and Close Configuration

Use to save any changes to the open configuration, then close it. As with the save operation, the **minor** version number will be incremented by 1.

5.2.7 Print Configuration to PDF

Use to print the configuration to a PDF file. A save window will appear allowing the user to select where to save the file to and to rename the file if required. For versions 3.7 and lower, it is recommended best practice to append the PDF file name with the same underscore and version number as the .cbn file has. For example: TEST002.cnfg, TEST002_0.3.cbn, TEST002_0.3.pdf. This filename style is automatic in versions 3.8 onwards.

Important! When renaming the file, include the .pdf extension in the **File name:** field or the file will be created without it and will require renaming with the .pdf extension in the operating system before it is useable.

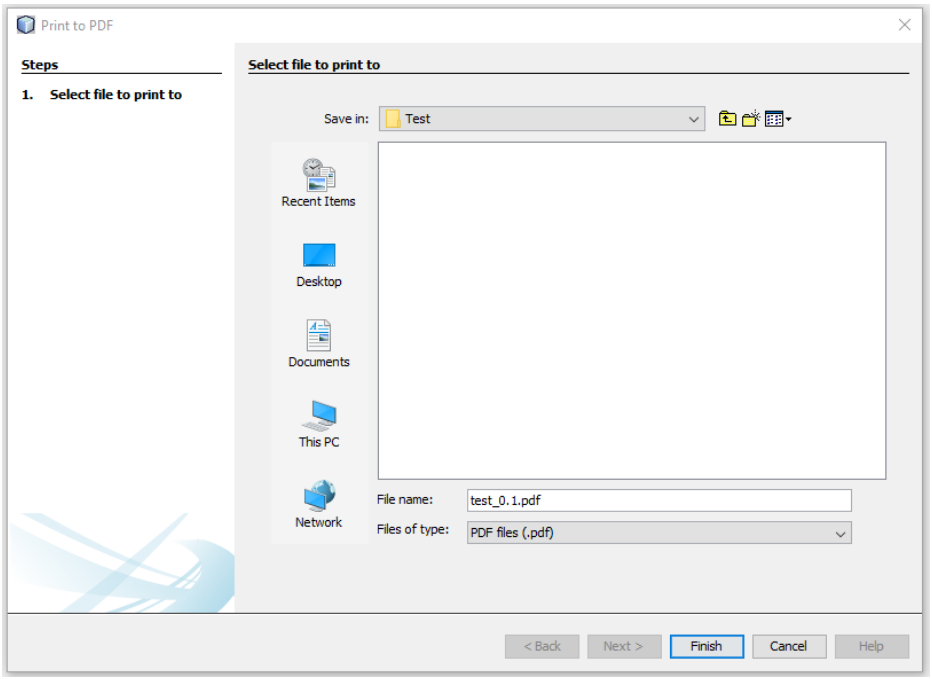


Figure 9 - Print Configuration to PDF Window

A PDF copy of the source configuration can be downloaded from the controller webpages when the configuration has been created on version 3.7 or later, running on a controller with Optima Software Version 2.17 or later. Refer to the “File Storage” section of the *Optima Web Page Interface Manual*, Issue 3 or later, UCM 433443.

Refer to **Appendix 1** in Section 8 for a list of printed forms.

Note: Some forms only print if the facility is configured.

Configurator 3.8 introduced page numbers for all forms and an index page on the second page, as Form 1A. It lists the screens printed against their form number and page number in the printout.

5.2.8 Export Special Conditioning

Use to save the special conditioning from the open configuration into an XML format text file. An **Export Special Conditioning** window will open to select where to save the file to and to rename the file if required.

Important! When renaming the file, include the .xml extension in the **File name:** field or the file will be created without it and will require renaming with the .xml extension in the operating system before it is useable.

5.2.9 Import Special Conditioning

Use to load special conditioning from the XML file into the open configuration. An **Import Special Conditioning** window will open allowing a file to be selected.

Note: Regardless of the statement number being viewed, the imported statements are appended to the end of any existing statements.

5.2.10 Exit

Use to exit from the Configurator without saving any modified data. A message box as shown in Figure 10 in will appear warning of this allowing exit with **Yes** or cancel with **No**.

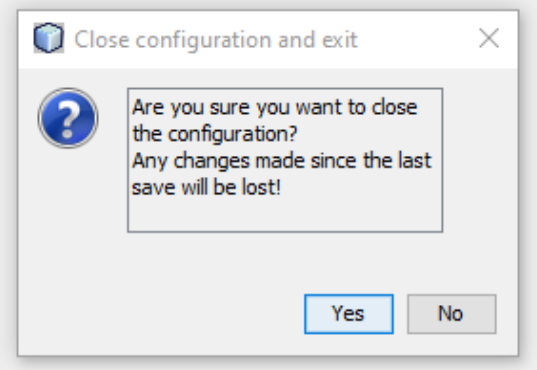


Figure 10 - Close Configuration and Exit Message Box

5.3 Convert Menu

5.3.1 Compile configuration

Opens a window to select an existing configuration to compile without having to open it in the Configurator. This means that the existing file version number will not be updated.

There is also the option of downloading it to a controller via its IP address.

5.3.2 Save and compile configuration

The save part of this option will trigger an update of the minor issue number of the open configuration for example from 1.3 to 1.4. It will then compile the newly saved configuration with this new version number. For example, pressing save and compile on an open configuration called TEST with issue number 1.3, will generate a 1.4 configuration file TEST.cnfg, and 1.4 compiled binary for the controller called TEST_1.4.cbn.

Note: The saved configuration .cnfg file doesn't show the version number in the file name but the compiled .cbn file for use with the controller and/or simulator does. The version number of an existing configuration file is shown in the open window of the Configurator.

Again, there is the option of downloading the configuration to a controller.

5.3.3 Compile Test version of configuration

Introduced in version 3.7 onwards, it is possible to test that the open configuration compiles without saving and without updating the version number. This means that issues (for example in special conditioning) can be ironed out iteratively without having to save and compile, which would increase the version number. The compiled .cbn filename will be amended with _***Test,*** for example ***CE182_Test.cbn***. Subsequent test compiles of the same configuration will all be appended with _***Test*** and will overwrite previous versions if the compile directory is the same.

Note: There may be a warning that the configuration isn't saved during the compilation.

5.3.4 Change format

Use to change the format of the loaded configuration to either:

- iOptima (Optima 2)
- Optima (Optima 1)

Note: The option to convert to Sentinel format has been removed.

5.3.5 Import Sentinel Configuration

Note: The option to import Sentinel configurations has been removed.

Due to Java library changes it is no longer possible to change format to or import from Sentinel configurations. There is now a separate utility available from Telent to do the initial conversion. Contact Telent Traffic Engineering for more information.

5.4 Data Area Menu

This menu not normally used since there are shortcut buttons available on a toolbar below the menu bar.

5.4.1 Change Area

Use to open the **Select Data Area Window** of the Configurator. The default position of this window is as a column on the left side of the Configurator main window to allow the user to navigate to and open the data areas.

5.4.2 Next Screen

Use to move forward to the next data entry screen of the data area in use, for example the data area Real Phases has two data entry screens and so would cycle from Screens 1 to 2. This is a cyclic operation, so the user can use the button to go from the last screen in the data area to the first again.

5.4.3 Previous Screen

Used to move back to the previous data entry screen of a data area in use. This is also cyclic, so will step backwards through the screens and loop back to the last screen after the first.

5.5 Item Menu

Where the current data entry screen within a data area contains multiple items, these options will be available. For example, in the Detectors data area, each detector is given an index starting at zero, and so each detector is considered an item. If a data area has no items, for example Part-time mode, these options are greyed out and disabled.

5.5.1 First Item

Use to move to the first item in the current data area. For example, in the Detectors data area, selecting **First Item** returns the user to detector 0.

5.5.2 Previous Item

Use to move to the previous item in the current data entry screen.

5.5.3 Next Item

Use to move to the next item in the current data entry screen.

5.5.4 Last Item

Use to move to the last item in the current data entry screen, with the highest index.

5.5.5 Add item

Use to add a new item in a data entry screen.

5.5.6 Delete Item

Use to delete the selected or current item in a data entry screen. F6 may be used as an alternative.

Warning! Once an item is deleted it cannot be undone. If the item is a stream, all data relating to that stream will be lost. For example, mode priority and manual button associations for that stream.

5.6 History Menu

5.6.1 Up Issue

Use to up issue the major version number of a configuration and reset the minor number to 0. For example: from version 1.3 to 2.0. This menu item opens a window showing the new issue number and gives the user an option to write a comment or reason for the up issue. Ticking the **Finish editing** box will save the configuration and close it when the **Finish** button is pressed.

If the **Finish** button is pressed without ticking **Finish editing**, then the configuration is up issued and all screens are closed. Editing can then continue by selecting the **Change Area** command: **Data Area** → **Change Area**, pressing F2 or the **Change Area** toolbar button.

5.7 Tools Menu

5.7.1 Templates

This menu item is not used.

5.7.2 Options

Opens the **Options** window, which has two main tabs, **Appearance** and **Configurator**. Within the **Appearance** tab, there are three sub-tabs, controlling the user experience. The default settings are recommended.

The **Configurator** tab has the default locations of the configuration files when opening and saving configurations. Use the **Select Directory** buttons to change the default directories. It is recommended that all four directories match.

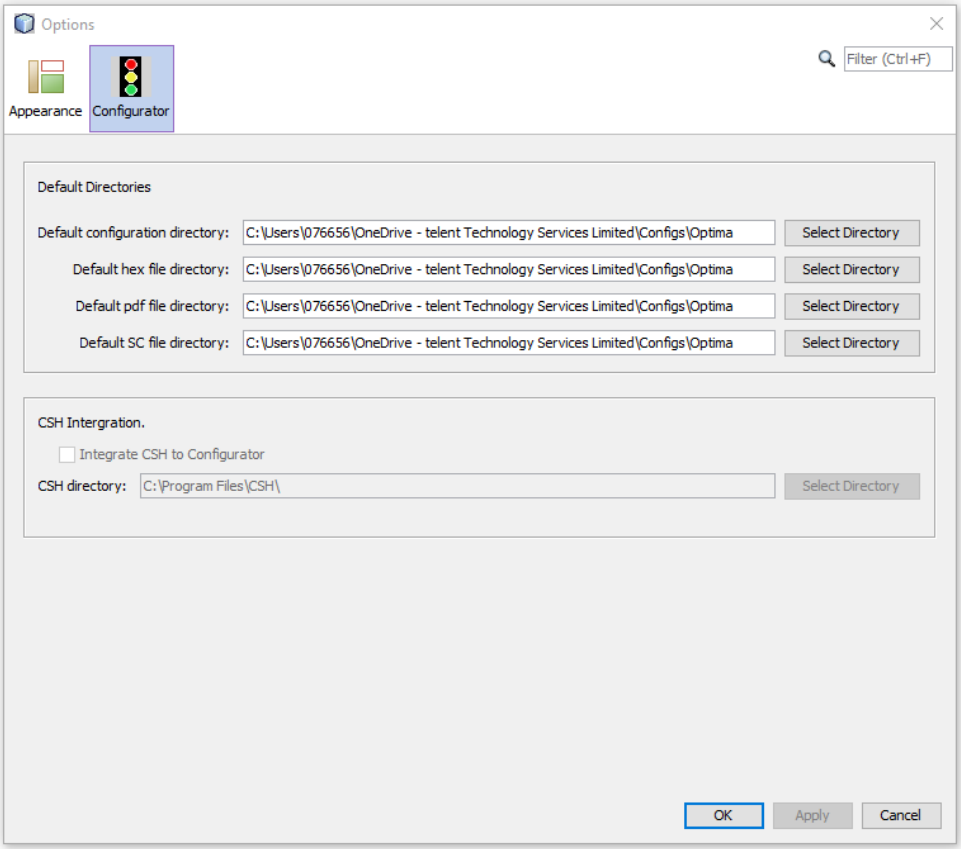


Figure 11 - Options Window: Configurator Tab

5.8 Help Menu

5.8.1 Help Contents

Opens the window shown in ***Figure 12***. It has a navigation window on the left side, and main window where the help information is displayed. The navigation window has two tabs, **Contents** and **Search**, and by default **Contents** is displayed which lists topics sorted by Data Area then Screen. The help topics are named after Data Areas and are in alphabetical order. Click on a topic to see the help information.

Context Sensitive Help: Pressing F1 when a data area is active in the Configurator will open the help window at the help page for that data area. If the data area doesn't have a help page, the help window will open at the default page, shown in ***Figure 12***

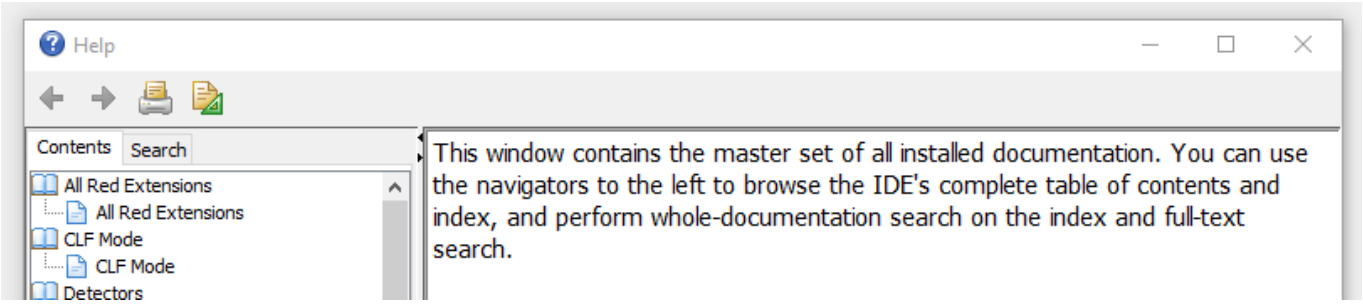


Figure 12 - Help Contents

The **Search** tab provides the user with a text-based search box and will return a list of topics where the search term was found. To the left of the topic name is the number of times the search term was found in that topic.

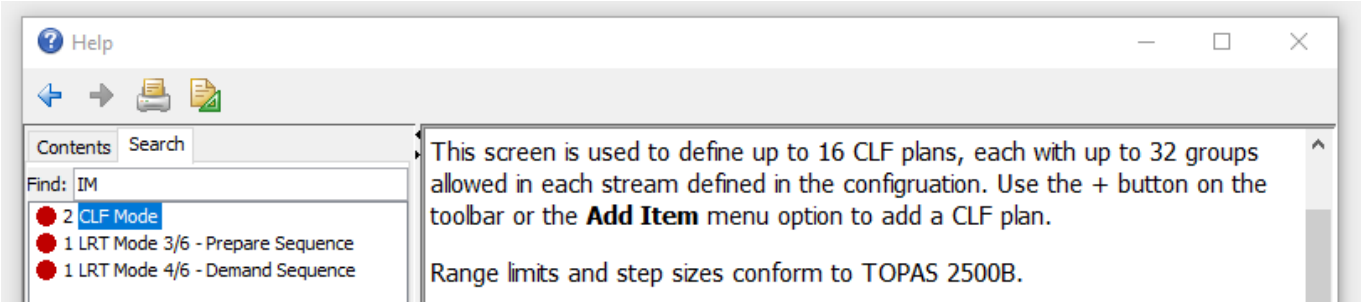


Figure 13 - Example Search Within Help

5.8.2 About

Displays the application and system information.

6. Toolbar Icons

Toolbar icons are a means to access menu items quickly.

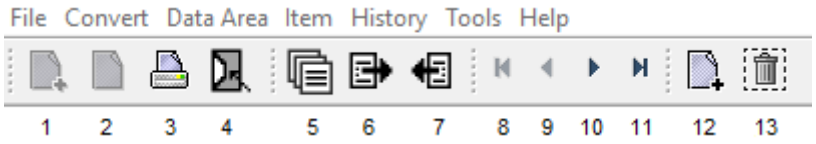


Figure 14 - Toolbar Icons

An indication of the function of every icon on the toolbar may be found by hovering the cursor over it briefly.

The icons are:

1. Create new configuration (available only if no configuration loaded)
2. Open existing configuration (available only if no configuration loaded)
3. Print configuration to PDF
4. Save and close configuration
5. Change Area (re-opens the **Select Data Area Window** if it closed)
6. Next Screen (available only if more than one screen in current Data Area)
7. Previous Screen (available only if more than one screen in current Data Area)
8. First Item (available if Screen has multiple items and not currently on first item)
9. Previous Item (available if Screen has multiple items and not currently on first item)
10. Next Item (available if Screen has multiple items and not currently on last item)
11. Last Item (available if Screen has multiple items and not currently on last item)
12. Add Item (available if Screen uses multiple items)
13. Delete Item (available if Screen uses multiple items).

7. Editing a Configuration

7.1 Real-Time Error Checking

Some of the fields contained in the data entry screens have real-time error checking. If a value is entered outside of a valid range, or if incorrect formatting of the data is found such as missing an H or M on a DFM time field, the field will be highlighted red, until a valid value is entered. An example of an invalid value is shown in **Figure 15**. The configuration will not compile if there are any fields in this error state.

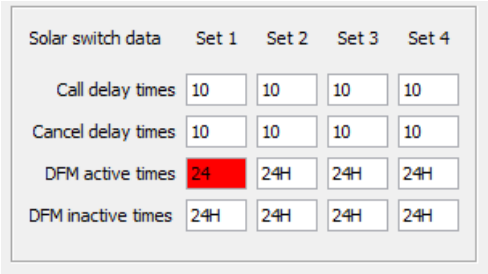


Figure 15 - Real-Time Error Checking

7.2 Data Areas

The data entry screens of the Configurator are grouped into several different data areas. Each data area contains one or more different screens, and some screens may be repeated for different items. For example, the **Real Phases** data area has two screens, but these are repeated for each phase configured, and every phase is an item in the data entry screens. Another example is the **Detectors** data area which has only one data entry screen, but it is repeated for each detector added. The data areas available are:

General
Real Phases
Dummy Phases
Empty/Clone Phases
Lamp Sequences
Stages
Switched Signs
Mode Priority
Part Time Mode
Hurry Call Mode
Manual Mode
UTC Interface
FT/VA Mode
CLF Mode
LRT Mode
PSV Mode
Stage to Stage Movements
Intergreen
Phase Delays
Detectors
Speed Assessors
All Red Extension
Intergreen Extensions
Timetable
Special Conditioning
Red Lamp Monitoring
Integral Lamp Monitoring
Input/Output
Hardware
iMOVA Interface
System

The following sections show the data entry screens available in each data area giving user guidance where appropriate.

7.3 General

There are three data entry screens in this data area.

7.3.1 General – 1/3 Administration

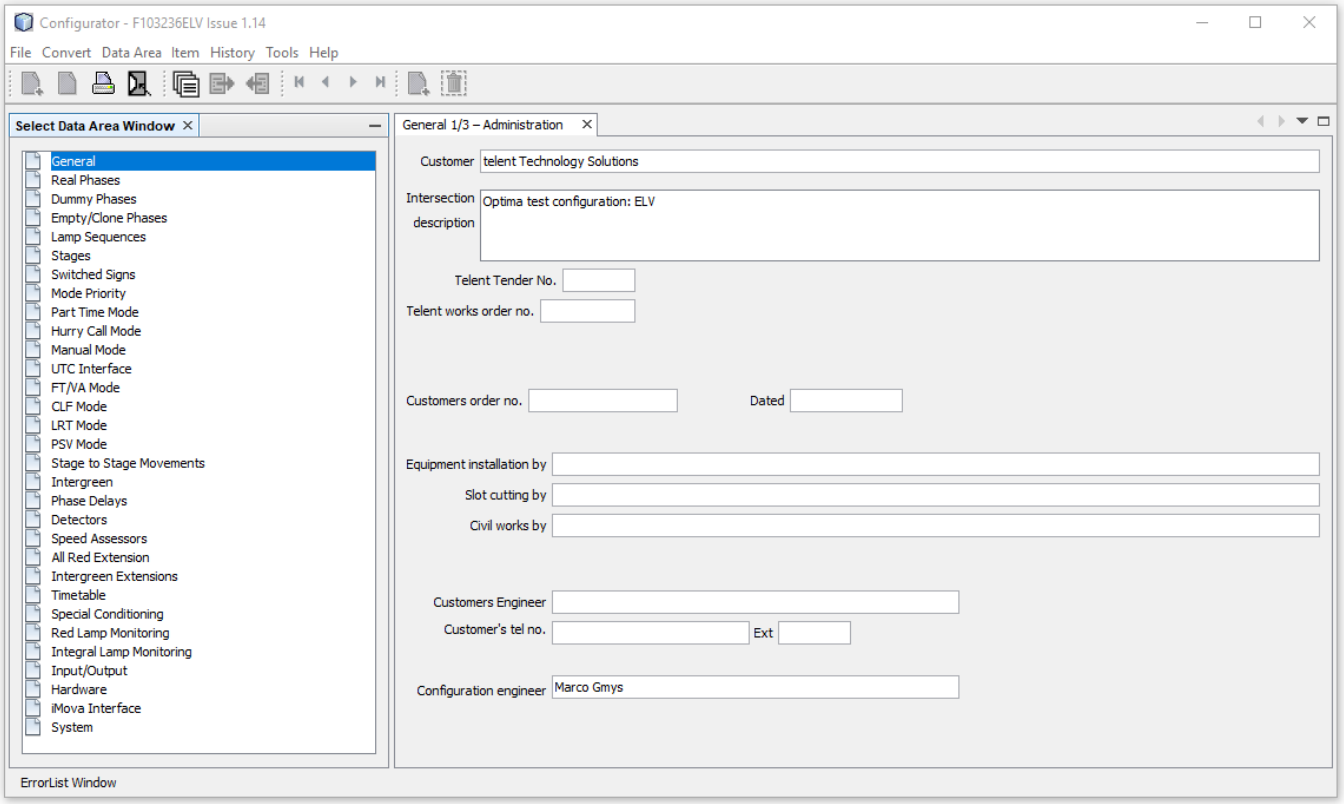


Figure 16 - General - Screen 1/3 Administration

This screen is used to define general administration data, all of which is self-explanatory. The data on this screen is only used for the front-page configuration paperwork. As much information as possible should be filled in for future reference.

7.3.2 General 2/3 – Miscellaneous Settings

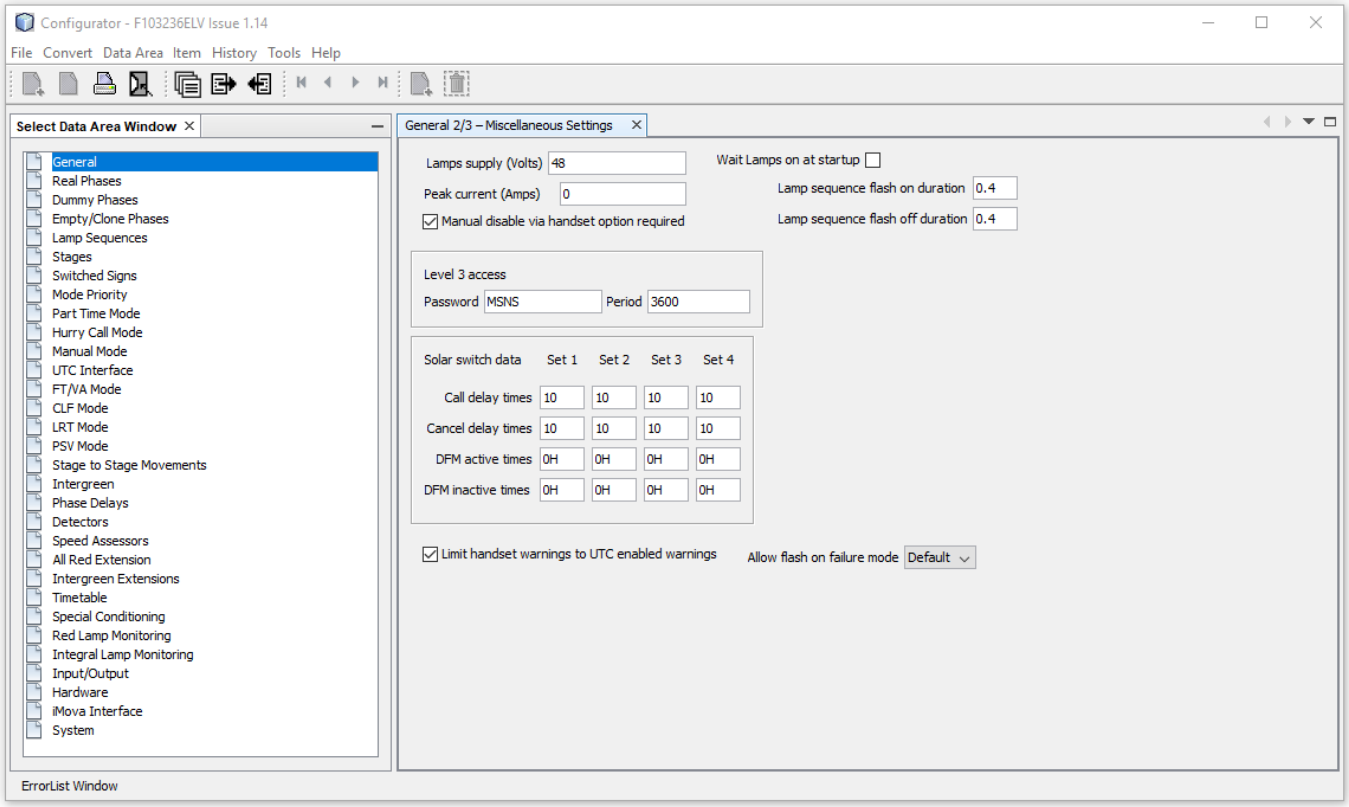


Figure 17 - General 2/3 – Miscellaneous Settings

7.3.2.1 Lamp Supply (Volts)

Required for configuration, the default value is 240 volts for controllers requiring a LV lamp supply and 48 volts for those requiring an ELV supply. The value should be entered without units i.e., 240 or 48.

Note: The correct lamp type must be selected in the Integral lamp monitoring data area, or the configuration will not run.

Warning! Using a value other than 240 or 48 will compile but the controller safety card will **not** allow the lamps to switch on.

7.3.2.2 Peak Current (Amps)

Optional for information only, however the value must be in the range 0 to 30 Amps.

7.3.2.3 Manual Disable Via Handset Option Required

When the facility is enabled, with the box checked, the **MAN** button on the manual panel is disabled and pressing it will result in the **M N/A** LED flashing briefly to indicate that manual mode has been disabled. The handset command **MND/E** can be used to enable the **MAN** button. It can be disabled again with the handset command **MND/D**.

7.3.2.4 Wait Lamps on at Startup

When this option is ticked (default) the phases defined with pedestrian demand confirmation and a startup demand (set on the Mode Priority screen) will have the Wait lamp outputs illuminated during the startup sequence.

Note: This does not insert demands, these must be specified on the Mode Priority screen.

7.3.2.5 Lamp Sequence Flash On/Off Duration

Must be in the range of 0 to 5 seconds in 0.1 second steps. The default values are 0.4 seconds for both.

Warning! The default values of 0.4 seconds must always be used within the UK.

7.3.2.6 Level 3 Access

The **Password** field is case sensitive and must be between four and eight characters long. The default password is **MSNS**. Upper case is used, as some handsets do not support lower case.

The **Period** field defines the level 3 timeout period. This period must be between 60 and 3600 seconds in steps of 1 second. The default is 600 seconds (ten minutes).

Note: If the handset is disconnected, level 3 access will be lost.

7.3.2.7 Solar Switch Data

Call/cancel delay times are used to provide a filter period and must be in the range of 10 to 300 seconds in 0.1 second steps. Default values are all 10 seconds.

DFM times must be in the range of 0 to 15300 minutes in steps of 1 minute, or 0 to 255 hours in steps of 1 hour. Note that minute values must be suffixed with M and hour values with H. If dimming is not required, then all DFM timings must be entered as 0H. Default values are all 24 hours.

The four alternative timings form part of the detector timing set which may be changed via the timetable.

7.3.2.8 Limit Handset Warnings to UTC enable Warnings

If checked then only the warnings checked in the **UTC Interface** data area, **Screen 7/7 – Timeouts and Warnings** will be reported via the handset.

7.3.2.9 Allow Flash on Failure Mode

This controls whether the signals fail to Flashing Amber or Dark for certain faults. It is a drop-down box with 3 options:

- Default – Fail to Flashing Amber is not used
- None – Fail to Flashing Amber is not used
- Custom – Provides a list of Fault Categories that trigger Flashing Amber

Warning! The default must always be used within the UK.

7.3.3 General 3/3 – Special Notes

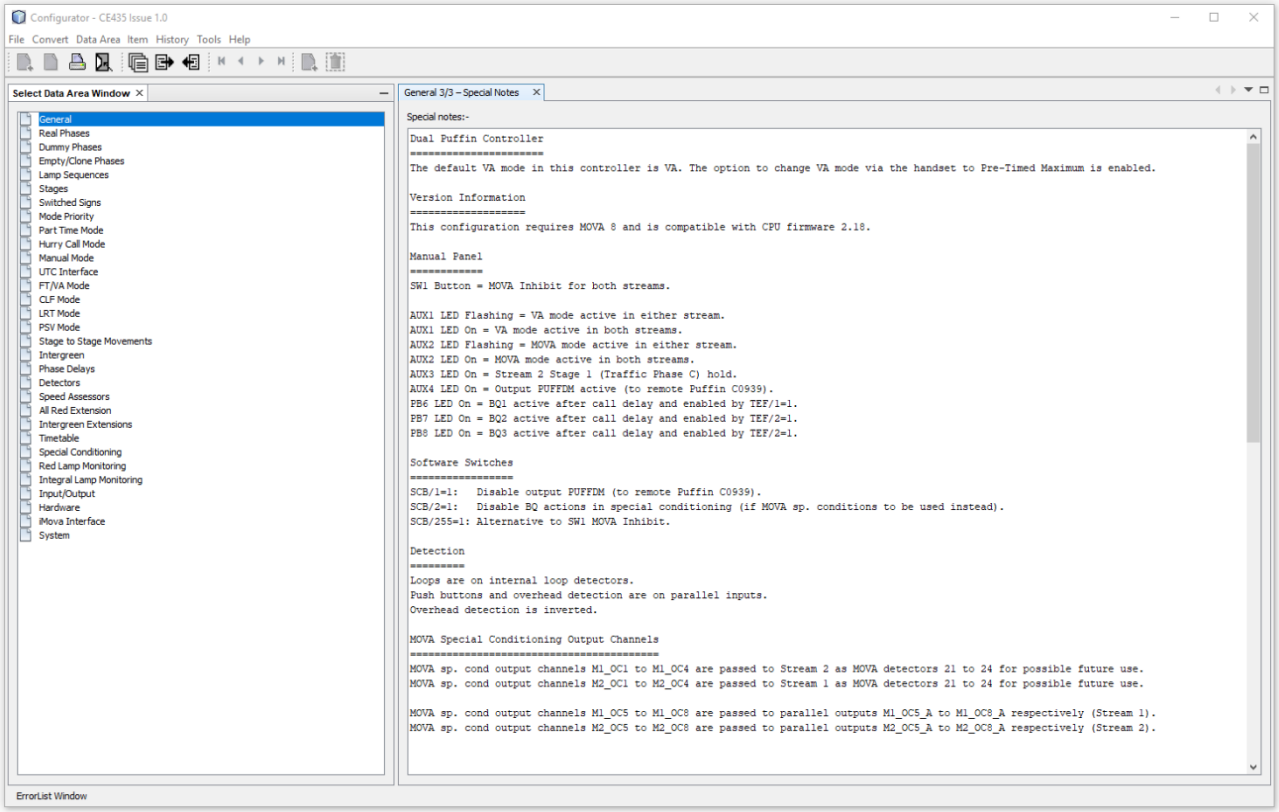


Figure 18 – General 3/3 – Special Notes

This screen is used to make special notes about the configuration, for example notes on special facilities that may be useful to maintenance engineers working on site.

7.4 Real Phase

There are two screens in this data area, and they are repeated according to the number phases created.

7.4.1 Real Phases 1/2 – Basic

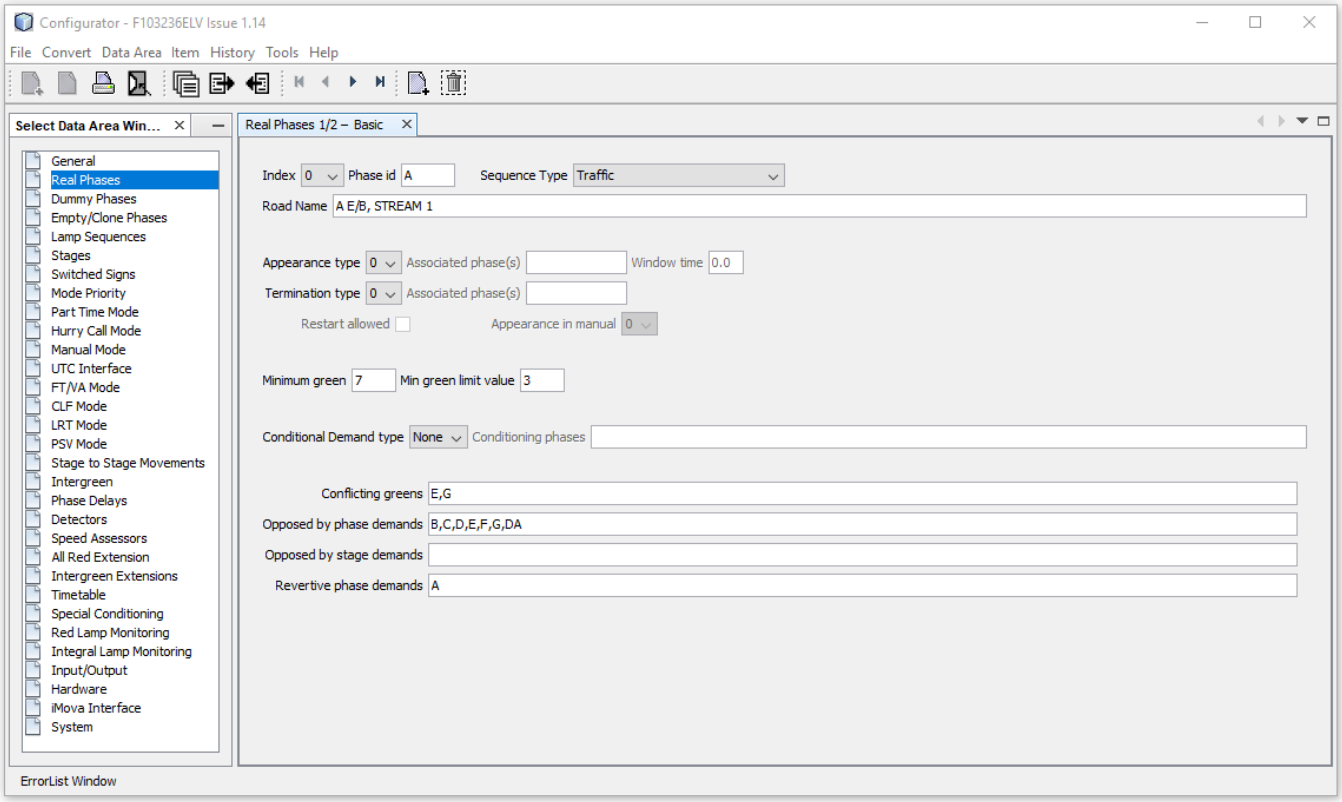


Figure 19 – Real Phases 1/2 – Basic

This screen is used to define phase data for up to 32 real phases. Use the button on the toolbar or the **Add Item** menu option to add phases as required. When a configuration is first created no real phases exist.

7.4.1.1 Index

The item index starts at zero and is automatically incremented when phases are added. The control is a drop-down list which allows the user to select the phase to view. The **First item, Next item, Previous item** and **Last item** buttons or menu options can be used to navigate the configured phases.

7.4.1.2 Phase Id

The **Phase id** is automatically allocated by the Configurator and from **A-Z** followed by **A2-F2**.

7.4.1.3 Road Name

For information only and can be any alpha-numeric string with a 56-character limit.

7.4.1.4 Sequence Type

Select the desired phase sequence type from the drop-down list. The default is **Traffic**, and can be any one of the following:

Sequence Type	Description
Far/Side pedestrian	Two-aspect pedestrian phase using red/green figures, with amber used as the wait indicator. The signals are on the **opposite** side of the road to the demand unit.
Ind/Filter	Single aspect green arrow phase for filter or indicative arrows. Dummy phases are usually configured as these.
LRT	Light Rail Transit phase for tramcar control.
Near/Side pedestrian	Two-aspect pedestrian phase using red/green figures, with amber used as the wait indicator. The red/green signals are on the **same** side of the road as the demand unit.
Pedestrian	Two-aspect pedestrian phase using red/green figures, with amber used as the wait indicator. The red/green signals are on the **opposite** side of the road to the demand unit.
Pelican Pedestrian	Two-aspect pedestrian phase using red/green figures, with amber used for the wait indicator. The red/green figure signals are on the **opposite** side of the road to the demand unit, and the green signal has a flashing period.
Pelican Traffic	Three-aspect red, amber, and green vehicle phase, uses flashing amber signal instead of starting amber.
Traffic	Three-aspect red, amber, and green vehicle phase, and is the default entry.
Wig-Wag	Three-aspect vehicle phase, with a starting amber followed by two alternating flashing red signals.

Note: Special user-defined lamp sequences can be created, and these will appear in the drop-down menu. See the **Lamp Sequence** data area.

7.4.1.5 Appearance Type

Phase appearance type may be any one of the following:

Appearance Type	Description
0	Phase always appears when stage runs. This is the default value.
1	Phase appears only if demand exists at start of stage*, or as **Type 2** if no opposing demands exist against the phase. *Where a **Type 1** phase can appear in several consecutive stages, this relates only to the start of the first stage.
2	Phase appears, if demanded, at any time up until the end of the stage.
3	Phase appears, if demanded, at any time during the stage up until the window time expires, or after the window if no opposing demands exist for the phase.
4	Phase appears when one of its associated phases runs.

Note: Only appearance type 4 requires an associated phase or phases to be specified. For all other types it should be left blank.

7.4.1.6 Termination Type

Phase termination type may be any one of the following:

Termination Type	Description
0	Phase terminates at end of stage. This is the default value.
1	Phase terminates when associated phase gains right-of-way.
2	Phase terminates when associated phase loses right-of-way.
3	Phase terminates when minimum green expires.
4	Phase can terminate early when its maximum green expires.
5	Phase terminates early on gap condition or when its maximum green expires.

Note: Only termination types 1 or 2 require an associated phase or phases to be specified. For all other types it should be left blank.

7.4.1.7 Restart Allowed

Restart allowed is only applicable for phases with an appearance type of 1, 2, 3 or 4 and a termination type of 3, 4 or 5. This facility allows a phase to be restarted if it has previously terminated early, subject to its normal starting conditions and is selected/deselected by the adjacent check box.

7.4.1.8 Appearance in Manual

Phase appearance in manual mode may be any one of the following:

Appearance Type	Description
0	Phase always appears during manual mode (default value).
1	Phase never appears during manual mode.
2	Phase is demand dependent during manual mode.

Note: This facility is only applicable for demand dependent phases, for example: those with appearance types 1, 2, 3 or 4.

7.4.1.9 Minimum Green

The range of valid phase minimum green time is dependent on the lamp sequence type, stream type and whether, in the case of a vehicle phase, it is associated to a pedestrian phase. The following ranges are quoted ranges are in 0.1 second steps. The default value is 7 seconds. TOPAS 2500B updated these ranges:

- 0 to 30 seconds for vehicle phases
- 6 to 15 seconds for vehicle phases associated to a pedestrian phase, at a junction.
- 6 to 15 seconds for vehicle phases at a stand-alone crossing.
- 4 to 12 seconds for pedestrian phases at a stand-alone crossing.
- 4 to 99 seconds for pedestrian phases at a junction.

7.4.1.10 Min Green Limit Value

Phase minimum green limit value must be in the range of 0 to the upper limit of the minimum green seconds in 0.1 second steps. Default value is 3 seconds.

Note: TOPAS 2500B states that only dummy phases and left-hand filter arrows can be set to have a minimum green limit below 3 seconds.

7.4.1.11 Window Time

Only for **Type 3** appearance phases, phase window time, must be in the range of 0 to 300 seconds in 0.1 second steps.

7.4.1.12 Conditional Demand Type

Selected using the drop-down list, this can be **NONE**, **ANY** or **ALL**. For types of **ANY** and **ALL**, a conditioning phase or phases must be specified. The default entry is **NONE**. This facility blocks demands for the phase unless **ANY** or **ALL** of the conditioning phases are demanded as well.

7.4.1.13 Conditioning Phases

Real or dummy phases need only be specified if the conditional demand type above has been set to **ANY** or **ALL**.

Note: Multiple phase IDs must be separated by commas with no spaces.

7.4.1.14 Conflicting Greens

List all the real phases and switched signs with security that conflict with this phase. Dummy phases cannot conflict. Switched signs with security are indicated by the ID of the phase drive that they are allocated to. **ALL** is allowed as a valid entry in this field, where it means all phases in the current stage stream except the current phase. **ALL** may optionally be followed by an exceptions list, for example **ALL,C,D** means all phases in the current stage stream except the current phase and phases C and D.

Note: Multiple phase IDs must be separated by commas with no spaces.

7.4.1.15 Opposed By Phase Demands

List all real and dummy phases that oppose this phase. This means phases whose demands should start the maximum green timer of this phase. A phase should normally be opposed by all other phases in the same stream. **ALL** is allowed as a valid entry in this field, where it means all phases in the current stage stream except the current phase. **ALL** may optionally be followed by an exceptions list, for example **ALL,C,D** means all phases in the current stage stream except the current phase and phases C and D.

Note: Multiple phase IDs must be separated by commas with no spaces.

7.4.1.16 Opposed By Stage Demands

List all stages that oppose this phase. This means stages whose demands should start the maximum green timer of this phase. This only needs to be filled in if stage demands are being used either from UTC demand bits or from special conditioning, otherwise it can be left blank. A stage must be indicated in <stream>.<stage> format, for example: 1.2 means stream 1, stage 2.

Note: Multiple stage IDs must be separated by commas with no spaces.

7.4.1.17 Revertive Phase Demands

Enter the phase or phases to be demanded if this phase terminates with extensions active. An extendible traffic phase usually inserts a revertive demand for itself and an indicative green arrow phase usually inserts one for its associated, full green phase. Non-extendible phases such as pedestrians and filter green arrows do not require an entry. Real or dummy phases may be specified.

Note: Multiple stage IDs must be separated by commas with no spaces.

Important! If delayed reversion is required for MOVA sites, via special conditioning, then these revertive phase demands MUST NOT be used. Conditioning is required so that the revertive demands are not placed in MOVA mode, since they prevent the delayed reversion from working properly. See Section 7.32.2.4 for an example.

7.4.2 Real Phases 2/2 - Advanced (Traffic Sequence)

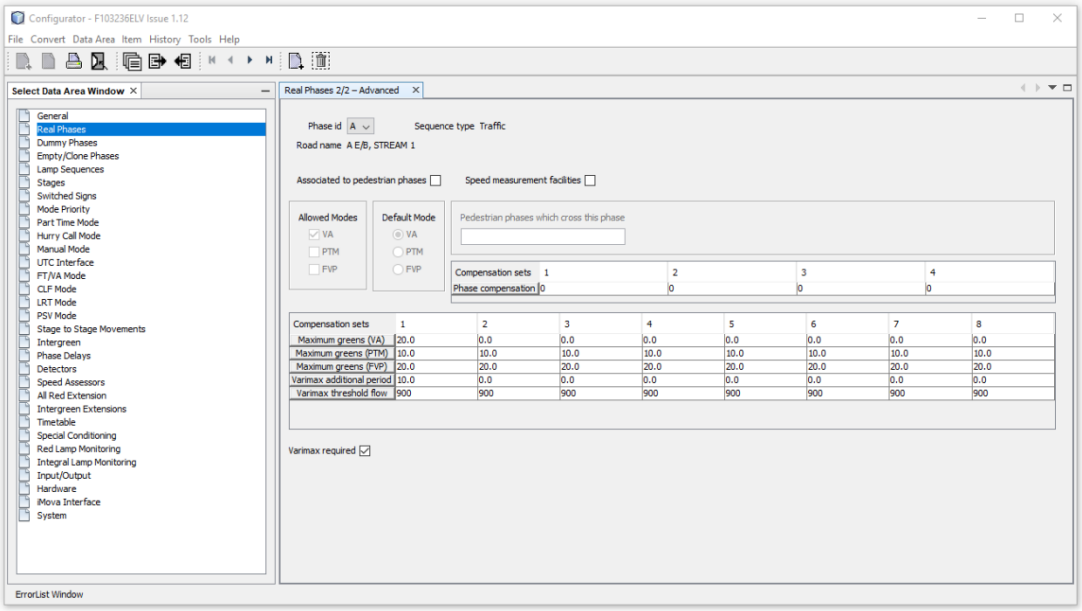


Figure 20 - Real Phases 2/2 - Advanced (Traffic Sequence)

This screen is only seen if a vehicle lamp sequence was selected on the Basic Screen. The sequence type selected on the Basic Screen is shown for reference.

