New Focus
A Newport Corporation Brand

# Model 8742 Picomotor™ Controller / Driver
# Quick Start Guide


## Package Contents:

This package contains the following components:

- Model 8742 includes (1) Controller and (1) USB Flash Drive
- Model 8742-4-KIT includes (1) Controller (1) USB Flash Drive, (1) Power Supply, and (1) USB Cable
- Model 8742-8-KIT and 8742-12-KIT includes (2 or 3) Controllers (1) USB Flash Drive, (1) Power Supply, (1) USB Cable, (1 or 2) DC Power Cables, (1 or 2) RS-485 Jumper Cables, and (1 or 2) Stacking Plate Kits (see chart on page 13)
- This Quick Start Guide

## Getting Started:

Before operating this device, refer to the Model 8742 User's Manual, starting with the section on Safety Precautions. The complete User's Manual is available in electronic format (PDF file). It is included in this product's USB flash drive, and is automatically installed on your computer's hard drive during software installation. Additionally, the latest version of the User's Manual can be found at www.Newport.com on the product's web page.

## Safety:

The Model 8742 User's Manual contains numerous safety warnings and cautions. The user must read it prior to applying power to the Model 8742 Picomotor™ Controller / Driver.

Voltages of up to 130 V are accessible inside the Controller and Picomotors™ devices. DO NOT operate with the Controller cover removed. If the wire of a Picomotor™ is damaged, discontinue use and return it for repair. If the device is used in a manner not specified by New Focus, the protection provided by the device may be impaired.

Power should not be applied to either item by unqualified or untrained personnel.

## Software Information:

The root folder of the USB flash drive contains a ReadMe.PDF file and the setup program to install the software. To install the USB driver and software, double-click on **SETUP.EXE** file.
Follow the on-screen instructions to complete the installation process. For more information refer to the **8742's ReadMe.PDF** file contained on the USB flash drive.

# EU27 DECLARATION OF CONFORMITY

**Application of Council Directive(s):**

☒ Electromagnetic Compatibility Directive (EMCD) – 2014/30/EU
☒ Low Voltage Directive (LVD) – 2014/35/EU
☒ Restriction of Hazardous Substances Directive (RoHS2) – 2011/65/EU (2)
☒ Restriction of Hazardous Substances Directive (RoHS3) – (EU) 2015/863 (2)
☒ Waste Electrical and Electronic Equipment – Directive 2012/19/EU

**Standard(s) to which conformity is declared:**

☒ EN 61326-1:2013 – (EMC)
☒ EN 61010-1:2010 + AMD 1:2016 (Ed 3) – (Safety)

**Emissions:**

☒ CISPR 11:2015 Industrial, Scientific and Medical Equipment Radio-Frequency Disturbance Characteristics - Limits and Methods of Measurement
☒ IEC 61000-3-2:2018 EMC/Limits for Harmonic Current Emission (1)
☒ IEC 61000-3-3:2013 + AMD1:2017 EMC/Limitations of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems (1)

**Immunity:**

☒ IEC 61000-4-2:2008 EMC/Electrostatic Discharge Immunity Test
☒ IEC 61000-4-3:2006+AMD1:2007+AMD2:2010 EMC/Radiated Radio - Frequency Electromagnetic Field Immunity Test
☒ IEC 61000-4-4:2012 EMC/Electrical Fast Transient/Burst Immunity Test
☒ IEC 61000-4-5:2014 + AMD 1:2017 EMC/Surge Immunity Test (1)
☒ IEC 61000-4-6:2013 EMC/Conducted Disturbances induced by Radio Frequency Fields Immunity Test
☒ IEC 61000-4-8:2009 EMC/Power Frequency Magnetic Field Immunity Test
☒ IEC 61000-4-11:2004 + AMD 1:2017 EMC/Voltage Dips, Short Interruptions and Variations Immunity Test (1)

**Manufacturers Name: MKS Instruments, Inc., 2 Tech Drive, Andover, MA 01810 USA**

Authorized Representatives Name & Location: MICRO-CONTROLE Spectra-Physics S.A.S., Zone Industrielle, 45340 Beaune la Rolande, France

Equipment Type/Description: Electrical equipment for measurement, control and laboratory use

Model Number(s) (1): 8742, 8742-Various

The object of the declaration described above is in conformity with the relevant Community harmonization legislation. MKS product conforms to the above Directive(s) and Standard(s) only when installed in accordance with manufacturer's specifications. This declaration has been issued under the sole responsibility of the manufacturer.

