INTEGRATED TIME SYSTEMS, INC.

Software Products:
TymEdit ™ - Tymkon™ Recipe Editor

Instruction Manual

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Our controllers and software products are warranted against defects in materials and workmanship for the lifetime of the product. We will repair or replace, at our option, products that prove to be defective during the warranty period. All repairs will be made at the manufacturer's facility.

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1. GLOSSARY

1.1. *Tymkon*

Tymkon (pronounced 'time-con') is a series of process sequence controllers designed for batch-type process-control applications. All Tymkon controllers are based on a CMOS microprocessor as the major control element. This, along with other CMOS components and with the application of digital filtering, enables these controllers to operate reliably in the high electrical noise environments in which they often must function. Programming may be accomplished with front-panel controls or from a host computer.

1.2. *TicTalk*

TicTalk is a phrase used to encompass a network (used in the generic sense) of Host Computers, Tymkon's, Gas Panel Interfaces, Drive Controllers and other peripherals. In a typical installation, the interconnection of these devices requires the integration of different parallel and serial communications protocols from several different vendors. *TicTalk* provides the user a consistent programming interface for these various devices.

1.3. *TymEdit*

TymEdit is a recipe editor that allows the user to edit and print process segment tables, recipes, temperature tables and configuration information. This information is then stored in Microsoft Access database tables on the host computer's hard disk where it can be retrieved for later download to one or more Tymkon's.

1.4. *TymPlex*

TymPlex is a PC-based software application that provides a graphical user interface and data collection tool for all current versions of Tymkon process sequencer controllers. It allows the user to download recipes from the Microsoft Access database tables created by TymEdit and provides access to all of the Tymkon front panel functions as well as data logging functions.

1.5. *TymPro*

TymPro is a user profile editor that allows an installation's supervisory staff to edit user lists, process lists, and user-permissions information. These data tables are then made available to TymPlex, TymEdit and other Tymkon-related applications to regulate user access to various tools.

2. GENERAL INFORMATION

2.1. Software Scope

The purpose of this document is to provide instructions for use of the *TymEdit™* software application only. Please refer to the *Tymkon Manual* for more complete information regarding Tymkon features and behaviors. For information concerning other Tymkon related applications, refer to the appropriate manual.

All Tymkon Process Sequencers are designed to store (32) Process Recipes, (64) Process Segments and (32) Temperature Segments in local, non-volatile memory regardless of whether a Host PC is used. The *TymEdit™* application allows the user to create and edit database files, each of which contains an entire set of recipes and segments. The *TymPlex* application is used to download recipes to the *Tymkon*.

2.2. System Requirements

The preferred operating system for *TymEdit™* is WindowsXP Pro (with Service Pack 3) but it has been successfully used on most versions of Windows including Windows 98 and Vista. Windows 95 and earlier versions of windows are not supported.

The *TymEdit™* application does not communicate with *Tymkon* process controllers directly; it merely saves process instructions in database files. If the *Tymkon's* are physically connected to a different computer, any computer running *TymEdit™* must provide some mechanism to transport the process files to the computer that actually connects to the *Tymkon* through *TymPlex* (floppy disk, memory stick, network etc).

2.3. Software Installation

For detailed instructions on installing *TymEdit™* and other related software, please refer to the *TicTalk Software Installation Manual.*

2.4. Screen Navigation

2.4.1. Starting *TymEdit ™*

While any of the *Tic-Talk* applications loads, a splash screen is displayed. Although the splash screen displays the product name, version, copyright information, and the current stage of program initialization, the primary purpose of the Splash Screen is to convey that the program is loading and not 'hung up'. The amount of time that each element of the Splash Screen remains visible depends on the computer speed and the current CPU load and may disappear too quickly to be interpreted. All of this information is also visible on other screens after the program has been fully initialized.

2.4.2. Using *TymEdit ™*

TymEdit™ uses 'tab' controls to group similar functions on its screens. The tab controls have the appearance of conventional tab folders that might be used to organize various documents in a file cabinet. Under various conditions, different tabs may be enabled or disabled, visible or not visible and selected or not selected. The tab controls in all *Tic-Talk* applications exhibit the same colors, fonts and behavior to minimize confusion.

When selected, some of the major tabs across the top of the screen reveal a set of secondary (minor) tabs just below the major tabs.

Each of the major and minor tabs is labeled with a caption in which a single letter is underlined. A particular tab may be selected by clicking on its caption with the left mouse button or by holding down the <ALT> key on the keyboard and pressing the letter that is underlined in the caption.

The set of major tabs across the top of all screens has captions labeled *'Files'*, *'Edit Process'*, *'Edit Temperatures'*, and *'Edit Configuration'*. Under some circumstances, an additional tab labeled *'Print Preview'* appears to the right of the *'Edit Configuration'* tab. When a major tab is selected, the lower portion on the screen changes to display the functions related to the selected tab. For example, when *'Edit Configuration'* is selected, a set of 'secondary' tabs labeled *'Outputs'*, *'Inputs'*, *'Zones'*, *'Tymkon Settings'*, and *'User Settings'* becomes visible.

The *Edit Process* and *Edit Temperatures* screens contain most of the functions the user will need to manage recipe sequences. The other screens contain functions that are used by engineering during system installation and setup.

2.4.3. Exiting *TymEdit ™*

TymEdit™ can be closed with the application exit icon located in the upper right hand corner of the window. *TymEdit™* can also be closed by holding down the <ALT> key and pressing F4.

Application Exit Icon

If either the Process Data or the Configuration Data has been altered since the file was opened, the user will be
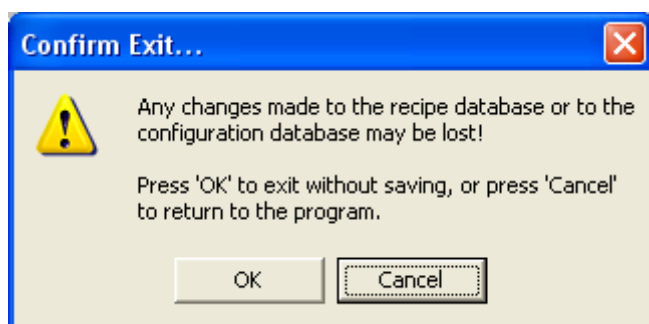

asked to confirm the exit. While the message warns that data may be lost, in most cases it won't be. That is, when *TymEdit™* is next opened, the altered version of the file will be loaded and available for saving or for additional editing. The only case where unsaved, edited data may be lost is when another user uses *TymEdit™* to edit a different file without first saving your changes.

3. INSTRUCTIONS - STANDARD EDITING MODE

3.1. Files

This is the screen that displays after *TymEdit* initially loads. It allows recipes to be loaded, created, or saved. It also notifies the user if the current file has been modified since it was last saved.
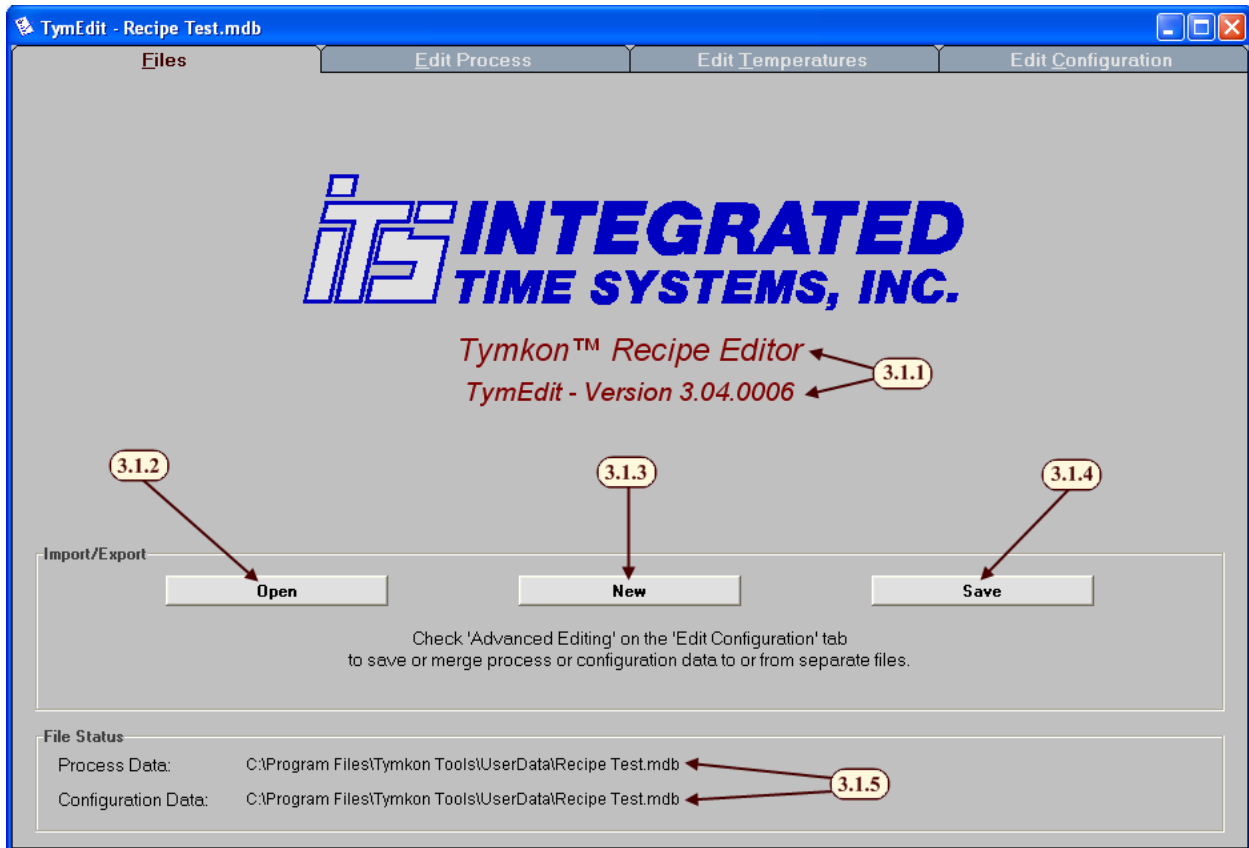
3.1.1. This area displays the program name and version. You will likely be asked for this information when requesting technical support from the factory.
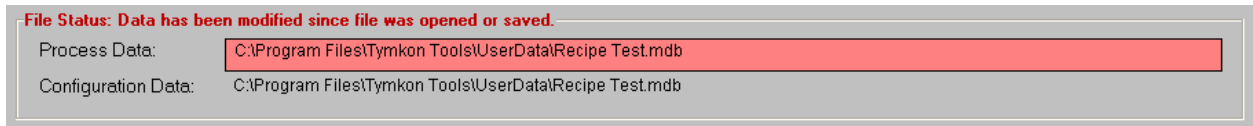
3.1.2. *Open* – This button displays a standard Windows 'File Open' dialog box. After the user has located the file they choose to edit, the software creates a copy of the file and makes the data available for editing. Unless Advanced Editing is enabled, both Process and Configuration data is loaded.

Warning: When a file is opened, any previously un-saved data will be lost and cannot be recovered. It is suggested that you save your previous work before opening a new file.

3.1.3. *New* – This button creates a blank file and makes it available for editing. Unless *Advanced Editing* is enabled, both Process and Configuration data are cleared.

Warning: When a new file is created, any previously un-saved data will be lost and cannot be recovered. It is suggested that you save your work before creating a new file.

3.1.4. *Save* – This button causes a standard Windows 'File Save' dialog box to appear. The user may choose to rename the file or save it on any accessible storage media (hard drive, memory stick, network drives etc). Once the file is saved, it may later be re-opened for additional editing or it may be downloaded to a *Tymkon* using *TymPlex*.

