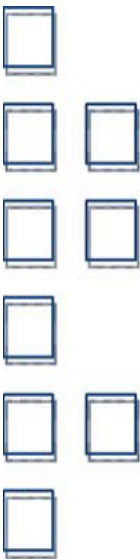




# UV Laser Marking Module Series

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## User Guide



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# Revision History

Date	Revision	Revision Information
November 2017	A	Initial Document Release

## **Preface**

Ensure you read and understand this guide in its entirety and familiarize yourself with the operating and maintenance instructions before you use the product. IPG strongly recommends that all operators of the product read and pay particular attention to all safety information contained herein prior to operating this product.

This guide should stay with the product to provide you and all future operators, users, and owners of the product with important operating, safety, and other information.

For technical assistance concerning the product, contact IPG Customer Service at:

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## **Audience**

The audience for this guide is system integrators and technicians that are responsible for installing and operating the Laser Marking Module in industrial and non-industrial installations.

## **Notice**

Instructions for the safe installation of this laser product are provided in the servicing information available from the manufacturer of the complete system. Such instructions should be followed closely.

Note: The language of the original instructions is English.

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# 1. Overview

## 1.1 Introduction

The UV Laser Marking Module consists of a new generation pulsed fiber laser, which is fully integrated with a two-axis scanning system.

The UV Laser Marking Module also includes control electronics and scanning optics. This complete module comes fully optimized, pre-calibrated, and designed to help integrators enhance their laser marking products.

The UV Laser Marking Module also lets you use industry standard command inputs for use with your own scan controller and marking software.

There are two versions of the Laser Marker Module covered in this guide:

- Laser Marker Module XY2-100
- Laser Marker Module with Integrated Scan Controller

### 1.1.1 Additional Documentation

Refer to the following documentation included with the product:

- *Specification Ytterbium Pulsed Fiber Laser- UV sources*

### 1.1.2 Applications - Industrial and General Manufacturing

Varieties of Materials: Stainless Steel, Aluminum, Brass, Nickel Alloy, Silver, and polymers such as Polycarbonate, HDPE, and Silicone.

### 1.1.3 Key Terms

- **Laser Source** – responsible for generating the laser beam.
- **Scan Head** – deflects a laser beam using galvo-controlled mirrors through a scanning lens.
- **Laser Marking** – delivers and focuses a laser beam on a target surface.

## 1.2 Certification

IPG certifies that the Laser Marking Module is thoroughly tested and inspected, and meets published specifications prior to shipping.

Upon receiving your shipment, check the packaging for any possible damage that could have occurred in transit. If damage is apparent, contact IPG immediately.

This product does not comply with IEC 60825, 21 CFR 1040.10 and/or 1040.11. For use as a system component only. It is the responsibility of the purchaser/end-user to bring the end system into full compliance with all applicable regulations.

### 1.2.1 Recommended Requirements

IPG Photonics recommends the following additional requirements for your Laser Marker system:

- Safety Switch
- Z Stage Positioner to hold Optical Scanner Head
- Fume Extraction System to remove gases and particles released during the laser marking process.
- Protective Enclosure

## 2. Safety and Compliance Information


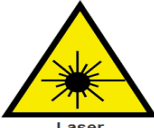

### 2.1 Safety Information and Conventions

To ensure the safe operation and optimal performance of the product, follow all warnings in this guide. Safety precautions must be observed during all phases of operation, maintenance, and service.

Operators must adhere to these recommendations and to apply sound laser safety practices at all times. Never open the device module. There are no user-serviceable parts, equipment or assemblies associated with this product. All internal service and maintenance should only be performed by qualified IPG personnel.

IPG Photonics uses various words and symbols in this User Guide. They are designed to call to your attention to any hazards or important information. Refer to Table 2-A.

**Table 2-A: Safety Symbol**

Symbol	Description
 Electrical	Text marked with an <b>Electrical Warning</b> symbol refers to a potential personal hazard. It requires a procedure that, if not correctly followed, can result in bodily harm to you or others. Do not proceed beyond the <b>Electrical Warning</b> symbol until you completely understand and meet the required conditions.
 Laser	Text marked with a <b>Laser Warning</b> symbol refers to a potential personal hazard. It requires a procedure that, if not correctly followed, can result in bodily harm to you or others. Do not proceed beyond the <b>Laser Warning</b> symbol until you completely understand and meet the required conditions.
	Text marked with a <b>CAUTION</b> symbol refers to a potential product hazard. It requires a procedure that, if not correctly followed, can result in damage or destruction to the product or components. Do not proceed beyond the <b>CAUTION</b> sign until you completely understand and meet the required conditions.
<b>No Symbol</b>	Text marked with " <b>Important</b> " is pertinent information regarding the operation of the product. Ensure that you do not overlook this information.

### 2.2 Safety Requirements and Features

#### 2.2.1 EMC Compliance

The ULPN-Series lasers are components and should be integrated into finished system. The EMC (CE mark relevant) standards are not applicable to the laser modules, however are applicable to the complete systems. The system integrator is responsible to comply with all applicable standards to the final laser system.

## 2.2.2 Laser Classification- Class IV Laser Product

Table 2-B: Laser Classification

Laser Classification	Average Power	Peak Power	Wavelength(s)
Class IV	3W	10kW	355nm

Governmental standards and requirements specify that laser products must be classified according to their accessible emissions accounting for power, energy, temporal, and wavelength characteristics. The UV Laser Marking Module Series are marked with the classifications that apply only to it as a standalone component. The UV Laser Marking Module is a Class 4 laser source; therefore all precautions associated with Class 4 laser products should be taken.

This device is classified as a high power **Class IV** laser instrument under 21 CFR, Sub-chapter J, part II, 1040.10(d).

This product emits visible and invisible laser radiation at or around a wavelength of 355 nm. The total light energy radiated from the optical output is **greater than 3.0W average at 300kHz and >10kW peak**, depending on the model. Under normal operating conditions, the UV laser output will emit secondary wavelengths (510nm - 540nm and 1020nm - 1080nm) from the aperture. Therefore, PPE determination should be based on the information listed on the label(s).



Class IV laser beams are also a potential fire hazard and skin hazard as well. Take precautions to prevent accidental exposure to both direct and reflected beams.

### WARNING



Diffuse and specular beam reflections can inflict severe retina and/or cornea injuries leading to permanent eye damage or blindness.

When operating the device, all personnel must wear appropriate eye protection. For information on laser safety eyewear, see section 2.2.4. Use of controls, adjustments or performance of procedures other than those set forth in this User Guide may result in exposure to hazardous radiation.



## 2.2.3 Laser Safety Eyewear

### WARNING



Use appropriate laser safety eyewear when operating this device. The selection of appropriate laser safety eyewear requires the end-user to accurately identify the range of wavelengths emitted from this product.



If the device is a tunable laser or Raman product, it emits light over a range of wavelengths. The end-user should confirm that the laser safety eyewear being used protects against the light that is emitted by the device over its entire range of wavelengths.

Please review the safety labeling on the product and verify that the personal protective equipment (i.e. enclosures, viewing windows, or viewports, eyewear, etc.) being utilized is adequate for the output power and wavelength ranges.

Whether the laser marking module is used in a new installation or to retrofit an existing system, the end-user is solely responsible for determining the suitability of all personal protective equipment.

There are several laser safety equipment suppliers that offer materials or equipment. Some of them include LaserVision USA, Kentek Corporation, and Rockwell Laser Industries. There are other laser personal protective equipment providers. IPG provides the names of these providers solely as a convenience and does not endorse or recommend any of them, or their products or services. IPG assumes no liability for their recommendations, products or services.


Laser safety eyewear must conform to US and international safety standards, including ANSI Z136.1 (US) and EN207/EN208/EN60825 (Europe). The regulations in force will depend on the location of the installation.


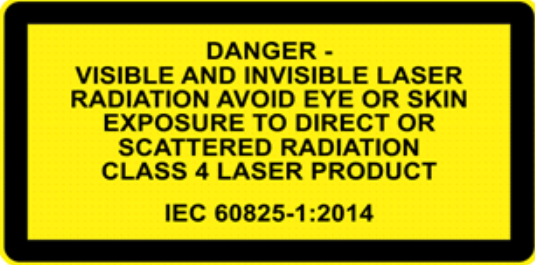


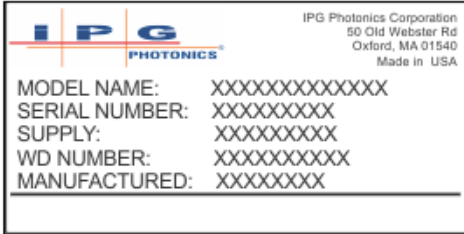
**IMPORTANT**


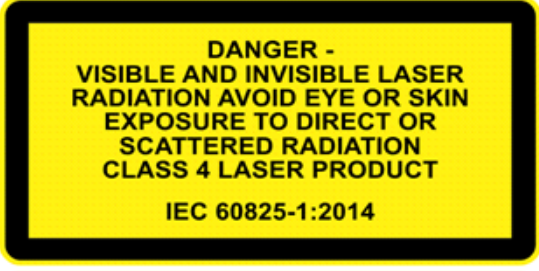



### 2.2.4 Device Safety Labels

The UV Laser Marking Module has the required safety labels located on the outside of the chassis in various locations. These include warning labels indicating removable or displaceable protective housings, apertures through which laser radiation is emitted and labels of certification, and identification.

**Table 2-C: Safety Label Description**

	Label Description and Location	Picture of Label
1.	<u>Certification Label</u>	

2.	<u>Laser Radiation Hazard Label:</u> Located near output aperture or exit point from the enclosure.	
3.	<u>Class 4 Laser Product</u>	
4.	<u>Warning Label:</u> Identifies the laser classification, power, pulse duration, repetition rate, and wavelength.	
5.	<u>Aperture Label:</u> Located near output aperture.	
6.	<u>Identification Label (Products Made in the United States).</u>	

7.	<u>Optical Scanner Head Aperture Label</u>	
8.	<u>Optical Scanner Head Caution Label – Class 4</u>	
9.	<u>Warranty Void Sticker</u>	
10.	<u>Caution Label</u> Consult accompanying documentation.	
11.	<u>Functional Earth Grounding</u> This is placed at the device earthing point and is mandatory for all grounded equipment.	

## 2.3 General Safety Instructions

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### IMPORTANT

If this instrument is used in a manner not specified in this document, the protection provided by the instrument may be impaired and the warranty will be voided.

---

### 2.3.1 Specular Reflections

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#### WARNING



Exercise caution to avoid / minimize specular reflections. This product emits visible and invisible laser radiation.

---

### 2.3.2 Equipment and Solvents

Light-sensitive elements in equipment, such as video cameras, photomultipliers, and photo diodes may be damaged from exposure to the laser light.

---

#### WARNING



Laser light is strong enough to cut or weld metal, burn skin, clothing, and paint. Laser light can ignite volatile substances such as alcohol, gasoline, ether, and other solvents.

Exposure to solvents or other flammable materials and gases must be avoided and must be relocated away from the device.

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### 2.3.3 Optical Safety

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- NEVER look directly into a laser or scanner head when the power is ON.
- Always make sure that you wear appropriate laser safety eyewear at all times while operating the product.
- Do not stare into the beam or view directly with optical instruments.
- If the output of the device is delivered through a lens with an anti-reflection coating, ensure that the lens is of good quality and clean.

#### CAUTION



- Hot or molten pieces of metal can be present when using this laser. Exercise caution if debris is being generated in your application.
- Ensure all electrical and optical connections are connected to the correct locations.
- Proper enclosures must be used to secure a laser safe work area. This includes but is not limited to laser safety signs, interlocks, appropriate warning devices and training/safety procedures. In addition, it is important to install the output assembly away from eye level.

The interaction between the laser and the material being processed can also generate high intensity UV and visible radiation. Ensure that all laser enclosures are in place to prevent eye and skin exposure to visible and invisible collateral radiation.

---



## 2.4 Electrical Safety

To ensure electrical safety:

1. Always use your device in conjunction with properly grounded power source.
2. Before supplying the power to the product, make sure that the correct voltage of the DC power source is used. Failure to use the correct voltage could cause damage to the product.
3. Before switching the power on, ensure the voltage corresponds to the specified level.
4. There are no operator serviceable parts inside. Do not attempt replacement of any parts. Refer all servicing to qualified IPG personnel. Do not remove covers. Any tampering with the product might void the warranty.
5. Connections to external circuits except for Mains connections: the external connections between this product and other external devices are PELV (Protected Extra-Low Voltage) as defined by IEC 61140. Non-Mains outputs of other devices connected to this product should also be PELV or SELV (Safety Extra-Low Voltage).
6. Keep away from sources of shock or vibrations.

## 2.5 Environmental Safety

### WARNING



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Ensure that all personal protective equipment (PPE) is suitable for the output power and wavelength range listed on the laser safety labels that are affixed to the laser marker module.

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### CAUTION



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Damage to the laser is possible, unless caution is employed when operating the device.

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### 2.5.1 Humidity

In order to enhance the longevity of the Laser Marker Module, IPG recommends that the device is not exposed to a high-moisture environment (>95% humidity).

## 2.5.2 Process By-Product

Ensure that the work surface is properly vented. When a laser beam reacts with any material, it can generate vapors, fumes, sparks, and particulate debris. By-products from the laser process are often toxic and can pose additional safety hazards. These fumes must be evacuated from the work area by means of an extraction system.

### IMPORTANT

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It is the responsibility of the end-user to ensure proper disposal of waste debris and other by-products. Any extraction system must comply with local and health and safety regulations.

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## 2.6 Additional Safety Resources

For additional information regarding Laser Safety, please refer the following list:

### **Laser Institute of America (LIA)**

13501 Ingenuity Drive, Suite 128  
Orlando, Florida 32826  
Phone: 407.380.1553, Fax: 407.380.5588  
Toll Free: 1.800.34.LASER  
Email: [lia@laserinstitute.org](mailto:lia@laserinstitute.org)

### **American National Standards Institute**

ANSI Z136.1 – 2014, American National Standard for the Safe Use of Lasers (Available through LIA)

### **International Electro-technical Commission**

IEC 60825-1, Edition 3, 2014  
Safety of laser products – Part 1: Equipment classification, requirements and user's guide. (Available through LIA)

### **Center for Devices and Radiological Health**

21 CFR 1040.10 – Performance Standards for Light-Emitting Products

### **US Department of Labor – OSHA**

Publication 8-1.7 – Guidelines for Laser Safety and Hazard Assessment.  
<http://www.osha.gov/>

### **Laser Safety Equipment**

Laurin Publishing  
Laser safety equipment and Buyer's Guides  
<http://www.photonics.com/Directory>

### IMPORTANT

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IPG Photonics recommends that the user of this product investigate any local, state or federal requirements as well as facility or building requirements that may apply to installing or using a laser or laser system.

Ensure that the standard you are using such as ANSI, IEC, and OSHA are current. Do not dispose of the machine with domestic waste. Electronic devices have to be disposed according to the regional directives on electronic and electric waste disposal.

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## 3. Using the Laser Marker Module

### 3.1 Overview

The Laser Marker Module consists of a laser device connected to an optical head by a flexible cord. Components are located in the base enclosure with the laser board, laser diodes, and optical scanner.

Figure 3-1 illustrates the Laser Marker Module, XY2-100 Version architecture.

**Figure 3-1. Laser Marker Module Architecture**

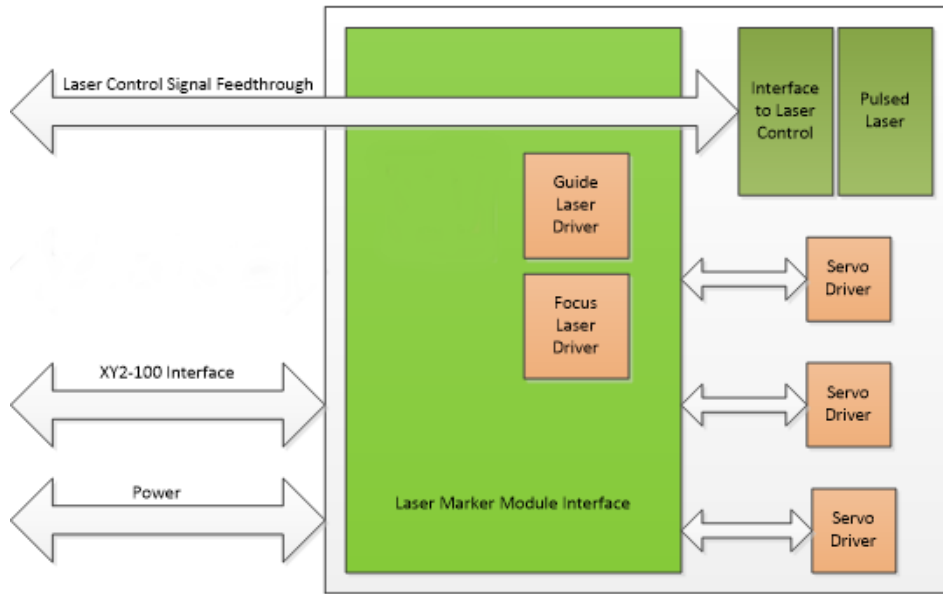
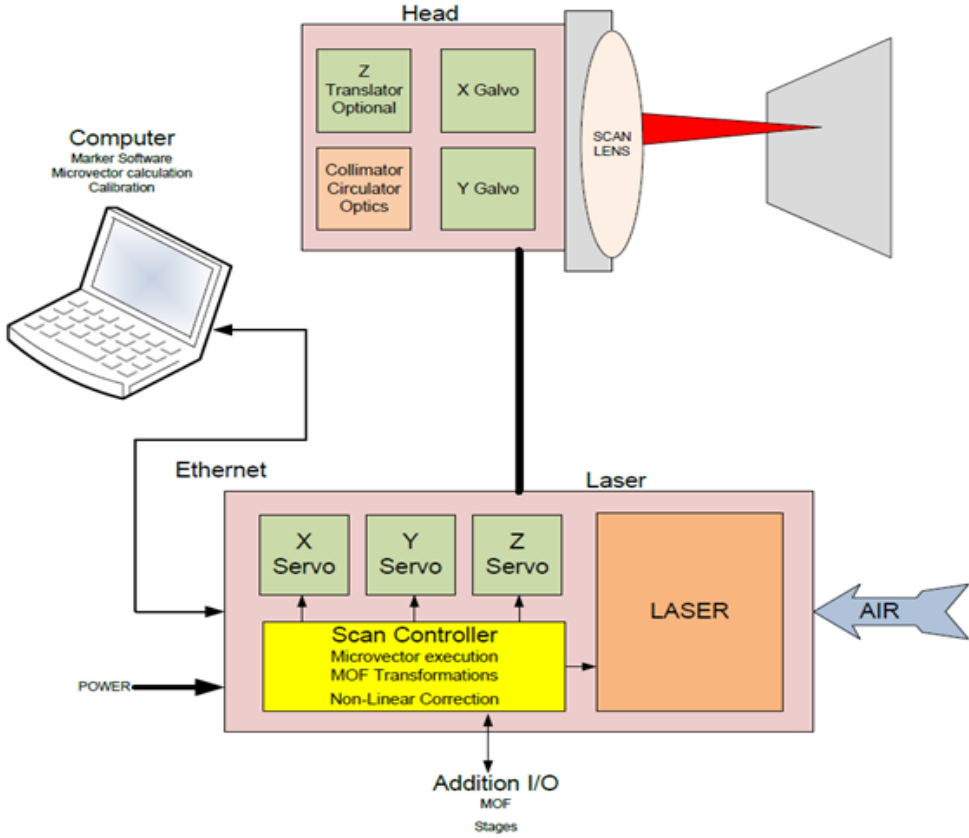


Figure 3-2 on the next page, illustrates the Laser Marker Module with Integrated Scan Controller Version architecture.

Figure 3-2. Laser Marker Module Scan Controller Architecture



The Scan Controller interfaces between a software dll on a PC, servo drivers, stages, encoders, lasers, and any other external systems. When used with external stages, the Scan Controller can monitor the stage location and output the image objects when the correct workspace location is in view or control external stages.

### 3.2 Specifications

Table 3-A and Table 3-B list the specifications for the UV Laser Marking Module and the Optical Scanner Head.

**Table 3-A: Laser Marker Module Specifications**

Item	Specification
Average Output Power	3W
Mode of Operation	Pulsed
Polarization	Linear
Maximum Pulse Energy	10 $\mu$ J
Nominal Average Output Power (in watts) <ul style="list-style-type: none"> <li>• Minimum</li> <li>• Typical</li> <li>• Maximum</li> </ul>	2.0 3.0 3.2
Output Power Adjustment Range	20-100%
Pulse Duration $\Delta t$ <ul style="list-style-type: none"> <li>• Minimum</li> <li>• Typical</li> <li>• Maximum</li> </ul>	1.0 ns 1.5 ns 1.8 ns
Central Emission Wavelength	355 nm
Pulse Repetition Rate	10-300 kHz
Laser Switching On/Off Time	2 $\mu$ s

**Table 3-B: Optical Scanner**

Item	Specification
Clear Aperture	12 mm
Square Field Size Options	60x60 mm – 110x110 mm – 155x155 mm
Tracking Delay	100 $\mu$ sec

### 3.3 Unpacking Instructions

#### IMPORTANT

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If the packaging shows any signs of external damage, carefully check the unit for damage and notify the shipping agent immediately.

Particular care must be taken when you remove the unit from the shipping carton to ensure that the fiber optic cord is not broken or damaged.

---

#### CAUTION




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To minimize the risk of damage to the device, IPG Photonics recommends that you unpack your Laser Marker Module and Optical Scanner using the procedure in section 3.3.1: "Unpacking a Unit From the Shipping Carton."

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### 3.3.1 Unpacking a Unit from the Shipping Carton

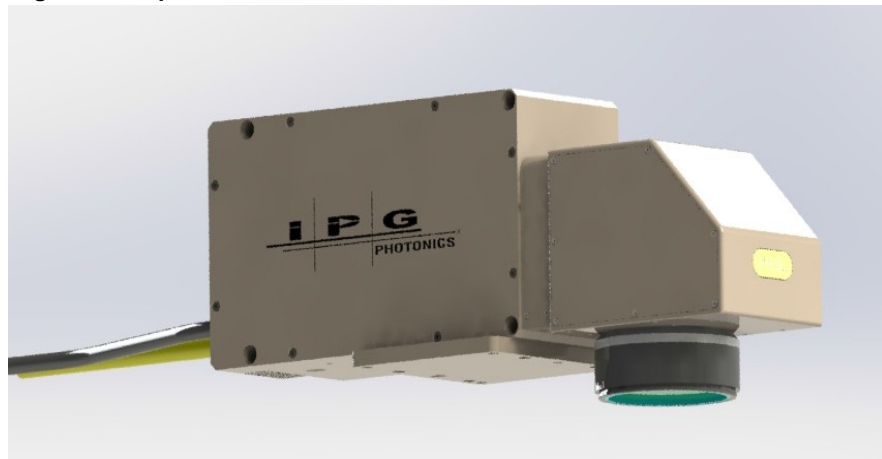
To unpack your unit from the shipping carton:

1. Place the package on a stable surface such as the floor or a large table.
2. Open the carton and remove the foam cover and store for later use.
3. Carefully lift the Laser Marker Module and Optical Scanner Head out of the box. The flexible yellow cord is already connected to the Optical Scanner Head. IPG strongly recommends two people lift the unit to avoid damaging the fibers in the flexible yellow scanner cord.
4. Carefully place contents on a stable surface.
5. Remove the cover from the Optical Scanner Head before use. Store for later use if needed.
6. If you have the XY2-100 version, remove the USB memory stick and store it in a safe place. Calibration files for third-part controllers are stored in the USB memory stick. Refer to section 3.4.4 for instructions.
7. Retain all packaging for future transportation or storage needs.

## 3.4 Optical Scanner Head

The Scanner Head connects to the laser module with a flexible, permanent, yellow cord.

**Figure 3-3. Optical Scanner Head**

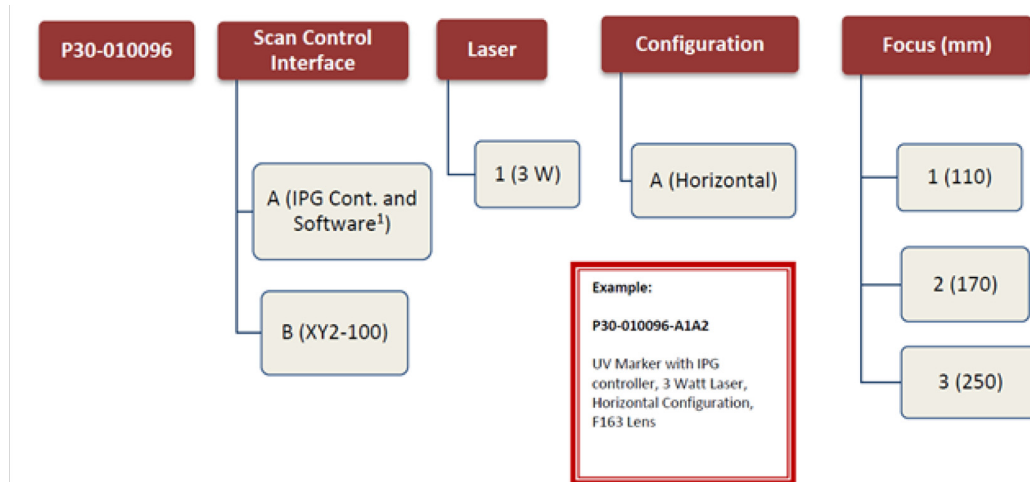


The Optical Scanner Head has the following features:

- 2D Factory Calibrated Marker
- 12mm CA Optics

Figure 3-4 illustrates available configurations for the optical scanner head.

