

MANUAL

Industrial Box Thin Client BTC01



With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

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1 Safety

1.1 Introduction

1.1.1 Content of this Document

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal



Note!

This document does not substitute the instruction manual.



Note!

For full information on the product, refer to the instruction manual and further documentation on the Internet at www.pepperl-fuchs.com.

The documentation consists of the following parts:

- Present document
- Instruction manual
- Datasheet

Additionally, the following parts may belong to the documentation, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Additional documents

1.1.2 Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

1.1.3 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:



Danger!

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.



Warning!

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.



Caution!

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

Informative Symbols



Note!

This symbol brings important information to your attention.



Action

This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

1.2 Warnings and Cautions

Depending on the device marking, this device is suitable for use in Class I/Div 2, Groups A, B, C and D, or non-hazardous locations only. Consult local electrical codes for hazardous location installation guidelines.

Special Conditions of Use for Hazardous Locations

- Mount device in a suitable enclosure providing a minimum degree of protection of NEMA 4x or IP54, which only allows access by using a tool.
- Supply the device with a power supply that meets the requirements for safety extra-low protective voltage (SELV) or protective extra-low voltage (PELV).
- Do not connect or disconnect the external connections of the I/O in the presence of an explosive atmosphere.
- The total current draw on all USB connections combined must not exceed 1 A.



2 Product Description

2.1 Application

BTC01 is a rugged, industrial-grade box thin client. With a fanless design, this box thin client is specially designed to withstand extended temperatures, as well as shock and vibration resistant per IEC 60068.

It is a small-footprint, stand-alone computer with an Intel Bay Trail series quad-core Celeron processor and optional PCI-E graphics card, to allow connection of up to four desktop monitors. The housing consists of an aluminum extruded body for the top and sides, and a powder-coated aluminum base.

Overall, the BTC01 is ideal for monitoring and control applications in factory and process automation. Its high quality workmanship ensures reliable operation under harsh environmental conditions.



Warning!

The Industrial Box Thin Client BTC01 is a self contained unit with no customer accessible parts.



Warning!

Warranty

The BIOS may not be accessed. Any tampering with BIOS is at your own liability, and is not covered under warranty for repairs.



Warning!

Radio Interference

This device is compliant to class A industrial limits and is intended for use in industrial settings. In a domestic environment this product may casue radio interference in which the user may be required to take adequate additional measures.

2.2 RM Shell

RM Shell 4.x or 5.x is the operating system software that runs on the BTC01 industrial box thin client.

VisuNet RM Shell (RM Shell) embedded operating system enables users to easily access applications that run on a host system (e.g., workstation PC or server) via Ethernet.

RM Shell 4.0 supports common remote protocol, such as RDP 8.0 or VNC.

RM Shell 5 is based on Windows® 10 IoT Enterprise LTSC—an embedded version of Windows® with long-term support that is compatible with the latest versions of common remote protocols such as RDP 10, Citrix Receiver, and VNC.

With these protocols, the BTC01 and other VisuNet Remote Monitors can be easily integrated into all major process control systems, whether they are virtualized or conventional, workstation-based setups.

Also installed is a hardware driver for ELO touch screen controller. When connecting a third party ELO touch screen, connection must be done via USB. The ELO touch driver supports most ELO touch devices. Please contact Pepperl+Fuchs to ensure compatibility.

For more information on using RM Shell 4.x or 5.x, refer to the VisuNet RM Shell manual.



Note!

Visit www.pepperl-fuchs.com regularly to check on the latest version of RM Shell.

2.3 ACP ThinManager Ready

As an alternative to the VisuNet RM Shell 4.x or 5.x, the BTC01 can also be order as ThinManager "Ready", by having a customized PCI expansion ROM installed in the BIOS. When this feature is ordered, the ThinManager server installs the running OS onto the BTC01 over the LAN connection.

ThinManager is a software created by ACP. The software allows centralized management of thin client architecture, allowing ThinManager Ready thin clients to be configured in a central location instead of individually at each client.

The ThinManager shows the following information:

- thin clients are operating
- terminal servers the clients are assigned to
- thin clients log-in information
- applications run by the thin clients

ThinManager partners with certain thin client manufacturers like Pepperl+Fuchs to flash the BIOS of their hardware to ensure it automatically boots into the ThinManager environment. These are referred to as ThinManager-Ready devices. In this configuration, you can seamlessly connect to the ThinManager infrastructure without any IT set-up.

The BTC01 can only support dual video out when used as a ThinManager Ready device. Quad video is not supported.

ACP ThinManager supports a variety of third party touch screens. Please contact ACP to verify compatibility.

2.4 Technical Data

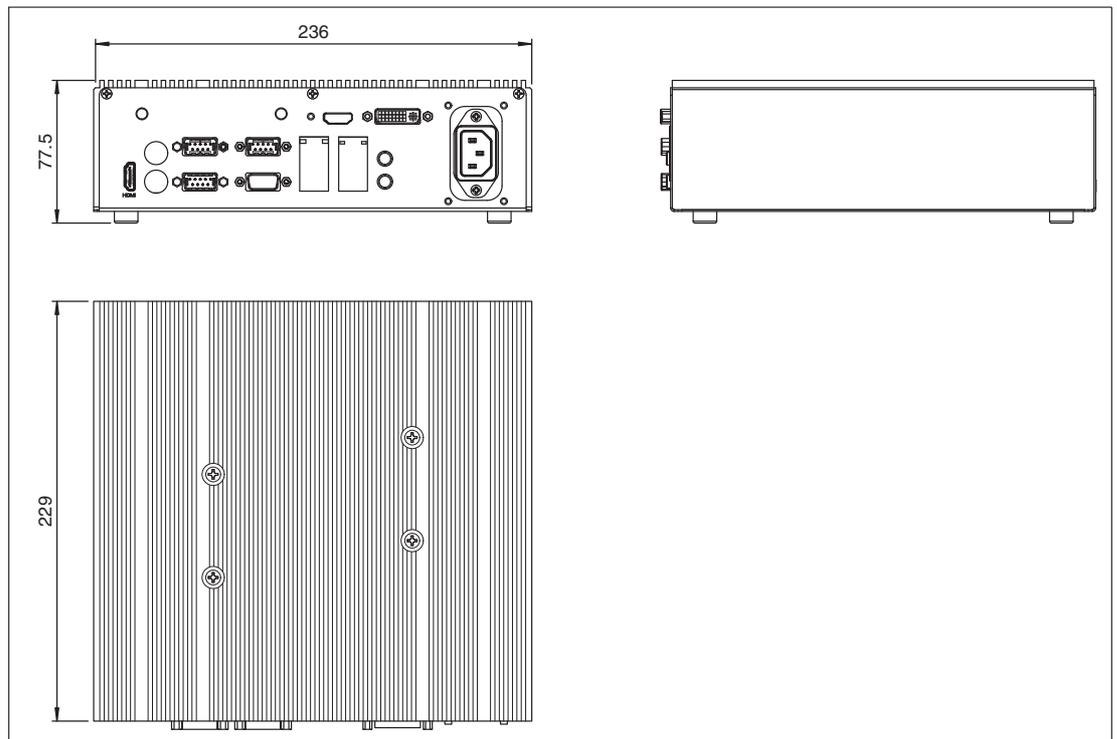


Figure 2.1 Dimensions BTC01

Hardware	
Processor	Celeron J1900 Graphics controller: Intel® Gen7 Graphics DX 11*, OGL3.2 GPU (expansion): NVIDIA GeForce GT 730 (2 GB memory)
RAM	4 GB DDR3L
Mass storage	32 GB mSATA