3.1.5. *File Status* – This area displays the name, location and status of the current file. Unless *Advanced Editing* is enabled, the path and file name of the Process Data will be the same as the path and file name of the Configuration Data. If either type of data has been edited since it was last saved, a red box will appear around the appropriate field as shown below.

File Status: Data has been modified since file was opened or saved.

| Process Data: | C:\Program Files\Tymkon Tools\UserData\Recipe Test.mdb |
| Configuration Data: | C:\Program Files\Tymkon Tools\UserData\Recipe Test.mdb |

3.2. Edit Process

The *Edit Process* screen is divided into five areas:
- The Upper-Left area displays a Recipe List,
- The Upper-Central area displays Recipe Details of the selected recipe,
- The Lower-Left area displays a Process Segment List,
- The Lower- Central area displays the Process Segment Details of the selected segment, and
- The Right-Margin area displays three groups of buttons that duplicate functions that are also available in various right-button-click menus.

Some actions require one record (row) to be selected in a table (Recipes, Cycles or Process Segments) while other actions require two or more records to be selected. To select the first record, left click on any column in the row of the desired record. The selected record will now be marked with a Record Selector in the left-most column of the table. If an additional record is required, hold the <Ctrl> key and click on the left-most column of the desired record.

Note: If the user clicks on any column other than the left-most column after the initial selection, the identity of the first selection will be lost and the user must start over.
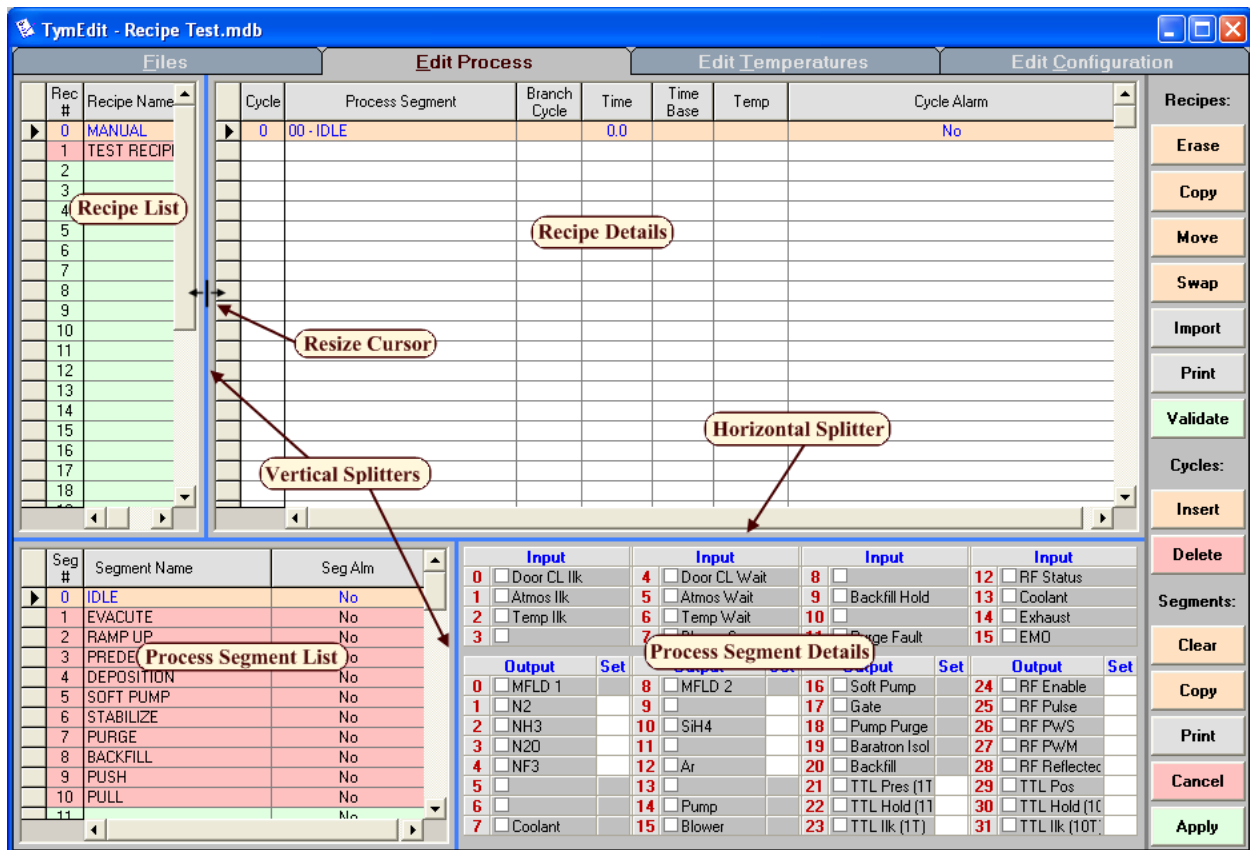
If more than two records are to be selected, the user may use the <Ctrl> key to make a non-contiguous (random) selection or the <Shift> key to make a contiguous selection. Note that in the example to the left, the <Ctrl> key was held while Record 4 was selected and also while Record 6 was selected. In the example to the right, the <Shift> key was held while Record 5 was selected.

These four areas of the *Edit Process* screen are separated by 'splitters' that appear as solid blue lines. These splitters allow each of the four areas to be resized. To resize an area, move the mouse over the blue splitter until its appearance changes to a line with an arrow on either side. Then click and drag the splitter in either direction. When the splitter has been moved to the desired location, release the mouse button.

Note: While the upper and lower vertical splitters are independent of each other, the horizontal splitter is one continuous bar.

3.2.1. Recipe List

The *Recipe List* area displays information pertaining to an entire recipe.
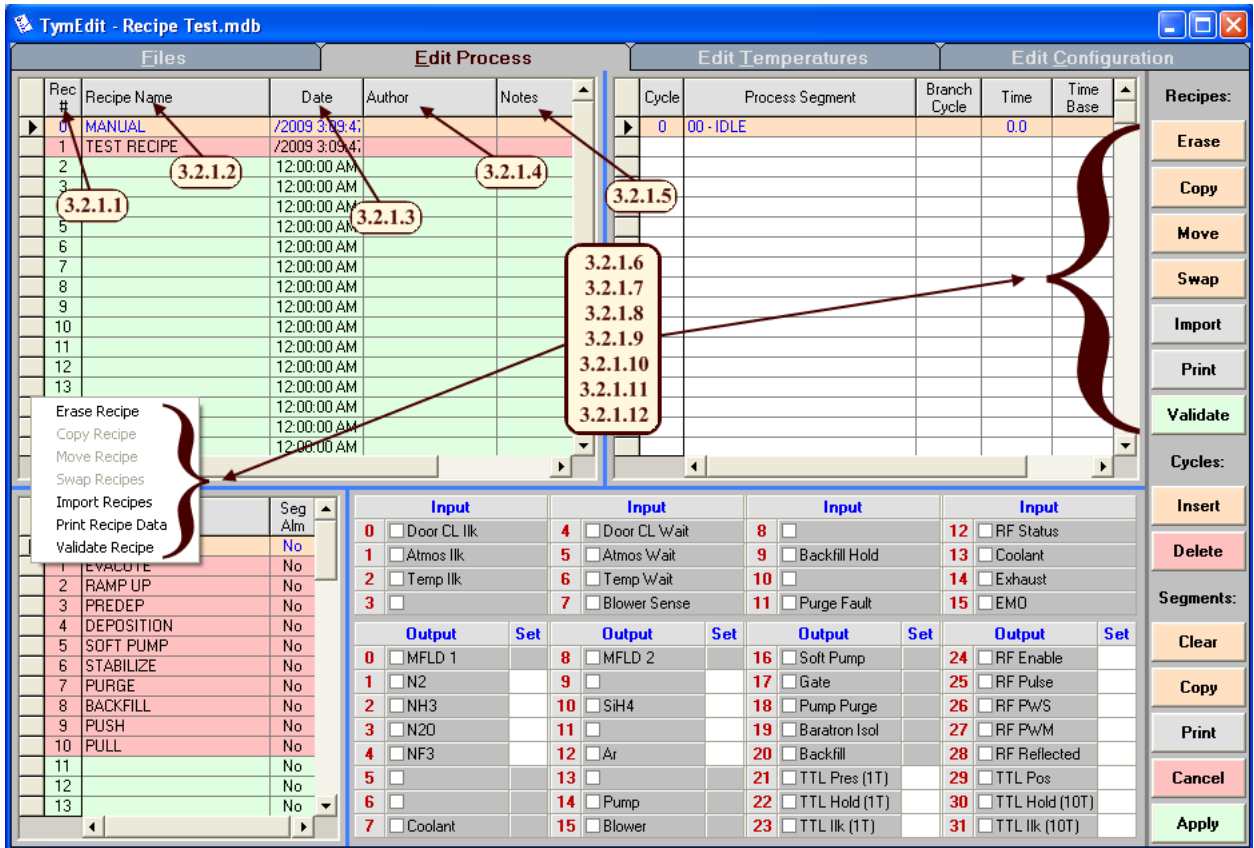
3.2.1.1. *Rec #* – This field displays the number of each of the 32 recipes. The vertical scroll bar to the right of the Recipe List can be used to reveal the recipes that are not visible.

3.2.1.2. *Recipe Name* – This field allows each recipe to be named. This information is not displayed on the *Tymkon* but is available in *TymPlex* after a successful download. This field is limited to 256 characters.

3.2.1.3. *Date* – This field is automatically filled in when a recipe is edited. It lists the date and time when that recipe was last edited.

3.2.1.4. *Author* – This field allows each recipe to have a user name associated with the recipe. This field is limited to 256 characters.

3.2.1.5. *Notes* – This field allows the user to save comments about each recipe. This field is limited to 65,535 characters.

Note: To access the commands described in the following statements, first left click on a particular recipe. Then, left click the appropriate command button on the right. Alternately, after the recipe is selected, right click on the record selector to the left of the Rec # field and left click on the appropriate action.

3.2.1.6. *Erase [Recipe]* – This command erases the selected recipe.

Warning: When a recipe is erased, any previously un-saved data in the recipe will be lost and cannot be recovered. It is suggested that you save your work before erasing a recipe.

3.2.1.7. *Copy [Recipe]* – This command erases the recipe that was selected second and overwrites it with the recipe that was selected first.

Warning: When a recipe is copied, any previously un-saved data in the target recipe will be lost and cannot be recovered. It is suggested that you save your work before copying a recipe.

3.2.1.8. *Move [Recipe]* – This command moves the recipe that was selected first to the location of the recipe that was selected second. It also moves any recipes between the two selected recipes to fill the gap created by the move. Any affected 'Branch to Recipe' Auxiliary Commands are automatically renumbered to reflect the new locations.

3.2.1.9. *Swap [Recipes]* – This command swaps the two selected recipes. Any affected 'Branch to Recipe' Auxiliary Commands are automatically renumbered to reflect the new locations.

3.2.1.10. *Import [Recipes]* – This command is not available for general use.

3.2.1.11. *Print [Recipe]* – This command prints recipe details. If recipe data has changed since the last time it was saved, the user will be asked to confirm that they want to print the modified data. It then asks if the user wants to print all of the recipes or just the selected recipes. A standard 'Page Setup' Dialog window is displayed and the Print Preview tab becomes visible.

3.2.1.12. *Validate [Recipe]* – This command essentially 'cleans up' the recipe details:
- Superfluous time and temperature set points are removed from any cycles that reference an Auxiliary Command instead of a Process Segment.
- The Time field of Cycle 0 is cleared since Cycle 0 is not timed.
- The Time field in the Count-up cycle at the end of the recipe is cleared.
- Additional Data validation is performed. (Most user-entered data is validated as it is entered.)
- The total time of the recipe is calculated and displayed.

