Xpert / XLite AT Display (SLL)

USERS MANUAL
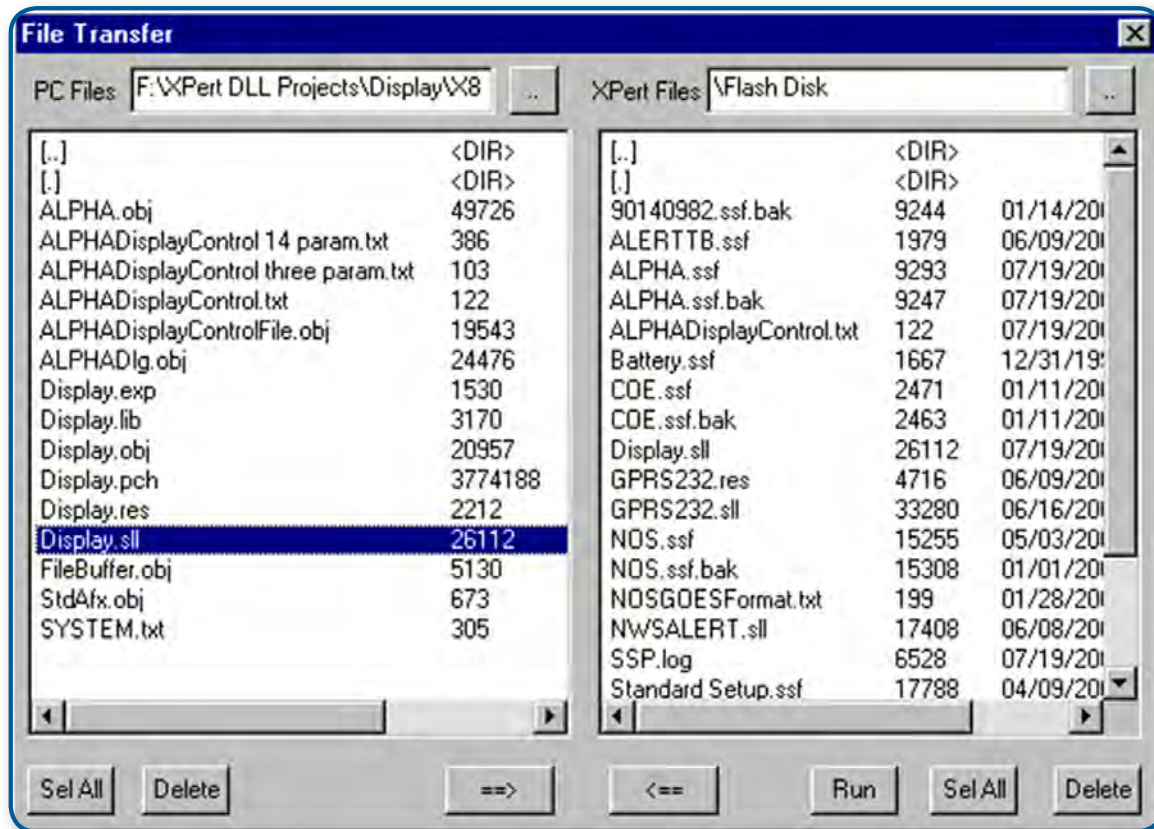
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INTRODUCTION

Sutron's Xpert family of DCPs (both the 9210 and the Xpert, hereafter referred to as the Xpert) have been designed to be easily expandable by adding additional software libraries, called Sutron Link Libraries (SLLs). One such library is ATDisplay.sll, which adds the ability to display data from a log file on an Adaptive Technologies display device. This document is the user manual for ATDisplay.sll. The following topics are discussed:

- Overview

- How to install the library.

- How to wire the serial connection to the display.

- Operating instructions.

- Error messages and troubleshooting.

OVERVIEW

The purpose of this SLL is to allow users to display information from and Xpert/Xlite LOG file on an Adaptive Technologies display device.   Adaptive Technologies (http://www.adaptivedisplays.com/Pages/products1.htm) offers a variety of indoor and outdoor displays that can be used to make information in an Xpert easily accessible to the public.

Adaptive displays make use of a common serial protocol, and the block described here can be used to drive any of the available 20-character one-line displays. The software will also drive a two-line display, but the second line will not be used.

