BAS-200B CONTROL

MF-9070 **INSTRUCTION MANUAL**

ChromGraph® BAS-200B CONTROL

MANUFACTURER'S NOTE

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SECTION 1. INTRODUCTION

ChroGraph CONTROL is a sophisticated set of programs for automated control of the BAS-200B Chromatograph, the PM-80 Gradient pump, the DA-5 Chromatography Control and Data system, and other BAS instruments. The software runs in the Windows environment, thus providing all the flexibility and multitasking inherent in this operating system.

CONTROL provides all the control features needed to operate the BAS-200B Chromatograph, both in immediate mode and programmed operation. Up to four detectors may be simultaneously controlled, two of which may be external to the chromatograph. Methods are easily chained together and integrated with the BAS Sample Sentinel autosampler. All details of data collection and storage are defined by the software, but actual processing of the data (peak identification, quantitation, etc.) is provided by a sister program, ChromGraph REPORT.

REPORT also is a Windows based program, and it may run concurrently with CONTROL. CONTROL can pass data directly to REPORT, or it may store the data for later processing. Please refer to the ChromGraph REPORT manual (MF-9071) for a thorough discussion of this advanced data-processing software.

This manual is intended to be a simple introduction to CONTROL. Where there are several paths to accomplish the same task, usually only one will be described. For example, many operations can be carried out either by clicking on a pushbutton with the mouse, or by selecting items from a menu with the keyboard. Only the mouse operations are described, to keep the manual as simple and undaunting as possible. Those who wish to explore other alternatives are free to experiment, using the comprehensive Help screens and a knowledge of Windows.

Both ChromGraph REPORT and CONTROL run in the Windows operating system. Wherever possible, we have maintained the style of Windows in the "look" and "feel" of our software. We use similar drop-down menus, list boxes, dialog boxes, radio buttons, help screens, etc. If you are already familiar with Windows, the transition to ChromGraph software will be smooth. If Windows is new to you, we urge you to learn it first, using the Windows tutorial provided with your operating system.

SECTION 2. INSTALLATION

NOTE: If you purchased your computer and BAS-200B chromatograph from BAS as a complete system, this installation has been done for you. Proceed to Section 3.

ChromGraph CONTROL and REPORT are complex programs that require a moderately powerful computer for optimal performance. In theory, any 80286 or larger computer that can run Windows will operate the BAS software. However, speed and multitasking ability will suffer with too small a computer. The minimum computer size we recommend is a 25 MHz 386SX, with 4 MB RAM and an 80 MB Hard Drive. The Windows version should be 3.1 or higher.

Begin the installation of ChromGraph CONTROL by inserting the disk into the A: or B: drive of your computer, whichever is appropriate. Using Windows FILE MANAGER, view the files on the disk (Figure 2.1).

Figure 2.1 Obtaining the installation instructions
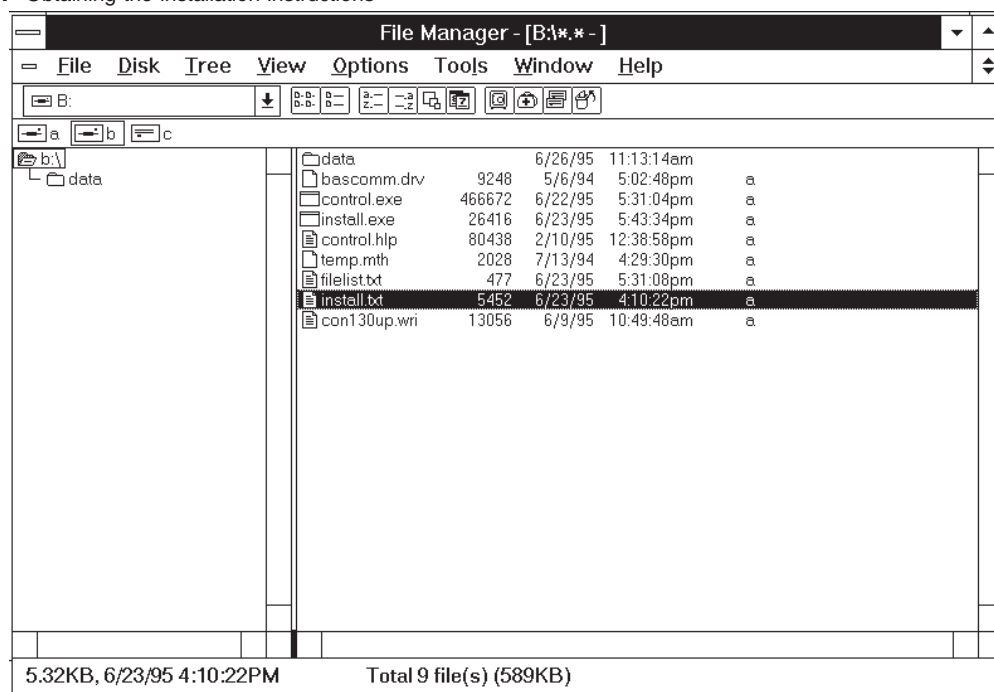
Double-click on the file INSTALL.TXT, which brings up complete instructions for installing CONTROL. It is helpful to print out these instructions, using the PRINT command found in the FILES menu at the upper left of the screen.

Pay particular attention to the instructions for modifying Windows SYSTEM.INI file, as you will not be able to communicate with BAS equipment without these changes. Note that Windows must be restarted for these changes to take effect.

During the installation, CONTROL will be installed into a subdirectory called C:\BAS. Demonstration data files and methods will be installed into C:\BAS\DATA. The Windows Program Manager will be modified so that a CONTROL icon will appear in a new program group called BAS PROGRAMS (Figure 2.2).

Figure 2.2 BAS Programs group after installation.
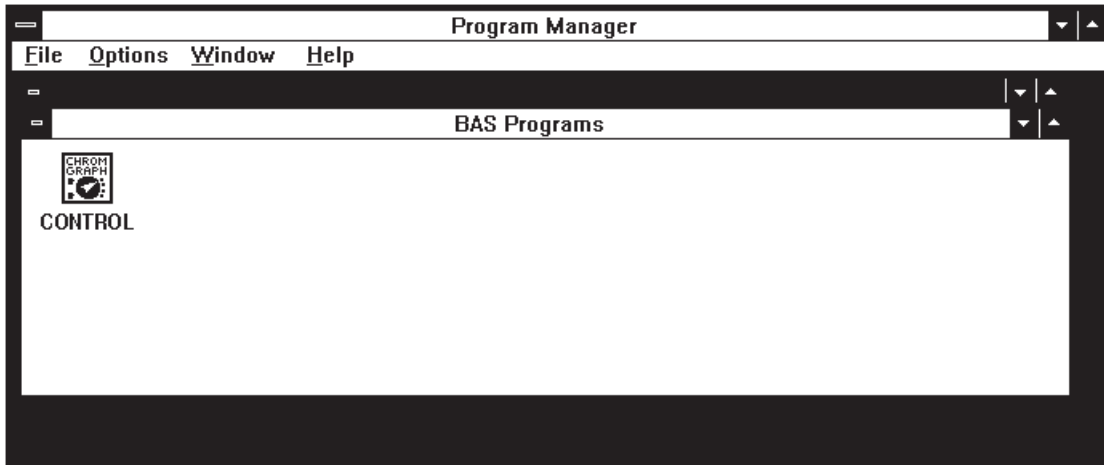
Installation is now complete. Make a backup copy of the floppy disk, and store the two disks in separate safe places.

SECTION 3. STARTING THE SYSTEM

First connect the BAS-200B Chromatograph to the computer. Plug a standard RS-232 computer cable between one of the computer's serial ports (Com 1,2,3 or 4), and the BAS DATA SYSTEM socket on the rear panel of the BAS-200B.

Once the hardware is connected, turn on the BAS-200B Chromatograph. Double-click on the CONTROL icon from the Windows Program Manager Screen (Figure 2.2). As the BAS software loads, a serial interface screen may appear (Figure 3.1). (If the software has been installed for you at the factory, this screen may not appear.). If it does appear, select the communications port to which you connected the chromatograph.

Figure 3.1 Serial I/O screen showing settings for normal operation.

Once the ComPort is selected, click on the OK button, and a message giving several ROM versions should appear. We recommend that you start with the configuration of Figure 3.1. Smart Mouse positioning puts the mouse cursor on the next OK>> or << OK button when you switch screens. Auto-Backup .MTH saves a reference Method with each series of runs (Section 7.5, page 30). The remaining options are used with autosamplers (Section 10).

Once the options in this screen are selected, click OK again and the serial interface screen will disappear. You're now ready to operate the system. (If the message "BAS hardware isn't responding" appears, check that the cable is tightly plugged into the proper ports, and try the OK button again.)

The serial interface screen will not appear again unless there is a communication problem between the BAS-200B and the computer. If you wish to review or edit this screen, choose "Setup Options" in the DATA menu (Figure 3.2). When you exit the system, SAVE the CONTROL.INI file (Section 12, page 46) to permanently save these setup options.

Figure 3.2 Selecting the Serial I/O screen from the DATA menu.

```
╒═══════════════════════ CONTROL 1.50  TEMP.MTH ═══════════════════╕
│ Data   Method   Queue   Control   Status   Graphics   Help       │
├──────────────────────────────┐
│ List Data...        Ctrl+F2   │
│ Save Data...        Shift+F2  │
├──────────────────────────────┤
│ Setup Options... Alt+0        │
│ Edit .RAN file...             │
├──────────────────────────────┤
│ Run REPORT                    │
│ Quit...                       │
└──────────────────────────────┘
```
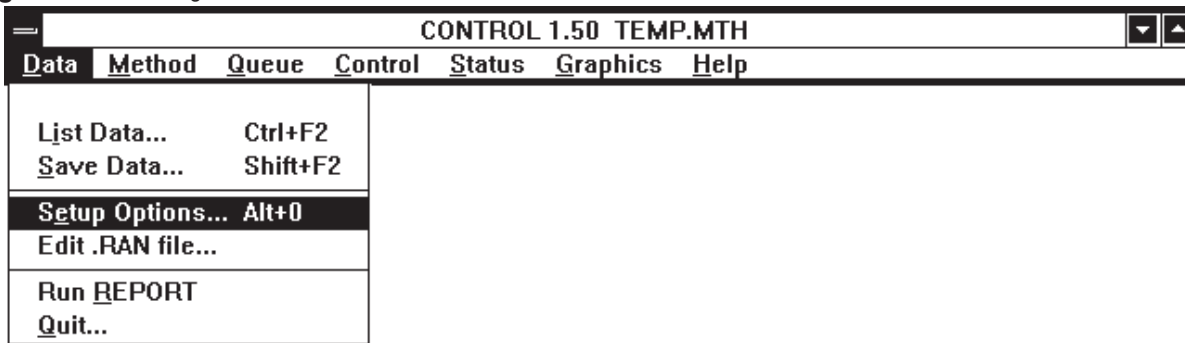
SECTION 4. HELP SCREENS

ChromGraph CONTROL contains a complete on-line, context-oriented system of help files. Information is provided for virtually any aspect of the software, and for any entry that must be made. Help information can be obtained in several ways which parallel the help screens of Windows.

For general access to help screens, select Help from the menu bar across the top of the screen (Figure 4.1). The INDEX option opens up a screen showing all the main help topics (Figure 4.2). Select whichever topic is of interest.

Figure 4.1 Using the HELP menu.
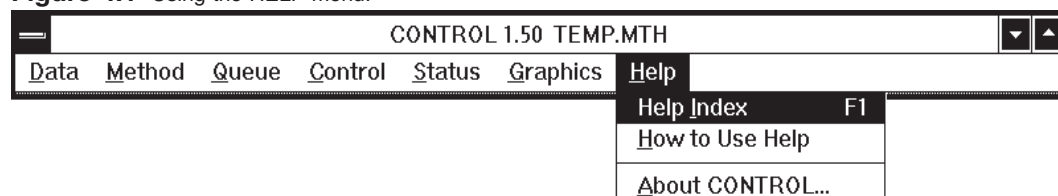
Figure 4.2 The HELP index.
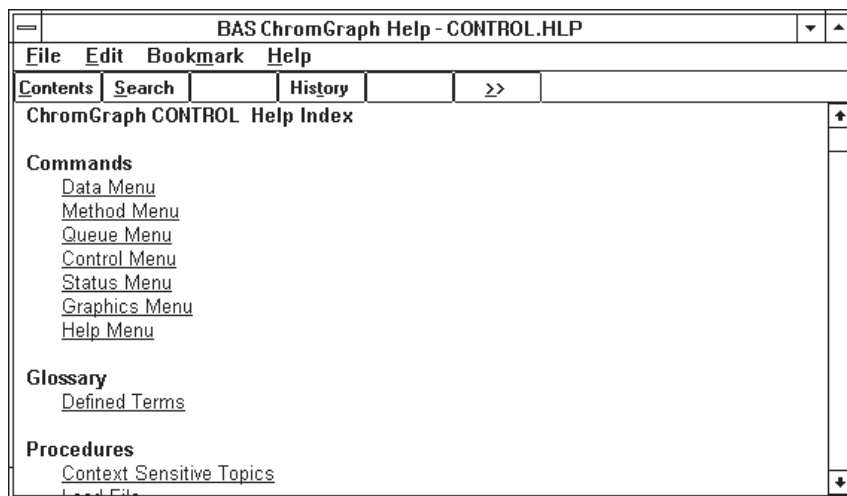
For more specific help when using the software (e.g., when you're not sure what to enter for an option in the Method), use the context-oriented feature of the help screens. Pressing F1 will bring information about whatever option is highlighted on the screen. Highlights can be moved around the screen using the tab and arrow keys.

