

Thin Clients



HP Dual Monitor Thin Client



HP Quad Monitor Thin Client

The HP® thin clients can be used in traditional and virtualized I/A Series systems.

FEATURES

The HP® thin clients:

- ▶ Serve as a human to machine interface (HMI) station for remote connections to remote servers running Microsoft® Remote Desktop Services (formally known as Terminal Services).
- ▶ Are supported for systems at:
 - I/A Series software v8.8 and later
 - FCS 4.0 and later.
- ▶ Can establish connections to:
 - A Model H90 or H91 server running Microsoft® Windows Server® 2008 R2 Standard operating system.
 - A virtual machine running on an I/A Series V90 server virtualization host.
- ▶ Can be configured for connections to a specific remote server or multiple remote servers simultaneously.
- ▶ Support the following:
 - Up to four monitors
 - Touchscreen monitors
 - A local USB color printer.
- ▶ Are designed to be mounted locally to their user.
- ▶ Communicate with the I/A Series system through an off-Mesh network called the DCS Auxiliary Communications Network (ACN).

OVERVIEW

Thin clients are physical hardware terminals with a compact form factor which are capable of operating software via a remote connection to a remote server through the use of Microsoft Remote Desktop Services (formally known as Terminal Services). Invensys has qualified two versions of HP® thin clients for use with the I/A Series system.

Thin client versions available:

- ▶ HP Dual Monitor Thin Client (P0928FY) - with support for up to two monitors via one DisplayPort 1.1a video port plus one DVI-I video port
- ▶ HP Quad Monitor Thin Client (P0928FZ) - with support for up to four monitors via one DisplayPort 1.1a video port plus three DVI-I video ports

Thin clients support a mouse, an optional trackball (purchased separately), an alphanumeric keyboard, 23-inch flat panel LCD monitor (purchased separately), an optional USB touchscreen (purchased separately with the monitor), an optional USB printer (purchased separately) and an optional USB speaker set (purchased separately). Additionally, thin clients support an external USB DVD drive (purchased separately) which is required for installing the thin client image.

NOTE

The thin clients do not support the serial/GCIO annunciator keyboard. Currently, the thin clients also do not support the USB annunciator keyboard. However thin clients do support the use of FoxPanels which can be used as an alternative to an annunciator keyboard.

Thin clients can be used to operate I/A Series software or Foxboro Control Software (FCS), as well as third-party software or user-written applications. Supported thin client use cases include connections to two different types of remote servers:

- ▶ A Model H90 or H91 server running Microsoft Windows Server 2008 R2 Standard operating system.
- ▶ A virtual machine running on an I/A Series V90 server virtualization host.

Thin clients communicate with the I/A Series system through a DCS Auxiliary Communications Network (ACN) via a single 1 GB copper Ethernet. The DCS ACN is a 1 GB off-Mesh network comprised of managed Ethernet switches that must not share any of the same network hardware (switches) with The Mesh control network. Thin Clients are required to use the DCS ACN for communication to the I/A Series system in order to prevent visualization traffic from adversely affecting the control communication on The Mesh control network.

CONFIGURATIONS

Thin clients may be set-up in one of the following configurations:

- 1** A configuration in which a specific thin client is restricted to connect to one particular virtual machine, or one physical (supported) I/A Series server.
- 2** A configuration in which a specific thin client is connected automatically to only one particular virtual machine, or one physical (supported) I/A Series server when the thin client boots up.
- 3** A configuration in which a specific thin client has the option to connect to one of several different virtual machines, and/or physical (supported) I/A Series servers.

- 4 A configuration in which a specific thin client has the option to connect to multiple virtual machines and/or multiple physical (supported) I/A Series servers simultaneously.
- 5 A configuration in which a specific thin client is connected automatically to multiple virtual machines and/or multiple physical (supported) I/A Series servers simultaneously when the thin client boots up.

-sizing

A single remote server running Microsoft Remote Desktop Services can support up to twenty simultaneous remote sessions simultaneously. Therefore, if a thin client is only using one remote session, then a single remote server can support up to twenty thin clients.

However, there is a limit to the number of remote sessions that can be supported simultaneously by a V90 server virtualization host - though each individual virtual machine can support up to twenty simultaneous remote sessions, collectively the V90 server virtualization host cannot support more than 40 simultaneous remote sessions due to bandwidth constraints of the V90's physical Ethernet ports.

SECURITY

Thin clients can be configured to restrict connections to remote servers. Refer to "CONFIGURATIONS" on page 2 regarding which configurations are permitted. Once a thin client establishes a connection with a remote server, the remote server's remote sessions configuration determines what privileges to grant the user based on the user profile used to log into the remote server.