Supply	
Power supply	100 ... 240 V AC, 50 ... 60 Hz, 40 W max. 12 V DC, 4.0 A or 18 ... 30 V DC, 2.6 ... 1.6 A
Power ON	AT/ATX Supported AT: Directly PWR on as operating voltage ready ATX: Press Button to PWR on after operating voltage ready

Interface	
Interface type	USB: Front: 2 x USB 2.0, rear: 2 x USB 2.0, 2 x USB 3.0 LAN: 2 x RJ45 (Gigabit Ethernet) Serial: 3 x RS232 Video (standard): 1 x HDMI (up to WUXGA, 1920 x 1200), 1 x VGA (up to WUXGA, 1920 x 1200) Video (option): 1 x HDMI (up to 3840 x 2160 @ 30Hz); 1 x DVI-D (up to WQXGA, 2560 x 1600) Audio: 1 x mic in, 1 x line out

Directive conformity	
Electromagnetic compatibility	
Directive 2014/30/EU	EN 61326-1
Low voltage	
Directive 2014/35/EU	EN 60950-1

Software	
Operating system	Windows® 10 IoT Enterprise x64 (VisuNet RM Shell 5.x) Windows® Embedded Standard (VisuNet RM Shell 4.x)

Ambient conditions	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-20 ... 70 °C (-4 ... 158 °F)
Relative humidity	0 ... 95% non-condensing
Shock resistance	operating: 20 g , 11 ms all axis, IEC 60068-2-27
Vibration resistance	operating: 2 g rms , 5 ... 500 Hz , IEC 60068-2-6

Mechanical specifications	
Degree of protection	IP41 (with I/O covers or cables plugged in)
Mass	3.5 kg
Dimensions	229 mm x 236 mm x 77.5 mm

International approvals

UL approval	Hazardous locations: UL Listing E190294; Class I, Div 2, Groups A, B, C, D (18 ... 30 V DC version only) Ordinary locations: UL Listing E185778 (all DC versions)
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2.5

Accessories

Mounting Kits

Accessories	Designation
Boxed Thin Client wall mount kit	BTC-Wallmount-Kit-1

Video Adaptors

Accessories	Designation
Video Adaptor; DVI-D male to VGA female	ADP-V-DVIM-VGAF
Video Adaptor; HDMI male to VGA female	ADP-V-HDMIM-VGAF
Video Adaptor; HDMI male to DVI-D female	ADP-V-HDMIM-DVIF
Video Adaptor; DVI-D male to HDMI female	ADP-V-DVIM-HDMIF

Connection Cables AC Power

Accessories	Designation
AC power cord; IEC320-C13 to US/Japan	S-BN-12/1500-US/JP2
AC power cord; IEC320-C13 to European	S-BN-12/1500-EU2
AC power cord; IEC320-C13 to United Kingdom	S-BN-12/1500-UK2
AC power cord; IEC320-C13 to Australian	S-BN-12/1500-AU2



Note!

All units ship with US/Japan AC power cord. For other regions, power cords must be ordered separately

Connection Cables 12 V DC Power

Accessories	Designation
AC power cord; IEC320-C8 to US/Japan	S-BN-24/1500-US/JP1
AC power cord; IEC320-C8 to European	S-BN-24/1500-EU1
AC power cord; IEC320-C8 to United Kingdom	S-BN-24/1500-UK1
AC power cord; IEC320-C8 to Australian	S-BN-24/1500-AU1



Note!

All units ship with US/Japan AC power cord. For other regions, power cords must be ordered separately

12 V DC Power Supply

PG12-BTC1	
Input	80 ... 264 V _{AC}
Output	12 V _{DC}
Power	60 Watts



PG12-BTC1	
Efficiency	88 %
Operating Temperature	-30 ... 60 °C
Storage Temperature	-40 ... 85 °C
Humidity	20% ... 95% RH Non-condensing
Dimensions	125 x 50 x 31.5 mm



3 Installation

3.1 Mounting



Warning!

Install the device in accordance with the instructions by competent personnel. Observe national laws and regulations.

Attaching Brackets to the Steel Base

There are two brackets that you attach to the steel base so that you can mount the unit on the wall. The unit must be mounted so that the heat fins are vertical to allow for proper convection cooling.



Warning!

Hot surface

The surface of the unit can be hot when system is in use.



