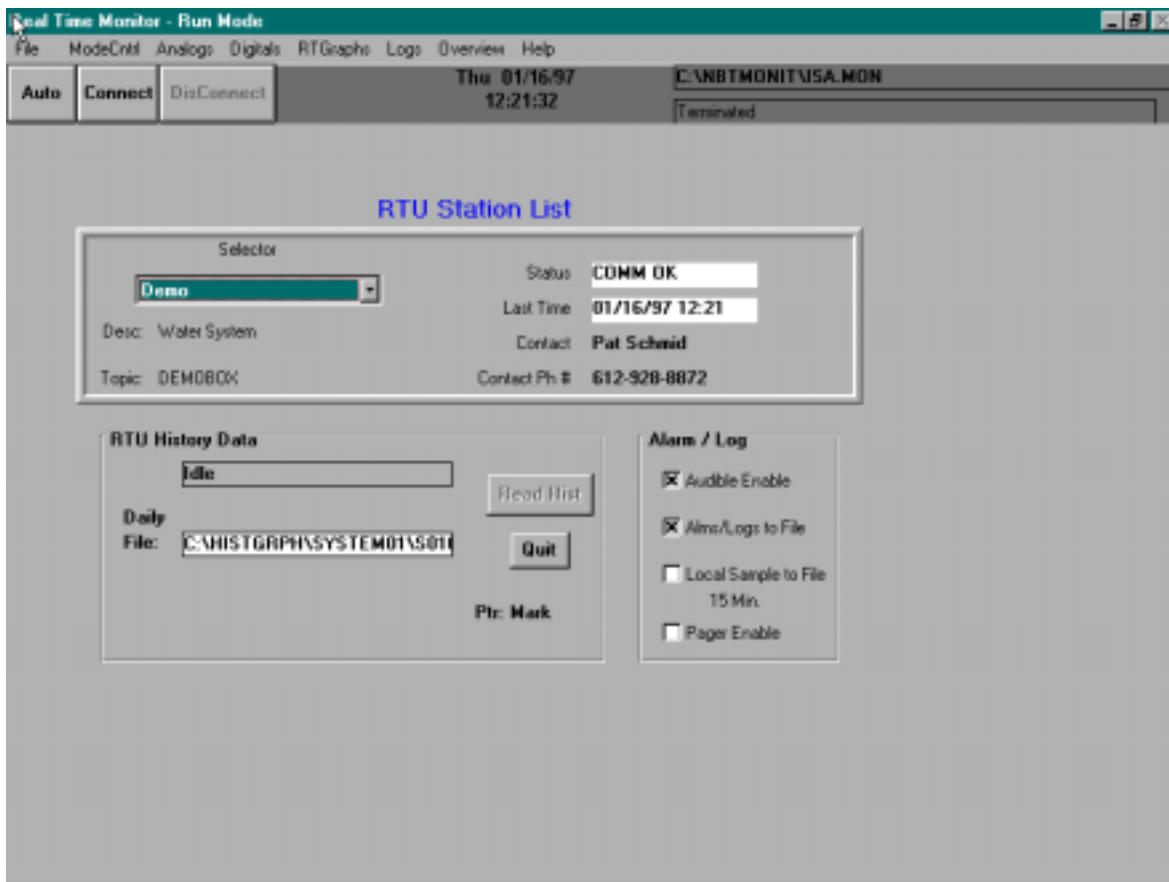


Real Time Monitor



A Real-Time Windows Operator Interface

DDE Compliant

(for remote data display)

TABLE OF CONTENTS

1. INTRODUCTION.....	1
1.1 INSTALLATION	2
1.2 FIRST START UP - DDE CONFIGURE.....	2
1.3 AUTO-STARTUP.....	2
2. SETUP MODE.....	3
2.1 STARTING TO USE THE RT MONITOR	3
2.2 CREATING A MONITOR FILE	4
2.2.1 Reading a saved RTU File.....	4
2.2.2 Reading the Configuration directly from an RTU.....	5
2.2.3 Creating or Loading a Template for any Station.....	5
2.3 READING AN EXISTING 'MONITOR' FILE.....	5
2.4 OFF LINE EDITING IN SET-UP MODE	6
2.4.1 Showing the RTU and Point Grids	6
2.4.2 Editing in the RTU List Grid.....	6
2.4.3 Points Grid	6
2.4.4 Editing the Points or Adding Calculated Points in the Grid.....	7
2.4.5 Local Alarming.....	8
2.4.6 Local Analog Engineering Unit Conversion	8
3. RUN MODE DISPLAYS	8
3.1 DISPLAYS/REVIEWING DATA	9
3.1.1 Analog.....	9
3.1.2 Digital.....	10
3.1.3 Graphs	11
3.1.4 Logs Screen.....	12
3.2 DISPLAY HEADERS	15
4. RUN MODE- OFF-LINE.....	15
4.1 DISPLAY EDITING	16
4.1.1 Re-arranging Points on displays	16
4.1.2 Pop Up Point Editing.....	16
5. RUN MODE- ONLINE OPERATIONS	17
5.1 CONNECTING TO RTU	17
5.1.1 Automatic Mode	17
5.2 CONNECT STATE ENTRIES	17
5.3 ANALOG DISPLAY	17
5.3.1 Data Entry	17
5.3.2 Reading High/Low Limits.....	17
5.3.3 Alarm Enable (per point).....	18
5.3.4 How it works details.....	18
5.4 DIGITAL DISPLAY	18
5.4.1 Control.....	18
5.4.2 Reading Runtimes and # of Starts.....	18
6. APPENDIX A- PASSWORDS.....	19

1. Introduction

The NBT Real Time Monitor is a Windows™ compatible product. Windows Version 3.1 or newer is recommended.

The Real Time Monitor (RT Monitor) allows real-time display and control of NBT Remote Terminal Units (RTU's). Using the RT Monitor the operator is able to connect to any or all RTUs on the system up to a maximum of 40. Each RTU can have up to 120 points per station. The RT Monitor uses the NBT DDE Server which can communicate via leased line, radio, dial or cellular telephone.

The RT Monitor has individual screens for:

1. Digital Points
2. Analog Points
3. Real Time Graph Displays
4. Graphical Remote Site Display (operator designed)
5. Alarm Log and Call Log Display

These graphical display screens provide an easy to use generic presentation of live field data for viewing by the operator. Displays are described in more detail in Section 3.1.

The RT Monitor MMI is rich with features. Configuration of the RT Monitor is automated. All configuration data in an RTU is automatically displayed in the appropriate RT Monitor screens. The RT Monitor can read the internal point configuration information directly from the RTU, or read-in existing RTU configuration files from your PC's hard disk (See chapter 2). Reading an RTU file directly from the RTU or reading an existing RTU file from disk accomplishes the same purpose, the configuration of the RT Monitor is automatic.

The operator has control over the remote site (See chapters 5.3.1, 5.4.1). Digital (On/Off) points and analog limit values can be sent to the field as output values or as equipment control set-points.

