

# MicroHAWK MV-20 / MV-30 / MV-40 Smart Camera Guide



Copyright ©2019  
Omron Microscan Systems, Inc.  
Tel: +1.425.226.5700 / 800.762.1149  
Fax: +1.425.226.8250

All rights reserved. The information contained herein is proprietary and is provided solely for the purpose of allowing customers to operate and/or service Omron Microscan-manufactured equipment and is not to be released, reproduced, or used for any other purpose without written permission of Omron Microscan.

Throughout this manual, trademarked names might be used. We state herein that we are using the names to the benefit of the trademark owner, with no intention of infringement.

## ***Disclaimer***

The information and specifications described in this manual are subject to change without notice.

## ***Latest Manual Version***

For the latest version of this manual, see the Download Center on our web site at: [www.microscan.com](http://www.microscan.com).

## ***Technical Support***

For technical support, e-mail:

[Americas\\_support@microscan.com](mailto:Americas_support@microscan.com)

[EMEA\\_support@microscan.com](mailto:EMEA_support@microscan.com)

[APAC\\_support@microscan.com](mailto:APAC_support@microscan.com)

[China\\_support@microscan.com](mailto:China_support@microscan.com)

## ***Warranty***

For current warranty information, see: [www.microscan.com/warranty](http://www.microscan.com/warranty).

## **Omron Microscan Systems, Inc.**

### **United States Corporate Headquarters**

+1.425.226.5700 / 800.762.1149

### **United States Northeast Technology Center**

+1.603.598.8400 / 800.468.9503

### **European Headquarters**

+31.172.423360

### **Asia Pacific Headquarters**

+65.6846.1214

# Statements of Compliance

## **CE Class A**

MicroHAWK Smart Cameras have passed Class A testing for the standards listed below, including U.S. (FCC), European (EN), and Canadian EMC requirements (ICES).

- 2011/65/EU
- EN 50581:2012
- 2004/108/EC
- EN 55022:2010 For Class A Products
- EN 55024:2010, including:
  - IEC 61000-4-3:2010
  - IEC 61000-4-4:2012
  - IEC 61000-4-5:2014
  - IEC 61000-4-6:2013
  - IEC 61000-4-8:2009
  - IEC 61000-4-11:2004
- EN 61000-3-2:2014
- EN 61000-3-3:2013
- FCC 15.109:2015 For Class A Products
- FCC 15.107:2015 For Class A Products
- ICES-003:2012 For Class A Products

## **CE Class B**

MicroHAWK Smart Cameras have passed Class B testing for the standards listed below, including U.S. (FCC), European (EN), and Canadian EMC requirements (ICES). The MicroHAWK had a ferrite core installed on the USB cable adjacent to the MV-20 for all tests. The ferrite used was classified as a lower and broadband part for frequencies in the range of 1-300 MHz.

- 2011/65/EU
- EN 50581:2012
- 2004/108/EC
- EN 55022:2010 For Class B Products
- EN 55024:2010, including:
  - IEC 61000-4-3:2010
  - IEC 61000-4-4:2012
  - IEC 61000-4-5:2014
  - IEC 61000-4-6:2013
  - IEC 61000-4-8:2009
  - IEC 61000-4-11:2004
- EN 61000-3-2:2014
- EN 61000-3-3:2013
- FCC 15.109:2015 For Class B Products
- FCC 15.107:2015 For Class B Products
- ICES-003:2012 For Class B Products

## **EMC**

### **ESD**

Electromagnetic compatibility (EMC) exception: The MicroHAWK was tested for electrostatic discharge immunity per IEC 61000-4-2. The following conditions and exclusions apply for proper use of the MicroHAWK and for ESD immunity as it applies to the overall system in which the MicroHAWK is integrated. The MicroHAWK is not intended for stand-alone functionality and is meant to function as part of a larger system. Per paragraph 8.3.2 of IEC 61000-4-2, sections A and C:

A.) Points and surfaces that are only accessible by maintenance.

Justification: The MicroHAWK is approved for use when installed as a component and when it is no longer accessible to the end user except at the time of installation or when maintenance is performed. The MicroHAWK may be accessed for maintenance provided that proper ESD handling procedures are followed.

C.) Points or surfaces of equipment that are no longer accessible after fixed installation.

Justification: The MicroHAWK is installed as a component in a system and the device is no longer accessible.

The end user should be trained in ESD safety and handling. The system in which the MicroHAWK is installed should be properly grounded for power ground and earth ground. The MicroHAWK should not be placed next to devices that build up excessive static charge.

# Statements of Compliance



## ***FCC***

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras have been tested for compliance with FCC (Federal Communications Commission) requirements and have been found to conform to applicable FCC standards.

To comply with FCC RF exposure compliance requirements, this device must not be co-located with or operate in conjunction with any other antenna or transmitter.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## ***CE***

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras have been tested for compliance with CE (Conformité Européenne) requirements, and have been found to conform to applicable CE standards.

The CE Declaration of Conformity for this product is available from Omron Microscan upon request.

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras have been tested by an independent electromagnetic compatibility laboratory in accordance with the applicable specifications and instructions.

## ***UL***

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras have been tested for compliance with UL (Underwriters Laboratories) standards and guidelines, and have been found to conform to applicable UL standards.

## ***Restricted Substances***

See [www.microscan.com/quality](http://www.microscan.com/quality) for Omron Microscan compliance statements related to all applicable restricted substances.

# Warning and Caution Summary

## **WARNING**

### **LED LIGHT**

**DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS**

**CLASS 1 LED PRODUCT**

**LED Output: 625 nm**

**CAUTION:** Viewing the MicroHAWK MV-20, MV-30, or MV-40 Smart Camera's LED output with optical instruments such as magnifiers, eye loupes, or microscopes within a distance of 100 mm could cause serious eye injury.

**CAUTION:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

---

# Contents

<b>PREFACE</b>	<b>Welcome ix</b> Purpose of This Manual ix Manual Conventions ix
<b>CHAPTER 1</b>	<b>Introduction 1-1</b> Product Summary 1-2 Features and Benefits 1-2 Applications 1-3 Package Contents 1-3 MicroHAWK MV-20, MV-30, and MV-40 Smart Camera Models 1-4 MicroHAWK MV Part Number Structure 1-6
<b>CHAPTER 2</b>	<b>System Components 2-1</b> Hardware Components and Accessories 2-2 Label Information 2-4 Mechanical Dimensions 2-5 Cabling Configurations 2-12 Mounting the Camera 2-19 I/O Wiring 2-20 Grounding and Power 2-30 I/O Filtering and Debounce 2-32 Camera Definition File Example 2-33 Status Indicators 2-34

---

<b>CHAPTER 3</b>	<b>Getting Started with AutoVISION 3-1</b>
	Setting Up a Job in AutoVISION 3-2
	PROFINET I/O and IP Address Assignment 3-9
<b>CHAPTER 4</b>	<b>Optics and Lighting 4-1</b>
	Optics 4-2
	Illumination 4-5
	Machine Vision Lighting Principles 4-6
	MicroHAWK MV-40 External Illumination Control and Wiring 4-7
<b>APPENDIX A</b>	<b>Connector Pinouts A-1</b>
	MV-20 Connector A-2
	MV-30 Connector A-3
	MV-40 Connector A-4
<b>APPENDIX B</b>	<b>Cable Specifications B-1</b>
	MV-20 Cables B-2
	MV-30 Cables B-3
	MV-40 Cables B-8
<b>APPENDIX C</b>	<b>General Specifications C-1</b>
	MV-20 General Specifications C-2
	MV-30 General Specifications C-3
	MV-40 General Specifications C-4
<b>APPENDIX D</b>	<b>Serial Commands D-1</b>
<b>APPENDIX E</b>	<b>USB Power Management (MV-20 and MV-30) E-1</b>
<b>APPENDIX F</b>	<b>TCP/UDP and General Port Usage F-1</b>
	MicroHAWK Ports F-2

# Welcome

## Purpose of This Manual

---

This manual contains detailed information about how to configure and operate MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras.

## Manual Conventions

---

The following typographical conventions are used throughout this manual.

- Items emphasizing important information are **bolded**.
- Menu selections, menu items and entries in screen images are indicated as: Run (triggered), Modify..., etc.





## CHAPTER 1

# Introduction

## MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras



## Product Summary

---

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras are designed for reliable vision performance in embedded identification and inspection applications. As the world's smallest fully-integrated vision system, the MicroHAWK's compact size and wide angle optics provide the best performance available for machine vision tasks at close range.

The MicroHAWK MV-20, MV-30, and MV-40 allow OEM design engineers to implement inspection, color matching, symbol decoding, OCR, and more, in a single compact solution. The camera's small form factor allows flexible positioning in tight spaces.

AutoVISION software, designed for use with the MicroHAWK MV-20, MV-30, and MV-40, provides an intuitive interface, step-by-step configuration, and a library of presets that allow easy setup and deployment. For more complex vision applications, the system can be upgraded from AutoVISION to Visionscape.

## Features and Benefits

---

- World's smallest fully functional vision system
- Virtual Ethernet over USB (MicroHAWK Engine, MV-20 and MV-30)
- OEM-ready for easy integration
- Integrated lighting and flexible M12 fixed optics
- Flexible programming options for custom applications
- Simplified configuration with AutoVISION software

---

## Applications

---

- Inspection
- Guidance
- Gauging
- Part presence/absence
- Color detection and matching
- Medical device inspection
- Fiducial location
- Part location/orientation detection
- Packaging
- Robotics
- Auto ID (Data Matrix and other 2D symbologies, 1D, OCR)
- 1D and 2D Code Verification
- OCV (Optical Character Verification)

---

## Package Contents

---

Before you install AutoVISION software and connect your MicroHAWK MV-20, MV-30, or MV-40, please take a moment to confirm that the following items are available:

- A MicroHAWK MV-20, MV-30, or MV-40 Smart Camera.
- An active internet connection to download the latest AutoVISION software installer from the Download Center on the Omron Microscan website or a USB drive containing the latest AutoVISION software installer.
- A Micro-USB Type B-to-USB Type A cable (not included).

## MicroHAWK MV-20, MV-30, and MV-40 Smart Camera Models

---



### **MV-20: OEM Smart Camera**

The world's smallest full-featured and fully-integrated smart camera, the MicroHAWK MV-20 offers OEM integrators and engineers a perfect set of value and performance options in a tiny, simple, enclosed solution for embedded traceability and inspection designs. The MV-20 offers a single-cable solution that uses USB for both communication (USB 2.0 High Speed and Ethernet over USB) and power to enable plug-and-play integration.

- IP40 • USB 2.0 High Speed • Ethernet over USB • 24 x 34 x 39 mm



### **MV-30: Miniature Serial / USB Smart Camera**

A micro-sized smart camera with huge potential, the MV-30 furthers Omron Microscan's 30+-year legacy of innovative, space-efficient, miniature design with a corner-exit cable and high-density 15-pin connector (offering serial, USB 2.0 High Speed, and Ethernet over USB capabilities) as well as optional liquid lens autofocus. Perfect for OEMs and machine builders, the MV-30 offers the perfect combination of size, performance, and flexible integration.

- IP54 • Serial RS-232 • USB 2.0 • Ethernet over USB • Autofocus • Corner-Exit Cable



### **MV-40: Industrial Ethernet Smart Camera**

The MV-40 redefines the imaging market as the smallest IP65/IP67-rated, true-industrial Ethernet smart camera. With the library of Omron Microscan's machine vision tools on board in a rugged, ultra-compact case, the MV-40 is the complete package for solving any vision inspection challenge under any condition. Combining unprecedented ease of use, high-speed communication, optional liquid lens autofocus, and ultra-small form factor, the MV-40 is the ultimate compact machine vision system in the industry.

- IP65 • EtherNet/IP • Ethernet TCP/IP • PROFINET • Autofocus • Power over Ethernet (PoE)

## Software Options

AutoVISION Software provides a simple setup and runtime interface for solving basic to mid-range vision and auto ID challenges. Scalable with Visionscape Software.

Visionscape Software provides a professional setup and runtime interface with access to Omron Microscan's full auto ID, verification, and machine vision tools.

## MicroHAWK Feature Comparison

<i>Features</i>	<i>MV-20</i>	<i>MV-30</i>	<i>MV-40</i>
Barcode Reading (1D/2D)	•	•	•
Complete Machine Vision	•	•	•
Enclosure	IP40	IP54	IP65/67
PROFINET			•
Ethernet TCP/IP, EtherNet/IP			•
Ethernet over USB	•	•	
Serial (RS-232)		•	•
USB 2.0 High Speed / HID	•	•	
Power over Ethernet (PoE)			•
Outer Illumination		•	•
Liquid Lens Autofocus		•	•
Color Sensor	•	•	•
AutoVISION Sensor Software	•	•	•
AutoVISION Software	•	•	•
Visionscape Software	•	•	•

## MicroHAWK MV Part Number Structure

MicroHAWK MV part numbers follow the format **7ABX-YZZZ-LPPP**.

**7 = MicroHAWK.**

**Example Part Number: 7412-3000-2104**

**Description:** MicroHAWK MV-40, IP65 Case, 24V, Ethernet, Machine Vision, SXGA, 1.2 Megapixel, Mono, Ultra-High Density, Autofocus, White Outer LEDs, AutoVISION + Verification + Visionscape.

### (A) Model

- 1: Engine, No Case, USB
- 2: MV-20, IP40 Case, USB
- 3: MV-30, IP54 Case, 5V, USB
- 4: MV-40, IP65 Case, 24V, Ethernet

### (B) Application Type

- 1: Machine Vision

### (X) Sensor

- 1: WVGA 0.3 Megapixel, Mono
- 2: SXGA, 1.2 Megapixel, Mono
- 3: QSXGA, 5 Megapixel, Color

### (Y) Optics

- 0: Custom
- 1: Standard-Density
- 2: High-Density
- 3: Ultra-High-Density
- 4: Long-Range (Autofocus Long Range available for SXGA sensor only.)
- 5: Ultra-High-Density with Polarizer

### (ZZZ) Focus Distance

- 000: Autofocus
- 050: 50 mm = 1.96 in.
- 064: 64 mm = 2.51 in. – UHD FF
- 081: 81 mm = 3.18 in.
- 102: 102 mm = 4.02 in.
- 133: 133 mm = 5.23 in.
- 190: 190 mm = 7.48 in.
- 300: 300 mm = 11.81 in.
- 400: 400 mm = 15.75 in. – UHD FF

### (L) Outer LED Color

- 0: N/A (Engine and ID-20)
- 1: Red (Not available with QSXGA sensor.)
- 2: White
- 3: Blue
- 4: IR

### (PPP) Software

- 100: AutoVISION Sensor
- 101: AutoVISION
- 102: AutoVISION + Visionscape
- 103: AutoVISION + Verification
- 104: AutoVISION + Verification + Visionscape

### Notes:

- **(A) Model:** The MicroHAWK Engine is available for OEM-certified partners only.
- **(L) Outer LED Color:** Outer LEDs provide extra illumination. Base-level LED illumination included with all cameras.
- **Field Upgrades:** Not available for optics or illumination due to factory settings for optical alignment, LED balancing, and sealing for IP enclosure rating. However, the camera's software is field-upgradeable via licenses.

# System Components

This section contains specific information about system components as well as information to help you connect your MicroHAWK MV-20, MV-30, or MV-40 Smart Camera.

---

**Note:** There are no user-serviceable parts inside the camera.

---



## Hardware Components and Accessories

---

The table below lists MicroHAWK Smart Camera hardware components and the table on the next page lists the accessories. The reference numbers shown on configuration drawings later in this section refer to these tables.

<i>Item</i>	<i>Part Number</i>	<i>Description</i>
<b>1</b>	7ABX-YZZZ-LPPP	MicroHAWK MV-20, MicroHAWK MV-30, or MicroHAWK MV-40
<b>2</b>	61-9000034-01	Cable, USB A to Micro B, 6 ft., MV-20
<b>3</b>	61-9000045-01	Cable, USB A to Micro B, 3 ft., MV-20
<b>4</b>	61-9000043-01	Cable, DB15 to BUS Power USB Type A, MV-30
<b>5</b>	98-9000048-01	Kit, Cable, DB15 to Ext. Power/RS-232 with Power Supply, MV-30 – includes 97-9000006-01 and 61-9000037-01
<b>6</b>	97-9000006-01	Power Supply, 5V – for use with cables 61-9000037-01 and 61-9000038-01
<b>7</b>	61-9000037-01	Cable, DB15 to Ext. Power/RS-232, MV-30
<b>8</b>	98-9000049-01	Kit, Cable, DB15 to Ext. Power/USB with Power Supply, MV-30 – includes 97-9000006-01 and 61-9000038-01
<b>9</b>	61-9000038-01	Cable, DB15 to Ext. Power/USB, MV-30
<b>10</b>	98-9000050-01	Kit, Cable, DB15 to Ext. Power/USB, I/O with Power Supply, MV-30 – includes 97-000011-02 and 61-9000039-01
<b>11</b>	97-000011-02	Power Supply, 100-240VAC, +5VDC, 2-Pin U.S./Euro Plug
<b>12</b>	61-9000039-01	Cable, DB15 to Ext. Power/USB, I/O, MV-30
<b>13</b>	97-000012-02	Power Supply, 100-240VAC, +24VDC, TRK 3-Pin, U.S./Euro Plug
<b>14</b>	99-000018-01	IB-131 Interface Box
<b>15</b>	FIS-0001-0035G	Converter, IC-332, 24V/5V, Opto I/O – for use with IB-131
<b>16</b>	61-3000026-03	Cable, Communication, DB25 Plug to DB9 Socket, 6 ft.
<b>17</b>	99-000019-01	Photo Sensor, Visible, NPN, Light On, 5VDC
<b>18</b>	61-9000102-01	Cable, DB15 to USB/RS-232, Triggered, MV-30
<b>19</b>	97-000012-01	Power Supply, 100-240VAC, +24VDC, M12 12-Pin Socket
<b>20</b>	98-000103-02	QX-1 Interface Device
<b>21</b>	61-000162-02	Cordset, Common, M12 12-Pin Socket (Screw-On) to M12 12-Pin Plug
<b>22</b>	61-000160-03	Cordset, Host, Ethernet, M12 8-Pin Plug (Screw-On) to RJ45, 1 m.
<b>23</b>	99-9000016-01	Photo Sensor, M12 4-Pin Plug, NPN, Dark On or Light On (Selectable), 2 m.
<b>24</b>	61-9000054-01	Cable, M12 12-Pin Socket to 9-Pin Socket and M12 Plug
<b>25</b>	61-9000088-01	Cable, M12 12-Pin Socket to USB Keyboard Wedge and M12 Plug
<b>Upgrade to Visionscape</b>		
	98-000217-01	Upgrade from AutoVISION to full Visionscape functionality
<b>Mounting Options</b>		
	98-9000034-01	MicroHAWK MV-20-to-MINI Hawk Adapter Plate Kit
<b>Documentation</b>		
	37-000010-01	Omron Microscan Tools Drive (Software, documentation, links to website)

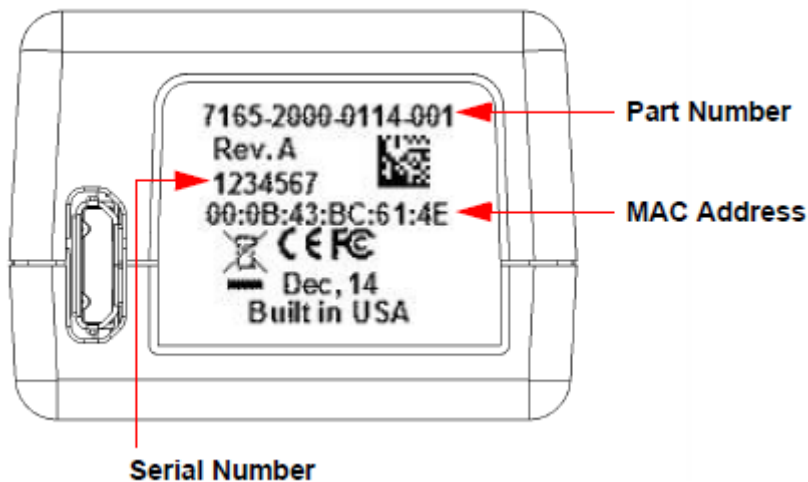
<b>MicroHAWK MV-30 Connectivity Kits</b>	
98-9000048-01	Kit, Cable, DB15 to Ext. Power/RS-232 with Power Supply, MV-30 – includes 97-9000006-01 and 61-9000037-01
98-9000049-01	Kit, Cable, DB15 to Ext. Power/USB with Power Supply, MV-30 – includes 97-9000006-01 and 61-9000038-01
98-9000050-01	Kit, Cable, DB15 to Ext. Power/USB, I/O with Power Supply, MV-30 – includes 97-000011-02 and 61-9000039-01 Recommended items (not included with kit): <ul style="list-style-type: none"> <li>• 99-000019-01, Visible, NPN, Light On, 5VDC</li> <li>• 61-000151-01, Flying Lead Cable</li> </ul>
<b>MicroHAWK Power Supplies</b>	
97-9000006-01	Power Supply, 5V – for use with cables 61-9000037-01 and 61-9000038-01
97-000011-02	Power Supply, 100-240VAC, +5VDC, 2-Pin U.S./Euro Plug
97-000012-01	Power Supply, 100-240VAC, +24VDC, TRK 3-Pin, U.S./Euro Plug
<b>MicroHAWK Cables</b>	
61-9000034-01	Cable, USB A to Micro B, 6 ft., MV-20
61-9000045-01	Cable, USB A to Micro B, 3 ft., MV-20
61-9000037-01	Cable, DB15 to Ext. Power/RS-232, MV-30
61-9000038-01	Cable, DB15 to Ext. Power/USB, MV-30
61-9000039-01	Cable, DB15 to Ext. Power/USB, I/O, MV-30
61-9000043-01	Cable, DB15 to BUS Power USB, MV-30
61-9000102-01	Cable, DB15 to USB/RS-232 Triggered, MV-30
61-9000054-01	Cable, M12 12-Pin Socket to 9-Pin Socket and M12 Plug
61-9000088-01	Cable, M12 12-Pin Socket to USB Keyboard Wedge and M12 Plug
<b>MicroHAWK Mounting Accessories</b>	
98-9000034-01	Kit, Adapter, MS-4 to MV-20
98-9000041-01	Kit, L-Bracket, MicroHAWK
98-9000047-01	Kit, 1/4-20 Camera Mount, MicroHAWK
98-9000052-01	Kit, Mounting Stand, Ram, MS-3, MS-4, MINI, MicroHAWK, 4"
98-9000053-01	Kit, Mounting Stand, Ram, MS-3, MS-4, MINI, MicroHAWK, 3"
98-9000054-01	Kit, Mounting, APG, MS-4, MINI, MicroHAWK
98-9000059-01	Kit, Adapter Plate, MS-4, MINI to MicroHAWK
<b>Other Accessories</b>	
98-9000043-01	Kit, Diffuser, MicroHAWK MV-30/MV-40
98-9000129-01	Kit, Polarizer, MicroHAWK MV-30/MV-40
98-9000045-01	Kit, Red LED, MicroHAWK MV-30/MV-40
98-9000046-01	Kit, White LED, MicroHAWK MV-30/MV-40
98-9000051-01	Kit, Window, MicroHAWK MV-30/MV-40
98-9000057-01	Kit, Right-Angle Mirror, MicroHAWK MV-20
98-9000058-01	Kit, Right-Angle Mirror, MicroHAWK MV-30/MV-40
98-9000064-01	Kit, Isolation Mounting, M3, MicroHAWK MV-30/MV-40

---

## Label Information

---

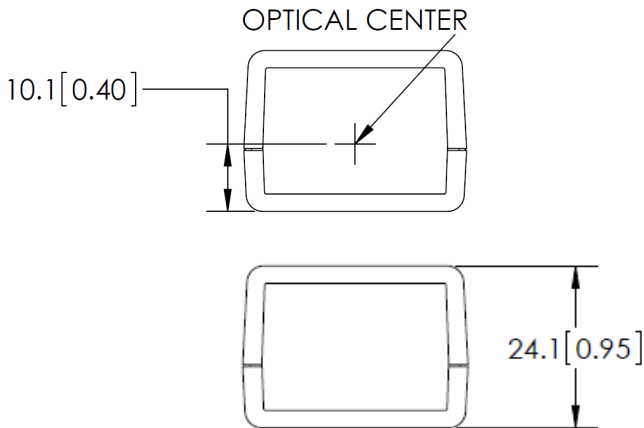
Each MicroHAWK MV-20 / MV-30 / MV-40 Smart Camera has a label that contains important information about that camera.