The user can select the time interval between data updates as well as the labeling of the information. The displayed string includes the Xpert clock time. The user can format the time as 12 hour or 24 hour and can offset the time in case the Xpert is using GMT and local (or some other) time is preferred.

INSTALLING ATDISPLAY.SLL

SLLs are installed by copying the .SLL file to the \Flash Disk folder on the Xpert. The easiest way to accomplish this is to use Sutron's XTerm utility. Connect a PC or laptop computer to COM 1 on the Xpert. The steps to load the SLL are as follows:

1. Run XTerm
2. If the Xpert application is running, go to the STATUS tab and press the Exit App button to shut it down. (The new SLL will not take effect until the application is stopped and restarted.)
3. Press the File Transfer button. The File Transfer window is illustrated in Figure 1.
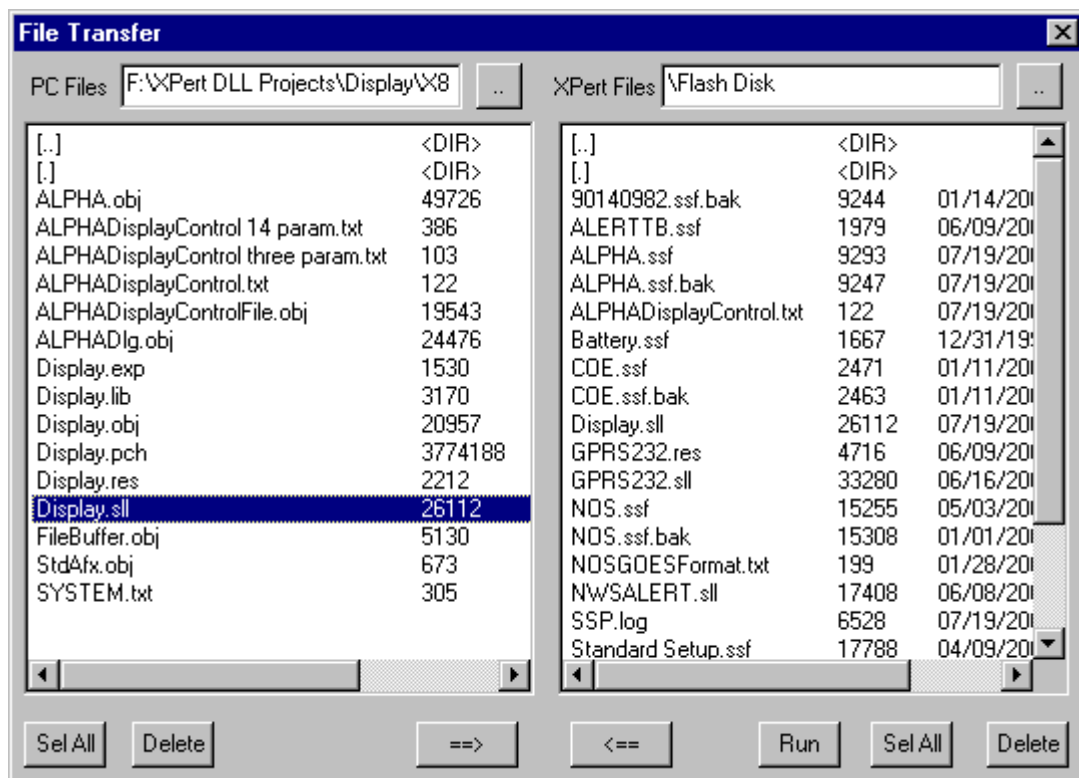
Figure 1: XTerm File Transfer Window

4. Set the left hand panel (PC Files) to display the folder on the PC containing the SLL to be loaded
5. Make sure the right hand panel (Xpert Files) is pointed to \Flash Disk
6. Highlight the SLL file and press the right-pointing arrow at the bottom of the screen to copy the SLL to the flash disk
7. You will be asked to confirm the operation. Press OK.
8. After the SLL load is completed you may restart the Xpert application. You may do this by scrolling to the bottom of the \Flash Disk panel (Xpert Files), selecting Xpert.exe, and pressing the RUN button at the bottom of the window. Powering off and on will also work if an Autoexec.bat file is defined on the Xpert.

