WAVEWIN™ SNIFFER

USER'S MANUAL

for the

Intelligent Data Sensors (IDS-8)

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Last Update: 06 / 01 / 2011

Acknowledgments

Preface

This manual contains information about the Wavewin Sniffer IDS-8 hardware and software.

Documentation Format

The documentation is structured to the following format:

- Chapter 1, Software Installation
- Chapter 2, Configuration Software
- Chapter 3, Viewing Data Files
- Appendix A, Hardware Installation
- Appendix B, Hardware Specifications
- Appendix C, Hardware Data Sheets

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LIST OF FIGURES

C H A P T E R 1

1.0 SYSTEM REQUIREMENTS & INSTALLATION

This chapter lists the system requirements needed for installing and running Wavewin and the Wavewin Sniffer Configuration software it also provides technical support information.

1.1 SYSTEM REQUIREMENTS

The system requirements are listed below.

Recommended System Requirements:
1GHz Processor,
1GB of memory,
10GB of hard disk space,
VGA, 8514/A, or compatible graphics adapter,
Microsoft Windows Xp or higher,
Network Interface Card.

Minimum System Requirements:
500MHz Processor,
512MB of memory,
500MB of hard disk space,
VGA, 8514/A, or compatible graphics adapter,
Microsoft Windows 98 or higher,
Network Interface Card.

1.2 SOFTWARE INSTALLATION

The system files are distributed in a compressed format. To install the software follow the instructions for the type of storage media distributed with this manual.

CD: To install the software using a CD, place the CD into the CD-ROM drive. The installation program will run automatically. If the install program does not run automatically open Windows Explorer, navigate to the CD drive and double click on the install.exe application located on the root drive.

Follow the instructions to fully install the software.

Figure 1.1 - Start Software Installation

The default destination folder path is C:\Wavewin COMTRADE. To change the default path either type in a new install path or click on the browse button to select an existing directory.

The destination folder is the location where all the files are to be copied.

Click “Next” to start the installation.

Figure 1.2 - Create Install Path

Click “Yes” to create the path.

Figure 1.3 - Finish Software Installation

The install is now complete click “Finish” to end the installation.

1.3 TECHNICAL SUPPORT

Although this system is easy to use and understand, at some point you may encounter a technical question, feel that the system has improperly operated, or have suggestions for future improvements. In either case, contact SoftStuf using one of the following methods:

Phone: 215-627-8850, hours are from 9:00 a.m. to 6:00 p.m. Mon- Fri, (EST).
Fax: 215-625-2497, response time is 24 hours.
E-mail: support@softstuf.com, response time 24 hours.

C H A P T E R 2

2.0 CONFIGURATION SOFTWARE

This chapter describes how to use the Wavewin Sniffer Configuration Software. To begin, click on the installed desktop icon TISConfig or open the Start Menu, navigate to the installed program folder and click on the TISConfig shortcut.

2.1 CONFIGURATION SOFTWARE

The Configuration software is used to configure and save the device channel properties. To connect, enter the device IP address and click “Connect” or press enter.

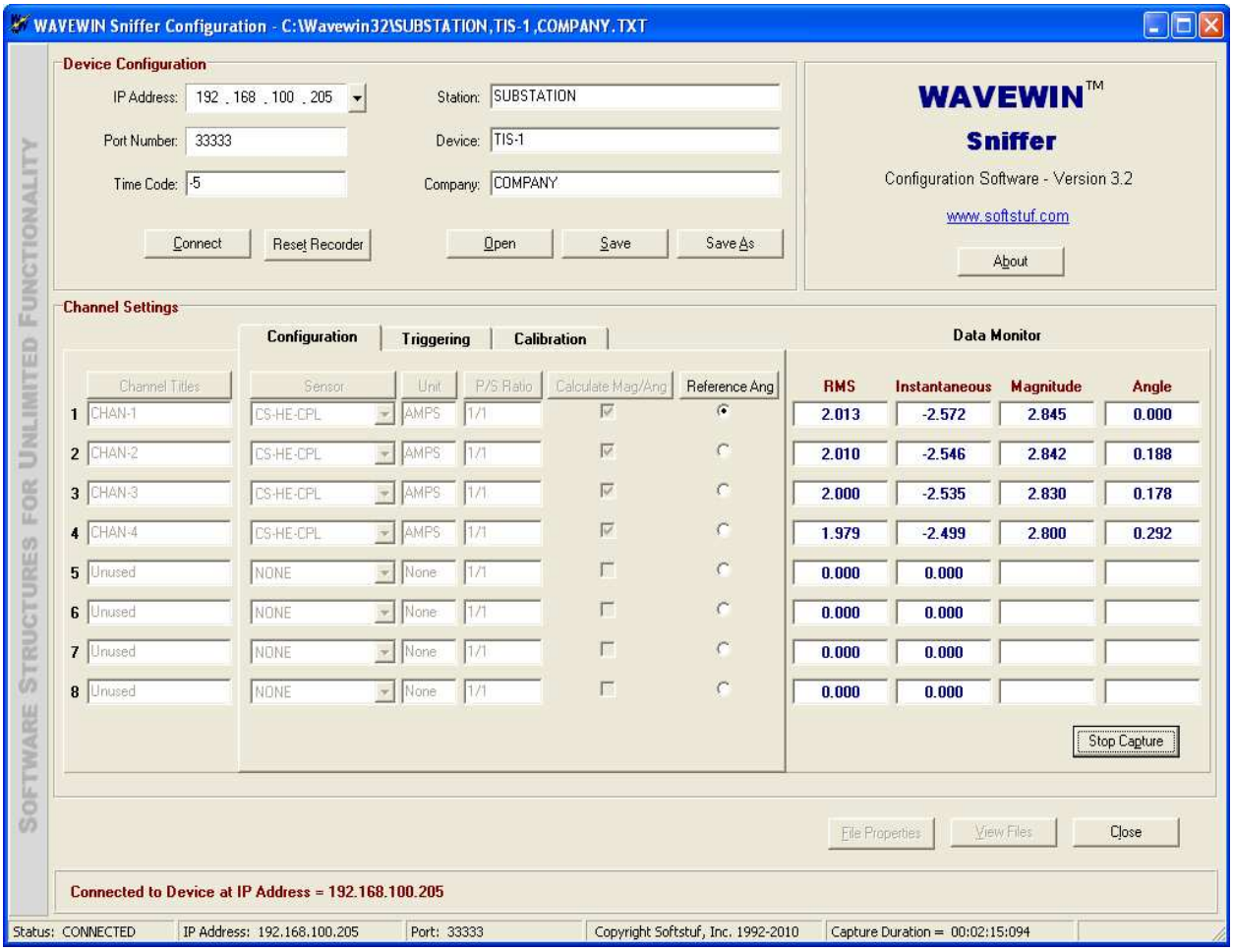

Figure 2.1 - Configuration Software

If the device is connected properly a message will be displayed at the bottom of the window stating “Connected to Device at IP Address =”. If an error was encountered connecting, then an error message will be displayed. Refer to Figure 2.2

Figure 2.2 - Error Connecting

If an error message is displayed check the connection of the device to the computer or switch and make sure the device is powered up. Also, make sure the local IP address of the computer is on the same network as the device. Refer to “Configure Window’s IP Address” and the “Troubleshooting” sections for more information.

2.2 DEVICE CONFIGURATION

This section defines the device configuration fields. Refer to Figure 2.3.

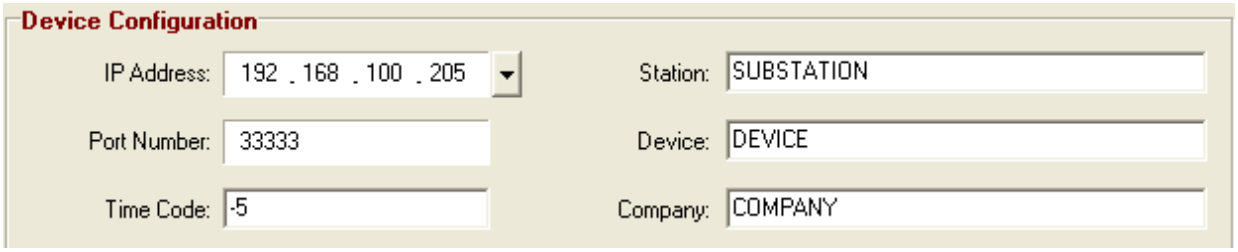

Figure 2.3 - Device Configuration Fields

The table below defines each field in the device configuration section. The IP address, port number, time code, station, device and company name. The subnet mask of the device is fixed at 255.255.0.0 and the resolution is fixed at 16 bits.

Table 2.1 - Device Configuration Information

Field	Description	Default
IP Address	A unique identifier for the device on a TCP/IP network.	192.168.100.205
Port Number	Ethernet port number of the device. This field is automatically populated from the device.	33333
Time Code	Time code where the device is installed. Time is offset from Greenwich Mean Time (GMT).	-5
Station	Name of the substation where the device is installed. The default name is automatically populated in the title of the configuration file if the file is untitled.	SUBSTATION
Device	Name of the installed device. The default name is automatically populated in the title of the configuration file if the file is untitled.	DEVICE
Company	Name of the company that owns the device. The default name is automatically populated in the title of the configuration file if the file is untitled.	COMPANY

2.3 CONFIGURATION FILES

This section defines how to open and save a device configuration. When using the save button while connected to the device, the configuration file will be saved to both the device and computer disk. When using the save button while not connected, the configuration file will be saved to disk only.

The configuration for each device can be saved to the computer's hard disk in an ASCII text file. There are three buttons that allow for saving and reading the configuration of a device to/from disk. This feature is helpful when a device/s need to be deployed in the field. Each device configuration can be setup and saved to disk prior to mounting the device. In the field, each configuration can be easily read from disk and displayed. It is also useful for keeping a backup copy of each device/s configuration and for generating reports. The "File Properties" button defines the Configuration save path.

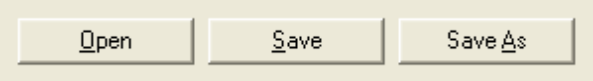

Figure 2.4 - Open/Save Configuration Files

When saving a configuration to disk, the name of the file is automatically defaulted to "Substation, Device, and Company.TXT". This allows for easily filing the configuration files according to what substation they reside in, the name of the device and the company that owns the device. All configurations are automatically assigned the ".TXT" extension. The path and file name of the configuration is displayed in the header of the software. Contents of the configuration file are maintained by the configuration software. The table below describes the features of each button's functionality.