3.2.2. Recipe Details

The Recipe Details area displays information pertaining to a single cycle.
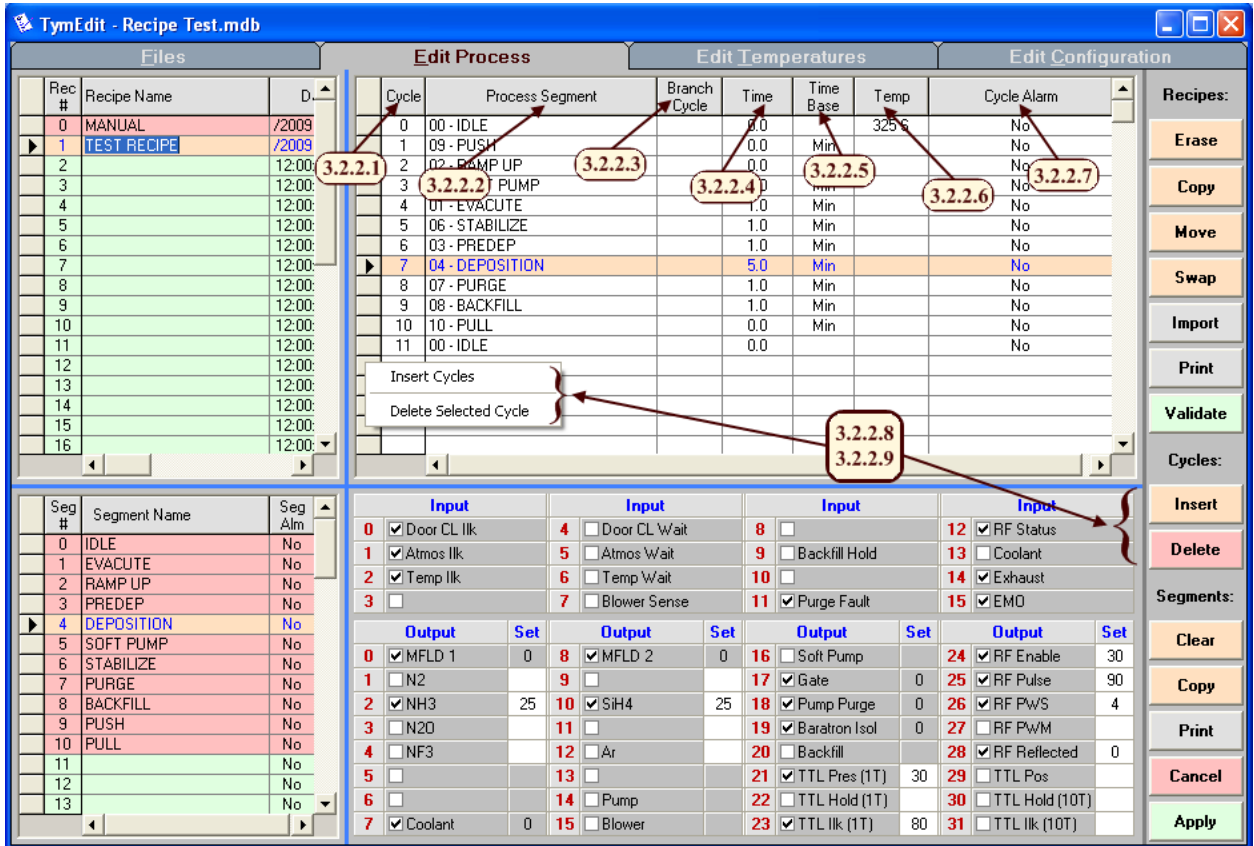
3.2.2.1. *Cycle Number* – This field displays the number of each cycle in the displayed recipe.

3.2.2.2. *Processes Segment* – This field allows each cycle to have a Process Segment associated with it. While Process Segments 0 through 63 are programmed in the Process Segment table, Process Segments 64 through 99 represent Auxiliary Commands. (See 3.2.3. Process Segment List for details on user-defined Process Segments or see the *Tymkon Manual* for details on Auxiliary Commands.)

3.2.2.3. *Branch Cycle* – This field allows each cycle to branch to another cycle within the same recipe whenever an Interlock Branch occurs or when an Auxiliary Command causes a branch. This field is also used with other Auxiliary Commands that require a parameter.

3.2.2.4. *Time* – This field allows the minimum cycle time to be set. Cycles can take longer if one or more wait inputs are enabled. Cycles with no time specified immediately progress to the next cycle unless one or more wait inputs are enabled. Cycle times range from 0.0 to 999.9 with a resolution of 0.1 minutes or seconds.

3.2.2.5. *Time Base* – This field allows the time base to be selected. Either minutes or seconds can be selected.

3.2.2.6. *Temperature* – This field allows the desired temperature to be programmed. If the entered value is greater than 31, it will be treated as the setpoint for all installed furnace zones. If the temperature controllers are configured with dual thermocouples, a 'P' (Process) or 'S' (Spike) in this field determines which thermocouples are used for PID control.

If the entered value is less than 32, it will be treated as a link to an entry in the Temperature Segment Table. Please refer to Section 3.3. Edit Temperatures for more information on temperatures.

3.2.2.7. *Cycle Alarm* – This field determines whether the cycle initiates an audible alarm.

Note: To access the commands described in the following statements, first left click on a particular cycle. Then, left click the appropriate command button on the right. Alternately, after the cycle is selected, right click on the record selector to the left of the Cycle field and left click on the appropriate action.

3.2.2.8. *Insert [Cycles]* – Opens a dialog box that asks for the quantity of cycles to be inserted. The new cycles will be inserted before the selected cycle.

3.2.2.9. *Delete [Selected Cycle]* – This deletes all information related to the selected cycle.

Warning: When a cycle is deleted, any previously un-saved data in that cycle will be lost and cannot be recovered. It is suggested that you save your work before deleting a cycle.

3.2.3. Process Segment List

The Process Segment List displays the Process Segments in ascending order from 0 through 63. There are 61 user defined segments and three pre-named segments: Idle (Segment 0), Manual (Segment 62) and Abort (Segment 63). For more information about the segments, please refer to the *Tymkon* Manual.
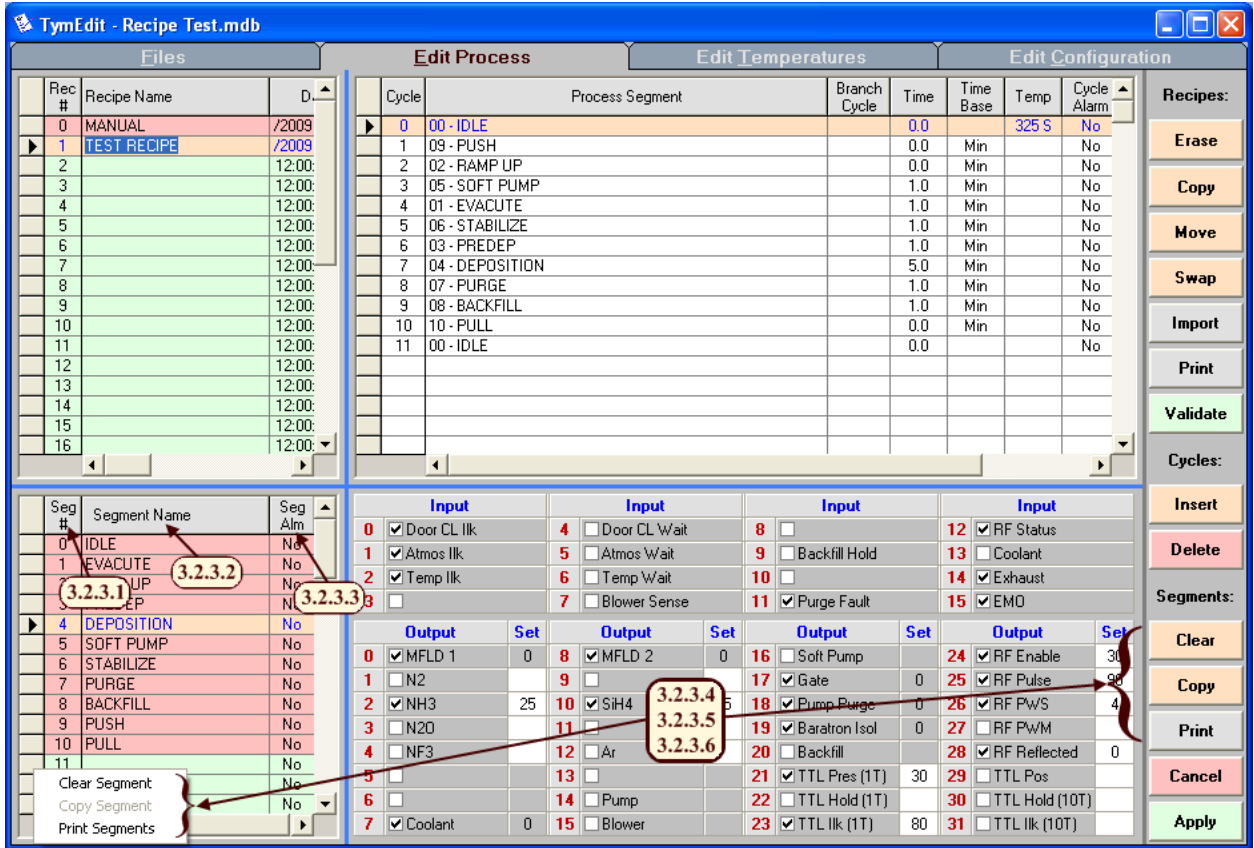
3.2.3.1. *Segment Number* – This field displays the number of each segment. Process Segment numbers range from 0 to 63. The vertical scroll bar to the right of the Process Segment List can be used to reveal the segments that are not visible.

3.2.3.2. *Segment Name* – This field allows each segment to be assigned an optional name. The first 8-characters of a Process Segment's name is displayed on the *Tymkon* front panel any time that particular Process Segment is active. In addition, the first 16 to 20 characters of the Segments used in a particular Recipe are displayed in *TymPlex* when a particular Recipe is selected.

Note: This field may contain up to 255 characters, but the user should restrict Segment Names to 16 to 20 characters for display purposes.

3.2.3.3. *Segment Alarm* – This field sets whether the segment will automatically cause an audible alarm. As described in the Tymkon Manual, the Process Segment Alarm sounds whenever the particular Process Segment is active. This type of alarm is used to alert the operator to some condition that may need attention.

Note: To access the commands described in the following statements, first left click on a particular Process Segment. Then, left click the appropriate command button on the right. Alternately, after the segment is selected, right click on the record selector to the left of the Seg # field and left click on the appropriate action.

3.2.3.4. *Clear [Segment]* – This command erases the details of the selected Process Segment, but not it's name. The change can be made permanent by clicking the "Apply" button in the right margin or the segment can be restored by clicking the "Cancel" button in the right margin.

Warning: When a segment is erased, any previously un-saved data in the target segment will be lost and cannot be recovered. It is suggested that you save your work before erasing a segment.

3.2.3.5. *Copy [Segment]* – This command erases the second selected segment and overwrites it with the first selected segment.

Warning: When a segment is copied, any previously un-saved data in the target segment will be lost and cannot be recovered. It is suggested that you save your work before copying a segment.

3.2.3.6. *Print [Segments]* – This command prints the segment data. If any segment data has changed since the last time the file was saved, the user is asked to confirm that they want to print the modified data. A standard 'Page Setup' Dialog window is displayed and the Print Preview tab becomes visible.