Attaching Brackets

1. Remove the feet ① from the steel base.

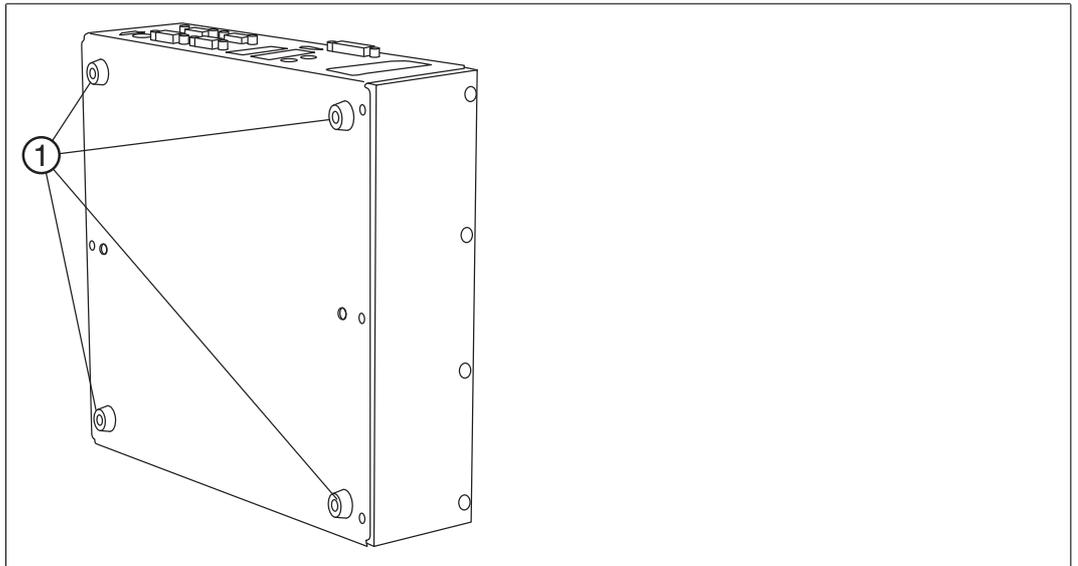


Figure 3.1

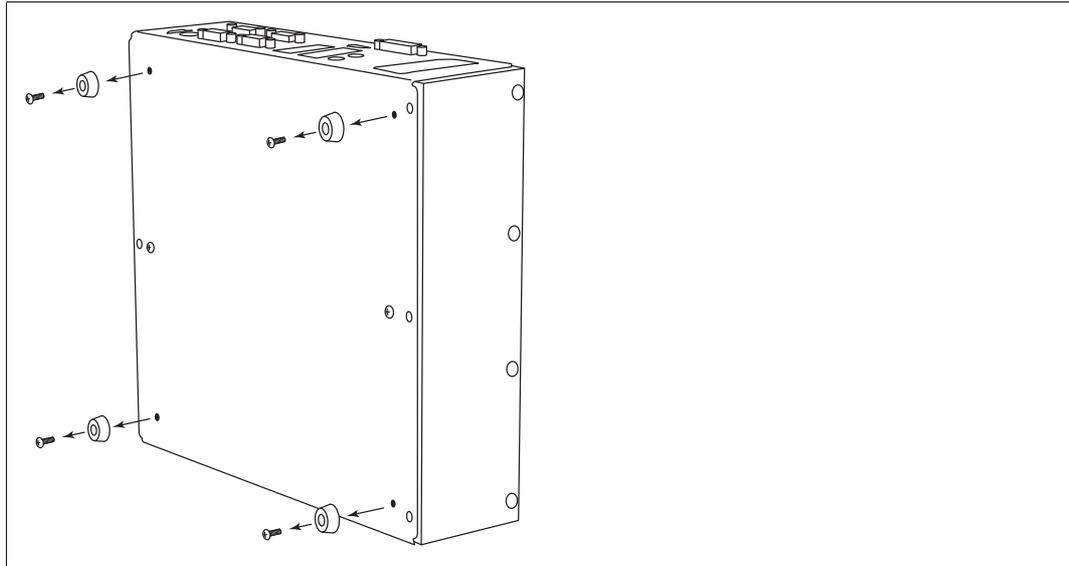
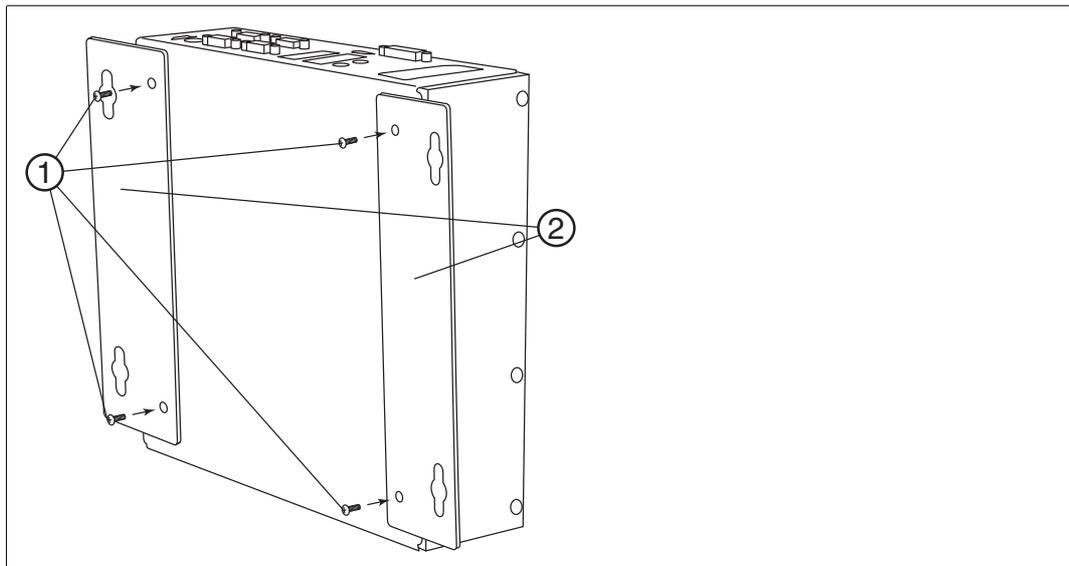


Figure 3.2

2. Use the screws ① from the feet to attach the brackets ② to the steel base as shown below.



3. Use appropriate mounting screws with a diameter of 5 mm (not included) and the following mounting diagram to mount the unit to a wall.

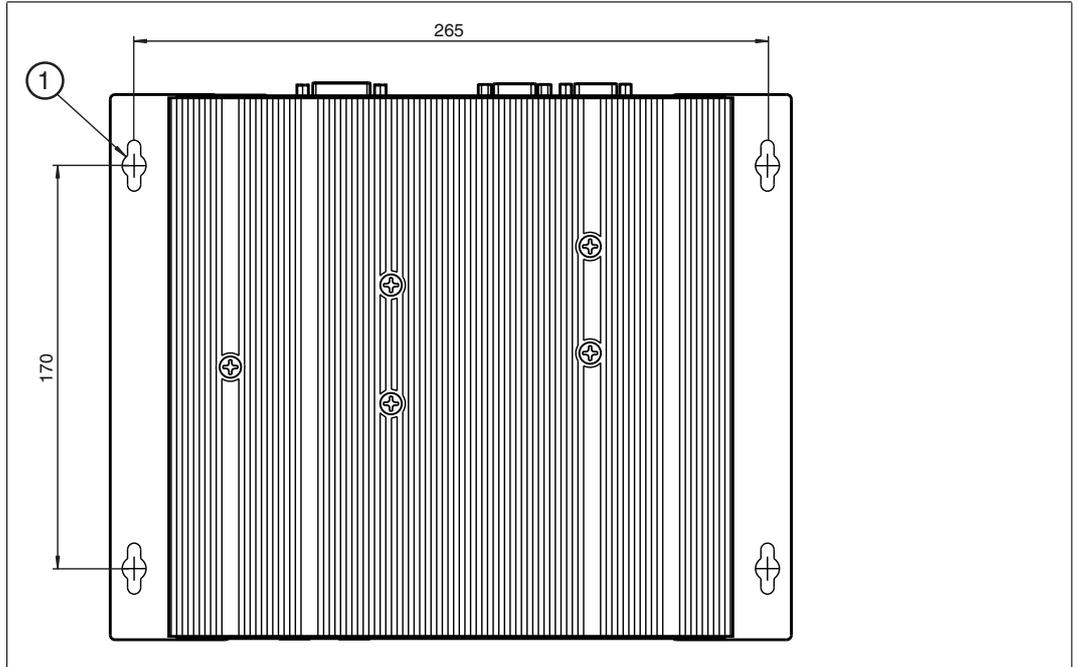


Figure 3.3 ① - for mounting screws \varnothing 5 mm

3.2 Electrical Connection

There are three different connection options depending on the ordered device type.