Verify that the SLL has loaded correctly. Log on to the Xpert application (either through the front panel or using XTerm) with SETUP access privileges. Go to the SETUP tab and press the ADD button. The Select Category window (see Figure 2) will appear.
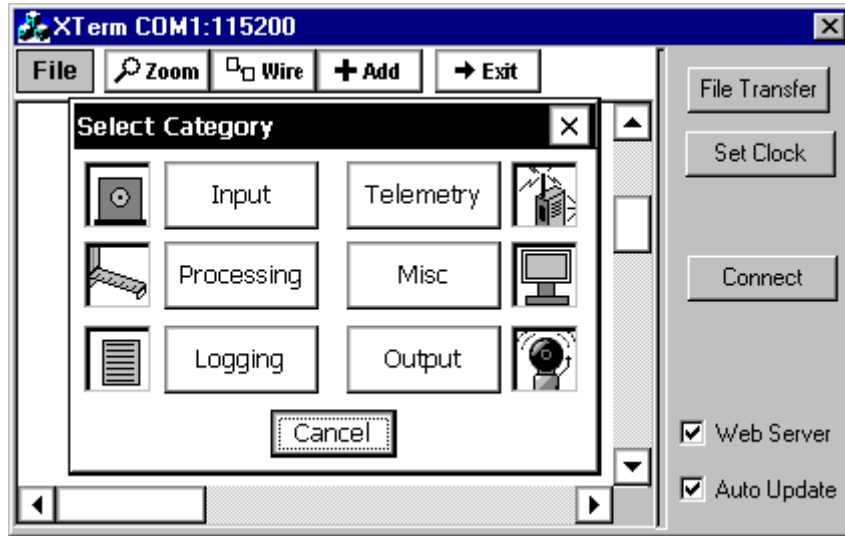

Figure 2: Category Window for Selecting Block Type

Select Processing as the block type.   This will bring up the Available Module window, Figure 3.
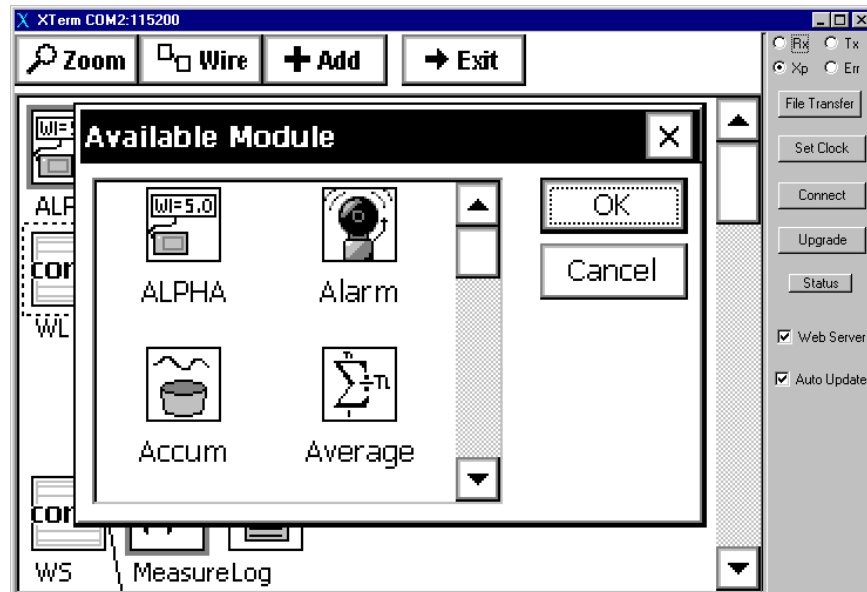
Figure 3: Available Module Window

You will see the ALPHA block with the following icon as an available input.

ALPHA

 If the block is not available, or you received an error message when the Xpert application started then try powering down the Xpert and restarting it. If you still can't find the block or you still receive an error message, it is likely that the SLL is not compatible with the version of Xpert software that you are running. Contact Sutron or access the Sutron web site to obtain the latest updates.

If the block is available, the installation is successful. Press Cancel twice (once in the Output Module window and once in the Select Category window) to return to the Setup window. Using the Display block in a setup is covered later in this manual.

WHAT THE BLOCK DOES

Interaction with the Hardware

The ALPHA Display block makes use of one serial port. One port is required for each connected display.

Software Operations

The ALPHA display block is intended for "real time" operations in the 30 second to 10 minute range. The block is designed to take information stored in an Xpert LOG file and incorporate it in a user-formatted string. The string scrolls across the display, which typically can show 20 characters at one time. The user can select the time interval between data updates as well as the labeling of the information. The displayed string includes the Xpert clock time. The user can format the time as 12 hour or 24 hour and can offset the time in case the Xpert is using GMT and local (or some other) time is preferred.