3.2.4. Process Segment Details

The Process Segment Details area displays information pertaining to an individual Process Segment. This includes which digital inputs are to be monitored and which outputs are to be energized as well as setting any analog set points. For more information about inputs and outputs, please refer to the *Tymkon* Manual.
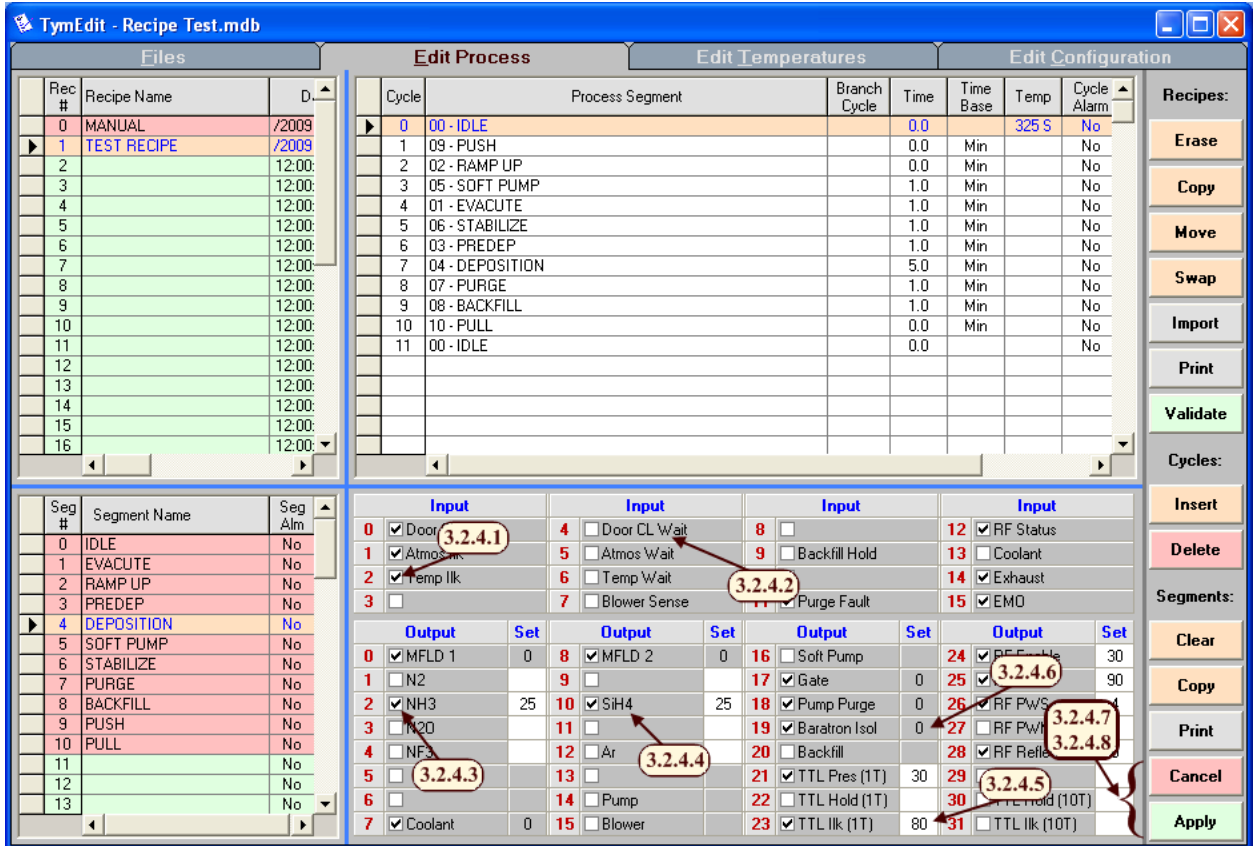
The upper portion of the Process Segment Details area displays an entry for each Digital Input as identified by a number ranging from 0 to 15.

3.2.4.1. *Input Enable* – This check box indicates whether the input is monitored in this particular Process Segment. If the input is monitored and unsafe, the LED on the *Tymkon* front panel flashes The *Tymkon's* behavior in response to the unsafe input depends on whether the input is configured as an Alarm, Interlock, Wait or Hold input.

3.2.4.2. *Input Name* – This field displays the input name (if any). Input names should already be set in the template file supplied by the manufacturer.

The lower portion of the Process Segment Details area displays an entry for each Output as identified by a number ranging from 0 to 31.

3.2.4.3. *Output Enable* – This check box indicates whether the output is energized in this particular Process Segment. If the Output is mapped to a digital On/Off signal, the check box controls the digital signal. If the Output is mapped to an analog output, the check box enables or disables the analog output.

3.2.4.4. *Output Name* – This field displays the output name (if any). Output names should already be set in the template file supplied by the manufacturer.

3.2.4.5. *Output Set point* (White boxes) – Output functions that are mapped to either an analog output and/or an analog input have a white box in which to enter an analog setpoint. This value must be an integer ranging from 0 to 99 (no decimal points allowed). An empty box is interpreted as the value '0'.

3.2.4.6. *Output Set point* (Gray boxes) – Output functions that are not mapped to an analog output or an analog input have a gray box next to the name. Values may be entered into gray boxes, but the *Tymkon* will ignore them.

3.2.4.7. *Cancel* – Undoes any recent changes to this Process Segment. If the user happens to change tabs or click on some area outside the Process Segment Details, any pending changes may be committed to the Process Segment data table and cannot be cancelled.

3.2.4.8. *Apply* – Saves all pending changes to the Process Segment data table. The changes can no longer be reversed after the Apply command has been executed.

Note: If the user changes tabs or clicks on some area outside the Process Segment Details, any pending changes may have already been committed to the Process Segment data table without ever specifically executing the Apply command. However, it is a best practice to always use the Apply command to insure that the changes are saved.
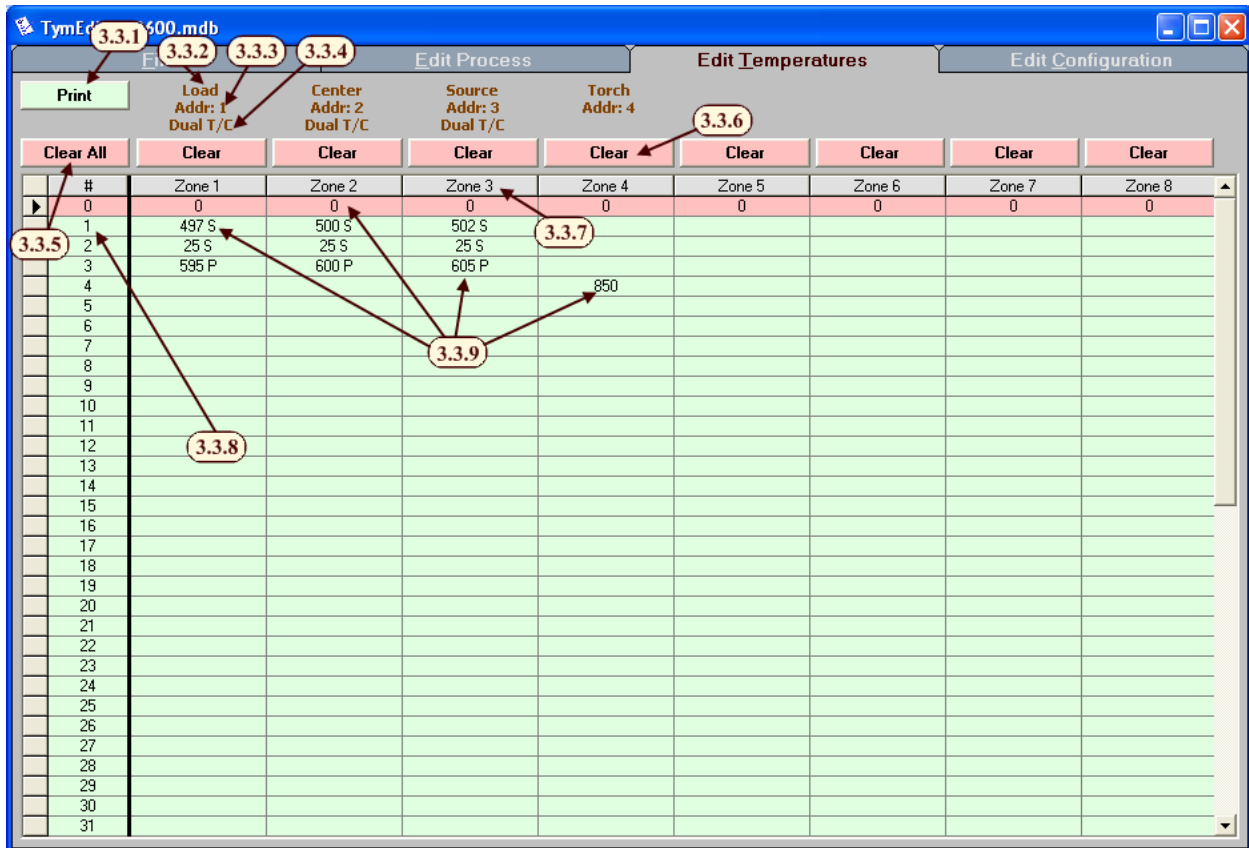
3.3. Edit Temperatures

The Edit Temperature screen allows up to 31 temperature segments to be programmed. Each segment can have a unique temperature set point for each zone and can specify whether the Spike or the Profile Thermocouple will be used for control. When a particular Temperature Segment is in use, the temperature set point will remain unchanged for any zone without a set point.

Note: Both the temperature controllers and the installed Tymkon must support dual thermocouples for the Spike/Profile feature to function. (See 3.4.3. Zones for more information about temperature control features.)

To use a Temperature Segment in a recipe, enter the number of the segment (0-31) in the Temperature field of a recipe cycle. Temperature Segment '0' is predefined to be all zero's and cannot be edited.

Note: By default some temperature controllers may not be programmed to accept the value '0' as a valid set point. Contact the temperature controller's representative for additional information.

3.3.1. *Print* – This command prints the Temperature Segment data. If any Temperature Segment data has changed since the last time the file was saved, it asks the user to confirm that they want to print the modified data. A standard 'Page Setup' Dialog window is displayed and the Print Preview tab becomes visible.

3.3.2. *Zone Name* – This field contains a name for each zone. The user can edit this field on the Edit Configuration/Zones tab.

3.3.3. *Device Address* – This field displays the Device Address of the temperature controller installed on each zone. This information is provided by the manufacturer. It should not be changed by the user.

3.3.4. *Dual T/C* – This field displays whether the temperature controller on each zone supports dual thermocouples. This information is provided by the manufacturer. It should not be changed by the user.

3.3.5. *Clear All* – This command clears all of the user-entered set points in the temperature table.

Warning: When the temperature segment data is deleted, any previously un-saved data is lost and cannot be recovered. It is suggested that you save your work before deleting the temperature segment data.

3.3.6. *Clear* – These commands clear all temperature set points in the column corresponding to a single zone.

Warning: When temperature segment data is deleted, any previously un-saved data is lost and cannot be recovered. It is suggested that you save your work before deleting any temperature segment data.

3.3.7. *Zone Number* – This field identifies each zone. It cannot be edited by the user.

3.3.8. *Temperature Segment Index* – This field displays the number of each Temperature Segment. Temperature Segment numbers range from 0 to 31. (See 3.2.2. Recipe Details for more information about using Temperatures Segments in a recipe)

3.3.9. *Temperature Set Point* – These fields indicate the individual Temperature Set Point per zone per index. Each value can range from 0 to 1350. An 'S' or 'P' can be entered before or after the value to select the Spike or Profile thermocouple on those zones where Dual T/C's are supported.

Note: Either the Tymkon firmware or the temperature controllers may further restrict the allowable set point range.

3.4. Edit Configuration

This collection of screens displays configuration data associated with the Tymkon for which this file is intended. Either the manufacturer or the equipment installer usually provides this information. The average user may wish to view these screens for informational purposes, but has no need to edit them.

