Optima Signal Conditioner

User Manual

Version 1.1

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OPTIMA USER MANUAL

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Symbols

Important tip that may be of help

Product or safety warning

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Advanced Mechanical Technology, Inc. (AMTI) warrants all transducers it manufactures to be free from defects in materials and factory workmanship, and agrees to repair or replace any industrial transducer or amplifier that fails to perform as specified within one year, and any force platform within five years after date of shipment. This warranty shall not apply to any transducer that has been:

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ii.   Subjected to misuse, negligence or accident or

iii.   Connected, installed, adjusted, or used otherwise than in accordance with the instructions furnished by AMTI.

At no charge, we will repair at our plant or at our option or replace any of our products found to be defective under this warranty.

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  * Sergey Bochkanov (ALGLIB project). Translation from FORTRAN to pseudocode.

See subroutines comments for additional copyrights.

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Product Warnings

Please read this manual fully before using the Optima.
Only trained personnel should operate this equipment.
Modification of equipment will void both warranty and CE certification.
The Optima should use only an AMTI provided external power supply.
The Optima has no user-serviceable parts inside.
The Optima should not be submerged in water.
The Optima is not to be used in an oxygen-rich environment.
The Optima is not intended for use with flammable anesthetics.
The Optima is not category AP or APG equipment.
If used as a component in a medical system the computer and other components of
the system must be certified.

1. **Overview**

This manual will guide you through the installation and operating procedures of your new Optima signal conditioner, hardware, driver and software so that you can prepare your Optima for operation.

This manual applies to the following products

Product: Optima   Model#:   OPT-SC

Software: AMTI System Configuration software   Version: 1.1.0

Platform: In this manual the word platform may also be substituted with transducer, load cell, any six channel strain gage multi-axis measurement device.

1.1. Product Description

The AMTI Optima Signal Conditioner (OPT-SC) is an essential component of the Optima Human Performance System, a revolutionary force measurement system that offers a 10-fold improvement in accuracy over any force platform system on the market.

The Average COP accuracy is just a fraction of a millimeter (typically less than 0.2).

The crosstalk values are typically ±0.05% of applied load.

Measurement accuracy is typically ±0.1% of applied load*.

The Optima Signal Conditioner Is designed exclusively for use with the Optima Human Performance System force plates (OPT series), and Optima Precision Calibration files.

The Optima Signal Conditioner is a six-channel strain gage signal conditioner; an integral part of a system used to measure a time varying mechanical load applied to a force plate. In biomechanics, typically a force plate is embedded in the floor and the load is applied by a human subject, perhaps by walking. This applied load is decomposed into six components, the three orthogonal forces and the three orthogonal moments and torques.   The Optima is a six channel signal conditioning device where each channel corresponds to one of these six components. For each channel the Optima supplies an excitation voltage to a set of strain gage bridges embedded in the force platform. The resulting output is a low level voltage proportional to that component of the applied mechanical load. This output is amplified, filtered, and then periodically sampled by the Optima. The resultant digital data is used to produce fully conditioned digital and analog data streams.

1.2. Signal Conditioning

The Optima Signal Conditioner utilizes proprietary computer algorithms to achieve both greater accuracy and lower crosstalk. Each of the six data channels is independently configurable; each channel is fully calibrated and all corrections are applied internally. Multiple types of signal conditioning are

implemented including a 1 kHz anti-aliasing filter, oversampling and digital signal processing. The Optima uses factory calibrated constants in place of nominal values for gains and excitations, correcting for cable losses due to finite bridge resistances. It can remove DC offset, implement a user-defined DC set point, and perform rotational transformation to compensate for physical platform-placement considerations.

1.3. Non-Volatile Memory

The Optima is fully software configurable, with all calibration and configuration settings stored in internal nonvolatile memory. Additionally, when attached to an AMTI Optima Platform, the platform identification settings are automatically uploaded from the platform to the Optima, reducing platform setup time.

1.4. Bridge Balancing

The Optima features easy bridge balancing through its Auto-Zero button located on the front panel or through the software user interface.

1.5. Digital Output Stream

The digital outputs stream consists of fully processed IEEE floating point numbers presented in their respective engineering units. The digital output stream can provide either six or eight channels of data. The six channels consist of the three orthogonal components of the applied force (Fx, Fy, Fz) and the three orthogonal components of the applied torques and moments (Mx, My, Mz). Optionally, two other data channels may be configured, one indicating the external trigger state and the other the dataset count.

1.6. Analog Outputs

Each of the six analog output channels has its own independent 16-bit digital-to-analog converter (DAC). Each DAC output is conditioned by a low-pass reconstruction filter and amplifier. Factory-calibrated gain and offset correction constants are applied to each output channel. The analog output amplifier provides continuous output with a 2 kHz refresh rate. The full-scale analog output range is +- 5 V. To allow for maximum DAC resolution, the analog outputs may be scaled to a user-defined conversion factor. This allows the full analog output range to encompass only the expected range of measurement.

1.7. User-Selectable Excitation

The Optima provides independent bridge excitation for each channel. The excitation voltage choices are 2.5, 5.0, and 10.0 volts, providing the best integrated force plate system signal to noise ratio for an expanded range of thermal conditions. If the connected transducer requires a common excitation input for all channels, the Optima will provide it automatically.

1.8. User-Selectable Gains

The Optima has four gain settings for each channel: 500, 1000, 2000, and 4000. This provides for optimal system resolution, and can be further enhanced when combined with a user-defined zero set-point offset.

1.9. User-Selectable Zero Set Point

For each channel the Optima provides a selectable zero set point, allowing the user to offset the mechanical range of the signal conditioner.

1.10. Data Synchronization

Multiple Optima's automatically synchronize their data sampling without additional wiring; when connected through a USB hub, the skew is typically less than +- 2.0 microseconds. For synchronization with external devices, the Optima support both genlock data acquisition and external triggering.

1.11. Software

AMTI provides two software packages for the Optima, AMTI NetForce and AMTI System Configuration software.

The AMTI System Configuration software is for coordinating and configuring one or multiple Optima's. Use the AMTI System Configuration software when you need to configure the Optima's for use with a third party application such as a motion capture system.

AMTI's NetForce software is a complete data acquisition solution specifically designed to gather data from multiple AMTI multi-axis force plates and force sensors. It features multi-channel real time acquisition and display, including center of pressure. It can combine both pre trigger and post trigger data collection, and will accept multiple trigger sources including; keystroke, keystroke with delay, channel level, and external signal. NetForce supports two file formats, a proprietary format for AMTI gait and balance analysis packages, and ASCII text for easy import into Excel. It includes a subject information and trial database and supports both English and metric units. NetForce can record data from multiple Optima's simultaneously. The Optima is compatible with AMTI NetForce versions 3.5.0 and later.

A software development kit is available for those users who would like to integrate the Optima into their own proprietary systems.

1.12. Calibration

Each Optima is fully calibrated and traceable to the National institute of Standards and Technology (NIST).

1.13. Compliance

The Optima (OPT-SC) is a medical-grade strain gage signal conditioner manufactured under the ISO 13485:2003 and ISO 9001:2008 quality systems.

This product meets the standards set by CE Directive 2006/95/EC and has successfully been tested to comply with medical electrical equipment standards regarding basic safety, essential performance and electro-magnetic compatibility:

AAMI/ES 60601-1 Issued: 2005/01/01, 'Medical electrical equipment Part 1 - Safety Requirements for Electrical Equipment for basic safety and essential performance '

CAN/CSA C22.2 #60601-1 Issued 2008/02/01 Ed:3, 'Medical electrical equipment Part 1 - Safety Requirements for Electrical Equipment for basic safety and essential performance '

IEC 60601-1 Issued: 2005/01/01, Ed.3, 'Medical electrical equipment Part 1 - Safety Requirements for Electrical Equipment for basic safety and essential performance '

IEC 60601-1-6, Issued: 2006/12/08, Ed.2, 'Medical electrical equipment Part 1-6 - General Requirements for safety – collateral Standard: Usability '

In the Box

The Optima arrives with the following components. Please make sure they are all present.

- 1 Optima Signal Conditioner

- 1 Medical grade universal power supply

- 1 USB 2.0 cable

- 1 Vertical base (with 3 screws) for vertical Optima configuration

- 4 Adhesive baked pads for horizontal Optima configuration

- 2 Optima Driver CD

- 1 Optima Calibration Backup CD

- 1 AMTI System Configuration software CD

- 1 AMTINetForce CD

3. Hardware Installation

Serial Number	Compliance Labels
USB Connector	Genlock/Trigger input (Type RCA Phono)
Power Supply Connector	Analog Output Port (Type DB255)
Transducer Input Port (36-pin circular)	Electrostatic-Sensitive Device Symbol
Vertical Mounting Stand	
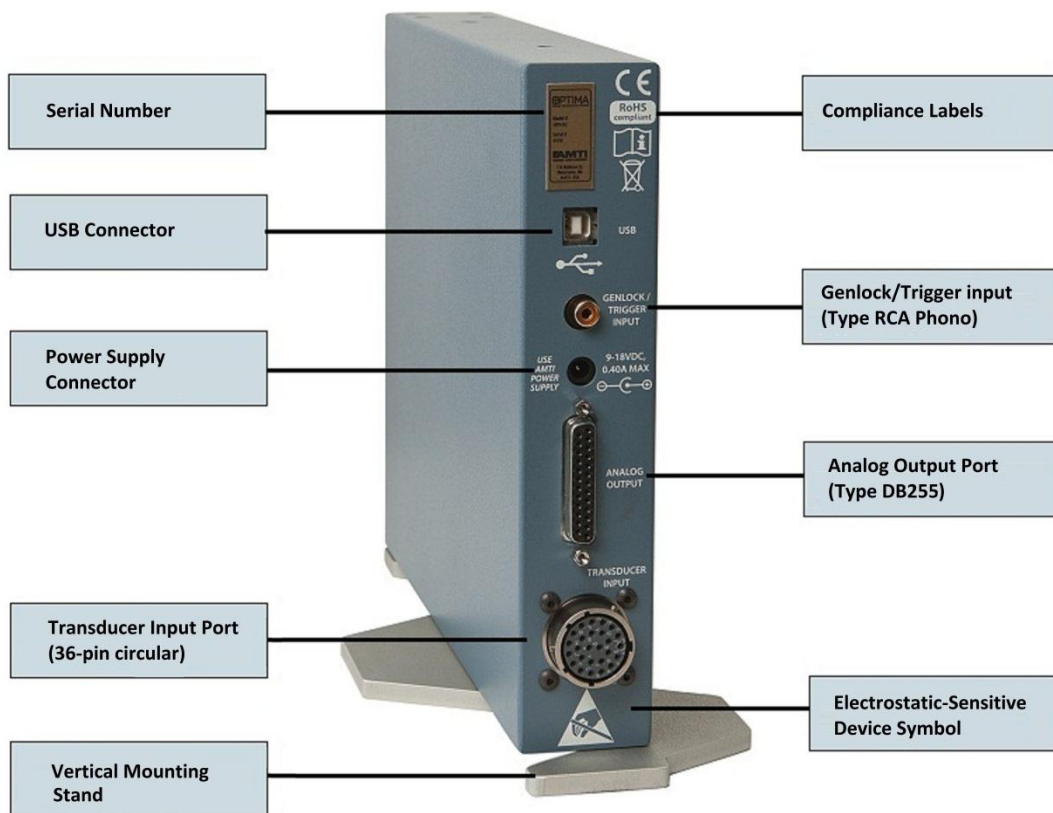
Follow the instructions below to install the Optima hardware.

1. A base stand and three screws are provided for vertical mounting of the Optima. If you prefer a horizontal orientation four adhesive backed pads are provided which can be applied to each corner on the underside of the case.
2. Attach the 7615 cable from the platform to the transducer input port.
3. If you intend to collect analog data, connect the 25 pin ribbon cable to the analog output port.
4. Make sure the power switch is set to the off position. Plug the power supply into the Optima and then into the power source.
5. Attach the USB cable from the Optima to the PC. If using more than one Optima, it is best to attach them all to a common USB hub for optimal data synchronization.

4. Driver Installation

The following section describes the driver installation process on Windows 7; if you are using a different windows operating system similar dialog boxes will appear. Follow the instructions below to install the Optima drivers.