**Figure 3-4. Optical Scanner Head Configurations**



The Optical Scanner Head includes three lens options. Refer to Table 3-C:

**Table 3-C: Specification for Three Lens Options**

Item	Lens 1	Lens 2	Lens 3
Nominal Focal Length (mm)	110	170	250
Nominal Spot Size @ 1/e <sup>2</sup> (um)	9	17	14
Working Distance (mm)	137	216	300
Field Size (mm <sup>2</sup> )	60 x 60	105 x 105	155 x 155

**IMPORTANT**

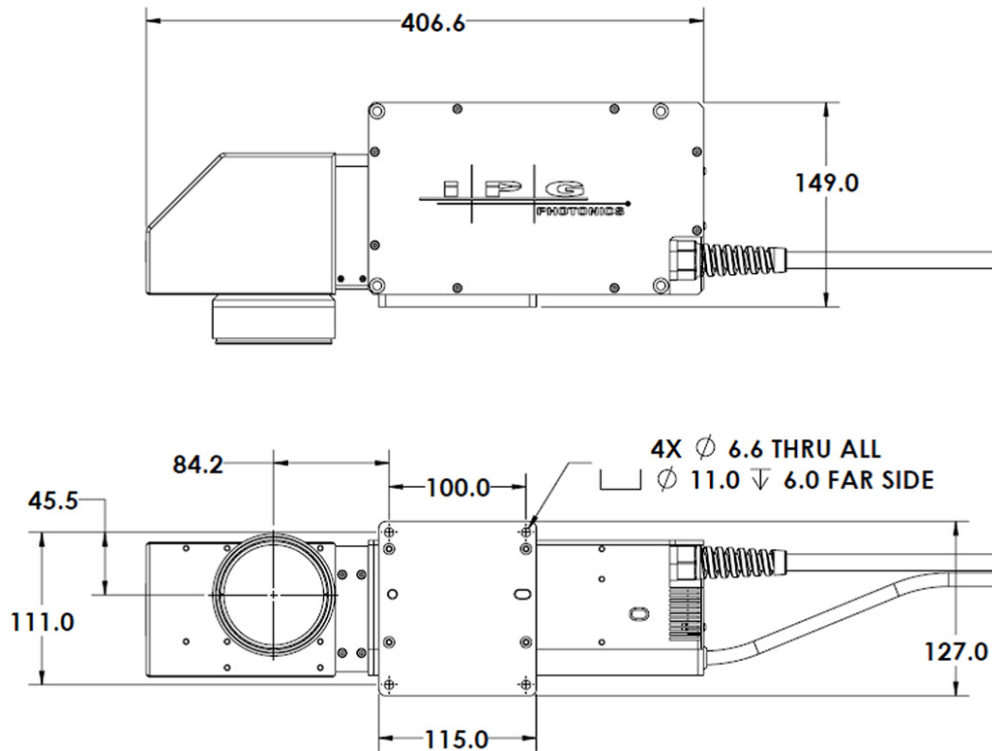
Working distances are taken from the edge of the lens housing.

**3.4.1 Bolt Pattern and Field Center**

The bolt pattern and field center diagrams are shown in Figure 3-5.



**Figure 3-5. Scanner Head Diagram - Horizontal Configuration**



### **3.4.2 Connecting Cables- Laser Marking Module XY2-100 Version**

IPG does not include cables in the shipment of the Laser Marker Module. You are responsible for providing your own cable connectors. Contact IPG Customer support if you need assistance.

For details on the rear panel refer to section 3.5.

To connect the cables to the Laser Marker Module XY2-100:

1. Connect a 5-pin female cable to the 5-pin male Power Supply.
2. Connect a 25-pin female cable to the 25-pin male Laser Control interface.
3. Connect a 25-pin male cable to the 25-pin female XY2-100 interface.

### **3.4.3 Connecting Cables- Laser Marking Module - Integrated Scan Controller**

Refer to section 3.6 for details on the rear panel for the Laser Marking Module with the Integrated Scan Controller.

To connect the cables to the Laser Marker Module with the Integrated Scan Controller:

1. Connect a 5-pin female cable to the 5-pin male Power Supply.

2. Connect an Ethernet cable to the Ethernet interface.
3. Optionally, connect a 37-pin female cable to the 37-pin male D connector.

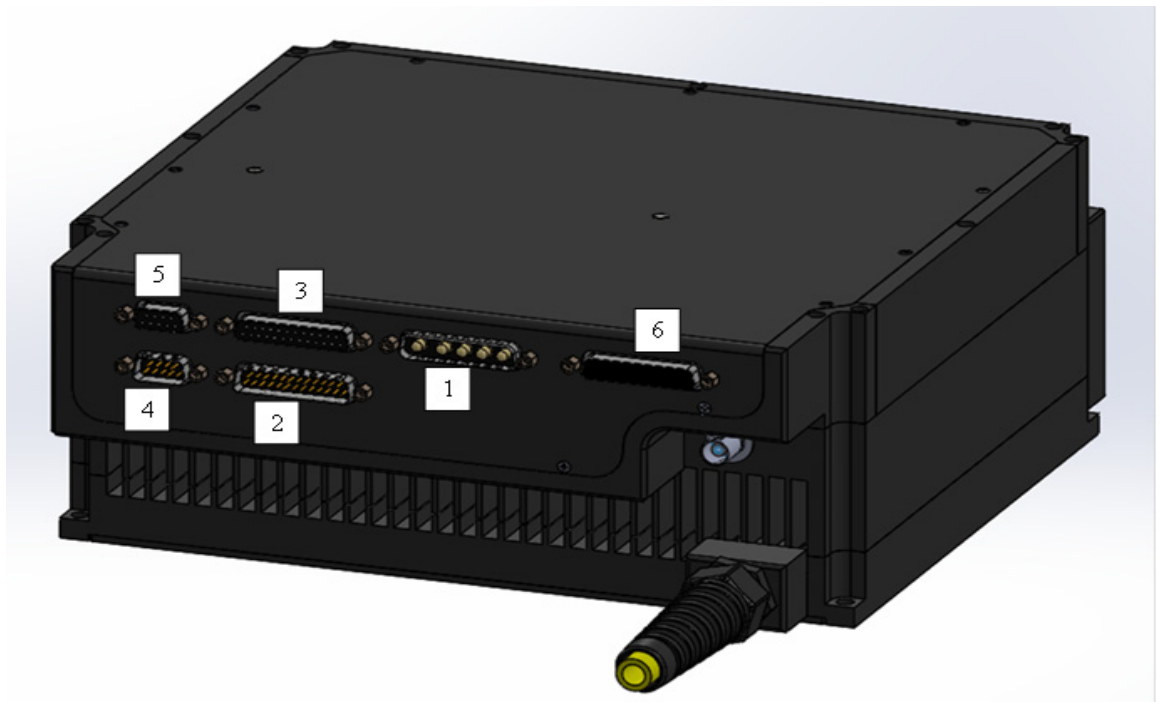
### 3.4.4 Calibration Files (XY2-100 Version Only)

Calibration files for both the main laser and the guide laser in .cbt format are included on the USB memory stick included with your shipment. If you are using a third-party controller, you need to load these configurations to your system.

## 3.5 Laser Marking Module: XYS-100 Version- Rear Panel

Figure 3-6 shows the rear panel of the Laser Marking Module. Details on each component are found in the table that follows.

**Figure 3-6. Laser Marking Module - Rear Panel**

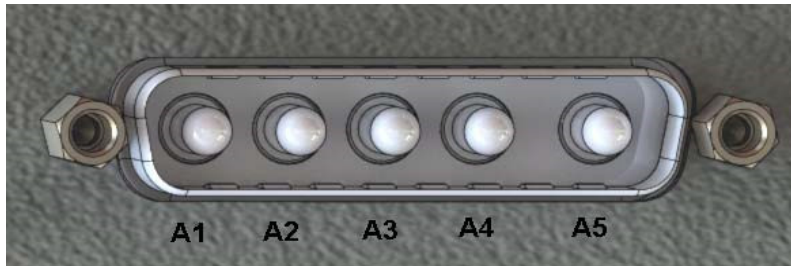


	Feature	Description
1	5-pin Male Power Supply	DB 5W5 connector used as the main power supply for the Laser Marking Module.
2	25-pin Male Laser Control	Connector used to control the laser.
3	25-pin Female XY2-100 Sockets	XY2-100 D connector used to control the galvanometers.
4	9-pin Male RS-232	Controls the laser via a RS-232 port.
5	9-pin Female Sockets	D connector for miscellaneous signals.
6	Scanner Ctrl Cable	Provides power and control signals for galvo mirrors.

### 3.5.1 Power Supply Pinouts- XYS2-100 Version

Figure 3-7 illustrates the male DB 5W5 5-pin power supply pinouts. Details for the power supply pinouts are found in the table that follows.

**Figure 3-7. Power Supply Pinouts**



Pin	Function	Description
A5	-V Scanner	Isolated Scanner Power (+V) - (-V) = 24V to 30V
A4	+V Scanner	
A3	Return	Return for HK and Laser Power. Laser Control and the XY2-100 Interface Reference
A2	+V LaserHK	House Keeping Power 24V
A1	+V LaserPower	Laser Diode Power 24V

### 3.5.2 Power Requirements- XYS-100 Version

**Table 3-D: Power Requirements**

Type	Specification
Scanner Power	24-30V +/- 5% @ 10 Amp Peak / 2 Amp Average
Laser HK Power <sup>1</sup>	24V +/- 5% @ < 1 Amp
Laser Power <sup>1</sup>	24V +/- 5% @ Max Laser Power Watts / (6 Volts)
<sup>1</sup> Maximum Values.	

**Table 3-E: Power Supply Options**

Wiring Options	Pin	Voltage
<b>Split Supply:</b> +/- 15 Volt supply for scanner (10 Amp Peak / 2 Amp RMS)  24 Volt supply for laser (8 Amp RMS for 50W laser)	A5	-15V
	A4	+15V
	A3	RET
	A2	+24V
	A1	+24V Safety Switched
<b>Single Supply:</b> 24 Volt supply for laser and scanner (18 Amp Peak / 10 Amp RMS)	A5	RET
	A4	+24V
	A3	RET
	A2	+24V
	A1	+24V Safety Switched

Figure 3-8 shows a split supply operation for the XY2-100 Version.

Figure 3-9 shows a single supply operation for the XY2-100 Version.

**Figure 3-8. Split Supply Operation: XY2-100**

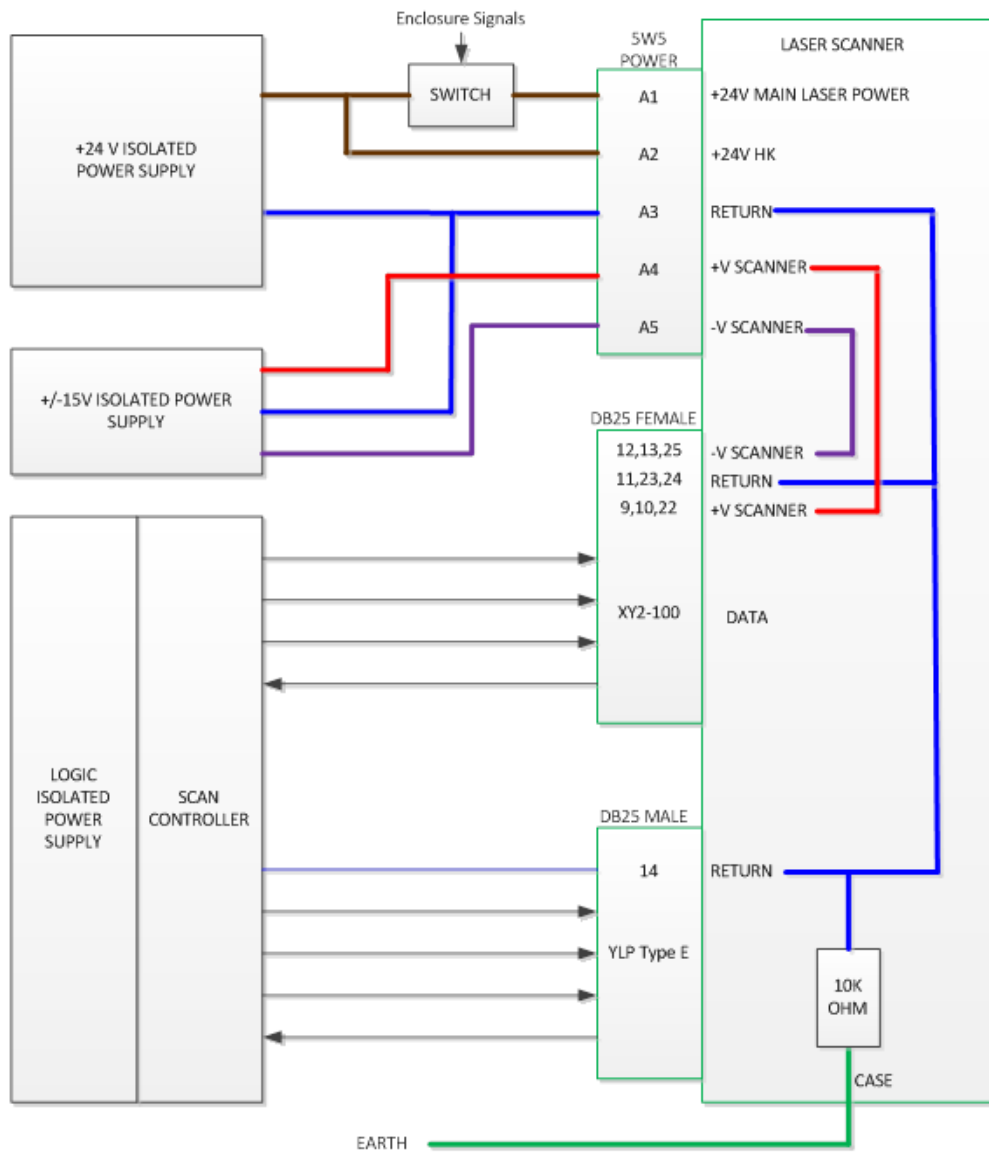
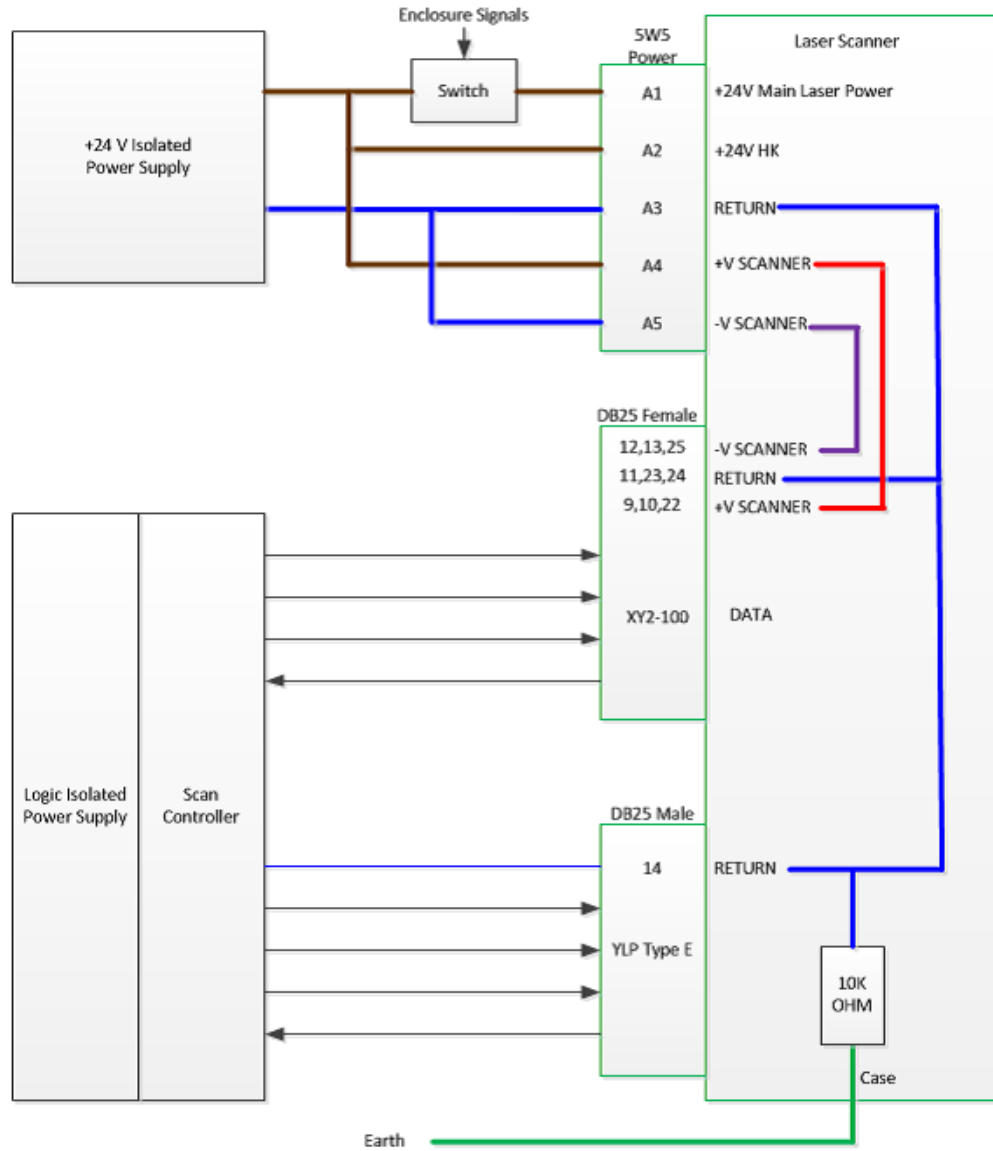


Figure 3-9. Single Supply Operation: XY2-100



### 3.5.3 Laser Control Pinouts- XY2-100 Version

Figure 3-10 illustrates the 25-pin Laser Control Pinouts. For details on the pinouts refer to the table that follows.

**Figure 3-10. Laser Control Pinouts**



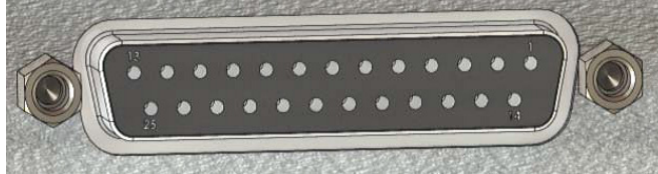
Pin Number	Description	Pin Number	Description
1	D0	14	Gnd
2	D1	15	5V Aux Out
3	D2	16	Alarm1
4	D3	17	GI_Pwr
5	D4	18	Mo On
6	D5	19	Pa_On
7	D6	20	Sync
8	D7	21	Alarm0
9	Latch	22	GI On
10	Auxin1	23	Emer_Off
11	Alarm2	24	Auxin3
12	Alarm3	25	Auxin4
13	Auxin2		

### 3.5.4 XY2-100 Sockets

Figure 3-11 illustrates the 25-pin female XY2-100 sockets, which are used for control and status of the galvanometers. Refer to table that follows for more details.

Figure 3-11 illustrates the 25-pin female XY2-100 sockets, which are used for control and status of the galvanometers. Refer to table that follows for more details.

**Figure 3-11. XY2-100 Sockets**



Socket	Name	I/O	Description
1	CK-	O	2Mhz Clock
XX14	CK+	O	
2	SYNC-	O	SYNC Signal
15	SYNC+	O	
3	XD-	O	X Channel Data
16	XD+	O	
4	YD-	O	Y Channel Data
17	YD+	O	
5	ZD-	O	Z Channel Data (If Z axis is present)
18	ZD+	O	
6	STAT-	I	XYZ-100 Status Word
19	STAT+	I	
7	NC	---	No Connect
20	NC	---	
8	NC	---	
21	NC	---	
9	+V Servo	PWR	Positive Power Supply for galvanometers. 24-30V referenced to -V Servo. Connected to A4.
22			
10			

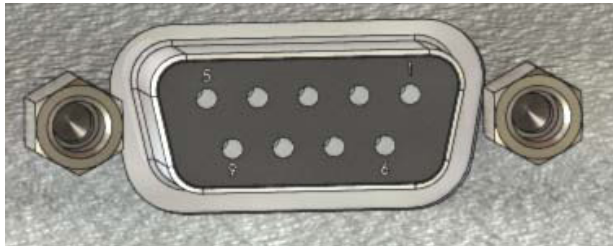


Socket	Name	I/O	Description
23	GND	PWR	GND Reference for pins 1-6 and 14-19.
11			
24			
12	-V Servo	PWR	Negative Power Supply Return for galvanometers. Connected to A5.
13			
25			

### 3.5.5 Miscellaneous Signal Sockets- XYS-100 Version

Figure 3-12 illustrates the 9-pin female sockets. For details on the 9-pin female pinouts, refer to the table that follows. Do not connect to "Reserved".

**Figure 3-12. 9-Pin Female Signal Sockets**

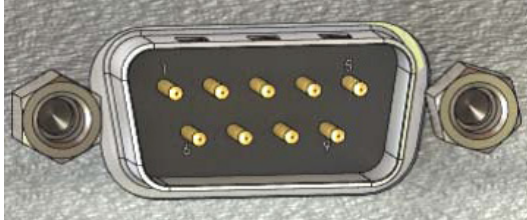


Socket	Name	Description
1	A1	Reserved
2	B1	Reserved
3	GL_ON	Reserved
4	FL_ON	Reserved
5	NC	Reserved
6	A2	Reserved
7	B2	Reserved
8, 9	GND	Reserved

### 3.5.6 RS-232 DB-9 Pinouts

Figure 3-13 illustrates the 9-pin male RS-232 DB9 pinouts. Detailed pinouts information is found in the table that follows.

**Figure 3-13. 9-Pin Male Pinouts**

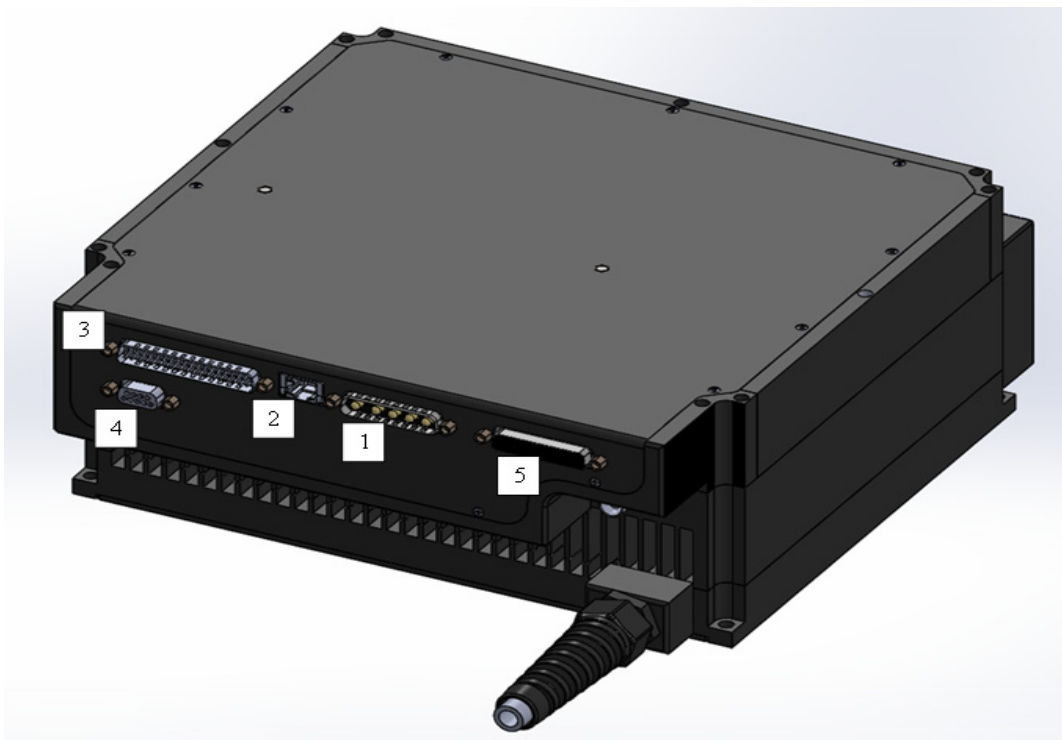


Socket	Description
1	Reserved – Do not connect
2	Rx Input - Receive
3	Tx Output - Transmit
4	Reserved – Do not Connect
5	Common
6 to 9	Reserved – Do not Connect

### 3.6 Laser Marking Module: Integrated Scan Controller Version - Rear Panel

Figure 3-14 shows the rear panel of the Laser Marking Module with Integrated Scan Controller. The table that follows provides details for each connection.