LICENSING

There are two types of licensing that apply when using thin clients with an I/A Series system:

- 1 I/A Series or FCS licensing
- 2 Microsoft licensing

I/A Series or FCS Licensing

- ▶ There is no specific I/A Series or FCS hardware license for thin clients.
- ▶ There is no specific I/A Series or FCS software license for thin clients.
- ▶ Existing I/A Series and FCS licensing still applies with regards to remote sessions. However, the license resides with the remote server NOT with the remote client.
 - For example, the I/A Series S10 license is required for any I/A Series server (physical machine or virtual machine). Within the S10 license, there is a selection for quantity of display managers being run on the I/A Series server. Since thin clients have the ability to access an I/A Series server and run one or more display managers, the S10 license for the remote server must include the correct quantity of display managers being used by thin clients.

Microsoft Licensing

- ▶ There are no additional Microsoft licenses required if a thin client is being used to access a remote server in a *one-to-one* relationship where there is only one single instance of the server being accessed at one time.
 - A *one-to-one* relationship is when the server is only able to be accessed via a user sitting at a thin client and using the thin client to invoke the server's desktop. In this situation, a user is not able to sit locally to the server to access it at the same time that it is being accessed by the thin client. If the user local to the server does choose to access the server, the thin client will no longer be able to access the remote server (i.e. the thin client client's monitor will indicate it is no longer connected to the remote server).
 - Please note that a single thin client can have multiple *one-to-one* relationships to different remote servers. For example, a single quad-head thin client could easily have four different *one-to-one* relationships with four different remote servers. In this example, it is likely that the thin client would display a different remote server on each of its four different monitors. However, a thin client is not limited to only four connections.
- ▶ There are additional Microsoft licenses required if a thin client is being used for connection to Microsoft Remote Desktop Services servers (formally known as Terminal Services sessions). These licenses are available in BuyAutomation in five license packs for both a "license per user" or "license per device" model.

Remote Desktop Services Client Access License (RDS CAL)

- ▶ Formally known as Terminal Services Client Access License (TS CAL)
- ▶ A RDS CAL is required for every remote session that connects to and displays applications running on a Remote Desktop Services server.
- ▶ I/A Series servers (V90, H90/P90, H91/P91) do not ship with any RDS CALs included.

Windows Server Client Access License (CAL)

- ▶ A CAL is required for every remote session that will be connection to a Remote Desktop Services server.
- ▶ A physical I/A Series server (H90/P90 or H91/P91) ships with five CALs included.
- ▶ An I/A Series V90 server virtualization host ships with a minimum of ten CALs included but may include more based on the particular V90 model code.

HP DUAL MONITOR SERIES THIN CLIENT

Base Configuration



The HP Dual Monitor Series Thin Client contains the following elements:

- ▶ AMD® processor
- ▶ One integrated DisplayPort 1.1a and one integrated DVI-I port - supports one or two monitors, digital only⁽¹⁾
- ▶ Integrated 10/100/1000BaseT Ethernet port
- ▶ Universal Serial Bus (USB) interface ports for:
 - Mouse
 - Trackball (optional)
 - Keyboard
 - Audio speakers (optional)
 - Touchscreens (optional)
 - USB Digital Color printers (optional)
 - External USB DVD drive (P0928GY - required).

Mounting Options

The HP thin clients can be either mounted:

- ▶ Vertically on a plastic base (supplied)
- ▶ Horizontally with four mounting feet (supplied) attached to one side of the thin client.

(1) Optional DisplayPort to VGA adapter is available but not recommended. The use of the VGA adapter can greatly degrade the performance of the system. The thin clients are not optimized for a mixed digital and analog or analog-only monitors.

FUNCTIONAL SPECIFICATIONS (HP DUAL MONITOR SERIES THIN CLIENT)

Processor Type

AMD® processor

Devices Served

VIDEO DISPLAYS (UP TO 2)

23-inch LCD USB Touchscreen Monitor

23-inch LCD Monitor

INTERFACES TO EXTERNAL DEVICES

USB

Mouse or optional trackball.

Alphanumeric keyboard

External speakers

Digital Color Printer

External DVD drive (P0928GY)

Internal Diagnostics

Self-checking is performed at power-up.

Video

OUTPUT TYPE

One DisplayPort 1.1a video port

One Digital Visual Interface (DVI-I) video port

SCREEN PRESENTATION

Refresh Rate

Up to 85 Hz

Colors

Over 65,000⁽²⁾

Resolution

Widescreen (16:9) Aspect Ratio

Up to 2560x1600 pixels

Ethernet Interface Communications

One Integrated Ethernet port (10/100/1000Base-T)

DCS Auxiliary Control Network Interface Communications

TYPE

IEEE 802.11

TCP-IP

Power Requirements

INPUT VOLTAGE

100 or 240 V ac (nominal), auto select

50 to 60 Hz Operating Line Frequency Range

POWER CONSUMPTION⁽³⁾

65 W maximum output power supply

⁽²⁾ May be limited by specific software specifications.