1. To install the Optima device drivers, first make sure the Optima is connected to the PC with a USB 2.0 cable. Then turn the OPTIMA power on, using the Power switch located on the front of the Optima. The Windows operating system will find new hardware. After Windows has detected the new hardware, the following dialog box will appear asking you to provide the correct hardware driver.
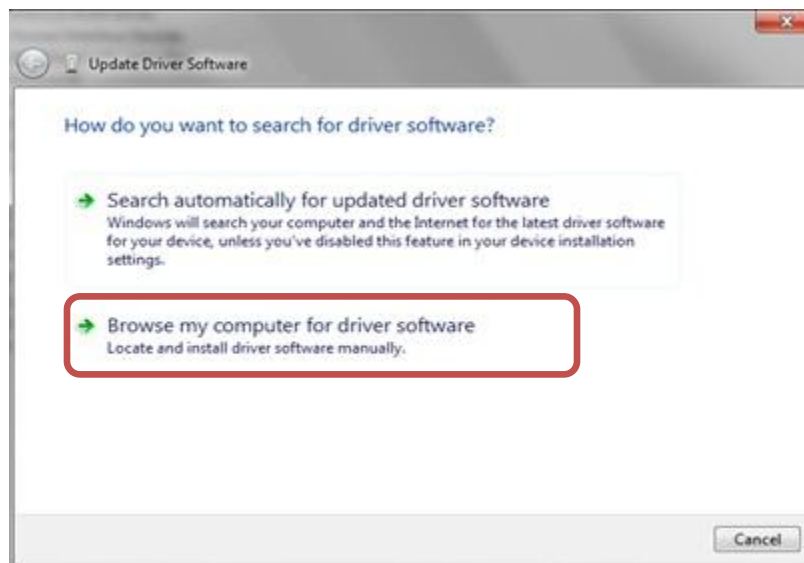
2. Click on **Browse my Computer for driver software**.
3. Now insert the Optima driver CD provided into your CD drive.
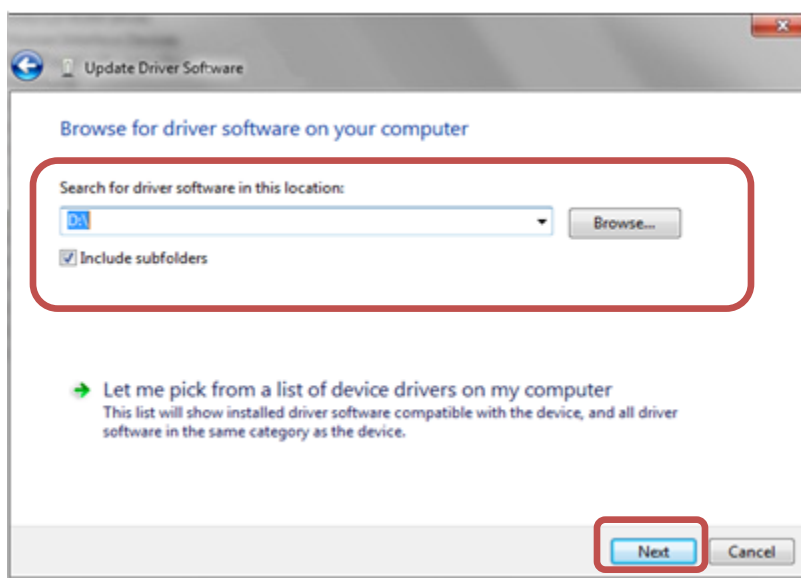
4. Click The **Browse** button and select the location of your CD drive
5. Click the **Next** Button
6. Depending on the operating system the following warning may appear. If that is the case, select the second option: **Install this driver software anyway.**
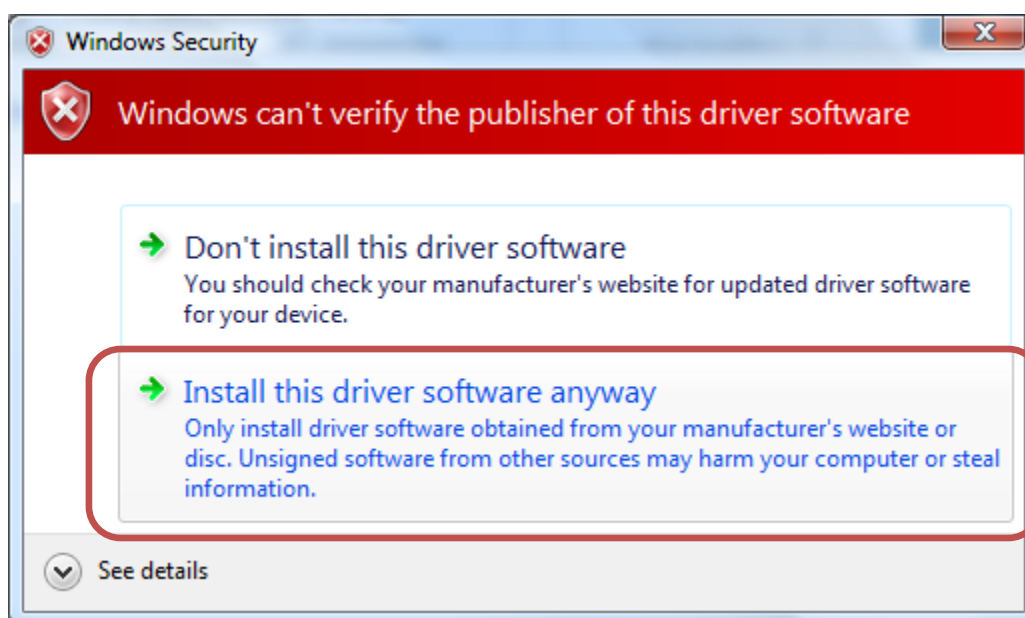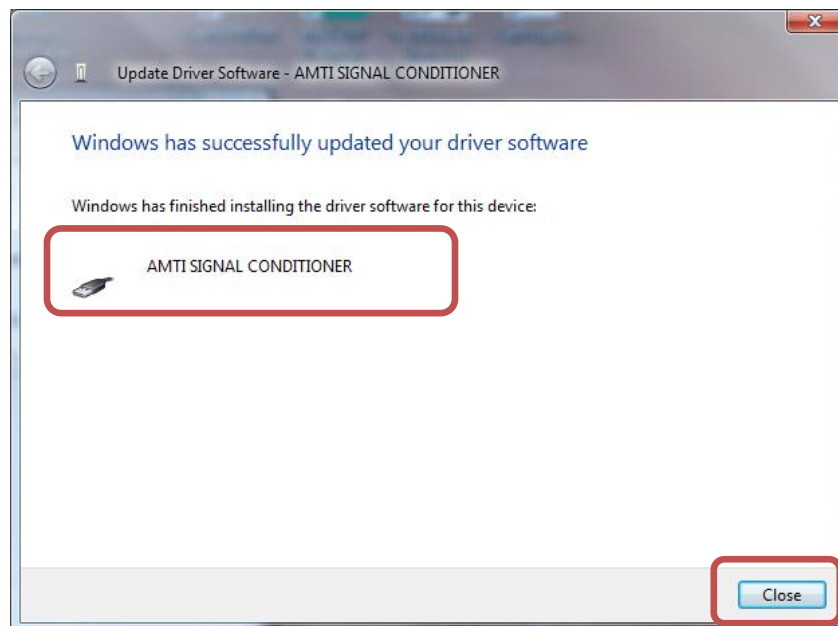
7. If the device name AMTI SIGNAL CONDITIONER appears in this dialog box the driver is successfully installed.
8. Click the **Close** button to finish the installation.

5. AMTI System Configuration Software

If you are planning on collecting digital data with AMTI NetForce you do not need to install the AMTI System Configuration software. All of the System Configuration software features are fully embedded in the AMTI NetForce program.

The AMTI System Configuration software configures one or more Optima's for use with third party software, for either digital or analog acquisition.

When collecting analog data with Optima it is not necessary to have the USB cable connected. The analog output is continuous and when powered-on the Optima always uses the last saved configuration settings.