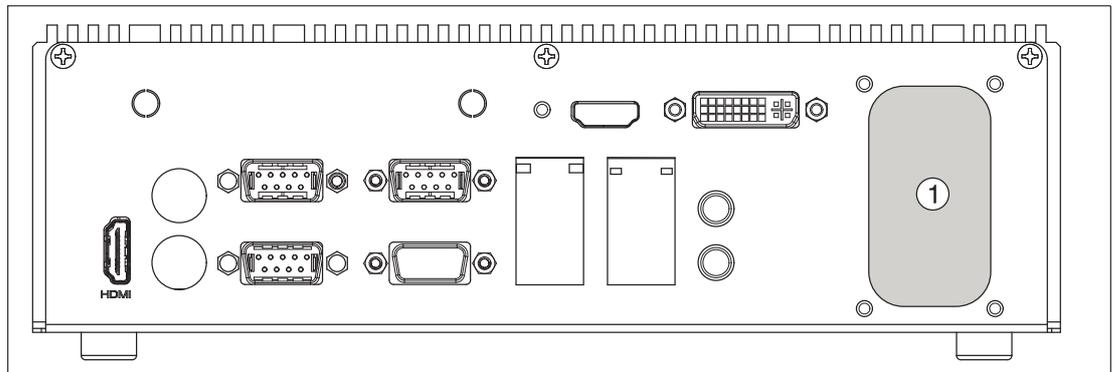


Figure 3.4 ① - Electrical connection depending on device type

AC

For AC power, you insert a plug into the back of the unit. AC power utilizes connector type C14. See Figure below.



Warning!

Do not connect or disconnect the electrical connection of the device in the presence of a potentially explosive atmosphere.



Warning!

The connector on the back of the unit is an IEC320-C14 receptacle and requires a mating of an IEC320-C13.

The intended installation location is an overvoltage category II. The Industrial Box Thin Client BTC01 comes with an AC power cable that is intended for US type outlet. Other power cables for other global regions are available as accessories. See chapter 2.5.

Any cable used has to fulfill the following specifications:

- The cable needs to be rated for at least 60° C.
- The cable has to be double insulated.
- The cable has to have an individual wire size of at least 18 AWG (0.75 mm²).
- The cable has to have a ground conductor with the same size as the other 2 conductors.
- The cable must be rated for 10 A for the AC version.
- The cable has to be connected to a type TN power system, protected by a maximum 20 A breaker or fuse.
- The socket outlet should be close to the equipment and easily accessible.



Figure 3.5 C14 receptacle
1 & 3 = AC power
2 = ground

DC 12 V

For 12 V_{DC} power, you insert a power jack into the back of the unit. The connector on the back of the unit is a 5.5 mm barrel jack. The polarity of the plug is center positive. For this option, an AC power adapter with 5.5 mm barrel jack is supplied.



Warning!

The 12 V_{DC} power has to be provided from a rated supply of -20° C to 60° C, and has to provide a SELV output according to IEC60950-1. This supply has to be powered from an OVC II source.



Figure 3.6 12 V_{DC} barrel jack

DC 18 ... 30 V

For 18 V_{DC} ... 30 V_{DC} power (including 24 V_{DC}), a terminal block DFK-MC 1,5/ 3-GF-3,81 BK (Phoenix Contact) is attached to the back of the unit. A matching connector MC 1,5/ 3-STF-3,81 BK (Phoenix Contact) to attach the customers wiring is included. The range of wire size for this setup is 14 AWG ... 18 AWG. The recommended tightening torque is 0.24 Nm (2 in-lbs).



Warning!

The 18 V_{DC} ... 30 V_{DC} power has to provide a SELV output according to IEC60950-1. This supply has to be powered from an OVC II source.

The pinout for the power connection is as follows.