Display Interval

The default display interval is every 30 seconds. The user can set the rate to other values. If the display rate is less than the time required for the message to scroll then the message simply completes as fast as it can.

Display Content

The string that scrolls across the display is made up of:

- A welcome message
- The clock time from the Xpert
- Information extracted from any Xpert LOG file

The user can set the Welcome Message and select the parameters that are displayed. The user's selections are determined by a control file that is placed on the Xpert \Flash Disk. The following paragraphs describe the control file and its contents.

Control File

The control file is a standard ASCII .txt file that can be created with any PC text editor. The file will normally be created on a PC and then copied to the Xpert \Flash Disk using the File Transfer feature of XTerm. The first line of the file is the Welcome Message. This is the text that will be displayed first in each scrolling cycle. The remaining lines control what parameters are displayed and the display format. Time display is a special case. Time is automatically included in the display string and the time format is set by the properties of the block.

Each of the remaining lines in a control file selects one parameter from the Xpert LOG for display. Each line is composed of fields that control formatting. These fields are:

- LOG Label – the name by which the parameter is stored in the Xpert LOG
- Display Label – What you want the parameter called as it scrolls across the display
- Display Format – zero (0), one (1), or two (2) zero being general, 1 being wind direction, and 2 being a rising/steady/falling indicator
- Display Units – How you want the parameters units displayed, for example Ft., or meters
- Display right digits – How many places past the decimal point from zero to three

Here is a typical control file:

Money Point Tide Station --
WL,Tide Level,0,Meters,2
WD,Winds from,1,,0
WS,@,0,Kts,1
BP,Barometric pressure,0,mb,2

Display Appearance

The control file in the previous section would cause the following message to scroll across the display:

Money Point Tide Station – Current Conditions 07/20/2004 11:00: Tide Level 3.26 Meters Winds from NNE @ 2.3 Kts Barometric pressure 984.62 mb

A complete explanation of the control file and its interaction with the display is given later in this manual, in section "Setup".

HARDWARE REQUIREMENTS AND WIRING

Serial Port Connection

Use of the display will require one available serial port on the Xpert/Xlite.

The serial port properties are set by the ALPHA display block as 9600 bps, 7 data bits, even parity, two stop bits.   You do not need to make any of these setting.

Be sure that the COM port you use has its first property set to None in the COMS item in the Xpert Setup tab. This is the default setting and you will not normally have to worry about it unless the port has previously been used for something else.

SETUP

Adding a display to an existing setup

The ALPHA display block is a processing block and does not wire to any other Xpert block. It gets its information directly from an Xpert LOG file. The ALPHA block is designed to be added to an existing setup and to display data created by the setup.

Complete the following steps to include the ALPHA display block. (Be sure that you have loaded and tested the SLL first, as described in the "INSTALLING ATDISPLAY.SLL" section of this manual.

1. From the front panel of the Xpert or from XTerm, go to the SETUP tab and select the Graphical Setup item.
2. Click on the Edit… button at the bottom of the window. This will bring up your Xpert setup.
3. Click the +Add button at the top of the graphical setup window.
4. When the Select Category dialog appears, click on the Processing button.

This will bring up the Available Module window, Figure 4.
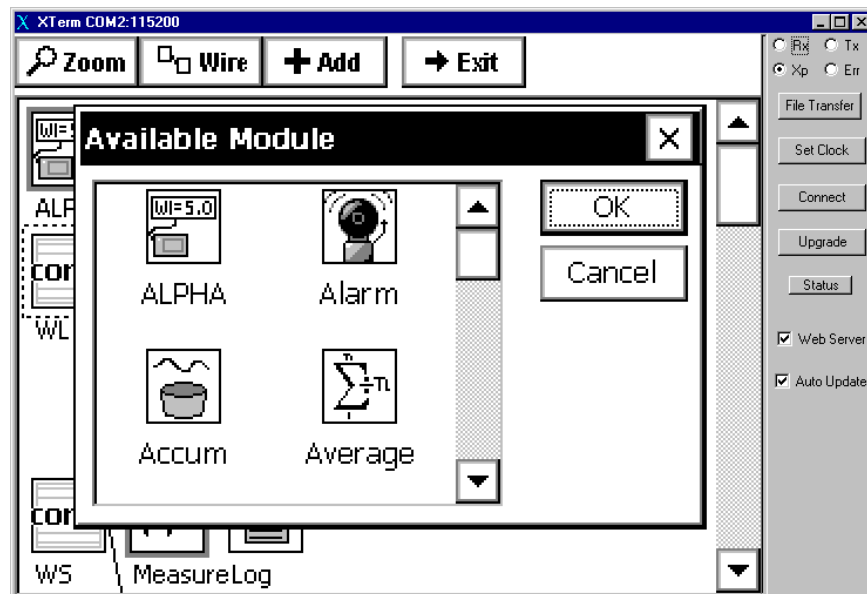
Figure 4: Available Module Window