Table 2.2 - Save & Open Configuration Files

Button	Description
Open	Open an existing configuration from disk. The open file dialog is displayed. All configuration files are saved with the .TXT extension. Select a file and click the "Open" button or double click on the desired file. All fields in the connection and channel configuration sections are updated with the information read from the file. If the selected file is not a valid configuration file then an error message is displayed. The path and filename of the selected file is displayed in the header.
Save	Save the active configuration file. An active configuration will be saved to both the device and to disk. When the configuration is saved a dialog box will appear confirming the save was successful. If the name of the configuration is listed as "Untitled" in the header then the "Save As" dialog is displayed with the filename defaulted to "Substation, Device, and Company.TXT".
Save As	Save the active configuration under a new name. The Window's "Save As" dialog is displayed with the filename defaulted to "Substation, Device, and Company.TXT".

2.4 CONFIGURATION DOWNLOAD

When connected, click the “Save” button to send the active configuration to the device.

If the configuration was sent successfully a message will be displayed.

Figure 2.5 - Download Successful

To load a configuration from the device, click on the “Connect” button. All device configuration and channel configuration fields will be updated with fields read from the device. Any new unsaved entries made in the software prior to connecting will be lost unless saved before connecting. If an unsaved configuration exists, a prompt will appear “Save Changes before Connecting?” reminding you to save the information entered. To change to a new device edit the IP Address fields in the Device Configuration section and press enter or click on the “Connect” button. To help save time entering an IP address, the IP address dropdown list displays a history of the 12 previously entered addresses, click on an address to select it.

2.5 CHANNEL SETTINGS

The channel settings section defines all the parameters needed to define the sensors, including configuration, triggering and calibration settings.

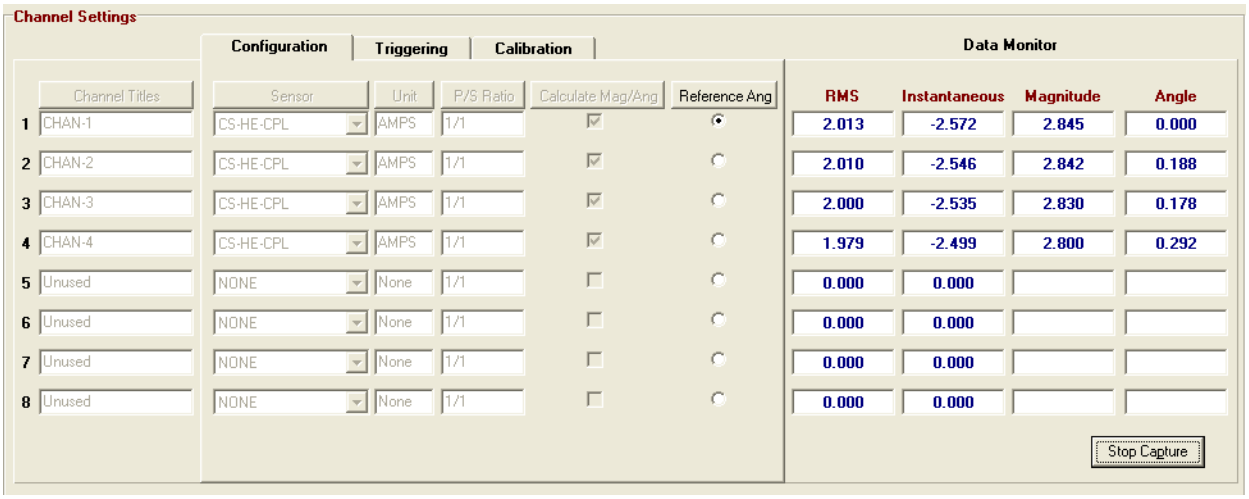

Figure 2.6 - Channel Settings Section

The table below defines each field and option in the Channel Settings section, including the Configuration, Triggering, Calibration and the Data Monitor sections.

Table 2.3 - Channel Settings

Header	Description	Default
Channel Titles	The Channel title is the name of the channel. By default, the channel title is named “Unused”. Change the default name of the channel, when selecting it for polling. This field is saved in the first line of the data file. Click on the header to default the column to “Unused”. (Required)	Unused
Configuration - Channel Settings		
Sensor	The Sensor field indicates the type of sensor to being polled. From the drop down list, select the type of sensor to be polled. Click on the sensor header to default both the sensor and unit columns to “None”.	None
Unit	The Unit field is directly related to the type of sensor being polled. The units are automatically associated with the type of sensor selected. The units available are: Amps, Volts and °F.	None
P/S Ratio	The primary to secondary ratios for AC measurements. DC primary ratio is always 1/1. Click on the header to default the column to 1.	1/1
Calculate Mag/Ang	Used for Discrete Fourier Transform (DFT) calculations and to display the Magnitude and Angle values. Checked = On. Values are displayed when the selection box is checked. Click on the header to turn all on or off.	Checked (On)
Reference Angle	DFT angle reference. Click on the header to default the first channel to the reference angle.	1st Channel
Triggering - Channel Settings		
Trigger Value	The instantaneous threshold value at which the actual trigger takes place. This field along with the following 5 fields defines when to save an event trigger file to disk. Enter the instantaneous value when a trigger file should be generated then click “Start Capture” to begin polling. Click on the header to set the defaults.	Blank
Duration (ms)	The duration of the trigger before saving an event trigger file. The file is measured in milliseconds (ms). 2ms are equivalent to 4 consecutive samples. Click on the header to default the column to 0.	0
Upper Hysteresis	Upper offset for trigger level	0

Header	Description	Default
(Upper)	(Trigger Level + Upper Hysteresis = Upper Trigger Level). Click on the header to default the column to 0.	
Lower Hysteresis (Lower)	Lower offset for trigger level (Trigger Level - Lower Hysteresis = Lower Trigger Level). Click on the header to default the column to 0.	0
Absolute Values	Take the absolute value of the samples before comparing them to the entered trigger value. This option is useful in case the sensor was mistakenly mounted in the reverse polarity direction. Unchecked = Off. Click on the header to turn all on or off.	Unchecked (Off)
Operator	The logic to use when determining if a trigger level is active. There are four types of options available: greater than (>), less than (<), equal to (=), or not equal to (<>). Click on the header to default the column to greater than (>).	>
Calibration - Channel Settings		
DC Cancellation (DC Cancel)	Defines if the software should automatically calculate the offset value for the sensors connected when polling continuously (not in a triggered state). *Access the "Save Continuous" check box, by clicking on the "File Properties" button.* The Hall-effect current sensor may drift off the zero reference point over time causing the samples values to be incorrect. The DC offset cancellation can only be applied if a sensor unit is set to "AMPS". Checked = On. Click on the header to turn all on or off.	Checked (On)
Offset	The Offset is a measure of the distance to the zero reference axis. To set the offset refer to the "Calibrating" section. Click on the header to default the column to 0.	0
Scale Factor	The Scale Factor is a real number used to scale the raw data. This field is automatically populated with a default value when a sensor type is selected. *The default values are listed in the "Calibrating" section.* To calibrate the scale factor refer to the "Calibrating" section. Set this field to 1 before calibrating the sensors that need calibrating. Click on the header to default the column to the default value of the sensor.	
Calibrate Value (Cal Val)	The known value for the calibration process. Enter the expected amount of current injected	

Header	Description	Default
	into the wire during the calibration process. This field is automatically populated with a default value when a sensor type is selected.	
Calibrate	The calibrate selection box is used to indicate if the sensor is active or inactive. If checked, the channel is active for calibration. To calibrate, refer to the "Calibrating" section. Click on the header to make all channels active or inactive.	Checked (Active)
Gain	Magnitude Ratio of the analog channels. It increases the magnitude of an input signal. Gain options are: 1, 2, 4, 8, 16, 32, 64, and 128. Useful when measuring very low current levels (below 1 amp). No Gain = 1. Click on the header to default the column to 1.	1 (No Gain)
Data Monitor - Channel Settings		
RMS	The Root Mean Square value calculated over a one second average using the instantaneous values. The vales are displayed when polling begins.	Blank
Instantaneous	Amplitude of the input signal at a particular instant. It is the raw values received from the device minus the offset value, and that quantity multiplied by the scale factor ((raw values-offset)*scale factor). The vales are displayed when polling begins.	Blank
Magnitude	Magnitude of the input signal. The values are displayed when the "Calculate Mag/Ang" selection box is checked and polling begins.	Blank
Angle	Angle of the input signal. The values are displayed when the "Calculate Mag/Ang" selection box is checked and polling begins.	Blank

2.6 TRIGGERING

Each sensor trigger level is configured using 6 trigger settings: Trigger Value, Duration, Upper Hysteresis, Lower Hysteresis, Absolute Values, and Operator.

When polling begins (Start Capture), the device scans all of the connected sensors and continuously sends the scans to the software. The software checks each sample value to see if it is above/below the defined trigger value and the number of consecutive samples exceeding the trigger value is counted. When the number of consecutive samples triggered is greater than the defined duration then a trigger condition occurs and an event trigger file is saved to the repository path. The repository paths are defined in the "File Properties" dialog.

The region between the upper and lower trigger levels is called the Hysteresis region (Region 2 in Figure 2.12). The user can create this region by entering values for the Upper and Lower Hysteresis fields. This region prevents continuous triggering as the input signal from the sensors may drift around the trigger level.

The “Operator” field defines what region to trigger. By selecting different logic operators the software can capture signals that are outside or inside of the Hysteresis region. The following table shows 4 different logic operators with their Trigger and Reset regions.

Table 2.4 - Trigger Regions

Logic	Trigger	Reset
=	Region 2	Region 1 or Region 3
<>	Region 1 or Region 3	Region 2
>	Region 3	Region 1
<	Region 1	Region 3

The “Absolute Values” field, if checked, will compare the absolute value of the samples with the trigger levels. This field is helpful in case the sensor was mistakenly mounted in the reverse direction.