A faster way to get information about any option is to use the mouse. If the option of interest requires a text entry, simply click on it, then press F1. If the option of interest is a pushbutton that will cause immediate action, you must prevent that action from occurring in order to to get help. Press the mouse button but do not release it; then press and release F1. Now you can release the mouse button; instead of activating the button, a help screen will appear.

SECTION 5. CREATING A METHOD FILE

The nerve center of both immediate-mode and automated operation is the Method file. The Method contains all the information about how to do a series of runs: how many runs, which detectors to use and how to set them, what changes will occur during a run, the duration of the run, the data collection rate, etc. We will go through the development of an entire Method here. This will rarely be needed, since in most cases an existing Method can be edited slightly to create new Methods.

5.1 Loading A Method

Begin creating a Method by loading an existing Method which we will modify. (This is not strictly necessary: a temporary Method is always loaded into RAM at startup, so a Method is always present. But this is a good place to learn how to load a Method.)

Select the LOAD METHOD option from the Method menu at the top of the screen (Figure 5.1). A directory of existing Methods that reside in the default data location will appear (Figure 5.2). To load a Method, either double click on its name or highlight it and click the OK button.

Figure 5.1 Accessing the Method and its subsections.

CONTROL 1.50 TEMP.MTH

| Data | Method | Queue | Control | Status | Graphics | Help |

Load Method...   Alt+F3
Data Description...   Alt+2
Data Acquisition Options... Alt+3
Temperature Options...
Purge Options...
Pump Gradient Schedule...
Switch Relay Schedule...
EC/Ext Detector Schedule...
UV/Vis Detector Schedule...
UV/Vis Lamp Options...
DA 5 Filter Options...
DA-5 PAD Options...
List Method...   Ctrl+F3
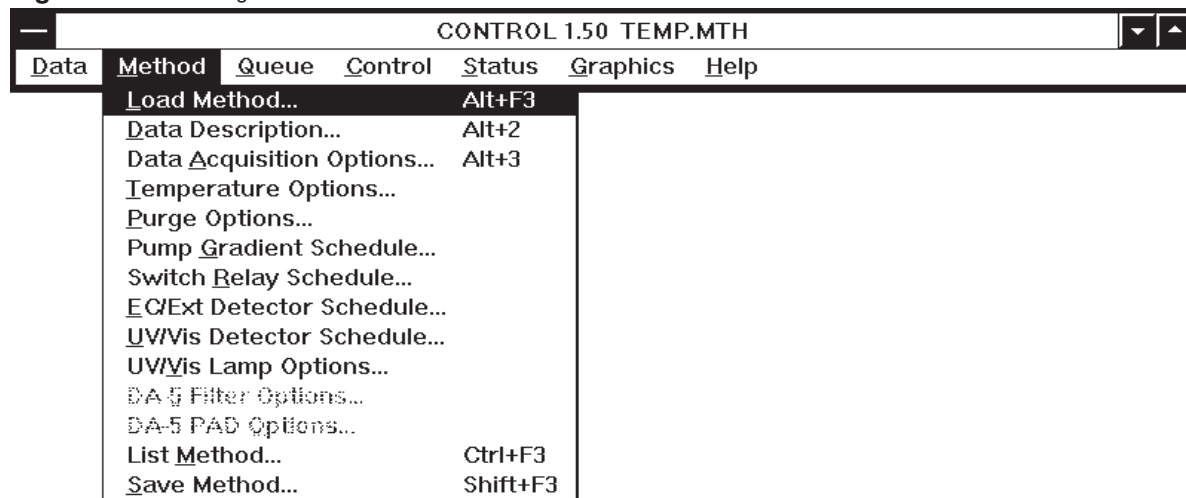Save Method...   Shift+F3

Figure 5.2 Loading a Method file.
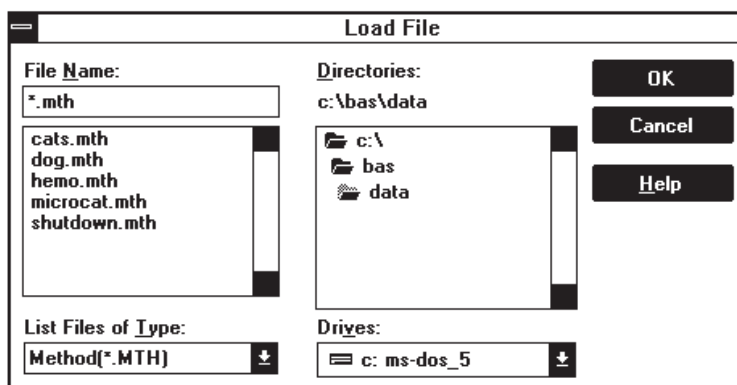
Methods can be loaded from other locations by using the mouse to select other drives or subdirectories. Such a selection automatically becomes the new default data location. The default location will remain in effect throughout the session, unless changed by another LOAD operation. When you finish your session and QUIT the software, saving the CONTROL.INI file will save the new default data location for subsequent sessions. If you do not save this file, the original default location will be used for subsequent sessions (see Section 12, page 46).

5.2 Opening The Method Screens

To edit or review the Method you must open the Method screens. Start by clicking on the METHOD section of the main menu. A list of options will appear (Figure 5.3). Except for the LOAD, LIST and SAVE options, each option will open a screen for a section of the Method. Simply click on the desired section with the mouse.

Figure 5.3 Accessing the Method and its subsections.

Figure 5.4 Sample subsection of the Method.

```
┌─────────────────────────────────────────────────┐
│  ▬           PUMP GRADIENT SCHEDULE              │
│ ┌Pressure limits, psi──────────────────────────┐ │
│ │Mi̲nimum <0:5000>: 200    Ma̲ximum <500:6000>: 4000│
│ └───────────────────────────────────────────────┘ │
│                                                   │
│  F̲low rate <0:5.0>: 1.00 ml/min    ☐ S̲ynchronize start│
│                                                   │
│  Minutes    %A      %B      %C    (Select a R̲ow) │
│    0.0    100.0    0.0     0.0                    │
│   10.0    100.0    0.0     0.0                    │
│                                                   │
│                                                   │
│                                                   │
│                                                   │
│                                                   │
│      Mi̲nutes:      %A̲ <0:100>:    %B̲ <0:100>:     │
│     ┌──────┐      ┌──────┐      ┌──────┐          │
│     │      │      │      │      │      │          │
│     └──────┘      └──────┘      └──────┘          │
│      ┌─────────┐  ┌─────────┐   ┌─────────┐       │
│      │ D̲elete  │  │ C̲hange  │   │ Insert  │       │
│      └─────────┘  └─────────┘   └─────────┘       │
│                                                   │
│ ┌────┐ ┌────┐ ┌────┐ ┌──┐ ┌──────┐ ┌────┐ ┌────┐ │
│ │<< OK│ │E̲xec│ │Sa̲ve│ │OK│ │Cancel│ │S̲top│ │OK >̲>│ │
│ └────┘ └────┘ └────┘ └──┘ └──────┘ └────┘ └────┘ │
└─────────────────────────────────────────────────┘
```
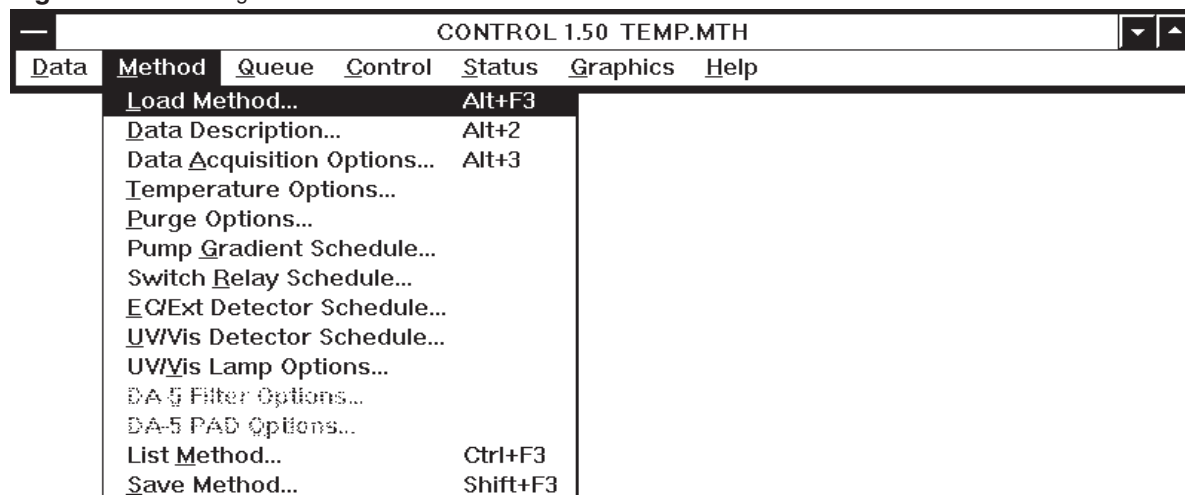
5.3 Pushbuttons Found In Method Screens

At the bottom of each Method screen (more correctly called a dialog box) is a variable number of pushbuttons for subsequent action (Figure 5.4). These are:

OK accepts any changes and saves them to RAM. These changes are then used in subsequent runs of the Method. To permanently save these changes to disk, use the SAVE option.

<< OK and OK >> These have the same function as OK, except they automatically bring up the previous (<<) or next (>>) screen of the Method.

CANCEL closes the dialog box without accepting any of the changes. The original information is thus preserved.

EXEC sends a command to the BAS-200B to set the conditions called for in the dialog box (e.g., temperature). For screens with multiple time lines (e.g., pump control) the conditions on the 0.0 time line are activated.

STOP sends a command to the BAS-200B to stop or turn off the appropriate device.

DELETE removes the highlighted line from a dialog box with time lines.

CHANGE puts edited information into the highlighted line of a dialog box with time lines.

INSERT inserts a new line into a dialog box with time lines.

SAVE opens a dialog to save the Method with a name and location of your choice.

5.4 Listboxes Found In Method Screens

The detector, pump, and timed events schedules each contain a listbox - a list of up to 10 time lines for control of the BAS-200B during a run (Figure 5.4). Time is measured in minutes from the start of a run. Time lines are automatically sorted by time as they are entered. The maximum time is 999.9 minutes, and lines must be at least 0.1 minutes apart.

Under each listbox is found a set of edit boxes, used to enter, delete, and modify the time lines. To insert a new time line, enter the information in the edit boxes, then press INSERT. To modify the information in an existing line, click on the line to make it appear in the edit boxes. Make the changes, then press CHANGE. To delete a line from the listbox, click on it, then press DELETE.

5.5 Data Description

Choosing the DATA DESCRIPTION option under METHOD brings up the edit screen for the first section of the Method (Figure 5.5). You may enter information about the run under OPERATOR, CONDITIONS, and RUN NOTES. These are all comments and do not affect chromatography.

Figure 5.5 Data Description section of the Method.

The entries for TIME OF RUN, DATE OF RUN, RUN NUMBER, VIAL NUMBER and DETECTOR will be automatically entered during a run, and saved with the data. Each time you load an existing data set, its values for these parameters will appear.

DATA NAME is the most important parameter in this section. It is the name under which the data file will be saved. Enter up to four numbers or letters (the last position must be a letter, to avoid confusion with the run number). Run numbers (three digits) and a letter (A through D, for detector 1 through 4) will be automatically appended during a run. On disk the data file will have the extension ".DAT." Thus, MCAT006A.DAT is the sixth run of a data file called mcat, and contains data from detector A.

5.6 Data Acquisition Options

This next section of the Method can be accessed by either choosing it from the Method Menu (Figure 5.3) or clicking the OK >> button from the DATA DESCRIPTION screen. The parameters in this screen (Figure 5.6) define how the data are collected:

Figure 5.6 Selecting Data-Acquisition Options.