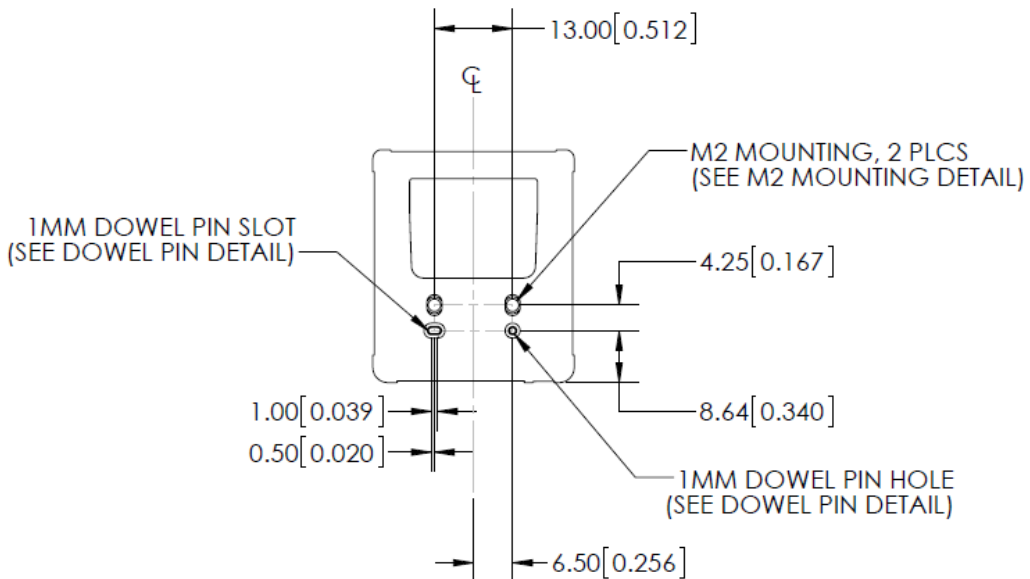
- **Part Number** – The Omron Microscan part number of your MicroHAWK Smart Camera.
- **Serial Number** – The serial number of your MicroHAWK Smart Camera.
- **MAC Address** – The MAC address of your MicroHAWK Smart Camera.

## Mechanical Dimensions

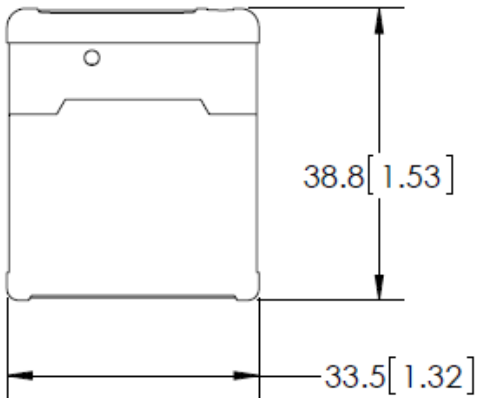
### MV-20 Front



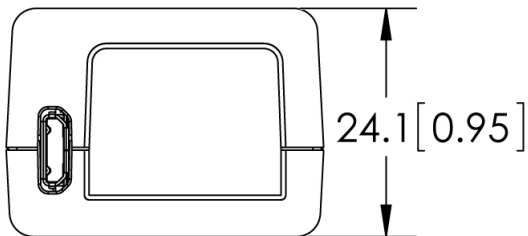
### MV-20 Base



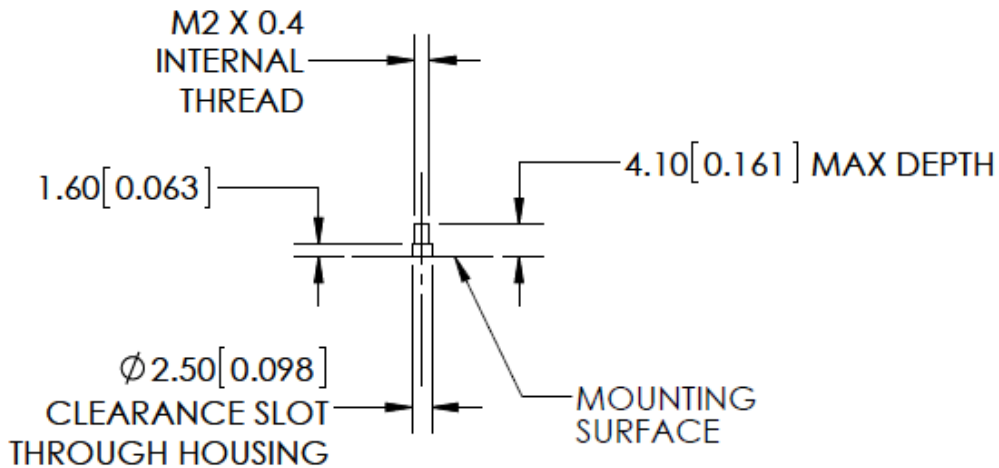
## MV-20 Top



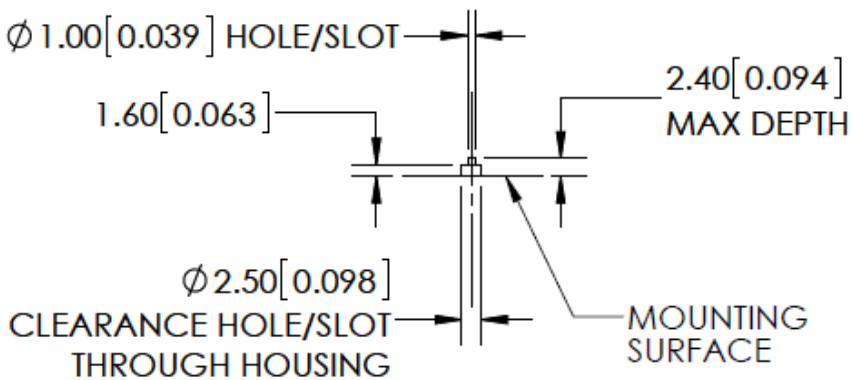
## MV-20 Back



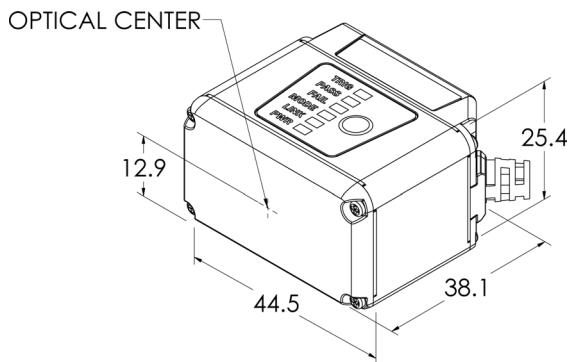
## MV-20 M2 Mounting Detail



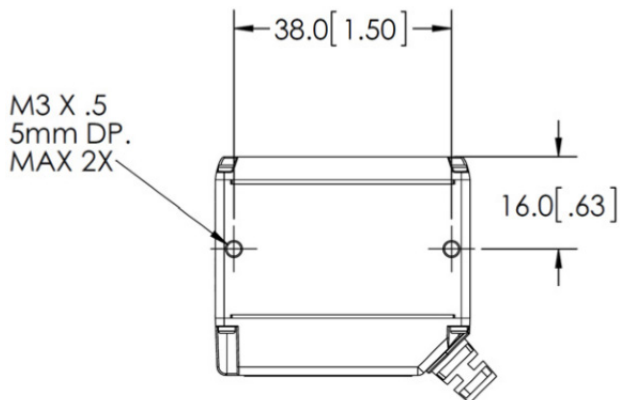
## MV-20 Dowel Pin Detail

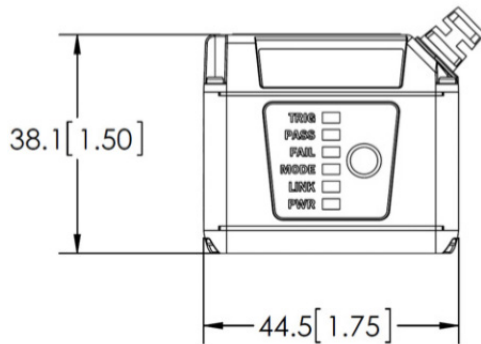
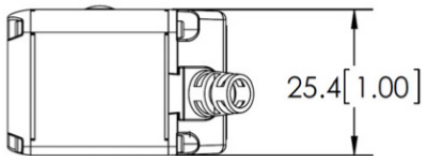


## MV-30 Front



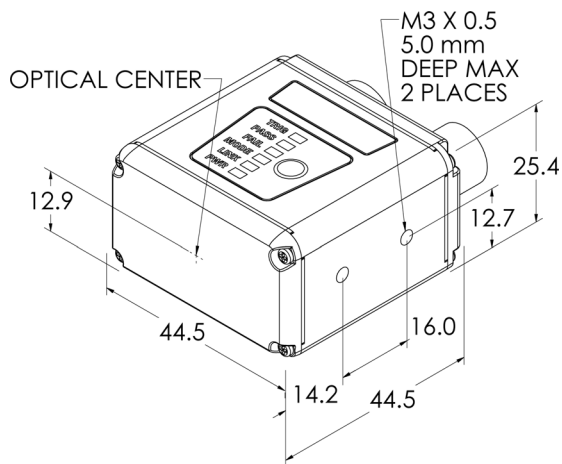
## MV-30 Base



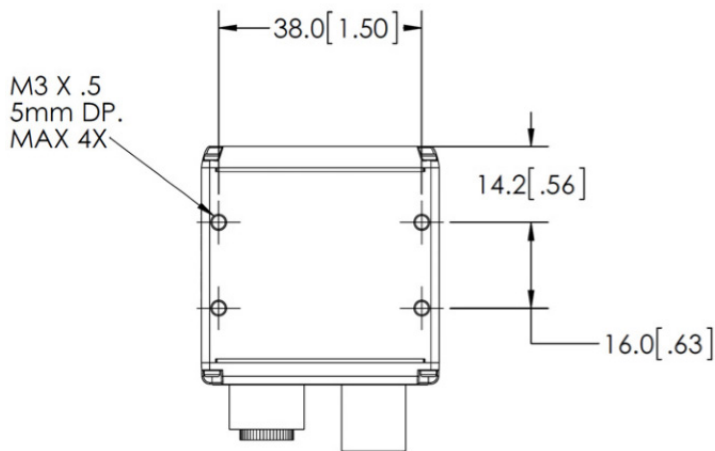
**MV-30 Top****MV-30 Side**



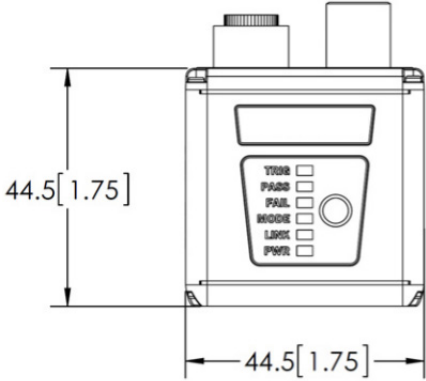
## MV-40 Front



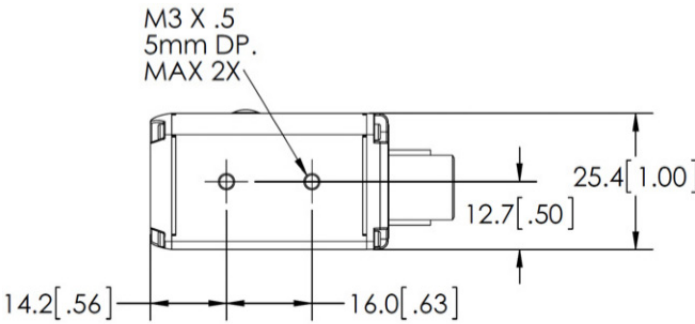
## MV-40 Base



**MV-40 Top**



**MV-40 Side**



---

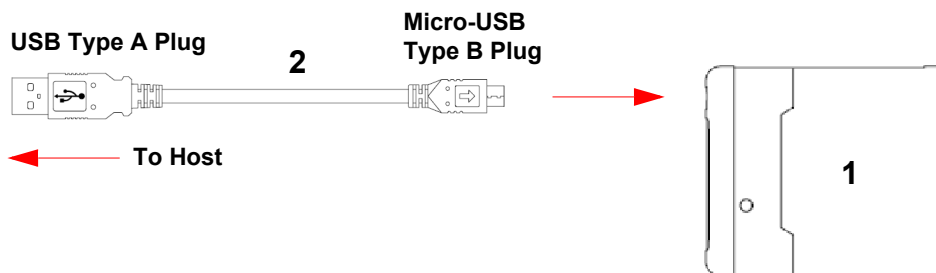
## Cabling Configurations

---

### MV-20

**Note:** The numbers in the diagram correspond to the numbers in the [Hardware Components and Accessories](#) table.

- Mount the camera securely in its camera stand (not supplied).
- Mount the camera (as required by the application).
- Connect the Micro-USB Type B side of the USB cable to the MicroHAWK MV-20.
- Connect the USB Type A side of the USB cable to the host.



### MV-20 Power Requirements

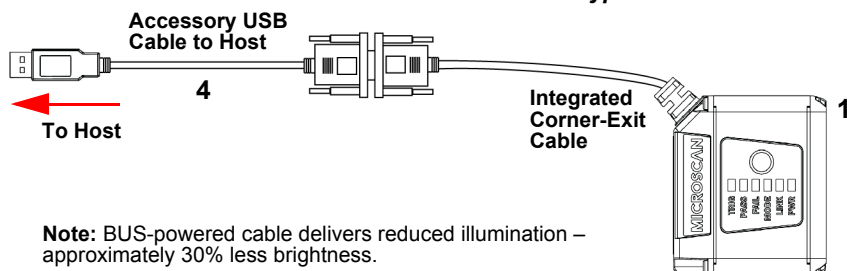
The MicroHAWK MV-20 Smart Camera is a USB 2.0 bus-powered device. The camera is a high-powered device, and the host must be capable of supplying up to five unit loads (500 mA).

## MV-30

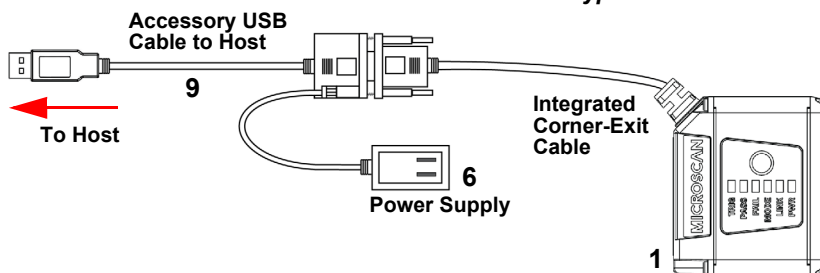
**Note:** The numbers in the diagram correspond to the numbers in the [Hardware Components and Accessories](#) table.

- Mount the camera securely in its camera stand (not supplied).
- Mount the camera as required by the application.
- Connect the integrated corner-exit cable to the MicroHAWK MV-30.
- Connect the accessory USB cable to the integrated corner-exit cable.
- Connect the USB Type A side of the USB cable to the host.
- Connect the power cable into the power source.

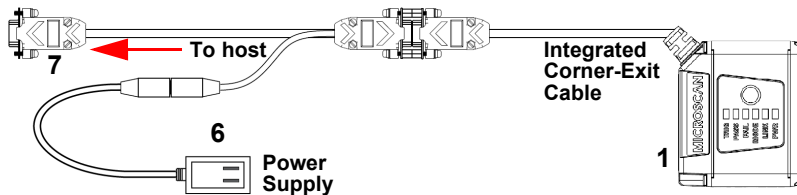
### *MicroHAWK MV-30 with DB15 to BUS Power USB Type A*



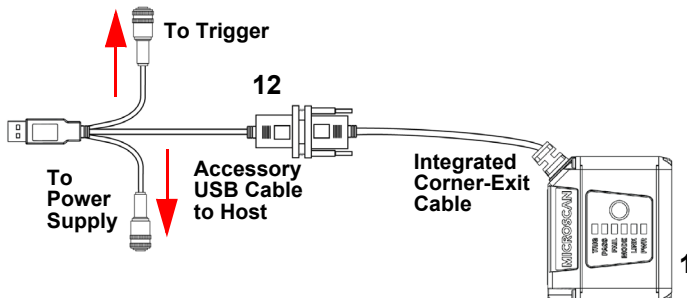
### *MicroHAWK MV-30 with DB15 to Ext. Power/USB Type A*



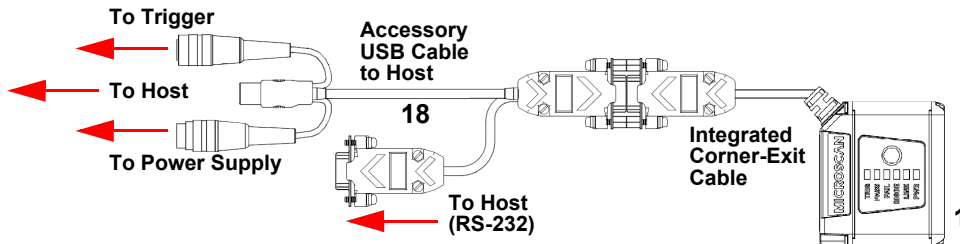
## MicroHAWK MV-30 with DB15 to Ext. Power/RS-232

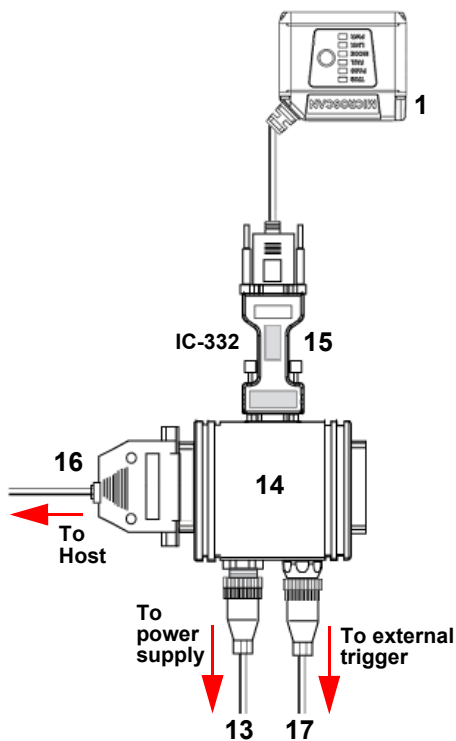


## MicroHAWK MV-30 with DB15 to Ext. Power/USB, I/O



## MicroHAWK MV-30 with DB15 to USB/RS-232, Triggered



**MicroHAWK MV-30 with IB-131 and IC-332****MV-30 Power Requirements**

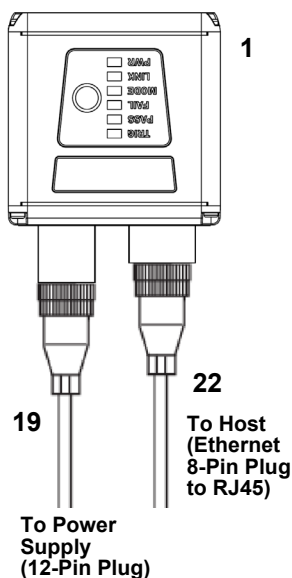
The MicroHAWK MV-30 Smart Camera is an RS-232 or USB 2.0 bus-powered device. The camera is a high-powered device, and the host must be capable of supplying up to five unit loads (600 mA).

