



XR5-SE Text Interface User's Guide

April, 2010

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Note: This document pertains only to the XR5-SE’s Text Interface. Please see the [XR5-SE User’s Guide](#) for complete details on the XR5-SE Data Logger and our free LogXR Software.

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The XR5-SE Text Interface

The Text Interface enables an XR5 to be accessed from any computer or PDA equipped with a serial port and communications software (like HyperTerminal on Windows XP). LogXR Software is the primary way to interact with an XR5 Data Logger. The Text Interface is an alternate way. LogXR and the Text Interface may be used interchangeably during a logging session.

“Top Level” Commands

The XR5 is normally in the “Top Level” command state. In the “Top Level” state, the XR5 will respond to 3 commands (below). All other character combinations are ignored.

<u>Command</u>	<u>Total characters</u>	<u>Result</u>
text	4	Enter the Text Interface menu system. XR5 outputs the Main Menu character strings. Sending an Esc character from the Main Menu puts the XR5 back into the “top level”.
r	1	Sends a readable text string consisting of the current date and time, and the current scaled value of each active channel. Each value is separated by a comma. The XR5 continues to respond to any “top level” command. The XR5's response (the text string) occurs within 1 second of receiving the r command. The maximum rate that the text string can be transmitted from the XR5 is once per second. <i>The r command provides a simple way to use the XR5 as a sensor “front end”.</i>
h	1	Enters host (LogXR) communications protocol. Commands in this mode are binary commands with CRC checksums. Sending an Esc character puts the XR5 back into the “top level”. The XR5 host communications protocol used by LogXR is not currently available. A document detailing how to unpack and convert an XR5 binary data file into a readable text file is available. Please contact Pace for details.

Text Interface Limitations

Using the Text Interface, a computer or PDA running a terminal emulation program can launch a logging session, view readings in Real Time, read current XR5 Status, start/stop logging, and transfer logged data as a binary data file. Data files transferred using the Text Interface **must be converted to readable files using Pace LogXR Software or a user written software program.** The XR5 is configured for a logging session by sending a Setup file to the XR5. Setup files can be stored on a computer or PDA. **XR5 Setup files must be created using Pace LogXR Software.**

Using the Text Interface "r" command or Real Time mode, current sensor values are output as a string of readable text at a user selected rate. Linear sensors / transducers and Pace PT9xx Series Temperature Probes display scaled, readable values. Non-linear sensors display actual resistance or voltage values. Non-linear sensors include the LS100 Light Sensor, the PT510 Platinum RTD, and 10k Thermistors. The Text Interface does not support Thermocouple channel Types, and the internal temperature sensor included with the millivolt option is not readable from the Text Interface. With the correct slope multiplier entered into the LogXR Setup, XR5 models equipped with a millivolt option can display actual millivolt readings using the Text Interface (see page 17 for details).

RH readings using the Text Interface are not temperature compensated. RH temperature compensation is not necessary for temperatures from approximately 55 to 95 degrees F (13 to 35 degrees C). For wider temperature ranges using the Text Interface, we suggest transferring the binary data file (see page 9) and convert it to a readable file using LogXR Software's menu selection **Utilities | Convert Binary File.** or implementing temperature compensation via a user-written program or macro (contact Pace for details).

Terminal Emulation Software

To use the XR5's Text Interface, a computer or PDA must run a terminal emulation or serial communications program. Terminal emulation programs are included with (or are available for) virtually all computers including Macintosh, Windows Mobile, Palm, Linux, Unix, and WinCE. A terminal emulation program simply sends all manually typed characters out a serial port (to be received by the XR5), and all characters sent by the XR5 are received by the same serial port and displayed on the computer or PDA screen. In addition, most emulation programs (and virtually all serial communication programs) support the Xmodem file transfer protocol used by the XR5 for file transfers (sending a Setup file to the XR5, or receiving a data file from the XR5).