TRIGGER TYPE determines which piece of equipment starts the chromatographic run. Choose MANUAL if you will use the mouse to start the run. Choose AUTOMATIC if the BAS-200B will be in charge of an autosampler, and will send a start signal to the autosampler (see USING AUTOSAMPLERS, Section 10, page 38). In the AUTOMATIC mode, the BAS-200B will perform its designated number of runs, one after another. Choose EXTERNAL if the BAS-200B should wait for a start signal from an autosampler before beginning its run. This is the appropriate mode for interaction with the BAS Sample Sentinel autosampler.

START DATA TIME and END DATA TIME refer to the duration of data collection. These values may be the start and end times of the chromatographic run, or some subset of the entire run. (The length of the chromatographic run is determined by the longest time line in the pump, detector, and timed events files, as described below.)

POINTS PER MINUTE determines how much of the data are actually stored. The digitizer acquires data at a much greater rate than needed; storing all this data uses excess space, and processing it takes too much time. This parameter reduces the data to a more reasonable level by summing a given number of points before storing the summed value. We recommend the following data-acquisition rates...

RUN LENGTH (minutes)	POINTS PER MINUTE
1 - 5	300
6 - 10	150
11 - 18	75
19 - 40	50
41 - 60	25

Set the points per minute by clicking on the down arrow. A listbox of choices will appear.

DETECTORS ENABLED. Select up to four detectors. When detectors are enabled, the menus for their control become accessible. These can be opened through the Method Menu, or by clicking the OK>> buttons until they are reached.

To recieve data from one or two external detectors, click on the EXT boxes. You also must enter time lines in the EC/EXT DETECTOR SCHEDULE (Section 5.11, Page 16). Output from the external detector(s) enters the system at the DIFFERENTIAL INPUTS plugs on the back of the BAS-200B.

FIRST RUN NUMBER is the number that will be given to the first run of a series. This value is incremented by one each time a run is completed. If a series of runs is aborted during a run, the number assigned to the aborted run will remain, so the series can be restarted where it left off.

NUMBER OF RUNS is the number of runs (maximum = 255 for any one Method) to be made in programmed operation. It will be decremented by one each time a run is completed. If a series of runs is aborted during a run, the NUMBER OF RUNS will remain at its last decremented value, so the series can be restarted where it left off.

For manual operation (starting each run with the mouse), the NUMBER OF RUNS can be ignored: run numbers will increment properly each time a run is completed.

5.7 Temperature Options   The Temperature Options screen (Figure 5.7) can be accessed through the Method Menu (Figure 5.3) or by using the <<OK and OK>> buttons from other Method screens. Select the following temperatures for the BAS-200B:

Figure 5.7 Temperature Options.

OVEN TEMPERATURE from 20.0 to 85.0°C. Reasonable values are in the 30-40° range. For ambient temperature, use 20°.

CELL TEMPERATURE from 20.0 to 85.0°C. Since the cell is in the oven, you may leave it on 20.0° and rely on the oven temperature. CELL TEMPERATURE has been discontinued.

The oven fan turns on whenever a method with oven or cell temperature >20°C is EXECuted. To use the fan without heat, set the oven to 21°C. To turn the fan off, use the STOP button, then put the oven and cell temperatures back to 20°C and click EXEC.

MOBILE PHASE TEMPERATURE may be independently set to 20, 35 or 50°C for bottles A, B and C. In general, warming the mobile phase to 35°C will aid in degassing and should be routinely used. Bottles that are not being actively used should be set at 20°, as should bottles with highly volatile solvents, such as tetrahydrofuran and acetone. The 50° range is not routinely used, and should never be used when there are organic solvents in the mobile phase.

SOLVENT NAMES may be entered in the boxes provided. These are comments which will be printed with the identifying information about each run.

5.8 Purge Options

The Purge Option screen (Figure 5.8) can be accessed through the Method Menu (Figure 5.3) or by clicking the <<OK and OK>> buttons from other Method screens. A purge can be used to bring fresh mobile phase rapidly through the system. The BAS-200B will attempt to maintain the set pressure by varying the flowrate. If the set pressure limit is not reached (e.g., if the purge valve is open) the pump will increase flow to its maximum, 5 mL/min.

Figure 5.8 Purge Options.

To program a purge, enter the PURGE DURATION, MAX. PURGE PRESSURE, and SOLVENT % (enter percentages for bottles A and B; bottle C will be calculated as the remainder).

INITIAL FLOW is the starting flow rate, and should generally be about 1/2 of the desired flow rate. For a purge through the purge valve it should be 2.5 mL/min; for a purge through a column it should be 1/2 of the usual flow rate of the column.

Start the purge by clicking on the PURGE button. During a purge, the RUN STATUS box (Section 7, page 27) displays elapsed time.

5.9 Pump Gradient Schedule

The Pump Gradient Schedule screen (Figure 5.9) is accessed through the Method Menu (Figure 5.3) or by clicking the <<OK and OK>> buttons from other Method screens. This screen contains all the operating information for the pump, as well as pushbuttons for immediate-mode control.

Figure 5.9 Control of the pump.

MAXIMUM and MINIMUM PRESSURE are the safety limits for the pump. For most chromatography, we recommend a pressure minimum of 200 PSI and a maximum of 4000 PSI. If the pressure falls below the set minimum, or rises above the set maximum, the pump will stop and report the appropriate error.

FLOW RATE can be set from 0 to 0.5 mL/min in 0.01 mL increments, and from 0.5 to 5 mL/min in 0.1 mL increments.

SYNCHRONIZED START should be checked for gradient runs, and blank for isocratic runs. Synchronization ensures precise gradients by delaying the start of a run until a pre-set piston position has been reached.

GRADIENT SCHEDULE LISTBOX contains the pump instructions for a timed run. There must be at least two lines here: a 0.0 minute start line and an end line. Up to 10 lines may be entered in the gradient schedule, and they are automatically sorted by time. The first event must have time 0.0, and subsequent events must be at least 0.1 minutes apart. For each line of the listbox, enter the time and the percentages for bottles A and B (C is automatically calculated as the remainder). When bottle percentages differ between lines, the BAS-200B will calculate the appropriate linear gradient between the two lines. The run will end when the longest time line in this schedule, the detector schedule, or the timed events schedule is reached. At the end of a run the BAS-200B reverts to time 0.0 conditions.

EXEC and STOP pushbuttons are provided for manual control of the pump. EXEC puts the 0.0 time line into effect. The gradient program cannot be started from this screen (see Section 7, page 27, PROGRAM CONTROL OF THE BAS-200B).

5.10 Switch Relay Schedule

The Switch Relay Schedule (Figure 5.10) is accessed through the Method Menu (Figure 5.3) or by clicking the <<OK or OK>> buttons from the other Method screens. This section is used for triggering peripheral equipment, such as autosamplers and integrators. Signals are sent out via the Timed Events port on the BAS-200B. See the BAS-200B manual for pin diagrams and cable information.

Figure 5.10 Sending signals to peripheral equipment.

Use the listbox and its editing features to turn switches on (x= on) or off (blank=off) at particular times. The default line (-1) should be left blank (all off). For most applications, turning a switch on at the start of a run (0.0 minutes) and off again six seconds later (0.1 minutes) provides a sufficient signal.

5.11 EC/External Detector Schedule

The EC/External Detector Schedule screen (Figure 5.11) is accessed through the Method Menu (Figure 5.3) or by clicking the <<OK or OK>> buttons from other Method screens. This screen contains all the information for control of the electrochemical detectors during a run. In addition, the duration of data collection from an external detector is determined by the first and last time lines of this screen.

Figure 5.11 Controlling the EC detectors.

The screen consists of a listbox for time lines, edit boxes, and pushbuttons. If two EC detectors have been enabled in the DATA ACQUISITION OPTIONS screen (Section 5.6, page 11), then each time-line in the detector listbox will have two sublines, one for each detector. These will be numbered 1 and 2, corresponding to W1 and W2 in the BAS-200B.

TIME is set in minutes, with a minimum interval of 0.1 minutes between lines. The BAS-200B will perform an automatic rezero at each time line except 0.0. Every detector schedule must have at least two time lines: a 0.0 line and an end line. The length of a run is determined by the longest time line in the detector, pump, and timed events schedules. At the end of the run the BAS-200B reverts to time 0.0 conditions.

POTENTIAL is set by entering the voltage, in millivolts, in the edit box provided. RANGE and FILTER are set for each detector, using a listbox (Figure 5.12). You may scroll with the mouse or the up and down arrow keys to select one of the preset values for these parameters.

Figure 5.12 Setting the range for detector 1.

OFFSET can be used to give a slight positive offset to the output from one or more detectors. For example, at a range of 50 nAfs, a 10% offset will rezero to 5 nA (10% of 50).

POLARITY changes pen direction for the output to a chart recorder only. Choose (+) or (-).
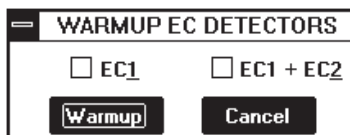
The pushbuttons allow immediate-mode control of the EC detectors. EXEC activates the 0.0 time-line instructions, and STOP opens a dialog to turn off the detectors (Figure 5.13).

Figure 5.13 Stop Detectors dialog.

NOTE: EC2 cannot be used by itself: you can turn off EC2 or both EC detectors.

Figure 5.14 Use the Warmup feature to turn on the EC detectors.

WARMUP opens a dialog to turn on the detectors at the insensitive range of 1 μAfs (Figure 5.14). ALWAYS turn on the detectors using the WARMUP mode, as this range can handle the surge of current at initial startup. The detectors will equilibrate faster if you use WARMUP. Once the detectors are equilibrated, then use EXEC to send the final conditions to the detectors.

NOTE: EC2 cannot be used by itself: you can turn on EC1 or both EC detectors.

5.12 UV/VIS Detector Schedule

The UV/Vis Detector Schedule screen (Figure 5.15) is accessed through the Method Menu (Figure 5.3) or by clicking the <<OK or OK>> buttons from other Method screens. This screen, in conjunction with the following screen (LAMP OPTIONS) contains information for control of the on-board UV-Vis detector during a run. The screen consists of a listbox for time lines, edit boxes, and pushbuttons.

Figure 5.15 Controlling the UV-Vis detector.

TIME is set in minutes, with a minimum interval of 0.1 minutes between lines. The BAS-200B will perform an automatic rezero at each time line. Every detector schedule must have at least two time lines: a 0.0 line and an end line. The length of a run is determined by the longest time line in the detector, pump, and timed events schedules. At the end of a run the BAS-200B reverts to time 0.0 conditions.

Enter WAVELENGTH (190-800 nm) directly in the edit box. ABSORBANCE RANGE and FILTER are entered using a listbox (Figure 5.16). You may scroll with the mouse or the up and down arrow keys to select one of the preset values for these parameters.

Figure 5.16 Setting the range for the UV-Vis detector.

The pushbuttons allow immediate-mode control of the UV-Vis detector. EXEC sends the 0.0 time-line instructions, and STOP turns the lamps off.

5.13 UV/VIS Lamp Options

The UV/Vis Lamp Options screen (Figure 5.17) can be accessed from the Method Menu (Figure 5.3) or by clicking <<OK or OK>> from other Method screens. This screen lets you specify which lamp to turn on for any Method. In general, use the tungsten lamp for wavelengths greater than 350 nm, and the deuterium lamp for shorter wavelengths. EXEC turns on the indicated lamp(s), while STOP turns off both lamps.

Figure 5.17 UV-VIS lamp-control screen.

The parameters in this screen work in conjunction with the UV/VIS DETECTOR SCHEDULE. Pressing the EXEC button in the schedule will initially turn on both lamps, but then the lamps that are not checked in the Options screen will turn off.

5.14 Listing A Method

To review the method, you may scroll forward or back through all the screens using the <<OK>> buttons, or choose LIST METHOD from the Method Menu (Figure 5.18). Methods may be listed to the screen and/or the printer. If listed to the screen, they scroll along the rearmost section of the screen, the output window. After the listing is finished, you may scroll through the method by using the scroll bars on the right side of the output windows (Figure 5.19).

