AccuMate for AccuLoad III

Smith Meter®
AccuLoad® III AccuMate

Installation / Operation Manual

FMC Technologies

Caution

The default or operating values used in this manual and in the program of the AccuLoad III are for factory testing only and should not be construed as default or operating values for your metering system. Each metering system is unique and each program parameter must be reviewed and programmed for that specific metering system application.

Disclaimer

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Product Description

AccuMate for AccuLoad III is a Windows application that facilitates configuration of the Smith Meter® AccuLoad III series of electronic presets. AccuMate allows the user to configure existing parameters, create custom reports, translate AccuLoad III interface text, and create custom equation sets.

AccuMate III supports context-sensitive help. Press "F1" from any location for detailed help on a particular feature, or select "Index" from the Help menu to browse the index.

AccuMate for AccuLoad III.net uses a wizard to configure new AccuLoad files. The wizard is a series of dialogs that guide the operator through the available options for each parameter. Once the appropriate parameters have been selected, the AccuMate will display only those portions of the program mode tree that are relevant to the selected type and mode.

A CRC table is maintained for each revision of AccuLoad III.net. When communication is established with a unit, the revision is examined. Any discrepancies, such as an unknown revision or a type mismatch, are reported to the operator.

AccuMate is an MDI (Multiple Document Interface) standard application, enabling the user to work with several files simultaneously. In the context of the AccuMate, a "file" is the data associated with one AccuLoad III. When multiple files are open, the currently active window is the one that will be affected by menu choices and tool bar options.

Modes of Operation

Offline Mode

In the Offline mode of operation, the AccuMate can be used to completely set up a data file or edit an existing file. This file can then be saved for future use. By switching to Online mode, the file can be downloaded to the AccuLoad.

Read Only Mode

Read Only mode is used to read information from the AccuMate. The program may enter the Read Only mode for one of several reasons, including insufficient security access, transaction in progress, already in program mode at keypad, or an incorrectly programmed communications port control. An error message will appear. If the operator clicks "OK" and presses "ENTER" on the computer keyboard, the AccuMate will automatically go into the Read Only mode and no data will be exchanged.

Online Mode

The Online mode of operation requires that either the AccuLoad III and the AccuMate's communications port are configured with the same baud rate, parity, protocol, and address or the Ethernet port is configured properly. In addition, a file must be created for each AccuLoad with which the AccuMate is to communicate. A file is created by selecting "File" in the upper left-hand corner of the AccuMate's tool bar, then selecting "New," then "AccuLoad III Data File."

Once the setup is complete, communications can be established and information can be passed between the AccuMate and the AccuLoad III.

When in the Online mode, the AccuMate can be used to configure the AccuLoad III, read information from the AccuLoad, and dump directories or entire files to the AccuLoad III. Information is sent to the AccuLoad III by using the "dump" icons on the AccuMate tool bar.

Online Help

To access AccuMate's built-in help function, type Alt-H from the keyboard or click on "Help" at the top right of the AccuMate screen. These actions display the Help menu. Select "Contents" for an index of built-in help topics. The operator can also press F1 at any time for context-sensitive help.

Installing AccuMate

Open up a web browser on a Windows operating system (Windows 95 or newer) and type in the following address: http://www.fmctechnologies/MeasurementSolutions/ onlineservices/software.aspx and download the latest version of AccuMate software. Follow the steps in the Installation Wizard for a proper setup.

Program Files

During the installation process, the following files will have been copied to the PC's hard drive. These files may be viewed by opening Windows Explorer and selecting the AccuMate directory.

File Extensions

AccuLoad file names are typically followed by a two- or three-letter extension (e.g., .A3X). The extension indicates the nature of the file.

- .A3X files – AccuLoad III-X configuration files
- .RPX files – AccuLoad III-X configurable report definition files
- .LGX files – AccuLoad III-X translation files
- .EQX files – AccuLoad III-X equation files.

AccuMate for AccuLoad III.net
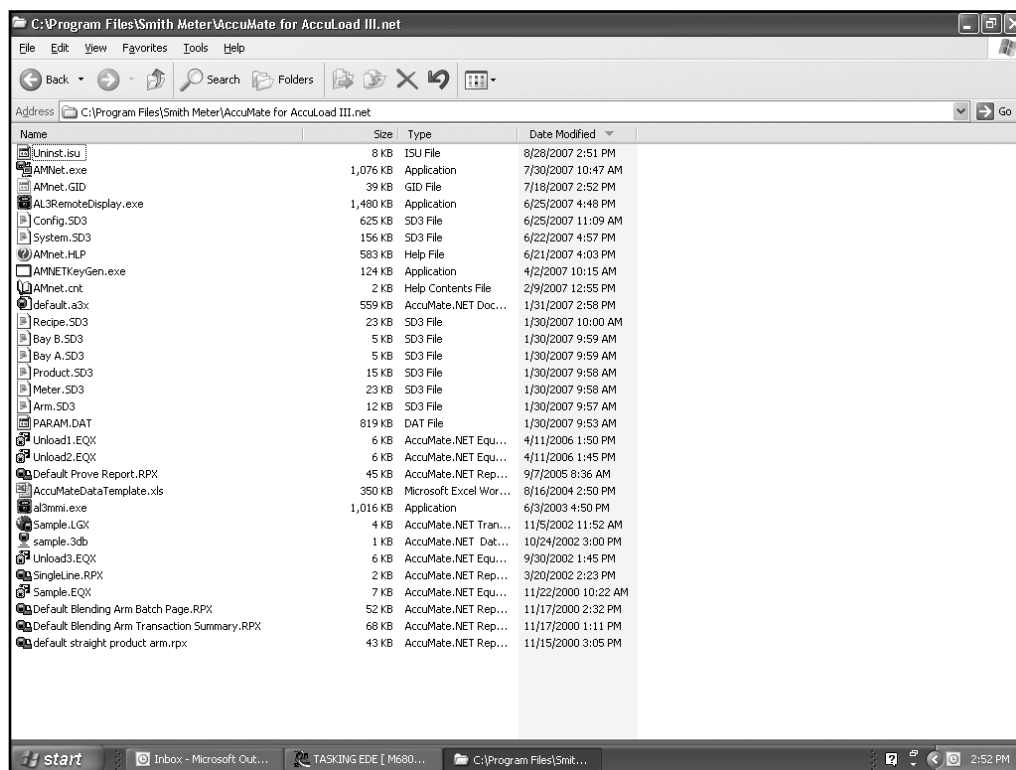
Contact a Smith Meter Distributor if any of these files are missing, or if there are any other problems with the AccuMate installation.

Establishing Communications

In order for communications to function, the AccuLoad III and AccuMate setups must be compatible and the communications cable correctly wired. Several AccuLoad III parameters (including communications port, baud rate, data bits, and parity) must be properly set to enable communications for serial parts. The AccuMate setup must then be configured to match the AccuLoad III parameters. For Ethernet communications refer to AB06069.

Communication Cable Writing

Select an available communications port; Comm1 is set as the default in the AccuLoad III. Only three wires are necessary for EIA-232 serial communications. They must be connected as follows:

Computer Port (9-Pin Connector)	AccuLoad Comm Port #1 TB1 – KDC
1 – Shield	3 – No Connection
2 – Receive	1 – Transmit
3 – Transmit	2 – Receive
5 – Ground	5 – Common
	Comm Port #2 TB2 – KDC
1 – Shield	5 – No Connection
2 – Receive	1 – Transmit
3 – Transmit	2 – Receive
5 – Ground	3 – Ground/Common
	Comm Port #4 TB4 – EAAI
1 – Shield	5 – No Connection
2 – Receive	1 – Transmit
3 – Transmit	2 – Receive
5 – Ground	3 – Ground/Common
Computer Port (25-Pin Connector)	AccuLoad Comm Port #1 TB1 – KDC
1 – Shield	3 – No Connection
2 – Receive	2 – Receive
3 – Transmit	1 – Transmit
5 – Ground	5 – Common
	Comm Port #2 TB2 – KDC
1 – Shield	5 – No Connection
2 – Receive	2 – Receive
3 – Transmit	1 – Transmit
5 – Ground	3 – Common

Computer Port (25-Pin Connector)	Comm Port #4 TB4 – EAAI
1 – Shield	5 – No Connection
2 – Receive	2 – Receive
3 – Transmit	1 – Transmit
5 – Ground	3 – Common

Communications Port Setup

Each AccuLoad III file stores the address used for communications, the PC serial port to which it is attached, and other important information. Because each AccuLoad III has its own file, there is no need to change communications settings when moving among multiple AccuLoads connected to the same PC (as in a load rack environment, for example). All AccuLoads on the same PC comm port must have the same port settings and protocol (either terminal or minicomputer).

To begin communicating with the AccuMate, set up the communications port using the Options|Options for this AccuLoad III… menu choice. The dialog presented allows for setup of both the communications port and the communications protocol.

To set up the communications port, first determine the available communications ports on the PC. If COM1 is available (not connected to a mouse, modem, or some other device), connect your communications line to the COM1 (Serial Port 1) connector on the back of the PC. Select COM1 in the combo box. (See Figure 1 at the top of the next page.) If COM1 is not available or the AccuMate is being used in conjunction with Virtual Load Rack software, use COM2. If both are in use, select either COM3 or COM4 if present. Be aware that in most PCs, COM1 and COM3 cannot be used simultaneously, nor can COM2 and COM4 be used simultaneously. Extender boards for serial communications (e.g., DigiBoards) can be used as long as they support the Windows communications API standard.

To configure the communications settings, open an existing AccuLoad III file or create a new one, then select Options/Options for this AccuLoad III… Click the "Comm Settings" button on the dialog box to select the desired baud rate (38,400 is recommended), using the same baud rate for both the AccuMate and the AccuLoad III. Data/Parity must be 8 Bits, No Parity (8 Bits None). Because some data transfers are binary, all eight bits are needed for the data.

Communications Port Setup – Ethernet

Set the Comm Port to TCP/IP after selecting "Options" from the tool bar and then selecting "Options for this AccuLoad." After TCP/IP is selected, configure the IP Address to match the AccuLoad to communicate with. This will match parameter 735 in the Communications Directory on the AccuMate and AccuLoad configuration.
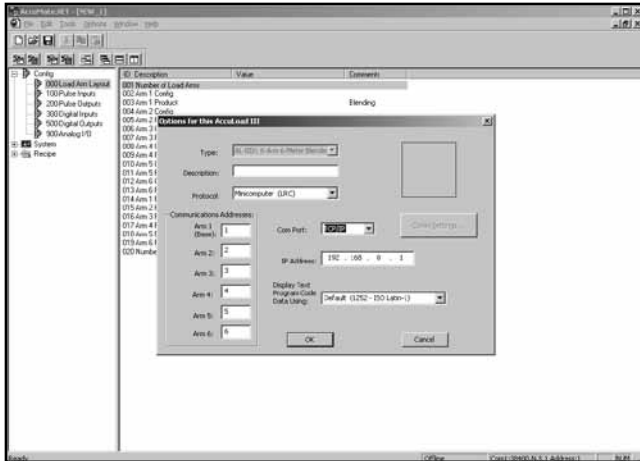
Figure 1

Initiating Communications with the AccuLoad III

To configure the AccuLoad III for communications, do the following:

1. Connect the selected PC communications port to an AccuLoad III communications port. (Serial or Ethernet)

2. Select an existing AccuLoad file, or create a new one, by choosing "Open" or "New" under "File" on the AccuMate tool bar.

3. A display similar to that shown below will appear on the computer screen. Communication configuration program codes are in the "700" System Communications group, as shown in *Figure 2* below.

4. To configure an option, use the mouse to select the appropriate program code, then double click. A dialog box will appear that allows the user to enter information for that parameter.

Example: To specify the comm address for a specific AccuLoad, choose "701: AccuLoad Comm Address." Type a unique address (a number from 1 to 99) in the box labeled "New," and click "OK." The AccuLoad's address will appear in the right-hand column labeled "Value."

Figure 2

Note: Since only one port can be a control port, if an automation system is connected to another port, choose Poll & Program for the AccuMate in the Comm Control parameter. Poll & Program is also a good selection for demonstrations, since it allows batches to be run without remote authorization.

For detailed information about program codes, refer to the AccuLoad III-X Operator Reference Manual, MN06129.
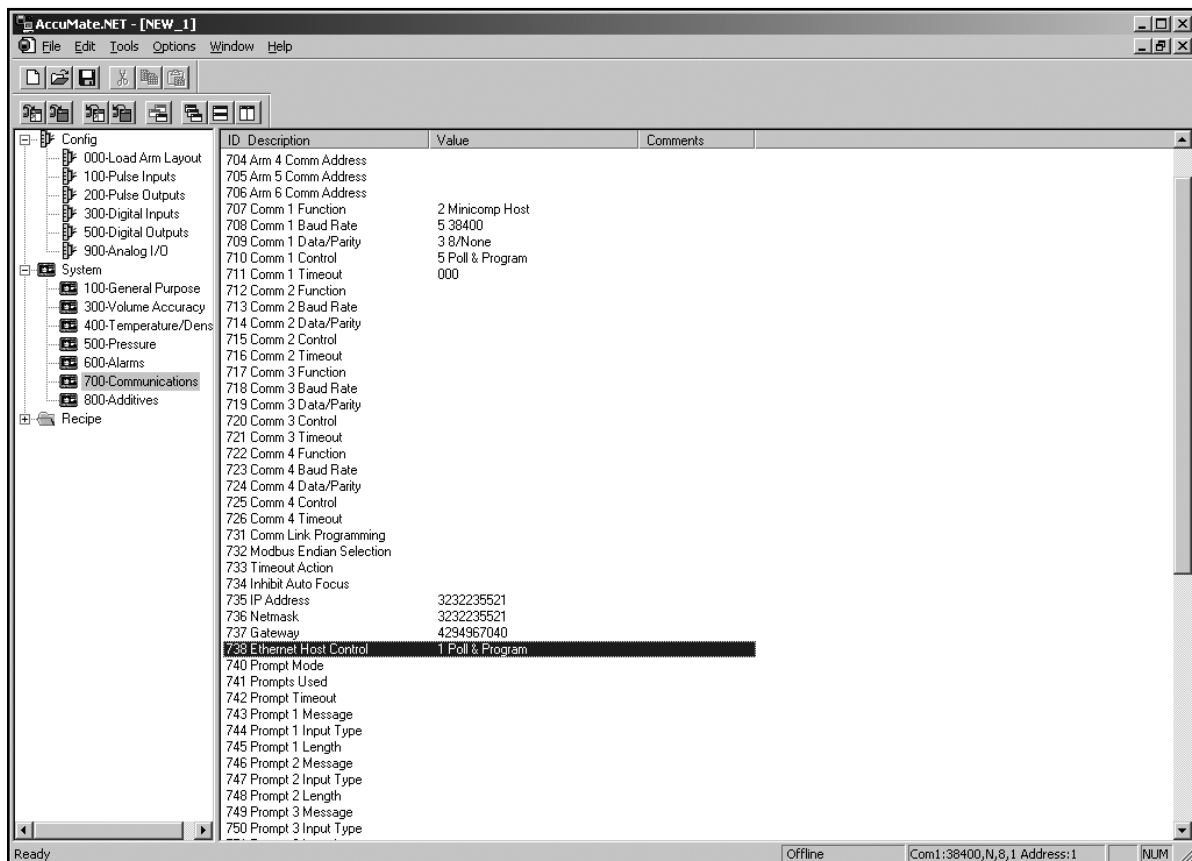
Once the communications configuration is complete, do the following:

1. Open an AccuLoad data file. Select *Options| Options* for this AccuLoad.net, and verify the AccuLoad III address.
2. Verify that the communications port is set to the port on the PC, and that the selected protocol matches that programmed at the AccuLoad III.
3. If the parity and baud rate are not correct, change them using the "Comm Settings" button in the dialog box, for serial communications. Make sure the IP Address, Net mask, and Gateway all match for Ethernet Comm.
4. Close the "Options" dialog.