The Real Time Graphing capabilities of the RT Monitor allow the operator to select up to 4 analog values (pens) for graphing and to sample at variable intervals. This is extremely useful for viewing or storing real-time data as line graphs. With a simple "point and Click" the operator can automatically store graph data to a file, or print the actual graph (See Chapter 3.1.4).

Another feature is local alarming (See Chapter 5.3.3). Individual points can be enabled or disabled for local alarming at the PC, independent of RTU alarming operations. Once enabled and running on the PC, the operator will be alerted audibly of any alarm condition. This feature can be used as an early warning system while running the RT Monitor.

The RT Monitor has a Connect and Alarm Log screen (See Chapter 3.1.5). The Connect Log provides a grid listing of the connect time and disconnect times for each station. The Alarm log records date and time along with the point and condition that caused the alarm.

Another salient feature is seamless historical event retrieval (See Chapter 2.2.4). The RT Monitor has pre-defined parameters to allow the easy, automatic retrieval of historical event samples (collected and stored at the RTU) from any RTU for storage on the PC's hard disk in any one of three file storage formats; CSV (comma separated), TSV (tab separated), or Access database files. This feature allows the data to be used on nearly all other Windows software packages.

1.1 Installation

As with most Windows applications, install disk #1 contains a SETUP.EXE file used to install the RT Monitor. The SETUP program will prompt you for the desired path and directory for installation; we recommend "c:\nbtmonit". Everything else is automatic. The installation disks load the RT Monitor ONLY. A separate disk is supplied which contains the DDE Server. Repeat the installation procedures for the DDE Server after you have installed the RT Monitor (see note below).

NOTE: ONLY install the DDE Server into your "c:\nbtmonit" directory. The RT Monitor will automatically start the DDE Server if installed this way.

The next step is to do an initial set up of the DDE I/O server.

1.2 First Start up - DDE Configure

Each time you run the RT Monitor the DDE server is automatically started (see note 1.1). The DDE server program must be running for the RT Monitor program to be used. **The operator must configure the port and topic information in the DDE server.** All configuration of the DDE server is performed using the menu selections and pop up menu's.

The server must have TOPIC names defined for each RTU that is to be accessed by the Monitor program (or any other operator interface). Generally, a unique TOPIC should be used for each station.

The TOPIC is an alphanumeric name that is used by client programs (e.g. RT Monitor) to interact with the DDE server. It associates the TOPIC name to a specific RTU. The TOPIC specifies the RTU address, which port to use on your PC, and update or refresh rate. To define TOPIC, the DDE server has an easy to use pop up menu with the definable parameters or see your DDE Server Manual.

Along with a TOPIC, the operator must also define the port configuration in the DDE server. Port configuration is done via an easy to use, pop-up menu in the DDE Server. The operator specifies baud rate, word length, parity, number of stop bits. (See DDE help index or manual for more information)

Note: Chapter 1.3 Auto Start up is best understood after reading Chapters 2 through Chapter 5

1.3 Auto-Startup

This feature is useful if the operator always starts a specific .MON file each time he uses the RT Monitor

The operator can enable the RT Monitor to:

- Start any .MON file, and begin to poll stations in AUTO mode
- Retrieve Historical Data Automatically every hour

With Windows, an ICON is created for the MONITOR program at SETUP run time, and the path and program name are set. The working directory may also be added (*Example see Figure 1-1*) Adding "demo2.mon" will cause this .MON file to be loaded automatically upon startup of the MONITOR program (See Command line *Figure 1-1*).

Note: Only use the Auto startup features after a MON file has been created (See Chapter 2.2) and saved

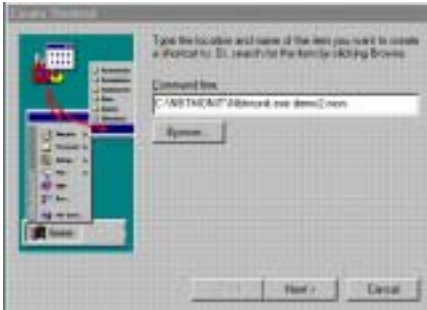


Figure 1-1(Illustrates Windows 95 Shortcut Wizard)

Once the operator has entered a **single space** and then the MON file name ('demo2.mon' in Figure 1-1) it is automatically started with the RT Monitor. If the operator wants the RT Monitor to begin polling in the AUTO connect mode, (See Chapter 5.1.1 for AUTO Mode) the Operator simply adds a space and 'AUTO' at the end of the Command Line, the RT Monitor will start up in Auto mode. If you add a space after AUTO then add HH, the historical file will be retrieved from the RTU every hour.

2. Setup Mode

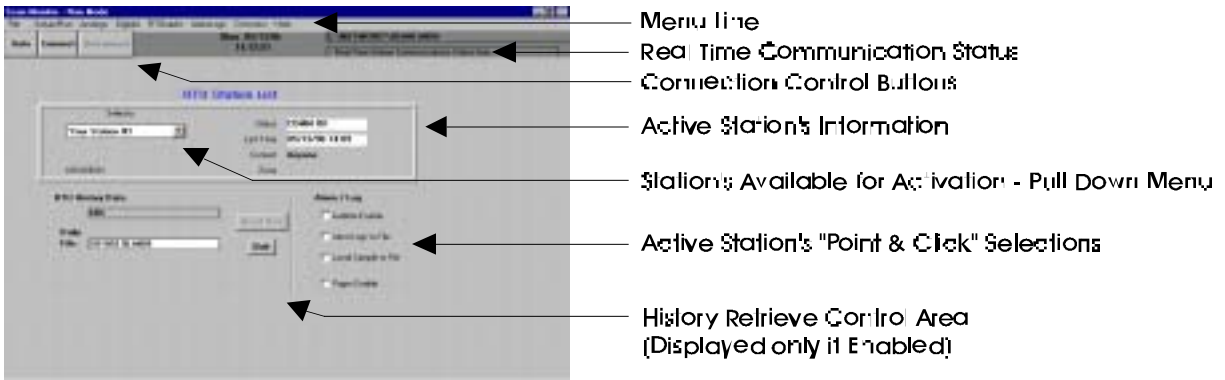


Figure 2-1 Scan Monitor - Run Mode - Auto start of .MON file

2.1 Starting to use the RT Monitor

When the Monitor program is started, the screen presented is the **Scan Monitor - Set up Mode**, Figure 2-1.

IMPORTANT: The **Mode Control** menu selection's vary depending on whether the operator is in **Run Mode** or **Set up Mode**. **Set-up Mode** selections are described individually; see sections 2.2.1, 2.2.2, 2.2.3, or 2.4.1. or see Chapter 3, 4 for **Run Mode**.

If this is the first start-up, the operator must complete one of the step's listed below:

- 1) Creating or Loading a Template (See 2.2.3)
- 2) Read an RTU file (See 2.2.1)
- 3) Read an Station Directly (See 2.2.2)

When the operator has completed one of the above steps they are ready to connect with a station. To manually connect, select **Mode Control** from the menu line (figure 2-1), then select **Run Mode**.