7.4.2.1 Phase ID

This is automatically allocated by the Configurator in the range **A-Z** followed by **A2-F2**. It is shown only for reference on this screen.

7.4.2.2 Associated to Pedestrian Phases

The adjacent check box is used to select / deselect whether the current phase is associated to pedestrian phases. This has implications for how the minimum greens allowed ranges are managed and what VA green modes may be used.

7.4.2.3 Allowed Modes

Selection of the allowed modes of a vehicle phase is only available with the selection of **Associated to pedestrian phases**. Three modes of operation are available Vehicle Actuated [VA], Pre-timed Maximum [PTM] and Fixed Vehicle period [FVP]. At least one of these must be selected.

VA Mode	Name	Description
VA	Vehicle Actuated	Counts down the maximum green when opposed demand is registered against the phase. It may commence during the minimum green in parallel. Green can be extended up to the specified maximum by street detection or special conditioning. Once counted down, the phase cannot be held by green extensions. Green maximum time can expire early in the absence of extensions, which is known as “gapping out”.
PTM	Pre-Timed Maximum	Counts down the maximum green on appearance of green, in parallel with the minimum green. Green can be extended up to the specified maximum by street detection or special conditioning. Once counted down, the phase cannot be held by green extensions. Green maximum time can expire early in the absence of extensions.
FVP	Fixed Vehicle Period	Counts down the maximum green on appearance of green, in parallel with the minimum green. The green will count down for the specified fixed period, and then rest in green. The maximum time cannot be extended by street detection. Green maximum time cannot expire early.

7.4.2.4 Default Mode

Only applicable for phases that are associated to pedestrian phase and therefore could support the three different VA modes, if selected.

7.4.2.5 Speed Measurement Facilities

Selected / deselected by the adjacent check box. Required if phases are linked to any form of Speed Measurement facility. Ticking the box unlocks the following field.

7.4.2.6 Pedestrian Phases Which Cross This Phase

Only applicable with Speed Measurement facilities, list all the pedestrian phases that cross this phase. These phases will then be affected by any Speed Measurement detection on this phase, triggering intergreen extensions.

7.4.2.7 Maximum Greens

Phase maximum green times should be specified, as required, for extendible phases and must be in the ranges to follow; each range is in 0.1 steps, defined in TOPAS 2500B.

- 0 to 120 seconds for a vehicle phase not associated to a pedestrian phase. Must be VA mode.
- 10 to 60 seconds for a vehicle phase associated to a pedestrian phase in VA or PTM mode.
- 20 to 60 seconds for a vehicle phase associated to a pedestrian phase in FVP mode.

The 8 alternative timings available form part of the phase timing set which may be changed via the timetable for each available mode of operation.

7.4.2.8 Varimax Required

The variable maximum facility is selected / deselected by the adjacent check box.

7.4.2.9 Varimax Additional Period

Should be specified, as required, for extendible phases and must be in the range of 0 to 100 seconds in 0.1 second steps. The default values are zero. The 8 values available for varimax form part of the phase timing set which may be changed via the timetable.

7.4.2.10 Varimax Threshold Flow

Should be specified, as required, for extendible phases and must be in the range of 900 to 3000 vehicles per hour in steps of 1. The 8 values available for varimax form part of the phase timing set which may be changed via the timetable. Default values are 900 vehicles per hour.

7.4.3 Real Phases 2/2 – Advanced (Pedestrian Sequence)

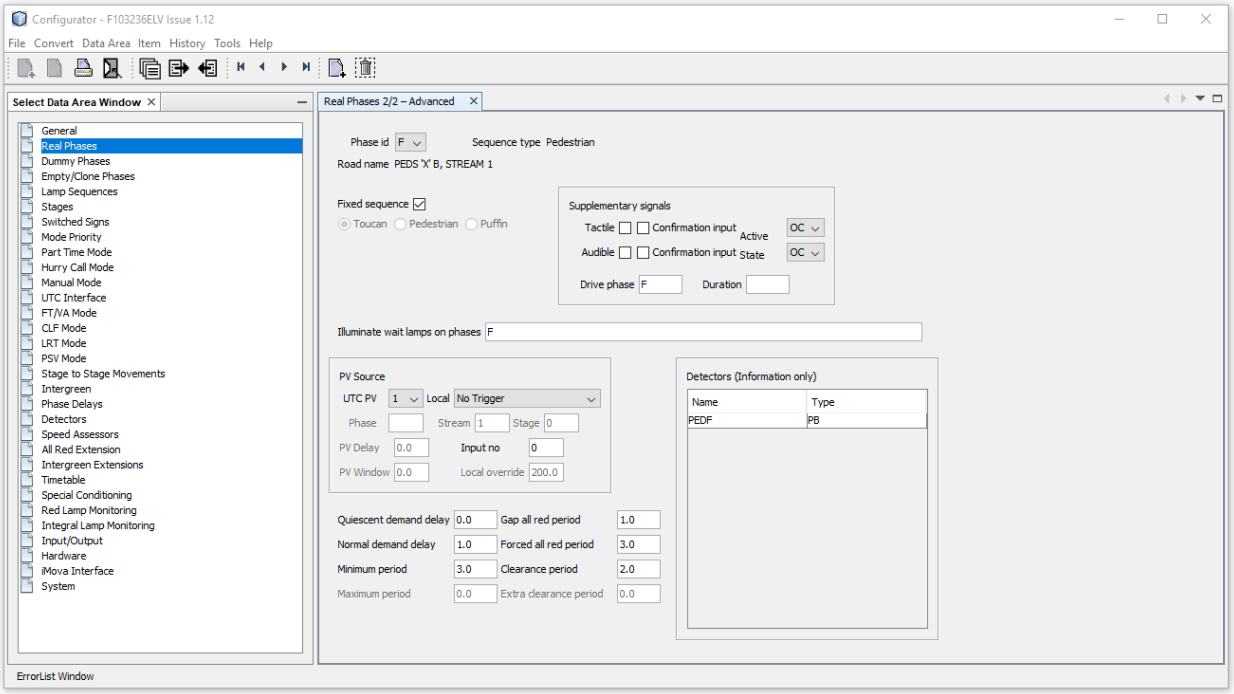


Figure 21 - Real Phases 2/2 - Advanced (Pedestrian Sequence)

This screen is only seen if a pedestrian lamp sequence was selected on the Basic Screen. The sequence type selected on the Basic Screen is shown for reference.

7.4.3.1 Phase ID

This is automatically allocated by the Configurator in the range **A-Z** followed by **A2-F2**. It is shown only for reference on this screen.

7.4.3.2 Fixed Sequence

Selected / deselected as required by the adjacent check box for all pedestrian phases excluding Pelican phases.

7.4.3.3 Toucan / Pedestrian / Puffin

Radio buttons (circle with dot when selected, else empty circle when deselected) define characteristics of the type of pedestrian sequence configured:

- Near/Side Pedestrian – Toucan or Puffin, default Toucan. Mutually exclusive.
- Far/Side Pedestrian – Toucan, Pedestrian, default Toucan. Mutually exclusive.
- Pedestrian – Default Pedestrian which cannot be changed.
- Pelican Pedestrian – Not used, any previous default may be shown, but the field is inactive.

7.4.3.4 PV Source

UTC PV: is the identifier of the number of the **PV** bit (1-16) used as an external trigger. Prior to version 3.7 the range was 0-15, where 0 was PV1 this was corrected in 3.7 onwards.

Local: The local PV trigger type which can be set to one of the following:

- No Trigger
- Phase starting
- Phase stopping
- Stage starting
- Stage stopping
- Local link (Active release)
- Local link (Inactive release)
- Stage stopping

Phase: Must be specified for local PV trigger types **Phase starting** and **Phase stopping**.

Stream and **Stage**: Must be specified for local PV trigger types **Stage starting** and **Stage stopping**.

Input no: Must be specified for local PV trigger types **Local link (Active release)** and **Local link (Inactive release)**.

PV Delay: Must be specified for all pedestrian phases unless the local PV trigger is set to **No Trigger**. **PV delay** duration must be in the range 0 to 99 seconds in 0.1 second steps.

PV Window: Must be specified for all pedestrian phases unless the local PV trigger is set to set to **No Trigger**. If a UTC PV bit is specified, this window must have a value. **PV Window** duration must be in the range of 0 to 30 seconds in 0.1 second steps.

Local override: time must be specified for local PV trigger types **Local link (Active release)** and **Local link (Inactive release)**. **Local Override** duration must be in the range of 20 to 300 seconds in 0.1 second steps.

7.4.3.5 Illuminate Wait Lamps on Phase

Specify the phase output used to drive the wait indicator for the phase. This is normally the same phase letter as the phase being configured, however this output cannot be lamp monitored. If a monitored wait indicator is required, a switched sign must be used, where no red output is used on the same phase of the lamp switch card used to drive it.

7.4.3.6 Demand Delays

Demand delays must be in the range 0 to 2 seconds in 0.1 second steps for quiescent demand delays and 1 to 3 seconds in 0.1 second steps for normal demand delays.

7.4.3.7 Pedestrian Intergreen Sequence Timings

These timings are made up of several different periods, which can be changed using the **PSQ** handset command. The periods are:

- GAP: Period 3 All Red Gap change from traffic to pedestrian right of way.
- FRC: Period 3 All Red Forced change from traffic to pedestrian right of way.
- MIN: Minimum clearance period from pedestrian to traffic right of way.
- MAX: Maximum clearance period from pedestrian to traffic right of way.
- CLR: Clearance period from pedestrian to traffic right of way.
- XTR: Extra clearance period from pedestrian to traffic right of way.

Note: Whether some of these periods are required, durations, limits and colour in the sequence depend on the pedestrian sequence settings.

7.4.3.7.1 Pelican Sequence

The Pelican sequence is shown in the figure below:

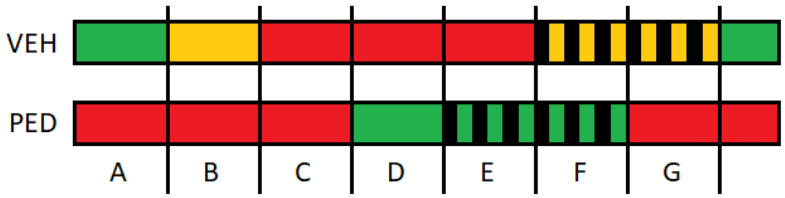


Figure 22 - Pelican Sequence

Period C [Vehicle and pedestrian red] Set either by the **GAP** step, **FRC** step or **SPD** step period. The **SPD** step is of a fixed duration set by TOPAS 2500B and is only used when the pedestrian phase crosses a vehicle phase with speed measurement facilities. Otherwise, **GAP** step is used if it is a gap condition change or **FRC** step if it is a forced change condition.

Period D [Vehicle red and pedestrian green] Set by the pedestrian phase Minimum Green.

Period E [Vehicle red and pedestrian flashing green] Set by the **MIN** step period.

Period F [Vehicle flashing amber and pedestrian flashing green] Has a maximum time set by the **MAX** step period.

Period G [Vehicle flashing amber and pedestrian red] Set either by the **CLR** step or **XTR** step period. **XTR** step period is only used if waking from the quiescent state with a vehicle demand for example: Period C straight to Period G.

Step	Lower Range Limit	Upper Range Limit
GAP	1.0	3.0
FRC	1.0	3.0
MIN	0.0	2.0
MAX	6.0	18.0
CLR	1.0	2.0
XTR	3.0	5.0

7.4.3.7.2 Puffin Sequence (Nearside Signal)

The Puffin Nearside sequence is shown below:

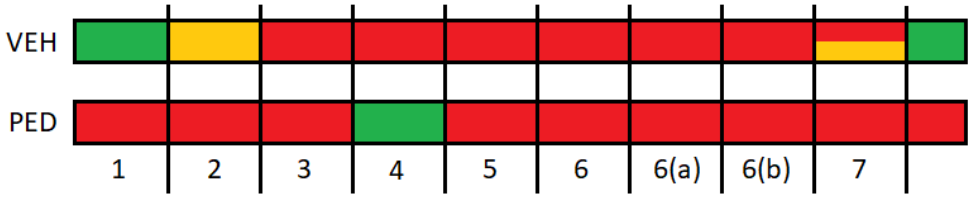


Figure 23 - Puffin Nearside Sequence

Period 3 [Vehicle and pedestrian red] Set either by the **GAP** step, **FRC** step or **SPD** step period. The **SPD** step is of a fixed duration set by TOPAS 2500B and is only used when the pedestrian phase crosses a vehicle phase with speed measurement facilities. Otherwise, **GAP** step is used if it is a gap condition change or **FRC** step if it is a forced change condition.

Period 4 [Vehicle red and pedestrian green] Set by the pedestrian phase Minimum Green.

Period 5 [Vehicle and pedestrian red] Set by the **MIN** step period. The minimum all-red time.

Period 6 [Vehicle and pedestrian red] Extendible by on-crossing detection, has a maximum time set by the **MAX** step period.

Period 6a [Vehicle and pedestrian red] Sometimes known as period 7, this is set by the **XTR** step period and this only runs if period 6 reaches its maximum time, called a forced change.

Period 6b [Vehicle and pedestrian red] Sometimes known as period 8, is set by the **CLR** step period and this only runs if period 6a (8) does not.

Step	Lower Range Limit	Upper Range Limit
GAP	1.0	3.0
FRC	1.0	3.0
MIN	1.0	5.0
MAX	0.0	30.0
CLR	0.0	3.0
XTR	0.0	3.0

7.4.3.7.3 Intersection Pedestrian Sequence (Farside Signal)

The Intersection Pedestrian sequence (farside signal) is shown below:

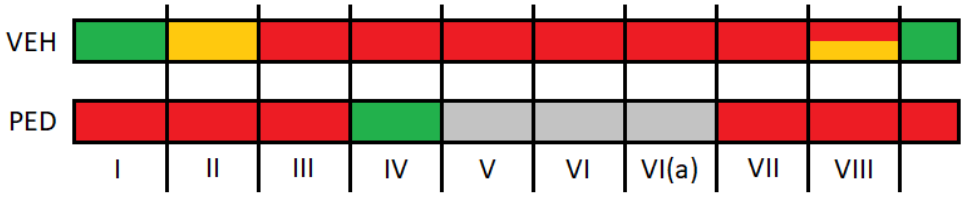


Figure 24 – Intersection Pedestrian Farside Sequence

Period III [Vehicle and pedestrian red] is set either by the **GAP** step, **FRC** step or **SPD** step period. The **SPD** step is of a fixed duration set by TOPAS 2500B and is only used when the pedestrian phase crosses a vehicle phase with speed measurement facilities. Otherwise, **GAP** step is used if it is a gap condition change or **FRC** step if it is a forced change condition.

Period IV [Vehicle red and pedestrian green] Set by the pedestrian phase Minimum Green.

Period V [Vehicle red and pedestrian blackout] Set by the **MIN** step period.

Period VI [Vehicle red and pedestrian blackout] Has a maximum time set by the **MAX** step period.

Period VI(a) [Vehicle red and pedestrian blackout] Set by the **XTR** step period and this only runs if period VI reaches its maximum time.

Period VII [Vehicle and pedestrian red] Set by the **CLR** step period.

Step	Lower Range Limit	Upper Range Limit
GAP	1.0	3.0
FRC	1.0	3.0
MIN	3.0	15.0
MAX	0.0	30.0
CLR	1.0	3.0
XTR	1.0	3.0

7.4.3.7.4 Toucan Sequence (Nearside Signal)

This is the same as the Puffin Sequence (Nearside Signal) in respect of the sequence and timings.

7.4.3.7.5 Toucan Sequence (Farside Signal)

The Farside sequence is shown below:

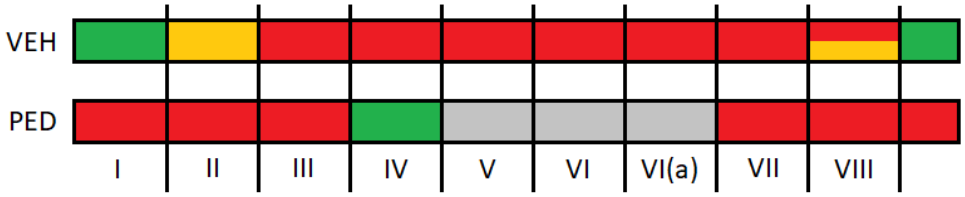


Figure 25 – Toucan Sequence (Farside Signal)

The periods of the Toucan Farside sequence are the same as the Farside sequence, but the timing ranges are slightly different.

Period III [Vehicle and pedestrian red] is set either by the **GAP** step, **FRC** step or **SPD** step period. The **SPD** step is of a fixed duration set by TOPAS 2500B and is only used when the pedestrian phase crosses a vehicle phase with speed measurement facilities. Otherwise, **GAP** step is used if it is a gap condition change or **FRC** step if it is a forced change condition.

Period IV [Vehicle red and pedestrian green] Set by the pedestrian phase Minimum Green.

Period V [Vehicle red and pedestrian blackout] Set by the **MIN** step period.

Period VI [Vehicle red and pedestrian blackout] Has a maximum time set by the **MAX** step period.

Period VI(a) [Vehicle red and pedestrian blackout] Set by the **XTR** step period and this only runs if period VI reaches its maximum time.

Period VII [Vehicle and pedestrian red] Set by the **CLR** step period.

Step	Lower Range Limit	Upper Range Limit
GAP	1.0	3.0
FRC	1.0	3.0
MIN	1.0	5.0
MAX	0.0	30.0
CLR	1.0	3.0
XTR	1.0	3.0

7.4.3.7.6 Fixed Sequence (Nearside Signal)

The fixed sequence for nearside signals is shown below:

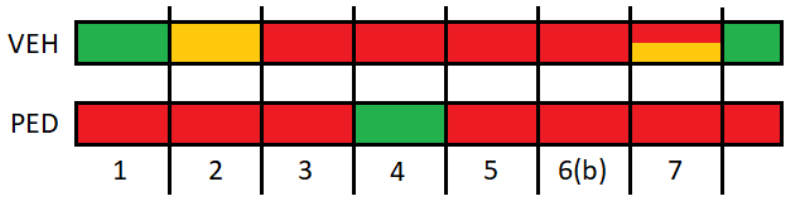


Figure 26 - Fixed (Nearside) Sequence

Period 3, [Vehicle and pedestrian red] Set either by the **GAP** step, **FRC** step or **SPD** step period. The **SPD** step is of a fixed duration set by TOPAS 2500B and is only used when the pedestrian phase crosses a vehicle phase with speed measurement facilities. Otherwise, **GAP** step is used if it is a gap condition change or **FRC** step if it is a forced change condition.

Period 4, [Vehicle red and pedestrian green] Set by the phase Minimum Green.

Period 5 [Vehicle and pedestrian red] Set by the **MIN** step period.

Period 6 is not applicable.

Period 6a is not applicable.

Period 7 [Vehicle and pedestrian red] Set by the **CLR** step period.

Step	Lower Range Limit	Upper Range Limit
GAP	1.0	3.0
FRC	1.0	3.0
MIN	1.0 *	45.0 *
MAX	N/A	N/A
CLR	1.0	3.0
XTR	N/A	N/A

Note: * This value gives an overall range, refer to TOPAS 2500B to determine the actual range appropriate to the site.

7.4.3.7.7 Fixed Sequence (Farside Signal)

The fixed sequence for farside signals is shown below:

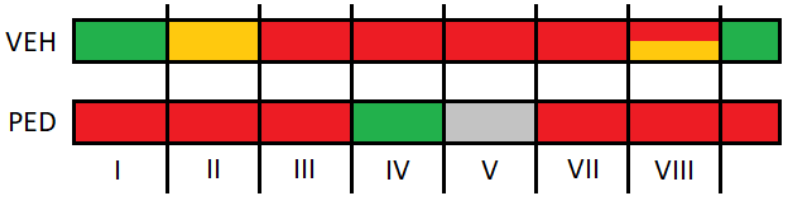


Figure 27 - Fixed Sequence (Farside Signal)

Period III [Vehicle and pedestrian red] Set either by the **GAP** step, **FRC** step or **SPD** step period. The **SPD** step is of a fixed duration set by TOPAS 2500B and is only used when the pedestrian phase crosses a vehicle phase with speed measurement facilities. Otherwise, **GAP** step is used if it is a gap condition change or **FRC** step if it is a forced change condition.

Period **IV** [Vehicle red and pedestrian green] Set by the pedestrian phase Minimum Green.

Period V [Vehicle red and pedestrian blackout] Set by the **MIN** period.

Period **VI** is not applicable.

Period **VI(a)** is not applicable.

Period VII [Vehicle and pedestrian red] Set by the **CLR** period.

Step	Lower Range Limit	Upper Range Limit
GAP	1.0	3.0
FRC	1.0	3.0
MIN	1.0 *	45.0 *
MAX	N/A	N/A
CLR	1.0	3.0
XTR	N/A	N/A

Note: * This value gives an overall range, refer to TOPAS 2500B to determine the actual range appropriate to the site.

7.5 Dummy Phase

There are two screens in this data area, and they are repeated according to the number phases created.

7.5.1 Dummy Phases 1/2 - Basic

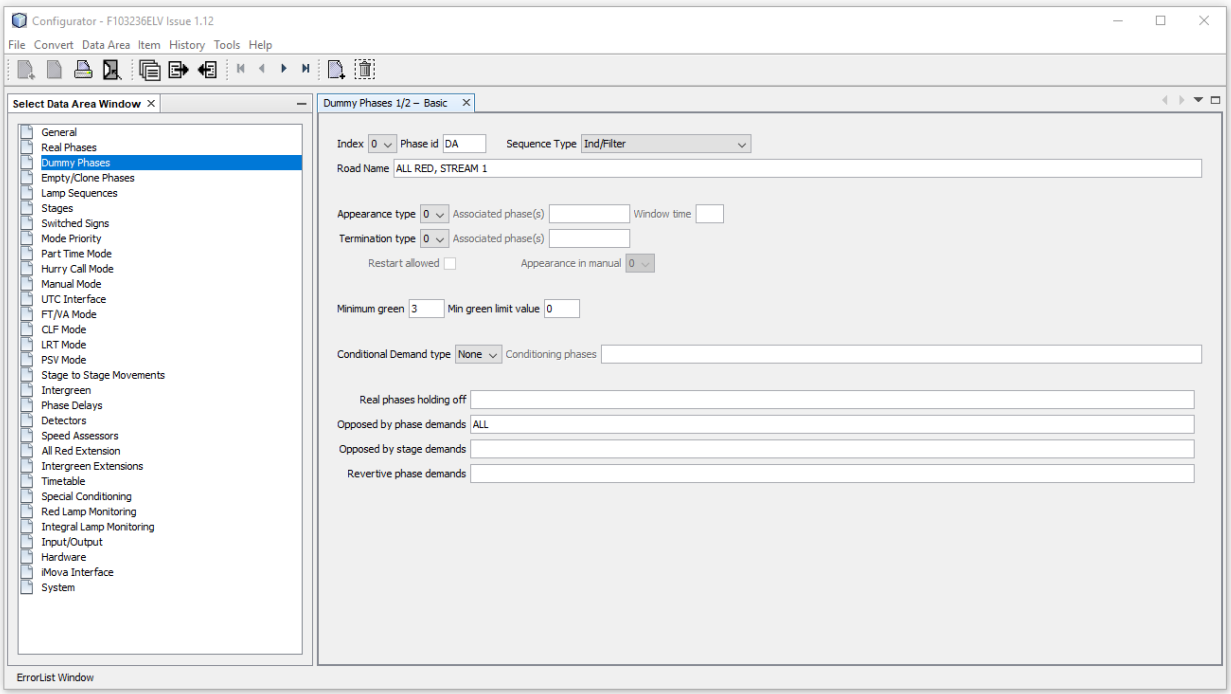


Figure 28 - Dummy Phases 1/2 – Basic

This screen is used to define phase data for up to 26 dummy phases. Use the button on the toolbar or the **Add Item** menu option to add phases as required. When a configuration is first created no dummy phases exist. For all fields other than the following refer to the description given for real phases in the previous data area.

7.5.1.1 Real Phases Holding Off

List all the real phases and switched signs with security that conflict with this phase. Dummy phases cannot conflict, but they can be held off by real phases. Switched signs with security are indicated by the ID of the phase drive that they are allocated to. **ALL** is allowed as a valid entry in this field, where it means all phases in the current stage stream except the current phase. **ALL** may optionally be followed by an exceptions list, for example **ALL,C,D** means all phases in the current stage stream except the current phase and phases C and D.

Note: Multiple phase IDs must be separated by commas with no spaces.

7.5.2 **Dummy Phases 2/2 – Advanced (Traffic Sequence)**

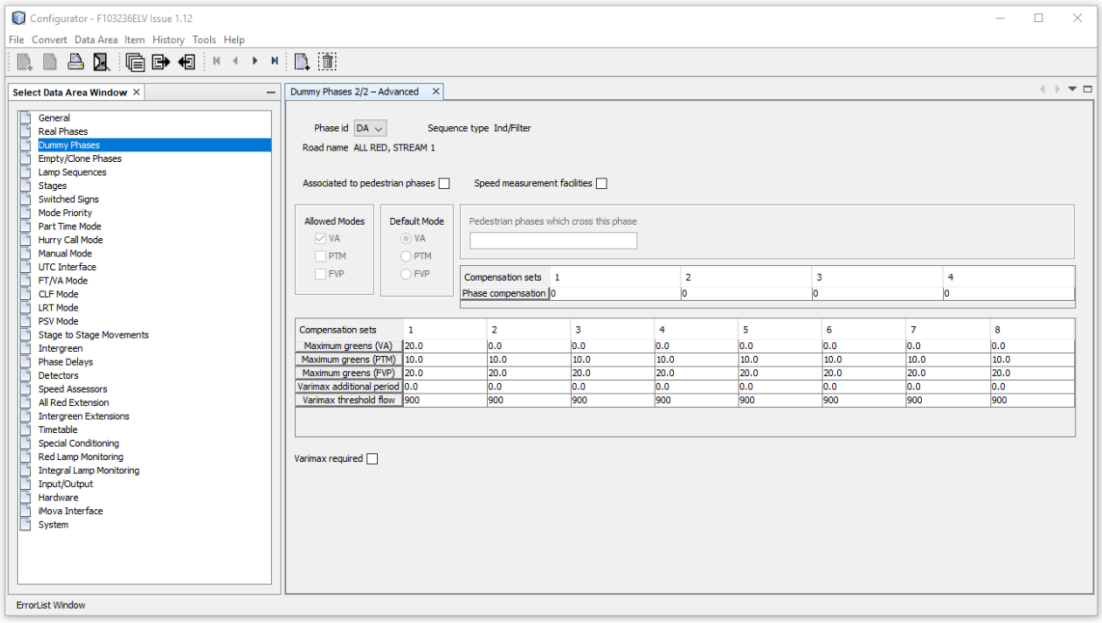


Figure 29 - Dummy Phases 2/2 – Advanced (Traffic Sequence)

This screen is only seen if a vehicle lamp sequence was selected on the Basic Screen. The sequence type selected on the Basic Screen is shown for reference.

7.5.3 Dummy Phases 2/2 – Advanced (Pedestrian Sequence)

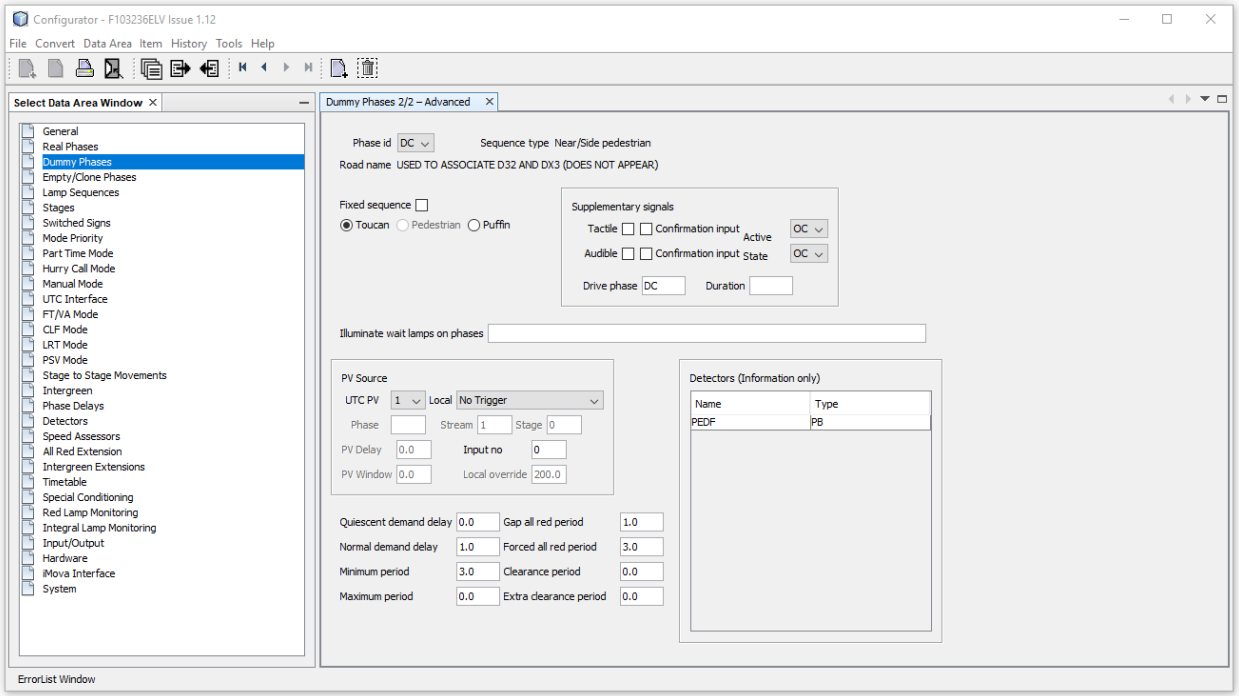


Figure 30 - Dummy Phases 2/2 – Advanced (Pedestrian Sequence)

This screen would not normally appear since most dummy phases would be configured as Indicative / Filter arrow sequence type.

7.6 Empty / Clone Phases

There is one screen in this data area and entries form a tabulated list.

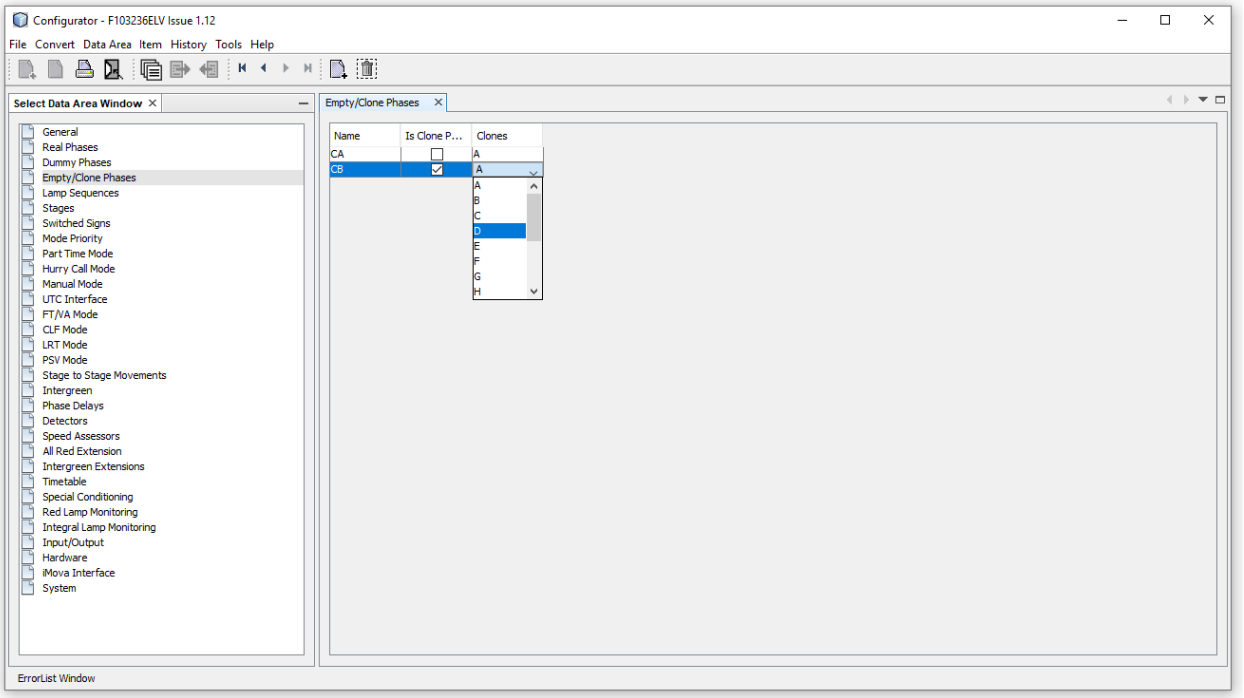


Figure 31 - Empty/Clone Phases

This data area is where empty and clone phases are defined.

7.6.1 Empty Phases

If a phase drive of any colour is to be used as a switched sign, then an empty phase must be defined here to make use of it in the **Switched Signs** data area.

7.6.2 Clone Phases

A clone phase as its name suggests, drives signals and is a clone of a real phase. It will maintain all the attributes of the real phase, such as timings, opposing phases etc. These are especially useful if there are too many signal heads on site to drive from a single phase output. Clone phases can be mapped to real phases to preserve red lamp monitoring – see the **Integral Lamp Monitoring** data area.

7.7 Lamp Sequence

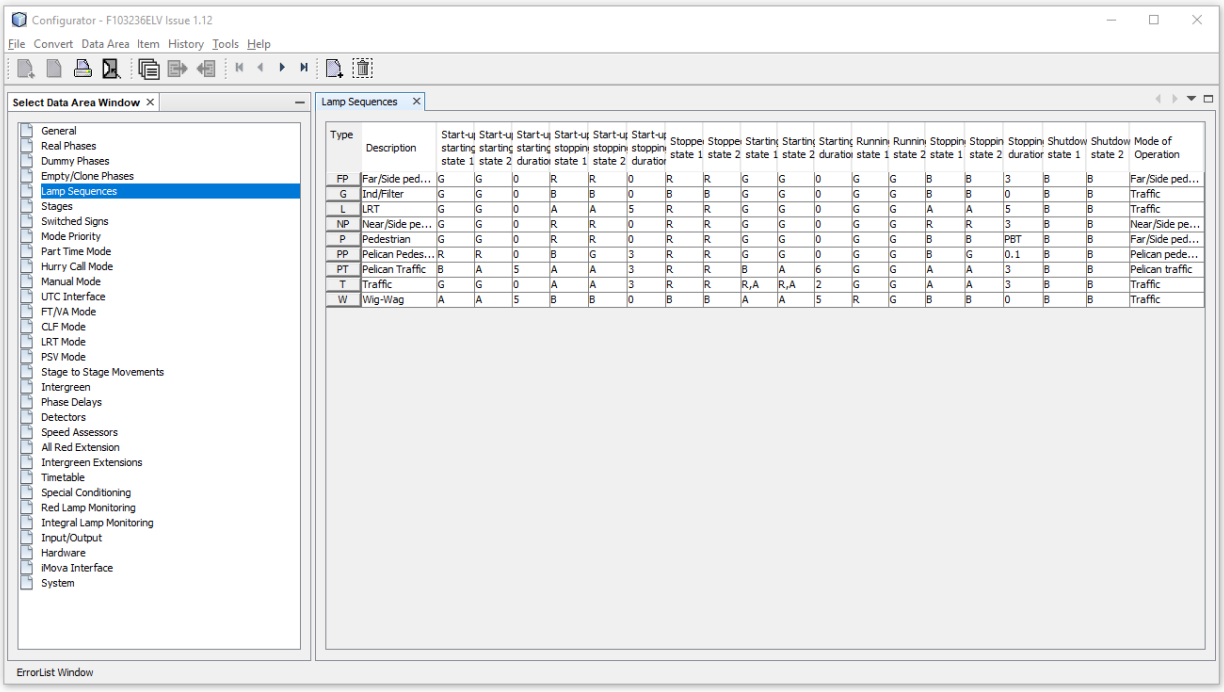


Figure 32 - Lamp Sequences

This screen defines the standard UK lamp sequences. Up to 10 user defined sequences, (U0 to U9) can be added. Use the button on the toolbar or the **Add Item** menu option to add sequences as required.

7.7.1 Description

When a sequence has been added the description field (default "**User defined**") adjacent to the lamp sequence type should be edited to describe it. This description will then be seen in the **Sequence Type** drop-down list on the phase screens.

7.7.2 Sequence States

There are seven parts to the sequence:

- Start-up starting
- Start-up stopping
- Stopped
- Starting
- Running
- Stopping
- Shutdown

Each part has two states, state 1 and state 2. These define the aspects to be displayed for each part of the sequence. Letter codes are used to define each aspect output as follows:

- R: Red
- A: Amber
- G: Green
- B: Blackout

Letter codes can be combined, separated by a comma, for example **R,A** = Red / Amber.

If both states are the same, then a steady signal will be displayed for that part of the sequence. However, if they are different then flashing signals can be created. For example, with state 1 defined as G and state 2 defined as B the result is flashing green.

Note: Screen **General 2/3 – Miscellaneous Settings** has the setting **Lamp sequence flash on duration** which defines the length of state 1, and **Lamp sequence flash off duration** defines the length of state 2.

Note: Some of the sequence states require a duration, and this must be in the range of 0 to 100 seconds in 0.1 second steps. A duration of **PBT** indicates that a value specified for pedestrian blackout will be used, but this can only be used for the **Pedestrian** sequence type.

7.7.3 Mode of Operation

It is necessary to identify a base type lamp sequence for any user defined sequence. The five possible base types can be selected from a drop-down list and are:

- Traffic
- Pelican Traffic
- Near/Side pedestrian
- Far/Side pedestrian
- Pelican pedestrian

7.8 Stages

There is only one screen in this data area, but the data shown is repeated for each configured stream.

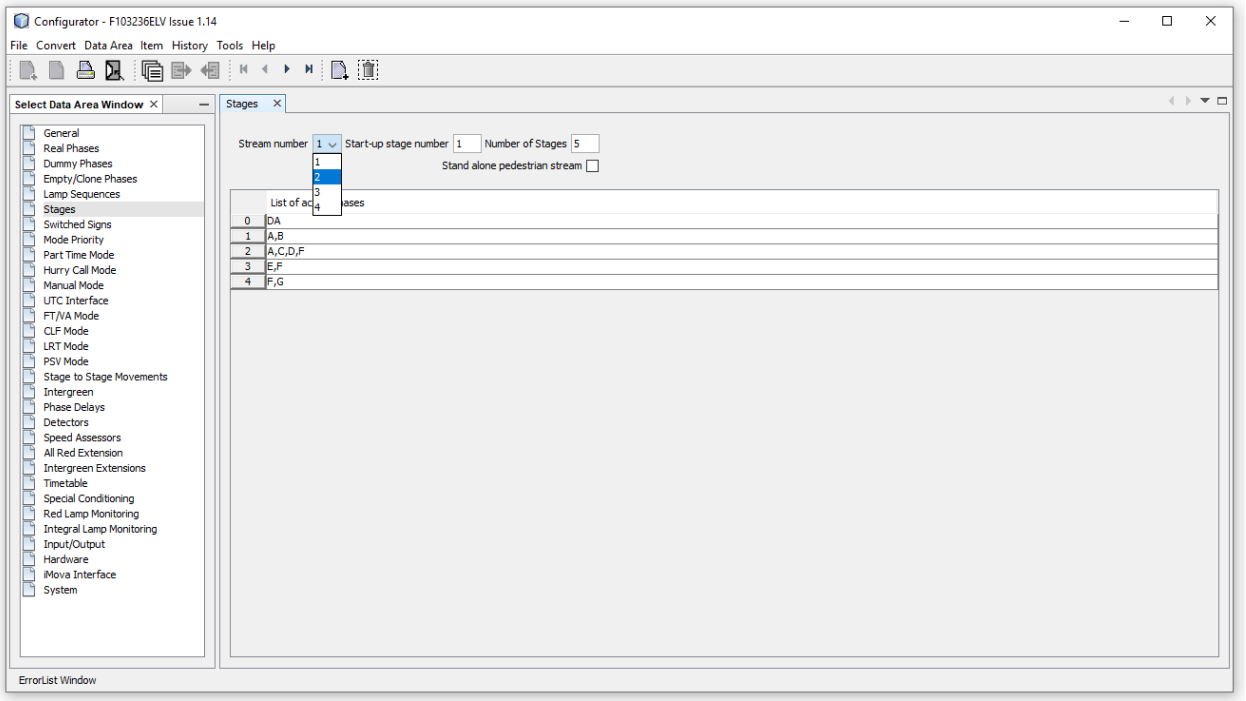


Figure 33 - Stages

This screen is used to define stage data for up to a maximum of 8 streams. Use the button on the toolbar or the **Add Item** menu option to add phases as required. When a configuration is first created no streams exist until they are added here.

7.8.1 Stream Number

The index of streams starts at 1 and is automatically incremented when streams are added. This control is a drop-down list which allows the user to select the stream to view. The First item, Next item, Previous item and Last item buttons or menu options can be used to navigate the configured streams.

7.8.2 Start-Up Stage Number

This must be in the range of 0 to 15. The default value is 1.

7.8.3 Number of Stages

This must be between 0 and 15. The value entered should be the last required stage number + 1. Each stream starts from stage 0.

7.8.4 Stand Alone Pedestrian Stream

Any stream that is only used to implement a pedestrian crossing must be marked as a standalone pedestrian stream under TOPAS 2500B. This is done by selecting the adjacent checkbox.

7.8.5 List Active Phases

For each stage required list the phases that may appear, including dummy phases, but excluding switched signs. Multiple phase IDs must be separated by commas. Each stage, excluding any all-red stage(s), must contain at least one type 0 appearance phase, (appears always) which means sometimes a dummy phase must be included in a stage that contains only demand dependent phases.

7.9 Switched Signs

There is only one screen in this data area, which is repeated for each configured sign.

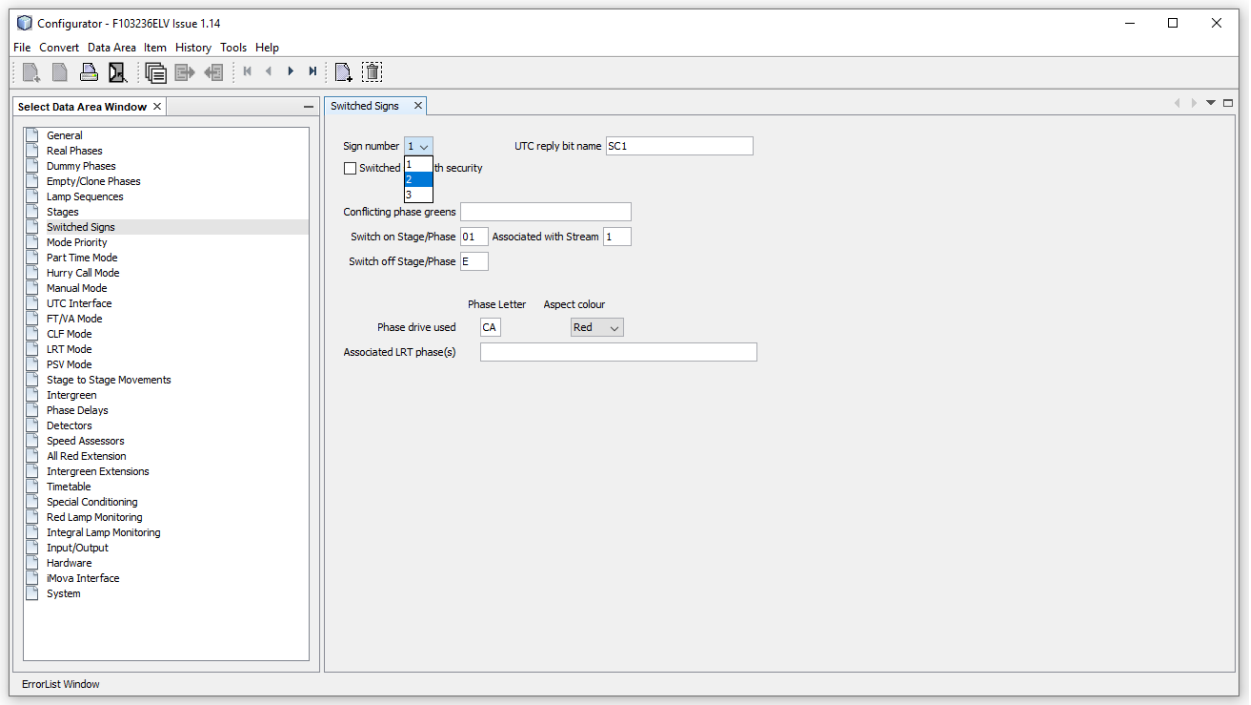


Figure 34 - Switched Signs

This screen is used to define data for switched signs. Use the button on the toolbar or the **Add Item** menu option to add switched signs as required. When a configuration is first created no signs exist until they are added here. Up to 16 signs are available, hardware permitting.