If all is working properly, the status bar text (at the bottom of the screen) should change from "Offline" to "Online" mode. If the status bar indicates "Read Only," verify that the AccuLoad III is not in Program mode at the keypad, and that all programmed security requirements have been met at the AccuLoad III.

Troubleshooting

If difficulty is encountered, verify the accuracy of the following:

• Communications setup at the AccuMate
• Communications setup at the AccuLoad III
• Port, baud rate, and parity
• Protocol (Terminal or Minicomputer); Minicomputer is recommended
• AccuLoad III address
• Wiring between the AccuLoad III and the PC (Are transmit and receive connections reversed? Is the cable connected to the proper comm port at both the AccuLoad III and the PC?).

Using Smith Meter's Virtual Load Rack with AccuMate

The Smith Meter Virtual Load Rack simulates actual inputs/outputs without external hardware. To facilitate the use of this software package with AccuMate, a configuration file has been included that will program the AccuLoad III.net to work with the six product ratio configuration on the Virtual Load Rack (VLR). If the PC on which AccuMate is installed has only one comm port, it is impossible to use AccuMate and VLR simultaneously. In this case, connect AccuMate and download the required file, then disconnect AccuMate and connect VLR.

Refer to Manual MN06116 for more information on the Virtual Load Rack Simulator.

Using the Terminal Emulator

The Terminal Emulator is a "smart" terminal emulator that formats commands to be sent to the AccuLoad III. It is accessed by selecting *Tools|Terminal Emulator* from the AccuMate tool bar. Terminal Emulator supports both Terminal and Minicomputer modes, and processes all required framing characters. The operator types only the actual command and any associated command qualifiers. From this interface, the operator can send any of the commands in the AccuLoad III repertoire.

The Terminal Emulator adds a new pull-down menu, "Commands," to the menu bar. From this menu, the operator can browse all commands in the AccuLoad III command set. As each command is highlighted, information about the command will appear on the application's status bar. Once an item is selected, pressing "F1" will display the help message for that particular command. If a command requires no additional information, it will be sent immediately.

Refer to the AccuLoad III-X Communications Manual, MN06130L, for additional information about AccuLoad III commands.

Program Startup

The AccuMate, when launched, will open to a screen similar to that shown in the figure below. AccuMate is a Multiple Document Interface (MDI) application, meaning that an operator can work with more than one file at a time. In the context of the AccuMate, a "file" is the data associated with one specific AccuLoad III. Multiple AccuLoad III files can be open at one time. The currently active AccuLoad III file is the one that will be affected by menu choices or tool bar actions such as *File|Save or Read AccuLoad*.
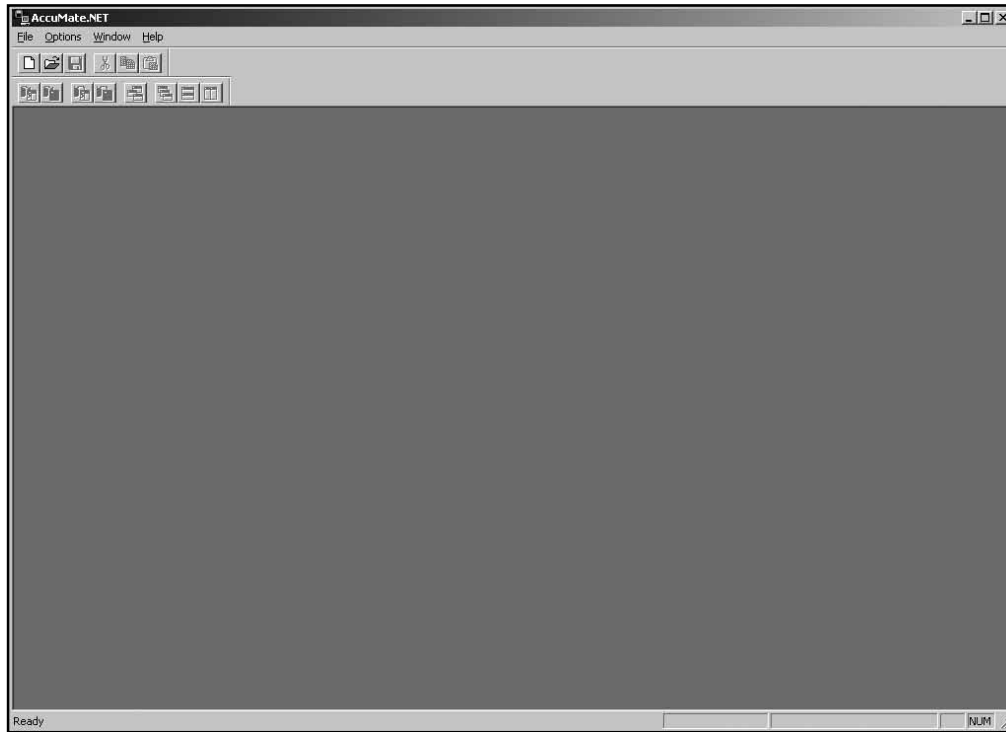
Figure 3

Data and Functions

The data and functions that can be accessed or accomplished from this screen are as follows. Note that some of these menus (e.g., Edit) will not be available unless a file is open.

File Menu

Access the File menu by clicking "File," which appears at the far left of the AccuMate menu bar (at the top of the AccuMate screen).

New: A new AccuLoad III data file will be created. (Other functions available under "New," including "Report Configuration," "Translation," and "Equation Set," will be discussed in other sections of this manual.) The new file is configured by means of a wizard, which is explained below.

Open: Opens an existing AccuLoad file.

Close: Closes an open AccuLoad file.

Save: Saves changes to the current file to disk.

Save As: Displays a dialog box that allows a new name to be assigned to a file.

Print: Prints either the current directory or all the parameters in the active AccuLoad file.

Exit: Exits the program.

Edit Menu

Access the Edit menu by clicking "Edit" on the AccuMate menu bar.

Cut: Removes the selected text and places it on the clipboard.

Copy: Copies the selected text and places it on the clipboard.

Paste: Inserts the text stored on the clipboard at the location of the cursor.

Read Selection (F5): Loads values from the AccuLoad into the currently selected directory or subdirectory. "Read Selection" can also be activated by clicking its icon *(see Figure 4 below)* on the AccuMate tool bar. From either of these options, the operator can choose to read a specific directory from the active AccuLoad III. When the data reading is complete, the program will return to the previous screen.

Read All (F3): Reads all values associated with the active file from the AccuLoad III. "Read All" can also be activated by clicking its icon *(see Figure 4 below)* on the AccuMate tool bar. From either of these options, the operator can choose to read all data from the active AccuLoad III. When the data reading is complete, the program will return to the previous screen.

Dump Selection (Alt-F5): Sends the current selection to the AccuLoad III. "Dump Selection" can also be activated by clicking its icon (see Figure 4 below) on the AccuMate tool bar. From either of these options, the operator can choose to download a specific directory to the active AccuLoad III. When the data transfer is complete, the program will return to the previous screen.

Dump All (Alt-F3): Sends all data in this file to the AccuLoad III. "Dump Selection" can also be activated by clicking its icon (see Figure 4 below) on the AccuMate tool bar. From either of these options, the operator can choose to download all data from the AccuMate to the active AccuLoad III. When the data transfer is complete, the program will return to the previous screen.
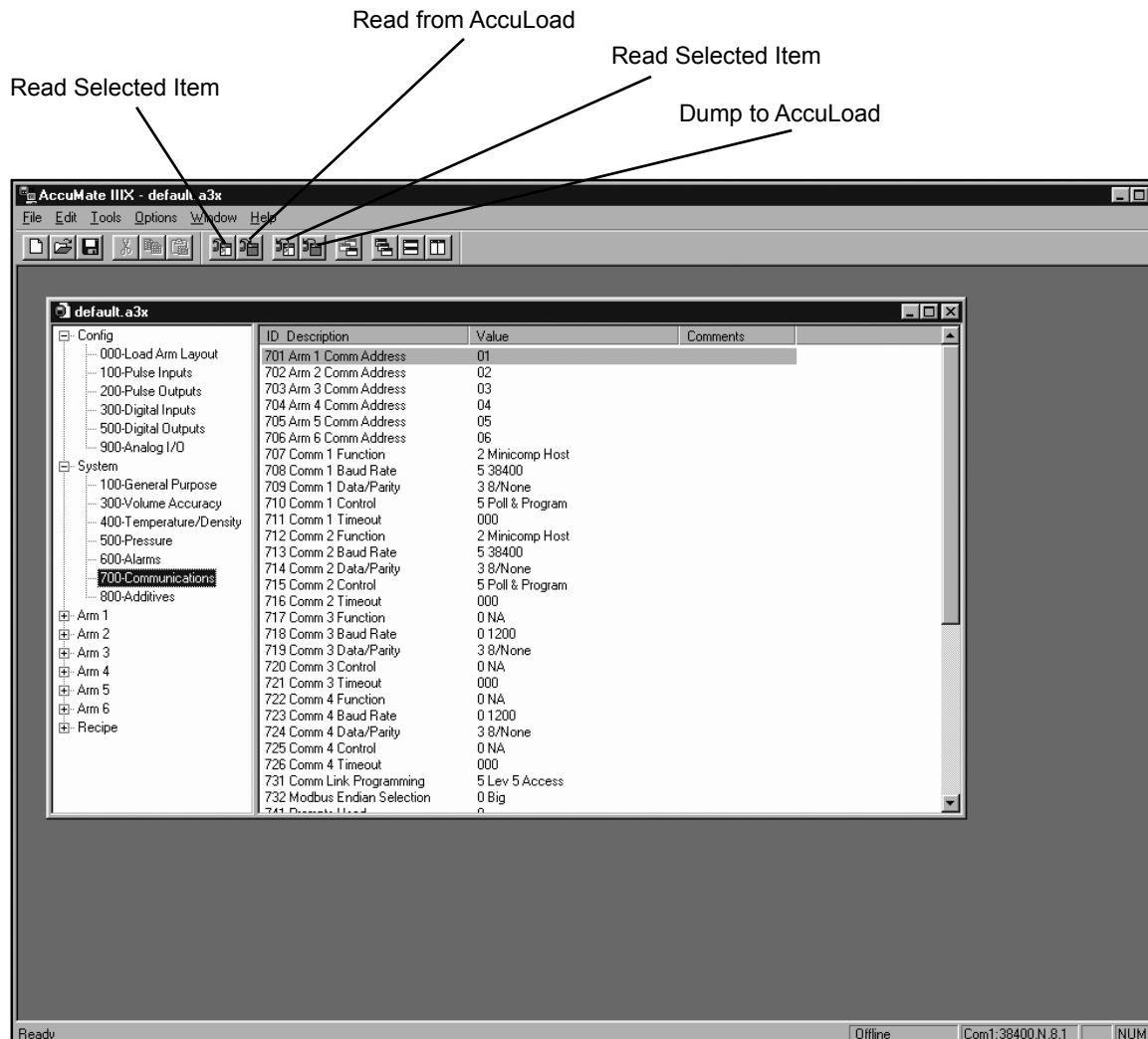

Figure 4

Tools Menu

The Tools menu is accessed by clicking "Tools" on the AccuMate menu bar. (This menu is only available when an .SD3 file is active.)

Terminal Emulator (Alt-F10): The Terminal Emulator is a "smart" terminal emulator that formats commands to be sent to the AccuLoad III. It is accessed by selecting *Tools|Terminal Emulator* from the AccuMate tool bar. Terminal Emulator supports both Terminal and Mini-computer modes, and processes all required framing characters. The operator types only the actual command and any associated command qualifiers. From this interface, the operator can send any of the commands in the AccuLoad III repertoire.

The Terminal Emulator features a pull-down menu, Commands, on the tool bar. From this menu, the operator can browse all commands in the AccuLoad III command set. As each command is highlighted, information about the command will appear on the application's status bar. Once an item is selected, pressing "F1" will display the help message for that particular command. If a command requires no additional information, it will be sent immediately. The pull-down menu at the upper right-hand corner of the terminal emulator display allows the operator to select the arm with which communications will interact.

Refer to the AccuLoad III-X Communications Manual, MN06130L, for additional information about AccuLoad III commands.

Retrieve Nonresettables…: This feature offers a quick way to retrieve and display nonresettable totalizers maintained at the AccuLoad III. Data is automatically limited to products, recipes, and additives that are actually in use. Totals are labeled with user-defined product and recipe names, and can be printed if a hard copy record is desired.

Transaction Log to File…: This feature creates a backup of transaction data on disk. Its purpose is to prevent complete loss of data when re-initializing an AccuLoad III. The AccuLoad III will initialize when upgrading software. Since initialization erases the Accu-Load III's flash memory, the transaction log is destroyed.

When "Transaction Log to File" is selected, the operator will be prompted to select a file name. The default name is A3XFileName-TransLog.txt. The file will be saved in a text format that may be opened using a template in Microsoft Excel. Spreadsheet program, such as Microsoft Excel, This template sorts the data into readable columns based on the placement of commas in the text. The AccuMate program has an Excel template already available to view transaction log information. When "Transformation Log to File" is selected, the spreadsheet will open automatically.

Note: This option is only available when the AccuLoad III is online and its file is open and active on the AccuMate.

Event Log to File…: This feature creates a backup of event data on disk. Its purpose is to prevent complete loss of data when re-initializing an AccuLoad III, such as when upgrading software by installing new software. Because initialization erases the AccuLoad III's flash memory, the event log is destroyed.

Note: This option is only available when the AccuLoad III is online and its file is open and active on the AccuMate.

Audit Trail Log to File…: This feature creates a backup of audit trail data on disk. Its purpose is to prevent complete loss of data when re-initializing an AccuLoad III, such as when upgrading software.

Because initialization erases the AccuLoad III's flash EEPROM memory, the audit trail log is destroyed.

When "Audit Trail Log to File" is selected, the operator will be prompted to select a file name. The default name is A3XFileName-AuditLog.txt. The file will be saved in a text format.

Note: This option is only available when the AccuLoad III is online and its file is open and active on the AccuMate.