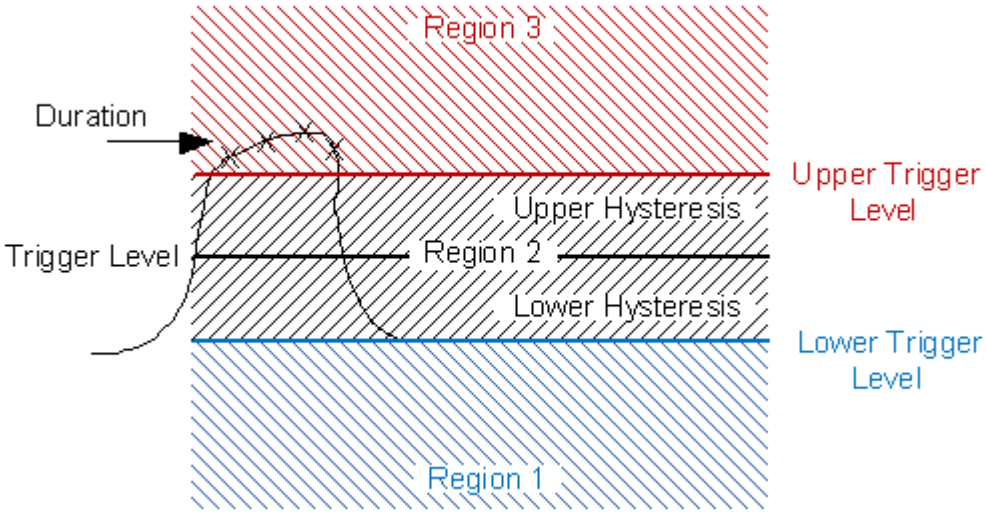

Figure 2.7 - Trigger Regions

2.7 CURRENT DETECTION

The following example describes how to detect a current flow of 2.0 Amps DC or more that last for 2 milliseconds. The input is a DC signal with an AC ripple (DC + AC).

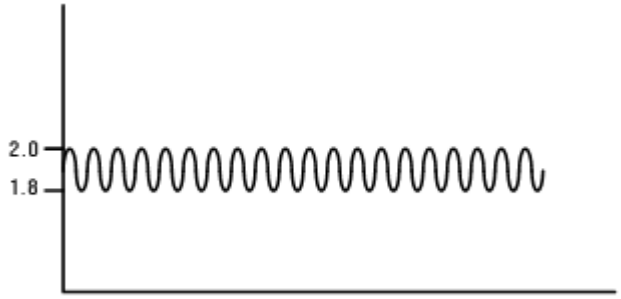

Figure 2.8 - DC + AC Signal

Trigger Value	Duration (ms)	Upper	Lower	Absolute Values	Operator
1.9	2.136	0.1	0.1	☑	>
	0.000	0	0	☐	>
	0.000	0	0	☐	>
	0.000	0	0	☐	>

Figure 2.9 - Trigger Settings

In order to make the triggering condition less sensitive to noise (AC ripple), create a Hysteresis region:

1. Enter 1.9 in the “Trigger Value” field.
2. Enter 2 in the “Duration (ms)” field.
3. Enter 0.1 in the “Upper” hysteresis field.
4. Enter 0.1 in the “Lower” hysteresis field.
5. Select the “Absolute Values” check box.
6. Select > from the “Operator” list.
7. Click on the “Start Capture” button to start polling.

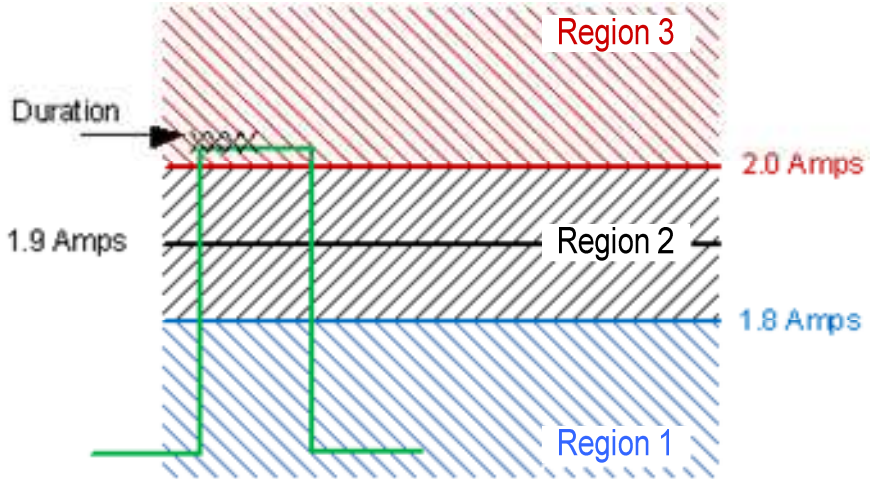

Figure 2.10 - Hysteresis Region

In reference to the example above, if the software detects values of 2.0 Amps or more for a minimum of 2 milliseconds (4 consecutive samples) then a triggered event file will be saved. The trigger will reset when the current goes below 1.8 Amps.

2.8 CALIBRATING

The “Start Capture” and “Calibrate” buttons are used to calibrate the sensors.

Figure 2.11 - Calibration Buttons

To calibrate manually follow the steps below (general calibration):

1. To begin, enter a channel title and choose the proper sensor type for each sensor to be calibrated (Configuration Tab).
2. Select the channels to be calibrated by checking the “Calibrate” check box for each channel. Uncheck the box for sensors that do not need calibration (Calibration Tab).
3. Set the offset value for each channel to 0. If calibrating all of the sensors click on the “Offset” header button to default the offset fields to 0.
4. Set the scale factor for each channel to 1. If calibrating all of the sensors click on the “Scale Factor” header button to default the scale factor fields to 1.
5. Place the sensors in the intended environment.
6. Enter the expected amount (calibration value) for each sensor in the “Calibrate Value” fields.
7. Calibrate the sensor/s: with the expected calibration value applied, click on “Start Capture” and wait several seconds (the duration of the capture is displayed in the status bar) then click “Calibrate” and “Stop Capture” in order. The offset and scale values for each selected channel will be displayed.
8. Click on “Save” to save the configuration to both the device and the computer.

Zeroing the sensor or offset is automatically calculated when clicking on “Start Capture”. Setting the scale value is automatically calculated when clicking on “Calibrate”.

As for accuracy, the main purpose of the clothespin and clamshell sensors are for remote target indication (by monitoring the DC side) and relay performance assessment (by monitoring the AC side). The Hall-effect chip used in the current sensors produces an 8 mV output for every 200 mA passing through its core with an accuracy of 2%. When calibrated manually, the over-all system accuracy is 2% around the calibration region. If a sensor is relocated from the place it was originally calibrated, it will need to be recalibrated at its new position on the wire. Avoid clamping the sensors onto any labels or tape that may be on the wire. As for the temperature sensor, the accuracy is +/- 2 degrees Celsius.

To calibrate using factory default values follow the procedure below (default calibration):

For the Clothespin current sensor (model, CS-HE-CPL): Follow steps 1 - 3, 5 & 6 above then click on “Start Capture” to calculate the Offset. The default Scale Factor value displayed will be **0.00203052**. Save the configuration.

For the Clothespin current sensor (model, CS-HE-CPS): Follow steps 1 - 3, 5 & 6 above then click on “Start Capture” to calculate the Offset. The default Scale Factor value displayed will be **0.00152525**. Save the configuration.

For the Clamshell current sensor (model, CS-HE-CS): Follow steps 1 - 3, 5 & 6 above then click on “Start Capture” to calculate the Offset. The default Scale Factor value displayed will be **0.00252953**. Save the configuration.

For the Split Core CT current sensor (model, CS-SC-200): The default Scale Factor value **0.00843647** will be displayed when the sensor type is selected. The Offset is 0. Save the configuration.

For the Temperature sensor (model, TS-LM-212): Both the default Offset and Scale Factor values for Fahrenheit will be displayed when the sensor type is selected. °F (Offset: 1226, Scale Factor: **0.01356812**). Save the configuration.

For the Voltage sensor (model, VS-OA-500): The default Scale Factor value **0.01405315** will be displayed when the sensor type is selected. Save the configuration.

2.9 FILE PROPERTIES

This section defines the options available in the File Properties dialog. These dialog options allow the user to define save paths for the device configuration and data files.

Click on the “Files Properties” button to open the dialog. Refer to table 2.5 for a description of the options available in this dialog.

For more information on configuration files (.TXT extension files), refer to the “Configuration Files” section. For more information on data files (.TIS extension files), refer to the “Viewing Data Files” section.

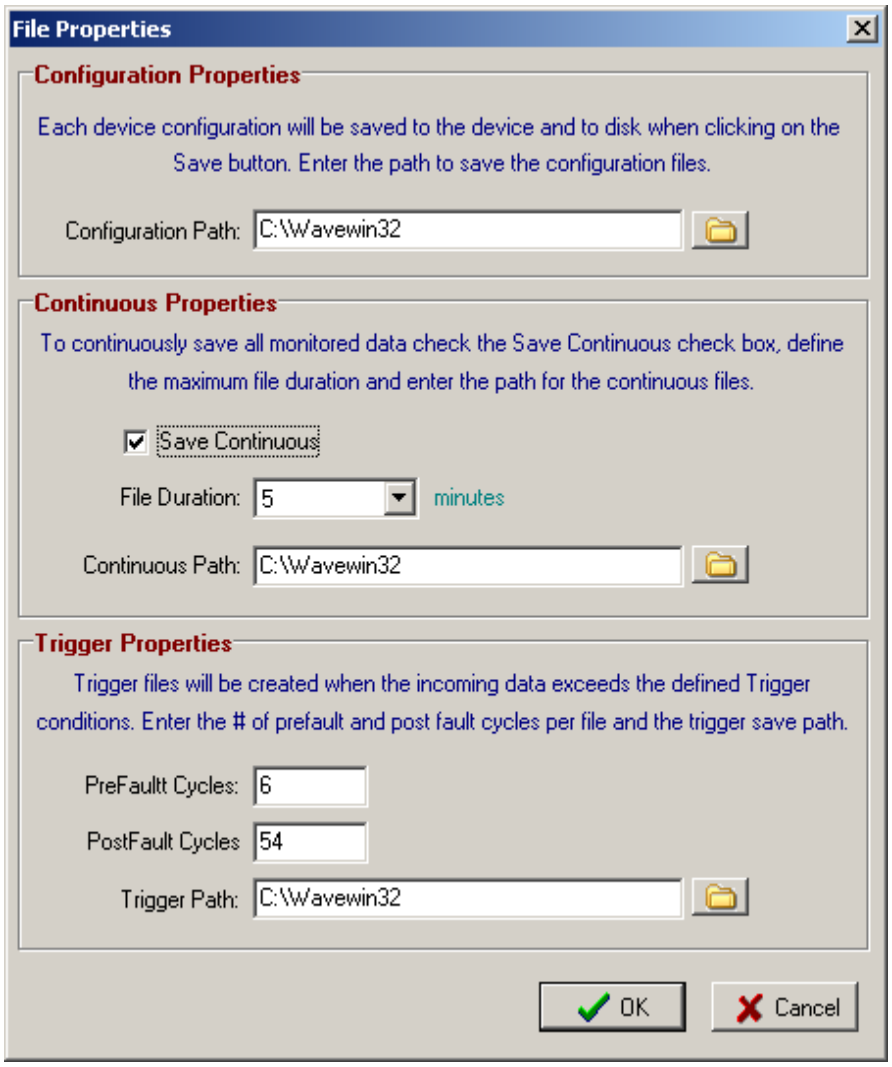

Figure 2.12 - File Properties

The table below defines options available in the File Properties section, including the Configuration, Save Continuous and Trigger save paths.