A switched sign is an output that is driven from a lamp switch card output which can be red, amber or green. The phase and colour used as the output drive must not already be used by the real phases. Usually, an empty phase is defined in the **Empty/Clone Phases** data area is used.

Note: It is also possible to use the red output of a real phase using only green. An example of this is a bleeper drive output using a real phase green, configured with the green arrow sequence. Here, the red output on that phase can be used to drive a switched sign used for illuminating the centre island red signals on the same phase by conditioning to provide a centre island blackout facility.

Signs may be switched by the timetable, by a UTC **SF** bit, or by special conditioning. If one or more methods are used for requesting then ANY may request the sign to be ON, but ALL requests must be OFF before it can be extinguished.

Important! Care should be taken when using switched signs with security regarding conflict conditions.

7.9.1 Sign number

The index of the switched sign starts at 1 and is automatically incremented when the signs are added. This control is a drop-down list, which allows the user to select the sign to view. The **First item, Next item, Previous item** and **Last item** buttons or menu options can be used to navigate the configured signs.

7.9.2 UTC Reply Bit Name

Prior to version 3.7 this field was a drop-down list containing **N/A** which was the default and meant it was not used with UTC. Other options in the list were the fixed UTC reply bit names **SC1** to **SC16**, which required an output to be configured with this name for use by UTC.

In version 3.7 and later, the fixed names have been replaced with user-defined names, so the field is now a free text box. It should be left blank if the UTC facility is not used to switch the sign.

Note: Older configurations opened in Configurator versions 3.7 or later, convert any **N/A** used in the drop-down list to **N/A** in the text box. This will cause compilation failure and must be manually removed for all configured switched signs prior to compiling the configuration.

7.9.3 Switched Signs with Security

These are allocated to a phase green, so that they can have conflicts associated with them. This option is selected/deselected by the adjacent check box, default disabled.

7.9.4 Conflicting Phase Greens

These need only be filled in for switched signs with security. This may contain real phases and/or other signs with security. When referring to another sign you must enter the phase ID for the green aspect used. Multiple phase IDs must be separated by commas.

7.9.5 Switch On/Off Stage/Phase

Switching occurs at the start of the specified stage or phase. The switch on and switch off conditions may be different. If switching is to occur immediately on request or via special conditioning, then leave blank.

7.9.6 Associated with Stream

This must be filled in otherwise the configuration will fail to compile. It is used for reference to switch on/off stages and for extinguishing the sign if the stream it belongs to is shut down.

Important! Firmware 2.18 introduced a 7 second **All Off** blackout prior to the start-up sequence commencing. Ensure that any configured switched signs used for signals (such as centre-island red signals) include SHTDWN mnemonic in special conditioning, as the streams are not in the shutdown state (but phases are) in this blackout.

7.9.7 Phase Drive Used

Enter the phase letter for the output drive, which can be **A** to **Z**, **A2** to **F2**.

7.9.8 Aspect Colour

Select the colour for the output drive from the drop-down list, which can be red, amber or green. Green must be used for switched signs with security.

7.9.9 Associated LRT Phase(s)

Switched signs are used for LRT centre lamp drives (also known as centre dot). List the associated LRT phase(s) here.

Note: Multiple phase IDs must be separated by commas with no spaces.

7.10 Mode Priority

There is only one screen in this data area, which is repeated for each configured stream.

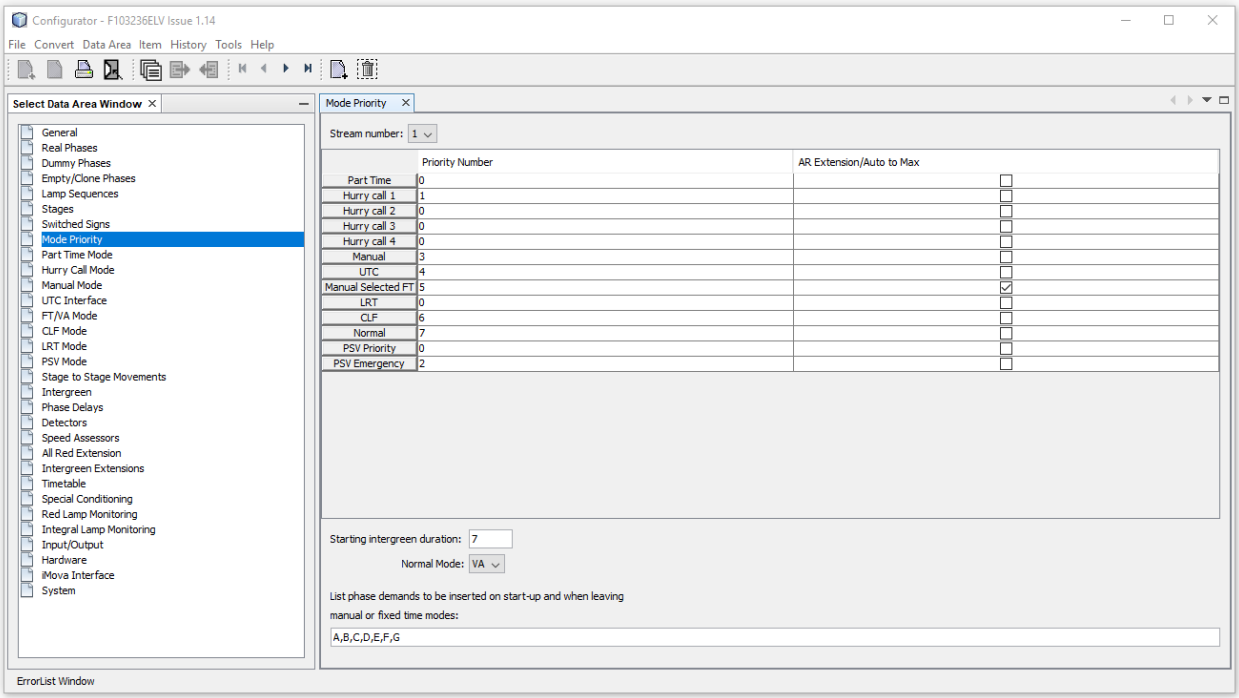


Figure 35 - Mode Priority

This screen is used to define the mode priorities for each stream already configured in the Stages data area.

Note: Each stream can have a completely different mode priority table.

7.10.1 Priority Number

A non-zero priority number must be given to each mode required, where 1 is highest priority.

Note: If no priority is given to **Normal** mode, it is automatically assigned the lowest priority.

7.10.2 AR Extensions / Auto to Max

If all red extensions are required, then indicate for each mode configured whether they should be automatically extended up to the maximum configured All Red Extension time for that stream or not.

Note: Fixed time mode should always be checked as it must always extend to maximum for safety reasons, as stated in TOPAS 2500B. Even if not ticked, the controller will automatically run to the maximum All Red Extension in fixed time.

7.10.3 Normal Mode

Select whether the normal or default mode should be Vehicle Activated (VA) or Fixed Time (FT). The default entry is VA.

7.10.4 List Phase Demands to be Inserted

Specify which phases will be demanded when the signals are switched on, or when the controller leaves Manual or Fixed Time modes. This is usually all phases in the stream not including All Red dummy phases. ALL can be specified for all phases in the stream.

Note: Multiple phase IDs must be separated by commas with no spaces.

7.10.5 Starting Intergreen Duration

The starting Intergreen duration for each stream must be in the range of 0 to 30 seconds in 0.1 second steps. This time should not include the amber period for phases not in the start-up stage. The default value is 7 seconds.

Important! Firmware 2.18 introduced a 7 second **All Off** blackout prior to the start-up sequence commencing. Ensure that any configured switched signs used for signals (such as centre-island red signals) include SHTDWN mnemonic in special conditioning, as the streams are not in the shutdown state (but phases are) in this blackout.

7.11 Part-Time Mode

There is only one screen in this data area, and all streams are shown in one table.

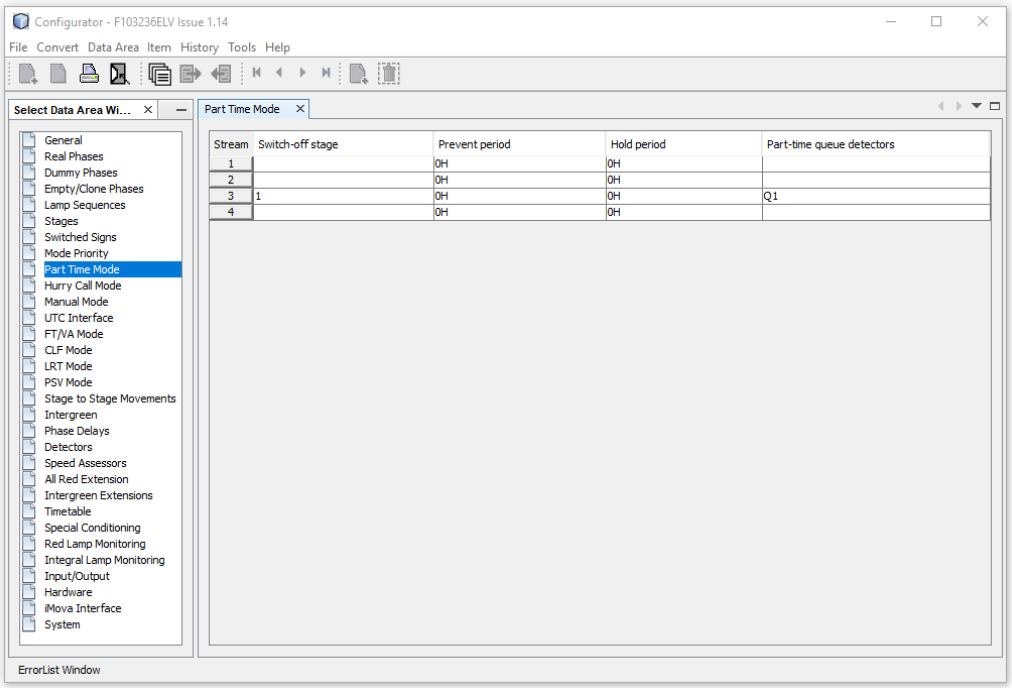


Figure 36 - Part-Time Mode

This screen is used to define mode Part-time mode data for each stream, as required.

Important! Part-time mode is active when the signals are extinguished (but the signals ON/OFF switch is ON without major fault.).

7.11.1 Switch-Off Stage

Must be in the range of 0 to 15 and must be specified for each stream requiring Part-time mode.

7.11.2 Prevent Period

This is the minimum time that the signals must remain ON after Part-time mode has ended. The time must be in the range 0 to 720 minutes in 1-minute steps, or – to 12 hours in 1-hour steps.

7.11.3 Hold Period

This is the minimum time that the signals must remain ON after entering Part-time mode. The time must be in the range 0 to 720 minutes in 1-minute steps, or 0 to 12 hours in 1-hour steps.

7.11.4 Part-Time Queue Detectors

Enter the name(s) of detectors which when active cause the controller to leave Part-time mode and switch the signals ON. The detector name(s) specified here must be defined in the **Detectors** data area. Multiple detector names must be separated by commas and no spaces.

Note: Part-time mode may also be requested/cancelled by the timetable, by a UTC **LO** bit, or by special conditioning. If one or more methods are used for requesting, any one of those active will request Part-time mode. All requests must be inactive before Part-time mode can be cancelled.

Note: The manual panel **PTI** (Part-Time Inhibit) button or `PTI` handset command can be used to override Part-time operation to bring the signals back ON. The Hold/Inhibit periods will be ignored.

7.12 Hurry Call Mode

There is only one screen in this data area, which is repeated for each stream.

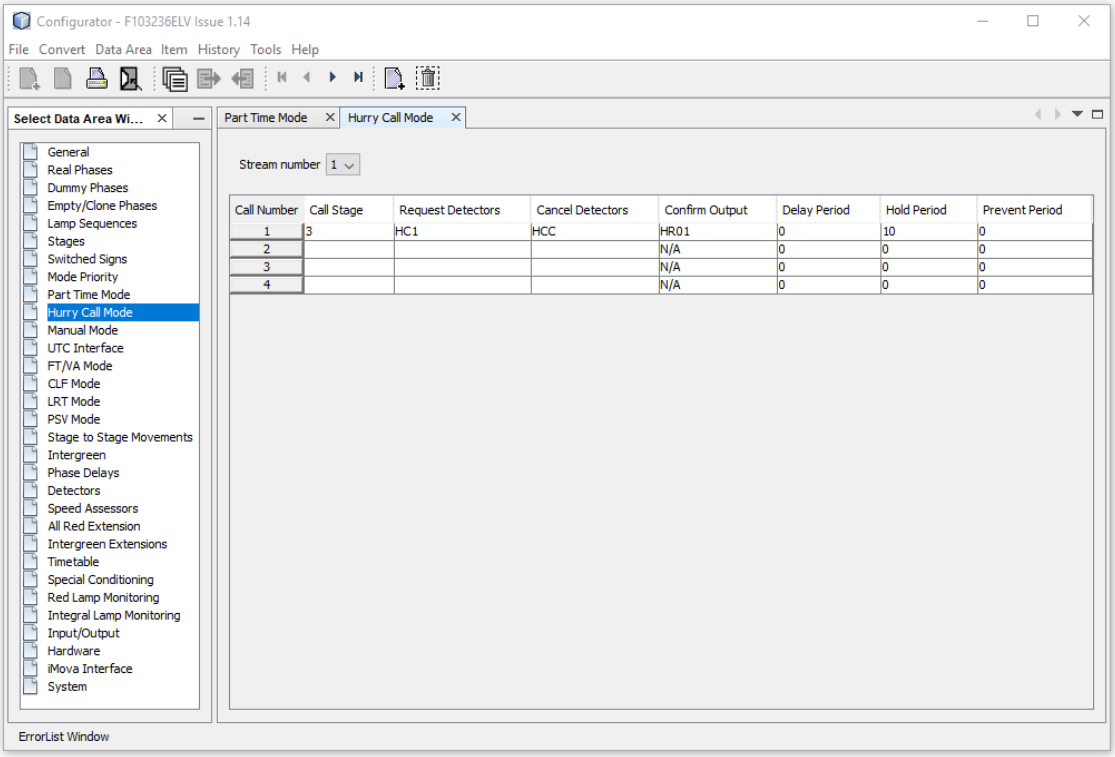


Figure 37 - Hurry Call Mode

This screen is used to define up to four Hurry Calls per stream. A hurry call detector can only be used once per stream as either a request or cancel detector. Consider using a dummy detector defined in special conditioning if a detector should be considered for more than one Hurry Call, or if combinations of detectors should operate under certain conditions.

7.12.1 Call Stage

Must be in the range of 0 to 15 and must be a configured stage.

7.12.2 Request / Cancel Detectors

Enter the name(s) of detectors which when active cause the request/cancellation of the Hurry Call. The detector name(s) specified here must be defined in the **Detectors** data area. Multiple detector names must be separated by commas with no spaces.

Note: Where combinations of detectors are required, a dummy detector must be used which is set active by special conditioning when the appropriate combination is achieved.

7.12.3 Confirm Output

This can be either **N/A** (the default) if the facility is not required or one of the pre-defined output names **HR01** to **HR32**. The confirm output is set at the start of the delay period and is removed at the end of the hold period.

Note: Where an output name is used, this must be defined later in the **Input/Output 2/3 - Outputs** screen and if virtual, also on the **Input/Output 3/3 - Virtual Bits** screen.

7.12.4 **Delay Period**

Must be in the range of 0 to 300 seconds in 0.1 second steps.

7.12.5 **Hold Period**

Must be in the range of 0 to 300 seconds in 0.1 second steps.

7.12.6 **Prevent Period**

Must be in the range of 0 to 199 seconds in 0.1 second steps.

Note: Hold and prevent periods both commence at the start of the Hurry Call stage.

7.13 Manual Mode

There is only one screen in this data area and all streams are shown in one table.

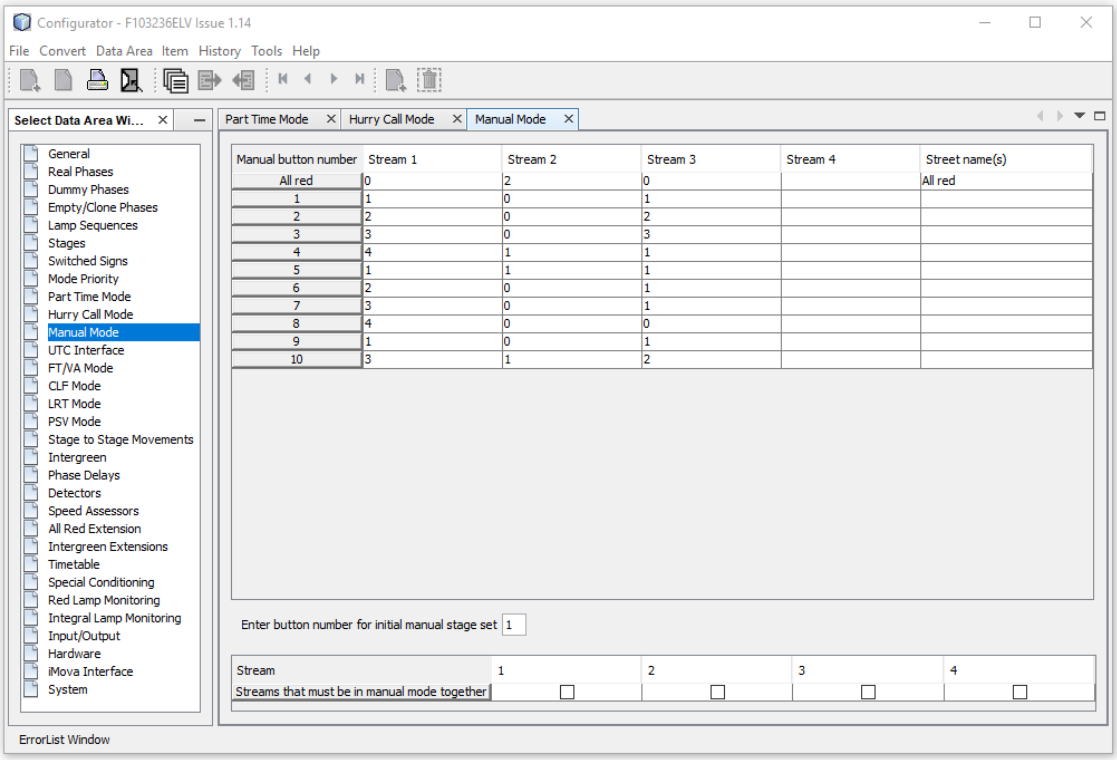


Figure 38 - Manual Mode

This screen is used to define the Manual mode stage select switch data for up to 8 streams.

7.13.1 Stage Number

In the table enter a stage number for each button number required (ALL RED and 1 – 10) against every stream configured. Unused buttons should be left blank.

7.13.2 Street Names

Street names may be entered, but these are for information purposes only, appearing on the printed form 14, “Manual Mode”.

7.13.3 Enter Button Number for Initial Manual Stage Set

Must be in the range of 0 (ALL RED) to 10.

Note: If Manual mode is entered and the current stage or combination of stages does not match any of the manual button assignments, then this button number will be forced.

7.13.4 Streams That Must Be in Manual Mode Together

Select streams by marking the checkbox for that stream. If one of the streams selected changes to another mode, then all of the selected streams will also drop out of Manual mode.

7.14 UTC Mode

There are seven screens in this data area.

7.14.1 UTC Control Bit Names

The following list shows the UTC control bit names available in the Optima. Although these may not all relate to a single screen, they are relevant for the whole data area. Some names are fixed, but most can have customised names.

Default Bit Name	Description	Older than 3.7	Version 3.7	Version 3.8 onwards
DX1 – DX8	Common Demand	Fixed	Fixed	Fixed
D01 – D32	Stage Demand	Fixed	Fixed	Fixed
F01 – F32	Stage Force	Customisable	Customisable	Customisable
SF01 – SF16	Switch Facility	Customisable	Customisable	Customisable
SG	CLF Group Timer Synchronisation	Customisable	Customisable	Customisable
SO	Solar Override	Customisable	Customisable	Customisable
LO1 – LO8	Lamps On	Customisable	Customisable	Customisable
TS	Time Synchronisation	Customisable	Customisable	Customisable
FM1 – FM8	Fallback Mode selection	Customisable	Customisable	Customisable
LL1 – LL8	Local Link Inhibit	Customisable	Customisable	Customisable
GO1-GO8	Gap Out	Customisable	Customisable	Customisable
LRTI1 – LRTI8	LRT Mode Inhibit	Customisable	Customisable	Customisable
PV1 – PV16	Hold Vehicle	Customisable	Customisable	Customisable
TC	Suppress timeout.	Customisable	Customisable	Customisable
TO1 – TO8	Take Over (Suppress timeout)	Customisable	Customisable	Customisable

7.14.2 UTC Reply Bit Names

The following list shows the UTC reply bit names available in the Optima. Although these may not all relate to a single screen, they are relevant for the whole data area. In versions older than 3.7, some of the UTC bit input and output names were fixed. In version 3.7 this was changed so that the user could specify custom names.

Default Bit Name	Description	Older than 3.7	Version 3.7	Version 3.8 onwards
DF	Detector Fault Demand	Customisable	Customisable	Customisable
G1 – G32	Stage Green Confirm	Customisable	Customisable	Customisable
FC1 – FC8	Fall Back Mode Selection Confirm	Customisable	Customisable	Customisable

Default Bit Name	Description	Older than 3.7	Version 3.7	Version 3.8 onwards
SC1 – SC16	Switch Facility Confirm	Fixed	Customisable	Customisable
HC1 – HC8	Hurry Call Confirm	Customisable	Customisable	Customisable
FGR1 to FGR8	First CLF Group Confirm	Customisable	Customisable	Customisable
SD1 to SD32	Stage Demand Confirm	Fixed	Fixed	Customisable
SR	CLF Group Timer Sync Confirm	Fixed	Customisable	Customisable
RT	Time Synchronisation Confirm	Fixed	Customisable	Customisable
MC	Manual Control Mode	Customisable	Customisable	Customisable
CF	Controller Fault	Customisable	Customisable	Customisable
CW	Controller Warning	Customisable	Customisable	Customisable
LE	Lamps Extinguished	Customisable	Customisable	Customisable
RR	Remote Reconnect	Customisable	Customisable	Customisable
TOR1 – TOR8	Take Over Reply	Customisable	Customisable	Customisable
TF	Test Facility (Handset Connection)	Customisable	Customisable	Customisable
DC	Dim confirm	Fixed	Customisable	Customisable
LRTR1 – LRTR8	LRT mode running	Customisable	Customisable	Customisable
LSF	Suspect LRT event	Customisable	Customisable	Customisable
LDF	Failed LRT detector/event	Customisable	Customisable	Customisable
LEV<phase><event>	LRT event confirm	Fixed	Fixed	Fixed

Note: A handset plugged in causes the **TF** bit to be latched on until the next **TF** reset time.

Note: For **LEV**, <phase> is the relevant phase ID and <event> can be **P** for prepare, **D** for demand, and **S** for stopline.

7.14.3 **UTC Interface 1/7 - General**

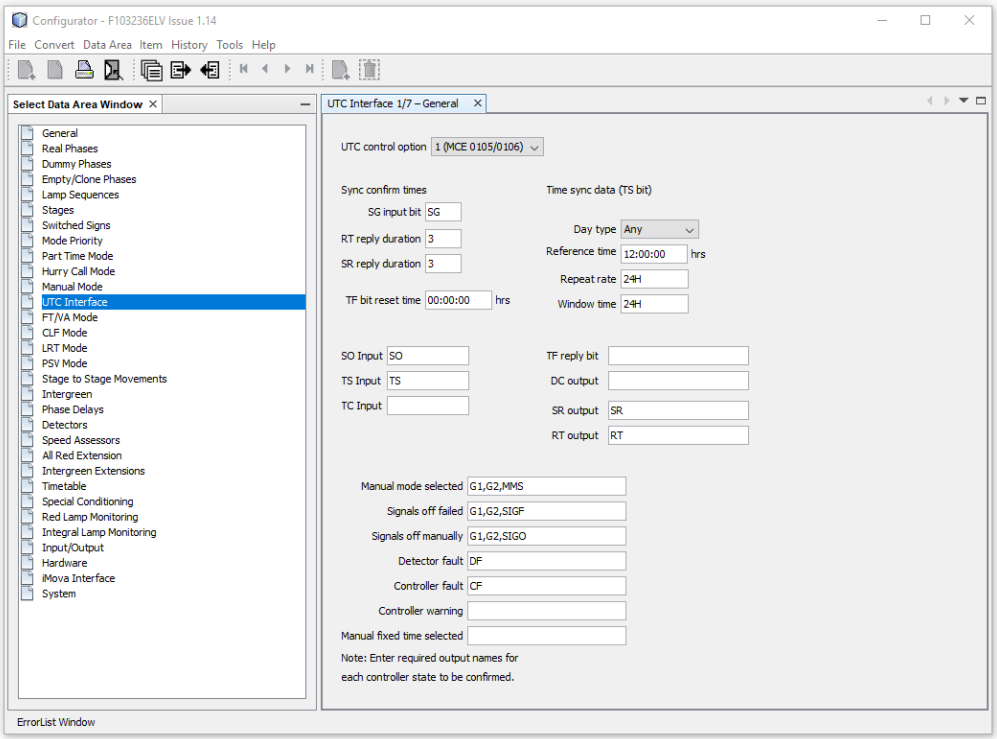


Figure 39 - UTC Interface 1/7 - General

This screen is used to define some basic settings for the UTC interface and to define some of the commonly used control and reply bits. Control bit names must be defined on the **Input/Output 1/3 – Inputs** screen. Reply bit names must be defined on the **Input/Output 2/3 – Outputs** screen. For integral UTC, control and reply bits must also be defined on the **Input/Output 3/3 – Virtual** screen. The sources for inputs and outputs must also be virtual. Multiple reply bit names must be separated by commas with no spaces.

7.14.3.1 UTC Control Option

UTC control option is selected using the drop-down box. Three options are provided which covers the various control methodologies. The most common and default is the first, **MCE 0105/0106**.

- MCE 0105/0106, (default entry)
- TCD 316
- VA SELECTION

7.14.3.2 Sync Confirm Times

Enter the control bit name for CLF Group Sync Confirm, this is usually **SG**. Enter values in seconds for the RT (Time Sync Reply) and SR (CLF Group Sync Confirm) reply durations. These must be in the range 1 to 10 seconds in 1 second steps. The default value is 3 seconds for both. To obtain different length durations of RT depending on day of the week, special conditioning must be used.

Note: TS/RT is not required for integral UG405, but dummies can be created in the UG405 XML file if the server still demands to use them.

7.14.3.3 TF Bit Reset Time

This must be in HH:MM:SS format, and is the time that the **TF** (Handset Connected) reply bit will be reset to inactive in that 24-hour period.

Note: The **TF** reply is set active when a handset is connected but can only be reset inactive once per day. This will usually be a time when it is likely that the handset will not be in use, otherwise it will immediately become active again. It requires 5 minutes inactivity on the handset.

7.14.3.4 Time Sync Data (TS Bit)

Normally only used for non-integral configurations, since integral requires a very accurate clock and so uses Network Time Protocol (NTP). If a clock synchronisation is required, set the following parameters:

- **Day Type:** Can be MON, TUE, WED, THU, FRI, SAT, SUN or ANY. If day type is not ANY then the date will also be changed when a valid TS bit is received.
- **Reference Time:** Must be in HH:MM:SS format.
- **Repeat Rate:** Must be in the range of 1 to 24 hours in steps of 1 hour, or 1 to 1440 minutes in steps of 1 minute. For a day type other than ANY this is not applicable. This time must be wholly divisible into 24 hours.
- Window Time: This must be in the range 1 to 24 hours in steps of 1 hour, or 1 to 1440 minutes in steps of 1 minute, or 2 to 86400 seconds in steps of 1 second. For a day type other than ANY this is not applicable. This time must be less than or equal to the repeat rate.

For a normal, “once a day” time sync, day type should be set to ANY and repeat rate and window time should be set to 24H. Hour values must be suffixed with **H**, and minute values with **M**, and seconds with **S**.

7.14.3.5 SO / TS / TC Control Bits

Specify the names for **SO** (Solar Override), **TS** (Time Sync) and **TC** (Transmission Confirm) inputs as required.

7.14.3.6 TF / DC / SR / RT Reply Bits

Specify the names for **TF** (Handset Connected), **DC** (Dimming Confirmed), **SR** (CLF Group Sync Confirm) and **RT** (Clock Sync Confirm) inputs as required.

Note: Prior to version 3.7 only **TF** could have a user-defined name.

Important! Opening older configurations in versions 3.7 or later will require these to be re-entered if they are used, since they were fixed names in older configurations.

7.14.3.7 General Reply Bits

Specify the bit names for the following controller states:

- **Manual Mode Selected:** Define reply bits to reply when the **MAN** button is selected (not necessarily manual mode active). Separate multiple replies with commas and no spaces.
- **Signals Off Failed:** Usually this is the stage confirms for stages 1 and 2, **G1, G2**. For certain multiple stream UTC server arrangements, this may be left blank and configured in conditioning per stream.
- **Signals Off Manual:** Usually this is the same as above **Signals Off Failed**.
- **Detector Fault:** Reply when a DFM has been logged. Usually **DF**.
- **Controller Fault:** Reply when a controller fault has been logged. Usually **CF**.
- **Controller Warning:** Reply when a controller warning has been logged. Rarely used.
- **Manual Fixed Time Selected:** Define reply bits for when the manual panel **FT** button has been pressed.

7.14.4 UTC Interface 2/7 – Stage Force Bits

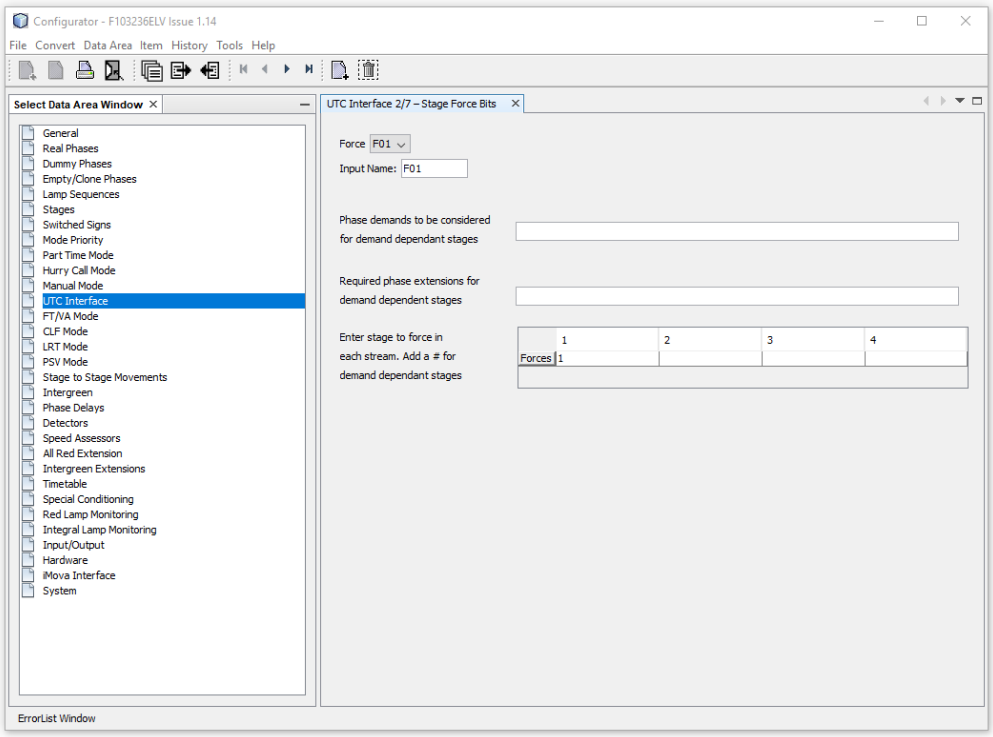


Figure 40 - UTC Interface 2/7 - Stage Force Bits

This screen is used to define data for up to 32 UTC force bits, **F01** to **F32**. Use the button on the toolbar or the **Add Item** menu option to add bits as required.

7.14.4.1 Phase Demands to be Considered for Demand Dependent Stages

Enter phases with demands to be considered for this force bit to influence UTC. This data is only used when the force bit is for a demand dependent stage. Multiple phase IDs must be separated by commas with no spaces.

7.14.4.2 Required Phase Extensions for Demand Dependent Stages

Enter phases where their extensions are to be considered before this force bit can influence UTC. This data is only used when the force bit is for a demand dependent stage under UTC option 2 (TCD 316). Multiple phase IDs must be separated by commas with no spaces.

7.14.4.3 Stage to Force

Enter the required stage to be forced in the appropriate stream(s). If the stage is to be demand dependent add a # to the stage number, for example: **2#** and ensure that the phase demands to be considered field is filled in.

Important! Where a stage has been defined as demand dependent, if the stage is also used in MOVA, conditioning must be used to ensure non-demand dependent operation of the MOVA forces. For example, if F7 is MOVA F2, F7 when MOVA mode active must demand stage 1.2:

```
IF UTCBIT-F7 AND STMNT-MOVA THEN STGDMDA-1.2 ELSE STGDMDN-1.2
```

7.14.5 UTC Interface 3/7 – Stream Associations

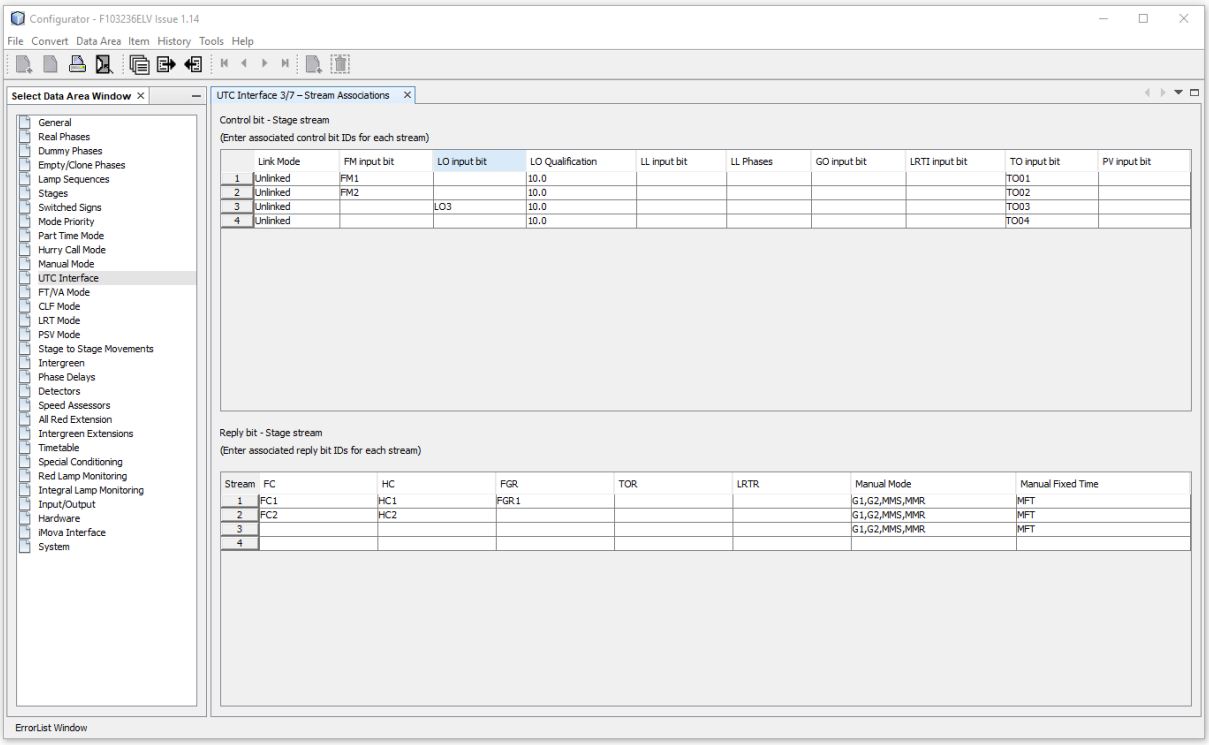


Figure 41 - UTC Interface 3/7 - Stream Associations

This screen is used to define various control and reply bits that may be required. All bit names used here must be defined in the **Input/Output** data area as appropriate.

7.14.5.1 Stream Linking Options

For a multiple stream configuration enter the required stream linking options using the drop-down lists. Linking options are:

- UNLINKED (default entry)
- MASTER
- SLAVE

Unlinked streams will enter UTC mode as soon as they have a force bit active. Master streams must all have force bits active before any of them can enter UTC mode. Slave streams cannot enter UTC mode unless they have force bits active and all master streams also have force bits active. An **LL** bit can be used to inhibit this linking so the appropriate stream(s) will operate as unlinked when the **LL** bit(s) is active.

7.14.5.2 Control Bit - Stage Stream

Enter the required control bit name against the stream requiring the facility. Only Optima defined control bit names can be used here. Control bits can have an index, if more than one stream is configured, to ensure the bit only affects the relevant stream. One control bit name may be used to affect more than one stream, for example if **GO1** was entered in the columns for streams 1 and 2 then that bit when active would provide the gap-out facility on both streams.

7.14.5.3 LO Qualification

The qualification period is the time for which the **LO** (Lamps On) bit must be active or inactive before it is actioned. The range is 10 to 25.5 seconds in 0.1 second steps.

7.14.5.4 LL Phases

This is used to define the pedestrian phases that have a local **PV** inhibited by each **LL** bit.

7.14.5.5 TO Bit

A unique **TO** bit must be defined for each stream of MOVA so that the force bits do not go inactive due to the timeout facility. Usually **TO1**, **TO2**, **TO3** and **TO4** are used. These must also be the same as those defined on the **iMOVA Interface** screen.

7.14.5.6 Reply Bit - Stage Stream

Enter the required reply bit name against the stream using the facility. It is advisable to use Optima defined reply bit names here, however any six-character name may be used provided it is defined in the **Input/Output** data area. Generally reply bits don't use an index, and it is common to use the same bits across streams, for example Manual Mode and Manual Fixed Time replies may be used on all streams. Multiple reply bits must be separated by a comma, with no spaces.

7.14.6 UTC Interface 4/7 – Stage Confirm Bits

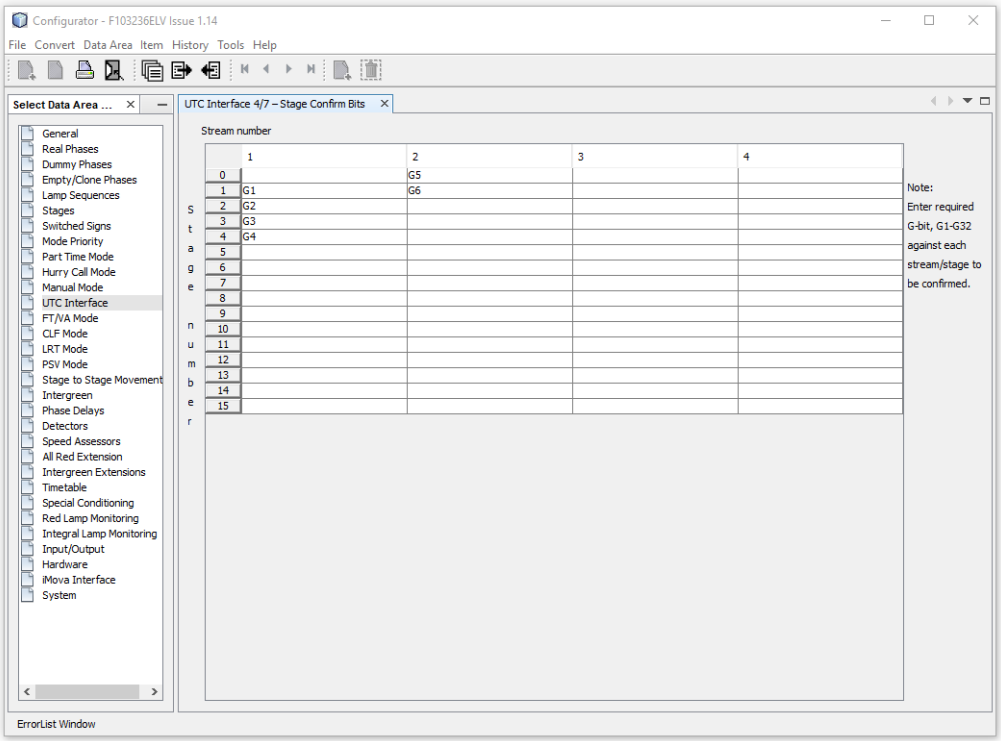


Figure 42 - UTC Interface 4/7 - Stage Confirm Bits

This screen is used to define stage green confirm bits for up to 8 streams. For each stage requiring a green confirm enter the required **G** bit name which must be in the range of **G1** to **G32**. If a phase confirm are required, then this must be done in special conditioning, for example phase A in stream 1 provided signals ON:

```
IF PHASE-A AND NOT SHDMODE-1 AND NOT MSDMODE-1 THEN OUTPUTA-GA ELSE OUTPUTN-GA
```

For freestanding MOVA, separate **G** bits may be used but these will need to be programmed in special conditioning. If the MOVA unit requires the **G** bits to be shared between UTC and MOVA, then it will be necessary to use conditioning to define the **Signals off failed** and **Signals off manually** replies (usually **G1,G2**) so that a delay can be introduced before these are replied, to give the MOVA **CRB** bit time to change state in the event of the signals being extinguished. This avoids a MOVA fault caused by multiple stage confirms under such conditions.

Bits must be defined on the **Input/Output 2/3 - Outputs** screen.

7.14.7 UTC Interface 5/7 – D and DX Bits

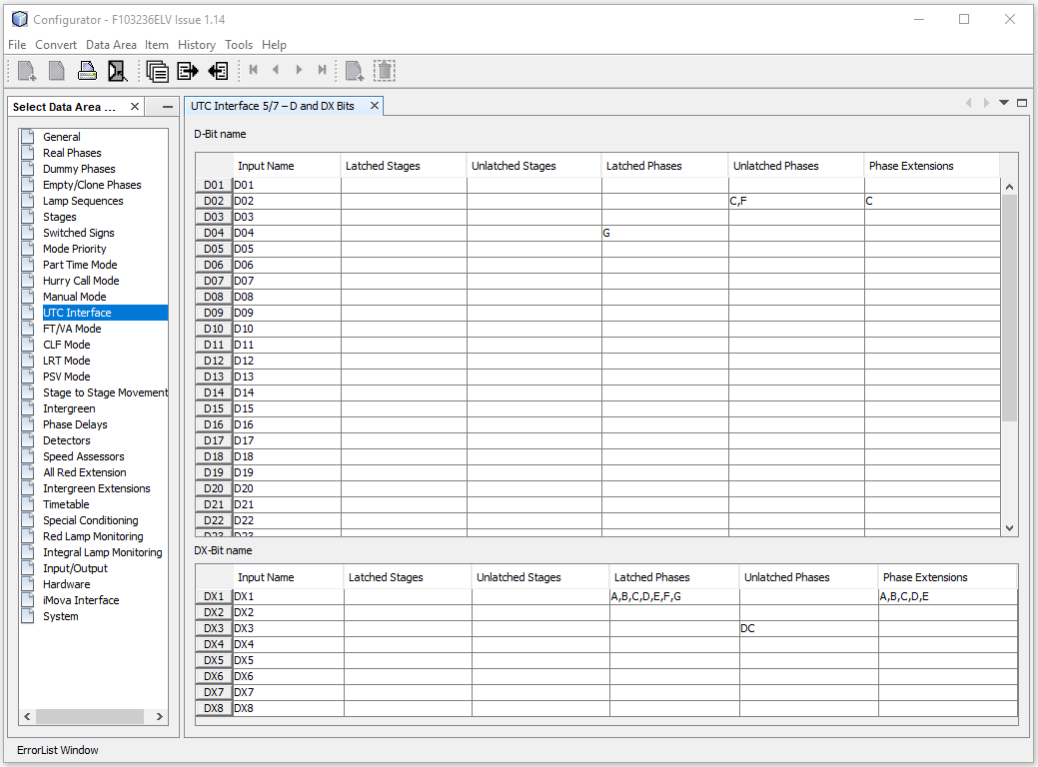


Figure 43 - UTC Interface 5/7 - D and DX Bits

This screen is used to define UTC demand bit data for demand bits **D01** to **D32** and 8 common demand bits, **DX1** to **DX8**. For each D or DX bit the following data can be specified:

7.14.7.1 Latched/Unlatched Stages

Enter the stage(s) to be demanded, in <stream>.<stage> format. For example: 2.4 = stream 2, stage 4. Multiple stage IDs must be separated by commas with no spaces.

