HAI Model

Release 5.2a-MA

Automation Description

and User Guide

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1. General Description

The HAI Model Release 5.2a-MA ("HM 5.2a-MA") is developed and sponsored by HAI Consulting, Inc., AT&T Corp. The Model calculates the cost of unbundled network elements (UNEs), Universal Service Funding (USF) requirements, and the cost of carrier access and interconnection through the use of a highly sophisticated costing tool.

[1] The computer program chosen to support such a complicated analysis is Microsoft Excel, version Excel 97. The Model's calculations are contained in four Excel workbooks; these workbooks constitute the following modules:

Distribution Module
Feeder Module
Switching and Interoffice Module
Expense Module (Summarized by Density Zone, Wirecenter, CBG, or Cluster).

A USF summary module is also provided. This module allows the user to combine and summarize the USF results from a selection of companies with previously prepared expense modules.

The HAI Model developers and sponsors believe that a model developed in a readily understandable and ubiquitous spreadsheet program will permit detailed analysis of the calculations, algorithms, and user definable inputs. Moreover, the use of Microsoft Excel's auditing tools will allow the user to determine relationships among the Model's various inputs and outputs.

While HM 5.2a-MA remains a spreadsheet-based model, it uses two Microsoft programming languages – Visual Basic (VB) and Visual Basic for Applications (VBA) – and a database to integrate the Model's four calculating modules (See Model flowchart on the following page). The use of programming code and macros allows the model to run with limited user intervention. The programming code automates the copy and paste functions when applying intermediate results and data calculations among the Model's modules. Although the model will execute successfully on less capable machines, the recommended PC for repetitive uses of the model is a 200 MHz Pentium processor with 64Mb of RAM.

HM 5.2a-MA takes advantage of Microsoft's object oriented structure to enhance the Model's speed and functionality. Structured Query Language (SQL) database queries have removed the need for complex and time consuming data aggregation functions within Excel, permitting the model to calculate quickly and produce results at various levels of aggregation.

Three of the model's VB/VBA calculations are performed within the database. First, the database aggregates Distribution Module results for outlier cluster and associates these results with the outlier's "home" main cluster. Second, the database aggregates investment results from the Cluster level to the Wire Center and Density Zone levels. And third, the database assigns switching and interoffice investments, developed on a per-line basis, to each cluster. In both cases the Model utilizes simple arithmetic calculations that can be externally verified by the user. Use of the database increases the efficiency of the Model, but does not compromise the ability to