Figure 3-14. Front Panel View of Device

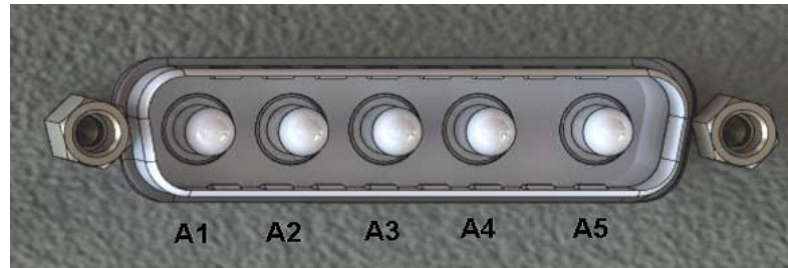


	Feature	Description
1	5-pin Male Power Supply	DB 5W5 connector used as the main power supply for the Laser Marking Module.
2	Ethernet Interface	<p>Communication from the IPG ScanPack .dll and system console is performed over Ethernet.</p> <p>Configure an Ethernet connection for DHCP. For optimal results, IPG recommends using a direct Ethernet connection (capable of 100 Mbit/s) directly from the PC to the Scan Controller.</p> <p>To change an IP Address to static, run the IPG Scan Controller Upgrade Utility. Refer to section 4.6.</p>
3	37-pin Male D Connector	(Optional) Used for external interface to external controllers, encoders, and safety logic.
4	9-pin Female DB9 RS-232	The RS-232 port can be used as a system console to set up IP addresses.
5	Scanner Ctrl Cable	Provides power and control signals for galvo mirrors.

### 3.6.1 Power Supply Pinouts- Integrated Scan Controller Version

Figure 3-15 illustrates the male DB 5W5 5-pin power supply pinouts. Refer to the table that follows for details.

**Figure 3-15. Power Supply Pinouts - Integrated Scan Controller**



Pin	Function
A5	-V Servo
A4	+V Servo
A3	GND Laser
A2	+V LaserAux
A1	+V LaserPower

### 3.6.2 Power Configuration Options- Integrated Scan Controller Version

Table 3-F lists details for the power configuration options.

**Table 3-F: Power Supply Options - Integrated Scan Controller Version**

Wiring Options	Pin	Voltage
Split Supply: +/- 15V supply for scanner 24V supply for laser.	A5	-15 V
	A4	+15 V
	A3	GND
	A2	+24 V
	A1	+24 V Safety Switched
Single 24V supply for laser and scanner	A5	GND
	A4	+24 V
	A3	GND
	A2	+24 V
	A1	+24 V Safety Switched

**Table 3-G: Power Requirements - Integrated Scan Controller Version**

Type	Specification
Scanner Power	24-30V +/- 5% @ 10 Amp Peak / 2 Amp Average
Laser HK Power <sup>1</sup>	24V +/- 5% @ < 1 Amp
Laser Power <sup>1</sup>	24V +/- 5% @ Max Laser Power Watts / (6 Volts)
<sup>1</sup> Maximum Values.	

Figure 3-16 shows a split-supply operation for the Integrated Scan Controller Version. Figure 3-17 shows a single-supply operation for the Integrated Scan Controller Version.

**Figure 3-16. Split Supply Operation - Integrated Scan Controller**

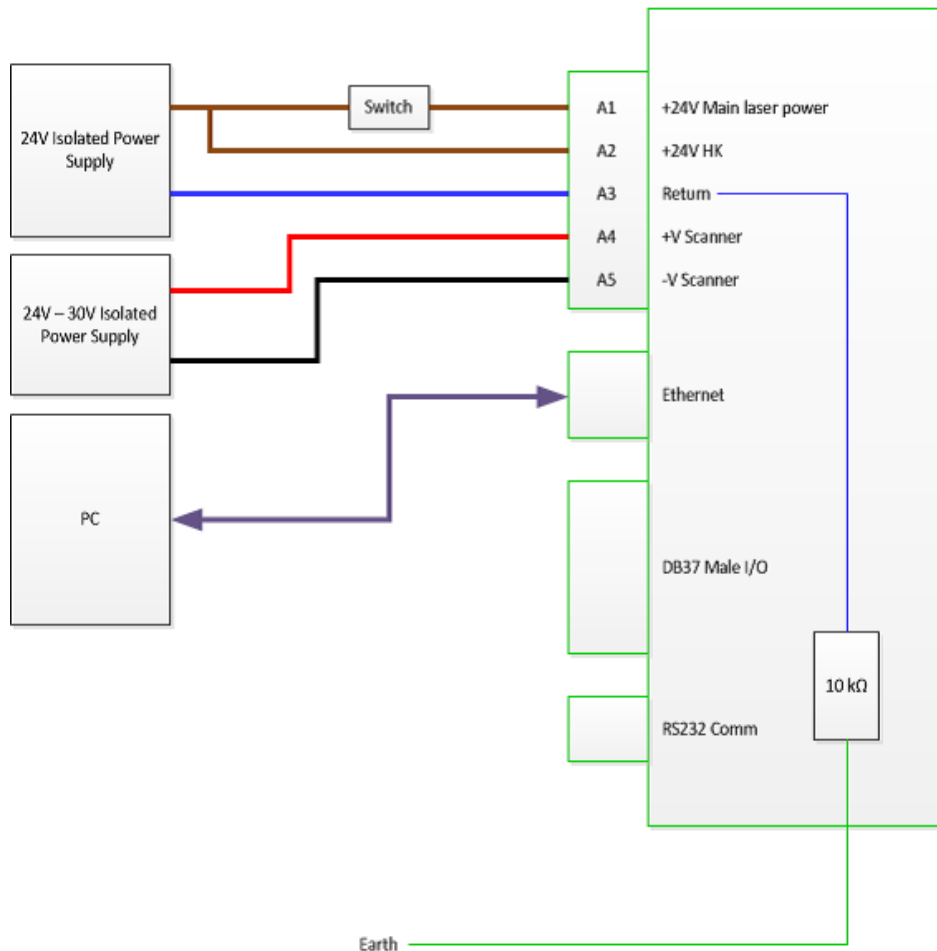
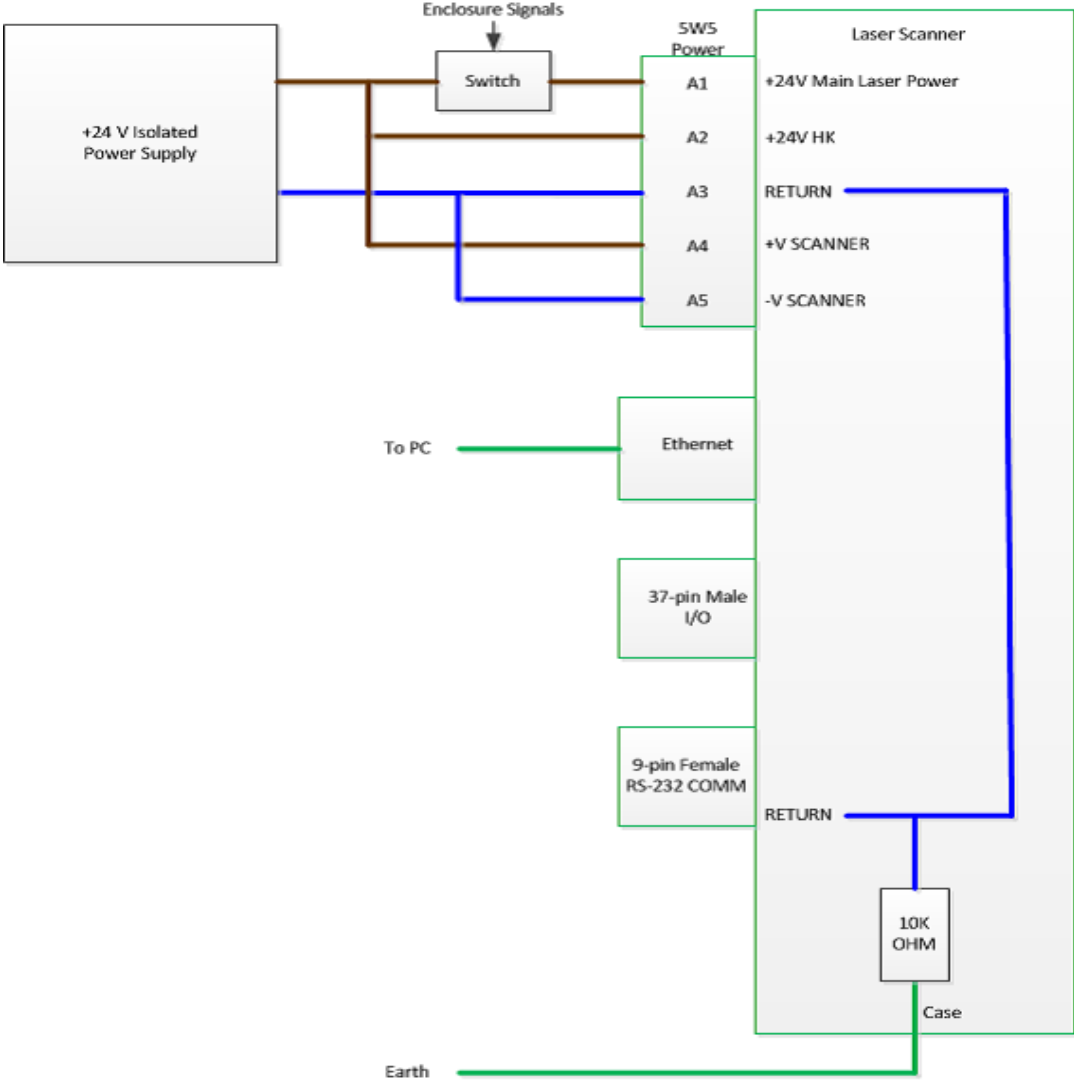
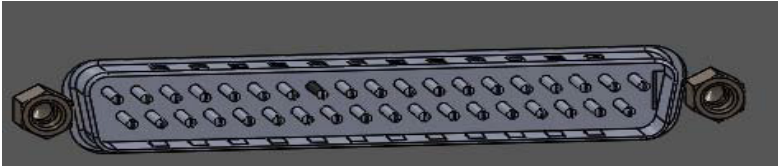


Figure 3-17. Single Supply Operation - Integrated Scan Controller



3.6.3. 37- Pin I/O Pinouts- Integrated Scan Controller Version

Figure 3-18. 37-Pin I/O Pinouts - Integrated Scan Controller



Pin	Name	I/O	Description
1	Active	Out	Mark in Progress
20	GND	3VTTL	
2	Ready	Out	Ready/Waiting Signal
21	GND	3VTTL	
3	Error	Out	Error Condition
22	GND	3VTTL	
4	Start	In	Start Signal Input
23	GND	3VTTL	Pulled up to 3.3V
5	Stop	In	Stop Signal Input Active Low
24	GND	3VTTL	Pulled up to 3.3V
6	GPIO[0]	In/Out	General Purpose Input/Output for Synchronization
25	GND	3VTTL	Pulled up to 3.3V
7	GPIO[1]	In/Out	General Purpose Input/Output for Synchronization
26	GND	3VTTL	Pulled up to 3.3V
8	A_Axis_A+	In/Out	Axis A Phase A
27	A_Axis_A-	RS-422	
9	A_Axis_B+	In/Out	Axis A Phase B
28	A_Axis_B-	RS-422	
10	A_Axis_Z+	In	Axis A Phase Home (or Zero) Differential or Single Ended (on Z+ Pulled up to 3.3V)
29	A_Axis_Z-	RS-422	

Pin	Name	I/O	Description
11	B_Axis_A+	In/Out	Axis B Phase A
30	B_Axis_A-	RS-422	
12	B_Axis_B+	In/Out	Axis B Phase B
31	B_Axis_B-	RS-422	
13	B_Axis_Z+	In	Axis B Phase Home (or Zero) Differential or Single Ended (on Z+ Pulled up to 3.3V)
32	B_Axis_Z-	RS-422 or 3VTTL	
14	C_Axis_A+	In/Out	Axis C Phase A
33	C_Axis_A-	RS-422	
15	C_Axis_B+	In/Out	Axis C Phase B
34	C_Axis_B-	RS-422	
16	C_Axis_Z+	In/Out	Axis C Home (or Zero) Differential or Single Ended (on Z+ Pulled up to 3.3V) or ClkIn/ClkOut Differential for Synchronization to laser.
35	C_Axis_Z-	RS-422 or 3VTTL	
17	FiberInterlockA0	Out Relay	FiberInterlock is safe when 1 is connected to 0.
36	FiberInterlockA1		
18	FiberInterlockB0	Out Relay	FiberInterlock is safe when 1 is connected to 0.
37	FiberInterlockB1		
19	GND	Out	Logic Ground

### 3.6.4. RS-232 DB9 9-Pin Sockets- Integrated Scan Controlled Version

Figure 3-19 illustrates the 9-pin female RS-232 DB9 sockets. The table that follows provides more detailed socket information.

**Figure 3-19. 9-Pin Female Sockets - Integrated Scan Controller Version**





Socket	Description
1	Reserved – Do not connect
2	Receive Data Output
3	Transmit Data Input
4	Reserved – Do not connect
5	GND
6	Data Set Ready Internally Connected to Pin-4 Data Terminal Ready
7	Request to Send Internally Connected to Pin-8 Clear to Send
8, 9	Reserved – Do not connect

## 4. Installing IPG ScanPack and WinLase 6 Software

### 4.1 Overview

This chapter explains how to install IPG ScanPack and the WinLase 6 laser marking software on your system for use with the Laser Marker Module with the Integrated Scan Controller. It also explains how to activate the WinLase 6 program and configure a LAN connection over Ethernet.

#### 4.1.1 Requirements

The following requirements are necessary:

- Windows 7 or 8 Operating System
- IPG Laser Marker Module with Integrated Scan Controller
- IPG ScanPack software
- WinLase 6 software
- WinLase 6 licensing key for product activation

### 4.2 Installing IPG ScanPack

In order to use the WinLase 6 software with the Laser Marker Module with Integrated Scan Controller, users must first install IPG ScanPack.

ScanPack is a .dll file in which WinLase 6 interfaces for communicating with your Scan Controller over Ethernet. The ScanPack installation program installs Bonjour (a protocol that discovers IP addresses over the network), Microsoft Visual C++ Runtime Libraries, and the ScanPack dll on your system.

#### IMPORTANT

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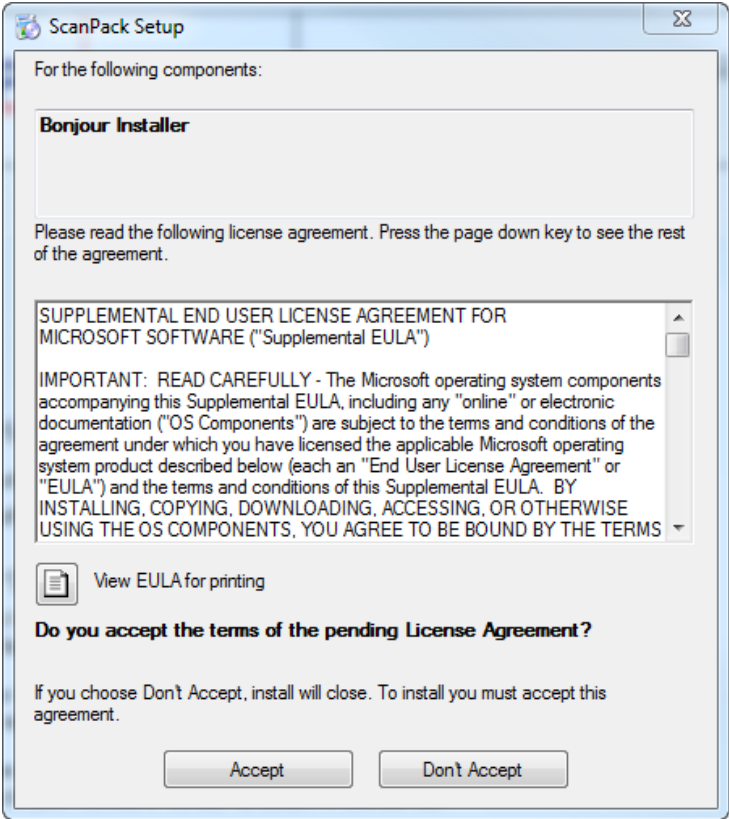
Before installing ScanPack, uninstall any previous versions of ScanPack, if applicable.

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To install IPG ScanPack:

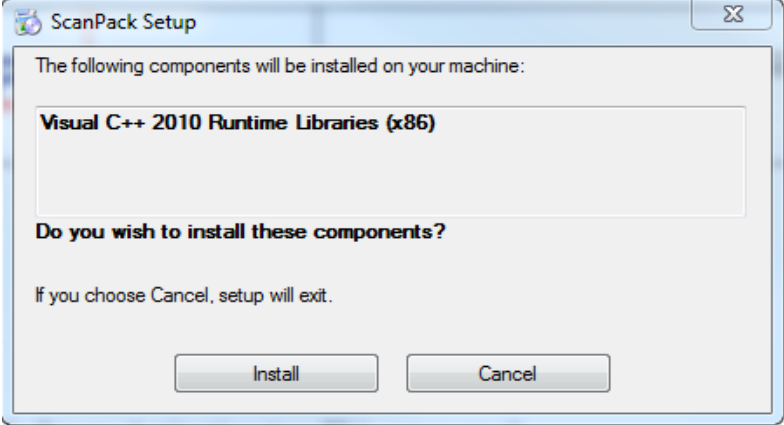
1. Open a web browser and go to: **software.ipgphotonics.com**.
2. Click the **Marker** folder.
3. Click the **ScanPack** folder.
4. Download the **ScanPack.zip** file to your computer.
5. Once downloaded, extract the ScanPack.zip file. A folder called ScanPack is created.
6. Open the folder and run **setup.exe** and click **Next**. The Bonjour installer appears. See Figure 4-1.

Figure 4-1. Bonjour Installer License Agreement



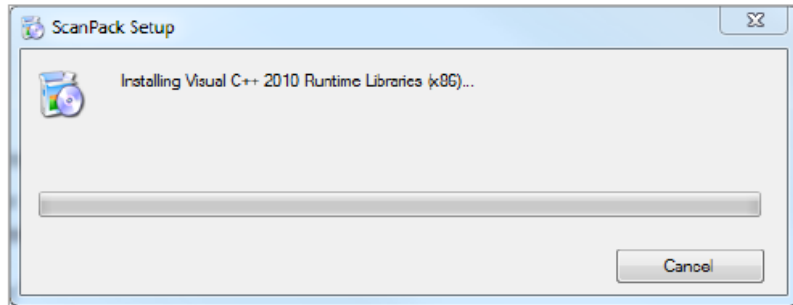
7. Click **Accept** to accept the license agreement. The following dialog box appears. See Figure 4-2.

Figure 4-2. Visual C++ 2010 Runtime Libraries Installation



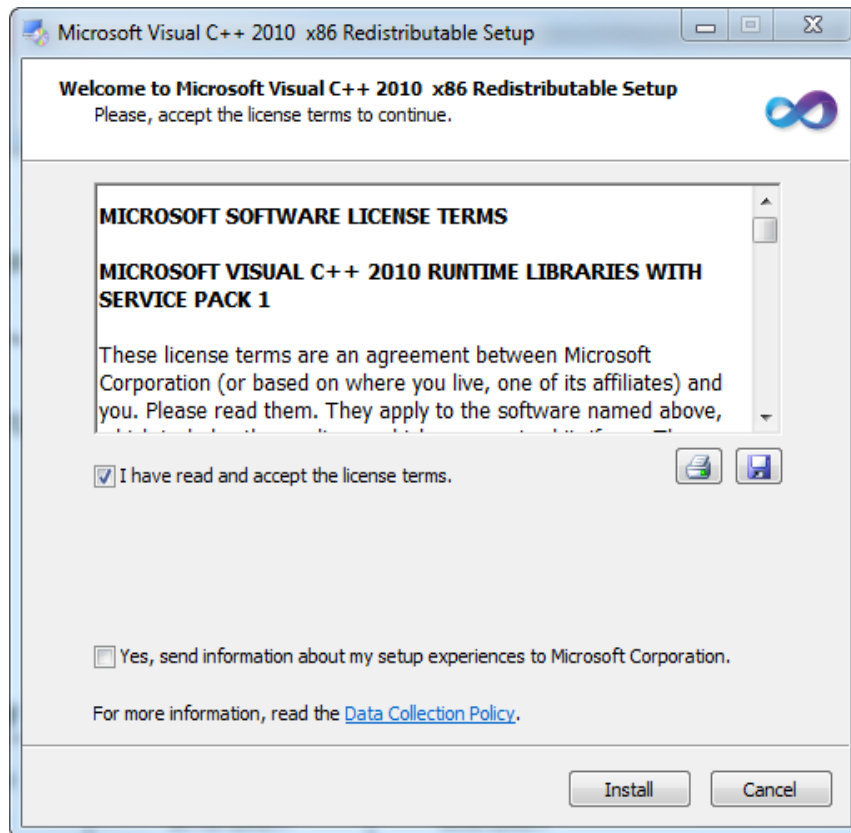
8. Click **Install** to begin the installation of the Visual C++ 2010 Runtime Libraries to your system. Figure 4-3 Status Message will appear.

**Figure 4-3. Status Message during Install of Visual C++ Runtime Libraries**



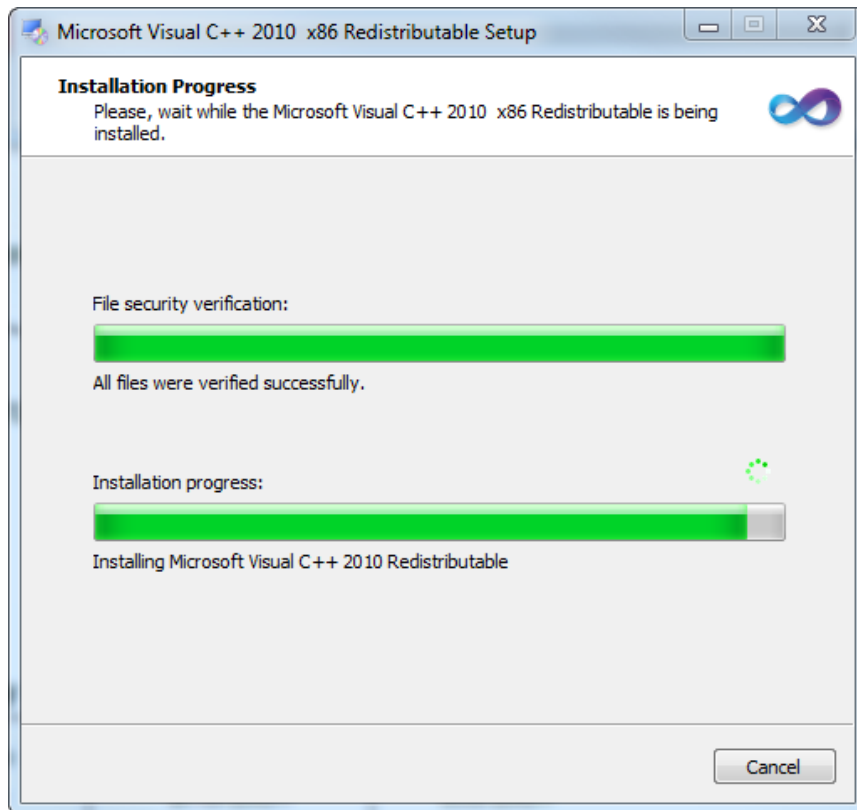
Next, the Microsoft Visual C++ 2010 x86 Redistributable Setup window appears. See Figure 4-4.