Once in Run Mode simply **select the appropriate Station name, and click CONNECT**. In the upper right corner you will see the connection status as it occurs. You will notice that it will progress from connecting to connected. If this does not happen the you have not properly setup the communications. Call NBT or review the DDE Server and RT Monitor Manuals

If, when attempting to connect to a station, you receive an "error connecting to server" message, be sure you have the same DDE Topic defined for both the DDE server and the station you are attempting to connect with.

The **Auto Connect Control** Button can be used to cycle through and poll all stations that have been loaded (for more detail see *Chapter 5.1*).

2.2 Creating a Monitor File

Note: The Monitor program must be in the **Setup Mode**, in the Mode Control menu, for this operation.

If the operator has previously saved any configuration files (*See Chapter 2.2.1*) from a RTU onto his PC's hard disk, these .RTU files can be read into the RT Monitor and then saved as a .MON file. The configuration data can also be retrieved from the RTU directly (*See Chapter 2.2.3*), and saved as a .MON file.

Once the operator has loaded a saved RTU file, or read directly an RTU file, and then wants to create a .MON file: via the Scan Control MENU, select File, then select 'SaveAs'. You will be prompted with a Pop-up menu. Enter the 7 character name associated with the loaded information. These MON files then can be reloaded at any time in the future.

At any time, while using the RT MONITOR program, stations can be added (loaded) by selecting Add STATIONS under the Mode Control menu selection. If you wish to permanently save the added station to your .MON file, go to Menu line, select File, the select save.

2.2.1 Reading a saved RTU File

Note: The RT Monitor must be in the **Setup Mode**, from the Mode Control menu, for these operations.

To read an RTU file that is already on your PC's hard disk, go to Mode Control, select ADD Station, select Read File, then select the desired file from the file Windows dialog box. If no .RTU files appear, be sure you are in the directory where the .RTU files have previously been saved in.

When reading the RTU file, a pop-up box will ask if you want only active, named points from the file, or ALL points from the file (including inactive). Normally, you should respond YES to get only active named points, since the inactive points are normally useless.

The limit values from a saved RTU file are not necessarily current. Once Online with the RTU the operator must request an update from the RTU(Chapter 3.1.1) to ensure that the High/Low set points are current. For example, if another person has modified a set point, in order to see those changes you must perform a 'Read HL'.

2.2.2 Reading the Configuration directly from an RTU

Note: The RT Monitor must be in the OFFLINE mode, from the Mode Control menu, for these operations.

To read the configuration directly from an RTU go to Mode Control, then select read RTU, you will be prompted for a TOPIC name as defined in the DDE driver for that RTU.

When reading the RTU configuration directly, a pop-up box will ask if you want only active, named points from the RTU, or ALL points from the RTU (including inactive). Normally, you should respond YES to get only active named points, since the inactive points are normally useless.

High/low values and other parameters will reflect the current data in the RTU as opposed to the original data when the RTU was configured.

2.2.3 Creating or Loading a Template for any Station

Note: The RT Monitor must be in the OFFLINE mode, from the Mode Control menu, for these operations.

The operator can create a template using any RTU or station configuration. A template allows you to duplicate a configuration and load that configuration as a new station. This eliminates the duplication of the set-up of the RT Monitor. For example, if the operator has added analog values, deleted digital values, and customized an overview screen for a particular RT Monitor file and then has the identical needs at a different station, using the read template function eliminates the duplication of the set-up effort.

To ADD the configuration directly from saved template, go to Mode Control, select STA TEMPLATE, then select read Station Template. You will be prompted with the EDIT RTU pop up BOX, here you must define a DDE TOPIC, and can also add other information specific to the new station you are creating.

After you have read a Template, the points named will appear on the other operating screens (For operating screens *See Chapter 3.1*)

2.2.4 Setting up for Reading the Historical Events Data directly from the RTU

Note: The Monitor must be in the OFFLINE mode, with the station to be read loaded from the Mode Control menu, to set up these operations.

For each station, the RT Monitor has the ability to directly read out the historical events that have been logged at the RTU and place them into either Comma Separated, Tab separated, or ACCESS database files.

To enable this functionality the operator must go to Mode Control and select Edit RTU list. Then, for any station in the grid, simply click on the line of the grid containing the station information, then do a right mouse button click. A pop-up RTU edit form will appear. Select the History check box.

For Comma and Tab separated files, you must specify the time period you want the data stored in. For example, if your Historical Data is most useful by the day, then select day, or you can specify a name to store data under.

Using the ACCESS database file type you should enter a **specific file name**, in the PERIOD or NAME box. Your data will then be stored with that file name and the .MDB file extension. If you do not enter a specific name, the file will automatically be save with the file name "LASTDATA". **If you do not enter a specific name you will have a single file name, "LASTDATA.MDB", that contains all the historical data.**

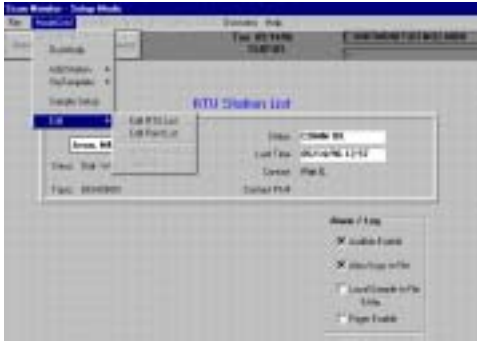
2.3 Reading an existing 'Monitor' file

Note: The Monitor program must be in the SETUP mode for this operation.

If a Monitor file exists, it can be loaded into the RT MONITOR program by selecting the FILE choice on the menu line of the Scan Control screen. Select the LOAD choice and use the Windows file dialog box to

choose the .MON file to load. Upon loading, the data for each station in the .MON file is restored to the condition at the last time the file was saved.

2.4 Off Line Editing in Set-up Mode



Chapter 2.4 explains the editing options available only while in Setup in the Mode Control menu. Pictured in figure 2-2, Edit RTU List has been selected (see 2.4.1).



Figure 2-2 Mode Control - Setup Mode - Edit

Figure 2-3 Edit RTU List From Figure 2-2

2.4.1 Showing the RTU and Point Grids

The RTU or Points grids can be displayed as pictured in *Figure 2-2*. See 2.4.2, and 2.4.3 for operational information on these two grids.

Once the RTU grid is displayed as in *Figure 2-3*, you must either uncheck the **Edit** selection in the Mode Control menu, or select **Run Mode** from the Mode Control.

2.4.2 Editing in the RTU List Grid

Edit RTU List has been selected in *Figure 2-3*. This grid contains information about all RTUs that have been loaded and are available for monitoring. Each line has information relevant to a single RTU.

To edit any of the information in the grid simply click on the line of the grid line containing information about an RTU, and then do a right button click. A **Edit RTU** pop-up form will appear. This pop-up menu gives you the ability to change the DDE TOPIC and contact information, and to define the historical events retrieval for this particular RTU. You must go to File from the menu line, then select save, to record any changes that you may have made to the RTU file.

Note: Edit RTU List is the only place to define the historical events retrieval parameters, and the enabling or disabling of output's.