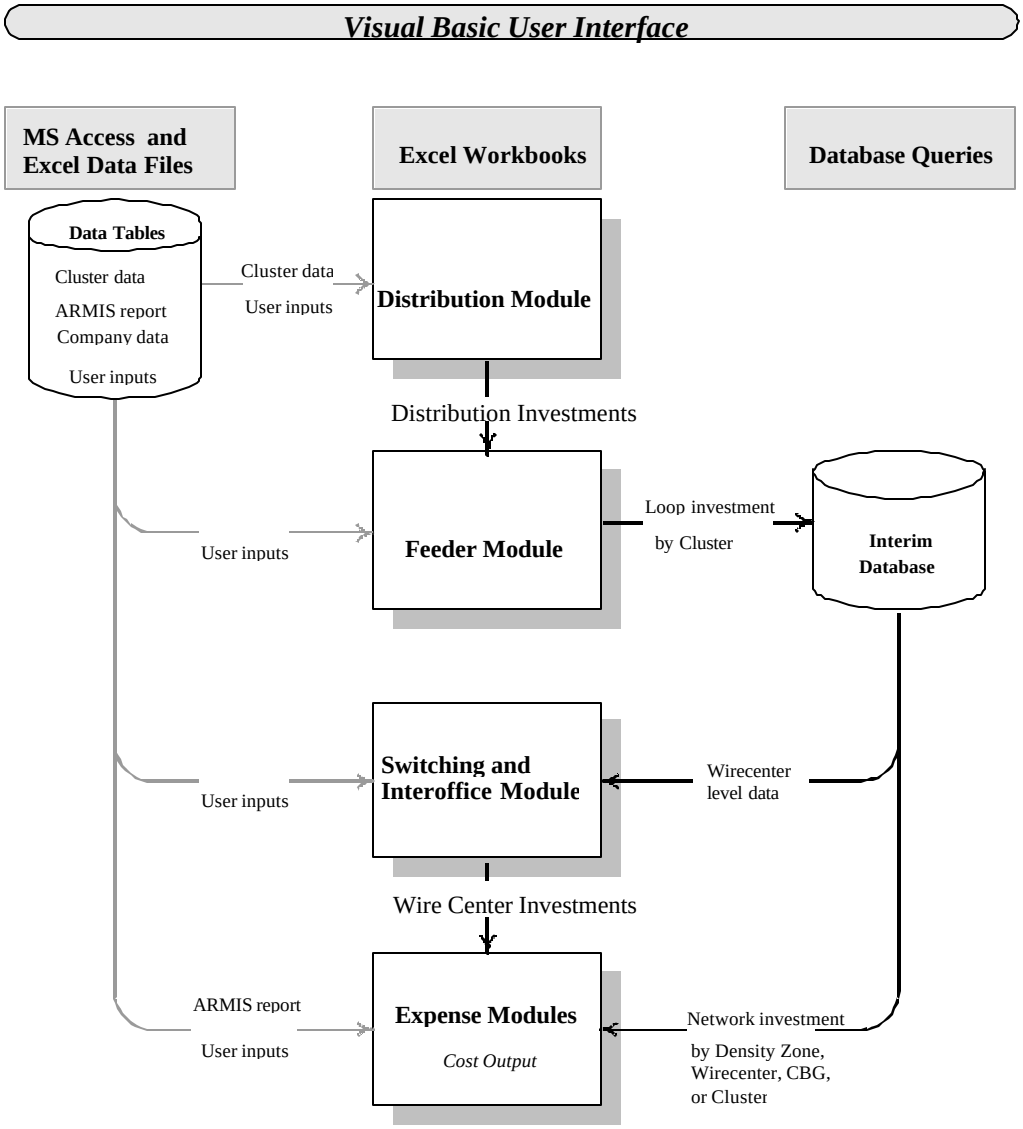
[1] Please refer to the *HAI Model, Release 5.2a-MA Model Description*, for a precise description of the Model's functions, including its evolution into the current release.

audit the Model. A final use of VBA is in the Switching and Interoffice Module for the determination of efficiently constructed interoffice transport rings.

To improve the user's ability to audit the Model, an Excel "workfile" is generated with each run to keep track of the intermediate results of each module. Using this workfile, the user can trace the development of investment results through each of the calculating modules.

2. HAI Model 5.2a-MA Module Flowchart

Module Flowchart



3. System Requirements

In order to run HM 5.2a-MA your PC should meet the following requirements:

133 MHz or faster Pentium processor (200 MHz preferred)*
64 megabytes of RAM*
SVGA monitor set to 800 x 600 (or higher) display resolution
400 megabytes of available hard drive capacity
Microsoft Windows NT, Windows 95 (or later) operating system
Microsoft Office Professional 97, with Microsoft Service Release 1 (SR-1) installed

The items marked with an asterisk (*) are recommendations, and should be followed if the Model is to be used for large companies in large states (e.g., California, New York, or Texas). For smaller companies, the Model will function on a smaller PC.

Please note that the preferred application software is Microsoft Office 97 Professional for Windows 95 that incorporates Excel 97, Access 97, and Word for Windows 97.[2] Use of this complete suite of Microsoft products will ensure that all file libraries that are needed to run the model will be installed. In addition, Word for Windows 97 permits users to examine the Model's documentation in electronic form, and Access 97 will permit the user to examine the Model's database more readily.

