Sigma 4+

Quick Start

Mark Day

DOCUMENT REVISIONS

VERSION	*DATE*	*CHANGES*	*AUTHOR*
1.0	4/4/2019	Initial Draft	Mark Day

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Contents

Introduction

The Sigma 4+ is a simple yet powerful 3-channel seismograph node. It can be used for active or passive recording, and can record data collected in real-time, or to be collected later.

System Overview

GPS

The GPS port is used to connect external GPS when the internal GPS option is not used.

USB

The USB port is used on the Sigma 4+ Linux option to connect the device to the cloud.

Data

The Data port is a 10-pin connector used to connect your computer to the Sigma 4+. Download data or configure the unit.

Sensors

The Sensors port is a 26-pin connector used to connect 3 sensors, or connect shorting plug for internal geophones.

Power

The power port is a 3-pin connector used to connect the Sigma 4+ to a power source.
Power Requirement: 9 - 28 volts.

Aux

The Aux port is used to connect a USB stick for saving data, or connect a trigger cable to trigger the unit.

Sigma 4+ Status LEDs

Battery LED:

- **Green** Flashing – Battery voltage is good
- **Yellow** Flashing – Battery voltage is low
- **Red** Flashing – Battery voltage is critical, Sigma 4+ no longer writing to flash card

Status LED:

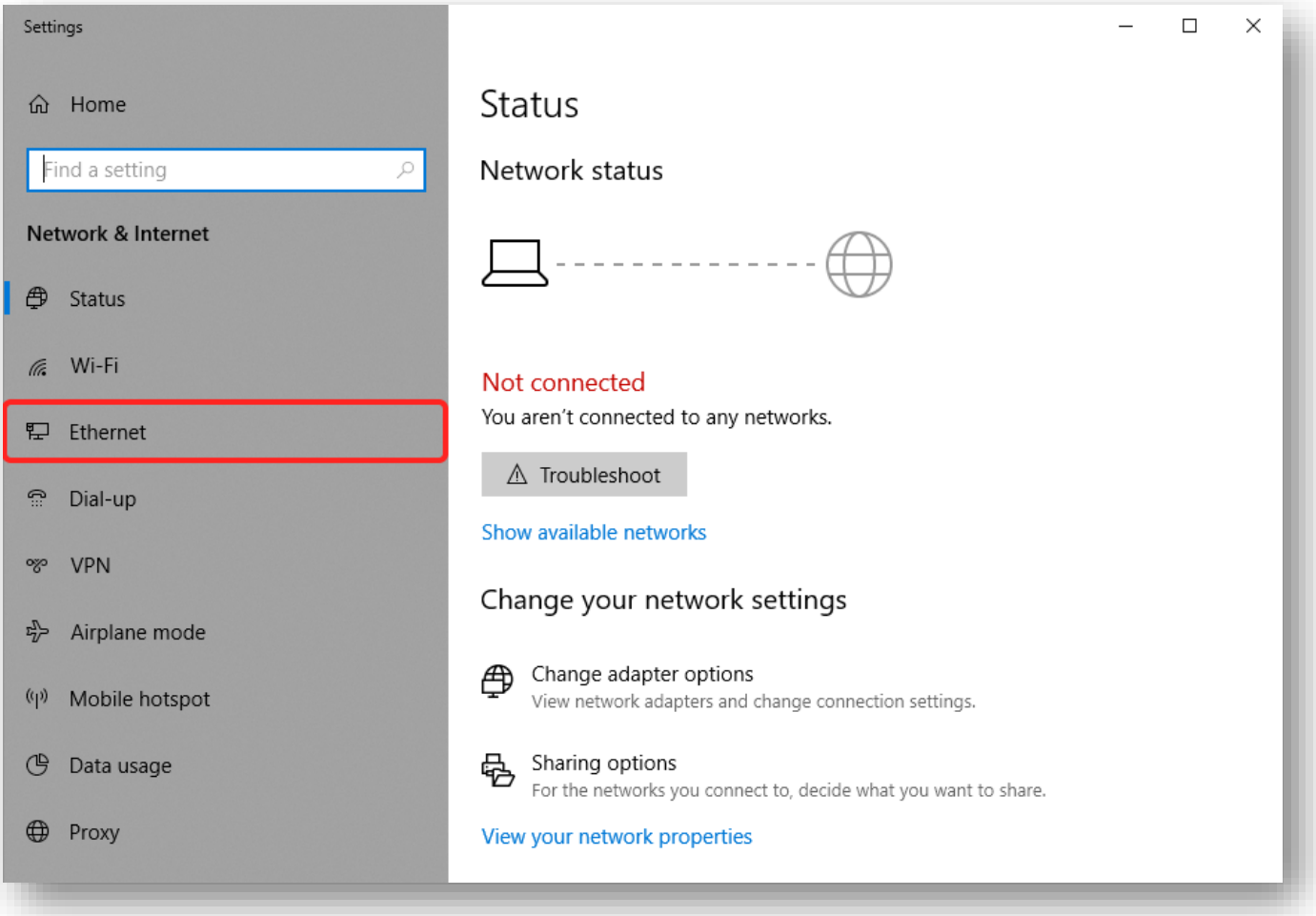
- **Green** Flashing – GPS Acquired, ready to record
- **Green** Solid – Recording data (GPS Acquired)
- **Yellow** Flashing – Internal Sensor or Instrument test fail
- **Red** Flashing Quickly – Flash card error
- **Red** Flashing Slowly – No GPS, ready to record
- **Red** Solid – Recording data (No GPS)

Network Settings

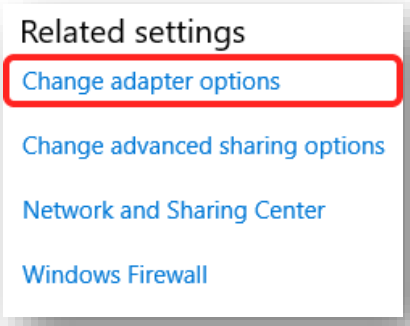
Sigma 4+ units are set up on a 10.x.x.x IP address, so your computer needs to be set-up the same network to establish communication.

Begin by opening your Network Settings.