**Figure 4-4. Microsoft Visual C++ 2010 x86 Redistributable Setup**



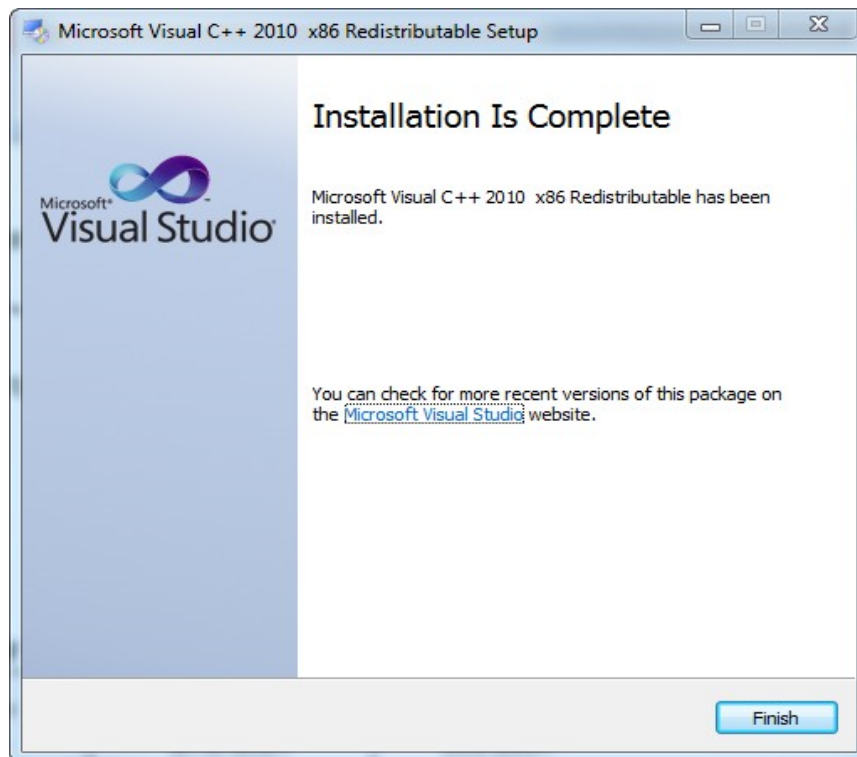
9. Click **I have read and accept the license terms** and click **Install**. The following window appears with the Microsoft Visual C++2010 x86 Redistributable installation progress. See Figure 4-5.

**Figure 4-5. Installation Progress Window**



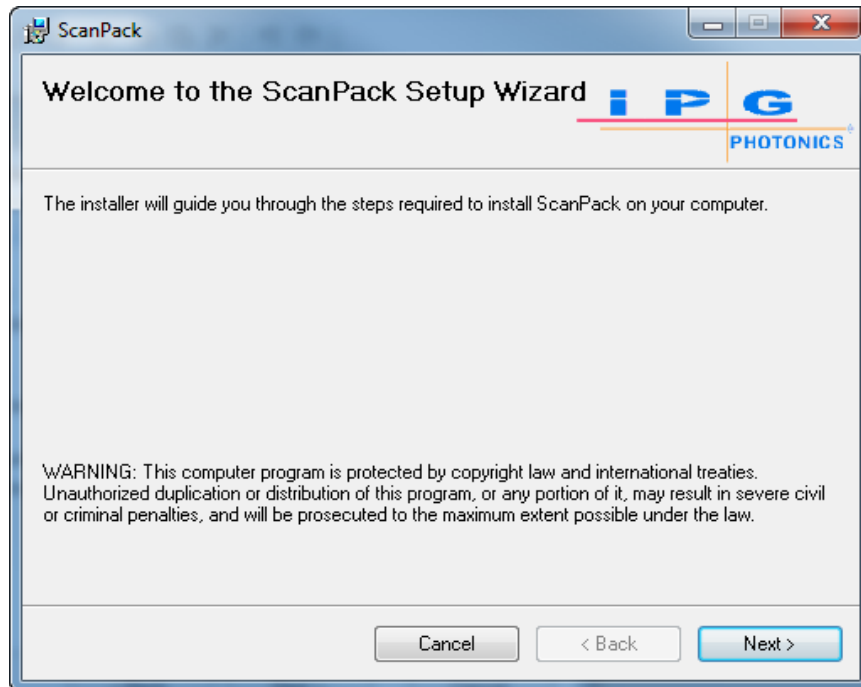
Next, the Installation is Complete window appears. See Figure 4-6.

**Figure 4-6. Installation is Complete**



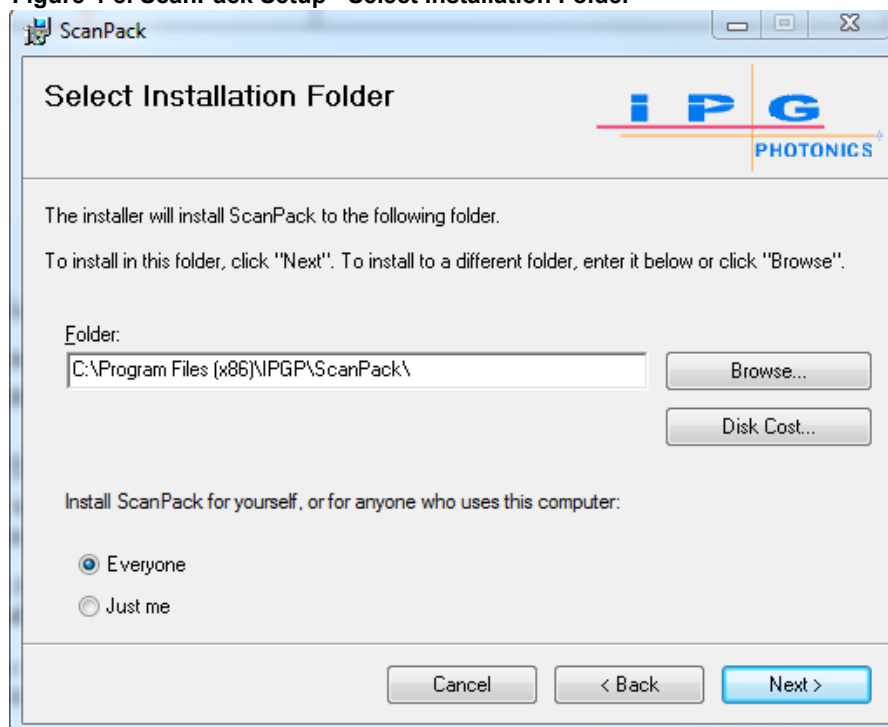
10. Click Finish. The ScanPack Setup Wizard appears. See Figure 4-7.

Figure 4-7. ScanPack Setup Wizard Window



11. Click **Next** to proceed. The Select Installation Folder window appears. See Figure 4-8.

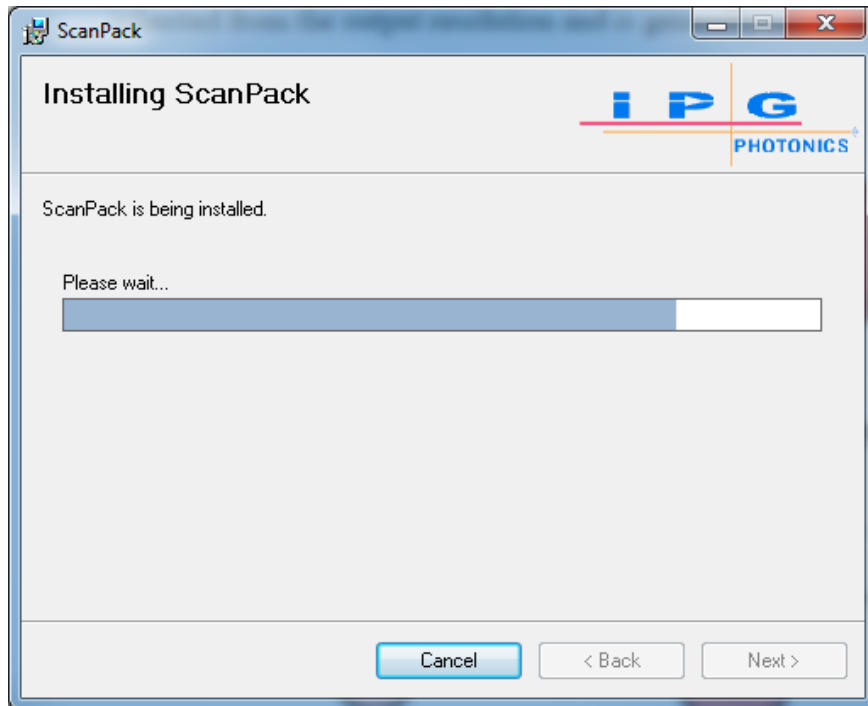
Figure 4-8. ScanPack Setup - Select Installation Folder



12. Click **Next** to accept the default Start Menu Folder.
- Click **Browse** if you want to change the default Start menu to another location.
  - Click **Everyone** to allow all users to have access to the ScanPack dll or **Just me** if only you want access.

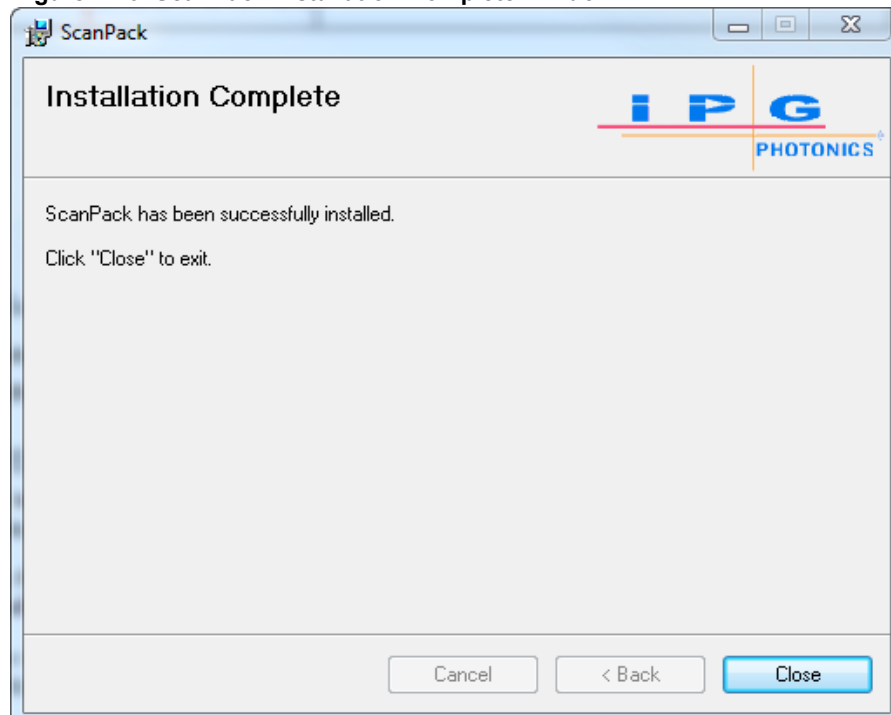
13. Click **Next** to begin the installation. The Installation Progress window appears. See Figure 4-9.

**Figure 4-9. Installing ScanPack Window**



14. Click **Next** to proceed. The Installation Complete window appears. See Figure 4-10.

**Figure 4-10. ScanPack Installation Complete Window**



15. Click **Close** to exit the program.

ScanPack is successfully installed on your system.

## 4.3 Installing WinLase 6 Software

The WinLase 6 program is only compatible with the Laser Marker Module – Integrated Scan Controller version.

### IMPORTANT

---

Before installing the WinLase 6 software, uninstall any previous versions of WinLase 6, if applicable. You also need to first install IPG ScanPack as instructed in the previous section 4.2.

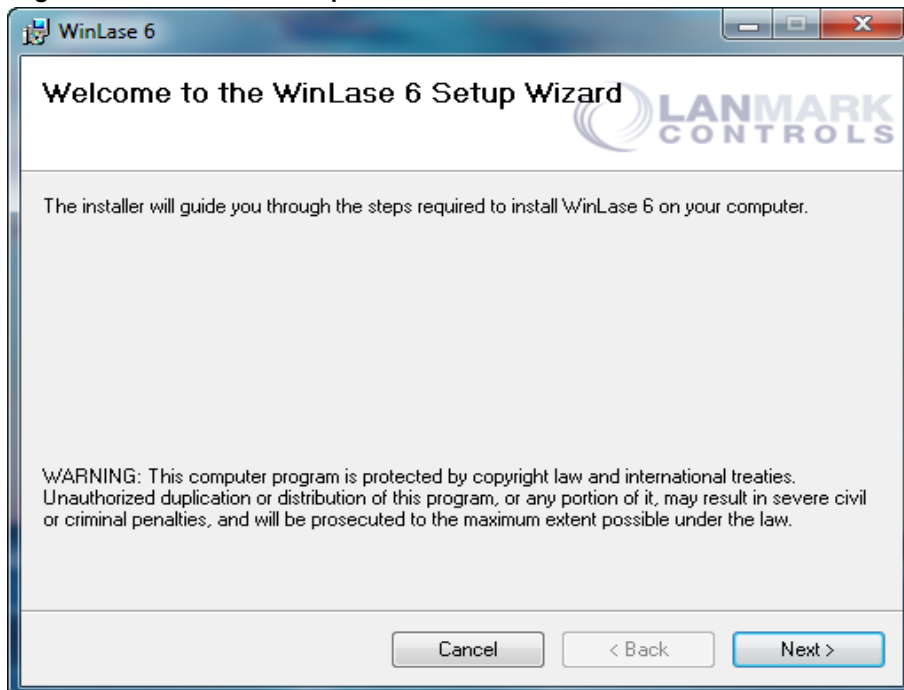
---

With WinLase 6, you can edit nodes and vectors and change properties without using an external graphics software package. You can also keep multiple instances of the software open for side-by-side editing of jobs.

To install the WinLase 6 software:

1. Open a web browser and go to: **software.ipgphotonics.com**.
2. Click the **Marker** folder.
3. Click the **WinLase6** folder.
4. Download the **WinLase6.zip** file to your computer.
5. Once downloaded extract the WinLase6.zip file. A folder called WinLase6 is created.
6. Open the folder and run setup.exe. WinLase 6 Setup Wizard appears. See Figure 4-11.

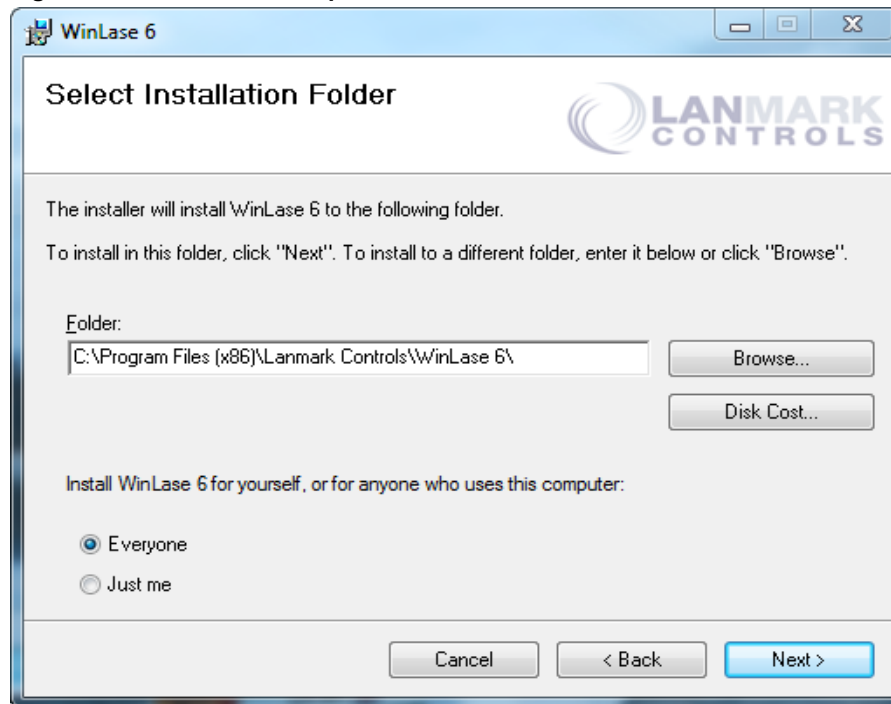
**Figure 4-11. WinLase 6 Setup Wizard**





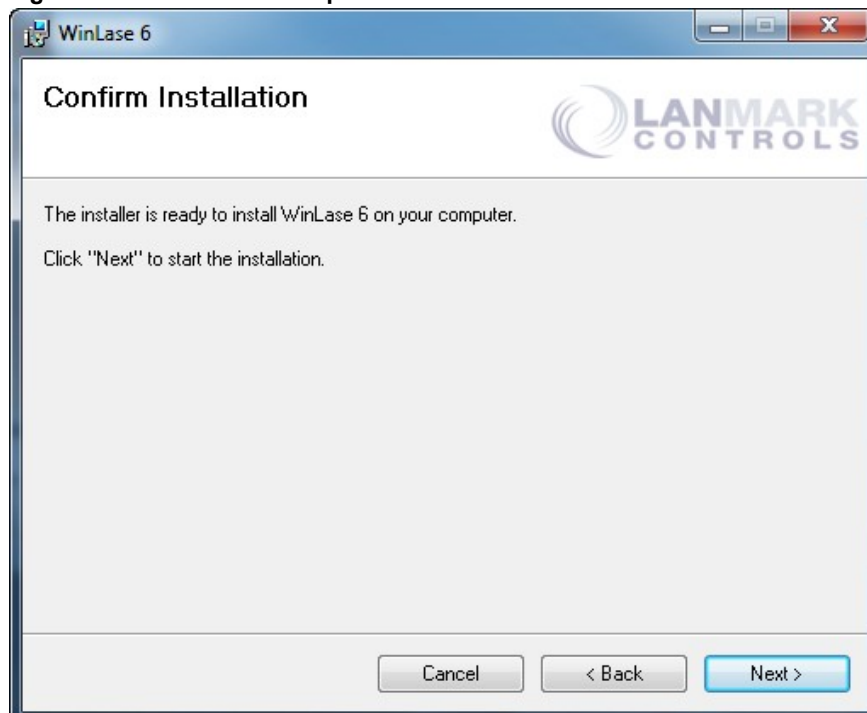
7. Click **Next**. The Select Installation Folder window appears as shown in Figure 4-12.

**Figure 4-12. WinLase 6 Setup - Select Installation Folder**



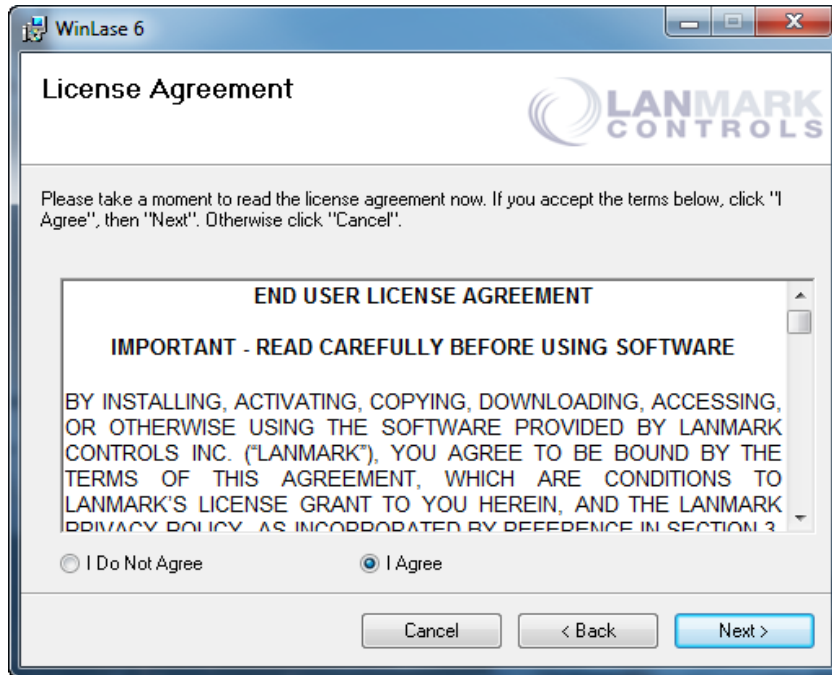
8. Click **Next** to accept the default Start Menu folder.
  - a. Click **Browse** if you want to change the default Start menu to another location
  - b. Click **Everyone** to allow all users to access the WinLase 6 program or **Just me** if only you want access.
9. Click **Next**. Confirm Installation window appears. See Figure 4-13.

**Figure 4-13. WinLase 6 Setup - Confirm Installation**



10. Click Next to proceed. The License Agreement window appears. See Figure 4-14.

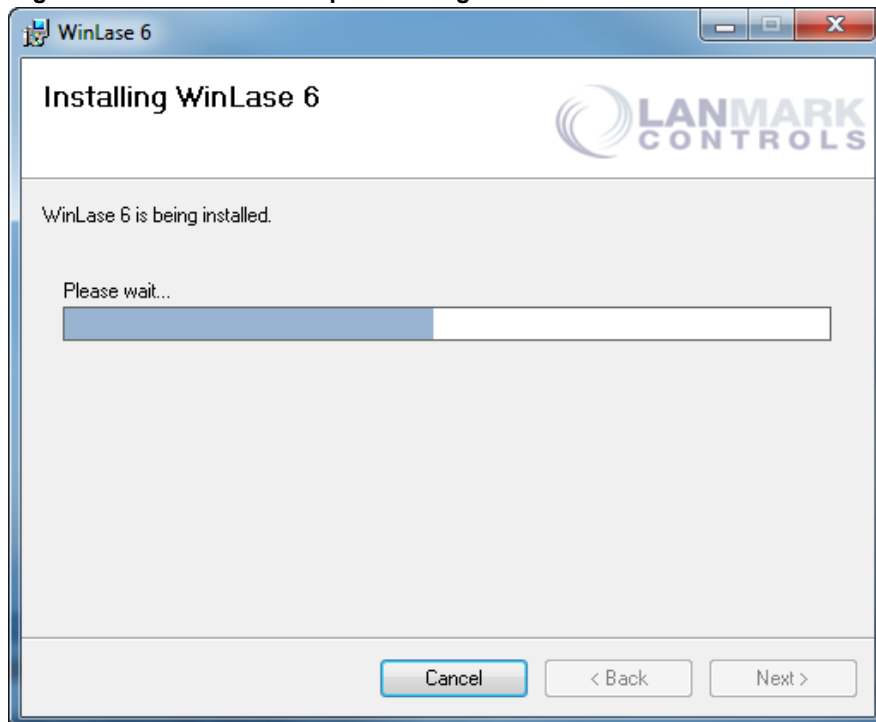
**Figure 4-14. WinLase 6 Setup - License Agreement**



11. Click **I agree** to accept the License Agreement.

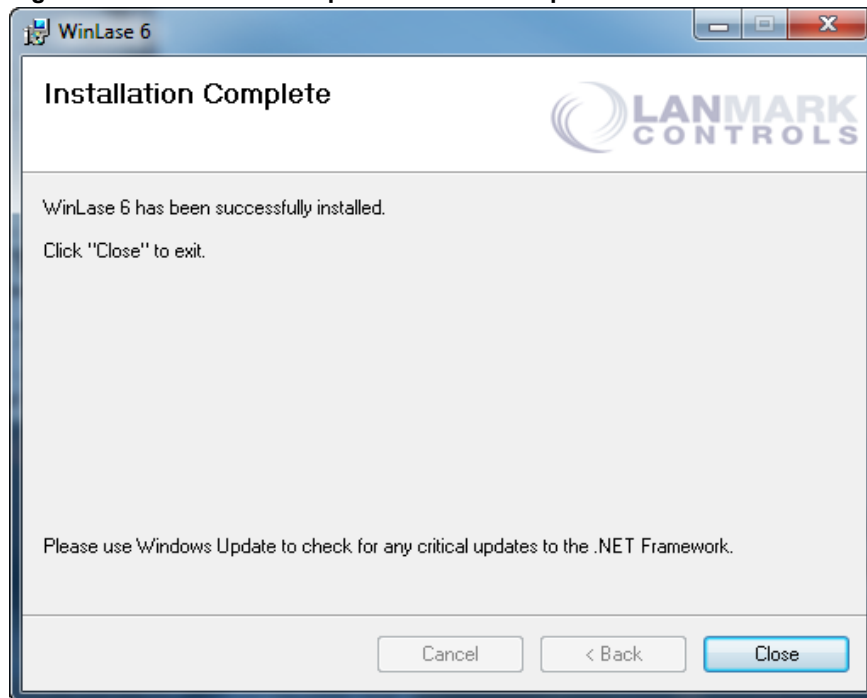
12. Click **Next** to proceed. The Installing WinLase 6 window appears. See Figure 4-15.

**Figure 4-15. WinLase 6 Setup - Installing WinLase 6**



13. The Installation Complete window appears. See Figure 4-16.

**Figure 4-16. WinLase 6 Setup - Installation Complete**



14. Click **Close** to exit. WinLase 6 is successfully installed on your system.

15. Activate the WinLase 6 program using the license key that was provided by IPG Photonics Refer to section 4.4 for more information.

---

**IMPORTANT**

You cannot Use WinLase 6 without first activating it with a valid license key.

---

## 4.4 Activating WinLase 6

This section explains how to:

- Create a license file request
- Emailing the license file request to IPG Photonics for obtaining a license key.
- Activating WinLase 6 on your computer.

