



# 9210 & XPERT DATALOGGERS

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## Nortek SLL Manual

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# INTRODUCTION

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Sutron's Xpert family of DCPs (both the 9210/B and the Xpert/2, herein 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 Nortek.sll, which adds a new "Nortek" sensor block to support data capture and manipulation of the line of Nortek current and wave meters and profilers.

## Topics

- How to install the library
- How to configure and use the Nortek sensor block

## **INSTALLING NORTEK.SLL**

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This section describes installation of the Nortek.sll library.

### **Installation**

To install the Nortek.sll library, copy the file to the “\Flash Disk” subdirectory of your Xpert using Xterm. For more information on performing this file transfer, please refer to chapter 6 of the Xpert or 9210 user manual.

Once the library file has been transferred, reboot the Xpert. The library will load automatically after the Xpert reboots.

To uninstall the library, use Xterm to delete the file from the Flash Disk subdirectory. This can only be done when the Xpert application is not running (select “Exit App” from the Status tab).

In order for the Nortek.sll library to load and operate correctly, the version of the Nortek.sll file must be the same as the version of the application loaded into the Xpert. This is usually not a concern because the same versions of the sll and application are typically packaged together. Should the need arise to verify that the versions are the same, the version of the sll as it resides on the PC can be determined by looking at the file’s properties (right-click on the file and select the “Version” tab). The version of the Xpert application is given by the application itself, at the top of the About dialog, which is accessed from the Status tab.

# NORTEK SENSOR BLOCK

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This section describes how to configure and use the Nortek sensor block.

## Features

The Nortek sensor block supports the following features:

- Capture and archive RS-232 output from any Nortek sensor
- Parse and process NMEA-formatted output
- Parse and process AquaDopp binary data structures
- Load sensor configuration at recording start
- Synchronize the sensor time to the Xpert logger's time at recording start
- Generate NOAA PORTS tag-compatible output reports
- Upgrades and replaces the "AWAC" sensor block provided in versions before 3.17

Any Nortek sensor that outputs data over RS-232 can be captured. If the RS-232 output contains NMEA encoding, then the captured data may be parsed and provided for further processing by other Xpert graphical setup blocks. Nortek sensors supporting NMEA output: AquaDopp, AquaDopp DW, AquaDopp Profiler, and AWAC (2D and 3D). Note, with regard to the AWAC, wave data is available by NMEA only when the Prolog component is installed. Current data is available via NMEA, even when Prolog is not installed (be sure to use the NS poll command, in this case).

## Graphical Setup

The Nortek sensor block supports three different modes of operation:

- Polled mode
- Deploy mode
- Passive mode

### Polled Mode

Polled Mode is when the block is configured to poll the Nortek sensor with a poll command when the block is executed. In this mode, you'll connect a Measure block to the Nortek sensor to define the poll schedule. When more than one Measure blocks are used (because you want to sample multiple outputs), just make sure the Measure block schedules are all the same (the Nortek sensor will only poll once in this case).

You'll most commonly use the "NS" poll command, which polls the Nortek sensor for NMEA formatted data. Only NMEA data can be parsed and assigned to the Nortek block's outputs. If you use other poll commands that don't generate NMEA formatted data, like the MS and ST commands, the data will be captured and saved to file, but it won't be parsed and assigned to any outputs you may have defined.

In polled mode, you'll typically want to enable sending a user configuration file to the Nortek on recording start. You may also choose to set the time in the Nortek sensor at recording start, but

doing so isn't critical, since the poll schedule is set by the Xpert, rather than the Nortek sensor itself. For more information on these initialization options, see the description of the "Init" button, later in this document.

Here's a picture showing a typical block arrangement in the graphical setup for polled mode:

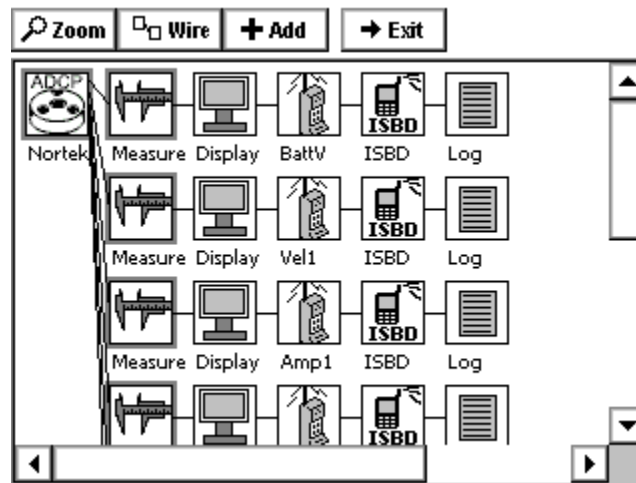


Figure 1: Example Polled Mode graphical setup

## Deploy Mode

Deploy Mode is when the block is configured to output a deployment command to the Nortek sensor, either on recording start (when "Deploy on recording start" is checked), or the first time the block is executed by a connected Measure block. Deploy Mode is most useful when the sensor is configured for continuous measurement cycle, where the sensor measures and outputs on its own schedule, as is common with the AWAC with Prolog. You would use a Measure block when you want to ensure the sensor enters its continuous measurement cycle at a specific time.