Figure 5.18 The Method Menu.
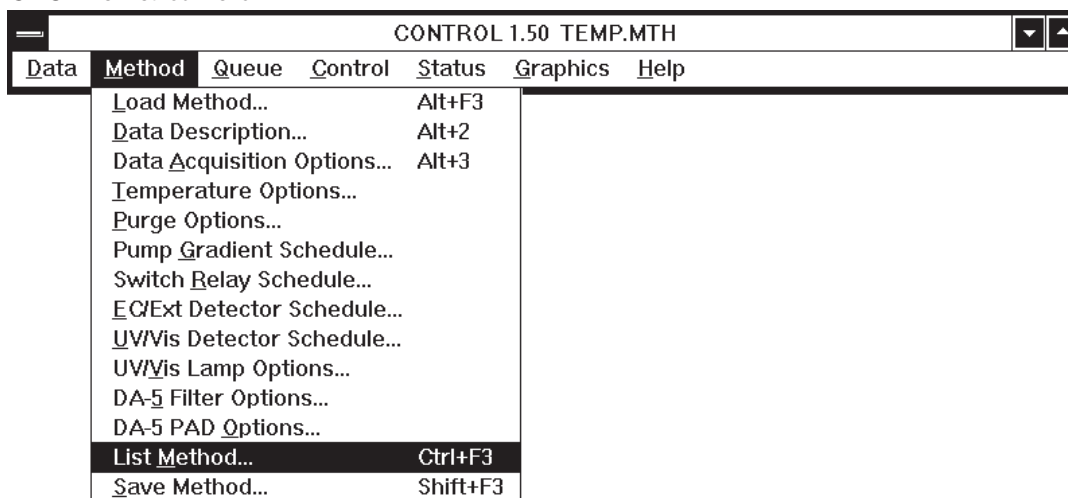
Figure 5.19 A listing of the completed Method.
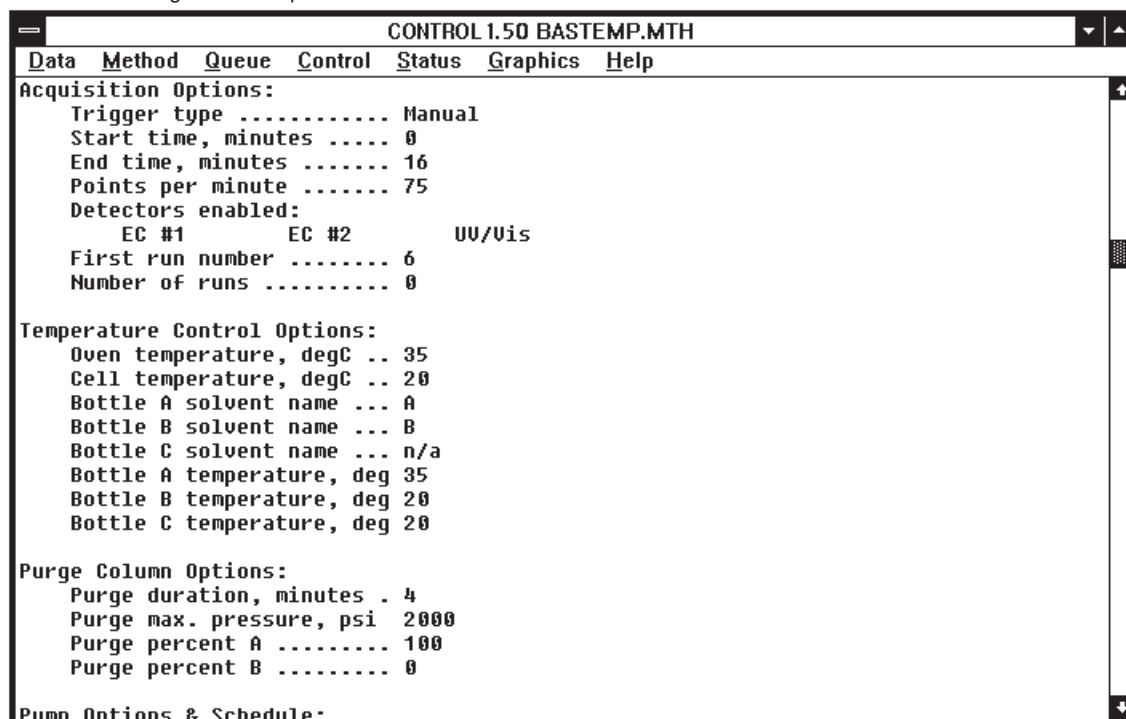
5.15 Saving A Method

Choose the SAVE option from any of the Method screens, or from the Method Menu (Figure 5.18). A SAVE screen will appear, showing the default method name and the location to which it will be saved (Figure 5.20). A listbox will show the existing Methods in the default data location. Change the Method name or data location as appropriate and click on the OK button to save it. A Method name can have up to 8 characters. The extension ".MTH" will automatically be appended to the name you choose. If a file of the same name already exists, a warning will appear.

Figure 5.20   Saving the completed Method file.
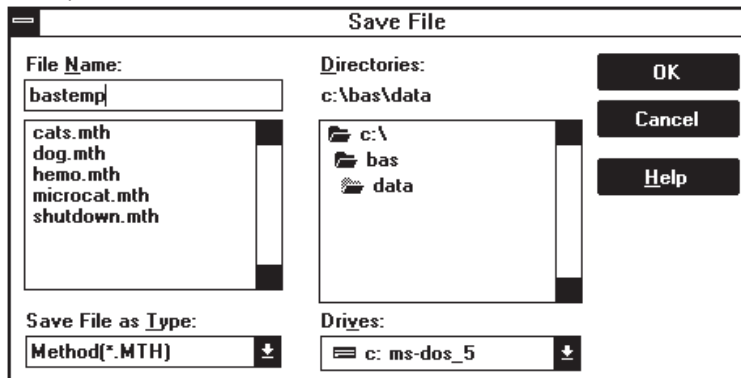
SECTION 6. IMMEDIATE-MODE CONTROL OF THE BAS-200B

There are many instances where fully automatic chromatography is not needed. When developing a separation, for example, you may wish to set the chromatograph for an isocratic elution and observe the results of injections on a chart recorder. And during startup, shutdown or maintenance, you may wish to turn the pump on and off, change solvents, etc. The Method screens and the mouse provide a convenient way to control the BAS-200B. In general, the EXEC button turns components on with the conditions found in the screen (in a listbox of time lines, the conditions in the 0.0 time line are executed). The STOP button turns components off.

6.1 Operating The Pump

Let's assume a typical situation: you wish to start up the system which has been cleaned and disassembled for vacation. The column has been stored in 40% acetonitrile, and the electrochemical flowcell disassembled. Begin by turning on the BAS-200B and the computer, starting Windows, and double-clicking on the CONTROL icon.

The first thing to do is pump fresh, filtered mobile phase, which is in bottle A, through the system. Flush the irrigation ports on the BAS-200B with water, then open the prime/purge valve and put a 50 mL syringe on it. Next open the Purge Options screen and set the system to purge for 5 minutes from bottle A at 3000 PSI (Figure 6.1). Click on the PURGE button. The pump will never reach 3000 PSI since the prime/purge valve is open, so it will increase its speed to 5 mL/minute and hold that until 5 minutes are up. Now fresh mobile phase is present in most of the system.

Figure 6.1 Setting a purge from bottle A.

Close the prime/purge valve and go to the Pump Gradient Schedule screen (Figure 6.2). If necessary, set the flowrate to 1 mL/minute and the 0.0 time line to 100% A. Put a beaker under the tubing that leads to the column and press EXEC. Fresh mobile phase will now

flow through this tube. After a minute or two press STOP. Now connect the column. Press EXEC again and mobile phase will flow through the column, to waste.

Figure 6.2 Pump conditions for the example in the text.

6.2 Operating The EC Detector

After a sufficient time for the column to equilibrate with the mobile phase, STOP the pump and connect the outflow of the column to the EC detector. Attach the working electrode. Then change the flowrate to 0.5 mL/minute and press EXEC. The reference well will fill up with mobile phase. When it is filled and bubble free, insert the reference electrode with its o-ring and screw down the retainer. Wipe up any spills, then change the flowrate to 1 mL/minute.

Once the electrode is assembled, attach the cell leads. Then open the EC/EXT Detector Schedule (Figure 6.3). Edit the 0.0 time line if necessary. Then click on the WARMUP button. Choose EC1, then press WARMUP (Figure 6.4). This turns the cell on at the insensitive range of 1 μAfs. After the cell has equilibrated you can press the EXEC button to set the cell to its working range.

Figure 6.3 EC detector conditions for the example in the text.

Figure 6.4 Warmup options.

6.3 Operating The UV/VIS Detector

The on-board UV/Vis detector requires no special instructions. Simply set the parameters and press EXEC, as in Section 5.12 and 5.13, pages 18 and 19.

6.4 Temperature Controls

While the electrode is equilibrating, set the oven and bottle temperatures (Figure 6.5). Open the Temperature Options screen, set the oven to 35°C, the cell to 20°C, and click on the 35°C button for bottle A. Then press EXEC.

Figure 6.5 Temperature settings for the example in the text.

6.5 Status Screens

Status screen icons appear along the bottom of the screen. To activate any status screen, simply double-click on its icon. The status screens show real-time conditions of the BAS-200B Chromatograph (Figure 6.6). We recommend that status screens be left as icons when not needed, and especially during automatic operation. When the status screens are activated there is a flurry of communication between the computer and the BAS-200B, which ties up computer memory and makes screen operations appear sluggish. Individual status screens can be iconized by clicking on the down arrows at their upper right hand corners. All four screens can be activated or iconized together by taking the View Status option in the Status menu (Figure 6.7), or with the F6 key.

Figure 6.6 Real-time status screens.
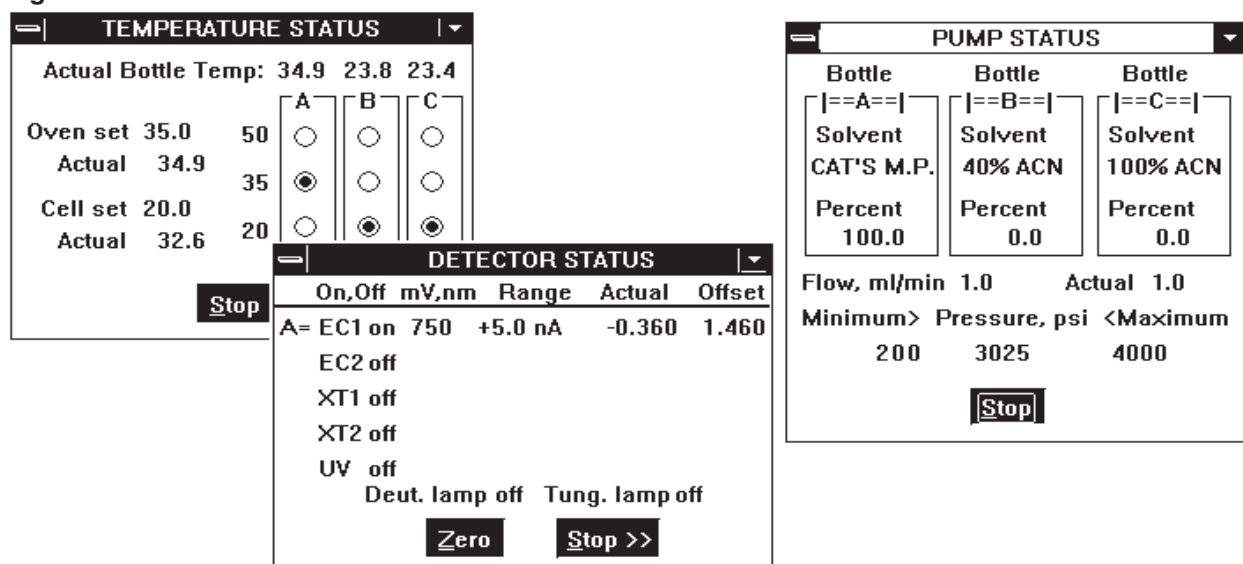
Figure 6.7 The Status menu.
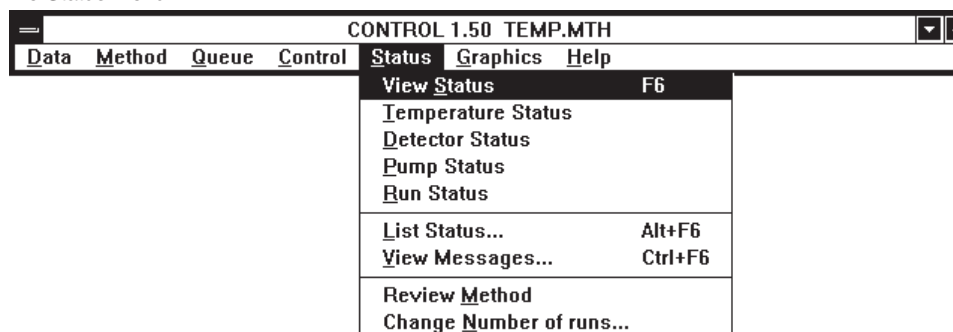
6.6 Temporary vs. Permanent Changes

When operating in immediate mode, you have the flexibility of making changes that are temporary or permanent. For example, the flow rate was changed to 0.5 mL/minute and EXECuted for inserting the reference electrode. To make this change permanent, click the OK button. To keep it temporary, click CANCEL. When the screen is CANCELed, the pump will continue to run at 0.5 mL/minute. But the next time you open the Pump Gradient Schedule screen, the default flow rate will be listed as the original 1 mL/minute. This will take effect the next time EXEC is clicked.