For all terminal emulation / serial communication programs, use the following com port settings:

Bits per second: 9600
Data Bits: 8
Parity: None
Stop Bits: 1
Flow control: None

Terminal emulation programs are listed below for the following computers:

Macintosh

ZTerm, a shareware terminal emulation program for the Macintosh, is available at <http://homepage.mac.com/dalverson/zterm>

Please note: LogXR Software for Mac OS X will be released shortly. Contact Pace for details.

Windows Mobile / Pocket PC

vxHpc, a terminal emulation program written by Cambridge Computer for Windows Mobile, Win CE and Pocket PC. See <http://www.cam.com/vxhpc.html> to obtain a copy.

Palm

CS Online, a terminal emulation program for Palm OS based PDAs. See page 7 or <http://www.conklinsystems.com/> to obtain a copy.

Linux

Minicom is a terminal emulation program included in most Linux distributions. However, since Pace LogXR Software is available for Linux, customers typically prefer to use LogXR Software rather than minicom and the XR5's Text Interface.

Windows

HyperTerminal, a terminal emulation program included with all Windows PCs. However, since Pace LogXR Software is available for Windows, customers typically prefer to use LogXR Software rather than HyperTerminal and the XR5's Text Interface.

The following instructions explain the setup and use of HyperTerminal with the XR5. Similar instructions apply when using another terminal emulation program (like Zterm and vxhpc).

HyperTerminal (for Windows)

In order to use HyperTerminal, your Windows computer needs a USB or serial port. If your computer has a USB port, you can add a USB to Serial Adapter (Pace part number USB-A), or a Wireless Link (Pace WL-100 see page 20 for details).

Hardware Setup

Connect the IC209 Cable from the Com Port on the XR5 to a serial port on your PC (9 pin male connector) typically Com Port 1 (Com1). If you are using a USB-A Serial Adapter, the com port # may be displayed by selecting Start | Control Panel | System (classic view) | Hardware | Device Manager and clicking the + sign beside Ports. The USB Adapter's com port number displays as USB Serial Port COMx (where x is the COM port number)

Creating a HyperTerminal session

1. Launch HyperTerminal (usually found by selecting Start | Programs | Accessories | Communications). A “New Connection” screen is displayed.

2. Enter a session name. We suggest “9600comx” (where x is the com port number). You can also select an icon to launch future HyperTerminal sessions for the XR5 with a single click.
Click OK

3. You are asked for a phone number. Ignore this, and click the down button of the selection field labeled “Connect using” and select the Com port you will be using for the XR5. For example: “Direct to Com1”.
Click OK.

4. Enter the following port settings:

Bits per second: 9600
Data Bits: 8
Parity: None
Stop Bits: 1
Flow control: None
Click OK

5. The terminal screen now appears. Keys pressed on your keyboard are sent to the XR5, and any characters transmitted by the XR5 appear on your terminal screen. To display the Text Interface’s Main Menu, type the following 4 letters: “text”. The XR5 Main Menu should appear on your screen.

Notes:

If the Main Menu does not appear when you type “text”, you may be using (or have selected) the wrong com port in HyperTerminal. Try connecting the IC209 Cable to a different Com port on your computer and enter “text” again. If no other com port connectors exist on your computer, try creating a new HyperTerminal session using a different com port number (following steps 1 - 5 above).

CS Online for Palm devices

CS Online is a terminal emulation program. A free trial version is available at <http://www.conklinssystems.com/>. CS Online runs on most Palm PDAs equipped with an Serial Port.

Hardware Setup

See page 18 for cable recommendations and connections.

CS Online Setup

Refer to the CS Online User's Manual for instructions to set up and use CS Online.

Use the following CS Online settings with the XR5:

Terminal Settings

Emulate:	VT100
Font:	Large
Return:	CR
Backspace:	BS
Add LF:	Not checked
Display follows cursor:	Checked
Auto wrap to next line:	Checked
Local echo:	Not checked
Pacing:	Off

Communication Settings

Method:	Serial
Port:	Serial
Baud:	9600
Data Bits:	8
Parity:	N
Stop Bits:	1
Handshake:	None

XR5 Text Interface Menus

Note: HyperTerminal for Windows is used for the screen illustrations that follow. CS Online (for Palm PDAs) and other terminal emulation programs will display similar screens.