Users wishing to run the Model having only a stand-alone installation of Excel 97 should examine the "Readme.txt" file. This file is located in the Model's home directory or Section 8 of this documentation. The file explains instructions on how to ensure that the computer installation of supporting file libraries for Excel 97 is sufficient to run the model.

4. Installation Instructions

HM 5.2a-MA ships on the CD-ROM as a single self-extracting installation file. To install the Model on your personal computer follow these directions.

Ensure that your personal computer and its software meet the system requirements described in Section 3.

Place the HM 5.2a-MA CD-ROM in your PC's CD-ROM drive.

Locate and double click on the *File Manager* or *Windows Explorer* icon.

Double click on the icon for your computer's CD-ROM drive.

Double click on the HM 5.2a-MA -installation icon. The model will first check to see if a

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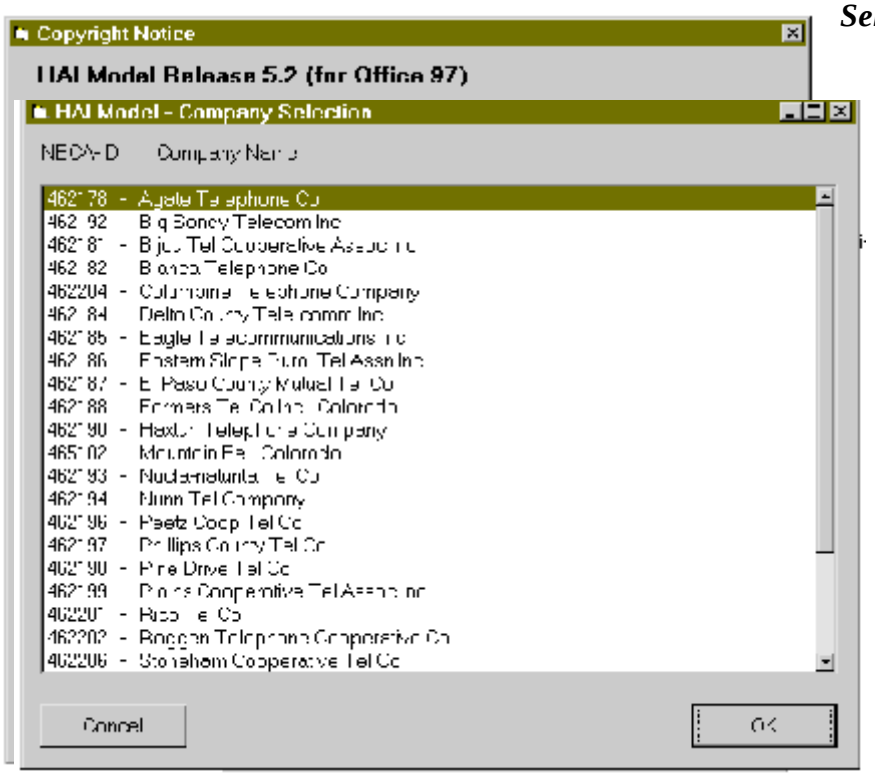
previous installation of Release 5.2 of the Hatfield/HAI Model exists on your computer. If a previous installation is found, you will be asked whether you wish this previous installation to be deleted, or the current installation process aborted. If you wish to retain your old installation of Release 5.2, you should choose to abort the installation process and use Windows File Manager or Explorer to change the name of the old installation's *HM51.exe* file to another name. Failure to do this will result in the new model version overwriting the old version and all files stored within the model's directory! After changing the name, you may then rerun the current installation process.[3]

The model will run a self-extraction routine that will install the Model and all of its components on your computer's internal hard drive.

You are now ready to run the HM 5.2a-MA.

5. Running the Model



Select State

Running HM 5.2a-MA is straightforward. To start the program, click on its icon under the *Programs* entry on the *Start* menu (in Windows 95 or Windows NT 4.0), or the HAI Model program group (in Windows NT 3.51). A copyright message will appear, followed by the State Selection form. From this list, select the state you desire to run.[4]

Select Company

After the State is selected, the

[3] Note that if you decide to preserve your previous installation of the HM 5.2a-MA or previous versions of the HM, only the most recent installation will be "active" and be executed when you click on the Model's icon or entry in the Start menu.