SECTION 7. PROGRAM CONTROL OF THE BAS-200B

Program control of the BAS-200B will be required for all the following applications: gradients, isocratic runs with automatic rezero or gain and wavelength changes, automatic runs with autosamplers, and data collection and analysis.

7.1 Programming

To begin program control, first double-check the Method to make sure it is correct. Then open the DATA ACQUISITION OPTIONS section of the Method (Figure 7.1). Set the TRIGGER TYPE to "automatic" if the BAS-200B will be sending a start signal to an autosampler, or to "external" if the autosampler will be sending start signals to the BAS-200B (see section 10, page 38, USING AUTOSAMPLERS). Use "external" for the BAS Sample Sentinel autosamler.

Figure 7.1 Data Acquisition Options for automatic operation.

Next enter the number of the first run, and the number of runs in the series (maximum = 255). Then click OK. To start the program, double-click on the RUN STATUS icon, which will open up the RUN STATUS window (Figure 7.2). Click EQUIL to send the information from the Method to the BAS-200B.

Figure 7.2 Programmed runs are started from the Run Status screen.

NOTE: ALWAYS CLICK THE EQUIL BUTTON IN THE RUN STATUS WINDOW BEFORE BEGINNING A SERIES OF RUNS. EQUIL puts any changes you made in the Method into effect.

7.2 Starting a Run

To begin the series of runs, click RUN. The run will start within a few seconds if an automatic or manual trigger has been selected. If an external trigger has been selected, the run will await a signal from the autosampler (see Section 10, Using Autosamplers). When the run starts, a graph will appear showing the chromatogram in real time (Figure 7.3). The EQUIL and RUN functions in the RUN STATUS window will be unavailable, and the PAUSE, END and ABORT buttons will become available.

Figure 7.3 Screen activity during a run.
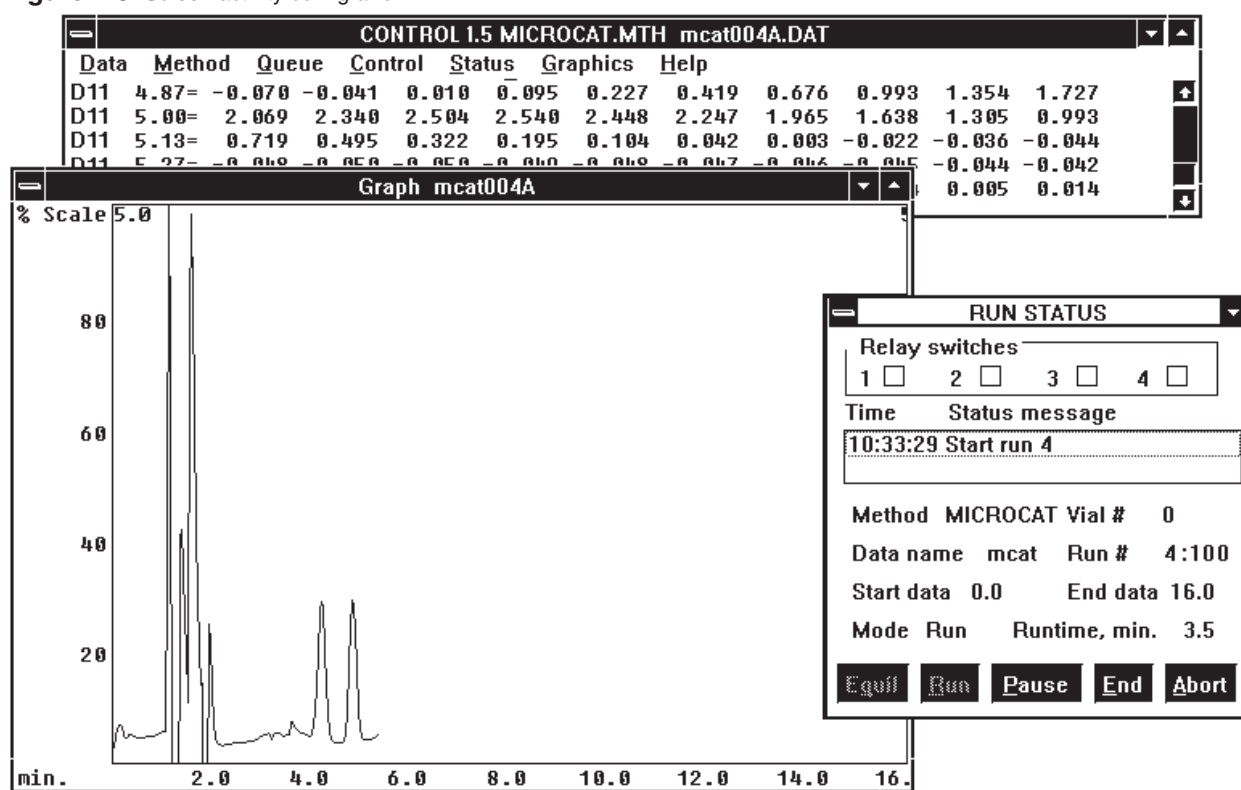
PAUSE stops the timers from all modules. Thus, the current detector and gradient conditions at any time during the run can be held constant. This feature can be used during method development, for example, to hold the gradient constant while peaks elute. A CONTinue button appears when PAUSE is pressed, allowing resumption of the run.

END stops data collection and saves the data to disk. END does not end the pump's run, in case there is a gradient or column wash programmed in. If you've ENDed the data and are sure you want to terminate the pump's run, press ABORT to terminate the run. ABORT cancels all timed events and returns the BAS-200B to 0.0 time conditions.

Several events occur onscreen while the run is in progress. Data and messages will scroll upwards on the output screen, which appears in the background. Superimposed on this output screen are the graph, which shows a chart-recorder style image of the detector output, and the RUN STATUS window. In addition to the pushbuttons described above, the RUN STATUS window displays the elapsed time and messages, the current run number and vial number, and the final run number.

The listing and graphing of data during the run are turned on and off by options in the CONTROL MENU (Figure 7.4). Graph colors are selected in the GRAPHICS MENU (Section 9, page 33).

Figure 7.4 Selecting data display for a run.
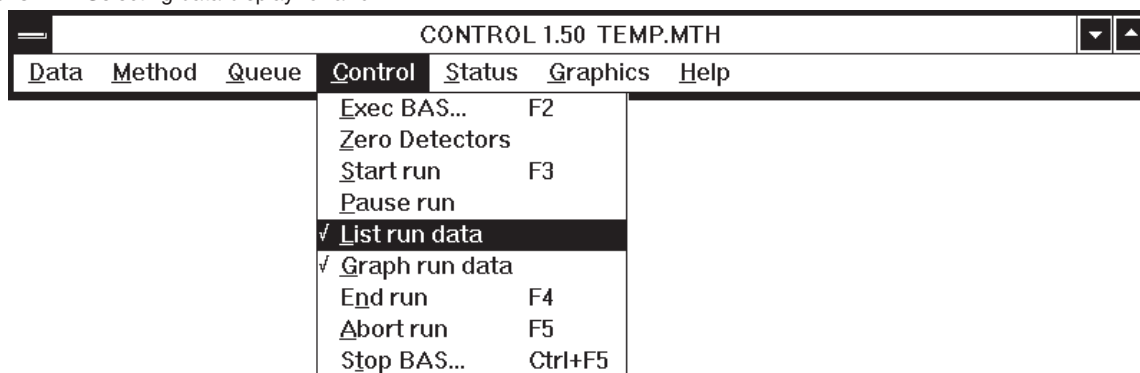
When the first run is complete, the system prepares for the next run in the series. The BAS-200B returns to time 0.0 conditions. The data are saved, the RUN NUMBER is incremented by one, the NUMBER OF RUNS is decremented by one, and the new run is either started or waits for a trigger.

7.3 Adding Runs

Additional runs may be scheduled while a batch of runs is in progress. Simply open the STATUS menu (Figure 7.5) and take the CHANGE NUMBER OF RUNS option. Then enter the updated LAST RUN NUMBER.

7.4 Method Review

If you've started a bunch of runs and need to check that everything in the Method is correct, you can do this without stopping the runs. Take the REVIEW METHOD option under the STATUS menu (Figure 7.5). A copy of the Method will appear in the output window, and you can review it there. For this to occur, the scrolling of data on the output window must stop (no data points are lost, however). To turn data scrolling back on, take the LIST RUN DATA option under the CONTROL menu (Figure 7.4).

Figure 7.5 The Status menu.

```
═                    CONTROL 1.50  TEMP.MTH                    ▼▲
 Data   Method   Queue   Control   Status   Graphics   Help
                              View Status          F6
                              Temperature Status
                              Detector Status
                              Pump Status
                              Run Status

                              List Status...        Alt+F6
                              View Messages...      Ctrl+F6

                              Review Method
                              Change Number of runs...
```
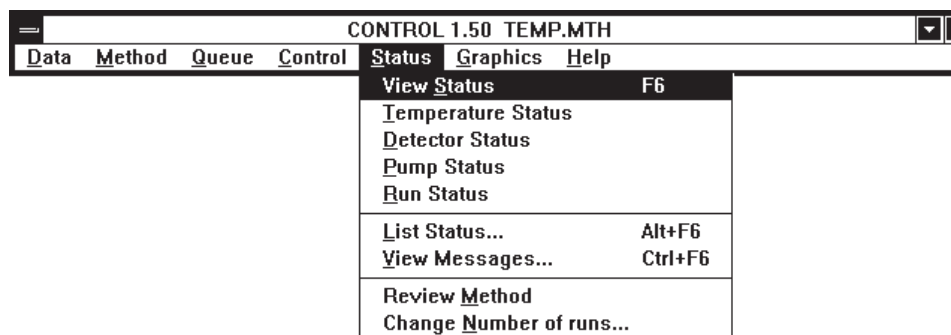
7.5 Files Created

Several files are saved to the default data location in conjunction with a programmed run. These are:

DATA FILES contain the collected digitized data from the detectors. These have the format NAME###X.DAT. NAME is the data name, up to four characters, ending in a letter.   ### is the run number from 1-255. X is the detector code, from A-D, corresponding to detectors 1-4. Each detector will produce its own data file. The extension ".DAT" stands for data, and will automatically be appended.

LOG FILES have the Method name, followed by a ".log" extension. They record the runs made under each method. LOG files are created automatically whenever you run a Method. They can be viewed with any word processor.

BACKUP METHOD FILES are copies of the Method that are associated with data files for future reference. If you made runs 1-20 from the Method MCAT.MTH, for example, you would find the following files in your default data location:

    MCAT.MTH (current Method file)
    MCAT .LOG (log file)
    MCAT001A.DAT through MCAT020A.DAT (20 data files)
    MCAT001A.MTH (Backup Method File)

The last file is a copy of MCAT.MTH. Because of its hybrid name (DATA name + .MTH) it will not normally be used as a Method file, and thus never modified. It serves as a record of the conditions under which the runs were made, and thus should not be altered.

Only one Backup Method File will be made for any sequence of runs. However, if you start runs individually, one by one, a Backup Method will be made for each. To turn off the backup feature, click off the Auto-Backup .MTH feature in the serial interface screen (Section 3, page 4).

SECTION 8. QUEUES: CHAINING METHODS TOGETHER

Methods can be chained together using the QUEUE feature from the main menu. Chaining can be useful in at least three situations:

1. When there are more than 255 runs in a series (the maximum for any data name) the data name can be changed with a second Method that allows another 255 runs, etc.

2. When two types of analyses are being conducted, a second Method can change any run parameters, including detector type and detector conditions.

