



MC 100 Software Interface for MasterTrace Controllers

What is MC100 for Internet?

MC100 for Internet (MC100 for Windows Version 4.00) is designed for plant wide monitoring and programming of MasterTrace heat tracing controllers using a standard PC running Windows 95, 98, NT4, 2000 and Windows XP operating system. It communicates with control modules through RS485 serial link with facilities for bringing data on any part of network to the desk top and controlling the operation of heat tracing controllers remotely. With its server/client Internet communication capability, cross continent control and maintenance of heat tracing systems are realities. It provides a graphical user interface to allow the operator to easily and quickly interpret the data collected from the field and program the controllers as required.

Alarm Status Function Window

Alarm Status Function Window can be opened via **View|Alarm Status** menu. It can **also be opened by clicking on the flashing red alarm button on the right-hand side of the speed bar**. This alarm button only appears if there is at least one alarm in the network.

Alarm Status Function Window displays all the current alarm information in a tabular format. Each alarm occupies 1 row and 6 columns (Port, Heater #, Heater Name, Alarm Type, Setpoint, Actual Value). The window can only display 20 alarms in a page. **If there are more than 20 alarms in the network, use the page up and page down buttons located on the right-hand side of the table to view the alarms on the different pages.**

Some alarms are **latched alarms**. To reset a latched alarm, one must follow these procedures:

- (1) Move the mouse cursor to the alarm row.
- (2) Double click the left mouse button.
- (3) Confirm/Cancel the reset action by clicking the *Yes/No* box on the confirmation box.

Backup/Restore Function Window

Backup/Restore Function Window can be opened via **Tools|Backup/Restore** menu. It is designed to backup/restore all the setpoints and setups of a group of selected heaters into/from files. **Each selected heater will have its own setpoint backup file saved in the Config sub-directory.** For a heater with Modbus Protocol, its data file is named as mcP-M-Hsp.txt, where P is the port number, M is the module number and H is the heater number. For a heater with MasterTrace Protocol, its data file is named as mcP-Hsp.txt, where P is the port number and H is the heater address. If the backup file exists, a new backup file will be created and the old one will be renamed to mcP-M-Hsp.bak or mcP-Hsp.bak.

The **Backup/Restore Function Window** consists of two panels (Option panel and Backup/Restore Heater Map panel) and one Start button.

To perform Backup/Restore operation, one must follow these procedures:

- (1) Select backup or restore operation by checking the radio buttons on the Option panel.
- (2) Select the desired heater by choosing the correct com port and checking the heater box on the Backup/Restore Heater Map panel.
- (3) Start the operation by clicking on the Start button.
- (4) If the operation has been indeed started, a progress bar will appear and the word "Start" on the Start button will be changed to "Stop".
- (5) Unless the operation is manually stopped by clicking on the Stop button, it will continue until the last heater is backup/restored.

Change Password

Password, if there is one, is required if you want to change *Program Enable* or to perform *Controller Commissioning/Addressing*. The default password is no password after the MC100 is newly installed, which means that you don't need a password to perform the above tasks.

To change the password, you must follow these procedures:

- (1) Start the task via **Tools|Change *Password*** menu.
- (2) If currently the MC100 has a password, a Password box will be displayed asking for the old password. Enter the current password and click the OK button.
- (3) At this moment, a ***Confirm*** box will be displayed asking if you want a password or not. If you don't want a password, click on the ***No*** button and the task is accomplished. If you want a password, click on the ***Yes*** button and a Password box will be displayed asking for the new password.
- (4) **Enter your new password and click on the OK button.**

Communication Port Setup Function Window

Communication Port Setup Function Window is designed to setup the RS485 communication between MC100 and the heat-tracing controllers, and the Internet communication between server and clients. It can be opened via **View|Port** menu.

There are up to eight COM ports possible being used by MC100 to communicate with heat-tracing controllers. To properly setup a COM port, follow these procedures:

(1) A RS232/RS485 converter is needed for communication signal conversion between each com port on the PC and the heat-tracing controllers. Make sure the wire connection is correct. **Fig. 2** is the wiring diagram for the RS232/RS485 converters from WIZ-TEC Computing Technologies Inc.