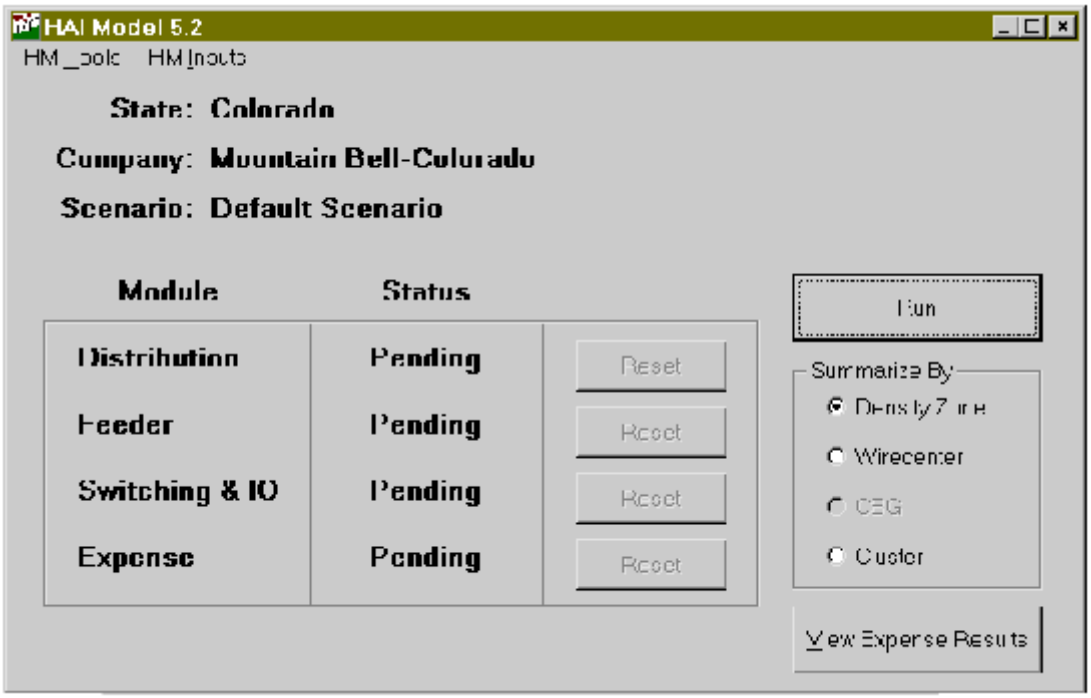
[4] Screen replicas in this document say HM 5.2 or HM 5.2a, but they apply to HM 5.2a-MA as well.

Company Selection window will appear. This window will contain the names of all companies in the selected state for which HM 5.2a-MA contains data. Select the appropriate company from this list.

If you have not previously run this State/Company combination under this installation of the HM 5.2a-MA, you will be asked if you wish to create a default scenario. You should click on "OK."

Run the Model

After the desired state and company are selected, the main window will appear.



To run the Model using default user inputs, select ***Density Zone, Wirecenter, CBG,*** or ***Cluster*** level outputs, by clicking on the appropriate button. Click ***Run***. The Model will automatically calculate its four modules and produce results in the Expense Module. Finally, the Model will prompt the user to save the now-populated Expense Module workbook.

As each of the modules is calculating, a status bar will display the progress of the calculations. As each module completes, the *Status* indicator will change from *Pending* to *Complete* to indicate that it has calculated successfully.

After a particular Company has been run once, subsequent runs will show the module Status as *Complete* for all modules. To re-run the model, click the ***Reset*** button next to the module from which you would like to restart the Model. For example, to re-run the Expense Module, click ***Reset*** next to the Expense Module status indicator, and click ***Run***.