Using the Pace IC209 Cable, connect the XR5 to the com port selected in your terminal emulation program.

To display the Main Menu, send 'text' (4 characters) to the XR5.

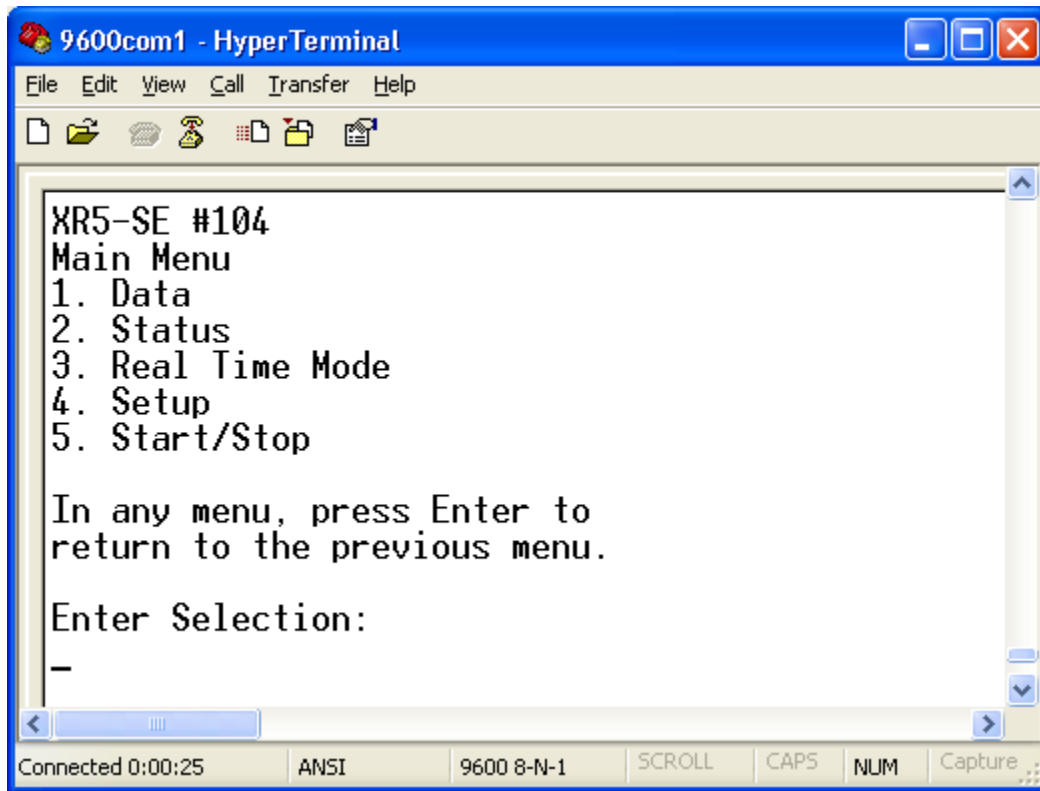
IMPORTANT!

You must first send 'text' (4 characters) to the XR5 to display the Main Menu (see screen below).