(2) Select the COM port.

(3) Select the desired baud rate. For the COM port which is not connecting to any controllers, its baud rate should be set to None.

(4) Select the proper protocol. If a Com port is connected to the controllers with Modbus protocol (firmwares MSxx.Dxx), choose Modbus D
If a com port is connected to the controllers with MasterTrace protocol (firmwares MS10.Cxx, MS10.Bxx, RS10.Bxx, RS10TC.Bxx), choose MasterTrace C or MasterTrace B.

(5) Select the proper module/heater range. For a particular com port, all the controllers to which it is connected should have their module numbers (Modbus D protocol) or heater addresses (MasterTrace protocol) falling into one module/heater range.

(6) Select all the modules for communication. For each COM port, there are 30 module boxes within the Communication Map panel. If the heaters on a controller module are to be communicated with MC100, their corresponding module box must be checked. On the other hand, if a controller module does not exist or it is power down, selecting the module for communication will generate NO RESPONSE alarm. To get rid of the alarm, de-select the module by un-checking the module box.

(7) Save the configuration.

(Note: after each change made ensure that the information has been saved)

Alarm Contact panel is designed to program how the alarm contact on the RS232/RS485 converter reacts to the alarm situation in MC100. Some RS232/RS485 converters have an alarm contact some of them do not. For those RS232/RS485 converters with alarm contact, such as WH2-CVTR manufactured by WIZ-TEC Computing Technologies Inc., the alarm contact can be programmed in one of the following 3 ways to react to the alarm situation in MC100:

(1) Disabled.

The alarm contact will not react to the alarm situation in MC100.

(2) Energized on port alarms.

The alarm contact will be energized if there is at least one alarm among all heat-tracing modules communicating to the selected COM port, and de-energized otherwise.

(3) Energized on system alarms.

The alarm contact will be energized if there is at least one alarm among all heat-tracing modules communicating to the MC100, and de-energized otherwise.

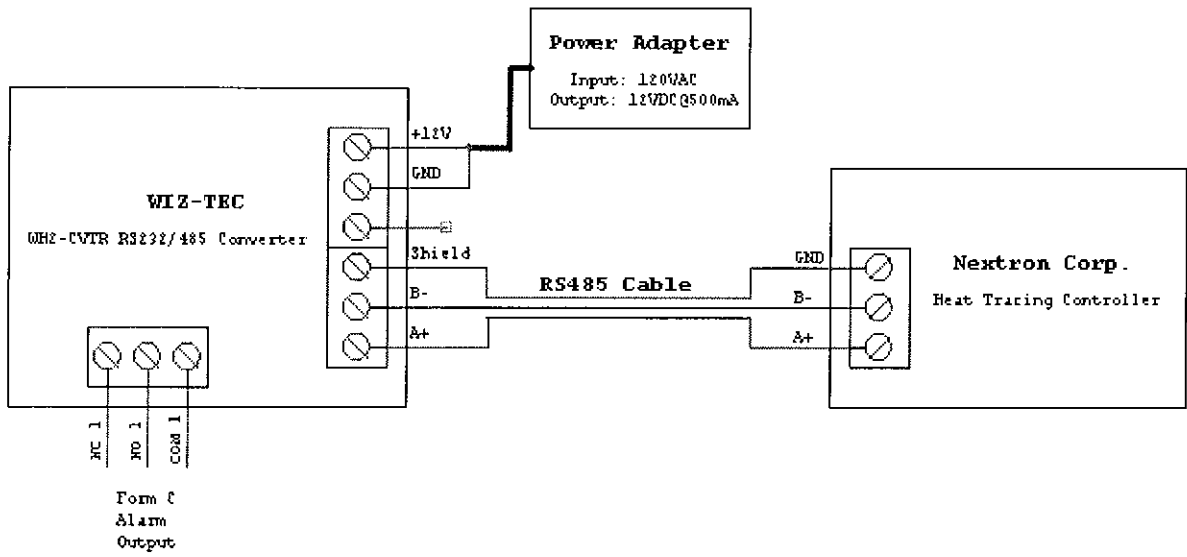


Fig. 2 RS232/RS485 Converter Wiring Diagram

Clients with MC100 Internet

Internet Setup panel is designed to setup the internet communication network. A MC100 internet communication network consists of one server (MC100 server) and one or more clients (MC100 client).