⁽³⁾ The actual power consumption at your location could vary and is dependent on many factors including but not limited to software load on the thin client, attached peripherals, and environmental factors.

ENVIRONMENTAL SPECIFICATIONS (HP DUAL MONITOR SERIES THIN CLIENT)

Operating⁽⁴⁾

TEMPERATURE

10 to 40°C (50 to 104°F)

RELATIVE HUMIDITY

10% to 90%, noncondensing

20% to 80%, condensing

ALTITUDE

-15.2 to +3,048 m (-50 to 10,000 ft)

Storage

TEMPERATURE

-30 to +60 °C (22 to +140°F)

RELATIVE HUMIDITY

10% to 90%, noncondensing

ALTITUDE

-15.2 to +9,144 m (-50 to +30,000 ft)

Location

UL/UL-C listed as suitable for use in ordinary locations and meets ordinary safety standards for fire and shock hazards.

Contamination

Class G1 (Mild) as defined in ISA Standard S71.04

REGULATORY COMPLIANCE (HP DUAL MONITOR SERIES THIN CLIENT)

Safety Certifications

USA

UL® (UL Std 1950)

CANADA

CSA® (CSA C22.2 No. 950)

EUROPE

TÜV-GS (EN60 950)

Ergonomics

German ZH1/618; EN29241-3, approved

EMC

USA

FCC Class B

EUROPE

CE Mark; EN55022B

JAPAN

VCCI Mark

(4) Specifications are at sea level with altitude derating of 1° C/300m (1.8° F/1000ft) to a maximum of 3 Km (10,000 ft), with no direct, sustained sunlight. Upper limit may be limited by the type and number of options installed.

PHYSICAL SPECIFICATIONS (HP DUAL MONITOR SERIES THIN CLIENT)

Dimensions

PROCESSOR - WITHOUT STAND

Height

239 mm (9.4 in)

Width

221 mm (8.7 in)

Depth

41 mm (1.6 in)

PROCESSOR - WITH STAND

Height

251 mm (9.9 in)

Width

221 mm (8.7 in)

Depth

41 mm (1.6 in)

Mounting

Tabletop

Weight

Exact weights depend upon configuration.

PROCESSOR - WITHOUT STAND

1.49 kg (3.29 lbs)

PROCESSOR - WITH STAND

1.55 kg (3.42 lbs)

Heat Dissipation⁽⁵⁾

65 W POWER SUPPLY

@ 100-115 V ac (60 Hz)

41.53 BTU/hour, idle state

4.98 BTU/hour, sleep state

2.66 BTU/hour, Off mode

@ 230 V ac (50 Hz)

42.38 BTU/hour, idle state

4.74 BTU/hour, sleep state

3.00 BTU/hour, Off mode

(5) Heat dissipation is calculated based on the measured Watts, assuming the service level is attained for one hour.

HP QUAD MONITOR SERIES THIN CLIENT

Base Configuration



The HP Quad Monitor Series Thin Client contains the following elements:

- ▶ AMD® processor
- ▶ One integrated DisplayPort 1.1a and one integrated DVI-I port - supports one or two monitors
- ▶ Dual-head AMD video card - supports one or two monitors, digital only⁽⁶⁾ for a total of four monitors for this thin client
- ▶ Integrated 10/100/1000BaseT Ethernet port
- ▶ Universal Serial Bus (USB) interface ports for:
 - Mouse
 - Trackball (optional)
 - Keyboard
 - Audio speakers (optional)
 - Touchscreens (optional)
 - USB Digital Color printers (optional)
 - External USB DVD drive (P0928GY - required)

Mounting Options

The HP thin clients can be either mounted:

- ▶ Vertically on a plastic base (supplied)
- ▶ Horizontally with four mounting feet (supplied) attached to one side of the thin client.

⁽⁶⁾ Optional DisplayPort to VGA adapter is available but not recommended. The use of the VGA adapter can greatly degrade the performance of the system. The thin clients are not optimized for a mixed digital and analog or analog-only monitors.

FUNCTIONAL SPECIFICATIONS (HP QUAD MONITOR SERIES THIN CLIENT)

Processor Type

AMD® processor

Devices Served

VIDEO DISPLAYS (UP TO 4)

23-inch LCD USB Touchscreen Monitor

23-inch LCD Monitor

INTERFACES TO EXTERNAL DEVICES

USB

Mouse or optional trackball

Alphanumeric keyboard

External speakers

Digital Color Printer

External DVD drive (P0928GY)

Internal Diagnostics

Self-checking is performed at power-up.