5.1. AMTI System Configuration Software Installation Instructions

1. Insert the AMTI System Configuration software CD in your drive and let auto-run start. If the auto-run function doesn't start for any reason, browse to the CD and double click on the icon **Setup.exe**.
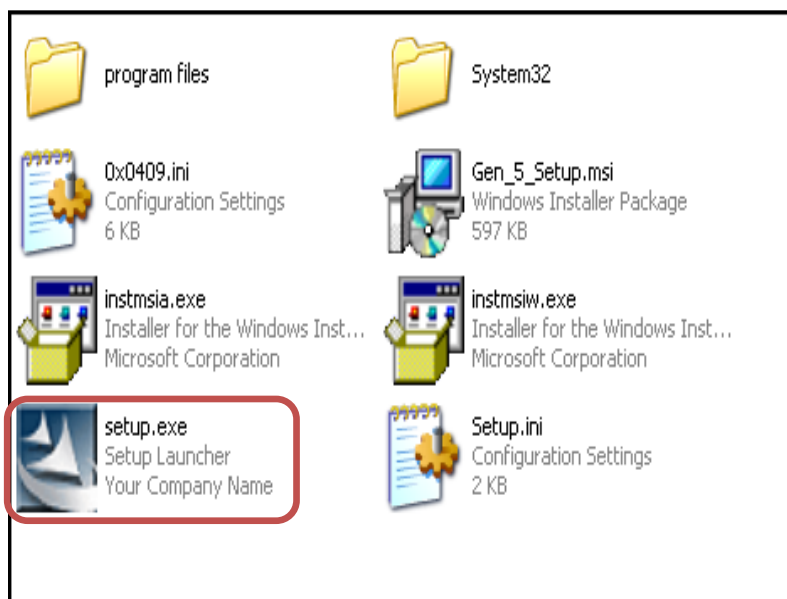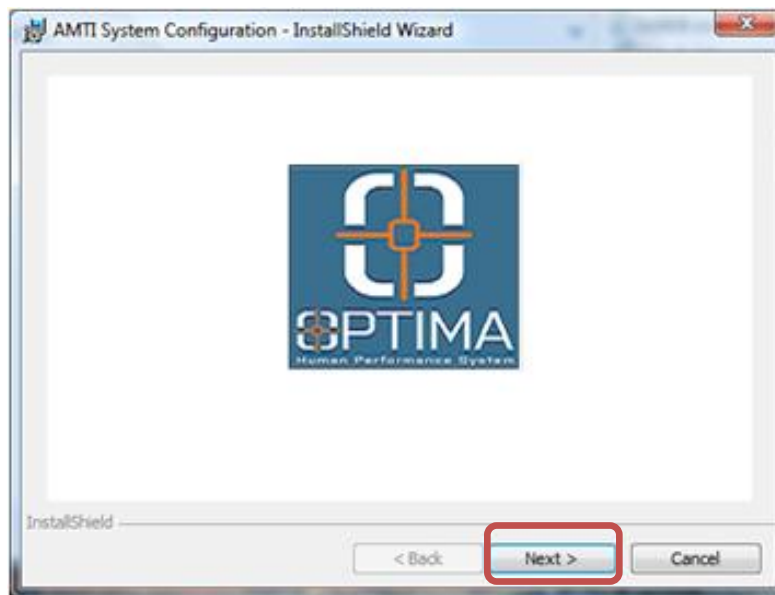
2. Once the installation procedure starts the above dialog box will appear with the Optima logo. Press the **Next** button to continue.
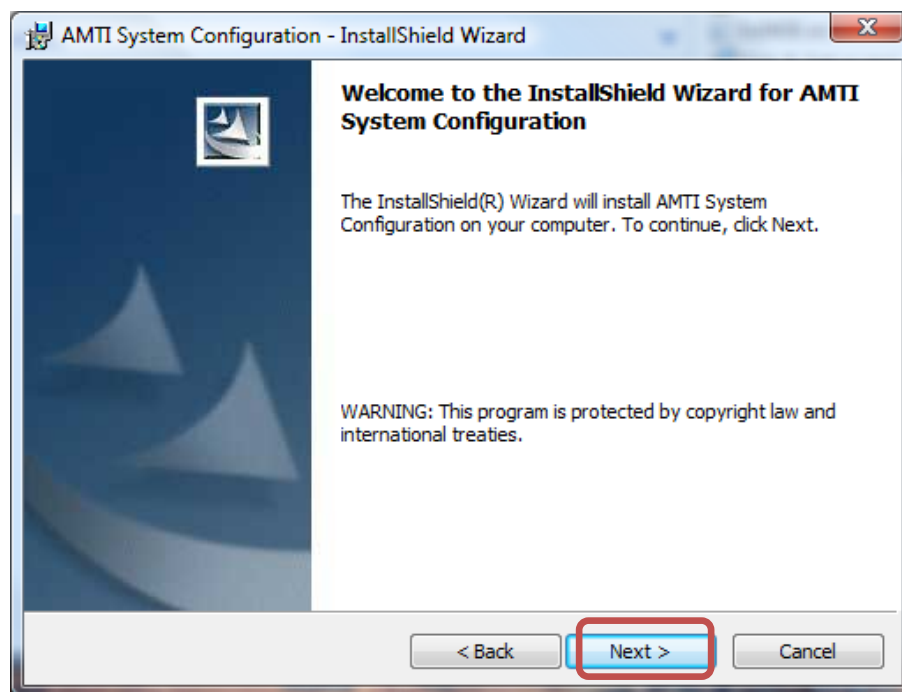
3. Press the **Next** button to continue.
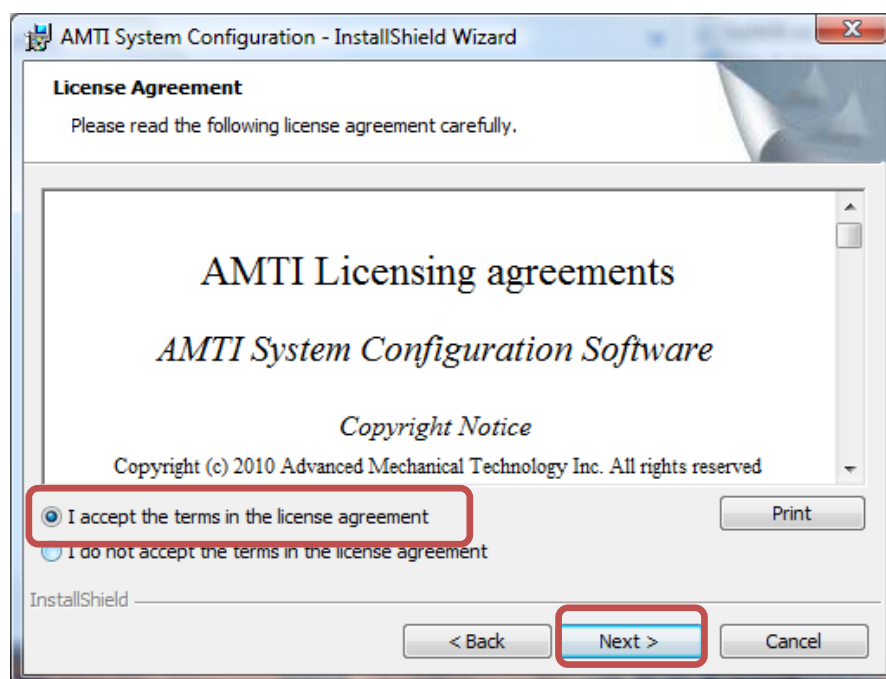
4. The license agreement will appear. To continue you must check, _**I accept the terms of the license agreement**_ option. Press the **Next** button to continue.
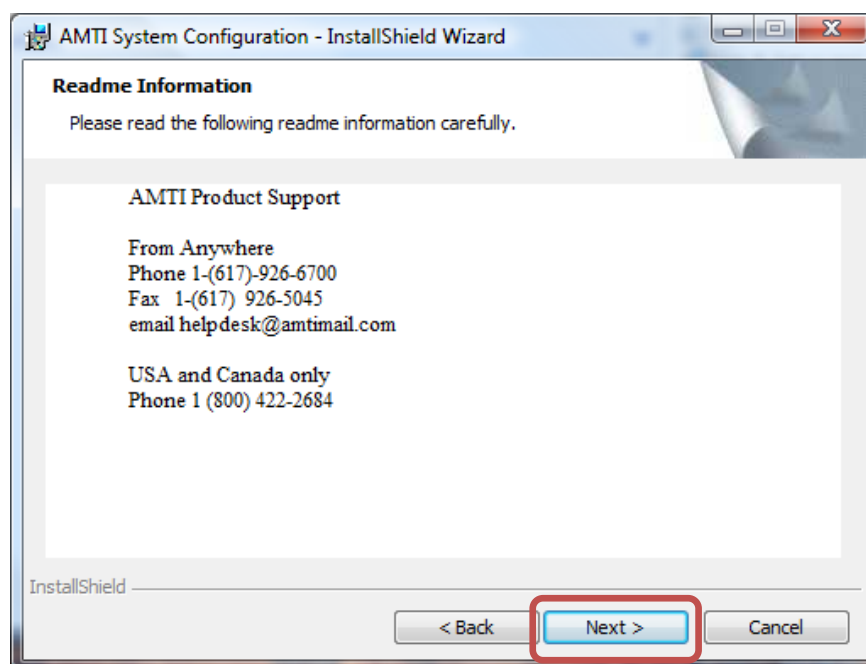
5. Take note of the AMTI product support information. Press the **Next** button to continue.
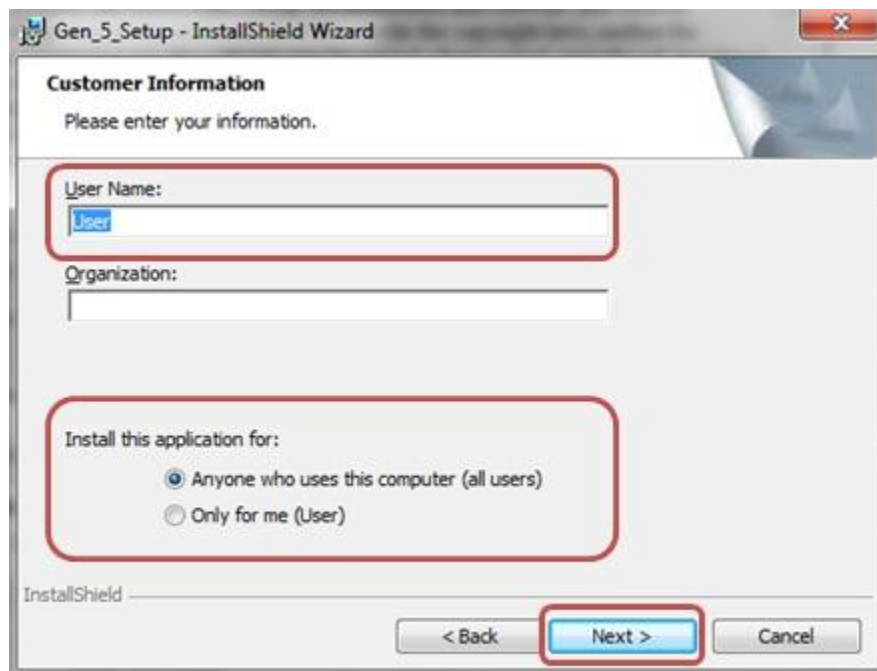
6. Fill in the user name and organization

7. Select "Anyone who uses this computer". Click the **Next** button to continue
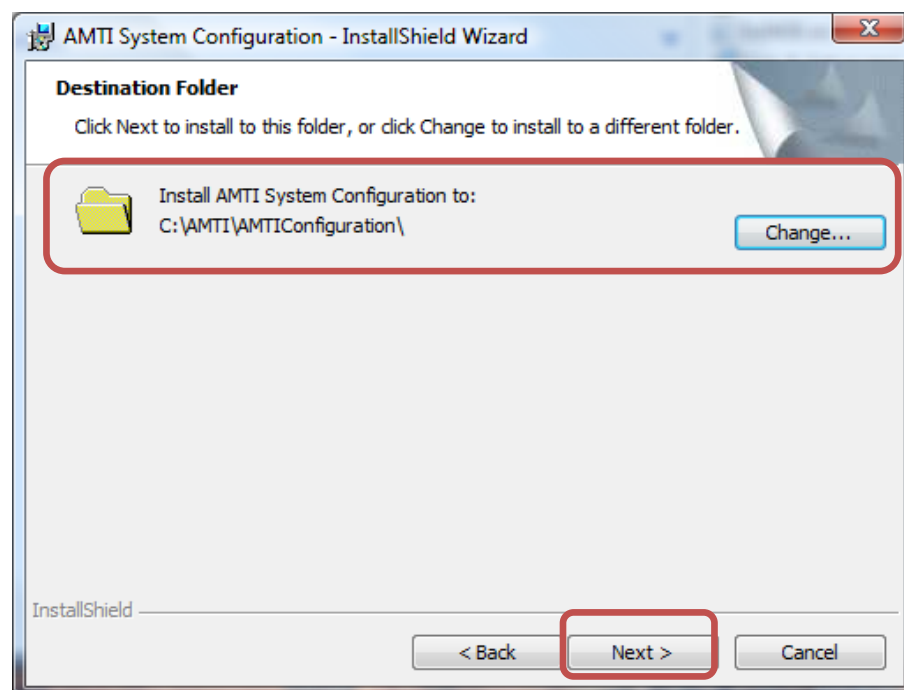
8. Verify the folder where you want the program to be installed. We recommend using the default location. Click the **Next** button to continue.
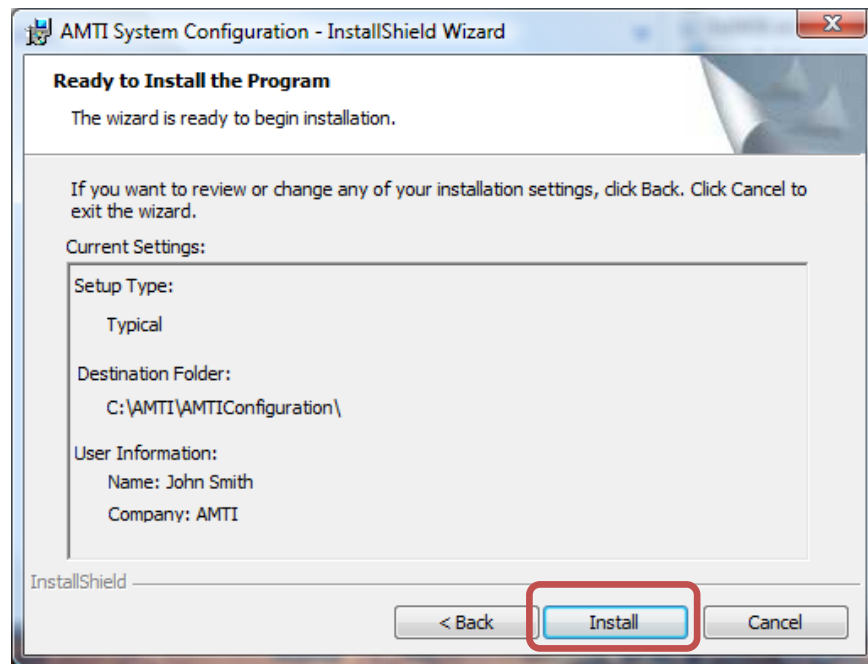
9. Click the **Install** button. The installation files will be installed.
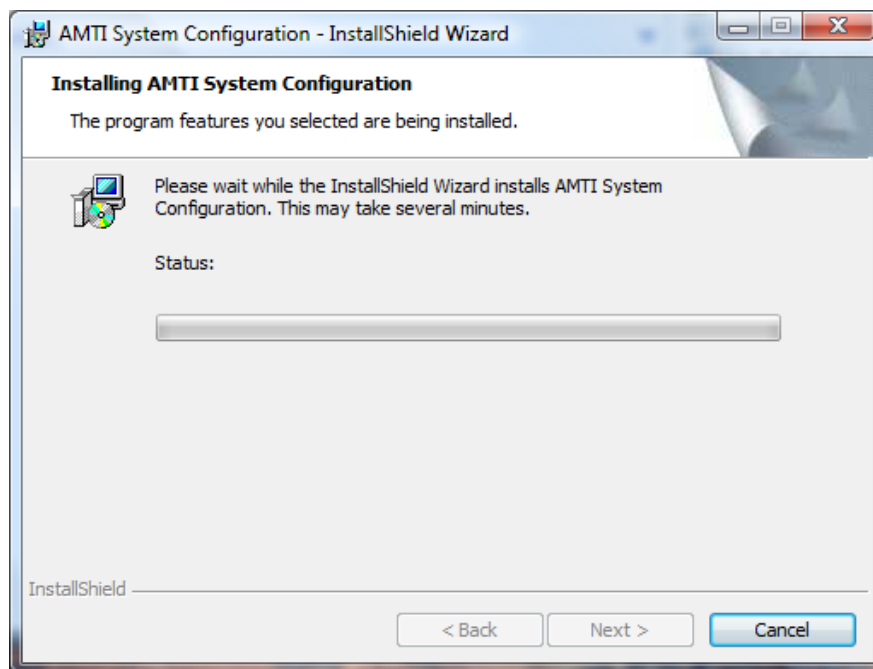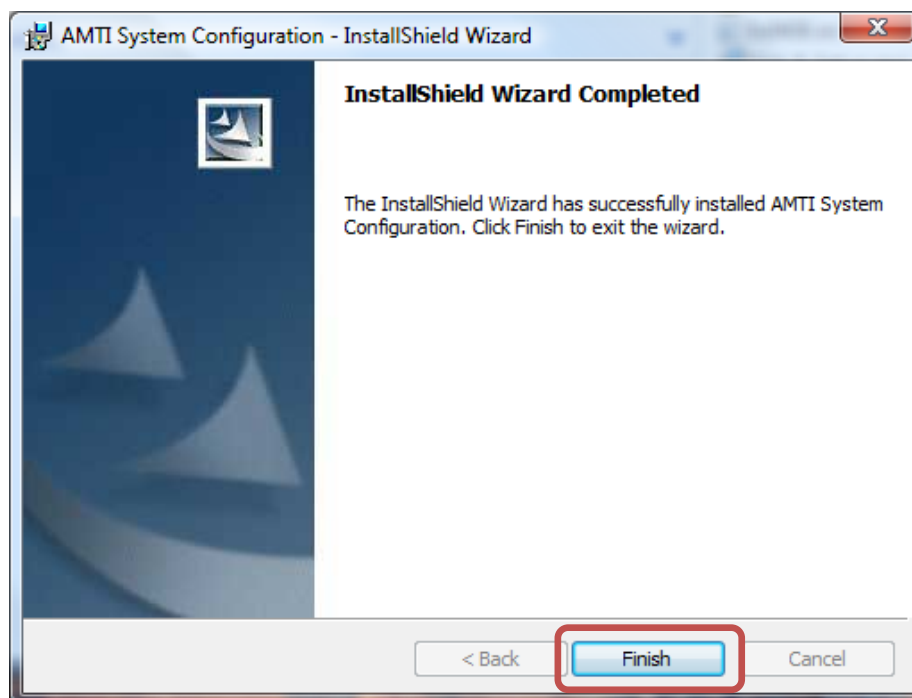
10. Click the **Finish** Button to complete the Installation.