2.4.2.1 Enabling Output Controls (by station)

Outputs to a station can be enabled, disabled, or authorized by password. **NOTE: outputs can only be performed while online with a single station.** The selection of whether to allow outputs can be made on the **Edit RTU** pop-up editing form(See Chapter 2.4.2). The password setting and use for a station is identified in Appendix A. This appendix should be removed if this manual is to be used by personnel not authorized for output operations.

2.4.3 Points Grid

Note: Most point editing and re-arranging is accomplished more easily from the Run Mode displays (i.e., Analogs, Digital's, etc.)

To view all the station's point information go to Mode Control, select Edit, and Edit Points. **The grid that appears contains information about all Points from all stations that have been loaded.**

Each line has information relevant to a single Point. **NOTE: because the point information for all station's are displayed within a single grid, "STA ROW" column indicates the station's row from the Edit RTU list grid. The operator can only edit a point from the current station listed above the point's grid in the station name box.**

A pop-up editing menu will appear when you click on a line of the grid, followed by a right button click. The **Point Edit** pop-up menu is pictured below. Notice that the **TYPE** of point displayed is a **ACALC** (calculated) point, which is explained below (*Chapter 2.4.4*).

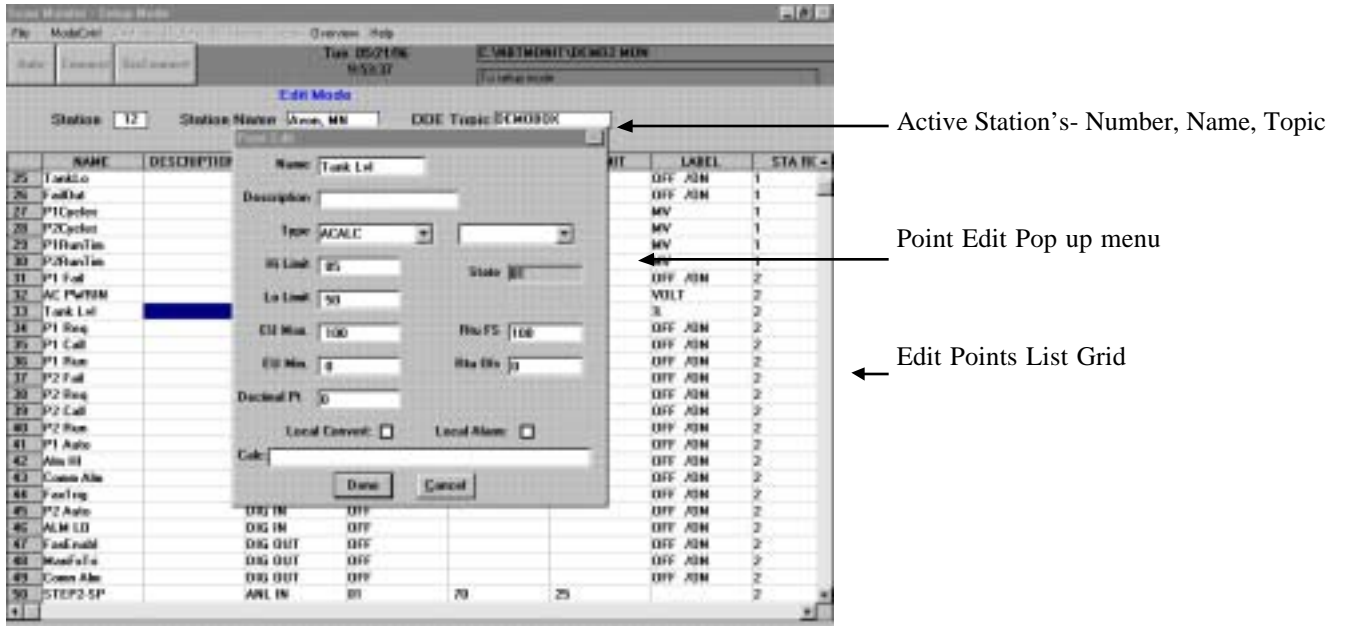


Figure 2-3 Edit Point List

2.4.4 Editing the Points or Adding Calculated Points in the Grid

Note: The Monitor program must be in the SETUP mode for these operations. Most editing from the points grid can also be performed from the Run Mode displays (See Chapter 3.1).

To view the Points list grid, go to the menu line, select Mode Control, then select Edit, then Edit Points List. To access the Edit Points pop-up menu box, select a single line (within active station), followed by a right click.

The desired line for modification in the Point edit box can be selected by clicking on it. There are then two types of editing that can be performed: Editing fields in the line, and making the point a calculated Analog point (within a single station only).

To ADD or Delete a row in the Grid display, use the cursor to block the row or rows, go to Mode Control, select Edit, then select either delete or add Row(s). Adds or Deletes can only be performed on an active station. **Once you have deleted a row it is eliminated from this RT Monitor File.**

Rearranging points for the purposes of display can best be done within the display screens (See Chapter 4.1.1 & 4.1.2).

To Add a calculated point, use the Edit Point Pop-up menu (path to menu explained above). First add a Row, then go to Edit Point menu box. Next change the type to ACALC. At the bottom of the menu box a

calculation line will appear (See Figure 2-4). A double click on this calculation line will cause a point selection box to appear, then select the point(s) on which to perform a calculation. Referencing Figure 2-5 you will notice we have added together the run times for Pump 1 and Pump 2. The operator can perform any arithmetic calculation, using one or multiple analog points.

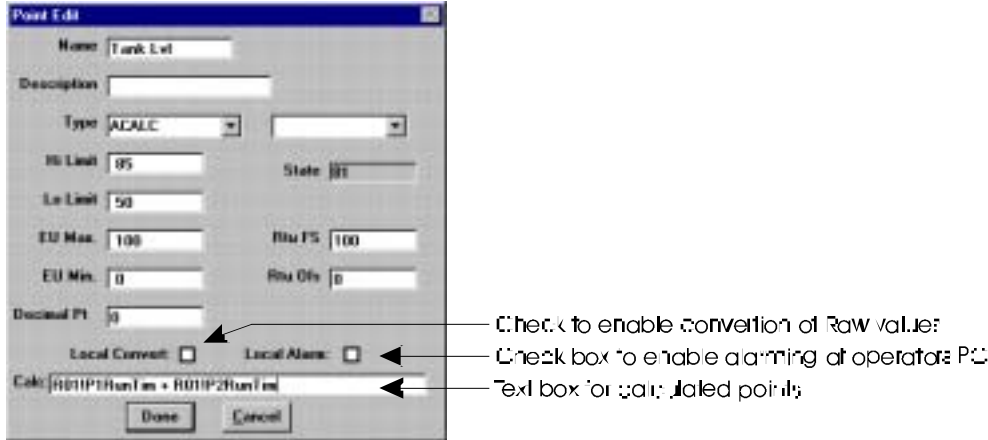


Figure 2-5 Edit Point pop-up menu box

2.4.5 Local Alarming

Digital and/or analog points can be designated to generate alarm log entries based on changes of state or violation of high/low limits. This option can be selected via a check-box on the Edit Point pop-up menu box (Figure 2-5)

See the Run Mode section Chapter 5.3.3 regarding indications and online changes in alarming operations.