A MC100 server must be the PC which is the master in the RS485 communication network. Its functionality's are two-fold. First, it has a physical link with all heat-tracing controllers and uses these links to query data from the controllers in the RS485 communication network. Secondly, it is the server in the Internet communication network, and upon request, it will pass all the information obtained from the RS485 communication network to its clients throuout the world.

To setup a MC100 server, follow the following procedures:

- (1) Select Server from the Option drop-down edit box.
- (2) Enter the server computer's IP Address into the Server IP edit box.
- (3) Start the MC100 server by clicking the Start Internet Operation button.

The IP Address may vary depending on the different network environment.

- (1) If the MC100 server and clients are located in the same LAN (Local Area Network), the IP Address is the LAN IP Address of the MC100 server computer, normally in the format of 192.168.x.x. In Windows 95 & 98, the IP Address can be found out by running "winipcfg" from the Start menu. In Windows NT, 2000, it can be found out by running "ipconfig" from the DOS Prompt.
- (2) If the MC100 server is a stand-alone computer, which does not belong to any LAN and is not behind any router or firewall, the format of the IP Address could be anything other than 192.168.x.x. It can be found by using the same method as above.
- (3) If the MC100 server and clients are located in the separated LANs, the IP Address is the WAN IP Address of the LAN, which the server computer belongs to. In this case, since the MC100 server computer is connecting to the client computers through a router or firewall, users must ask their network administrator to configure the Port Forwarding (to the MC100 server computer) function on Port 5000 of the router.

An MC100 client is a MC100 software installed on a computer and configured as a client in the MC100 internet communication network. Even though it has no physical link with any heat-tracing controllers, it can monitor and control the operation of any controllers through the MC100 server. **With the exception that the MC100 client has fewer function windows than the MC100 server the two are identical in terms of screen structure and operation.**

Once the MC100 server is setup and running an MC100 client can be setup by following these procedures:

- (1) Select Client from the Option drop-down edit box.
- (2) Enter the MC100 server computer's IP Address into the Server IP edit box.
- (3) Start the MC100 client by clicking the Start Internet Operation button.

Controller Commissioning/Addressing Function Window

Controller Commissioning/Addressing Function Window can be opened via **Tools|Controller Commissioning/Addressing** menu. Controller Commissioning/Addressing includes three operations.

They are:

- (1) Reset EEPROM. It is used to reset all the heater setpoints on a controller module to their default values.
- (2) Read address. It is used to read the module number (Modbus Protocol) or the starting heater address (MasterTrace Protocol) of a controller module.
- (3) Assign address. It is used to assign the module number (Modbus Protocol) or the starting heater address (MasterTrace Protocol) of a controller module.
Each operation can be carried out if the target controller module is the only one in listening new address mode and its program enable jumper is in Enable position.
The Controller Commissioning/Addressing panel consists of 3 edit boxes and 1 button, i.e., Com Port drop-down edit box, Option drop-down edit box, Address edit box and Start button.

To perform one Controller Commissioning/Addressing operation, one must follow these procedures:

- (1) Select the proper com port using the Com Port drop-down edit box.
- (2) Select the desired operation using the Option drop-down edit box.
- (3) If the operation is Assign Address, select the desired module number or starting heater address using increment/decrement button on the Address edit box.
- (4) Clicking on the Start button.
- (5) Start the operation by clicking on the Yes button on the popup Confirmation Box.
- (6) It takes about 15 seconds for the target controller to accomplish the operation. During this period, the word "Start" on the Start button will be changed to "Wait ...".
- (7) If the operation is successful, word "Done !" will appear on the Start button for a while. Otherwise, word "Failed !" will appear. For a successful Read address operation, the module number or the starting heater address will appear on the Address edit box.
- (8) In the end, word "Start" will re-appear and a new operation can be started.