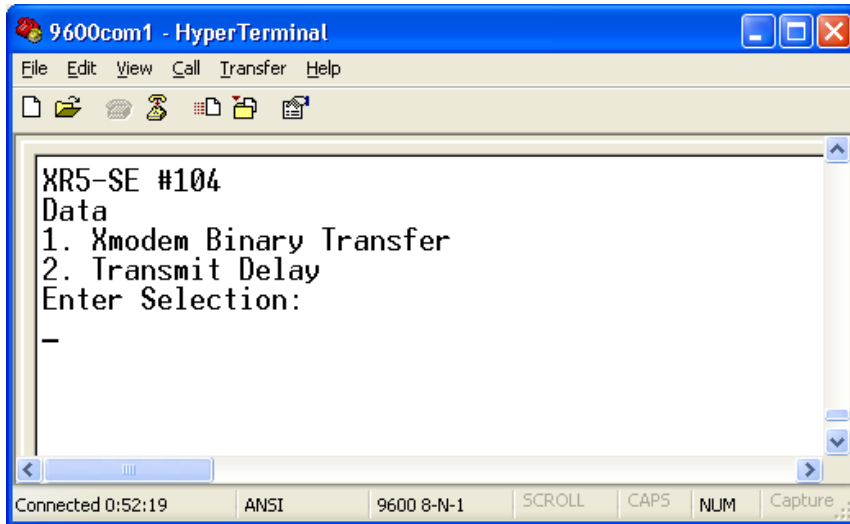
Menu Navigation

- All menu choices must be followed by the Enter (Return) key.
- Pressing only the Enter key in any menu will return you to the previous menu.
- When prompted for a numerical value, pressing only the Enter key will cause the current value to be retained.
- Pressing the Esc key while transferring data will cause the data transfer to immediately terminate.

Main Menu



Main Menu | 1. Data



The Data menu enables a user (or computer program) to transfer binary data to a computer or PDA using the Xmodem file transfer protocol.

1. **Xmodem Binary Transfer** Transfers all logged data.
2. **Transmit Delay:** Adds a delay to each transmitted character equal to the “Transmit Delay” value times 30ms. A delay is needed when transferring data to some slower PDAs to prevent character over-runs.

NOTE: When a data transfer is in progress, the transfer may be terminated by sending an Esc character (press the Esc key).

Xmodem transfer using HyperTerminal

1. Select 1 (Xmodem Binary Transfer).
2. If the XR5 Data Logger has no data to transfer, the message "No Data" appears.
3. From the HyperTerminal menu, select Transfer | Receive File...
4. Click the Browse button to select a different directory if the directory shown is not where you wish to store your data file.
5. Make sure "Use receiving protocol:" is set to "Xmodem".
6. Click the “Receive” button.
7. Type in a file name and add a ".bin" or ".binary" extension to signify it is a binary file.
8. Once the transfer is complete, you need to convert the file using [Pace LogXR Software](#) (Utilities | Convert Binary File). The converted file can be viewed in Excel or a text editor (like Notepad).

Interruption in the data transfer

If the xmodem data transfer is interrupted (cable disconnected, etc.) while a data transfer is in progress, the data transfer will resume when the connection is restored. If the connection is not restored, or if the device receiving the XR5 data via xmodem "times out", the XR5 will continue to wait indefinitely for incoming xmodem file transfer characters. Sending a Ctrl-X character to the XR5 will cause the XR5 to break out of its xmodem "wait loop".

Converting binary XR5 Data Files

1. Launch LogXR Software.
2. From the main menu, select Utilities | Convert Binary File.
3. Navigate to the saved XR5 binary file and select it.
4. Click Unpack.
5. A text file is created with the same name as the binary file and has a .txt or .csv extension (based on LogXR's "Data preferences" in the Transfer | Settings menu selection) and can be opened in a program such as Excel or Notepad.

Opening an XR5 Text File in Excel

XR5 data file with .txt extension

1. Launch Excel and click File | Open.
2. At the bottom of the Open dialog, change "Files of type:" to display Text Files.
3. Use the Open dialog to navigate to the XR5 data file (.txt file extension) and select it.
4. Click Open.
5. In the Text Import Wizard, select Delimited and then click Next.
6. Check the "Comma" checkbox and click Next.
7. Click Finish.
8. Scroll down past the header info to see your data.
9. If the time stamps in column A are not visible beside your data, you will need to widen column A. To do this, move your mouse cursor between the "A" and "B" column headings (column selectors) and double click.

XR5 data file with .csv extension

1. Launch Excel and click File | Open.
2. Navigate to the XR5 data file (.csv file extension) and select it.

Saving an XR5 Text File as an Excel Workbook

1. With an XR5 text file open in Excel, click File | Save As...
2. In "Save as type:" at the bottom of the Save As dialog, select Microsoft Excel Workbook.
3. Click Save.