Table 2.5 - File Properties

Field	Description
Configuration Path	The save path for the device configuration. Files with the (.TXT) extension. Each device configuration will be saved to the device and to disk when clicking on the “Save” button. Enter a save path or click on the folder to browse to an existing folder.
Save Continuous	Continuously save all monitored data. Files with the (.TIS) extension. Click on the “Save Continuous” check box to save all monitored data. Uncheck this box when only capturing event trigger files. By default this box is unchecked.
File Duration	The time duration of the data file measured in minutes. The

	software will automatically save a new file when the maximum file duration is reached. Save options are (1 to 5) minutes. By default the duration is set to 5 minutes.
Continuous Path	The save path for the monitored data files. Files with the (.TIS) extension. The file duration option defines the length of each file. Enter a save path or click on the folder to browse to an existing folder.
Pre Fault Cycles	Defines how many prefault cycles are saved to the event trigger files. The default value is 6 prefault cycles.
Post Fault Cycles	Defines how many postfault cycles are saved to the event trigger files. The default value is 54 postfault cycles. Using the default settings each event file will be 60 cycles in length. The maximum prefault cycles + postfault cycles is 480. If the combined value of the prefault cycles + postfault cycles is greater than 480 then the prefault cycles are automatically defaulted to 6 and the postfault cycles to 54. Each cycle received from the device is 16.667 ms in length. A file with 480 cycles is about 8 seconds in duration.
Trigger Path	The save path for the event trigger files. Files with the (.TIS) extension. These files are measured in milliseconds (ms). Enter a save path or click on the folder to browse to an existing folder. Refer to the “Triggering” section for information on generating event trigger files.

C H A P T E R 3

3.0 VIEWING DATA FILES

This chapter briefly describes how to use the Device Configuration and Wavewin software to locate and display the generated data files. The data files are generating with the ".TIS" file extension and are tagged as TIS (Trip Information System) files. It is not necessary to convert these files to COMTRADE before viewing.

3.1 LOCATE DATA FILES

Wavewin's file manager and analysis windows are used for viewing the captured data files. To locate the data files from the Device Configuration software, click on the "View Files" button. To locate the data files from Wavewin, click on the Wavewin desktop icon to run Wavewin or open the Start Menu and navigate to the Wavewin shortcut.

Wavewin's File Manager is used to manage files on disk, search the contents of a drive or directory, and edit, plot, or draw the contents of a file. The File Manager supports the IEEE Standard C37.232-2007 for naming time sequence data files

To change the active drive from the Device Configuration software, click on the "File Properties" button. From Wavewin, navigate the folder tree or click on the "ChDir" menu button or press F7. Browse to the user defined repository path and click the "Ok" button.

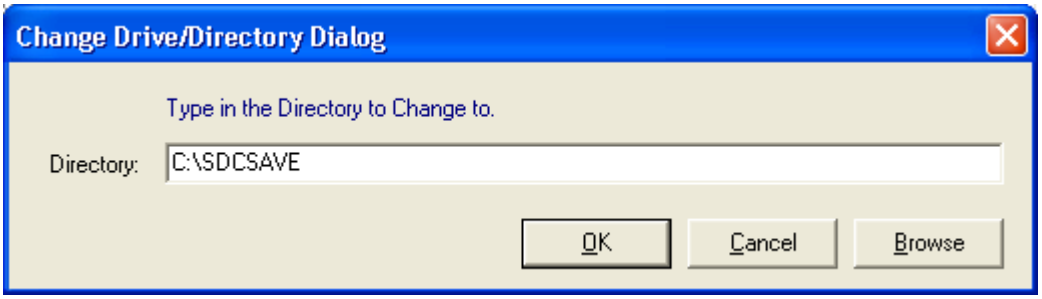

Figure 3.1 - Wavewin Change Directory Dialog

The ".TIS" data files generated are saved in the user defined repository path.

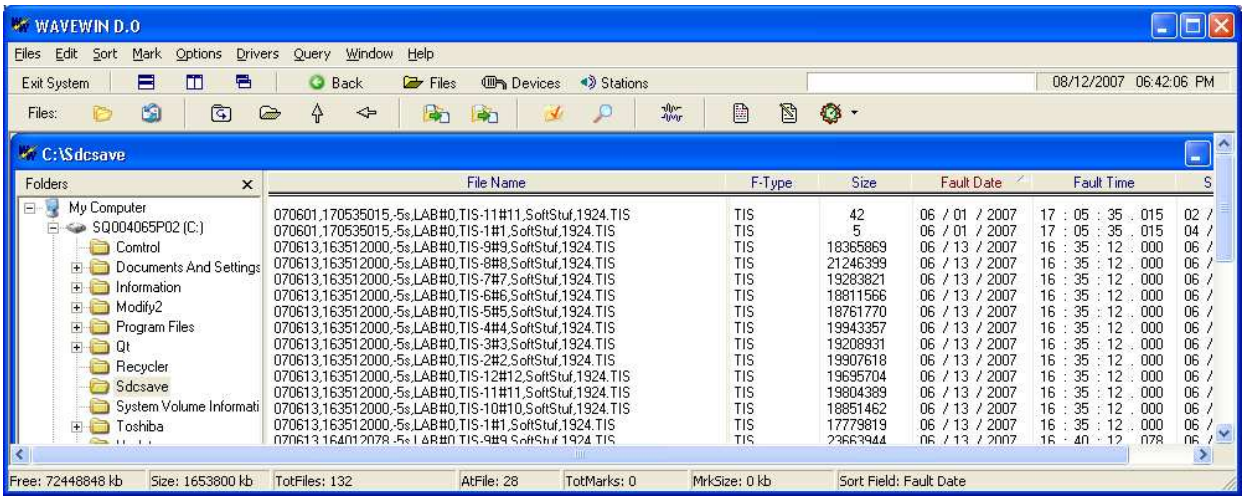

Figure 3.2 - Wavewin Repository Folder

3.2 DISPLAY DATA FILES

To display the data file, double click on the file name. The data display offers a high-resolution graphical interface for displaying, analyzing, and manipulating analog and digital channels of a waveform record or a periodic load file.

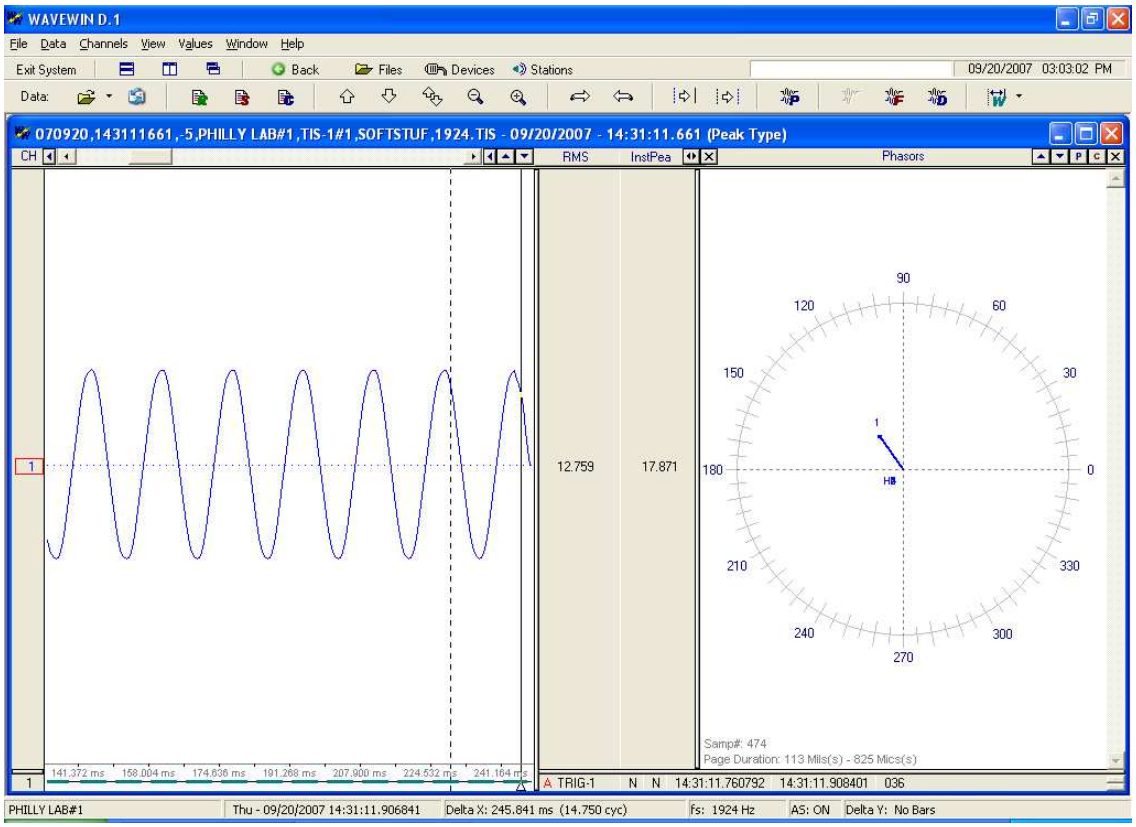

Figure 3.3 - Data Display

A P P E N D I X - A

HARDWARE INSTALLATION

CONFIGURE WINDOW'S IP ADDRESS (ETHERNET)

In order to communicate with an Ethernet device, the computer must be on the same network as the device. Follow the steps below to configure the computer with an IP address that resides on the same network as the device IP address.