Copy Heater/Module Function Window

Copy Heater/Module can be opened via **Tools|Copy Heater/Module** menu. It is designed to allow user to copy all the setpoints and setups from one heater/module to another heater/module. The Copy Heater/Module Function Window consists of 3 panels (Option, Source Heater/Module, and Destination Heater/Module panel) and 1 Start button.

Copy Heater/Module operation can't be started unless the following conditions are met:

- (1) The source heater/module and destination heater/module share the same protocol.
- (2) The source and destination have different heater address or module number.
- (3) Both the source and destination heaters/modules are communicating with MC100.
- (4) Module to module copying can't be performed between the modules with MasterTrace protocol.
- (5) If it is module to module copying, both the source and destination modules must have the same numbers of heater, i.e., MS1 to MS1, MS5 to MS5, MS10 to MS10.

To start a Copy Heater/Module operation, one must follow these procedures:

- (1) Define the copying option by clicking on desired radio button the Option panel.
- (2) Select the desired source heater/module by using the Source Heater/Module selector.
- (3) Select the desired destination heater/module by using the Destination Heater/Module selector.
- (4) Start the copying operation by clicking on the Start button.
- (5) If the copying operation has been indeed started, a progress bar will appear and the word "Start" on the Start button will be changed to "Stop".
- (6) Unless the copying operation is manually stopped by clicking on the Stop button, it will continue until the last parameter is copied.

Data Logging Function Window

Data Logging Function Window can be opened via **Tools|Data Logging** menu. It is designed to record the actual measured data such as temperature, current, ground fault current of any selected heaters at regular time interval within a specified period of time. Each selected heater will have its own data file saved in the Log sub-directory. For a heater with Modbus Protocol, its data file is named as mcP-M-Hdata.txt, where P is the port number, M is the module number and H is the heater number. For a heater with MasterTrace Protocol, its data file is named as mcP-Hdata.txt, where P is the port number and H is the heater address. If the size of the data file is too big to add more data, a new mcP-M-Hdata.txt or mcP-Hdata.txt will be created to record the new data. The old data will be kept in a file named mcP-M-Hdata.bak or mcP-Hdata.bak.

The Data Logging Function Window consists of 2 panels (Log Options panel and Data Log Heater Map panel and Log Options panel) and 1 Start logging button. Log Options panel is used to define log options such as Start Date, Start Time, Interval and Duration. Data Log Heater Map panel is used to select all the heaters to be logged.

To perform Data Logging operation, one must follow these procedures:

- (1) Define the logging start date by using the Start Date drop-down edit box on the Log Options panel.
- (2) Define the logging start time by using the Start Time edit box on the Log Options panel.
- (3) Define the logging interval by using the Interval edit box on the Log Options panel.
- (4) Define the logging duration by using the Duration edit box on the Log Options panel.
- (5) Select the desired logging heater by choosing the correct com port and checking the heater box on the Data Log Heater Map panel.
- (6) Start the data logging by clicking on the Start logging button.
- (7) If the logging operation has been indeed started, a progress bar will appear and the word "Start logging" on the Start logging button will be changed to "Stop logging".
- (8) Once the logging has been started, unless the Stop logging button is clicked, it will continue until its logging duration is expired.
- (9) Save the configuration. This will continue the logging operation even if the MC100 is exited and re-launched.

Heater Measured Function Window

Heater Measured Function Window displays all measured data values of a selected heater, such as heater current, ground fault current, temperature, etc. It can be opened via View|Measured menu or Measured speed button on the speed bar. There are two panels on the window. One is Heater Select and the other is Heater Measured Values.