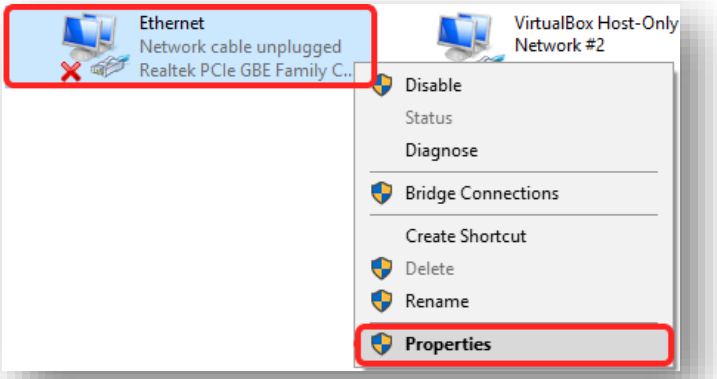
1. Click on **Ethernet** under Network & Internet on the left-side menu.



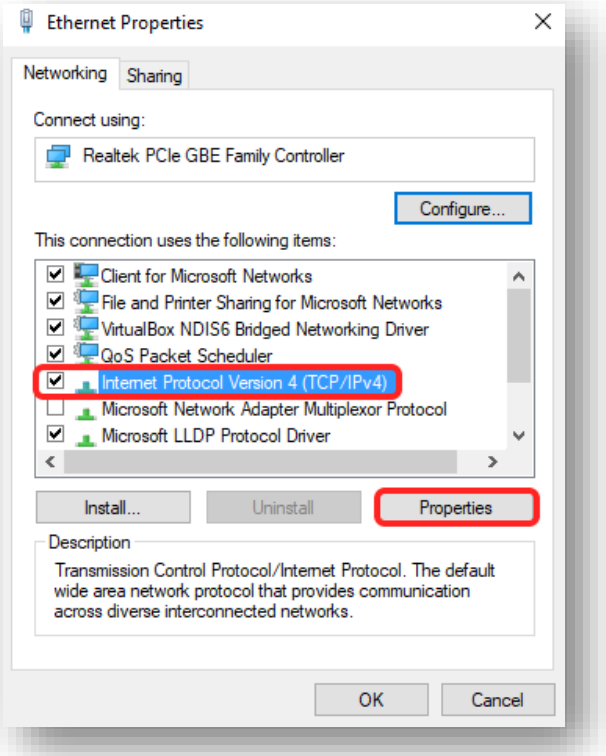
2. Select **Change Adapter Options.**



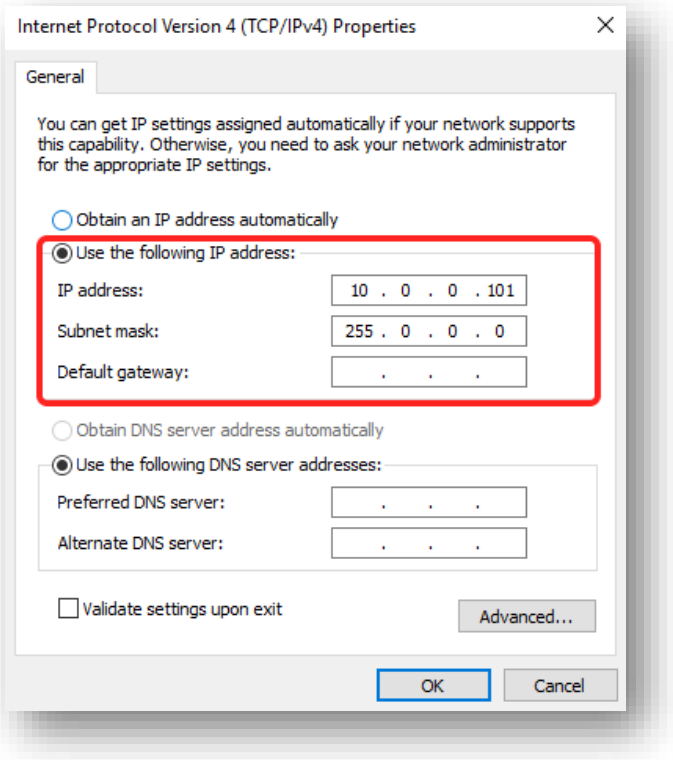
3. Right click **Ethernet** and select **Properties.**



4. Select **Internet Protocol Version 4** and click **Properties.**



5. Click **Use the following IP address**
6. Set your IP address to **10.0.0.101**
7. Set your Subnet mask to **255.0.0.0**
8. Click **OK**



Finally, connect your unit to your computer through the network port.

NOTE: If your computer is unable to communicate with the unit, temporarily disable your virus protection and firewall, as they may be blocking the connection. Windows Defender can also block this connection.