Remote Display: Bundled with the AccuMate is an application designed to mimic the front panel of the AccuLoad III and allow user interaction as if standing at the actual unit. This application can be launched by AccuMate. AccuMate will minimize itself when the remote display opens. Clicking on the keypad buttons with the mouse will perform the same actions as at the front panel of the AccuLoad III. (It may be necessary to click on CLEAR or ENTER to get the display to draw properly when the AccuLoad III Remote Display is first launched.)

Access the System menu when using the remote display by pressing the "Alt" key and space bar simultaneously.

When finished with the remote display, close it by pressing the "Alt" and "F4" keys simultaneously. The AccuMate window will be restored and AccuMate will re-establish communications with the AccuLoad III.

Retry Communications: This feature sends a status request to the AccuLoad III to determine the viability of communications between the AccuMate and the AccuLoad III. This command is generally used after changes to communications settings to ascertain the current communication status, or after using the "Go Offline" command.

Go Offline: Terminates communications between the AccuMate and the AccuLoad III, allowing the operator to make changes to the file that do not immediately affect the AccuLoad III.

Options Menu

Access the Options menu by clicking "Options" on the AccuMate menu bar.

General…: Display and printing options can be selected by modifying entries in the Options dialog box *(shown in Figure 5)*. The Options dialog box is accessed by selecting *Options|General…* .

Display Options: Click with the mouse in the box beside "Display Security Level in List View" to add the Security Level for the parameter to the parameter list view. Click again to suppress this option.

Printing Options: Click with the mouse in the box beside "Suppress Printing Unused Recipes" to avoid printing recipes that are programmed as "Not Used" in Recipe Parameter 001. Click again to suppress this option.

Click with the mouse in the box beside "Include Security Level on Printout" to add the Security Level for the parameter to the printed list. From the pull-down menu to the right of "Limit printout of parameters to:", select the security level that determines which parameters are to print. Click again to suppress this option.
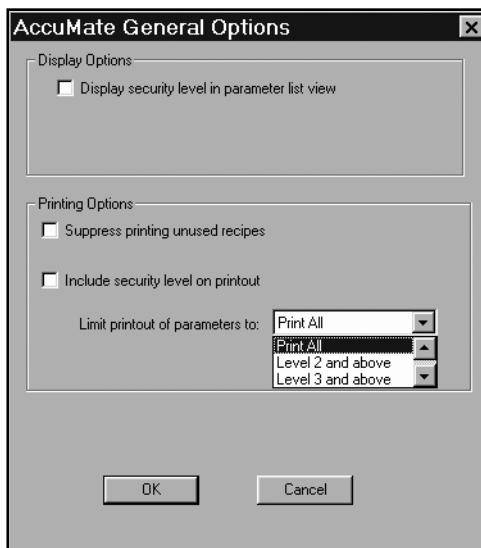

Figure 5

Options for this AccuLoad.net…: This selection allows the operator to configure communication settings for a specific AccuLoad III. For more information, refer to "Section III – Communications" in this manual.

Tool bars: This selection permits the operator to customize the AccuMate toolbar display. Selecting *Options|Tool bars* results in the dialog box shown in Figure 6. Click in the box beside each item to select (or deselect) the option. Selecting "Main" displays the following icons: New, Open, Save, Cut, Copy, and Paste. Deselecting "Main" hides these icons. Selecting "Edit" displays the following icons: Read Selected Item, Read from AccuLoad, Dump Selected Item, Dump to AccuLoad, New Window, Cascade Windows, Tile Horizontally, and Tile Vertically. Deselecting "Edit" hides these icons. Choosing "Tool-tips" activates the yellow labels that appear when the cursor passes over an icon and explain the function of the icon. "Color Buttons" controls the appearance of the icons.
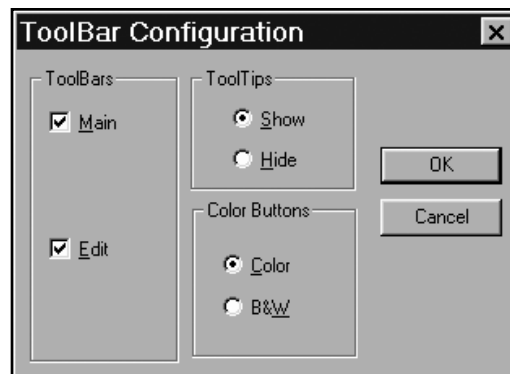
Figure 6

Status Bar: Shows or hides the status bar at the bottom of the AccuMate screen. The status bar indicates whether the AccuMate is online or offline, as well as the current communications settings and status.

Window Menu

The Window menu is accessed by clicking "Window" on the AccuMate menu bar.

Cascade: This selection cascades all currently open AccuLoad III file windows, with the active window on top. To select another file, click on the edge of its window to move it to the top of the pile.

Tile Horizontally: This selection arranges all currently open AccuLoad III file windows in a horizontal pattern.

File Vertically: This selection arranges all currently open AccuLoad III file windows in a vertical pattern.

Using the Wizard to Configure New Files

When the operator selects *File|New|AccuLoad III.net Data File*, the AccuLoad III Wizard dialog box appears, as shown in the figure below. The operator is presented with a series of lists from which he can select options for the new AccuLoad file. When an option is chosen that excludes other options, the options that are no longer available will not appear on subsequent lists. This lessens the possibility of configuration errors. The Wizard also tallies the number of digital inputs and outputs as they are assigned to specific functions, and alerts the operator when available I/O has been exceeded. To select an option, highlight it by clicking it with the mouse. Pressing "Cancel" at any time while in the Wizard creates an empty new file.
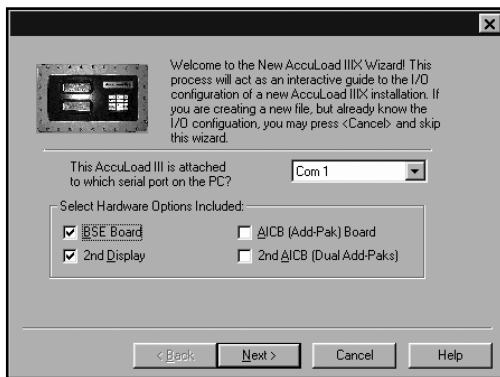

Figure 7

Each screen of lists includes four buttons at the bottom of the display. These buttons are "Back," "Next," "Cancel," and "Help." Choose "Back" to return to a previous page to change a selection, "Next" to proceed to the next list of options, "Cancel" to exit the Wizard and display the new file, and "Help" to access the AccuLoad help file. For more information about each of the available options, consult the AccuLoad III.net Operator Reference Manual, Bulletin MN06129.

The sequence of lists (dialog boxes) is as follows:

Arm Type, Arm 1

In the upper right-hand corner of the Arm Type display, as shown in *Figure 8*, type the address. This specifies the arm to be configured. Then, choose one of the following:

- Arm Not Used
- Straight Product Arm
- 2-Product Sequential Blending Arm
- 3-Product Sequential Blending Arm
- 4-Product Sequential Blending Arm
- 5-Product Sequential Blending Arm
- 6-Product Sequential Blending Arm

- Side-Stream Blending Arm
- 2-Product Ratio Blending Arm
- 3-Product Ratio Blending Arm
- 4-Product Ratio Blending Arm
- 5-Product Ratio Blending Arm
- 6-Product Ratio Blending Arm

In the box at the bottom of the display, type the number of additive injectors for the arm being configured. When the selection process is complete, press "Next."

Figure 8
Arm Type, Arm 2
A list of Arm Type options for Arm 2 appears below. Depending on the options selected in Arm 1, not all of these will be available.

- Arm Not Used
- Straight Product Arm
- 2-Product Sequential Blending Arm
- 3-Product Sequential Blending Arm
- 4-Product Sequential Blending Arm
- 5-Product Sequential Blending Arm
- 6-Product Sequential Blending Arm
- Side-Stream Blending Arm
- 2-Product Ratio Blending Arm
- 3-Product Ratio Blending Arm
- 4-Product Ratio Blending Arm
- 5-Product Ratio Blending Arm

In the box at the bottom of the display, type the number of additive injectors for the arm being configured. When the selection process is complete, press "Next."

Arm Type, Arm 3

A list of Arm Type options for Arm 3 appears below. Depending on the options selected in Arms 1 and 2, not all of these will be available.

- Arm Not Used
- Straight Product Arm
- 2-Product Sequential Blending Arm
- 3-Product Sequential Blending Arm
- 4-Product Sequential Blending Arm
- 5-Product Sequential Blending Arm
- 6-Product Sequential Blending Arm
- Side-Stream Blending Arm
- 2-Product Ratio Blending Arm
- 3-Product Ratio Blending Arm
- 4-Product Ratio Blending Arm

In the box at the bottom of the display, type the number of additive injectors for the arm being configured. When the selection process is complete, press "Next."

Arm Type, Arm 4

A list of Arm Type options for Arm 4 appears below. Depending on the options selected in Arms 1, 2, and 3, not all of these will be available.

- Arm Not Used
- Straight Product Arm
- 2-Product Sequential Blending Arm
- 3-Product Sequential Blending Arm
- 4-Product Sequential Blending Arm
- 5-Product Sequential Blending Arm
- 6-Product Sequential Blending Arm
- Side-Stream Blending Arm
- 2-Product Ratio Blending Arm
- 3-Product Ratio Blending Arm
- 4-Product Ratio Blending Arm

In the box at the bottom of the display, type the number of additive injectors for the arm being configured. When the selection process is complete, press "Next."

Arm Detail, Arm 1

The Arm Detail display of options will be similar to that shown below in *Figure 9*. Note that some options are grayed-out, or unavailable, depending on selections made in previous screens. To choose an option, use the mouse to position the cursor in the box to its left, then left-click the mouse. A check mark will appear in the box to indicate that the option has been selected. When the selection process is complete, press NEXT to go to the next screen.
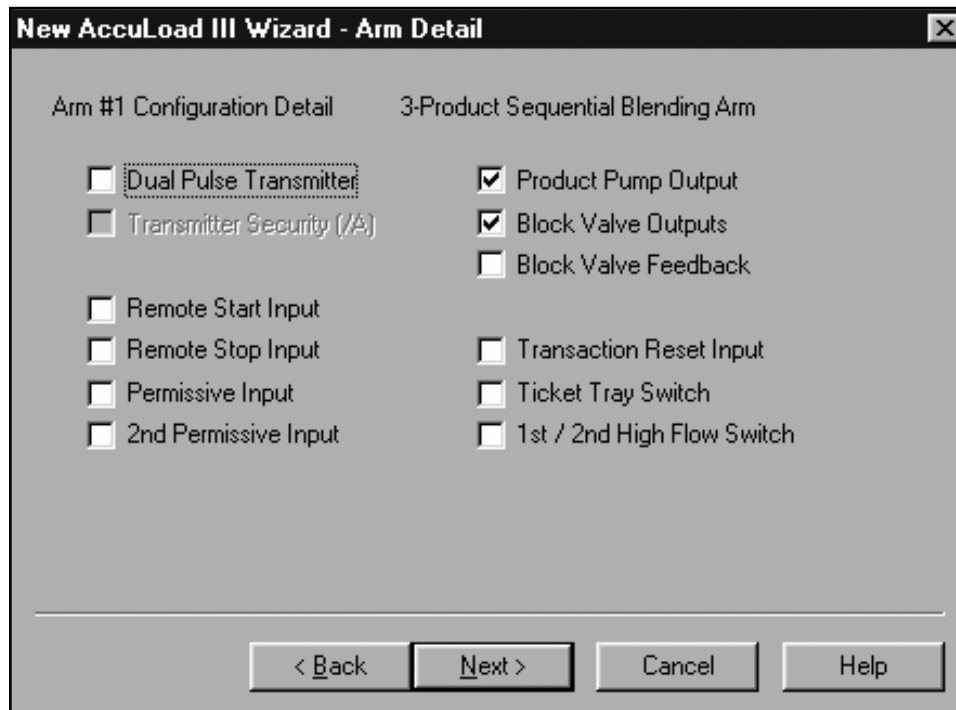

Figure 9

Meter Run, Arm 1

The Meter Run display of options will be similar to that shown below in Figure 10. Note that some options are grayed-out, or unavailable, depending on selections made in previous screens. To choose an option, use the mouse to position the cursor in the circle to its left, then left-click the mouse. A dot will appear in the circle to indicate that the option has been selected. When the selection process is complete, press NEXT to advance to the next screen.

Figure 10

Arm Detail and Meter Run, Arms 2 through 6

The two previous screens are repeated, except that this time, the operator is prompted to configure arms 2 through 6 instead of arm 1. In every other respect, the displays are identical to those shown in *Figures 8 and 9.*

Additives

If additives were selected, the operator will be prompted to specify an injector type from the Additives display. The available options are as follows:

- Not Used
- Piston
- Piston with feedback
- Titan
- Blend-Pak
- Mini-Pak
- Smith Smart
- Metered Injector
- Add-Pak

Choose an additive injector from the pull-down menu shown in the figure below. The Wizard will present a separate injector display for every additive specified in the setup process. When the selection process is complete, press NEXT for the next screen.

Figure 11

Pulse Outputs

This display of options will be similar to that shown in Figure 12. Configure Pulse Outputs using the pull-down menus. For "source," select from the options below. (For ratio blending arms, also select either the total pulses or an individual meter on the arm.)

- Not Used
- Arm 1 Pulses
- Arm 2 Pulses
- Arm 3 Pulses
- Arm 4 Pulses
- Arm 5 Pulses
- Arm 6 Pulses

Choose the desired number of pulses per unit in the box labeled "pulses/unit," then select the volume type from the pull-down menu. The volume options are as follows:

- IV (Raw)
- GV (Gross)
- GST (Gross at Standard Temperature)
- GSV (Gross at Standard Temperature and Pressure)
- Mass

For more information about each of these options, refer to the AccuLoad III.net Operator Reference Manual, Bulletin MN06129. When the selection process is complete, press NEXT to advance to the next screen.
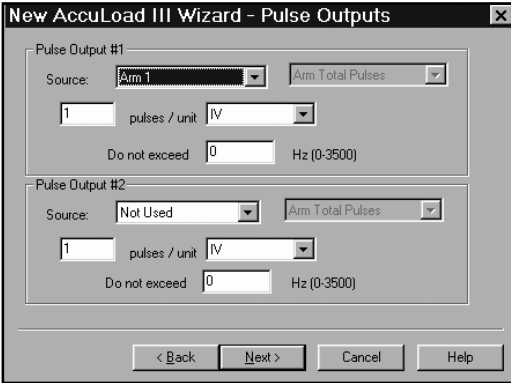

Figure 12

Other I/O

The Other I/O display of options will be similar to that shown below in the figure below. The operator is prompted to configure shared Digital Inputs and Outputs. Select the appropriate option by placing the cursor in the box to its left and left-clicking with the mouse. A check mark will appear in the box beside a selected option. Deactivate an option by placing the cursor in a box with a check mark. Left-click with the mouse, and the check mark will disappear. Note that the AccuMate has tallied the number of digital inputs and outputs configured thus far. When the selection process is complete, press NEXT to proceed.
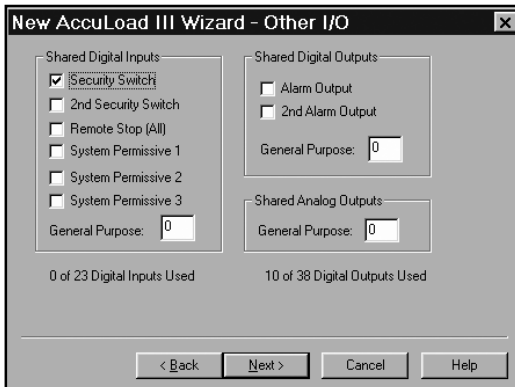

Figure 13

Confirmation

This display, shown in below, summarizes the configuration choices made on all prior screens, and indicates the total number of digital inputs and outputs used. Choose "Back" to return to a prior screen to change a selection, or "Finish" to initialize and display the new AccuLoad III data file.