## MV-40

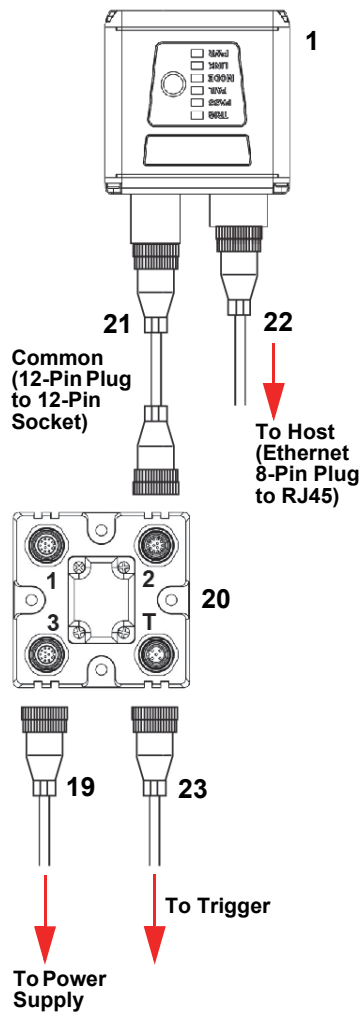
**Note:** The numbers in the diagram correspond to the numbers in the [Hardware Components and Accessories](#) table.

- Mount the camera securely in its camera stand (not supplied).
- Mount the camera as required by the application.
- Connect the power cable to the MicroHAWK MV-40.
- Connect the Ethernet cable to the MicroHAWK MV-40.
- Connect the Ethernet cable to the host.
- Connect the power cable into the power source.

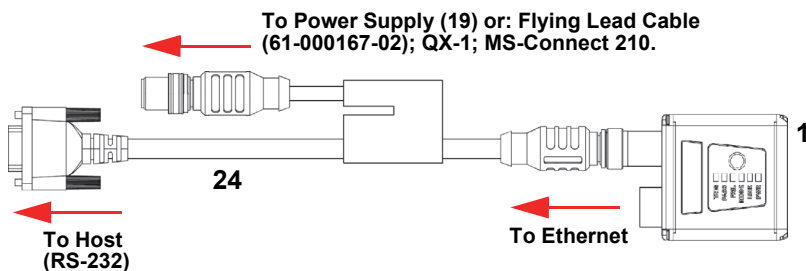
### *MicroHAWK MV-40 Simple Configuration*



**MicroHAWK MV-40 with QX-1 Interface Device**





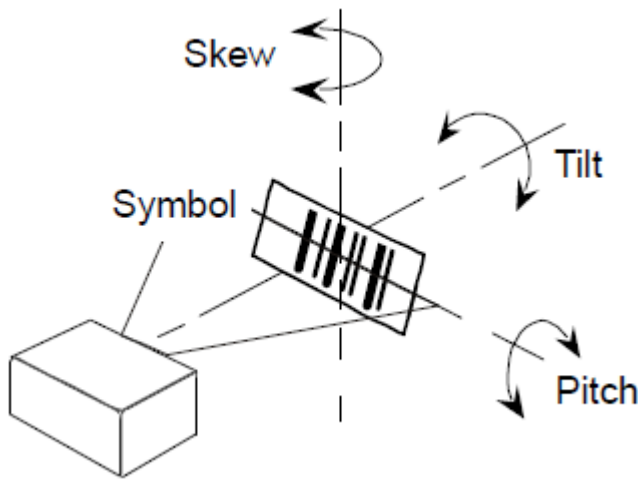
**MicroHAWK MV-40 M12 12-Pin Socket to 9-Pin Socket and M12 Plug****MV-40 Power Requirements**

The MicroHAWK MV-40 Smart Camera is an RS-232-powered device. The camera is a high-powered device, and the host must be capable of supplying up to twenty-four unit loads (150mA).

## Mounting the Camera

### Mount and Position the Camera

1. Position the camera at a focal distance of one inch or more from a test object.
2. Tip the camera relative to the object to avoid the glare of direct (specular) reflection. The case parting line should be perpendicular to the plane of the symbol by either pitching the symbol or the camera. Avoid excessive skew or pitch. Maximum skew is  $\pm 30^\circ$ ; maximum pitch is  $\pm 30^\circ$ .



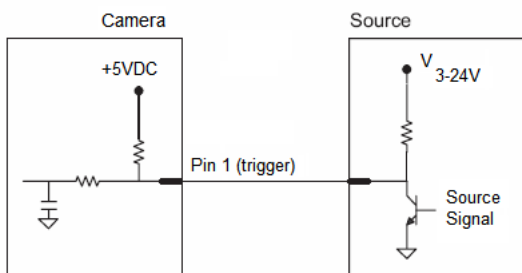
## I/O Wiring

### MicroHAWK MV-30

#### Direct Input / Output Diagrams (MV-30)

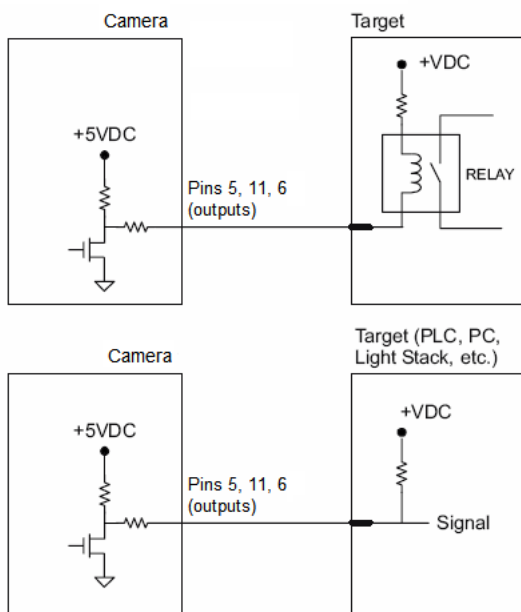
##### Trigger Input Example

Trigger, New Master Inputs: 3 to 24V rated, 1mA @ 5VDC



##### Output Examples

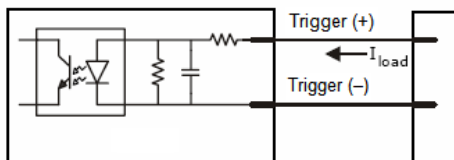
Outputs (1, 2, 3): 5V TTL compatible, can sink 10mA and source 2mA



## Optoisolator Trigger Inputs for IC-332 (MV-30)

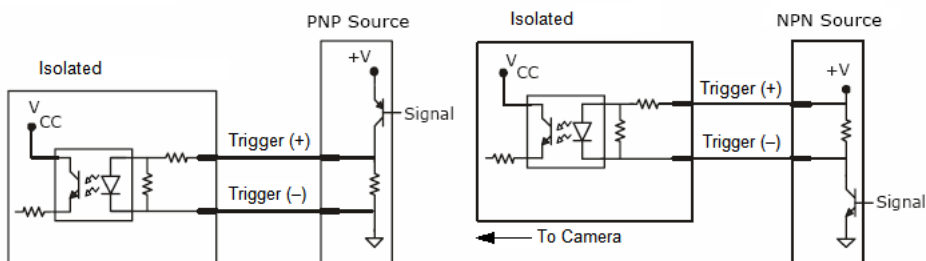
Trigger input can be fully electrically isolated from an NPN or PNP signal source.

	Minimum	Maximum
$V_{IN-HIGH}/I_{IN-HIGH}$	4.5V/3.0mA	28V/15mA
$V_{IN-LOW}/I_{IN-LOW}$	0V/0mA	2.0V/1mA
Pulse Width <sub>min</sub>	48 $\mu$ s	

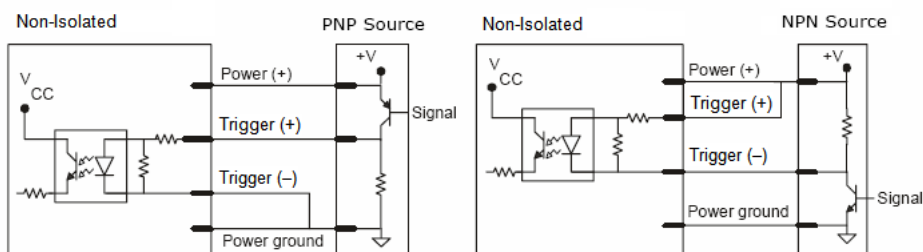


### Input Examples

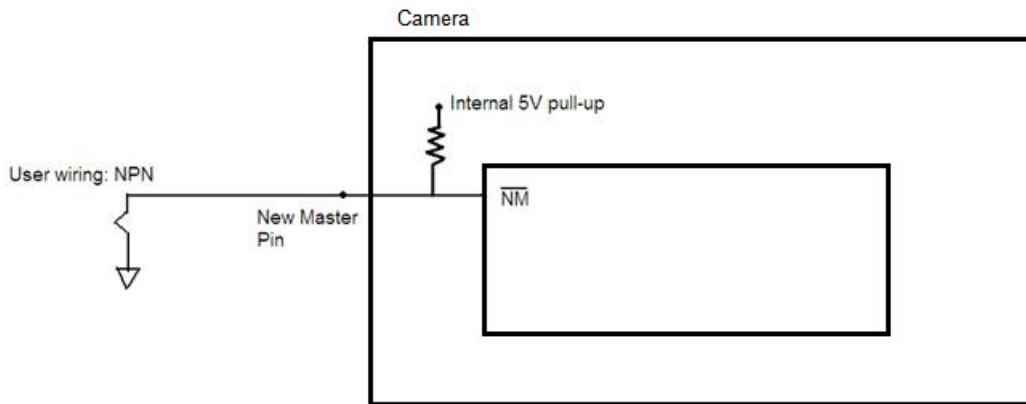
#### Fully Optoisolated



#### Not Optoisolated



## New Master Pin (MV-30)

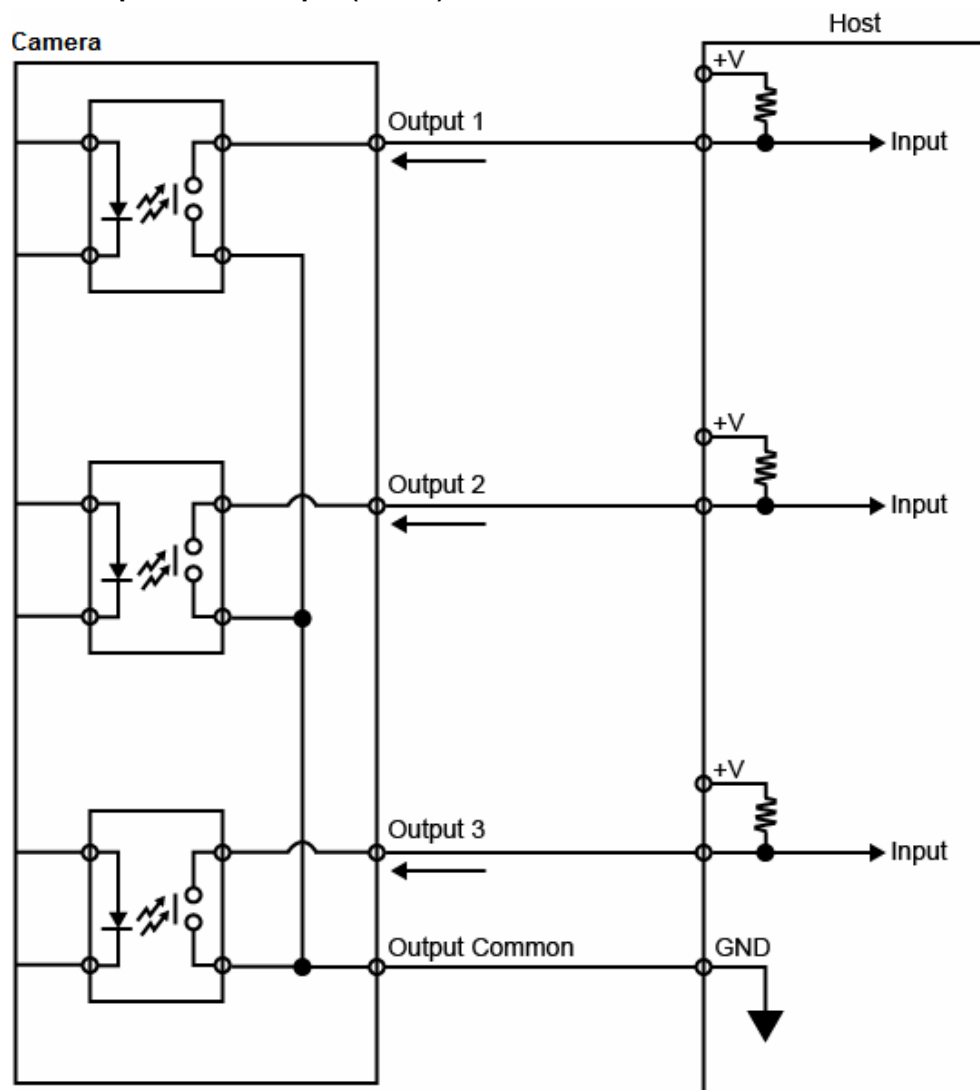


## MicroHAWK MV-40

### Optoisolated Outputs (MV-40)

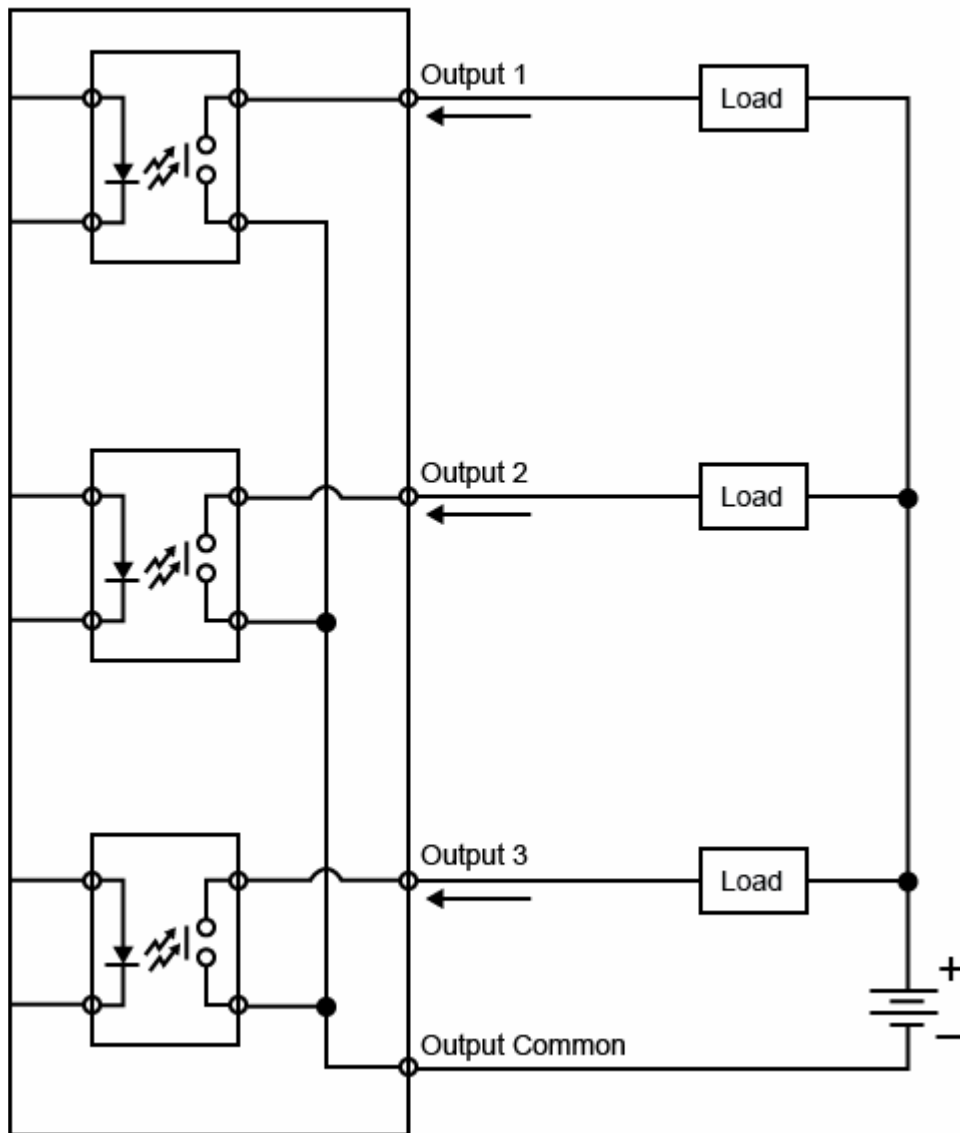
The camera has optoisolated outputs that can transfer signals from the camera to peripherals. Outputs can be configured as either NPN or PNP, but NPN and PNP cannot be mixed in a system, because the output common is shared by all outputs.

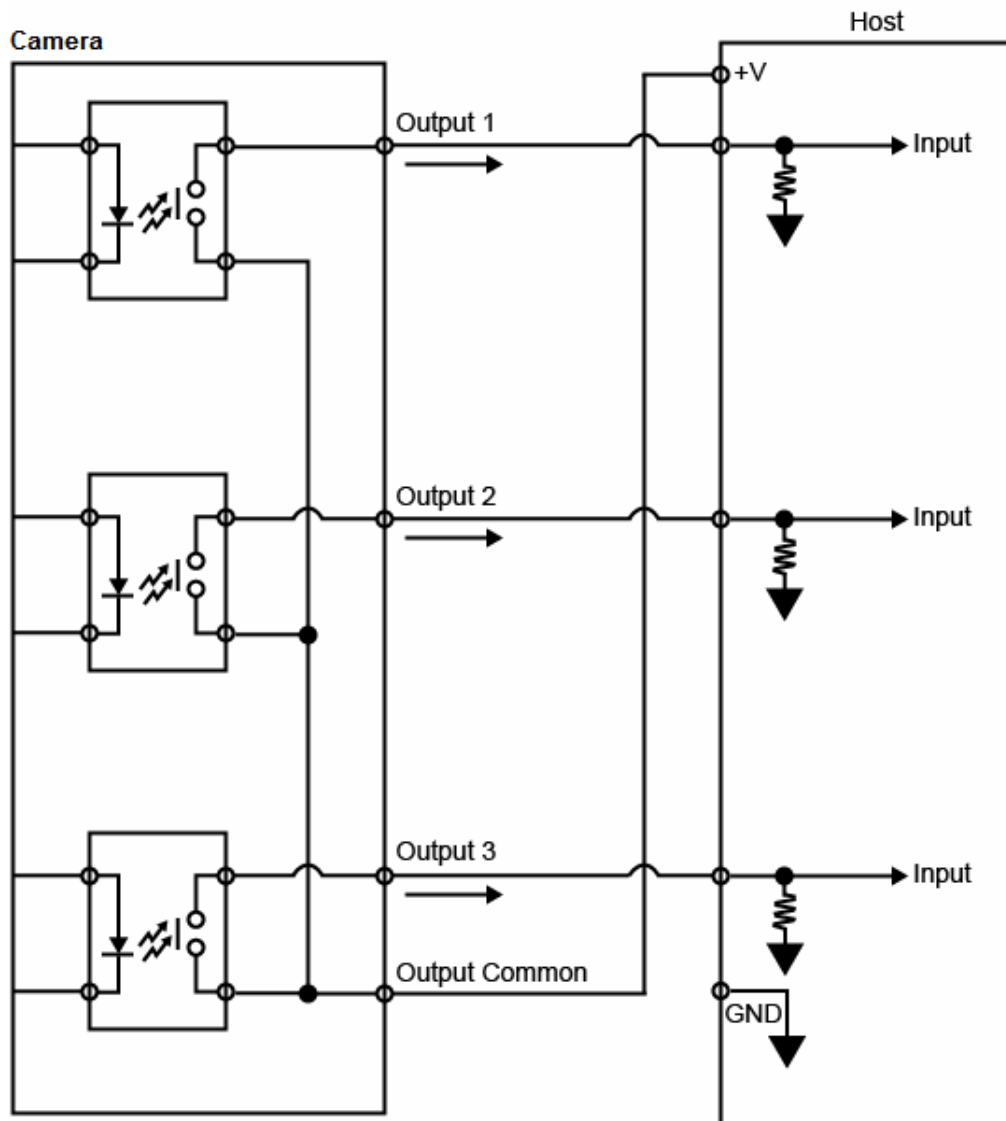
#### NPN Output for Host Input (MV-40)