2.4.6 Local Analog Engineering Unit Conversion

Analog points that are reading raw or unscaled values from the RTU can be scaled to display values in a desired range. This option can be selected on the Edit Point pop up menu box.

If the analog points are scaled, the Engineering Unit Max value and Engineering Unit Min value should also be scaled to the same desired range. The RT Monitor performs conversion through the following equation:

$$EU = \text{Input}/4096 (EU_{\text{max.}} - EU_{\text{min.}}) + EU_{\text{min.}}$$

2.4.6.1 Decimal Points

The values from an RTU may have an implied decimal point which will normally be set from the RTU parameters loaded. The decimal point position can be changed via the pop up editing screens.

3. Run Mode Displays

The display screens can be accessed by first selecting Mode Control, then Run Mode.

Note: Access is disabled to the other Mode Control pull down menu items.

3.1 Displays/Reviewing Data

3.1.1 Analog

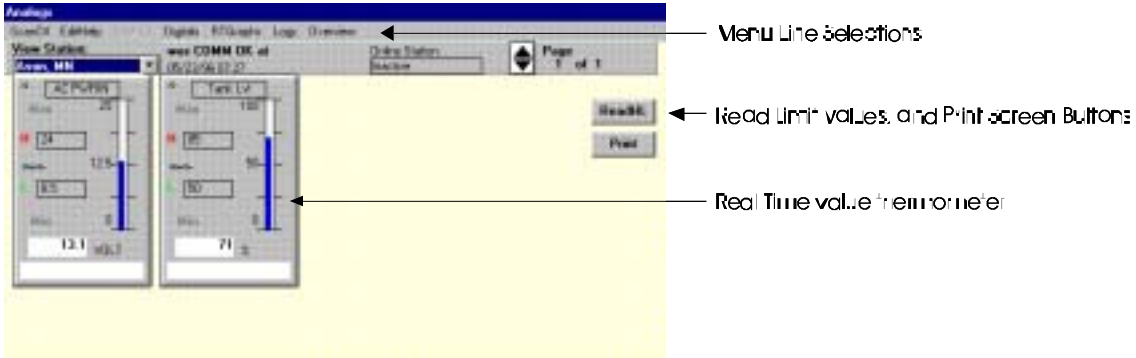


Figure 3-1 Analog values (only 2 points are pictured)

The Analog Display screen shows up to 8 analog points per page, with a total of 12 pages and 96 points per station. Each point is displayed in a template box. Pertinent information for the point is shown in the template (See below).

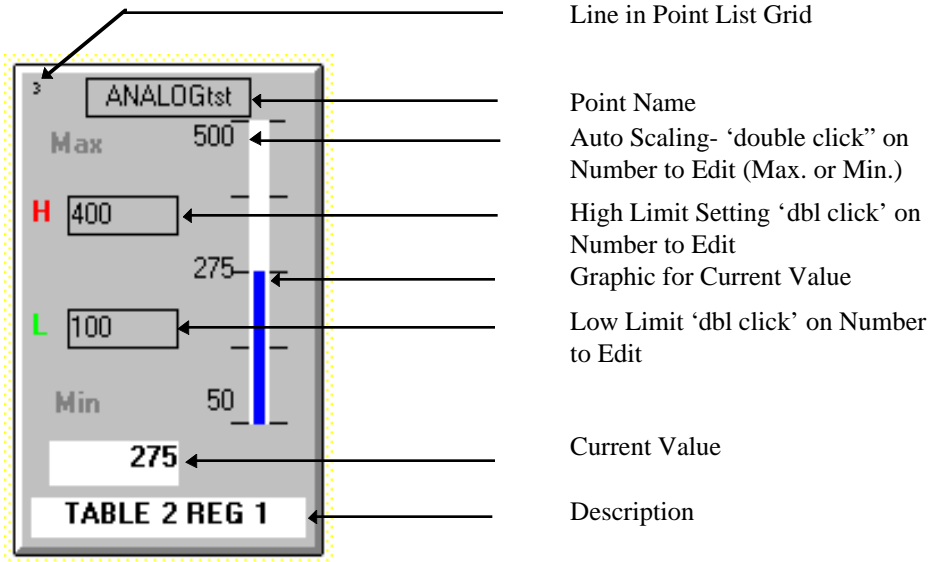


Figure 3-2 Analog Point Template

The page selector in the upper right corner of Analog screen (Figure 3-1) is used to change to the next (or previous) page.

The Maximum scale value and Minimum scale value are shown adjacent to the ends of the thermometer type meter for each point. The **operator can edit these values by double 'clicking'** and entering the new value in the pop up menu. These values are the local Engineering Unit values used to scale the thermometer gauge.

The High and Low Limit values correspond to the last read value from the RTU or the initial setting from the configuration file. To refresh these values select the Read HL button. The refresh values come from the RTU, and therefore the RTU must be connected before a refresh can be done.

Editing can also be performed on the point name and descriptor fields directly from the Analog screen. To edit, simply double click on the number for 'Line in Points List Grid' (*Figure 3-2*) and a pop up menu will appear.

3.1.2 Digital

Each page of the digital display shows the current status for up to 16 digital (On/Off) points. There are a max. of 5 pages and 80 points per station for Digitals.

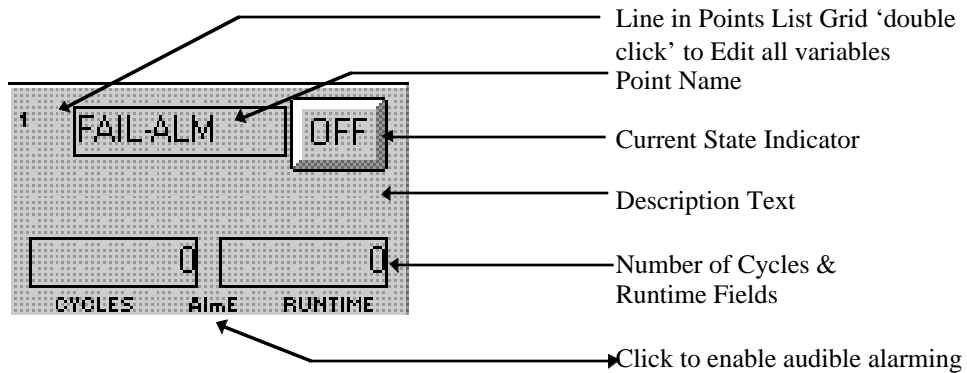


Figure 3-3 Digital Point Template

The current status for each point is indicated in the small rectangular field in the upper right corner of each point panel. It will be Gray and have an "OFF" label if the point is off (picture above). It will show as solid Green if it is ON.

The Number of Cycles and Runtime fields can be hidden via the Edit Point pop up menu box if they are not used for a given point.

The point name and descriptor fields are editable directly from the Digital screen. To edit, simply double click on the number for 'Line in Points List Grid' (*Figure 3-3*) and a pop up menu will appear.