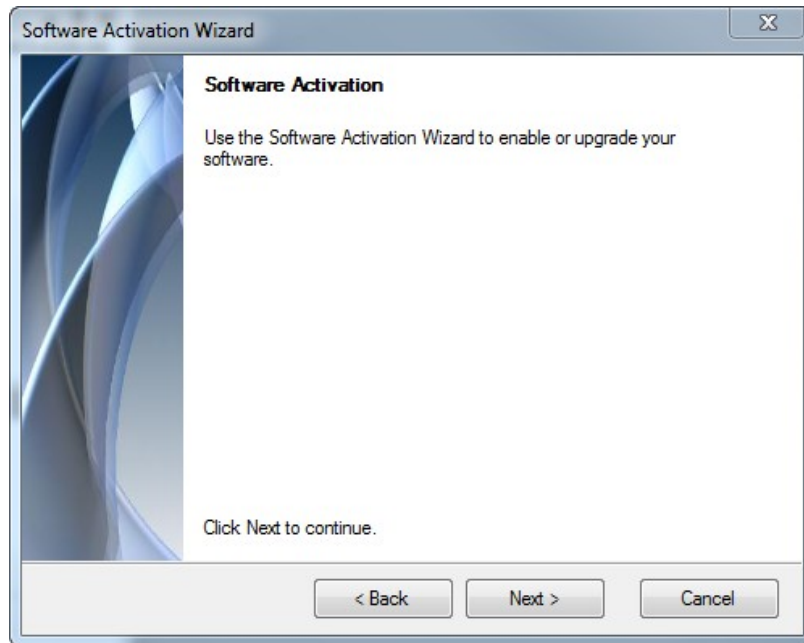
### 4.4.1 Creating a License File Request

To create a license file request:

1. Open the WinLase 6 program. A message displays prompting you for a license key to use the product.
2. Click **Cancel** to proceed.

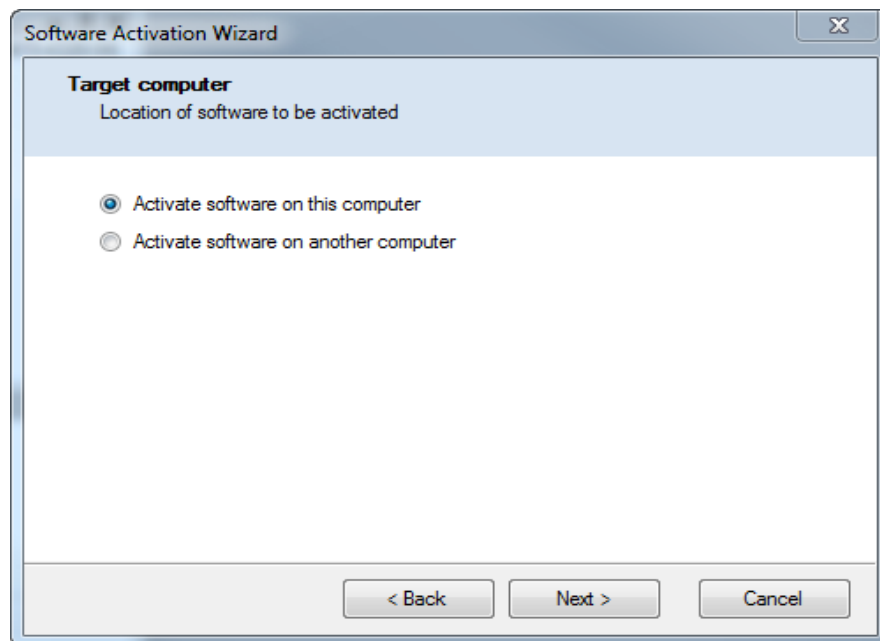
3. Select **Software Activation** from the **Help** menu. The Software Activation Wizard appears. See Figure 4-17.

**Figure 4-17. WinLase 6 Software Activation Wizard**



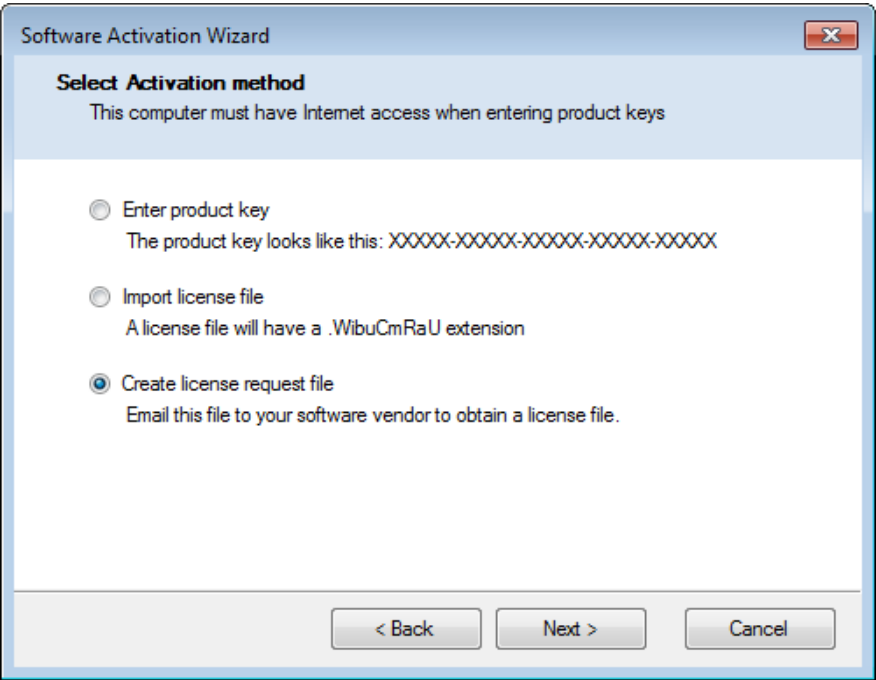
4. Click Next to continue. The following window appears. See Figure 4-18.

**Figure 4-18. Activate Software on This Computer**



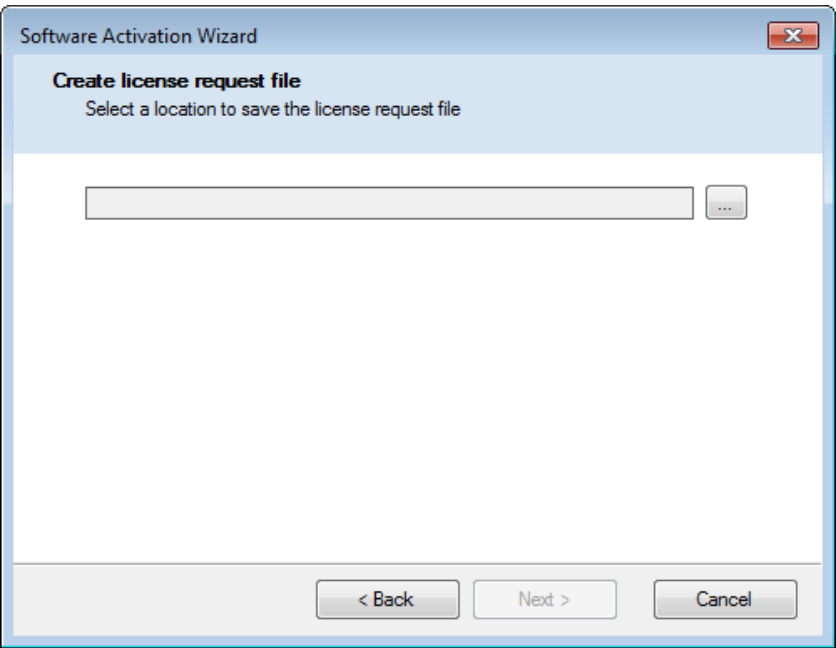
5. Click **Activate software on this computer** and click **Next** to continue. The **Select Activation Method** window appears. See Figure 4-19.

**Figure 4-19. Select Activation Method**



6. Click **Create license request file** and click **Next**. The **Create License Request File** appears as shown in Figure 4-20.

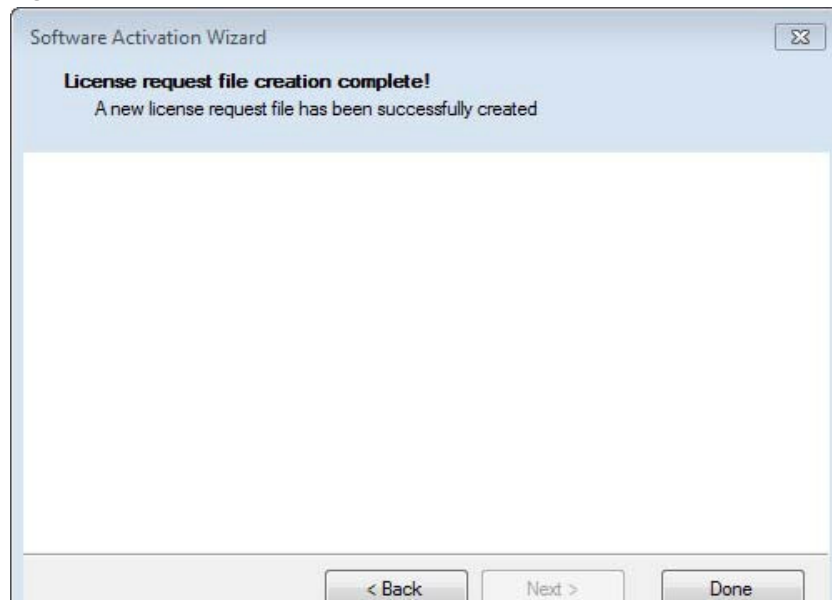
**Figure 4-20. Create License Request File**



7. Save the file with the serial number of the laser to a location on your computer. For example: 15041235.WibuCmRaC.

8. Click Next to continue. The following confirmation message appears. See Figure 4-21.

**Figure 4-21. License Request Complete**



9. Click **Done** to exit WinLase 6.

10. Email the license request file from the saved location to IPG Photonics at:  
**marker@ipgphotonics.com**

11. Enter "**WinLase6 License Request**" in the subject line of the email.

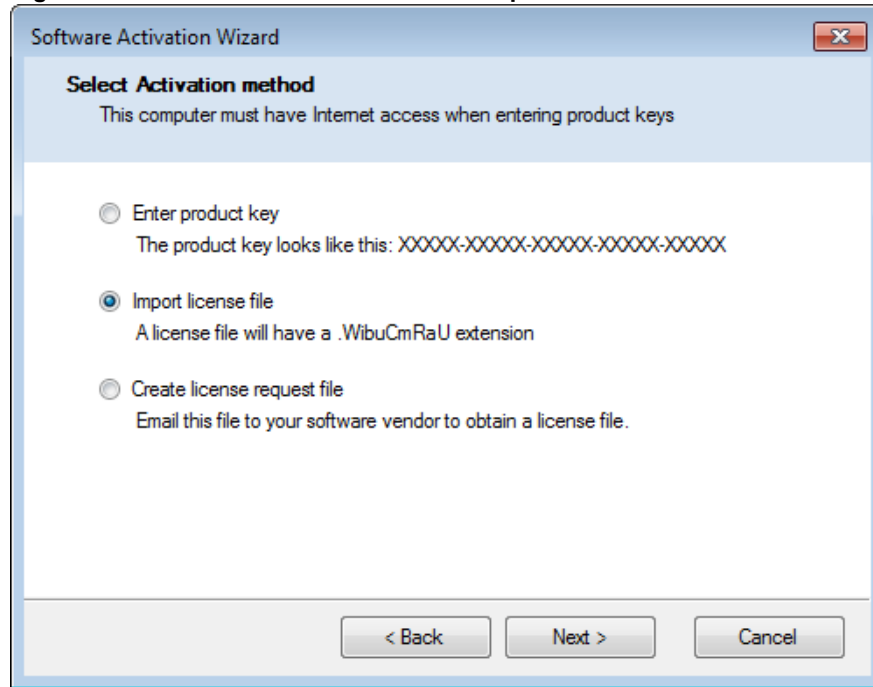
IPG Photonics emails you the license file once your email is received. The license key is valid for one activation only (one user).

#### **4.4.2 Activating WinLase 6 with a License Key**

To activate WinLase 6 with a license key:

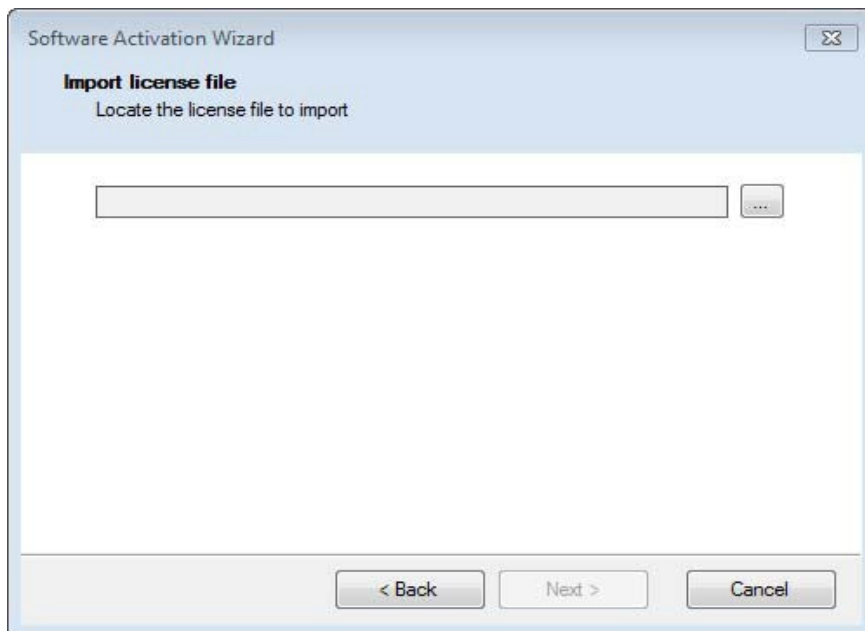
1. Once you receive the license file from IPG Photonics, follow steps 1 to 5 as instructed in section 4.1.
2. Click Import license file. See Figure 4-22.

**Figure 4-22. Software Activation Wizard - Important License File**



3. Click Next to continue. The following window appears. See Figure 4-23.

**Figure 4-23. Import License File from Saved Location**



4. Import the license file to the computer where you generated the request for the license.

---

**IMPORTANT**

Once the file is activated on your computer, it cannot be used on another computer.

---

5. Click **Next** to continue. A message appears confirming that the WinLase 6 activation was successful.
6. Click **Done** to exit the window. WinLase 6 is activated and ready for use on your computer.
7. Refer to Chapter 5 for step-by-step instructions for creating and running a laser marker job using WinLase 6.

## 4.5 Configuring a DHCP IP Address

This section explains how to configure a DHCP IP address, which is necessary for use with WinLase 6 marking software with the Laser Marker Module — Integrated Scan Controller version.

For optimal configuration, IPG recommends that you use an Ethernet connection (capable of 100 Mbit/s) directly from the host PC to the Laser Marker with the Integrated Scan Controller.

---

### IMPORTANT

If you want to configure a static IP address, you need to run the Scan Controller Upgrade Utility. Refer to section 4.6 for step-by-step instructions for changing your network settings.

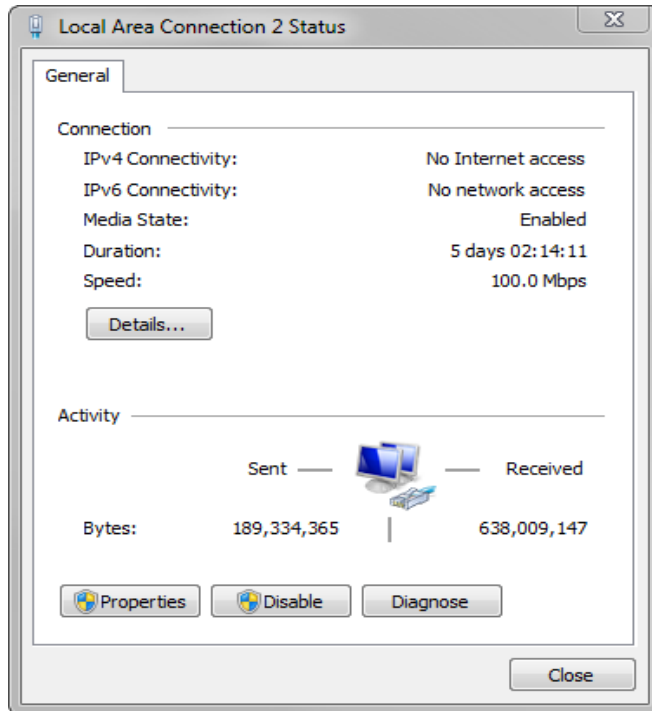
---

To configure a DHCP IP Address:

1. Connect your computer to the Ethernet interface on the rear of the Laser Marker/ Scan Controller using a standard Ethernet cable.
2. Go to **Control Panel > Network and Internet > Network and Sharing Center**.
3. Click **Change adapter settings**.
4. Select a Local Area Connection icon. The following window appears. See Figure 4-24.

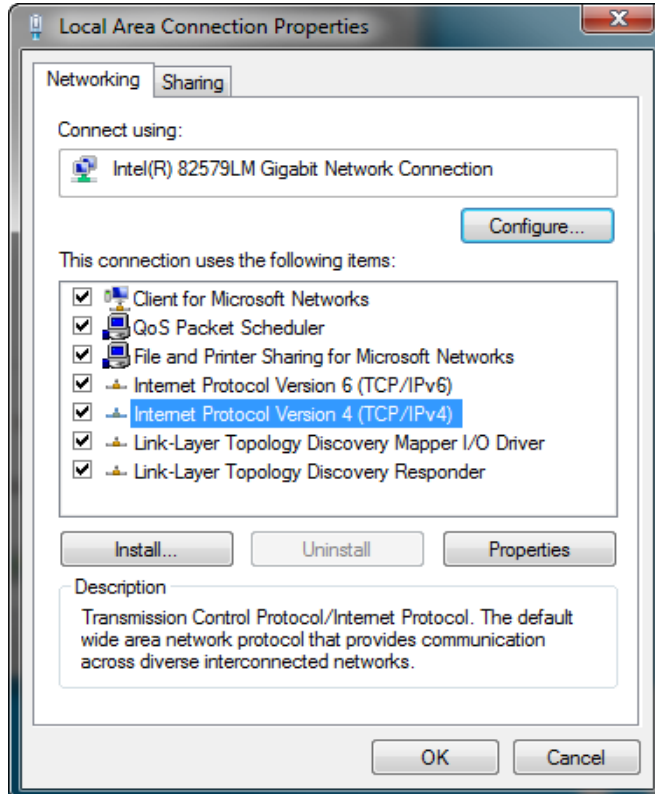


Figure 4-24. Local Area Connection Status Window



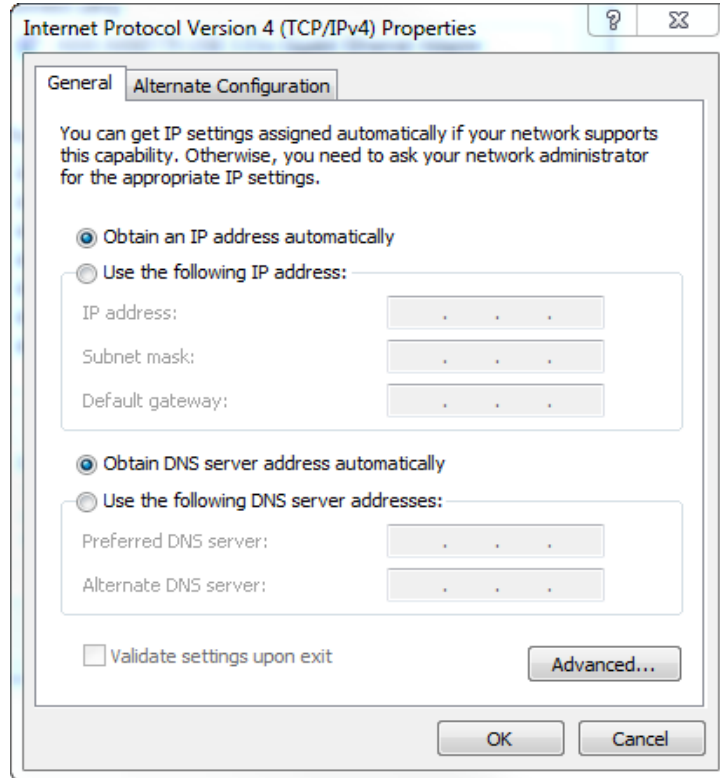
5. Click **Properties**. The following window appears. See Figure 4-25.

Figure 4-25. Local Area Connection Properties Window



6. Select **Internet Protocol Version 4 (TCP/IPv4)**.
7. Click Properties. The following window appears. See Figure 4-26.

**Figure 4-26. Internet Protocol Version 4 Properties Window**



8. Click the **Obtain an IP address automatically** radio button.
9. Click the **Obtain DNS server address automatically** radio button.
10. Click **OK** to accept your changes.

## 4.6 Installing the Scan Controller Upgrade Utility

You set a static IP address and change the host name of the Scan Controller using the Scan Controller Upgrade Utility.

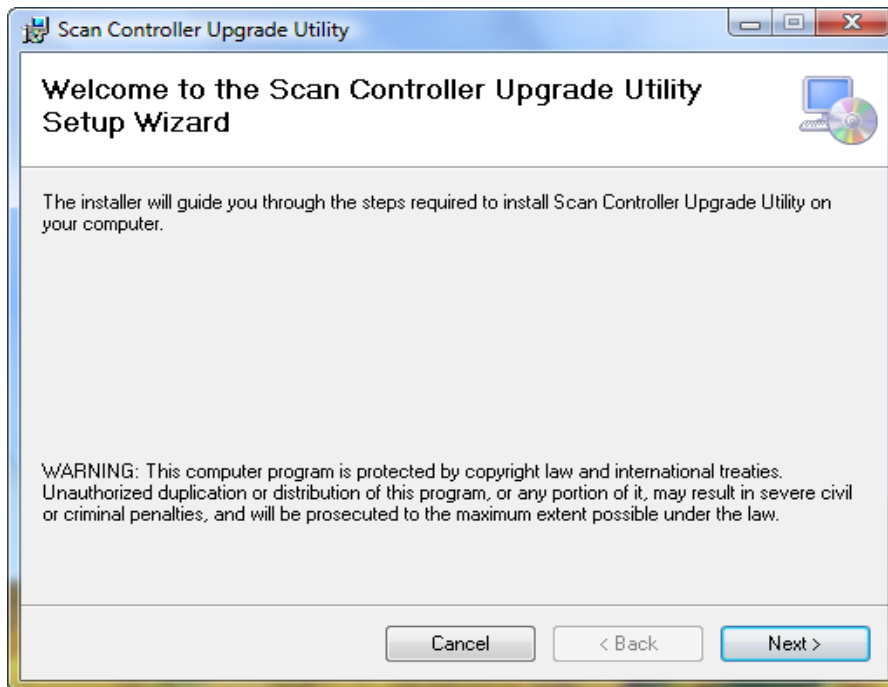
To install the Scan Controller Upgrade Utility:

1. Open a web browser and go to **software.ipgphotonics.com**.
2. Click the **Marker Folder**.
3. Click the **Utilities folder**.
4. Download the ScanControllerUtility.zip file to your computer.

5. Once downloaded, extract the **Utilities.zip** file. A folder called Utilities is created.

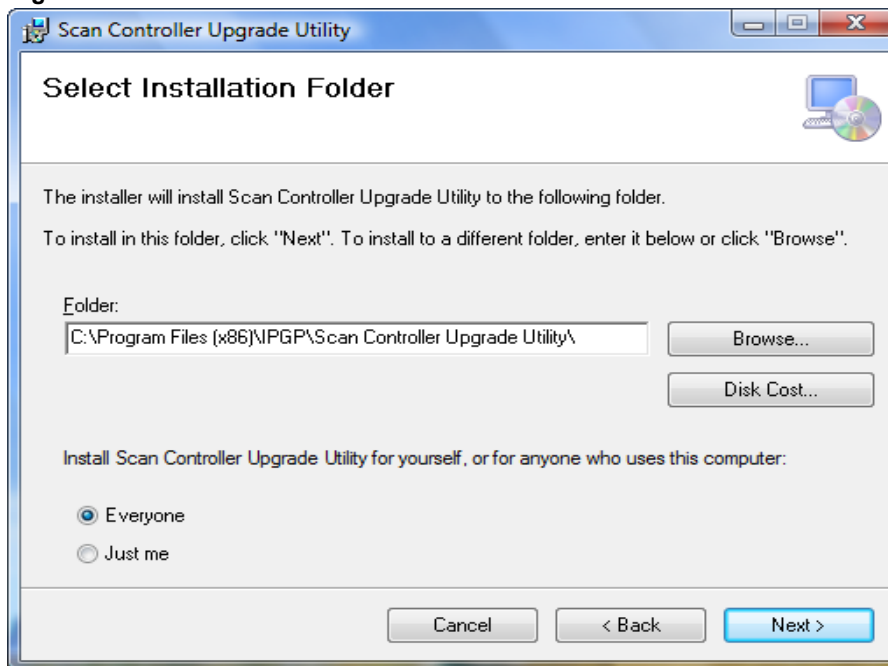
6. Open the folder and run **setup.exe** and click **Next**. The following window appears. See Figure 4-27.