### NPN Output for External Load (MV-40)

#### Camera

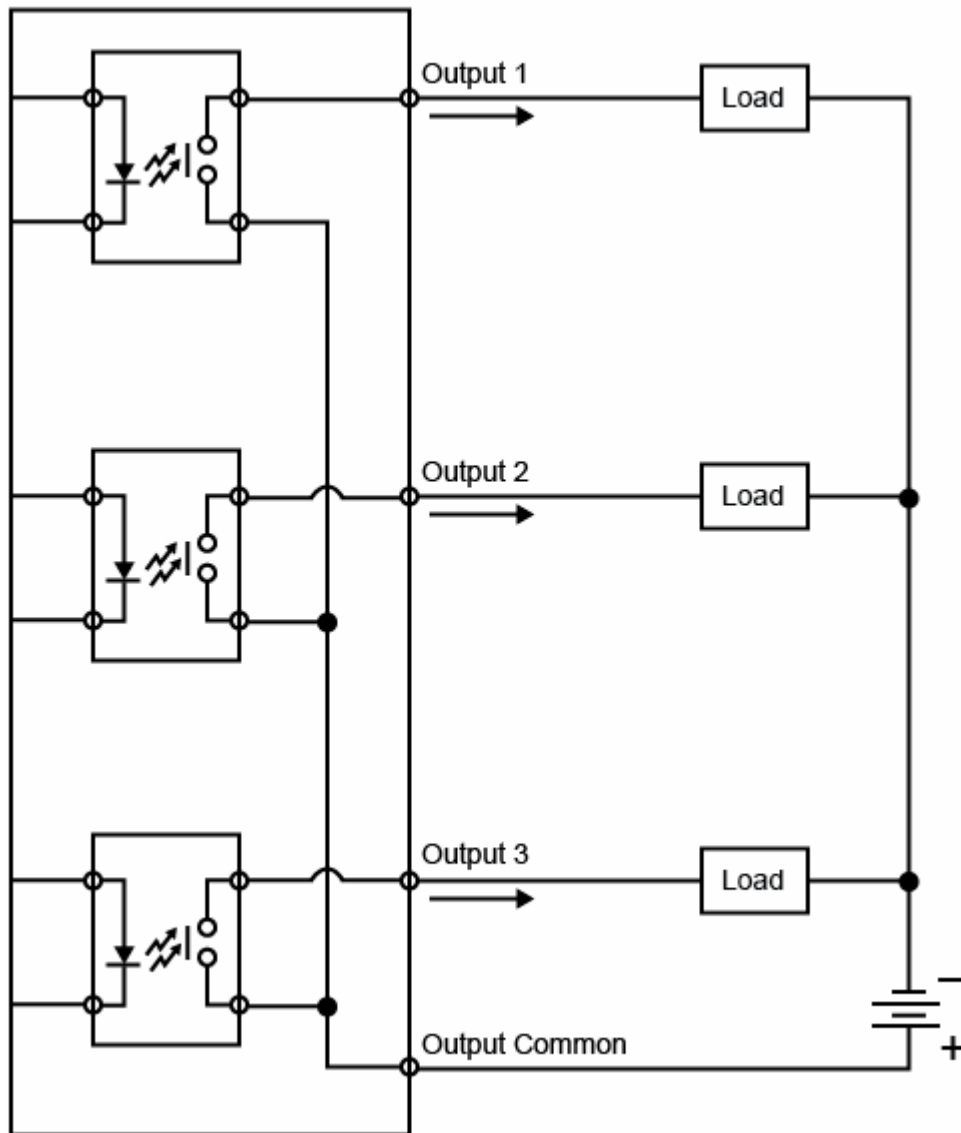


**PNP Output for Host Input (MV-40)**



### PNP Output for External Load (MV-40)

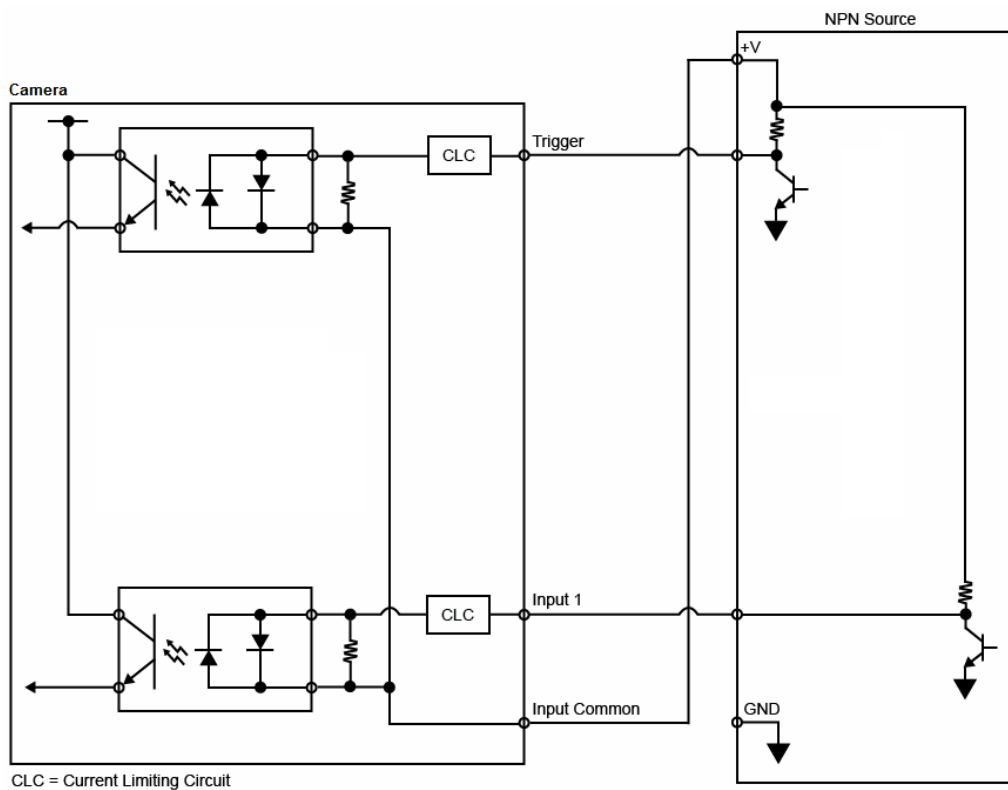
#### Camera



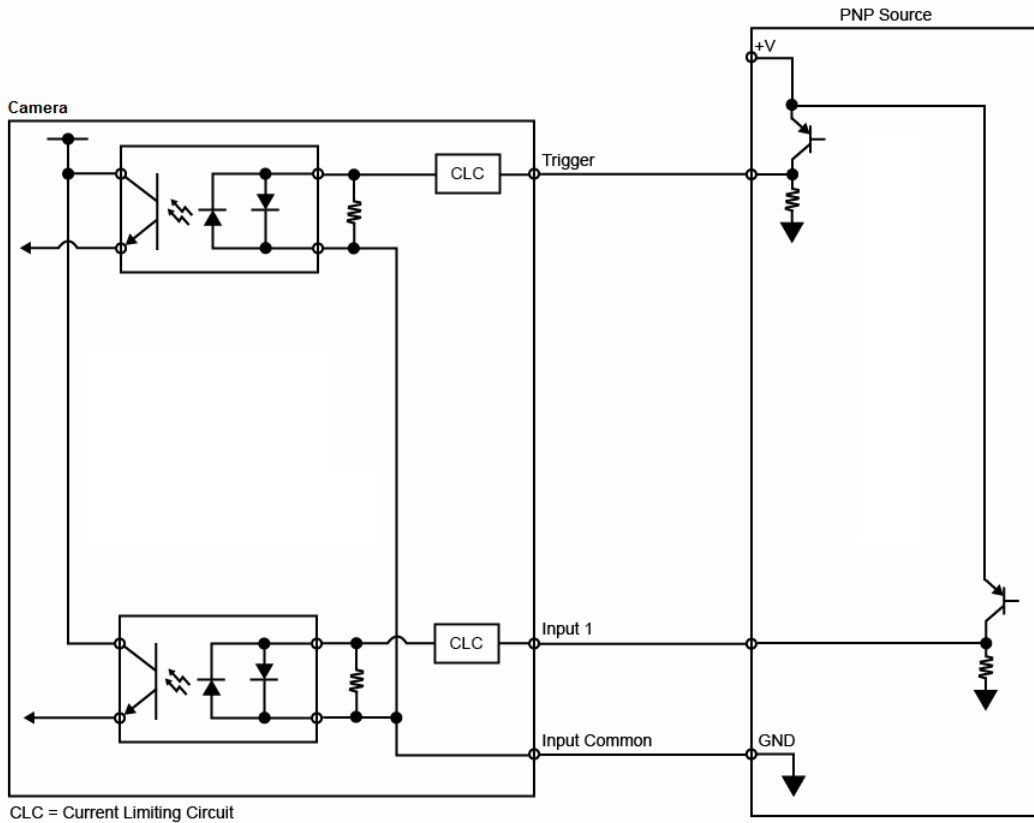
## Optoisolated Inputs (MV-40)

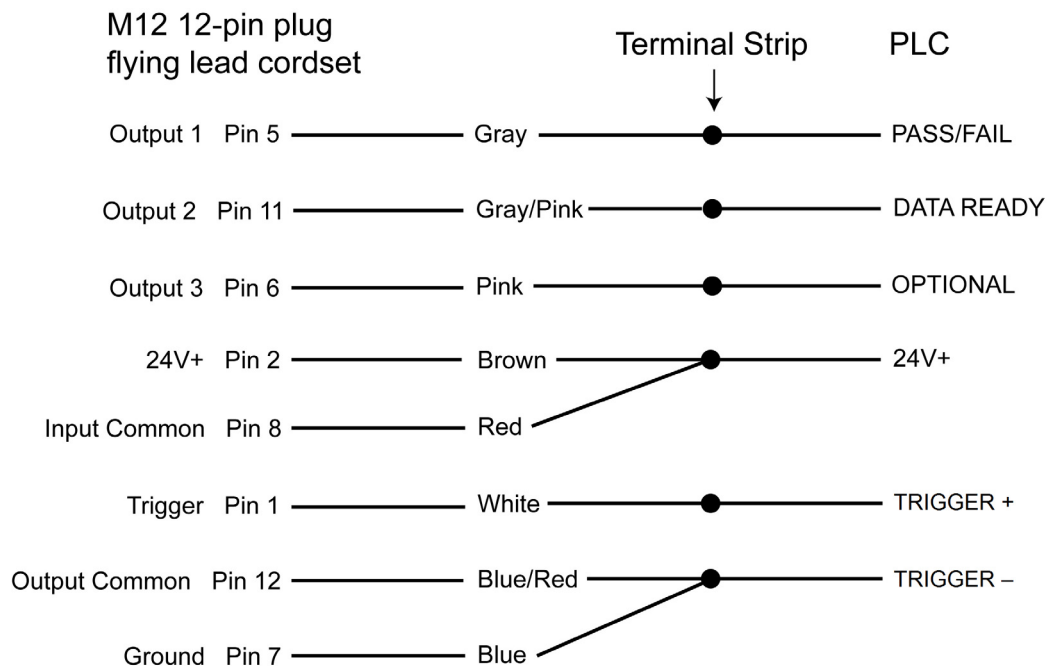
All discrete inputs are optoisolated. Inputs can be configured as either NPN or PNP, but NPN and PNP cannot be mixed in a system, because the input common is shared by all inputs.

### NPN (MV-40)



## PNP (MV-40)

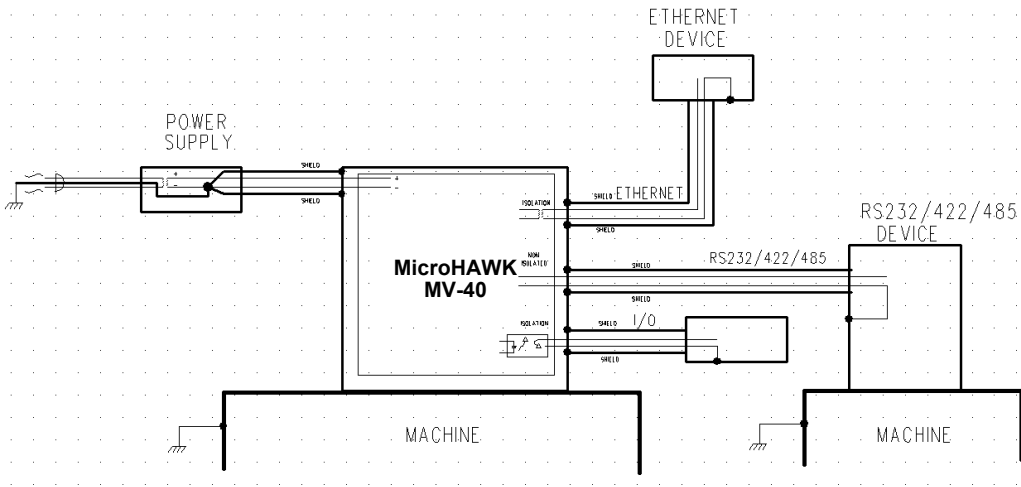


**Example Wiring (MV-40) for PLC Communications, NPN Outputs, NPN Inputs**

## Grounding and Power

### Ground and Shield Considerations

Proper grounding is necessary for operator safety, noise reduction, and the protection of equipment from voltage transients. Buildings, including any steelwork, all circuits, and all junction boxes must be grounded directly to an earth ground in compliance with local and national electrical codes.

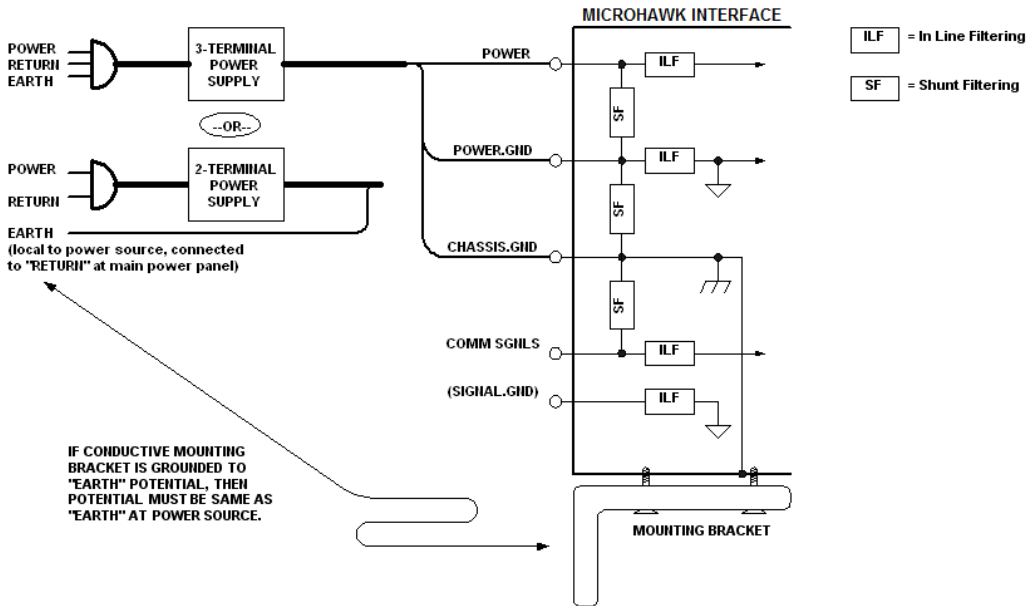


*An earth ground is provided through the cable shields and chassis of the camera.*

### Ground Loops

Ground loops (signal degradation due to different ground potentials in communicating devices) can be eliminated or minimized by ensuring that both the host, imager, and their power supplies are connected to a common earth ground.

## Expected Power and Ground Connections for Proper Operation



## Grounding Notes

- Ensure that mounting bracket "Earth" is at the same potential as power source "Earth".
- Supply "Return" and "Earth" ground must be stable, low-impedance reference points.
- "2-Terminal Power Supply" must still provide an "Earth" connection to the imager.
- "Signal Ground" can be used for communications and/or discrete signal ground reference. It must **not** be used as Power Ground or Earth Ground.

## MicroHAWK Power Requirements

Refer to this table when determining the power requirements for your camera.

<b>MicroHAWK MV-20</b>	5VDC $\pm$ 5%; 350mA at 5VDC (typ.)
<b>MicroHAWK MV-30</b>	5V $\pm$ 5%; 600mA at 5VDC (typ.)
<b>MicroHAWK MV-40</b>	4.75V – 30V; 150mA at 24VDC (typ.)

## I/O Filtering and Debounce

---

**Trigger Debounce** is the ability of the system to accommodate switching noise on a trigger state change – a common issue with relays that have some intermittent contact while engaging.

Trigger overruns (when the vision system is triggered faster than the device can process) can be avoided by increasing the “debounce” time in the camera definition file located in the C:\Microscan\Vscape\Drivers\CamDefs directory.

The I/O Line Debounce High Time and IO Line Debounce Low Time can be added to the file as in the example below. Debounce time is 1 ms (1,000  $\mu$ s).

**Note:** Although the value entered for the "IO Line Debounce Time" is in microseconds, it will only be rounded up to a millisecond value. For example, entering the value **1001** will resolve to 2 ms; entering a value of **2800** will resolve to 3 ms.

The min value for "IO Line Debounce Time" is 0, which disables software debounce altogether. The maximum value is 100000 (100 ms).

We have the standard debounce as described for the trigger:

```
IO Line Debounce High Time      1000 //usecs (default is 0)
IO Line Debounce Low Time       1000 //usecs (default is 0)
```

The MicroHAWK has an I/O Line Filter Time as well:

```
IO Line Filter High Time        100 //usecs (default is 100)
IO Line Filter Low Time         100 //usecs (default is 100)
```

I/O Filter is the ability to ignore any signals on the I/O lines that are less than the “Filter Time” long. Sometimes, electrical interference puts spikes on the line. This feature makes it ignore them until the signal that is seen on the I/O line is longer than the filter time.

## Camera Definition File Example

```
// Camera Definition File
// Version: 1.04

Camera Name                      MicroHAWK 1280x960 // Name Displayed in
Camdef Selection Dialog
Digitizer Type                   6001                // Number
associated with Trident SXGA

Stride                           1280                // Image Width
Rows                             960                // Image Height
X Offset                         0                  // Image X Offset
Y Offset                         0                  // Image Y Offset
Bits Per Pixel                   8                  // Bits that represent Pixel Value
Pixel Type                       0                  // Type of Pixel:
MONOCHROME=0, COLOR_RGB=1, COLOR_BGR=2, COLOR_BAYGR8=3, COLOR_BAYRG8=4,
COLOR_BAYGB8=5, COLOR_BAYBG8=6, COLOR_HSI=7
Image Structure                  1                  // Pixel Organization: Packed=1, TwoPlanes =
2, ThreePlanes = 3

Async Control                    1                  // Controllable shutter time. Usually
using a pulse width specified in usecs
Usecs Per Frame                  18518 // Fastest time to acquire a frame: 54 FPS
// -1 Disables

timeout feature
Binning                          0
Zoomed                          0

// IO Configuration
GPIO Edit Mask                   0x0000
GPIO Defaults                    0x0001 // 1 General Purpose Input 3 General Purpose
Outputs
GPIO Count                       4
GPIO Inputs                      1
GPIO Outputs                     3
Sensors                          1                  // One input dedicated
to Trigger signal
Strobes                          0

Virtual IO                       2048

IO Line Filter High Time         100                //usecs (default is 100)
IO Line Filter Low Time          100                //usecs (default is
100)
IO Line Debounce High Time       0                  //usecs (default is 0)
IO Line Debounce Low Time        0                  //usecs (default is 0)
Sensor Trigger Delay Time        0                  //usecs
Custom External Strobe Delay Time0 //usecs

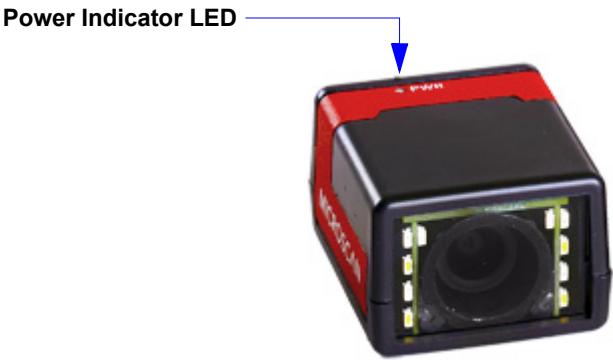
// Focus & Photometry Ranges
Gain Dflt                       20
Gain Min                        0
Gain Max                        100                // 0 to 100%
Exp Dflt                        4000
Exp Min                         66
Exp Max                         58825 // 1/17 to 1/15,000
Focus Dflt                      100                // 100 mm default
Focus Min                      50
Focus Max                      500                // 50 to 500 mm
```



## Status Indicators

### MV-20

The top of the MicroHAWK MV-20 Smart Camera has an LED that indicates whether or not the device is powered-on.



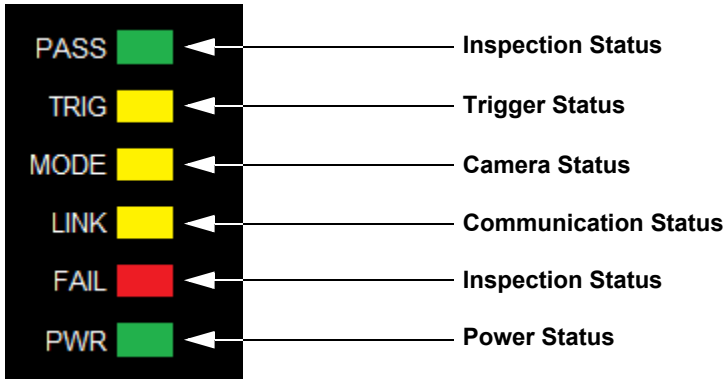
PWR LED	On	Power On
	Off	No Power Applied to Unit

### Additional User Feedback

- Green Flash – A green flash from the front of the unit indicates a Good Read.
- Blue Targeting Pattern – The blue targeting pattern from the front of the unit allows the user to center an object in the camera’s field of view.

## MV-30, MV-40 Status Indicators

The top of the MicroHAWK MV-30 and MV-40 Smart Cameras have multiple LEDs that indicate different inspection, trigger, camera, communication, and power states.



PASS/FAIL	On	Active State
	Off	Inactive State
TRIG	On Steady	Continuous Trigger
	Off	Waiting for Trigger Event
	On Flashing	Trigger Event
MODE	On Steady	Unit Ready
	Off	Unit Not Ready
LINK	On Steady	Link Established
	Off	No Link/Activity
	On Flashing	Link Established and Activity on Link
PWR	On	Power On
	Off	No Power Applied to Unit

## Additional User Feedback

- **Green Flash** – A green flash from the front of the unit indicates a Good Read.
- **Blue Targeting Pattern** – The blue targeting pattern from the front of the unit allows the user to center an object in the camera's field of view.



---

CHAPTER 3

# Getting Started with AutoVISION

This section describes how to set up and use MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras with AutoVISION Software.