The system configuration software is now installed; you may access the program either through the Start menu or through a convenient shortcut icon on the desktop.

5.2. AMTI System Configuration Software Overview

Use the AMTI System Configuration software when you need to configure the Optima's for use with third party software. This user guide describes the function, use and controls provided by the AMTI System Configuration software for coordinating, configuring and maintaining multiple Optima signal conditioners.

Click on the AMTI System Configuration icon on the desktop to load the software. Upon boot up the system configuration program will automatically scan for connected devices and the *AMTI System Configuration* dialog box will appear.

The following paragraphs provide a brief description of what each dialog box in the system configuration software does; the sections following will describe each dialog box in more detail.

5.2.1. AMTI Optima Setup Dialog Box

 The *AMTI Optima Setup* dialog box is the central control console for configuring one or multiple Optima signal conditioners. Available global configuration options consist of selecting data output formats, setting acquisition rates, detecting connected Optima's, setting the platform order for data collection,

and zeroing all platforms. Additionally each *Installed Amplifier* and *Associated Platform* can be easily identified and accessed for configuration.

5.2.2. Platform Calibration Page

The *Platform Calibration* page displays calibration information for the platform connected to the associated Optima. The *Platform Status* field at the top of the page will indicate whether the platform calibration files from the Optima Calibration CD are installed correctly.

5.2.3. Amplifier Configuration Dialog Box

Use the *Amplifier Configuration* dialog Box to configure the Optima optimally for the expected application. The configuration options help achieve optimal system resolution, with maximum signal to noise ratios. The excitation outputs, gain amplification, zero set points and other features are configured in this dialog box.

5.2.4. Configuring the Optima for Optimal Mechanical Range

For best results the Optima signal conditioner should be set up to achieve both the highest possible signal to noise ratio and maximum system resolution. This is accomplished by independently configuring each channel. The three adjustable configuration settings that affect the measurement range are the excitation voltage, the amplifier gain, and the zero set point.

5.2.5. Optima Calibration Dialog Box

The Optima signal conditioner is precision calibrated at the factory. The *Optima Calibration* dialog box displays all of the calibration parameters of the selected Optima. This dialog box is informational only.

5.2.6. The Configuration File

The AMTI System Configuration software maintains a configuration file containing the last saved platform order and global settings. The file is called AMTIUSBSetup.cfg and is located n the C:\AMTI\CFG folder. Whenever the AMTI System Configuration software is started it reads this configuration file and restores these settings.

5.3. AMTI System Configuration Dialog Box

The *AMTI System Configuration* dialog box is the central control console for configuring one or multiple signal conditioners. Global configuration options include selecting data output formats, setting acquisition rates, detecting connected devices, setting the platform order for data collection, and zeroing all platforms. Additionally each *Installed Amplifier* and *Associated Platform* can be easily identified and accessed for configuration.

5.3.1. Global Settings Group

The *Global Setting Group* controls settings applied to all connected devices. These settings are acquisition rate, and digital and analog output formats.

Acquisition Rate - The Acquisition rate is the collection rate in datasets per second for recording digital data through the USB port. The table below shows the available selections.

Acquisition Rates									
1200	1000	900	800	600	500	450	400	360	300
250	240	225	200	180	150	125	120	100	90
80	75	60	50	45	40	30	25	20	15
10									

Output Formats

AMTI force platforms and multi-component force and torque transducers measure the three orthogonal components of the applied force and the three orthogonal components of the applied torques and/or moments. The Optima collects these six channels of data. The table below defines the relationship between channel order, and the force, moment and torque components of an applied load. The respective units are also listed.

Channel	Label	Definition	English Units	Metric Units
0	Fx	The force component in the platform x direction	inches	Newton
1	Fy	The force component in the platform y direction	inches	Newton
2	Fz	The force component in the platform z direction	inches	Newton
3	Mx	The moment and torque around the platform x axis	in – lb	N-m
4	My	The moment and torque around the platform y axis	in – lb	N-m
5	Mz	The moment and torque around the platform z axis	in – lb	N-m

The Optima signal conditioner provides multiple output formats. There are three digital output formats and one analog. The output format determines the level of signal conditioning that will be applied. The table below defines the relationship between output format selections and the associated signal conditioning.

Digital Outputs	Output Format	Signal Conditioning	Port
	English Units	Full Conditioning	USB
	Metric Units	Full Conditioning	USB
	Bits	Diagnostic	USB
Analog Outputs	Volts	Full Conditioning	Analog

Digital Outputs – There are three selections for the USB digital output units. The choices are metric, English or bits. If the units are English or metric the data is *fully conditioned*. If bits are selected the data is not conditioned.

Analog Outputs – The analog output full scale range is +/- 5 volts. The two conditioning selections are *Fully Conditioned* and *MSA 6 Compatible*. *Fully conditioned* is the recommended choice, with all Optima signal conditioning features enabled. The *MSA 6 Compatible* choice may appear on the dialog box, it is a

viable option for those who purchased a Gen 5 signal conditioner, it is not a viable selection for those who purchased an Optima. If you own Optima always use fully conditioned mode.

5.3.2. Commands Group

The Commands Group consists of commands applied to all connected Optimas. The commands are *Zero Platforms, Find Amplifiers*, and *Set Platform Order.*

Commands
Zero Platforms
Find Amplifiers
Set Platform Order
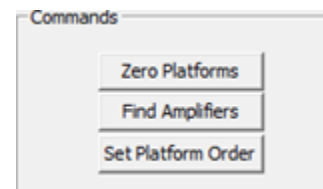
Zero Platforms - By clicking *Zero Platforms*, all data channels for all connected platforms will be zeroed. This is typically done with the platform in an unloaded state.

Find Amplifiers – By clicking on the button *Find Amplifiers*, the software will detect all Optima signal conditioners connected to the computer, and display a list in the *Installed Amplifier* group of the dialog box. This is also done automatically when the program is started.

If the software detects one or more Optima signal conditioners but does not detect the necessary Optima Precision Calibration files, you will be prompted to select and install the calibration files from the Optima platform CD.

Optima Installation

The following Optima calibration files need to be installed. Please use the Browse button to navigate to the xxxx.bcf file on the Optima platform CD. Then click open.
0101m.bcf

Browse   OK
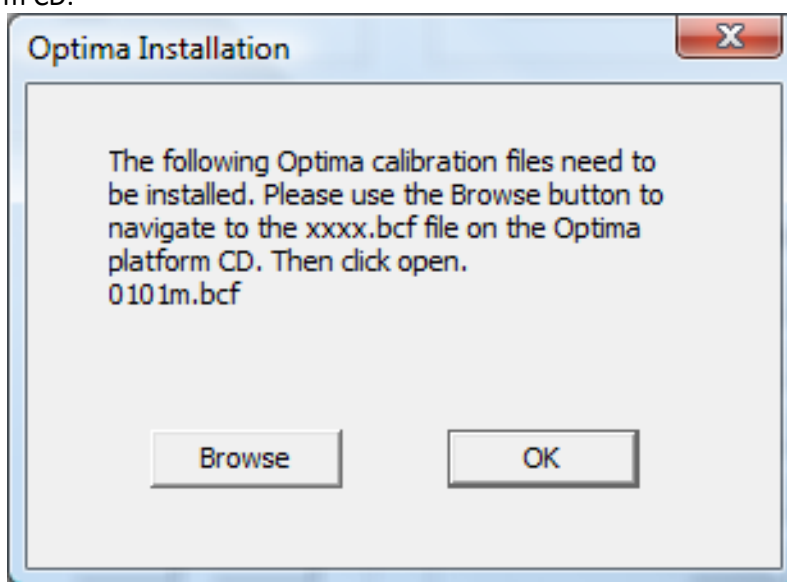
Set Platform Order – By clicking on the button *Set Platform Order*, the order of the connected transducers can be set for digital data collection. A single dataset sample consists of 6 channels of force, torque and moment data, if there are multiple platforms the datasets will be concatenated together. The question is which platforms data should be presented first in each dataset. By setting and saving the platform order that problem is resolved.

 There are two ways to set the platform order once the *Set Platform Order* button has been clicked:

> a) After *Set Platform Order* is clicked, each button in the *Order* column of the *Associated Platform Group* will be labeled **Push.** Click on the buttons in the desired sequence to set the platform order. As the buttons are pressed they will display their sequence numbers.

b) After *Set Platform Order* is clicked, walk on the platforms in the order of the desired sequence, and the software will register the order automatically.

5.3.3. Installed Amplifiers Group

The Installed Amplifiers Group describes, and gives access to, the configuration settings of each Optima amplifier connected to the computer

Index – The Index number of the Optima as it is stored in the system configuration software.

Serial – The serial number of the Optima.

Configure – Clicking the **Configure** button opens up the *Amplifier Configuration* dialog box. The *Amplifier Configuration* dialog is used to configure a Optima.
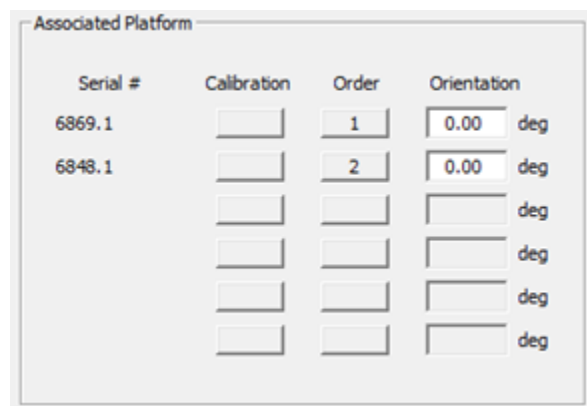
Blink – The **Blink** button is for identification of the connected Optima. Clicking the button will make the respective Optima front LED flash 10 times.