Main Menu | 2. Status

```

9600com1 - HyperTerminal
File Edit View Call Transfer Help
XR5-SE #104
Status
Current State: Stopped
Log Time Until Full: 4h, 25m, 4s
Log Interval: 0h, 0m, 2s
Log Mode: Manual
Clock: 2005/03/25 14:23:42
Label:
FwRev: 1.00.86, Bat: 7.25V
1. Alarms
2. Description
3. Channel List
4. System Log
Enter Selection:
-
Connected 0:58:35 ANSI 9600 8-N-1 SCROLL CAPS NUM Capture

```

Current status of the XR5

A “snap-shot” of the XR5 Data Logger at the time Status was selected from the Main Menu. Additional screens may be displayed for Alarm status, Channel information, and System Log.

Current State:*	Displays “Stopped”, “Logging”, or “Start Logging” + preset time.
Log Time Until Full:	Time remaining until memory is full (based on current setup).
Log Interval:	Current log interval, selected in Setup.
Log Mode:	Current log mode, selected in Setup.
Clock:	XR5’s time clock reading (static) when Status was initially displayed.
Label:	A descriptive label of up to 32 characters.
FwRev:	Internal firmware revision number.
Bat:	Battery voltage. Battery voltage is the total voltage across both batteries. With fresh batteries installed, the voltage should be about 7.2V. Replace the batteries when the voltage is below 6.2V.

AUXILIARY STATUS MENU

1. Alarms:	Lists alarm status, SMS alarm messages, and current readings.
2. Description:	Currently non-functioning and inaccessible from LogXR Software.
3. Channel List:	Lists channel Status and Descriptions.
4. System Log:	Internal system log (for factory system testing).

*Additional details on next page.

Status

Current State:

Display

Meaning

‘Stopped’

from prior

Not logging, XR5 inactive; any logged data

logging session is available.

‘Start Logging’ + Preset Time

If the Preset Time has been reached, then logging is active.
If the Preset Time has not been reached, then not logging.
(used for ‘Cycle’, ‘Preset’ and ‘Preset Start/Wrap’ logging modes)

‘Logging’

Logging is active.

OR

If logging mode is ‘Log on Alarms’:

Logging session has begun, but data is being logged only if one or more alarms are active.

If no alarms are currently active, no data is being logged.

OR

If logging mode is ‘Log on Ext. Trigger’:

Logging session has begun, but data is being logged only if selected trigger level (High/Open or Low/Closed) is present.

If the trigger state selected in the Pulse tab of LogXR to log data is not present on Terminal X, then no data is being logged.

Main Menu | 3. Real Time Mode

Continues to display the XR5's current sensor readings at a pre-determined update rate. When the Real Time Mode is active, sending a Carriage Return character ("Enter" key) causes the Real Time Mode to terminate and the Main Menu to display. The Real Time Mode can function while logging is active and will not affect the logging session in any way.

The Real Time mode is not available when fast logging (2Hz – 1000Hz) is active.

Real Time Mode Settings

Two Real Time Mode settings may be selected from LogXR Software's Setup, Other tab. When a Setup file is sent to the XR5, the Real Time mode selections in effect when the Setup file was saved are sent as well.

Update Interval

Two selections are available: '2 seconds' and 'When Logging'.

2 seconds

Real Time readings are updated every 2 seconds.

When Logging

Real Time readings are updated only when readings are logged and stored in memory. For example, if the XR5 is set to Log on Alarms, the Real Time Display will be active only when Alarms are active, and the Real Time readings will be updated at the selected Slow Logging Interval.

LogStream

A special "always active" mode designed to send Real Time Data to a host computer via an Ethernet LAN. LogStream is a binary format and is not compatible with the Text Interface.