7.14.7.2 Latched/Unlatched Phases

Enter the phase(s) to be demanded. Multiple phase IDs must be separated by commas with no spaces. Real or dummy phases may be specified.

7.14.7.3 Phase Extensions

Enter the phase(s) to be extended. Multiple phase id's must be separated by commas with no spaces. Real or dummy phases may be specified.

Note: In UTC mode, the **DX** bits only extend the phases that appear in the demand dependent stages, however all phases will be demanded and extended in VA mode.

Note: Special conditioning will be required to link **DX1** bit activation to other stream **DX** bits if only one UTC **DX** bit is configured for the UTC interface of multi-stream controllers.

7.14.8 UTC Interface 6/7 SD and SF Bits

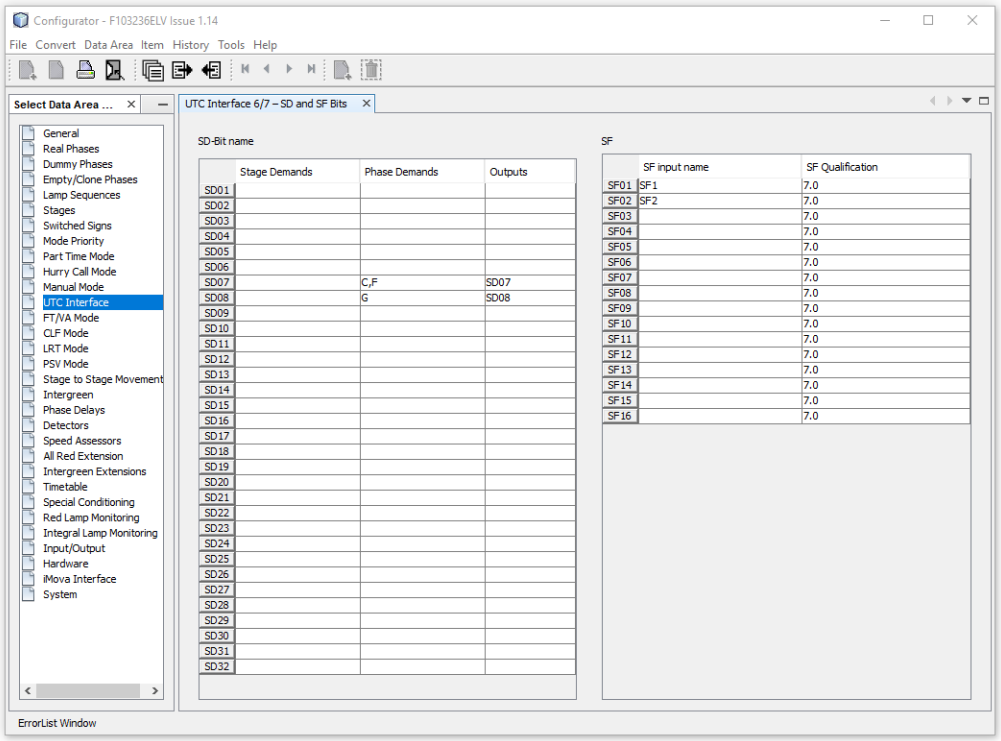


Figure 44 - UTC Interface 6/7 SD and SF Bits

This screen is used to define UTC demand bit data for **SD01** to **SD32** and **SF01** to **SF16**. For each bit the following data can be specified:

7.14.8.1 Stage Demands

Enter the stage(s) to reply when demanded in <stream>.<stage> format. For example: 2.4 = stream 2, stage 4. Multiple stage IDs must be separated by commas with no spaces.

7.14.8.2 Phase Demands

Enter the phase(s) to reply when demanded. Multiple phase ids must be separated by commas with no spaces. Real or dummy phases may be specified.

7.14.8.3 Outputs

- In Configurator 3.8 and later, the standard UTC names for **SD** replies can be changed to any user defined name, which must be defined as an output, and also virtual bit for integral UTC.
- In Configurator 3.7, the standard UTC names for **SD** replies can be changed, but the **outputs will not toggle** due to a bug, so users must specify the standard names.
- In Configurator 3.6 and earlier, the standard UTC names for **SD** replies are fixed and cannot be changed.

Note: If older configurations are opened in Configurator 3.7 or later, the **Outputs** field will be blank and must be filled in for the used demand replies, or the configuration will not compile. Use the standard UTC names **SD02** etc, unless changing the Output (and optionally virtual) bit names.

7.14.8.4 SF Input Name

Enter the name of the input defined for each **SF** bit.

7.14.8.5 SF Qualification

This is the time for which the bit must be active or inactive before it is actioned. The range 7 to 10 seconds in 0.1 second steps must be used.

7.14.9 UTC Interface 7/7 Timeouts and Warnings

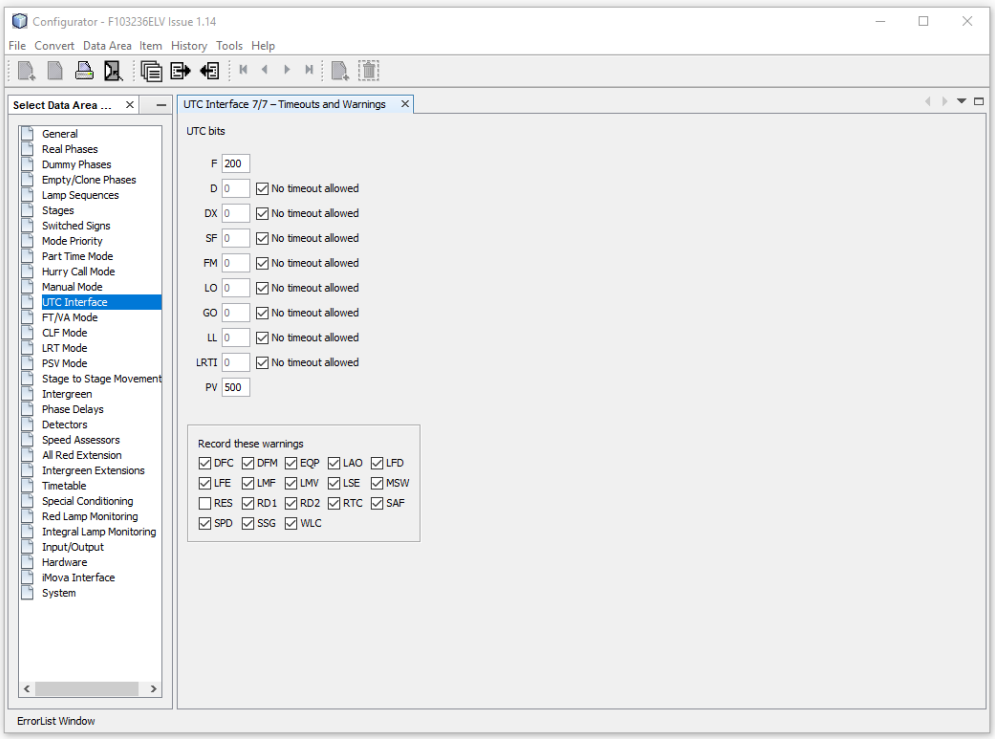


Figure 45 - UTC Interface 7/7 - Timeouts and Warnings

This screen is used to specify the timeout durations for those UTC bit types that are allowed timeouts, and which warnings to record.

7.14.9.1 Timeout durations

For each UTC bit types check the box adjacent to the **No timeout allowed** if the timeouts are NOT required. **PV** and **F** bit types always require timeouts (unless for MOVA and **TO** bit used to disable). The defaults and ranges for timeouts are:

- **F** bits must be in the range of 120 to 300 seconds in 1 second steps. The default is 200 seconds.
- PV bits must be in the range of 60 to 3600 seconds in 1 second steps. The default is 500 seconds.
- All other bit types must be in the range of 20 to 3600 seconds in 1 second steps. The defaults are 0 seconds with **No timeout allowed** checked.

7.14.9.2 Record These Warnings

Any warning checked will be considered when generating UTC warning log reports. The warnings are as follows:

DFC	Detector faults cleared.
DFM	Detector fault monitor.
EQP	Equipment Error. **Note:** Not implemented.
LAO	Lamps All Off warning.
LFD	Failed LRT detector warning.
LFE	Failed LRT event warning.
LMF	Lamp monitoring fault.
LMT	Lamp monitoring toroid faults.
LMV	Lamp monitoring mains voltage unstable fault.
LSE	Suspect LRT event warning.
MSW	Main processor software warning.
RES	Reset after power fail.
RD1	1st red lamp failure.
RD2	2nd red lamp failure.
RTC	Real Time Clock error.
SAF	Safety Card error.
SPD	Speed Assessor warning.
SSG	Supplementary signals warning.
WLC	Warning log cleared.

7.15 FT/VA Mode

There is only one screen in this data area, but it is be repeated for each configured stream.

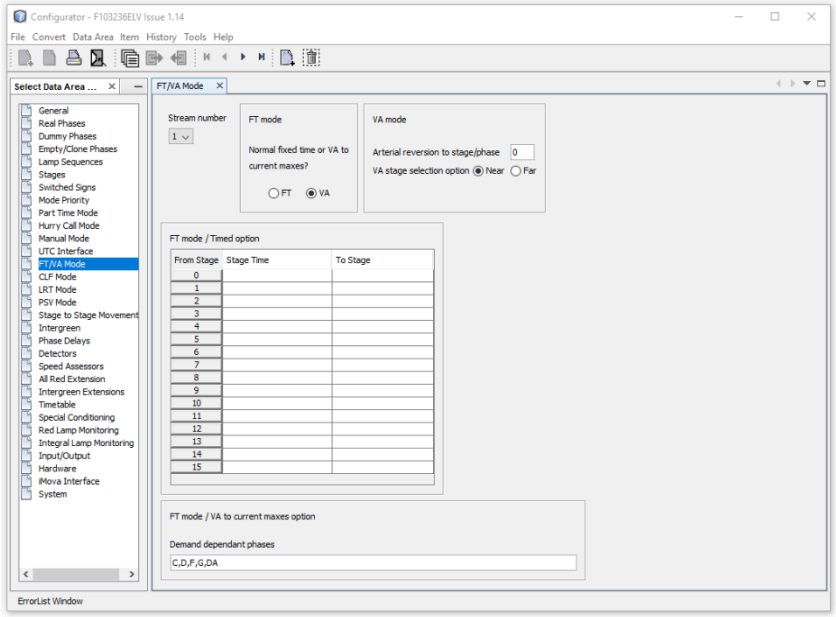


Figure 46 - FT/VA Mode Data Area

This screen is used to define FT/VA mode data for each configured stream. The stream is selected using the drop-down list, and at least one stream must have been configured to enable data entry on this screen.

7.15.1 FT Mode

This is selected using the radio buttons as either of the following:

- **FT:** Cycled Fixed Time
- **VA:** Fixed Time to current VA maximums (default)

7.15.1.1 FT

Known as cycled fixed time, this option runs a defined set of stages for a fixed stage length. Stages can be skipped in the fixed time sequence. The sequence is programmed in the FT mode / Time option table.

7.15.1.2 VA

Known as Fixed Time to current VA maximums, this more common option runs a fixed time cycle in ascending cyclic stage order, with stage green times determined by the current VA maximum set called by the timetable.

Note: Fixed Time to current VA maximums will be affected by stage restrictions placed on it by the **Stage to Stage Movements** table for VA mode. Stages run in Cycled Fixed Time and Fixed time to current VA maximums can both be influenced (allowed or inhibited) by special conditioning.

7.15.2 VA Mode

This has two controls applicable to VA mode only.

7.15.2.1 Arterial Reversion to Stage/Phase

This can be a stage in the range 0 to 15, or a phase in the ranges A to Z, A2 to F2, or DA to DZ. This field should be left blank for no reversion (rest in current stage) or if reversion is to be programmed in special conditioning. Delayed reversion is an example of where special conditioning must be used.

7.15.2.2 VA Stage Selection Option

VA stage selection can either be **Near** (default) or **Far**. **Near** is when the controller always selects the nearest stage in cyclic order to satisfy the current demands. **Far** is where it will select the farthest stage to satisfy the demands present. When using the **Far** option, the controller cannot skip over phase demands.

7.15.3 FT Mode/Timed Option

This table is for the Cycled Fixed Time option. Against each configured stage enter a **Stage Time** in the range 0 to 300 seconds in 0.1 second steps and a **To Stage** in the range of 0 to 15. The duration entered is green time only so does not include intergreen times.

For stages that should not run in Cycled Fixed Time mode should be given a **To Stage** that does run in Cycled Fixed Time mode and should not be used themselves as a **To Stage.** They should also have a **Stage Time** duration of 0.

Note: If a stage that does not run in Cycled Fixed Time is running when the mode is started, it will have to complete any minimum green times of phases that do not run through (overlap) to the next stage.

7.15.4 FT Mode/VA To Current Maxes Option

This allows **Demand Dependent Phases** to be specified when the mode is Fixed Time to current VA maximums. Multiple demand dependent phases should be separated by commas with no spaces. Any phases in the selected stream that are not listed in **Demand Dependent Phases** will have a permanent demand and extension applied during fixed time mode.

Note: Care should be taken to ensure that phases are not required to appear in Fixed Time mode are specified in this field, for example a Dummy All Red phase, as well as those phases required to be truly demand dependent.

7.16 CLF Mode

There is only one screen in this data area, which is repeated for additional CLF plans.

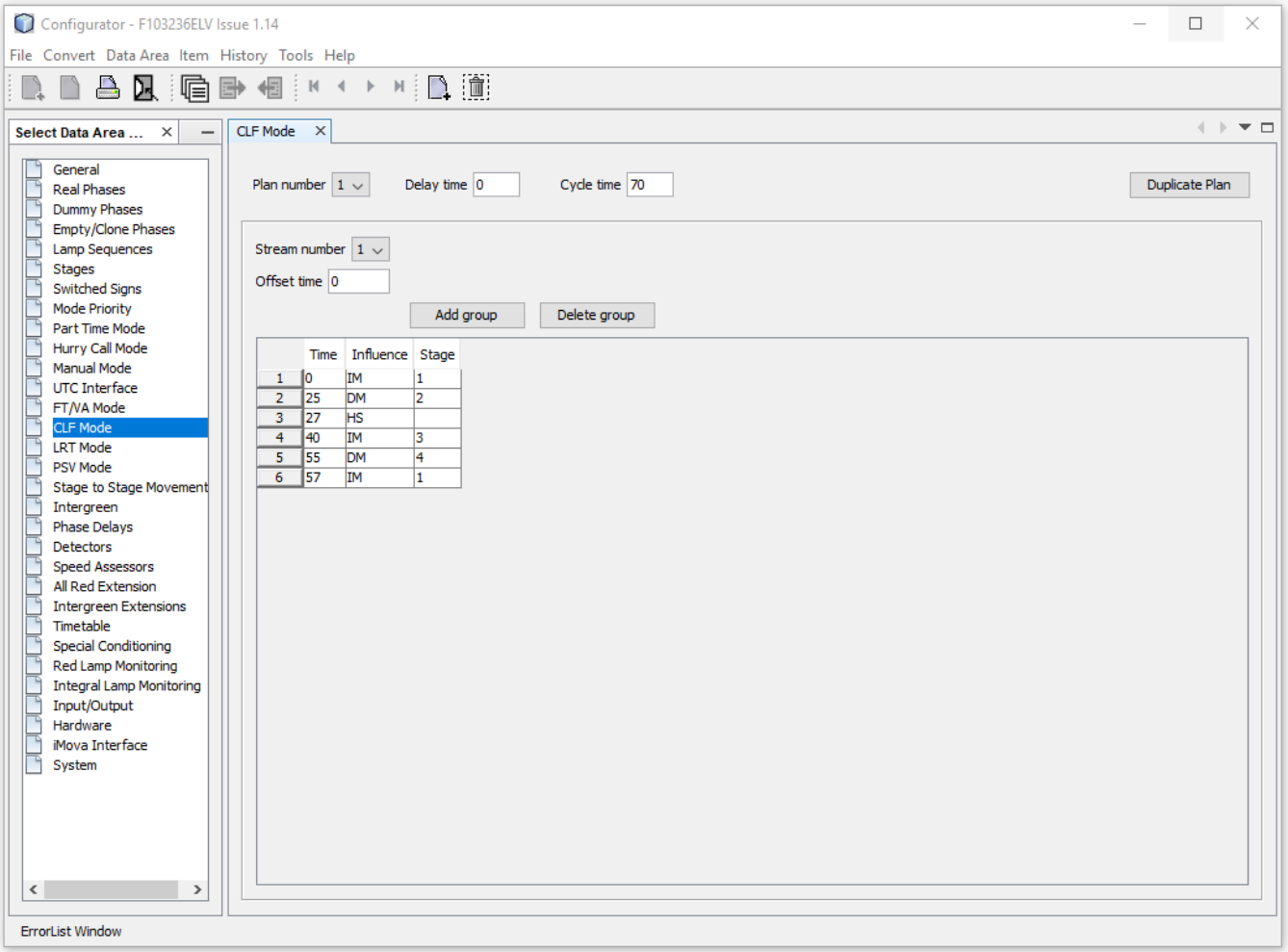


Figure 47 - CLF Mode Data Area

This screen is used to define data for up to 16 CLF plans. Use the button on the toolbar or the **Add Item** menu option to add plans as required.

For each CLF plan up to 32 groups are available for each stream configured. Range limits and step sizes confirm to TOPAS 2500B.

Introduced in version 3.7, the **Duplicate Plan** button can be used to cop the current plan and paste it as the last plan after the plans already configured.

The order of the rows of the current CLF plan will automatically sort in real-time by group time, with the lowest at the top and highest at the bottom. Data entry is easiest by adding the required number of groups, then entering the group times starting with the highest time, from the bottom, working upwards.

7.16.1 Delay Time

This must be in the range of 0 to 200 in 0.1 second steps. This delays the start of the plan from a timetable event.

7.16.2 Cycle Time

This must be in the range of 0 to 200 seconds in 0.1 second steps.

7.16.3 Offset Time

Can be set per stream and should be in the range 0 to 200 seconds in 0.1 second steps. The stream offset timers start once the plan has started, after any plan delay time.

7.16.4 Add Group / Delete Group

Use these buttons to obtain the required number of groups.

7.16.5 (Group) Time

The times specified for each group are start times and they must be in the range of 0 to 200 seconds in 0.1 second steps.

Important! The Group 1 start time MUST always be 0 on every stream, hence the need for stream offset times. However, all other group start times can be different across the streams.

7.16.6 (Group) Influence

Group influences may be any one of the following:

- **IS:** Isolate to VA **Note:** No maximum green expiry.
- **IM:** Immediate move to stage (n)
- **DM:** Demand dependent move to stage (n)
- **HS:** Hold current stage
- **PX:** Prevent moves except to stage (n) (if demanded)
- **AI:** Add immediate move to stage (n) to existing influence
- **AD:** Add demand dependent move to stage (n) to existing influence.

Note: An add influence (AI or AD) will only be actioned if the preceding influence has not been actioned. These generally follow demand dependent influences.

7.16.7 (Group) Stage

Must be in the range of 0 to 15 and are only required with influences of **IM, DM**, **PX**, **AI** and **AD** as shown above. For influences of **IS** and **HS** leave blank.

7.17 LRT Mode

There are six screens in this data area.

7.17.1 LRT Mode 1/6 - General

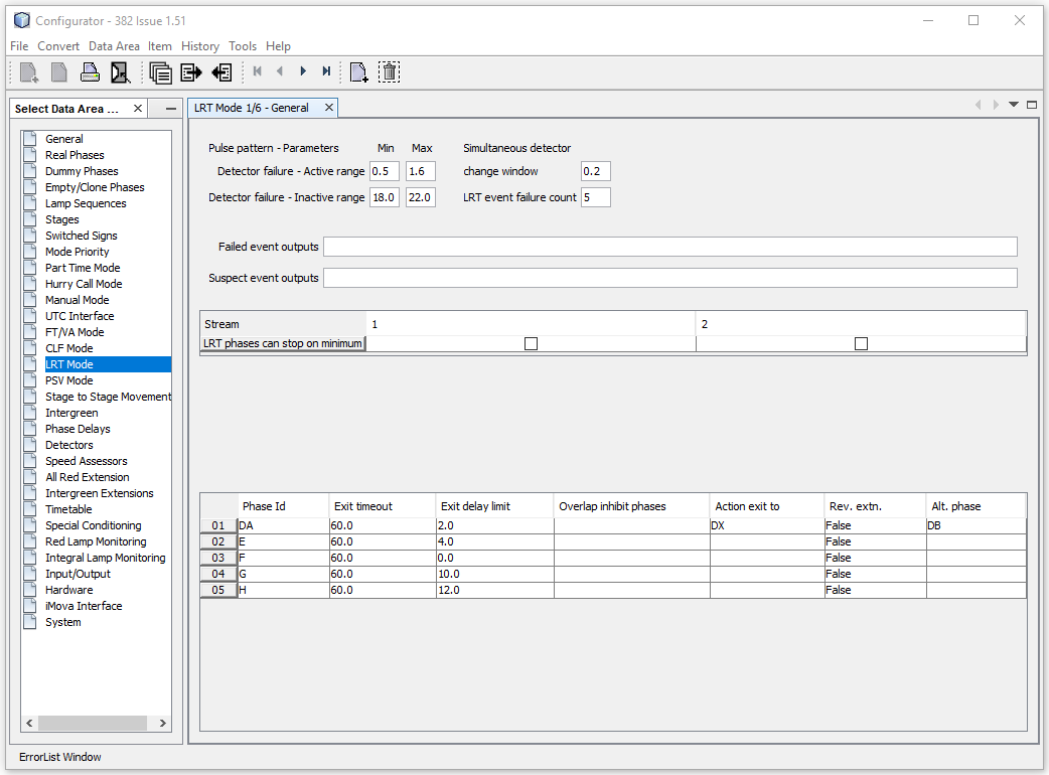


Figure 48 - LRT Mode 1/6 - General

This screen is used to define LRT general data. Use the button on the toolbar or the **Add Item** menu option to add an LRT phase as required.

7.17.1.1 Pulse Pattern Parameters

VIS-OTU units can provide a characteristic failure pattern on malfunctioning inputs. The failure pattern consists of a timed active period and a timed inactive period, this signal repeats while the input is faulty. **Detector failure Active/Inactive Range** Min and Max values are used to define the failure pulse pattern expected. All values must be specified in the range of 0 to 300 seconds in 0.1 second steps. The default values are 0.9/1.1 seconds for the active range and 29/31 seconds for the inactive range.

7.17.1.2 Simultaneous Detector Change Window

LRT events are signalled by one or more inputs changing state together, where multiple changes are required, those changes must all occur within the **Simultaneous detector change window**. This value must be in the range of 0.1 to 0.4 seconds in 0.1 second steps. The default value is 0.3 seconds.

7.17.1.3 LRT Event Failure Count

This is the count of consecutive times that an event is seen as suspect before it is registered as a failed event. This value must be in the range of 1 to 100 in steps of 1. The default value is 3.

7.17.1.4 Failed Event Outputs

The option to set a custom name for the output set when a failed event is registered, was introduced in version 3.7. this must correspond to a configured output. On earlier versions, the failed event output has the name **LDF** and is set whenever the **LFE** or **LFD** warnings are active.

7.17.1.5 Suspect Event Outputs

The option to set a custom name for the output set when a suspect event is registered, was introduced in version 3.7. this must correspond to a configured output. On earlier versions, the suspect event output has the name **LSF** and is set whenever the **LSE** warning is active.

7.17.1.6 LRT Phases Can Stop on Minimum

For any stream, it can be specified that LRT phases can stop on minimum green expiry. They are usually required to remain green until a gap or maximum green expiry. Streams that allow stopping on minimum are selected by the adjacent check box.

7.17.1.7 Phase ID

Enter a configured phase ID, (real or dummy) for each LRT phase required.

7.17.1.8 Exit Timeout

How long to wait until an Exit event has been considered timed out. Must be in the range 0 to 300 seconds in 0.1 second steps.

7.17.1.9 Exit Delay Limit

A handset lower limit value, (minimum threshold) for the Exit event delay timer specified on the next screen. This value must be in the range of 0 to 300 seconds in 0.1 second steps.

7.17.1.10 Overlap Inhibit Phases

Enter the phase(s) to be inhibited when this LRT phase overlap inhibit period is running. Multiple phase IDs must be separated by commas with no spaces.

7.17.1.11 Action Exit To

Defines actions to be taken when the Exit Timeout period expires. Valid entries are:

- **D** for demand LRT phase
- **X** for apply a permanent extension next time LRT phase runs
- **DX** for both actions (there is no space between D and X)

7.17.1.12 Rev. extn. (Revertive Extension)

Indicates whether an LRT phase has a revertive extension demand or not. Enter **Y** for yes or **N** for no. If an LRT phase is terminated while an extension is active a revertive extension demand can be applied. This means the next time LRT phase runs it will have a permanent extension applied.

7.17.1.13 Alt. phase (Alternative Phase)

When fault actions require a change to the appearance or termination of an LRT phase, this can be achieved by replacing that phase with its alternative phase.

Note: Both the normal and alternative phases should be configured as dummy phases with a green arrow sequence type, the signals will be driven by a real phase with an LRT sequence type, configured to appear and terminate in association with both the dummy phases.

7.17.2 LRT Mode 2/6 - Timing

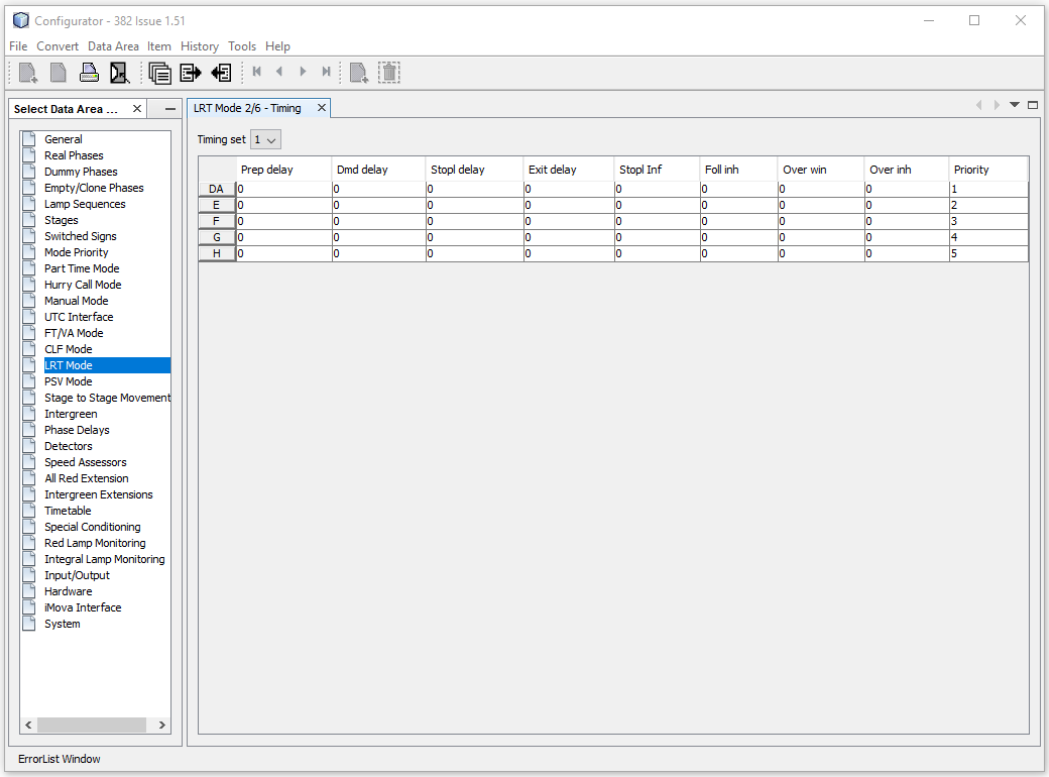


Figure 49 - LRT Mode 2/6 - Timing

This screen is used to define event delay durations, stopline influence period, follow and overlap inhibit periods, overlap window period and LRT phase priorities. All this data is contained in the LRT timing sets. There are four LRT timing sets which can be selected using the drop-down list at the top.

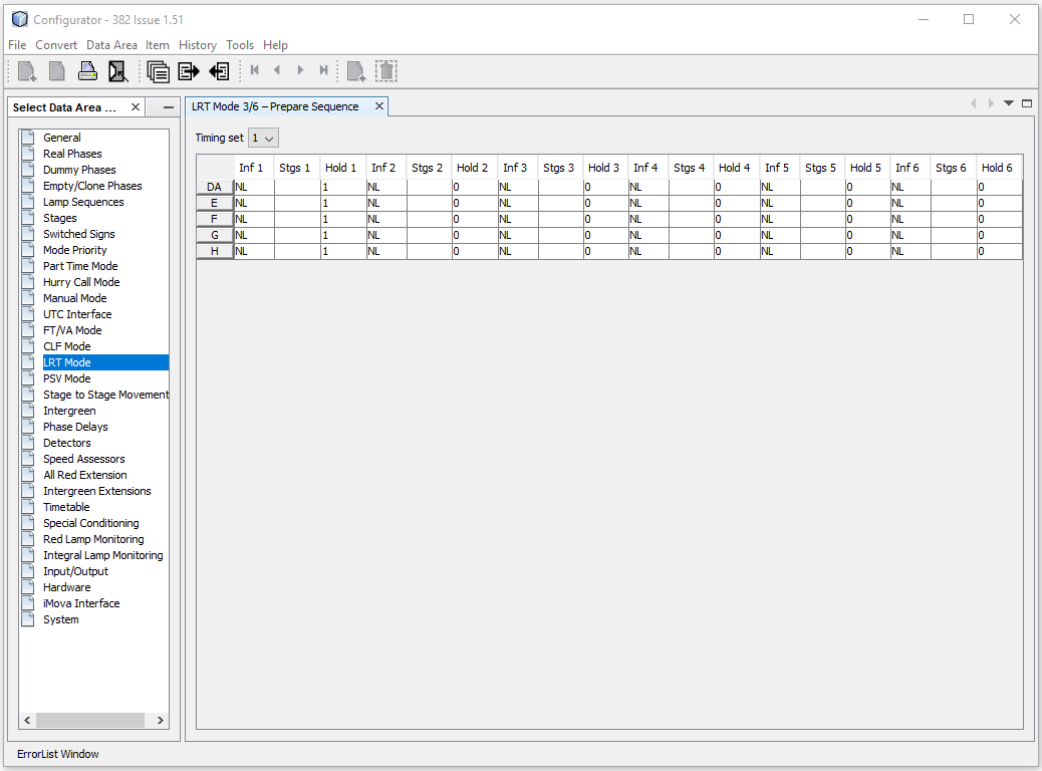
7.17.2.1 Timing Periods

All timing periods must be in the range of 0 to 300 seconds in 0.1 second steps.

7.17.2.2 Priority

For LRT phase priority, 1 is the highest priority down to 16 as the lowest.

7.17.3 LRT Mode 3/6 – Prepare Sequence



	Inf 1	Stgs 1	Hold 1	Inf 2	Stgs 2	Hold 2	Inf 3	Stgs 3	Hold 3	Inf 4	Stgs 4	Hold 4	Inf 5	Stgs 5	Hold 5	Inf 6	Stgs 6	Hold 6
DA	NL		1	NL		0	NL		0	NL		0	NL		0	NL		0
E	NL		1	NL		0	NL		0	NL		0	NL		0	NL		0
F	NL		1	NL		0	NL		0	NL		0	NL		0	NL		0
G	NL		1	NL		0	NL		0	NL		0	NL		0	NL		0
H	NL		1	NL		0	NL		0	NL		0	NL		0	NL		0

Figure 50 - LRT Mode 3/6 Prepare Sequence

This screen is used to define prepare event sequences for the four available LRT timing sets. For each LRT phase requiring a prepare event up to six different steps can be specified.

7.17.3.1 Inf 1 to Inf 6 (Influences 1 to 6)

The influences available for each of the six steps in the sequence, (Inf 1 to Inf 6) are listed below.

- **HS:** Hold current stage
- **IM:** Immediate move to stage
- **AI:** Add immediate move to stage
- **PX:** Prevent stage moves except to stage(s)
- **DM:** Demand dependent move to stage
- **AD:** Add demand dependent move to stage
- **PR:** Phase request (no stage)
- **PD:** Phase demand (no stage)
- **NL:** Null Influence (no stage)

Note: An influence is applied even if its duration is zero.

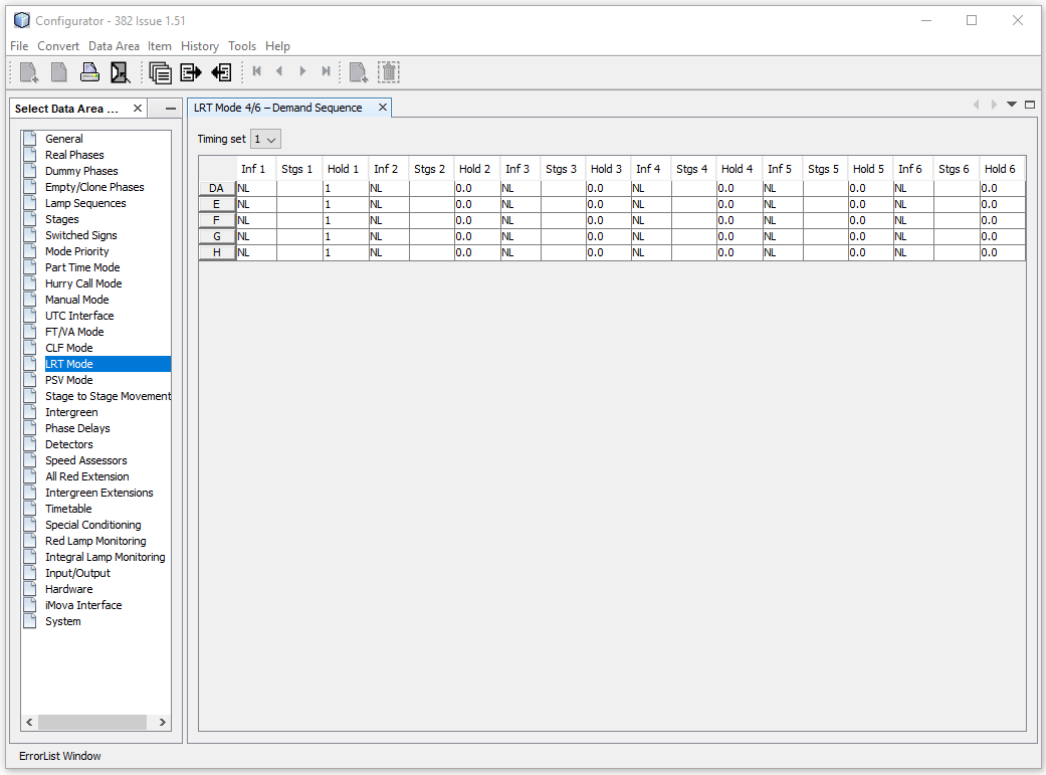
7.17.3.2 Stgs 1 to Stgs 6 (Associated Stages for Influences 1 to 6)

Some influences require an associated stage(s). Stage numbers must be in the range of 0 to 15. Multiple stage numbers must be separated by commas with no spaces. Stream references are not required.

7.17.3.3 Hold 1 To Hold 6

All timing periods, (Hold 1 to Hold 6) must be in the range of 0 to 300 seconds in 0.1 second steps.

7.17.4 LRT Mode 4/6 – Demand Sequence



	Inf 1	Stgs 1	Hold 1	Inf 2	Stgs 2	Hold 2	Inf 3	Stgs 3	Hold 3	Inf 4	Stgs 4	Hold 4	Inf 5	Stgs 5	Hold 5	Inf 6	Stgs 6	Hold 6
DA	NL		1	NL		0.0	NL		0.0	NL		0.0	NL		0.0	NL		0.0
E	NL		1	NL		0.0	NL		0.0	NL		0.0	NL		0.0	NL		0.0
F	NL		1	NL		0.0	NL		0.0	NL		0.0	NL		0.0	NL		0.0
G	NL		1	NL		0.0	NL		0.0	NL		0.0	NL		0.0	NL		0.0
H	NL		1	NL		0.0	NL		0.0	NL		0.0	NL		0.0	NL		0.0

Figure 51 - LRT Mode 4/6 - Demand Sequence

This screen is used to define demand event sequences for the four available LRT timing sets. For each LRT phase requiring a demand event up to six different steps can be specified.

7.17.4.1 Inf 1 to Inf 6 (Influences 1 to 6)

The influences available for each of the six steps in the sequence, (Inf 1 to Inf 6) are listed below.

- **HS:** Hold current stage
- **IM:** Immediate move to stage
- **AI:** Add immediate move to stage
- **PX:** Prevent stage moves except to stage(s)
- **DM:** Demand dependent move to stage
- **AD:** Add demand dependent move to stage
- **PR:** Phase request (no stage)
- **PD:** Phase demand (no stage)
- **NL:** Null Influence (no stage)

Note: An influence is applied even if its duration is zero.

7.17.4.2 Stgs 1 to Stgs 6 (Associated Stages for Influences 1 to 6)

Some influences require an associated stage(s). Stage numbers must be in the range of 0 to 15. Multiple stage numbers must be separated by commas with no spaces. Stream references are not required.

7.17.4.3 Hold 1 To Hold 6

All timing periods, (Hold 1 to Hold 6) must be in the range of 0 to 300 seconds in 0.1 second steps.

7.17.5 LRT Mode 5/6 – Event Detector States

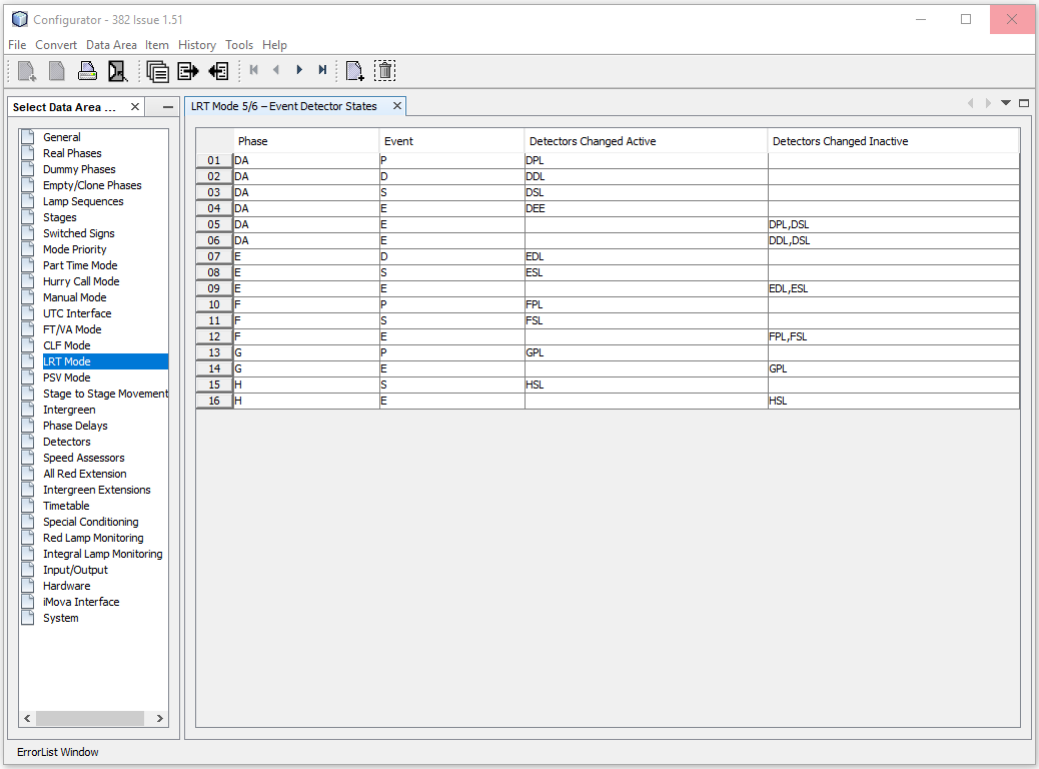


Figure 52 - LRT Mode 5/6 - Event Detector States

This screen is used to define the detector states required for certain LRT event triggers. Use the button on the toolbar or the **Add Item** menu option to add an event trigger as required.

7.17.5.1 Phase

Enter the normal LRT phase ID, which can be a dummy phase.

7.17.5.2 Event

Enter one of the following:

- **P:** Prepare
- **D:** Demand
- **S:** Stopline
- **E:** Exit

7.17.5.3 Detectors Changed Active/Inactive

Enter the detector name(s) that cause the LRT event to occur. Alternative triggering events may be defined for the same event on the same phase and multiple entries can be defined for the same phase/event combination. Where multiple detector names are defined these must be separated by a comma with no spaces.

Note: Each set of detector names are ANDed together.

7.17.6 LRT Mode 6/6 – Event Failure Actions

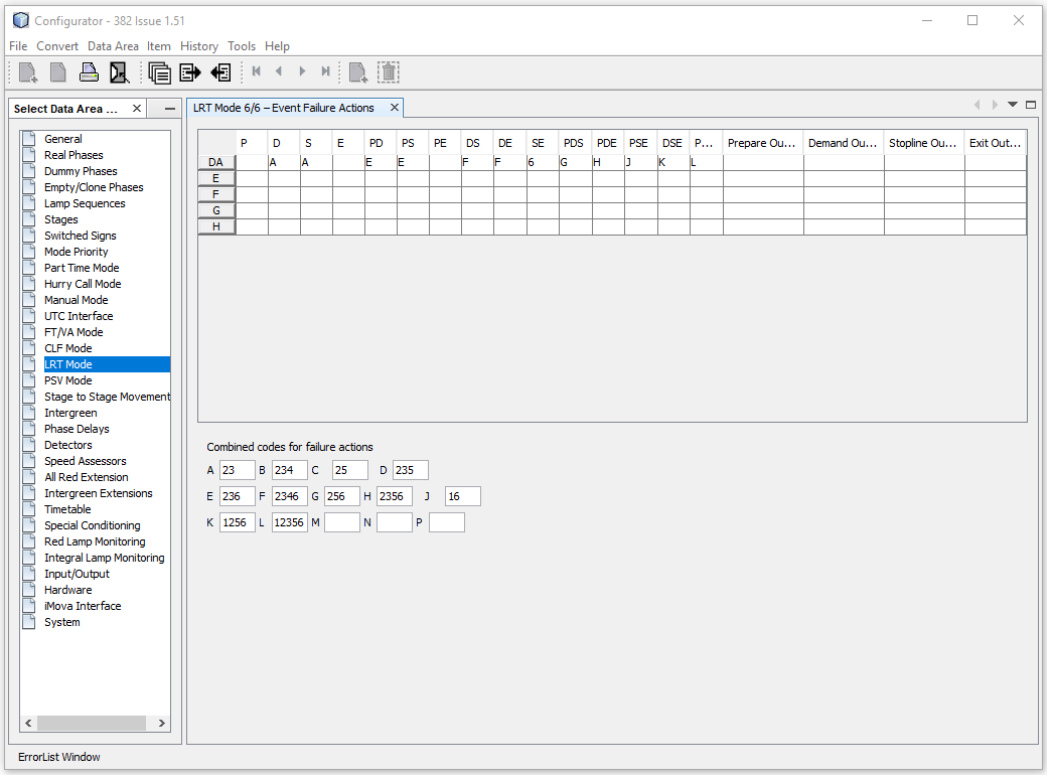


Figure 53 - LRT Mode 6/6 - Event Failure Actions

This screen is used to define the failure actions used for each LRT phase. It is possible to specify a different failure action for every combination of event faults on a phase. Event types are:

- **P:** Prepare
- **D:** Demand
- **S:** Stopline
- **E:** Exit

7.17.6.1 Event Outputs

The option to set a custom name for the event outputs of each LRT phase was introduced in version 3.7. This must correspond to a configured output. On earlier versions, the even outputs have fixed names **LEV*XY*** where ***X*** is the Phase or Dummy Phase letter, and ***Y*** is the event code given above. Outputs must be created that confirm to the fixed name on earlier versions.

7.17.6.2 Combined Codes for Failure Actions

The failure actions and corresponding number available are listed below and these may be entered directly into the failure actions table. Alternatively, combinations of failure actions can be assigned to letter codes, and then these letter codes can be entered into the failure actions table. Some letter code combinations are pre-defined.