3.4.1. Outputs

The Output screen displays the hardware configuration for the outputs on the *Tymkon*.

3.4.1.1. *Output Number* – This field displays the number of each output as it appears on the *Tymkon* front panel and on *TymPlex* screens. These numbers usually do not match the numbers of the solenoids or MFC's on the gas tray.

3.4.1.2. *Output Name* – This field displays the name for each output. The name is displayed in *TymPlex* after a successful download.

3.4.1.3. *Output Abbreviation* – This field displays a shorter version of the output name for use on the *Tymkon* front panel insert. In most cases, the *Output Abbreviation* is the same as the *Output Name*.

3.4.1.4. *Delay* – This field displays the debounce time that must elapse before the output is declared bad. The value is in seconds.

3.4.1.5. *Range* – This field displays the guard band of acceptable values. An output is bad, if the analog input differs from the set point by more than the *Range* value.

3.4.1.6. *Scale* – This field displays the full-scale value of this parameter in engineering units (Ex: 500 sccm).

Note: This field is provided for information only. It may be used in future versions of the software for scale calculations.

3.4.1.7. *Output Functions Definitions* – This area displays information about the selected output:
   a. Bit 7– Analog Input: Displays whether there is an analog input associated with the output function.
   b. Bit 6 – Analog Output: Displays whether there is an analog output associated with the output function.
   c. Bits 5, 4 and 3 – Display Mode: Displays the format of the output function that will be displayed on the *Tymkon* front panel and on *TymPlex* screens.
   d. Bits 2, 1 and 0 – Ramp Rate: Displays the rate that the *Tymkon* will use to ramp changes on the analog output associated with this function.
   e. Bit 7 – Upper Limit: Displays whether the analog input associated with this function will be monitored for excessive values.
   f. Bit 6 – Lower Limit: Displays whether the analog input associated with this function will be monitored for low values.
   g. Bit 5 – Fn Exists: Displays whether the output function exists in this configuration and can be enabled.
   h. Bit 4 – Alarm Input: Displays whether the output function produces an audible alarm if the analog input falls outside the defined limits.
   i. Bit 3 – Interlock Input: Displays whether the output function produces an Interlock Fault alarm if the analog input falls outside the defined limits.
   j. Bit 2 – Wait Input: Displays whether the output function causes a *Wait* condition if the analog input falls outside the defined limits.
   k. Bit 1 – Hold Input: Displays whether the output function causes a *Hold* condition if the analog input falls outside the defined limits.
   l. Bit 0 – Stay: Displays whether the output function stays at the most recent analog set point when the function turns off.

3.4.2. Inputs

The Input screen displays the hardware configuration for the inputs on the *Tymkon*.

3.4.2.1. *Input Number* – This field displays the number of each input as it appears on the *Tymkon* front panel and on *TymPlex* screens. These numbers usually do not match the numbers of the sensors or switches on the gas tray.

3.4.2.2. *Input Name* – This field displays the name for each input. The name is displayed in *TymPlex* after a successful download.

3.4.2.3. *Input Abbreviation* – This field displays a shorter version of the input name for use on the *Tymkon* front panel insert. In most cases, the *Input Abbreviation* is the same as the *Input Name*.

3.4.2.4. *Delay* – This field displays the debounce time that must elapse before the input is declared bad. The value is in tenths of seconds.

3.4.2.5. *Input Functions Definitions* – This area displays information about the selected input:
   a. Bit 7 – Unused: Does not affect the behavior of the *Tymkon*.
   b. Bit 6 – Unused: Does not affect the behavior of the *Tymkon*.
   c. Bit 5 – Fn Exists: Displays whether the input function exists in this configuration and can be enabled.
   d. Bit 4 – Alarm Input: Displays whether the input produces an audible alarm when it fails.

e. Bit 3 – Interlock Input: Displays whether the input produces an Interlock Fault when it fails.

f. Bit 2 – Wait Input: Displays whether the input causes a *Wait* condition when it fails.

g. Bit 1 – Hold Input: Displays whether the input causes a *Hold* condition when it fails.

h. Bit 0 – Unused: Does not affect the behavior of the *Tymkon.*

3.4.3. Zones

The Zones screen displays configuration data for the temperature control zones supported by the *Tymkon.*

3.4.3.1. *Zone Name* * – This field contains short names that identify the control zones on various *TymPlex* screens. Appropriate *Zone Names* include "Source", "Center", "Handle", "Flange", "Zone 1" or anything that is consistent with the user's conventions.

3.4.3.2. *Zone Address* ** – This field contains the device address that the Tymkon will use when communicating with this zone. The device address of the corresponding temperature controller must match this address. Most temperature controllers require device addresses in the range of "1" to "32", but in some models a setting of "0" is also acceptable.

3.4.3.3. *Enabled Zones* ** – This series of checkboxes displays which of 8 possible zones this Tymkon configuration supports.

3.4.3.4. *Furnace Zones* ** – This series of checkboxes displays which of those enabled zones (see *Enabled Zones* above) are connected to temperature controllers that control the main furnace heating elements. Any set point that is programmed in the "Temp" field of a Cycle will not be sent to zones that are not specified as *Furnace Zones*.

3.4.3.5. *Aux Zones* ** – This series of checkboxes displays which of those enabled zones (see *Enabled Zones* above) are connected to the temperature controllers that control peripheral equipment (Water Bubblers, Cooling Flanges etc). This field is used to allow different temperature guard-bands on peripheral equipment.

3.4.3.6. *Ramped Zones* ** – This series of checkboxes displays which of those enabled zones (see *Enabled Zones* above) should have their set points ramped during temperature changes. If not checked, temperature set-point changes are instantaneous.

3.4.3.7. *Zones Monitored for Interlock* ** – This series of checkboxes displays which of those enabled zones (see *Enabled Zones* above) are monitored for temperature deviation. The guard-bands for these tests are displayed in the Interlock Range settings below. The status of the temperature deviation test is usually displayed on one or more Tymkon Digital Inputs labeled something like "Temp Wait" or "Temp Ilk".

3.4.3.8. *Primary Zone* ** – This field is largely obsolete. The main screen of earlier versions of *TymPlex* displayed a single temperature Set-point/Actual field. In those versions, the zone that was marked as the Primary Zone displayed in that field.

3.4.3.9. *Allow Dual T/C Zones* ** – This series of checkboxes displays which of those enabled zones (see *Enabled Zones* above) are connected to temperature controllers that support two thermocouple inputs.

3.4.3.10. *Allow Polarity* ** – This field is no longer supported. It was used on older Tymkons that used an analog millivolt signal to control temperature.

3.4.3.11. *Output Power Maps to Function* ** – This field displays which Tymkon Output Function is used to display and graph the output power of the corresponding zone.

3.4.3.12. *Thermocouple 1* * – This field contains a short name that identifies the thermocouple connected to the first analog input on the temperature controller. An appropriate Thermocouple 1 name would be "Spike" or anything that is consistent with the user's conventions.

3.4.3.13. *Thermocouple 2* * – This field contains a short name that identifies the thermocouple connected to the second analog input on the temperature controller. An appropriate Thermocouple 2 name might be "Profile", "Process", "In-situ" or anything that is consistent with the user's conventions.

3.4.3.14. *Maximum Temperature* ** – This setting displays the maximum set point the *Tymkon* will send to any zone. Note that most temperature controllers also

have a "Maximum Set-point" parameter that may further restrict the range of acceptable set-point values.

3.4.3.15. *Interlock Range not Ramping* ** – This setting displays the temperature guard-band of those zones that are marked as "*Zones Monitored for Interlock*". The setting in this field applies during those cycles in which the temperature is not being ramped. Temperatures outside this range will cause any Digital Inputs that are configured as "Temperature Interlock" to fail.

3.4.3.16. *Interlock Range during Ramping* ** – This setting displays the temperature guard-band of those zones that are marked as "*Zones Monitored for Interlock*". The setting in this field applies during those cycles in which the temperature is being ramped from one set point to another. Temperatures outside this range will cause any Digital Inputs that are configured as "Temperature Interlock" to fail.

3.4.3.17. *Temperature Wait Range* ** – This setting displays the temperature guard-band of those zones that are marked as "*Zones Monitored for Interlock*". The setting in this field applies whether the temperature is being ramped or not. Temperatures outside this range will cause any Digital Inputs that are configured as "Temperature Wait" to fail.

3.4.3.18. *Temperature Aux Range* ** – This setting displays the temperature guard-band of those zones that are marked as "*Aux Zones*". The setting in this field applies whether the temperature is being ramped or not. Temperatures outside this range will cause any Digital Inputs that are configured as "Aux Temp Wait" or "Aux Temp Ilk" to fail.

* The user may edit these fields while Advanced Editing is enabled. Changes will appear on the TymPlex screens when the file is next downloaded. These fields may include up to 255 upper or lower case characters, numerals or punctuation marks, but their lengths should be restricted to 10 or 12 characters to remain completely visible in *TymPlex*.

** The manufacturer provides a template file that contains the settings for these fields for a particular Tymkon configuration. This data is shown here for information purposes only. Any changes that the user makes to this data will not affect the behavior of the Tymkon unless the Tymkon firmware is also changed.

3.4.4. Tymkon Settings

The *Tymkon Settings* screen allows the user to view additional configuration data for the *Tymkon* and for *TymPlex*. Miscellaneous information that does not apply to Outputs, Inputs or Zones is presented on this screen. Buttons located here are also used to prepare and print new *Tymkon* front panel inserts.
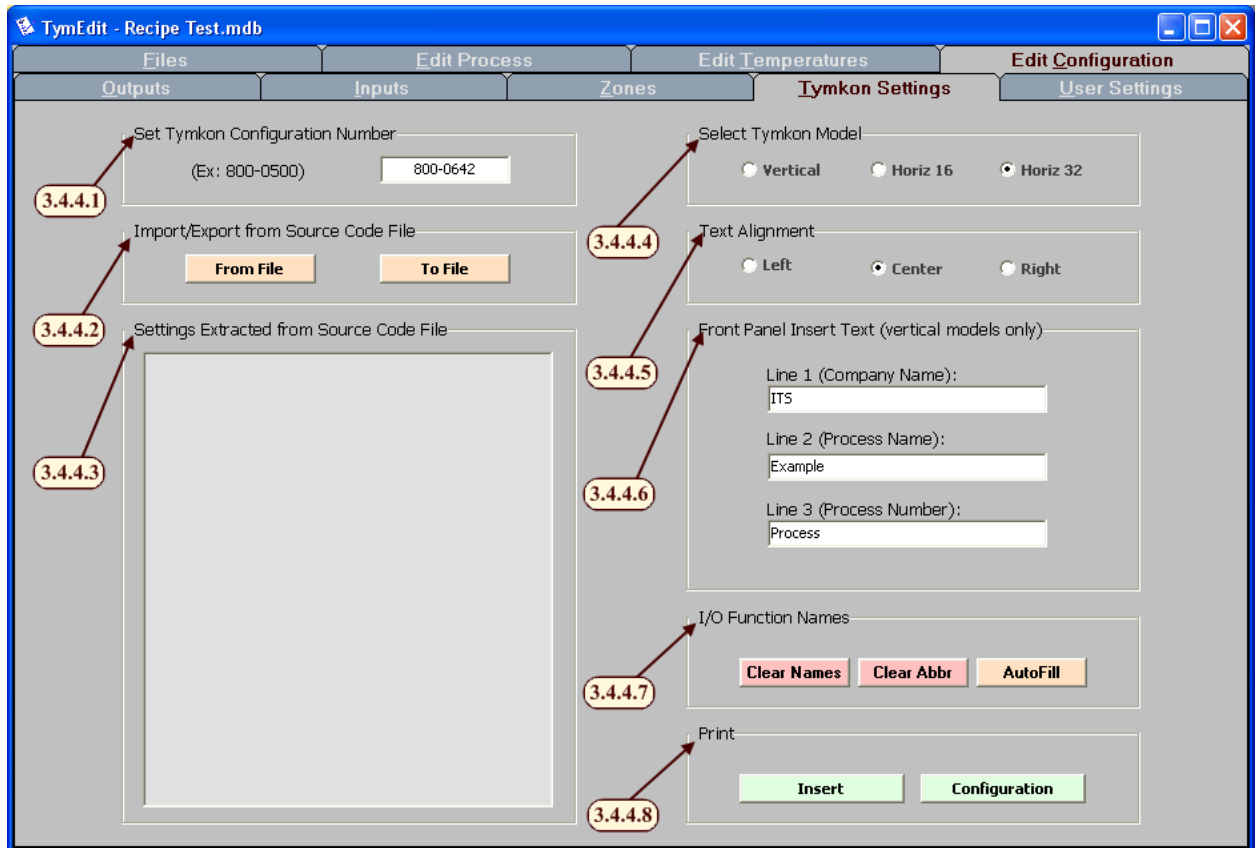
3.4.4.1. *Set Tymkon Configuration Number* – This area displays the configuration number of the *Tymkon* for which this file is intended. When this file, or any of its copies, is downloaded to a Tymkon, this number is compared with the configuration number reported by the Tymkon.