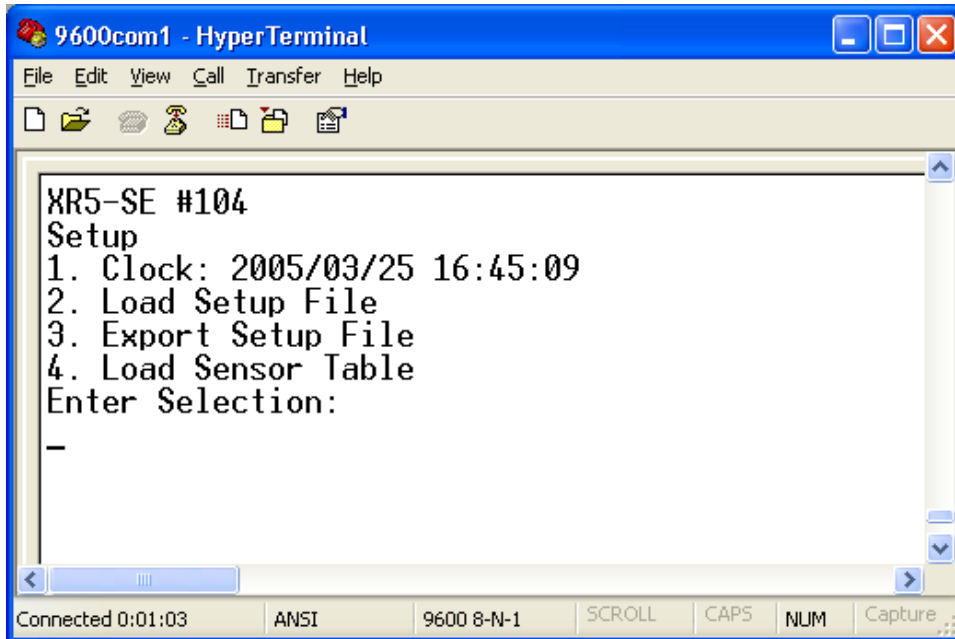
Auto Stop

Auto Stop automatically terminates the Real Time Display mode after the selected Auto Stop time has elapsed (the default is 1 hour). Auto Stop is disabled by setting it to 0.

Note:

Not all Pace sensors provide scaled, readable output from the Text Interface (using the Real Time mode or "r" command). Please see page 4 for details.

Main Menu | 4. Setup



1. **Clock:** Use to set the XR5's time and date.
2. **Load Setup File:** Use to set up the XR5 for a data logging session. The Setup file must have been previously created using Pace LogXR Software. Using LogXR, a Setup file must be based on the correct model using Setup | Extract, or Setup | New and selecting the correct model number.

To proceed using HyperTerminal:

1. Enter 2 and press Enter. The XR5 will respond by sending a "C" character every 10 seconds for up to 1 minute (7 times)* until the xmodem file transfer is initiated by the user (or sending program).
2. In the HyperTerminal menu bar, click Transfer and Send File.
3. Make sure the Xmodem protocol is selected.
4. Click the Browse button and navigate to the LogXR Setup file you wish to send, then click the Send button.

CAREFUL! Any XR5 setup file can be loaded into the XR5-SE; if the file is not for the correct model then the setup configuration will be incorrect.

Load Setup File, note:

After initiating step 1 above (Enter 2 and press Enter), the XR5 outputs a "C" character every 10 seconds until a HyperTerminal xmodem transfer is initiated by the user (steps 2, 3, and 4). If steps 2 through 4 are not completed within 1 minute*, the XR5 breaks out of its xmodem receive state and re-displays the setup menu.

* 3.5 minutes for firmware version 1.00.98 and lower.

- 3. Export Setup File:** Extract the current XR5 Setup as a LogXR Setup file. The resulting file could be loaded into a different XR5 to give it the same Setup, or opened as a Setup in LogXR. If you wish to open the file in LogXR, it must have the correct file-name extension: '.8SE' for the XR5-SE and XR5-SE-M. Millivolt models have the Setup file extension of the millivolt option. For example, the XR5-SE-250mv has a Setup file extension of '.250mv'. Extended memory models (-M models) have the same setup file extension as standard memory models.

