LOVELINK™ II - Process Monitoring and Logger

VERSION 1.01.00

USER MANUAL

Version Release, September 1, 1998
Hardware/Software Requirements

Computer Requirements

The LOVELINK™ II application will run on both Windows® 95/98 and Windows® NT™ Workstation 4.0 (Service Pack 3 recommended). The hardware requirements for each of these operating systems can be found in the documentation provided with that operating system. One available RS-232 or RS-485 port is needed to communicate with the temperature control(s). A minimum of 3 MB of hard disk space is needed for the LOVELINK™ II application files, and additional hard disk space is needed to store temperature log files. Log file size will vary depending on the Duration and Rate selected (see Using LOVELINK™ II and Viewing Log Files for more information on temperature log files.)

Control Requirements

The temperature controls supported by LOVELINK™ II are the Love 2600, 8600, 16A, and 32A Series (with Option 992, RS-485 Serial Communications or Option 993, RS-232 Serial Communications). The controls are shown and captioned below. (Note: The 32A Series supports RS-485 communications only.)

Other Requirements

To communicate with controls equipped with Option 992, RS-485 Serial Communications, from an RS-232 communications port, an RS-485 to RS-232 converter (Mother Node) is needed. The converter models recommended are the Love Models 351, 352, and 356. For RS-485 systems a 120-ohm resistor is also needed to terminate the last control on the control network. Shielded twisted pair cable is recommended for wiring the controls together (Option 992). See Connecting and Configuring Love Temperature Controls for more information on connecting the host computer to the temperature controls.
Quick Start

This section is a condensed setup procedure for quickly connecting the temperature controls to the host computer and installing the LOVELINK™ II application. It is intended for users who are familiar with the supported Love controls and Windows® application installation.

Setting Up The Love Controls
Note: Detailed instructions on the following can be found under the Connecting and Configuring Love Controls section.

1. Assign a unique control address to each temperature control that is to be wired to the control network. This is done with the keypad located on the front of each control using the Addr Menu Item in the SECURE MENU. The control’s default address is 32 hexadecimal.
2. Set the baud rate for each control. This is done with the keypad located on the front of each control using the bAUd Menu Item in the SECURE MENU. This setting needs to be the same for all controls and the LOVELINK™ II application itself (application and control(s) default is 9600 baud).
3. Enable host writes on each control. This is done with the keypad located on the front of each control using the LorE Menu Item in the SECONDARY MENU.
4. Wire the control network (if applicable), and connect the control(s) to the host computer. Option 992 requires an RS-485 to RS-232 converter (Mother Node) for use on a PC RS-232 port. Terminate the control network with a 120-ohm resistor.

Software Installation
Note: Detailed instructions on the following can be found under the Installing LOVELINK™ II section.

1. Windows® 95/98 users - Insert Disk 1 into the floppy drive and run “x:\setup”, where x is the drive letter of the floppy drive. During installation, the user may need to restart Windows® and run “x:\setup” again (some Windows® system files may need to be updated for the Setup program to work): The user will be prompted if this is necessary. Accept all defaults when prompted (press Enter).
2. Windows® NT™ users - Insert Disk 1 into the floppy drive and run “x:\setup”, where x is the drive letter of the floppy drive. During installation, the user may need to restart Windows® and run “x:\setup” again (some Windows® system files may need to be updated for the Setup program to work - this will happen if Service Pack 3 is not installed on the host computer): The user will be prompted if this is necessary. Accept all defaults when prompted (press Enter).

See the Using LOVELINK™ II section of this manual for instructions on how the application functions.
Connecting and Configuring Love Temperature Controls

This section describes how to configure a Love control, and how to connect multiple controls together (Option 992) and to the host computer. Each control that is to be used with LOVELINK™ II must have Option 992, RS-485 Serial Communications (for a multiple control configuration), or Option 993, RS-232 Serial Communications (for a single control).

- Note: When configuring the control(s), THE BAUD RATE AND ADDRESS MENU ITEMS WILL TAKE EFFECT ON THE NEXT POWER UP OF THE CONTROL. BE SURE TO POWER CYCLE THE CONTROL BEFORE USING THE NEW BAUD RATE AND ADDRESS.

The following control keys will be referenced in this section:

INDEX   UP ARROW   DOWN ARROW   ENTER

Setting Control Address on a Control

In order for the LOVELINK™ II application on the host computer to address each temperature control on a control network successfully, each control must have a known, unique address. This address is a number ranging from 1 to FF hexadecimal (the documentation provided with the Love controls states that the address can range from 1 to 3FF hexadecimal, but LOVELINK™ II only supports 1-FF.) The control address of a control can be viewed and changed through the use of the keypad located on the front of that control. The default address for the control is 32 hexadecimal.

Note: If a unique control address has already been assigned to each control and all addresses are known, then skip to the Communication Settings heading of this section.