3.4.4.2. *Import/Export from Source Code File* – This area is not useful to most users. It allows the manufacturer to extract specific hardware configuration data from the *Tymkon* source code file.

3.4.4.3. *Settings Extracted from Source Code File* – This area is also not useful to most users. It is part of the feature mentioned above.

3.4.4.4. *Select Tymkon Model* – This selection displays the type of *Tymkon* that the recipe file is intended for.

3.4.4.5. *Text Alignment* – This selection determines whether abbreviations on new *Tymkon* inserts will be printed left, center or right justified.

3.4.4.6. *Front Panel Insert Text* – These fields display additional details that will be printed on the *Tymkon* insert. *(Note: This only applies to vertical models.)*

3.4.4.7. *I/O Functions Names* –The manufacturer uses these buttons to prepare front panel inserts. The *Clear Names* button erases any existing Input or Output names, the *Clear Abbr* button erases any existing Input or Output abbreviations and the *AutoFill* button copies all Input and Output names to the corresponding abbreviation fields where they may be further edited.

3.4.4.8. *Print/Insert* – This buttons prints a Tymkon front panel insert *Note: The Print/Configuration feature is not currently implemented.*

3.4.5. Under Settings

The User Settings screen allows the user to modify some of the behavior of the *TymEdit* application.
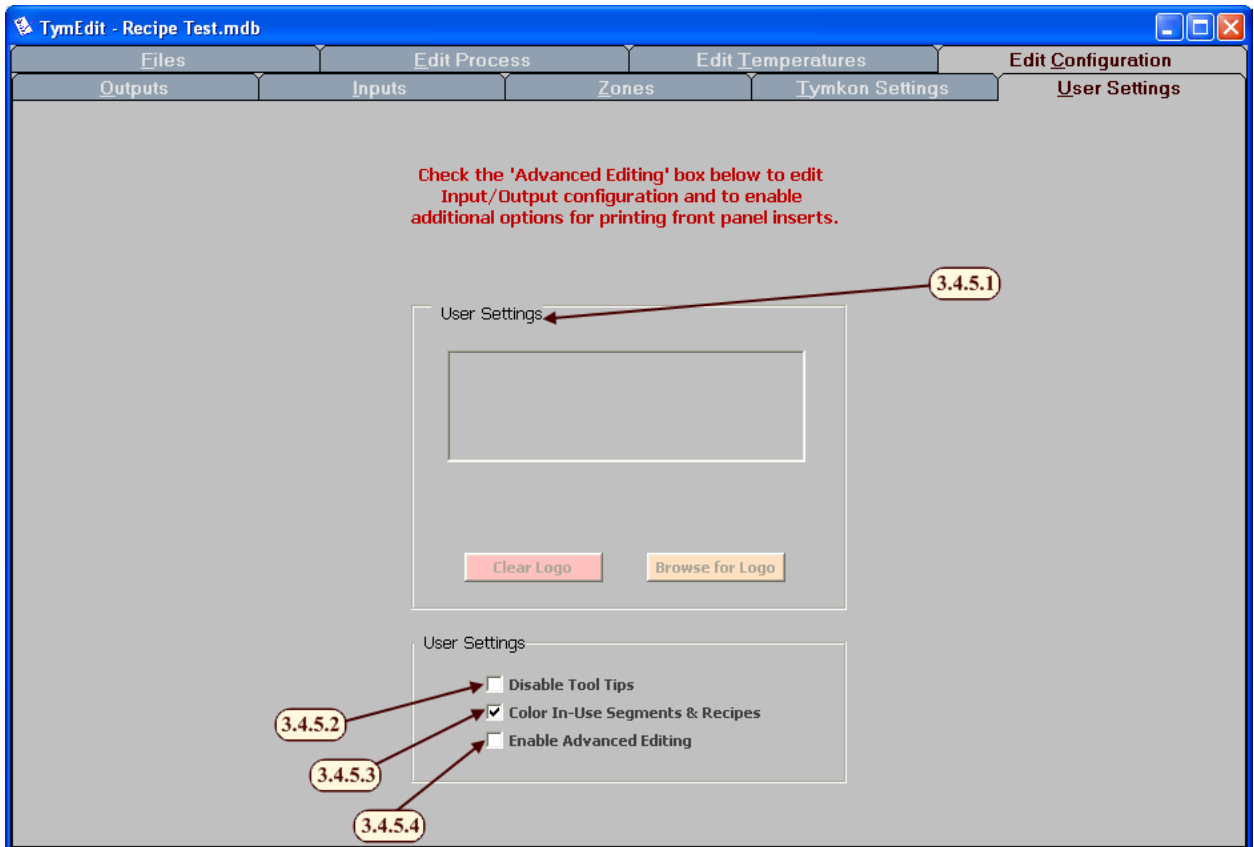
3.4.5.1. User Settings/*Logo* – This area enables an equipment installer to insert their logo on a vertical front panel insert. (Please refer to Section 4. Additional Features Related to Advanced Editing Mode for more information.)

3.4.5.2. *Disable Tool Tips* – This checkbox enables or disables Tool Tips. A Tool Tip may appear when the mouse hovers over a button, field or other object in the program.

3.4.5.3. *Color In-Use Segments* – This checkbox enables the green and red coloring on the *Edit Process* and *Edit Temperatures* screens. A green field indicates the item is not yet used and red indicates the item is already in use one or more times.

3.4.5.4. *Enable Advanced Editing* – This checkbox enables *Advanced Editing*. (See Section 4. Additional Features Related to Advanced Editing Mode).

3.5. Print Preview

The Print Preview screen appears when you attempt to print something. It allows you to preview the data before actually sending it to a printer.
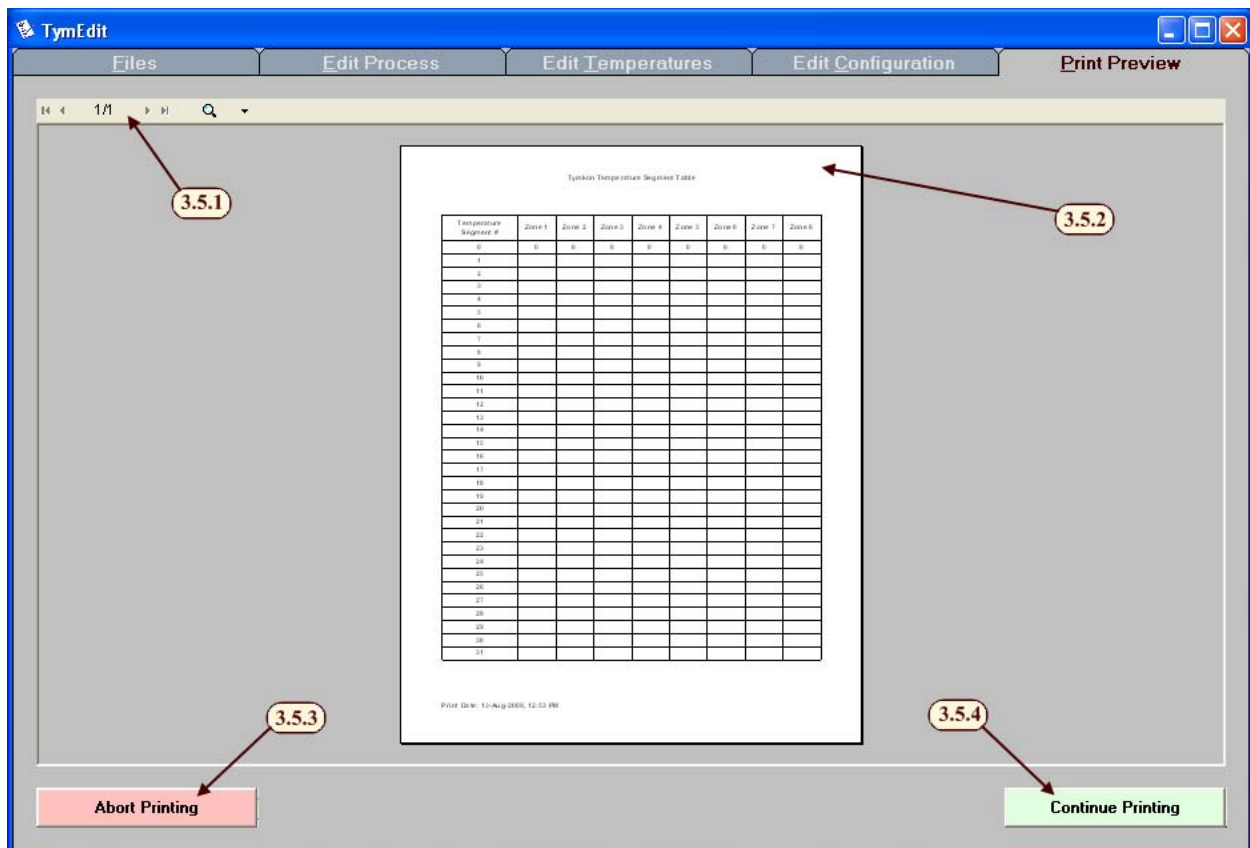
3.5.1. The toolbar along the top allows the user to zoom in on the preview as well as changing which page is being previewed.

3.5.2. The print preview area shows the user what will be printed if the Continue Printing command is pressed.

3.5.3. *Abort Printing* – This button cancels the preview and hides the *Print Preview* screen.

3.5.4. *Continue Printing* – This button causes the document to print.
Note: If the user wishes to select a printer other than the default printer, that must be done before the print preview screen is displayed. When the user first hits a print button the Page Setup dialog opens. The lower right button, Printer…, allows the user to select a printer. The OK button then brings up the Print Preview Tab.

4. ADDITIONAL FEATURES RELATED TO ADVANCED EDITING MODE

The manufacturer supplies an initial template file for each Tymkon configuration. This file contains a complete set of configuration data, but no process details. The configuration data is for information purposes and screen display formatting only. For safety reasons, editing the configuration data in a recipe file does not change the behavior of the *Tymkon*. This information helps the *Tic-Talk* applications know the parameters of the *Tymkon's* they are talking to as well as allow the user to see these values.

Note: On occasion, an equipment installer will provide an enhanced template file that also contains some simple test recipes or sample process recipes.