Heater Select panel is designed to allow user to select the desired heater to view its measured data. There are two ways to select a heater. (1) Select a heater by using the three drop-down edit boxes (com port, module number and heater number) in combination. (2) Select a heater using the previous heater or next heater button.

All the measured data values related to the selected heater are displayed on the Heater Measured panel. MC100 will be constantly polling the selected heater to update those data. Depending on the type of the controller module, the type of Heater Measured panel can change from fixed size panel (single phase MS10) to horizontal scrollable panel (three phase MSx), or to vertical scrollable panel (MSx with dual RTDs).

Heater Setpoint Function Window

Heater Setpoint Function Window displays all setpoint values of a selected heater. It can be opened via View|Heater Setpoint menu or Heater Setpoint speed button on the speed bar. There are two panels on the window. One is Heater Select and the other is Heater Setpoints.

Heater Select panel is designed to allow user to select the desired heater to view or adjust its setpoints. There are two ways to select a heater. (1) Select a heater by using the three drop-down edit boxes (com port, module number and heater number) in combination. (2) Select a heater using the previous heater or next heater button.

Heater Setpoint panel lists all the necessary setpoint edit boxes related to the selected heater. Depending on the type of the controller module, the type of Heater Setpoint panel can change from fixed size panel (single phase MS10) to horizontal scrollable panel (three phase MSx), or to vertical scrollable panel (MS1). Some setpoint edit boxes are simply drop-down edit boxes. Some of them are the combination of edit box and increment/decrement buttons. To change a setpoint using drop-down edit box or increment/decrement button, it is just a matter of mouse click. To change a setpoint using edit box, use mouse or Tab key to enter into the edit field first. Then, use keyboard to enter the setpoint value.

Heater Setup Function Window

Heater Setup Function Window displays all setup parameters of a selected heater. It can be opened via View|Heater Setup menu or Heater Setup speed button on the speed bar. There are two panels on the window. One is Heater Select and the other is Heater Setup.

Heater Select panel is designed to allow user to select the desired heater to view or adjust its setup parameters. There are two ways to select a heater. (1) Select a heater by using the three drop-down edit boxes (com port, module number and heater number) in combination. (2) Select a heater using the previous heater or next heater button.

Heater Setup panel lists all the necessary setup edit boxes related to the selected heater. Depending on the type of the controller module, the type of Heater Setup panel can change from horizontal scrollable panel (MS10) to horizontal and vertical scrollable panel (MS1). Some setup edit boxes are simply drop-down edit boxes. Some of them are the combination of edit box and increment/decrement buttons. To change a setup parameter using drop-down edit box or

increment/decrement button, it is just a matter of mouse click. To change a setup parameter using edit box, use mouse or Tab key to enter into the edit field first. Then, use keyboard to enter the parameter value.

On the right-hand side of the Heater Setup panel, there is a small Heater Notes panel. It consists of a text editor and a save button. User can enter any text information regarding to the selected heater. Upon clicking the save button, all the information entered will be saved.

Heater Statistics Function Window

Heater Statistics Function Window displays all statistic data values of a selected heater, such as heater maximum current, minimum temperature, etc. It can be opened via View|Statistics menu. There are two panels on the window. One is Heater Select and the other is Statistics.

Heater Select panel is designed to allow user to select the desired heater to view its statistic data. There are two ways to select a heater. (1) Select a heater by using the three drop-down edit boxes (com port, module number and heater number) in combination. (2) Select a heater using the previous heater or next heater button.

All the statistic data values related to the selected heater are displayed on the Statistics panel. MC100 will be constantly polling the selected heater to update those data. Depending on the type of the controller module, the type of Statistics panel can change from fixed size panel (single phase MSx) to horizontal scrollable panel (three phase MSx).

To reset a statistic data, one must follow these procedures:

- (1) Move the mouse cursor to the statistic data box.
- (2) Double click the left mouse button.
- (3) Confirm/Cancel the reset action by clicking the Yes/No box on the confirmation box.