- Position 1: +V_{DC}
- Position 2: -V_{DC}
- Position 3: Ground



Figure 3.7 18 V_{DC} ... 30 V_{DC} terminal I/O plate

3.3

I/O Connection

Front

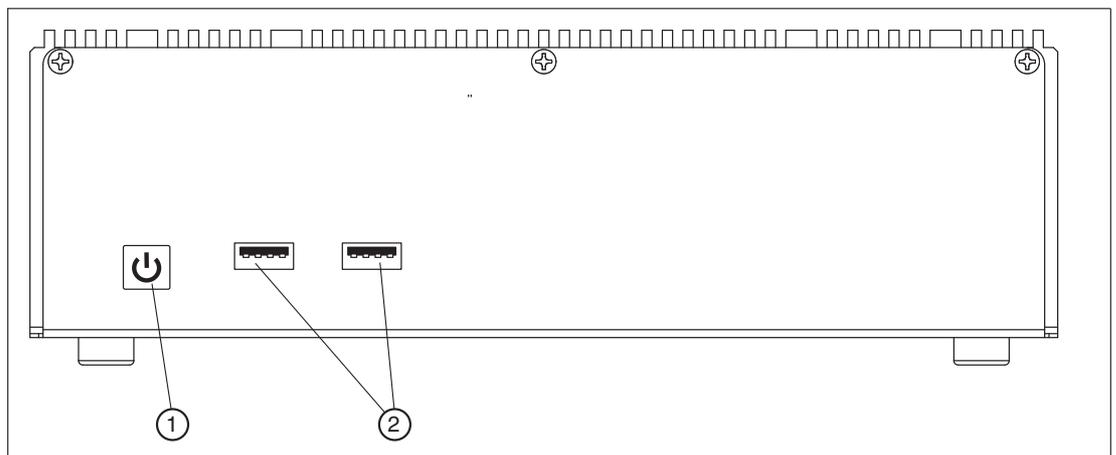


Figure 3.8 BTC01 Industrial Box Thin Client I/O Connection Ports, Front

- 1 Power Switch
- 2 USB 2.0 Ports

Back

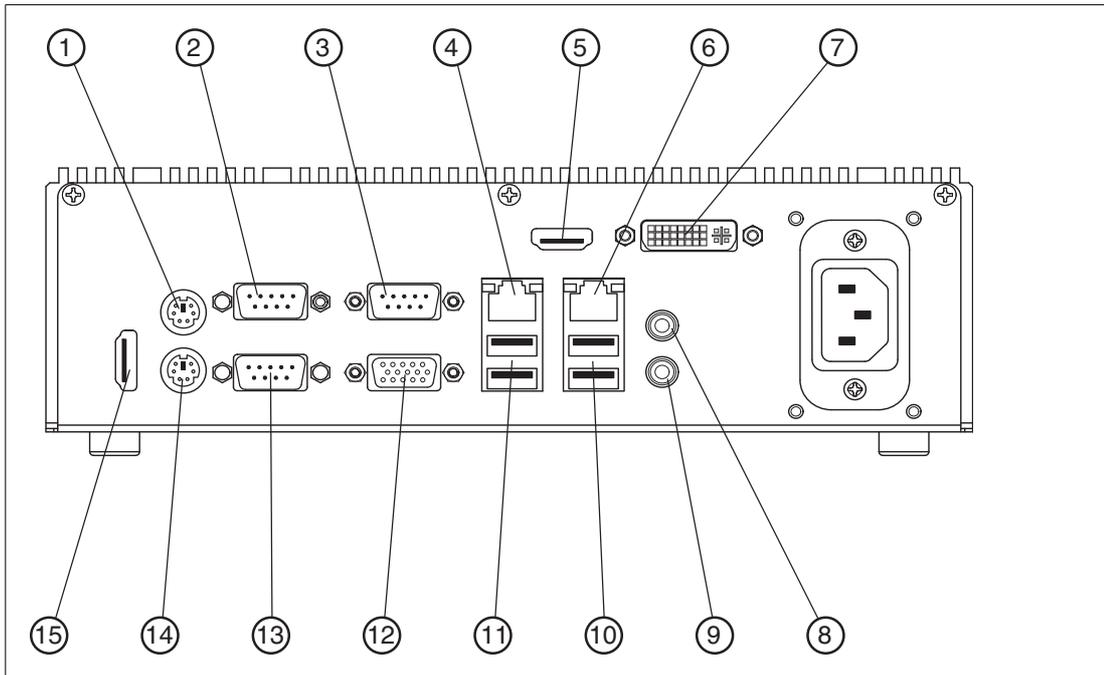


Figure 3.9 BTC01 Industrial Box Thin Client I/O Connection Ports, Back

- 1 PS/2 Mouse Port
- 2 COM Port 1 (COM1)
- 3 COM Port 3 (COM3)
- 4 LAN RJ-45 Port
- 5 HDMI Port (HDMI2)
- 6 LAN RJ-45 Port
- 7 DVI-D Port
- 8 Line out (green)
- 9 Microphone (pink)
- 10 USB 3.0 Ports (USB3_0_1)
- 11 USB 2.0 Ports (USB_0_1)
- 12 VGA Port (VGA1)
- 13 COM Port 2 (COM2)
- 14 PS/2 Keyboard Port
- 15 HDMI Port (HDMI1)

PS/2 Port



Figure 3.10

Pin	PS/2
1	Keyboard data
2	Not used
3	Ground
4	+5 Volt
5	Clock
6	Not used

RS-232 Port



Figure 3.11

Pin	RS-232
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	COM1: +5V/+12V/+5VSB COM2, 3: +5V/+12V



Note!

Use the cable retention bracket (3) to mount the connectors to the COM ports securely. See chapter 3.3.1.

RJ45 Port



Figure 3.12 There are two LEDs next to the LAN port. The green LED ① is the Act/Link LED. The yellow LED ② is the Speed LED. Please refer to the table "LED display" below for the LAN port LED indications.

Pin	RJ45
1	Tranceive data+
2	Tranceive data-
3	Receive data+
4	Bidirectional data+
5	Bidirectional data-
6	Receive data-
7	Bidirectional data+
8	Bidirectional data

LED display

Status	LED green	LED Yellow
Off	No Link	10 Mb/s connection
Blinking	Data Activity	100 Mb/s connection
On	Link	1 Gb/s connection

HDMI Port



Figure 3.13

Pin	RJ45
1	TMDS data 2 +
2	TMDS data 2 shield
3	TMDS data 2 -
4	TMDS data 1 +
5	TMDS data 1 shield
6	TMDS data 1 -
7	TMDS data 0 +
8	TMDS data 0 shield

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Pin	RJ45
9	TMDS data 0 -
10	TMDS clock +
11	TMDS clock shield
12	TMDS clock -
13	CEC
14	Reserved
15	SCL
16	SDA
17	DDC/CEC ground
18	+5 V power
19	Hot plug detect

DVI-D Port



Figure 3.14

Pin	DVI-D
1	TMDS data 2 -
2	TMDS data 2 +
3	TMDS data 2/4 shield
4	TMDS data 4 -
5	TMDS data 4 +
6	DDC clock (SCL)
7	DDC data (SDA)
8	Not used
9	TMDS data 1 -
10	TMDS data 1 +
11	TMDS data 1/3 shield
12	TMDS data 3 -
13	TMDS data 3 +
14	+5 VDC
15	Ground
16	Hot plug detect
17	TMDS data 0 -
18	TMDS data 0 +
19	TMDS data 0/5 shield
20	TMDS data 5 -
21	TMDS data 5 +
22	TMDS clock shield
23	TMDS clock +
24	TMDS clock -



USB Port



Figure 3.15

Pin	USB
1	+5 Volt
2	Data -
3	Data +
4	Ground

VGA Port

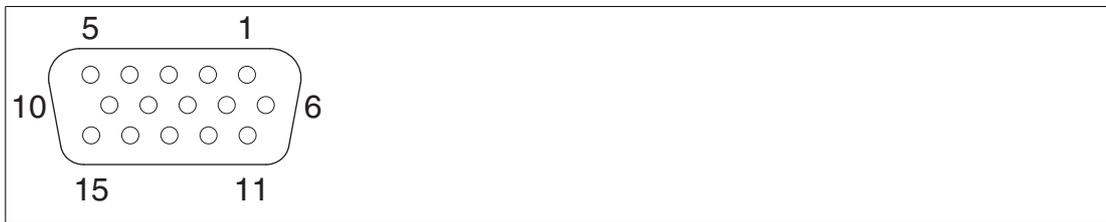


Figure 3.16

Pin	VGA
1	Red video
2	Green video
3	Blue video
4	Reserved
5	Ground
6	Red ground
7	Green ground
8	Blue ground
9	Not connected
10	Ground
11	ID0 (ground)
12	ID1 (no connect)
13	Horizontal sync
14	Vertical sync
15	Not connected

3.3.1 Use of PS/2 Ports in Hazardous Locations



Mounting the Cable Retention Bracket



Warning!

All connectors with screw terminals must be appropriately fastened.

The device is equipped with PS/2 ports. In order to use these ports, a cable retention bracket (3) must be installed to hold the connectors securely in place.

1. Remove the mounting screws (2) of the COM ports (1).
2. Place the cable retention bracket (3) between the COM ports (1) by aligning the four threaded holes.
3. Put the mounting screws (2) back into place and torque them to 4 inch-lbs (0.45 Nm) in a crisscross pattern.