1. From the desktop, left click on the Start Menu then click on Control Panel.
2. Double click on Network Connections.
3. Double click on Local Area Connection.
4. Select "Internet Protocol (TCP/IP)" then click on Properties, Refer to Figure A.1.
5. Select "Use the following IP address", Refer to Figure A.2.
6. Enter 192.168.100.2 for the computer IP address.
7. Enter 255.255.255.0 for the Subnet Mask.
8. Click on Ok to save the changes and exit.

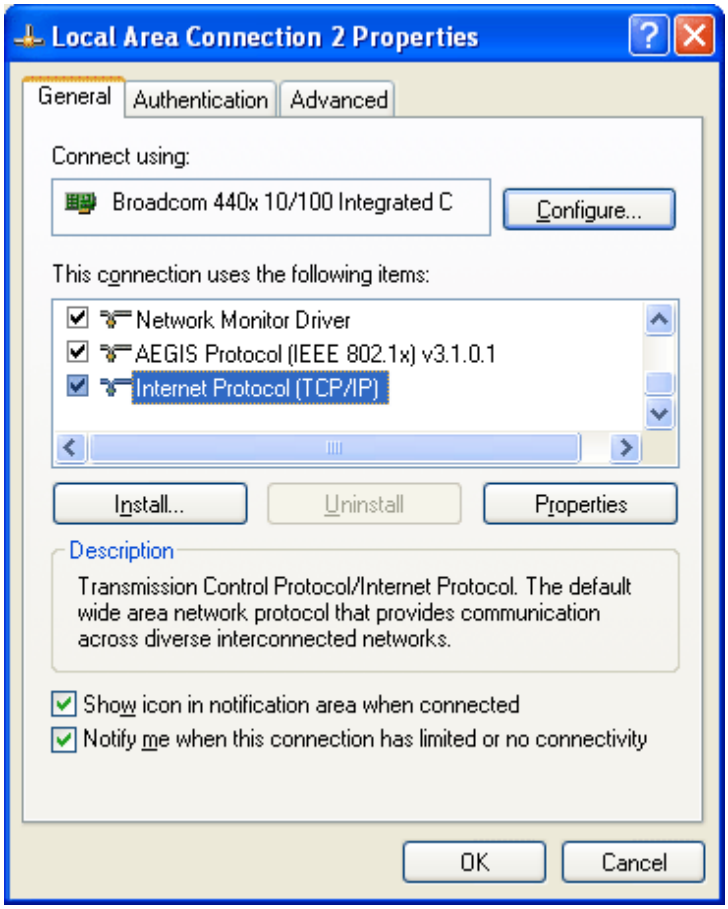

Figure A.1 - Local Area Connection Properties

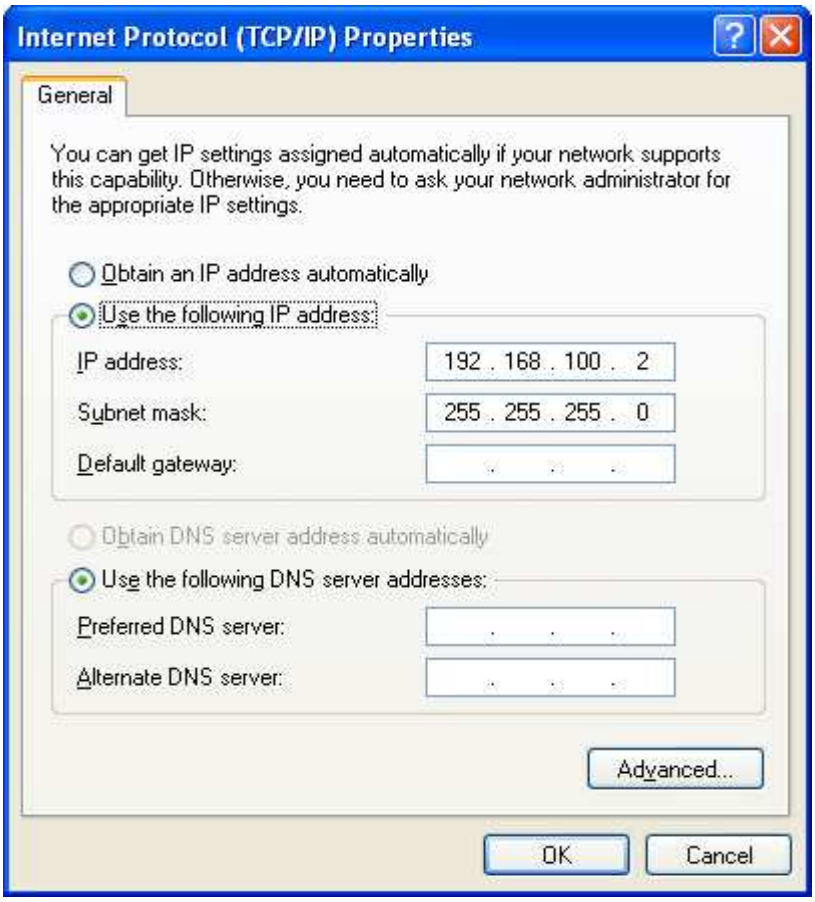

Figure A.2 - Internet Protocol Properties

A basic requirement for TCP communication is that the device IP address must be part of the subnet and not already used. Open a command prompt window and type “ipconfig” to see a listing of the IP address and subnet mask for a particular computer. If the computer shows a subnet mask of 255.255.255.0, that means it can only talk to devices with the same first 3 bytes of the IP address. The default IP address of the device is 192.168.100.205, which will work on a network using the 192.168.100.* subnet (unless another device on the same network is already using the .205 address).

Ping is a useful utility for testing basic Ethernet communication (open a command prompt window and type “ping 192.168.100.205”). It is a good idea to attempt to Ping the desired IP address before connecting, to see if any other device is already using that address. If another device is using the same address an IP conflict will occur and the device will not communicate properly. Each device residing on the same network must have its own unique IP address.

A P P E N D I X - B

HARDWARE SPECIFICATIONS

RECEIVER (IDS-8)

The receiver is a high speed 16-bit sampling unit used for digitizing the outputs of the analog sensors. The receiver transmits data continuously to a host computer over an Ethernet connection and can connect up to a maximum of 8 analog sensors.

Figure B.1 - Receiver (Model# IDS-8)

B.1.1 INPUT SIGNALS

There are 8 differential analog input channels on the IDS-8 receiver.

Table B.1.1 - Analog Input Female Port (1- 8)

RJ45 Pin #s	Description
1	Power Supplied to Sensor from Receiver (5 Volts)
3	Input Signal - Positive Wire (0 to 5 Volts)
5	Input Signal - Negative Wire (2.5 Volts)
7	Ground (0 Volts)

B.1.2 SPECIFICATIONS

Table B.1.2 - IDS-8 Receiver Specs

Specification	Description
A/D Resolution	16-bit
Analog Input	-2.5 to 2.5 Volts (8 Differential)
Sampling Rate	2340 Hz Simultaneously per Channel
Input Gain	1, 2, 4, 8, 16, 32, 64, 128
Dimensions (L x W x H)	6.25 x 3.5 x 1.63 Inches
Temperature Range	-40 to 85 ^{o}C
Humidity Range	0 to 95% Non-condensing
Communication Interface	10/100Base-T Ethernet, RJ45
Analog Inputs Connecter Type	RJ45 Female
Power Supply	24 Volt DC (External)
Power Connecter Type	Screw Terminal, 6 Position

B.1.3 TROUBLESHOOTING

The “Error Connecting to the Device” message may be caused by:

1. No power. Check the power connection to the receiver.

2. The cross-over Ethernet cable between the computer and receiver is not connected. Use a straight Ethernet cable when connecting the receiver or computer to a switch.

3. The incorrect IP address is entered in the Device Configuration software. Refer to the label (if available) on the receiver for the correct IP address and review the “Configure Window’s IP Address” section for the correct network information. The receiver’s default IP address is 192.168.100.205.

4. The “Status” (ST) red LED is solid or not on, indicates that the receiver is not operating properly. A blinking red Status LED indicates normal operation.

5. The “Duplex” orange LED is not blinking after connecting the Ethernet cable between the computer and the receiver. A blinking orange Duplex LED indicates a connection has been established. A solid orange Duplex LED indicates that the software is polling data.

6. The “Speed” red LED is blinking or not on. A solid red Speed LED indicates normal operation.

7. The “Link” green LED is not solid after connecting the Ethernet cable between the computer and the receiver. A solid green Link LED indicates a hardware connection has been established.

CLOTHESPIN SENSOR (CS-HE-CPL)

Using Hall-effect technology, the sensor measures both AC & DC currents in 12 gauge wires. To calibrate follow the steps in the “Calibrating” section.

Figure B.2 - Clothespin Current Sensor (Model# CS-HE-CPL)

B.2.1 OUTPUT SIGNALS

The relationship between current and the output voltage is equal to 40mV/Amp.
The receiver works with output signals between pins 3 & 5 from the clothespin sensor.

Table B.2.1 - Clothespin Male Connector

RJ45 Pin #s	Description
1	Power Supplied to Sensor from Receiver (5 Volts)
3	Output Signal - Positive Wire (0 to 5 Volts)
5	Reference Voltage - Negative Wire (2.5 Volts)
7	Ground (0 Volts)

B.2.2 SPECIFICATIONS

Table B.2.2 - Clothespin Specs

Specification	Description
Current Range	0.1 to 40 Amps
Accuracy	2%
Bandwidth	DC to 100 KHz
Response Time	10 Microseconds

Supply Current	16 Milliamps Max
Supply Voltage	5 Volts DC
Dimensions (L x W x H)	1.56 x 0.78 x 0.41Inches
Maximum Wire Diameter	0.187” (4.75 mm)
Operating Temperature Range	-40 to 85 ^{o}C
Relative Humidity Range	0 to 95% Non-condensing
Cable Length	10 ft Lead with RJ45 Male Connecter

CLAMSHELL SENSOR (CS-HE-CS)

Using Hall-effect technology, the sensor measures both AC & DC currents in 12 and 10 gauge wires. To calibrate follow the steps in the “Calibrating” section.

