

**DREAM**  
**MSAT**

**Monitor System and Automated Testing**

**User Manual and Scripting Reference**

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Fairlight ESP Pty Ltd,  
Unit 2, 1 Skyline Place,  
French's Forest, NSW 2086,  
AUSTRALIA.  
Telephone +61 2 8897 9999  
Fax +61 2 8897 9900

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# Chapter 1 - Introduction

## ABOUT THIS MANUAL

This manual covers the installation and use of MSAT, the Fairlight monitor system and automated testing application for DREAM. The DREAM products are a range of digital recording, editing and mixing systems for use in a professional audio production environment. MSAT is used by Fairlight support personnel, test engineers and software developers for use in troubleshooting, fault diagnosis and system development. MSAT can also be used by third-party software developers working with the Fairlight RAPID remote application programming interface for DREAM.

This manual details the installation process for MSAT, basic use of the software and includes a complete scripting reference.

## INSTALLING MSAT

MSAT is included with DREAM software releases for DREAM Station and DREAM Console. The DREAM software installation places MSAT in the following directory: *C:\projects\mixers\msat\*.

MSAT is included with Plug-Ins Manager 5. Once PIM5 has been installed a short-cut to MSAT is located in the Windows **START** menu under **Programs>Fairlight ESP>Tools** folder.

MSAT is also included in the RAPID software development kit. This includes a cut-down DREAM software installation which includes the major software components: FMC, MSAT, ConsCon, the RAPID software libraries plus the RAPID and MSAT documentation. The RAPID SDK places all the software components in the a directory structure similar to the DREAM software releases.

To install the RAPID SDK run the *RAPIDSDK1\_0.exe* self extracting archive.

MSAT is copied to the following directory: *C:\projects\mixers\msat\*.

## MSAT VERSION

To ensure that you are running a current version of MSAT check the version number by right clicking the filename in Windows Explorer and selecting **Properties**. Select the **Version** tab to display the file version. The version number is divided into four segments which indicate from left to right: major version number; minor version number; build number; and a reserved number.

NOTES:

# Chapter 2 - Using MSAT

## MSAT OVERVIEW

MSAT is a monitor system and automated testing application for use in troubleshooting, fault diagnosis and system development. MSAT.exe is located in the *C:\projects\mixers\msat\*. In a standard DREAM installation there is a short-cut to MSAT on the Windows desktop.

MSAT displays a scrolling list of parameter, system and general messages generated by FMC or Plug-Ins Manager. Messages can also be recorded to a log file for future reference. MSAT also provides a script playback system for automated testing and a parameter monitor panel for displaying and controlling individual mixer parameters.

## RUNNING MSAT

MSAT communicates with the mixer application, FMC, or with Plug-Ins Manager 5, via TCP/IP. MSAT may be run on the mixer PC, SSM, or another PC running Windows 2000 and connected via an ethernet network. Multiple instances of MSAT may be run on the same machine, each utilising a separate communications channel with its respective host application (i.e. FMC or PIM 5).

To start MSAT click on the short-cut on the Windows desktop or click on the **Start** menu and select **Run**. Type *C:\projects\mixers\msat\ msat*. MSAT should be started before starting FMC, as FMC initialises a number of important system functions at start-up only. Once the mixer application FMC is running, hold down the **Alt** key and press the **Tab** key to switch to MSAT or the Windows desktop.