Use the SECONDARY MENU to view the current control address assigned to a given control. The SECONDARY MENU is accessed by holding the UP ARROW & ENTER keys simultaneously on the front of the temperature control. To view the control address setting, press the INDEX key until Addr is displayed.

Use the SECURE MENU to change the control address of a given control. The SECURE MENU is accessed by holding the UP ARROW & ENTER keys simultaneously on the front of the temperature control for 5 seconds. To view the control address setting, press the INDEX key until Addr is displayed. The address is changed by using the UP ARROW and DOWN ARROW keys and pressing ENTER when the desired address is displayed.

- Note: If security level 1 or 2 is being used, then viewing the control address will not be possible. Changing the control address will not be allowed in security levels 1, 2, or 3. See the Love Control Instruction Manual for instructions on how to unlock the SECURE MENU.

Communication Settings

All temperature controls and the host computer on the control network must have the same baud rate setting. The baud rates supported are 300, 1200, 2400, 4800, 9600, and 19200 BPS. The default baud rate for the LOVELINK™ II application is 9600 BPS. The baud rate of a control can be viewed and changed through the use of the keypad located on the front of that control. Note: If all controls on the control network have already been assigned the same baud rate, then skip to the Enabling Host Writes heading of this section.
Use the SECURE MENU to **change** the baud rate of a given control. The SECURE MENU is accessed by holding the UP ARROW & ENTER keys simultaneously on the front of the temperature control for 5 seconds. To view the baud rate setting, press the INDEX key until **bAUd** is displayed. The baud rate is changed by using the UP ARROW and DOWN ARROW keys and pressing ENTER when the desired baud rate is displayed.

- **Note:** **Changing** the baud rate will not be allowed in security levels 1, 2, or 3. See the Love Control Instruction Manual for instructions on how to unlock the SECURE MENU.

**Enabling Host Writes**

In order for the LOVELINK™ II application on the host computer to be able to write to a control on the control network (i.e. setpoints), the control must be set up to allow writes from the host computer. The Local/Remote Status (**LOrE**) of a control can be viewed and changed through the use of the keypad located on the front of that control. **Note:** If host writes have been enabled on all controls on the control network, then skip to the Wiring the Control Network heading of this section.

Use the SECONDARY MENU to **change** the **LOrE** of a given control. The SECONDARY MENU is accessed by holding the UP ARROW & ENTER keys simultaneously on the front of the temperature control. To view the **LOrE** setting, press the INDEX key until **LOrE** is displayed. The **LOrE** is changed by using the UP ARROW and DOWN ARROW keys and pressing ENTER when the desired setting (**rE** for remote) is displayed.

**Wiring a Single Control (Option 993)**

If only one temperature control is being controlled remotely, then a control equipped with Option 993, RS-232 Serial Communications may be used. The wiring described here is the wiring required for communications only - please refer to the Love Control Instruction Manual for power and thermocouple wiring.

The RS-232 communications between the host computer and the control is composed of 3 wires: Data In, Data Out, and Signal Ground. The Data In (Rx) signal is pin 11 on the 16A series control, and pin 23 on the 8600 series. Data Out (Tx) is pin 12 on the 16A, and pin 24 on the 8600. Signal Ground (GND) is pin 6 on the 16A, and pin 10 on the 8600. The following diagrams show how these wires should be connected from a temperature control to a DB-9 female connector. This connector would then need to be plugged to the selected COMM port on the back of the host computer.

**16A Wiring, Option 993**
8600 Wiring, Option 993

2600 Wiring, Option 993

32A Wiring, Option 993

The 32A does not offer the RS-232 Option 993. Use the RS-485 Option 992.
Wiring the Control Network (Option 992)

Once each control has been configured as described above, the control network can be wired. The wiring described here is the wiring required for communications only. Please refer to the Love Control Instruction Manual for power and thermocouple wiring. The controls used in the network defined below are equipped with Option 992, RS-485 Serial Communications.

RS-485 communications is composed of a positive (B) and negative (A) signal, daisy-chained from control to control with shielded twisted pair cabling.

Signal A is pin 12 on the 16A Series control, signal B is pin 11.
Signal A is pin 24 on the 8600 Series control, signal B is pin 23.
Signal A is pin 31 on the 2600 Series control, signal B is pin 32.
Signal A is pin 5 on the 32A Series control, signal B is pin 6.

See the diagrams below for the locations of these pins. The control network must also have a 120-ohm termination resistor across the A and B pins of the last control on the network.