You will see the ALPHA block with the following icon as an available input.

ALPHA

5. Select the ALPHA block and click on OK.

The block will now be included in your setup as illustrated in Figure 5. (The exact location will depend on your particular setup.) Note that the block does not wire to any other blocks.

Figure 5: Setup with Alpha Block Included

The Properties Dialog

After the block is included in the setup you must set several properties. Click on the ALPHA block to select it and then click on Edit Properties. This will bring up the properties dialog illustrated in Figure 6.

Figure 6: Alpha Display Block Properties

Each of the properties is described in the paragraphs that follow.
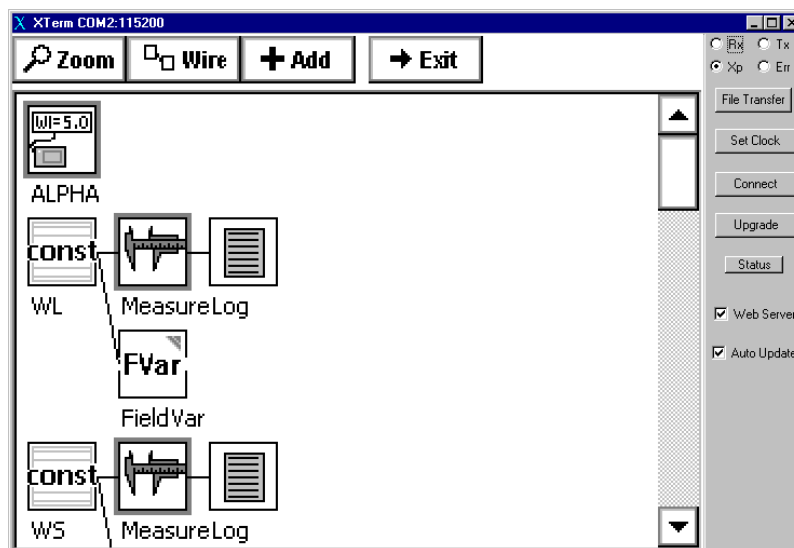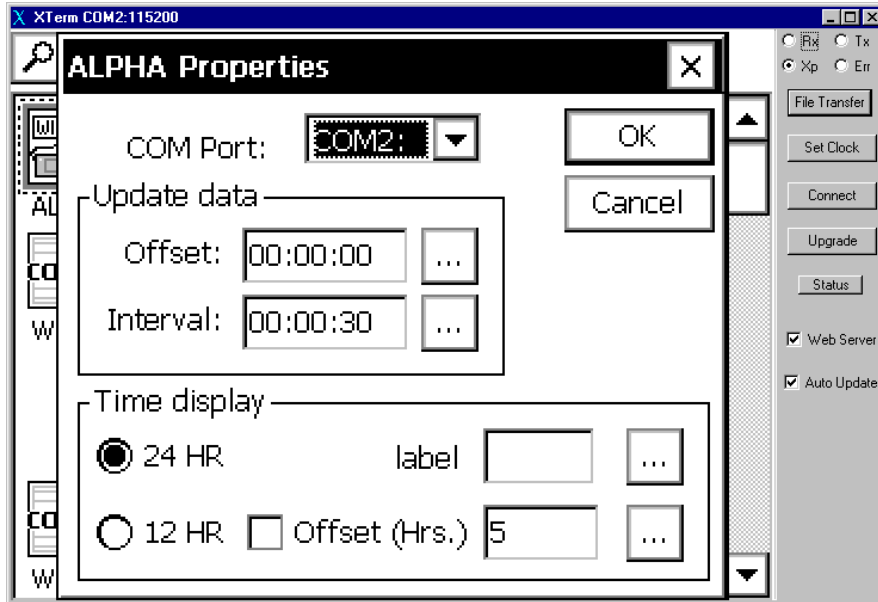
COM Port

Use the COM Port drop down to select the port where you will connect the cable from the ALPHA display.