The file will now contain programming reflecting the selections made in the wizard. Additional program codes will require modification for the AccuLoad III to perform as desired, but the Configuration directory should be nearly completed. (Some shuffling of I/O may be desired to optimize use of AC versus DC digital I/O, etc. These changes can be made after using the Wizard to do the initial setup).

Figure 14

Editing Program Code Data

To edit program code data, first open a new or existing AccuLoad III data file. Do this by selecting "New" or "Open" from the File menu on the AccuMate tool bar. If "New" is selected, choose "AccuLoad III Data File" from the pull-down menu. If "Open" is selected, choose an existing AccuLoad III file from the pull-down menu. Accu-Load III files are designated by the file extension ".A3X".

A list of system groups will appear on the left of a split screen in the active AccuLoad III window. Refer to the Operator Reference Manual, Bulletin MN06129 for detailed information about system groups and the program codes within each group, or click on "Help" at the far right of the AccuMate tool bar.) Clicking on "System 700 – Communications," for example, causes a listing of all program codes within the Communications group to appear on the right-hand screen, as shown in *Figure 15*. Double click on one of these program codes to display a dialog box.

This dialog box, "Edit Program Code Data," contains information about the selected program code. This particular dialog box provides a pull-down menu with all valid options and value ranges for the currently-selected code. When new information is selected from the pull-down menu, the new value appears on the active AccuLoad III data file screen.

To access the program code dialog box shown in *Figure 16*, select "Configuration," then double click on "206 Pulse Output 2 Function" in the right-hand window. The dialog box will then appear.

The program code shown in *Figure 16* has a pull-down pick list. To access the pick list, use the mouse to click on the down arrow at the right of the box labeled "New," then highlight the desired option and click OK.
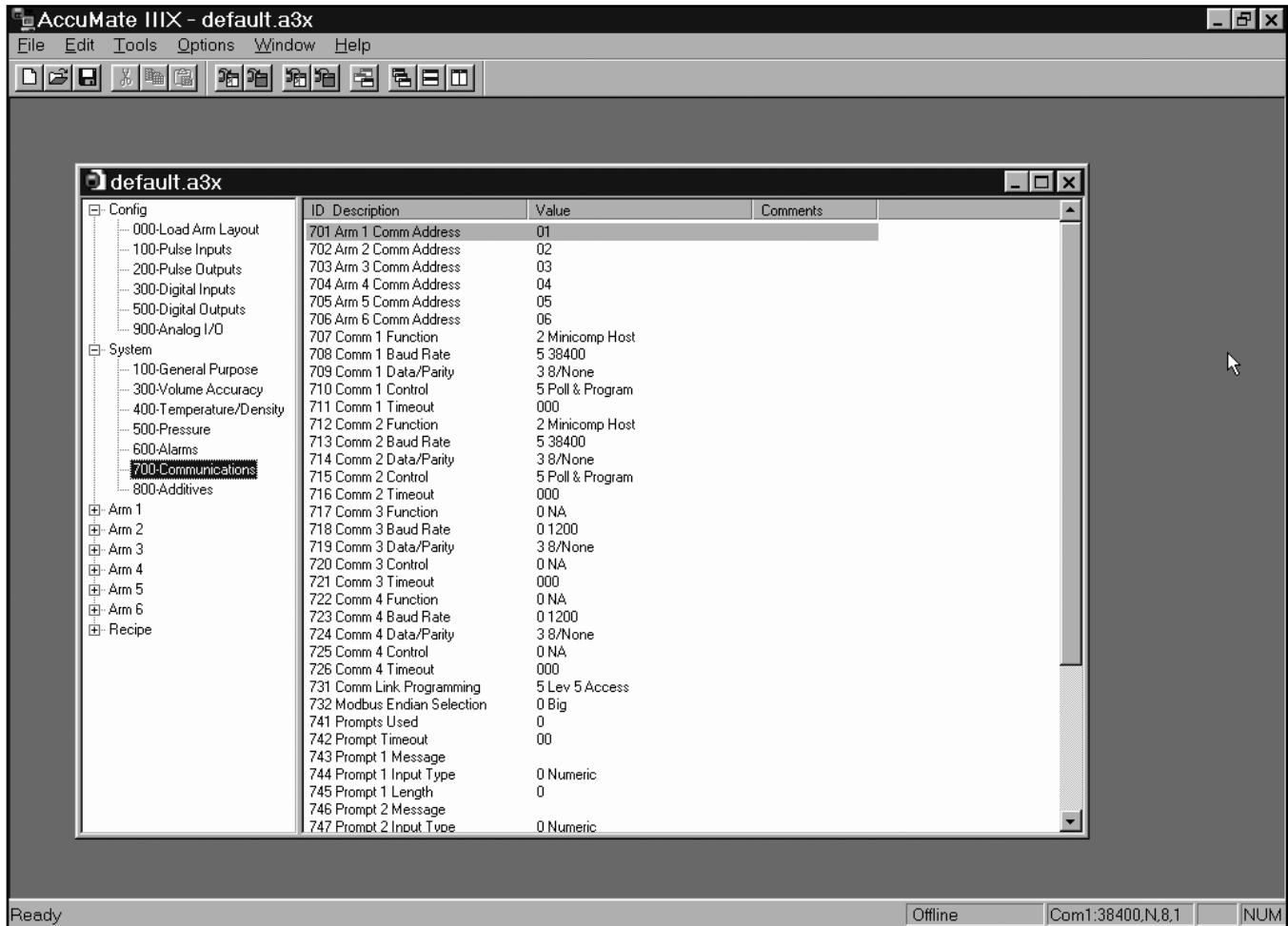

Figure 15

If the AccuLoad III is currently online and communication with the AccuMate is active, the new value will be effective immediately; otherwise, the value change will have to be dumped to the AccuLoad when communication is established.
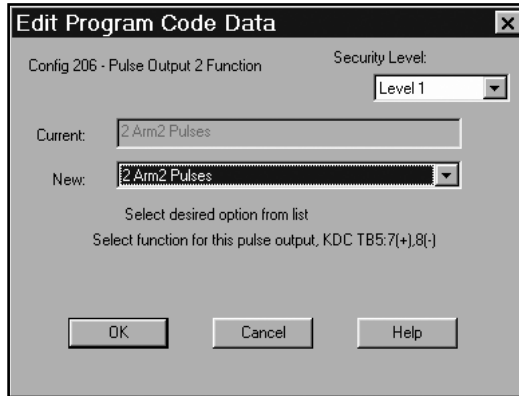

Figure 16

Other dialog boxes require the operator to type in alphanumeric data. An example of this is the box shown in *Figure 17*. This particular box is selected by clicking on "System," then highlighting "135 Transaction ID Message" from the menu of program codes in the window on the right. The resulting dia-log box prompts the operator to type up to twenty-eight characters (in any combination of letters and/or numbers) in the box labeled "New." Once the updated position ID information has been typed in the box, the operator clicks on OK to save the current data. The new data will appear in the "Value" column in the window on the right.

The third type of dialog box allows only numeric entries. An example of this type of box is shown in *Figure 18*. This particular box is selected by clicking on "100 General Purpose" from the System menu, then highlighting "123 Zoom Reset Timer." The dialog box prompts the operator to enter a number from zero to 99. Once the updated information has been typed in the box, the operator clicks on OK to save the current data. All boxes of this type display help messages that include the range of the entry and other pertinent information.
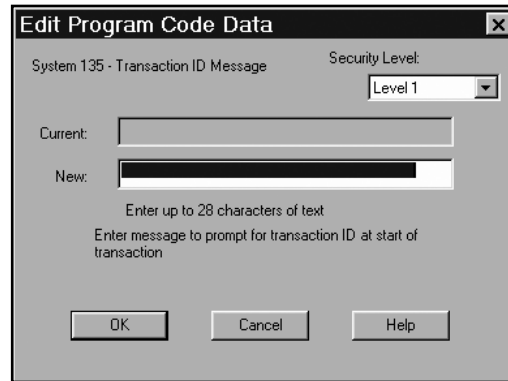
Figure 17
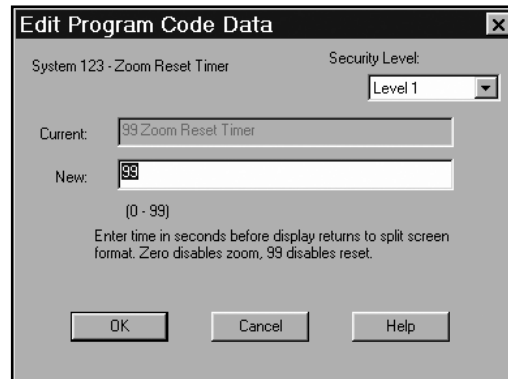
Figure 18

Finally, there is the dialog box listing available options selectable with check boxes, as shown in *Figure 19*. To activate an option, the operator uses the mouse to position the cursor in the box to the left of the desired option, then clicks once in the box. A check mark appears to indicate that the option has been selected. To deactivate an option, position the cursor on the check and click once with the mouse. The check mark will disappear. Click on "OK" to store changes. The new selection will appear in the value column in the window on the right. Access the dialog box in *Figure 19* by choosing Systems, then "600 Alarms," then "System 612 Low Density Alarm."
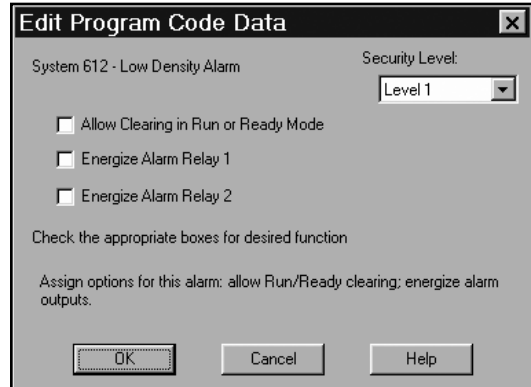
Figure 19

Report Editor

The Report Editor uses a combination of basic Windows commands (e.g., Cut, Copy, and Paste) and simple value descriptions to create customized reports. Access the Report Editor by selecting *File|New|Report Configuration* from the AccuMate menu bar.

"Insert New Item," "Edit Selected Item," "Cut," "Copy," and "Paste" are accessed by clicking "Edit" on the AccuMate tool bar, then selecting the desired option from the pull-down menu.

|	
Insert New Item	Opens a dialog box from which a new item can be added to the report.
Edit Selected Item	Opens a dialog box from which an existing report item, when highlighted, can be modified.
Cut	The item highlighted on the Report Editor will be cut from the display and stored on the clipboard.
Copy	The item highlighted on the Report Editor will be copied to the clipboard.
Paste	The information stored on the clipboard will be pasted to the Report Editor window at the specified row and column.
Read Report from AccuLoad III	Uploads a report from the AccuLoad. (This option is only available when the AccuMate is online.)
Dump Report to AccuLoad III	Downloads a report to the AccuLoad. (This option is only available when the AccuMate is online.)

"Line," "Column," "Item Type," "Item Value," and "Format String" are accessed by moving the cursor to the appropriate option on the "Edit Report Item" dialog box. The "Edit Report Item" box appears whenever an existing report item on the Report screen is double-clicked.

Line	Indicates the row on which the data to be displayed is entered.
Column	Indicates the column in which the data to be displayed is entered.
Item Type	Selects the type of data to be entered on the screen. The choices are as follows:
• **User-defined text entry**	Displays text typed in the Item Value entry.
• **Database value**	Displays the database value for a selected register.
• **Database Description**	Displays the database descriptive text for a selected register.
Item Value	Displays the current value of the register; or, if a user-defined text entry is selected as Item Type, the text is entered here.
Format String	The format string designates the type of data to be displayed. The strings used in the AccuLoad III are based on IEEE standards and are as follows:
• **%uc**	Data labeled as "Byte" AccuLoad III (unsigned character).

- **%f**   Data labeled as "DP Float" or "Double Precision Floating Point." Specify the length of the numeric data in this field. (The AccuLoad III stores all double precision floating point data as ten digits.) Using the number 0.2 between the "%" and the "f" right-justifies the data five places and truncates the data to two decimal places (i.e., %0.2f). This field can be used to line up the numerical data on the screen by entering an "8" between the "%" sign and the "f" (i.e., %8f). If the requirement is to both line up the data and truncate to two decimal places, the entry would be %8.2f.

- **%d**   Data labeled as an integer in the AccuLoad III database.

- **%s**   Data labeled as a string in the AccuLoad III, consisting of multiple characters.

Note 1: The "Edit Report Item" dialog box may also be opened by right-clicking on an existing report item, then selecting "Properties."

Note 2: Existing report items may be moved from one location to another on the Report screen by clicking the item with the mouse, then dragging it to another position. Hold "Ctrl" while dragging to copy an entry.