3. To slow down the pump and/or turn off the lamps once a series of runs has been completed (a SHUTDOWN Method).

8.1 Defining A Queue

To chain Methods together, take the QUEUE option from the main menu (Figure 8.1). Choose DEFINE OR EDIT QUEUE. A dialog box will appear (Figure 8.2). Up to 20 methods can be chained together in the QUEUE listbox, each one occupying a line.
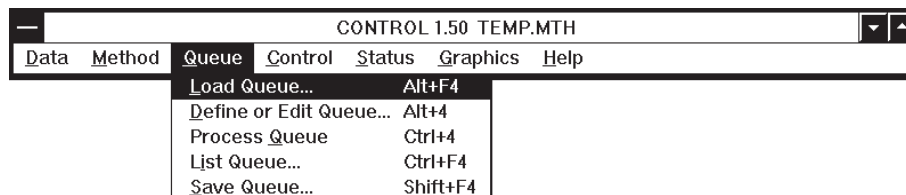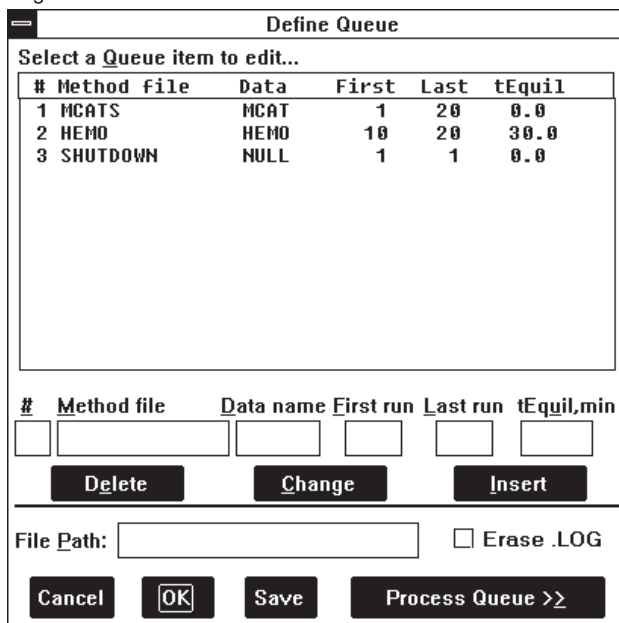
Figure 8.1 The Queue Menu.

Figure 8.2 Chaining Methods together with a Queue.

For each line in the listbox, enter a line number, the name of the Method to be run, the name of the data files to be saved, and the first and last run numbers of the sequence to be performed. The data filenames and run numbers in the listbox supersede those in the Method.

The tEQUIL entry allows you to program a time delay, in minutes, between Methods. This could be used, for instance, to allow the UV lamps to warm up, or to allow the EC detectors to equilibrate. For most purposes, however, set the time to zero for immediate execution of the Method.

Enter a FILE PATH only to send data to a location different from the default data location. For most purposes, leave this section blank.

Use the ERASE .LOG feature to erase any previous LOG file when the Queue is started. Since the LOG file contains a record of each run, it's best not to erase it. Rather, rename the LOG file and archive it with the data.

If desired, SAVE the Queue by pressing the SAVE button. This opens a dialog for saving the Queue (Figure 8.3). A Queue name can have up to eight characters, and will automatically be assigned a .BAQ extention.

Figure 8.3 Save Queue dialog.
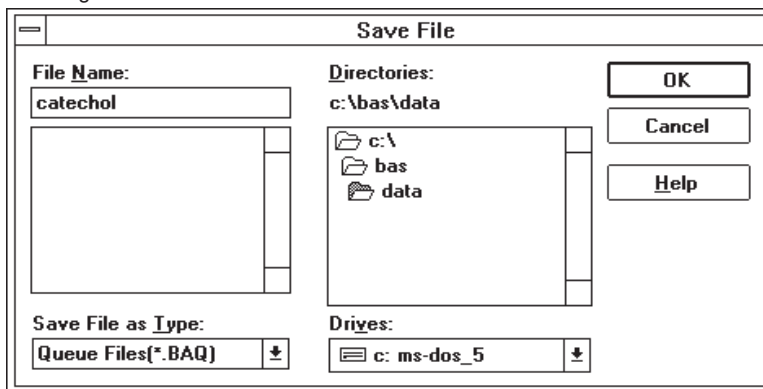
To start the sequence of chained Methods, click the PROCESS QUEUE>> button. The Methods will begin running according to their individual directions. While the Queue is processing, a status box (Figure 8.4) will indicate the current Method and the scheduled runs.

Figure 8.4 Status of the Queue.

8.2 Chaining A Shutdown Method

The last Method in the queue can be a SHUTDOWN Method. You can change almost all operating parameters with a SHUTDOWN Method. Although all parameters may be modified, we recommend only slowing the pump to conserve mobile phase, and turning the lamps off. The EC detectors should remain on to maintain their equilibration, and the pump should never be stopped for extended periods with mobile phase in the system.

To create a SHUTDOWN Method to slow the pumps and turn off the lamps, create a method with a lower flow rate (PUMP GRADIENT SCHEDULE) and without the UV box enabled (DATA ACQUISITION OPTIONS). Save this Method under the name SHUTDOWN, and add this name at the end of the Queue (Figure 8.2).

To start the sequence of Methods, choose the PROCESS QUEUE button. The Methods will run in sequence, each performing its appropriate number of runs. When the SHUTDOWN method is reached, it will make the appropriate changes to the pump and lamps, then maintain these new settings.

SECTION 9. USING THE GRAPHICS MENU

The GRAPHICS MENU (Figure 9.1) allows you to control the appearance of the graph, including which items are graphed and all colors. In addition, options for printing both graphs and text are included in this menu.

Figure 9.1 The drop-down GRAPHICS MENU.
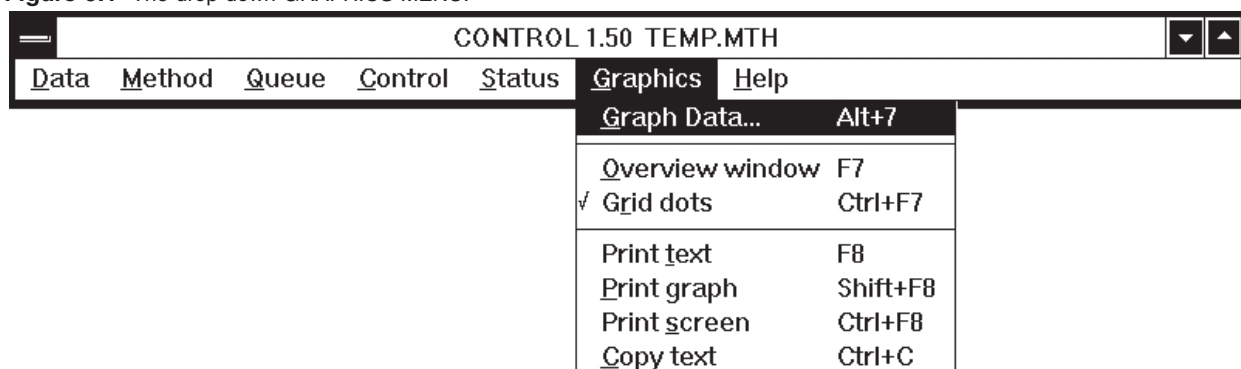
9.1 Formatting The Graph

Before formatting the graph, you must have a data set in RAM. Either collect new data with a chromatographic run (Section 7, page 27) or switch to the SIMULATE mode (Figure 3.1, page 4) and load an old data set using the LOAD option in the DATA MENU (Figure 9.2).

Figure 9.2 Loading data through the DATA MENU. You must be in SIMULATE mode to use the LOAD DATA option.
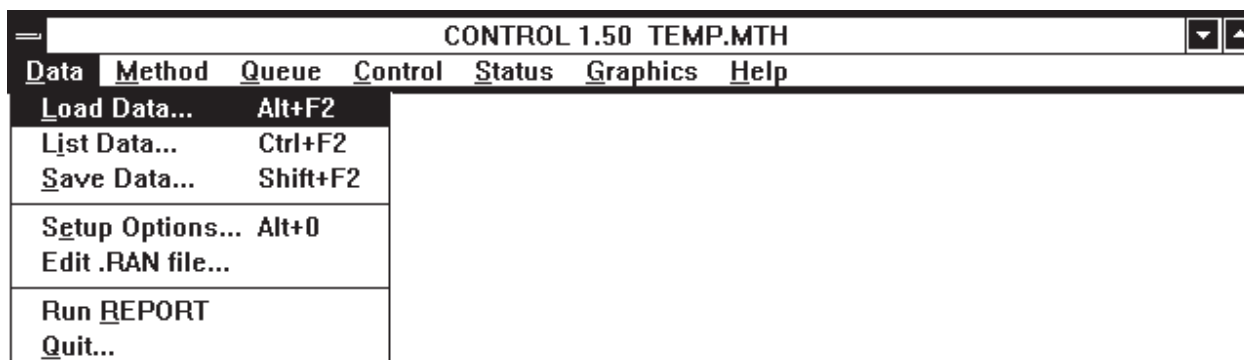
Select the GRAPH DATA option in the GRAPHICS MENU (Figure 9.1). A GRAPH OPTIONS screen opens (Figure 9.3). Each data set in RAM will have a section where it can be selected for graphing. Check the box for each data set to be graphed, and select the line color using the drop-down listbox of colors.

Figure 9.3 Options for drawing the graph.

Several aspects of pump performance also can be selected for graphing, but these must be selected before the run begins. For gradient runs, the percentage of each mobile-phase bottle can be plotted against time. A continuous graph of pump pressure also can be plotted. Each of these options has its own selection for line color.

The GRAPH OPTIONS screen also contains options for controlling the overall appearance of the graph. Both background color and border color can be selected with drop-down listboxes. The Y-axis label can be changed. The Y-axis numerical scale defaults to the full-scale detector range.

The graph (Figure 9.4) will be drawn when the OK button is clicked. The graph can be made larger or smaller by dragging the borders with the mouse. All the default settings for graph colors and size will be made permanent if you exit the system and save the CONTROL.INI file (Section 12, page 46).

Two additional options present in the GRAPHICS MENU (Figure 9.1) allow for customization of the graph. OVERVIEW WINDOW enables a second window, which always shows the entire graph, even when parts of the main graph have been enlarged. Turn this feature on by clicking on its name, or by pressing F7. GRID DOTS overlays a grid on the graph, to facilitate estimations of peak height and retention time. Turn it on by clicking on its name or typing CTRL-F7. Both these features are illustrated in Figure 9.4.

Figure 9.4 Graph drawn with overview window and grid dots.
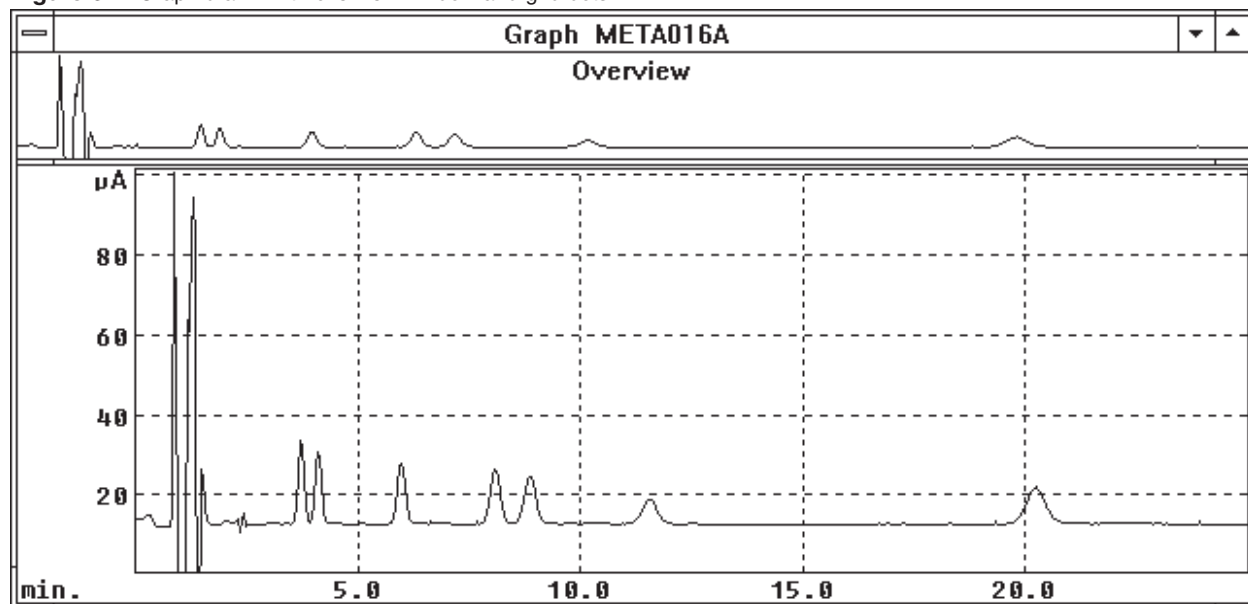
9.2 Zoom

Parts of the graph may be enlarged at any time, even while data are being collected, using the zoom feature. Simply click and hold the left mouse button on a section of the graph, drag it to another section (thus making a rectangle) and release the button. The rectangle can be drawn either on the main graph or on the overview window, but only the main graph shows the enlargement. Figure 9.5 shows the outline of the rectangle, and Figure 9.6 shows the resultant graph. Notice that the overview window retains the original graph, with a rectangle delineating the enlarged area. This rectangle may be dragged along the overview window, thus enlarging new sections of the graph. To return from an enlarged graph to the previous view, position the cursor on the main graph and click the right mouse button.