Video

OUTPUT TYPE

One DisplayPort 1.1a video port

One Digital Visual Interface (DVI-I) video port

Dual-head AMD FirePro 2270 video card - provides two Digital Visual Interface (DVI-I) video ports

SCREEN PRESENTATION

Refresh Rate

Up to 85 Hz

Colors

Over 65,000⁽⁷⁾

Resolution

Widescreen (16:9) Aspect Ratio

Up to 2560x1600 pixels

Ethernet Interface Communications

One Integrated Ethernet port (10/100/1000Base-T)

DCS Auxiliary Control Network Interface Communications

TYPE

IEEE 802.11

TCP-IP

Power Requirements

INPUT VOLTAGE

100 or 240 V ac (nominal), auto select

50 to 60 Hz Operating Line Frequency Range

POWER CONSUMPTION⁽⁸⁾

85 W maximum output power supply

⁽⁷⁾ May be limited by specific software specifications.

⁽⁸⁾ The actual power consumption at your location could vary and is dependent on many factors including but not limited to software load on the thin client, attached peripherals, and environmental factors.

ENVIRONMENTAL SPECIFICATIONS (HP QUAD MONITOR SERIES THIN CLIENT)**Operating⁽⁹⁾****TEMPERATURE**

10 to 40°C (50 to 104°F)

RELATIVE HUMIDITY

10% to 90%, noncondensing

20% to 80%, condensing

ALTITUDE

-15.2 to +3,048 m (-50 to 10,000 ft)

Storage**TEMPERATURE**

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Location

UL/UL-C listed as suitable for use in ordinary locations and meets ordinary safety standards for fire and shock hazards.

Contamination

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EMC**USA**

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EUROPE

CE Mark; EN55022B

JAPAN

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(9) Specifications are at sea level with altitude derating of 1° C/300m (1.8° F/1000ft) to a maximum of 3 Km (10,000 ft), with no direct, sustained sunlight. Upper limit may be limited by the type and number of options installed.

PHYSICAL SPECIFICATIONS (HP QUAD MONITOR SERIES THIN CLIENT)

Dimensions

PROCESSOR - WITHOUT STAND

Height

239 mm (9.4 in)

Width

221 mm (8.7 in)

Depth

66 mm (2.6 in)

PROCESSOR - WITH STAND

Height

251 mm (9.9 in)

Width

221 mm (8.7 in)

Depth

66 mm (2.6 in)

Mounting

Tabletop

Weight

Exact weights depend upon configuration.

PROCESSOR - WITHOUT STAND

1.98 kg (4.37 lbs)

PROCESSOR - WITH STAND

2.04 kg (4.50 lbs)

Heat Dissipation⁽¹⁰⁾

85 W POWER SUPPLY

@ 100-115 V ac (60 Hz)

42.34 BTU/hour, idle state

5.39 BTU/hour, sleep state

2.63 BTU/hour, Off mode

@ 230 V ac (50 Hz)

43.47 BTU/hour, idle state

5.80 BTU/hour, sleep state

2.80 BTU/hour, Off mode

(10)Heat dissipation is calculated based on the measured Watts, assuming the service level is attained for one hour.

REFERENCE DOCUMENTS

For more information regarding the thin client product offering, please refer to the following documents. The latest revisions are available through the Invensys Operations Management Global Customer Support Center at <http://support.ips.invensys.com>.

Configuration	Document Part No.	Document Title
Supported Monitors	PSS 21H-4D10 B4	<i>Liquid Crystal Display (LCD) Monitors</i>
V90 Server Virtualization Host	PSS 21H-4U14 B4	<i>I/A Series V90 (Virtualization Server Host Hardware)</i>
	B0700VA, Rev. B or Later	<i>Hardware and Software Specific Instructions for I/A Series Model V90 Server Virtualization Host (DL380) (Windows Server 2008 R2 Enterprise Operating System)</i>
Virtualization	PSS 21S-8A9 B3	<i>Overview of Hypervisor Technology - Microsoft Hyper-V Hypervisor</i>
	B0700VM	<i>Virtualization User's Guide</i>
DCS Auxiliary Communications Network (ACN) Configuration	B0700CA, Rev. P or Later	<i>The MESH Control Network Operation, and Switch Installation and Configuration Guide</i>
Remote Server Connections and Required Microsoft Licenses	B0700VM	<i>Virtualization User's Guide</i>
Thin Client Hardware and Configuration	B0700VN	<i>Thin Client User's Guide</i>

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