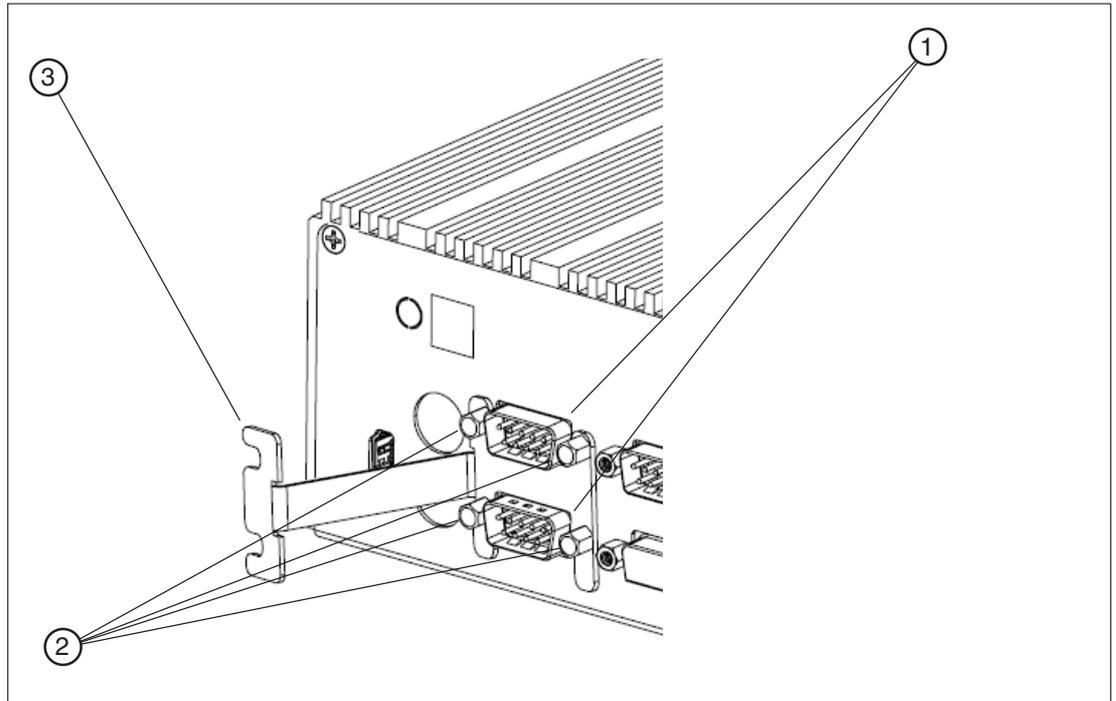


Figure 3.17

- 1 COM ports
- 2 Mounting screws
- 3 Cable retention bracket



4 Commissioning

4.1 Video Card Option

The BTC01 industrial box thin client comes with the 2 video outputs VGA and HDMI as a standard feature. You have the option to have 2 additional video outputs HDMI and DVI, to allow a total connection of four displays.

Video Card Specifications

The following specifications are for the standard option.

- VGA supports maximum resolution 1920 x 1200 pixel
- HDMI maximum resolution 1920 x 1200 pixel

The following specifications are for the video expansion card option.

- DVI-D maximum resolution: 2560 x 1600 pixel @ 120 Hz
- HDMI maximum resolution: 3840 x 2160 pixel @ 30 Hz

4.2 Power Mode Options

The Industrial Box Thin Client BTC01 is available with two different power mode options, AT and ATX. With the AT power mode, the industrial box thin client automatically starts up when connection is made to the power main. With ATX power mode, you must press the power button to start the computer after plugging in to the power main.



Note!

As the user is not allowed to access the internal hardware of the BTC01 for proper power mode configuration, it is important that the proper model is selected.

4.3 Multiple Display Setup

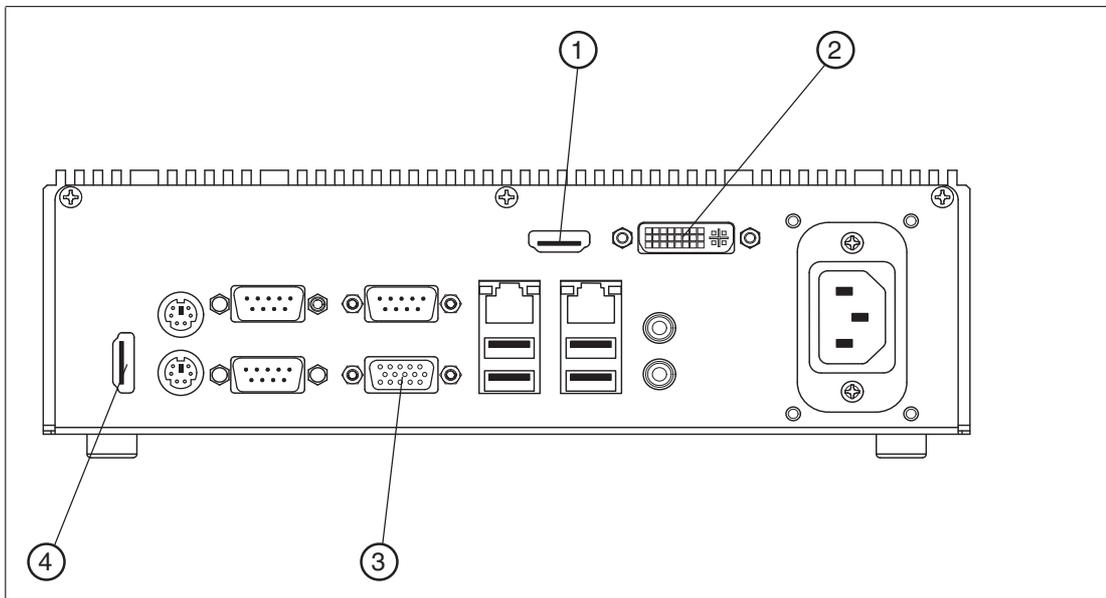


Figure 4.1

Display ports

1. Optional Third Display - HDMI2
2. Optional Fourth Display - DVI-D
3. Secondary Display - VGA
4. Primary Display - HDMI1



Connecting Multiple Displays

Depending on the number of displays you have, plug the Displays into the display input ports following the correct numerical order.

1. Plug in the first display into the primary display input port HDMI1
2. Plug in the second display into the secondary display input port VGA
3. Plug in the optional third display into the third display input port HDMI2
4. Plug in the optional fourth display into the fourth display input port DVI-D



Note!

If you don't have an HDMI-enabled display, connect your display to the secondary display input port VGA.

Note that the available optional display input ports 3 - HDMI and 4 DVI-D have to be connected last.