You'll most commonly use the "SR" deploy command, which starts the measurement cycle and causes the sensor to store data internally as well as output on the serial port. The "ST" command is a common alternative, where the sensor does not store the data internally, but does output on the serial port. The "SD" command may be used when the sensor has been configured with an explicit start date and time (though Xpert will update this time to next measurement interval when "Sync time on start" is selected in the Xpert "Init Properties" dialog).

As mentioned, all Nortek sensors outputting serial data over RS-232 can be captured by the Nortek sensor block. If however you want to have certain parameters from that data parsed and made available as block outputs, the data must be in NMEA format. The Nortek AWAC with Prolog can be told to output NMEA in its configuration file. The AquaDopp sensors are more typically measured using the NS poll command, in polled mode (see above).

In deploy mode, you'll typically want to enable sending a user configuration file to the Nortek on recording start. You will typically also choose to set the time in the Nortek sensor at recording start, to ensure the timestamps used by the Nortek sensor in its own files match those of the Xpert. For more information on these initialization options, see the description of the "Init" button, later in this document.

Here's a picture showing a typical block arrangement in the graphical setup for deploy mode:

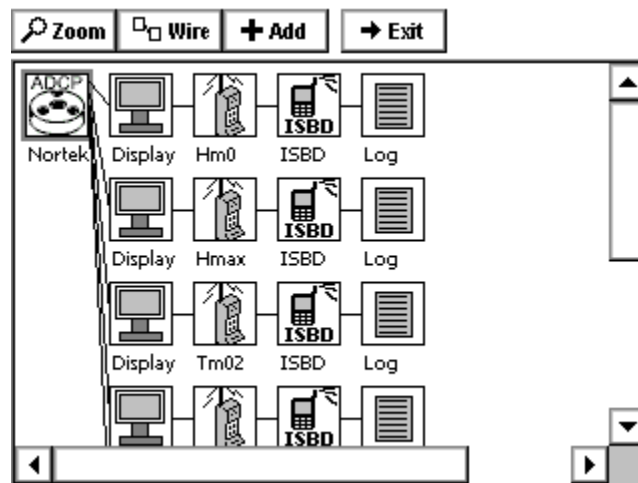


Figure 2: Example Deploy Mode graphical setup

In this example, each output of the Nortek block has been assigned a Display, ComsTag, ISBD, and Log block, which is a typical configuration for displaying values on the front panel of a 9210, and collecting data for logging and transmission (note, only the Nortek block is required to save data received from the Nortek sensor to file; the other blocks make it possible to display, transmit, and log values parsed from the captured data).

While the block doesn't require separate Measure blocks to operate, you may want to use them anyway to 1) control when the deploy command is issued, and/or 2) control the timestamps assigned to the data outputs, since by default, the timestamps assigned to output data reflect the time the data is received from the sensor.

The latter fact is particularly important when working with transmission data blocks like ISBD, GPRS, and STParam. Each of these blocks expect you to define the schedule of the data using the DataInterval and DataTime properties, and will only collect data for transmission that matches those properties.

*When using the Nortek block without Measure blocks, be sure to set DataInterval and DataTime properties to 00:00:00, so that any and all data is collected for transmission.*

## Passive Mode

Passive Mode is active when the block is configured to not output a poll command and to not output a deployment command. Passive Mode is most useful when the sensor has already been fully configured for deployment using a continuous measurement cycle.

*In this mode, the sync time and load configuration options should also be disabled, otherwise, the sensor will be left in a powered down state at recording start.*

The graphical setup in Passive Mode is the same as for Deploy Mode. Here again, Measure blocks may be used to control the timestamps of output parameters, but are otherwise not required.