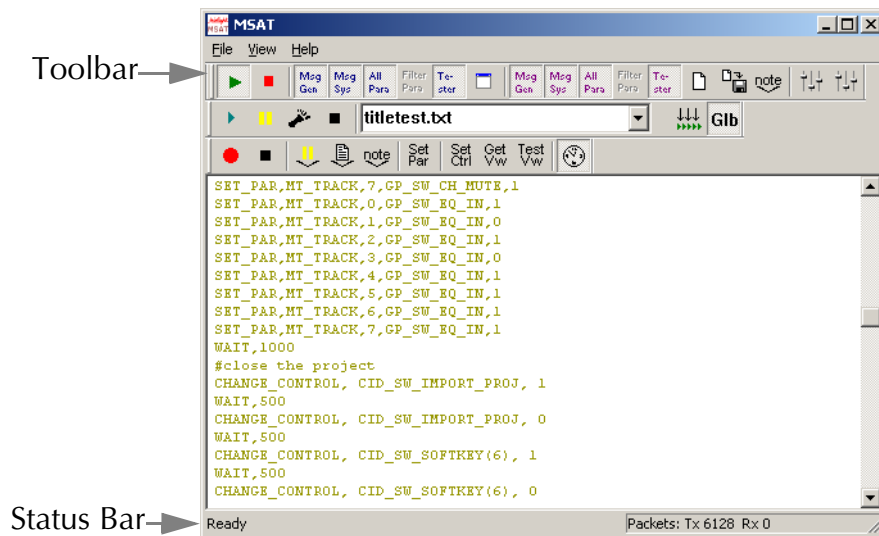


Figure 1: The MSAT Monitor System and Automated Testing Application

Make sure the Toolbar and Status Bar is displayed by selecting **Toolbar** and **Status Bar** from the **View** menu.