- **1:** Remove inhibition of current CLF plan. This is for the stream containing the LRT phase
- **2:** Ignore events for the LRT phase
- **3:** Apply a permanent demand for the LRT phase
- **4:** Apply a permanent extension for the LRT phase
- **5:** Use alternative phase to replace the LRT phase. Used to change appearance or termination type of LRT phase
- **6:** Switch off centre lamp (sometimes referred to as the centre dot) of LRT phase signals

7.18 PSV Mode

There are two screens in this data area.

7.18.1 PSV Mode 1/2 - General

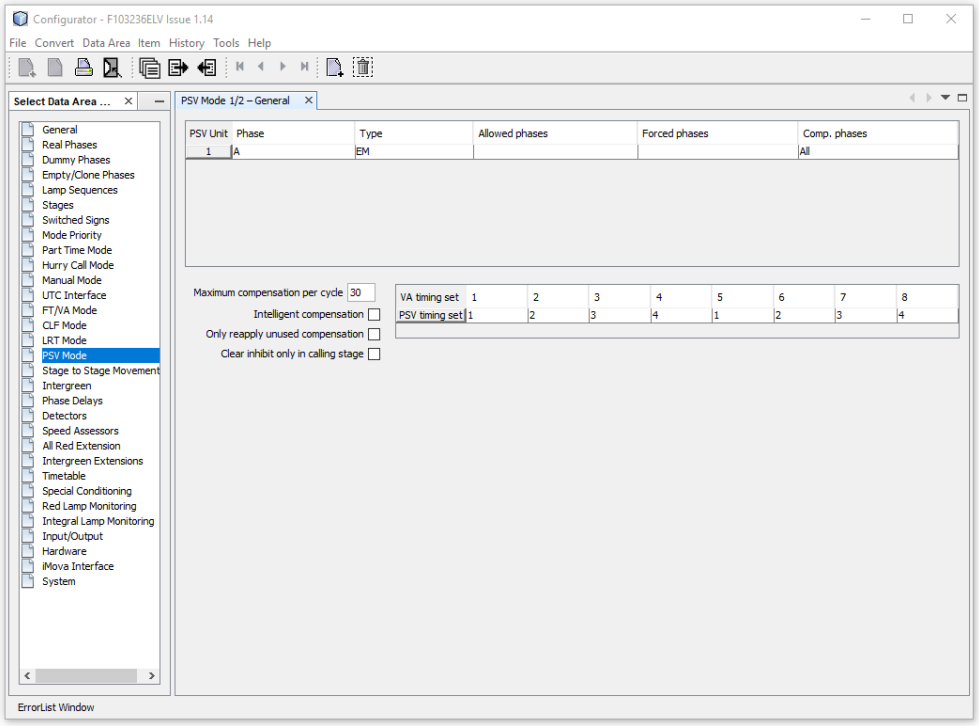


Figure 54 - PSV Mode 1/2 - General

This screen is in two parts. The first part is a table used to define the Priority units. Priority units are labelled as PSV (Public Service Vehicle) Units and can be added by using the button on the toolbar or the **Add Item** menu option. The second part contains some general settings applicable to all configured PSV Units.

7.18.1.1 PSV Units

Up to eight PSV Units can be configured, each having 5 fields to configure:

- **Phase:** Select a phase to link to the PSV Unit
- **Type: PR** for PSV Priority, **EM** for PSV Emergency
- **Allowed Phases:** Phases that can be serviced if demands exist before reaching the priority phase/stage.
- **Forced Phases:** Phases that must always be serviced regardless of demands, before reaching the priority phase/Stage.
- **Comp. Phases:** Phases that will have compensation applied. Valid entries are phase letter, separated by commas, with no spaces. For example: **A,C,F** or **ALL**.

The second part of the screen contains general settings:

7.18.1.2 Maximum Compensation Per Cycle

This sets the maximum compensation time a phase can have. The default is 30 seconds, up to a maximum of 100 seconds.

7.18.1.3 Intelligent Compensation

This sets the compensation time applied, based on the previous usage of maximum green, and how much was curtailed.

7.18.1.4 Only Reapply Unused Compensation

This allows unused compensation on the previous cycle to be applied to the current.

7.18.1.5 Clear Inhibit Only in Calling Stage

This clears the inhibit period if the relevant phase is serviced in normal operation, in the stage that the priority move went to.

7.18.1.6 VA/PSV Timing Set

Define which PSV timing set is applied during each VA timing set.

7.18.2 **PSV Mode 2/2 – Timing Sets**

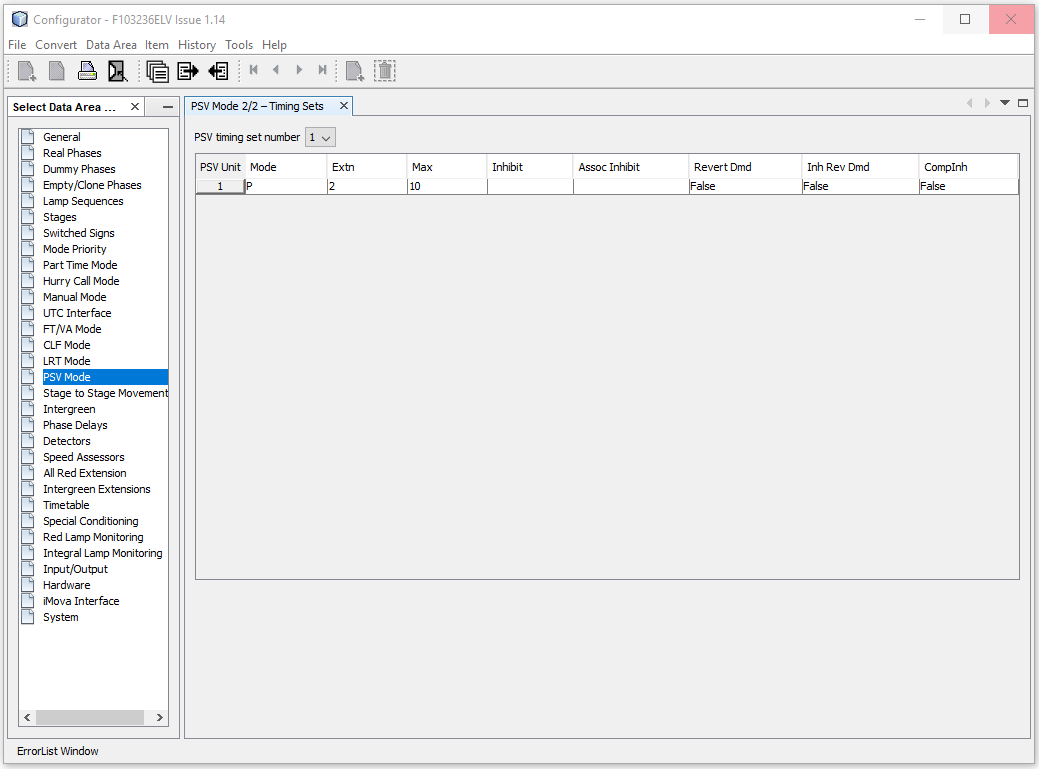


Figure 55 - PSV Mode 2/2 - Timing Sets

This screen is used to define timings, inhibits and demands for all configured PSV units. There are four timing sets selected by the **PSV timing set number** drop-down list.

- **Mode: P** for priority, **N** for normal
- **Extn:** PSV detector extension time
- **Max:** Priority maximum time
- **Inhibit:** Priority unit inhibit timer
- **Assoc Inhibit:** Other priority units to be inhibited by this one
- **Revert Dmd:** Demand if extension timer running at end of priority maximum.
- **Inh Rev Dmd:** Inhibit revertive demand
- **CompInh:** Inhibit compensation timer

7.19 Stage To Stage Movements

There are two screens in this data area.

7.19.1 Stage Moves 1/2 – Table Assignment

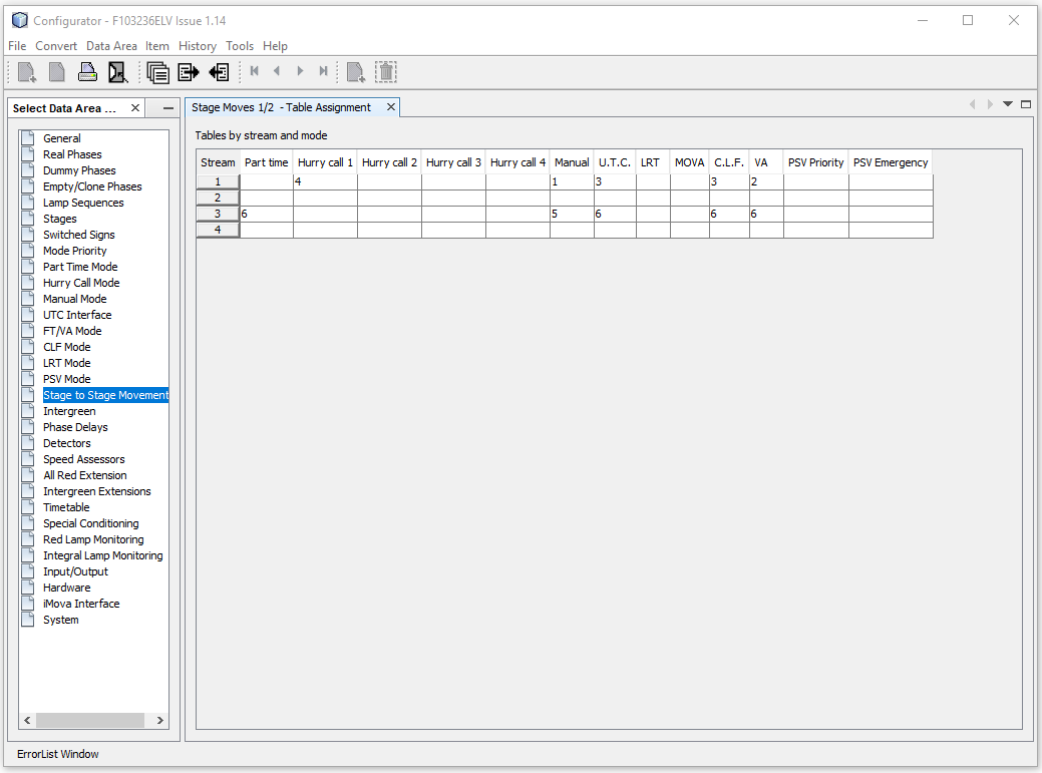


Figure 56 - Stage Moves 1/2 - Table Assignment

This screen is used to specify which stage to stage movement tables are to be used by which mode. It consists of a table where each row is a configured stream, and each mode has a column. There are 32 tables available and common tables can be used by one or more modes across the streams. Enter a value between 1 and 32 to assign a table to a mode in a stream.

A mode not requiring any stage-to-stage movement restrictions does not need a table defined for it, as no table allocated indicates all movements are allowed.

Fixed time does not have an entry, as the stages appearing are controlled with the **FT/VA mode** data area and special conditioning can also be used for more complex fixed time staging.

Important! MOVA does not exist as a mode and should not be used. MOVA is run as UTC mode, and which mode is operational depends on special conditioning and appearance of certain control bits.

7.19.2 **Stage Moves 2/2 - Tables**

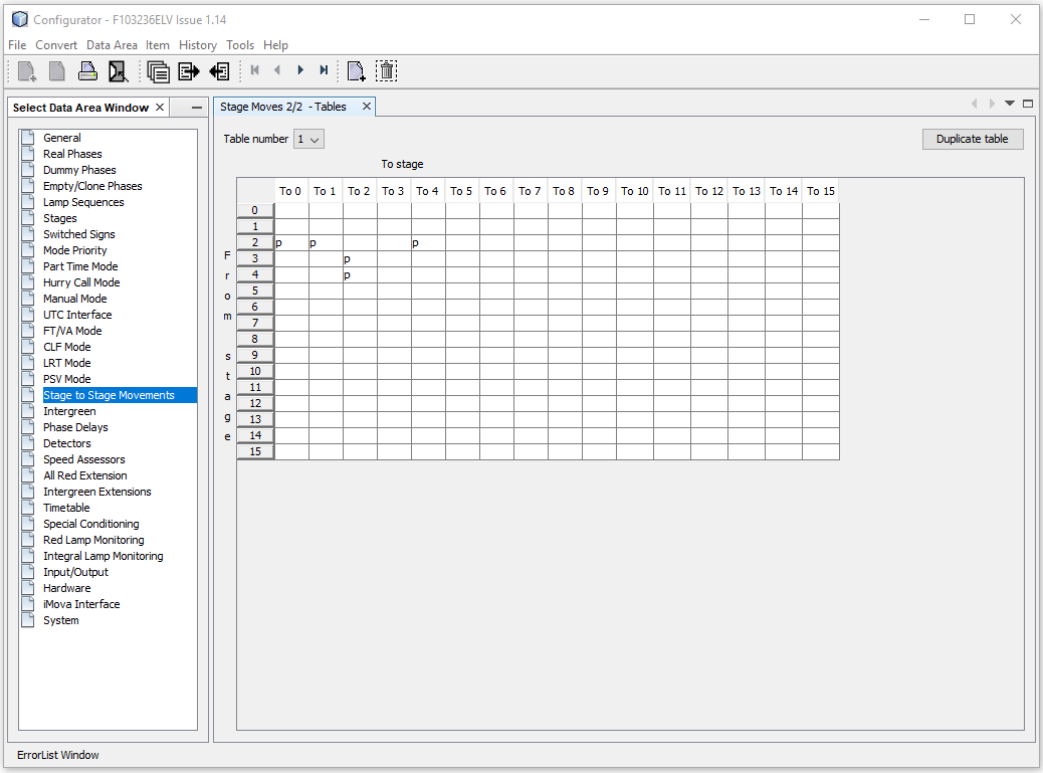


Figure 57 - Stage Moves 2/2 - Tables

This screen is used to define up to 32 stage to stage movement tables. Use the button on the toolbar or the **Add Item** menu option to add tables as required. For each stage to stage movement enter one of the following:-

- **Blank:** Permitted moves may be specified in all modes.
- **P:** Prohibited moves are generally only used in manual, UTC and CLF modes.
- **0 – 15:** Move to alternative stage (n). Alternative moves are not generally used in manual mode but can be.
- **R:** Ripple change permitted. Ripple changes are not allowed in manual mode.

7.20 Intergreen

There are three screens in this data area, Minimum Durations, Maximum Durations and Minimum Handset Limits.

7.20.1 Intergreen 1/3 – Minimum Durations

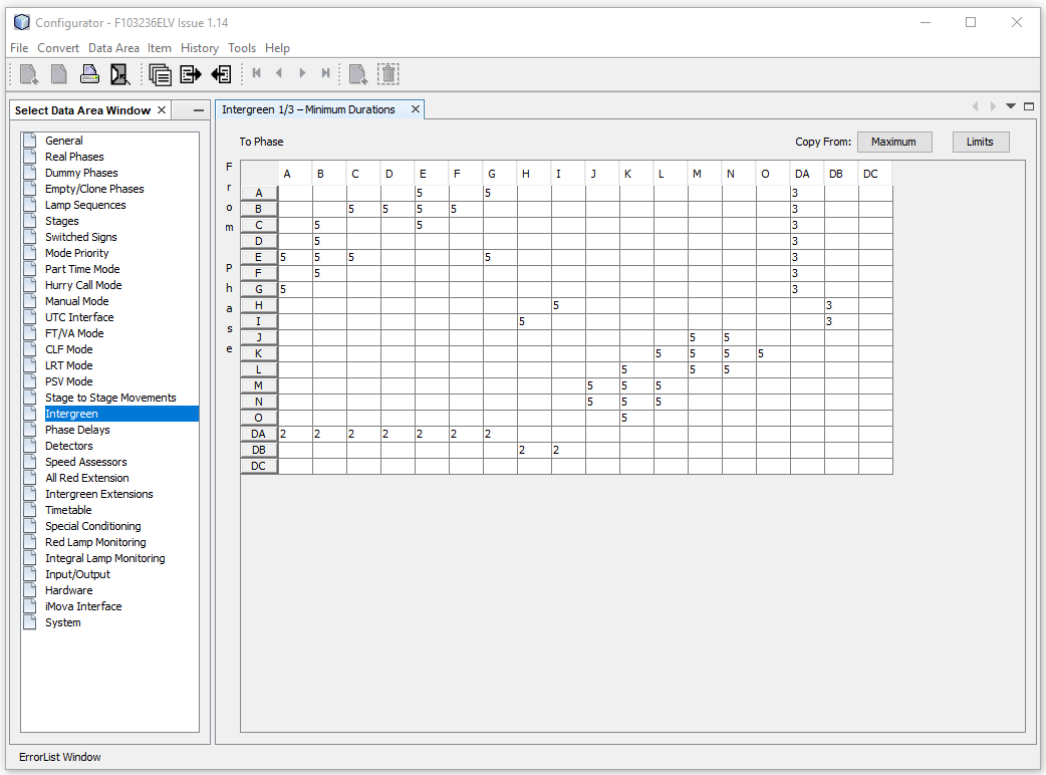


Figure 58 - Intergreen 1/3 - Minimum Durations

This screen is used to define minimum (normal) Intergreen durations.

Minimum Intergreen durations must in the range of 0 to 30 and should be entered for all conflicting phase to phase transitions.

Intergreen times can be specified for non-conflicting transitions if the phases in question do not appear together.

If an early termination phase is permitted to restart in the same stage, then an intergreen may be specified to itself to stop it re-appearing immediately.

7.20.1.1 Copy From:

Buttons are provided to copy the values from the Maximum and Limits tables. This will overwrite existing data.

7.20.2 **Intergreen 2/3 Maximum Durations**

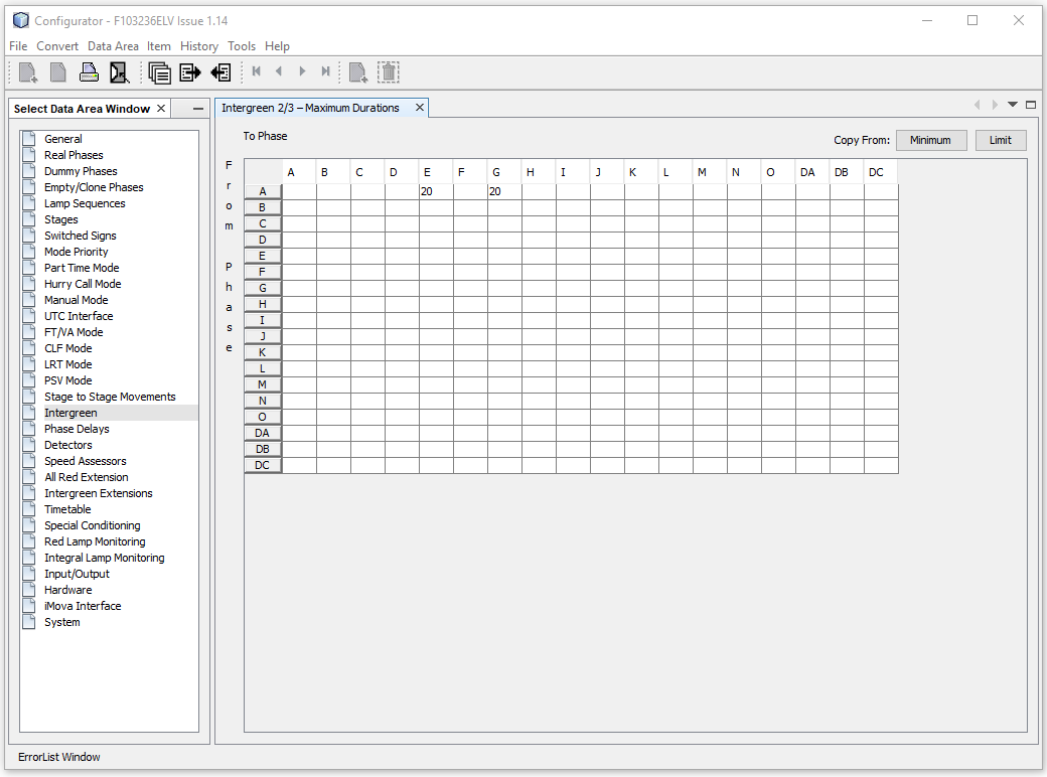


Figure 59 - Intergreen 2/3 - Maximum Durations

This screen is used to define maximum intergreen durations. Maximum intergreen durations may be entered for any phase-to-phase transition with a corresponding minimum, (normal) intergreen duration. These durations must be in the range of 0 to 30 seconds in 0.1 second steps.

The minimum intergreen duration can be extended up to the maximum intergreen duration by means of intergreen extensions (see **Intergreen Extensions** data area) or LRT phases awaiting an exit event.

Important! These durations are NOT handset upper limit values.

7.20.2.1 Copy From:

Buttons are provided to copy the values from the Minimum and Limits tables. This will overwrite existing data.

7.20.3 **Intergreen 3/3 – Minimum Handset Limits**

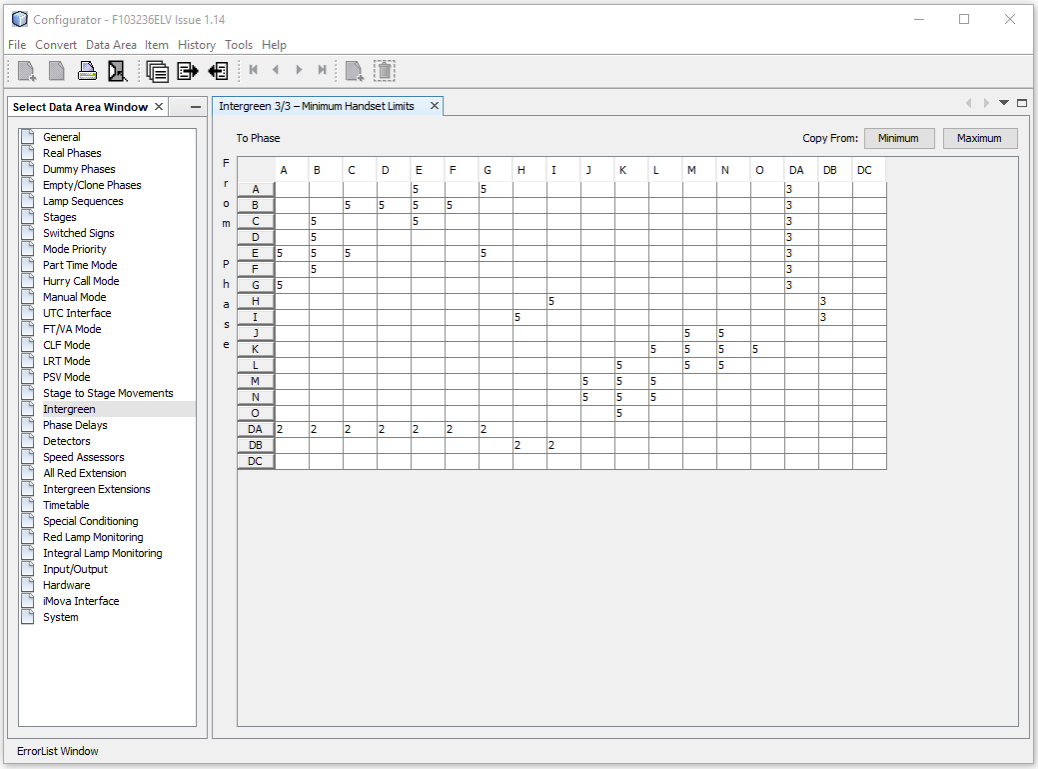


Figure 60 - Intergreen 3/3 - Minimum Handset Limits

This screen is used to define intergreen minimum limit values for handset use. Intergreen minimum limit values should be entered for all phase-to-phase transitions with a corresponding minimum (normal) intergreen duration. These values must be in the range of 0 to 30 seconds in steps of 0.1 seconds.

7.20.3.1 Copy From:

Buttons are provided to copy the values from the Minimum and Maximum Durations tables. This will overwrite existing data.

7.21 Phase Delays

There is only one screen in this data area.

7.21.1 Phase Delays

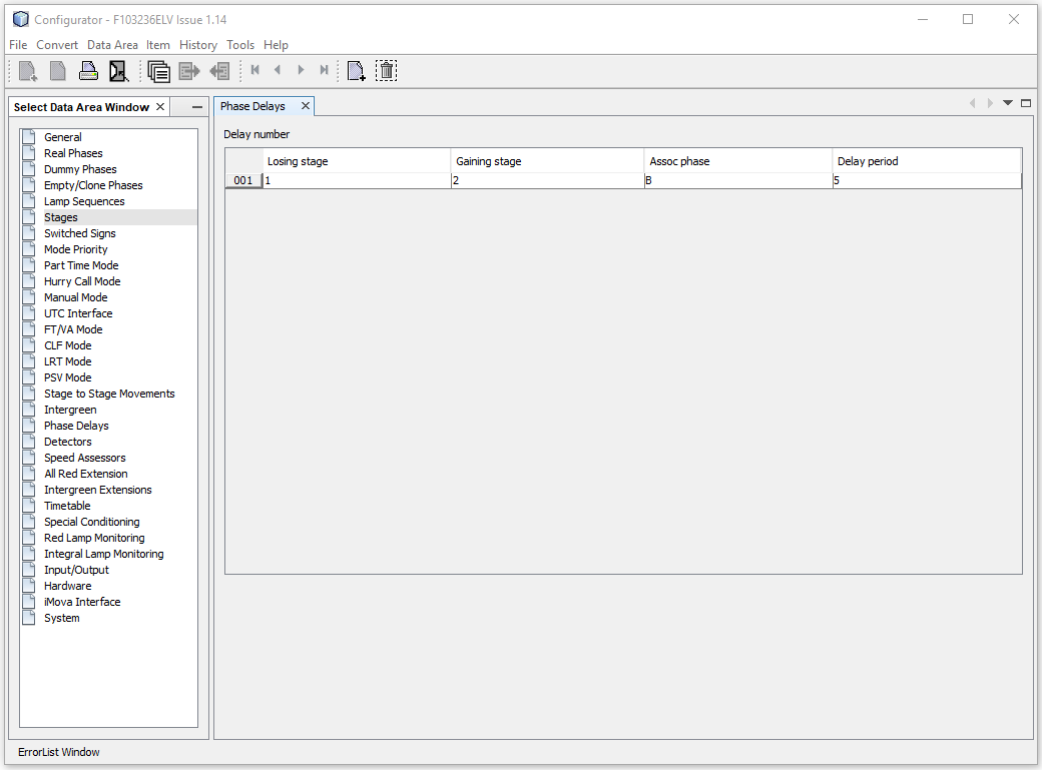


Figure 61 - Phase Delays

This screen is used to define up to 256 phase delays. Use the button on the toolbar or the **Add Item** menu option to add a phase delay as required.

7.21.1.1 Losing/Gaining Stage

Must be in the range 0 to 15 and must be configured in the **Stages** data area. Stream reference is not required, so stage 1.3 should be entered as 3.

7.21.1.2 Assoc Phase

The associated phase must be any configured real or dummy phase ID, If the phase does not run in the losing or gaining stages chosen, or runs in both, the compiler will fail to build the configuration.

7.21.1.3 Delay Period

This must be in the range of 0.1 to 60 seconds in 0.1 second steps.

Note: Delays of 0 second duration cannot be configured, but delays can be added/deleted as required using the handset.

7.22 Detectors

There is only one screen in this data area, which is repeated for each configured detector.

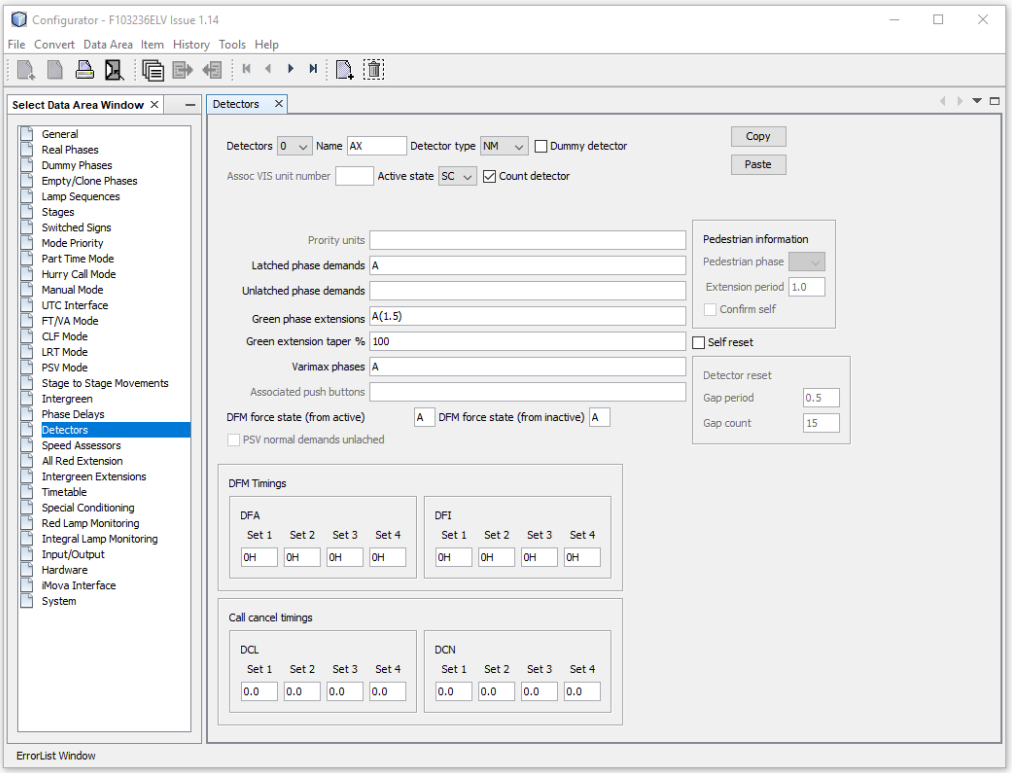


Figure 62 - Detectors

This screen is used to define data for up to 255 detectors. Use the button on the toolbar or the **Add Item** menu option to add a detector as required.

7.22.1 Copy and Paste Buttons

Since version 3.8 copy and paste buttons have been introduced to reduce the amount of data entry required. The **Copy** button may be used to copy the contents of the current detector to another detector. Click the **Copy** button whilst viewing the source detector and then either add a new detector or navigate to the detector where the data should be pasted and click the **Paste** button.

Note: Any data present on the current detector will be overwritten by the paste action.

Since version 3.7, detectors are first ordered in the order that they are created. Once they have been assigned a source on the **Input/Outputs 1/3 – Inputs** screen, they will be ordered by type and number in ascending order. The order is internal loop, parallel (digital), and finally any dummy types.

Range limits and step sizes conform to TOPAS 2500B.

7.22.2 Name

The detector name may be up to 6 characters and must NOT include any of the 4 following characters:

/ : ; -

These are reserved for Optima handset terminal operation.

It is recommended that the detector name is shortened to 4 characters in length when the detector is unidirectional (UD). The name of the automatically generated second input of the UD pair is appended with "**-B**" and the handset terminal is limited to 6 characters for detector names when looking at detector related commands.

Note: The compiler will produce a warning if the 6-character limit is exceeded by the second UD input name but will still compile.

Warning! Using lower case letters in the detector name will compile but the detector cannot be referenced using the handset which is upper case only. Use UPPER CASE for detector names!

7.22.3 Detector Type

The detector type may be any one of the following:

- **NM:** Normal, when not one of the following. Default entry.
- **PB:** Pedestrian push-button.
- **UD:** Unidirectional detector, requires 2 inputs.
- **LRT:** Normal LRT input.
- **LRTC:** LRT inputs witch checkable failure pattern.
- **VWD:** VIS unit watchdog input.
- **KS:** Kerb-side pedestrian detector.
- **ON:** On-crossing pedestrian detector.
- **PR:** PSV priority detector.
- **EM:** PSV emergency detector.

Note: UD type will create a second input with **-B** appended to the name, which will **NOT** be listed as a detector, but appears as an input.

7.22.4 Dummy Detector

Any detector can be marked as a dummy detector for the purposes of special conditioning.

7.22.5 Assoc VIS Unit No.

This field is only available for **LRT** and **LRTC** detector types. If used, it must be in the range of 1 to 4 for LRT inputs from a VIS-OTU. Entering the associated VIS unit number allows LRT inputs to be associated with the appropriate watchdog input. If detector is not an LRT input, then leave blank.

7.22.6 Active State

The active state for a detector input can be selected as either **OC**, (open circuit) or **SC**, (short circuit). Overhead detector inputs are usually **OC** and pedestrian pushbuttons are usually **SC**. The default is **SC**. This can also be changed on the **Input/Output 1/3 – Inputs** screen.

Note: An input added on the **Input/Output 1/3 – Inputs** screen will default to **OC**.

7.22.7 Count Detector

Any detector can be marked for use as a count detector. This does not affect the normal usage of the detector. An output **~VSn** will be automatically created where **n** starts at 01 for the first detector marked as count. This output follows the final (filtered) state of the detector not the raw state.

Note: The **~VSn** outputs do not appear on the configuration print out.

7.22.8 Priority Units

Enabled only for **PR** or **EM** detector types, enter the PSV unit numbers for this detector. Multiple PSV units must be separated by commas with no spaces. The default **PSV/EM** demand is latched for these detector types. If an unlatched demand is required, tick the **PSV normal demands unlatched** check box.

7.22.9 Latched/Unlatched Phase Demands

Enter the phase(s) to be demanded. Multiple phase IDs must be separated by commas with no spaces. Real or dummy phases may be specified.

A latched demand is set when the detector is activated and remains set until the phase gains right of way, whereas an unlatched demand only exists while the detector is active. Demands cannot be registered when the phase is at right of way.

These fields are disabled for detector types: **KS**, **ON**, **PR** and **EM**.

7.22.10 Green Phase Extensions

Enter the phase(s) to be extended, each followed by the required extension time in brackets, for example:

A(1.5),B(1.5)

Multiple entries must be separated by commas with no spaces.

256 green extension timers are available, and the times must be in the range 0.2 to 5 seconds in 0.1 second steps.

7.22.11 Green Extension Taper %

This should be left at the default value of 100. A legacy field, its use is not described here.

7.22.12 Varimax Phases

This only needs to be filled in if the detector is to perform vehicle counting for varimax operation. Enter the phase(s) that the detector will count for. Multiple phase IDs must be separated by commas with no spaces. Real or dummy phases may be specified.

7.22.13 Associated Push Buttons

Enabled only for **KS** detector types, enter the push button(s) that the kerb-side detector is associated with. Multiple pushbuttons must be separated by commas with no spaces.

7.22.14 DFM Force State

The DFM force state may be any one of the following:

- **A:** Force input active on DFM failure.
- **I:** Force input inactive on DFM failure.
- **N:** No state forced on DFM failure (default entry).

7.22.15 DFM Timings

DFM active times, (**DFA**) and DFM inactive times, (**DFI**) must be in the range of 0 to 15300 minutes in 1 minute steps, or 0 to 255 hours in 1 hour steps. Minute values must be suffixed with **M** and hour values with **H**. If DFM is not required, then all timings must be entered as **0H**. The four alternative timings form part of the detector timing set which may be changed via the timetable.

7.22.16 **Self-Reset**

A detector can be self-clearing from the DFM if this check box is ticked, provided there have been a certain number of gaps in activation separated by an acceptable gap time to avoid removing the DFM from a “chattering” detector. Once the number of gaps separated by the gap time reaches the **Gap count**, the DFM is removed.

Gap period specifies the gap time in seconds.

Gap count specifies the number of gaps that must be seen to remove the DFM.

The range limits depend on the type of detector as shown in the table below.

Detector Usage	**Count (Seconds)**		**Gap (Seconds)**	
Emergency Vehicle	1	50	10	125
Priority Vehicle	5	50	0.5	125
Other	5	50	0.5	125

7.22.17 **Call Cancel Timings**

The **DCL** (call delay) and **DCN** (cancel delay) times must be in the range 0 to 60 seconds 0.1 second steps. Four alternative timings form part of the detector timing set which may be changed via the timetable. The call/cancel delay times are only used for setting/clearing demands.

7.22.18 **Pedestrian Information**

Pedestrian related detectors, **PB**, **KS** and **ON**, require extra information to be supplied.

- **Pedestrian Phase:** Detectors can be linked to one pedestrian phase, selected from the drop-down list.
- **Extension period:** This should be in the range 1 to 5 seconds in 0.1 second steps for push-button and kerb-side detectors. For on-crossing detectors the range is 0.4 to 5 seconds in 0.1 second steps.
- **Confirm Self:** If no kerb-side detector is to be used with a push button, **Confirm self** can be checked.

7.23 Speed Assessors

There are two screens in this data area.

7.23.1 Speed Assessors 1/2 – Data

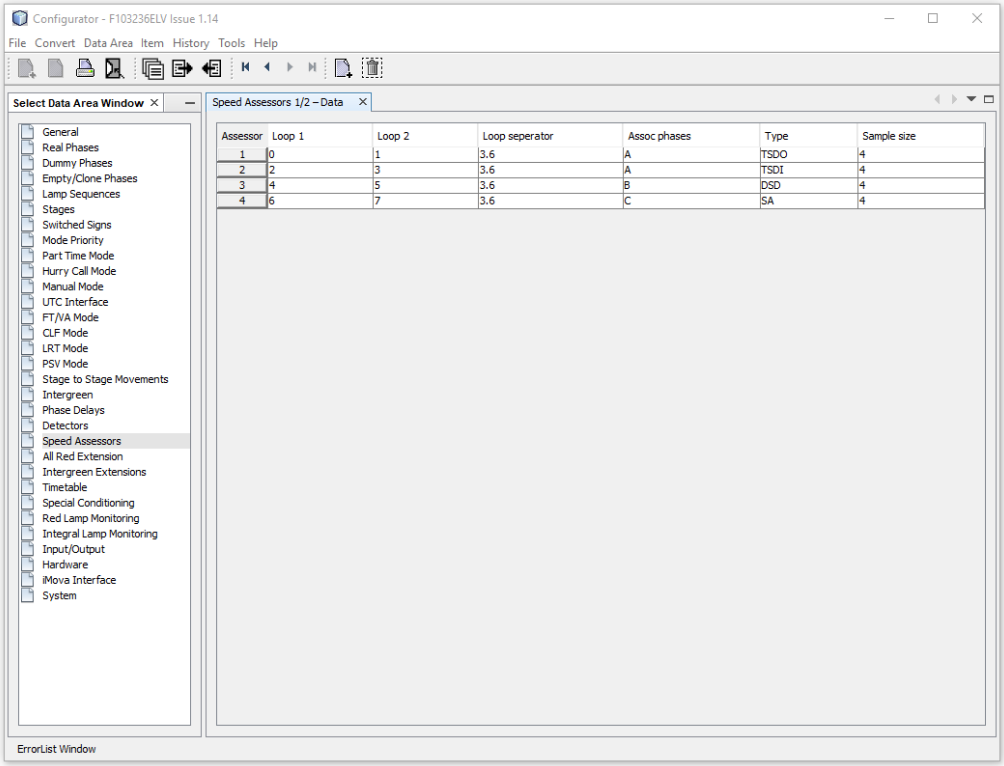


Figure 63 - Speed Assessors 1/2 - Data

This screen defines the speed assessor loops to be used, their properties and type of assessment to be used. Up to sixteen assessor pairs can be added, using a total of 32 inductive loops. These loops must be from the **internal loop detection**, NOT an external detector pack using the parallel interface. Use the button on the toolbar or the **Add Item** menu option to add assessors as required.

7.23.1.1 Loop 1 and Loop 2

Since version 3.7 loop numbers are automatically assigned in pairs, as each is added, starting with Loop 0.

Important! Speed Assessor loops must always be the first loops used, and assessor pairs must be on the same detector card.

7.23.1.2 Loop Separator

This is the distance between the leading edges of the assessor loops. The default is 3.6 meters (approx. 12 feet). Other distances may be used, and this should be checked prior to configuration. The other common separation distance is 3.0 meters (approx. 10 feet).

7.23.1.3 Assoc Phases

The phase that the assessor relates to. Ensure that the phase has been marked as using speed measurement facilities on the **Real Phases 2/2 – Advanced** screen.

7.23.1.4 Type

The type of assessor used can be one of the following, with distances measured from the stopline:

- **DSD:** Double Speed Discrimination, loops at 79 meters.
- **TSDO:** Triple Speed Discrimination Outer, loops at 159 meters.
- **TSDI:** Triple Speed Discrimination Inner, loops at 91 meters.
- **SA:** Speed Assessment, loops at 151 meters.
- **MON:** Monitor only.

7.23.1.5 Sample

Number of actuations used to calculate averages.

Note: For further information about speed assessors and monitoring, refer to the *Optima Handset Command Manual*, UCM 239138.

7.23.2 Speed Assessors 2/2 – Global Settings

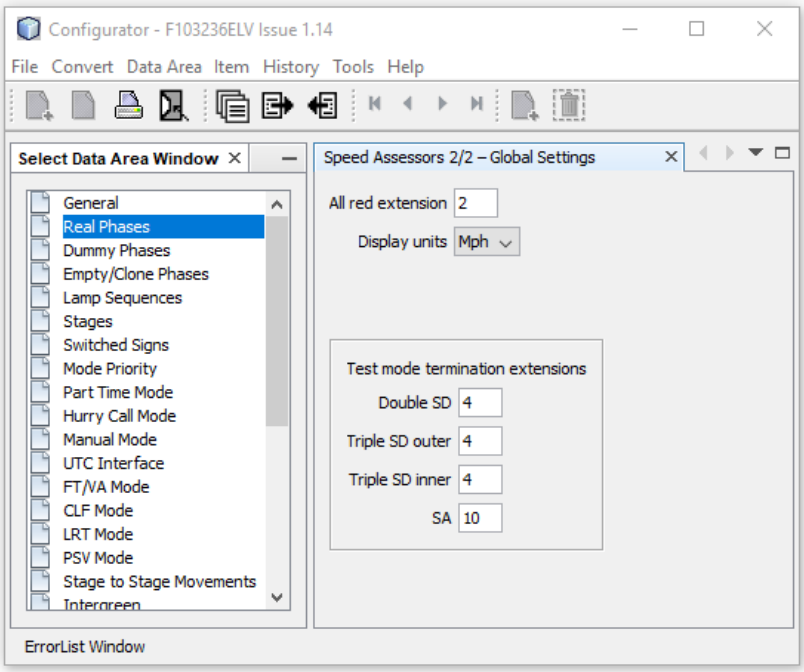


Figure 64 - Speed Assessors 2/2 - Global Settings

This screen is used to define speed assessors global settings and test mode parameters.

7.23.2.1 All Red Extension

Defines the All Red extension value. This would normally be set to 2 seconds, which is the default value. The range is 0 to 10 seconds in 0.1 second steps. Set to zero if a standalone pedestrian crossing with speed measurement facilities enabled.

7.23.2.2 Display Units

Sets the speed values used as either Miles Per Hour (MPH) or Kilometres Per Hour (KMH). The default is MPH.

7.23.2.3 Test Mode Termination Extensions

This sets the termination extensions used during the speed assessor test mode:

- **DSD:** 4 seconds.
- **TSDO:** 4 seconds.
- **TSDI:** 4 seconds.
- **SA:** 10 seconds.

The test mode is controlled by the **SPT** handset command to simulate speed events on the assessors which are monitored by the handset. During the test mode which these alternative extensions are used, assessors will still generate real speed events from the real inputs, but if a clash occurs with a set of test events, the controller will generate phase and all red extensions appropriate to the test mode. Refer to the *Optima Handset Command Manual*, UCM 239138 for more information.

7.23.2.4 Intergreen to Pedestrians

If a traffic phase has speed assessors linked to it, and it conflicts with a pedestrian phase, **the minimum intergreen will be 6 seconds**, even if a lower value is programmed in the intergreen table.

Whether or not **PSQ/<ped phase>GAP** and **PSQ/<ped phase>FRC** are available on the handset depends on a configuration setting.

The related setting is on the **Real Phases 2/2 – Advanced (Traffic Sequence)** Screen. It is the field called **Pedestrians Phases Which Cross this Phase**. If the pedestrian phase is listed here, then the handset will display **PSQ/<ped phase>SPD** with a value of 3.0 and not display **GAP** or **FRC** at all. If the pedestrian has not been included here (it should have been) then the controller will still run a 3 second period C / 3 / III overriding the **GAP** or **FRC** values.

7.24 All Red Extension

There is only one screen in this data area.