5.3.4. Associated Platform Group

The Associated Platform Group describes, and gives access to, the calibration settings of each platform connected to the associated Optima.

Serial The serial number of the platform.

Calibration - Click on the **Calibration** button to open the *Platform Calibration* dialog box. The *Platform Calibration* dialog box is for configuring the Optima to work with the connected platform.

Associated Platform				
Serial #	Calibration	Order	Orientation	
6869.1		1	0.00	deg
6848.1		2	0.00	deg
				deg
				deg
				deg
				deg

Order - Each button below the **Order** label displays the current data collection sequence of the connected platform. For more information see the *Set Platform Order* command description in the *Commands Group* of this dialog box.

Orientation – Because of physical space limitations it may be desirable to change the orientation of the platform's X and Y axes. For that purpose, you may enter a rotation angle in degrees (0–360) to rotate the X and Y axis around the Z axis. This feature is not compatible with the MSA 6 compatible analog output mode or the digital raw bit diagnostic output. It will work with all other digital and analog output selections.

Standard orientation:
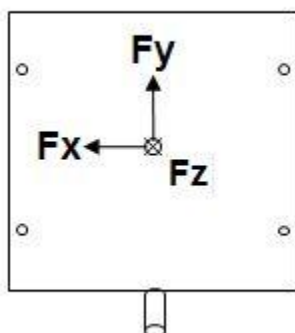
Rotation of the axes by 180 degrees:
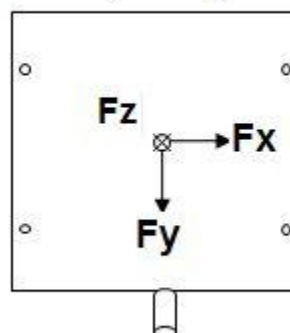
5.3.5. Dialog Box Footer
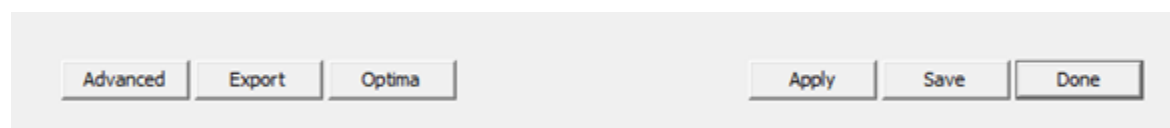
Advanced - Clicking on the button *Advanced* loads the *Genlock* dialog box. The Genlock feature only applies to digital outputs. The software used for digital data collection must also accommodate this feature.

Genlock Dialog Box - Genlock, which stands for generator lock, is a common technique that uses a specific reference signal to synchronize the data with an external video source. When G*enlock On* is checked the Optima will collect a single dataset on either the rising or falling edge of an analog signal, input into the Genlock port in the back of the Optima.
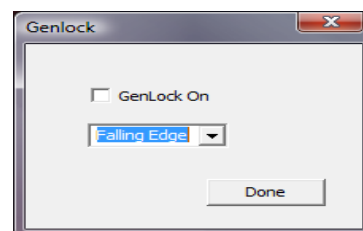
Export - Click on the button *Export* to save the settings of all connected signal conditioners to a single text file. The parameters included are: date, analog output range, Optima model number, Optima serial number, platform model number, platform serial number, the selected digital output units, the platform capacities, the Optima electrical maximums and minimums represented as engineering units, and the currently selected gain and excitation settings, the analog sensitivities required for *MSA 6 compatible* mode, and the analog conversion factor required for *fully conditioned* mode..

Optima – If you have a new Optima and would like to install the calibration *.bcf file on the PC, you may click the *Optim*a button. Then click *Browse* and navigate to the Optima platform CD and select the Optima nnnnm.bcf file for your platform. Click Open and it will automatically install the Optima file to the C:\AMTI\HPS directory. The AmtiSystemConfig software always searches this directory first for calibration files to download when new Optima platforms are detected.
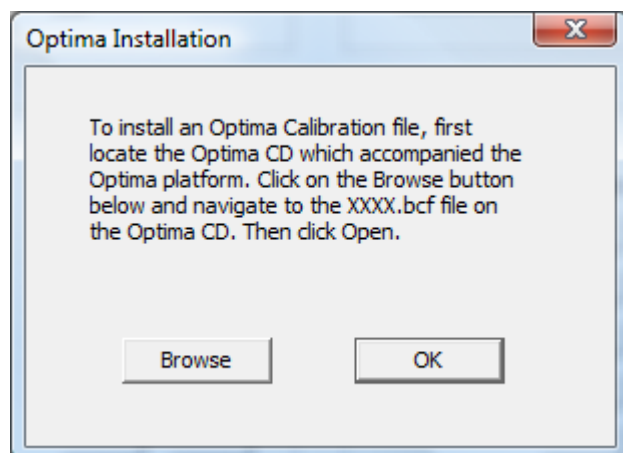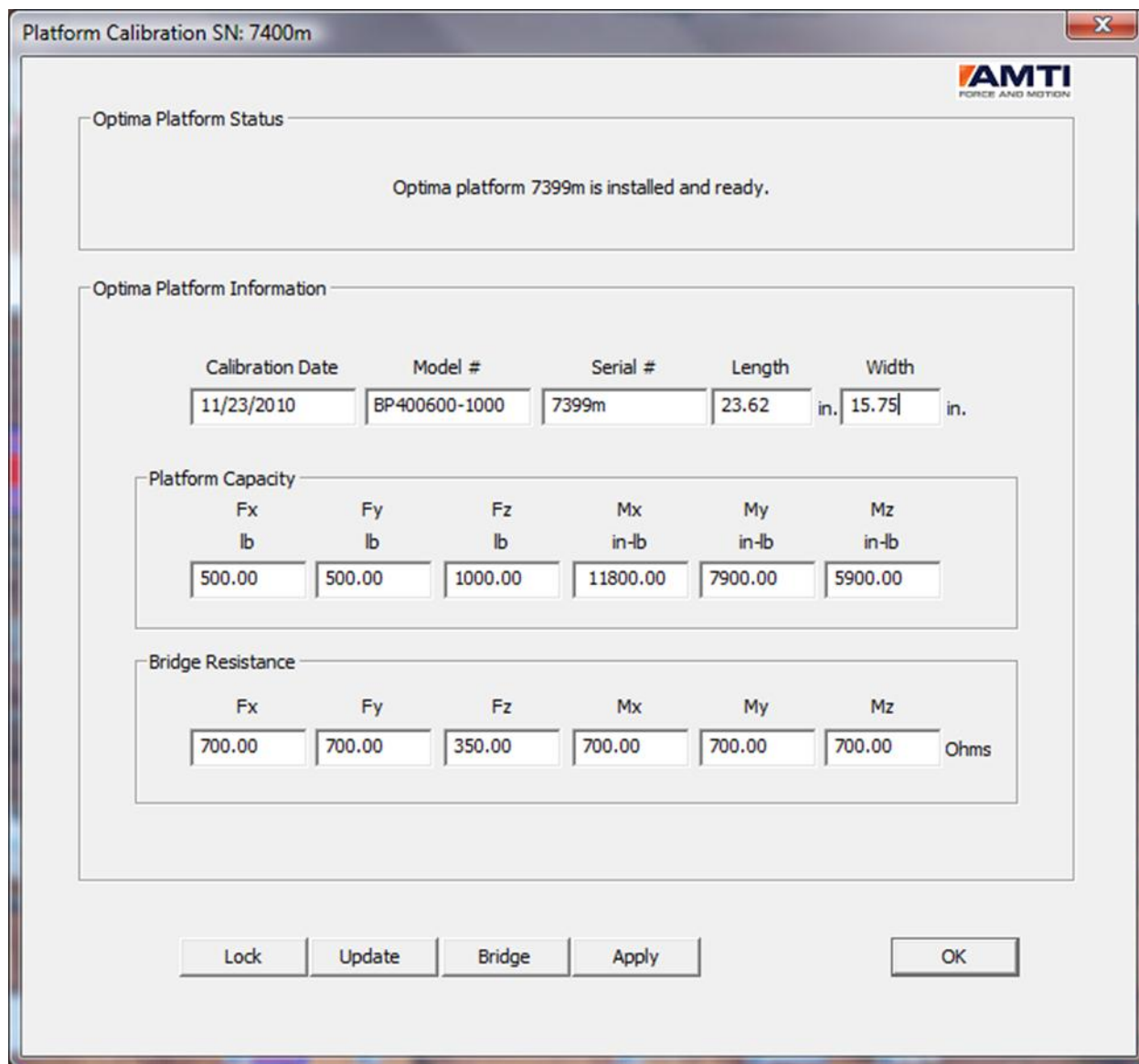
Apply – Clicking on the *Apply* button will temporarily apply all of the configuration changes you have made in this dialog box. When the Optima is rebooted, the device will default to its last saved settings.

Save – Clicking on the *Save* button will save any configuration changes you have made. Changes to the Optima configuration will be saved directly to the Optima and configuration changes such as platform order will be saved to a configuration file on the PC. The saved settings will be reloaded upon startup.

5.4. Platform Calibration Dialog Box

The *Platform Calibration* dialog box displays all of the calibration information of the platform connected to the associated Optima. The Optima uses the platform calibration data in order to process the platform data. Each Optima stores the associated platform calibration information in non volatile memory. The *Platform Status* field at the top of the page will indicate whether you need to download the platform calibration files from the Optima Calibration Backup CD.

5.4.1. Platform Status

The *Platform Status* field monitors your calibration files and platform connections. There are three *Platform Status* messages:

1. "Optima platform *###* is installed and ready."
   > Your Optima system is ready to use.
2. "Optima file not found for platform *###*."
   > Load the platform calibration files from the calibration backup CD.
3. "Optima platform *###* not found."
   >The System Configuration software does not recognize the connection between the Optima signal conditioner and the associated platform. Check to be sure the platform is connected properly.

Platform Information Group

Optima Platform Information				
Calibration Date	Model #	Serial #	Length	Width
11/23/2010	BP400600-1000	7399m	23.62 in.	15.75 in.

Calibration Date- The date of the platform calibration

Model # – The model number of the platform

Serial # – The serial number of the platform

Length – The platform length

Width – The platform width

Platform Capacity					
Fx	Fy	Fz	Mx	My	Mz
lb	lb	lb	in-lb	in-lb	in-lb
500.00	500.00	1000.00	11800.00	7900.00	5900.00

Platform Capacity - The *Platform Capacity* values are the platform's maximum mechanical loads and torques that can be safely applied in the specified directions. The platform capacities will always be present if the platform is an AMTI smart platform. If they are not present you may enter them manually. They are informational only and not used for calculations.

Bridge Resistance - The wheatstone bridge is a configuration of strain gages used in measurement transducers. They are at the heart of every strain gage force plate. The bridge resistance of the wheatstone bridge is measured in ohms. Each channel of an AMTI force plate has a specific bridge resistance common to its model type. If the bridge resistance is not present you may load it by clicking on the **Bridge** button and selecting the model type.

5.4.2. Dialog Box Footer

Lock/Unlock - Click on **Lock/Unlock** button to unlock the dialog box for editing.

Update - Click on the **Update** button to load a new calibration file.
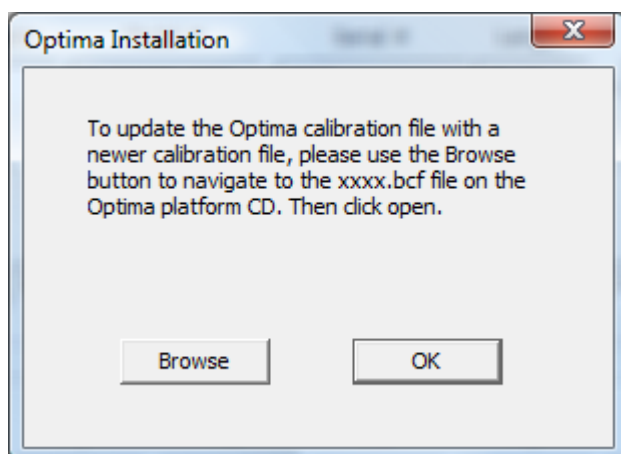
The filename will consist of the platform serial number followed by a 3 digit (bcf) extension (xxxxx.bcf).