Having said that, there may be occasions where the user needs to alter the name of a gas channel or temperature zone. For those occasions, an Advanced Editing Mode is provided to allow the user access to those parameters. When Advanced Editing Mode is enabled, the user may edit the configuration data that is associated with the Tymkon Configuration for which the recipe file is intended. To reduce screen clutter, *Advanced Editing Mode* is disabled by default. To enable Advanced Editing Mode, (See 3.4.5. Ụser Settings). The following section describes some of the additional features that are activated in *Advanced Editing Mode.*

4.1. Customizing Front Panel Inserts

This allows equipment installers to print inserts with custom logos. *(Note: This feature is only useful on vertical Tymkon models. Horizontal Tymkons do not provide an area on the insert for custom logos.)*
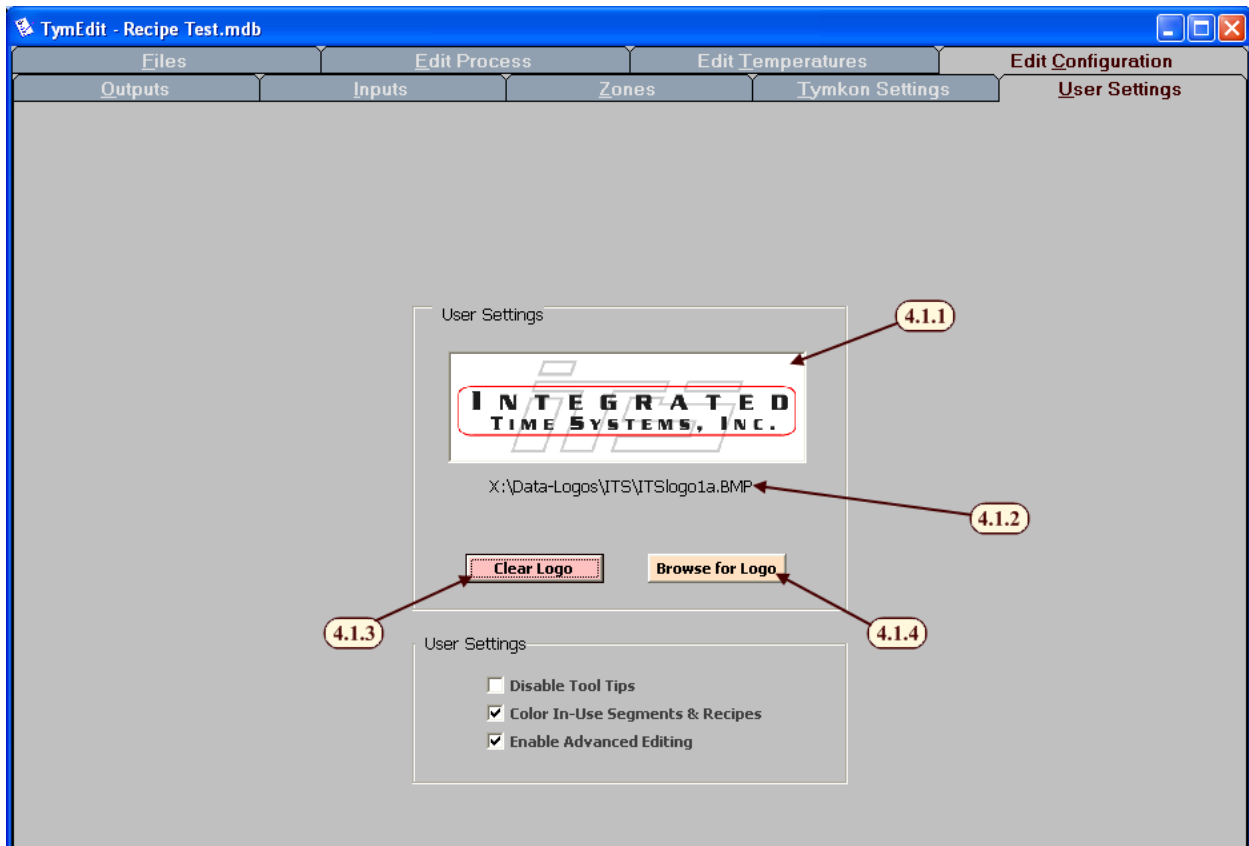
4.1.1. *Logo* – This area displays the currently loaded logo. The logo is used when printing *Tymkon* inserts.

4.1.2. This field displays the file path for the currently loaded logo.

4.1.3. *Clear Logo* – This button clears the currently loaded logo.

Note: Tymkon inserts will have a blank area where the logo would go if none were selected.

4.1.4. *Browse for Logo* – This button opens a dialog window that allows the user to browse for a logo for use on the Tymkon insert.

Note: Logos are limited to the following formats: bmp, jpg, ico, wmf, & emf.

4.2. Opening or Saving: Configuration Data or Process Data Only

With *Advanced Editing Mode* enabled, this screen has additional options to open and save Process Data and Recipe Data individually or together.
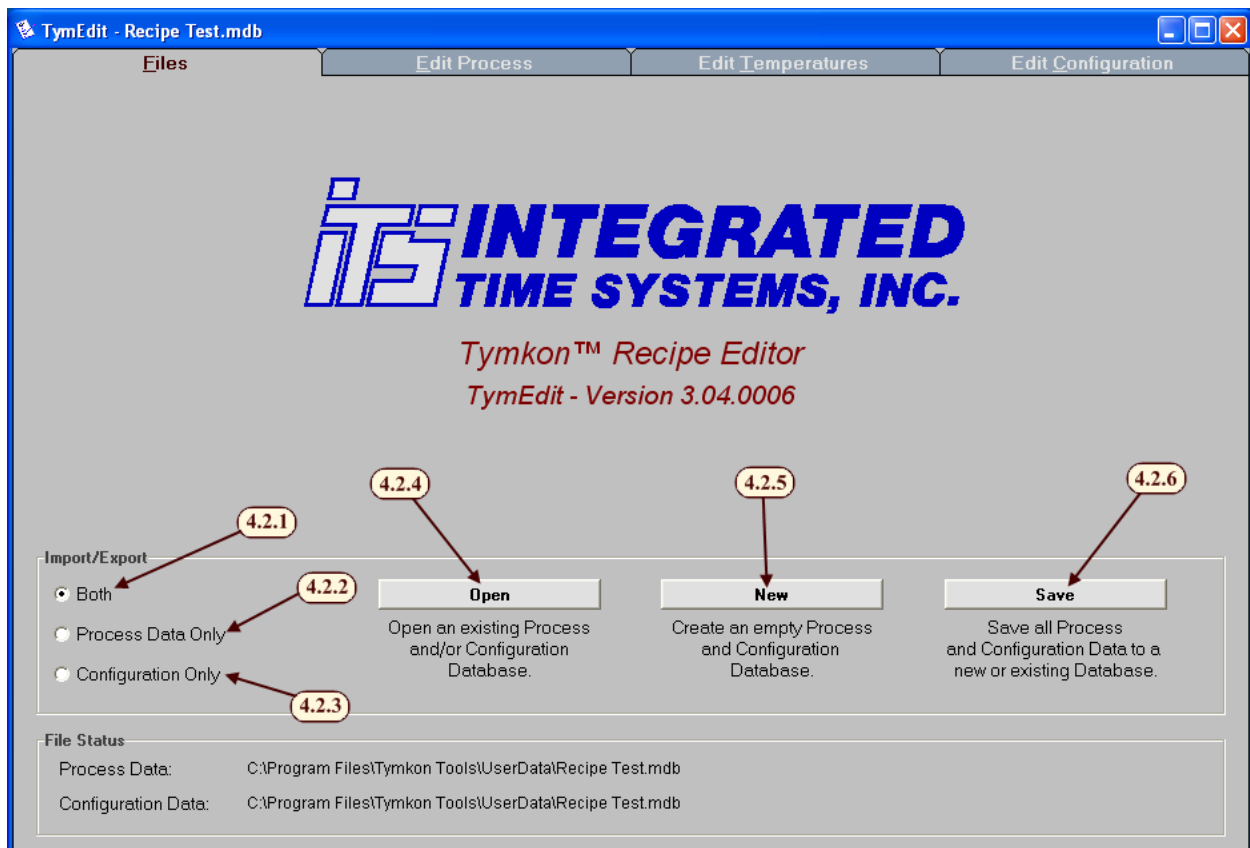
4.2.1. *Both* – This option allows the user to read from a file (Open), clear (New) or save to a file (Save) both the Process Data and the Configuration Data. (Same behavior as when Advanced Editing Mode is disabled.)

4.2.2. *Process Data Only* – This option allows the user to read from a file (Open) or clear (New) only the Process Data. The Configuration Data that was loaded remains unchanged.

4.2.3. *Configuration Only* – This option allows the user to read from a file (Open) or clear (New) only the Configuration Data. The Process Data will be left unmodified.

4.2.4. *Open* – This button displays a standard Windows 'File Open' dialog box. After the user has located the file they choose to edit, the software creates a copy of the file and makes the data available for editing. Because *Advanced Editing* is enabled, Process data, Configuration data or both are loaded. This is controlled by the selection in 4.2.1 to 4.2.3.

Warning: When a file is opened, any previously un-saved data will be lost and cannot be recovered. It is suggested that you save your previous work before opening a new file.

4.2.5. *New* – This button creates a blank file and makes it available for editing. Because *Advanced Editing* is enabled, Process data, Configuration data or both are cleared. This is controlled by the selection in 4.2.1 to 4.2.3.

Warning: When a new file is created, any previously un-saved data will be lost and cannot be recovered. It is suggested that you save your work before creating a new file.

4.2.6. *Save* – This button causes a standard Windows 'File Save' dialog box to appear. The user may choose to rename the file or save it on any accessible storage media (hard drive, memory stick, network drives etc). Once the file is saved, it may later be re-opened for additional editing or it may be downloaded to a *Tymkon* using *TymPlex*. Because *Advanced Editing* is enabled, Process data, Configuration data or both are saved. This is controlled by the selection in 4.2.1 to 4.2.3.

5. ADDITIONAL FEATURES RELATED TO TYMPRO

TymPro is an optional program that can be used with the other *Tic-Talk* applications. It introduces users with different access rights into *TymEdit*. This section outlines the changes to *TymEdit* once *TymPro* has been installed. In order for a user to be able to edit a recipe file or the configuration file, that user needs permission to Tool Setup.