Figure B.3 - Clamshell Current Sensor (Model# CS-HE-CS)

B.3.1 OUTPUT SIGNALS

The relationship between current and the output voltage is equal to 40mV/Amp.
The IDS-8 receiver works with output signals between pins 3 & 5 from the clamshell sensor.

Table B.3.1 - Clamshell Male Connector

RJ45 Pin #s	Description
1	Power Supplied to Sensor from Receiver (5 Volts)
3	Output Signal - Positive Wire (0 to 5 Volts)

5	Reference Voltage - Negative Wire (2.5 Volts)
7	Ground (0 Volts)

B.3.2 SPECIFICATIONS

Table B.3.2 - Clamshell Specs

Specification	Description
Current Range	0.1 to 40 Amps
Accuracy	2%
Bandwidth	DC to 100 KHz
Response Time	10 Microseconds
Supply Current	16 Milliamps Max
Supply Voltage	5 Volts DC
Dimensions (L x W x H)	1.375 x 1.0 x 0.625 Inches
Maximum Wire Diameter	0.312” (7.92 mm)
Operating Temperature Range	-40 to 85 ^{o}C
Relative Humidity Range	0 to 95% Non-condensing
Cable Length	10 ft Lead with RJ45 Male Connecter

SPLIT-CORE CT SENSOR (CS-SC-200)

Using a current transformer, the sensor converts AC currents to an equivalent voltage output in 12, 10, and 8 gauge wires. To calibrate follow the steps in the “Calibrating” section.

Figure B.4 - Split-Core CT Current Sensor (Model# CS-SC-200)

B.4.1 OUTPUT SIGNALS

Table B.4.1 - Split-Core CT Male Connector

RJ45 Pin #s	Description
3	Output Signal (0 to 2.5 Volts)
5	Ground (0 Volts)

B.4.2 SPECIFICATIONS

Table B.4.2 - Split-Core CT Specs

Specification	Description
Current Range	0.1 to 200 Amps
Accuracy	0.5% Overall
Turns Ratio	3000:1
Current Ratio	120 Amps / 40 Milliamps
Weight	75 Grams
Dimensions (L x W x H)	1.161 x 1.22 x 2.165 Inches
Hinge Opening	0.625” (16 mm)
Operating Temperature Range	-20 to 50 ^{o}C
Relative Humidity Range	0 to 85% Non-condensing
Cable Length	10 ft Lead with RJ45 Male Connecter

TEMPERATURE SENSOR (TS-LM-212)

The temperature sensor containing an LM335A sensor from National Semiconductor and two additional resisters inserted into waterproof stainless steel tube is designed for both indoor and outdoor applications. To calibrate follow the steps in the “Calibrating” section.

Figure B.5 - Temperature Sensor (Model# TS-LM-212)

B.5.1 OUTPUT SIGNALS

The relationship between the temperature and output voltage is equal to 10 mV/1°K. The IDS-8 receiver works with output signals between pins 3 & 5 from the temperature sensor.

Table B.5.1 - Temperature Male Connector

RJ45 Pin #s	Description
1	Power Supplied to Sensor from Receiver (5 Volts)
3	Output Signal - Positive Wire (2.33 to 3.73 Volts)
5	Reference Voltage - Negative Wire (2.47)
7	Ground (0 Volts)

B.5.2 SPECIFICATIONS

Table B.5.2 - Temperature Sensor Specs

Specification	Description
Temperature Range	-40 to 100 ^{o}C
Accuracy	+/- 2 ^{o}C @ 25 ^{o}C
Supply Current	2 Milliamps Max
Supply Voltage	5 Volts DC
Stainless Steel Tube Length	2 Inches
Cable Length	10 ft Lead with RJ45 Male Connecter

AC/DC VOLTAGE SENSOR (VS-OA-500)

The small, rugged, differential voltage sensor measures AC/DC voltages. Using a built-in isolation amplifier, it converts the high differential input to a low differential output by a ratio of 200:1. To calibrate follow the steps in the “Calibrating” section.

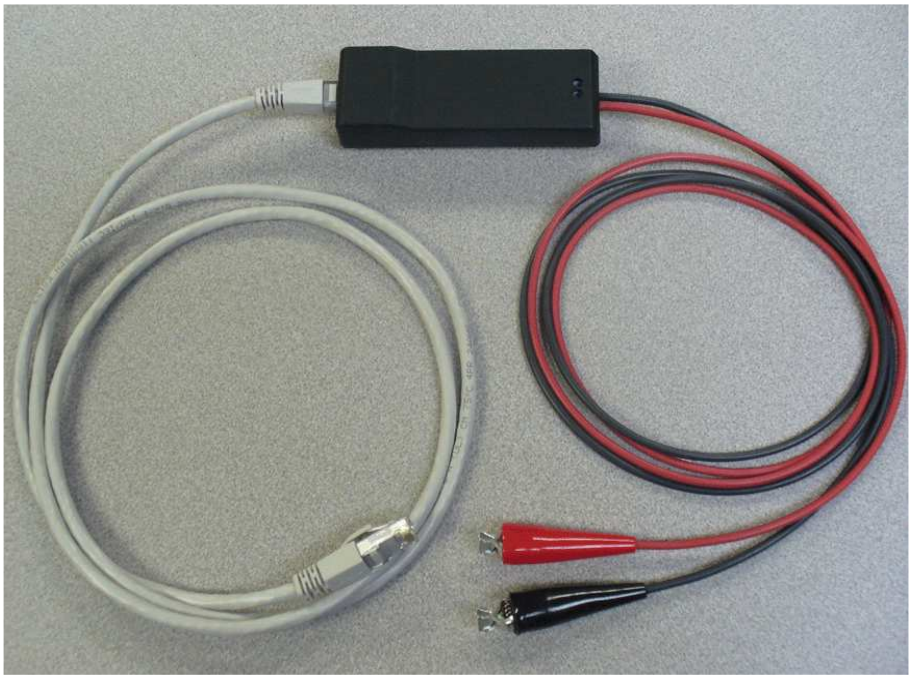

Figure B.6 - Voltage Sensor (Model# VS-OA-500)

B.6.1 OUTPUT SIGNALS

The IDS-8 receiver works with output signals between pins 3 & 5 from the voltage sensor.

Table B.6.1 - Voltage Sensor Female Port

RJ45 Pin #s	Description
1	Power Supplied to Sensor from Receiver (5 Volts)
3	Output Signal - Positive Wire (0 to 5 Volts)
5	Reference Voltage - Negative Wire (2.5 Volts)
7	Ground (0 Volts)

B.6.2 SPECIFICATIONS

Table B.6.2 - Voltage Sensor Specs

Specification	Description
Maximum Voltage Input	+/- 500 V Peak
Output Voltage	+/- 2.5 Volts

Attenuation Ratio	200:1
Bandwidth	DC to 5 KHz
Accuracy	+/- 0.05%
Supply Voltage	5 VDC
Supply Current	30 Milliamps
Rise Time	1ms for 200V C-M Steps
Input Connector	Screw Terminal, 2 Position
Input Connector Gauge	10 - 24 AWG
Dimensions (L x W x H)	4.0 x 1.5 x 1.0 Inches
Input Impedance	1 M Ohm / 10 pF
Source Impedance	600 Ohm
Absolute Max Isolation	750 Vrms
Temperature Range	-40 to 85 ^{o}C
Humidity Range	0 to 95% Non-condensing
Output Connector	RJ45 Female
Output Cable Connectors	RJ45 Male

A P P E N D I X - C

HARDWARE DATA SHEETS

SOFTSTUF INC. | ANALOG RECEIVER | DATA SHEET

Part No. IDS-8

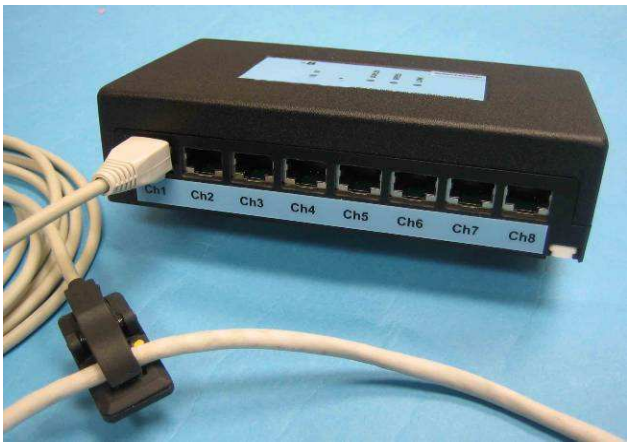

Figure C.1 - Receiver IDS-8

Receiver Features:

- 8 RJ45 Differential Analog Inputs
- 8 16-Bit A/D Converters for Simultaneous Sampling
- Ethernet Interface for Real-Time Data Transfers
- Programmable Gain Options
- Optical Isolation of Analog Inputs
- 24 Volt DC Power Input with Cascading Option
- Lightweight Rugged Enclosure
- Din Rail or Panel Mounts

Receiver Specifications:

A/D Resolution	16-Bit
Analog Inputs	8 Differential
Input Range	-2.5 to 2.5 Volts
Sampling Rate	2340 Hz per Channel
Input Gain Options	1, 2, 4, 8, 16, 32, 64, 128
Current Draw	Max 250 Milliamps
Dimensions (L x W x H)	6.25 x 3.5 x 1.65 Inches
Operating Temp Range	-40 to 85 ^{o}C
Humidity Range	0 to 95% Non-condensing
Communication Interface	10/100 Base-T
Ethernet Connector	RJ45 Female
Analog Input Connectors	RJ45 Female
Power Supply	24 Volt DC (External)
Power Connector	Screw Terminal, 6 position

Receiver Description:

The receiver is a small, high-speed A/D device that samples at 2340Hz per channel and transmits data continuously to a host computer over an Ethernet connection. The receiver can connect up to 8 analog sensors (current, voltage, temperature or humidity) and has the ability to start and stop data logging by analog triggering. It is also capable of simultaneous sampling and provides 8 programmable gain options. The enclosure provides both panel and DIN rail mounts.