## Nortek Block Properties

To set Nortek block properties, select the block and press “Edit Properties” to display the following dialog:

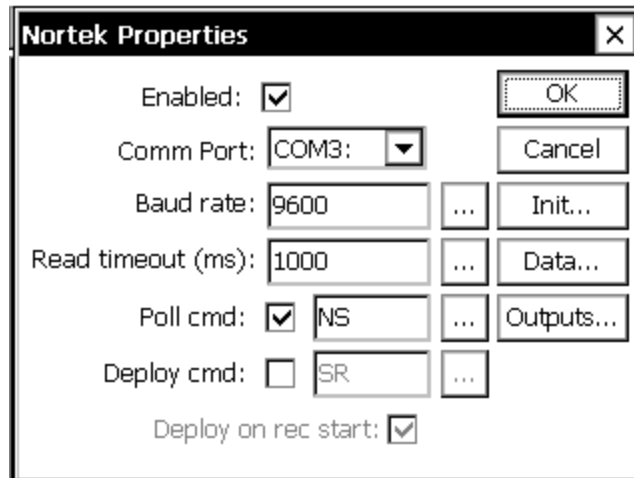


Figure 3: Nortek Properties Dialog

### Enabled

When “Enabled” is checked, the block actively listens for traffic on the assigned COM port, and performs the other functions indicated (deploy command, sync time, etc., as selected). When not checked, the block is fully disabled, meaning the comm port is not opened, and no effort is made to capture and process data from the sensor. The Enabled checkbox is helpful to those users that often deliver setups with “optional” features, i.e., a single setup that can be used for different purposes in the field, enabled on-site as needed.

### Comm Port

Select the Xpert communications port to which you’ve attached the Nortek sensor. Note that no other block or component in the Xpert should attempt to use this port. For example, make sure the selected com port is not selected for use under the “Coms” item of the Setup tab.

### Baud Rate

Select the baud rate to use when communicating with the Nortek sensor. For example, the AWAC sensor’s default baud rate is 9600.

### Read Timeout (ms)

Read Timeout (ms) specifies the number of milliseconds to wait in between characters when capturing data. A good default value is 1000 (or 1 second). You may need to increase this value if the Nortek sensor has pauses in between sections of the data response to capture.

### Poll Cmd

Check the box to enable sending a poll command every time the block executes (requires a Measure block, or other “active” block, to be connected to the Nortek sensor block). The most



common poll command is “NS”, which polls for NMEA formatted data. Nortek sensors supporting the NS command: AquaDopp, AquaDopp DW, AquaDopp Profiler, AWAC (for current data; use deploy command “SR” for Prolog data).

### Deploy Cmd (and Deploy on Rec Start)

Check the box to enable sending a deploy command, either at recording start (if **Deploy on rec start** is checked), or the first time the block executes due to a connected Measure block (or other “active” block). The most common deploy command is “SR”, which starts the sensor’s continuous measurement cycle.

### “Init” (Initialization) Properties

The Initialization Properties dialog is used to configure certain options that occur at recording start. To display the dialog, press the “Init...” button on the Nortek Properties dialog. The following dialog is displayed:

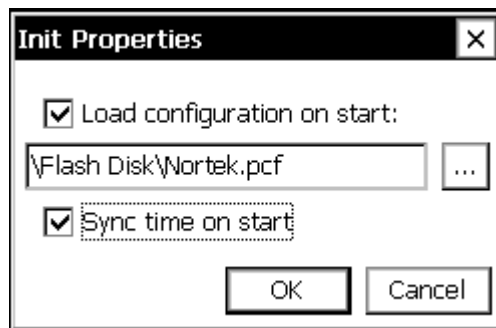


Figure 4: Initialization Properties Dialog

### Load configuration on start

When checked, the specified file is loaded into the Nortek sensor at recording start. This is useful to make sure the Nortek starts with the same configuration every time.

The file to load should be a valid Nortek “pcf” file, which is generated by the Nortek configuration tools, when the tool is started with the “-cu” option. For example, start the AWAC configuration tool using the command line “awac.exe -cu”. Then, once you are finished creating the correct deployment file, save the deployment file with the typical “.dep” extension. The configuration tool also saves a “.pcf” file that can then be transferred to the Xpert for loading at recording start.

Note: at the time of this writing it was found you must make sure no “.” character is in the path to the saved file when saving the deployment file, or the pcf file will not be created (for example, save to “C:\Temp”, but don’t save to “C:\Users\myname.workgroup\documents”). See the Nortek integrators manual for more information on using the -cu option.

