UHD100T32

Release 1.0

ixia
A Keysight Business

Getting Started Guide

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Documentation conventions

The following documentation conventions are used in this guide:

Describing interactions with the UI

You can interact with products by using different input methods: keyboard, mouse, touch, and more. So in most parts of the user documentation, generic verbs have been used that work with any input method. In cases where input-neutral verbs do not work, mouse-specific verbs are used as the first choice, followed by touch-specific verbs as the second choice.

See the following table for examples on how you can interpret the different input methods.

Input-neutral	Mouse	Touch
Select **Modify**.	Click **Modify**.	Tap **Modify**.
Select **Accounts** > **Other accounts** > **Add an account**.	Click **Accounts** > **Other accounts** > **Add an account**.	Tap **Accounts** > **Other accounts** > **Add an account**.
To open the document in Outline view, select **View** > **Outline**.	To open the document in Outline view, click **View** > **Outline**.	To open the document in Outline view, tap **View** > **Outline**.
Select **Protocols**.	Click the **Protocols** tab.	Tap **Protocols**.
-NA-	Double-click the **Client** wizard.	Double-tap the **Client** wizard.
Open the **Packages** context menu.	Right-click **Packages** to open the shortcut menu.	Long tap **Packages** to open the shortcut menu.

Deprecated words

The following words have been replaced with new words, considering the audience profile, our modern approach to voice and style, and our emphasis to use input-neutral terms that support all input methods.

Old usage...	New usage...
shortcut menu, right-click menu	context menu
click, right-click	select
drag and drop	drag

CONTENTS

Symbols and their meanings

The following notational conventions are used in this guide.

Text is **bolded** to highlight important information.

⚠️ The caution symbol denotes information that is of critical importance to the operation of UHD100T32.

⚡ The electrical hazard symbol indicates that the power supplies in your system may produce high voltages and energy hazards, which can cause bodily harm.

♨️ The hot surface symbol indicates that a surface or component is hot.

The electrostatic discharge (ESD) symbol indicates proper antistatic precautions should be taken to avoid damaging electronic equipment including printed circuit boards and components that are sensitive to static electricity.

The pointer symbol indicates that the information that follows provides helpful tips on how to use and configure UHD100T32.

ℹ️ **Note:** Notes are written like this.

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Product Safety Information

⚠️ Before installing the unit, read all product safety instructions contained in this document. These instructions contain specific safety messages that will alert you to any hazards associated with the installation and proper operations of the equipment. Failure to follow those instructions can result in serious injury or death.

The unit is a 100GE Test System for enhancing network reliability and powered by 2 redundant, load-sharing hot-swappable power supplies, rated 100-240VAC, 50-60Hz, 12-5A per PS.

Disconnect both power supply cords before servicing.

CAUTION: Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions.

Rack Mount Instructions

1. Elevated Operating Ambient Temperature: If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, consider installing the equipment in an environment that is compatible with the maximum allowable ambient temperature specified for the equipment (35° C).

2. Reduced Air Flow: Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

3. Mechanical Loading: Mount the equipment so that it is level in the rack and that a hazardous condition is not caused.

4. Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

5. Reliable Earthing: Maintain reliable earthing (grounding) of rack-mounted equipment. Equipment frame should be screwed down to racks to ensure proper grounding path. In addition, pay special attention to supply connections other than direct connections to the branch circuit (such as use of power strips).

Informations sur la sécurité du produit

Avant d'installer l'unité, lisez toutes les instructions de sécurité du produit contenues dans ce document. Ces instructions contiennent des messages de sécurité spécifiques qui vous alerteront de tout risque associé à l'installation et au bon fonctionnement de l'équipement. Si ces instructions ne sont pas respectées, cela peut entraîner des blessures graves, voire mortelles.

L'unité est un système de test 100GE destiné à améliorer la fiabilité du réseau et est alimentée par 3 blocs alimentations, 100-240 VCA, 50-60 Hz, 12-5 A par PS.

Débranchez les deux cordons d'alimentation avant l'entretien.

CAUTION: Risque d'explosion si la batterie est remplacée par un type incorrect. Jetez les piles usagées conformément aux instructions.