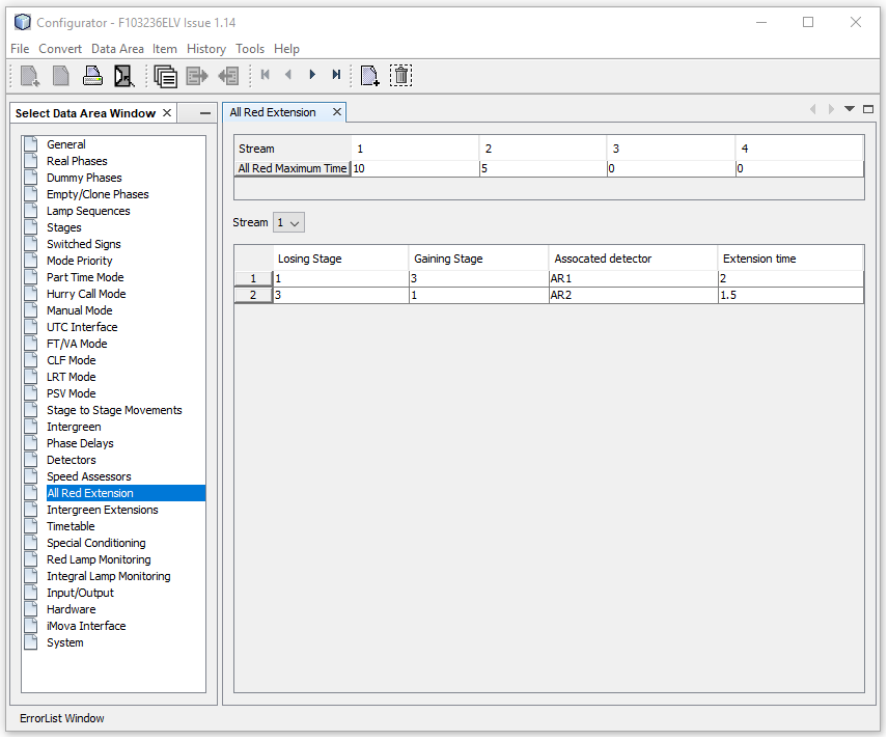


Figure 65 - All Red Extension

This screen is used to define up to 256 all red extensions. Use the button on the toolbar or the **Add Item** menu option to add an all red extension as required. Range limits and step sizes conform to TOPAS 2500B.

Note: All red extensions are measured from the point at which the first phase in the new stage would normally start its red to green transition. For example, starting amber for a traffic phase.

7.24.1 All Red Maximum Time

This must be in the range of 0 to 99 seconds in 0.1 second steps.

A time should be specified for every stream requiring all red extensions, but the values may be different.

7.24.2 Losing/Gaining Stage

Must be in the range of 0 to 15, defined as a configured stage, and they must be different.

7.24.3 Associated Detector

This can be of any type but must have been previously defined in the **Detectors** data area.

Important! Only one detector can be used for a given extension. To combine multiple detectors, define a dummy detector to use in this field, then use special conditioning to control it.

7.24.4 Extension Time

Must be in the range of 0 to 25 seconds in 0.1 second steps.

7.25 Intergreen Extensions

There is only one screen in this data area.

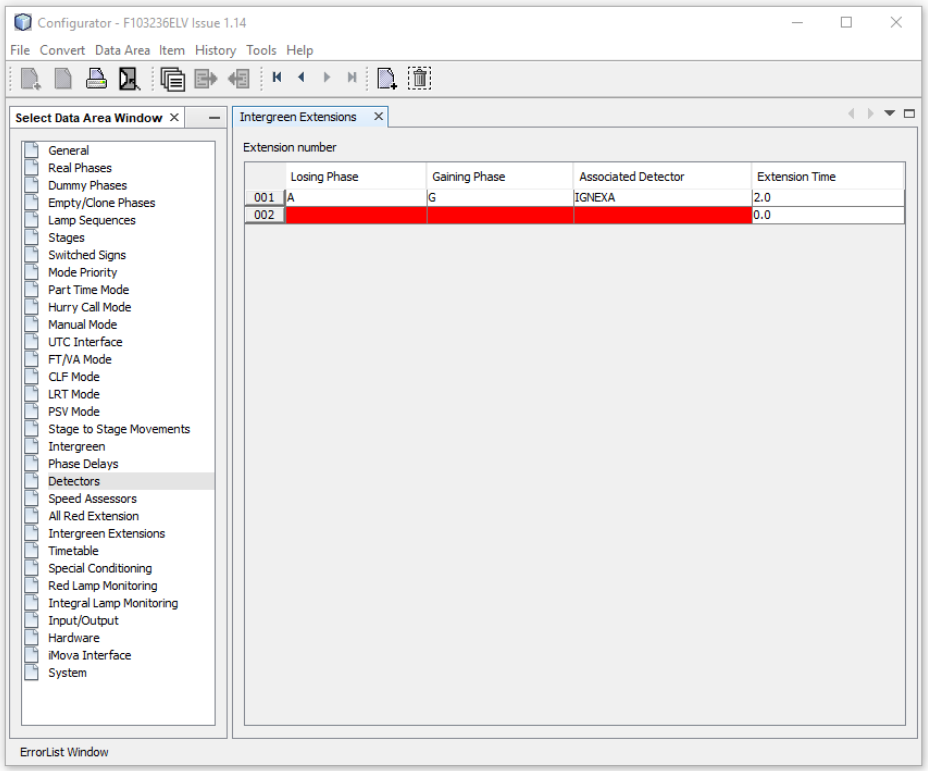


Figure 66 - Intergreen Extensions

This screen is used to define up to 256 intergreen extensions. Use the button on the toolbar or the **Add Item** menu option to add an intergreen extension as required. A corresponding maximum intergreen value must have been entered on the **Intergreens 2/3 Maximum Durations** screen for these to operate.

7.25.1 Losing/Gaining Phase

These must be any configured phase ID, real or dummy. These would normally be different, but could be the same, extending the intergreen from a phase back to itself.

7.25.2 Assoc Detector

These can be of any type but must have been previously defined in the **Detectors** data area.

7.25.3 Extension Time

Must be in the range of 0 to 300 seconds in 0.1 second steps.

Note: If the associated detector is active at the end of the minimum, (normal) intergreen, then it can extend the intergreen up to its maximum duration.

7.26 Timetable

There are 4 screens in this data area, which can be repeated for a number of timetable entries and event lists.

7.26.1 Timetable 1/4 – Timetable Entries

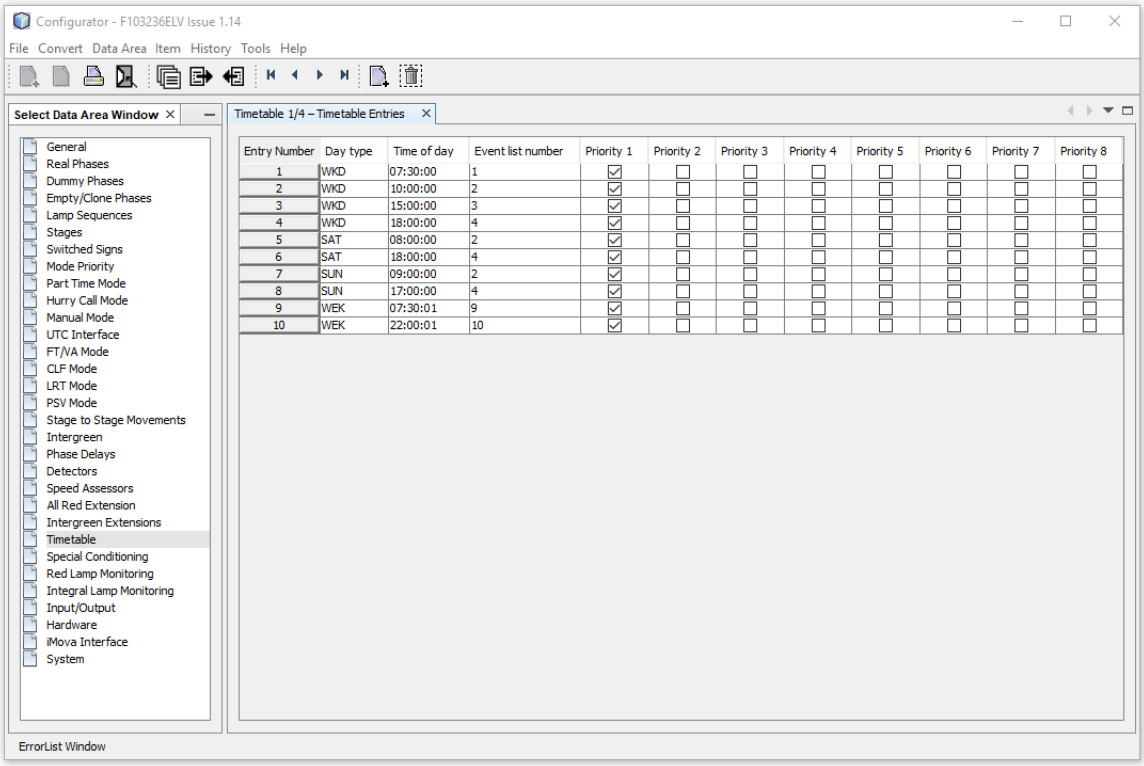


Figure 67 - Timetable 1/4 - Timetable Entries

This screen is used to define up to 128 timetable entries. Use the button on the toolbar or the **Add Item** menu option to add a timetable entry as required.

Version 3.7 has a real-time sort which ordered the rows in the Timetable by time, to match how they were sorted by the Traffic Signal Engine (TSE) and viewed using TTI (Timetable Inspection) handset command. This sort was removed in version 3.8 (and later).

7.26.1.1 Entry Number

This is an automatic field for reference only. It is automatically incremented as new rows are added to the timetable, starting at row 1.

7.26.1.2 Day Type

The day type may be any one of the following:

- **MON:** *Monday.
- **TUE:** *Tuesday.
- **WED:** *Wednesday.
- **THU:** *Thursday.
- **FRI:** *Friday.
- **SAT:** *Saturday
- **SUN:** *Sunday

- **WEK:** *All Week (Mon – Sun)
- **WKD:** *Weekdays only (Mon – Fri) NOT to be confused with Weekend.
- **WND:** *Weekend only (Sat – Sun).
- **XMO:** Every day except Monday.
- **XTU:** Every day except Tuesday.
- **XWE:** Every day except Wednesday.
- **XTH:** Every day except Thursday.
- **XFR:** Every day except Friday.
- **XSA:** Every day except Saturday.
- **XSU:** Every day except Sunday.
- **SELn:** Selected days of the week where n = 1 to 8. See **Timetable 4/4 - User-defined Day Types**

Note: Special Conditioning only recognises day types up to and including WND in this list. They are marked with * for clarity.

7.26.1.3 Time Of Day

The time of day must be entered in **HH:MM:SS** format. Entries with the same time may only be made if they do not share a day of the week (even if the day type is different). This is because the TSE sorts by time and day, so when using the handset, if two clashing entries exist, there is no guarantee which entry will be changed.

For example, where alternate VA Maximum green timing sets are to be changed at the same time as CLF plans introduced ensure that the switching times of the alternate VA maximums is set to be 1 second later than the CLF timings.

7.26.1.4 Event List Numbers

Must be in the range of 1 to 64 and it refers to data entered in **Timetable 3/4 – Event Lists**.

7.26.1.5 Priority 1 to 8

Each entry can be assigned a priority from 1 to 8 where 1 is the highest priority and 8 the lowest. The default is for all entries to have priority 1. Priorities are defined on the **Timetable 2/4 – Calendar** screen, which can be used to give day ranges or dates a higher priority timetable entry to run in preference to the usual timetable.

7.26.2 Timetable 2/4 - Calendar

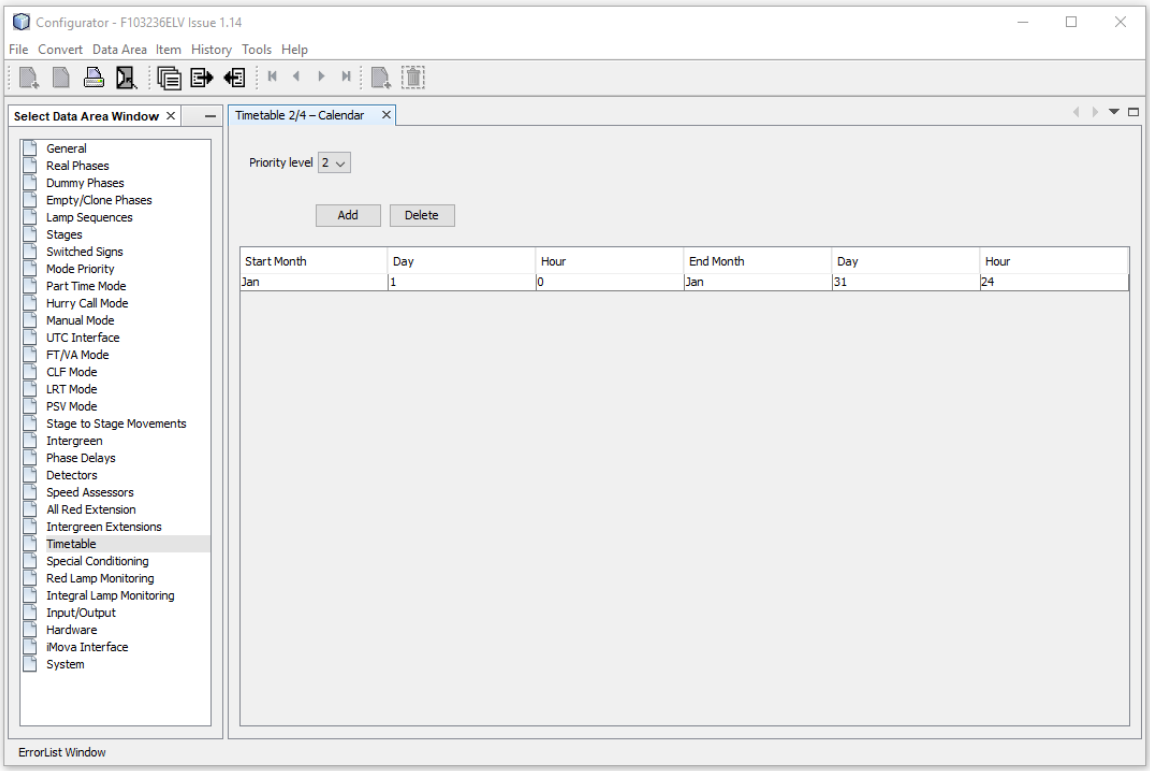


Figure 68 - Timetable 2/4 - Calendar

This screen is used to edit the calendar for the 8 timetable priority levels. Use the drop-down list to change to the priority level of interest. The default priority level displayed is 1. This only has one calendar event which is by default configured as all year round, starting at the first hour (0) on 1st January, until the last hour (24) of 31st December.

7.26.2.1 Priority Levels

Priority levels 2 to 8 can have up to 16 calendar events entries, which are added or removed using the **Add** and **Delete** buttons. By default, they have no calendar events. Calendar entries are for the current year, so the handset must be used to remove on-off events form the calendar if they are only to occur in a specific year.

7.26.2.2 Start Month/End Month

Must be specified as the following shorthand:

- **Jan:** January.
- **Feb:** February.
- **Mar:** March.
- **Apr:** April.
- **May:** May.
- **Jun:** June.
- **Jul:** July.
- **Aug:** August.
- **Sep:** September.

- **Oct:** October.
- **Nov:** November.
- **Dec:** December.

7.26.2.3 Day

Must be specified as an integer between 1 and 31. If an event is specified for a day that cannot happen, for example 31st February, then the compilation will fail. 29th February is not allowed.

7.26.2.4 Hour

Use 0 for the first hour of the day and 24 for the last hour of the day.

7.26.3 Timetable 3/4 – Event Lists

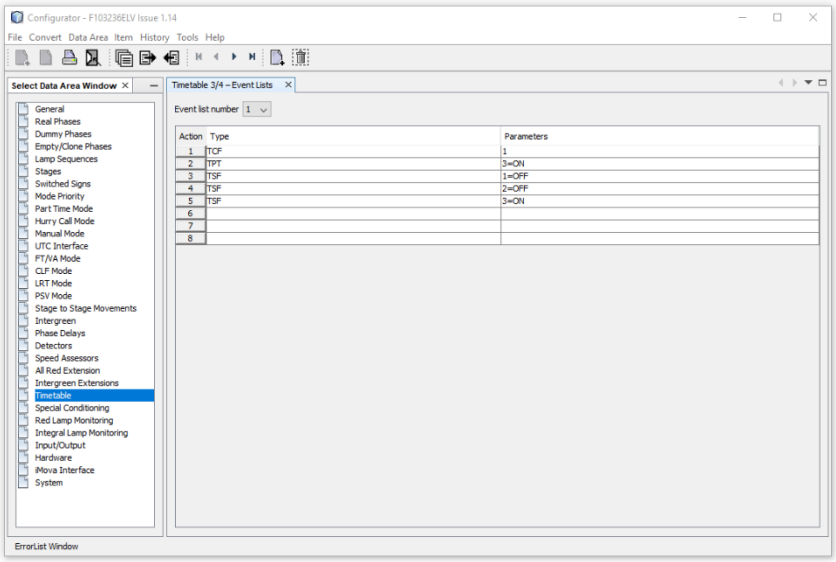


Figure 69 - Timetable 3/4 - Event Lists

This screen is used to define up to 64 timetable event lists. Use the button on the toolbar or the **Add Item** menu option to add an event list entry as required.

7.26.3.1 Event List Number

This is a drop-down list which allows the user to select the Event list to view. The **First item**, **Next item**, **Previous item** and **Last item** buttons or menu options can be used to navigate the configured event lists.

7.26.3.2 Action

Each list can have up to 8 actions. Empty actions are not actioned.

7.26.3.3 Type

For each action to be used, clicking in the empty Type field will open a drop-down list from which the following action types can be selected. The following list gives the available event types and following sections detail any parameters that must be used with them.

- **TCF:** Timetable CLF Request.
- **TDO:** Timetable Detector Override.
- **TDT:** Timetable Detector Timing set.
- **TEF:** Timetable Event Flag.
- **TIS:** Timetable Inhibit Stage.
- **TLT:** Timetable LRT Timing set.
- **TPT:** Timetable Part-Time request.
- **TSF:** Timetable Switched Sign.
- **TTS:** Timetable phase Timing Set.
- **TPM:** Timetable Phase Mode change.

7.26.3.4 Parameters

The following sections detail the parameter data required for each different event type.

7.26.3.4.1 TCF Parameter

The parameter required with a **TCF** event is either a CLF plan number in the range of **1 to 16, or OFF** to isolate.

7.26.3.4.2 TDO Parameter

The parameters required with a **TDO** event are **<detector_name> = A, I or N**, for example **AXYZ=A** would put an active override on detector AXYZ. The detector name must have been previously defined in the **Detectors** data area. For the override state:

- **A**: Active
- **I**: Inactive
- N: No force state

7.26.3.4.3 TDT Parameter

The parameter required with a **TDT** event is a detector timing set number in the range of **1 to 4**. The detector timing set incorporates DFM and call/cancel timings on all detectors and the solar switch.

7.26.3.4.4 TEF Parameter

The parameters required with a **TEF** event are **<event_flag_number> = ON or OFF**, for example **1=ON** would set event flag 1 on. The event flag number must be in the range 1 to 32. Timetable event flags are for use in special conditioning.

7.26.3.4.5 TIS Parameter

The parameters required for a **TIS** event are **<stream>.<stage> = ON or OFF**, for example **1.3=ON** would inhibit stage 3 in stream 1. The stream number must be in the range of 1 to 8 and the stage number must be in the range of 0 to 15 and be a configured stage.

7.26.3.4.6 TLT Parameter

The parameter required with a **TLT** event is an LRT timing set number in the range of **1 to 4**.

7.26.3.4.7 TPT Parameter

The parameters required with a **TPT** event are **<stream> = ON or OFF**, for example **2=ON** would set a request for Part-time mode, in stream 2. Stream number must be in the range 1 to 8 and be configured for Part-time.

7.26.3.4.8 TSF Parameter

The parameters required with a **TSF** event are **<sign_number> = ON or OFF**, for example **1=OFF** would request Switched Sign 1 to be off. Sign number must be in the range of 1 to 16.

7.26.3.4.9 TTS Parameter

The parameter required with a **TTS** event is a phase timing set number in the range of **1 to 8**. The phase timing set incorporates maximum green times, varimax additional periods and varimax threshold flows.

7.26.3.4.10 TPM Parameter

The parameters required with **TPM** event are <phase_name> = **V, P, F** or **N**, for example **G=V** would override phase G into vehicle actuated [VA] mode. The phase name must have been previously defined in the Real Phases data area as a traffic phase. The override modes are:

- **V:** Vehicle Actuated [VA]
- **P:** Pre-Timed Maximum [PTM].
- **F:** Fixed Vehicle Period [FVP].
- **N:** No override.

7.26.4 Timetable 4/4 – User-defined Day Types

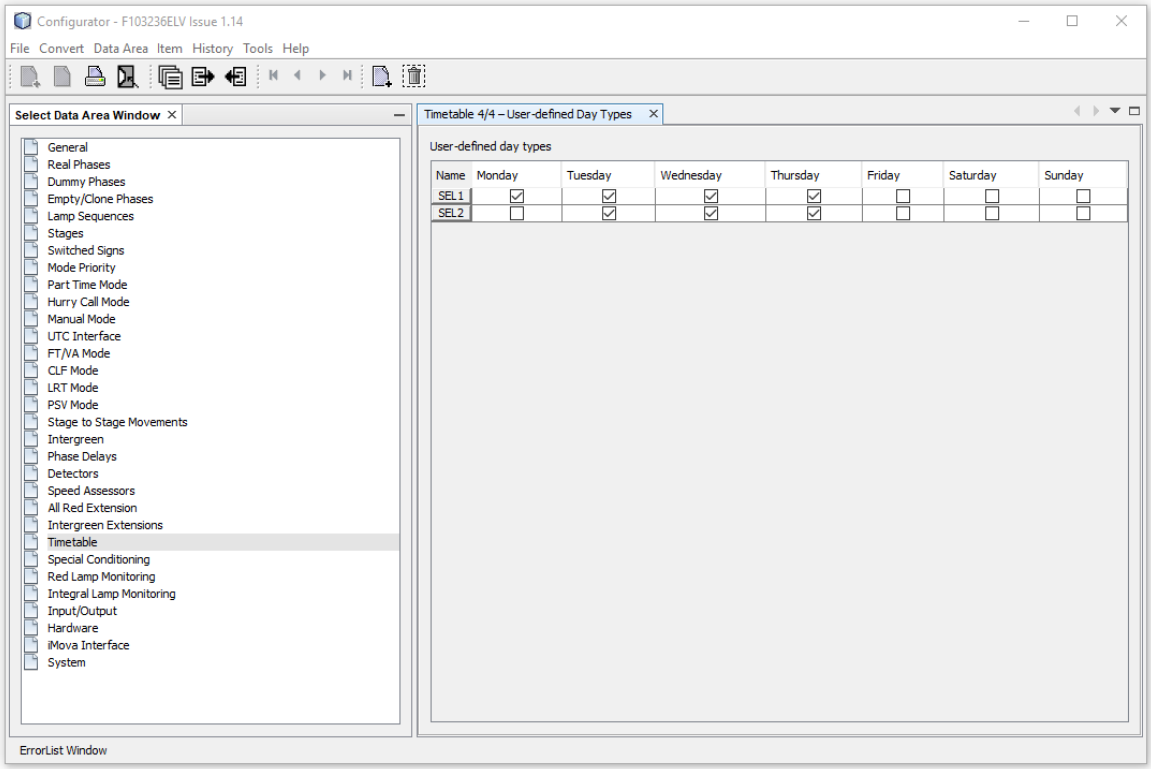


Figure 70 - Timetable 4/4 - User-defined Day Types

This screen is used to define up to 8 user-defined day types that can be used in the timetable as **SEL1** to **SEL8**. These are added or deleted using the **Add** / **Delete** buttons. By default, there are no user-defined day types created.

Each day type added is automatically named. For each one created, days of the week can be selected using the adjacent check boxes as appropriate.

Note: This screen allows the user to add more than the allowed 8 entries (SEL1 to SEL8). The configuration will compile with these extra entries but if any reference is made to them in the timetable the configuration will fail to compile.

7.27 Special Conditioning

There are three screens in this data area, the first is to create the Special Conditioning Statements.

7.27.1 Special Conditioning 1/3 - Statements

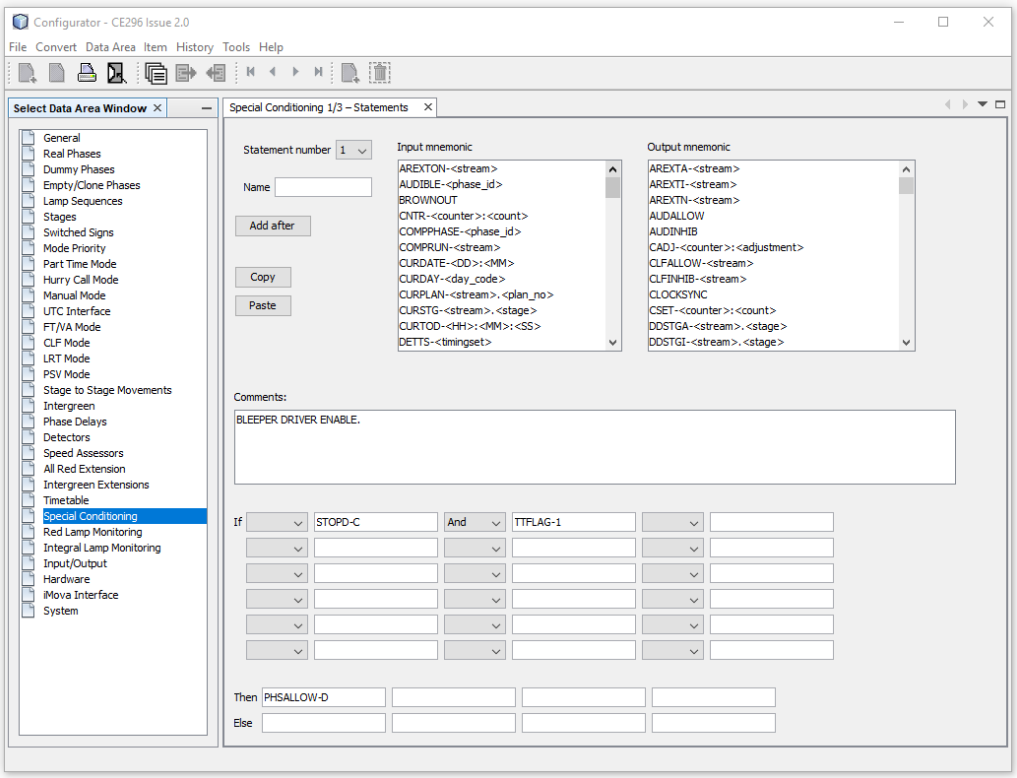


Figure 71 - Special Conditioning 1/3 - Statements

This screen is used to define up to 256 special conditioning statements to create functions that are not standard Optima facilities. Use the button on the toolbar or the **Add Item** menu option to add statements as required. Since version 3.7 statements can be inserted using the **Add after** button.

Warning! Special conditioning statements should be used with caution as it is possible to severely disrupt the normal behaviour of the controller by their improper use. Any special conditioning written should be thoroughly tested before installation on street.

7.27.1.1 Statement Number

This drop-down list shows the number of the current statement being viewed and provides a quick way to navigate to a particular statement. The **First Item**, **Next Item**, **Previous Item**, and **Last Item** buttons or menu options can also be used to navigate the statements.

7.27.1.2 Name

This was introduced at version 3.7 to allow a statement name to be used as a reference using the **STMNT-** mnemonic. The name should consist of letters and numbers only, with no spaces, but the first character must be a letter. The name must be between 2 and 20 characters long.

7.27.1.3 Add After, Copy and Paste

This was introduced at version 3.7 the **Add after** button allows the user to insert a blank statement. In previous versions new statements were only able to be added at the end, after the last statement.

Note: If inserting statements, ensure that any statements that are referenced by number are updated if not using statement names.

Also introduced at version 3.7, the **Copy** and **Paste** buttons can be used to duplicate statements and paste them in. The way this works is that the currently viewed statement will be copied when the **Copy** button is pressed, however internally, what is copied is the reference to that statement. If, before the paste operation, a statement is inserted before the statement copied, this will push the reference off by one, so that the incorrect statement will be pasted in. The **Paste** button pastes all statement data **overwriting** the currently viewed statement. It does **not** insert the pasted data to a new statement.

7.27.1.4 Input and Output Mnemonic List Boxes

Special list boxes are provided for input and output mnemonics. To add a mnemonic into a statement, use the mouse to highlight the required mnemonic and then double-click with the mouse on the target edit box. The selected mnemonic is then copied. Attempts to copy input mnemonics into output edit boxes and vice versa are ignored. Alternatively, a mnemonic may be written in manually. When a mnemonic has been copied anything shown in angle brackets must be replaced by the real data stated, for example: **FDET-<det_name>** requires a detector name, such as **FDET-AXYZ**.

7.27.1.5 Comments

The comments field is used to describe the function of the following special conditioning statement for ease of future reference and is for information purposes only, appearing in the printout.

7.27.2 **Special Conditioning 2/3 - Timers**

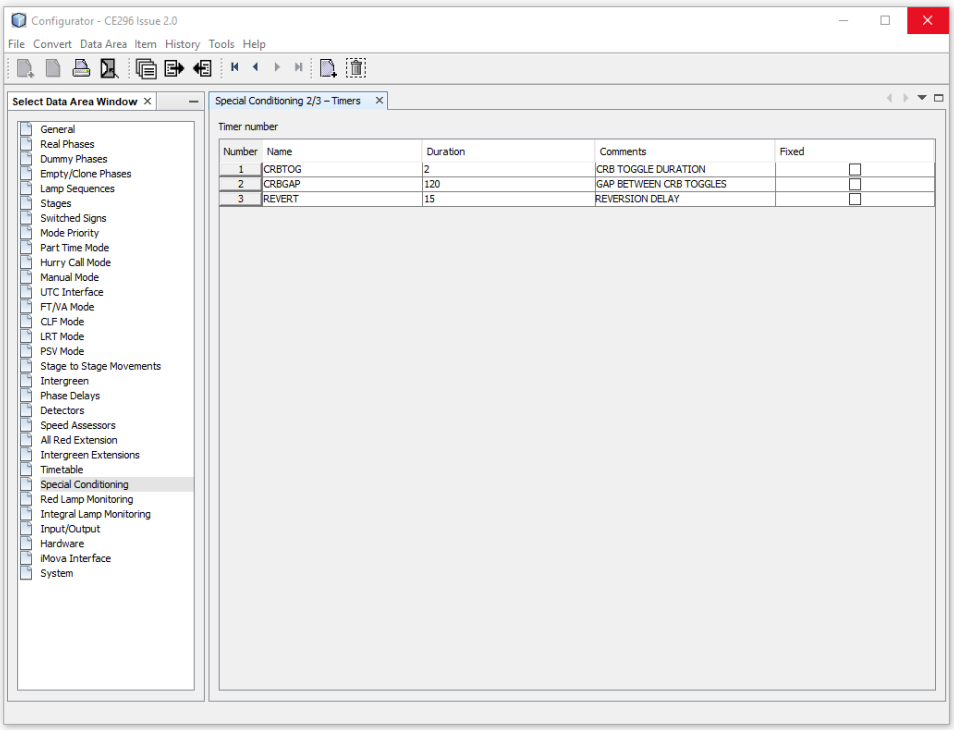


Figure 72 - Special Conditioning 2/3 - Timers

Up to 256 special conditioning timers can be defined. Use the button on the toolbar or the **Add Item** menu option to add a special conditioning timer.

7.27.2.1 Name

Timers are referenced in special conditioning statements by their timer names. A default name is provided upon creation but any combination of up to 7 alphanumeric characters may be used, preferably a name that indicates the function of the timer, for example **DLY1** - delay timer 1, **MD32PLS** for MOVA Det 32 Pulse.

7.27.2.2 Duration

The timer duration must be in the range of 0 to 6000 seconds in 0.1 second steps. The field defaults to 0 and cannot be left blank.

7.27.2.3 Comments

The comments field is used to describe the function of the timer and is for administration purposes, appearing on the printout. Up to 90 characters are allowed.

7.27.2.4 Fixed

Alteration of timer settings from the handset can be prevented by marking the timer as fixed. Select the adjacent checkbox to make the timer fixed.

7.27.3 **Special Conditioning 3/3 - Faults**

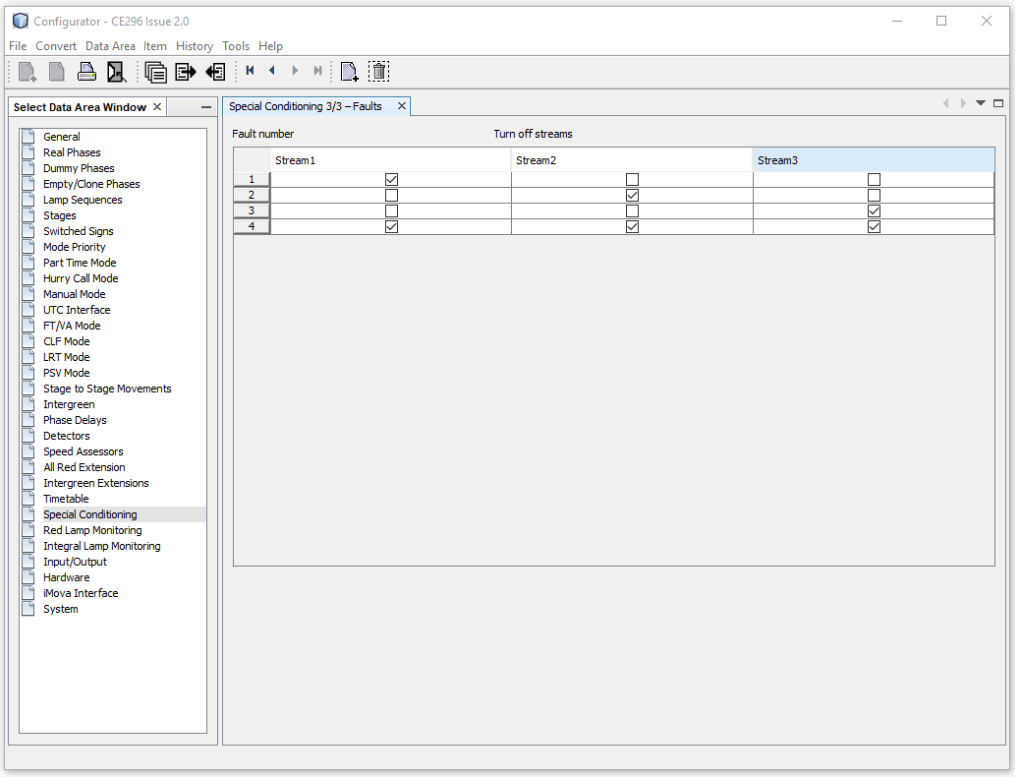


Figure 73 - Special Conditioning 3/3 - Faults

This screen is used to define up to 256 special conditioning faults. Use the button on the toolbar or the **Add Item** menu option to add a special conditioning fault.

Faults are referenced in special conditioning statements by their numbers. The mnemonic **SCFLTON-<fault_no>** switches the fault on and **SCFLTOFF-<fault_no>** switches the fault off.

For each fault, tick all the streams that should be shut down by this fault. When a special conditioning fault is set active the appropriate streams will be shut down and an entry will be made in the fault log.

7.27.4 **Special Conditioning Logic**

Special conditioning statements are defined in the following format:

IF statement = TRUE, THEN perform active actions, ELSE perform inactive actions.

There are a maximum of four active and inactive actions that can be set. When the statement value changes from FALSE to TRUE the **active** actions are performed, and when it changes from TRUE to FALSE, the **inactive** actions are performed. This means that the special conditioning actions are edge triggered. A statement does not need to have both active and inactive actions, and sometimes may not have any actions if it is used as part of a larger set of statements.

Each statement is made up of mnemonics with associated data and logical operators. A complex Boolean type expression may need more than one statement as brackets are not catered for. As an example, consider the following Boolean expression:

(A.B.C)+(D.E)+!(F)

Note: This uses the notation of . for AND, + for OR and ! for NOT.

The above example requires two different statements as shown below, where statement 1 has no actions and statement 2 has the expressions required to complete the expression and perform the active and inactive actions.

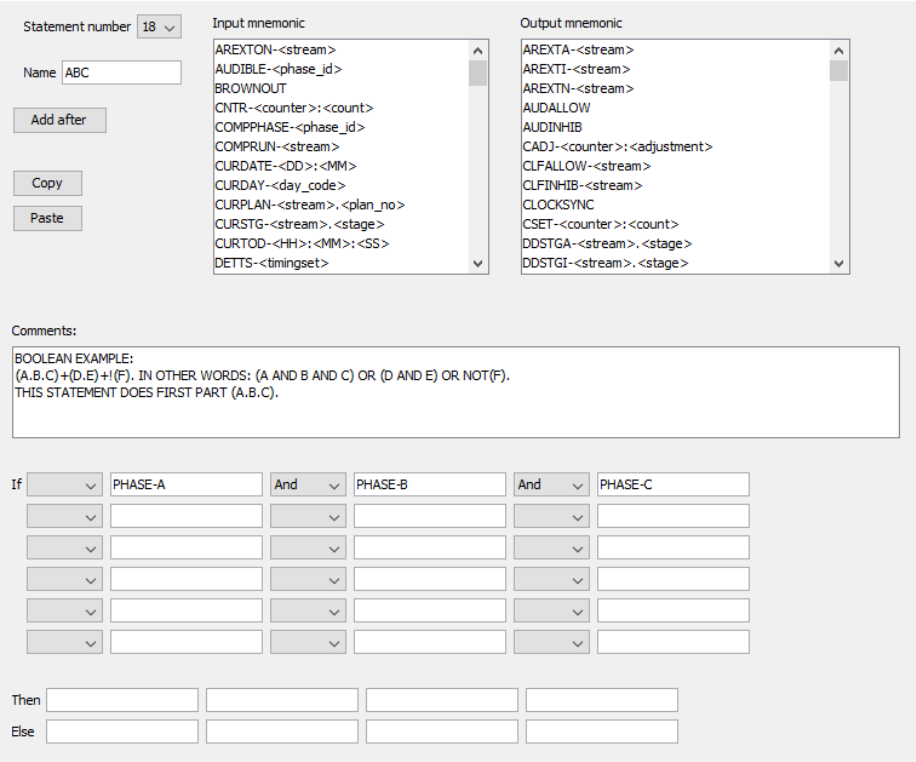


Figure 74 - Boolean Logic Example: Statement 1

In the example in the figure above, the first part of the expression **A.B.C** is evaluated. There are no actions, and the statement has been given the name "**ABC**". In version 3.7 and later, statements can be named, however in earlier versions, the statement number can be referenced instead. This statement is number **18** in the configuration.

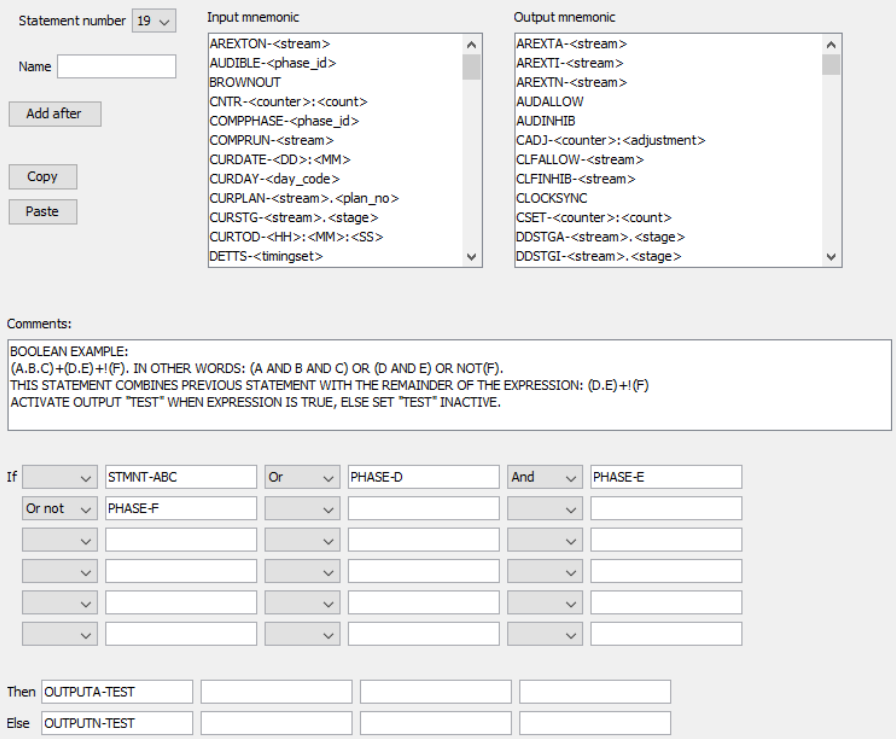


Figure 75 - Boolean Logic Example: Statement 2

The figure above shows the second statement which takes the first statement **STMNT-ABC** and then evaluates the rest of the original Boolean expression.

7.27.4.1 Logical Operators

There are four different logical operators available:

- **AND**
- **OR**
- **NOT**
- **EQU**

The drop-down lists between the mnemonics list the 10 possible combinations of these logical operators.

- **AND**
- **OR**
- **AND NOT**
- **OR NOT**
- **NOT**
- **NOT AND**
- **NOT OR**
- **EQU**
- **EQU NOT**
- **NOT EQU**

7.27.4.2 Precedence

There is no operator precedence between OR and AND and evaluation of a statement is from **left to right**. As already mentioned, brackets are not catered for. If a NOT appears immediately after an input mnemonic, then it will NOT the whole expression up to that point. If a NOT appears immediately before an input mnemonic, then it will only NOT the following input mnemonic. The following examples demonstrate this function.

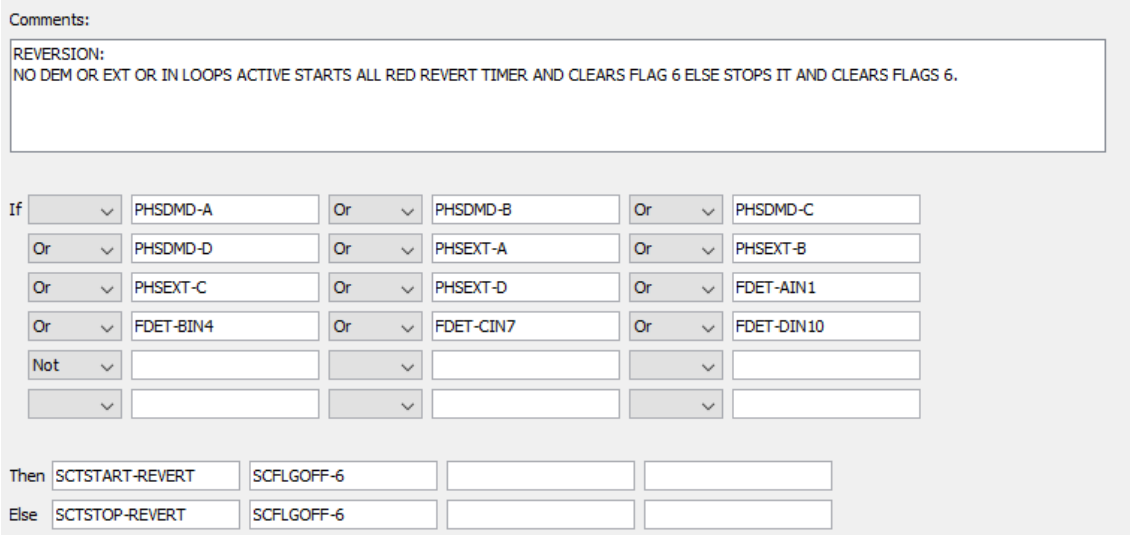


Figure 76 - Example of NOT Following the Expression

In the above figure, several phase demands/extensions and detector states are checked to see if they are active, however what is required is that none of the phases have any demand or extensions present and none of the detectors are active. Placing a NOT at the end of this Boolean expression does just that.

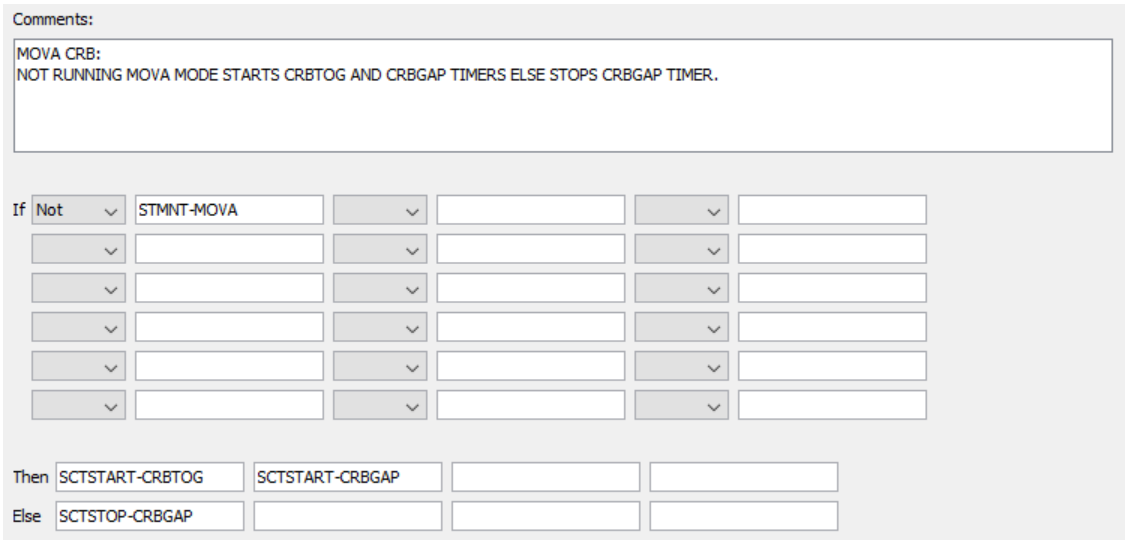


Figure 77 - Example of NOT Preceding the Expression

In the above figure a common expression forming part of MOVA Controller Ready Bit code is given. Here there is a previous statement named “MOVA” that indicates when MOVA is the active control mode. As part of the CRB code, some timers need to be started or stopped depending on whether MOVA is in control. The expression:

IF NOT (STMNT-MOVA)

means that if MOVA mode is NOT running, do something.