To export an XR5 Setup File using HyperTerminal:

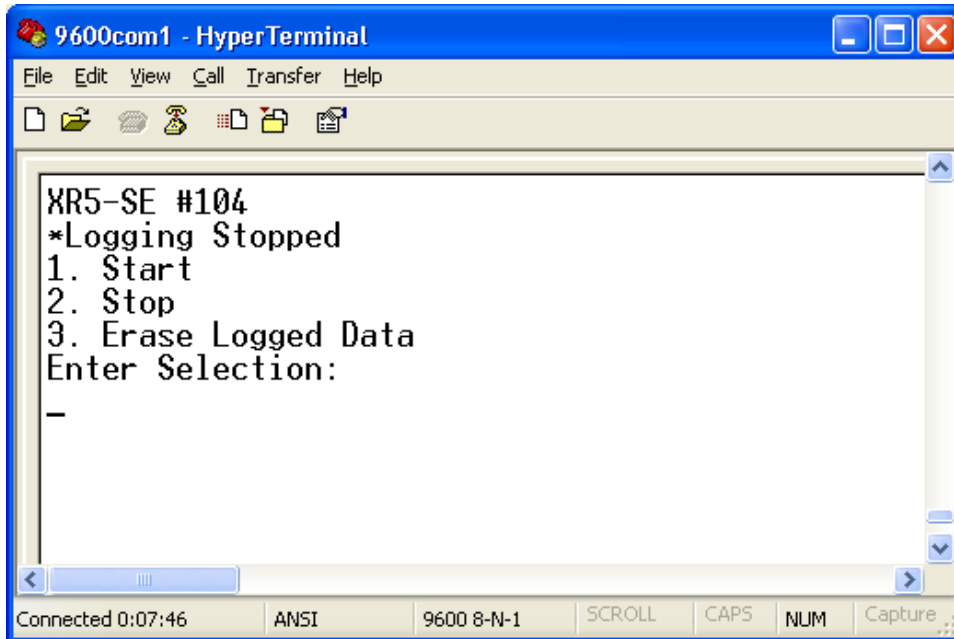
1. From the Text Interface Setup Menu, enter 3 and press Enter.
2. In the HyperTerminal menu bar, click Transfer and Receive File.
3. If you do not wish to store the Setup file in the directory shown, click Browse and select a different directory.
4. Make sure the Xmodem protocol is selected.
5. Click the Receive button.
6. Enter a file name for the Setup file (make sure you use the correct file extension; see Export Setup File (above)).

- 4. Load Sensor Table:** The Sensor Table is used to convert a non-linear resistive sensor into readable values for the Text Interface's Real Time display, the "r" command response, and the SMS Alarm function. The XR5 ships with a Sensor Table for Pace PT9xx series thermistors (30k ohm). Resistive sensors which do not match the loaded Sensor Table will either display raw a/d values (0 to 4095) using the Text Interface's Real Time mode, or display as actual resistance if "Resistance" was selected as the channel Type in the LogXR Setup file.

To proceed using HyperTerminal:

1. Enter 4 and press Enter.
2. In the HyperTerminal menu bar, click Transfer and Send File.
3. Make sure the Xmodem protocol is selected.
4. Click the Browse button and navigate to the Sensor Table you wish to send, and then click the Send button.

Main Menu | 5. Start/Stop



1. Start Logging

Starts a logging session for all logging modes except Cycle, Preset, and Preset/Wrap (these modes start automatically at a pre-selected time). If Manual slow logging is selected, starts or restarts an existing logging session.

2. Stop Logging

If Manual slow logging mode is selected:

Logging stops but the logging session remains “open”. In the Manual slow logging mode, if logging is re-started (using menu choice #1), prior logged data is retained, and additional new data is logged (until the memory is full or Stop Logging is selected again).

For all other slow logging modes:

Permanently ends the logging session.

Fast Logging:

If Fast Logging is active, press the “Q” key to stop logging; the XR5’s menu screens are disabled while Fast Logging is active.

3. Erase Logged Data

Use to maximize the capacity of the XR5 to store new data. Be careful using this selection! Once logged data is erased, it can not be recovered. Only Logged Data is erased. The setup configuration is retained.

Millivolt Range limitations using the Text Interface

(applies to XR5-SE models with a millivolt option)

On XR5-SE models equipped with a millivolt option, Text Interface readings of millivolt channels set to Type: Millivolt in LogXR need to be converted to read as millivolts. Multiplying the channel's Text Interface reading by the Multiplier in the table below will convert the reading to actual millivolts.