To reset all the statistic data of the selected heater, one must follow these procedures:

- (1) Click the Reset Statistics button on the Statistics panel.
- (2) Confirm/Cancel the reset action by clicking the Yes/No box on the confirmation box.

Load Shedding Function Window

Load Shedding Function Window can be opened via **Tools|Load Shedding** menu or Loadshed speed button on the speed bar. It is designed to allow user to disable/enable a group of selected heaters manually or automatically on a certain condition. The Load Shedding Function Window consists of 2 panels (Heater Loadshed panel and Loadshed Heater Map panel) and 1 Start loadshed button. Heater Loadshed panel is used to define loadshed operation by choosing its Mode (manual or automatic), Option (disable heater or enable heater), Temperature Setpoint and Ambient Temperature Heater (for automatic mode only). Loadshed Heater Map panel is used to select all the heaters to be affected by loadshed operation. The Start loadshed button is used to start the loadshed operation.

There are two loadshed modes, manual mode and automatic mode.

In **manual mode**, upon clicking on the Start loadshed button, all the selected heaters will be sequentially disabled or enabled depending on the Option. After the last selected heater is disabled or enabled, the operation will be stopped.

In **automatic mode**, upon clicking on the Start button, MC100 will constantly monitor the temperature of the Ambient Temperature Heater. Once the temperature of the Ambient Temperature Heater is higher than the Temperature Setpoint, all the selected heaters will be sequentially disabled. Unless stopped by user, the automatic loadshed operation will continue. Should the above condition become true again, another round of disabling heater will be automatically started.

To perform Loadshed operation, one must follow these procedures:

- (1) Define the loadshed mode by using the Mode drop-down edit box on the Heater Loadshed panel.
- (2) Define the loadshed option by using the Option drop-down edit box on the Heater Loadshed panel.
- (3) If it's automatic mode, define the loadshed setpoint by using the Temperature Setpoint edit box on the Heater Loadshed panel. Also, select the ambient temperature heater by using the Ambient Temperature Heater selector.
- (4) Select the desired loadshed heater by choosing the correct com port and checking the heater box on the Loadshed Heater Map panel.
- (5) Start the loadshed operation by clicking on the Start loadshed button.
- (6) If the loadshed operation has been started, a progress bar will appear and the word "Start loadshed" on the Start loadshed button will be changed to "Stop loadshed".
- (7) An ongoing loadshed operation can be manually stopped by clicking on Stop loadshed button.
- (8) Save the configuration. This will continue the automatic loadshed operation even if the MC100 is exited and re-launched.

MC100 Screen Structure

A typical MC100 screen is shown in Fig.1. It consists of 4 major parts. They are: (1) System pull-up menu; (2) Speed bar; (3) Function window; (4) Status bar.