Configuring Multiple Displays

1. In the RM Shell, log in as the Administrator user using the Switch User dialog.

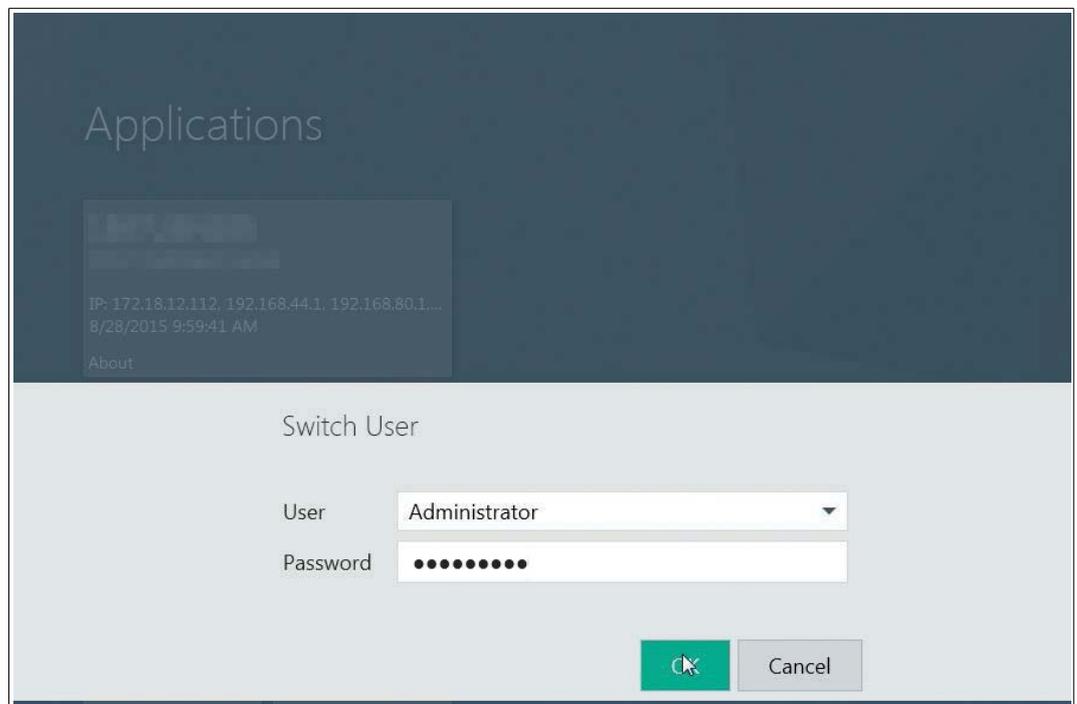


Figure 4.2



2. Select the System Settings application.

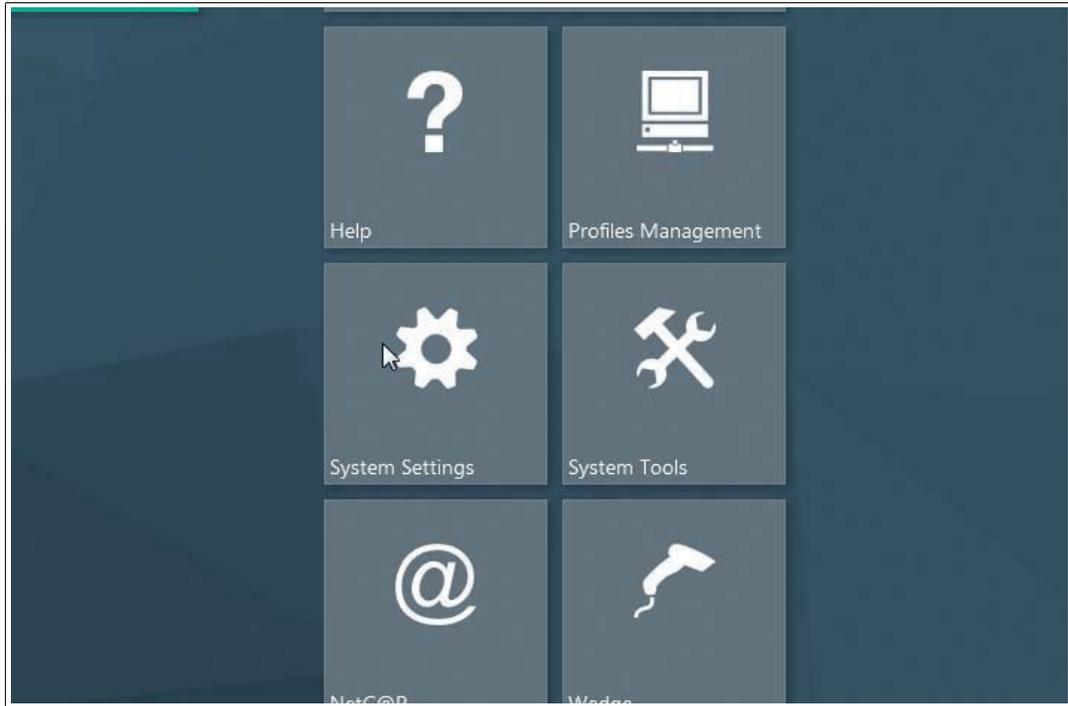


Figure 4.3

3. Open the Display tab.

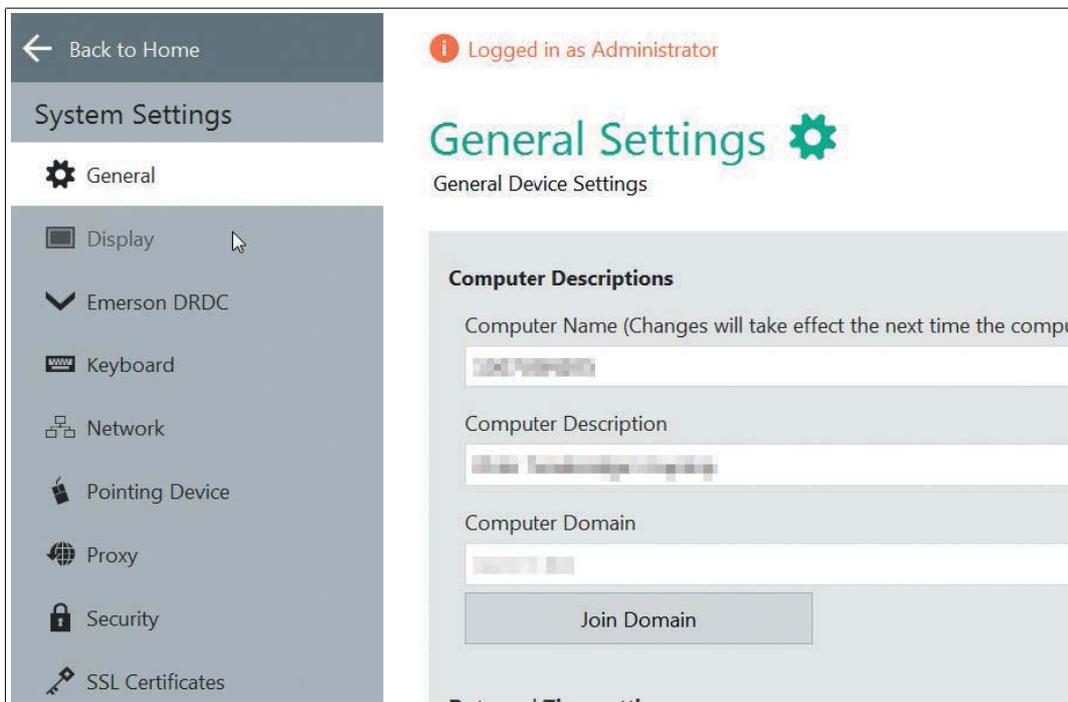


Figure 4.4



- Click the Advanced button. This will open the Windows Screen Resolution dialog.