# CONNECTING TO FMC OR PIM 5

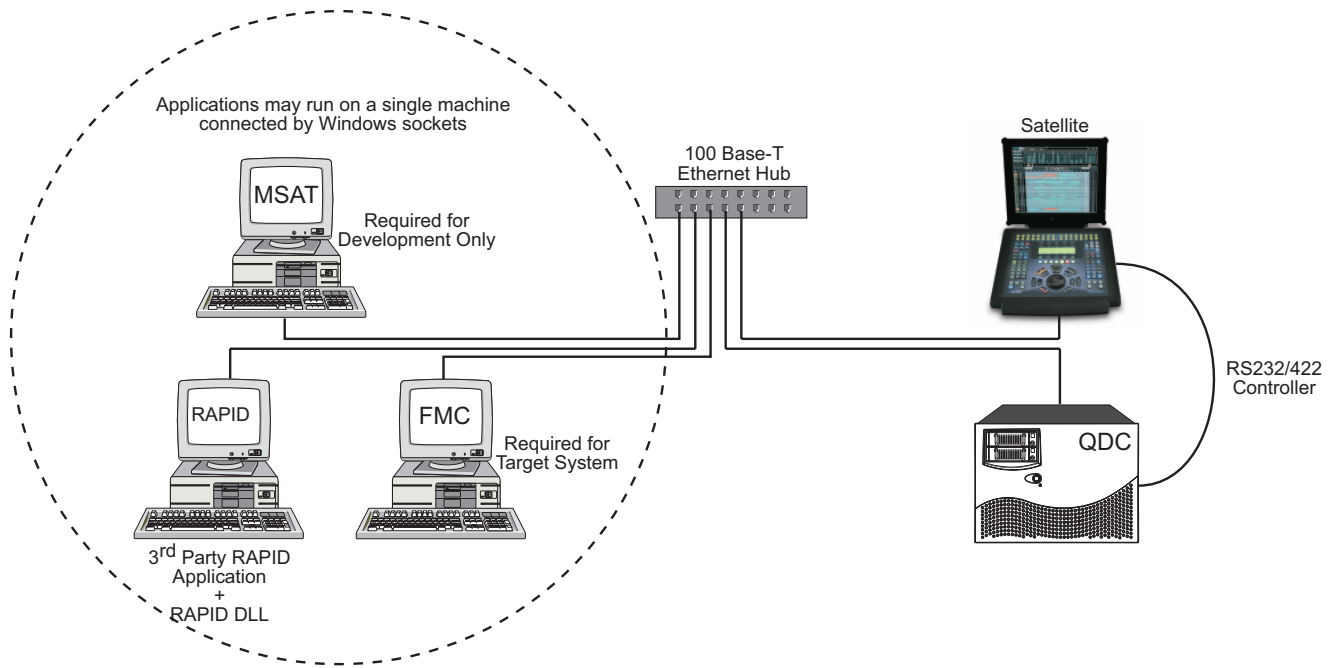


Figure 2: RAPID/MSAT Set-up for Satellite Systems

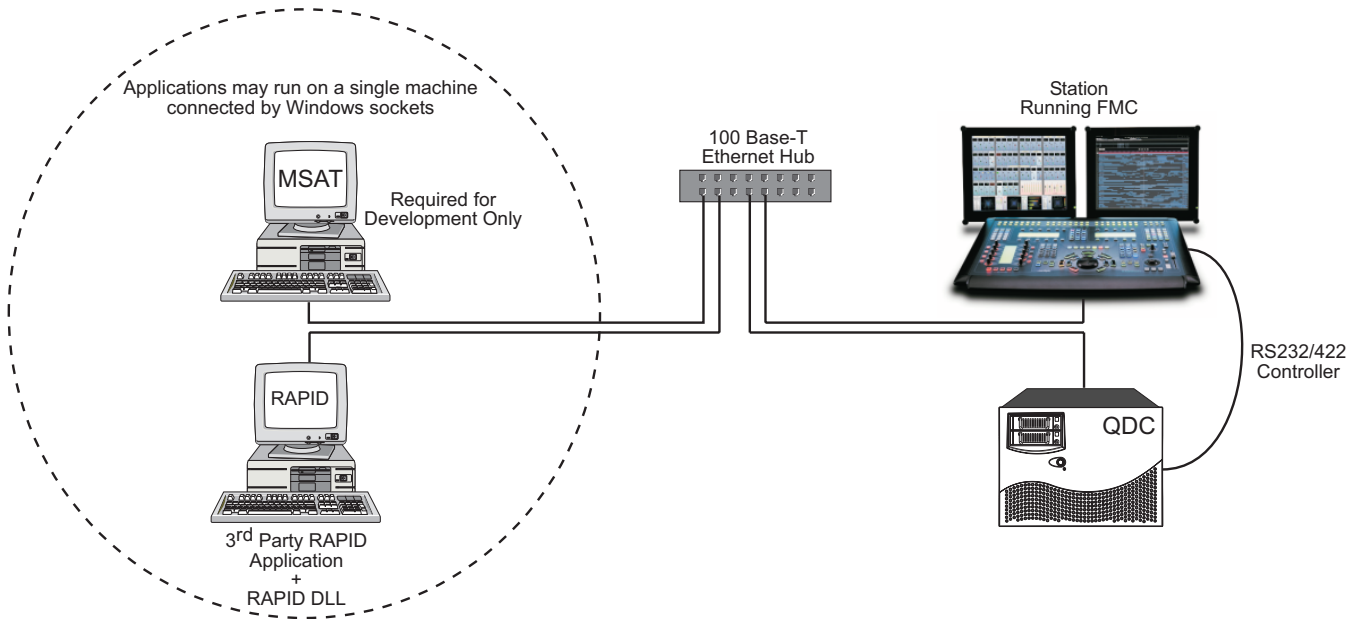


Figure 3: RAPID/MSAT Set-up for Station or Console Systems

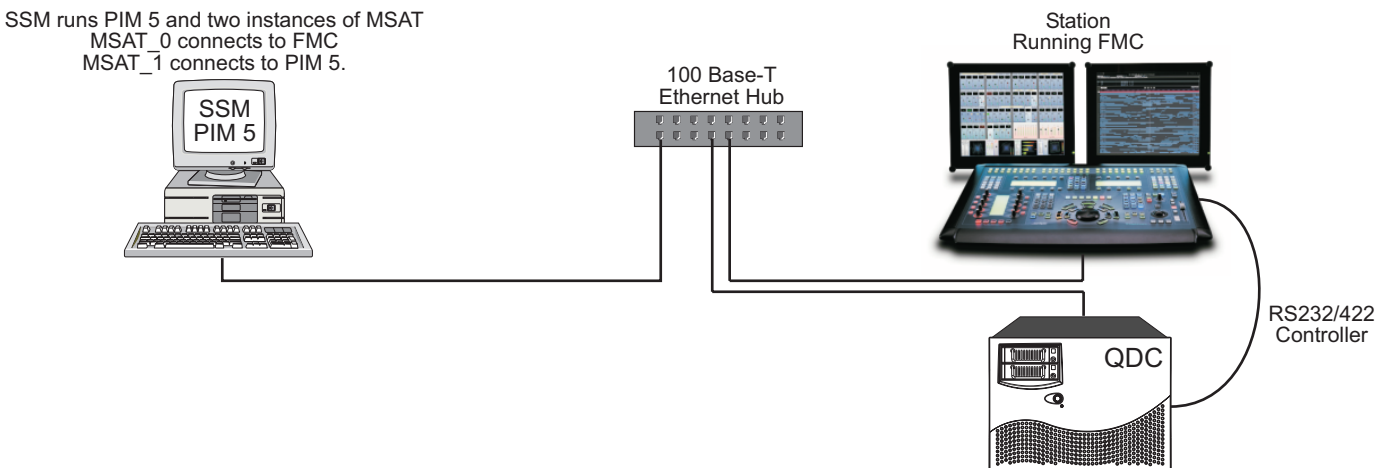


Figure 4: MSAT/PIM/FMC Set-up for Station or Console Systems

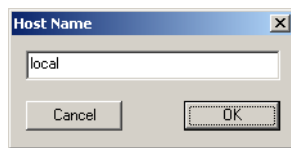


MSAT communicates with FMC or PIM 5 via TCP/IP and must be correctly configured as described below. When MSAT is successfully connected to FMC the **Online** indicator is displayed at the right of the status bar at the bottom of the MSAT window. When no connection has been made, the **Offline** indicator is displayed. The **Tx/Rx** indicators show a tally of the packets sent between MSAT and FMC or PIM 5.