Software Overview

Sigma Setup

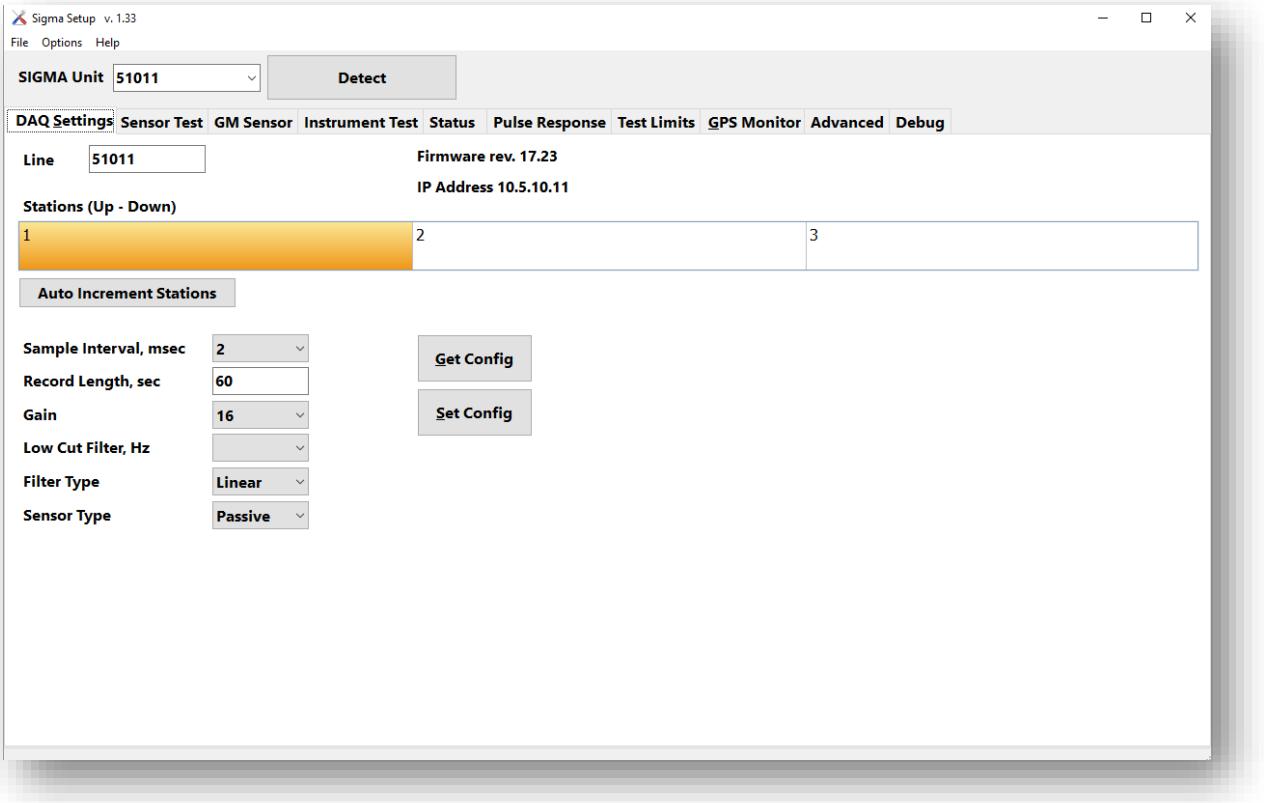
Sigma Setup is used to set acquisition parameters in the Sigma 4+ unit, perform sensor/instrument tests, and otherwise debug the system.

After powering on your Sigma 4+, connect it to a computer using a 10-pin ethernet data cable.

DAQ Settings

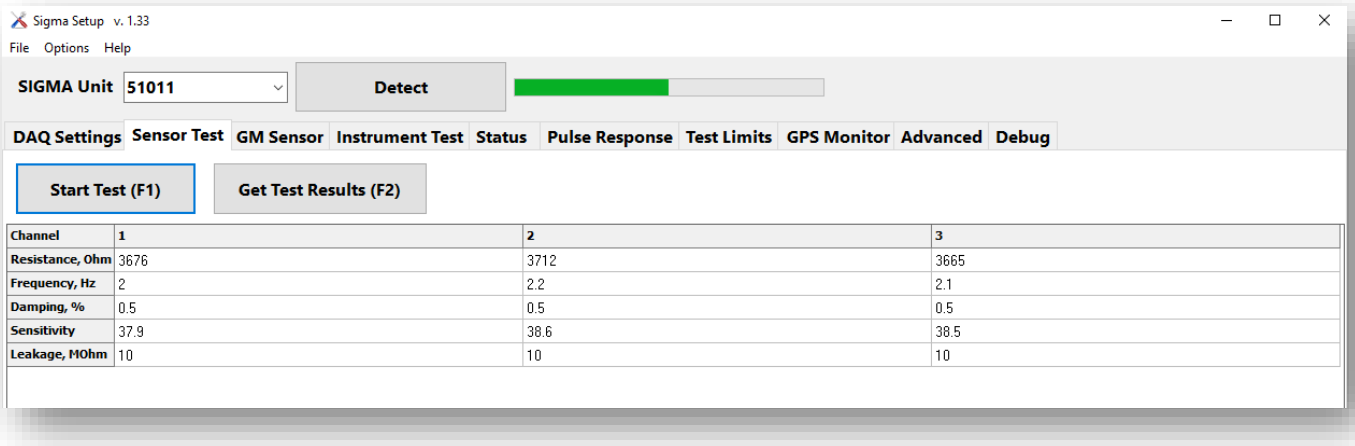
1. Open Sigma Setup
2. Click ‘Detect’ to connect to the unit

Here, you can configure your Sigma 4+ by setting the options on the left, then click “Set Config”.



Sensor/Instrument Test

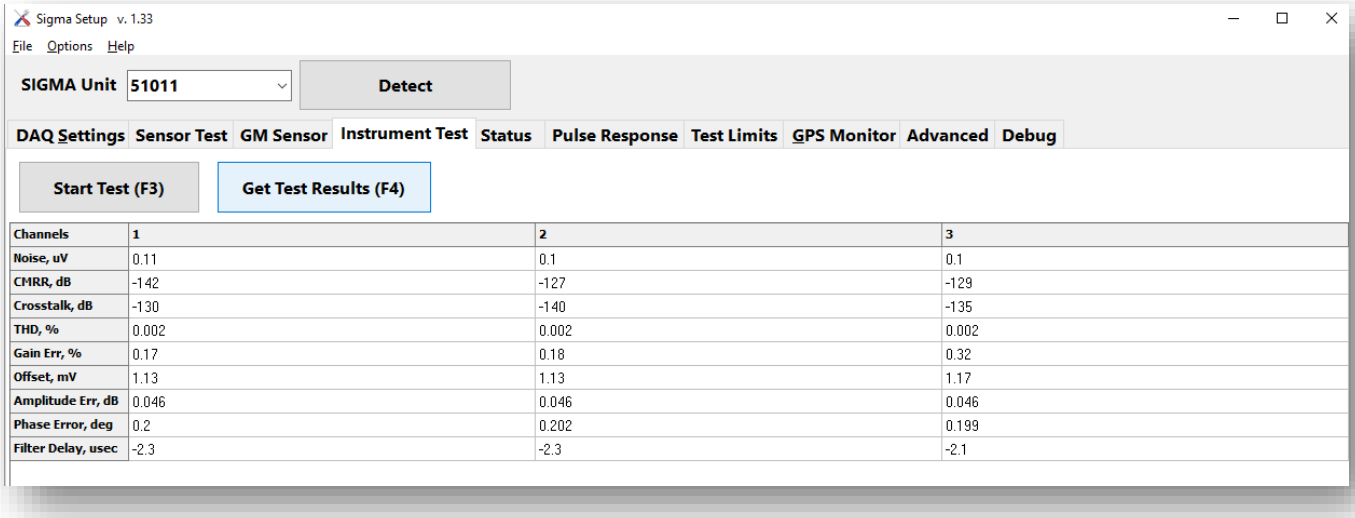
To test your unit, begin by navigating to the Sensor Test tab and click Start Test (F1).