16A Wiring, Option 992

<table>
<thead>
<tr>
<th>992</th>
<th>B</th>
<th>A</th>
<th>na</th>
<th>na</th>
<th>na</th>
</tr>
</thead>
<tbody>
<tr>
<td>993</td>
<td>Data In</td>
<td>Data Out</td>
<td>Signal Ground</td>
<td>na</td>
<td>na</td>
</tr>
</tbody>
</table>

8600 Wiring, Option 992 (partial view)

<table>
<thead>
<tr>
<th>OPTION</th>
<th>10</th>
<th>23</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>992</td>
<td>Not Used</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

Connecting and Configuring Love Temperature Controls (cont.)
8600 Wiring, Option 993

<table>
<thead>
<tr>
<th>Terminal</th>
<th>29</th>
<th>30</th>
<th>31</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 992</td>
<td>Y (receive -)</td>
<td>Z (receive +)</td>
<td>A (transmit -)*</td>
<td>B (transmit +)*</td>
</tr>
</tbody>
</table>

32A Wiring, Option 992

Terminal 5 is line A (-).
Terminal 6 is line B (+).
Last control in chain must have 120 ohm ± 1% resistor across 5 and 6.

Once the controls are daisy-chained, the RS-485 to RS-232 converter (Mother Node) must be wired. Connect the positive (B) signal to the “+” pin on the converter, and the negative (A) signal to the “-” pin on the converter. This converter is then connected to the host computer, usually by a separate cable equipped with a DB-9 or DB-25 connector. View the documentation of the converter being used for locations of the pins, and for specific instructions on connecting the converter to the host computer.
Installing LOVELINK™ II

This section describes how to install the LOVELINK™ II application onto the host computer. LOVELINK™ II will run on both Windows® 95/98 and Windows® NT™ Workstation 4.0 (Service Pack 3 recommended). The hardware requirements for each of these operating systems can be found in the documentation provided with that operating system. A minimum of 3 MB of hard disk space is needed for the LOVELINK™ II application files, and additional hard disk space is needed to store temperature log files. Log file size will vary depending on the Duration and Rate selected (see Using LOVELINK™ II and Viewing Log Files for more information on temperature log files.)

Windows® 95/98 Installation

The following instructions are for users who have Windows® 95/98 already installed on their host computer. If the operating system on the host computer is Windows® NT™ Workstation 4.0, then skip to the section Windows® NT™ Workstation 4.0 Installation. If neither operating system is installed on the host computer, then the computer must be upgraded to either Windows® 95/98 or Windows® NT™ Workstation 4.0 before this installation can be performed.

1. With Windows® started, insert the 3 1/2" disk labeled “LOVELINK™ II - Process Monitoring and Logger, DISK 1/2” into the floppy drive. Open the Run dialog box by clicking Start\Run. Enter “x:\setup”, where x is the drive letter of the floppy drive on the host computer. Click the “OK” button to start the installation.

2. If the following message does not appear after the above step, then proceed to step 4:

Setup cannot continue because some system files are out of date on your system. Click OK if you would like setup to update these files for you now. You will need to restart Windows® before you can run setup again. Click cancel to exit setup without updating system files.

3. Click “OK” to update the system files, and then click “Yes” to reboot the computer. The floppy disk will need to be removed from the floppy drive in order for the computer to reboot.

4. Once Windows® has restarted, insert the 3 1/2" disk labeled “LOVELINK™ II - Process Monitoring and Logger, DISK 1/2” into the floppy drive, and open the Run dialog box by clicking Start\Run. Enter “x:\setup”, where x is the drive letter of the floppy drive on the host computer. Click the “OK” button again to start the installation.

5. When prompted, insert the 3 1/2" disk labeled “LOVELINK™ II - Process Monitoring and Logger, DISK 2/2” into the floppy drive, and click “OK”. Once the installation is complete, the following message should appear:

   LOVELINK™ II setup was completed successfully.

6. Click “OK” to close the setup program and finish the install.
**Windows® NT™ Workstation 4.0 Installation**

The following instructions are for users who have Windows® NT™ Workstation 4.0 (Service Pack 3 recommended) already installed on their host computer. If the operating system on the host computer is Windows® 95/98, then go back to the section **Windows® 95/98 Installation** above. If neither operating system is installed on the host computer, then the computer must be upgraded to either Windows® 95/98 or Windows® NT™ Workstation 4.0 before this installation can be performed.

1. With Windows® NT™ started, insert the 3 1/2" disk labeled “LOVELINK™ II - Process Monitoring and Logger, DISK 1/2” into the floppy drive. Open the Run dialog box by clicking Start\Run. Enter “x:\setup”, where “x” is the drive letter of the floppy drive on the host computer. Click the “OK” button to start the installation.

2. If the message below appears, then chances are Service Pack 3 is not installed on the host computer. It is recommended that Service Pack 3 for Windows® NT™ Workstation 4.0 be installed before proceeding with the LOVELINK™ II install. If the following message does not appear after the above step, then proceed to step 4:

   Setup cannot continue because some system files are out of date on your system. Click OK if you would like setup to update these files for you now. You will need to restart Windows® before you can run setup again. Click cancel to exit setup without updating system files.

   Click “OK” to update the system files, and then click “Yes” to reboot the computer. The floppy disk will need to be removed from the floppy drive in order for the computer to reboot.