Date: 1/5/2021

Signature:

Full Name: **Le Cointe Hervé**
Title: Quality director

1) Compliance of the above model numbers requires the use of a braided shielded cable properly terminated at both ends – if so noted in the MKS Instruction Manual.
2) RoHS Directive has to be checked for in scope products; cannot CE mark without compliance to RoHS. RoHS Directive can be unchecked only for systems which MKS sells which qualify for "Large Scale Industrial Tool" exclusion.

# UK DECLARATION OF CONFORMITY

**Application of Council Directive(s):**

☒ Electromagnetic Compatibility Directive (EMCD) – 2014/30/EU
☒ Low Voltage Directive (LVD) – 2014/35/EU
☒ Restriction of Hazardous Substances Directive (RoHS2) – 2011/65/EU (2)
☒ Restriction of Hazardous Substances Directive (RoHS3) – (EU) 2015/863 (2)
☒ Waste Electrical and Electronic Equipment – Directive 2012/19/EU

**Standard(s) to which conformity is declared:**

☒ BS EN 61326-1:2013 – (EMC)
☒ BS EN 61010-1:2010 + AMD 1:2016 (Ed 3) – (Safety)

**Emissions:**

☒ CISPR 11:2015 Industrial, Scientific and Medical Equipment Radio-Frequency Disturbance Characteristics - Limits and Methods of Measurement
☒ IEC 61000-3-2:2018 EMC/Limits for Harmonic Current Emission (1)
☒ IEC 61000-3-3:2013 + AMD1:2017 EMC/Limitations of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems (1)

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2) RoHS Directive has to be checked for in scope products; cannot UKCA mark without compliance to RoHS. RoHS Directive can be unchecked only for systems which MKS sells which qualify for "Large Scale Industrial Tool" exclusion.

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### Trademarks

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## Service Information

This section contains information regarding factory service for the source. The user should not attempt any maintenance or service of the system or optional equipment beyond the procedures outlined in this manual. Any problem that cannot be resolved should be referred to New Focus.

# 1 Safety Precautions

## 1.1 Definitions and Symbols

The following terms and symbols are used in this documentation and also appear on the Model 8742 Controller/Driver where safety-related issues occur.

### 1.1.1 General Warning or Caution

Figure 1 *General Warning or Caution Symbol*

The Exclamation Symbol in the figure above appears on the product and in Warning and Caution tables throughout this document. This symbol designates that documentation needs to be consulted to determine the nature of a potential hazard, and any actions that have to be taken.

### 1.1.2 Electric Shock

Figure 2 *Electrical Shock Symbol*

The Electrical Shock Symbol in the figure above appears throughout this manual and on the product. This symbol indicates a hazard arising from dangerous voltage. Any mishandling could result in irreparable damage to the equipment, and personal injury or death.

### 1.1.3 Potential Burn Hazard

Figure 3 *Hot Surface Symbol*

The Hot Surface Symbol in the figure above appears throughout this manual and on the product. This symbol indicates a hazard arising from a high temperature. Any mishandling could result in personal injury.

### 1.1.4 European Union CE Mark

Figure 4 *CE Mark*

The presence of the CE Mark on New Focus equipment means that this instrument has been designed, tested and certified compliant to all applicable European Union (CE) regulations and recommendations.

### 1.1.5 UKCA Mark

Figure 5 *UKCA Mark*

The presence of the UKCA Mark on New Focus equipment means that this instrument has been designed, tested and certified compliant to all applicable United Kingdom regulations and recommendations.

### 1.1.6 Alternating voltage symbol

Figure 6 *Alternating Voltage Symbol*

This international symbol implies an alternating voltage or current.

### 1.1.7 On



Figure 7 *On Symbol*

The symbol in the figure above represents a power switch position on a Model 8742. This symbol represents a Power On condition.