Update Data

The Offset and Interval determine when, and how often the information in the display is refreshed. The default interval is every 30 seconds. Bear in mind that the display scrolls continuously. It is displaying a string that is stored in its memory. What you are doing here is setting the interval at which the information in the string is changed.

The Offset is a time relative to the top of the hour. Zero indicates that the first refresh will occur at the top of the hour.

The Interval is the refresh rate, which defaults to every 30 seconds. This means that beginning at Offset into the hour, and repeating every Interval, the ALPHA block will send new data from the Xpert LOG to the ALPHA display.

Be aware that there is NO value in setting Interval to a number smaller than the actual update rate for the LOG itself. That is, if the log updates every 15 minutes there is no reason to set Interval at less than 15 minutes. You will simply be retrieving the same information repetitively and creating extra work for the Xpert.

Time Display

The Xpert clock time is automatically included in the display immediately after the Welcome Message. The clock time can be formatted in several ways, as described in the following paragraphs.

12/24 Hour Clock

The display will output the time in either 12-hour or 24-hour format. Click on the desired value. Note that this selection works with or without the time offset.

Time Label

The label will be appended after the time if it is not set to blank. The purpose of the label is to allow the user to identify the type of time, for example GMT or EST or CDT. Click on the edit button to change the label. The default label is blank.

Offsetting the displayed time

Many Xperts have times that are set to Universal Coordinated Time (Greenwich Mean Time, GMT) by an attached satellite transmitter. Displaying this time may be confusing to observers of the display. You may offset the internal clock time by plus or minus up to 23 hours. Click the Offset check box and then click the button to edit the amount of the offset. The offset time will be displayed in either 12 or 14-hour format, as selected earlier.

The Control File

Aside from the time, everything that is presented in the display is set by the contents of a small ASCII text file stored on the Xpert \Flash Disk. The file name is:

ALPHADisplayControl.txt

The file must be created on a PC or laptop computer using a text editor such as Notepad or WordPad or a word processor. Be sure to save the file in .txt format if you use a word processor.

Location

The control file must be transferred to the Xpert using XTerm. Bring up the File Transfer dialog in XTerm and set the left panel to the directory where you have stored the control file. Make sure the right panel is set to the Xpert's \Flash Disk folder. Select the ALPHADisplayControl.txt file in the left panel and then press the right arrow button at the bottom of the window to transfer the file to the Xpert.

There is NO default control file included in the Xpert software. If you do not provide one and recording is turned on with the display connected you will see the message Control File Missing on the display.

Control File Records (Lines)

A control file consists of a minimum of two records (lines). The first line is called the Welcome Message. The remaining records determine what parameters are included in the display. Here is a typical control file:

Money Point Tide Station --
WL,Tide Level,0,Meters,2
WD,Winds from,1,,0
WS,@,0,Kts,1
ONE,Barometric pressure,0,mb,2

 The content of the records is described in the following paragraphs.

The "Welcome" String

The first line in the file is the Welcome String. This string cannot be blank, but it can contain any phrase you desire. Typically the Welcome String will identify the station or indicate something useful about the display.

Note that the Welcome String will be followed in the display by the phrase "Current conditions" and the time in the format specified by the Properties Dialog of the ALPHA display block. The control file earlier would begin the display with:

Money Point Tide Station -- Current conditions 07/13/2004 13:00

Parameter Records

The remaining lines in the control file each consist of five fields separated by commas. The five fields are:

- LOG Label
- Display Label
- Display Format
- Display Units
- Display right digits

The fields are explained in the paragraphs that follow.

LOG ID

The LOG ID field tells the ALPHA block what parameter to find in an Xpert LOG file. This field must exactly match the name of a parameter that is logged. The spelling is case sensitive.

Display Label

The Display Label field determines what the viewer will see as the name of the parameter. This allows you to change cryptic or meaningless names within the log to standard words. For example, if the tide is stored as PWL you might want to set the Display Label field to something like "Tide level". (Do not put quotes around fields unless you want quotes in the display!)