1. Once Windows® NT™ has restarted, insert the 3 1/2" disk labeled “LOVELINK™ II - Process Monitoring and Logger, DISK 1/2” into the floppy drive, and open the Run dialog box by clicking Start\Run. Enter “x:\setup”, where “x” is the drive letter of the floppy drive on the host computer. Click the “OK” button again to start the installation.

2. Click the “OK” button on the Welcome screen, and click the “picture” button (the button with the computer on it) to install the application into the default folder. The application folder may be changed by clicking the “Change Directory” button and specifying a different path for the folder.

3. When prompted, insert the 3 1/2" disk labeled “LOVELINK™ II - Process Monitoring and Logger, DISK 2/2” into the floppy drive, and click “OK”. Once the installation is complete, the following message should appear:

   LOVELINK™ II setup was completed successfully.

   Click “OK” to close the setup program and finish the install.
Using LOVELINK™ II

This section contains the instructions on how to use the LOVELINK™ II application to monitor and log temperatures being read by the Love control(s). It also explains where the application files are located, how to configure the application, and how to add security to the system.

LOVELINK™ II Application Files

The LOVELINK™ II application files are stored in the default installation path “C:\Program Files\LOVELINK™ II”, unless a different path was specified during installation. If a different path was selected during the install, then the files would be located in that path specified. The following is a list of these files and a description of their purpose:

- LOVELINK™ II.EXE - the executable (the application itself)
- LOVELINK™ II.CFG - the application configuration file; contains comm. settings, control configuration, etc. (see the System Configuration heading of this section for more information on application configuration.)
- MONITOR.VAL - the System Monitor configuration file; contains a list of the last controls selected for monitoring (see the Monitoring the System heading of this section for more information on the System Monitor.)
- APPTITLE.TXT - this file contains the application title that appears in the title bar and on the main form; this file may be edited with a text editor to change the title of the application.
- COMPANY.BMP - this file contains the company logo that appears on the main form of the application; it can be replaced with any logo (bitmap), as long as it is also named COMPANY.BMP (the bitmap to be displayed on the main form should be sized so that it does not go off the bottom of the screen.)
- PASSWORD.TXT - this file contains the application password. The default password is NULL (nothing). The password can be changed by editing this file with a text editor.

The LOVELINK™ II application is started by clicking the LOVELINK™ II shortcut located in the Start Menu under “Programs”.

- Note: Because the application is setup to use COM 1 and a baud rate of 9600 BPS (by default), errors may occur when the application is first started. Just click “OK” when these messages appear during the first startup - communication setup is explained later in this section under the heading, System Configuration.
Main Form Description

Error Message Area

Application Title

VERSION 1.01.00

Company Logo

Comms Established LED

Log Sessions LED

System Buttons

Main Form

Above is the Main Form, which appears first when the LOVELINK™ II application is started. The following is a description of each area shown above:

Error Message Area - this banner displays the last communications error that occurred; it shows the date and time of the error, the address of the control that generated the error, and an error description. The error is cleared when the problem causing the error is resolved.

Application Title - the title of the application; this title can be changed by editing the APPTITLE.TXT file located in the application folder with a text editor.

Version Number - the version of the executable, LOVELINK™ II.EXE.

Company Logo - a bitmap located in the application folder; this logo can be replaced by replacing the bitmap file COMPANY.BMP.

Comms Established LED - this LED indicates that the COM port was opened successfully; it does not mean that the host computer is successfully communicating with all configured controls on the control network. The LED will turn green when the configured COM port has been opened, and gray when the COM port is not available.

Log Sessions LED - this LED indicates when one or more log sessions are in progress. The LED will be green when a log session is in progress, and gray when no log sessions are in progress.

System Buttons - these buttons and the forms that they display will be described in detail in the following sections.
Enabling/Disabling Edits

Some functions in LOVELINK™ II are initially disabled to provide a level of security. These secure items are typically changed/used by a supervisor, and therefore the average user does not need access to them.

To enable these secure items, click on the “Enable Edits” system button located at the bottom of the Main Form. When this button is pressed, the Enter Password dialog box appears. Enter the password required to enable the edits, and then click “OK”. If the password is entered correctly, the “Enable Edits” button now displays “Disable Edits”, and ENABLED is displayed above the button. All secure fields are now enabled.

Note: The default password for the system is NULL (nothing). If using this default password, when the Enter Password dialog box appears, just click the “OK” button to enable the edits. The default LOVELINK™ II password can be changed by editing the file PASSWORD.TXT with a text editor.

To disable the edits and secure the system again, just click the “Disable Edits” system button. When this button is pressed, the button becomes the “Enable Edits” button, and the ENABLED message disappears.

System Configuration

In order for LOVELINK™ II to work with the established control network, and to create log files in a location that is easily managed and accessed, it must be first configured. This configuration is typically done once, after installation and before regular use of the application. The System Configuration dialog box is displayed by clicking the “Configure System” system button at the bottom of the Main Form. All fields on the System Configuration dialog are secure: edits must be enabled before the system configuration can be changed.