3.1.3 Graphs

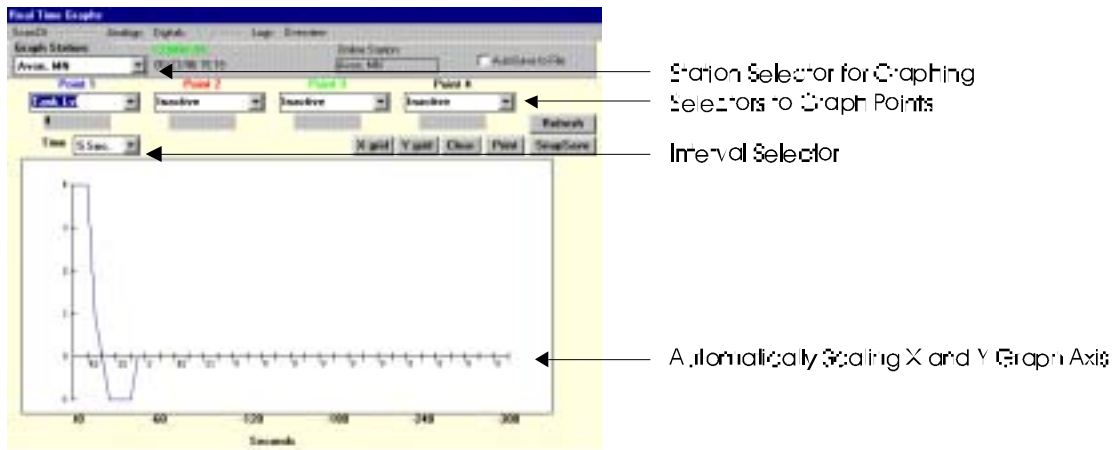


Figure 3-4 Real Time Graphing Display Screen

This display allows selection of up to 4 analog values (from a single station) for real time graphing. The time scale per sample is selectable in a range from 5 seconds to 15 minutes per sample.

To enable the Real Time Graphing, the station must be selected (the drop-down Station selector), the individual point(s) must be selected, and the sampling time must be selected. **Graphing begins when an activated point changes value.**

The Operator has the ability to add grid lines, print the screen, and log graph data to a file; simply point and click on the appropriate buttons.

For each sample the graph will scroll 1 increment to the right. In the case of a 5 second resolution, the X axis will show the seconds value at the time of the sample. For any other time selection, the X axis will show the minutes value at the time of the sample.

The graph is 60 samples wide. The total amount of time displayed for each sample time selection is:

Sample Interval	Total Time shown on Graph
5 seconds	5 minutes
15 seconds	15 minutes
30 seconds	30 minutes
1 minute	60 minutes
5 minutes	5 hours
15 minutes	15 hours

3.1.4 Logs Screen

3.1.4.1 Alarms

TIME	STA. NAME	POINT NAME	STATE	
05/24/96 12:39:26	Assoc. MN	Tank Lvl	49	Lo
05/24/96 12:39:19	Assoc. MN	STEP2-SP	69	Return
05/24/96 12:39:17	Assoc. MN	STEP1-SP	74	Return
05/24/96 12:39:16	Assoc. MN	Ala Hl	OFF	
05/24/96 12:39:15	Assoc. MN	Tank Lvl	81	Return
05/24/96 12:39:09	Assoc. MN	P1 Fan	OFF	
05/24/96 12:39:00	Assoc. MN	Ala Hl	ON	
05/24/96 12:39:00	Assoc. MN	Tank Lvl	87	Hi
05/24/96 12:39:05	Assoc. MN	STEP1-SP	76	Hi
05/24/96 12:39:05	Assoc. MN	P1 Call	OFF	
05/24/96 12:39:03	Assoc. MN	STEP2-SP	72	Hi
05/24/96 12:39:03	Assoc. MN	P2 Call	OFF	
05/24/96 12:38:57	Assoc. MN	Tank Lvl	51	Return
05/24/96 12:38:52	Assoc. MN	STEP1-SP	36	Return
05/24/96 12:38:45	Assoc. MN	STEP2-SP	26	Return
05/24/96 12:38:26	Assoc. MN	STEP2-SP	24	Lo
05/24/96 12:38:26	Assoc. MN	P2 Call	ON	
05/24/96 12:38:23	Assoc. MN	P1 Fan	ON	
05/24/96 12:38:22	Assoc. MN	STEP1-SP	34	Lo
05/24/96 12:38:22	Assoc. MN	P1 Call	ON	
05/24/96 12:38:13	Assoc. MN	Tank Lvl	82	Lo

Figure 3-5 Alarm Log Screen

The Alarm Log will record digital changes of state and analog limit violations for the system. New entries are inserted at the top of the form, and existing entries are scrolled down. The screen is dynamic and will remain showing the most recent entries unless the Scroll/Froze button is clicked to select the frozen mode. In this condition, the user can use the vertical scroll bar to manually move down the form.

Clicking the MARK button will insert a time marker at the first line to identify and segregate groups of entries.

3.1.4.2 Call Log

CONNECT TIME	STATION NAME	RESULTS
05/24/96 12:45:23	St. Coas, MN	Disconnect
05/24/96 12:45:19	St. Coas, MN	Connect
05/24/96 12:45:09	Aves, MN	Disconnect
05/24/96 12:45:05	Aves, MN	Connect
05/24/96 12:45:01	Harwood, WI	Disconnect
05/24/96 12:44:57	Harwood, WI	Connect
05/24/96 12:44:53	St. Coas, MN	Disconnect
05/24/96 12:44:49	St. Coas, MN	Connect
05/24/96 12:44:42	Time Marker	-----
05/24/96 12:44:28	Aves, MN	Disconnect
05/24/96 12:44:26	Aves, MN	Connect
05/24/96 12:44:32	Harwood, WI	Disconnect
05/24/96 12:44:27	Harwood, WI	Connect
05/24/96 12:44:24	St. Coas, MN	Disconnect
05/24/96 12:44:19	St. Coas, MN	Connect
05/24/96 12:44:09	Aves, MN	Disconnect
05/24/96 12:44:05	Aves, MN	Connect
05/24/96 12:41:58	Aves, MN	Disconnect
05/24/96 12:38:13	Aves, MN	Connect
05/24/96 12:37:29	System Startup	-----

Figure 3-6 Call Log Screen

The Call Log will record connects, disconnects and communications errors (DDE) for the system. New entries are inserted at the top of the form, and existing entries are scrolled down. The screen is dynamic and will remain showing the most recent entries unless the Scroll/Froze button is clicked to select the frozen mode. In this condition, the user can use the vertical scroll bar to manually move down the form.

Clicking the MARK button will insert a time marker at the first line to identify and segregate groups of entries.

3.1.5 Overview Screens

To create overview screens, the operator can use any drawing Software package that is capable of saving in the Windows Meta File (.WMF) format. This format is standard to Microsoft Corporation. We recommend a package named Visio Technical, but the operator can choose from any package that is .WMF compatible.