## Running MSAT on Local Machine

To run MSAT on the same machine as FMC or PIM 5 it is necessary to modify the FMC or PIM 5 command line and set the MSAT Host Name from the MSAT File Menu.

### MSAT Host Name



Open the **File** menu in MSAT and select **host name...**

Type `local` in the **Host Name** dialog box. Restart MSAT

### FMC Command Line

Use the `-c` command line option when starting FMC. FMC is started by executing the DREAM.bat file. Edit the DREAM.bat file which is located in the `C:\projects\mixers\` directory.

On a working DREAM system the DREAM.bat file will display the following option at the top of the file:

```
set MSAT_IPADDRESS=LOCAL
```

Edit this line, if necessary, making sure that LOCAL is entered in upper case.

On a development system based on the RAPID SDK, DREAM.bat will only contain a simple command line.

A typical command line will look like this:

```
C:\projects\mixers\fmc\fmc -d -e -s2 -c.
```

Make sure you remove the `-p` option which is only applicable for remote MSAT connection.

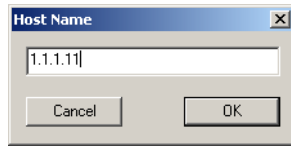
### PIM 5 Command Line

Click on the **Start** menu and select **Programs>Fairlight ESP>Tools** and right click on **MSAT** and select **Properties** from the context menu. Select the Shortcut tab and click in the **Target:** text box. Add the `-c` command line switch to the end of the target command line. Add the `-hlocalhost` command line switch to the end of the target command line.

## Running MSAT on a Remote Machine

To run MSAT on a network connected machine, first verify that the two machines are correctly configured. You will need to know the IP address of both machines. Note, that the two machines must be on the same subnet. Use the Ping utility from a command line window to ensure both machines are communicating. For more information on Windows networking, refer to the Windows Help system.

### MSAT Host Name



Open the **File** menu in MSAT and select **host name...**

Type the IP address of the machine running FMC in the **Host Name** dialog box. Restart MSAT

### FMC Command Line

Use the `-p` command line option when starting FMC. FMC is started by executing the DREAM.bat file. Edit the DREAM.bat file which is located in the `C:\projects\mixers\` directory.

On a working DREAM system the DREAM.bat file will display the following option at the top of the file:

```
set MSAT_IPADDRESS=1.1.1.11
```

Edit this line as shown above replacing the IP address with the address of the machine running MSAT.

On a development system based on the RAPID SDK, DREAM.bat will only contain a simple command line.

A typical command line will look like this:

```
C:\projects\mixers\fmc\fmc -p1.1.1.11 -d -e -s2.
```

Make sure you remove the `-c` option which is described above. Replace the IP address with the address of the machine running MSAT. Do not insert a space before the number.

### PIM 5 Command Line

Click on the **Start** menu and select **Programs>Fairlight ESP>Tools** and right click on **MSAT** and select **Properties** from the context menu. Select the **Shortcut** tab and click in the **Target:** text box. Add the `-c` command line switch to the end of the target command line. Add the `-h=www.xxx.yyy.zzz` command line switch to the end of the target command line, replace `www.xxx.yyy.zzz` with the IP address of the machine running MSAT.

## Running Multiple MSATs

Multiple instances of MSAT may be run on the same machine or network, each utilising a separate communications channel with its respective host application (i.e. FMC or PIM 5). The channel number of each instance of MSAT is displayed in the MSAT window title bar. Each instance writes to a separate log file whose file name is appended with the channel number.

The channel number must be specified in the `-c` command line argument of MSAT, FMC and PIM as described below.

### MSAT Command Line

Make a copy of the shortcut you are using to run MSAT. Right click on the shortcut and select **Properties** from the context menu. Select the **Shortcut** tab and click in the **Target:** text box. Add the `-c#` command line switch to the end of the target command line. Replace # with the channel number (e.g. `\\MSAT.exe -c0`). The default channel number is 0. Select the **General** tab and change the name of the shortcut to MSAT/FMC or similar.