Depicted above is the System Configuration dialog. The following is a description of each field:
Comm Port Field - this field is where the selected COM port number must be entered; the selected COM port is the port on the host computer connected to the control network. The default for this field is 1.

Baud Rate Field - this field is where the selected baud rate must be entered; this must match the baud rate set on each control in the control network. See the Connecting and Configuring Love Temperature Controls section earlier in this manual for instructions on setting the baud rate of a control. The default for this field is 9600.

Timeout Field - this is the amount of time allowed for a response back from a control (in milliseconds); set this value high enough to avoid numerous comm errors. The default for this field is 100.

View Application Field - this field along with its button (far right) is used to enter the name and path of the application that is to be used to view temperature log files from within the LOVELINK™ II application. See the Viewing Log Files section later in this manual for more on viewing log files with different applications. The application may be entered manually, or with the Windows® open dialog box by pressing the button at the far right of the View Application Field. The default for this field is “C:\Program Files\Accessories\Wordpad.exe”. This default will not work if the NT™ operating system is being used (only works with Windows® 95).

Log Folder Field - this field along with its button (far right) is used to enter the path to the default folder where all temperature log files will be kept. See the Logging Process Values heading later in this section for more on Logging Process Values. The folder path may be entered manually, or with the Windows® open dialog box by pressing the button at the far right of the Log Folder Field. The default for this field is “C:\” (root directory).

Control List - this list box displays all the configured controls that LOVELINK™ II will attempt to communicate with, and allows the addition, removal, and editing of those controls. Each item in the list shows the control address and a descriptive name (optional) for that control. Clicking a control in the list causes the address to be placed in the Address Box, and the name (if there is a name defined) to be placed in the Name Field. The Address Box and Name Field will be described later.) This “master list” of controls is referenced throughout the application for setting setpoints, monitoring temperatures, and logging. The Control List is initially blank (no controls are defined.)

Address Box - this drop-down list box makes available all allowed control addresses for building the Control List (addresses 1-FF). Note: The documentation provided with the Love controls states that the address can range from 1 to 3FF hexadecimal, but LOVELINK™ II only supports 1-FF. When an address is selected from the Address Box, the Control List jumps to the control selected if the selected address is configured. The control name is also displayed in the Name Field, if a name is defined. When setting up the Control List, select addresses that match the control addresses assigned to the controls on the control network. (See the Connecting and Configuring Love Temperature Controls section earlier in this manual for instructions on setting the address of a control.)

Name Field - the name field is used to tie a description to each address selected when defining the Control List. A name can contain up to 30 characters, even though not all characters can be seen at once in the Name Field. Note: The entire name can be viewed (tool tip) by moving the mouse pointer over the Name Field and letting the pointer set there. Control names are not required when building the Control List, but it is
easier to refer to a control by name rather than by just an address.

Update Button - this button updates the Control List with any changes made in the Address Box and/or Name Field. It is used to add controls to the Control List, and to change existing controls.

Remove Button - this button removes the control currently selected in the Control List.

Click the “OK” button to save any changes made to the system configuration. If logging is currently taking place, the user will be informed that if he/she saves his/her configuration changes, all logging will stop and all logging variables will be reset. If the Comm Port Field is changed and saved (COMMS SETUP area of the System Configuration dialog box), the application will attempt to open the COMM port with the new settings. If the COMM port cannot be opened, the user will be informed, and he/she will have to return to the System Configuration dialog to correct the problem. If the Control List is changed and saved, those changes will be reflected throughout the application, wherever the Control List is referenced.

Click on the “Cancel” button to cancel any changes that may have occurred. The user will be prompted to confirm his/her action if changes have been made.

Establishing/Testing Communications - Using the Terminal

Once the system is configured and communications are established (the COMM port is open - indicated by the green “Comms Established” LED on the Main Form), LOVELINK™ II is ready to communicate with the control network. To verify and troubleshoot communications with the control network, the user can use the Terminal. The Terminal dialog is displayed by clicking the “Terminal” system button at the bottom of the Main Form. If logging is currently taking place, the user will be informed that if he/she displays the Terminal, all logging will stop and all logging variables will be reset. Some of the fields on the Terminal dialog are secure: edits must be enabled before the Terminal can be used.

• Note: Writing to a control will not be possible unless host writes have been enabled on that control. See the Connecting and Configuring Love Controls section earlier in this manual for instructions on enabling host writes.

Before testing communications between the host computer and the control network, the COMM port itself should be tested. One of the biggest problems in establishing communications within any application is selecting a COMM port that is not already being used and is working properly. There are two tests that will help in determining the usability of a COMM port. The first test is to simply click on the Messages Received box (see diagram above), and type “AT” and press the Enter key. If the Messages Received box echoes back “OK”, then the COMM port configured for LOVELINK™ II is already being used by another device, such as a modem. If this is the case, then LOVELINK™ II must be setup for a different COMM port.