To create a customized report, do the following:

1. Access Report Editor by selecting *File|New|Report Configuration* from the AccuMate menu bar. A display similar to that shown in *Figure 20* below will appear.
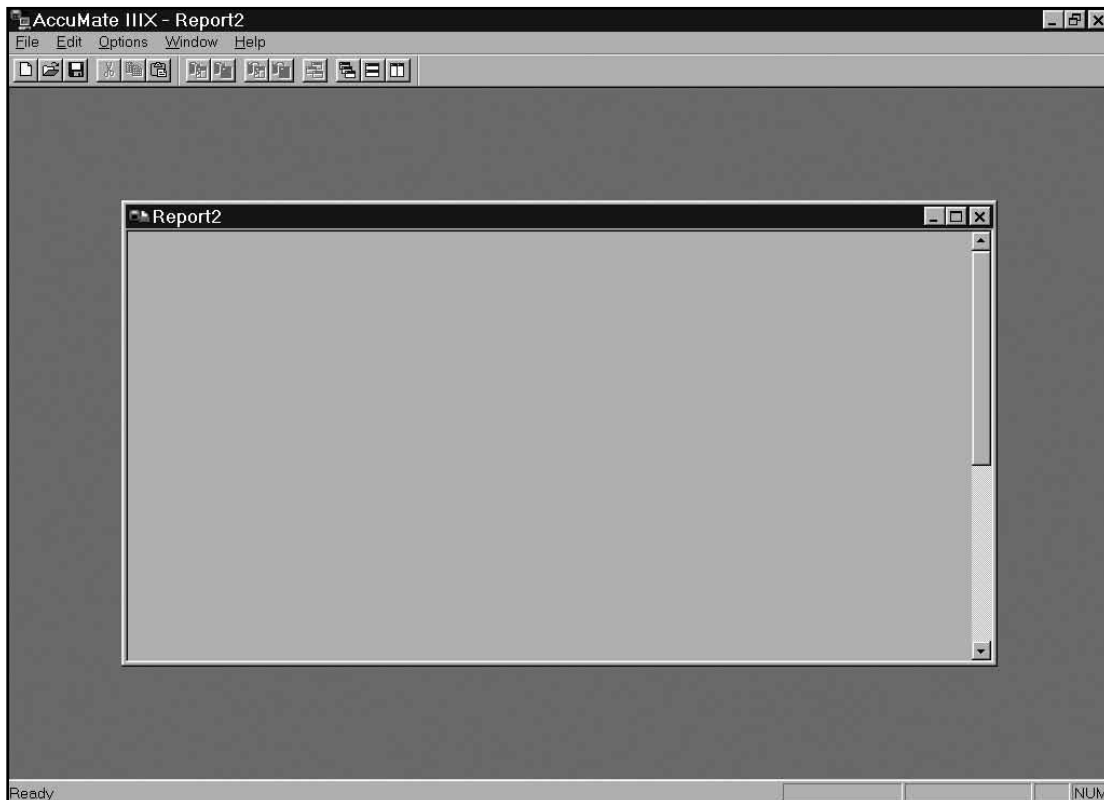

Figure 20

2. Next, select Edit|Insert New Item… from the AccuMate menu bar. An "Edit Report Item" dialog box will appear, similar to that shown in Figure 21.
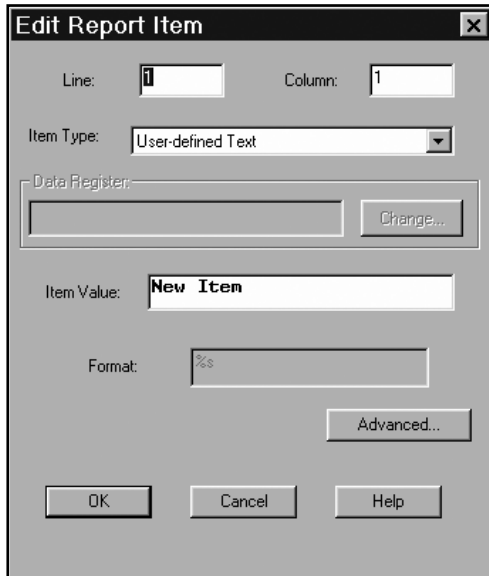

Figure 21

3. In the boxes labeled "Line" and "Column," indicate the position of the new report item. In *Figure 22*, the text "Reprint" will appear in Line 1, Column 1 – the upper left-hand corner of the report. There are 60 lines and 80 columns on a single page of an AccuMate report.

4. Next, select "Item Type" from the pull-down menu shown in *Figure 22*. There are three options: "Run/Program Data Value," "Run/Program Data Description," and "User-defined Text." More about these options appears later in this subsection.

5. To display custom information such as a company name, select "User-defined Text," type the desired information in the "Item Value" box, and click "OK." The text will appear in the appropriate position on the report screen shown in Figure 20.
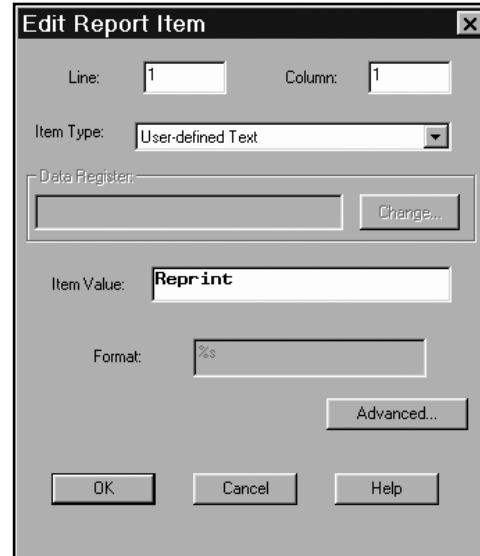
Figure 22

6. If "Run/Program Data Value" or "Run/Program Data Description" is selected, click on "Change" beside the "Data Register" box. A menu of selections will appear. Choose an item by highlighting and double-clicking.

7. Note that the format of the new entry must be appropriate for its type. A sample report appears in Figure 24. A corresponding table immediately following the figure details the item, entry type, register, format string, position, and location for each element on the report.

Advanced Report Options

AccuMate's Report Editor offers certain advanced configuration features that allow the operator to modify format strings, as well as the number of digits to be printed. Normally, no modification is required. AccuMate follows the "C" programming language standard for the "printf" function format string.

To access the Report Editor's advanced features, choose *Edit|Insert New Item…* from the AccuMate tool bar. A dialog box, similar to that shown in *Figure 22*, will appear. Use the mouse to click on the "Advanced" button in the lower right-hand corner of the screen to obtain the dialog box shown in *Figure 23*.

Figure 23

Use Alternate Print Format

The primary benefit to the "Use Alternate Print Format" feature is the option of editing field sizes. For example, the designation %8.3f indicates a total field size of eight characters, with three numbers to the right of the decimal point. The printed report format is XXXX.XXX. *(See Figure 23.)* To eliminate one decimal place in this example, use the mouse to highlight the "3", then type "2". The format string for this report item is now %8.2f and the printed report format is XXXXX.XX.

Reference Register

This feature allows the selection of an alternate database point that may be used to either determine the offset to use for the report item, or aid in determining whether the report item should be suppressed for this printing.

Use Reference Register Value as Offset for this Item

If checked, the database value offset specified for this report item (the register specified on the previous dialog) will be replaced. The actual offset used to determine the value printed is the value of the reference register. The typical application for this fea-ture would be to print the correct product name. On the base dialog, the database value "Product 1 ID" may have been selected. On the report, the operator may wish to print the recipe name of the recipe delivered for this batch; however, the batch data contains only the recipe number. To print the actual recipe name, specify the Batch x Recipe number for the reference register and select this check box.

Restrictions

This combo box allows the selection of a test func-tion. The AccuLoad III may either print or skip this report item, depending on the result of the specified conditional. The default is to always print the entry.

Always print this entry – The default option.

Print if value is nonzero – Only print this entry if the value of the entry is greater than zero (database entry types only).

Print if reference value is nonzero – Only print this entry if the value of the database entry specified by the reference register is zero (any entry type can use this restriction).

Print if indicated batch was delivered – Only print this entry if the batch offset associated with the entry was delivered in the transaction (only valid for database entries with a "batch #" offset).

Print if reference register's batch was delivered – Only print this entry if the batch offset associated with the reference register's batch was delivered in the transaction (the reference register must be a database register with a "batch #" offset).

Print if this product was delivered – Only print this entry if the product offset for this entry was a product delivered in this transaction (only valid for database entries with a "product #" offset).

Print if reference register's product was delivered – Only print this entry if the product offset for the refer-ence register was a product delivered in this transaction (reference register must be a database entry with a "product #" offset).

Print if this recipe was delivered – Only print this entry if the recipe offset for this entry was a recipe delivered in this transaction (only valid for database entries with a "recipe #" offset).

Print if reference register's recipe was deliv-ered – Only print this entry if the recipe offset for the reference register was a recipe delivered in this transaction (reference register must be a database entry with a "recipe #" offset).

Sample Report

```
AccuMate IIIX - [Sample Report.RPX]

File   Edit   Options   Window   Help

Reprint

Bill of Lading                    101 Date   NNNNNNNNNNNNNNNN

Transaction Number

Batch P1 Gross Volume (GV)               0.00
Batch P1 Gross @ Std Temp (GST)          0.00
Batch P1 Indicated Volume (IV)           0.00
Batch P1 Total Pulses                       0
Batch P1 Average Flow Rate                0.0
Batch P1 Mass Total                      0.00

Additive  1 Volume                      0.000
Additive  2 Volume                      0.000


This is to certify that the above-named materials are properly classified,
described, packaged, marked, and labeled and are in proper condition for
transportation according to the applicable DOT regulations.



_____
Driver Signature


_____
Signature of Receiving Agent
```

```
Ready                                              Line: 030 Col: 001                    NUM
```

Figure 24

Item	Type	Register	Format String	Row	Column	Where Found
Reprint	User-Defined Text	---	%s	1	1	---
Bill of Lading	User-Defined Text	---	%s	3	1	---
Date	Run/Program Data Description	101	%s	1	37	System Configuration
Date	Run/Program Data Value	101	%s	3	47	System Configuration
Transaction Number	Run/Program Data Description	---	%s	5	1	Transaction Data
Transaction Number	Run/Program Data Value	---	%5.0u	5	21	Transaction Data
Batch P1 Gross Volume (GV)	Run/Program Data Description	---	%s	7	1	Product Run Data for Batch
Batch P1 Gross Volume (GV)	Run/Program Data Value	---	%10.2f	7	42	Product Run Data for Batch
Batch P1 Gross @ Std Temp (GST)	Run/Program Data Description	---	%s	8	1	Product Run Data for Batch
Batch P1 Gross @ Std Temp (GST)	Run/Program Data Value	---	%10.2f	8	42	Product Run Data for Batch
Batch P1 Indicated Volume (IV)	Run/Program Data Description	---	%s	9	1	Product Run Data for Batch
Batch P1 Indicated Volume (IV)	Run/Program Data Value	---	%10.2f	9	42	Product Run Data for Batch
Batch P1 Total Pulses	Run/Program Data Description	---	%s	10	1	Product Run Data for Batch
Batch P1 Total Pulses	Run/Program Data Value	---	%8.1f	10	42	Product Run Data for Batch
Batch P1 Average Flow Rate	Run/Program Data Description	---	%s	11	1	Product Run Data for Batch
Batch P1 Average Flow Rate	Run/Program Data Value	---	%8.1f	11	44	Product Run Data for Batch
Batch P1 Mass Total	Run/Program Data Description	---	%s	12	1	Product Run Data for Batch
Batch P1 Mass Total	Run/Program Data Value	---	%10.2f	12	42	Product Run Data for Batch
Additive 1 Volume	Run/Program Data Description	---	%s	14	1	Batch Data
Additive 1 Volume	Run/Program Data Value	---	%8.3f	14	44	Batch Data
Additive 2 Volume	Run/Program Data Description	---	%s	15	1	Batch Data
Additive 2 Volume	Run/Program Data Value	---	%10.3f	15	44	Transaction Data
This is to certify...	User-Defined Text	---	%s	19	1	N/A
Described, packaged...	User-Defined Text	---	%s	20	1	N/A
Transportation...	User-Defined Text	---	%s	21	1	N/A
Signature Line...	User-Defined Text	---	%s	25	1	N/A
Driver Signature	User-Defined Text	---	%s	26	1	N/A
Signature Line	User-Defined Text	---	%s	30	1	N/A
Signature of Receiving Agent	User-Defined Text	---	%s	31	1	N/A

Note: The first entry on any report should be the text "Reprint." This text will only appear on reports that are reprinted; it will not appear on the first report printed.

Translation Editor

The AccuMate's Translation Editor makes it possible to replace any of the text literals in the AccuLoad III with customized text. The interface consists of a list view with the original text in the left-hand column and an edit space in the right-hand column, as shown in the figure below. The Translation Editor is accessed by selecting *File|New|Translation* from the AccuMate tool bar.
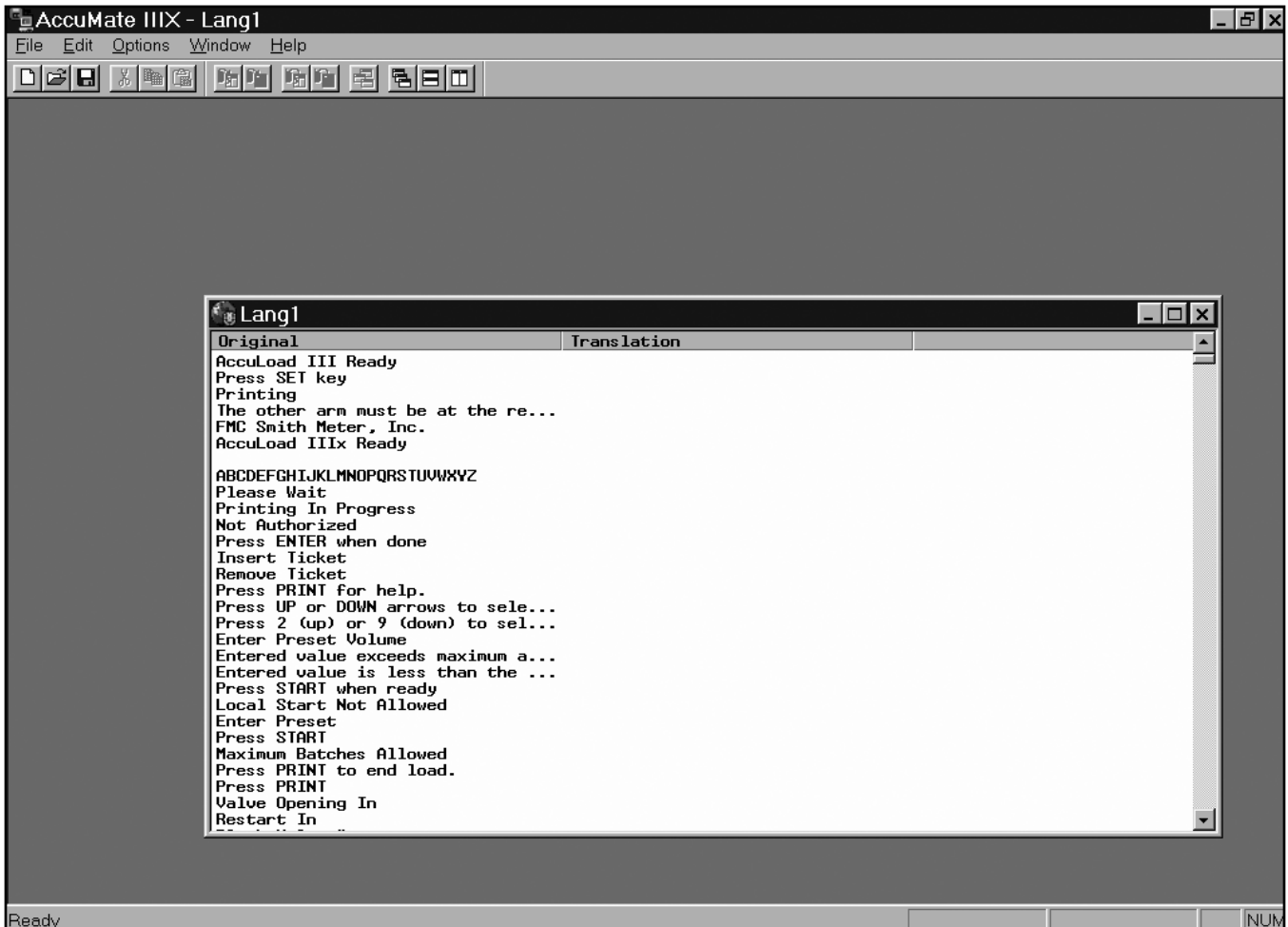

Figure 25

A search feature allows the operator to quickly locate a specific entry by matching the text in either the original or translated literal. To use the search feature, select *Edit|Find* (with the Translation Editor open). A dialog box similar to that shown in the figure below will appear on the screen.
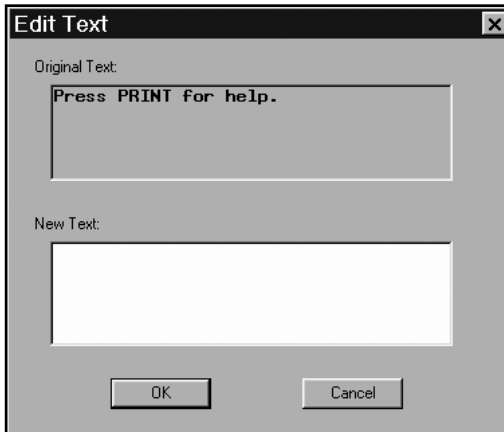

Figure 26

To conduct a search, type the desired text in the "Text to Find" box, specify the direction of the search, and click "Find." The specified text will be highlighted. Additional search options, "Ignore Case" and "Find From Cursor," are located on the left-hand side of the dialog box. Select these options, if desired, by using the mouse to click in the box to the left of each option. An "x" will appear in the box.