Channel	1	2	3
Resistance, Ohm	3676	3712	3665
Frequency, Hz	2	2.2	2.1
Damping, %	0.5	0.5	0.5
Sensitivity	37.9	38.6	38.5
Leakage, MOhm	10	10	10

The test will take a few moments to complete, and the results will come back automatically. You can click Get Test Results (F2) to get the results of the last Sensor Test completed by the unit.

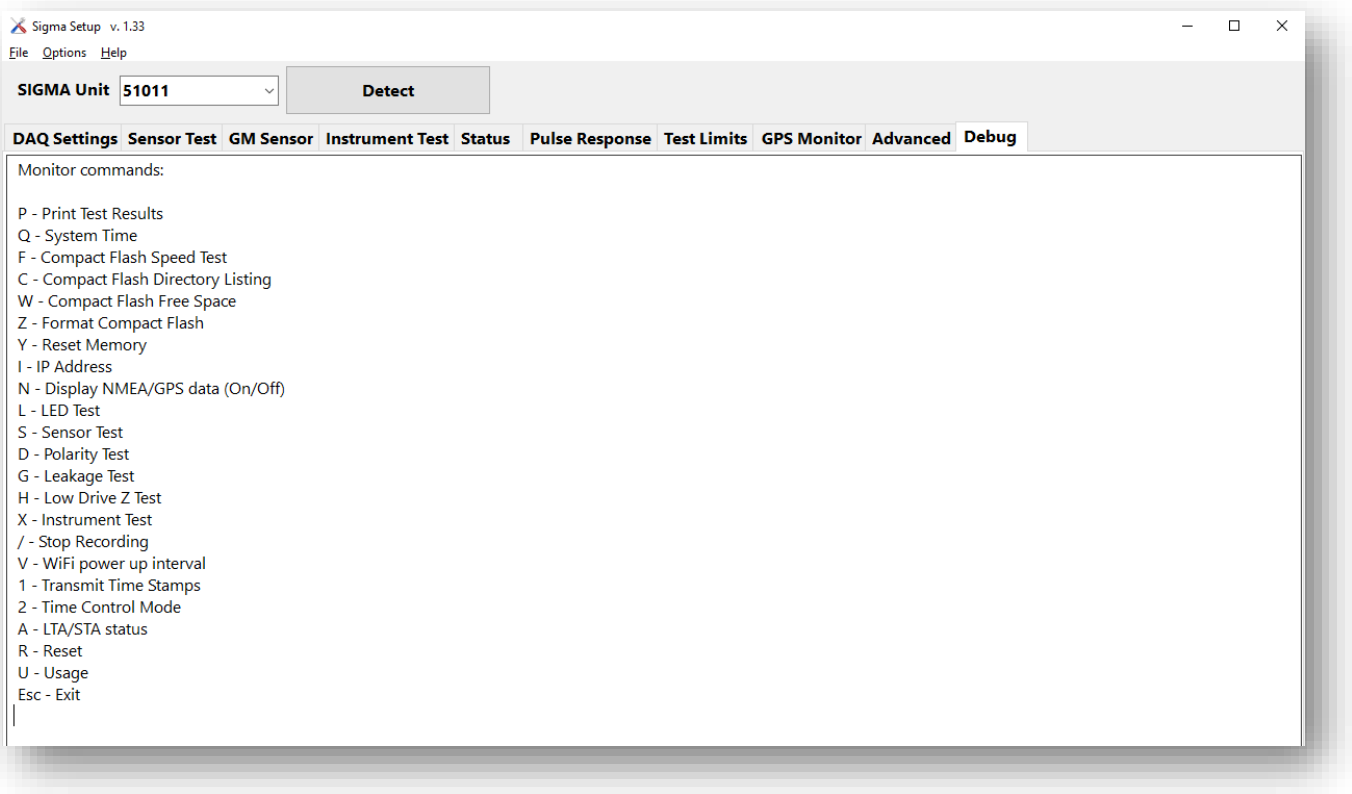
The steps are the same for the Instrument Test.



Channels	1	2	3
Noise, uV	0.11	0.1	0.1
CMRR, dB	-142	-127	-129
Crosstalk, dB	-130	-140	-135
THD, %	0.002	0.002	0.002
Gain Err, %	0.17	0.18	0.32
Offset, mV	1.13	1.13	1.17
Amplitude Err, dB	0.046	0.046	0.046
Phase Error, deg	0.2	0.202	0.199
Filter Delay, usec	-2.3	-2.3	-2.1