The second test requires the shorting of pins 2 & 3 on the port connector with a paper clip or screwdriver (see diagram above for locations of these pins.) Once these pins are shorted, anything typed in the Messages Received box (in diagram above) on the Terminal should echo back (the keys pressed should appear in the box.) If the Terminal does not echo back the characters, then try setting the System Configuration up with a different COMM port.

In order to use the Terminal dialog, one must be familiar with the way host-to-control communications works. In order for
the Terminal to **read** data from a control, it must know 2 things: the address of the control, and the read command to perform (what variable to read). For the Terminal to **write** data to a control, it must know 3 things: the address of the control, the write command to perform (what variable to write to), and the value to write to that variable. Once the above information is known, and the user presses the “Read” or “Write” button to initiate the request, the Terminal takes this information and creates a string that the receiving control understands. When the control receives this string, it interprets the command, and if it is a read command, it sends a string to the Terminal that contains the requested value. If the command sent to the control is a write command, it writes the new value to the specified variable, and sends a confirmation back to the Terminal. The Terminal may also receive error messages from a control, or a message indicating that the control address specified in the command string was not found. Please refer to the Love Control Remote Communications documentation for an in-depth explanation of host command strings and control (instrument) reply strings. This Love document will help in explaining the way the Terminal (and the LOVELINK™ II application) works.

Depicted above is the Terminal dialog. The following is a description of each field:

**Address Box** - use this drop-down list box to select the address of the control on the control network that is to be read from or written to (addresses 1-FF). Note: The documentation provided with the Love controls states that the address can range from 1 to 3FF hexadecimal, but LOVELINK™ II only supports 1-FF. Select an address that matches the control address assigned to one of the controls on the control network. See the [Connecting and Configuring Love Controls](#) section earlier in this manual for instructions on setting the address of a control.

**Command Field** - this field is used to enter the **command** for reading from or writing to a temperature control on the control network. The command is a 2 or 4-digit number as defined in the Love Control Remote Communications documentation. The following is a list of commands commonly used by LOVELINK™ II:
- 00 - read status and process variable (most commonly used)
- 0100 - read active setpoint (Note: LOVELINK™ II expects Setpoint 1 (1SP1) to be the active setpoint - this is the default setting for the control. See the [Editing Setpoints](#) heading of this section for more information on setpoints.)
- 0106 - read Alarm1 Lo setpoint
- 0107 - read Alarm1 Hi setpoint
- 0108 - read Alarm2 Lo setpoint

Using LOVELINK™ II (cont.)
0109 - read Alarm2 Hi setpoint
0200 - write Setpoint 1 (Note: Setpoint 1 (1SP1) is also assumed to be the active setpoint in the LOVELINK™ II application. See the Editing Setpoints heading of this section for more information on setpoints.)
0205 - write Alarm1 Lo setpoint
0206 - write Alarm1 Hi setpoint
0207 - write Alarm2 Lo setpoint
0208 - write Alarm2 Hi setpoint

Value Field - this field is used to enter a value to be written to the variable specified by the Command Field, at the control specified by the Address Box. This field’s value is ignored if a read command is invoked.

Read Button - press this button to invoke a read command (when a read command is specified in the Command Field.) Pressing this button causes a read string to be created and sent to the control at the specified address (the address specified in the Address Box field.)

Write Button - press this button to invoke a write command (when a write command is specified in the Command Field and a value is entered in the Value Field.) Pressing this button causes a write string to be created and sent to the control at the specified address (the address specified in the Address Box field.)

Last Message - this field displays the last message (string) created as a result of a read or write. This string is created when the Read Button or Write Button is pressed, and is then sent to the control specified by the Address Box field. If a read was invoked, the string will contain the variable to be read. If a write was invoked, the string will contain the variable to be written to, and the value to write. See the Love Control Remote Communications documentation for a better explanation of this string. The Love documentation refers to a sent string as the host command.

Messages Received - this box displays the messages (strings) received from a control recently read from or written to by the Terminal. If a successful read command was previously invoked, the string will contain the value of the variable requested. If a successful write was invoked, the string will be a confirmation of the write. If an unsuccessful read or write occurs, the string will contain an error code. For an explanation of these error codes, see the Love Control Remote Communications documentation. The Love documentation refers to a received string as the instrument reply.

Monitoring the System

Once communications are established, a control’s status may be monitored. To monitor the status of the control(s) on the control network, use the System Monitor. The System Monitor is displayed by clicking the “System Monitor” system button at the bottom of the Main Form. The System Monitor is capable of monitoring up to 40 controls at one time, although this is not recommended while Logging Process Values (excessive monitoring bogs the system down and results in inaccurate data logs.) See the Logging Process Values heading of this section for more information on Logging Process Values. The information displayed by the monitor includes the temperature being read by the control (the process variable), the active setpoint, the status of alarms 1 & 2, and an error indicator for communication errors. Note: Some Love controls only have one alarm - in this case, only the status of one alarm is displayed.
To select a control for monitoring, click on any one of the 40 drop-down list boxes under the Address/Name column. The scrollbar on the far right of the System Monitor allows access to rows that will not fit on the screen. The System Monitor form may also be resized to accommodate more controls. The list of controls made available to the System Monitor is the same list defined under the System Configuration dialog.