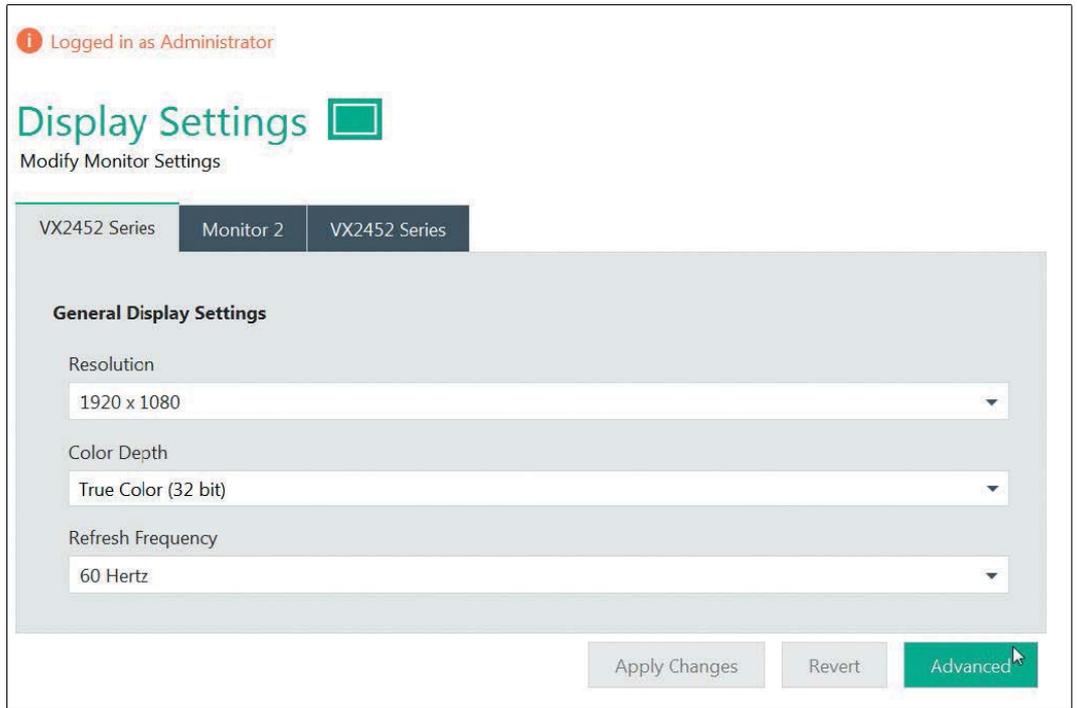


Figure 4.5

- Use the Screen Resolution dialog to reposition the displays to match your current setup. This screen allows you to see your monitor layout and rearrange it by dragging and dropping the blue boxes. This dialog can also be used to set the resolution and orientation of each display.

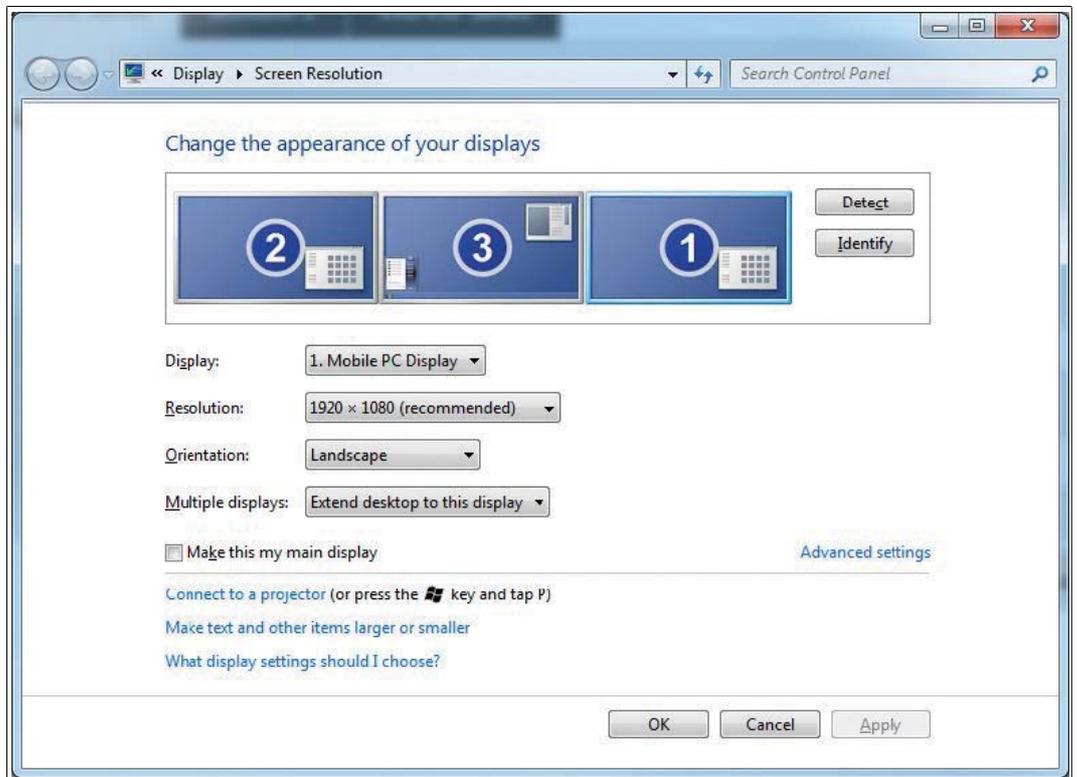


Figure 4.6



6. Set the main display by selecting it and then checking the setting “Make this my main display”.

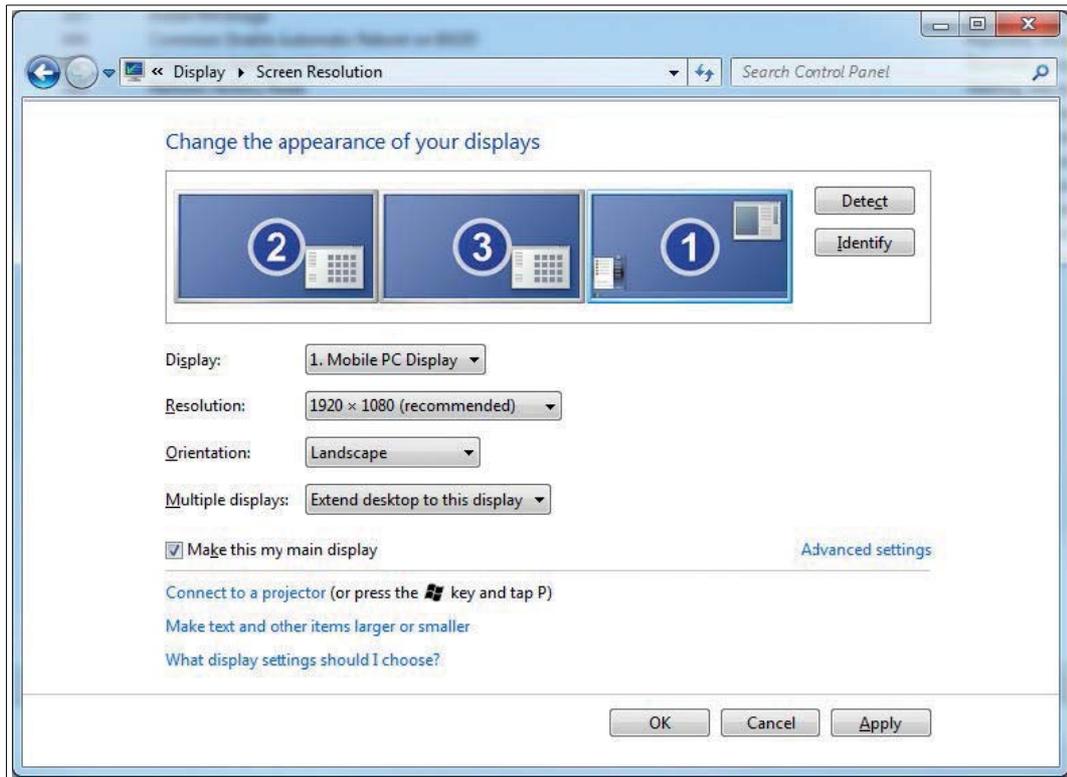


Figure 4.7

7. Click OK to save any changes and follow any resulting prompts.



PROCESS AUTOMATION – PROTECTING YOUR PROCESS



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