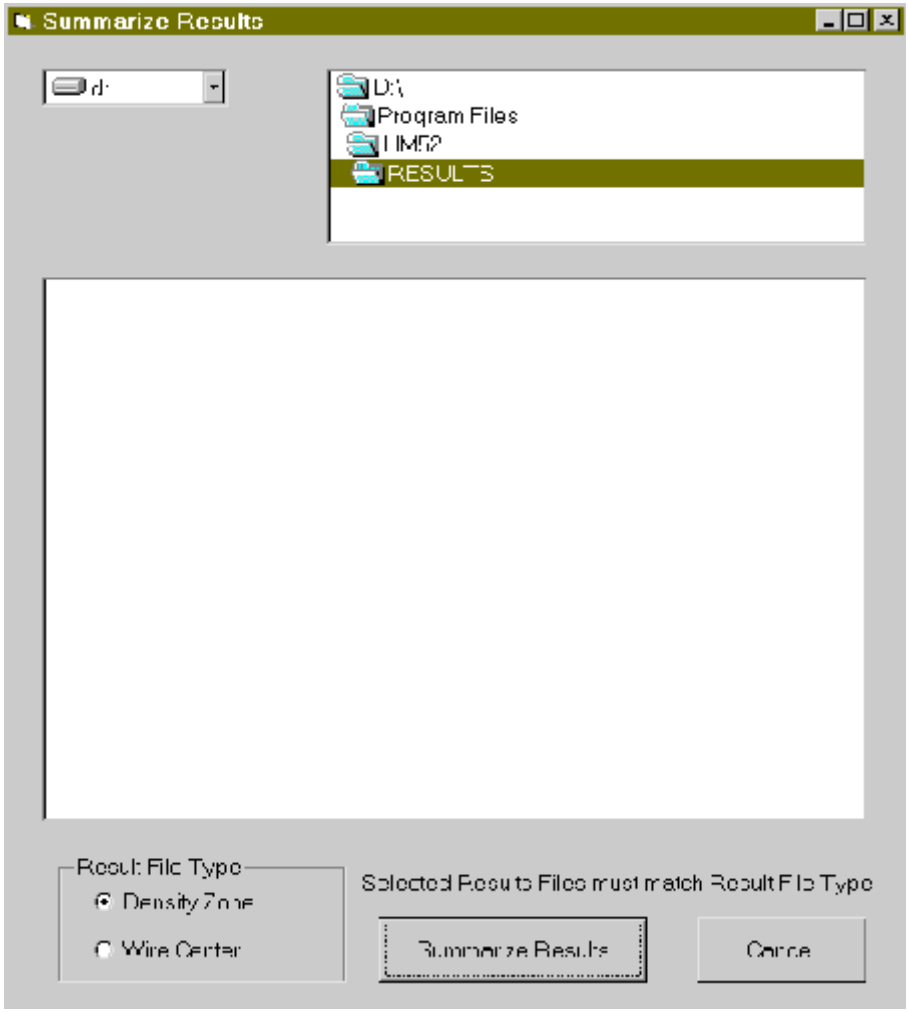
HM 5.2a-MA results can be summarized by ***Density Zone***, ***Wirecenter***, ***CBG,*** or ***Cluster***. Click on the desired option on the main window before clicking ***Run***. To see all outputs, first run the Model by *Density Zone* and save the results. Next, select the *Wirecenter, CBG, or Cluster* outputs, click ***Reset*** next to the Expense module, and then click ***Run***. The new output will be displayed.

To run the model with customized user inputs, see Section 6.

The length of computing time required to execute a run of the Hatfield Model depends both on the number of clusters and wire centers in the study area being run, and on the speed of the computer.