Bridge - This button opens up the Bridge Resistance dialog box. You can now select the corresponding platform or transducer model series connected to the Optima and then click **OK**. The values in the *Bridge Resistance* group will be automatically updated.
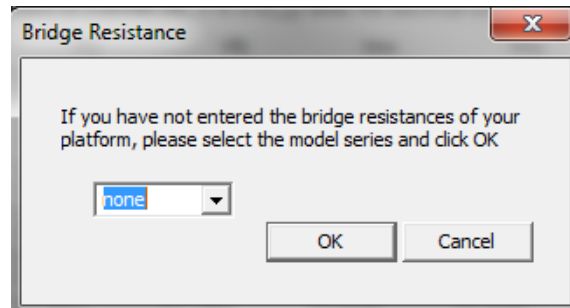
Apply - Clicking on the *Apply* button will temporarily apply all of the configuration changes you have made in this dialog box. When the Optima is rebooted, the device will default to its last saved settings.

Save – Clicking on the *Save* button will save any configuration changes you have made. Changes to the Optima configuration will be saved directly to the Optima and configuration changes such as platform order will be saved to a configuration file on the PC. The saved settings will be reloaded upon startup.

OK - Clicking the **OK** button returns you to the *AMTI Optima Setup* dialog box.

5.4.2.1. Amplifier Configuration Dialog Box

Use the *Amplifier Configuration* dialog Box to configure the selected Optima amplifier. The *Configuration Information* group shown in the top half of the window displays the Optima measurement limits for the current configuration. The *Current Configuration* group located in the bottom half of the dialog box allows the user to modify the configuration settings. The user may modify the configuration and view the effect on measurement limits by pressing the *Apply* button located at the bottom of the dialog box.

This dialog box display is organized in columns, each representing one of the six data channels. When units are displayed they are represented in the measurement units selected in the *Global Settings* group of the *AMTI Optima Setup* dialog box.

5.4.3. Configuration Information Group

The _Configuration Information_ group displays the Optima measurement limits for the current configuration.

Configuration Information	Fx N	Fy N	Fz N	Mx N-m	My N-m	Mz N-m	
Platform Capacity	2224.11	2224.11	4448.22	1333.22	892.58	666.61	
Amplifier Range	745.67	748.28	2929.99	347.28	274.37	159.76	Max
	-745.67	-748.28	-2929.99	-347.28	-274.37	-159.76	Min
Analog Outputs	714.29	714.29	2857.14	384.62	294.12	178.57	Max
	-714.29	-714.29	-2857.14	-384.62	-294.12	-178.57	Min

Platform Capacity - The _Platform Capacity_ values are the platform's maximum mechanical loads and torques that can be safely applied in the specified directions. The platform capacities will only be present if the platform is an AMTI smart platform.

Amplifier Range - The _Amplifier Range_ is the full-scale output range available for all digital and analog output under the current configuration. Maximum and minimum values are displayed for each channel. These values are functions of the Optima electrical output range and the selected channel excitations, gains and setpoints. The range will update automaticallly if the settings are changed in the _Current Configuration_ group of the dialog box and the _Apply_ button has been pressed.

Analog Outputs – The values listed in _Analog outputs_ depend on output mode. If the analog output mode is set to _MSA 6 compatible_ the _Analog Outputs_ will not be visible. The output range will be identical to the _Amplifier Range_.

For _fully conditioned_ analog outputs the ranges are determined by the _Analog Senstivities_ values in the _Current Configuration_ group. The _Analog Senstivities_ set the output millivolts per unit of mechanical load for each channel. Although the _Analog Outputs_ range can exceed the _Amplifier Range_ the analog outputs themselves will not.

5.4.4. Current Configuration Group

Selections within the _Current Configuration_ group allow for optimal configuration of the Optima for the expected application. After making changes pressing the Apply button will both apply the settings and update the measurement limit information displayed in the _Configuration Information_ group.

Optimization – The signal conditioner should be optimized to work with the type of tranducer you are using.

Cable Length - The *Cable Length* is used to correct the excitation voltage drop due to the analog cable length; the cable length must be entered in feet. The drop or line loss is a function of the bridge resistance and the excitation voltage.

Excitation – The *Excitation* selections corresponds to the voltage excitation sent to the strain gage bridges to measure force. You can choose 2.5, 5 or 10 volts. There are two things to consider when selecting the excitation voltage. First, a higher excitation voltage provides a better signal to noise ratio. Second, a higher excitation voltage may exacerbate thermal drift. Typically, at room temperature 10 volt excitation is the correct choice.

A few AMTI transducers use a single aggregate excitation voltage for all channels. This is usually done for very small transducers where space is a limitation. If this is the case, select the same excitation voltage for all channels. If you have such a transducer it will be indicated in the manual.

Gain – The *Gain* selections set the internal amplifier gain. Four gains are available: 500, 1000, 2000 and 4000. When selecting a gain the most important consideration is the bit resoulution of the measurement range. The higher gain will always correspond with a better bit resolution, therefore always choose the largest gain which, when applied still encompasses the application measurement range.

Zero Setpoint - The *Zero Setpoint* allows the user to offset the measurement range of the signal conditioner to better adapt to the test being conducted. The zero set point offsets are expressed as a percent of the full scale measurement range.

The tables below illustrate the effects of three different zero set point settings for a single channel of a Optima configured for a +-1000 Newton measurement range. The first table is referring to the digital outputs and the second table is referring to the analog outputs.

Digital Output in Newtons			
Zero Setpoint %	0	75	-75
Maximum amplifier range	1000	250	1750
Zero load output	0	0	0
Minimum amplifier range	-1000	-1750	-250

Analog Output in Volts			
Zero Setpoint %	0	75	-75
Maximum amplifier range	5.0	5.0	5.0
Zero load output	0.0	3.75	-3.75
Minimum amplifier range	-5.0	-5.0	-5.0

Consider offsetting the measurement range when by doing so, you can apply a greater gain setting than otherwise. This will achieve greater system resolution.

	mV/N	mV/N	mV/N	mV/(N-m)	mV/(N-m)	mV/(N-m)	
Analog Sensitivities	44.482216	44.482216	44.482216	1.129848	1.129848	1.129848	Conditioned

Analog Sensitivities – The *Analog Sensitivities* are user defined scale factors which set the analog output in millivolts per unit of load for each channel. The table below identifies the units used to express analog sensitivity for each channel.

Analog Sensitivity Unit Table		
Units	Forces (Fx, Fy, Fz)	Moments (Mx, My, Mz)
English	millivolts/pound	millivolts/inch-pound
Metric	millivolts/Newton	millivolts/Newton-meter

 If the analog output mode is set to *MSA 6 compatible* the *Analog Sensitivities* will not be available. The analog output range will be identical to the *Amplifier Range*: although the *Analog Outputs* range can exceed the *Amplifier Range* the analog outputs themselves will not.

5.4.5. Dialog Box Footer
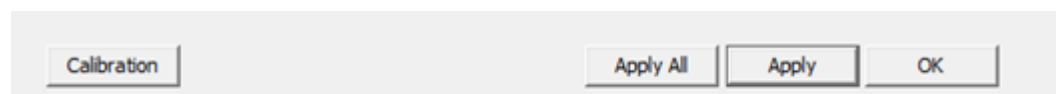
Calibration – Clicking on the calibration button will open the *Optima Calibration* dialog. The Optima is factory calibrated. This dialog box will allow you to view the calibration tables.

Apply All – Clicking on the *Apply All* button will temporarily apply, to all connected Optimas, all of the configuration changes you have made in this dialog box. This feature is only recommended if you want all of the platforms to have the same configuration settings.

Apply - Clicking on the *Apply* button will temporarily apply all of the configuration changes you have made in this dialog box. When the Optima is rebooted, the device will default to its last saved settings. Additionally, the *Configuration Information* group output ranges are updated on the dialog box display to reflect the configuration changes.

Save – Clicking on the *Save* button will save any configuration changes you have made. Changes to the Optima configuration will be saved directly to the Optima and configuration changes such as platform order will be saved to a configuration file on the PC. The saved settings will be reloaded upon startup.
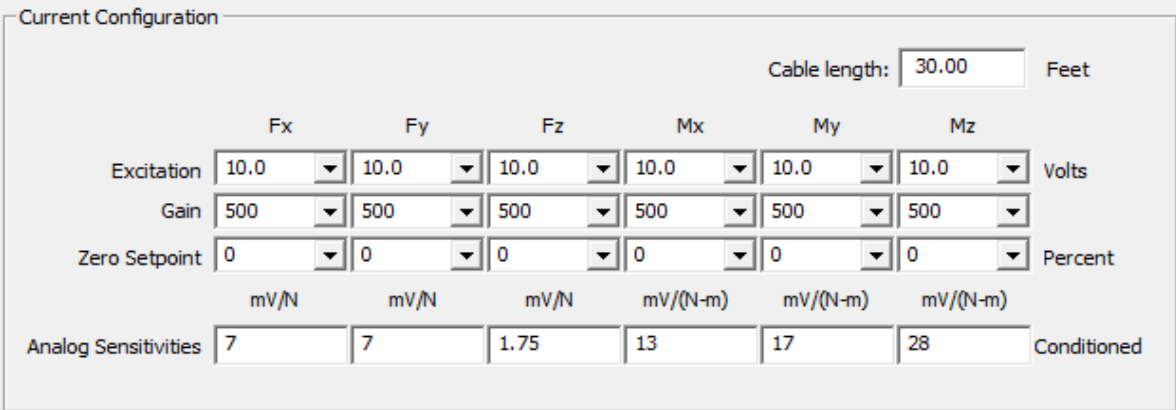
OK – Clicking the *OK* button returns you to the *AMTI Optima Setup* dialog box.

5.5. Configuring the Optima for Optimal Mechanical Range

For best results the Optima signal conditioner should be setup to achieve both the highest possible signal to noise ratio and maximum system resolution. This is accomplished by independently configuring each channel. The three adjustable configuration settings that affect the measurement range are excitation voltage, amplifier gain, and zero set point.

To achieve the best signal to noise ratio you want the Optima to output the largest possible excitation voltage. This will normally be 10 volts; except for the most thermally variable conditions. Under those conditions a lower excitation might be required to minimize thermal drift.