Edit the copy of the shortcut and add a `-c1` command line switch to specify channel 1. Change the name of this shortcut to MSAT/PIM.

### FMC Command Line

Edit the DREAM.bat file which is located in the `C:\projects\mixers\` directory.

On a working DREAM system the DREAM.bat file will display the following option at the top of the file:

```
set MSAT_CHANNEL=0
```

Edit this line as shown above replacing the channel number specified in the MSAT command line.

On a development system based on the RAPID SDK, DREAM.bat will only contain a simple command line.

A typical command line will look like this:

```
C:\projects\mixers\fmc\fmc -p1.1.1.11 -d -e -s2 -c0.
```

Add the `-c0` option to the end of the line, replacing the channel number specified in the MSAT command line.

### PIM 5 Command Line

Click on the **Start** menu and select **Programs>Fairlight ESP>Tools** and right click on **MSAT** and select **Properties** from the context menu. Select the **Shortcut** tab and click in the **Target:** text box. Add the `-c=1` command line switch to the end of the target command line, replacing the channel number specified in the MSAT command line. Add the `-h=www.xxx.yyy.zzz` command line switch to the end of the target command line, replace `www.xxx.yyy.zzz` with the IP address of the machine running MSAT.

## MESSAGE MONITORING AND LOGGING

MSAT allows the a range of parameter, system and general messages generated by FMC to be displayed and recorded in a log file. This feature allows third-party RAPID developers to verify the operation of their remote control applications. It also provides useful information for fault finding and general testing of DREAM systems.

FMC messages are displayed in the main message window.

### Monitor Start/Stop



Click the start or stop buttons to start or stop monitoring FMC messages. Alternatively press the Space bar to quickly toggle message monitoring on or off.

### Monitor Message Masks



Click the Message Mask buttons to enable the display of general messages, system messages, or parameter messages.

### General Messages

General messages include a range of optional de-bug messages that can be generated by FMC. To enable de-bug messages from FMC hold down the **Shift** key and press **Pause/Break** on the PC keyboard to display the De-bug Switch dialog box. Enter the debug switch value at the bottom of the dialog box. De-bug switch values for each switch are defined in the dialog box when the switch is selected from the drop-down list.

### System Messages

System messages include messages relating to the operating system, including file and memory management events. System messages also include events generated by MSAT associated with script playback.

### All Parameter Messages

Parameter messages are generated whenever a parameter value changes. Parameter changes may be caused by physical actions on the control surface, script replay, or remote control via a RAPID application.

### Tester Messages

Tester messages include the control change events associated with the replay of automated scripts.

### Clear MSAT Display



Click the Clear Window button to clear the message display.

### Log File

MSAT records all messages to a log file located at *C:\Projects\Mixers\MSAT\MSAT-log.txt*. The file can be viewed with the **Notepad** text editor, but cannot be viewed while MSAT is running. To view the log file while MSAT is running, use the save-as function described below. If running multiple MSATs on the same machine, the log file name will be appended with the channel number.

### Log File Message Masks



Click the Log File Message Mask buttons to enable the recording of general messages, system messages, parameter messages or Test-

er messages as described above.

## Log File Functions



Tool bar buttons are available to clear the log file, save a copy of the log file to another name, and insert a text comment in the log file.

## MSAT PARAMETER MONITOR



Each Parameter Monitor provides on-screen control and display of four parameters. Select the signal path or module from the top list box. Select the Module or path number from the second list box. Finally select the parameter type from the bottom list box. Refer to the RAPID reference document for details on all parameters and modules in the DREAM system. Note that the parameter names displayed in the MSAT Parameter Monitor do not include the `R_` prefix that is used when calling RAPID functions.

Use the slider to adjust the parameter in real time, or enter a value in the field below the slider and click **Set** to transmit the parameter to the mixer.

The Parameter Monitor will also display changes made to mixer parameters via the control surface in real time.