The steps for making an Overview screen are, create a .WMF drawing, link picture, plot digital and Analog points from station(s) , and save as a .PAG file. These operations are described in detail below.

Within the overview screen the operator has the ability to plot any digital or analog points from any loaded station as text boxes. These boxes can easily be added, deleted, arranged, aligned and linked. Pictured below are the two Sample backgrounds that are available.

Note: The operator must be in Setup Mode (See Chapter 2) to access the EditHelp menu line selections for the Overview Screen. Exceptions are the Show Point ID, and Print Screen, which are available at any time.

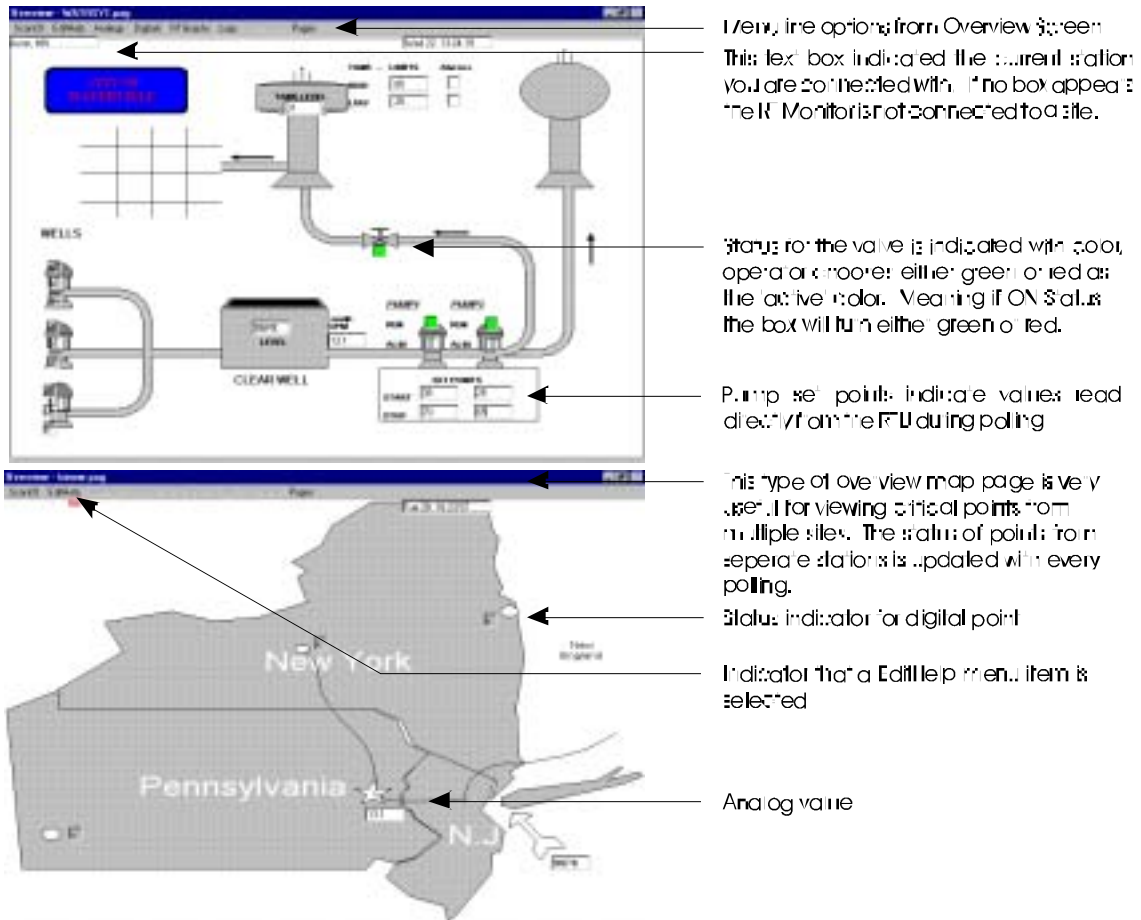


Figure 3-7 Overview Sample Screen (Included with RT Monitor MMI Software)

Once the .WMF format drawing has been created and saved in the same directory as the RT Monitor, go to overview screen. If this is initial set up, the screen should be blank. Go to EDIT from the menu line and select link picture. Then enter the command string including the path and file names. See Figure 3-8 for example.

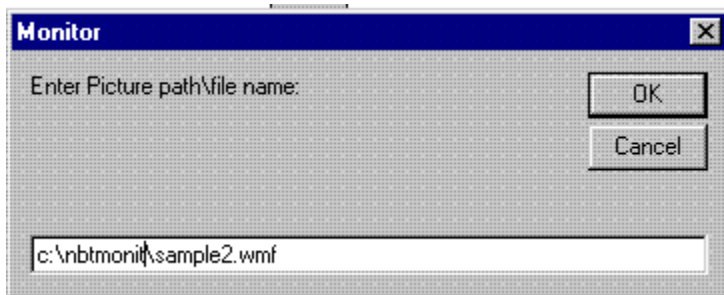


Figure 3-8

After the proper file name has been entered, click OK and the .WMF formatted drawing will appear.

After a .WMF file has been linked as described above, digital or analog points can be added or arranged as necessary. To Add points, go to Edit from the Overview screen menu line, select Add (Digital or Analog), repeat for adding multiple points (All added points appear in the exact same position). Then to arrange the points into proper position on the overview screen, go to Edit menu (See top picture figure 3-7), select move point, then left mouse click on the point, holding down while moving the point text box to the desired position.

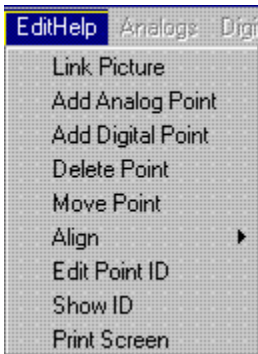


Figure 3-9 EditHelp Pull Down Menu

NOTE: The EditHelp menu selections labeled Delete Point, Move Point, Align, Edit Point ID, and Show Point ID, will stay active until another EditHelp pull down menu or another Overview screen menu line is selected via mouse click. If an EditHelp menu selection described above is active, a small RED indicator appears below EditHelp menu line text. (See bottom picture figure 3-7)

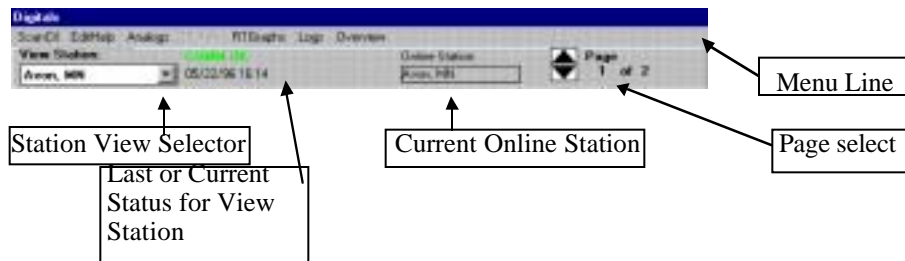
All points can be moved into their desired position on this screen by repeating the action for each point. To arrange text boxes into exact position it is useful to utilize Align, and the other functions under Align.

