

# *Application Note*

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**Altia<sup>®</sup> DeepScreen<sup>™</sup>**  
*Simulation Graphics Software*

## **The DeepScreen and I-Logix StateMate Generated Code Connection**

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### **Introduction**

This application note assumes you have already connected your StateMate generated code to an Altia interface using Altia Runtime. This document explains how to replace Altia Runtime with DeepScreen generated code. To learn how an Altia interface is first connected to StateMate generated code using Altia Runtime, please read *The Altia and I-Logix StateMate Generated Code Connection* Application Note. If you do not have a current copy, one may be available from the Altia web page at <http://www.altia.com> by choosing Online Support, then Tutorials. A copy is also available in the Altia software `stmm/docs` directory if you've already installed the Altia/StateMate connection package.

The process described in this document requires the 6.12.2001 or newer version of the Altia/StateMate connection software. If you do not have a suitable version, please contact your Altia Sales Representative or send email to [support@altia.com](mailto:support@altia.com).

This document assumes you have a license for Altia DeepScreen. As of May 2001, the Altia DeepScreen code generator is only available on Windows 2000 and XP and the integration of DeepScreen generated code with StateMate generated code has only been tested for Windows 2000 and XP platforms.

### **The Altia DeepScreen Connection to StateMate Generated Code**

After developing a StateMate model and verifying its correctness using the simulator, it is common to transition to generated code. This is easily done with Altia Runtime, the royalty free runtime version of Altia Design and Altia FacePlate editors. The Altia Runtime connection to StateMate generated code allows you to execute a model on a system that has no Altia editor or StateMate MAGNUM license; however, you must copy the Altia interface design files (`.dsn` and `.rtm` files), Altia Runtime files (for example, `altiaart.exe`, `fonts.ali` and `colors.ali` on the PC), and the StateMate generated program to each system.

DeepScreen generated code replaces the Altia interface design files and Altia Runtime files. This results in a single executable program file, faster startup time, and significantly less memory usage during execution!

To support the transition to DeepScreen generated code, Altia provides an updated `user_activities.c` file in the Altia/StateMate connection package's `stmm/code_link` directory. The updated version of this file is only available in the 6.12.2001 or newer version of the Altia/StateMate connection software.

### **Running the HVAC DeepScreen Demonstration**

For the PC version of the Altia/StateMate connection, the HVAC demonstration programs were created from StateMate generated code for a Windows NT target. As a result, they only execute properly on Windows 2000 or XP systems.

To run the programs in a command prompt window, change directory to the `hvac_with_codegen` directory located under the `stmm/demos` Altia/StateMate connection software directory. Alternatively, you can view the contents of the `hvac_with_codegen` directory in a file browser window.

Execute the `hvac_deepscreen` program (`hvac_deepscreen.exe` on the PC) to run the DeepScreen version of the HVAC Demonstration. To try the version of the HVAC demonstration that uses Altia Runtime, execute the `hvac` program (`hvac.exe` on the PC).

## Connecting Your DeepScreen Generated Code to StateMate Generated Code

After successfully connecting an Altia interface design to StateMate generated code using Altia Runtime, you can easily replace Altia Runtime with DeepScreen generated code using the following steps as a guide:

1. **If you just installed the 6.12.2001 or newer version of the Altia/StateMate connection after using an older version of the connection, read this step carefully.** You **MUST** copy the `user_activities.c` and `altia.h` files from the Altia/StateMate connection `stmm/code_link` directory to the directory containing the generated code for your own StateMate model. In this same directory containing the StateMate generated code, you **MUST** remove the `user_activities.obj` object file and the `tmp_out_lib.lib` library if they exist. You must remove these files to force a recompile of the new version of `user_activities.c` when the program is made from StateMate.
2. Open your Altia interface design file into Altia Design DeepScreen, generate code and perform **Make Standalone**. If you do not know how to perform these tasks, see the *Altia DeepScreen User's Guide* for instructions.