Instructions de montage en rack

1. Température ambiante de fonctionnement élevée: si installé dans un ensemble en rack fermé ou multi-unités, la température ambiante de fonctionnement de l'environnement du rack peut être supérieure à la température ambiante de la pièce. Par conséquent, envisagez d'installer l'équipement dans un environnement compatible avec la température ambiante maximale autorisée spécifiée pour l'appareil (35 ° C).

2. Débit d'air réduit: L'installation de l'équipement dans un rack doit être telle que la quantité d'air requise pour un fonctionnement en toute sécurité de l'équipement ne soit pas compromise.

3. Chargement mécanique: montez l'appareil de manière à ce qu'il soit de niveau dans le rack et qu'aucune condition dangereuse ne soit provoquée.

4. Surcharge du circuit: Il convient de prendre en compte le raccordement de l'équipement au circuit d'alimentation et les effets qu'une surcharge des circuits peut avoir sur la protection contre les surintensités et le câblage d'alimentation. Lors de la résolution de ce problème, il convient de prendre en compte les caractéristiques de la plaque signalétique de l'équipement.

5. Mise à la terre fiable: Maintenez une mise à la terre fiable des équipements montés en armoire. Le cadre de l'appareil doit être vissé sur les racks pour assurer un bon chemin de mise à la terre. De plus, faites particulièrement attention aux connexions d'alimentation autres que les connexions directes au circuit de dérivation (telles que l'utilisation de barrettes d'alimentation).

About This Guide

The Getting Started Guide provides instructions for the basic set up and configuration of the UHD100T32 fixed chassis.

Notes, Cautions, Warnings

Icons are used throughout the documentation to draw attention to caution and warning statement, and to highlight information that can help you make more effective use of your system.

> **Note:** Provides information that needs special attention within text.

Provides information that is needed to avoid potential harm to equipment or the environment. Provides information needed to prevent certain harm to a person, piece of equipment, or the environment.

UHD100T32 on ixiacom.com

The Ixia UHD100T32 Solution Brief, plus related information, is available from the Ixia website:

https://www.ixiacom.com/products/uhd100t32

Additional information

See the following document for additional information about the UHD100T32 fixed chassis:

- UHD100T32 User Guide

Record product information

You need to record the product information required during initial system configuration (and for future reference).

- The Host Name is the Serial Number, located on a label on the bottom of the unit, and also on the green pull tab on the right side of the faceplate.
- The Part Number and Product Key are printed on the label on the back of the unit.
- The IP address is either assigned by the network's DHCP server or statically assigned by a system administrator.

Host Name:	
Part Number:	
IP address:	

CHAPTER 1 About UHD100T32

This section contains an overview of the UHD100T32 fixed chassis and its specifications.

Section contents:

Overview

UHD100T32 is the industry's highest density 100GE test solution that addresses the density challenges of validating 100GE devices and networks in a cost-effective way. In just a 1U form-factor, the fixed chassis provides 32 QSFP28 100GE ports, ready for use cases ranging from white box production-line testing to data center pre-deployment and post-deployment testing.

This fixed chassis supports 100GE, 50GE, 40GE, 25GE, and 10GE fan-out speed test capabilities. It also includes Keysight's proven technology for layer 2 to 3 traffic generation and analysis. Optional routing protocols are available that include OSPF, BGP, and ISIS and RFC 2544 benchmark test capabilities.

Specifications

This section describes the specifications, switch, power, and LED controls of the UHD100T32 fixed chassis.

Hardware specifications

The hardware specifications are listed in the following table:

Feature	Specifications
Part Number	944-1180
Hardware Fixed Chassis System Specifications	
RU/Number of Ports	1 RU 32-port fixed chassis system