Display Format

The ALPHA block supports three formats. The three formats are:

1. Numeric
2. ASCII wind direction
3. Rising/Steady/Falling indicator

Most parameters will be displayed in numeric form. The format number for numeric values is zero (0). That is, simply enter 0 in the line for the Display Format field.

The ASCII wind direction format is included so that wind direction can be displayed as phrases such as ENE, N, NNE, SSW, etc. This format CAN be used with any parameter, but for obvious reasons should only be used with wind direction. Enter one (1) for the Display Format if you want the wind speed values to be displayed in ASCII notation.

The Rising/Steady/Falling indicator is included so that the user can log a value that signifies the trend of some other value. For example, you would log a variable called BPUpDown that is less than zero when the barometer is falling, zero when the barometer is steady (probably with some deadband), and positive when the barometer is rising. By doing this, you can now create a control file that outputs not only the barometric pressure value, but also the trend. The example in the "Control File Example" section of this manual shows how to do this.

Display Units

Display Units allows you to specify what follows the parameter value. If you do not want anything to follow the value, simply enter a blank, or place the comma separator for the Display Units field against the one for the Display Format field. (Two commas in a row)

More likely, you will enter the units of the value, such as "ft" or "meters". Again, do not put quotes in the field unless you want the display to include them.

Display Right Digits

Display Right Digits applies to numerically formatted data (Display Format = 0). Enter 0 if you want the value displayed as an integer. Enter 1,2, or 3 if you want the value to be followed by 1,2, or 3 right digits after the decimal point.

Control File Example

Figure 7 illustrates how the following small control file is used to make up a display string.

Money Point Tide Station --
WL,Tide Level,0,Meters,2
WD,Winds from,1, ,0
WS,@,0,Kts,1
BP,Barometric pressure,0,mb,2
BPUpDown, ,2

The first line of the file is the Welcome String – in this case, "Money Point Tide Station –". Note that this string can say anything at all, and there are no length restrictions.

The second line is broken down as follows:

Log Label = WL
Display Label = Tide Level
Display Format = 0
Display Units = Meters
Display Right Digits = 2

This line instructs the ALPHA block to get the value for WL from the LOG and output in in the display as Tide Level as a numeric value with two decimal places. The value will be followed by the phrase Meters for units.

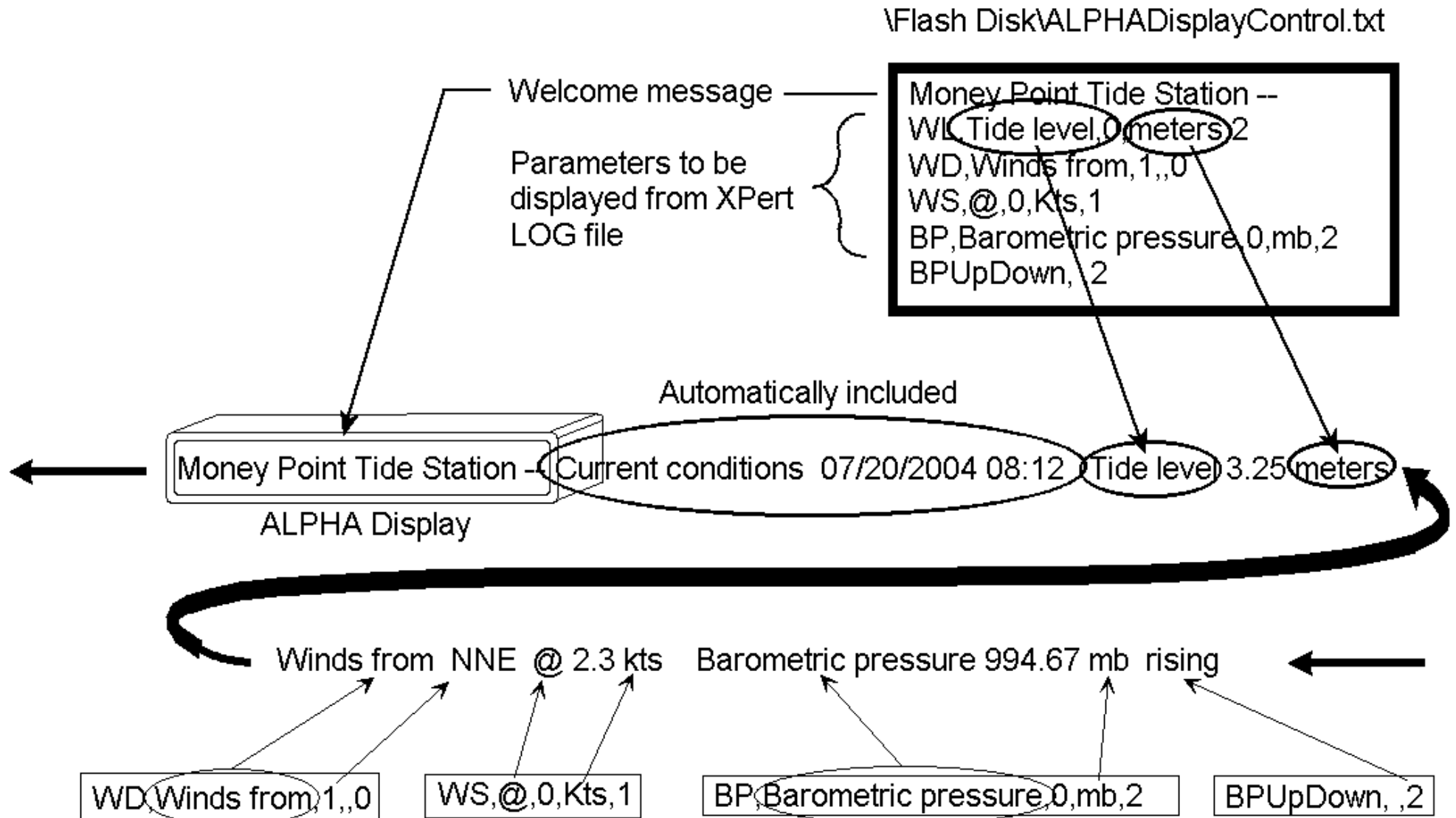The third and fourth lines work together to produce the following phrase:

Winds from NNE @ 2.3 kts

This is accomplished by setting the Display Label for the wind direction (logged as WD) to "Winds from", setting the Display Units for WD to blank (,,) , and formatting the wind speed (logged as WS) as 1 (set the Display Format in the fourth line to 1).   We have used the Display Label of the wind speed for the @ sign. We could have also used the word "at", or a complete phrase such as "with velocity of".

The final line adds the trend to the barometric pressure. The parameter BPUpDown will be checked at each update to see if it is negative, zero, or positive. The appropriate phrase falling/steady/rising will be added after the barometric pressure.

Study Figure 7 closely to see how the control file maps values to the display string.

Figure 7: Example Display Setup

\Flash Disk\ALPHADisplayControl.txt

Welcome message ⟶ Money Point Tide Station --
WL,Tide level,0,meters,2
Parameters to be
displayed from XPert
LOG file
WD,Winds from,1,,0
WS,@,0,Kts,1
BP,Barometric pressure,0,mb,2
BPUpDown, ,2

Automatically included

Money Point Tide Station -- Current conditions 07/20/2004 08:12 Tide level 3.25 meters

ALPHA Display

Winds from NNE @ 2.3 kts   Barometric pressure 994.67 mb rising

WD,Winds from,1,,0   WS,@,0,Kts,1   BP,Barometric pressure,0,mb,2   BPUpDown, ,2

ERROR MESSAGES AND TROUBLESHOOTING

Error Messages

The ALPHA display block can produce only one error message. The message and its meaning are presented in the following table.

Message	Explanation
CRS232::Execute OpenComm n failed	Xpert could not open the selected port

Troubleshooting

The following table presents common problems and their solution.

Problem	Solution
The error message in the above table appears in the Xpert status window.	Check the settings of the COM item in the Xpert setup tab. The selected port may be set to something other than NONE from a previous setup.
The display is scrolling the message Control File Missing	You have not copied a file named ALPHADisplayControl.txt to the Xpert \Flash Disk. The file must be there and the name must match exactly.
The display contains strange and incorrect values when it first starts up.	This is normal. The sign memory can contain all kinds of things until the first complete data cycle is complete. Be patient. It will fix itself.
One or more of my parameters is displayed as a series of dots or is blank	Check the parameter spellings in the LOG Label fields. The LOG Label fields must EXACTLY match the labels of parameters in an Xpert Log file. If the spelling is incorrect, or the parameter is not there, you will get blanks or dots.
The display contains the phrase "Format error line n"	You have entered something other than 1 or 0 for the Display Format field in line n of the control file