<u>mV Option</u>	<u>Multiplier</u>
20mv	4.0010
50mv	10.097
100mv	20.088
250mv	50.873
500mv	101.53
1000mv	203.19

Alternately, if the above multiplier is entered as the millivolt channel's Slope in LogXR Software, millivolt readings will read correctly using the Text Interface. But in this case, if LogXR Software is also used to display readings (while the XR5 has the Slope from the above table), millivolt readings will need to be divided by the channel's Slope value (using a spreadsheet or external program) to read actual millivolts in data files created using LogXR Software.

PDA's for the XR5

In order to communicate with the XR5, a PDA must have a Serial Port and the ability to run a terminal emulation or serial communications program.

Windows Mobile / Pocket PC

Hardware

A Windows Mobile or Pocket PC device equipped with a serial port and RS232 cable that mates to the Pace IC209 Cable should be compatible with the XR5.

RS232 Cable

Ideally, the RS232 serial cable should have a 9 pin connector with male pins. This type cable will mate with the XR5's IC209 Cable without additional adapters. Many serial cables are designed to connect to a PC's serial port and have a female 9 pin connector. This type cable requires a 9pin male to 9 pin male null modem adapter to mate with the XR5's IC209 Cable. This adapter is available from Pace, part# AN-9M.

Windows Mobile / Pocket PC Cable source

RS232 Cable (with male connector) for iPAQ - various models

http://www.serialio.com/products/adaptors/iPaqSerial_RS232.htm

Connections:

PDA <> RS232 Cable (with male connector) <> Pace IC209 Cable <> XR5

Communications Software

For the Windows Mobile / Pocket PC, we recommend 'vxhpc' by Cambridge Computer.

<http://www.cam.com/vxhpc.html>

Palm

Hardware

Palm OS devices equipped with a serial port and RS232 cable that mates to the Pace IC209 Cable should be compatible with the XR5.

Palm RS232 Cable

Connects to the Pace IC209 Cable which connects to the XR5.

An RS232 Cable from serialio.com is available for the following Palms:

Tungsten models T3, T2, T, C and W

Zire 71, m500, m505, m515, m125, m130, i705

http://www.serialio.com/products/adaptors/PalmSerial_RS232.htm

An RS232 Cable from pcables.com is available for the

Tungsten T5

<http://www.pcables.com> Part# PLPT5-M9-6.

Cable connections: **Palm PDA <> RS232 Cable <> Pace IC209 Cable <> XR5**

Using a Palm Serial HotSync Cable

A Palm Serial HotSync Cable can be used to communicate with the XR5 but requires one or two additional adapters to make it work with the XR5.

Cable connections with Pace AN-9M Adapter:

Palm PDA <> Serial HotSync Cable <> Pace AN-9M Adapter <> Pace IC209 Cable <> XR5

Cable connections with 9 pin male Gender Changer and Null Modem Adapter:

Palm PDA <> Serial HotSync Cable <> male Gender changer <> Null Modem Adapter <> Pace IC209 Cable <> XR5

Communication Software

We recommend CS Online which runs on the Palm and Sony PDAs listed above. It is available from Conklin Systems at <http://www.conklinsystems.com/> See page 7 for additional details.

Wireless Communications

Pace WTP-100 Wireless Transceiver Pair

The Pace WTP-100 consists of two miniature wireless modules. One module inserts into a computer's USB port and requires no external power. A second module plugs into the Pace IC209 Cable which connects to the XR5. An included AC power adapter is used to power the module on the XR5 side (module requires 5 to 12vdc). The WTP-100 has a range of up to 300 ft (100 meters) outdoors, and up to 100 ft (30 meters) indoors. Operating frequency is 2.4 GHz for world-wide compatibility. No software installation required. No setup required.

Part # WTP-100

Includes AC power adapter for XR5 side

Overseas customers use part # WTP-100-exp

Includes AC power adapter with plugs for UK, EU and Australia.

Dimensions:

Computer side: 2.2" x 1.0" x 0.3" (56 x 24 x 8 millimeters).

XR5 side: 2.9" x 1.2" x 0.7" (72 x 31 x 16 millimeters)

No software installation required. No setup required. Just plug and go!