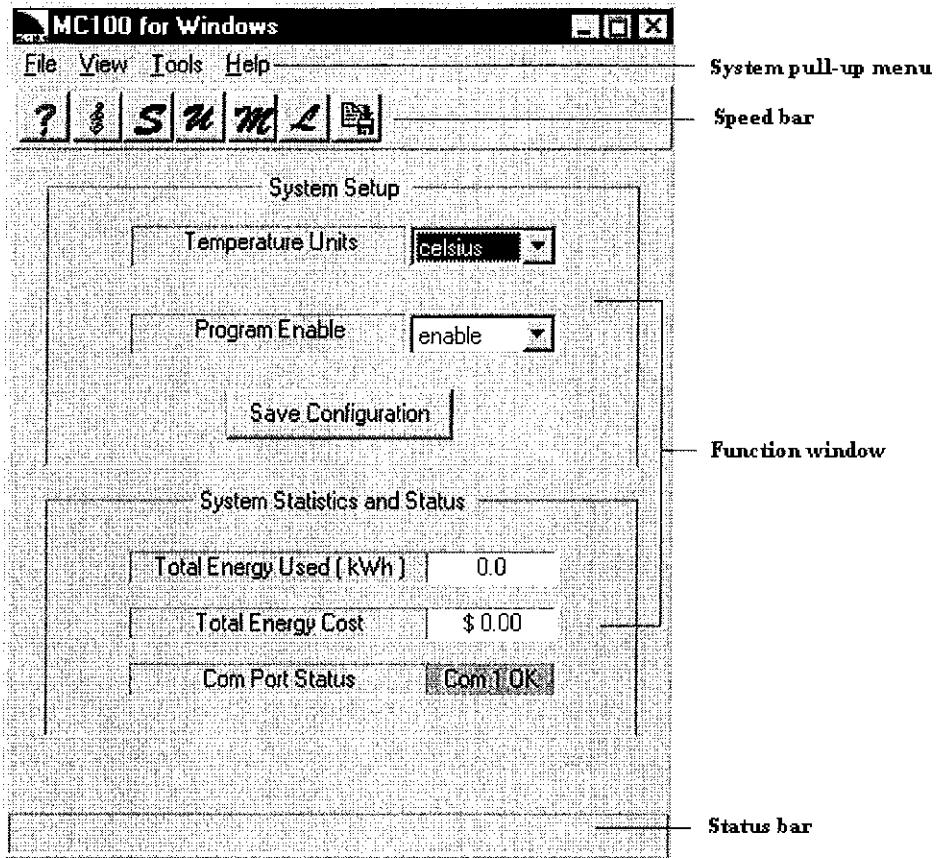


Fig.1 MC100 screen

Although System pull-up menu provides the complete access to any Function window, the speed button on the Speed bar offers one-click access to some often-used Function windows and tasks. Function window is MC100's primary working area. It displays all kinds of information, which MC100 gathers from each heat-tracing controller in the network. It also provides a graphical-user-interface system for user to interface with controllers and setup tasks. Status bar is used to display hint message whenever the mouse cursor is placed over an object.

Open and Print MC100 Files

As described in the above chapters, running MC100 will generate various files. User can open and print these files.

Five types of file can be opened and printed by MC100. They are:

- (1) MC100 configuration file.
- (2) MC100 heater setpoint backup files.
- (3) MC100 alarm files.
- (4) MC100 setpoint list file.
- (5) All text files.

To open and print a MC100 file, one must follow these procedures:

- (1) Click on **File|Open** menu.
- (2) A dialog box will appear. Select the desired file by choosing the right file folder and type.
- (3) Click the Open button on the dialog box.
- (4) After the file is opened, the contents of the file are displayed on the screen. Also, sub-menu Close, Print and Print Setup... become available on the File menu.
- (5) Click Print to print the file.
- (6) Click Close to close the file and return to the previous function window.

Setpoint List Function Window

Setpoint List Function Window can be opened via **Tools|Setpoint List** menu. It is designed to record some major setpoints such as heater enable, temperature setpoint, low temperature alarm and high temperature alarm of any selected heater. All the recorded setpoints will be saved in a file named mcsplist.txt in the Log sub-directory. If the file mcsplist.txt exists before, it will be renamed to mcsplistMM-DD-YY.txt, where MM is the month, DD is the day and YY is the year.

The Setpoint List Function Window consists of a Setpoint List Heater Map panel and a Start logging button.

To perform Setpoint List operation, one must follow these procedures:

- (1) Select the desired logging heater by choosing the correct com port and checking the heater box on the Setpoint List Heater Map panel.
- (2) Start the setpoint logging by clicking on the Start logging button.
- (3) If the logging operation has been indeed started, a progress bar will appear and the word "Start logging" on the Start logging button will be changed to "Stop logging".
- (4) Unless the logging operation is manually stopped by clicking on the Stop logging button, it will continue until the last heater is logged.

Technical Support

There are two ways to get help. (1) Read this help file in print or as embedded in the software. (2) Phone Nextron personnel to get help. Dr. Yuming Zeng is the Engineer Manager in charge of the development of MC100 for Internet. He can be reached at **1-866-639-2875** or **(403) 735-9555 Ext. 241**.