Shortly after a control is selected from a drop-down list box, one of two things will happen: if communications are setup properly between the host computer and the control selected, the control’s status will be displayed, and the Err LED will turn gray (off), indicating no errors. If there is a problem with the communications, no status will be returned, and the Err LED will turn red (on). The red LED will be accompanied with an error message displayed at the top of the Main Form.

- Note: If an error displayed contains the message “Response but no <ACK> received”, then chances are the COMM port selected in the System Configuration is connected to something other than the control network (i.e., a modem). See the System Configuration heading of this section earlier in this manual for information on configuring the COMM port.

To remove a control from the monitor form, click that drop-down list box and select “[none]” from the list. The list of controls established by the user is saved on the host computer’s hard drive, so when the System Monitor form is closed, or when the application is exited, this list will reappear the next time the System Monitor is displayed. A control will automatically be removed from the monitor form if it is removed from the System Configuration’s control list.
Click on the “Edit Setpoints” system button at the bottom of the Main Form to display the Edit Setpoint Values dialog box. This screen is used to edit the setpoints of a selected control. The setpoint fields on the Edit Setpoint Values dialog are secure: edits must be enabled before the setpoints of any control on the control network can be changed. The setpoints for a given control may be viewed at any time without enabling edits, provided that communications have been setup properly.

- Note: Writing a new setpoint to a temperature control will not be possible unless host writes have been enabled on that control. See the Connecting and Configuring Controls section earlier in this manual for instructions on enabling host writes.

A list box at the top of the form displays a list of all controls configured for the system. To view the setpoints for a given control, just click on that control in the list box. The address and name of the selected control is displayed in the two boxes at the bottom left of the screen. To view the entire name assigned to the control, move the mouse pointer over the Name field and let the pointer set there (tool tip). The setpoints of the selected control are displayed in the 5 fields to the right of the Address and Name fields. To change a setpoint, enter the new value in the corresponding Setpoint field, and press the “Update” button. Again, setpoints cannot be changed unless edits have been enabled from the Enable Edits dialog.

- Note: The SV field displays the active setpoint for a control when selected from the list of available controls. When the “Update” button is pressed, the value in the SV field is written to Setpoint 1 (1SP1), even if multiple setpoints are being used on the control. This is because the LOVELINK™ II application assumes that the active setpoint is always Setpoint 1. See the Love Control documentation for an explanation of multiple setpoints, and how to set Setpoint 1 as the active setpoint.

Any read or write errors that may occur on the Edit Setpoint Values dialog will be displayed in the error message banner at the top of the Main Form.
Logging Process Values

LOVELINK™ II gives the user the ability to log temperature readings from multiple controls through the use of the Temperature Logging dialog box. The Temperature Logging dialog is displayed by clicking on the “Logging” system button at the bottom of the Main Form. This dialog allows the user to setup the duration and rate of a logging session, start and stop a session, view a snapshot of a current session, and check the status of a session. The Temperature Logging dialog also gives the user the ability to view historical logs, which is covered in the Viewing Log Files section of this manual. Duration and Rate fields on the Temperature Logging dialog are secure: edits must be enabled before the values of those fields can be changed. The Duration and Rate for a given control may be viewed at any time without enabling edits.

• Note: Depending on the host computer’s capabilities (CPU speed, disk access time, other tasks running, etc.), the number of controls that can be logged at one time may be limited. The number of controls logging at any given time should be minimized so that the system is not bogged down. This number will also be affected by the System Monitor and the Edit Setpoint Values dialog. The use of these two forms should be minimized while logging is taking place. See the Monitoring the System and Editing Setpoints headings earlier in this section for a description of these two forms.

Depicted above is the Temperature Logging dialog. The following is a description of each field:

Control List - select a control from this list to display all log information for that control. This list of controls is the same list defined under the System Configuration dialog box.
Address Field - displays the address of the currently selected control in the Control List.
Name Field - displays the name defined (if any) for the selected control in the Control List. Note: The entire name can be viewed (tool tip) by moving the mouse pointer over the Name Field and letting the pointer set there.
Log Status - displays the log status of the currently selected control: STARTED, STOPPED, FINISHED, or “nothing” if no log session has been started for that control (since the application last started). This field is only updated when the corresponding control is clicked in the Control List.
Duration Setting - allows the user to set the duration of a log session; expressed in hours or minutes. Edits must be enabled for this field to be changed.
Rate Setting - allows the user to set the rate of a log session; expressed in minutes/log or seconds/log. Edits must be enabled for this field to be changed.
These fields are not available for editing for a given control while its logging session is in progress. The duration setting is saved to the host computer’s hard drive with the system configuration (LOVELINK™ II.CFG).