### 1.1.8 Off

Figure 8 *Off Symbol*

The symbol in the figure above represents a power switch position on the Model 8742. This symbol represents a Power Off condition.

### 1.1.9 Ground

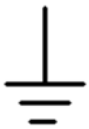


Figure 9 *Ground Symbol*

The symbol in the figure above appears on the Model 8742 to indicate the screw to be used to ground the case of the unit. This symbol identifies the frame or chassis terminal.

### 1.1.10 DC Symbol

Figure 10 *DC Symbol*

This international symbol implies an unvarying current or voltage.

### 1.1.11 Waste Electrical and Electronic Equipment (WEEE)

Figure 11 *WEEE Directive Symbol*

This symbol on the product or on its packaging indicates that this product must not be disposed with regular waste. Instead, it is the user responsibility to dispose of waste equipment according to the local laws. The separate collection and recycling of the waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For information about where the user can drop off the waste equipment for recycling, please contact your local New Focus representative.

### 1.1.12 Control of Hazardous Substances


Figure 12 *RoHS Compliant Symbol*

This label indicates the products comply with the EU Directive 2002/95/EC that restricts the content of six hazardous chemicals.

## 1.2 Warnings and Cautions

The Model 8742 is a component of a system that will contain one or more Picomotors and other items. Since New Focus cannot control these other system components, the User is ultimately responsible for ensuring that the complete system meets all applicable product and workplace safety regulations. Specific attention should be directed to the description of safety grounding concerns described in Section 1.3, below.

The following are definitions of the Warnings, Cautions and Notes that are used throughout this manual to call your attention to important information regarding your safety, the safety and preservation of your equipment or an important tip.

| | |
|---|---|
| ⚠ | **WARNING**<br>**Situation has the potential to cause bodily harm or death.** |

| | |
|---|---|
| ⚠ | **CAUTION**<br>**Situation has the potential to cause damage to property or equipment.** |

**NOTE**

**Additional information the user or operator should consider.**

| | |
|---|---|
| CE | **Situation has the potential to cause the product to not comply with applicable European Union regulations.** |

| | |
|---|---|
| UK CA | **Situation has the potential to cause the product to not comply with applicable United Kingdom regulations.** |

### 1.2.1 General Warnings

Observe these general warnings when operating or servicing this equipment:

- Heed all warnings on the unit and in the operating instructions.
- Do not use this equipment in or near water.
- Although the input power to this equipment is below 20 VDC, this equipment internally generates much higher voltages that are present on the Model 8742 connector pins. Only properly trained personnel should touch either of these items.
- The Model 8742 is intended to be used as a component in a larger system. When this product is included as part of a larger assembly, the user MUST ensure that appropriate additional safety and EMC-compliance features are incorporated the assembly.
- The Model 8742 is typically supplied with an external DC power source. When the external power source is connected to MAINS power, the external power source's detachable power cord may be used to disconnect power to the 8742. Do not position the external power supply so that its MAINS power cord cannot be easily disconnected.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp lint-free cloth.
- Lockout all electrical power sources before servicing the equipment.
- There are no user-replaceable fuses in this equipment. The user must ensure that appropriate current-limiting protection is provided by the external DC power source.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Qualified service personnel should perform safety checks after any service.
- Use only the New Focus-supplied MAINS power cord with the external DC supply. Use of under-rated power cords and cause property damage

### 1.2.2 General Cautions

Observe these cautions when operating this equipment:

- If this equipment is used in a manner not specified in this manual, the protection provided by this equipment may be impaired.
- Do not block ventilation openings.
- Use only the specified replacement parts.
- Follow precautions for static sensitive devices when handling this equipment.
- This product should only be powered as described in the manual.
- There are no user-serviceable parts inside the Model 8742 Picomotor Drive Module.