**Figure 4-27. Scan Controller Upgrade Utility Window**



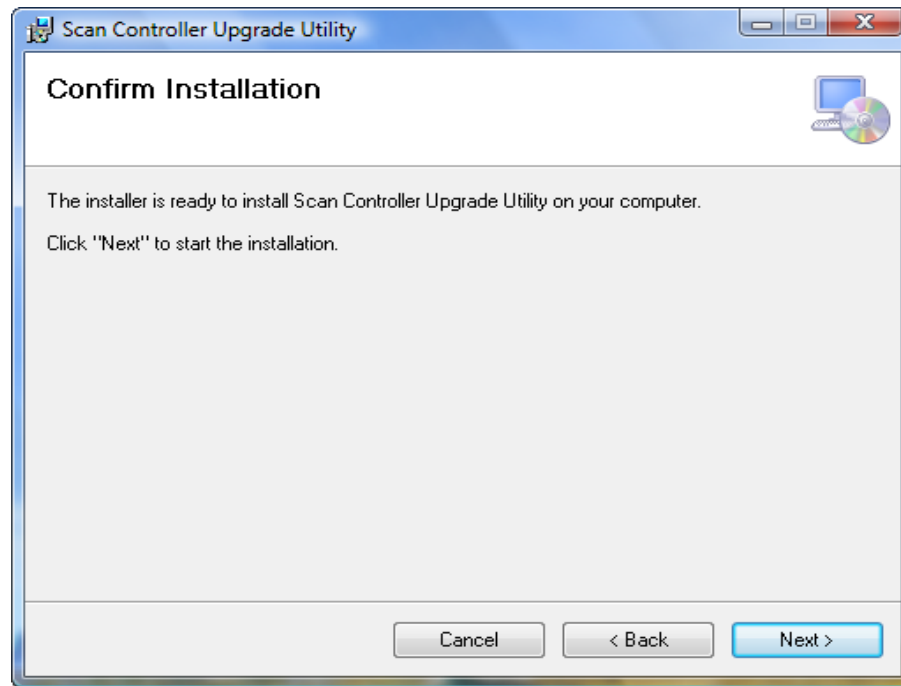
7. Click **Next**. The Select Installation Folder window appears. See Figure 4-28.

**Figure 4-28. Select Installation Folder Window**



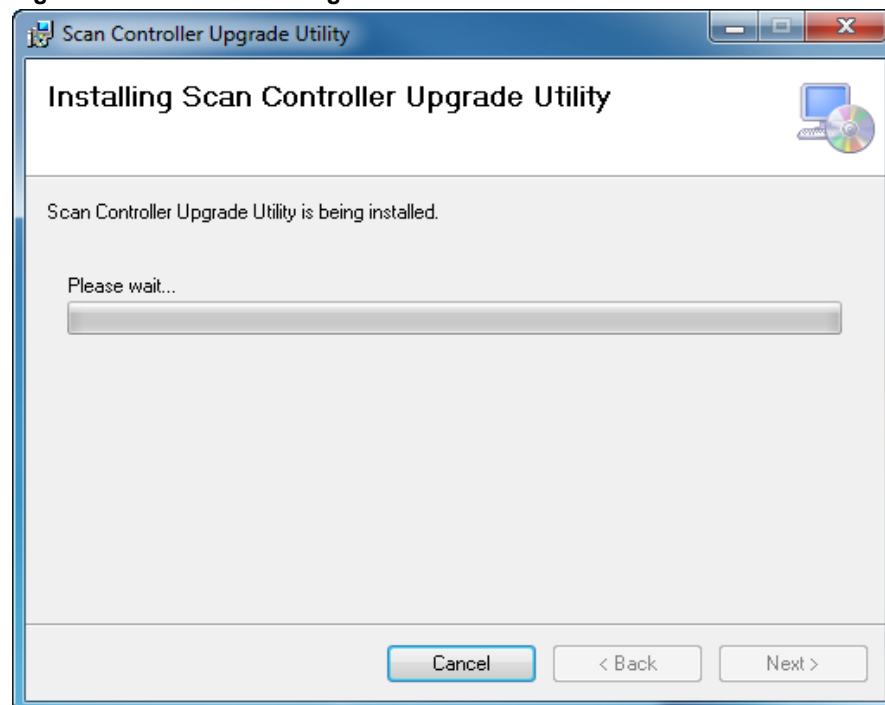
8. Click **Next** to accept the default Start Menu folder.
  - a. Click **Browse** if you want to change the default Start menu to another location.
  - b. Click **Everyone** to allow all users to access the Scan Controller Upgrade Utility or **Just me** if only you want access.
9. Click **Next**. The Confirm Installation window appears. See Figure 4-29.

**Figure 4-29. Confirm Installation Folder Window**



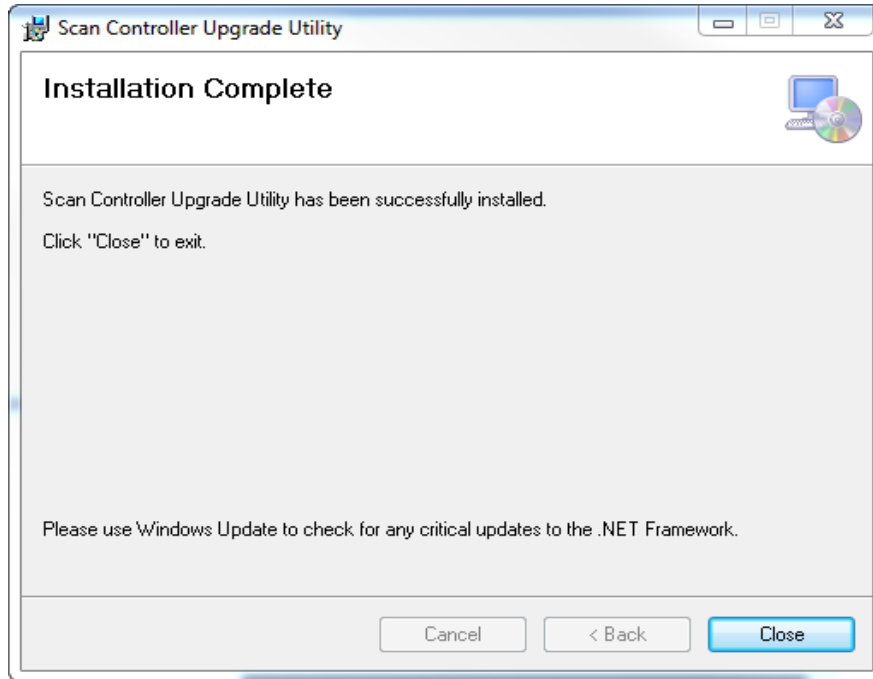
10. Click **Next** to continue with installation. The Installation Progress window appears. See Figure 4-30.

**Figure 4-30. Installation Progress Window**



11. Click **Next** to continue with installation. See Figure 4-31.

**Figure 4-31. Installation Complete Window**



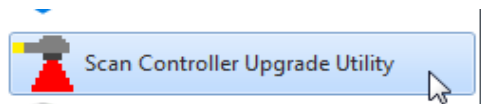
12. Click **Close** to complete installation.

#### 4.6.1 Running the Scan Controller Upgrade Utility

To run the Scan Controller Upgrade Utility:

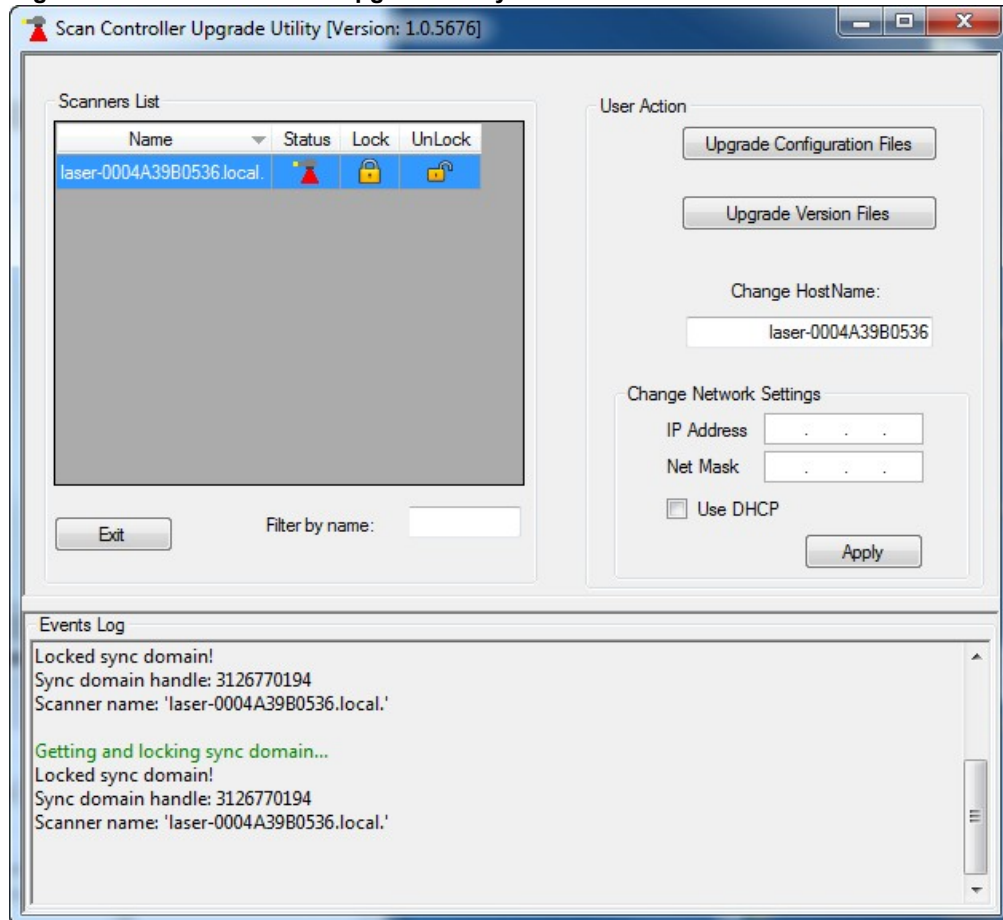
1. Select **All Programs > Scan Controller Upgrade Utility**.

**Figure 4-32. Scan Controller Upgrade Utility Program**



The Scan Controller Upgrade Utility window appears as shown in Figure 4-33. The Scan Controller host name automatically appears in the Scanners List (this may take several seconds).

**Figure 4-33. Scan Controller Upgrade Utility Window**



2. To change the host name of the Scan Controller enter a new name in the **Change Host Name** text box and click **Apply**. A progress status message appears in the Events Log pane.
3. To use a static IP address for the Scan Controller, enter the IP address in the **IP Address** text box and Net Mask in the **Net Mask** text box under **Change Network Settings** and click **Apply**. A progress status message appears in the Events Log pane.
4. Click **Exit** to close the Scan Controller Upgrade Utility.

## 5. WinLase 6 Quick Start

### 5.1 Overview

This chapter explains how to create, save, and run a one-time job using the WinLase 6 program with the Laser Marker Module, Integrated Scan Controller version.

Before you begin, ensure you have met the following requirements:

- Installed IPG ScanPack as instructed in section 4.2.
- Installed and activated WinLase 6 as instructed in sections 4.3 and 4.4
- Configured a local area network as instructed in section 4.5.

Use appropriate laser safety eyewear when operating this device. The selection of appropriate laser safety eyewear requires the end user to accurately identify the range of wavelengths emitted from this product.

Please review the safety labeling on the product and verify that the personal protective equipment (i.e. enclosures, viewing windows, or viewports, eyewear, etc.) being utilized is adequate for the output power and wavelength ranges.

---

Use appropriate laser safety eyewear when operating this device. The selection of appropriate laser safety eyewear requires the end-user to accurately identify the range of wavelengths emitted from this product.

Please review the safety labeling on the product and verify that the personal protective equipment (i.e. enclosures, viewing windows, or viewports, eyewear, etc.) being utilized is adequate for the output power and wavelength ranges.

---

**WARNING**

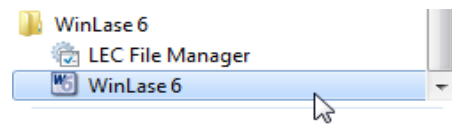


### 5.2 Starting WinLase 6

WinLase 6 provides drawings tools for creating custom images. You can also import file formats, for example, dxf, .bmp, and .hpgl formats.

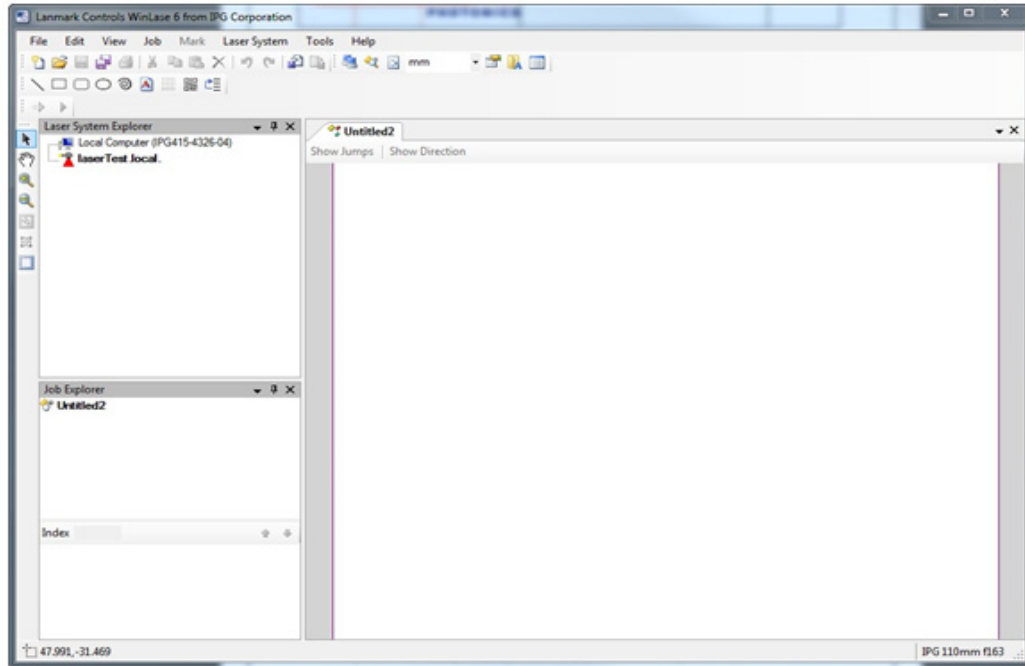
1. To start the WinLase 6 program:
2. Go to **All Programs > WinLase 6 Folder**.
3. Select **WinLase 6**. See Figure 5-1.

**Figure 5-1. Starting WinLase 6 Program**



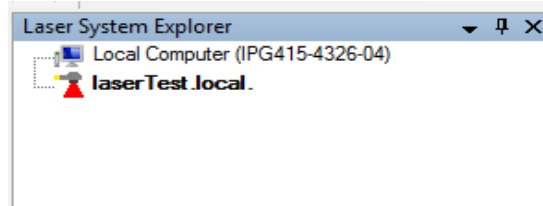
The Job Editor Workspace appears as shown in Figure 5-2. The Job Editor Workspace provides editing functions and full control sets.

**Figure 5-2. Job Editor Workspace**



The Laser Marker Module is automatically detected and appears in the Laser System Explorer window (this may take several seconds).

**Figure 5-3. Laser System Explorer Window**



4. To create a job, refer to section 5.3.

## 5.3 Creating a Job

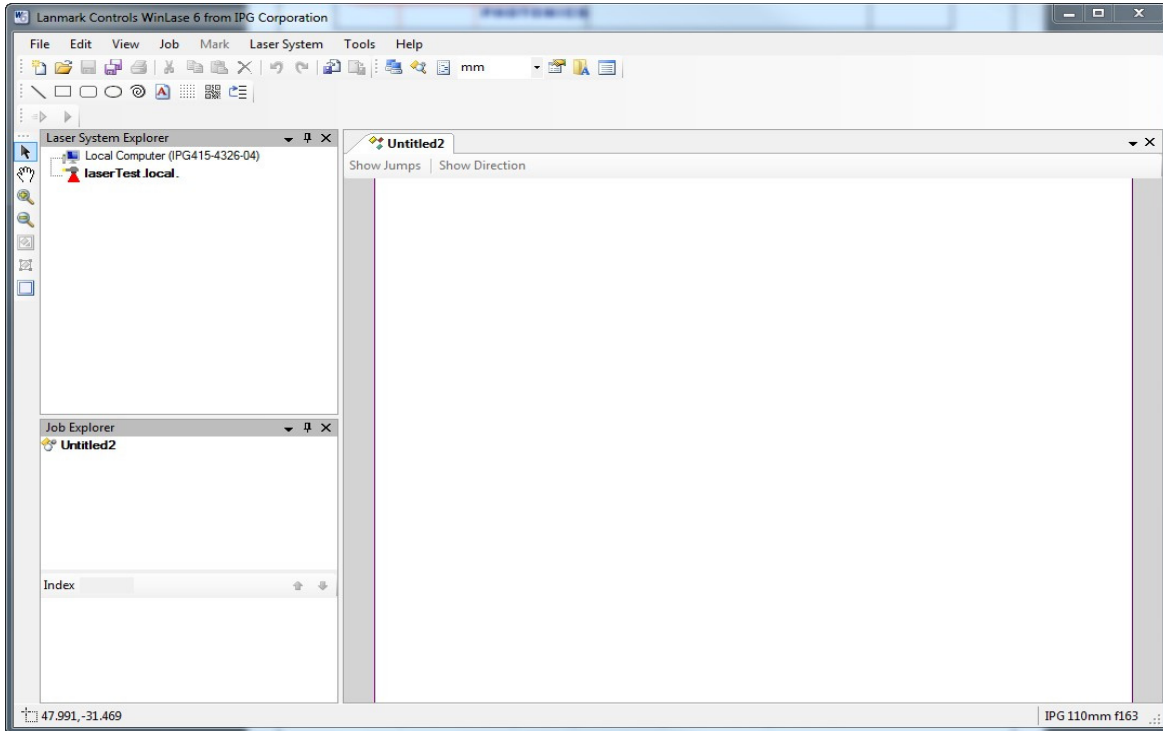
This section explains how to create a job and interact with objects within this job. A job lets you assemble a series of objects that are marked on the material using the scan head.

To create a job:

1. Select **New Job** from the **File** menu. An unsaved and untitled job appears. See Figure 5-4.



**Figure 5-4. New Job Window**



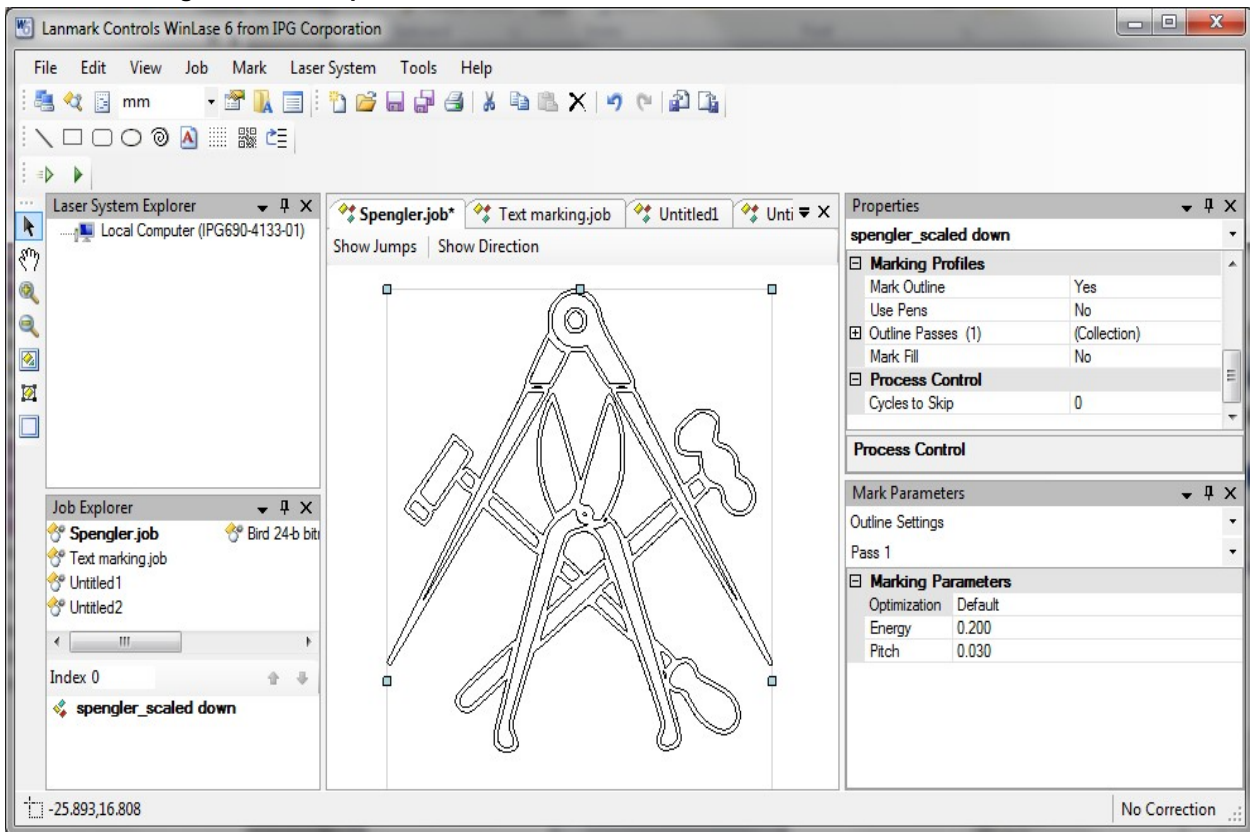
2. Define the marking layout by selecting the objects you want to mark. You can add a variety of objects such as text, barcodes, and point arrays. You can also import images by selecting **Import** from the **File** menu. Figure 5-5 shows an example job.

3. Select **Properties Window** from the **View** menu to display the Properties window in the Job Editor Workspace. Drag the window to the right side of the workspace. Make configuration changes in the Properties window, if needed.

4. Select **Mark Parameters** from the **View** menu to display the Mark Parameters window in the Job Editor Workspace. Drag the window to the right side of the workspace. For a recommended marking parameter configuration, refer to section 5.3.

An example of a job with the Properties and Mark Parameters windows displayed is shown in Figure 5-5.

Figure 5-5. Example of a Job



The order in which the objects appear in the Index window is the order in which they mark when you run the job.

### 5.3.1 Configuring Marking Parameters

The following marking controls are available in the Marking Parameters window:

- **Optimization** - lets you adjust the speed or quality of the marking job.
- **Pulse Energy** - lets you adjust the energy per laser pulse. The adjustment range is 0 to 1.0 mJ, however since the UV integrated marker can output a maximum of 10uJ, care must be taken to limit this value.
- **Pitch** - lets you adjust the overlapping of the pulses on the laser marking area. This marking parameter lets you modify the contrast of the marking or to create various dot patterns in the engraving (for example, continuous line vs. perforated line).

For a 163mm lens, you can use the following settings for obtaining good results on most metals:

1. Set the Pitch parameter to: 0.020 mm.

2. Set the Pulse Energy parameter to: 0.5 mJ.
3. Leave the Optimization parameter as: "Default"

---

For bitmaps, the pitch is inherited from the output resolution and is set to approximately the spot size.

## IMPORTANT

Quality optimization is automatically invoked, if limited by Laser Power. Setting the Pulse Energy to higher than needed can slow performance. Optimal Pulse Energies and spot sizes change with focal length selection.

---

Figure 5-6 illustrates the marking parameters configuration options.