## Setting Up a Job in AutoVISION

---

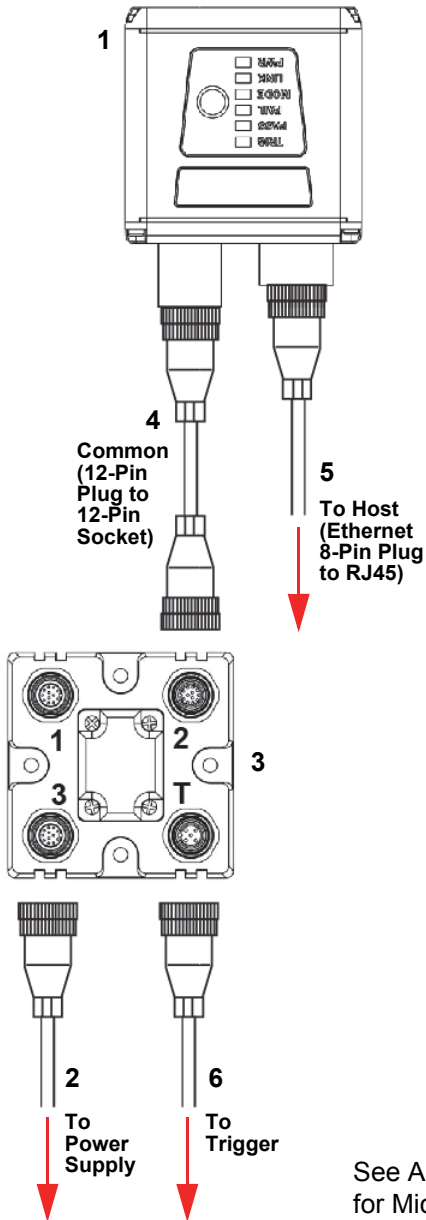
AutoVISION is a critical component of the MicroHAWK's functionality. Designed for use with the MicroHAWK, AutoVISION provides an intuitive interface, step-by-step configuration, and a library of presets that allow easy setup and deployment. For more complex vision applications, the system can be upgraded from AutoVISION to Visionscape.

<i><b>Item</b></i>	<i><b>Part Number</b></i>	<i><b>Description</b></i>
<b>1</b>	7ABX-YZZZ-LPPP	MicroHAWK MV-20, MicroHAWK MV-30, or MicroHAWK MV-40
<b>2</b>	97-000012-01	Power Supply, 100-240VAC, +24VDC, M12 12-Pin Socket
<b>3</b>	98-000103-02	QX-1 Interface Device
<b>4</b>	61-000162-02	Cordset, Common, M12 12-Pin Socket (Screw-On) to M12 12-Pin Plug
<b>5</b>	61-000160-03	Cordset, Host, Ethernet, M12 8-Pin Plug (Screw-On) to RJ45, 1 m.
<b>6</b>	99-9000016-01	Photo Sensor, M12 4-Pin Plug, NPN, Dark On or Light On (Selectable), 2 m.

### 1. Configure MicroHAWK Hardware

- Mount the camera as required by the application.
- Connect the Ethernet cable from "B" on the camera to the network.
- Connect the power supply to "3" on the QX-1.
- Connect the photo sensor to "T" on the QX-1.
- Connect the "Common" cable to "2" on the QX-1 and "A" on the camera.
- Plug in the power supply.

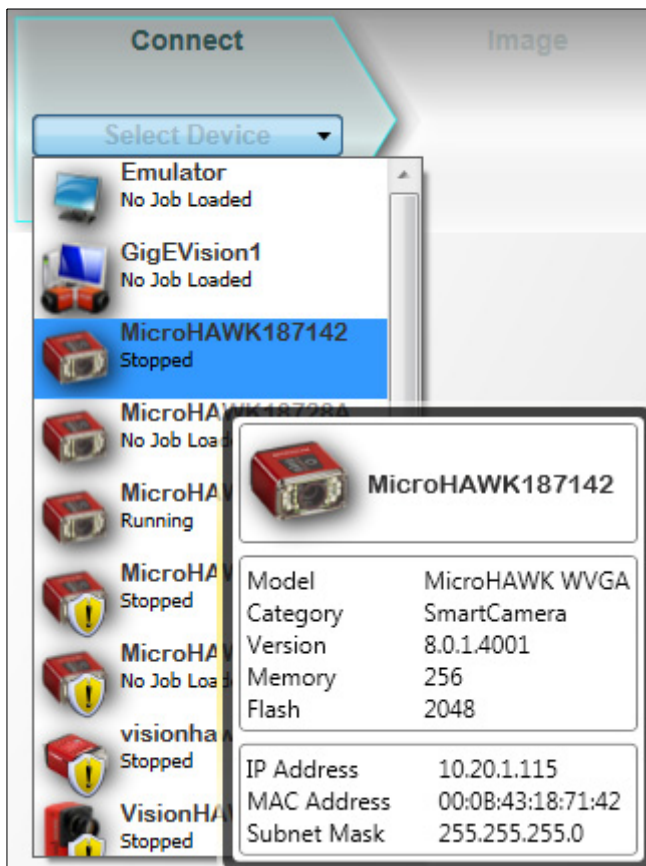
## MicroHAWK MV-40 with QX-1 Interface Device



See Appendix A, [Connector Pinouts](#),  
for MicroHAWK pin assignments.

## 2. Select MicroHAWK in Connect View; Create a Job; Adjust Camera Settings

AutoVISION's **Connect** view allows you to select your device and configure its settings, and to create a new job. The **Select Device** drop down menu provides a list of available devices. Hover the mouse over a device to see its details.



Click the lock icon to take control of the camera. When you have control of the camera, the **Modify** button will appear beneath the camera settings. Click the Modify button to adjust camera settings.

**Note:** If you are using an MV-20 or MV-30 with a USB cable, the driver has already configured your PC address. If you are using an MV-40, you must set the PC to the same IP range as the default IP address. Default IP address: **192.168.188.2**. Set the PC to the same IP range (example: **192.168.188.100**).

The screenshot displays the AutoVISION software interface. On the left, a camera card for 'MicroHAWK18728A' is shown with a status of 'Stopped' and IP address '192.168.0.40'. Below this is a 'Details' section containing various camera specifications. On the right, a 'No job is loaded' message is displayed above three buttons: 'Create a New Job', 'Load a Job', and 'Upload Current Job from Device'. A callout box with arrows points to the 'Details' section and the 'Upload Current Job from Device' button, providing instructions on how to modify camera settings and create, load, or upload jobs.

**MicroHAWK18728A**  
Stopped  
License Options  
192.168.0.40

Details

Model	MicroHAWK SXGA
Category	SmartCamera
Version	8.0.3.4001
Memory	256 MB
Flash	2048 MB

IP Address	192.168.0.40
MAC Address	00:0B:43:18:72:8A
Subnet Mask	255.255.255.0
Gateway	0.0.0.0
DHCP	Disabled
Number of serial TCP ports	4
Starting serial TCP Port	49211

Industrial Protocol    EtherNet/IP

Serial Port	RS232-1
Baud Rate	115200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

Auto Button    True  
Send Trigger

**Modify**

**No job is loaded**

**Create a New Job**

**Load a Job**

**Upload Current Job from Device**

Modify camera settings in the **Details** area at the left of the **Connect** view.  
**Create**, **Load**, or **Upload** a job using the buttons in the center of the **Connect** view.

**Important:** When modifying camera settings, you will need to enter a username and password for the camera if a password has been defined.

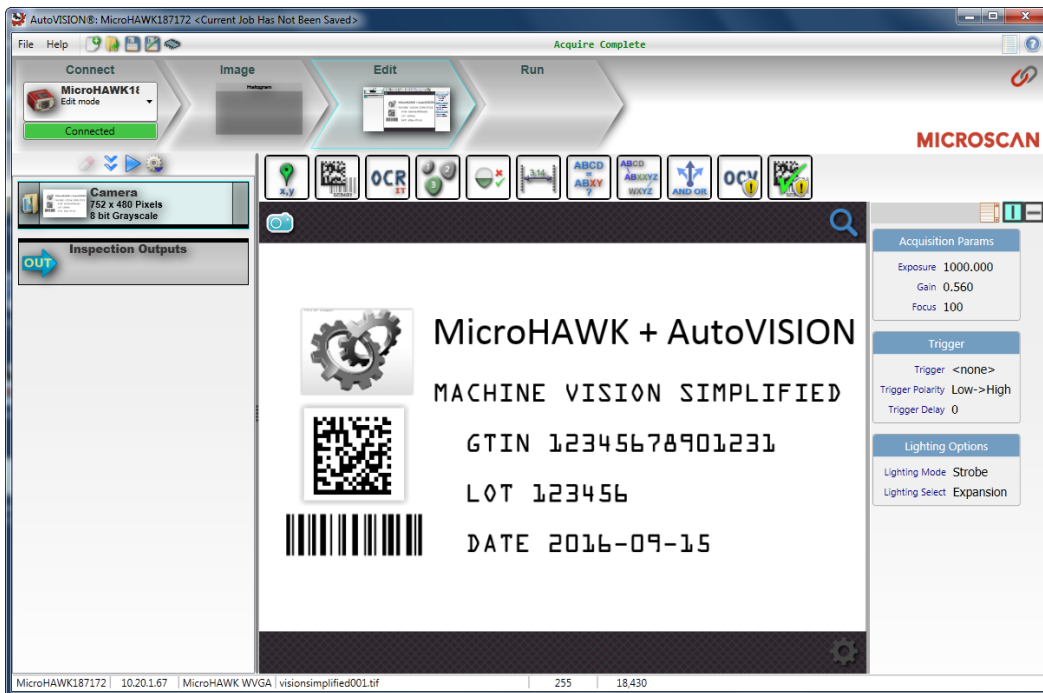


Once you have selected your camera, adjusted its settings, and created a new job, you will move to the **Image** view. This view allows you to **Auto Calibrate** the camera, and to manually adjust the camera's Exposure, Gain, and Focus, and also to set the Lighting Mode (On, Off, or Strobe).



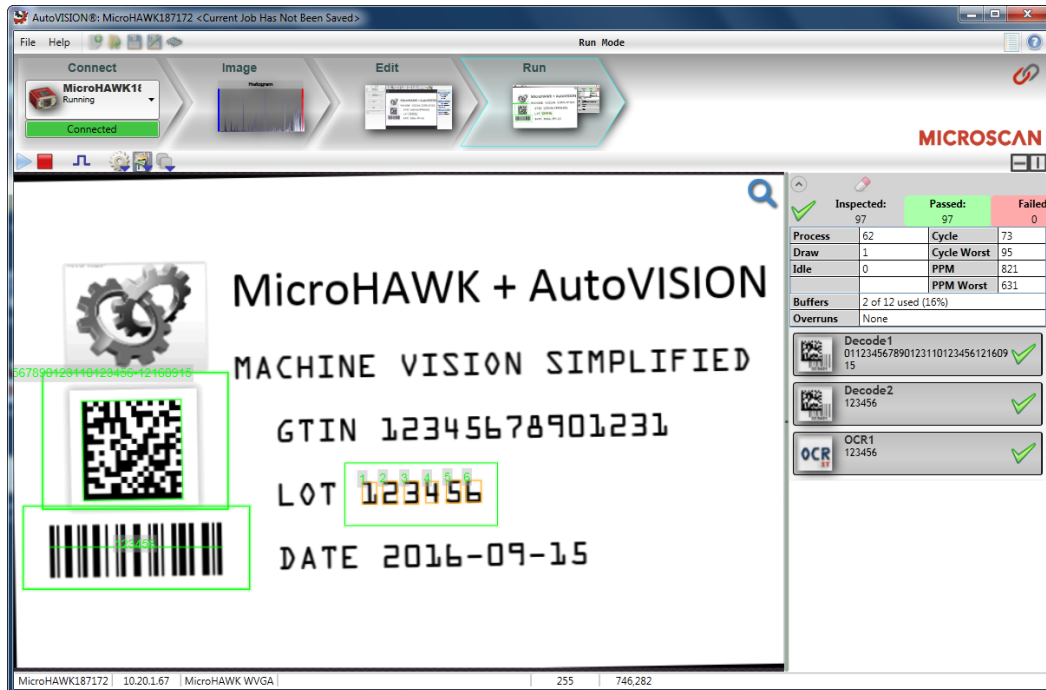
### 3. Edit the Job in AutoVISION

After you have created a new job, loaded a job from your PC, or uploaded a job from the camera, you will proceed to the **Edit** view to refine your machine vision job. The Camera parameters below the captured image allow you to set Gain, Exposure, Focus, Trigger, and Lighting. Inspection Outputs options allow you to connect your job to the outside world. This is also the view where you can add multiple tools to the job. The tool icons are located above the main view area.



## 4. Run the Job in AutoVISION

Going to the **Run** view will automatically download your job to the camera and start it running.



## 5. Save the Job

Click the **Save to Camera** icon on the File menu bar to save the job to the MicroHAWK.



---

## PROFINET I/O and IP Address Assignment

---

When PROFINET I/O is enabled on the unit, the PLC system may control the device name, IP address, and subnet. When this is the case, it is impossible to communicate with the unit from AutoVISION until the PLC has assigned an IP address. When the unit disconnects from a PROFINET controller without disabling PROFINET, it may no longer be reachable from AutoVISION. This condition may persist after cycling power on the unit because the PROFINET I/O configuration is stored in non-volatile memory on the unit.

When disconnecting a unit from a PROFINET controller, it is recommended to always disable PROFINET on the unit first, as this will erase the PROFINET configuration. The unit will then remain reachable under its last known IP address.

It is possible to recover from loss of communication when PROFINET is left enabled, as described below.

### APIPA Address Assignment

When the unit fails to obtain a valid IP address, it will fall back on the APIPA (Automatic Private Addressing) protocol after a timeout of 5 minutes.

To get an IP address, the unit will select an address at random in the range 169.254.1.0 to 169.254.254.255 with a subnet mask of 255.255.0.0. The client will then send an ARP packet asking for the MAC address that corresponds to the randomly-generated IPv4 address. If any other machine is using that address, the client will generate another random address and try again until it finds a free IP address.

The device network viewer can be used to discover units with an APIPA address, connect to them, and update the IP address to a desired range.

The default IP address and subnet mask can be restored by pressing the button on top of the unit and holding it for 30 seconds while applying power to the unit.



# Optics and Lighting

This section describes the optical and illumination characteristics of MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras.

## Optics

The monochrome and color versions of the MicroHAWK MV-20, MV-30, and MV-40 have a built-in CMOS sensor, available in Standard Density, High Density, and Ultra-High Density.

**Important:** UHD Fixed Focus is only available in 64 mm and 400 mm distances.

UHD Autofocus is only available for SXGA MV-30 and MV-40 cameras.

### Sensor Table

	Pixels (H x V)	Shutter	Frames per Second
<b>WVGA</b>	752 x 480, 0.3 MP, Mono	Global	52 fps
<b>SXGA</b>	1280 x 960, 1.2 MP, Mono	Global	40 fps
<b>QSXGA</b>	2592 x 1944, 5 MP, Color	Rolling	5 fps

### MV-20 Fixed Focus

	MV-20 FOV Chart		Fixed Focus Lens Type					
	Camera-to-Part Distance		SD - FOV (mm)		HD - FOV (mm)		UHD - FOV (mm)	
	mm	inch	Width	Height	Width	Height	Width	Height
<b>WVGA</b>	50	1.97	49	31	34	22		
	102	4.02	94	60	65	41		
	190	7.48	170	109	118	75		
	300	11.81	265	169	184	118		
<b>SXGA</b>	50	1.97	52	39	36	27		
	64	2.52	65	48	45	34	20	15
	102	4.02	100	75	69	52		
	190	7.48	181	136	125	94		
	300	11.81	282	212	196	147		
	400	15.75	375	281	260	195	117	88
<b>QSXGA</b>	50	1.97	49	37	34	26		
	102	4.02	95	71	66	49		
	190	7.48	173	129	120	89		
	300	11.81	270	201	187	140		

## MV-30 and MV-40 Fixed Focus

	MV-30/40 FOV Chart		Fixed Focus Lens Type					
	Camera-to-Part Distance		SD - FOV (mm)		HD - FOV (mm)		UHD - FOV (mm)	
	(mm)	(inch)	Width	Height	Width	Height	Width	Height
WVGA	50	1.97	49	32	34	22		
	102	4.02	95	60	66	42		
	190	7.48	171	109	118	76		
	300	11.81	266	170	185	118		
SXGA	50	1.97	53	39	36	27		
	64	2.52	66	49	45	34	21	15
	102	4.02	101	75	70	52		
	190	7.48	182	136	126	95		
	300	11.81	283	213	196	147		
	400	15.75	376	282	260	195	118	88
QSXGA	50	1.97	50	37	35	26		
	102	4.02	96	72	67	50		
	190	7.48	174	130	121	90		
	300	11.81	271	202	188	140		

## MV-30 and MV-40 Autofocus

	MV-30/40 FOV Chart		Autofocus Lens Type					
	Camera-to-Part Distance		SD - FOV (mm)		HD - FOV (mm)		UHD - FOV (mm)	
	(mm)	(inch)	Width	Height	Width	Height	Width	Height
WVGA	50	1.97	46	29	33	21		
	102	4.02	88	56	64	41		
	190	7.48	159	101	115	74		
	300	11.81	247	158	180	115		
SXGA	50	1.97	49	37	36	27	16	12
	102	4.02	93	70	68	51	32	24
	190	7.48	169	127	123	92		
	300	11.81	263	197	191	144		
QSXGA	50	1.97	47	35	34	25		
	102	4.02	89	67	65	48		
	190	7.48	161	120	117	87		
	300	11.81	252	187	183	136		



**MV-30 and MV-40 Long Range SXGA / Autofocus Field of View**

<b>Object Distance (mm)</b>	<b>FOV Width (mm)</b>	<b>FOV Height (mm)</b>
<b>75</b>	22	16
<b>100</b>	29	22
<b>200</b>	59	44
<b>300</b>	88	66
<b>400</b>	117	88
<b>500</b>	146	110
<b>600</b>	176	132
<b>700</b>	205	154
<b>800</b>	234	176
<b>900</b>	263	198
<b>1,000</b>	293	220
<b>1,100</b>	322	241
<b>1,200</b>	351	263
<b>1,300</b>	380	285
<b>1,400</b>	410	307
<b>1,500</b>	439	329
<b>1,600</b>	468	351
<b>1,700</b>	498	373
<b>1,800</b>	527	395
<b>1,900</b>	556	417
<b>2,000</b>	585	439

## Illumination



**Inner LEDs:** 4 white, 4 red (625 nm nominal)

**Outer LEDs:** 8 high-output white or red (617 nm nominal)

**Note:** MV-20 only has inner LEDs. MV-30 and MV-40 have both inner and outer LEDs. Options are available for IR and blue outer LEDs.

## LED Modules

Description	Left P/N	Right P/N	LED P/N	Wavelength
Expansion, Red	43-9500055-01	43-9500056-01	LA E65F-CAEB-24-1	617 nm
Expansion, White	43-9500055-02	43-9500056-02	NFSW036BLT b3-b6/P9-P12	N/A
Expansion, IR	43-9500055-03	43-9500056-03	SFH 4259S	850 nm
Expansion, Blue	43-9500055-04	43-9500056-04	LB E63C-T2V2-35-34	469 nm

## Machine Vision Lighting Principles

---

Proper lighting is critical to the success of a machine vision application. The MicroHAWK features integrated lighting (built-in red LEDs for monochrome sensors and white LEDs for color sensors). Depending on the requirements of your application, you may also need external lighting from Omron Microscan's NERLITE family of machine vision lighting products.

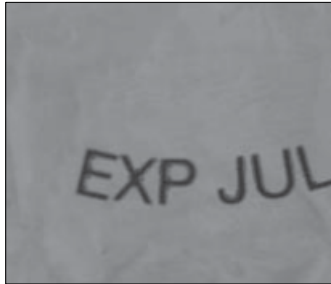
Consider the following when setting up your application:

- Is the surface of the object flat, slightly bumpy, or very bumpy?
- Is the surface matte or shiny?
- Is the object curved or flat?
- What is the color of the object or area being inspected?
- Is the object moving or stationary?

*Machine vision lighting should maximize contrast of the areas or features being inspected while minimizing the contrast of everything else.*



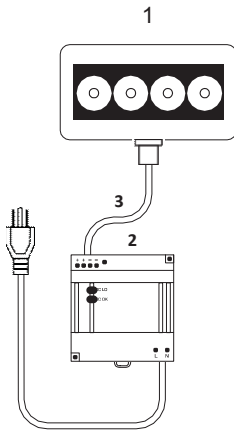
**Before correct lighting**



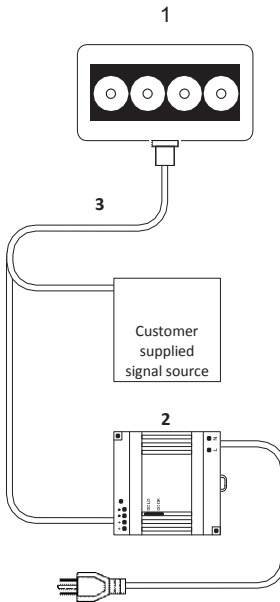
**After correct lighting with a  
NERLITE Illuminator**

## MicroHAWK MV-40 External Illumination Control and Wiring

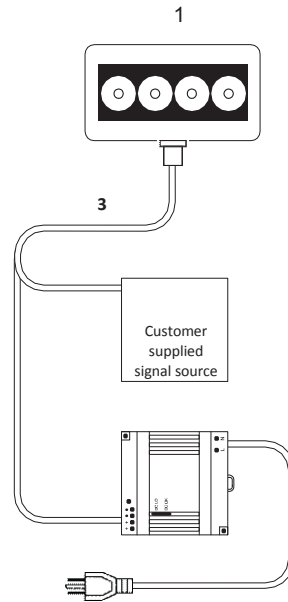
The MicroHAWK MV-40 Smart Camera supports external lighting with Omron Microscan's NERLITE Smart Series lights. The diagrams below demonstrates how the camera and light can be configured. The light is controlled using the Lighting control in the Camera configuration settings of AutoVISION software.