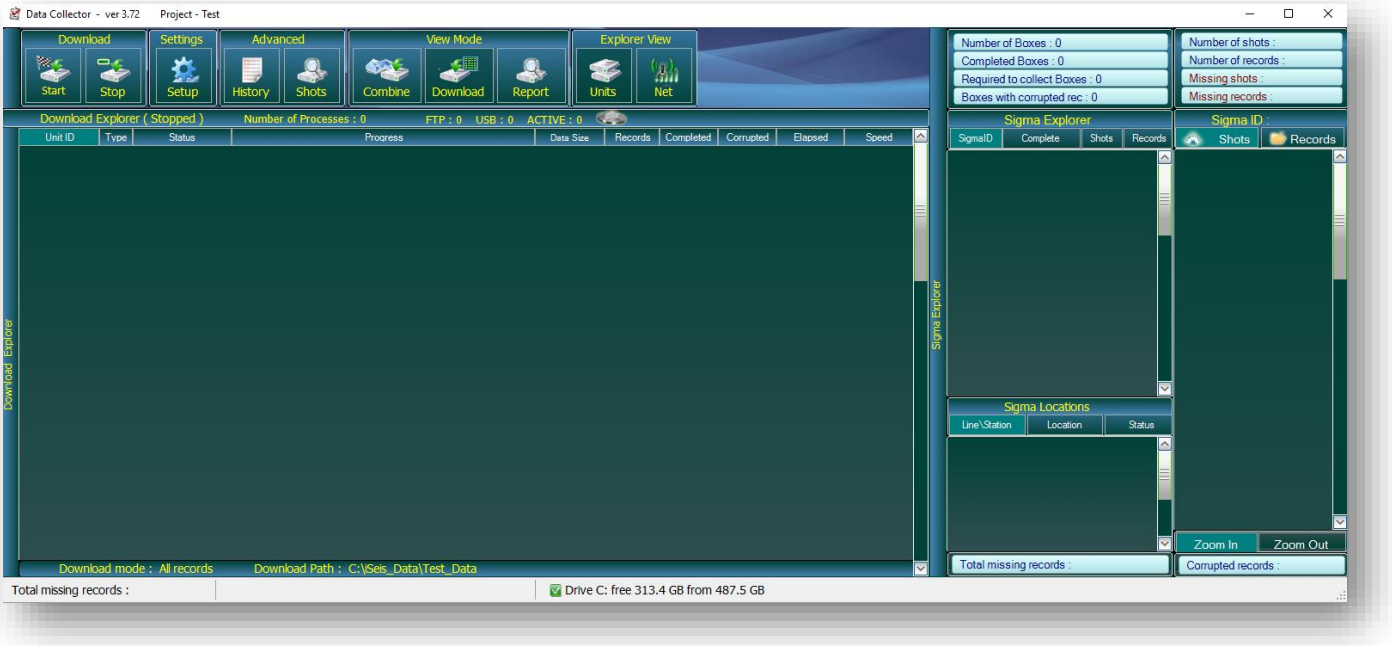
Debug

To enable the Debug window, navigate to the Debug Tab and click “Enable”. Next, click anywhere within the Debug window to place your text cursor inside. Press Enter to display a list of commands. The Debug window displays information about the current state of the Sigma 4+.



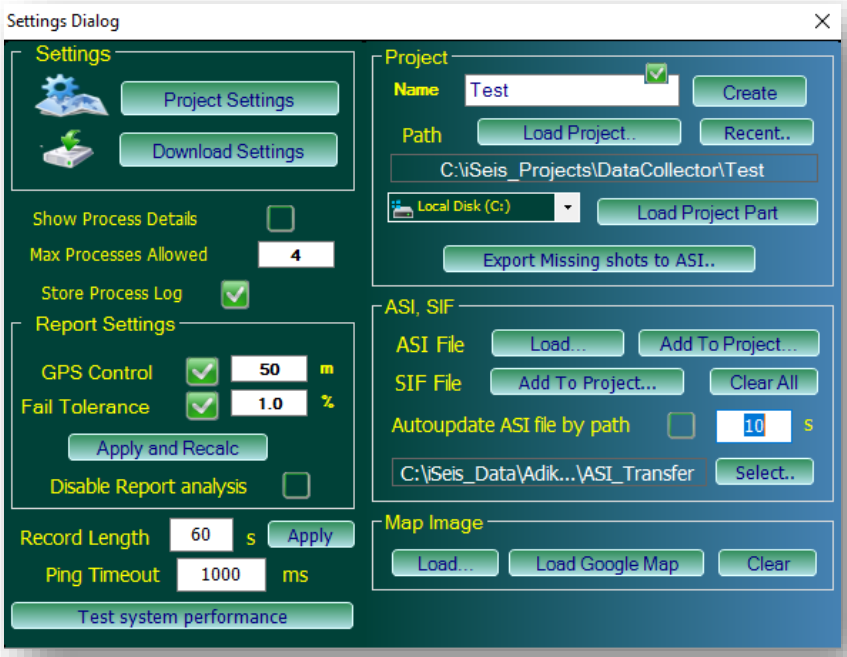
Data Collector

Data Collector can be used to collect data from one or multiple USB sticks, or directly from the Sigma 4+ through an ethernet connection. Begin by opening Data Collector.