Figure 9.5 Rectangle indicating section of chromatogram to be enlarged.
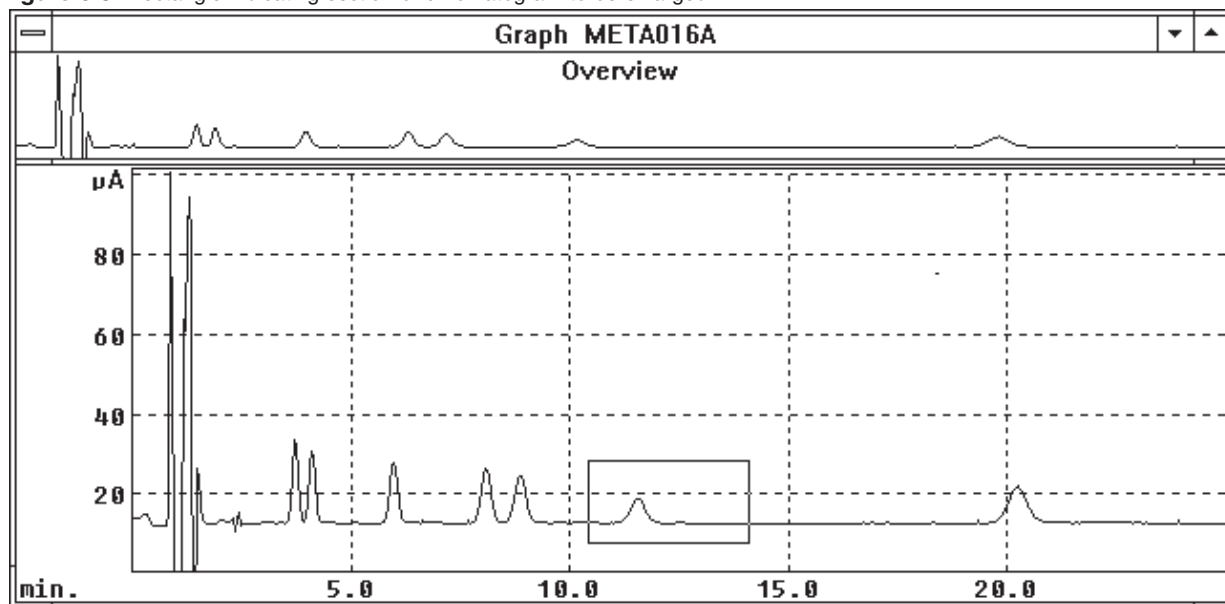
Figure 9.6 Enlarged section of chromatogram. Overview window indicates the position of the enlarged section.
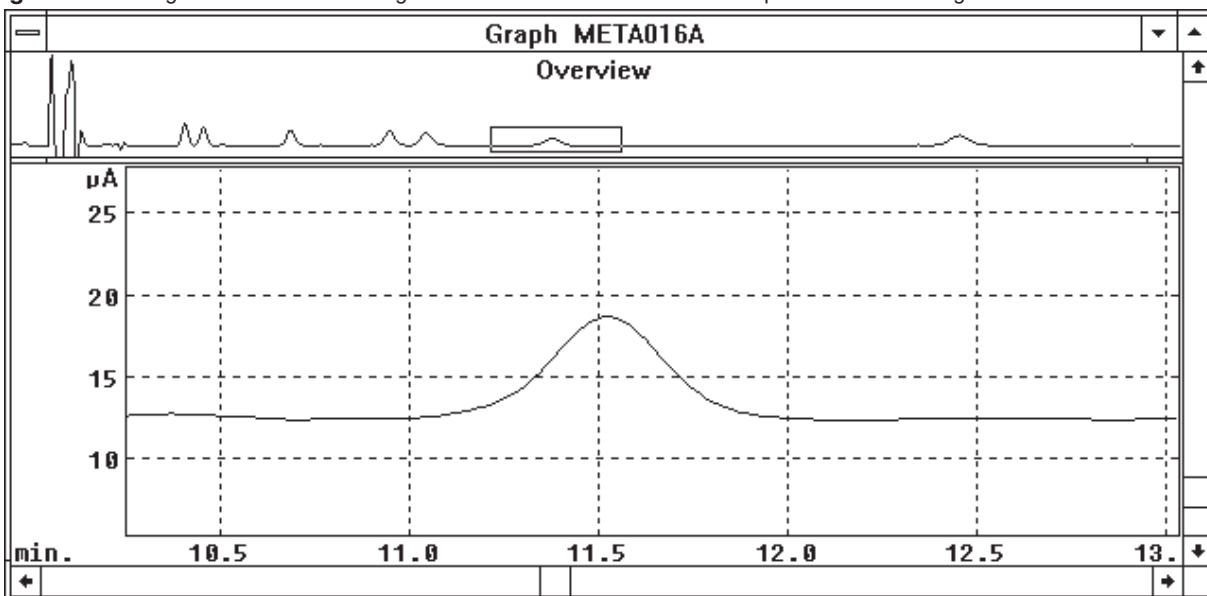
9.3 Printing and Copying   The printing options are accessed through the GRAPHICS MENU (Figure 9.1). To print text from the output screen, highlight the desired lines and click on PRINT TEXT (or press F8). To print the graph, click on PRINT GRAPH or press SHIFT-F8. To print the entire screen (all text and all windows) click on PRINT SCREEN or press F9.

COPY TEXT allows you to copy text on the screen into Windows Clipboard. Simply highlight the text with the mouse, then click on COPY TEXT or press Ctrl + Ins.

SECTION 10. USING AUTOSAMPLERS

The BAS-200B Chromatograph can communicate with autosamplers for automatic operation. The specific procedure to be used depends upon the type of autosampler that is available.

10.1 BAS Sample Sentinel Autosampler

The BAS Sample Sentinel autosampler is capable of two-way communication with the BAS-200B. The autosampler will not inject the sample until the chromatograph is ready to start its run, and the chromatograph will not start its run until the autosampler is ready to inject. Samples are thus safeguarded in the event of mechanical failure or depletion of mobile phase. In addition to these communication signals, CONTROL reads the vial position from the autosampler* and saves this information with the data file for reports.

Communication between the BAS-200B and the autosampler is via cable EW-4456. Simply plug the appropriate ends into the AUTOSAMPLER plug on the back of the BAS-200B and the connector strips on the BAS Sample Sentinel

When programming the autosampler and the chromatograph, make sure that you've indicated an EXTERNAL TRIGGER in the BAS-200B's Method (Figure 10.1). For the BAS Sample Sentinel, change INJECT HOLD ACTIVE to HI in the OPTIONS section of its menu.

The autosampler's run length should be a minute longer than that of the chromatograph. This ensures that the BAS-200B is "waiting for trigger" (Figure 10.2) when the autosampler sends its "ready to inject" signal. Start the system by clicking EQUIL, then RUN, in the RUN STATUS box (or PROCESS a QUEUE). Then start the autosampler.

* requires bcd option with autosampler

Figure 10.1 Data Acquisition Options for communicating with the BAS Sample Sentinel autosampler.

Figure 10.2 The BAS-200B is waiting for a start signal from the autosampler.

```
┌──────────────────────────────────────────────────────────────────┬───┬───┐
│─           CONTROL 1.50 TEMP.MTH  CATS001A.DAT                    │ ▼ │ ▲ │
├──────────────────────────────────────────────────────────────────┴───┴───┤
│ Data  Method  Queue  Control  Status  Graphics  Help                   ▲ │
│──────────────────────────────────────────────────────────────────────    │
│ Method filename: TEMP                                                     │
│ Operator:                      Conditions:                                │
│ Data filename: CATS            Run notes:                                 │
│ Run number:    1               Detector:    A=EC1                         │
│ Time of run:   11:52           Date of run: 03/23/94                      │
│ Solvent names: A=cat's m.p.  B=40% ACN     C=100% ACN                     │
│──────────────────────────────────────────────────────────────────────    │
│ Detectors enabled:  A=EC1                                                 │
│ Waiting for external trigger...                                        ▼ │
└───────────────────────────────────────────────────────────────────────────┘
```

10.2 Other Autosamplers: BAS-200B In Charge

If an autosampler is not capable of two-way communication, but will accept an inject trigger, the system can be automated with the BAS-200B in charge. Program the autosampler so it will end its run and load the next sample before the BAS-200B has completed its run. The autosampler must then wait for a trigger from the BAS-200B. Use cable EW-8162, and plug it into the TIMED EVENTS receptacle on the back of the BAS-200B. Connect the yellow and violet leads to the SAMPLE ENABLE terminals on the autosampler.

Now program CONTROL to trigger the autosampler at the start of each run: set the SWITCH RELAY SCHEDULE in the Method as shown in Figure 10.3. Set the TRIGGER TYPE to AUTOMATIC and indicate the number of runs (Figure 10.4). Start the Method from the RUN STATUS box, by clicking EQUIL, and then RUN (or PROCESS a QUEUE). The BAS-200B will proceed automatically from one run to the next, and send a start signal to the autosampler each time.

Figure 10.3 Switch Schedule for triggering an autosampler that accepts an inject signal.

```
┌──────────────────────────────────────────────────────┐
│─             SWITCH RELAY SCHEDULE                     │
├────────────────────────────────────────────────────────┤
│ Minutes Sw#1  Sw#2  Sw#3  Sw#4   (Select a Row)        │
│ ┌────────────────────────────────────────────────────┐ │
│ │    -1  off   off   off   off                       │ │
│ │   0.0  on    off   off   off                       │ │
│ │   0.1  off   off   off   off                       │ │
│ │                                                    │ │
│ │                                                    │ │
│ │                                                    │ │
│ │                                                    │ │
│ └────────────────────────────────────────────────────┘ │
│                                                          │
│ Minutes:  Switch1:  Switch2:  Switch3:  Switch4:         │
│ ┌──────┐     □         □         □         □             │
│ └──────┘                                                 │
│       ┌────────┐  ┌────────┐   ┌────────┐                │
│       │ Delete │  │ Change │   │ Insert │                │
│       └────────┘  └────────┘   └────────┘                │
│                                                          │
│ ┌──────┐ ┌──────┐ ┌──────┐ ┌──┐ ┌────────┐ ┌──────┐ ┌──────┐ │
│ │<< OK │ │ Exec │ │ Save │ │OK│ │ Cancel │ │ Stop │ │OK >> │ │
│ └──────┘ └──────┘ └──────┘ └──┘ └────────┘ └──────┘ └──────┘ │
└──────────────────────────────────────────────────────────┘
```

Figure 10.4 Data Acquisition Options for communicating with an autosampler that accepts an inject signal.

10.3 Other Autosamplers:
Autosampler In Charge

If the autosampler will not accept an inject trigger, then the autosampler must be in charge of the run.

To configure the system with the autosampler in charge, use cable EW-8162. Plug it into the TIMED EVENTS receptacle on the back of the BAS-200B. Connect the green wire and the white/black striped wire to the trigger terminals on the autosampler. The autosampler's run must be longer than that of the BAS-200B, so the chromatograph is waiting for a trigger when the autosampler is ready to inject. Program the BAS-200B to accept an external trigger, and set the number of runs (Figure 10.5). Start the system by clicking EQUIL and then RUN in the RUN STATUS box (or PROCESS a QUEUE). The message "waiting for trigger" will appear. Then start the autosampler.

Figure 10.5 Data Acquisition Options for accepting a start trigger from an autosampler.

10.4 Inputing Sample Information with a .RAN File

ChromGraph Control will take input from a text file with a .ran extension and save this information along with the data. This allows you to permanently associate the sample information with the data.

The format of the .ran file is shown in Figure 10.6. Find the file TEMPLATE.RAN in the BAS directory. Copy this file into the BAS/DATA directory and use it as a template to build your own .ran file. It is important that this file be in text format, so all characters and spaces have the same width. Use a text editor to make the modifications. Control will automatically call Windows Notepad when you take the EDIT .RAN FILE option under the DATA menu (Figure 11.2). Be sure to save the file with a new name.ran.

ChromGraph ignores the first 10 lines of the file. Enter the data you wish to incorporate starting in line 11. The information **MUST** be found in the specified columns, left justified.

Run Number: (Columns 16-25) Control will examine this column at the start of each run. If a run number anywhere in the column matches the current run number, Control will incorporate the relevant sections of that line into the data file.