To achieve the best system resolution, apply the largest gain setting available where the Optima measurement range is greater than the expected application range. By strategically utilizing the Optima *Zero Setpoint* feature to offset the Optima measurement range, a higher gain than normal can occasionally be accomplished.
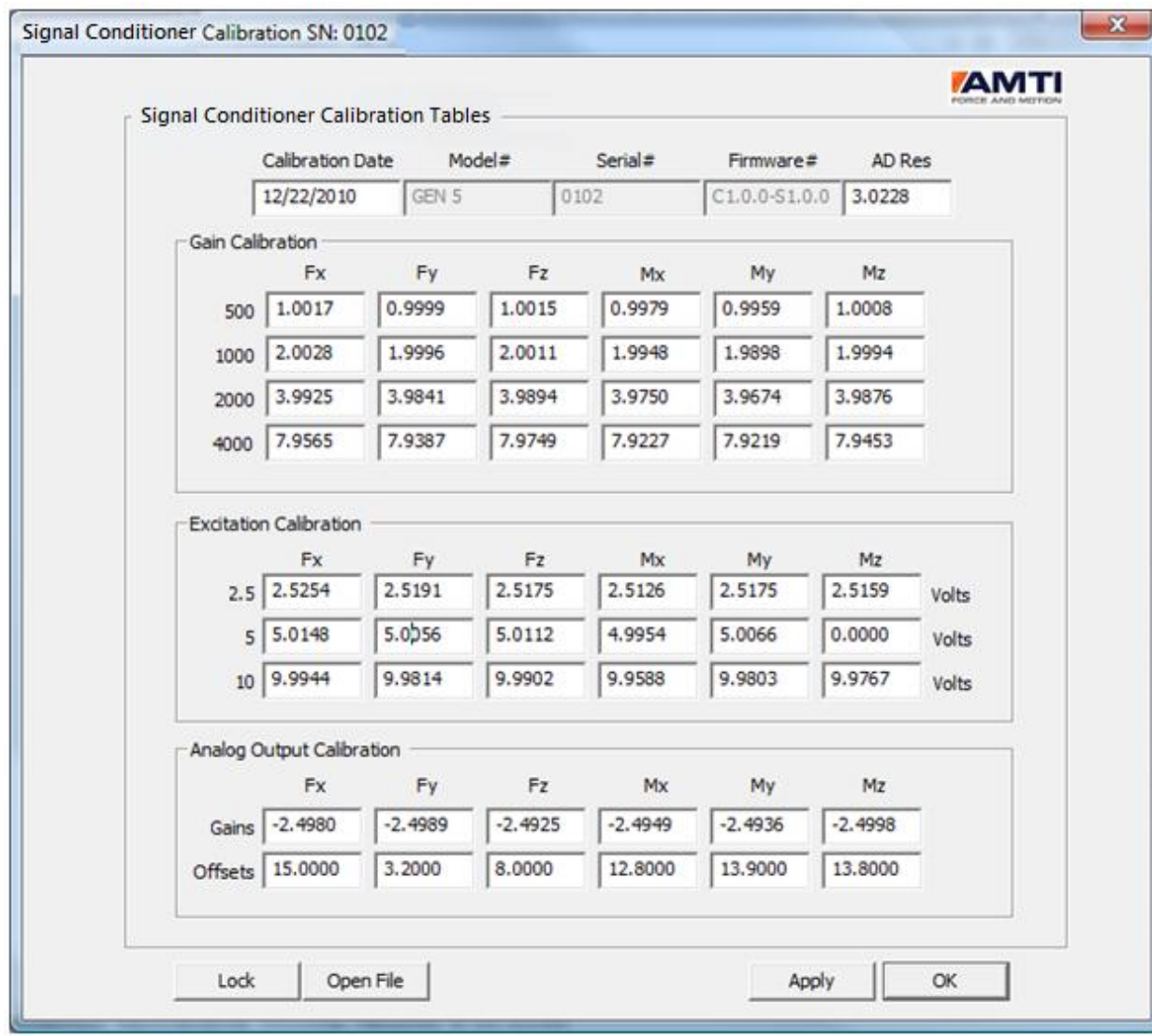
The figure above shows the portion of the Amplifier Configuration dialog box of the AMTI System Configuration software used for configuring measurement range. Each channel *Amplifier Range* is a function of the excitation, gain, and zero set point selection displayed in the combo boxes below it. To modify the amplifier ranges simply choose your selections and then press Apply. Pressing Apply will download the new setting to the signal conditioner and update the Amplifier Range on the display.

To optimally configure an Optima, start with an initial excitation setting of 10, a gain of 500, and a zero set point of 0. If the amplifier range is greater than the expected applied load range increase the gain to next level and continue to do so until you discover the largest gain you can apply and still encompass the expected applied load range for that channel.

5.6. Signal Conditioner Calibration Dialog Box

The Optima signal conditioner is precision calibrated at the factory. The *Signal Calibration* dialog box displays all of the calibration parameters of the selected Optima. The settings displayed here should not be modified and require a password to access. The calibration tables are presented in 6 columns, each column is representing one of the 6 data channels (Fx, Fy, Fz, Mx, My, Mz).

Signal Conditioner Calibration SN: 0102

Signal Conditioner Calibration Tables

Calibration Date	Model#	Serial#	Firmware#	AD Res
12/22/2010	GEN 5	0102	C1.0.0-S1.0.0	3.0228

Gain Calibration

	Fx	Fy	Fz	Mx	My	Mz
500	1.0017	0.9999	1.0015	0.9979	0.9959	1.0008
1000	2.0028	1.9996	2.0011	1.9948	1.9898	1.9994
2000	3.9925	3.9841	3.9894	3.9750	3.9674	3.9876
4000	7.9565	7.9387	7.9749	7.9227	7.9219	7.9453

Excitation Calibration

	Fx	Fy	Fz	Mx	My	Mz	
2.5	2.5254	2.5191	2.5175	2.5126	2.5175	2.5159	Volts
5	5.0148	5.0056	5.0112	4.9954	5.0066	0.0000	Volts
10	9.9944	9.9814	9.9902	9.9588	9.9803	9.9767	Volts

Analog Output Calibration

	Fx	Fy	Fz	Mx	My	Mz
Gains	-2.4980	-2.4989	-2.4925	-2.4949	-2.4936	-2.4998
Offsets	15.0000	3.2000	8.0000	12.8000	13.9000	13.8000

[Lock] [Open File]   [Apply] [OK]

5.6.1. Signal Conditioner Calibration Tables Group

Calibration Date	Model#	Serial#	Firmware#	AD Res
12/22/2010	GEN 5	0102	C1.0.0-S1.0.0	3.0228

Calibration Date – The date the Optima was calibrated

Model# - The model number of the Optima

Serial# - The serial number of the Optima

Firmware# - The firmware version number of the embedded software in the Optima

AD Res – The calibrated reference voltage used by the Optima analog-to-digital converter.

Gain Calibration

	Fx	Fy	Fz	Mx	My	Mz
500	1.0017	0.9999	1.0015	0.9979	0.9959	1.0008
1000	2.0028	1.9996	2.0011	1.9948	1.9898	1.9994
2000	3.9925	3.9841	3.9894	3.9750	3.9674	3.9876
4000	7.9565	7.9387	7.9749	7.9227	7.9219	7.9453

Gain Calibration –The Optima supports analog gains of 500, 1000, 2000, and 4000 for each channel. This table displays the calibrated correction factors for each gain selection.

Excitation Calibration

|	Fx	Fy	Fz	Mx	My	Mz	
2.5	2.5254	2.5191	2.5175	2.5126	2.5175	2.5159	Volts
5	5.0148	5.0056	5.0112	4.9954	5.0066	0.0000	Volts
10	9.9944	9.9814	9.9902	9.9588	9.9803	9.9767	Volts

Excitation Calibration – The Optima outputs 6 channels of excitation voltage to the platform strain gage bridges to measure force. The excitation voltage selections are 2.5, 5.0, and 10.0 volts. This table displays the calibrated correction values for each excitation selection.

Analog Output Calibration

	Fx	Fy	Fz	Mx	My	Mz
Gains	-2.4980	-2.4989	-2.4925	-2.4949	-2.4936	-2.4998
Offsets	15.0000	3.2000	8.0000	12.8000	13.9000	13.8000

Analog Output Calibration – To supply analog outputs the Optima signal conditioner uses a digital to analog converter (DAC). Each channel of the DAC requires both a gain and offset correction.

> **Gains** – The DAC gain corrections
> **Offset** - The DAC offset corrections

5.6.2. Dialog Box Footer
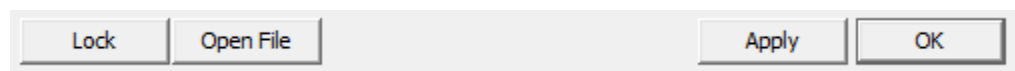
Lock/Unlock – If you press the _Lock/Unlock_ button to unlock this screen for editing, a dialog box will appear asking a password. To obtain a password AMTI must be contacted. AMTI does not want the factory calibrated settings to be modified.

Open File – Click the _Open File_ button to load a Optima calibration file. The calibration file name will consist of the serial number and the three digit extension cal. (xxxx.cal)

Apply - Clicking on the _Apply_ button will temporarily apply all of the configuration changes you have made in this dialog box. When the Optima is rebooted, the device will default to its last saved settings. Additionally, the _Configuration Information_ group output ranges are updated on the dialog box display to reflect the configuration changes.

Save – Clicking on the _Save_ button will save any configuration changes you have made. Changes to the Optima configuration will be saved directly to the Optima and configuration changes such as platform order will be saved to a configuration file on the PC. The saved settings will be reloaded upon startup.

OK – Clicking the **Ok** button returns you to the _Amplifier Configuration_ dialog box.

5.7. The AMTI System Configuration File

The AMTI System Configuration software maintains a configuration file containing its last saved settings. The file is called AMTIUSBSetup.cfg and is located in the C:\AMTI\CFG folder. Whenever the AMTI System Configuration software is started it reads this configuration file and restores the configuration. The stored parameters are listed in the table below.

Global Settings	Description , Range, or possible values
Configuration file version number	12345 (current version)
Number of Signal Conditioners	0-15 (range of possible values)
Acquisition Rate	0-2000 (range of possible values)
Run mode	0-4 (Range of possible values)
Genlock state	0-2 (Range of possible values)
For each connected Device	**Devices will be listed in data collection order**
Serial number	Text string
Model number	Text string
Platform serial number	Text string
Platform model number	Text string

The meaning of the possible run modes settings in the configuration file are listed in the table below.

Run Mode	Digital Outputs	Analog Output
0	Metric	MSA 6 compatible
1	Metric	Fully conditioned
2	English	MSA 6 compatible
3	English	Fully Conditioned
4	Bits	MSA 6 compatible

The meaning of the possible Genlock states, from the configuration file, is listed in the table below.

State	Description
0	Genlock off
1	collect datasets on rising edge
2	collect datasets on falling edge

6. The Optima Front Panel Description

Power Switch

The on/off switch has a green LED which will remain lit when the power is on.

Auto-Zero button

The auto-zero button is multi-purpose. It is used to zero the signal conditioner, or place the signal conditioner into diagnostic mode.

The signal conditioner may be zeroed either through software or by pushing the button and immediately releasing. Using either method the orange LED will flash once to confirm the zero action.

6.0.1. Diagnostic Mode

To place the amplifier into diagnostic mode press and hold the auto-zero button down until it starts to blink, then release. The LED will continue to blink until diagnostic mode is terminated. To terminate diagnostic mode turn the Optima off, then on.

The diagnostic mode is used to set the Optima into a known state. The following Optima settings are applied.

Diagnostics Setting	
Excitation*	10 V
Gain*	1000
Acquisition rate	2000
Analog outputs*	MSA 6 compatible
Digital Outputs*	Bits
Genlock	Off
Setpoint*	0

* Applies to all channels

6.0.2. Self Identification

The AMTI System Configuration software can make the orange LED flash for configuration identification.

7. Optima Rear Panel Description
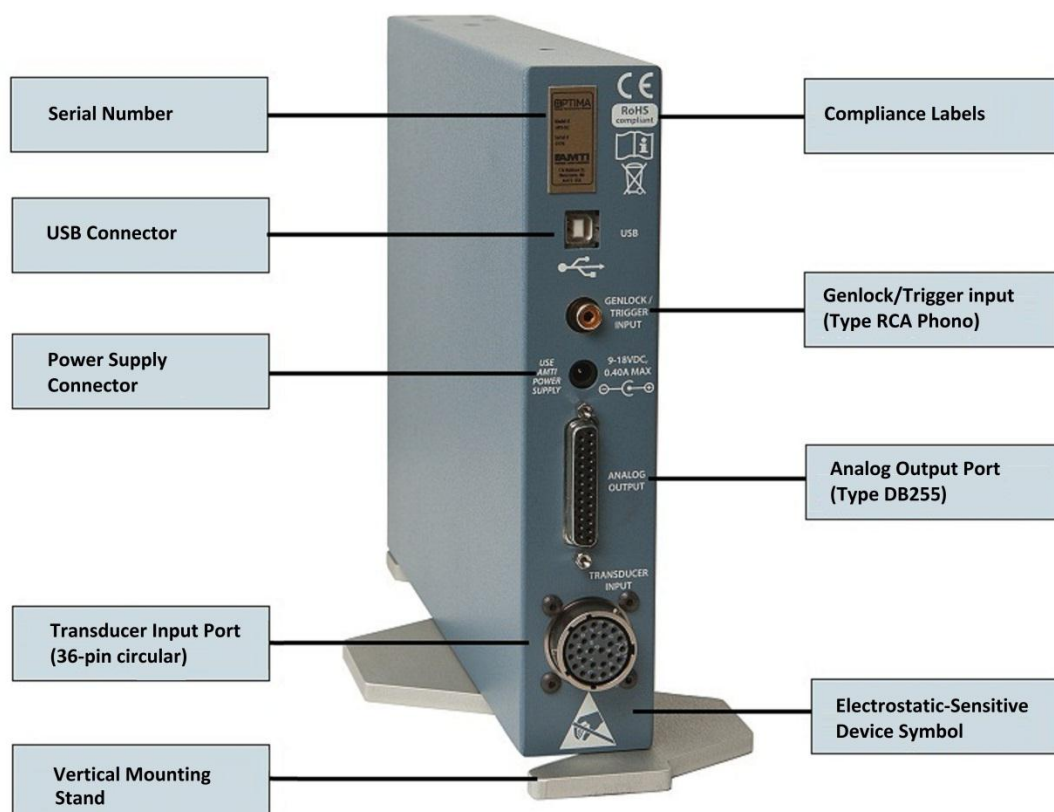
Serial Number
The serial number of the Optima

USB Connector
A standard USB 2.0 cable is sufficient. If using multiple signal conditioners we recommend using a USB hub. Within a single USB hub the skew between multiple signal conditioners is approximately 1 to 2 microseconds; with multiple USB hubs it is still excellent, on the order of 125 microseconds.
8.3 Genlock / Trigger Input

The genlock/trigger input is a multi-purpose digital input channel. The connector is an RCA phono type receptacle. The input range is 0 to 10 V. The low state is less than 1 V and the high state is greater than 3 V. The hardware supports two software configurable operating modes, genlock or generic digital input.