### 1.2.3 Summary of Warnings and Cautions

The following general warning and cautions are applicable to this instrument:

**WARNING**

**The Picomotor Controller/Driver is incomplete in constructional features and is considered only to be a component for the purposes of regulatory compliance. It is "equipment for building in;" a suitable enclosure must be provided so that the unit is not user accessible when incorporated into the final product.**

**WARNING**

**The Model 8742 Picomotor Controller/Driver internally generates non-SELV voltages. These voltages are present, at times, on the Picomotor connectors even when a Picomotor is not connected. The user shall mount the Model 8742 with appropriate barriers, spacings, markings, etc. to ensure that all applicable regulatory requirements are met. THIS IS THE USER'S RESPONSIBILITY.**

**WARNING**

**Do not attempt to operate this equipment if there is evidence of shipping damage or you suspect the unit is damaged. Damaged equipment may present additional hazards to you. Contact New Focus technical support for advice before attempting to plug in and operate damaged equipment.**

**WARNING**

**The Model 8742 is intended for use ONLY with New Focus Picomotors. Connection of other devices to the unit's motor connectors may cause damage to the unit or the connected device, fire, and/or personal injury.**

**WARNING**

**Before operating the Model 8742 Picomotor Driver, please read and understand all of Section 1.**

**WARNING**

**Do not attempt to operate this equipment if there is evidence of shipping damage or you suspect the unit is damaged. Damaged equipment may present additional hazards to you. Contact New Focus technical support for advice before attempting to plug in and operate damaged equipment.**

**WARNING**

**Do not apply external DC power to this equipment in excess of 14.5 VDC.**

**WARNING**

**Use only the New Focus-supplied MAINS power cord with the external DC power supply. Use of an under-rated power cord may cause damage to the product, fire, and/or personal injury.**

**WARNING**

**Before cleaning the enclosure of the 8742 Controller/Driver, the power cord must be disconnected from the wall socket and from the unit.**

**CAUTION**

**There are no user serviceable parts inside the Model 8742 Picomotor Controller/Driver. Work performed by persons not authorized by New Focus will void the warranty.**

**WARNING**

**If this equipment is used in a manner not specified in this manual, the protection provided by this equipment may be impaired.**

**WARNING**

**This instrument is intended for use by qualified personnel who recognize thermal, shock, or laser hazards and are familiar with safety precautions required to avoid possible injury. Read the instruction manual thoroughly before using, to become familiar with the instrument's operations and capabilities.**

**CAUTION**

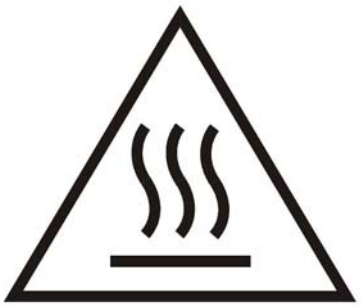
**The Model 8742 Picomotor Controller/Driver is designed to be safe when operated under Normal Environmental Conditions as defined in EN61010-1:2010. Operation under harsher environmental conditions can result in severe injury.**

## CAUTION

**The case of the Model 8742 Picomotor Controller/Driver is used to dissipate internally-generated heat. Blocking the normal convective airflow around the unit, or thermally insulating the unit, can result in severe injury, damage to the product, and/or fire.**

## CAUTION

**When operated at higher pulse rates for extended periods of time, the temperature on the outside of the Model 8742's case may rise above the "surface temperature limits in normal operation" as defined in EN61010-1:2010 unless the user takes appropriate measures. These may include the addition of an external heat sink, barriers to contact, reducing the pulse frequency, or other appropriate mitigations. Failure to take appropriate action when operating the Model 8742 under these conditions can result in severe injury.**



## CAUTION

**The case of the Model 8742 Picomotor Controller/Driver is used to dissipate internally-generated heat. Blocking the normal convective airflow around the unit, or thermally insulating the unit, can result in severe injury, damage to the product, and/or fire.**

**The Model 8742 Picomotor Controller/Driver is intended for use in an industrial laboratory environment. Use of this product in other environments, such as residential, may result in electromagnetic compatibility difficulties due to conducted as well as radiated disturbances.**

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## 1.3 Safety Grounding Considerations

There are potentially lethal voltages generated with the Model 8742 Picomotor Controller/Driver and presented on the pins of the "Motor" connectors EVEN WHEN NO PICOMOTOR IS INSTALLED. (These voltages are not present when power is not applied to the unit; they also are not present when the unit is switched OFF.) The User must manage certain system-level aspects to ensure safe operation. One of these is grounding.