Rate Setting - allows the user to set the sampling rate of a log session; expressed in minutes/log or seconds/log. Edits must be enabled for this field to be changed. These fields are not available for editing for a given control while its logging session is in progress. The rate setting is saved to the host computer’s hard drive with the system configuration (LOVELINK™ II.CFG)

Start Button - clicking this button starts a logging session for the currently selected control in the Control List. The user is prompted for a log file name in the default folder defined by the System Configuration. The default file name that appears at the prompt is explained later in this section. See the System Configuration heading earlier in this section for instructions on setting the default log folder. This log file is where LOVELINK™ II will log the temperature samples taken at the rate specified by the Rate Setting, for a duration specified by the Duration Setting.

Log Start Date/Time - this displays the date/time that the log started for the currently selected control in the Control List. This field disappears when a log is stopped or finished. This field is only updated when the corresponding control is clicked in the Control List.

Stop Button - clicking this button stops the logging session for the currently selected control in the Control List. The user is asked to confirm the action when this button is clicked. The “unfinished” log file remains on the hard drive when a log is stopped.

Current Button - this button will display a snapshot of the log file for the currently selected control in the Control List. It only displays the logs that exist prior to the button being clicked (does not update). See the Viewing Log Files section later in this manual for more on viewing logs.

When the Start Button is pressed, the user is prompted for a log file name. This file name defaults to the following format: cc_yyyymmdd.csv, where cc is the control address and yyyymmdd is the year, month, and day that the log started. The file is saved in Comma Separated Variable (CSV) format, which is a raw text format that other applications can easily import and use. Each log (row) in the file consists of the date and time that the log occurred, and the value of the temperature sampled.

The Temperature Logging dialog does not need to remain open during a logging session. The logging continues in the “background” until the specified duration has passed, even if the dialog box is closed. The have been stopped manually. Any communication errors that may occur during a logging session will be green “Logging Session(s) in Progress” LED indicates that one or more logging sessions are currently taking place. The LED will turn off (indicator turns gray) once all logging sessions have completed or displayed in the error message banner at the top of the Main Form - the logging will continue, but the temperature for that failed read will be logged as a -1.
Viewing Log Files

This section explains how to view historical log files that have been created with the logging capabilities of the LOVELINK™ II application. The log files are saved to the hard drive of the host computer in Comma Separated Variable (CSV) format, which is a raw text format that can easily be imported and used by numerous applications.

Log Files

All log files are located in the default Log Folder as specified in the system configuration, unless a different path is specified at the start of the logging session (See the System Configuration heading in the Using LOVELINK™ II section earlier in this manual for instructions on setting the default Log Folder.) The default format for these log files is cc_yyyymmdd.csv, where cc is the control address, and yyyymmdd is the year, month, and day of when the logging session started. The following is an example of the data stored in a typical log file:

```
06/17/1998 10:09:05 AM, 23.6
06/17/1998 10:09:06 AM, 23.6
06/17/1998 10:09:07 AM, 23.7
06/17/1998 10:09:08 AM, 23.7
06/17/1998 10:09:09 AM, 23.8
06/17/1998 10:09:10 AM, 23.8
06/17/1998 10:09:11 AM, 23.8
06/17/1998 10:09:12 AM, 23.8
06/17/1998 10:09:13 AM, 23.8
```

The rate of sampling for the sample data above is 1 second/log (the difference between each log is 1 second.) The duration of a logging session can be determined by taking the time difference between the first log and last log. Each record (row) in a log file contains the date and time that the temperature sample was taken, and the value of the temperature reading.

Viewing Current Logging Sessions

By pressing the View Current Button, a user can quickly view a current logging session. This view is only a snapshot of the session: it does not update as the LOVELINK™ II application continues to log.
The view (see diagram below) must be closed and opened again for it to be updated.

View of a current logging session

Viewing Historical Logs

Pressing the View History Button displays an open file dialog box where a user can select a log file to view. The application used to view this file is configured under the System Configuration. Common applications used to view LOVELINK™ II log files are Wordpad, Microsoft Word, and Microsoft Excel. The user does not need to open the viewing application directly - if LOVELINK™ II is configured correctly, it will open the viewing application and display the log file automatically. Files currently being logged to (active sessions) cannot be viewed through the use of the History Button - LOVELINK™ II will inform the user if this is attempted, and cancel the operation. These files must be viewed through the method described above under the previous heading, until the logging session is complete.

The log files may be viewed outside of the LOVELINK™ II application with any application that supports CSV formatted files.

- Note: Files currently being logged to by LOVELINK™ II should not be opened outside of the LOVELINK™ II application. Some applications, such as Excel, “lock” files when they are opened. LOVELINK™ II will fail to log to a file if the file is locked out by another application, and the logging session will be aborted abnormally. Use the Current Button within the LOVELINK™ II application to view a snapshot of an active logging session.
LOVE CONTROLS LOVELINK II LICENSING AGREEMENT

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