Genlock is a common technique where the output of one source is used to synchronize multiple devices. In genlock mode the Optima will transmit a single dataset on either the rising or falling edge of the genlock signal. The period between Genlock triggers must exceed 0.0005 seconds. The period must not exceed 0.125 seconds. If the sample period is exceeded data collection will time out. These limits correspond to periodic sample rates of 8 to 2000 datasets per second.

When the genlock/trigger input is operating as a generic digital input the state of the input is captured and transmitted in the digital output data stream. A separate digital data channel is used. A zero value in this channel indicates the signal remained low during acquisition of the corresponding data set. A one value indicates the signal went high or remained high during the acquisition. The trigger high state must exceed 21 microseconds for capture.

7.1. Power Supply

The power supply is a GlobTek©, Inc. P\N WR9QG400LCP–N-MED wall mount internationally recognized medical grade power supply unit designed to deliver the 15 V, within the 9-18 V required for the Optima. It comes with interchangeable input connectors for most countries.   It is designed to accept input voltages of 100-240VAC, 50 or 60 Hz, Class II. The power supply requires no maintenance and is not repairable. The Output connector is a 5.5 mm x 2.1 mm plug.

7.1.1. Analog Output Connector

The DB25S is a 25 pin connector providing access to the +/- 5 VDC analog outputs.

Analog Output Connector	
DB25S	
Pin #	Description
1	Fx: analog out
2	Fy: analog out
3	Fz: analog out
4	Mx: analog out
5	My: analog out
6	Mz: analog out
7	NC
8	NC
9	NC
10	NC
11	Optional power minus input*
12	Optional power plus input
13	Optional power minus input*
14	Voltage Ref 1ma, max
15	Ground Ref
16	Ground Ref
17	Ground Ref
18	Ground Ref
19	Ground Ref
20	Ground Ref
21	NC
22	NC
23	Optional auto zero Input**
24	Optional power plus input
25	Optional power minus input*

* With location R281 zero channel jumper installed

**With momentary switch to ground ref

7.2. Transducer Input

The transducer input is a 26 pin circular type connector.   It is used to connect the force plate to the Optima.

Transducer Input Connector	
851-02E-16-26S50-44	
Pin #	Description
A	Fx + excitation
B	Fx – excitation
C	Fx – output
D	Fx + output
E	Fy + excitation
F	Fy – excitation
G	Fy – output
H	Fy + output
J	Fz + excitation
K	Fz – excitation
L	Fz – output
M	Fz + output
N	Mx + excitation
P	Mx – excitation
R	Mx – output
S	Mx + output
T	My + excitation
U	My – excitation
V	My – output
W	My + output
X	Mz + excitation
Y	Mz – excitation
Z	Mz – output
a	Mz + output
b	+ smart platform
c	- smart platform

7.3. Compliance labels

	Compliance Labels
CE	This product meets the standards set by CE Directive 2006/95/EC and has successfully been tested to comply with medical electrical equipment standards regarding basic safety, essential performance and electro-magnetic compatibility AAMI/ES 60601-1 Issued 2005/01/01 CAN/CSA – EN 60601-1 Issued 2008/02/01 IEC –EN 60601-1 Issued 2005/01/01 IEC –EN 60601-1-6 2006/12/08
RoHS compliant	The entire Optima product including external power supply was designed with RoHS (reduction of hazardous substances) compliant components.
	The Optima should not be thrown away at the end of its lifetime. Please contact AMTI for proper disposal methods.
	Please avoid static discharges on amplifier and platform
	Follow instructions for use

8. Maintenance, Storage and Cleaning

There are no user-serviceable components inside the Optima. If service is required, please contact AMTI. There is no special cleaning, disinfection, or sterilization required, only the routine housekeeping required of a laboratory environment. It is recommended that the original container be used to store the Optima for extended periods of non-use.

9. Optima Technical Specifications

Optima specifications	
Analog inputs	Six 4-arm strain gage bridges (350 Ohm minimum)
Bridge excitation	Channel independent, software configurable – 2.5, 5 or 10 VDC
Amplifier gains	Channel independent, software configurable – 500, 1000, 2000, 4000
Auto zero	Push button or software initiated
Anti-aliasing filter	1000 Hz low pass, 2-pole Butterworth
Analog output range	+/- 5 volts
Analog output reconstruction filter	1000 Hz low pass, 3-pole Butterworth
Analog output DAC	16 bit
Sample rate	Max: 2000 Hz/channel Min: 10 Hz/channel
Synchronization	Genlock, external trigger, internal clock
Digital Signal Processor	16 bit
Digital data	IEEE 754 floating point 32 bit
Digital resolution	14 bit ENOB
Power Input	9-18 VDC, 0.4A
Power supply	External medical grade (included) Input: 120-240 VAC, 50/60 Hz, 0.5A; Class II Output: 15VDC @ 0.4A
Connectors	Digital output: USB 2.0 Sync/genlock: RCA phono Power: 5.5 mm x 2.1 mm plug Analog output: DB25S Transducer Input: 26-pin circular type connector
System environmental operating conditions	0 to 125°F (-18 to 52°C) 0 to 70% RH, indoor/laboratory environment
Physical dimensions (W x L x H)	26 x 21 x 4 cm (10.25 x 8.25 x 1.72)
Weight	2 kg (4.5 lbs)
IP Rating	IPX0

9.1. Analog Output Calculations

For each channel the analog output full scale range is +/-5 V. The calculations for converting from volts to engineering units differ depending on the selected analog output mode. The Optima has two possible analog output modes: MSA-6 compatible and fully-conditioned. Two understand the differences between the two please read Section 6.4 in depth.

The following is the calculation for converting the Optima Analog outputs to Engineering units. This equation anticipates the use of an ADC card.

F_{Chan} : The force or moment output in engineering units for a given channel [1]

V_{Ref} : The reference voltage of the ADC card

I_{FS} : The full scale integer output of the ADC card

I_{ADC} : Integer output of the ADC for a particular sample[1]

col : A column index to the Inverted calibration matrix

$C_{chan,col}$: The inverted sensitivity value from the calibration matrix. The chan subscript refers to the row. The col subscript refers to the column. [1]

V_{exc} : The nominal excitation voltage [1,2]

gain : The nominal gain value[1,2]

[1] These terms are channel specific.

[2] Since the gains and excitations are applied internally to the Optima we use only the nominal gains and excitations in the calculations.

$$\text{F}_{\text{chan}} = \frac{\left(I_{ADC} \times V_{Ref} \times 10^6 \times C_{chan,col}\right)}{(V_{exc} \times gain \times I_{FS})}$$

The inverted calibration matrix is shown below. One is supplied with every platform. To use the inverted sensitivity matrix to calculate F_{chan} for each of the three orthogonal forces and the three orthogonal moments and torques you can use either the main diagonal terms of the matrix or the full matrix.

The main diagonal term for each row is highlighted in blue. To use just the main diagonal term simply substitute the highlighted coefficient from the appropriate row into the $C_{chan,col}$ variable of the equation.

To implement the full matrix, sum over all columns using the appropriate $C_{chan,col}$ terms for each channel.

Channel	Sample inverted Sensitivity Matrix					
	0	1	2	3	4	5
	VFx	VFy	VFz	VMx	VMy	VMz
	Input to channel i(lb,in-lb) is B(I,j)times the electrical output j(uV,Vex)					
	BP 400600-2000					
Fx	0.6519	-0.0068	-0.0019	0.0009	-0.0017	-0.0003
Fy	0.0090	0.6515	-0.0037	0.0009	0.0005	0.0010
Fz	0.0018	0.0017	2.5523	-0.0062	0.0001	0.0026
Mx	-0.0044	-0.0032	0.0003	12.8281	0.0108	-0.0138
My	0.0725	-0.0032	0.0003	0.0058	10.1358	-0.0140
Mz	0.0649	0.0821	0.0792	0.0123	0.0340	5.4451

9.2. Analog output calculations for fully conditioned output mode

The following is the calculation for converting the Optima Analog outputs to Engineering units when operating in fully conditioned mode.

	mV/N	mV/N	mV/N	mV/(N-m)	mV/(N-m)	mV/(N-m)	
Analog Sensitivities	44.482216	44.482216	44.482216	1.129848	1.129848	1.129848	Conditioned

F_{Chan} : The force or moment output in engineering units for a given channel [1]

AS_{Chan} : The Analog sensitivity for a given channel. The setting may be found in the Optima configuration dialog box.

VO_{Chan} : The analog output in volts from the Optima.

$$F_{Chan} = \frac{(VO_{Chan} \times 10^3)}{AS_{Chan}}$$

10. Abbreviations

ADC - analog to digital converter

DAC - digital to analog converter

FS – Full scale

V – volts

mV – millivolts

GUI – graphical user interface

11. Definitions

AMTI Smart Platform – An AMTI Smart platform is a platform enhanced with an integral ROM. If the smart platform is of the Optima variety, the ROM holds platform identification parameters. When used in combination with an Optima signal conditioner, the platform identification information is uploaded to the Optima whenever it is powered on.

Analog output range – For a Optima the analog output range is always +- 5 volts. When we discuss the anlog output range in this manual we are frequently referring to it in engineering units.

Crosstalk – A force plate produces 6 output channels; 3 channels correspond to the 3 orthogonal components of the applied force and 3 channels correspond to the 3 orthogonal components of the applied torques and moments. Crosstalk occurs when a nonzero output is produced in a channel in response to an applied force and torque with no corresponding component. For example a force applied purely in the Z direction produces residual output in the X and/or Y force channels.

DC offset – Constant residual output level remaining when the true analog/digital output should be zero

Electrical Center – X, Y and Z offsets from the geometrical center of the platform where a pure force applied in any direction will produce no moment. (i.e. a point load in the Fz direction applied at the electrical center of the platform will produce no x or y moments)

IP rating – Stands for International Protection Rating. The IP rating classifies the degree of protection from dust, accidental contact, solid objects, and water in electrical enclosures.

Platform – In this manual the word platform may also be substituted with plate, transducer, load cell, any six channel strain gage multi-axis measurement device.

Load Components - The 3 orthogonal components of the applied force (Fx, Fy, Fz) and the 3 orthogonal components of the applied torques and moments (Mx, My, Mz).

Nominal Value - A nominal value is a value specified by the manufacturer for a particular device parameter. The actual value may be different, but will be within the manufacturing tolerance.

12. Errata

MSA-6 Mode – The Gen 5 has an MSA-6 mode for analog output.   Although the AmtiSystemConfig, and NetForce software will allow an Optima user to select MSA 6 mode it is not an Optima feature. Optima users should always select *Fully Conditioned* mode for analog outputs.

Optima Boot Sequence – When an Optima signal conditioner is turned on, it looks to see if an Optima force platform is connected. If an Optima platform is connected it uploads the platform serial number and checks it against the platform calibration file stored in the signal conditioner. If the platform serial number does not match the serial number of the calibration file stored in the signal conditioner then a new calibration file must be downloaded from the PC.   When NetForce or AMTISystemConfig software is started they check to see if each Optima Signal Conditioner has the appropriate calibration files. If they do not the C:\AMTI\HPS folder will be searched for the file and if not found the user will be prompted to select the file. The *Find Amplifier* button in both programs will cause the same sequence of events. The point to remember is, if you swap the Optima platform connected to the Optima Signal conditioner remember to power cycle the signal conditioner afterward and then either press *Find Amplifier* or restart the NetForce or AMTISystemConfig software to assure the correct calibration file has been downloaded.