To change a text literal, take the following steps:

1. Double-click on the literal to be edited. A dialog box, similar to that shown in Figure 27, will appear on the screen.

2. Type the new text in the space on the bottom half of the dialog box.

3. Click "OK" to exit and save changes, "Cancel" to abandon the change, or "Help" for more information about this function. Assuming that new text was entered, it will appear to the right of the Translation Editor screen, as shown in Figure 28. The new literal, once downloaded to the AccuLoad III, will appear in place of the original literal.
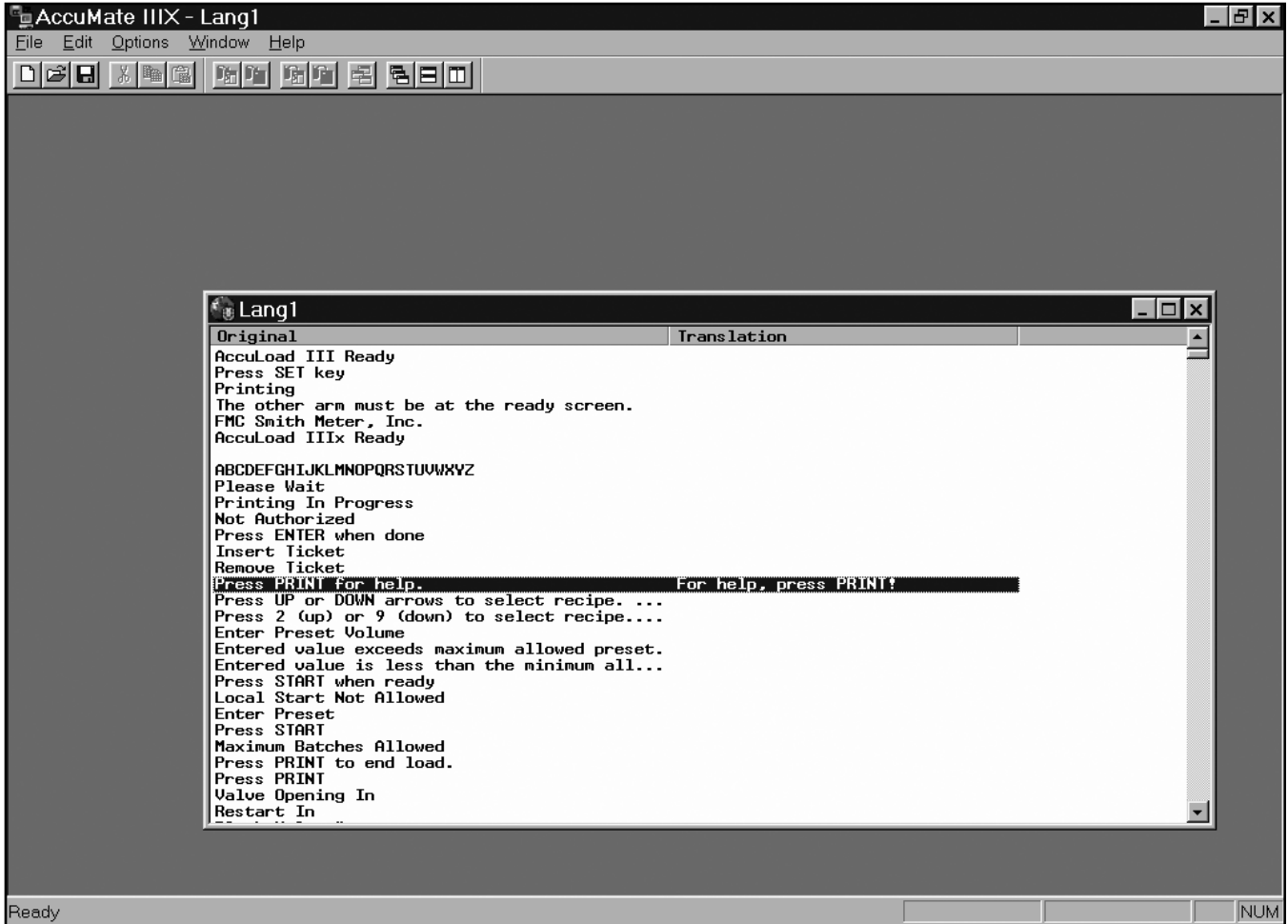

Figure 27

Figure 28

Translating Literals from English to Languages Using Non-Western Characters

AccuMate supports translation of literals from English to languages using non-western characters. Available character set options are 1252-ISO-Latin 1 (the default character set), Cyrillic (866-Russian DOS and 1251-Russian Windows), East European (1250), and Greek (1253). If the PC on which the AccuMate is running is equipped with the appropriate Windows character set, translate literals by following the instructions in the immediately preceding subsection. To translate literals using 866-Russian DOS, follow the instructions given below.

1. Start the AccuMate program and click on "File." From the pull-down menu, select "New" then "Translation." A display similar to that shown below will appear.
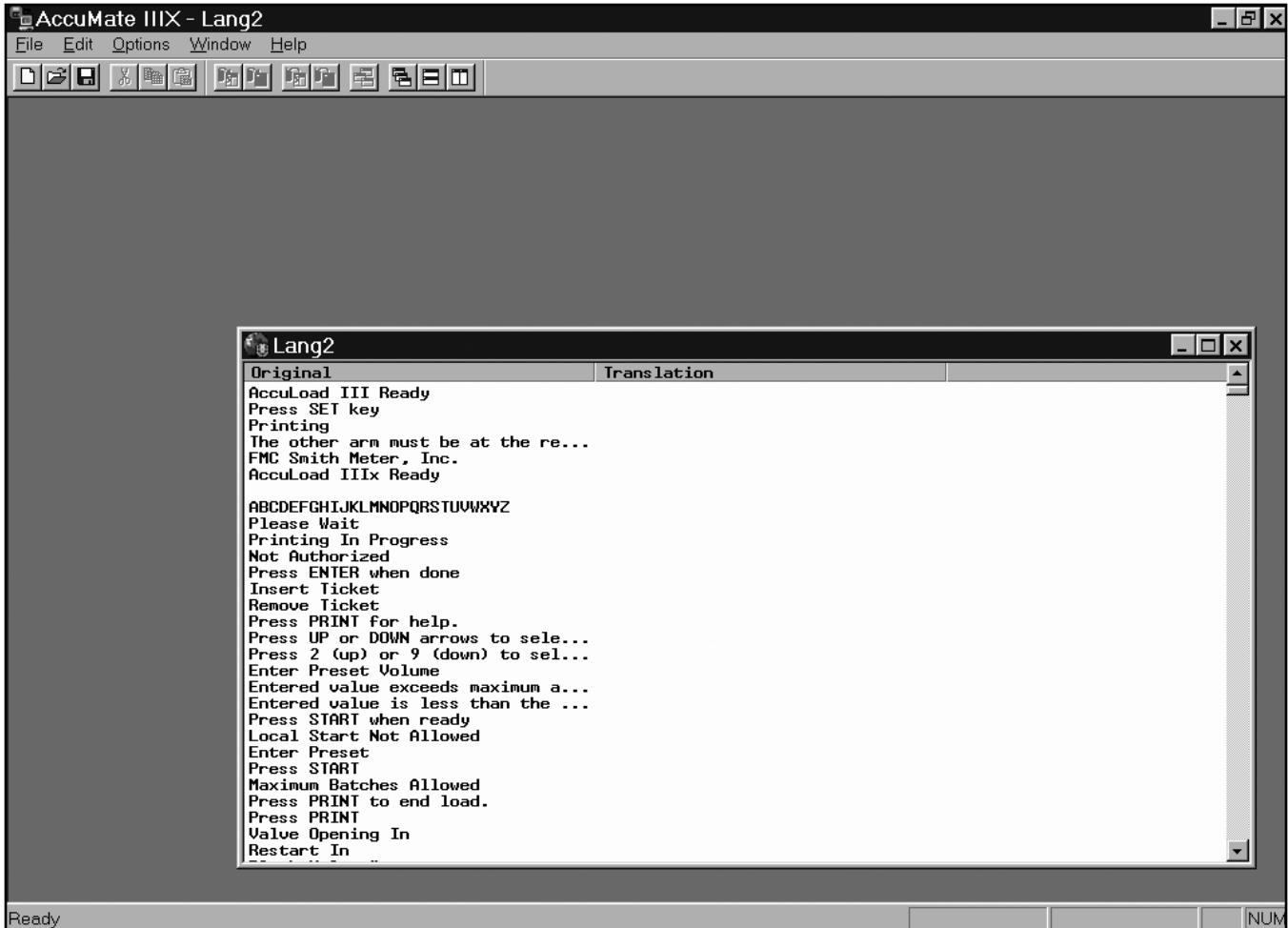

Figure 29

2. Click on the "Start" button on the PC. From the pop-up menu, select "Programs," then "Accessories."

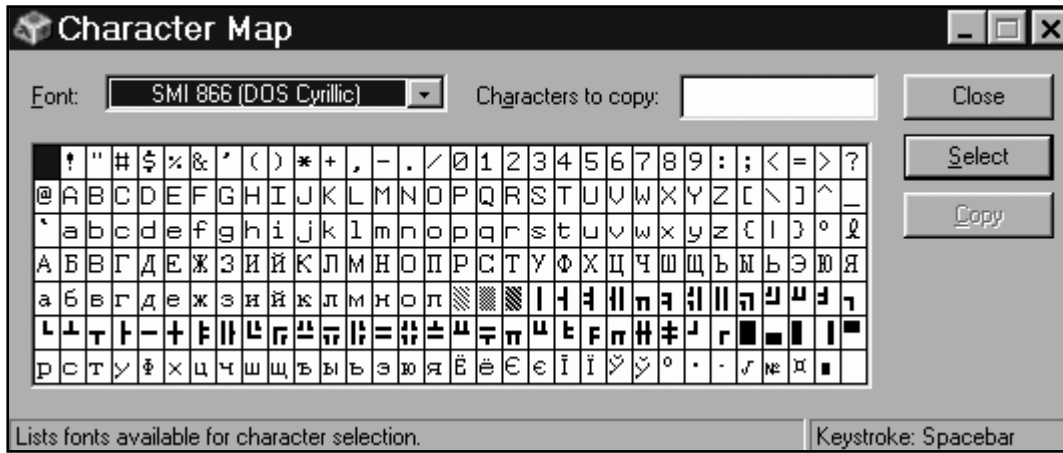3. Click on "Character Map." A dialog box will appear, similar to that shown in the figure below.

Figure 30

4. Using the scroll bar at the upper left-hand corner of the dialog box, select the appropriate font. (In this example, DOS Cyrillic was chosen.) This window is now open for translating phrases in the AccuLoad III.

5. Return to the AccuMate program by clicking on the AccuMate box at the bottom of the PC screen.

6. On the AccuMate screen, click on "Options" on the AccuMate tool bar. From the pull-down menu, select "Options for this translation…".

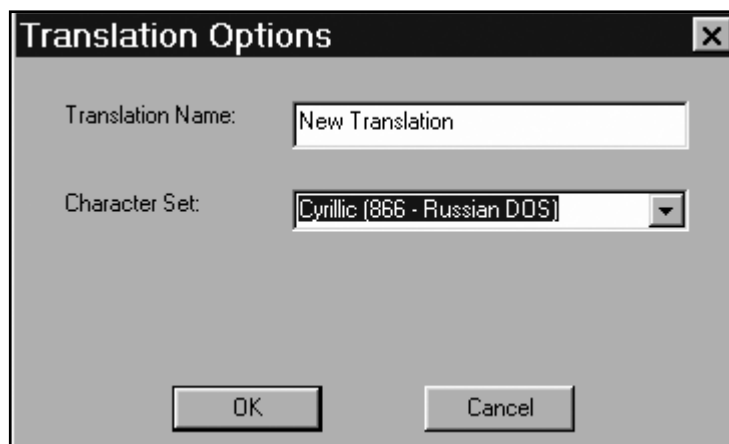7. A display will appear, similar to that shown in the figure below.

Figure 31

8. Return to the AccuMate screen and use the mouse to highlight the literal to be translated. The "Edit Text" box will appear.

9. From the character map display, click on the first letter of the new phrase, then click on "Select." The letter will appear in the "Characters to Copy" box. Repeat this step until the entire phrase appears in the "Characters to Copy" box.

10. Position the cursor to the left of the phrase, then drag the mouse across the phrase so that it is completely highlighted.

11. From the keyboard, type "Ctrl" and "C" simultaneously to copy the selected text to clipboard.

12. Position the cursor in the "New Text" box on the AccuMate's "Edit Text" display.

13. From the keyboard, type "Ctrl" and "V" simultaneously to paste the new literal into the text box.

14. Click "OK" to close the box. The new literal translation will appear on the AccuMate's translation window screen.

15. To save these changes, choose "File" then "Save As…" from the AccuMate tool bar. Give the file a unique name, such as "Russian.lng".