5.1. Logging into TymPlex

When *TymPro* has been installed and user profiles have been set up, the Files screen changes slightly. For more details on *TymPro* and user permissions, please refer to the *TymPro* manual.
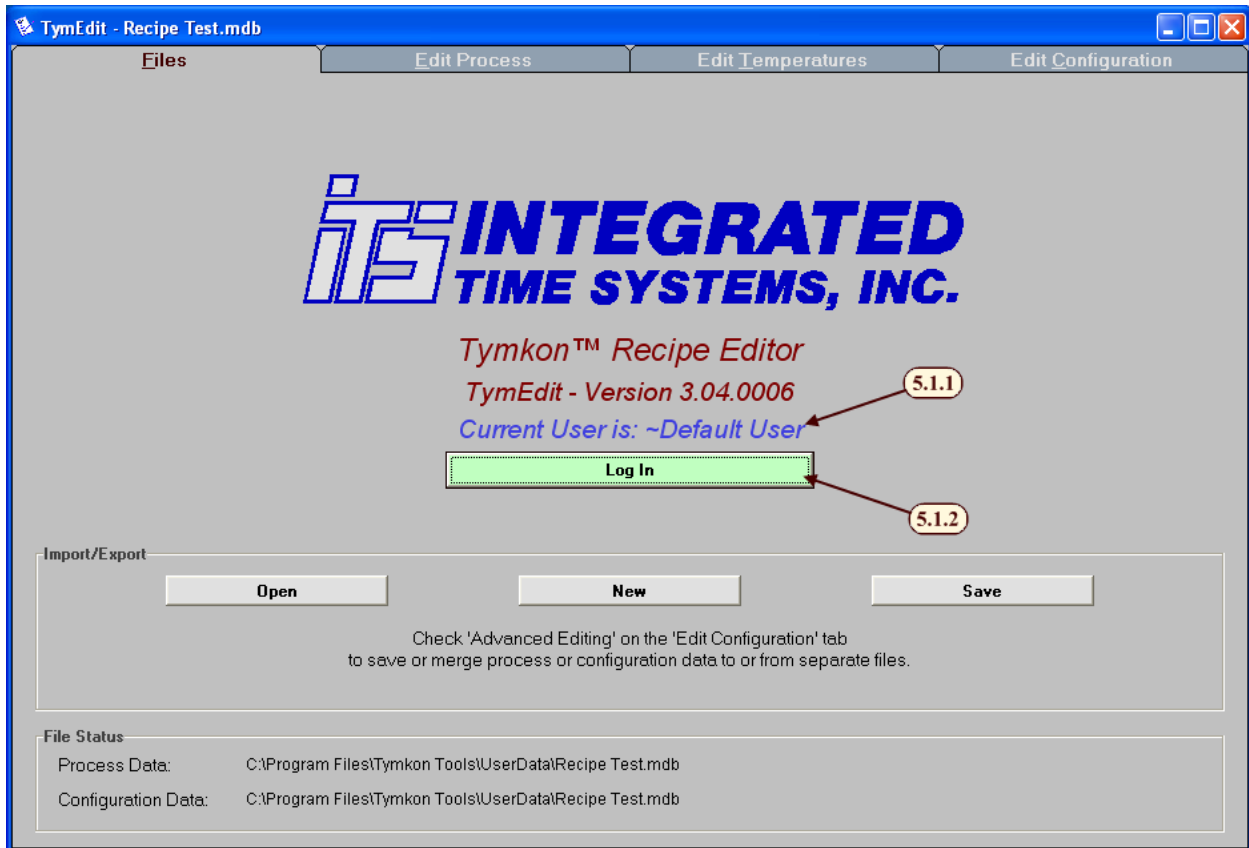
5.1.1. *Current User* – Displays the current users ID.

5.1.2. *Log In* – This button allows a user to log in using the User Login dialog box. If a user is already logged in, it allows the current user to change to a different user or to log out.

5.2. User Login Dialog Box

After the Log In button is pressed (See 5.1. Logging into TymPlex) the User Login Dialog Box appears. This allows the current user to log out or a new user to log in.
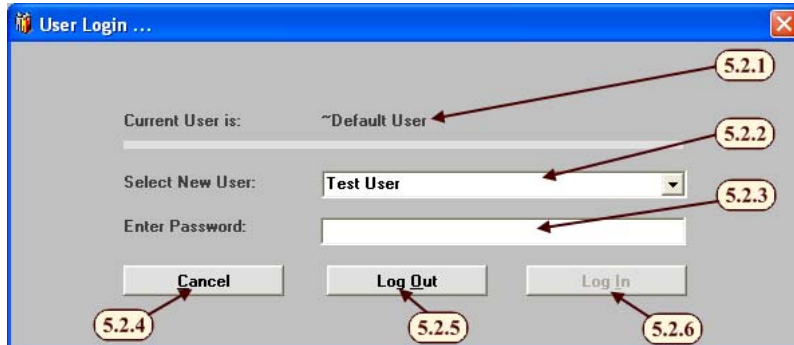
5.2.1. *Current User* – Displays the current users ID.

5.2.2. *Select New User* – This drop-down menu displays a list of all existing user ID's so a particular ID can be selected.

5.2.3. *Enter Password* – This field allows the user's password to be entered. It only appears after a user has been selected unless the ~Default User was selected.

5.2.4. *Cancel* – This command cancels the login operation. Leaves the current user logged in.

5.2.5. *Log Out* – This command logs out the current user and logs in as the ~Default User.

5.2.6. *Log In* – This command is attempts to log in the selected user with the password provided. If the password is incorrect, the user will be notified and then returned to the User Login Dialog Box. The Log in command is only enabled after a user is selected and a password is typed (since all users require a password).

6. TUTORIALS

These steps walk the user through creating a new recipe from start to finish. While it covers the mechanics of how to create a recipe, it does not explain in detail what all aspects of a recipe can do. For a more though description of any area, please refer to the *Tymkon* Manual.

6.1. Creating a new Recipe File from a Template File

A new recipe file may be created from the template file provided by the manufacturer. This can be accomplished by simply copying the file and renaming the copy as desired.

Alternately, a copy can be created from within TymEdit as follows:
1) Open the Files tab. (See 3.1)
2) Click Open and browse for the Template File. (See 3.1.2)
3) Click Save, browse to the location where you'd like to store the new recipe and enter a name for the new recipe file. (See 3.1.4)

In either case, the user now has a recipe file that is ready to have Process Data added to it.

6.2. Creating a new Recipe File from an existing Recipe File

A new recipe file may be created from an existing recipe file (assuming that the existing file already has correct configuration data). This is accomplished by opening the existing file and deleting the existing process data as follows:
1) Open the Edit Configurations tab (See 3.4)
2) Open the User Settings secondary tab (See 3.4.5)
3) Enable Advanced Editing Mode (See 3.4.5.4)
4) Open the Files tab (See 3.1)
5) Insure that *Both* is selected (See 4.2.1)
6) Click Open and browse for the existing recipe file. (See 4.2.4)
7) Select Process Data Only (See 4.2.2)
8) Click New (See 4.2.5)
9) Insure that *Both* is selected (See 4.2.1)
10) Click Save, browse to the location where you'd like to store the new recipe and enter a name for the new recipe file. (See 4.2.6)
11) Open the Edit Configurations tab (See 3.4)
12) Open the User Settings secondary tab (See 3.4.5)
13) Disable Advanced Editing Mode (See 3.4.5.4)

The user now has a recipe file that is ready to have Process Data added to it.

6.3. Importing new Configuration Data into an Existing Recipe File

These steps walk the user through importing a new configuration data template into an existing recipe file. This operation needs to be done if the user ever gets a new ROM and configuration file from the manufacturer in which the configuration has changed.

1) Open the Edit Configurations tab (See 3.4)
2) Open the User Settings secondary tab (See 3.4.5)
3) Enable Advanced Editing Mode (See 3.4.5.4)
4) Open the Files tab (See 3.1)
5) Insure that *Both* is selected (See 4.2.1)

6) Click Open and browse to the recipe file into which you wish to import the new configuration data. (See 4.2.4)
7) Select Configuration Only (See 4.2.3)
8) Click Open and browse for the file that contains the new configuration data. This file is usually provided by the manufacturer or the equipment installer. (See 4.2.4)
9) Insure that *Both* is selected (See 4.2.1)
10) Click Save and either overwrite the old recipe file or save the modified recipe file with a new name. (See 4.2.6)
11) Open the Edit Configurations tab (See 3.4)
12) Open the User Settings secondary tab (See 3.4.5)
13) Disable Advanced Editing Mode (See 3.4.5.4)

This newly saved file now contains all of the recipes from the old file and the new configuration data.

6.4. Creating a new Process Segment

These steps walk the user through creating a new Process Segment.
1) Open the Edit Process tab. (See 3.2)
2) In the Process Segment List, select an unused (green) Process Segment. (See 3.2.3)
3) Click in the *Segment Name* column and enter a name. (See 3.2.3.2)
4) If an audible alarm should be sounded whenever this segment is active, click in the *Seg Alm* column and select *Yes.* (See 3.2.3.3)
5) Check the Input check box for all inputs that should be monitored in this Process Segment. (See 3.2.4.1)
6) Check the Output check box for all outputs that should be energized in this Process Segment. (See 3.2.4.3)
7) If any those outputs require an Analog Setpoint, enter the value. (See 3.2.4.6)
8) Click the Apply button. (See 3.2.4.8)

Congratulations, you have just created your first process segment!

6.5. Creating a new Temperature Table Entry

These steps walk the user through creating a new Temperature Table Entry (Temperature Segment).
1) Open the Edit Temperatures tab. (See 3.3)
2) In the Temperature table, choose an unused (green) row. (See 3.3)
3) Enter a temperature value for any Zone that requires a setpoint when this Temperature Segment is active. (See 3.3.6) If any of the zones support dual thermocouples (See 3.3.2) type s to select the spike thermocouple, or type p to select the profile thermocouple.

Congratulations, your recipe file now contains at least one Temperature Segment entry.

6.6. Creating a new Recipe

These steps walk the user through creating a new recipe. This includes using Process Segments and Temperature Segments in a recipe. These steps are more meaningful if the user has already defined or at least provided names for a few Process Segments.
1) Open the Edit Process tab. (See 3.2)
2) From the Recipe List, select an unused (green) Recipe. (See 3.2.1)

3) Click in the Recipe Name column and enter an appropriate recipe name (example: "2K OXIDE" or "POCL3 DEP"). (See 3.2.1.2)
4) Click the *Insert* button under "Cycles:" to insert cycles into the selected recipe. (See 3.2.2.8)
5) Enter a value, maybe "10" or "20", to add enough cycles to develop the structure of the new recipe. The number of cycles can be refined later as the recipe develops.
6) In the Recipe Details area, you should now see the newly added cycles.
7) Choose a cycle to edit and click in the *Process Segment* column (See 3.2.2.2). Select a Process Segment from the drop-down list that appears (preferably one of the segments that you've named in a previous tutorial).
8) Click in the selected cycle's *Time* column and enter the cycle's duration. (See 3.2.2.4)
9) Click in the selected cycle's *Time Base* column and select Minutes or Seconds. (See 3.2.2.5)
10) Click in the selected cycle's *Temp* column (See 3.2.2.6) and enter the number of a Temperature Segment (See 3.3.5) (preferably one of the segments that you've edited in a previous tutorial). Note: If the value entered is greater than 31, the value will not refer to a Temperature Segment but will instead be treated as a temperature setpoint for all furnace zones.
11) Click the Validate Recipe button. (See 3.2.1.12)

Congratulations, you have just created your first simple recipe. At this point, it is advisable to save your work from the *Files* tab.

Notes regarding recipe structure: Cycle 0 is always present and is defined as the idle or stand-by cycle. If a recipe is selected, but a run is not started, Cycle 0 determines the stand-by behavior. The final cycle in any recipe with more than one cycle is called the count-up cycle. It determines the behavior after a run has completed (or aborted). The user must always allow for a count-up cycle at the end of a recipe whether or not the cycle will actually be used. Both the stand-by cycle and the count-up can be programmed like any other cycle.

APPENDIX A: - DATABASE STRUCTURE

Although *TymEdit* and the companion applications use Microsoft Access 97 file structures, the files may be opened and viewed in later versions of Microsoft Access or they may be queried from various database platforms using SQL (Structured Query Language). However, files that are altered using other database platforms may not be compatible with current versions of *TymEdit, TymPlex* and *TymPro.* Generally, the applications that are provided keep all of the details of the database tables hidden from the user and no database knowledge is required.

Each file created by *TymEdit* contains at least (38) different data tables but the user needs only to be aware that there are two types of information stored in the tables: **Process Data** and **Configuration Data**. A file containing the appropriate Configuration Data for a particular *Tymkon* configuration is provided with the original equipment. The user would then use a copy of this template file as a foundation on which to build process recipes.

The database files that *TymEdit* manages contain a data table for each of the (32) Recipes and for the Segment Table, the Temperature Table and for various configuration tables that support *Tymkon* operation. A list of the existing tables is as follows:

- Input Names
- Output Names
- Misc Settings
- Recipe Names
- Segment Table
- Temperature Table
- Recipe 0, Recipe 1 through Recipe 31