Receiver Inputs/Outputs:

The receiver has 8 differential analog inputs. Each RJ45 female analog input channel utilizes 4 pins. Pin 1 (5 Volts) and Pin 7 (GND) are used to provide power to the connected sensors. Pin 3 is the positive data input (0 to 5 volts) and pin 5 is the minus data input with a maximum of 2.5 volts. To achieve simultaneous sampling each analog input channel has a separate 16-bit A/D converter with programmable gain options available. The analog input voltage range is from -2.5 to 2.5 volts. The receiver has a 10/100Base-T Fast Ethernet communication interface for real time data transfers to a host computer.

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SOFTSTUF INC. | NON-INTRUSIVE CURRENT SENSOR | DATA SHEET

Part No. CS-HE-CPL

Figure C.2 - Clothespin Current Sensor

Sensor Features:

- Non-Intrusive, Small, Clamp-on AC/DC Sensor
- Hall-effect Technology
- Less than 10 Microseconds Response Time
- Locking Mechanism
- Very High Sensitivity
- Very Low Noise
- Shielded Enclosure (curved mu-metal strip)
- Single Cable for Power and Output Signals

Sensor Description:

The clothespin is a small, non-intrusive, clamp-on sensor that uses a Hall-effect chip in order to sense current flow through electric wires. The current sensor has a curved mu-metal strip used for shielding against external magnetic fields and used for amplifying internal fields. It has a clothespin like enclosure and is capable of sensing microsecond transients (AC and DC) with a 2% accuracy range. The sensor uses a single RJ45 shielded cable with 4 pins for both the power and output signals.

Sensor Outputs:

The sensor provides a differential output of 0 +/- 2.5V with respect to an internal reference. With zero current, the output is at 0V and will go toward -2.5V when the current is negative and toward 2.5V when the current is positive. It also provides a single-ended output which provides a 0 to 5V analog output with respect to ground. With zero current, the output is nominally at 2.5V and will go toward ground (0V) when the current is negative and the output will go toward 5V when current is positive. 100 milliamps of current flow produces a 6 millivolt increment on the output terminals, zero current floats under 20 millivolts.

Sensor Specifications:

Differential Output	0 +/- 2.5 VDC
Single-Ended Output	2.5 +/- 2.5 VDC
Supply Voltage	5 VDC
Supply Current	16 Milliamps
Sensitivity Range:	0.05 to 50 Amps
Maximum Conductor	0.187” (4.75 mm) 12 AWG
Response Time	10 Microseconds
Bandwidth	DC to 100 KHz
Sensor Accuracy	2 %
Dimensions (L x W x H)	1.56 x 0.78 x 0.41 Inches
Temperature Range	-40 to 85 ^{o}C
Humidity Range	0 to 90% Non-condensing
Cable Length	10 ft
Cable Connector Type	RJ45 Male

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SOFTSTUF INC. | NON-INTRUSIVE CURRENT SENSOR | DATA SHEET

Part No. CS-HE-CS

Figure C.3 - Clamshell Current Sensor

Sensor Features:

- Non-Intrusive, Small, Clamp-on AC/DC Sensor
- Hall-effect Technology
- Less than 10 Microseconds Response Time
- Conductive Foam
- Very High Sensitivity
- Very Low Noise
- Shielded Enclosure (curved mu-metal strip)
- Single Cable for Power and Output Signals

Sensor Description:

The clamshell is a small, non-intrusive, clamp-on sensor that uses a Hall-effect chip in order to sense current flow through electric wires. The current sensor has a curved mu-metal strip used for shielding against external magnetic fields and used for amplifying internal fields. It has a clamshell like enclosure with conductive foam and is capable of sensing microsecond transients (AC and DC) with 2% accuracy range. The sensor uses a single RJ45 shielded cable with 4 pins for both the power and output signals.

Sensor Outputs:

The sensor provides a differential output of 0 +/- 2.5V with respect to an internal reference. With zero current, the output is at 0V and will go toward -2.5V when the current is negative and toward 2.5V when the current is positive. It also provides a single-ended output which provides a 0 to 5V analog output with respect to ground. With zero current, the output is nominally at 2.5V and will go toward ground (0V) when the current is negative and the output will go toward 5V when current is positive. 100 milliamps of current flow produces a 6 millivolt increment on the output terminals, zero current floats under 20 millivolts.

Sensor Specifications:

Differential Output	0 +/- 2.5 VDC
Single-Ended Output	2.5 +/- 2.5 VDC
Supply Voltage	5 VDC
Supply Current	16 Milliamps
Sensitivity Range:	0.05 to 50 Amps
Maximum Conductor	0.312” (7.92 mm) 10 AWG
Response Time	10 Microseconds
Bandwidth	DC to 100 KHz
Sensor Accuracy	2 %
Dimensions (L x W x H)	1.375 x 1.0 x 0.625 Inches
Temperature Range	-40 to 85 ^{o}C
Humidity Range	0 to 90% Non-condensing
Cable Length	10 ft
Cable Connector Type	RJ45 Male

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SOFTSTUF INC. | SPLIT-CORE CURRENT SENSOR | DATA SHEET

Part No. CS-SC-200

Figure C.4 - Split-Core CT Current Sensor

Sensor Features:

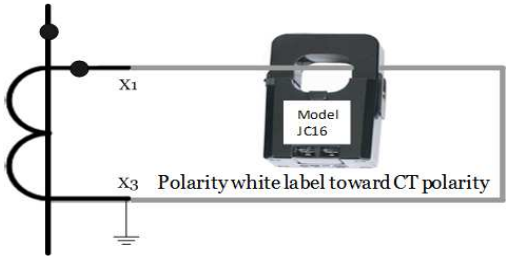
- Clamp-On Current Sensor
- Current Transformer Technology
- Non-Intrusive Installation
- Sensitive to AC Currents (0.1 to 200 Amps)
- Secure Hinge and Snap Locking Mechanism
- Very Low Noise
- High Sensitivity
- Analog Output Voltage

Sensor Description:

The split-core current transformer is a compact, non-intrusive, clamp-on sensor for measuring alternating current in electric wires. It uses a current transformer to convert current flowing through a conductor to an equivalent voltage output. The sensor is equipped with a unique secure hinge and locking snap mechanism that allows it to be mounted directly onto electric wires. The current transformer uses a single RJ45 shielded cable with 2 pins for the output signals.

Sensor Specifications:

Current Range	0.1 to 200 Amps
Accuracy	0.5% Overall
Turns Ratio	3000:1
Weight	75 Grams
Dimensions (L x W x H)	1.16 x 1.22 x 2.16 Inches
Hinge Opening	0.625” (16 mm)
Operating Frequency	50/60 Hz
Output Voltage	2.5 Volts
Operating Temperature	-20 to 50 °C
Relative Humidity Range	0 to 85% Non-condensing
Cable Connector Type	RJ45 Male
Phase Angle Error	< 1°



Sensor Outputs:

The sensor provides an output signal of 0 to 2.5 volts across pins 3 and 5 of the RJ45 connector. The sensor output is proportional to the actual value of current flow through the wire.

The CT contains a terminating resistor that produces a voltage output and mitigates shock hazard from an open secondary. Careful handling produces the best results, dropping or other impact may cause damage.

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SOFTSTUF INC. | SOLID RING CURRENT SENSOR | DATA SHEET

Part No. CS-SR-150

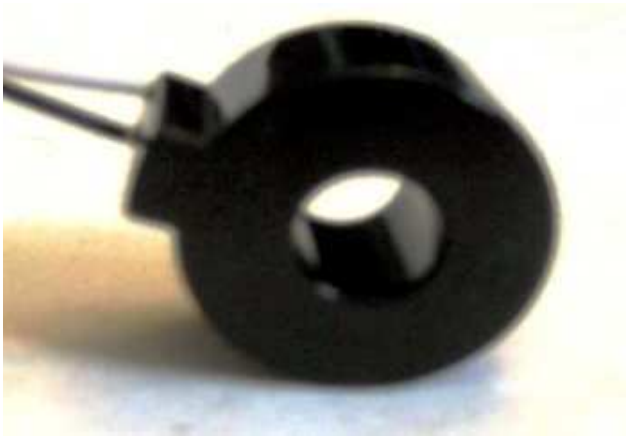


Figure C.5 - Solid Ring CT Current Sensor

Sensor Features:

- Precision CT for Metering
- Current Transformer Technology
- Compact Epoxy Molding
- Sensitive to AC Currents (0.1 to 150 Amps)
- Confirms to ANSI C12xx and IEC 62053.22
- Very Low Noise
- High Sensitivity
- Analog Output Voltage

Sensor Description:

The solid ring current transformer is a compact, light weight, high precision sensor for measuring alternating current in electric wires. The sensor uses a current transformer to convert current flowing through a conductor to an equivalent voltage output. It is recommended for fault current monitoring and metering applications. The current transformer uses a single RJ45 shielded cable with 2 pins for the output signals.

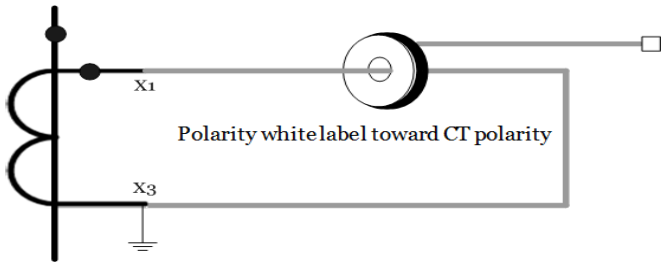
Sensor Outputs:

The sensor provides an output signal of 0 to 2.5 volts across pins 3 and 5 of the RJ45 connector. The sensor output is proportional to the actual value of current flow through the wire.

The CT contains a terminating resistor that produces a voltage output and mitigates shock hazard from an open secondary. Careful handling produces the best results, dropping or other impact may cause damage.