**Figure A**  
MAX Series Illuminator  
with power supply



**Figure B**  
MAX Series Illuminator  
with customer supplied dimming  
or on-off signal source



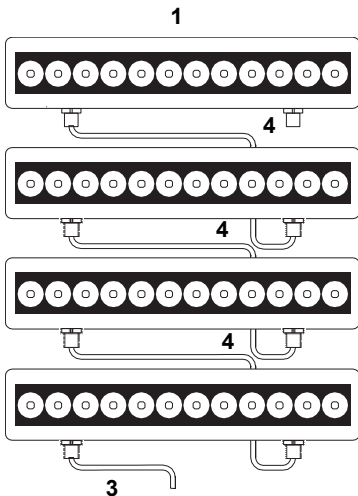
**Figure C**  
MAX Series Illuminator  
with customer supplied  
strobe trigger  
signal source

Item	Description	Part Number
1	MAX Series Lights	NER-011660XXXG
2	Power Supply DSP100 24VDC 4.2A DIN Mount	97-000006-01
	Power Supply DSP60 24VDC 2.5A DIN Mount	NER-011504100
3	Cable, 5P M12 Socket To Flying Leads, 3M	61-000186-01
	Cable, 5P M12 Socket To Flying Leads, 5M	61-000187-01
4	Cable, 5P M12 Plug To 5P M12 Socket, 1M	61-000184-01
	Cable, 5P M12 Plug To 5P M12 Socket, 3M	61-000185-01
5	Cable, Power Smart Series to QX-1	61-000204-01

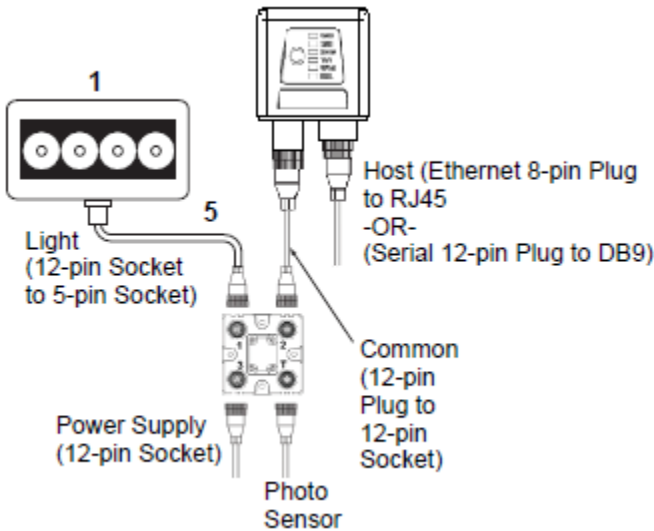
# QX-1 Interface

In Strobe mode, the external illuminator is strobed with the exposure of the camera to maximize light for the short exposure times needed in dynamic applications.

ON/OFF allows the external illuminator to be enabled and disabled using the MicroHAWK MV-40's I/O.



**Figure D**  
MAX Series Illuminator in a daisy chain configuration. See figures A, B, or C for the correct power supply and signal connections for your application.

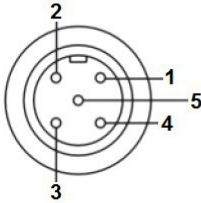


**Figure E**  
MAX Series Illuminators with QX-1 Interface Device.  
Note: Figure E is not compatible with daisy chaining. Powering more than one MAX via the QX-1 will exceed the QX-1's current capacity.

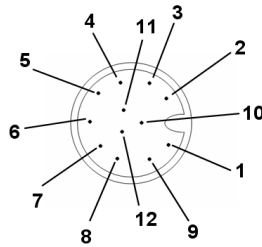
	Operation	Cable
1	Strobe	61-000218-01, Smart Series-to-QX-1, Strobe, NPN
2	ON/OFF	61-000207-01, Smart Series-to-QX-1, ON/OFF
3	Continuous ON	61-000204-01, Smart Series-to-QX-1, Continuous

## Wiring for Strobe Illumination (NPN)

**Warning:** Contact between Pin 5 (gray wire) and any ground or voltage source less than or equal to 3.5VDC may cause erratic operation in this configuration. Contact between Pin 5 (gray wire) and any voltage source greater than 3.5VDC will damage the illuminator.



**Smart Series Illuminator Connector**



**MicroHAWK MV-40 Connector A**

Smart Series Illuminator	
Pin	Signal Name
1	+24VDC
2	Trigger –
3	DC Ground
4	Trigger +
5	Dim

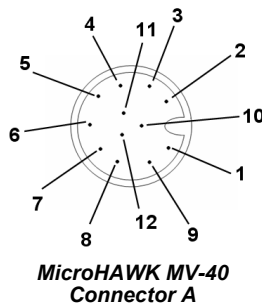
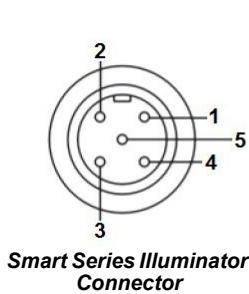
to  
to  
to  
to  
to

MicroHAWK (Connector A)	
Pin	Signal Name
2	Power
6	Output 3
7 and 12	Ground and Output Common
2	Power
No Connection*	N/A

\* Insulate Pin 5 (gray wire)

## Wiring for Strobe Illumination (PNP)

**Warning:** Contact between Pin 5 (gray wire) and any ground or voltage source less than or equal to 3.5VDC may cause erratic operation in this configuration. Contact between Pin 5 (gray wire) and any voltage source greater than 3.5VDC will damage the illuminator.



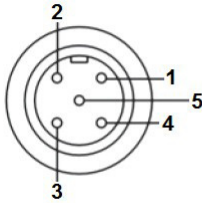
Smart Series Illuminator	
Pin	Signal Name
1	+24VDC
2	Trigger –
3	DC Ground
4	Trigger +
5	Dim

MicroHAWK (Connector A)	
Pin	Signal Name
2 and 12	Power and Output Common
7	Ground
7	Ground
6	Output 3
No Connection*	N/A

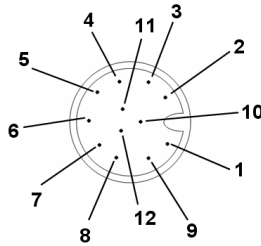
\* Insulate Pin 5 (gray wire)

## Wiring for ON/OFF Illumination (NPN Only)

**Warning:** Contact between Pin 5 (gray wire) and any voltage source greater than 3.5VDC will damage the illuminator.



**Smart Series Illuminator Connector**



**MicroHAWK MV-40 Connector A**

Smart Series Illuminator	
Pin	Signal Name
1	+24VDC
2	Trigger –
3	DC Ground
4	Trigger +
5	Dim

to  
to  
to  
to  
to

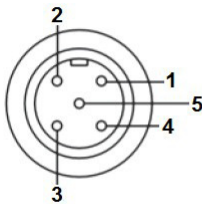
MicroHAWK (Connector A)	
Pin	Signal Name
2	Power
7 and 12	Ground and Output Common
7 and 12	Ground and Output Common
2	Power
6	Output 3

\* Insulate Pin 5 (gray wire)



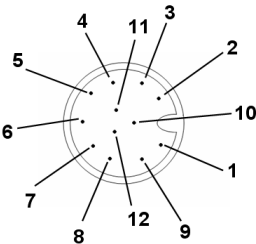
## Wiring for Continuous Illumination

**Warning:** Contact between Pin 5 (gray wire) and any ground or voltage source less than or equal to 3.5VDC may cause erratic operation in this configuration. Contact between Pin 5 (gray wire) and any voltage source greater than 3.5VDC will damage the illuminator.



**Smart Series Illuminator  
Connector**

Smart Series Illuminator	
Pin	Signal Name
1	+24VDC
2	Trigger –
3	DC Ground
4	Trigger +
5	Dim



**MicroHAWK MV-40  
Connector A**

MicroHAWK (Connector A)	
Pin	Signal Name
2	Power
7	Ground
7	Ground
2	Power
No Connection*	N/A

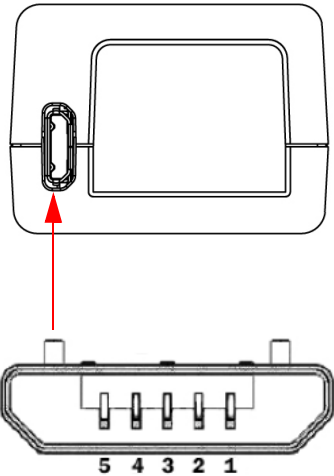
\* Insulate Pin 5 (gray wire)

# Connector Pinouts

This section contains information about the MicroHAWK MV-20, MV-30, and MV-40 Smart Camera's connectors and pin assignments.

# MV-20 Connector

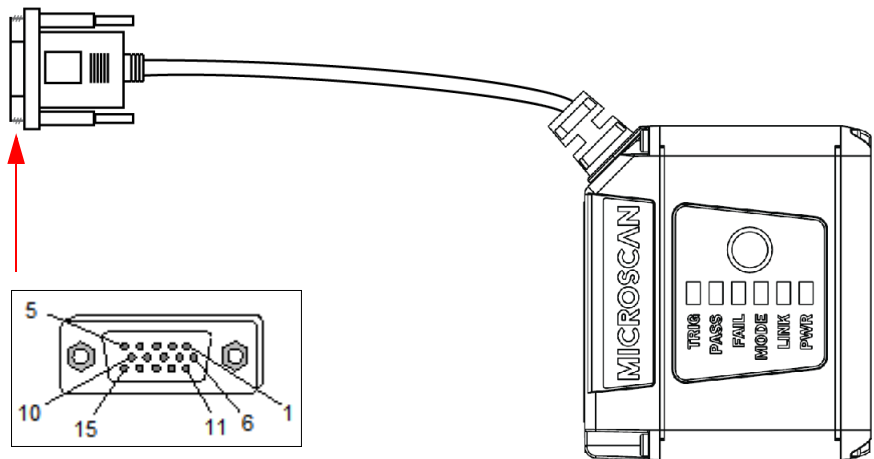
## Micro-USB Type B Socket



Pin	Function
1	Vbus (5V)
2	D-
3	D+
4	NC
5	Ground

# MV-30 Connector

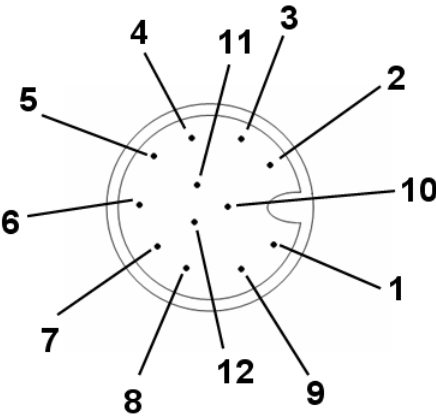
## High-Density 15-Pin D-Sub Socket



Pin	Function
1	+5VDC
2	TX232
3	RX232
4	GND
5	D+
6	N/C
7	Output 1+
8	Default+
9	Trigger+
10	D-
11	Output 3+
12	New Master+
13	N/C
14	Output 2+
15	Vbus

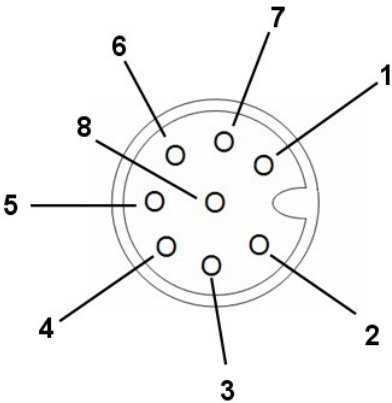
# MV-40 Connector

## Connector A – M12 12-Pin Plug – Power, I/O, and Serial



Pin	Function
1	Trigger
2	Power
3	Default
4	New Master
5	Output 1
6	Output 3
7	Ground
8	Input Common
9	RS-232 (Host) RxD
10	RS-232 (Host) TxD
11	Output 2
12	Output Common

**Connector B – M12 8-Pin Socket – Ethernet**



Pin	Function
1	V+
2	V-
3	V-
4	TX (-)
5	RX (+)
6	TX (+)
7	V+
8	RX (-)



## Cable Specifications

This section contains information about cables for the MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras.

**Note:** Cable specifications are published for information only. Omron Microscan does not guarantee the performance or quality of cables provided by other suppliers.

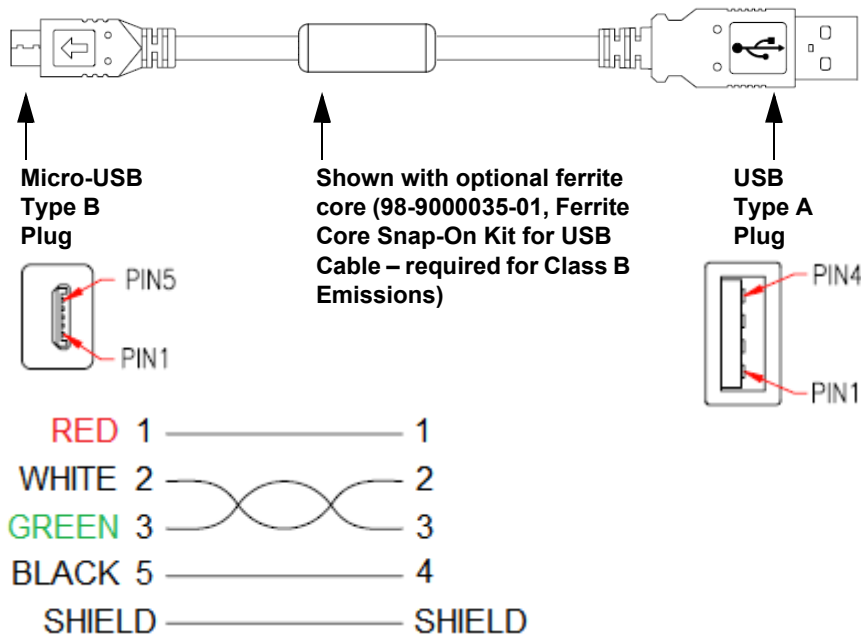
Part Number	Description
61-9000034-01	Cable, USB A to Micro B, 6 ft., MV-20
61-9000045-01	Cable, USB A to Micro B, 3 ft., MV-20
61-9000037-01	Cable, DB15 to Ext. Power/RS-232, MV-30
61-9000038-01	Cable, DB15 to Ext. Power/USB, MV-30
61-9000039-01	Cable, DB15 to Ext. Power/USB, I/O, MV-30
61-9000043-01	Cable, DB15 to BUS Power USB, MV-30
61-9000102-01	Cable, DB15 to USB/RS-232 Triggered, MV-30
61-9000054-01	Cable, M12 12-Pin Socket to 9-Pin Socket and M12 Plug
61-9000088-01	Cable, M12 12-Pin Socket to USB Keyboard Wedge and M12 Plug



# MV-20 Cables

## 61-9000034-01/61-9000045-01 USB Type A-to-Micro B Cable

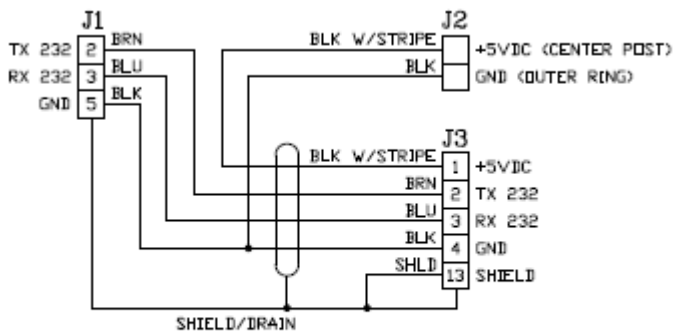
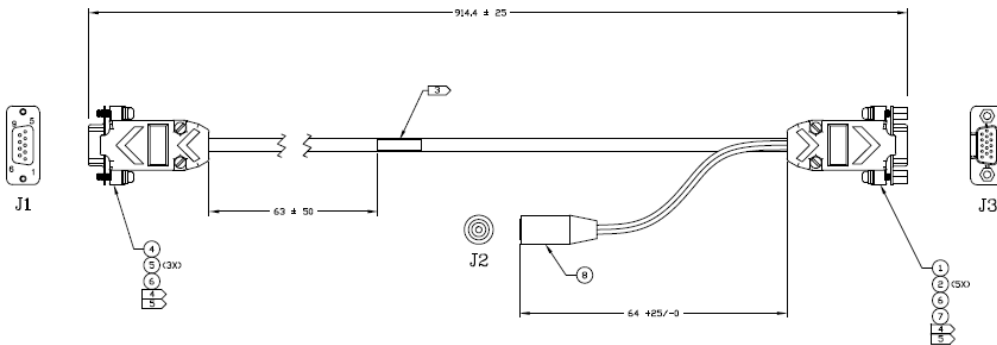
The 61-9000034-01/61-9000045-01 Micro-USB Type B plug to USB Type A plug cable is a double-ended shielded ferrite core USB cable. 61-9000034-01 is 6 feet long, and 61-9000045-01 is 3 feet long. This cable is used for basic communications-only applications.



## MV-30 Cables

### 61-9000037-01 DB15 to Ext. Power/RS-232 Cable

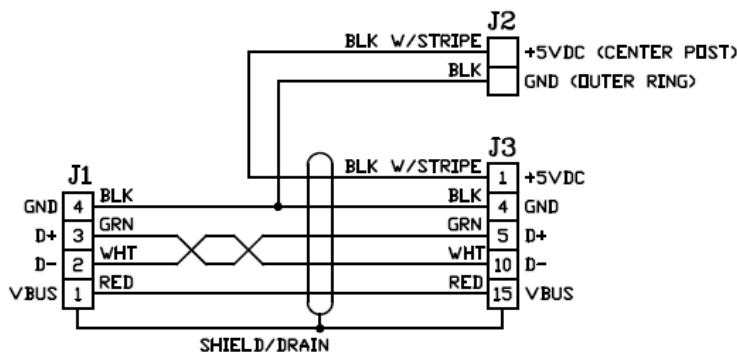
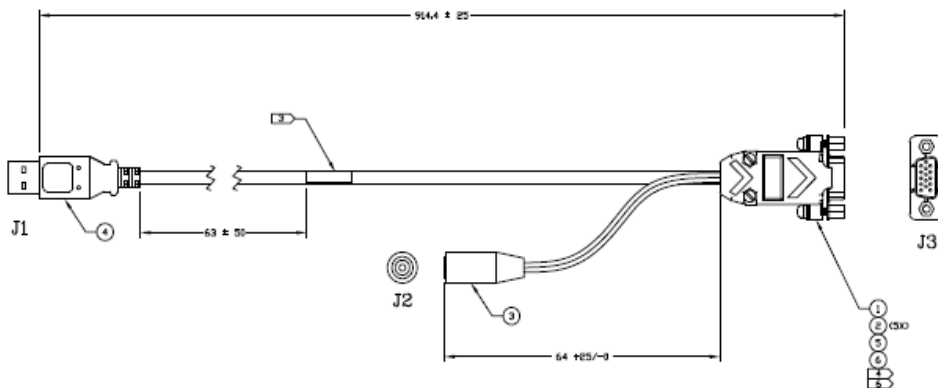
The 61-9000037-01 DB15 to Ext. Power/RS-232 cable is cable with one end a 9-pin D-Sub socket connector (J1) and the other end a DB15 (J3) extended Power/RS-232 (J2). This cable is used for basic communications applications that require more light or use higher-speed applications.



SCHEMATIC

## 61-9000038-01 DB15 to Ext. Power/USB Cable

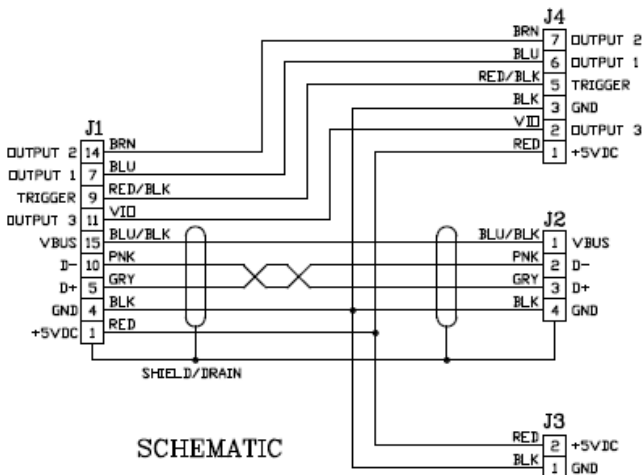
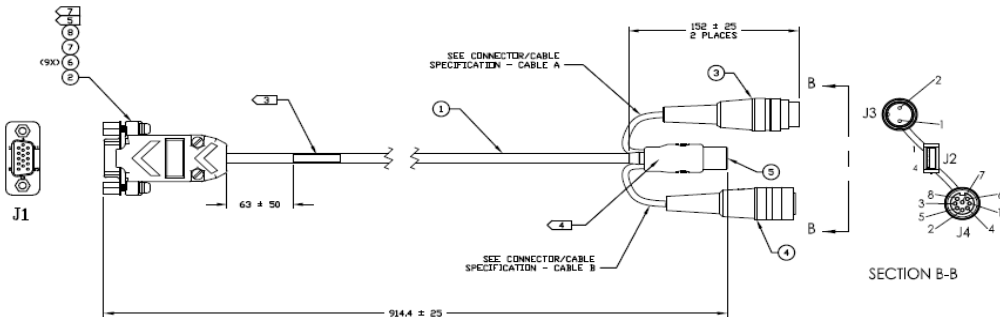
The 61-9000038-01 DB15 to ext. power/USB cable is a cable with one end a USB connector(J1) and the other end a DB15 (J3) extended power/RS-232 (J2). This cable is used for basic communications applications that require more light or for higher speed applications.