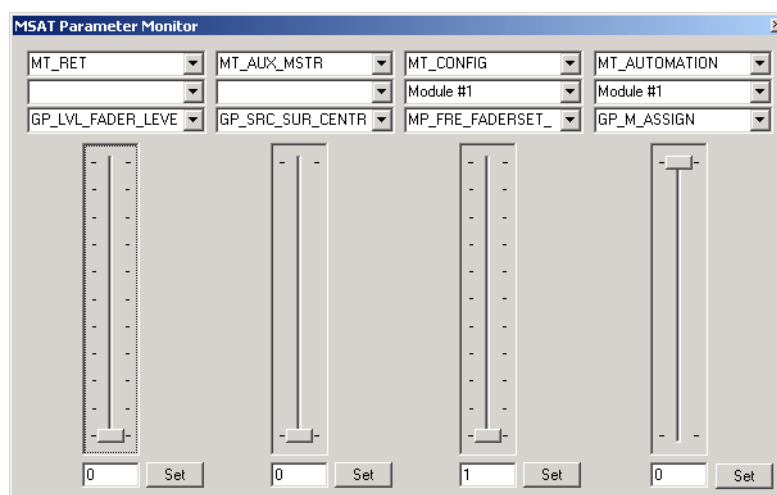


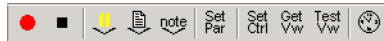
Figure 5: MSAT Parameter Monitor Window

## AUTOMATED TEST SCRIPTS

Test scripts are used in the production environment for quality control and may also be useful during field servicing or general or regression testing.

MSAT supports automated test script recording and playback. Scripts may be recorded from actions made on the control surface. Scripts may also be written with a text editor. Refer to “MSAT Script Syntax” on page 3-2 for details of the scripting commands.

### Recording Scripts



To record a new script, click on the button with the red circle. Enter a new file name for the script in the **New Test Script** dialog box. By default, local scripts are saved to the *C:\Projects\Mixers\MSAT\Scripts\* directory. To change the local directory select **Directory Path (local)** from the **File** menu. Use the controls on the console surface to perform the functions you wish to record. Click the square symbol to stop recording.

### Insert Pause

Click the button with yellow bars to inset a Pause command in the script. When played back, the script will pause when the command is played back and wait for the play button to be pressed.

### Execute Script

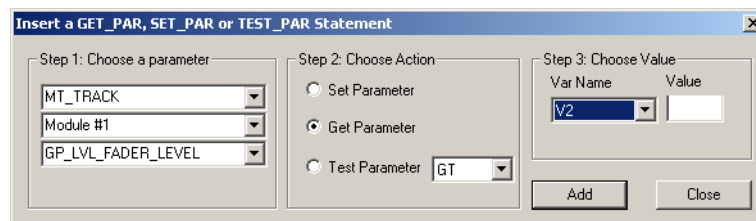
Click on the script button to insert a call to execute another script within the script which is currently being recording. Select the script from the dialog box and click the **Open** button. This feature provides a method of creating playlists of several scripts. It is important to avoid recursive scripts that call each other indefinitely.

### Insert Comment

Click the note button to insert a comment into the script.

### Set/Get/Test Parameter

Logical tests may be performed within scripts. Use the **Set Par** button to display the **GET, SET, TEST PAR Statement** dialog box.



Select the module type, module index and parameter name from the drop-down lists at the left. Select the action type with the radio buttons in the middle of the dialog box. Enter a value or choose the variable name at the right and click **Add** to add the line to the script.

The GET command reads the specified parameter and stores it in one of the five internal variables. These can later be used in a logical comparison with the TEST command.

The SET command can be used to set a parameter to a fixed value entered in the value field or to a value previously stored in one of the five internal variables.

The TEST command can be used to perform a logical comparison on the selected

parameter. The parameter can be tested against a fixed value entered in the value field or a value previously stored in one of the five internal variables.

The logical operators are GT - greater than, GTE - greater then or equal, EQ - equal, LTE - less than or equal, LT - less than, NE - not equal. If the result of the operation is false, the script will record an error. The script system can be set to Exit On Error or ignore errors. See “Exit On Error” on page 2-11.

## Time Filter

When a script is recorded, the time delays between physical actions is recorded and inserted into the script file. The time filter button minimises the **WAIT** times between recorded commands to 250 milliseconds in order to optimise script playback.

## Playing Scripts



To play back a previously recorded script, click the drop down list box to

select the script name.

Scripts are located in either the Global script repository on the in-house Fairlight LAN, or in a local directory. Click the **Glb** button to select files from the Global script repository, this feature is only for in-house applications.

Local scripts are saved in *C:\Projects\Mixers\MSAT\Scripts\*. This directory may be changed to any other directory. In the **File** menu select **Directory Path (local)**. Enter a path in the dialogue box and click **OK**.

Click the button with green arrow to the left of the drop down list to start script playback. Click the button with the yellow bars to pause playback. When paused, click the button with the footstep to step through the script one line at a time. Click the button with the black square to stop playback.