Sensor Specifications:

Current Range	0.1 to 150 Amps
Accuracy	0.5% Overall
Turns Ratio	2000:1
Dimensions (L x W x H)	0.96 x 1.10 x 0.65 Inches
Opening Diameter	0.345” (9 mm)
Operating Frequency	50/60 Hz
Output Voltage	2.5 Volts
Operating Temperature	-20 to 50 °C
Relative Humidity Range	0 to 85% Non-condensing
Cable Connector Type	RJ45 Male
Phase Angle Error	0.21°



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SOFTSTUF INC. | VOLTAGE SENSOR | DATA SHEET

Part No. VS-OA-500

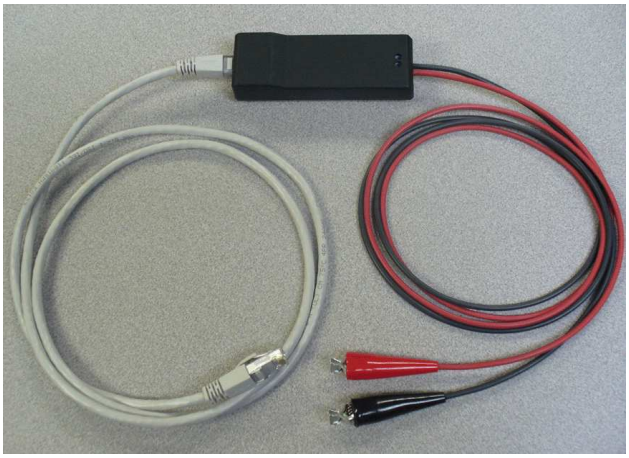

Figure C.6 - AC/DC Voltage Sensor

Sensor Features:

- Small, Rugged, Voltage Sensor
- +/- 500 V Peak Max Voltage Input
- Accurate AC/DC Voltage Measurements
- DC to 5 KHz Bandwidth
- High Accuracy +/- 0.05%
- Single Cable for Power and Output Signals
- DIN Rail Mounts
- UL, CUL Certified
- Fused Input

Sensor Specifications:

Maximum Voltage Input	+/- 500 V Peak
Output Voltage Range	+/- 2.5 Volts
Ratio	200:1
Bandwidth	DC to 5 KHz
Accuracy	+/- 0.05%
Supply Voltage	5 VDC
Supply Current	30 Milliamps
Input Connector	Screw Terminal, 2 Position
Input Connector Gauge	10 to 24 AWG
Input Impedance	1 M Ohm / 10 pF
Dimensions (L x W x H)	4.25 x 1.5 x 1.0 Inches
Absolute Max Isolation	750 Vrms
Fuse 5V Power Input	375 Milliamps
Fuse Differential Input	375 Milliamps
Temperature Range	-40 to 85 °C
Humidity Range	0 to 95% Non-condensing
Output Connector	RJ45 Female
Silicone Wire Leads	18 AWG

Sensor Description:

The small, rugged, differential voltage sensor is used for measuring AC/DC voltages. The input is fused to protect the measured source. It utilizes a built-in isolation amplifier to convert the high differential input to a low differential output with a ratio of 200:1. Measurements can be made directly across circuit components without the need for a common ground. Power is provided to the sensor via the data acquisition unit. The sensor uses a single RJ45 cable with 4 pins for both power and output signals.

Sensor Inputs/Outputs:

The sensor provides a 2 position terminal block for the differential input. Attached to the terminal block is a pair of silicone red and black wire leads terminated with steel clips. The input range is from -500 to +500 V peak with a bandwidth up to 5 KHz. The sensor provides a single RJ45 female connector for the differential output. Attached to the female connector is an RJ45 male cable for both the power and output signals. The output voltage range is from -2.5 to +2.5 volts with an accuracy of +/- 0.05%.

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SOFTSTUF INC. | VOLTAGE SENSOR | DATA SHEET

Part No. VS-VT-600

Figure C.7 - AC Voltage Sensor

Sensor Features:

- Small, Rugged, Voltage Sensor
- 600 V Max Input Voltage
- Accurate AC Voltage Measurements
- 50 to 400 Hz Bandwidth
- Accuracy 0.5%
- Panel Mounts
- UL, CUL Certified
- Fused Input

Sensor Specifications:

Input Voltage Range	0 to 600 Volts AC
Output Voltage Range	0 to 2.5 Volts
Ratio	240:1
Bandwidth	50 to 400 Hz
Burden	0.4 VA
Input Connector	Screw Terminal, 2 Position
Input Connector Gauge	20 to 2 AWG, Rated 1000V
Input Connector Surge	8000 Volts
Output Connector	RJ45 Female
Dimensions (L x W x H)	3.50 x 2.25 x 2.25 Inches
Temperature Range	-40 to 85 ^{o}C
Humidity Range	0 to 90% Non-condensing
Cable (Output)	RJ45 with Male Connector

Sensor Description:

The small, rugged voltage sensor is used for measuring AC voltages. The input is fused to protect the measured source. It utilizes a built-in voltage transformer to convert the high input to a low output with a ratio of 240:1. Measurements can be made directly across circuit components without the need for a common ground.

Sensor Inputs/Outputs:

The sensor provides a 2 position terminal block for the input. Attached to the terminal block is a pair of 18 AWG silicone red and black wire leads terminated with steel clips for the portable model. The input range is from 0 to 600 V with a bandwidth up to 400 Hz. The sensor has a single RJ45 female connector for the output. Attached to the female connector is an RJ45 male cable for the output signals. The output voltage range is from 0 to 2.5 volts with an accuracy of 0.5%.

Contact Us:

To purchase sensors, please contact our Sales Department at 800-818-3463, sales@softstuf.com

Hours: Monday - Friday, 9:00 a.m. to 6:00 p.m. EST
(Visa, Master Card, American Express, & POs accepted)

Mailing Address:

SOFTSTUF, Inc.
P.O. Box 40245
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www.softstuf.com

Support:

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SOFTSTUF INC. | TEMPERATURE SENSOR | DATA SHEET

Part No. TS-LM-212

Figure C.8 - Temperature Sensor

Sensor Features:

- 2 Inch Stainless Steel Probe
- Water Proof Enclosure
- Wide Operating Range
- Analog Output Voltage
- Directly Calibrated in Kelvin
- Single Cable for Power and Output Signals
- Powered from the Receiver (no additional power needed)

Sensor Specifications:

Temperature Range	-40 to 100 °C
Accuracy	+/- 2 °C @ 25 °C
Supply Current	2 Milliamps Max
Supply Voltage	5 Volts DC
Reference Voltage	2.47 Volts
Temperature Probe	Stainless Steel
Temperature Sensor	LM335A
Dimensions (Length)	2.0 Inches
Dimensions (Diameter)	0.25 Inches
Cable Length	10 ft
Cable Connector Type	RJ45 Male

Sensor Description:

The sensor has a small, rugged probe which consists of an LM335A temperature sensor from National Semiconductor and two additional resisters inserted into a waterproof stainless steel tube. It is designed for outdoor and indoor applications. Operating as a 2-terminal zener, the LM335A has a voltage directly proportional to absolute temperature at 10 mV/1°K. The temperature sensor has a single RJ45 shielded cable with 4 pins for both the power and output signals.

Sensor Outputs:

The relationship between temperature and output voltage is equal to 10 mV/1°K. Since this relationship is linear, dividing the voltage by 0.010 will yield the output temperature. The sensor has two different output configurations: A single-ended output (between RJ45 pins 3 and 7) which provides 2.33 to 3.73 volts analog output with respect to ground. At room temp the output is 2.98V (K = 100 * Output Voltage). And a differential output (between RJ45 pins 3 and 5) which provides - 0.14 to 1.26 volts with respect to a reference voltage of 2.47V. At room temperature the output is 0.51 volts (K = 100 * Output Voltage + 247).

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SOFTSTUF INC. | DRY CONTACT SENSOR | DATA SHEET

Part No. DCS-01/5

Figure C.9 - Dry Contact Sensor

Sensor Features:

- Small, Lightweight Sensor
- Rugged Binding Posts
- Single Cable for Output Signals

Sensor Specifications:

Voltage Range	0 to 5 Volts
Supply Voltage	5 VDC
Supply Current	1 Milliamps
Contact (Open)	0 Volts
Contact (Closed)	5 Volts
Dimensions (L x W x H)	3.37 x 2.12 x 1.50 Inches
Temperature Range	-40 to 85 ^{o}C
Humidity Range	0 to 90% Non-condensing
Cable Length	1 ft
Cable Connector Type	RJ45 Male

Sensor Description:

The dry contact sensor provides a low voltage across a contact for the purpose of determining the state of the contact, 0 Volts = open and 5 Volts = closed. It provides a way of monitoring a contact that has no applied voltage. It is not for use on live circuits. The sensor uses a single RJ45 shielded cable for the output signals.

Sensor Outputs:

The sensor provides a single 1ft RJ45 shielded cable for the output signals. The voltage range is from 0 to 5 Volts. It comes equipped with a pair of red and black binding posts for the monitored contact.

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SOFTSTUF INC. | IRIG-B CABLE | DATA SHEET

Part No. IRIG-B-CBL

Figure C.10 - IRIG-B Cable

Cable Features:

- IRIG-B Time Code Signals
- One-Second Time Frame
- 100 Pulses-Per-Second Bit Rate
- Stranded Coaxial Cable
- BNC Male Twist On Connectors
- BNC T-Type Female Adapters
- Stranded Twisted Pair Cable
- RJ45 Male Connector

Cable Specifications:

Coaxial Cable	Stranded Copper
Coaxial Connector	BNC Male Twist On
Coaxial Cable Length	1 ft Segment
Mating Connector	BNC T-type Adapter
Output Cable	Stranded Twisted Pair
Output Cable Connector	RJ45 Male
Output Cable Length	1 ft Segment

Cable Description:

The cable transmits the IRIG-B protocol for time synchronization from the GPS Satellite Controlled Clock to the analog receiver. The IRIG-B cable is part coaxial cable and part twisted pair cable. The coax cable segment is terminated with a BNC Male connector and the twisted pair cable is terminated with an RJ45 male connector to carry the unmodulated IRIG-B signals to the receiver. Assembled in 1 ft segments using BNC T-Type adapters the cable can transmit IRIG-B signals to multiple receivers.

Cable Pins:

RJ45 Connector	BNC Connector
3 + Data Wire (Output Signal)	Center (IRIG-B Signal)
7 (GND)	Shield (GND)

Contact Us:

To purchase cables, please contact our Sales Department at 800-818-3463, sales@softstuf.com

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