The Model 8742's external DC power supply provides 12VDC. The negative output from this supply is typically isolated from MAINS earth ground, but this isolation should not be assumed. This same negative output is connected directly to the Model 8742's external case within the Model 8742. This same "ground" is at the same potential as the MOTOR connectors' return signal pins. This means that the MOTOR connectors' drive signal pins are, at times, at VERY HIGH VOLTAGES relative to the Model 8742 case, the USB connector shell, and the DC input/loop-through connectors' negative terminals.

An 8-32 screw is provided on the unit and marked with the "Ground" symbol shown in Paragraph 1.1.9, above. While it is not necessary to connect this terminal to a building "earth" ground, New Focus recommends doing so because it will simplify system-level compliance with most regulatory requirements. Once this connection is made, the user must ensure that all other system components are appropriately grounded. If the other components are not grounded, a damaged Picomotor (or its wire) could result in a dangerously high voltage being present between anything that is grounded (like the 8742 and a computer attached to it via USB) and the picomotor case. Note that the simplest way to ground a Picomotor is via its threaded mounting bushing or other mounting hardware. DO NOT ATTEMPT TO OPEN A PICOMOTOR TO ACHIEVE THIS GROUNDING.

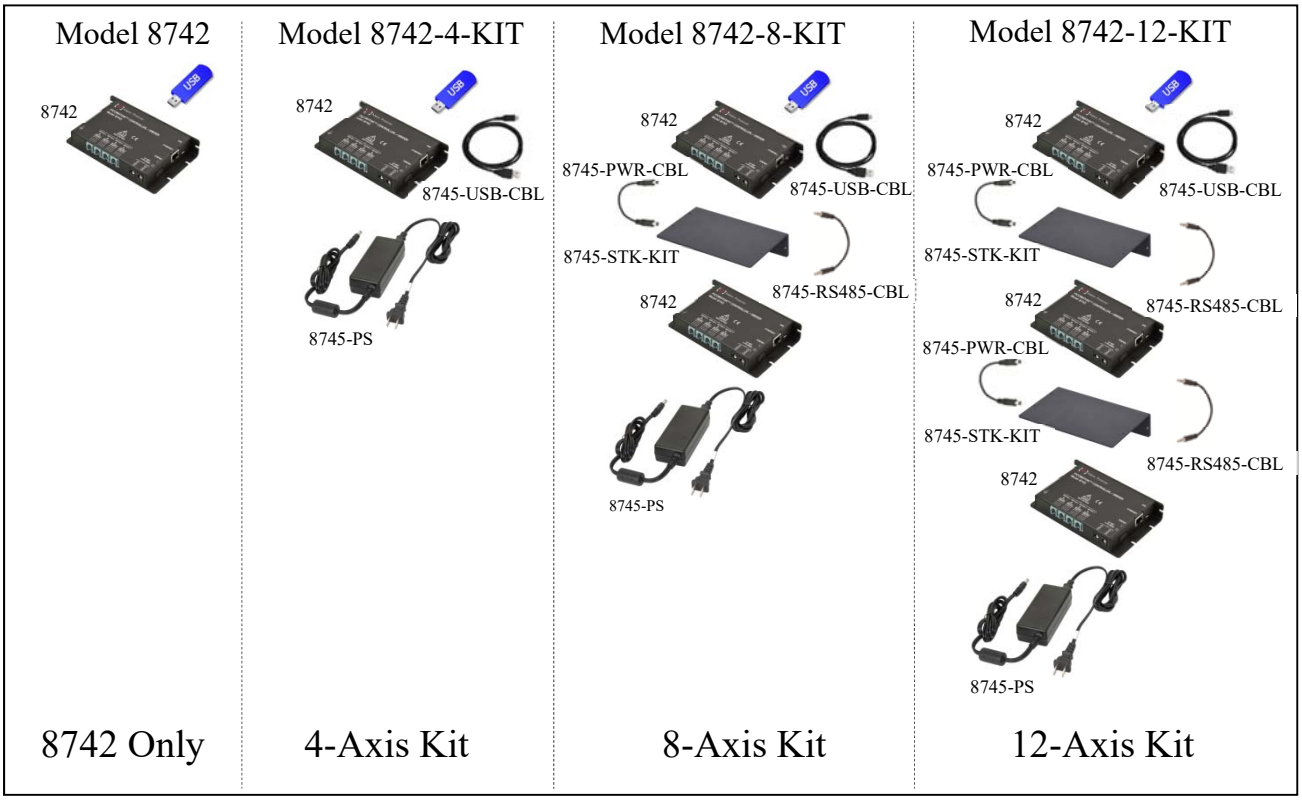
If system requirements prevent the Picomotor from being grounded, then the user must ensure that the Model 8742 and all other system components (including any USB-connected computers) are properly isolated from earth ground. This is because a short of the high-voltage drive signal to an earth ground may result in potentially lethal voltages existing between the case of the 8742 and anything that is earth grounded, such as a floor. The User is advised to consult all applicable regulations because this insulation will probably need to have a breakdown voltage of several thousand volts due to lightening concerns.