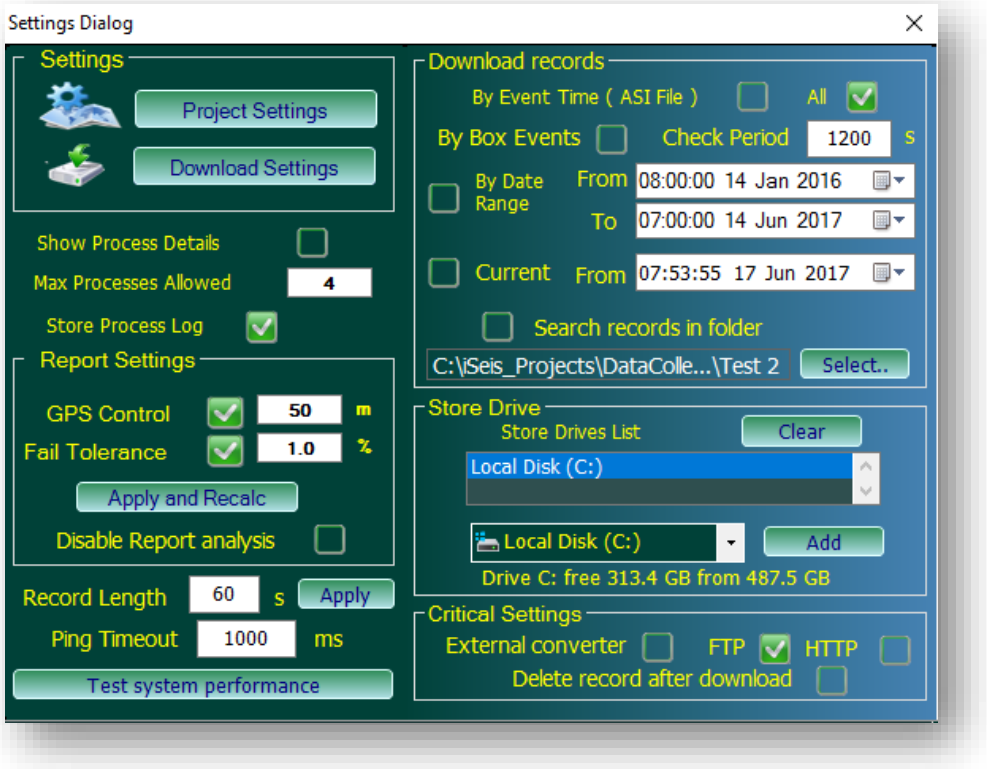


Setup

1. Click Setup on top menu bar
2. Enter a name for the Project
3. Click Create

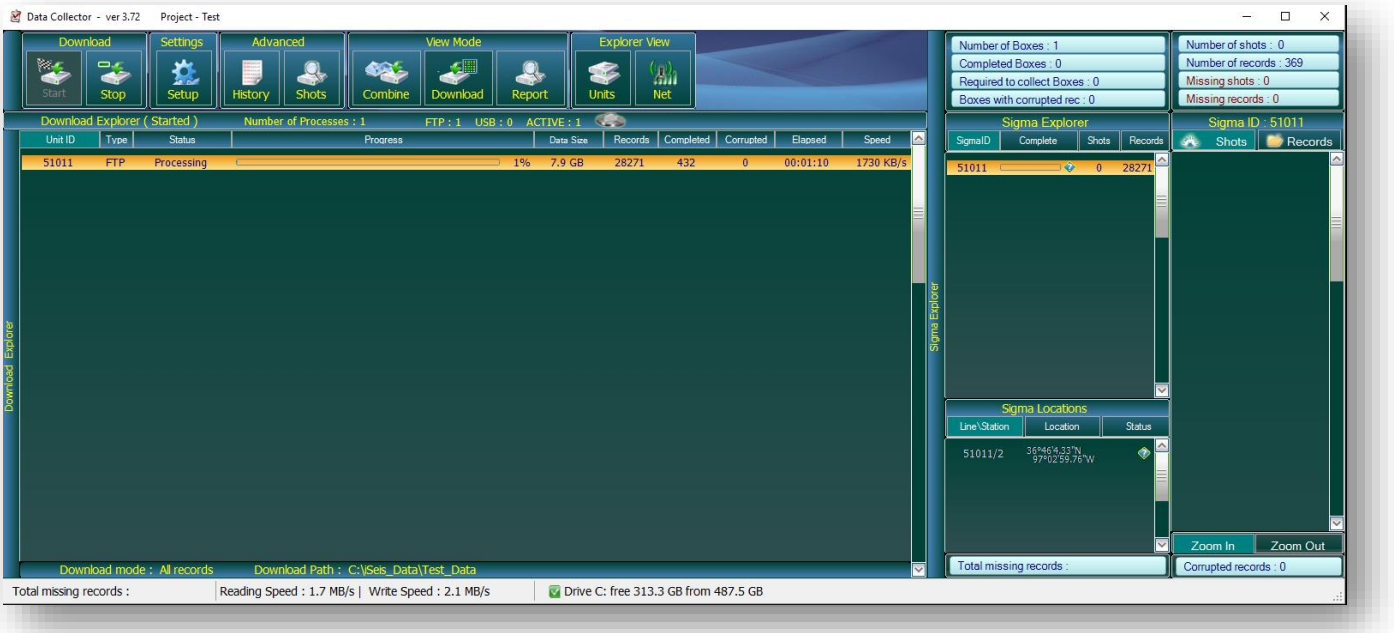


4. Click “Download Settings”
5. In the Download Records section, you can either select “All” to download everything from the Sigma 4+ or select “By Date Range” to specify a set of time that you want to download
6. Also ensure that External Converter is deselected



Data Collection

Once your project is setup, simply connect either the Sigma 4+ or a USB stick to your computer and click “Start” in Data Collector. Data Collector should automatically detect the unit and begin downloading the specified data.



Data Location

Once data has been downloaded, you can find it on your computer at **C:/iSeis_Data/$PROJECT_NAME_Data/Receivers**. These are stored as sgy files that can be opened in the SrcSig program.

Source Signature (SrcSig)

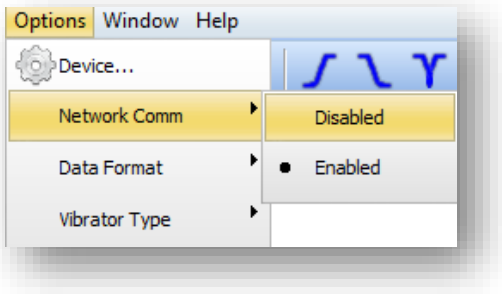
SrcSig can be used to view data directly from the Sigma 4+, or you can use it to view data previously downloaded with Data Collector.

Load From Unit

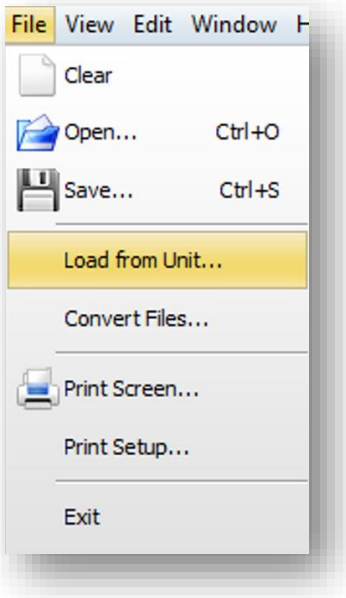
After connecting the Sigma 4+ to your computer, open SrcSig.

While the Sigma 4+ is recording, SrcSig will automatically show each minute of data as it is recorded. This needs to be disabled to view past records.