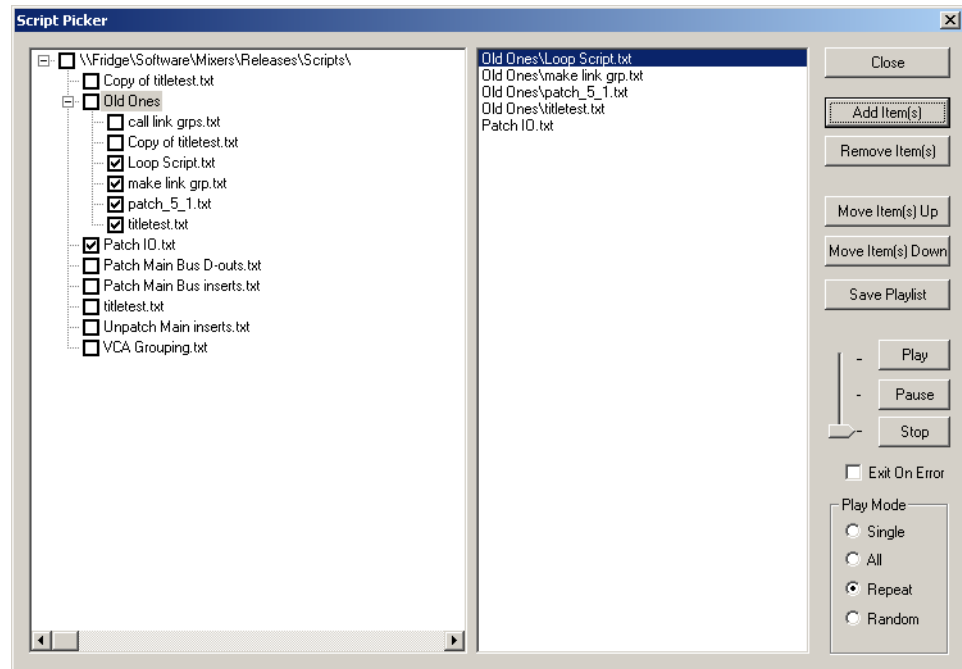
Script messages are played back and sent to FMC. **WAIT** messages record or simulate the real-time delay between performing actions on the control surface.

## Play List Script Picker



To enable a list of scripts to be played back in sequence, MSAT includes the script picker interface. First select the source directory for scripts by clicking the **Glb** button or changing the local directory path by selecting **Directory Path (local)** from the **File** menu.

Click the script picker button to display the script picker window:



The left hand panel displays available scripts. Click in the check boxes to select the scripts to add to the play list. Click the **Add Items** button to move the selected items into the play list in the right hand panel.

Double click on a script name in the play list to start playback of that script.

Select a script in the play list and click **Remove Item** to remove the script from the play list. Use the **Move Items Up/Down** buttons to change the order of the play items in the play list.

Click **Save Playlist** and enter a name for the list to save the play list for future use. Play lists may be added to a play list. Be careful not to make recursive lists.

## Play Mode

The script picker play mode options control play list execution.

**Single** mode plays the selected script and stops when it reaches the end of the script.

**All** mode plays through all the scripts in the play list and stops when it reaches the end of the last script in the list.

**Repeat** mode plays through all the scripts in the play list then returns to the top of the list and plays continuously.

**Random** mode continuously plays scripts from the list in a random order.

## Play Indicator

Press the **Play** button to start playback of the scripts in the play list. The play indicator displays the current playback status: Play, Pause or Stop. The indicator will show if a script has come to a PAUSE command or if playback has stopped.

## Exit On Error

The **Exit On Error** check box causes the playlist to stop when a **TEST\_PAR** or **TEST\_VIEW** command returns **false**. When not checked MSAT continues to play past the error.





NOTES:

# Chapter 3 - MSAT Script Syntax

## GENERAL

A script file is an ASCII text file, typically written using an editor such as Windows Notepad. Alternatively, the script may be entered interactively using the MSAT script recording features described in “Recording Scripts” on page 2-9. This text file contains a number of instructions, each instruction placed on a separate line.

Instructions exist for setting, accessing and testing mixer parameters, as well as controlling the flow of the script, using loops and simple IF statements. Other instructions allow for simple calculations, with assignments and basic math functions.

The scripts are normally executed at a speed of approximately 15 milliseconds per instruction, but the execution can be delayed additionally using the WAIT instruction.