After the screen has been arranged into the ideal configuration, go to PAGE from the menu line, select save. Enter the name to be associated with this display page to save it as a page (.PAG) file. It will appear as a .PAG file under the PAGE(See Load menu selection).

It is important to save continuously during the set up process to ensure that no data is inadvertently lost. To save, go to Page from the overview screen menu line and select save.

3.2 Display Headers

The following figure shows the typical Header information on the Run Mode displays. You will notice the menu line name of the screen pictured (here it is Digital) is shaded and therefore disabled.



4. Run Mode- Off-line

Note: The Run Mode displays can only be accessed after you have complete one of the three (3) steps listed in Chapter 2.1 - First Start Up.

To access the Run Mode screen displays go to Mode Control (*See Figure 2-1*) and select Run Mode. The Run Mode menu line screens are now enabled. (The Run Mode selection disables access to the grids and grid editing tools). While in Run Mode, there are two possible states: Online or Off-line. This section deals with Off-line operations; which means the Monitor is NOT connected to an RTU.

At any time while in the Run Mode, a station can be connected by selecting the station, (from the station selector box Figure 2-1), and then clicking either the AUTO or CONNECT buttons on the Scan Control display. Choosing AUTO will sequentially connect to all stations that are loaded, CONNECT will go Online and connect to the single station selected.

To DISCONNECT from a station, click the Disconnect button on the Scan Control display.

4.1 Display Editing

In the disconnected state, selected editing operations can be performed. See the individual display sections within this manual for editing options.

4.1.1 Re-arranging Points on displays

On the Analog, Digital, Logs, or Overview displays, the order of the points displayed can be changed and a pop up editing window is available to modify the parameters associated with the point.

4.1.1.1 Swapping Positions

To swap positions of two points (of the same type) click the small Line Number field in the upper left corner of the first point's template. It's background color will change to yellow. Click the Line Number field on the second point's template. They will "trade" places on the display.

4.1.1.2 Shifting a group

To shift a point to the end of a group of points, the procedure is similar to the swap procedure described above, except that the shift key is held down while the second points Line Number field is clicked.

4.1.1.3 Deleting a point

A double click on the Line Number field while holding down the Control key will delete that point. THE POINT IS COMPLETELY DELETED FROM THE MON FILE.

4.1.2 Pop Up Point Editing

A pop up editing window will be displayed when the Line Number field is double clicked.

5. Run Mode- Online Operations

Online operation is defined as being connected to an RTU and actively retrieving data from an RTU. Online operation implies Run Mode, and either Manual or Automatic connection has been made with the RTU(s).

In Automatic mode, all stations defined will be scanned. While each station is connected, a complete update of data will be retrieved and, if Logs to File is enabled on Scan Control Screen, data logging samples will also be retrieved). The program will then disconnect from that RTU, and proceed sequentially to the next RTU.

Changes of state will be recorded while connected, and the Call Log will record connect and disconnect times.

5.1 Connecting to RTU

To connect to an RTU, select the desired station on the Scan Control display, then click the MANUAL button. This will connect to the selected station, and stay connected until manually disconnected.

While manually connected, History data can be retrieved by clicking on the READ HISTORY button. The READ HISTORY button is visible only if a history file has been designated for this station.

5.1.1 Automatic Mode

To initiate AUTOMATIC scan mode, go to Run Mode, then click the Automatic button. The program will start with the currently selected station and sequentially connect to, read data, and disconnect from each station in the station selector list. The Call Log (Chapter 3.1.4.2) will show connect and disconnect times for each station.

5.2 Connect State Entries

Double clicking selected fields on a point template will cause a pop-up entry box to appear for a new entry. In cases of descriptive fields and scaling inputs, the data entered is stored locally. In the case of Current Values, Current States, or Limit Values, the new data is stored locally and, if enabled, also sent to the connected RTU. (See Output Enable section)

Note: Control outputs to a station are only permitted in the MANUAL connected mode.

5.3 Analog Display

5.3.1 Data Entry

By double clicking on one of the fields, new values for the selected field can be entered(See Figures 3-2, 3-3). A pop-up numeric keypad will appear allowing entry of the value. The value will be written to the local points grid as well as the RTU (if appropriate).

5.3.2 Reading High/Low Limits

The displayed High and Low Limit values can be refreshed (read from the RTU) by clicking the Read HiLo button. The label in the button will show a strike thru until the request has completed. The updated values of the limits will be saved in the Points grid, and will be saved permanently if the MON file is saved prior to exit from the program.

5.3.3 Alarm Enable (per point)

The Digital and Analog Run Mode displays indicate whether a point has local alarming enabled or not by changing the color of the 'AlmE' enable. If local alarming is disabled, the 'AlmE' field will be black. If local alarming is enabled, the 'AlmE' field will be red.

WHILE CONNECTED TO AN RTU (ONLINE MODE), a double click of the Line Number field will toggle the local alarming *for the selected point*.

Note: while Off-line, double clicking the line number field will present a pop-up edit window which will also allow changing of the local alarming flag.

5.3.4 How it works details

Normal Table 1 reads of analog values assume that the value from the RTU is already scaled. In this case, local conversion should not be selected. If an implied decimal point is specified at the RTU, it will remain the same when the RTU is added to the MON file. The implied decimal point setting can be changed in the MON file if desired. In this case, the EU MAX and MIN values (shown on the top and bottom of the thermometer graph on the point templates) are used only to scale the thermometer range.

5.3.4.1 Local Conversion

If the value being read from the RTU is not scaled, local scaling can be done by checking the local conversion option on the various point editing screens. In this case, the value read from the RTU is scaled according to the EU MAX and MIN values. The implied decimal point is still incorporated into the analog data.

5.4 Digital Display

5.4.1 Control

Note: Control can only be performed on an actively scanning station.

Any point displayed can be issued a control to toggle its state by double clicking the current status rectangle for that point. If the control is accepted, it will change color to reflect the change. The initial change will show a hashed green or a label change (to 'OFF') indicating that the change is accepted but not yet confirmed from the RTU. When confirmation comes, which in most cases is immediate, the color changes to the normal ON or OFF indication which reflects the actual status at the RTU.

5.4.2 Reading Runtimes and # of Starts

Note: Only applies to an actively scanning station.

The displayed Runtime and Starts values can be refreshed (read from the RTU) by clicking the ReadRT button. The label in the button will show a strike thru until the request has completed. The updated Runtimes and # of Starts values for these points will be saved in the Points grid, and will be saved permanently if the MON file is saved prior to exit from the program.

5.4.2.1 Local Invert

Local inverting can be done by checking the local conversion option on the various point editing screens. In this case, the value read from the RTU is inverted for local display purposes.

6. Appendix A- Passwords

Passwords for Output Controls are set by selecting the password choice on the station edit pop-up via RTU grid display.

The password for a station is the name entered for Contact name. It is important to note that the password is case sensitive i.e. it must be typed exactly as it appears in the RTU grid display.