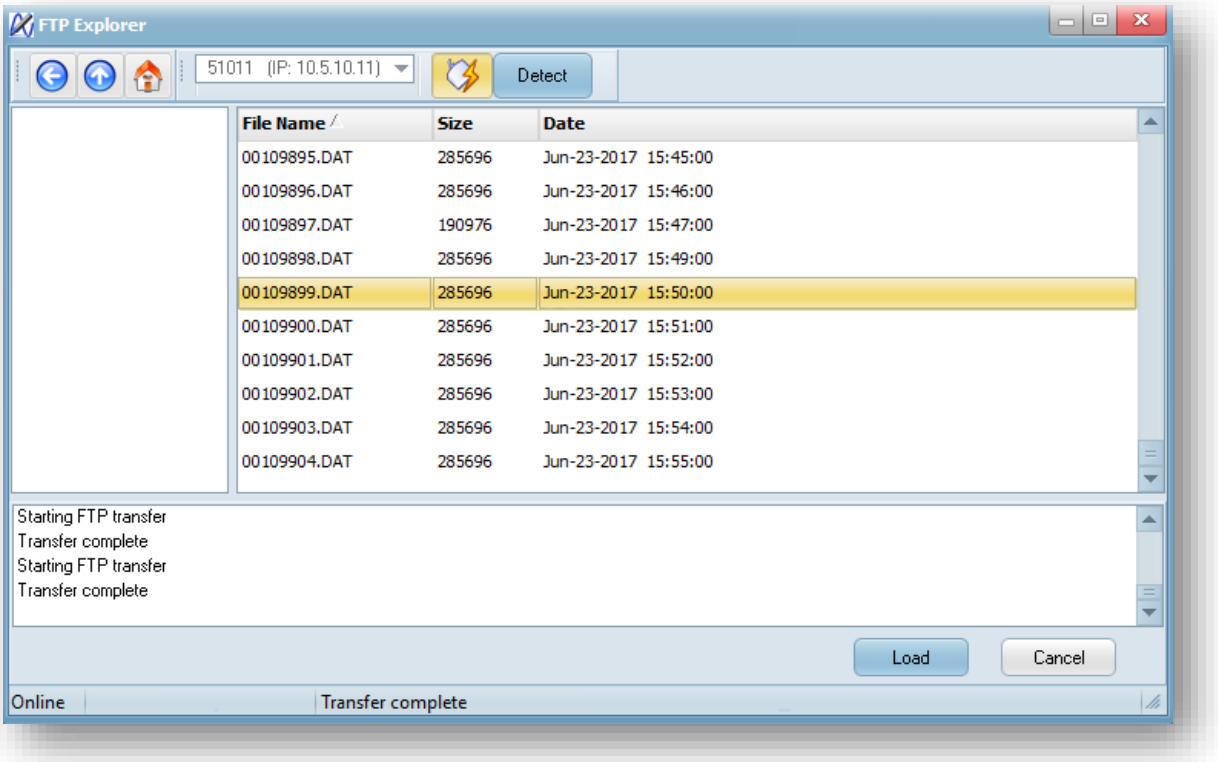
Open Options -> Network Comm -> Disabled



1. Click File -> Load from Unit
2. Click “Detect” to show the connected unit
3. Select the unit in the dropdown menu and click the “Connect” icon next to Detect
4. Select DAQ3 on the left and select a day



Each minute of recorded data can be seen here as .DAT files. Select one and click “Load” to view the data in SrcSig.

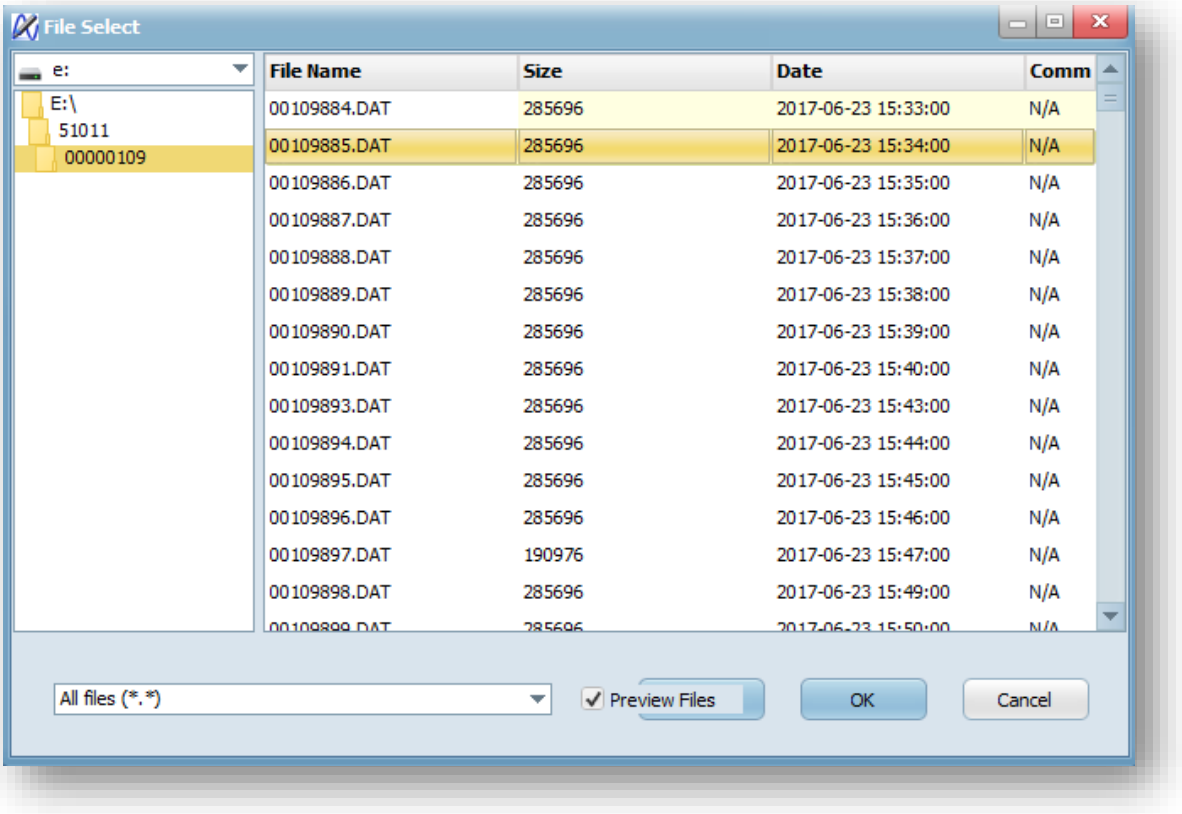


Load Data from USB

To load data into SrcSig from a USB:

1. Click File -> Open
2. Navigate to the USB drive using the navigation window on the left

You can also use this window to open sgy files collected with Data Collector.