Summarize Results Selection

This selection, under the *HM Tools* select window, allows the user to summarize the USF results (dollars of support and lines only) for any Density Zone or Wirecenter expense modules the user targets in a given directory. The select window is shown below:

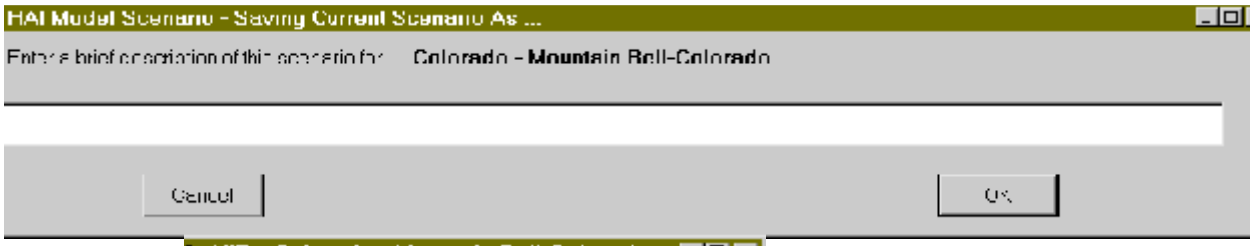


The selected Results Files must match the Result File Type, either Density Zone or Wire Center file types.

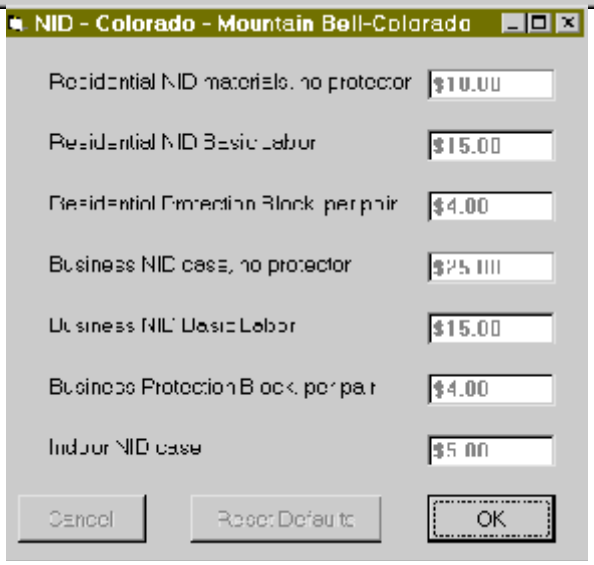
6. Adjusting User Inputs and Managing Scenarios

HM 5.2a-MA has over 1400 user adjustable inputs. The Model has input boxes that allow these inputs to be changed easily, and provides a scenario manager that allows a user to keep track of various sets of input parameters.

The *Default scenario* in HM 5.2a-MA cannot be changed through the user interface, so a new scenario must be created before input values can be changed.[5] To create a new scenario, select ***New HM Scenario*** from the ***HM Tools*** menu. The following input box will appear, prompting for a scenario name. The scenario can have any name up to 100 characters in length.



To change default inputs, click on ***HM Inputs*** then select the appropriate category and sub-category of inputs. An input box will appear similar to the Distribution NID input box as shown below:



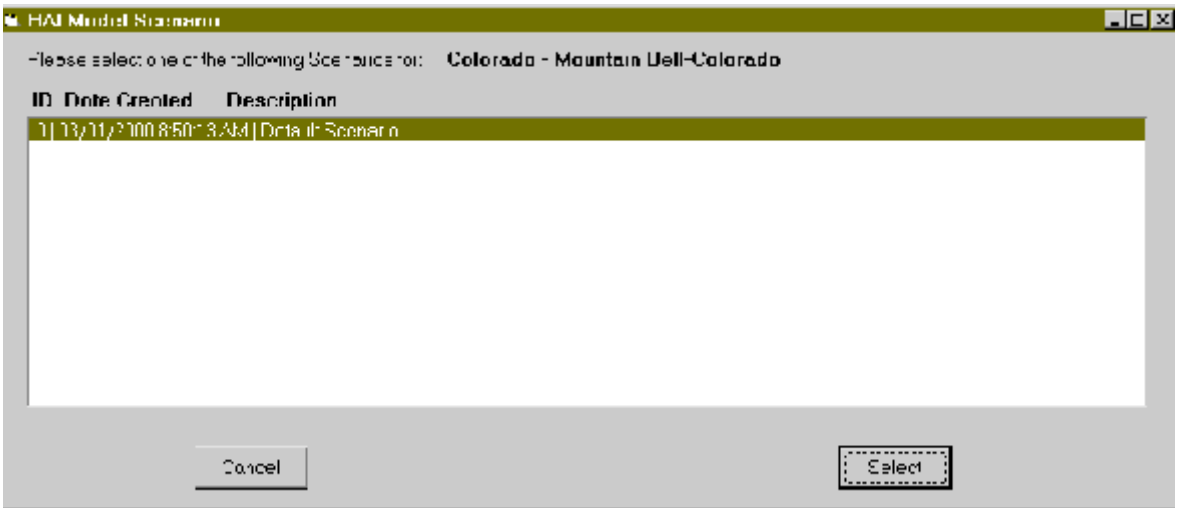
Inputs can be changed from default values by simply typing new values in the spaces provided. Clicking ***OK*** will register the input change, clicking ***Reset Defaults*** will return each item to its original value, and clicking ***Cancel*** will close the input box without registering any changes.[6] The user may find Appendix B of the HM 5.2a-MA Model Description useful in considering changes to the user input values. The appendix defines each user input and provides its default value, presenting them in approximately the same order as they appear in the user interface. In addition, the HM 5.2a-MA Model Inputs Portfolio provides the rationale and support for the default value of each user input.

Once a scenario has been created, it can be modified incrementally. After the initial scenario is created, choose ***Save HM Scenario As …*** from the ***HM Tools*** menu. An input box will appear, prompting for a new scenario name. Give the scenario a new name. The original scenario will be saved, and further changes can be made to the new scenario under its new name.

To return to a previously created scenario, choose ***Open HM Scenario*** from the ***HM Tools*** menu. The following selection box will appear, prompting the user to choose a scenario.

[5] Sophisticated users can alter the specification of the Default Scenario by editing the pertinent input tables in the Microsoft Access database table labeled "Scenario."

[6] The default scenario inputs are defined in Appendix B of the Model documentation. The HM 5.2a-MA Inputs Portfolio also defines each default-input value and provides supporting documentation for each input.



Up to 9,999 different scenarios can be stored in the Model for each company. However, each scenario represents hundreds of input values, so the scenario database could become quite large. Scenarios can be deleted when they are no longer needed by selecting ***Delete HM Scenario*** from the ***HM Tools*** menu. A selection box will appear which allows scenarios to be deleted.

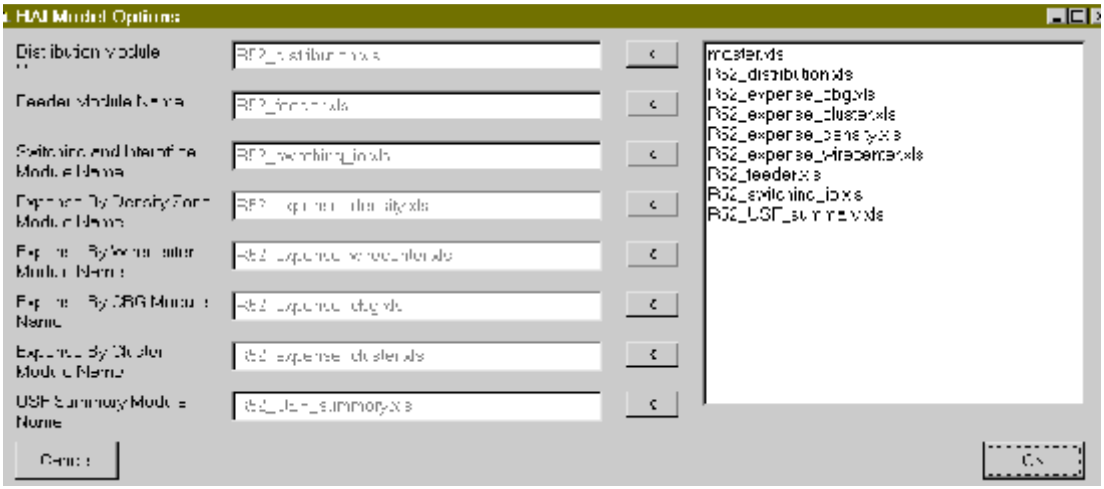
7. Additional Features

Changing Modules

If it becomes necessary to replace or update the modules that constitute HM 5.2a-MA, the Model provides a mechanism to do so.