AccuMate Equation Editor

The AccuMate makes it easy for the operator to direct the AccuLoad III to perform certain functions that are executed on a periodic basis. The AccuMate Equation Editor allows the operator to create application specific calculations, as well as to insert, delete, reorder, and edit existing equation lines. The Equation Editor is accessed by selecting *File/ New/Equation Set*. Doing so will result in a display similar to that shown in the figure below.
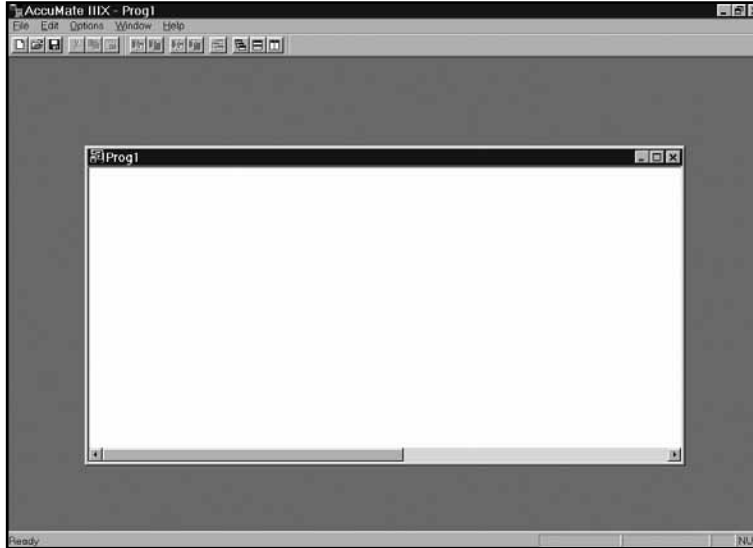

Figure 32

Next, select *Edit/Insert New* to obtain the dialog box shown in Figure 33. Use the pull-down menu at the top of the display to indicate the type of equation to be set. An explanation of Boolean and algebraic expressions is included in the next subsection of this manual.
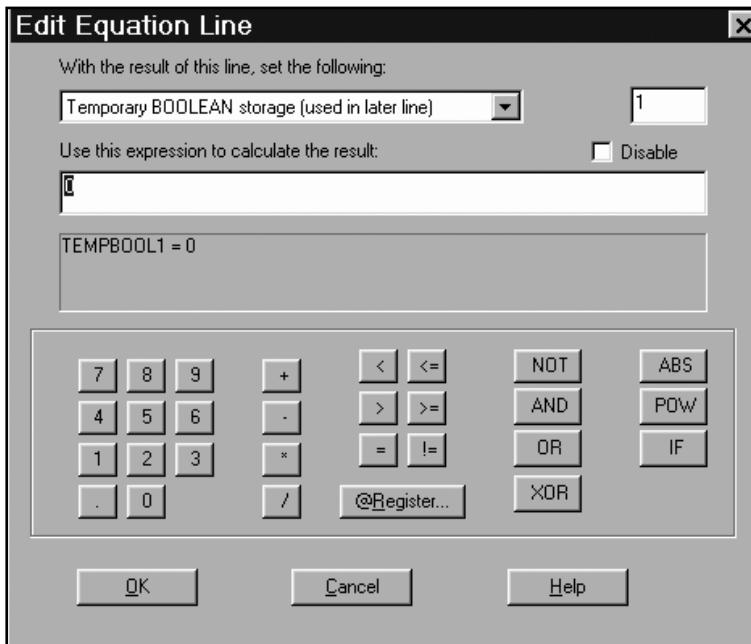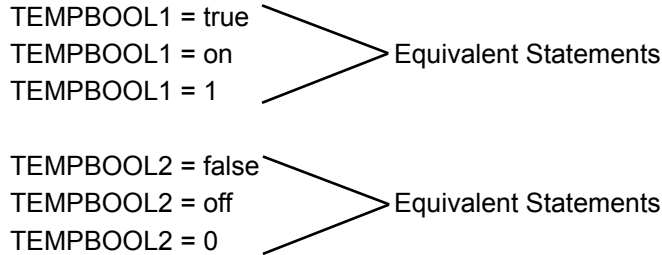

Figure 33

Boolean/Algebraic Statements

Boolean statements have two conditions: "true" or "false." They may also be represented as "on" or "off," or as integer values from 0 to 255. Any non-zero value is considered true; zero is false. Boolean statements can be used to create customized instructions to monitor inputs, control outputs, and calculate report values. The instructions are defined at the AccuMate, then downloaded to the AccuLoad III. The different ways of expressing Boolean statements are shown below:

TEMPBOOL1 = true
TEMPBOOL1 = on   } Equivalent Statements
TEMPBOOL1 = 1

TEMPBOOL2 = false
TEMPBOOL2 = off   } Equivalent Statements
TEMPBOOL2 = 0

The logical operators used in conjunction with Boolean statements are "NOT", "AND", "OR", and "XOR".

Refer to these definitions when studying the examples below:

- TEMPBOOL1 = True
- TEMPBOOL2 = True
- TEMPBOOL3 = False

NOT   A Boolean logic operator indicating negation. A variable designated with a "NOT" in front of it will be the opposite of its current value. It is a switching function for one variable.
Example: TEMPBOOL4 = NOT TEMPBOOL3 (True)

AND   A Boolean logic operator. If two variables are involved, both must be true for the output to be true.
Example: TEMPBOOL5 = TEMPBOOL1 AND TEMPBOOL2 (True)
Example: TEMPBOOL6 = TEMPBOOL1 AND TEMPBOOL3 (False)

OR   A Boolean logic operator. Using two variables, only one needs to be true for the output to be true.
Example: TEMPBOOL7 = TEMPBOOL1 OR TEMPBOOL3 (True)

XOR   An exclusive or Boolean logic operator in which the output is true if either of two variables is true but not if both are true.
Example: TEMPBOOL8 = TEMPBOOL1 XOR TEMPBOOL3 (True)
Example: TEMPBOOL9 = TEMPBOOL1 XOR TEMPBOOL2 (False)

Algebraic operators used in conjunction with algebraic statements are as follows:

- " + " – Used to add two numerical values (2 + 2 = 4)
- " - " – Used to subtract two numerical values (4 - 2 = 2)
- " * " – Used to multiply two numerical values (2 * 2 = 4)
- " / " – Used to divide two numerical values (1/2 = 0.5)
- "ABS" – Used when the absolute value of a number is required (| -2 | = 2)
- "POW" – Used to take a number to a power (2POW2 = 2^2)

Conditional operators used in conjunction with Boolean and algebraic statements are as follows:

- "IF" – Used in statements where if a condition exists, then another event is to occur
- " < " – Less than (1 < 2)
- " > " – Greater than (2 > 1)
- " <= " – Less than or equal to (1 <= 2)
- " >= " – Greater than or equal to (2 >= 2)
- " = " – Equal to (1 = 1)
- " != " – Not equal to (1 ! = 5)

All processing is from left to right and top to bottom:

Example: 1 + 3 * 4 / 2 – 1

4

16

8

7
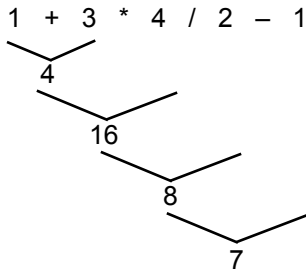
There are 99 Boolean registers and 99 float registers. The maximum number of instruction lines per expression is 200, and the maximum number of operations per statement is 4. All Boolean and algebraic equations for an AccuLoad III must be stored in a single file, and all changes to equations must be made in this file.

Specific Boolean Expressions

When constructing a set of equations that take action based on a level value (such as a temperature, a status value, the state of a digital I/O point, or any other value that may change between the evaluation of one equation and the next), read the value into a temporary or user-defined variable (Boolean or float, as applicable) and use the variable, not the actual value, in multiple equations.

Boolean equations can be more clearly expressed as a result of an evaluated expression than by assigning a value conditionally. For example, let us as-sume that we want to turn on a digital output when the product temperature of the meter is between 70° and 90°, inclusive, and turn the same digital output off again when the temperature is no longer within that range. Because of the left-to-right evaluation of Boolean and algebraic expressions, it is recommended that the expressions be broken down into simple expressions so that the results are as expected.

Setting a Timer

Sixteen timers are available in the AccuLoad III. The breakdown is as follows:

- 4 - 0.1 (Tenth) Second
- 4 - 1 (One) Second
- 4 - 1 (One) Minute
- 4 - 1 (One) Hour

A timer can be started by writing a 1 to it, and reset by writing a 0. Timers will hold values from 0 to 65535. To instruct a time to count down, set it to a negative number. For example, if Timer5 is set to –20, it will stop in 20 seconds. If a continuously run-ning timer is desired, include a line in the expression that resets the timer to 1 when it stops.

$$\text{Timer5} = 1 \text{ IF Timer5} = 0$$

Setting an Alarm

Ten user alarms are available in the AccuLoad III. These alarms are programmable, and clearable in Run or Ready mode. A text string of up to 18 characters may be associated with each alarm. The set commands available are as follows:

- Set Alarm Output #1
- Set Alarm Output #2

Inputs and Outputs

The AccuLoad III can monitor any of the digital and analog inputs, and control any of the digital and analog outputs using operator-configured Boolean commands. Outputs can be configured for general purpose applications, and can be turned on or off by equations.
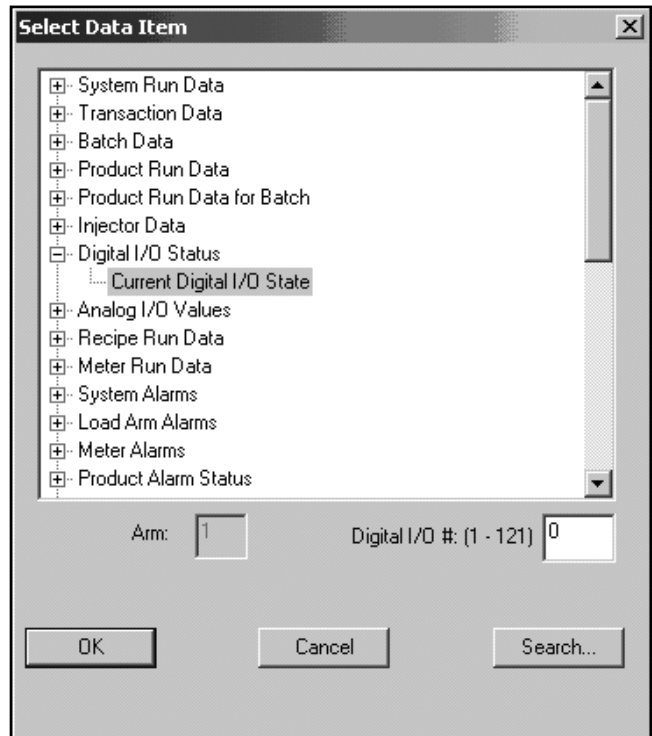
The digital I/O #: (1 – 121) is the offset that are used to monitor the status of the digital I/O the numbers are associated to the relays as indicated in the tables below:

1 to 43 are inputs and are numbered such in the AccuMate PC program:

Input Number	Description	Hardware Version
1-3	DC on KDC Board	S, N4, Q and SA
4-6	DC on EAAI Board	S, N4, Q and SA
7-11	AC on EAAI Board	S, N4, Q and SA
12-15	AC on BSE Board	Q and SA
16-23	DC on BSE Board	Q and SA
24-33	DC on AICB #1 Board	S, NA, Q and SA
34-43	DC on AICB #2 Board	Q and SA

44 to 121 are outputs and are numbered from 1 to 78 in the AccuMate PC program:

Output Number	Description	Hardware Version
44-46	DC on KDC Board	S, N4, Q and SA
47-57	AC on EAAI Board	S, N4, Q and SA
58-73	AC on BSE Board	Q and SA
74-81	DC on BSE Board	Q and SA
82-101	AC on AICB #1 Board	S, NA, Q and SA
102-121	AC on AICB #2 Board	Q and SA

Example of using these I/O points in an equations that monitors a swing arm switch and two grounding systems to make sure both are aligned before loading is allowed:

; Monitor Arm #1 Swing arm Switch Bay #1 (1 is a DC input on KDC board)
TEMPBOOL1 = Digital I/O status 1 Current Digital I/O State = ON
; Monitor Input from Ground System Bay #1 (7 is an AC input on EAAI board)
TEMPBOOL2 = Digital I/O status 7 Current Digital I/O State = ON
; Comparison that of the Swing Arm Switch and Ground System, both have to be true for TEMPBOOL3 to be true
TEMPBOOL3 = TEMPBOOL1 AND TEMPBOOL2
;Digital Output 1 is turned on if the loading arm switch and the grounding system are both aligned on Bay #1

(TEMPBOOL3 is true). Digital Output #1 is wired into a permissive input allowing the AccuLoad to proceed with the transaction. (1 is a DC out-put on the KDC board)
DIGOUT1 = TEMPBOOL3

Variables and Registers

Temporary variables include the following:

- TEMPBOOL1 to TEMPBOOL99
- TEMPFLOAT1 to TEMPFLOAT99
- Place holders used by other instruction lines.

User memory consists of the following:

- USERBOOL1 to USERBOOL99
- USERFLOAT1 to USERFLOAT99.

All variables and registers can be read and written to by equations. They can also be accessed via AccuMate communications and their values included in user-configured reports.

Possible Boolean Applications

In addition to the applications listed above, several other operations can be initiated or controlled using Boolean equations. These include the following:

- Periodic maintenance notification
- Relay output at first trip point
- Viscometer input set points
- Detection of density change
- Temperature calculations (C, F or K)
- Indicator lights
- Close safety valve on an overrun alarm.

Example A: Closing a relay (and safety valve downstream of a digital control valve) in the event of an overrun alarm

DIGOUT4 = Load Arms OA: System Overrun Alarm

Take the following steps to initiate this action:

1. With the AccuMate program open, go to File/New Equation Set.
2. Click on Edit/Insert New
3. From the "Edit Equation Line" screen, top box, select the output to be configured for this function. (Note: the output must be configured for general purpose use in the configuration.) For this example, we will use output #4.
4. Move the cursor to the box directly below and delete the 0.
5. Move the mouse to the button for @register and click.
6. From the "Select Data Item" screen, select the Load Arm Alarms by clicking on it.
7. Move the cursor down to OA: System Overrun Alarm.
8. Click on the OK button.
9. The AccuMate will display @152699392 (register number) in the second box. Directly below the register number will be displayed "OUTPUT4 = Load Arm Alarms OA, System Overrun Alarm."
10. Click on OK. The register and alarm information will be transferred to the scratch pad.
11. The equation can now be downloaded to the AccuLoad III by clicking on the "Dump Selected Item" button.
12. The equation can be saved as a file for future use by going to "File/Save As" and assigning a file name to the data. Equation files have a .eq extension.

Example B: Closing a relay (and safety valve downstream of a digital control valve), unless intervention has occurred either through the keypad or through communications.