SCHEMATIC

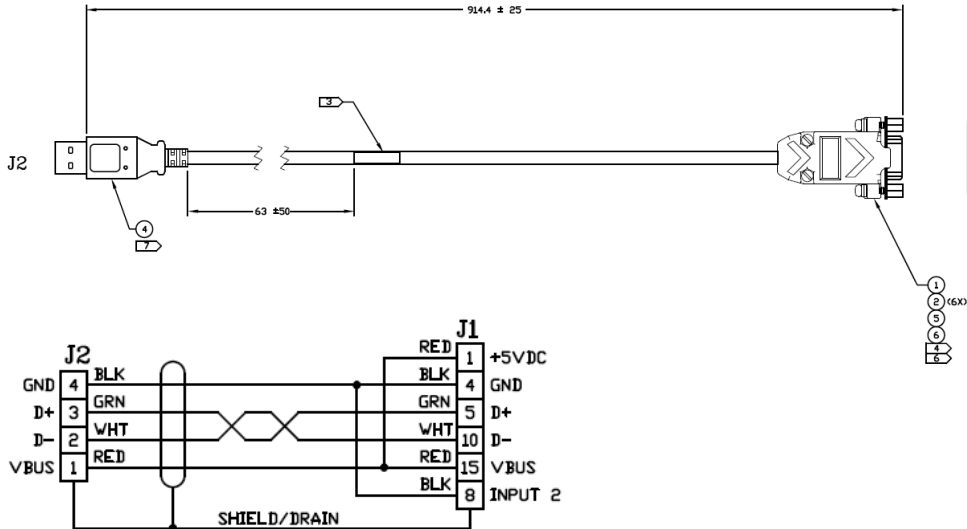
## 61-9000039-01 DB15 to Ext. Power/USB, I/O Cable

The 61-9000039-01 DB15 to ext. power/USB, I/O cable is a cable with one end a 15-pin D-Sub socket connector (J1) and the other end a USB (J2) extended with a 2-pin socket (J3) and an 8-pin socket (J4) connector. This cable is used for virtual LAN or RS-232 with I/O applications, any speed with line stop or result indication.



## 61-9000043-01 DB15 to BUS Power USB Cable

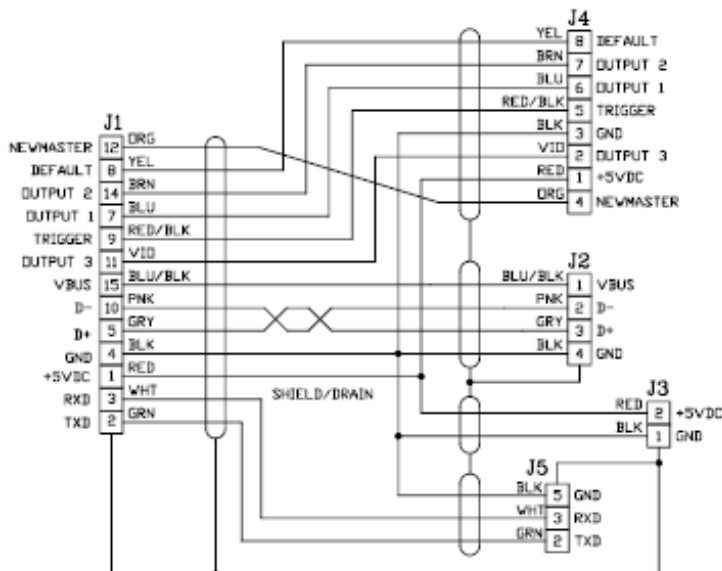
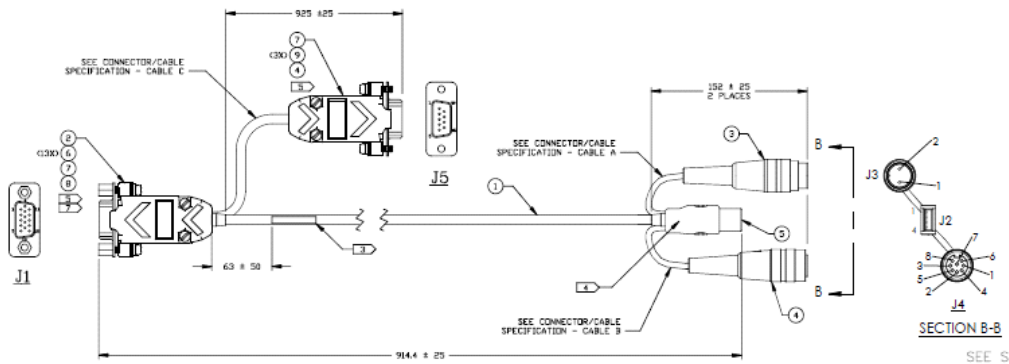
The 61-9000043-01 DB15 to bus power USB cable is a double-ended cable; one end is a 15-pin D-Sub socket (J1) and the other end is a USB plug (J2). This cable is used for basic communications applications that require more light or for higher speed applications.



SCHEMATIC

### 61-9000102-01 DB15 to USB/RS-232 Triggered Cable

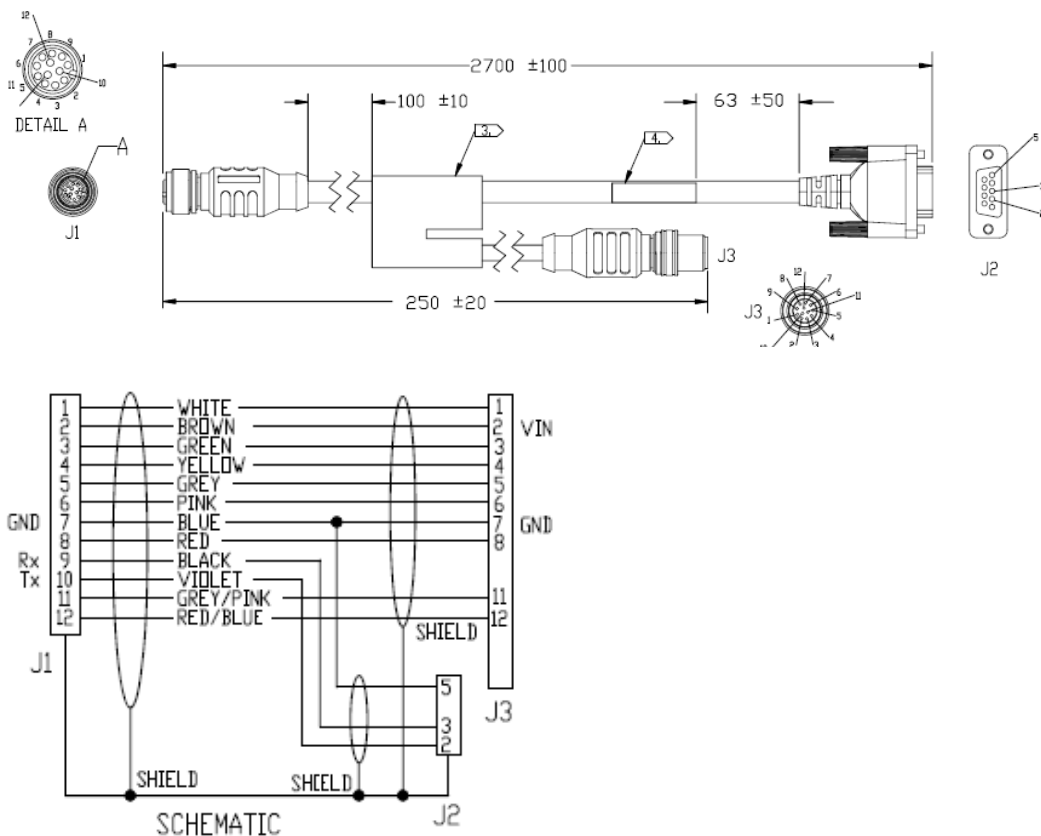
The 61-9000102-01 DB15 to USB/RS-232 triggered cable is a cable with one end a 9-pin (J5) and a 15-pin D-Sub socket connector (J1), and the other end a USB (J2) extended with a 2-pin socket (J3) and an 8-pin socket (J4) connector. This cable is used for RS-232 applications with I/O for line stop or result indications.



## MV-40 Cables

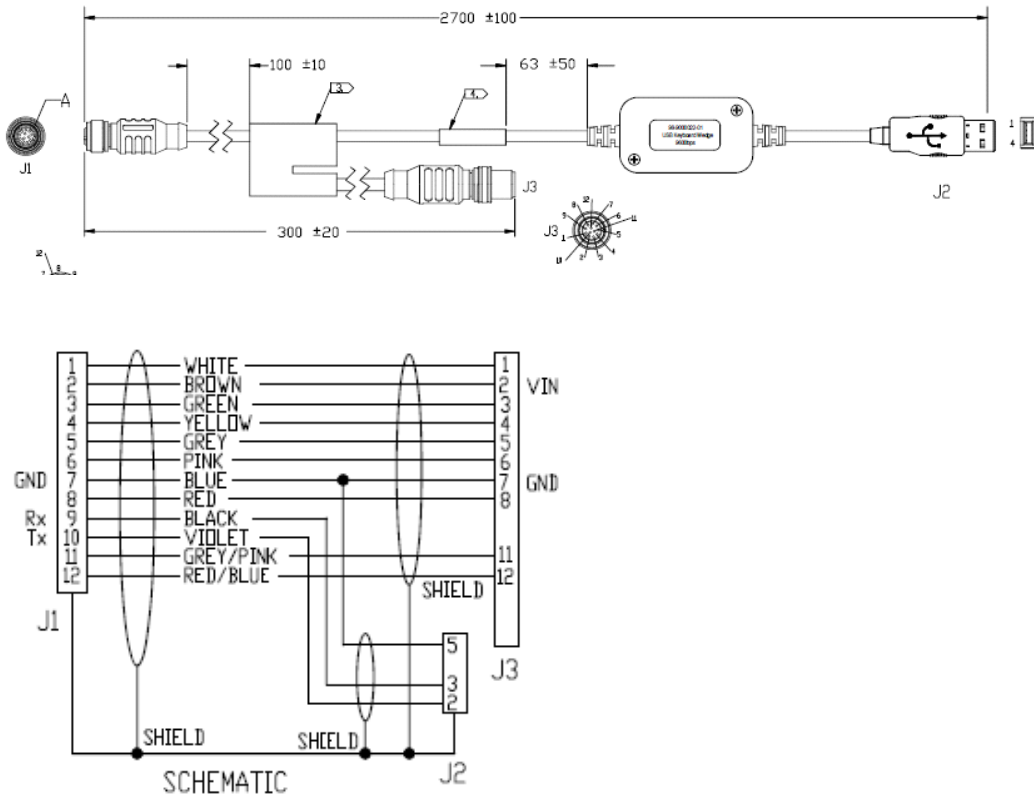
### 61-9000054-01 M12 12-Pin Socket to 9-Pin Socket and M12 Plug

The 61-9000054-01 M12 12-pin socket to 9-pin socket and M12 plug cable is a cable with one end a 12-pin socket connector (J1) and the other end a 9-pin socket (J2) and an M12 plug (J3). This cable replaces common cord set, QX-1 and RS-232 cable with a single cable option. It is used for both RS-232 and WebLink simultaneously.



## 61-9000088-01 M12 12-Pin Socket to USB Keyboard Wedge and M12 Cable

The 61-9000088-01 M12 12-pin socket to USB keyboard wedge and M12 cable is a cable with one end a 12-pin socket connector (J1) and the other end a 98-9000022-01 USB keyboard wedge (9600 bps) (J2) and an M12 plug (J3). This cable is used with applications requiring keyboard input.





## Pinouts for Cordsets with Flying Leads

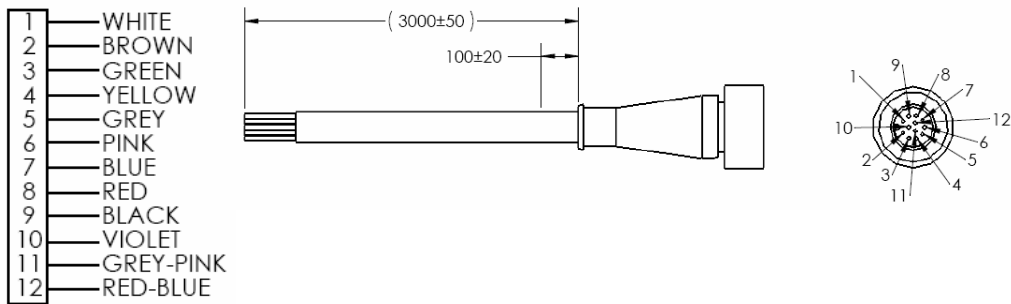
Omron Microscan offers two flying lead cordsets for use in hardware configurations:

- 61-000166-02 (Plug, Screw-On)
- 61-000167-02 (Socket, Screw-On)

The diagrams below show the correspondence of wire colors to pins.

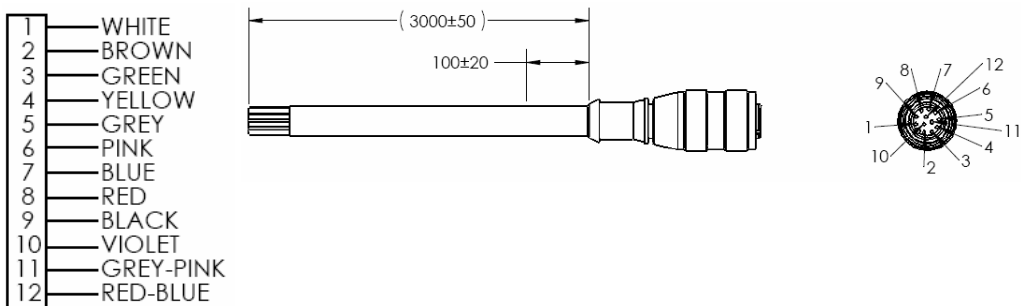
### 61-000166-02 – M12 12-Pin Plug to Flying Leads

61-000166-02 connects to Connector B (Serial) and QX-1 Connector 2.



### 61-000167-02 – Cordset, M12 12-Pin Socket to Flying Leads

61-000167-02 connects to Connector A and QX-1 Connectors 1 and 3.



# General Specifications

This section contains specifications for the MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras.

## MicroHAWK MV-20 General Specifications

### *MicroHAWK MV-20 Dimensions, Enclosure*

Dimensions	Enclosure
<b>Height:</b> 24 mm (0.94") <b>Width:</b> 34 mm (1.34") <b>Length:</b> 39 mm (1.54") <b>Weight:</b> 26 g (0.92 oz.)	IP40, Plastic

### *MicroHAWK MV-20 Environmental, Emissions*

Operating Temperature	Storage Temperature	Humidity	Emissions
0° to 40° C (32° to 104° F)	-50° to 75° C (-58° to 167° F)	5% to 95% (non-condensing)	EN 61326-1:2013 Class B Limits

### *MicroHAWK MV-20 Electrical*

Electrical
5 VDC $\pm$ 5%, 350 mA at 5 VDC (typ.)

### *MicroHAWK MV-20 Connector, Communication, Illumination, Indicators*

Connector	Communication	Illumination	Indicators
Micro-B USB	USB 2.0 High-Speed (Ethernet over USB and HD)	<b>Inner Red:</b> 4 LEDs, 625 nm nominal <b>Inner White:</b> 4 LEDs <b>Light Modes:</b> Off, On, Strobe	Power LED, 2 Target Pattern LEDs, 2 Inspection Passed Green Flash LEDs

### *MicroHAWK MV-20 Speed, Memory, Software, FTP Image Storage*

Speed	Memory	Software	FTP Image Storage
400 MHz	2 GB Non-Volatile Flash, 256 MB RAM	AutoVISION Sensor, AutoVISION, Visionscape	Supported

### *MicroHAWK MV-20 Sensor Options, Exposure Time, Shutter, Frames per Second*

Sensor Options	Exposure Time	Shutter	Frames per Second
<b>WVGA (Mono):</b> CMOS 0.34 MP (752 x 480), 4.51 x 2.88 mm, 6 $\mu$ m pixel size	<b>WVGA:</b> 50 to 66,667 $\mu$ s	Global	<b>WVGA:</b> Up to 52
<b>SXGA (Mono):</b> CMOS 1.2 MP (1280 x 960), 4.80 x 3.60 mm, 3.75 $\mu$ m pixel size	<b>SXGA:</b> 66 to 58,825 $\mu$ s		<b>SXGA:</b> Up to 40
<b>QSXGA (Color):</b> CMOS 5 MP (2592 x 1944), 4.536 x 3.402 mm, 1.75 $\mu$ m pixel size	<b>QSXGA:</b> 66 to 66,667 $\mu$ s	Rolling	<b>QSXGA:</b> Up to 5

### *MicroHAWK MV-20 Optics, Focus*

Optics	Focus
<b>Standard Density (SD):</b> 5.2 mm	<b>SD, HD:</b> Factory set to 50, 102, 190, or 300 mm
<b>High Density (HD):</b> 8.0 mm	
<b>Ultra-High Density (UHD):</b> 16.0 mm	<b>UHD:</b> Factory set to 64 or 400 mm

# MicroHAWK MV-30 General Specifications

## MV-30 Dimensions, Enclosure

Dimensions	Enclosure
<b>Height:</b> 25 mm (0.98") <b>Width:</b> 45 mm (1.77") <b>Length:</b> 38 mm (1.50") <b>Weight without Cable:</b> 46 g (1.62 oz.)	IP54, Aluminum

## MV-30 Environmental, Emissions

Operating Temperature	Storage Temperature	Humidity	Emissions
0° to 40° C (32° to 104° F)	-50° to 75° C (-58° to 167° F)	5% to 95% (non-condensing)	EN 61326-1:2013 Class A Limits

## MV-30 Electrical

Electrical
5 VDC $\pm$ 5%, 600 mA at 5 VDC (typ.)

## MV-30 Connector, Communication, Discrete I/O, Illumination, Indicators

Connector	Comm.	Discrete I/O	Illumination	Indicators
0.91 m Cable with High-Density 15-Pin D-Sub Socket	USB 2.0 Full-Speed (Ethernet over USB and HID), RS-232	<b>2 in/3 out:</b> Trigger Input; New Master Input: 5-28 V- rated (0.16 mA @ 5 VDC); Strobe Output; 2 General Purpose Outputs: 5V TTL- compatible, can sink 10 mA and source 10 mA	<b>Inner Red:</b> 4 LEDs, 625 nm nominal <b>Inner White:</b> 4 LEDs <b>Outer Red, White, Blue, or IR:</b> 8 LEDs <b>Light Modes:</b> Inner or Outer; Off, On, Strobe, Power Strobe; Power Strobe for Outer LEDs only. Not available when running under USB power.	TRIG, PASS, FAIL, MODE, LINK, PWR LEDs, 2 Target Pattern LEDs, 2 Inspection Passed Green Flash LEDs

## MV-30 Memory, Speed, Software, FTP Image Storage

Memory	Speed	Software	FTP Image Storage
2 GB Non-Volatile Flash, 256 MB RAM	800 MHz	AutoVISION Sensor, AutoVISION, Visionscape	Supported

## MV-30 Sensor Options, Shutter, Exposure Time, Frames per Second

Sensor Options	Shutter	Exposure Time	Frames per Second
<b>WVGA (Mono):</b> CMOS 0.34 MP (752 x 480), 4.51 x 2.88 mm, 6 $\mu$ m pixel size	Global	<b>WVGA:</b> 50 to 66,667 $\mu$ s	<b>WVGA:</b> Up to 52
<b>SXGA (Mono):</b> CMOS 1.2 MP (1280 x 960), 4.80 x 3.60 mm, 3.75 $\mu$ m pixel size		<b>SXGA:</b> 66 to 58,825 $\mu$ s	<b>SXGA:</b> Up to 40
<b>QSXGA (Color):</b> CMOS 5 MP (2592 x 1944), 4.536 x 3.402 mm, 1.75 $\mu$ m pixel size	Rolling	<b>QSXGA:</b> 66 to 66,667 $\mu$ s	<b>QSXGA:</b> Up to 5

## MV-30 Optics, Focus

Optics	Focus
<b>Fixed:</b> Standard Density (5.2 mm); High-Density (8.0 mm); Ultra-High-Density (16.0 mm)	<b>Fixed:</b> SD, HD: Factory set to 50, 102, 190, or 300 mm; UHD: 64 or 400 mm
<b>Autofocus:</b> Standard Density (5.2 mm); High-Density (7.7 mm); Ultra-High-Density (16.0 mm); Long Range (16.5 mm Focal Length)	<b>Autofocus:</b> SD, HD: Software-adjustable 50 to 300 mm; UHD: 40 to 150 mm; Long Range: 75-1,160 mm Autofocus Distance)

## MicroHAWK MV-40 General Specifications

### MV-40 Dimensions, Enclosure

Dimensions	Enclosure
<b>Height:</b> 25 mm (0.98") <b>Width:</b> 45 mm (1.77") <b>Length:</b> 45 mm (1.77") <b>Weight:</b> 68 g (2.40 oz.)	IP65/67, Aluminum

### MV-40 Environmental, Emissions

Operating Temperature	Storage Temperature	Humidity	Emissions
0° to 45° C (32° to 113° F)	-50° to 75° C (-58° to 167° F)	5% to 95% (non-condensing)	EN 61326-1:2013 Class B Limits

### MV-40 Electrical

Electrical
4.75-30 VDC, 200 mV p-p max ripple, 150 mA at 24 VDC (typ.)