*Be sure to only use this option when you have also enabled either a poll command or a deploy command. Otherwise, the sensor will be left in a powered down state at recording start, after the configuration load occurs.*

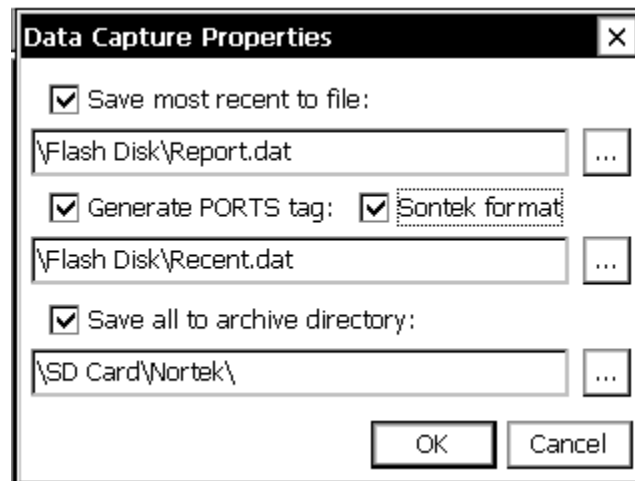
### Sync time on start

When checked, the Xpert will set the time in the Nortek sensor at recording start.

*Be sure to only use this option when you have also enabled either a poll command or a deploy command. Otherwise, the sensor will be left in a powered down state at recording start, after the time sync occurs.*

## Data Capture Properties

The Data Capture Properties dialog is used to specify details related to data capture from the Nortek sensor. To display the dialog, press the “Data...” button on the Nortek Properties dialog. The following dialog is displayed:



**Figure 5: Data Capture Properties Dialog**

This dialog allows you to specify whether and where to save data received from the Nortek sensor to file.

### Save most recent to file

Enable this option to define the file name and location in which to save the most recent captured data set. This file is overwritten on every capture.

### Generate PORTS tag and Sontek format

Enable this to generate a NOAA compatible PORTS tag report.

By default, the report follows the “Nortek AquaDopp” format, containing six columns of velocity and amplitude data. This format assumes a 3-beam sensor. When less than 3 beams are present, the data for missing beams is filled with variants of “-99.999”.

When the “Sontek format” option is checked, the output format follows that of a 2-beam Sontek sensor.

The file name for the PORTS tag should typically be \\Flash Disk\\Recent.dat, as this is the file that the GOES formatter (optional basic program) expects, and is also the name expected by the NOAA PORTS tag auto-dialer that retrieves PORTS tags over IP modem.

### Save all to archive directory

Enable this option to define where to archive all captured data sets. This should usually be a directory name on an inserted SD Card or USB Card, since the Flash Disk typically does not

have enough storage space for large data sets captured over time. The name given to the archive file is based on the time the data is received.

## Output Properties

The Output Properties dialog is used to configure the block's outputs. To display the dialog, press the "Outputs..." button on the Nortek Properties dialog. The following dialog is displayed:

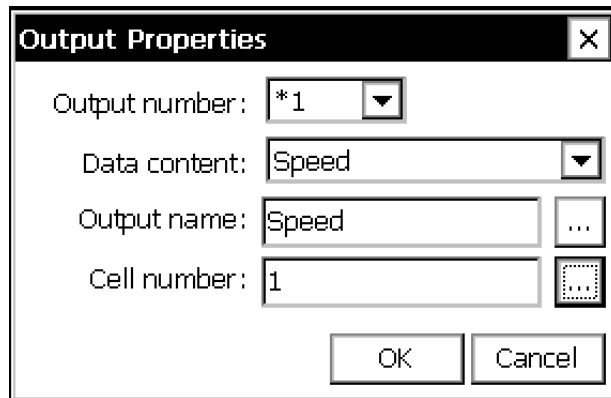


Figure 6: Output Properties Dialog

The Nortek block can output up to 20 values. The outputs are configured as "empty" by default, allowing you to decide and assign which data is of most importance. In the example above, we see output number 1 has been configured to contain the "Speed" output for cell number 1.

*Note: this feature is useable only when the Nortek sensor is configured for, or polled for, NMEA output. If the sensor outputs binary output, data WILL be captured, but won't be parsed and made available for block output.*

### Output Number

Use this to select the output number to configure. Values 1 through 20 are available. When you select an output number, the other fields of the dialog update to show the configuration for the selected output.

### Data Content

Use this drop-down to select the data to assign to the output. The names used match the names used in the Nortek System Integrator user manual, dated March, 2013.

### Output Name

Use this property to define the name of the output. By default, the name follows the text of the Data Content property.

### Qualifier (Cell Number, etc.)

This property is used to specify any additional data needed for the selected Data Content. For example, some Data Content types (Vel, Speed, Dir) require a Cell Number value. When Data Content is set to one of these types, the Qualifier field becomes editable and prompts for Cell Number.

If no qualification information is needed, the property is disabled and can be ignored.