TEMPBOOL1 = Load Arm ALarms OA: System Overrun Alarm; check USERBOOL1 if not 0 ignore alarm, keep valve open

TEMPBOOL2 = TEMPBOOL1 AND NOT USERBOOL1; check USERBOOL2 if not 0 close valve always

DIGOUT 4 = TEMPBOOL2 or USERBOOL2

Take the following steps to initiate this action:

1. With AccuMate program open, go to File/New/ Equation set.
2. Click on Edit/Insert New.
3. From the Edit Equation Line screen, top box, select the temporary Boolean storage.

4. The box to the right will indicate this is register1.
5. Move the cursor to the box directly below and delete the 0.
6. Move the mouse to button for @register and click.
7. From the Select Data Item screen, select Load Arm Alarms by clicking the left hand button on the mouse.
8. Move the cursor down to OA: System Overrun Alarm.
9. Click on the OK button.
10. The AccuMate will display @152699392 (register number) in the second box. Below that box will be displayed "TEMPBOOL1 = Load Arm Alarms OA, System Overrun Alarm."
11. Click on OK to transfer the data to the scratch pad.
12. Click on Edit/Insert New to start next item.
13. The next line is a comment line for a reminder of what the next statement will do. From the Edit Equation Line screen, top box, select "comment only" for this line.
14. Move the cursor to the box directly below and delete the 0.
15. Type in the comment "check USERBOOL1 if not 0 ignore alarm, keep valve open."
16. Click on OK to transfer the comment to the scratch pad. (Note: Comments are not downloaded to the AccuLoad III; therefore, if equations are uploaded from an AccuLoad, the comment lines will not appear.)
17. Click on Edit/Insert New Item to start the next item.
18. From the Edit Equation Line screen, top box, select Temporary Boolean Storage.
19. Move the cursor to the box at the right and change the number from 1 to 2.
20. Move the cursor to the box directly below and delete the 0.
21. Enter "TEMPBOOL1 AND NOT USERBOOL1" (AND and NOT can either be typed or selected from the buttons below).
22. Click on OK to transfer the statement to the scratch pad.
23. Click on Edit/Insert New to start a new item.
24. The next line is a comment line for a reminder of what the next statement will do. From the Edit Equation Line screen, top box, select "Comment Only" for this line.
25. Move the cursor to the box directly below and delete the 0.
26. Type in the comment "Check USERBOOL2 if not 0 close valve always".

27. Click on OK to transfer the statement to the scratch pad.
28. Click on Edit/Insert New Item to start the next item.
29. From the Edit Equation Line screen, top box, select "DIGITAL OUTPUT #4."
30. Move the cursor to the box directly below and delete the 0.
31. Enter "TEMPBOOL2 OR USERBOOL2" (OR can either be typed or selected from the buttons below).
32. Click on OK to transfer the statement to the scratch pad.
33. The expression is now complete. The file can be saved or downloaded to the AccuLoad and/or another expression can be added to the file.

Example C: Turn on digital output #1 when the product temperature is between 175º and 250º.

TEMPBOOL1 = Arm Product Run Data(1)
Current Product Temperature
>= 175

TEMPBOOL2 = Arm Product Run Data(1)
Current Product Temperature
<=250

TEMPBOOL3 = TEMPBOOL1 AND TEMPBOOL2

DIGOUT1 = ON if TEMPBOOL3

DIGOUT1 = OFF if NOT TEMPBOOL3
or
TEMPBOOL1 = Transaction Data Current Temperature >=175

TEMPBOOL2 = Transaction Data Current Temperature <=250

DIGOUT1 = TEMPBOOL1 AND TEMPBOOL2

Both of these groups of statements will yield the same results. Note that Current Product Temperature appears as Register 68289537 when selected and before moved to the file.

Example D: Convert the current product temperature (Celsius) to Fahrenheit
USERFLOAT1 = Arm 1 Product Run Data(1)
Current Product Temperature
* 1.8 + 32

Note that the current temperature register is 68289537.

Algebraic Expressions

The AccuLoad III converts all algebraic values to double precision floating point values prior to performing calculations.

Calculations may be defined using positive or negative whole numbers, fractional numbers, or a combination. Algebraic expressions are evaluated from left to right and all operators (+, -, /, *) have the same precedence. Multiplication does not take place before addition, etc. The following expression has a result of 54.

TEMPFLOAT1 = 4 + 5 * 6 (Result 54, 4 + 5 = 9 * 6 = 54)

Algebraic processing will allow out of range values, such as division by zero, or evaluations of expressions whose results are greater than the range of a double precision floating point variable. It is the responsibility of the user to ensure that valid expressions are used.

Coefficient of Thermal Expansion Calculator

The Coefficient of Thermal Expansion Calculator is used to determine the Coefficient of Thermal Expansion for nonstandard products that are not listed in API reference tables. This tool provides an accurate coefficient value, which the AccuLoad will use to calculate the CTL value.
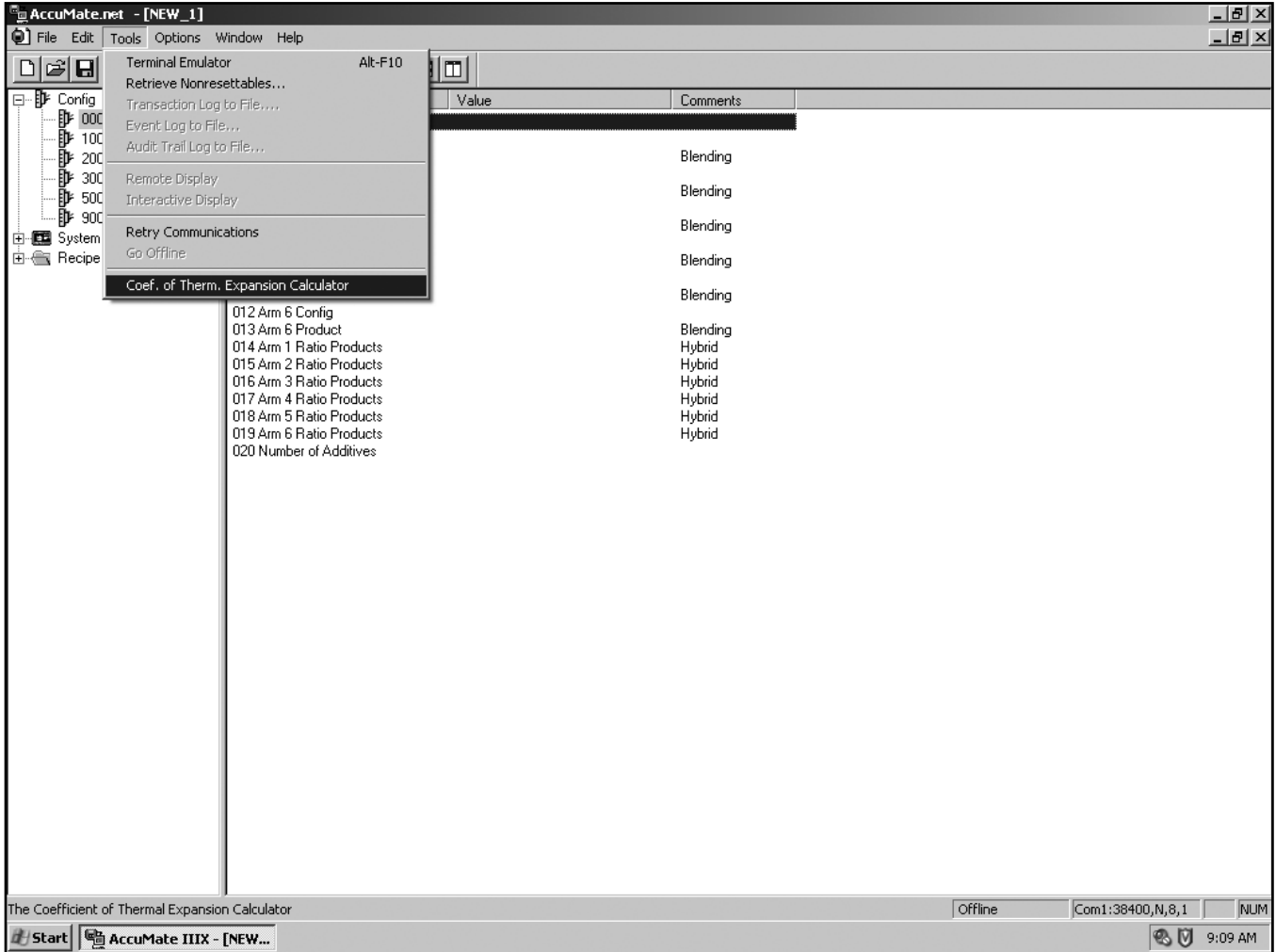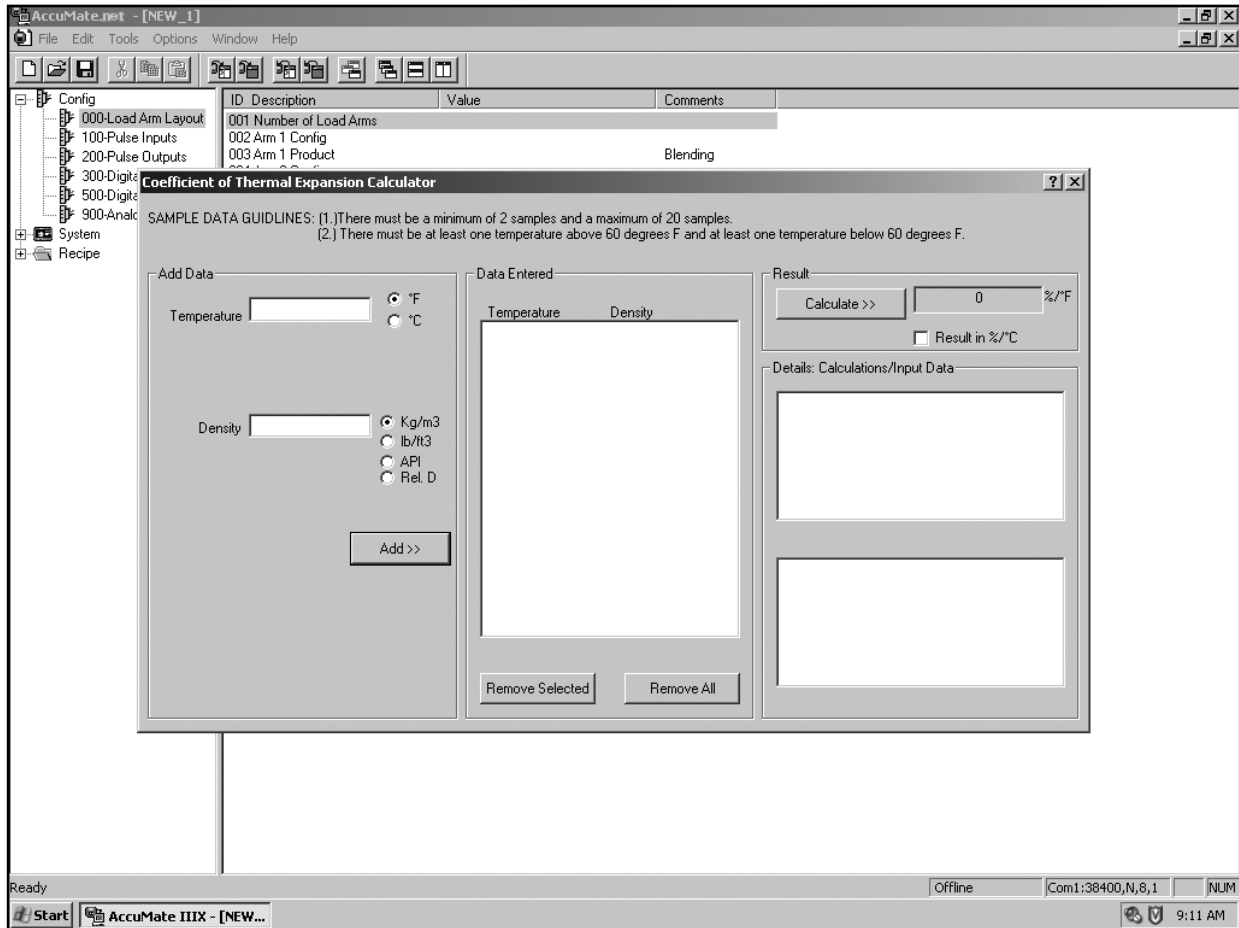
This calculator uses input sample data which consists of temperature and density values. There are several guidelines for entering sample data. These guidelines are listed below:

- The calculator will not allow more than 20 samples to be entered and will not calculate the coefficient if less than 2 samples entered.
- One sample temperature must be above 60°F and one sample temperature must be below 60°F in order for the coefficient to be calculated.
- Temperatures may not exceed the range: {-999.9 to 999.9}
- Densities in kg/m3 or lb/ft3 may not exceed the range: {0.0 to 9999.9}
- Densities in API may not exceed the range: {-999.9 to 999.9}
- Densities in Relative Density (Rel. D) may not exceed the range: {0.0 to 9.9}

For accuracy purposes, API recommends entering at least10 samples and all of the data should be as precise as possible. For instance, 888.8889 kg/m3 should be entered just as shown; do not round this value and enter it as 888.89 kg/m3. If the chosen units are different than Fahrenheit and Kg/m3, the accuracy of the resulting coefficient will NOT be sacrificed.

Removing data from the list of entered data can be easily done. To select undesired data from the list of data, click on the data that should be deleted. Then click the Remove Selected button and the selected data will be removed. If all of the data is undesired, then no data needs to be selected; just simply click the Remove All button.

If metric units are desired, click the metric units check box located below the result text box. The units in the result will change and the result will undergo a conversion procedure.

1. Prepare an AccuMate file. API Table (ID number 411) must be set to "6C". This table defines a non standard product.
2. Now enter the coefficient value as the reference density (ID number 412).
3. If temperature input is available, make sure that the maintenance temperature (ID 401) is set to -999.9. Otherwise, if a temperature input is not available, then enter a temperature here.
4. Set these parameters all the same for the remaining products. In this case, Products 2, 3, and 4 would all use a 6C API table along with the calculated reference density.
5. When finished dump the AccuMate file to the AccuLoad. Now the coefficient of thermal expansion as been set and an accurate CTL value will be calculated during the next batch.
6. Now run a batch.

The following literature can be obtained from FMC Technologies Measurement Solutions Literature Fulfillment at measurement.fulfillment@fmcti.com or online at www.fmctechnologies.com/measurementsolutions. When requesting literature from Literature Fulfillment, please reference the appropriate bulletin number and title.

AccuMate for AccuLoad III

Specification .... Bulletin SS06032
AccuMate for AccuLoad III-X Installation/Operation ....Bulletin MN06136

AccuLoad III-X

Specification .... Bulletin SS06036
Installation/Operation...Bulletin MN06135
Operator Reference...Bulletin MN06129
Installation/Operation...Bulletin MN06130L
Modbus Communications ....Bulletin MN06131L

Revisions included in MN06136 Issue/Rev. 0.6 (9/13)
     Page 2: Updated Installing AccuMate

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

Contact information is subject to change. For the most current contact information, visit our website at www.fmctechnologies.com/measurementsolutions and click on the "Contact Us" link in the left-hand column.

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