### MV-40 Connector, Communication, Discrete I/O, Illumination, Indicators

Connector	Passive PoE	Comm.	Discrete I/O	Illumination	Indicators
M12 12-Pin Power, M12 8-Pin Ethernet	24 V Passive Power over Ethernet, Type B; Requires passive PoE power supply	RS-232, Ethernet TCP/IP, EtherNet/IP, PROFINET I/O	<b>2 in/3 out:</b> Optoisolated Trigger Input; New Master Input: Bi-directional, Optoisolated, 1-28 V-rated (10 mA @ 28 VDC); Strobe Output, 2 General Purpose Outputs: Bi-directional, Optoisolated, 1-28 V-rated (I <sub>CE</sub> < 100 mA @ 24 VDC, current limited by user)	<b>Inner Red:</b> 4 LEDs, 625 nm nominal <b>Inner White:</b> 4 LEDs <b>Outer Red, White, Blue, or IR:</b> 8 LEDs <b>Light Modes:</b> Inner or Outer; Off, On, Strobe, Power Strobe; Power Strobe for Outer LEDs only	TRIG, PASS, FAIL, MODE, LINK, PWR LEDs, 2 Target Pattern LEDs, 2 Inspection Passed Green Flash LEDs

### MV-40 Speed, Memory, Software, FTP Image Storage

Speed	Memory	Software	FTP Image Storage
800 MHz	2 GB Non-Volatile Flash, 256 MB RAM	AutoVISION Sensor, AutoVISION, Visionscape	Supported

### MV-40 Sensor Options, Shutter, Exposure Time, Frames per Second

Sensor Options	Shutter	Exposure Time	Frames per Second
<b>WVGA (Mono):</b> CMOS 0.34 MP (752 x 480), 4.51 x 2.88 mm, 6 µm pixel size	Global	<b>WVGA:</b> 50 to 66,667 µs	<b>WVGA:</b> Up to 52
<b>SXGA (Mono):</b> CMOS 1.2 MP (1280 x 960), 4.80 x 3.60 mm, 3.75 µm pixel size		<b>SXGA:</b> 66 to 58,825 µs	<b>SXGA:</b> Up to 40
<b>QSXGA (Color):</b> CMOS 5 MP (2592 x 1944), 4.536 x 3.402 mm, 1.75 µm pixel size	Rolling	<b>QSXGA:</b> 66 to 66,667 µs	<b>QSXGA:</b> Up to 5

### MV-40 Optics, Focus

Optics	Focus
<b>Fixed:</b> Standard Density (5.2 mm); High-Density (8.0 mm); Ultra-High-Density (16.0 mm)	<b>Fixed:</b> SD, HD: Factory set to 50, 102, 190, or 300 mm; UHD: 64 or 400 mm
<b>Autofocus:</b> Standard Density (5.2 mm); High-Density (7.7 mm); Ultra-High-Density (16.0 mm); Long Range (16.5 mm Focal Length)	<b>Autofocus:</b> SD, HD: Software-adjustable 50 to 300 mm; UHD: 40 to 150 mm; Long Range: 75-1,160 mm Autofocus Distance)

# Serial Commands

**Serial commands** can be sent via **TCP port**, **AutoVISION Terminal**, or **HyperTerminal**.

**Important:** The HAWK MV-4000 Smart Camera does not support any focus commands.

# Serial Commands

## Serial Command Syntax

< > = Required argument. Replace appropriately.

For example:

-u <DB\_User\_name> becomes -u **av** where **av** replaces **DB\_User\_name**.

| = Mutually exclusive arguments. Choose one from the list.

{ } = Used with | to specify a list of choices for an argument.

[ ] = Optional parameter.

**Important:** Unless otherwise stated, commands will respond with **!OK** on success and **!ERROR** on failure.

## **AUTOCAL [-exp={0|1}] [-expval={60-100000}] [-gain={0|1}] [-gainval={0-100}] [-focus={0|1}] [-focval{0-9999}]**

Initiates camera calibration of gain, exposure, and focus. Each parameter is independent. Ranges are device-dependent.

**-exp enable=1** or **disable=0** autocalibrate exposure.

**-expval** value of exposure in  $\mu$ s.

**-gain enable=1** or **disable=0** autocalibrate gain.

**-gainval** value of gain in percentage.

**-focus enable=1** or **disable=0** autocalibrate focus

**-focval** value of focus in mm.

### **Example 1:**

**Command:** AUTOCAL

**Response:** 0;4632;134;50;300 (gain=0, exposure=4632  $\mu$ s, focus=134, min allowable focus=50, max allowable focus=300)

### **Example 2:**

**Command:** OFFLINE

**Response:** !OK

**Command:** QUERYAUTOCAL

**Response:** 0;4632;134;50;300 (Gain was 0.)

**Command:** AUTOCAL -exp=1 -gain=0 -gainval=18 (Fixed gain at 18%.)

**Response:** 18;3308;128;50;300 (Gain did not change and exposure has changed from 4632  $\mu$ s to 3308  $\mu$ s.)

**Example 3:****Command:** OFFLINE**Response:** !OK**Command:** QUERYAUTOLOCAL**Response:** 0;3478;226;50;300 (Exposure was 3478  $\mu$ s.)**Command:** AUTOLOCAL -exp=0 -expval=1000 (Fixed exposure at 1000  $\mu$ s.)**Response:** 31;1000;98;50;300 (Exposure stayed at 1000  $\mu$ s and gain has changed from 0% to 31%.)**Important:** AUTOLOCAL only functions when the camera is OFFLINE.**GET {tagname|service|service.tagname}**

Gets value of a global tag.

The tagname must correspond to one of the supported tags within the device. Use the **INFO** command to get a full list of tags and services, as well as attributes of the tag and list of subtags. The command is terminated by a carriage return and/or line feed character.

Include an index to get a single value from an array such as **GET int1**. If the index is omitted, the full array of values will be returned in a comma-separated list of values.

Send **Get {tagname|service.tagname|service}** to get the value of a tag within the global data service. To get the value of a tag within another service, prefix the tagname with the service name. For example, a **GET <service.tagname>** command such as **GET eip.input** for the EIP input assembly.

The AVP service allows retrieval of step and datum information from the job tree using forward slash '/' in the symbolic name path. **GET avp/insp1/snapshot1/status** paths are not case-sensitive and do not need to be fully qualified if unique.

**GET avp/snapshot1/status** will return the same result if there is only one inspection.

When issued against a step, **GET avp/snapshot1** will return the values for all datums.

**Success Return:** On success will return the value stored in the tag.

For example: ABCD

**Fail Return:** On failure will return !ERROR followed by the reason for the failure.

For example: !ERROR Tag matchstring66 not found

**Important:** This command only functions when the camera is ONLINE.

**GETIMAGE <-transfer=ymodem> [-format={jpg|png|tif|raw|bmp}] [-quality={0-100}] [-woi=left,top,right,bottom] [-inspection=n]**

Initiates serial transfer of inspection image.

**Note:** This command always returns the last (most recent) image.

**Important:** JOBDOWNLOAD only supports FTP on the HAWK MV-4000.

**-transfer=yodem** is currently not optional - only Ymodem protocol is supported.

**-format={jpg|png|raw|tif|bmp}** specifies the format of the image. If omitted, the image format is JPG.



**Note:** For monochrome cameras, the only formats available are TIF, PNG, and JPG. For color cameras, the only formats available are RAW, PNG, and BMP.

**Note:** If BMP is selected, the system will return a PNG file.

**Note:** All image file types return complete file information that can be saved directly to disk except the RAW file type, which requires explicit conversion.

**-quality=*n*** specifies a JPG compression quality of *n* less than or equal to 100. The default quality is 80 if not specified. This setting is only supported for the JPG file type.

**Note:** **PNG, RAW, TIF, and BMP** formats provide lossless image compression. If **format** is set to **PNG, RAW, TIF, or BMP**, the **quality** setting does not apply.

**woi=left,top,right,bottom** specifies a rectangular area of the image to be included in the output image. If omitted, the full image buffer is returned.

**-inspection=*n*** specifies the inspection from which to retrieve an image. The image will be from the first snapshot within that inspection. If not specified, the image will be from the first inspection that contains a snapshot.

The following example will retrieve an image from the camera with these settings: **Protocol:** ymodem; **Format:** png; **Quality:** N/A; **Inspection:** second inspection.

**GETIMAGE -transfer=ymodem -format=png -inspection=2**

The following example will retrieve an image from the camera with these settings: **Protocol:** ymodem; **Format:** jpg (default); **Quality:** 50; **Inspection:** first inspection (default).

**GETIMAGE -transfer=ymodem -quality=50**

**Important:** This command only functions when the camera is ONLINE.

## HELP

Returns a list of all serial commands showing correct syntax and functionality descriptions.

## INFO [tagname|service]

Gets information about a tag or service.

**INFO** with no arguments gets a list of services.

**INFO <service>** gets a list of tags in that service.

**INFO <service.tagname>** gets attributes of the tag as well as a list of subtags.

The AVP service allows retrieval of step and datum information from the job tree using forward slash '/' in the symbolic name path. **INFO avp/insp1/snapshot1/status** paths are not case-sensitive and do not need to be fully qualified if unique.

**INFO avp/snapshot1/status** will return the same result if there is only one inspection.

When issued against a step, **INFO avp/snapshot1** returns properties of the step, a list of child datums, and a list of child steps. Child steps are indicated by a trailing forward slash.

## JOBBOOT [-slot=]<*n*>

Sets bootup job slot *n* (RS-232 only).

**JOBDELETE {[-slot=*n*]-all}**

Deletes job in slot *n*, or all jobs if **-all**.

**Important:** Does not delete the current job loaded in camera memory.

**JOBDOWNLOAD <-transfer={ymodem|ftp}> [-size=value] [-c]**

**Important:** JOBDOWNLOAD only supports FTP on the HAWK MV-4000, as with the GETIMAGE command.

Downloads a **.avz** job file via the specified transfer method (ymodem supported only over RS-232; FTP supported only over network connection).

The **ymodem transfer method** only requires that the user send the **.avz** file via the ymodem protocol over RS-232, and the job will load automatically after the transfer is complete.

The **FTP transfer method** requires the user to perform the following steps to load the job:

- **JOBDOWNLOAD: -transfer=ftp [-size=avpsizeinbytes]**

Pre-creates a fixed-size /streamd0 RAMdisk to receive the **.avz** over FTP. If size is omitted, the default RAM disk size is used to create /streamd0. The size of /streamd0 is limited to (available contiguous RAM – minimum target contiguous RAM) / 2.

- User FTPs the job to /streamd0

- **JOBLOAD: -mem -r**

Loads **.avz** from /streamd0 into RAM, deletes the RAMDisk /streamd0, and optionally starts the job (if **-r** is specified).

**JOBINFO {[-slot=*n*] [-v]}**

Gets job summary or info about slot *n*.

**JOBINFO** with no arguments returns a list of all jobs on the device.

**-v** = Verbose *n*. This option shows the amount of space that would be freed if the job were deleted. It also lists the total disk space and free disk space.

**JOBLOAD {[-slot=<*n*>|-mem] [-r]}**

Loads a job from slot *n* or from memory when used with the JOBDOWNLOAD command via FTP.

**-r** = Start inspections.

**JOBSAVE [-slot=<*n*>]**

Saves current job to slot *n*.

**MEMAVAIL [-cp]**

Returns available memory for device or coprocessor.

**MEMCONTIG [-cp]**

Returns maximum memory block for device or coprocessor.

## **MEMFRAGS [-cp]**

Returns memory fragments for device or coprocessor.

**Important:** MEMFRAGS is not supported by the HAWK MV-4000. It will return **!ERROR**.

## **MEMINFO [-cp] [-v]**

Returns memory summary “avail/contig/frags” for device or coprocessor. Verbose.

## **OFFLINE**

Stops all inspections.

## **ONLINE**

Starts all inspections.

## **ONLINE? [-insp=n]**

Queries if each inspection on the camera is online. Defaults to all inspections if no inspection is specified. If the camera is running in a multi-inspection job, this command will return **!1** if all inspections are online and **!0** otherwise.

**-insp=n** specifies the inspection to query if it is online.

## **QUERYAUTOCAL**

Returns photometry settings: Gain, Exposure, and Focus.

## **QUERYFOCUSUNITS**

Queries the units being used for autofocus, mm (0) or inches (1).

## **QUERYWHITEBAL**

Returns white balance settings: RED gain, BLUE gain, and GREEN gain.

## **QUICKFOCUS [x] [y]**

Performs an autofocus by analyzing the area around the point specified by **x** and **y**.

The response is in the format of the camera’s current focus, min. allowable focus on the camera, max. allowable focus on the camera.

### **Example:**

Perform a quick focus on point (640,480) in the image.

**Command:** QUICKFOCUS 640 480

**Response:** 124;50;300 (Current focus is set to 124 mm with an allowable focus range of 50 – 300 mm on the current camera.)

**Important:** This command only functions when the camera is OFFLINE.

## READY? [-insp=n]

Queries if inspection is waiting for a trigger. **!1** if all inspections are ready or **!0** if not all inspections are ready.

**-insp=n** specifies the inspection to query if it is ready.

## REBOOT [-noload]

Reboots the device.

**-noload** = do not load BOOT job.

## RESTOREWBAL

Restores preset white balance parameters: RED gain, BLUE gain, and GREEN gain.

## SET <tagname> <value>

Sets value of a global tag.

The tagname must correspond to one of the supported tags within the device. Use the **INFO** command to get a full list of tags and services, as well as attributes of the tag and list of subtags.

The value can contain spaces.

The command is terminated by a carriage return and/or line feed character.

The value can be a list of comma-separated items to set a sequence of tags:

Send **SET int1 1, 2, 3** to set int1 = 1, int2 = 2, int3 = 3.

The AVP service allows setting of step and datum information from the job tree using forward slash '/' in the symbolic name path. **SET avp/insp1/snapshot1/acq1/gain 2.0** paths are not case-sensitive and do not need to be fully qualified if unique.

**SET avp/acq1/gain 2.0** will set the same gain value if there is only one acquire.

Control tags in the AVP service such as **START**, **STOP**, and **TRIGGER** act as momentary switches. **SET avp.start 1** is equivalent to the **ONLINE** command. **avp.start** will reset immediately and always read as **0**.

**Success Return:** On success will return **!OK** followed by an echo of the command.

For example:

**!OK SET matchstring1**

**Fail Return:** On failure will return **!ERROR** followed by the reason for the failure.

For example:

**!ERROR Tag matchstring66 not found**

## SETFOCUSUNITS

Sets units used for autofocus, **mm (0)** or **inches (1)**.

**Important:** The MicroHAWK MV-40 only supports mm so SETFOCUSUNITS will only accept **0** and anything else will respond with **!ERROR**.

## **TARGET {0|1|off|on}**

Turns targeting LEDs On or Off.

**target 1** = Turn Target On

**target 0** = Turn Target Off

## **TRIGGER**

Triggers an inspection.

## **VERSION**

Returns Visionscape software version.

## **vt [n]**

Triggers an inspection by pulsing a Virtual I/O point.

For example: **vt 1**

will return pulse **VIO1**. The inspection will run if it is configured to use **VIO 1** as a trigger.

If specified, the VIO index must be in the allowed range for Virtual I/O points within Visionscape. The virtual I/O line will be set high then low.

If VIO Index is not specified, VIO1 is assumed.

**Fail Return:** Return **!ERROR** followed by the reason for the failure.

For example: **!ERROR No such trigger** when the index specified 'n' is out of range of virtual triggers.

## **WHITEBAL**

Performs automatic calibration of white balance settings: RED gain, BLUE gain, and GREEN gain.

**Important:** This command only functions when the camera is OFFLINE.

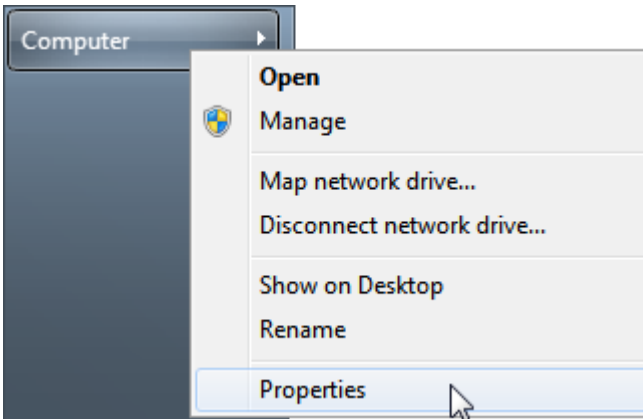
# USB Power Management (MV-20 and MV-30)

When your PC enters “sleep mode”, the USB ports may shut down and the camera may be disconnected. This section describes how to keep your PC’s USB ports active if the PC enters sleep mode or other low-power modes.

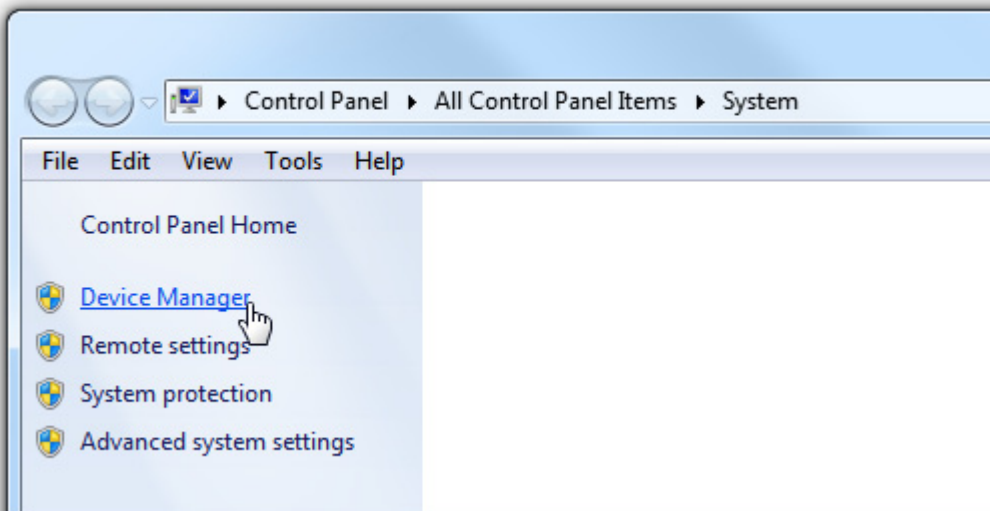
## USB Root Hub Power Management

Perform the following procedure to ensure that your PC does not shut down the USB connection to your MicroHAWK MV-20, MV-30, or MV-40.

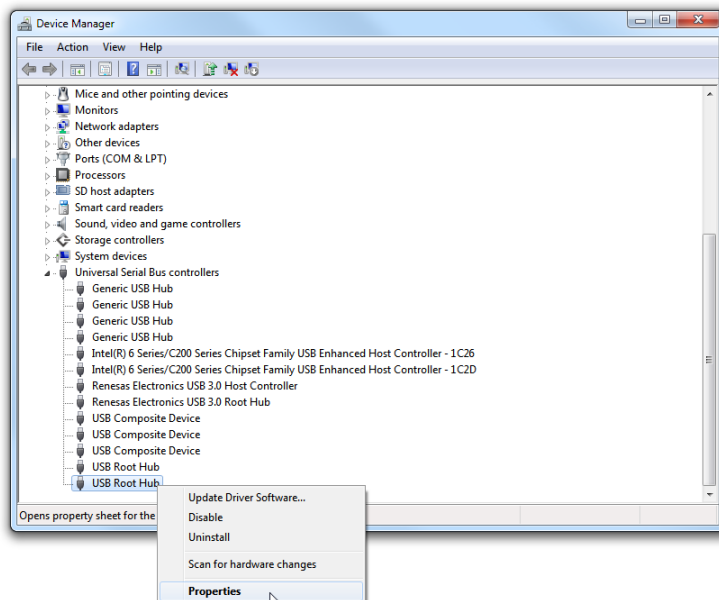
1. From the Windows **Start** menu, right-click on **Computer** and select **Properties**.



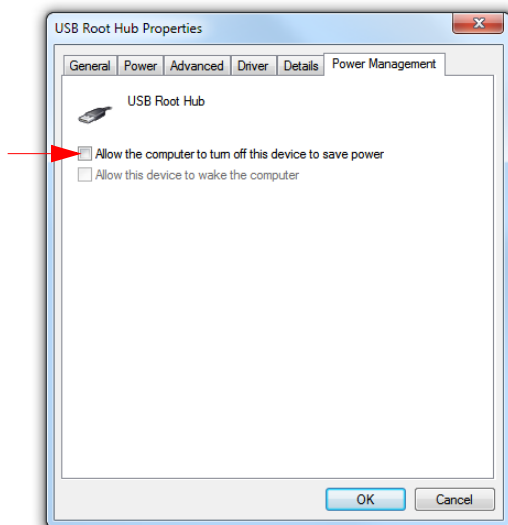
2. Select **Device Manager** from the options at the left side of the screen.



3. In the Device Manager, locate and expand the **Universal Serial Bus controllers** item. Right-click on **USB Root Hub** and select **Properties**.



4. In the **USB Root Hub Properties** dialog, select the **Power Management** tab. Un-check the box next to **Allow the computer to turn off this device to save power**. Repeat steps 3 and 4 for each **USB Root Hub** item in the **Universal Serial Bus controllers** list.







# TCP/UDP and General Port Usage

This section lists the ports used by MicroHAWK Smart Cameras for communication.

## MicroHAWK Ports

---

The following table lists the ports used by MicroHAWK Smart Cameras for communication.

Port Number	Protocol	Name
49059	TCP	RPC
49049	TCP	I/O
49050	TCP	PIC/LIVE
49200	TCP	REPORT
49202	TCP	REPORTCONTROL
49201	TCP	PARTQ
49079	TCP	KEEPALIVE
49211	TCP	Serial TCP#1
49212	TCP	Serial TCP#2
49213	TCP	Serial TCP#3
49214	TCP	Serial TCP#4
49497	UDP	UDP BROADCAST
49496	UDP	UDP COMMAND
21	TCP	FTP
23	TCP	TELNET
80	TCP	HTTP