7.27.5 Input Mnemonics

This section details the available special conditioning input mnemonics with a description of their meaning and use where necessary. The input mnemonics in the list box on the screen are in alphabetical order, but below they are grouped together in common areas.

7.27.5.1 Status

DIM	Signals in the dim state
BROWNOUT	Lamp supply brownout
SIGLAMPISO	Lamp supply isolated
HSCON	Handset Connected (see note below)
FLTEXIST	Fault log entry exists
WRNEXIST	Warning log entry exists

Note: HSCON returns TRUE once the handset has been plugged in and something has been typed, until the TF bit reset time (default midnight). Once active, HSCON remains true even if the handset is removed. This is due to a lack of modem signals on the handset port.

7.27.5.2 Optima Manual Panel Inputs

The following are acceptable input names <man_ip> for the MANIP mnemonic that processes inputs from the Optima manual panel:

PB0	All red button
PB1	Button 1
PB2	Button 2
PB3	Button 3
PB4	Button 4
PB5	Button 5
PB6	Button 6
PB7	Button 7
PB8	Button 8
PB9	Button 9
PB10	Button 10
SOFF	Signals On/Off. Active = signals ON.
PTI	Part-time Inhibit
LTST	Lamps test
DOOR	Door micro-switch Active when door closed.
MANSEL	Manual mode selected
FTSEL	Fixed Time mode selected
SW1	Button SW 1
SW2	Button SW 2
SW3	Button SW 3
SW4	Button SW 4
SW5	Button SW 5

7.27.5.3 Input

All physical and virtual inputs can be accessed using this mnemonic.

FLTIP-<input_name>	Input

7.27.5.4 Current Mode in Stream

SHDMODE-<stream>	Failure shutdown
MSDMODE-<stream>	Manual shutdown (signals OFF)
STUMODE-<stream>	Start-up
PTMODE-<stream>	Part-time (prior to lamps off)
PTSMODE-<stream>	Part-time (after lamps off)
HC1MODE-<stream>	Hurry Call 1
HC2MODE-<stream>	Hurry Call 2
HC3MODE-<stream>	Hurry Call 3
HC4MODE-<stream>	Hurry Call 4
MANMODE-<stream>	Manual
UTCMODE-<stream>	UTC (this could be UTC or MOVA)
MFTMODE-<stream>	Manually selected Fixed Time
TCLFMODE-<stream>	Timetable selected CLF
HCLFMODE-<stream>	Handset selected CLF
FTMODE-<stream>	Normal FT (as lowest mode)
VAMODE-<stream>	Normal VA (as lowest mode)
LRTMODE-<stream>	LRT
PVMODE-<stream>	PSV Priority
EVMODE-<stream>	PSV Emergency

7.27.5.5 Stages

STGDMD-<stream>.<stage>	Stage demand
CURSTG-<stream>.<stage>	Current stage
NXTSTG-<stream>.<stage>	Next stage

Note: CURSTG is set at the start of stage green and runs through to the following interstage until the start of the next stage. NXTSTG is set at the start of the preceding stage and runs through to the end of stage green.

For example:

- During stage green, CURSTG=NXTSTG
- During interstage
  - CURSTG = From stage
  - NXTSTG = To stage

7.27.5.6 Detection

RDET-<det_name>	Raw detector active (before overrides)
FDET-<det_name>	Final detector active (after overrides)
DFM-<det_name>	Detector failed DFM
UTCBIT-<bit_name>	UTC control bit active

7.27.5.7 All Red Extensions

AREXTON-<stream>	All Red extensions active in stream

7.27.5.8 Phases

PHSDMD-<phase_id>	Phase demand
PHSOPP-<phase_id>	Phase opposed
PHSEXT-<phase_id>	Phase demanded
MINCOMP-<phase_id>	Phase minimum green complete
MAX-<phase_id>	Phase in maximum
MAXCOMP-<phase_id>	Phase maximum green complete
START-<phase_id>	Phase starting
PHASE-<phase_id>	Phase running (green)
STOPNG-<phase_id>	Phase stopping
STOPD-<phase_id>	Phase stopped (red)
SHTDWN-<phase_id>	Phase shut down
PHSMOD-<phase_id>.-<phase_mode>	Phase Mode

<phase_mode> can be any one of the following:

- PTM: Pre-Timed Maximum
- FVP: Fixed Vehicle Period
- VA: Vehicle Actuated

7.27.5.9 Timing Sets

PHASETS-<timingset>	Phase timing set active
DETTS-< timingset>	Detector timing set active
LRTTS-< timingset>	LRT timing set active

7.27.5.10 Timetable

TTFLAG-<flag_no>	Timetable event flag active
SYNCDONE	Clock synchronise request actioned
CURPLAN<stream>.<plan_no>	Current CLF plan
CURTOD-<HH>:<MM>:<SS>	Current time of day
CURDATE<DD>:<MM>	Current date
CURDAY<day_code>	Current day of week

Note: Day codes are MON, TUE, WED, THU, FRI, SAT and SUN. Month must be a numeric value in the range 1 to 12.

7.27.5.11 Conditioning

STMNT-<statement_no>	Statement true. Versions 3.7 and later may use name as well as number.
SCBITS-<bitno>	Special conditioning bit active (1-256)
SCFLAG-<flag_no>	Special conditioning flag active (1-256)
SCTSTOPD-<timer_name>	Special conditioning timer stopped
SCTRUNNG-<timer_name>	Special conditioning timer running
SCTEXPRD-<timer_name>	Special conditioning timer expired (true for first cycle only)
CNTR-<counter>:<count>	Special conditioning counter (is less than or equal to count).

7.27.5.12 LRT Mode

LRTTS-< timingset>	LRT timing set active
LRTEVFLD-<phase>.<event>	LRT event failed
LRTEVOCD-<phase>.<event>	LRT event just occurred. True for first cycle only.
LRTEVRDY-<phase>.<event>	LRT event is ready to action
LRTSEQST-<phase>.<event>	LRT phase has active event sequence
LRTDETFL-<det_name>	LRT detector has failed.
LRTMODE-<stream>	LRT mode active

Note: For LRT events, enter P for prepare, D for demand, S for stopline, and E for exit.

7.27.5.13 Lamp Monitoring

RLF1-<stream>	First red lamp fault in stream
RLF2-<stream>	Second red lamp fault in stream
ILMFAIL-<phase_id>.<aspect>.<nfaults>	ILM lamp failure
ILMCFT-<phase_id>.<aspect>	ILM lamp conflict
ILMUNMAINS	ILM unstable mains voltage

Note: <aspect> can be R for red, A for amber or G for green. <nfaults> means 1 or more faults.

7.27.5.14 Pedestrian Monitoring

PEDWAIT-<phase_id>	Pedestrian wait indicator status
PEDCLEAR-<phase_id>.<status>	

Status can be:

- 0: Not in pedestrian phase
- 1: Timing minimum pedestrian intergreen
- 2: Waiting for pedestrian extension to end
- 3: Timing clearance period
- 4: Timing extra clearance period

Note: AUDIBLE-<phase_id> and TACTILE-<phase_id> are obsolete mnemonics. See Special Conditioning examples for example of how to drive bleeper using a phase drive output.

7.27.5.15 PSV Mode

PMRUN-<priority_unit>	PSV Priority unit running
COMPRUN-<priority_unit>	PSV priority unit compensation running
COMPPHASE-<phase_id>	PSV phase running compensation
PSVDMD-<priority_unit>	PSV priority unit demanded

7.27.5.16 Speed Assessor

VLEN-<assessor>:<vehicle_length>	Speed assessor last vehicle length
VSPD-<assessor>:<speed>	Speed assessor last vehicle speed
VAVSPD-<assessor>:<avg_speed>	Speed assessor average vehicle speed
VHSPD-<assessor>:<speed>	Speed assessor highest vehicle speed
VGAP-<assessor>:<gap>	Speed assessor new gap
VLGAP-<assessor>:<gap>	Speed assessor last gap
VAVGAP-<assessor>:<gap>	Speed assessor average gap
PHSSPDXTN-<phase_id>	Speed assessor phase extension
SPDARXTNREQ-<stream>	Speed assessor all-red extension required
SPDARXTNRUN-<stream>	Speed assessor all-red extension running

7.27.6 Output Mnemonics

This section details all the available special conditioning output mnemonics with a description of their meaning and use where necessary. The output mnemonics in the list box on the screen are in alphabetical order, but in this section they are grouped together in common areas.

Warning! Where special conditioning mnemonics may be set active/inactive/normal, care should be taken as the active/inactive overrides will affect other sources of the object overridden.

For example, to set UTC reply bit G1 active through conditioning then removing the override should be done with the no override mnemonic **OUTPUTN-G1**. If the inactive mnemonic was used this would stop the normal function of G1 from within the software.

7.27.6.1 Timetable

CLOCKSYNC	Clock sync request

7.27.6.2 Optima Manual Panel Input Override

The MANIP output mnemonic overrides inputs from the Optima manual panel:

- MANIPA-<man_ip> Override manual panel input active
- MANIPI-<man_ip> Override manual panel input inactive
- MANIPN-<man_ip> Remove manual panel input override

The following are acceptable input names <man_ip> for this mnemonic:

PB0	All red button
PB1	Button 1
PB2	Button 2
PB3	Button 3
PB4	Button 4
PB5	Button 5
PB6	Button 6
PB7	Button 7
PB8	Button 8
PB9	Button 9
PB10	Button 10
SOFF	Signals On/Off. Active = signals ON.
PTI	Part-time Inhibit
LTST	Lamps test
DOOR	Door micro-switch Active when door closed.
MANSEL	Manual mode selected
FTSEL	Fixed Time mode selected
SW1	Button SW 1
SW2	Button SW 2
SW3	Button SW 3
SW4	Button SW 4
SW5	Button SW 5

Note: Manual panel names are the same as described for the input mnemonics in the previous section.

7.27.6.3 Optima Manual Panel LED Override

The MPLED output mnemonic sets the state of the manual panel LEDs:

- MPLEDON-<man_op> Override manual panel LED on
- MPLEDOFF-<man_op> Override manual panel LED off
- MPLEDFLS-<man_op> Override manual panel LED to flashing (1 Hz)

The following are acceptable input names <man_op> for this mnemonic:

PB0	All red button LED
PB1	Button 1 LED
PB2	Button 2 LED
PB3	Button 3 LED
PB4	Button 4 LED
PB5	Button 5 LED
PB6	Button 6 LED
PB7	Button 7 LED
PB8	Button 8 LED
PB9	Button 9 LED
PB10	Button 10 LED
AS	A/W 1 (Awaiting selection) LED
PM	PROHIB MOVE (Prohibited Move) LED
HP	HP MODE (Higher priority mode running) LED
MNA	M N/A (Manual mode not available) LED
AUX1	AUX 1 LED
AUX2	AUX 2 LED
AUX3	AUX 3 LED
AUX4	AUX 4 LED
AUX5	AUX 5 LED

7.27.6.4 Shut Down

SHDON-<stream>	Shut down request on
SHDOFF-<stream>	Shut down request off

7.27.6.5 CLF Mode

CLFINHIB-<stream>	CLF mode inhibit
CLFALLOW-<stream>	CLF mode allow

Note: CLF mode inhibit/allow only affects timetabled CLF mode, and not handset selected CLF mode.

7.27.6.6 Fixed Time Mode

MANFTA-<stream>	Manual FT mode override active
MANFTI-<stream>	Manual FT override inactive
MANFTN-<stream>	Manual FT no override

7.27.6.7 Manual Mode

MANINHIB-<stream>	Manual mode inhibit
MANALLOW-<stream>	Manual mode allow
MANSTEPON-<stream>	Manual mode step on

7.27.6.8 Part-time Mode

PTIMEA-<stream>	Part-time mode override active
PTIMEI-<stream>>	Part-time mode override inactive
PTIMEN-<stream>	Part-time mode no override

Note: Part-time mode active forces the signals OFF.

7.27.6.9 UTC Mode

UTCA-<stream>	UTC mode override active
UTCI-<stream>	UTC mode override inactive
UTCN-<stream>	UTC mode no override
UTCBITA-<bit_name>	UTC control bit override active
UTCBITI-<bit_name>	UTC control bit override inactive
UTCBITN-<bit_name>	UTC control bit no override

7.27.6.10 Hurry Call Mode

HCINHIB-<stream>.<call_no>	Hurry call inhibit
HCALLOW-<stream>.<call_no>	Hurry call allow

7.27.6.11 LRT Mode

LRTINHIB-<stream>	Inhibit LRT mode
LRTALLOW-<stream>	Allow LRT mode
LRTEVOVR-<phase_id>.<event>	LRT event override
LRTTSINF-<timingset>	LRT influence timing set
LRTTSINFN	LRT remove timing set influence

Note: For LRT event, enter P for prepare, D for demand, S for stopline and E for exit.

7.27.6.12 Priority Mode

PRIORITYI-<priority_unit>	PSV unit inhibit
PRIORITYN-<priority_unit>	PSV unit allow
PRICOMPI-<priority_unit>	PSV unit compensation inhibit
PRICOMPN-<priority_unit>	PSV unit compensation allow
PRIEXTRESET-<priority_unit>	PSV unit extension reset

7.27.6.13 Stage

STGHOLDON-<stream>	Stage hold on
STGHOLDOFF-<stream>	Stage hold off
DDSTGA-<stream>.<stage>	Demand dependent stage request active
DDSTGI-<stream>.<stage>	Demand dependent stage request inactive
DDSTGN-<stream>.<stage>	Demand dependent stage request no override
IMSTGA-<stream>.<stage>	Immediate stage request active
IMSTGI-<stream>.<stage>	Immediate stage request inactive
IMSTGN-<stream>.<stage>	Immediate stage request no override
LSTGDMD-<stream>.<stage>	Latched stage demand
STGDMDA-<stream>.<stage>	Stage demand override active
STGDMDI-<stream>.<stage>	Stage demand override inactive
STGDMDN-<stream>.<stage>	Stage demand no override

Note: STGDMD demands are unlatched, so when stage demand override set to inactive or no override, the demand is removed.

STGINHIB-<stream>.<stage>	Inhibit stage
STGALLOW-<stream>.<stage>	Allow stage

7.27.6.14 Phase

EXTA-<phase_id>	Phase extension override active
EXTI-<phase_id>	Phase extension override inactive
EXTN-<phase_id>	Phase extension no override
OPPDMDA-<phase_id>	Opposing phase demands override active
OPPDMDI-<phase_id>	Opposing phase demands override inactive
OPPDMDN-<phase_id>	Opposing phase demands no override
LPHSDMD-<phase_id>	Latched phase demand
PHSDMDA-<phase_id>	Phase demand override active
PHSDMDI-<phase_id>	Phase demand override inactive
PHSDMDN-<phase_id>	hase demand no override

Note: PHSDMD demands are unlatched, so when phase demand override set to inactive or no override, the demand is removed.

PHSINHIB-<phase_id>	Inhibit phase appearance
PHSALLOW-<phase_id>	Allow phase appearance

7.27.6.15 Audibles (obsolete)

AUDINHIB	Inhibit audibles (obsolete)
AUDALLOW	Allow audibles (obsolete)

Note: Audible bleeper drive is now configured using an extra phase. See special conditioning examples later.

7.27.6.16 Detection

DETA-<det_name>	Detector override active
DETI-<det_name>	Detector override inactive
DETN-<det_name>	Detector no override
DETDMDA-<det_name>	Detector demands override active
DETDMDI-<det_name>	Detector demands override inactive
DETDMDN-<det_name>	Detector demands no override

Note: The DETDMD mnemonic is for overriding ALL demands from a particular detector.

7.27.6.17 Green Extensions

Prior to version 3.7

GEXTA-<green_ext_no>	Detector green extension override active
GEXTI-< green_ext_no>	Detector green extension override inactive
GEXTN-< green_ext_no>	Detector green extension no override

Versions 3.7 and later:

GEXTA-<det_name>.<phase_id>	Detector green extension override active
GEXTI-<det_name>.<phase_id>	Detector green extension override inactive
GEXTN-<det_name>.<phase_id>	Detector green extension no override

Important! Care should be taken when using the GEXT mnemonics **prior to version 3.7**. This is because it uses green extension numbers rather than detector name / phase ID.

To calculate the green extension number, it is necessary to count the extensions starting at 1, from the first detector, counting across the **Extensions** field of a detector if there are more than one extension in any of the detectors. For example:

Detector 1 ext: A(1.5),B(1.5)
Detector 2 ext: none
Detector 3 ext: C(1.0),D(0.2)

The green extension numbers would be as follows:

Detector 1, phase A = 1
Detector 1, phase B = 2
Detector 3, phase C = 3
Detector 3, phase D = 4

INEXTTAPERON	Inhibit extension taper
INEXTTAPEROFF	Allow extension taper

7.27.6.18 Outputs

OUTPUTA-<output_name>	Output override active
OUTPUTI-<output_name>	Output override inactive
OUTPUTN-<output_name>	Output no override

7.27.6.19 Switched Signs

SWSIGNA-<sign_no>	Switched Sign override active
SWSIGNI-<sign_no>	Switched Sign override inactive
SWSIGNN-<sign_no>	Switched Sign no override

7.27.6.20 Special Conditioning

SCFLTON-<fault_no>	Special conditioning fault on
SCFLTOFF-<fault_no>	Special conditioning fault off
SCFLGON-<flag_no>	Special conditioning flag on (256 available)
SCFLGOFF-<flag_no>	Special conditioning flag off

Note: Special conditioning flags are just scratch pad bits for use in writing special conditioning statements. They can only have a true or false value.

SCTSTART-<timer_name>	Start special conditioning timer
SCTSTOP-<timer_name>	Stop special conditioning timer
CSET-<counter>:<count>	Set special conditioning counter
CADJ-<counter>:<count>	Adjust special conditioning counter

7.27.6.21 All Red Extensions

AREXTA-<stream>	All red extensions override active
AREXTI-<stream>	All red extensions override inactive
AREXTN-<stream>	All red extensions no override

7.27.6.22 Intergreen Extensions

IGEXTA-<ig_ext_no>	Intergreen extensions override active
IGEXTI-< ig_ext_no >	Intergreen extensions override inactive
IGEXTN-< ig_ext_no >	Intergreen extensions no override

Warning! Care should be taken when using the IGEXT mnemonics. This is because they use intergreen extension number.

Intergreen extensions are sorted by the compiler into a fixed order, indexed by detector/from phase/to phase. The easiest way to calculate the number required is to have entered the intergreen extensions in the above-mentioned order, then the index number from the intergreen extension screen may be used.

Alternatively compile the configuration first and then using the simulator, step through the intergreen extensions using the **IGX** handset command and start counting from 1.

7.27.6.23 Pedestrian

PEDIGEXTA-<det_name>	Ped intergreen extension override active
PEDIGEXTI-<det_name>	Ped intergreen extension override inactive
PEDIGEXTN-<det_name>	Ped intergreen extension no override
PEDDMDEXTA-<det_name>	Ped demand extension override active
PEDDMDEXTI-<det_name>	Ped demand extension override inactive
PEDDMDEXTN-<det_name>	Ped demand extension no override

7.27.6.24 Speed Measurement

HIGHSPDCLR-<assessor>	Reset speed assessor highest speed
SAMPLE-<assessor>:<sample_size>	Set speed assessor sample size

7.27.7 Special Conditioning Examples

The following sections give a few examples of special conditioning.

7.27.7.1 Manual Disable Via Handset

If the **Manual disable via handset option required** facility is configured on **General 2/3 – Miscellaneous Settings** screen, then the following conditioning statement can be included to stop the **ALL RED** button functioning when manual is selected, but not enabled with the **MND** handset command.

Comments:						
Manual mode selected, but not running, inhibits the ALL RED button.						
If		MANIP-MANSEL	**And not**	MANMODE-1		
Then	MANIPI-PB0					
Else	MANIPN-PB0					

7.27.7.2 Stage Inhibit Unless Certain Demands Present

The following example shows stage 4, stream 1 being inhibited, in VA mode only, unless there is a demand for either phase G or J. A previous statement only active when MOVA is active is referenced.

Comments:						
Stage Logic: In all modes except Manual and MOVA modes, prevent stage 1.4 unless demand for phases G and J exist.						
If		MANMODE-1	**Or**	STMNT-MOVA	**Or**	PHSDMD-G
	Or	PHSDMD-J	**Or**	CURSTG-1.4		
Then	STGINHIB-1.4					
Else	STGALLOW-1.4					

7.27.7.3 Single Stream Pedestrian Crossing: Bleeper Drive

A phase output may be used to drive the bleeper, controlled by timetable flag, with special conditioning. Follow the steps below:

1. Create a bleeper driver phase:
    a. Name: Bleeper Driver
    b. Type: Ind/Filter
    c. App. Type 4, associated phase = ped phase
    d. Term. Type 2, associated phase = ped phase
    e. Min green and min green limit values = 0
    f. Conflicting phases = same as pedestrian phase
    g. Opposed phases = same as pedestrian phase
2. Any intergreens to/from bleeper phase should be the same as those for the pedestrian phase.
3. Place bleeper phase in the same stage as the pedestrian phase
4. Bleeper phase does not need to be demanded on startup
5. Bleeper phase should not demand in Fixed Time
6. Configure Timetabled flag active in the morning and inactive in the evening to switch on/off the bleeper
7. Lamp monitoring should be set to “Unmonitored”.
8. Insert the following special conditioning statements.

Comments:						
Bleeper drive ENABLE.						
If		STOPD-C	**And**	TTFLAG-1		
Then	PHSALLOW-D					
Else						

Comments:						
Bleeper drive DISABLE.						
If		STOPD-C	**And not**	TTFLAG-1		
Then	PHSINHIB-D					
Else						

7.27.7.4 Junction with All-Round Pedestrian Crossing: Bleeper Drive

A phase output may be used to drive the bleeper, controlled by timetable flag, with simple special conditioning. Follow the steps below:

1. Create a bleeper driver phase:
    a. Name: Bleeper Driver
    b. Type: Ind/Filter
    c. App. Type 2
    d. Term. Type 2, associated phase = all ped phases, for example: E,F,G,H
    e. Min green and min green limit values = 0
    f. Conflicting phases = same as pedestrian phases
    g. Opposed phases = same as pedestrian phases
2. Any intergreens to/from bleeper phase should be the same as those for the pedestrian phases.
3. Place bleeper phase in the same stage as the pedestrian phase
4. Bleeper phase does not need to be demanded on startup
5. Bleeper phase should not demand in Fixed Time
6. Configure Timetabled flag active in the morning and inactive in the evening to switch on/off the bleeper
7. Lamp monitoring should be set to “Unmonitored”.
8. Insert the following three special conditioning statements, adjust the phases and flag number to suit.

Comments:						Name: PEDGRN
Timetabled Bleeper Drive: Set flag 1 ON when pedestrian phases are green, else clear.						
If		PHASE-E	**And**	PHASE-F	**And**	PHASE-G
	And	PHASE-H				
Then	SCFLGON-1					
Else	SCFLGOFF-1					

Comments:						Name:
Timetabled Bleeper Drive: Phases E,F,G and H just gone green and timetabled event flag 1 ON, demands and allows bleeper driver phase I.						
If		STMNT-PEDGRN	**And not**	SCFLAG-1	**And**	TTLFAG-1
Then	PHSDMDA-I		PHSALLOW-I			

Else	PHSDMDI-I				
Comments:					Name:
Timetabled Bleeper Drive: Phases E,F,G and H not all green inhibits bleeper drive phase I.					
If not		STMNT-PEDGRN			
Then	PHSINHIB-I				
Else					

7.27.7.5 Centre Island Blackout – Monitored Red Signal

A phase output may be used to drive the centre island red signals of a nearside pedestrian crossing so that a blackout is achieved during the min and max clearance times. If the buttons on the centre island are pressed during the max clearance time, the centre island blackout ends early, and a red signal is shown.

This method uses an empty phase, which is linked to a secret sign, driven by special conditioning. The red signal is wired to this phase, whilst the amber and green signals remain from the pedestrian phase.

Follow the steps below:

1. If there is no bleeper phase, then create an empty phase from the Empty/Clone Phases data area. **CA** in this example. Do **not** tick “is clone phase”.
2. If there is a bleeper phase, with unused red output, this can be used instead of **CA**. For example: phase **D**.
3. Add a Switched Sign:
    a. UTC reply bit name should be empty
    b. Conflicting phase greens should be empty
    c. Associate with Stream where the Pedestrian runs, for example: **1**.
    d. Phase drive used should be either **CA** or **D** depending on whether point 1 or 2 was followed
    e. Aspect colour should be **Red**, as selected from the drop-down list.
4. Lamp monitoring may be set up against the red aspect for CA or D. Ensure that Green and Amber are set to **Unmonitored** and the correct lamp profile is chosen.
5. Add the following special conditioning, customising the flags, phases, detectors (for buttons) and switched sign number to suit.

Comments:						Name:
Centre Island Blackout: Flag 1 OFF when pedestrian phase green.						
If		PHASE-C				
Then	SCFLGOFF-1					
Else						

[Continued…]

Comments:						Name:
Centre Island Blackout: Flag 1 ON when phase C centre island push buttons pressed.						
If	**Not**	PHASE-C	**And**	FDET-CPB2	**Or**	FDET-CPB5
Then	SCFLGON-1					
Else						

Comments:						Name:
Centre Island Blackout: Deactivate Switched Sign 1 if phase C shut down, phase C green, or in Min/Max clearance.						
If		SHTDOWN-C	**Or**	PHASE-C	**Or**	PEDCLEAR-C.1
	Or	PEDCLEAR-C.2				
Then	SWSIGNN-1					
Else	SWSIGNA-1					

Comments:						Name:
Centre Island Blackout: Activate Switched sign 1 during phase C max clearance if centre island buttons are pressed (Flag 1 ON).						
If		PEDCLEAR-C.2	**And**	SCFLAG-1		
Then	SWSIGNA-1					
Else						

7.27.7.6 Pedestrian Link

The following example shows the statements required to provide a Pedestrian Link. Three timers are required for each link and these must be specified on the **Special Conditioning 2/3 – Timers** screen of the **Special Conditioning** data area. In this example **OVR1** is the override timer, **DLY1** is the delay timer and **WIN1** is the window timer, as the example is using an inhibit release period.

The example pedestrian link uses output 16, named **LINK1** in the **Input/Output – Outputs** screen of the **Input/Output** data area. to provide an inhibit link to an adjacent controller. Lifting of the inhibit is triggered by phase B terminating. The inhibit is also removed if the signals are off, either manually or due to a fault log entry. To get the output short circuit for inhibit, output 16 must have an invert state of OFF in the **Input/Output – Outputs** screen.

Comments:						Name:
Local Link: Phase B stopping starts DLY1 timer.						
If		STOPNG-B				
Then	SCTSTART-DLY1					
Else						

Comments:						Name:
Local Link: DLY1 or OVR1 timer expired starts WIN1 timer.						
If		SCTEXPRD-DLY1	**Or**	SCTEXPRD-OVR1		
Then	SCTSTART-WIN1					
Else						

[Continued…]

Comments:						Name:
Local Link: WIN1 timer expired starts OVR1 timer.						
If		SCTEXPRD-WIN1				
Then	SCTSTART-OVR1					
Else						

Comments:						Name:
Local Link: SHD/MSD mode or WIN1 timer running removes output LINK1, else sets it.						
If		SHDMODE-1	**Or**	MSDMODE-1	**Or**	SCTRUNNG-WIN1
Then	OUTPUTN-LINK1					
Else	OUTPUTA-LINK1					

7.27.7.7 Revertive Phase Demands when MOVA has Delayed Reversion

When MOVA requires delayed reversion, normal revertive demands applied in the **Real Phases 1/2 – Basic screen** can prevent the reversion from operating properly. It is therefore necessary to use conditioning to apply the revertive phase demands in all modes except MOVA. A prior statement has been set up to be active when MOVA mode is active since both MOVA and UTC share UTC mode in the controller. This statement is named “MOVA”. For each phase, two statements are required. If final revertive demand can be to the phase itself or the associated phase.

Comments:						Name:
Revertive Phase Demands: Set Flag 1 ON when phase A green, else clear it.						
If		PHASE-A				
Then	SCFLGON-1					
Else	SCFLGOFF-1					

Comments:						Name:
Revertive Phase Demands: Phase C just terminated with extensions active and not in MOVA mode inserts a revertive demand.						
If	**Not**	PHASE-A	**And**	SCFLAG-1	**And**	PHSEXT-C
	And not	STMNT-MOVA				
Then	LPHSDMD-A					
Else						

7.28 Red Lamp Monitoring

There is a single screen in this data area.

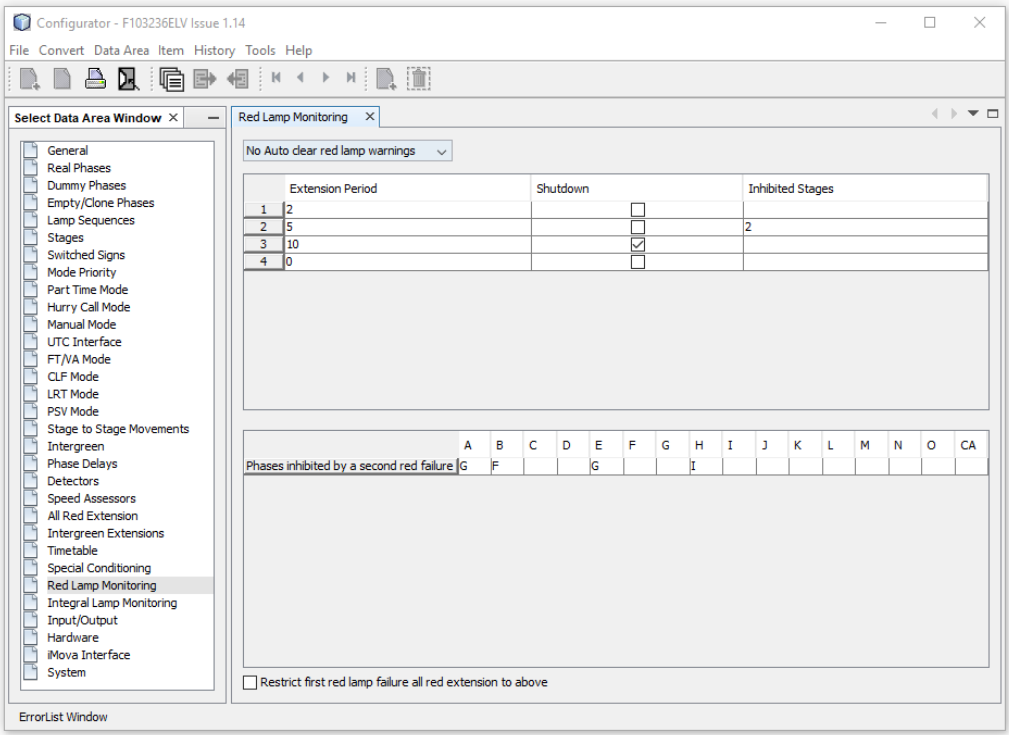


Figure 78 - Red Lamp Monitoring

This screen can be used to define the red lamp monitoring functions of the controller.

7.28.1 Auto Clear Red Lamp Warnings

The auto-clear red lamp warnings function is selected by choosing an option in the drop-down box. This is the same control that appears on the **ILM 1/2 – General** screen in the **Integral Lamp Monitoring** data area. The choices are:

- No Auto Clear Red Lamp Warnings: Any red lamp warning will require a manual reset.
- Auto Clear 1st Red Lamp Warnings: Any defined first red lamp warning will auto clear.
- Auto Clear 2nd Red Lamp Warnings: Any defined first or second red lamp warnings will auto clear.

Note: If the second red fault causes a stream to switch off, then manual reset will be required.

7.28.2 Stream Table

The top part of the screen is a table with row per stream with the following settings:

7.28.2.1 Extension Period

This is the extension applied on moves to a stage with a pedestrian phase when a single red lamp fault exists. This period must be in the range 0 to 300 seconds in 0.1 second steps. Zero must be entered if no extension is required.

Important! The pedestrian phase requires an intergreen to be programmed for this extension to function.

7.28.2.2 Shutdown

Streams can be extinguished on a second (or multiple) lamp failure. Select the checkbox against each stream that is to be shut down when a second red lamp failure exists. For streams that are not to be shut down or do not have red lamp monitoring, leave as default unchecked. Shut down of streams is normally only used on Part-time junctions, or stand-alone pedestrian crossings, which may be part of a larger junction controller.

7.28.2.3 Inhibited Stages

This is not normally used, to inhibit pedestrian phases in a junction controller, see **Phases Inhibited by a Second Red Failure.** For inhibited stages enter the stage(s) to be inhibited when a multiple red lamp failure exists on the associated stream. Stage numbers must be in the range of 0 to 15 and must be separated by commas with no spaces.

7.28.3 Phases Inhibited by a Second Red Failure

Each configured phase has a column in this table. The phases that should be inhibited by a second red lamp failure of each phase should be entered for example. any pedestrian phases that conflict with the phase of that column. Phase letters should separated by a comma with no space. Inhibited phases usually (but don't have to be) pedestrian phases. When a pedestrian phase is inhibited, the wait indicator will be lit and it cannot have a demand. This is useful for MOVA configurations where inhibited phases should not reply the MOVA detector for a wait indicator confirm. This means that the mnemonic **PHSDMD-<phase_id>** may be used to set the MOVA detector for a pedestrian demand.

7.28.4 Restrict First Red Lamp Failure All Red Extension to Above

This setting when checked restricts the intergreen extension to those conflicts specified in the table for phases inhibited by a second red failure.

7.29 Integral Lamp Monitoring

There are two screens in this data area. Phases are added automatically by the Configurator when real or empty/clone phases are created.

7.29.1 ILM 1/2 - General

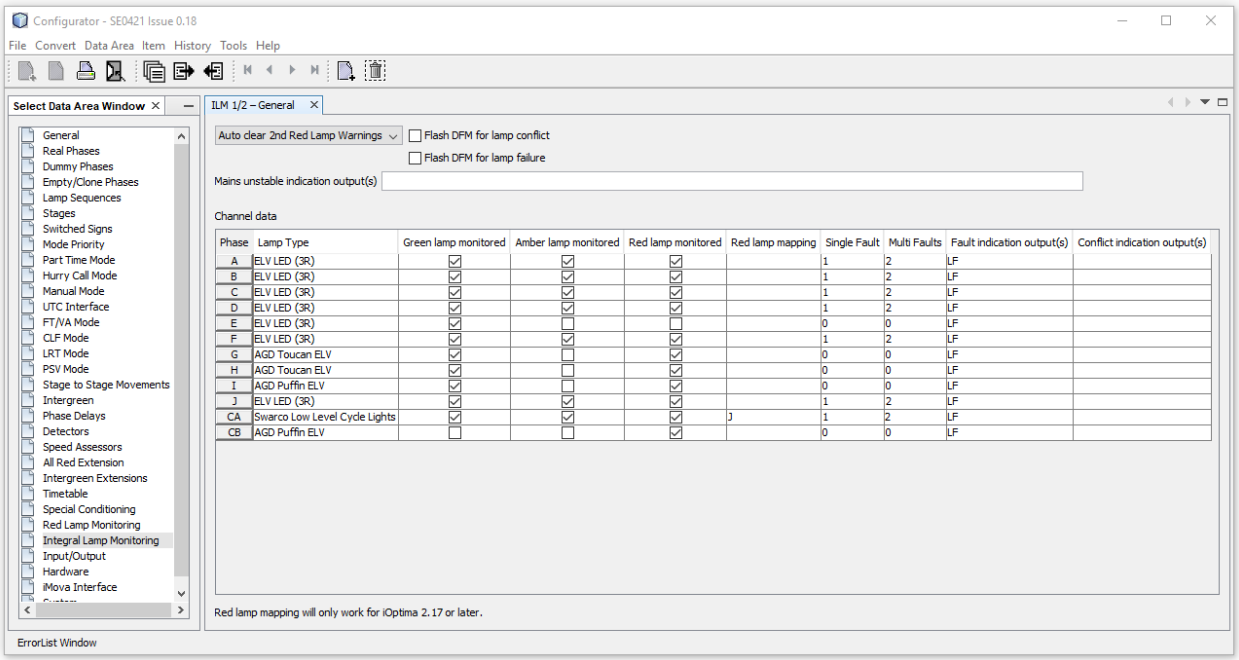


Figure 79 - ILM 1/2 - General

This screen is used to define the phase lamp monitoring channels.

7.29.1.1 Auto Clear Red Lamp Warnings

The auto-clear red lamp warnings function is selected by choosing an option in the drop-down box. This is the same control that appears on the **Red Lamp Monitoring** data area. The choices are:

- No Auto Clear Red Lamp Warnings: Any red lamp warning will require a manual reset.
- Auto Clear 1st Red Lamp Warnings: Any defined first red lamp warning will auto clear.
- Auto Clear 2nd Red Lamp Warnings: Any defined first or second red lamp warnings will auto clear.

Note: If the second red fault causes a stream to switch off, then manual reset will be required.

7.29.1.2 Flash DFM For Lamp Conflict / Failure

The DFM lamp will always flash when there are red lamp failures in the log. Additionally, the DFM lamp may be configured to flash for either general lamp failures and/or lamp conflicts. These facilities are selected by their adjacent check boxes.

7.29.1.3 Mains Unstable Indication Output(s)

If mains unstable indication output(s) are required, enter one or more output names. When the mains being read by the ILM is unstable then the output(s) specified will be set. Output names used here must be specified on the **Input/Output 2/3 – Outputs** screen.

7.29.1.4 Channel Data

A table is provided where lamp monitoring settings for each signal phase, cloned phase or switched sign output are selected.

7.29.1.4.1 Phase

Each configured phase will be automatically listed here.

7.29.1.4.2 Lamp Type

Select the type of lamp from the options in the drop-down menu to select its monitoring profile. A range of lamp profiles are provided, depending on firmware release and packages installed on the controller. See the section about the **ILM 2/2 – Profiles** screen for more information. Prior to version 3.7 the default was **LED 3G**. From 3.7 onwards, **ELV LED (3R)** has been made the default.

7.29.1.4.3 Lamps Monitored

Select which lamps are to be monitored by checking the relevant box. An unchecked box will mean the lamp drive colour will not be monitored. Typically, pedestrian phases only have the red and green lamps monitored. To monitor waits, an independent amber output is required (that drives no red signals) driven from an empty phase.

7.29.1.4.4 Red Lamp Mapping

A cloned phase can share the first and second red lamp counts with the phase entered here. Typical use for this is when a clone phase has been used to spread the load of the signals for the “parent” phase. Another example is when some of the signals on the same phase need to have a different lamp profile. For example, additional low level cycle signals on an approach, or a mast-arm with different signal head type. Linking the red lamp monitoring of the cloned phase back to the parent phase means that if both have a single red lamp fault, a second red lamp fault will be set for the parent phase.

7.29.1.4.5 Single/Multi Faults

These columns define the number of lamp failures required for the corresponding red lamp monitor fault state. Leave blank or use 0 if no red lamp monitoring required. For red lamp monitoring of normal traffic phases the values required are 1 and 2 respectively.

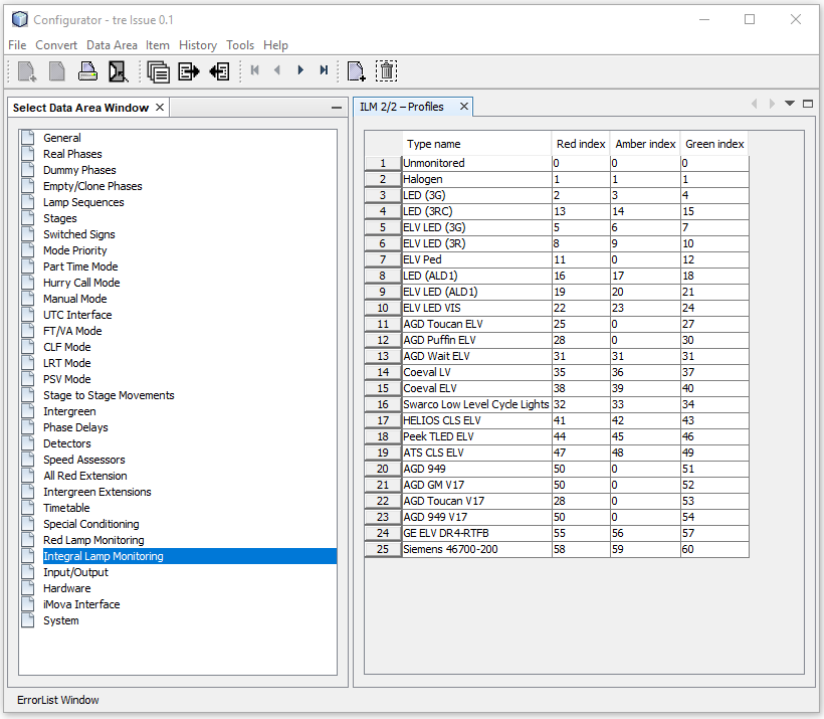
Important! If only one signal head is found on learning, if this single red is failed, this will create a first and second red lamp failure because no load is detected.

7.29.1.4.6 Failure/Conflict Indication Output(s)

Failure/conflict indication output(s) are used to define output name(s) that indicate lamp failures or conflicts. These are usually UTC reply bit names for UTC or free-standing remote monitoring. Output names used here must be specified on the **Input/Output 2/3 – Outputs** screen.

Note: CF will reply on a lamp fault if the lamps are extinguished because of the fault, otherwise CF will need to be added to the Failure indication outputs.

7.29.2 **ILM 2/2 - Profiles**



	Type name	Red index	Amber index	Green index
1	Unmonitored	0	0	0
2	Halogen	1	1	1
3	LED (3G)	2	3	4
4	LED (3RC)	13	14	15
5	ELV LED (3G)	5	6	7
6	ELV LED (3R)	8	9	10
7	ELV Ped	11	0	12
8	LED (ALD1)	16	17	18
9	ELV LED (ALD1)	19	20	21
10	ELV LED VIS	22	23	24
11	AGD Toucan ELV	25	0	27
12	AGD Puffin ELV	28	0	30
13	AGD Wait ELV	31	31	31
14	Coeval LV	35	36	37
15	Coeval ELV	38	39	40
16	Swarco Low Level Cycle Lights	32	33	34
17	HELIOS CLS ELV	41	42	43
18	Peek TLED ELV	44	45	46
19	ATS CLS ELV	47	48	49
20	AGD 949	50	0	51
21	AGD GM V17	50	0	52
22	AGD Toucan V17	28	0	53
23	AGD 949 V17	50	0	54
24	GE ELV DR4-RTFB	55	56	57
25	Siemens 46700-200	58	59	60

Figure 80 - ILM 2/2 - Profiles

This screen is used as a reference for the lamp types and indexes. It can also be used to add new lamp type profiles. Use the button on the toolbar or the **Add Item** menu option to add a profile entry as required. This option is useful if more than one profile is required for an aspect as indexes can be mixed and matched and the new profile given a name to show on the printout.

Note: The added profile name is only for administration print out purposes, the handset command LMD or controller webpage will display the name of profile of each index used for red, amber and green.

As new signal / lamp types are developed these may be profiled and lamp type indices will be released by Telent. An up to date list of the profiles lamp types is provided in the Handset Command Manual, UCM 239138.

Note: It will be necessary to update the Optima controller with this lamp type data. This may be in the form of a software upgrade, or as a lamp profile package. This can be uploaded using the Optima Manager.

7.30 Input/Output

There are three screens in this data area.