In summary, New Focus strongly recommends grounding the Model 8742's case.

## 1.4 Model 8742 Series Kits and Accessories

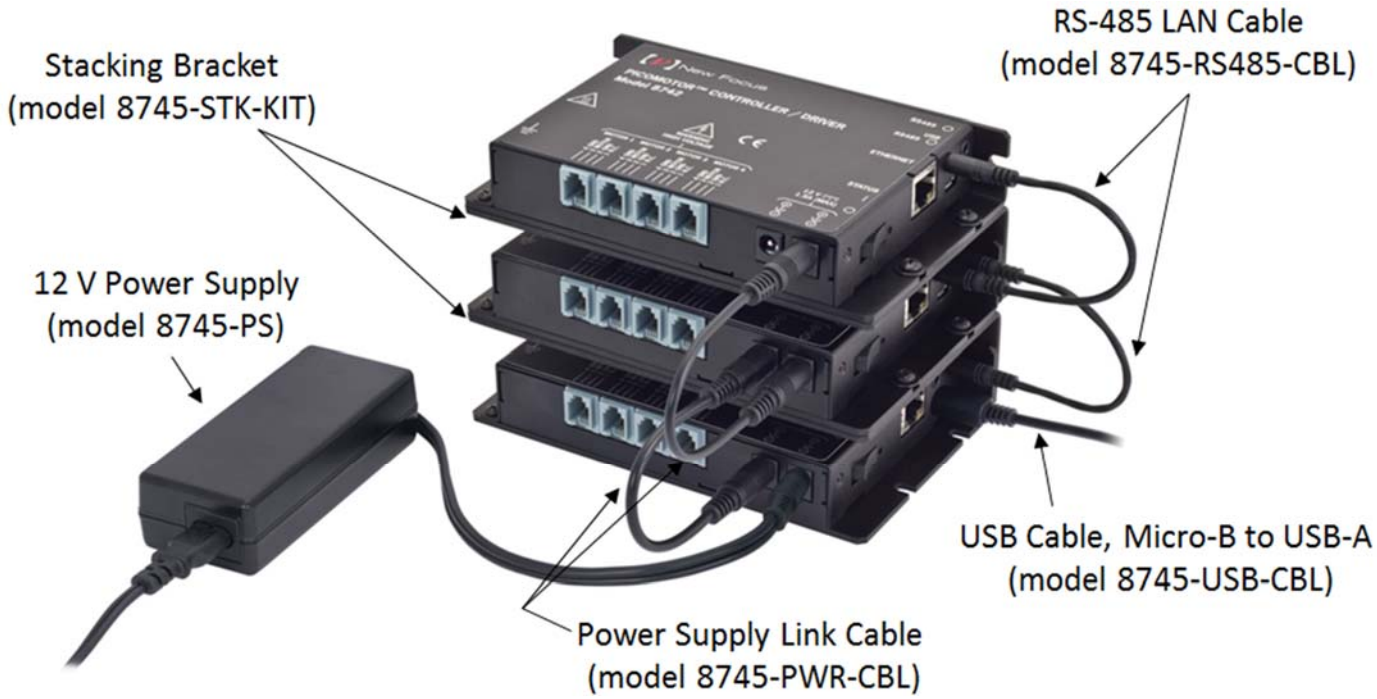
The following are available kits and accessories:

- Power supply/AC adapter, 60 Watt (Model 8745-PS)
- Power supply link cable, 6 inch, for daisy chaining multiple controllers together using a single 12 VDC supply (Model 8745-PWR-CBL)
- RS-485 LAN link cable, 6 inch, for daisy-chaining (Model 8745-RS485-CBL)
- USB cable, 3 meter (Model 8745-USB-CBL)
- L-shaped bracket for stacking several units (Model 8745-STK-KIT)
- Optical table mounting plate kit (Model 8745-MTG-KIT)



## 1.5 Stacking and Interconnecting Units

The following figure demonstrates how multiple controllers are typically stacked and i98nterconnected using standard available accessories:



## 1.6 RS-485 Local Area Network (LAN) Connectivity

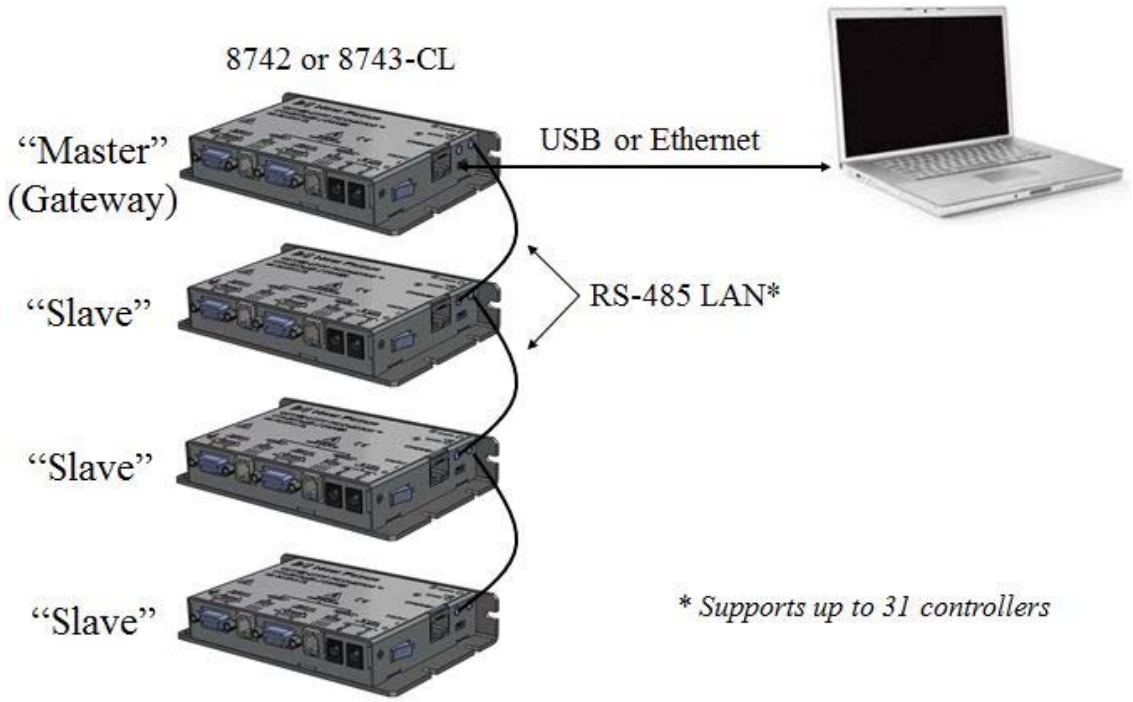
If several units need to be controlled via Ethernet or USB, they do not all have to be connected directly to the PC or an Ethernet Switch or USB Hub. Instead, a single unit can act as a "gateway" or "master" by connecting it to the PC and also connecting it to the remaining units using a half-duplex RS-485 LAN bus.

There are two RS-485 connectors that accept standard 3.5mm stereo plugs. The two connectors are connected in parallel inside the controller. These connections along with RS-485 cable (model 8745-RS485-CBL) facilitate daisy-chain type hook-up to simplify the wiring between an external computer and multiple controller units.

Read controller User's Manual for complete details.

**NOTE: Make sure RS-485 cable plug is fully inserted into controller connector input socket.**

**NOTE: Install and run easy to use Picomotor Windows application software to confirm USB, Ethernet and RS-485 LAN communication.**

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