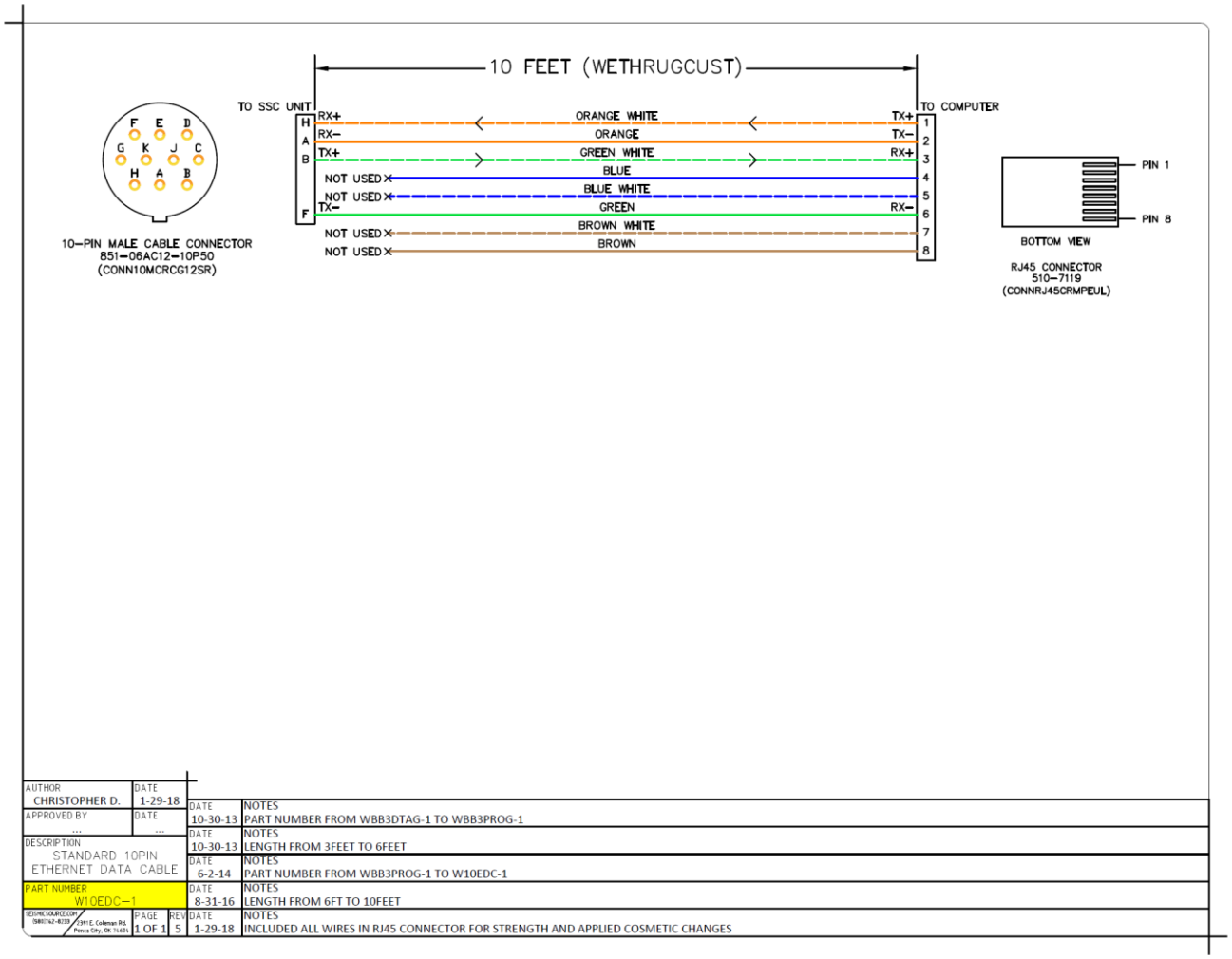
Appendix

The following contains technical drawings and information about the Sigma 4+ unit.

26-Pin Connector Wiring

26 Pin	Sigma 3-26	Sigma 4+	DX6
H	Ch1 +	Ch1 +	Ch1 +
J	Ch1 -	Ch1 -	Ch1 -
K	Ch2 +	Ch2 +	Ch2 +
L	Ch2 -	Ch2 -	Ch2 -
M	Ch3 +	Ch3 +	Ch3 +
N	Ch3 -	Ch3 -	Ch3 -
U	Attenuated Ch1+	Internal Geophone 1+	Ch4 +
C	Attenuated Ch1-	Internal Geophone 1-	Ch4 -
A	Attenuated Ch2 +	Internal Geophone 2 +	Ch5 +
S	Attenuated Ch2 -	Internal Geophone 2 -	Ch5 -
a	Attenuated Ch3 +	Internal Geophone 3 +	Ch6 +
P	Attenuated Ch3 -	Internal Geophone 3 -	Ch6 -
X			
c			
F	+12 v (battery +)	+12 v (battery +)	+12 v (battery +)
D	GND	GND	GND

10-Pin Ethernet Data Cable



AUTHOR: CHRISTOPHER D.	DATE: 1-29-18		
APPROVED BY: ...	DATE: ...	DATE: 10-30-13	NOTES: PART NUMBER FROM WBB3DTAG-1 TO WBB3PROG-1
DESCRIPTION: STANDARD 10PIN ETHERNET DATA CABLE		DATE: 10-30-13	NOTES: LENGTH FROM 3FEET TO 6FEET
		DATE: 6-2-14	NOTES: PART NUMBER FROM WBB3PROG-1 TO W10EDC-1
PART NUMBER: W10EDC-1		DATE: 8-31-16	NOTES: LENGTH FROM 6FT TO 10FEET
GEOSHECSOURCE.COM (580)762-8739 2911 E. Coleman Rd. Ponca City, OK 74604	PAGE: 1 OF 1	REV: 5	DATE: 1-29-18 NOTES: INCLUDED ALL WIRES IN RJ45 CONNECTOR FOR STRENGTH AND APPLIED COSMETIC CHANGES