7.30.1 Input/Output 1/3 - Inputs

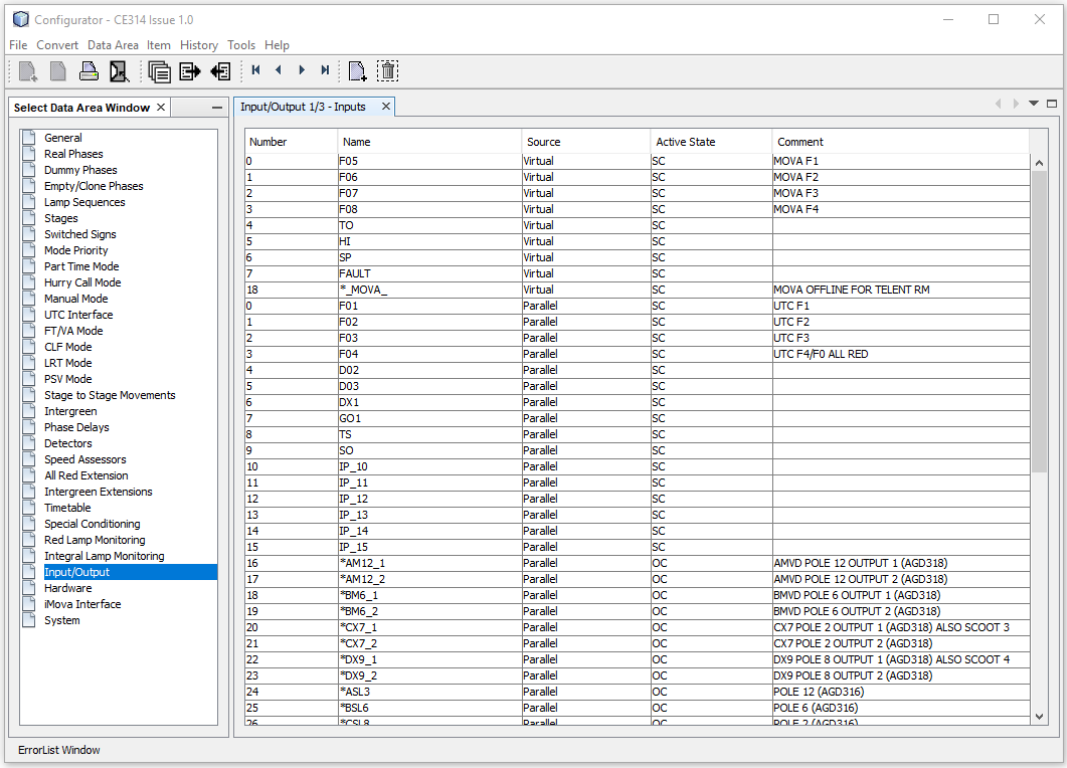


Figure 81 - Input/Output 1/3 - Inputs

This screen is used to define controller inputs. Real detectors will automatically be added to the table. There are three types (or sources) of inputs:

- Loop inputs from the integral loop detector backplanes, input numbers must be in the range 0 to 63.
- Parallel inputs from the digital IO cards, input numbers must be in the range 0 to 111.
- Virtual bits, input numbers must be in the range 0 to 255. Only virtual bits defined as inputs need to be listed.

Use the button on the toolbar or the **Add Item** menu option to add an input as required.

The input table is sorted by type, then in ascending order of input number. Virtual bits are listed first, followed by parallel inputs and finally loop detector inputs. The sort is performed when adding a new input or when first viewed again when moving back to the screen.

Note: Only virtual bits used as inputs need to be listed on this screen.

7.30.1.1 Number

As new inputs are generated, this field is blank. Numbering starts at zero up to a maximum according to the source type.

7.30.1.2 Name

Input name may be up to 14 characters in length; however, detector names can only be 6 characters in length. It is important to ensure that all UTC and MOVA control bits are defined on this screen. **F**, **D** and **DX** bits will be automatically added, but others are not and need to be added manually. Care should be taken that the correct UTC bit names are used, referring to the **UTC Interface** screens. If integral MOVA is used, then input bits for **T**, **SP**, **HI** and **FAULT** should be entered as named in the fields on the iMOVA Interface screen.

Note: Detector names are prefixed by a ***** for example, ***AIN1**. Local Link **PV** trigger inputs are prefixed by **~** with **PH** meaning phase and **_n** where **n** is the phase letter. For example: **~PH_D.** Prefixed names cannot be edited on this screen.

7.30.1.3 Source

The drop-down list allows type of input to be defined, Loop Parallel or Virtual. Quick selection can be made by selecting the drop-down list and pressing either **L**, **P** or **V** to select the source type.

7.30.1.4 Active State

The drop-down list allows the active state of the input of be defined as either **OC** (Open Circuit) or **SC** (Short Circuit). This setting reflects what has been set in the **Active State** field of the **Detectors** screen. If the active state is changed on this screen, it will be also updated on the **Detectors** screen. New inputs default to **OC**, so may need to be changed to **SC**.

7.30.1.5 Comment

Comments are entered for information purposes only, appearing on the printout.

7.30.1.6 Input Limitations

Dependent on firmware/configuration software used. See section 2.

7.30.2 Input/Output 2/3 - Outputs

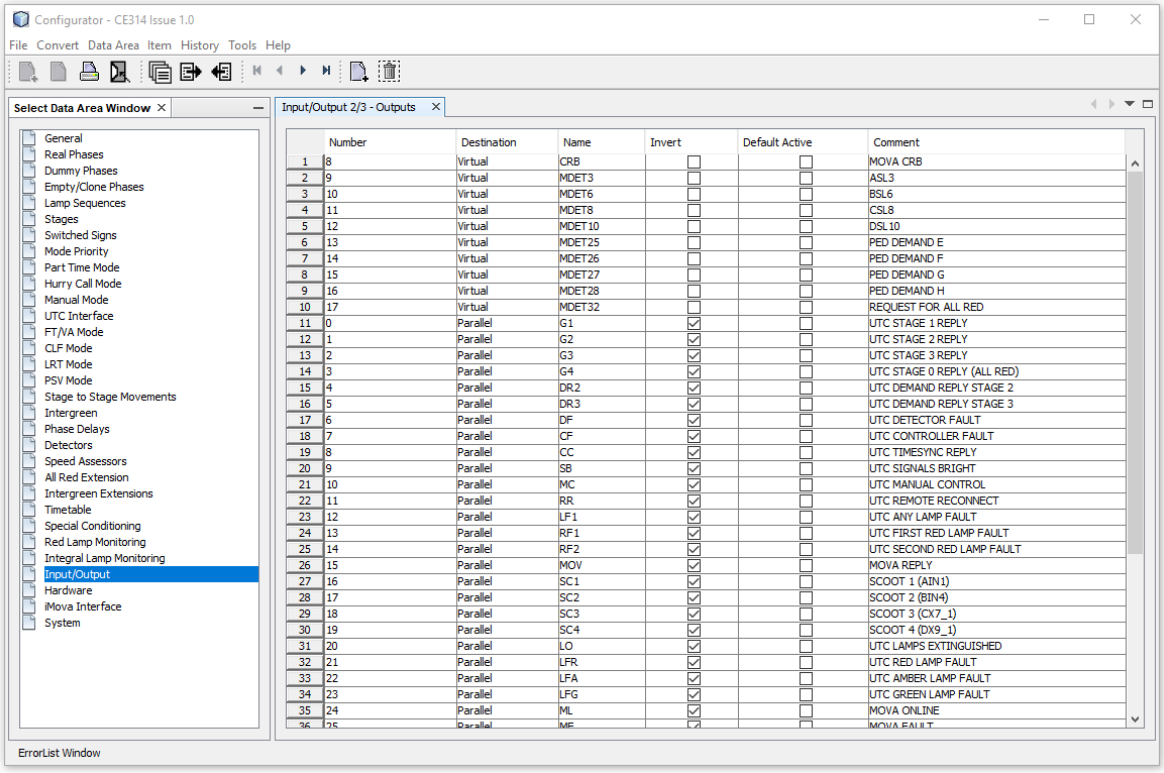


Figure 82 - Input/Output 2/3 - Outputs

This screen is used to define controller outputs. By default, no outputs are added, so all required outputs must be manually entered. There are two types (or sources) of outputs:

- Parallel outputs from the digital IO cards, output numbers must be in the range of 0 to 111.
- Virtual bits, output numbers must be in the range 0 to 255. Only virtual bits defined as outputs need to be listed.

Use the button on the toolbar or the **Add Item** menu option to add an output as required.

The output table is sorted by type, then in ascending order of output number. Virtual bits are listed first, followed by parallel outputs. The sort is performed when adding a new output or when first viewed again when moving back to the screen.

7.30.2.1 Output Limitations

Important! Please read the following paragraph about output limitations carefully.

The Optima Traffic Signal Engine (TSE) has a maximum of 120 outputs available for use, as a combination of parallel outputs and virtual bits. Only virtual bits defined as outputs and claimed by the TSE are included in this number. For the TSE to claim a virtual bit it must be manipulated by the configuration in some way, for example if the output is set active/inactive/normal in special conditioning.

7.30.2.2 Count Detector Outputs

If a detector is marked as a count detector, a parallel output will be automatically generated. Count outputs are labelled as VSn (n starting at 1) and prefixed by ~. For example: **~VS1**.

Important! Count outputs are not printed so note them on the **General 3/3 – Special Notes** screen.

Count outputs are indexed in order of creation, so check the operation and make a comment stating which count output relates to which detector.

Note: For integral UTC (UG405) there are much simpler and more accurate ways to set up count and occupancy for a detector outside of the controller configuration. Refer to the *Optima Integral UG405 Handbook,* UCM 376741

7.30.2.3 Number

As new outputs are created, this field is blank. Numbering starts at 0 up to a maximum according to destination type.

7.30.2.4 Destination

Destination can be either parallel output or virtual bit.

7.30.2.5 Name

This may be up to 14 characters in length. It is important to ensure that all UTC and MOVA reply bits and Hurry call confirm outputs are defined on this screen. No bits are automatically generated. Care should be taken that the correct UTC bit names are used, referring to the UTC interface screen.

In version 3.6 and earlier, the output names of many UTC reply bits were fixed and must be added correctly to the output table and the virtual bits table if integral UTC or MOVA is used.

In version 3.7 UTC SD replies can be given custom names, but a bug in the software meant that if they were not standard SD format they would not work, for example: **SD02** works but **DR2** would not.

This bug was fixed in version 3.8 and later.

7.30.2.6 Invert

This is only applicable to parallel (digital) outputs. Virtual outputs cannot be inverted on this screen. If converting from parallel to virtual remember to un-invert the output first, as it cannot be changed once set to virtual.

Usually, free-standing UTC and remote monitoring outputs are inverted.

Invert state may be checked ON or unchecked OFF.

7.30.2.7 Default Active

If checked this will set the output active if the application driving the output has stopped.

7.30.2.8 Comment

Comments are for information purposes, only appearing on the printout.

7.30.3 Input/Output 3/3 – Virtual Bits

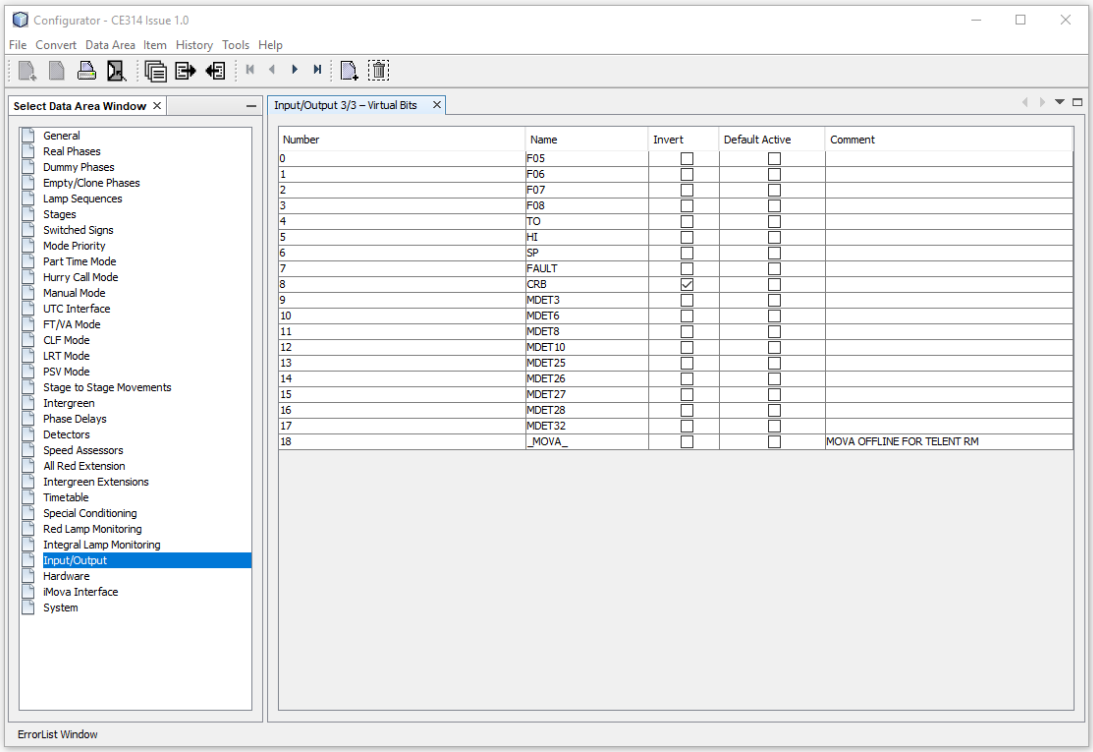


Figure 83 - Input/Output 3/3 - Virtual Bits

This screen is used to define controller virtual bits. Only bits needed by the controller configuration (including integral MOVA and integral UG405) need to be defined, up to a maximum of 255. Use the button on the toolbar or the **Add Item** menu option to add a virtual bit as required.

7.30.3.1 Number

As new bits are generated, this field is automatically filled in. It can be overridden by over-typing the desired number. Numbering starts at 0 with a maximum of 255.

Important: Ensure that the numbers match on the corresponding input or output table or the wrong bit may be updated by the TSE.

7.30.3.2 Name

Output name may be up to 14 characters in length. Names must exactly match corresponding entries in the input or output tables, except where a detector input has been autogenerated. For example a detector named _**MOVA**_ will be listed on the input table as ***_MOVA**_ but if it should be a virtual bit, the virtual bits table entry should be named _**MOVA**_ without the Asterix.

Note: In Configurator 3.10, a detector input defined as a virtual bit will have a * in front of its name in the input table but doesn't require this * in the name defined in the virtual bit table. However, the configurator will generate a compiler warning about this, which can be ignored.

7.30.3.3 Invert

Virtual bits can be inverted. MOVA CRB bits should always be inverted. Check the box to invert, default is not inverted (un-checked).

7.30.3.4 Default Active

If checked, this will set the bit active if the application driving the bit has stopped.

7.30.3.5 Comment

Comments are for information purposes, only appearing on the printout.

7.31 Hardware

There are two screens in this data area, and it is used to define the required controller hardware.

7.31.1 Hardware 1/2 – Lamp Switch Cards

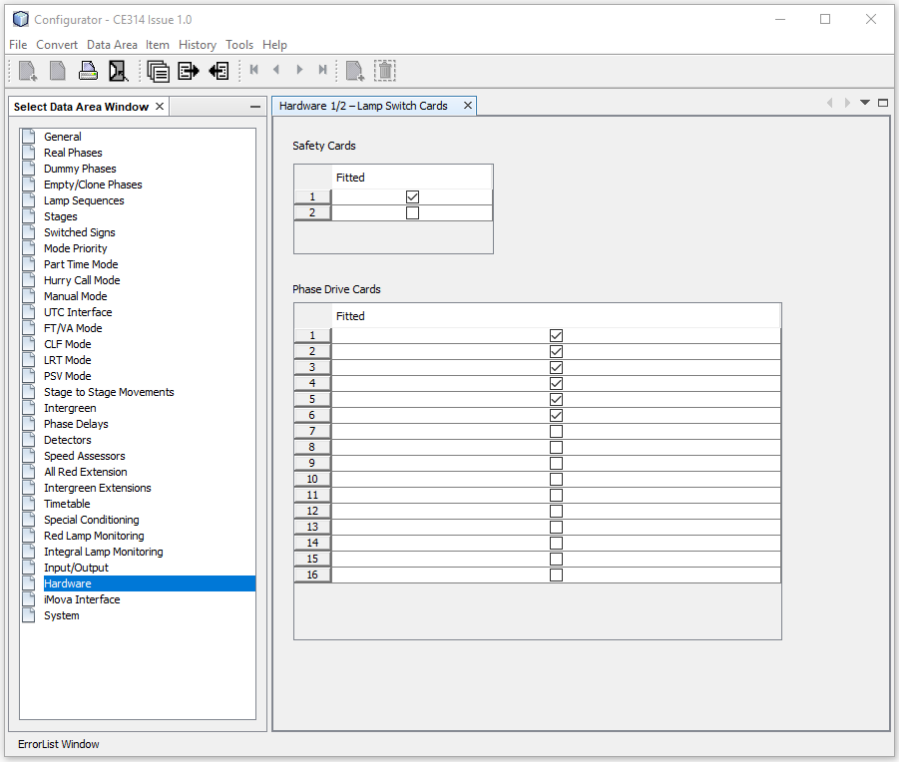


Figure 84 - Hardware 1/2 - Lamp Switch Cards

This screen is used to define the phase requirements of the controller.

7.31.1.1 Safety Cards

Currently only one safety card is supported by the controller. There is no need to change the default setting.

7.31.1.2 Phase Drive Cards

Check the number of cards required, each card covers two phases, and remember to include any cloned phases and Switched Sign outputs in the number

7.31.2 **Hardware 2/2 – IO and Detectors**

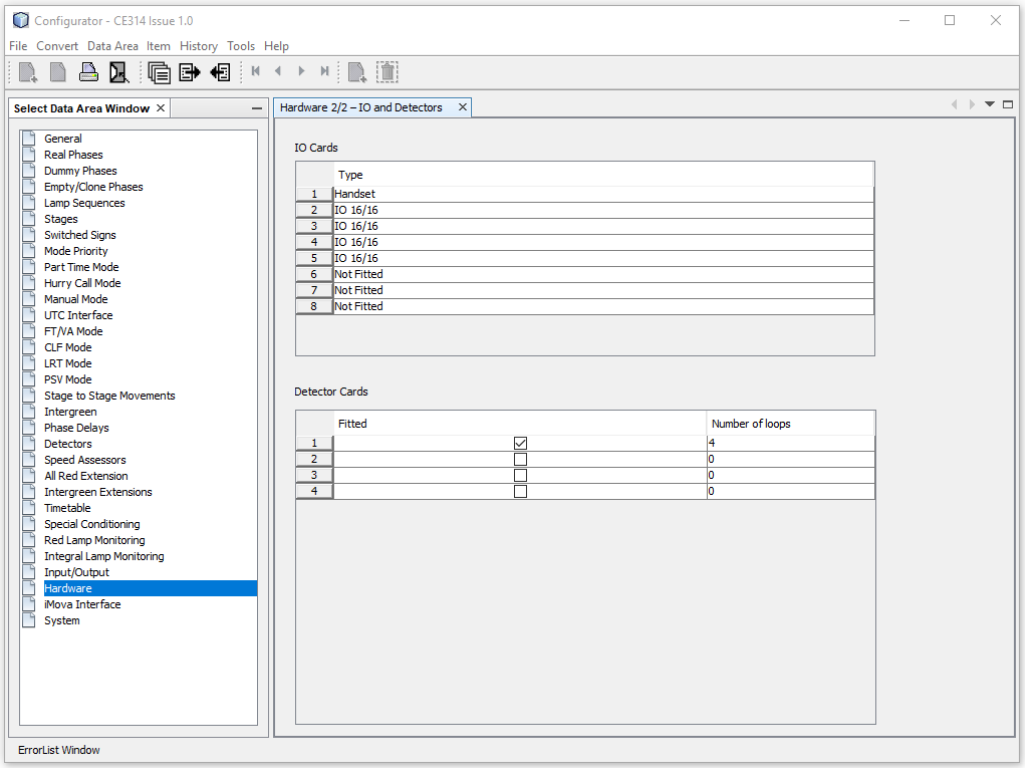


Figure 85 - Hardware 2/2 - IO and Detectors

This screen is used to define the IO and Loop detector requirements of the controller.

7.31.2.1 IO Cards

First slot is always for the Manual Panel IO and is called Handset (a legacy name). Up to seven further IO cards can be fitted. Currently only IO 16/16 types are supported. Select from the drop-down list as required.

7.31.2.2 Detector Cards

Up to four Detector backplanes can be connected, each supporting four UK standard detector packs having 4 loop detectors. This means a total of 64 loop detectors can be added.

Check the box for each backplane used and define the number of used loop channels.

7.32 iMOVA Interface

There is one screen in this data area, but the data shown is repeated for each configured stream.

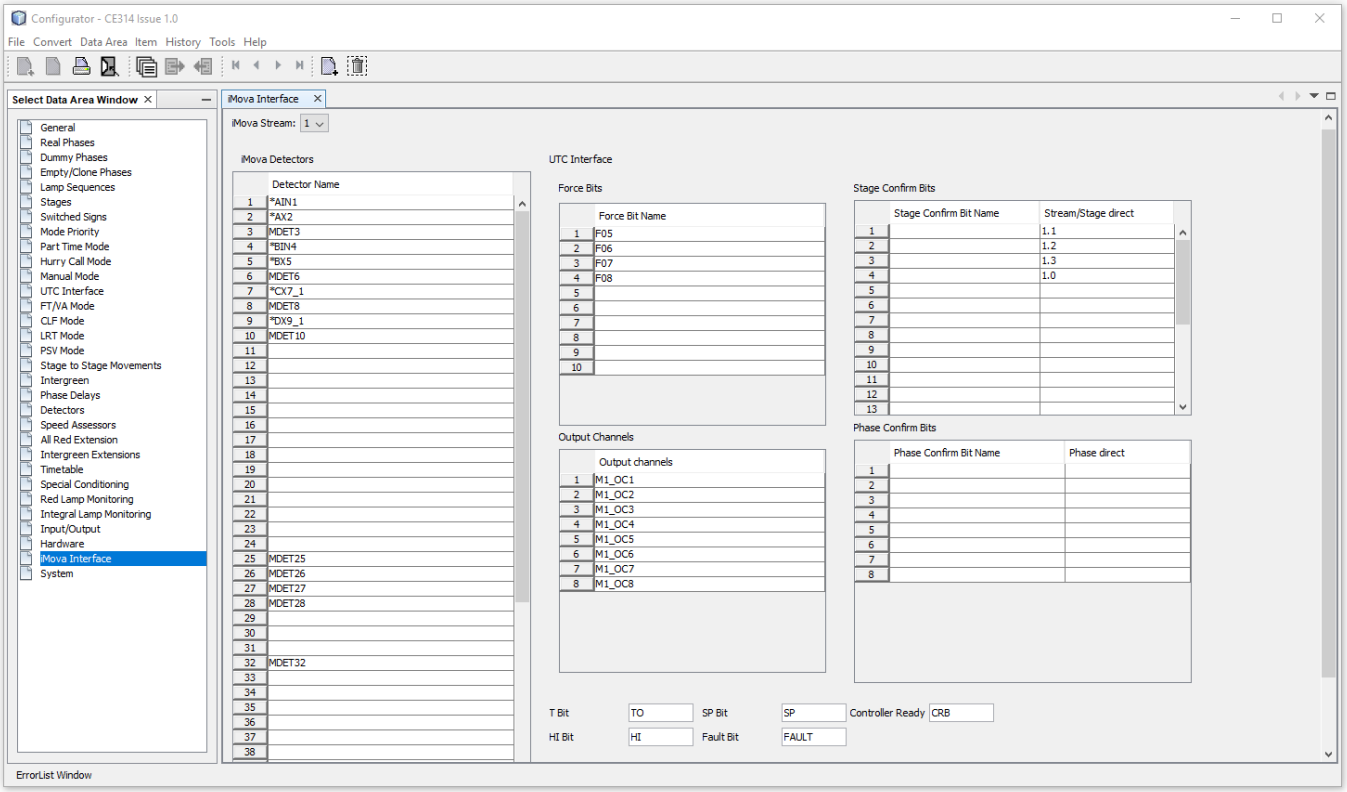


Figure 86 - iMOVA Interface

7.32.1 Screen Controls

This screen is used to define the integral MOVA interface. Use the button on the toolbar or the **Add Item** menu option to add MOVA to a stream as required. A stream must be configured to add MOVA to it. The current MOVA stream is selected by the drop-down box.

7.32.1.1 iMOVA Detectors

Detectors should be defined here against the relevant MOVA detector number as defined in the dataset. Most loop detectors will be entered as they are shown on the **Input/Output 1/3 – Inputs** screen including the asterisk, unless the MOVA detector must be manipulated in some way, for example Uni-directional loops must be configured in special conditioning to set the detector based on the final state of the UD loop pair. See the next section for common examples of this.

Important: MOVA detector inputs marked with a * are the **raw** state before **any handset override** has been applied. A MOVA detector **CANNOT** be inverted by the handset. If the physical detector active state cannot be changed, then the configuration will have to be updated to flip the active state.

7.32.1.2 Force bits

Stage force bits should be entered for each stage, starting at force bit 1. Normally any All Red stage is the last configured stage. The force bit name must match the name used in the **Input/Output 1/3 – Inputs** table.

7.32.1.3 Stage Confirm Bits

Older configurations often used UTC **G** bits to confirm the stage greens. However, care must be taken to avoid UTC setting **G1** and **G2** active (in a fault condition) at the same time, causing a multiple stage confirm error in MOVA. If **G** bits are to be used, ensure that there is a delay applied to the **G1/G2** reply so that the **CRB** bit may be dropped first to gracefully end MOVA control. Bit names must be entered exactly as they are defined in the outputs table.

To avoid the problem completely, Telent implemented a system called **Stream/Stage direct**. This allows the stage to be entered in <stream>.<stage> format and the stage green information is passed directly to MOVA from the TSE without going through the **G** bit replies. This is the preferred method for stage confirm bits.

7.32.1.4 Phase Confirm Bits

These may be entered as confirm bits configured as outputs and manipulated in special conditioning, or Phase Direct may be used. Bit names must be entered exactly as they appear in the output tables. Phase letters are entered when using phase direct.

7.32.1.5 MOVA Control and Output Bits

These 5 boxes should contain the names of the relevant MOVA control and output bits.

- T Bit: Usually defined as **TO** (MOVA Take Over). Must be specified on the **UTC Interface 3/7 – Stream Associations** screen. The **TO** bit stops the controller for applying the Force bit timeout when in MOVA control. For multiple streams specify as TO01, TO02 etc.
- SP Bit: Automatically defined. For multiple streams specify as SP01, SP02 etc.
- HI Bit: Automatically defined. For multiple streams specify as HI01, HI02 etc.
- FAULT Bit: Automatically defined. For multiple streams specify as FAULT01, FAULT02 etc.
- CRB Bit: Controller Ready Bit, should be set active when MOVA can take control and usually when MOVA is not in control it is pulsed every few minutes to encourage MOVA to take control. Requires conditioning, see later example.

7.32.1.6 Output Channels

MOVA 8 (M8) introduced its own special conditioning where output channels can be set or cleared. The output channel fields default to a unique name for each output channel. The outputs are virtual bits unless so they must be mapped in special conditioning to physical outputs if they are required as external linking bits.

Consideration should be given as to how the Output Channels will be used:

7.32.1.6.1 MOVA 8 Conditioning Used Internally Within a Single Dataset

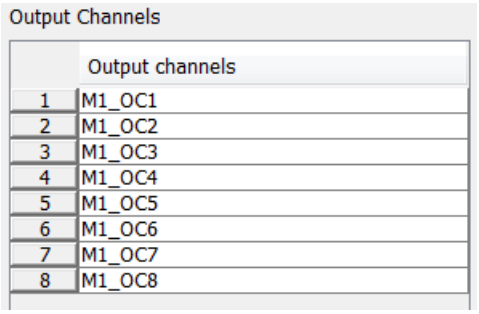
This does not affect the controller configuration, same as M7 in this respect.

All conditioning and associated detectors are done within the dataset produced by MOVA tools, so it does not affect the configuration.

7.32.1.6.2 MOVA 8 Conditioning Used to Pass Outputs to Another MOVA stream Within the Controller

Virtual bits will need to be passed between MOVA streams.

The Configurator auto fills the 8 MOVA Output Channels, these names can then be used by a different MOVA stream within the controller by entering the name in the appropriate MOVA detector field.


Output Channels

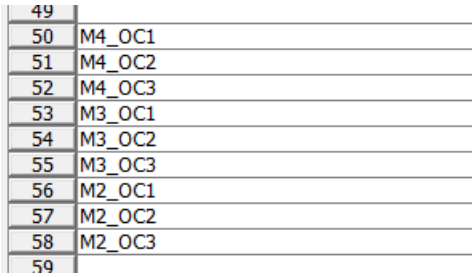
	Output channels
1	M1_OC1
2	M1_OC2
3	M1_OC3
4	M1_OC4
5	M1_OC5
6	M1_OC6
7	M1_OC7
8	M1_OC8

The names are auto generated but can be renamed for clarity, by default M1 represents the MOVA stream and OC1-8 is the output number.

These outputs **are not** shown in the virtual IO table.

Figure 87 - MOVA 8 Output Channels

The MOVA stream that is going to receive the output will then need an input adding of the same name, it is suggested when spare detectors are available all eight outputs should have a matching input:



49	
50	M4_OC1
51	M4_OC2
52	M4_OC3
53	M3_OC1
54	M3_OC2
55	M3_OC3
56	M2_OC1
57	M2_OC2
58	M2_OC3
59	

In this example MOVA stream 1 is receiving three special conditioning outputs from streams 2,3, and 4. For example **M3_OC2** is the second special conditioning output from MOVA stream 3 and replies on Stream 1 detector 54.

Figure 88 - MOVA 8 Detector using Output Channels

7.32.1.6.3 MOVA 8 Conditioning used to pass outputs to another controller

Parallel outputs will need to be created, and a line of conditioning added. To pass a MOVA special conditioning output to the parallel interface, a line of conditioning is required to take the MOVA output channel and set the parallel output. Optionally this can include a check for signals ON.

Comments:						Name:
MOVA OUTPUT CHANNELS: Pass output channel M1_OC1 to output M1_OC1_A provided signals on.						
If		FLTIP-M1_OC1	**And not**	SHDMODE-1	**And not**	MSDMODE-1
Then	OUTPUTA-M1_OC1_A					
Else	OUTPUTN-M1_OC1_A					

7.32.2 **Controller Special Conditioning Considerations for MOVA**

Some examples are now given of common conditioning statements used with MOVA.

7.32.2.1 MOVA CRB Control

1. First create CRBTOG and CRBGAP timers with values of 2 and 120 seconds respectively.
2. This assumes that a statement already exists that is TRUE when MOVA is in control.
3. This assumes that the CRB virtual bit is inverted.
4. Next create three conditioning statements in the order shown. The third statement can be customised as appropriate to the site. In the example SW1 or SCB/255 is Selected VA, and SW2 or SCB/254 is MOVA inhibit. STMNT-TUTC defines when true UTC mode is running. Timetable flag 2 must be ON for MOVA.

Comments:						Name:
MOVA CRB: Not running MOVA mode starts CRBTOG and CRBGAP timers, else stops CRBGAP timer						
If	**Not**	STMT-MOVA				
Then	SCTSTART-CRBTOG	SCTSTART-CRBGAP				
Else	SCTSTOP-CRBGAP					

Comments:						Name:
MOVA CRB: CRBGAP timer expired and still not running MOVA mode starts CRBTOG and CRBGAP timers						
If		SCTEXPRD-CRBGAP	**And not**	STMNT-MOVA		
Then	SCTSTART-CRBTOG	SCTSTART-CRBGAP				
Else						

Comments:						Name:
MOVA CRB: CRBTOG timer running, SHD/MSD/STU/UTC modes active, or MAN/MFT/VA/MOV Inhibit switches active, or timetable flag 2 off, then toggle CRB Reply.						
If		SCTRUNNG-CRBTOG	**Or**	SHDMODE-1	**Or**	MSDMODE-1
	Or	STUMODE-1	**Or**	MANIP-MANSEL	**Or**	MANIP-FTSEL
	Or	MANIP-SW1	**Or**	MANIP-SW2	**Or**	STMNT-TUTC
	Or	SCBITS-254	**Or**	SCBITS-255	**Or not**	TTFLAG-2
Then	OUTPUTA-CRB					

Else	OUTPUTN-CRB			

7.32.2.2 MOVA Wait Indicator Confirm for Pedestrian Phase

The controller will remove demands from pedestrian phases locked out due to a second red lamp fault, therefore the phase demand can be used to set the MOVA detector that demands a pedestrian phase.

Comments:						Name:
MOVA DETECTION: Pedestrian Phase E demanded sets MDET15.						
If		PHSDMD-E				
Then	OUTPUTA-MDET15					
Else	OUTPUTN-MDET15					

7.32.2.3 Stop Lines With Call Delay

If a stopline has a call delay, it is advisable to configure the corresponding MOVA detector to be active when the phase is green according to the raw state of the detector, but when the phase is not green, the final state should be used to consider the call delay. This is achieved with a simple piece of special conditioning.

Comments:						Name:
MOVA DETECTION: Raw state of ASL3 when phase A green, else final state after call delay sets MDET3.						
If		RDET-ASL3	**And**	PHASE-A	**Or**	FDET-ASL3
Then	OUTPUTA-MDET3					
Else	OUTPUTN-MDET3					

7.32.2.4 Revertive Phase Demands when MOVA has Delayed Reversion

When MOVA requires delayed reversion, normal revertive demands applied in the **Real Phases 1/2 – Basic screen** can prevent the reversion from operating properly. It is therefore necessary to use conditioning to apply the revertive phase demands in all modes except MOVA. A prior statement has been set up to be active when MOVA mode is active since both MOVA and UTC share UTC mode in the controller. This statement is named “MOVA”. For each phase, two statements are required. If final revertive demand can be to the phase itself or the associated phase.

Comments:						Name:
REVERTIVE PHASE DEMANDS: Set Flag 1 ON when phase A green, else clear it.						
If		PHASE-A				
Then	SCFLGON-1					
Else	SCFLGOFF-1					

Comments:						Name:
REVERTIVE PHASE DEMANDS: Phase C just terminated with extensions active and not in MOVA mode inserts a revertive demand.						
If	**Not**	PHASE-A	**And**	SCFLAG-1	**And**	PHSEXT-C
	And not	STMNT-MOVA				
Then	LPHSDMD-A					
Else						

7.33 System

There is one screen in this data area.

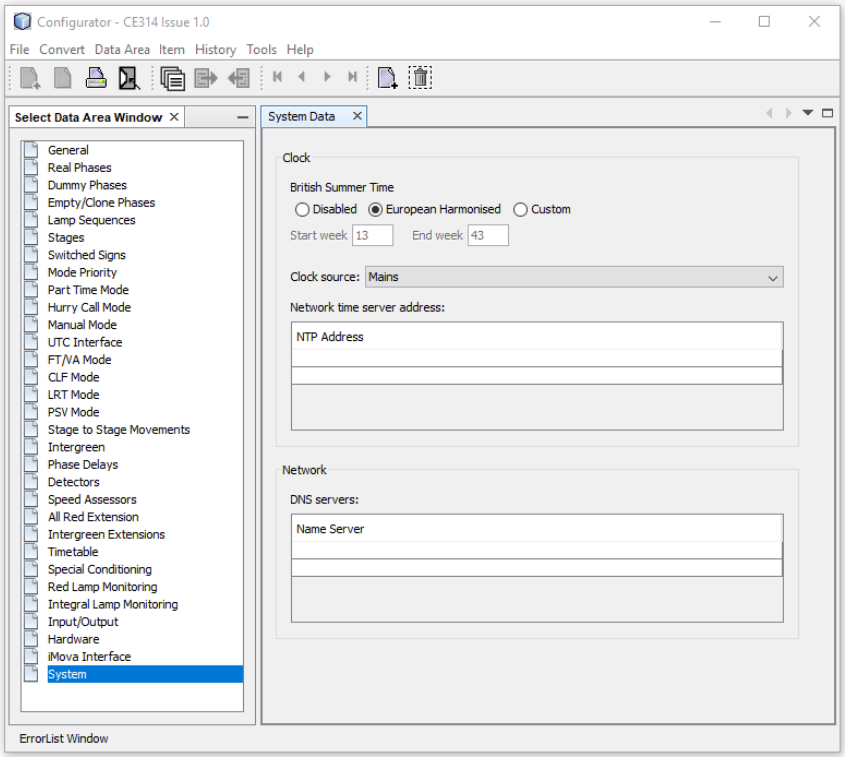


Figure 89 - System Data

This screen is used to configure system wide settings. This screen is not normally configured away from the default settings. UG405 and Remote Monitoring applications within the controller can change the Network Time Server and DNS servers themselves, away from these default settings.

7.33.1 Clock

7.33.1.1 British Summer Time

There are three options:

- Disabled: Daylight savings is not used.
- European Harmonised: This is the default.
- Custom: Choose start and end weeks for daylight savings.

The clock defaults to European Harmonised daylight savings time. In the Optima, a week begins on Monday, week 1 is the first week containing 4 or more days in January and changeover takes place at 2am on Sunday morning. It is recommended to leave the default of European Harmonised.

7.33.1.2 Clock source

This drop-down list allows the clock source for the system clock to be set. There are three options:

- System: Uses the onboard real time clock.
- Mains: Uses the mains frequency to synchronise the clock ticks and is the default option.
- Network: Uses a configured NTP (Network Time Protocol) server. Requires network connection.

7.33.1.3 Network Time Server Addresses

Up to two NTP servers can be configured, either as IP addresses or internet domain names. If domain names are used the DNS servers will need to be configured for them to work. These values will only have any effect if the clock source is configured as Network.

Important! If NTP is used, the controller must be able to access the network where the NTP server is located.

Note: NTP will be automatically configured and used by the UG405 and SNMP Remote Monitoring applications used within the Optima. Mains will not be used if these packages are installed.

7.33.2 Network

7.33.3 DNS servers

Enter DNS servers to be configured as IP addresses.

8. APPENDIX 1: Summary of Printed Forms

The following table details all available forms that can be printed. Some are dependent on the facility being configured. Index and Page numbers only available from version 3.8 onwards.

Up to 3.7: Form Name	3.8 Onwards: New Form Name	Form Number
Telent traffic controller configuration forms	Telent Traffic Controller Configuration Forms	1
-	Index	1A
General Data	General Data	2A
Configuration notes	Configuration Notes	2B
Configuration history	Configuration History	2C
Phase data 1	Phase General	4
Phase data 2	Phase Minimum Greens	5
Phase data 2_1	Phase Maximum Greens	5_1C
Phase data 2_2	Pedestrian Sequences and Linking	5_2C
Phase data 2_3	Phase Compensation	5_3C
Phase data 2_4	Pedestrian Supplementary Signals	5_4C
Phase data 3	Phase Varimax	6
Phase data 4	Phase Conflicts, Opposing and Revertive Demands	7
Phase data 5	Clone and Empty Phases	7B
Lamp Sequence Data	Lamp Sequences	8
Stage Data	Stage Data	10
Switched Sign Data	Switched Signs	11
Mode data	Controller Modes	12
Part time mode data	Part Time	13A
Hurry Call mode data	Hurry Call	13B
Manual Mode data	Manual Mode	14
UTC general data, confirm bit data & SF/LO qualification periods	UTC General, Confirm and SF/LO Qualification Periods	15
UTC force bits	UTC Force Bits	16
UTC (stream/stage) confirm data	UTC Stream/Stage Confirms	18A
UTC control/reply bit -stage stream associations	UTC Control/Reply Bit Stage Stream Associations	18b
UTC demand bits (DX Bits)	UTC DX Bits	
UTC demand bits (D Bits)	UTC Demand Bits	19B
UTC demand reply bits (SD Bits)	UTC Demand Reply Bits	19C
UTC timeout data and local link inhibit data	UTC Timeouts and Local Link Inhibits	20
FT and VA mode	FT and VA	21
CLF mode data	CLF	22

Up to 3.7: Form Name	3.8 Onwards: New Form Name	Form Number
Stage to stage movement table index	Stage to Stage Moves Table Index	23A
Stage to stage movement table data	Stage to Stage Moves Tables	23B
Minimum intergreen durations	Intergreen Minimums	24
Maximum intergreen durations	Intergreen Maximums	25
Intergreen Minimum limit values	Intergreen Limits	26
Phase delay data	Phase Delays	27
Detector Data 1	Detector Data 1	28
Detector data 2	Detector Data 2	29
All red extension data	All Red Extensions	30
Intergreen extension data	Intergreen Extensions	31
Timetable entry data	Timetable	32
Timetable event list data	Timetable Event Lists	33
Timetable priorities data	Timetable Priorities	33B
Timetable user defined days	Timetable User Defined Days	33C
Special conditioning timer data	Special Conditioning Timers	34A
Special Conditioning fault data	Special Conditioning Faults	34B
Special Conditioning statements	Special Conditioning Statements	34C
Red lamp monitoring data 1	Red Lamp Monitoring (RLM)	36A
Red lamp monitoring data 2	RLM Phase Inhibits	36C
LRT general data	LRT General	43
LRT data by timing set	LRT Timing Sets	44
LRT prepare sequence data	LRT Prepare Sequence	45
LRT demand sequence data	LRT Demand Sequence	46
Detector states for LRT events	LRT Event Detector States	47
Failure actions for event fault patterns	LRT Failure Actions	48A
User defined letter codes for LRT failure actions	LRT User Defined Letter Codes	48B
ILM data	General Lamp Monitoring	49
Input Data	Inputs	52
Output Data	Outputs	53
Speed Assessors	Speed Assessors (SA)	54
Speed Assessors	Global SA Settings	54_2
Hardware data	Hardware Build Information	55

Up to 3.7: Form Name	3.8 Onwards: New Form Name	Form Number
Virtual IO data	Virtual Bits	56
iMOVA interface	iMOVA Stream Associations	57A
iMOVA interface	iMOVA Detectors	57B
iMOVA interface	iMOVA Force Bits	57C
iMOVA interface	iMOVA Stage Confirms	57D
iMOVA interface	iMOVA Phase Confirms	57E
iMOVA interface	iMOVA Output Channels	57E
PSV	PSV General	58A
PSV	PSV Timing Sets	58B
System	System	59A

9. Document Control

9.1 Maintenance and Distribution

This document is subject to formal change and control procedures as required by the Quality Management System (QMS).

9.2 Amendment History

Issue	Date	Change Descriptions	Author
Issue 1	18/01/2013	First Issue	Marco Gmys
Issue 2	14/01/2014	Updates	Marco Gmys
Issue 3	09/11/2015	Updated Installation Instructions	Rob Harding
Issue 4	05/07/2016	Altered for Configurator version 3.3	Kevin Bagust
Issue 5	27/11/2017	Altered for Configurator version 3.4	Kevin Bagust
Issue 6	23/10/2018	Updated for v3.5	R Harding
Issue 7	18/12/2018	Added iMova Output channels and fixed UTC warnings	Kevin Bagust
Issue 8	11/09/19	Added MOVA 8 conditioning/output details	Stuart Deakin
Issue 9	06/12/2019	Updated installation sections for dongle free licensing	Rob Harding
Issue 10	28/03/2023	Updated for version 3.10, some formatting changes, addition of referenced and related document sections.	Iain Ross

9.3 Abbreviations

BST	British Summer Time
CLF	Cableless Linking Facility
DFM	Detector Fault Monitoring
DNS	Domain Name System
ELV	Extra Low Voltage
FAT	Factory Acceptance Test
FT	Fixed Time
FVP	Fixed Vehicle Period
ILM	Integral Lamp Monitoring
IO	Input / Output
IP	Internet Protocol
LRT	Light Rail Transit
LV	Low Voltage
MOVA	Microprocessor Optimised Vehicle Actuation
NTP	Network Time Protocol
PDF	Portable Document Format

PSV	Public Service Vehicle
PTM	Pre-Timed Maximum
RLMU	Red Lamp Monitoring Unit
SA	Speed Assessment
SCOOT	Split Cycle Offset Optimisation Technique
SD	Speed Discrimination
TC	Transmission Confirm
TOPAS	Traffic Open Products and Specifications
TRL	Transport Research Laboratory
UD	Uni-Directional
USB	Universal Serial Bus
UTC	Urban Traffic Control
VA	Vehicle Actuated
VPH	Vehicles per Hour
QMS	Quality Management System
XML	Extensible Markup Language

9.4 Referenced Documents

Title	Doc Number	Issue
Optima Web Page Interface Manual	UCM 433443	Latest
Optima Installation and Maintenance Handbook	UCM 272239	Latest
Optima Handset Command Manual	UCM 239138	Latest
Package Manager Handbook	UCM 369281	Latest

9.5 Related Documents

Title	Doc Number	Issue
[1] TOPAS Specification for Traffic Signal Controller.	TOPAS 2500	B
[2] TOPAS Traffic Control Equipment Interfacing Specification.	TOPAS 2523	B