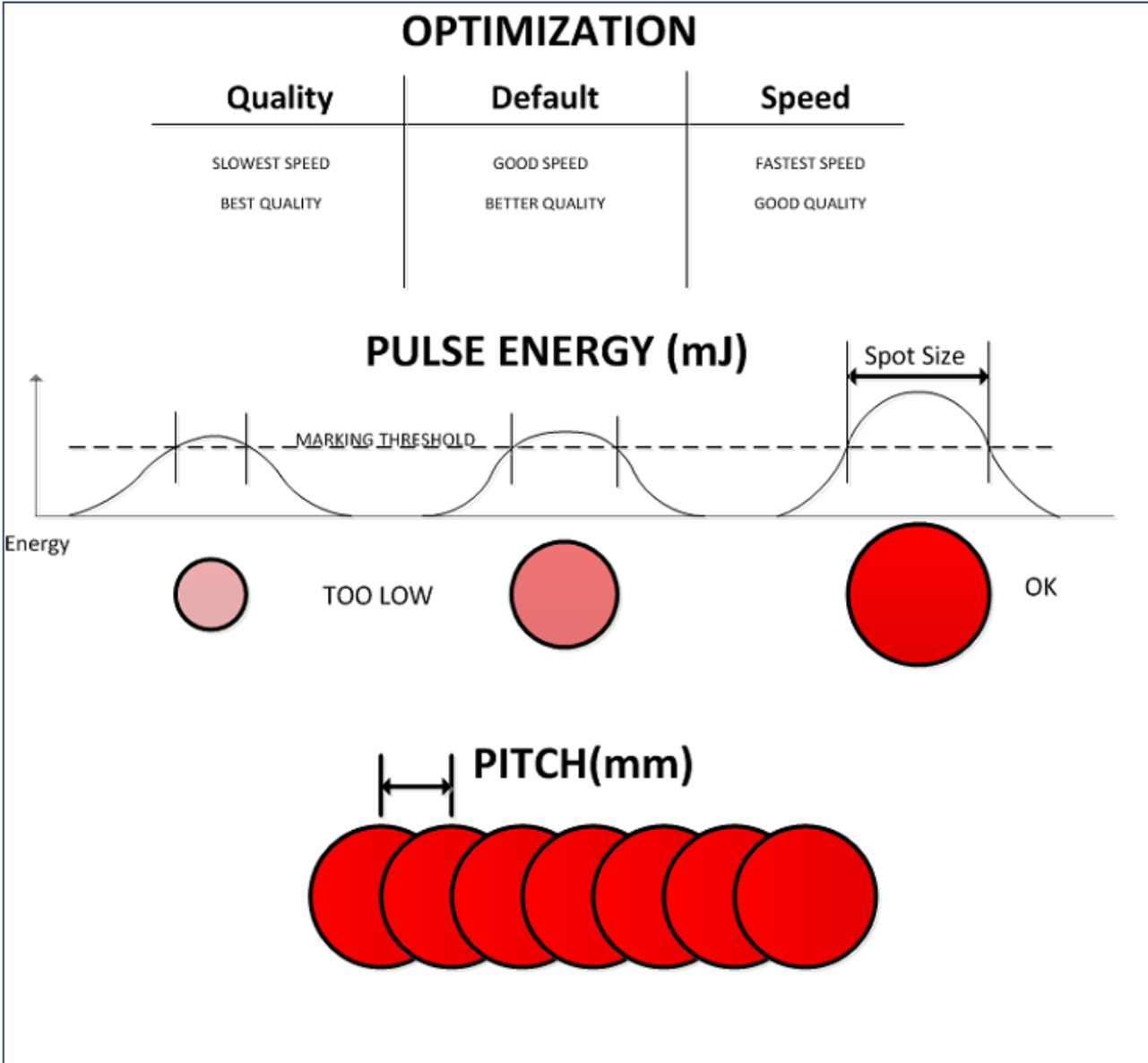
## 5.4 Saving a Job

The job file contains the basis for all interaction with the Laser Marker Module.

To save a job:

1. Select **Save Job** from the **File** Menu
2. Select a directory location for the saved job.
3. Input a name in the File name box for the job that was created.
4. Click Save.

Figure 5-6. Marking Parameters Configurations

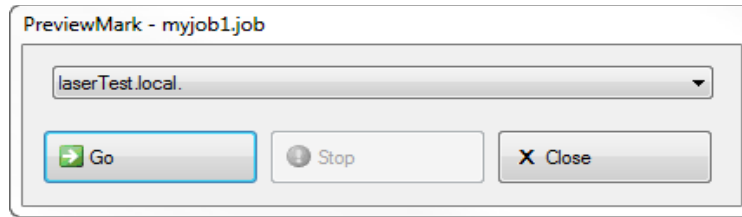


### 5.5 Previewing a Job

To preview a job:

1. Select **Preview Mark** from the **Mark** menu to preview the job and align where you want the mark to appear on the targeted surface.

**Figure 5-7. Preview Mark Dialog Box**

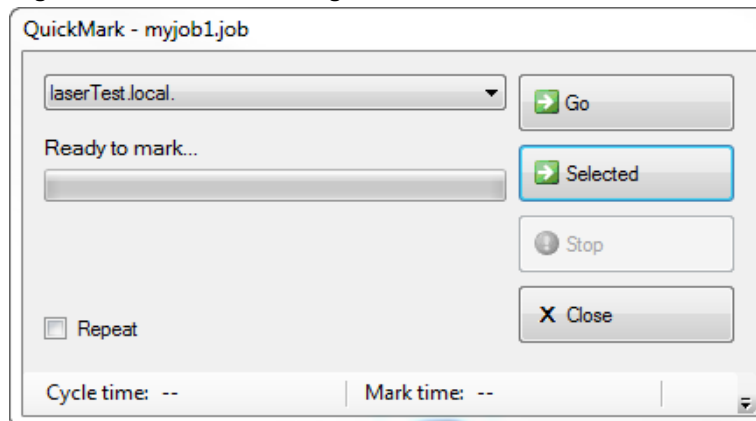


## 5.6 Running a One-Time Job

To run a one-time job:

1. Power on the Laser Marker Module.
2. Position the material to be marked on the targeted surface base.
3. Select an object or group of objects in the workspace to be marked using the arrow tool. The object appears with anchor points around it to indicate selection. The name of the object is bolded in the Index window.
4. Select **QuickMark** from the **Mark** menu to preview the job and align where you want the mark to appear.
5. Click **Selected** to mark a single object or **Go** to mark all objects currently in the job.

**Figure 5-8. QuickMark Dialog Box**



6. Click **Go**. A progress bar is displayed indicating the status of the job. The optical scanner head draws the shape over the targeted surface.
7. When the marking is complete, the status bar at the bottom of the dialog box displays the mark time.

## 6. Integration with a Motor or Gantry System

### 6.1 Overview

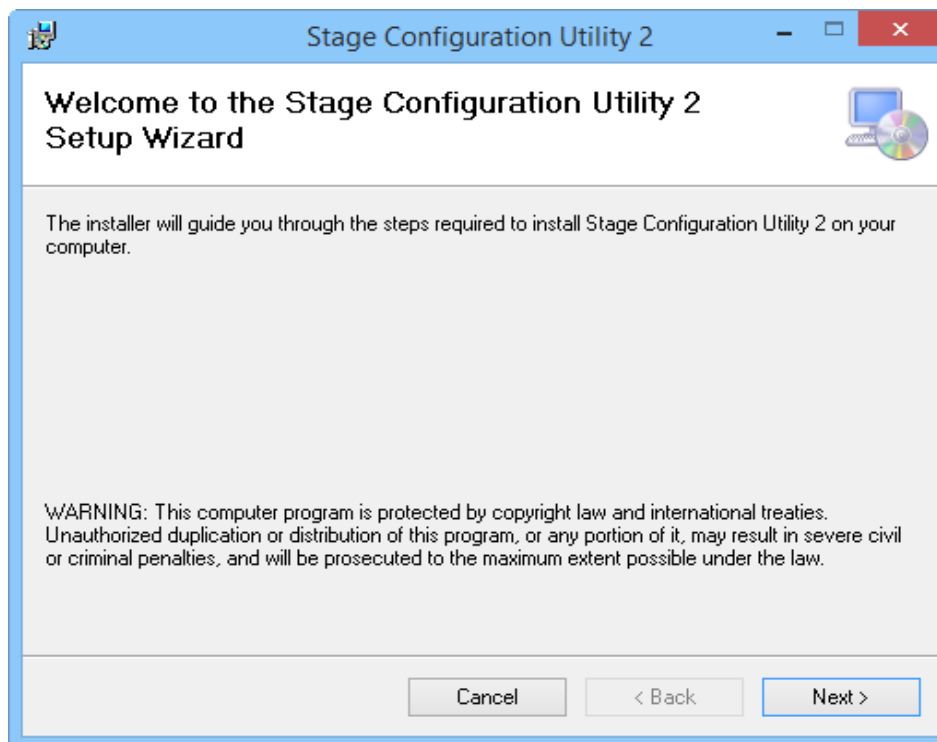
The Scan Controller Motor Interface allows the Laser Marker Module to work with common types of motor drivers, such as a Gantry overhead lift structure. It can be configured to send controller commands or monitor encoder feedback.

### 6.2 Installing the Stage Configuration Utility

To install the Stage Configuration Utility:

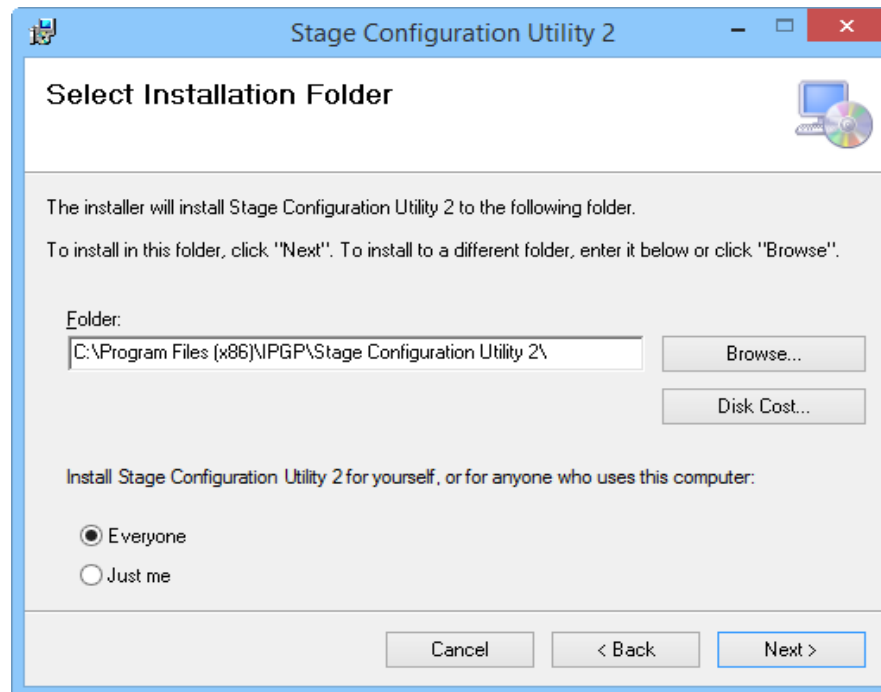
1. Open a web browser and go to: **software.ipgphotonics.com**.
2. Select the **Welder** folder.
3. Select the **IPGWeld** folder.
4. Download the installation program zip file to your computer.
5. Once downloaded, extract the zip file. A folder is created.
6. Open the folder and run **setup.exe**. The Setup Wizard appears. See Figure 6-1.

**Figure 6-1. Setup Wizard - Stage Configuration Utility**



7. Click **Next**. The Select Installation Folder window appears. See Figure 6-2.

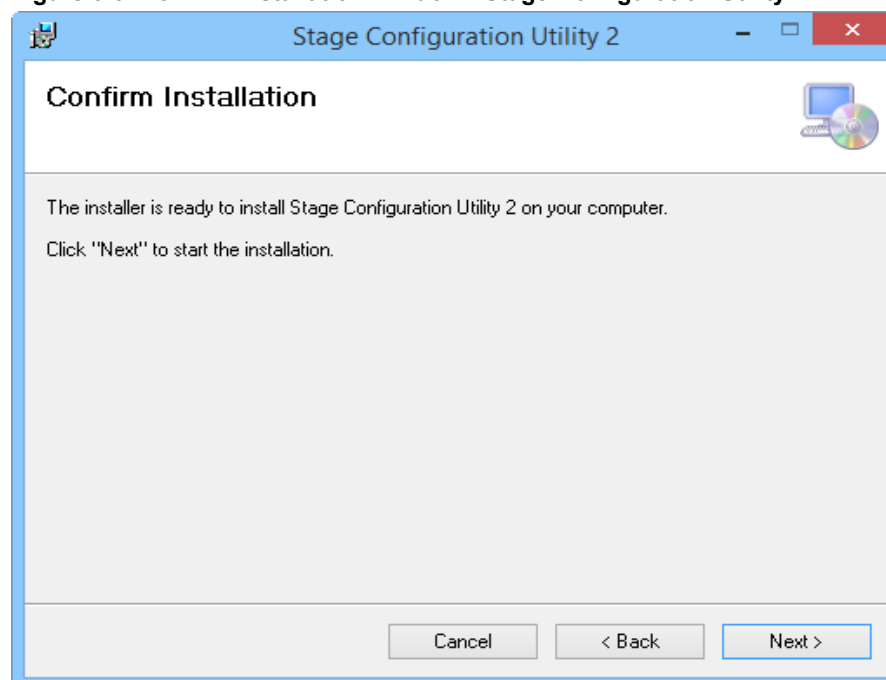
**Figure 6-2. Select Installation Folder – Stage Configuration Utility**



8. Click **Next** to accept the default Start Menu folder.
  - a. Click **Browse** if you want to change the default Start menu to another directory location.
  - b. Click **Everyone** to allow all users to access the Stage Configuration Utility program or **Just me** if only you want access.

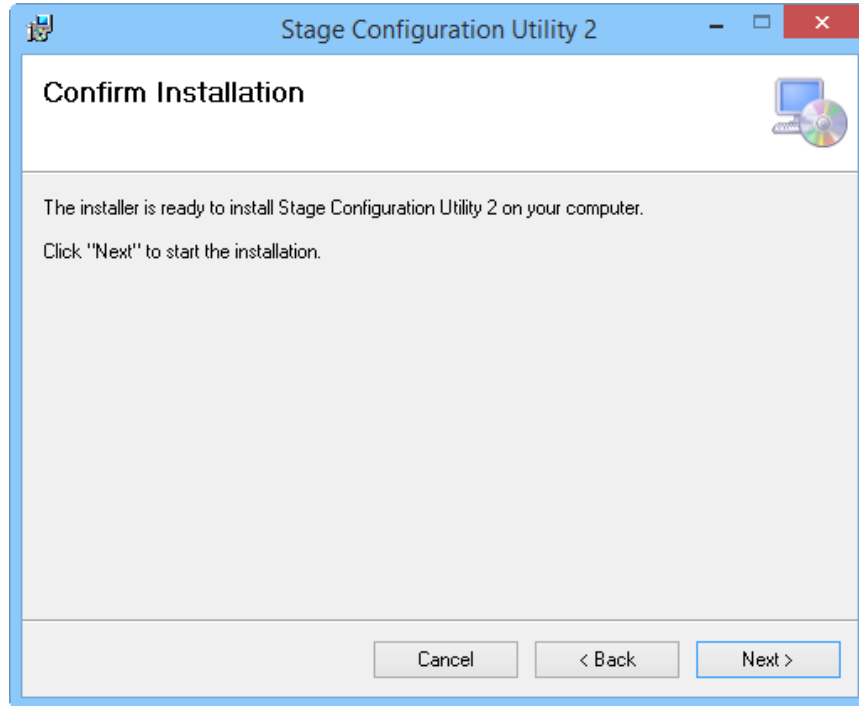
9. Click **Next**. The Confirm Installation window appears - see Figure 6-3.

**Figure 6-3. Confirm Installation Window - Stage Configuration Utility**



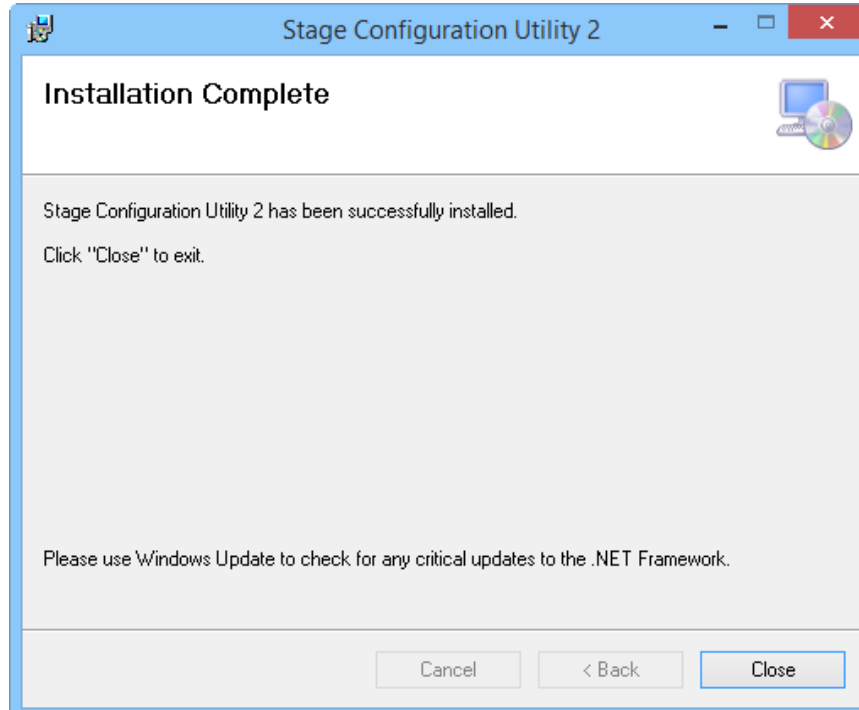
10. Click **Next** to proceed. The Installing Stage Configuration Utility window appears. See Figure 6-4.

**Figure 6-4. Installing Stage Configuration Utility Window**



11. Once installation is complete, the Installation Complete window appears. See Figure 6-5.

**Figure 6-5. Installation Complete Window – Stage Configuration Utility**





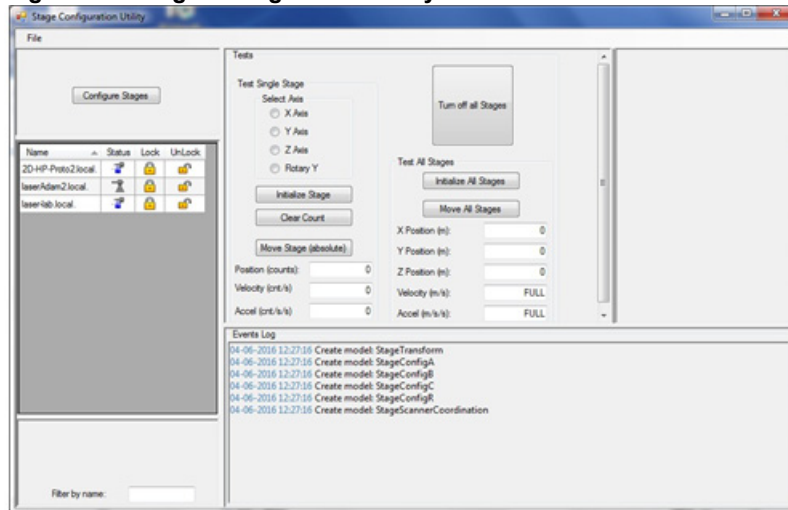
12. Click **Close** to exit the window. The Configuration Utility is successfully installed on your system.

## 6.3 Running the Stage Configuration Utility

To run the Stage Configuration Utility:

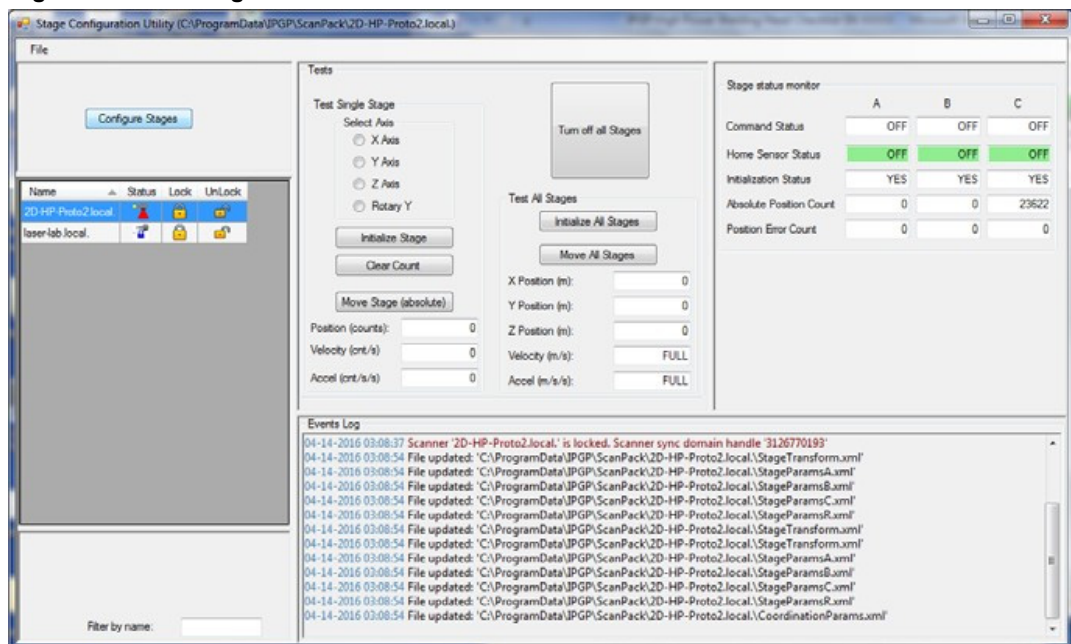
1. Open the Stage Configuration Utility program. The main window appears. See Figure 6-6.

**Figure 6-6. Stage Configuration Utility Main Window**



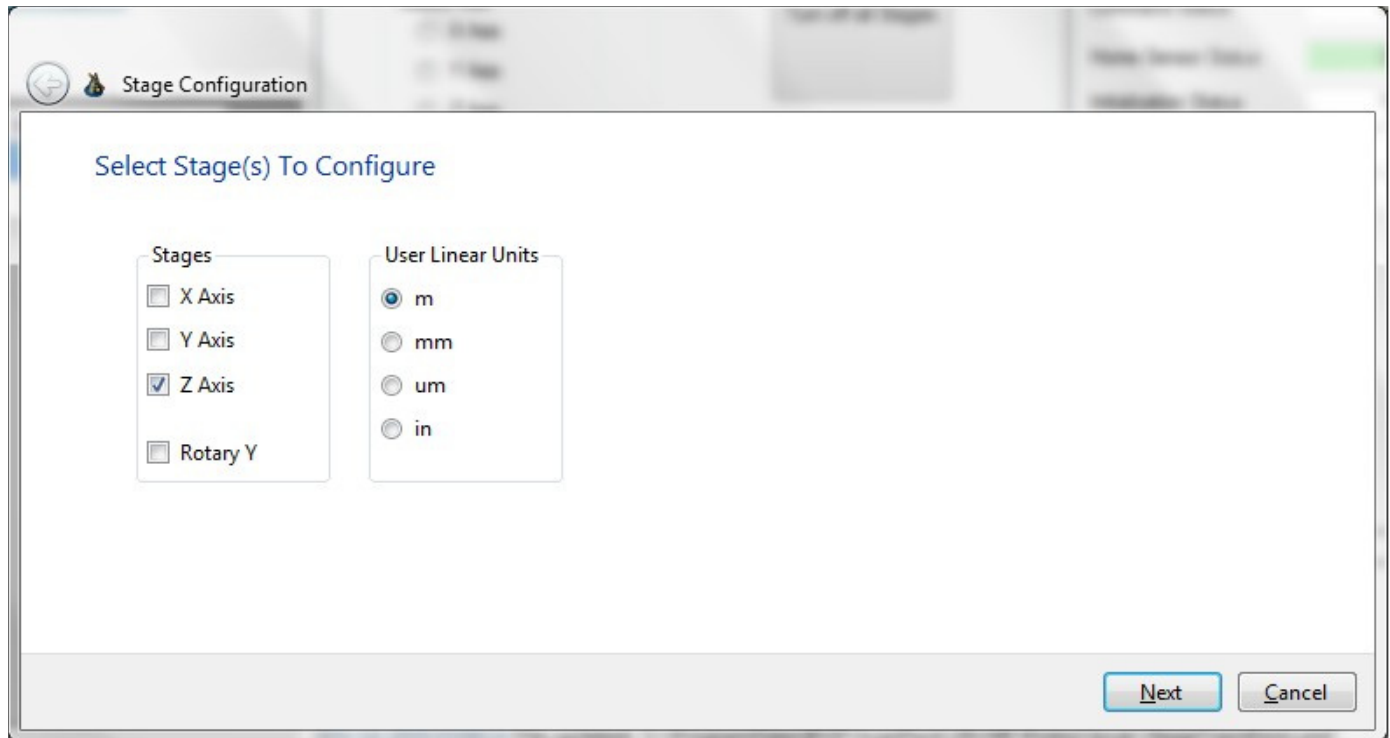
2. Select a controller from the list in the left pane. The controller you select changes to locked mode (red). See Figure 6-7.

**Figure 6-7. Selecting a Controller**



3. Click **Configure Stages**.

**Figure 6-8. Stage Configuration Window4**



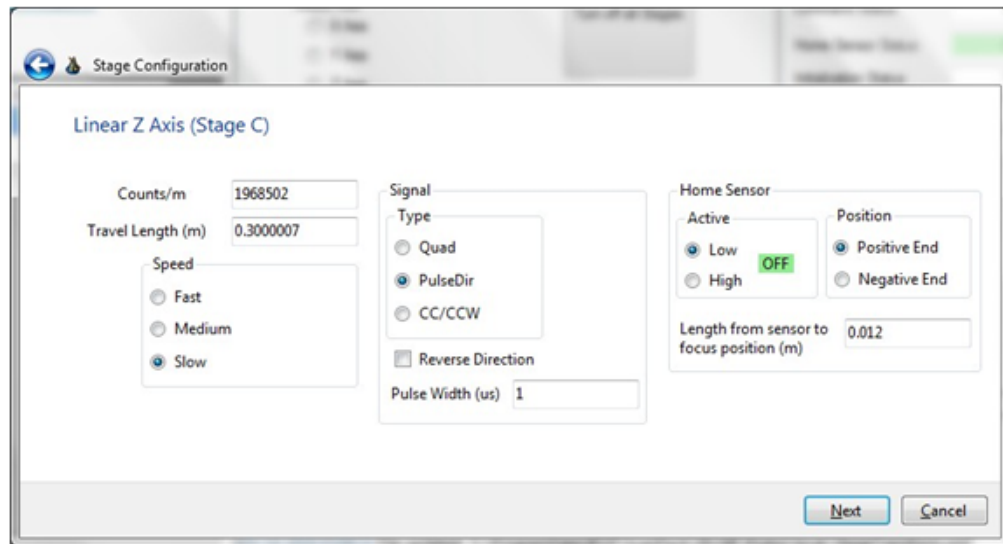
4. Select a stage, such as Z-Axis.