The script files reside in `\Projects\MIXERS\Msat\Scripts` or in the local directory specified under the **File** menu, and must use the extension “.TXT”.

## OPERANDS

The following types of operands are available:

- **MODULE\_TYPE**: module types as defined in the RAPID Reference Manual.
- **PARAMETER**: parameter name as defined in the RAPID Reference Manual.
- **CONTROL\_ID**: name of a control-surface element as defined in the “DeskCtrlViewDefs.h” code module. These operands are for internal testing purposes only, not for use in RAPID applications.
- **VIEW\_ID**: name of a control-surface display element as defined in the “DeskCtrlViewDefs.h” code module. These operands are for internal testing purposes only, not for use in RAPID applications.
- **CONSTANT**: integer value, specified in either decimal or hexadecimal (prefix by \$) notation.
- **LC1 to LC5**: Loop counters, with the outermost loop using LC1, the next using LC2 ect.
- **V1 to V5**: Variables 1 to 5.

## COMMENTS

Blank lines are allowed.

All lines starting with # are treated as comments, and are ignored.

## PARAMETER ACCESS INSTRUCTIONS

**SET\_PAR, module\_type, module\_index, parameter\_id, new\_value**

This instruction will cause the selected parameter in the mixer to take the `new_value`. The `module_index` and `parameter_id` will typically be constants as defined in the MPD document.

**READ\_PAR, module\_type, module\_index, parameter\_id, variable**

This instruction reads the value of the parameter from the mixer, and places it in the specified variable.

**TEST\_PAR, module\_type, module\_index, parameter\_id, condition, value**

Where condition is GT, GTE, EQ, LTE, LT, or NEQ.

This instruction is used to verify that the mixer has corresponded correctly to the proceeding instructions. The specified parameter from the mixer is tested against a value, and the execution of the script is stopped if the test is false.

**CHANGE\_CONTROL, control\_id, new\_value**

This instruction will cause the selected control surface parameter to take the `new_value`. The `control_id` will typically be constants as defined in the “DeskCtrlViewDefs.h”.

**READ\_VIEW, view\_id, variable**

This instruction reads the value of the view-element from the mixer, and places it in the specified variable.

**TEST\_VIEW, view\_id, condition, value**

Where condition is GT, GTE, EQ, LTE, LT, or NEQ.

This instruction is used to verify that the mixer has corresponded correctly to the proceeding instructions. The specified view-element from the mixer is tested against a value, and the execution of the script is stopped if the test is false.

**FAST**

Changes the default execution speed to approx 5 mS between instructions.

**SLOW**

Resets the default execution speed to approx 25 mS between instructions.

## MATH INSTRUCTIONS

The five local variables can be assigned values by reading either a mixer parameter, or by reading the state of a view element. Additionally, they can be preset using the ASSIGN command:

```
ASSIGN, variable, {MODULE_TYPE | PARAMETER | CONSTANT | control_id |  
view_id | LCx | Vx}
```

Basic math is supported, using the same variable to supply both destination and one of the source arguments, with the second argument being any of the possible operands:

```
ADD, variable, operand
```

```
SUB, variable, operand
```

```
MUL, variable, operand
```

```
DIV, variable, operand
```

```
MOD, variable, operand
```

```
AND, variable, operand
```

```
OR, variable, operand
```

```
XOR, variable, operand
```

## PROGRAM CONTROL INSTRUCTIONS

**LOOP, start\_value, end\_value, step\_value**

All instructions from the LOOP statement down to the next ENDLOOP are repeated until

end\_value is reached or exceeded.

Note, that the end\_value is only calculated once, at the entry to the loop.

Also note, that the step\_value is added to the loop counter at the end of the loop.

Finally, please note that the loop is not entered, if the start\_value is equal to or exceeds the end value.

The equivalent 'C' code is as follows:

```
    LC1 = start_value;
while (step_value > 0 ? LC1 < end_value : LC1 > end_value)
{
    ...
    ...
    ...
    LC1 += step_value;
}
```

Due to this implementation, the loop construct can be used as a simple IF statement.

**ENDLOOP**

Used in conjunction with LOOP – see above.

## MISCELLANEOUS INSTRUCTIONS

**WAIT, delay\_in\_milliseconds**

Stalls execution for an amount of time.

**EXECUTE\_SCRIPT, filename**

Calls and executes a script. Include the full pathname. Avoid recursive scripts.





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