Vial Number: (Columns 26-35) The preferred method for saving vial numbers along with the data is to let the autosampler do it, as with the BAS Sample Sentinel equipped with the vial-position option. In this case, go to SETUP OPTIONS (Figure 10.7) and make sure that GET VIAL # in .RAN FILE is **NOT** checked and that BINARY VIAL NUMBERS is checked. Control will ignore the vial numbers in the .ran file.

If the autosampler is not equipped to send vial position data, you can specify that vial numbers in the .ran file be saved with the data. Check the box for GET VIAL # in .RAN FILE.

Volume: (Columns 36-45) These numbers allow ChromGraph Report to adjust the results for each sample to account for variable volumes or sample weights. If this is not the case, **leave this column blank.**

If volume does differ among samples, you can enter the volume for each sample. See the ChromGraph Report manual for information on how these volumes are used. If a volume is entered, the Control will import it, and any text that follows it, into the Run Notes section of the data. This reduces the space available for Sample ID (see below) unless you move the ID's over so they follow the volumes, with one space between.

Sample ID (Columns 46-80) Unless variable volumes are used, these columns are imported into the Run Notes section of the data and are appropriate for appending identifying information about each sample.

The .ran file should be placed in the default data directory where the Method and data files reside. Then edit the Method to insert the name of the .ran file into the Run Notes section of DATA ACQUISITIONS (Figure 10.8). As each run is started Control will import the relevant information from the matching line in the .ran file.

Figure 10.6 A template for the .ran file.


```
Notepad - TEMPLATE.RAN

File   Edit   Search   Help

        BAS - ChromGraph REG Ver 1.0 (created:8/27/96 - 10:08:14 AM)
        ---------------------------------------------------------------
        TITLE:Test                          PROJECT #:0000 0000
        ANALYST:pkw                         RANDOM FILE:13NE.ran
        # OF SAMPLES:9                      AUTOSAMPLER CAPACITY:
        NORMAL VOLUME:1.00                  NOTEBOOK #:_____
                                            PAGE(S):_____


        RUN       VIAL       VOLUME      SAMPLE ID
        1         1          1           Sample 11012345678901234 5678901
        2         22         0.50        Sample 22012345678901234 5678901
        9         90         9.9876543   Sample 99012345678901234 5678901
        3         333        0.25        Sample 33012345678901234 5678901
        7         70         7.77        Sample 77012345678901234 5678901
        4         4444       4.4         Sample 44012345678901234 5678901
        5         55555      5.5         Sample 55012345678901234 5678901
        6         60         6.6         Sample 66012345678901234 5678901
        8         80         8.888888    Sample 88012345678901234 5678901
```

Figure 10.7 Options for importing data from a .ran file and the autosampler.

CONTROL SETUP OPTIONS

COM Port
○ Simulate ○ COM1 ◉ COM2 ○ COM3 ○ COM4

Baud Rate
○ 9600   ◉ 19200   ○ 38400

BAS ROM Versions
Pump 2.01 EC/Ext 2.21a UV/Vis 9.00 Utility 2.00

Simulated equipment
☒ Pump   ☒ Utility   ☒ EC/Ext   ☐ UV/Vis   ☐ DA-5

☒ Smart Mouse positioning   ☐ Auto-Backup .MTH
☒ Binary Vial Numbers   ☐ Abort if no .RAN file
☐ Get vial # in .RAN file   ☐ Get volume in .RAN file

[OK]   [Cancel]

Figure 10.8 Entering the .ran file name in the Method.

DATA DESCRIPTION

Method filename: TEMP

Operator: [   ]
Conditions: [   ]
Run Notes: [name.ran   ]

Time of run= 15:17   Date of run=   01/05/1998

Data name: [TEST]   Run #=   11

Detector=   A=EC1   Vial #=   2

[<< OK] [Save] [OK] [Cancel]   [OK >>]

## *SECTION 11. DATA ANALYSIS WITH CHROMGRAPH REPORT*

The data analysis companion to ChromGraph CONTROL is called ChromGraph REPORT. REPORT comes with its own manual, so detailed instructions for operating it are not needed here. This section will concentrate on interfacing the two modules.

11.1 REPORT In The Batch-Process Mode

The easiest way to interface the two modules is not to interface them at all. Many users prefer to separate data collection and data analysis into two separate activities. This reduces the array of things one must do before starting a series of runs, and reduces the chance of making mistakes.

In the batch-process mode you first do the chromatography. For example, you may have 30 microdialysis samples in which you are determining amino acids. Create an appropriate Method within CONTROL, paying particular attention to the default data location (Figure 11.1) to which the data will be saved. Configure the autosampler appropriately, start the system, and let the chromatograph and autosampler process the samples overnight.

Figure 11.1 Taking the LOAD METHOD option will indicate the default data location. In this case it is C:\BAS\DATA.
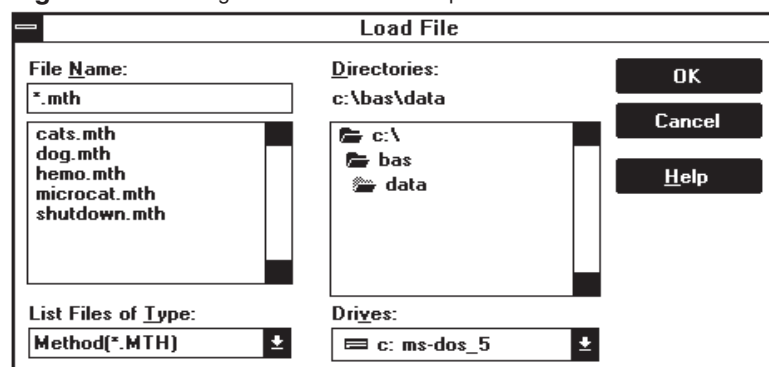
In the morning you will have a set of 30 data files in the default data location, plus a log file detailing the runs that were made and recording any error messeges. (The log file has your Method's name followed by a ".log" extension.) Now load up REPORT. This can be done by double-clicking on the REPORT icon in the BAS PROGRAMS group of Windows Program Manager, or by taking the RUN REPORT option in the CONTROL DATA MENU (Figure 11.2).

Figure 11.2 Starting REPORT from the CONTROL DATA MENU.
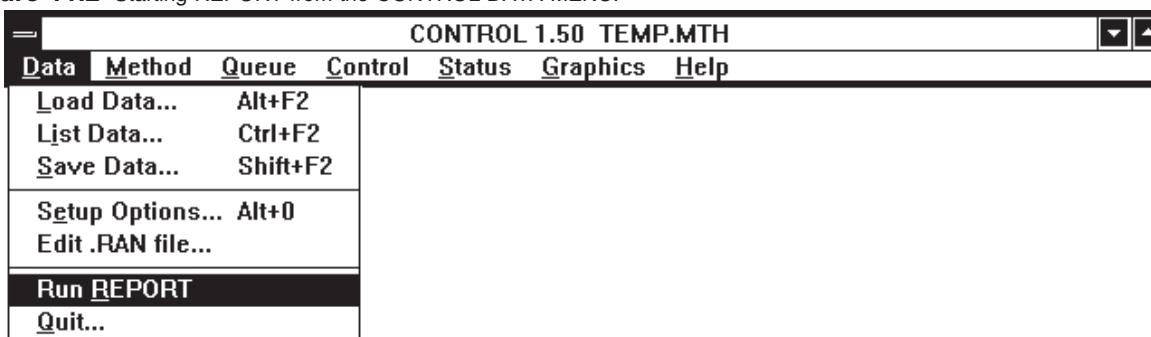
When REPORT is active, load a data file for any one of the runs of interest. This will both set the appropriate default data location, and allow you to process a sample run and tailor the report to your needs. Next use REPORT'S QUEUE dialog box to instruct the software on the Method(s) to use and the runs to process (Figure 11.3). Press the PROCESS QUEUE button, and all the runs will be analyzed.

Figure 11.3 Setting up a data-processing queue in REPORT.
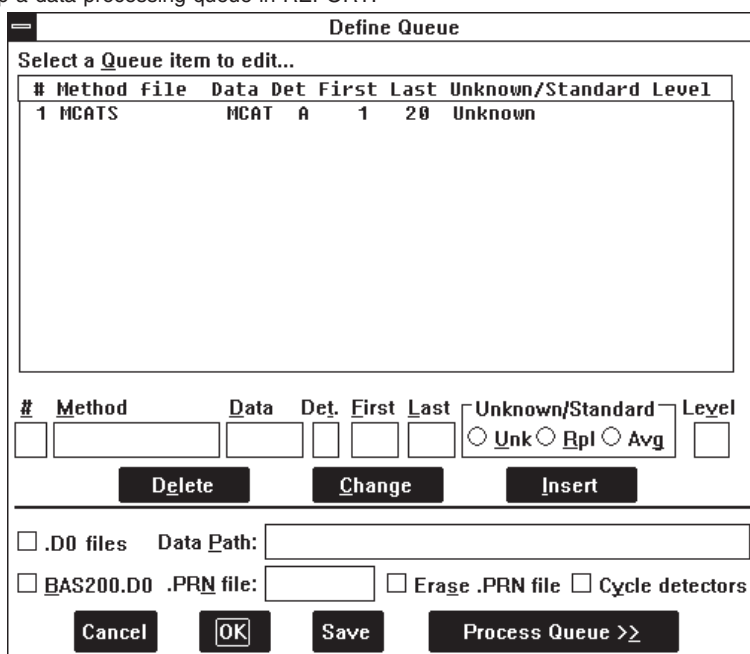
11.2 REPORT In The On-line Mode

REPORT also can be configured to process the data from each run immediately after the run is completed. This is a more complex procedure than the batch-process mode. The advantage to the on-line mode is that printed output from early runs can be examined while later runs are still in process. We recommend that you attempt the on-line mode only after you are thoroughly familiar with both CONTROL and REPORT.

The first step in setting up the system for on-line data processing is to erase, rename or move any old data files with the same name and run numbers as the new series of runs.

We recomend that old data files be archived on a floppy disk with the Method and LOG files associated with them. Use Window's File Manager to copy these files for storage.

To ready REPORT to receive data, first load some data from the directory in which the BAS-200B will save it. This sets the default data location appropriately. Next, set up a REPORT QUEUE listing the Method and run numbers to use (Figure 11.4). If more than one detector is configured you need a line for each detector. Also check the CYCLE DETECTORS box, which tells REPORT to process all the detectors for any run before going on to the next run. Then click the PROCESS QUEUE button. Since the data files do not yet exist, the message "REPORT Queue awaits" will appear (Figure 11.5). REPORT will do nothing until CONTROL writes the data files to disk.

Figure 11.4 Setting up REPORT to receive and process data passed from the BAS-200B.

Figure 11.5 REPORT is awaiting the data.

Now switch back to CONTROL. Start the sequence of runs or the QUEUE. After the data for each run are saved, REPORT will become active and produce a report for the run.

SECTION 12. EXITING THE SYSTEM

CONTROL may be exited, and the computer turned off, whenever there are no runs in progress. Since the BAS-200B has its own memory, it may be left on when the computer is turned off. The BAS-200B will continue to run, maintaining its last settings for flow rate, detector gain, etc.

To exit the software, choose QUIT from the DATA section of the Main Menu (Figure 12.1). You will be given a choice of saving the TEMP.MTH and CONTROL.INI files (Figure 12.2). The TEMP.MTH is a backup copy of the Method currently in RAM. It is also the Method that is automatically loaded at startup. The CONTROL.INI file contains information on how you've set up the screen. Such things as the size and location of windows and status boxes, size and color of the graph, and the default data location are stored here. Check the boxes if you want to save these files. (The CONTROL.INI box will always appear unchecked. The TEMP.MTH box will appear either checked or unchecked: its setting is preserved from the previous SAVE of CONTROL.INI.)

Figure 12.1 Exiting the software.
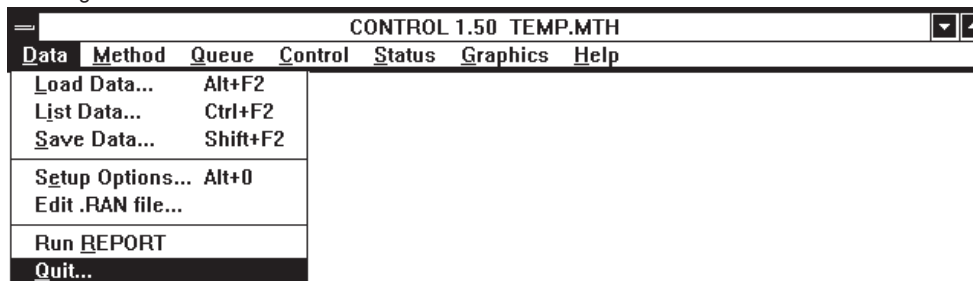
Figure 12.2 Check the boxes if you want the current method and screen settings to be recalled at your next session.