5. Select a linear unit.

6. Click Next.

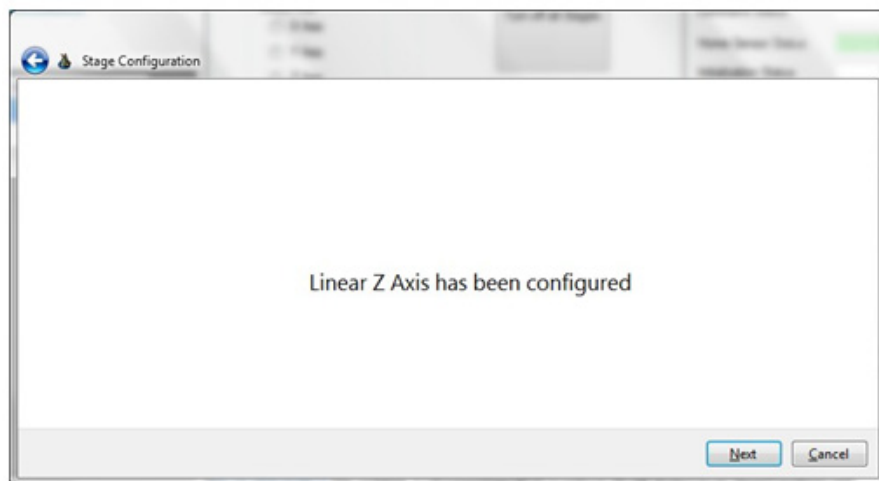
7. Select the stage configuration options. See Figure 6-9.

Figure 6-9. Linear Z-Axis (Stage C)



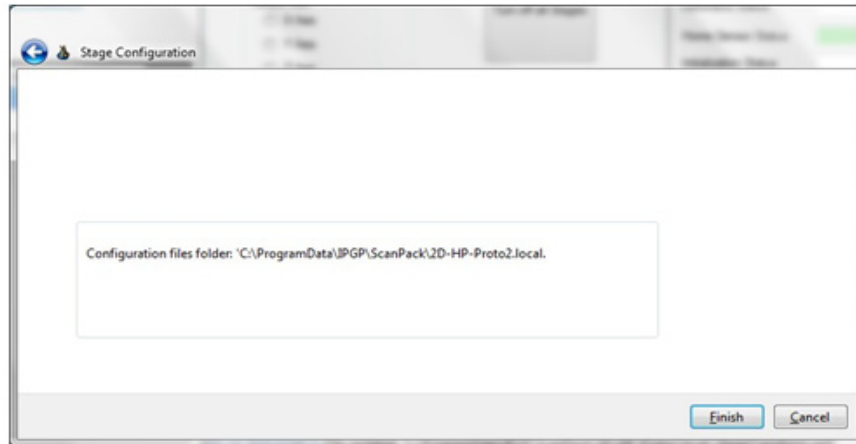
8. Click **Next**. A confirmation message appears. See Figure 6-10.

Figure 6-10. Confirmation Message



9. Click **Next**. A window appears displaying the local path for the configuration file.

Figure 6-11. Stage Configuration - Finish Message



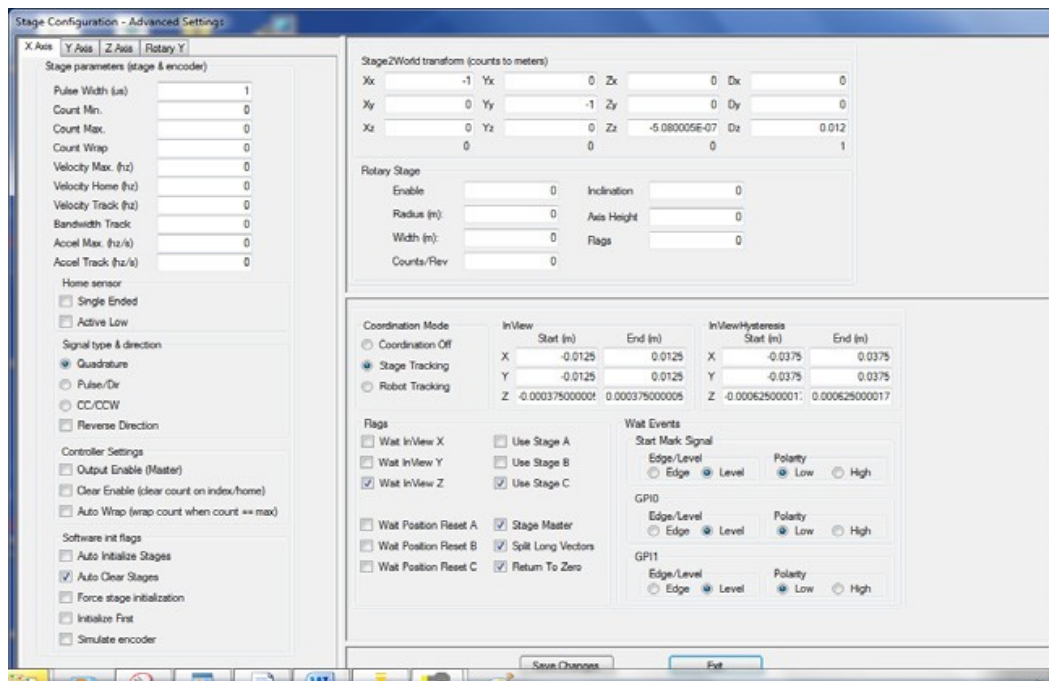
10. Click **Finish**.

### 6.3.1 Advanced Settings

To modify advanced settings:

1. Click **File > Advanced Settings**. The advanced Settings window appears. See Figure 6-12.

Figure 6-12. Advanced Settings



2. Make necessary changes and click **Save Changes**.

## 6.4 Configuring the Motor Control Interface

The Motor Control interface allows the Laser Marker Module to control or listen to common types of motor drivers. It is connected to the 37-pin connector on the controller box.

Figure 6-13 shows the Motor Control Interface front view.

**Figure 6-13. Motor Control Interface - Front View**

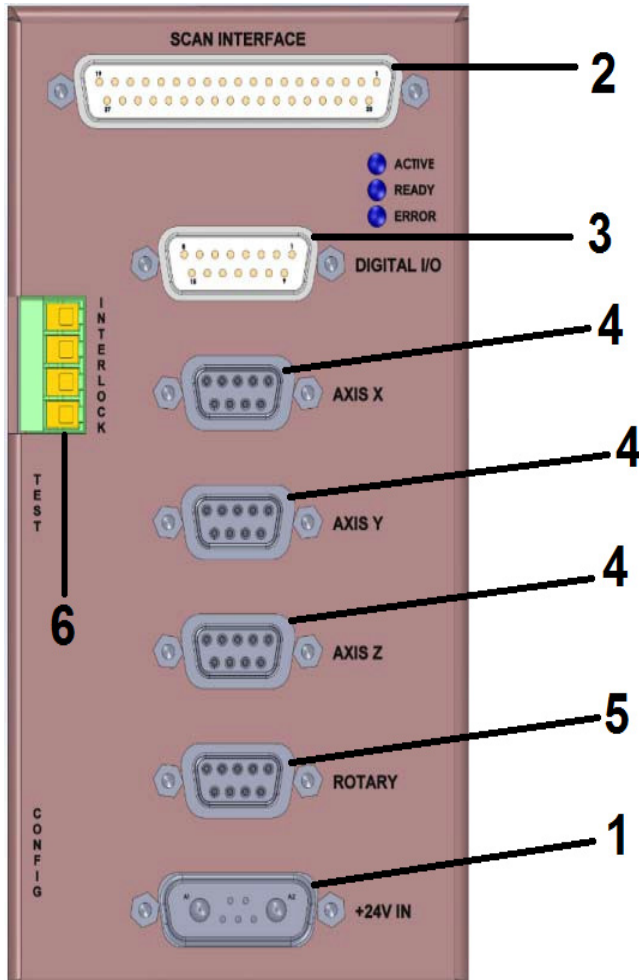


Table 6-A provides details on each component.

**Table 6-A. Motor Control Interface Description**

	<b>Feature</b>	<b>Description</b>
1	Power Supply +24V IN	+24V power supply for board. It is isolated from the 5V output supply and 3V input supply.
2	Scan Interface - 37-pin Female Sockets	Used for external interface to the 37-pin Male interface on the controller box rear panel.
3	Digital I/O - Female DB15	The digital I/O is a 15-pin female interface that connect to the 37-pin interface and is isolated and at 5V logic levels.
4	Motor Controller I/O – P1,P2, P3 (Axis X, Y, Z)	This connector interfaces with a motor controller to drive a stage. There are three connectors with identical pinouts intended for XYZ control.  The connectors can be configured to drive or receive signals at 5V logic and can be single-end or differential.
5	Motor Control Inputs - Female DB9	This connector is multiplexed with P2 Y axis. Depending on the logic level of P4-4 (normally high), you can enable the use of P2's signals or P4's.  The Y axis signals or the Rotary axis signals are mutually exclusive. The Y axis is enabled normally; pulling P4-4 to GND enables the Rotary axis and disables the Y axis.
6	Fiber Interlock	Brings the fiber interlock signals from the scan controller out to screw taps. Note: Not used in the current configuration

### 6.4.1 Scan Interface - 37-Pin Sockets

Figure 6-14 illustrates the Scan Controller 37-Pin female sockets. For more detailed information refer to the table that follows.

**Figure 6-14. 37-Pin Sockets**



Pin	Name	I/O	Description
1	Active	Out	Mark in Progress
20	GND	3VTTL	
2	Ready	Out	Ready/Waiting Signal
21	GND	3VTTL	
3	Error	Out	Error Condition
22	GND	3VTTL	
4	Start	In	Start Signal Input
23	GND	3VTTL	Pulled up to 3.3V
5	Stop	In	Stop Signal Input Active Low
24	GND	3VTTL	Pulled up to 3.3V
6	GPIO[0]	In/Out	General Purpose Input/Output for Synchronization
25	GND	3VTTL	Pulled up to 3.3V
7	GPIO[1]	In/Out	General Purpose Input/Output for Synchronization
26	GND	3VTTL	Pulled up to 3.3V
8	A_Axis_A+	In/Out	Axis A Phase A
27	A_Axis_A-	RS-422	
9	A_Axis_B+	In/Out	Axis A Phase B
28	A_Axis_B-	RS-422	

Pin	Name	I/O	Description
10	A_Axis_Z+	In	Axis A Phase Home (or Zero) Differential or Single Ended (on Z+ Pulled up to 3.3V)
29	A_Axis_Z-	RS-422	
11	B_Axis_A+	In/Out	Axis B Phase A
30	B_Axis_A-	RS-422	
12	B_Axis_B+	In/Out	Axis B Phase B
31	B_Axis_B-	RS-422	
13	B_Axis_Z+	In	Axis B Phase Home (or Zero) Differential or Single Ended (on Z+ Pulled up to 3.3V)
32	B_Axis_Z-	RS-422 or 3VTTL	
14	C_Axis_A+	In/Out	Axis C Phase A
33	C_Axis_A-	RS-422	
15	C_Axis_B+	In/Out	Axis C Phase B
34	C_Axis_B-	RS-422	
16	C_Axis_Z+	In/Out	Axis C Home (or Zero) Differential or Single Ended (on Z+ Pulled up to 3.3V) or ClkIn/ClkOut Differential for Synchronization to laser.
35	C_Axis_Z-	RS-422 or 3VTTL	
17	FiberInterlockA0	Out Relay	FiberInterlock is safe when 1 is connected to 0.
36	FiberInterlockA1		
18	FiberInterlockB0	Out Relay	FiberInterlock is safe when 1 is connected to 0.
37	FiberInterlockB1		
19	GND	Out	Logic Ground

### 6.4.2 Digital I/O - 15-Pin Sockets

Figure 6-15 illustrates the Digital I/O 15-Pin female sockets. For more detailed information refer to the table that follows.

**Figure 6-15. 15-Pin Female Sockets**



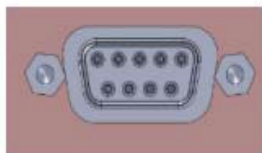


Socket	Name	I/O	Description
1	GND		
2	Stop	Input	Stop signal input, active low. Pulled up to +5V.
3	Ready	Output	Ready, waiting for start.
4	GPIO[0]	Input	If pin 6 on DB37 is an input use this pin. Must configure SW2-1 for input.
5	GND		
6	GPIO[1]	Output	If pin 7 on DB37 is an output use this pin. Must configure SW2-2 for output.
7	GND		
8	GND		
9	Start	Input	Start signal input. Pulled up to +5V.
10	Active	Output	Mark in Progress.
11	Error	Output	Error Condition
12	GPIO[1]	Input	If pin 7 on DB37 is an input use this pin. Must configure SW2-2 for input.
13	GPIO[0]	Output	If pin 6 on DB37 is an output use this pin. Must configure SW2-2 for output.
14	GND		
15	GND		

### 6.4.3 Motor Control I/O - P1, P2, P3

Figure 6-16 illustrates the Motor Control I/O 9-Pin female sockets. For more detailed information refer to the table that follows.

**Figure 6-16. 9-Pin Female Sockets – Motor Control I/O**



Socket	Name	I/O	Description
1	AXIS_IO0+	IO	Can be a 5V command or encoder feedback (SE or Differential) depending on SW1.
2	AXIS_IO0-		Only used if differential signal is needed.
3	GND		
4	AXIS_IO1+	IO	Can be a 5V command or encoder feedback (SE or Differential) depending on SW1.
5	AXIS_IO1-		Only used if differential signal is needed.
6	GND		
7	Home_sensor+	Input	Home sensor input. Can be SE or differential depending on SW1.
8	Home_sensor-	Input	Only used if differential signal is needed.
9	GND		

#### 6.4.4 Motor Control Inputs

Figure 6-17 illustrates the Motor Control I/O 9-Pin female sockets. For more detailed information refer to table that follows.

**Figure 6-17. 9-Pin Female Sockets - Motor Control Inputs**



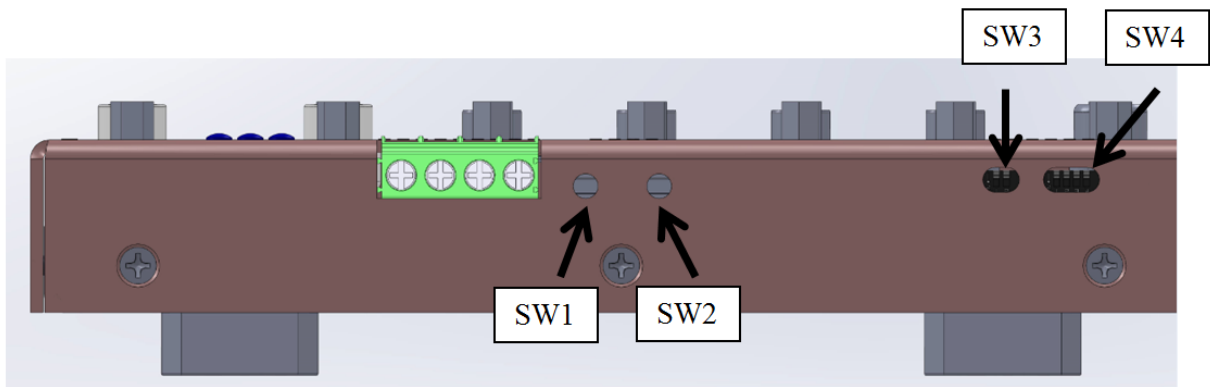
Socket	Name	I/O	Description
5	ROTARY_IN0+	IO	Can be a 5V command or encoder feedback (SE or Differential) depending on SW1.
9	ROTARY_IN0-		Only used if differential signal is needed.
4	ROTARY_SEL_L	Input	Pulled up to +5V. When this signal is high, the Y axis is enabled; when it is low the Rotary axis is enabled.
8	ROTARY_IN1+	Input	Can be a 5V command or encoder feedback (SE or Differential) depending on SW1.
3	ROTARY_IN1-		Only used if differential signal is needed.
7	GND		
2	Home_sensor+	Input	Home sensor input. Can be SE or differential depending on SW1.
6	Home_sensor-	Input	Only used if differential signal is needed.
1	GND		

## 6.5 PCB Configuration and Testing

There are two sets of dip switches used to configure the board. Two momentary contact push buttons can also test the operation of the “Start” and “Stop” commands.

Figure 6-18 shows the Motor Control Interface side view.

**Figure 6-18. Motor Control Interface - Side View**



### 6.5.1 SW1 and SW2 - Pushbutton Test Signals

**SW1** – When pressed, the Start signal is low. Normally high.

**SW2** – When pressed, the Stop signal is low. Normally high.

### 6.5.2 SW3 - PIO[0], GPIO[1] Direction

The switch is marked with an arrow pointing down that is labeled "ON." When the dip switch is pointed down, it is in the ON position. When it is pointed up, it is in the OFF position.

**Position 1** - This switch sets pin 6 of the 37-pin DSUB (J1-6) as an input or output.

- ON - GPIO[0] is an input. Send a 5V signal to J2-4.
- OFF - GPIO[0] is an output. J2-13 can drive a 5V signal to a controller.

**Position 2** - This switch sets pin 7 of the 37-pin DSUB (J1-7) as an input or output.

- ON - GPIO[1] is an input. Send a 5V signal to J2-12.
- OFF - GPIO[1] is an output. J2-6 can drive a 5V signal to a controller.

### 6.5.3 SW4 - Encoder Interface Setup - SW4

The switch is marked with an arrow pointing down that is labeled "ON." When the dip switch is pointed down, it is in the ON position. When it is pointed up, it is in the OFF position.

**Position 1** - This switch sets up the home sensor as differential or single-ended when toggled.

- ON - Home sensor is a single-ended signal connected to pin 2 of P1, P2, P3, or P4.
- OFF - Home sensor is a differential signal connected to pins 2, 6 of P1, P2, P3, or P4.

**Position 2** - This switch sets up the encoder signals as differential or single-ended when toggled.

- ON - Encoder signals are single-ended.
- OFF - Encoder signals are differential.

**Position 3** - This switch determines the direction of the encoder signals.

- ON - Encoder commands are sent to the DB9 connectors to control a motor driver.
- OFF - Encoder signals are read-back to the DB9 connectors so the IPGP523 can monitor stage locations.

---

## IMPORTANT

The rotary axis cannot be used if Position 3 is in the OFF position.

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**Position 4** - Reserve

## 7. Maintenance

The Laser Marker Module is incorporated into a given fixed installation. The safety functions have to be tested in a defined periodic maintenance interval.

The time cycle of this interval is dependent on the safety analysis of the system where the Laser Marker Module is installed.

Only personnel knowledgeable in the related functional safety assessment of the system can determine such maintenance.

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management or similar software solely for the purpose of administration, performance enhancement and/or preventive maintenance of the EQUIPMENT.

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21. Product Support. Product support for the SOFTWARE is not provided by MS, Microsoft Corporation, or their affiliates or subsidiaries. For product support, please refer to IPG support number provided in the documentation for the EQUIPMENT. Should you have any questions concerning this EULA, or if you desire to contact IPG for any other reason, please refer to the address provided in the documentation for the EQUIPMENT.

22. Termination. Without prejudice to any other rights, IPG may terminate this EULA if you fail to comply with the terms and conditions of this EULA. In such event, you must destroy all copies of the SOFTWARE and all of its component parts.

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## 9. Service and Support

### 9.1 Technical Support

Most issues and questions regarding the safety, set-up, operation and maintenance of IPG products can be resolved by carefully reading this User Guide. If you have questions regarding the safety, set-up, operation or maintenance of your IPG product, please call our Customer Service department located in Oxford, Massachusetts, USA, at 508-373-1100.

If you cannot resolve the issues through the use of this User Guide or over the telephone with our technical support group, you might need to return the product to IPG.

### 9.2 Product Returns

#### 9.2.1 Returns to the United States

All product returns require a Return Merchandise Authorization (RMA) from IPG.

To obtain an RMA, contact the Customer Service department of IPG Photonics Corporation at 508-373-1100 (US) or +49 2736 44 20 451 (Germany).

If you return a product with a RMA, please follow these procedures:

1. Products must be carefully packed in a suitable shipping container(s). Buyer assumes all responsibility for products damaged in shipment to IPG.
2. Buyer must issue a purchase order for the value of the replaced parts/service items and IPG will issue credit or invoice when the parts/service is received. Speak to IPG Customer Service Manager for the amount authorized under the required purchase order.
3. All requests for repair or replacement under this warranty must be made to IPG within 30 days after discovery of the defect (but not later than 7 days after warranty expiration).
4. All products returned to IPG but which meet applicable specifications, not defectively manufactured or used not in accordance with this User's Guide, will result in the Buyer being charged IPG's standard examination charge.
5. Complete packing list with product model and serial number will ensure prompt repair.
6. Be sure to include with the returned product your 'ship to' address for the return of the serviced product.

For shipping instructions refer to section 9.2.2.



## 9.2.2 Shipping Instructions for US Returns

**Warranty Returns** - Domestic & \*International Buyers pay for one-way freight costs and insurance to IPG. IPG will pay for freight return cost and insurance back to the Buyer.

**Non-Warranty Returns** - Domestic & \*International Buyers pay for two-way freight costs and insurance to IPG. If shipment consists of returns that are both warranty and non-warranty, the shipment will be considered as non-warranty.

### Shipping address for returns to US:

IPG Photonics Corporation  
50 Old Webster Road  
Oxford, MA 01540  
Attn: Product Returns  
Tel: 508-373-1100

## IMPORTANT

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\* International Returns must include applicable DUTIES AND TAXES. You must mark air bills with “US GOODS, RETURNED FOR REPAIR”.

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## 9.2.3 Returns to Germany

Shipping address for returns to Germany:

IPG Laser GmbH  
Siemensstrasse 7  
D-57299 Burbach, Germany  
Attn: Product Returns  
Tel: +49-(0)2736-44-20-451

1. IPG Laser GmbH will only accept returns for which an approved Return Material Authorization (RMA) has been issued by IPG Laser GmbH. You should address to the customer support team at +49-(0)2736-44-20-451 or support.europe@ipgphotonics.com to discuss the return and request an RMA number. You must return defective products freight prepaid and insured to IPG Laser at the address shown herein. All products which have returned to IPG Laser but which are found to meet all previously applicable specifications for such products or which indicate damage to the fiber connectors not resulting from defect manufacturing, shall be subject to IPG Laser' standard examination charge in effect at the time and these costs shall be charged to the Buyer. All products returned to IPG Laser which are not accompanied by an itemized statement of defects, shall be returned to the Buyer at the Buyer's expense and IPG Laser shall not carry out any evaluation of such products. IPG Laser warrants to Buyer that its services, labor and replacement parts, assemblies and modules will be free of defects in material and workmanship for ninety (90) days from the date of shipment or performance of services.

2. Warranty Returns - Domestic & \*International Buyers should pay for one-way freight costs to IPG Laser. IPG Laser will reimburse Buyers for applicable reasonable third-party freight costs and IPG Laser will pay for freight return cost back to the Buyer.
3. Non-Warranty Returns - Domestic & \*International Buyers are responsible for two-way freight costs. If shipment consists of returns that are both warranty and non-warranty, the shipment will be considered as non-warranty. Any UNAUTHORIZED shipments billed to IPG Laser without authorization will be re- invoiced to the Buyer. Confirming purchase orders are required for non- warranty returns.
4. \*International Returns must include applicable DUTIES AND TAXES, and you must mark air bills with "RETURNED FOR REPAIR". In any event, where IPG Laser accepts a shipment, IPG Laser will invoice to the Buyer for any charges as stated above.
5. Returns for credit will not be accepted unless authorized in advance, in writing by IPG Laser, in accordance with IPG Laser Terms and Condition, including the warranty provisions, In most cases, restocking fees will apply.
6. All returns must be packaged adequately to avoid damage during shipment.
7. Complete packing list with product model and serial number will insure prompt repair, if the other terms of this form are not followed.
8. See the IPG Terms and Conditions for the applicable warranty for the products before you request the return of the products.
9. RMA number will expire 31 days after the date of issue. Thereafter, units received in under the expired RMA number will result in a longer turnaround time. Include a copy of the completed RMA form with the return of your unit(s).



To learn more, visit [www.ipgphotonics.com](http://www.ipgphotonics.com)

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Revision A – November 2017