First, copy the new modules from the updated CD-ROM or diskette into the HM 5.2a-MA Modules directory. (The default path will be *c:\program files\hm50\modules* under Windows 95 or Windows NT 4.0 and *c:\hm50\modules* under Windows NT 3.51.)

Next, select ***Options*** from the ***HM Tools*** menu. A selection box will appear which allows the working modules to be substituted. The right side of the selection box will show all the files that reside in the Modules directory. Select the new module from the list on the right, then click the appropriate button to send the module name to the appropriate box on the left. The module names listed on the left side of the form are the calculating modules used by the Model.



Deleting Scenario Workfiles

On certain system configurations, HM 5.2a-MA can run up against the memory limitations of Microsoft Excel 97. This generally happens when running very large companies with completed workfiles (e.g., running Pacific Bell-CA or Southwestern Bell-TX subsequent to its initial run). If an *Out of Memory* error occurs when running a large company, click the ***Delete Scenario Workfile*** option on the ***HM Tools*** menu. This will delete the previously existing workfile (requiring the run to start from the *Distribution Module*), but should free up the required amount of memory.

8. Troubleshooting

Installation Problems

All the information contained in this section may be found in the "Readme.txt" file located in the HM 5.2a-MA home directory.

HM 5.2a-MA Workstation Prerequisites

The HM 5.2a-MA is a Visual Basic application designed to run on a Windows 95, Windows 98, Windows 2000, Windows NT 3.51, or Windows NT 4.0 workstation and interface with Microsoft Excel Version 97 with the Microsoft Office 97 Service Release 1 update, Excel 8.0, or Excel 2000. In addition to Excel, the "User Adjustable" inputs and other inputs to the application are maintained in a Microsoft Access 97 database that also resides on the workstation. It is not a requirement to have the MS Access software installed on the workstation, however, certain libraries must be in place for Excel to communicate with the Access database that is installed as part of the Model application.

Excel must be set up to work with MS Access.

This is an optional feature that may not have been selected when Excel was installed. If this feature of Excel was not installed, the HM 5.2a-MA application will not function properly. The most common symptom is the Distribution Module will stall and the status message "Copying Scenario Inputs..." is displayed on the status bar. Another symptom may be a message

something like “Runtime Error '424': Object Required” or another message that complains about “VBA Jet.”

The most reliable way to verify that this option is installed is to rerun the Excel Setup Program and check the options listed on the Add/Remove Components form.

Another, slightly less reliable, solution is to verify the existence of a library file called “DAO350.DLL.” This solution is less reliable because the Model Installation process places a copy of this file in the appropriate directory for use by the Visual Basic code. Therefore, depending on when you look for this file (before or after the HM 5.2a-MA Installation routine), it may be in the correct directory but still not “registered” with the Windows operating system. This file will most commonly be installed in the following platform specific directories:

Win 95: C:\Program Files\Common Files\Microsoft Shared\DAO
Win NT3.51: C:\WINNT35\MSAPPS\DAO
Win NT4.0:C:\WINNT\MSAPPS\DAO

To properly install and register this feature the Excel Setup Program must be rerun. When you get to the point where you can Add/Remove Components, Click on the Add/Remove Components button. On the next form select the Converter, Filters, Data Access option. On the next form select the Data Access option. Continue from this point by clicking the appropriate “OK”, “Continue”, or “Next” buttons to install this option. Once the Data Access option has been installed the errors/symptoms listed above should be resolved.