### NOTE

If your Altia interface design file is in the same directory as your StateMate generated code, you may encounter compile errors when you attempt to **Make Standalone**. This is most likely caused by conflicts between the StateMate generated code and DeepScreen generated code. If this happens, move or copy your Altia files (`.dsn` and `.rtm` files) to a clean directory, open the Altia interface design file from the clean directory, generate code, and perform the **Make Standalone**.

3. After completing step 2, you will have two new object libraries in the same directory as your Altia interface design file. On the PC, these files are `altiaWinLib.lib` and `altiaAPIlib.lib`. The `altiaWinLib.lib` library is the complete DeepScreen version of your Altia interface design (or at least the portion you selected for generating code) compiled into object library format. The `altiaAPIlib.lib` library is the integer version of the Altia C API for DeepScreen (also compiled into object library format).

Copy `altiaWinLib.lib` and `altiaAPIlib.lib` into your StateMate generated code directory.

4. You are now ready to modify the Makefile Settings for your StateMate Compilation Profile so that you can make a program that incorporates `altiaWinLib.lib` and `altiaAPIlib.lib`. Open your Compilation Profile in StateMate (hint: you begin by choosing the **C Code Generation** icon from the main window of StateMate MAGNUM). From the **Options** menu in the StateMate code generation window, choose the **Makefile Settings...** option.

In the **Libraries:** field of the Makefile Settings dialog, add:

```
altiaAPIlib.lib altiaWinLib.lib
```

If you already have a path to `liblan.lib` in this field, you must enter the new DeepScreen library names **before** the path to `liblan.lib`. To be very safe, you might consider completely removing the path to `liblan.lib`. When the changes are complete, close the Makefile Settings dialog.

You must generate new code from StateMate to incorporate the library changes into the generated Makefile file. To do this, open the **Compile** menu from the StateMate code generation window and choose the **Generate Code...** option.

Here is a brief explanation for the actions in this step. The `liblan.lib` library supplies the API routines to communicate with Altia Runtime. For the connection between Altia Runtime and StateMate generated code, the code in Altia's version of `user_activities.c` uses the API routines from `liblan.lib` to pass data between the StateMate code and Altia Runtime. The new `altiaAPIlib.lib` library supplies the same API routines, but they communicate with DeepScreen code instead of Altia Runtime. They have identical calling syntax so the code in `user_activities.c` is unaware of any change. Finally, `altiaWinLib.lib` supplies the DeepScreen code for a specific Altia user interface. This code has its own internal API and the routines in `altiaAPIlib.lib` use it to control the user interface.

5. Now you are ready to make the program from StateMate. In the StateMate code generation window, open the **Compile** menu and choose the **Make Code...** option. A new window will display the progress of the make as each source file is compiled and the object files are linked into a program.

#### NOTE

Every time you change your Altia interface design, repeat steps 2, 3, and 5 in order. You must repeat step 2 to generate and compile new DeepScreen code for the modified design. You must repeat step 3 to copy the new `altiaWinLib.lib` and `altiaAPIlib.lib` libraries to the StateMate generated code directory. Finally, you repeat step 5 to make the new code into a program.

6. If the make completes successfully, you will have a new program in the current directory that is ready for execution. The name of the program depends on the name of the StateMate Compilation Profile used to generate the code. On the PC, the program will have a `.exe` extension. After starting the program, you can exit it by closing the associated DeepScreen window. If you start the program from a command prompt window, you can also stop it with a **Ctrl+C** in the command prompt window.

## Packaging Files for Running on Other Systems

To run the generated program on other compatible systems, you only need the generated program! That is the beauty of DeepScreen.

## Additional Questions?

If you have additional questions, feel free to contact an Altia Technical Support Representative at 719-598-4299 in the United States or send email to [support@altia.com](mailto:support@altia.com). If you are located outside of the U.S., you may also contact your Altia software distributor.

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