Feature	Specifications
Physical Interfaces	Native QSFP28 physical port
Supported Port Speeds	• 100GE/port: 100GE-capable fiber and passive copper cable media • 2 × 50GE/port: 50GE-capable passive copper (DAC) for point-point and fan-out cables, and multimode fiber point-to-point AOC media • 40GE/port: 40GE-capable passive copper (DAC) for point-point and fan-out cables, and multimode fiber point-to-point AOC media • 4 × 25GE/port: 25GE-capable fiber and passive copper point-point and fan-out cable media • 4 × 10GE/port: 10GE-capable fiber and passive copper point-point and fan-out cable media
Multicore processor	Multicore processor with 4GB of CPU memory per resource group
IEEE Interface Protocols for 100GE	• IEEE 802.3 100GBASE-R LAN • IEEE P802.3bj • IEEE P802.3bm • IEEE P802.3by • IEEE 802.3ba • IEEE 802.3ae

Layer 1 support	**100GE**:
	
	• Auto-negotiation (AN), Clause 73 for passive copper DAC
	
	• Link training for 100GE copper cable media, Clause 73
	
	• Ethernet Forward Error Correction RS-FEC, Clause 91
	    ◦ FEC statistics: FEC Corrected and Uncorrected Codeword Counts
	
	• Ability to independently turn ON or OFF AN with Link training, or FEC, or to allow IEEE defaults to automatically manage the interoperability
	
	50GE:
	
	• Ethernet Forward Error Correction:
	    ◦ FC-FEC, Clause 74 for BASE-R PHYs
	    ◦ RS-FEC, Clause 91 for 50GBASE-R PHYs
	
	• FEC statistics:
	    ◦ FEC Corrected and Uncorrected Codeword Counts
	
	• Independent fan-out ports with physical fan-out media for up to 2× 50GE per QSFP28 port
	
	40GE:

Feature	Specifications

	• Auto-negotiation (AN), Clause 73 for passive copper DAC
	• Link training for copper cable media, Clause 73
	25GE:
	• Auto-negotiation (AN), Clause 73 for passive copper DAC.
	• Link Training (LT) for 25GE copper DAC media (Clause 93, 110)
	    ⓘ **Note:** Clause 72 link training patterns are not supported
	• Ethernet Forward Error Correction:
	    ○ FC-FEC, Clause 74 for BASE-R PHYs
	    ○ RS-FEC, Clause 108 for 25GBASE-R PHYs
	• FEC statistics:
	    ○ FEC Corrected and Uncorrected Codeword Counts
	• Ability to independently turn ON or OFF AN with Link training, or FEC, or to allow IEEE defaults to automatically manage the interoperability
	• Independent fan-out ports with physical fan-out media for up to 4× 25GE per QSFP28 port
	10GE:
	• Independent fan-out ports with physical fan-out media for up to 4× 10GE per port

Transceiver Support	• 100GBASE-SR4 and 4 × 25GBASE-SR QSFP28 for multimode fiber
	    ○ Pluggable transceiver
	    ○ 100GE speed support requires a point-to-point cable
	    ○ 40GE speed support requires a point-to-point cable
	    ○ 25GE speed support requires a point-to-point or a fan-out cable
	    ○ 10GE speed support requires a point-to-point or a fan-out cable
	• 100GBASE-LR4 QSFP28 for single-mode fiber
	    ○ Pluggable transceiver
	    ○ 40GE speed not compatible with 100GBASE-LR4 QSFP28. Must use 40GBASE-LR4 QSFP transceiver for 40GE speed
	• 100G PSM4 QSFP28 for single mode fiber
	    ○ Pluggable transceiver
	    ○ 100GE support requires a point-to-point cable
	    ○ 25GE support requires a point-to-point or a fan-out cable

Cable Media	• 100GBASE-SR4 multimode fiber Active Optical Cable (AOC) and MT-MT 12-fiber point-to-point cables for QSFP28

| Feature	Specifications
	• 100GBASE-CR4, passive, copper Direct Attached Cable (DAC) up to five meters in length 　ℹ️ **Note:** Requires RS-FEC to be enabled • 50GBASE-CR2 passive, copper Direct Attached Cable (DAC) QSFP28-to-2×QSFP28 fan-out media, up to 3 meters in length 　ℹ️ **Note:** Requires BASE-R FEC Clause 74 or RS-FEC Clause 91 to be enabled • 50GBASE-SR2 multimode fiber Active Optical Cable (AOC) media, 850 nm, three meter length • 25GBASE-SR multimode fiber Optical Cable (AOC) and MT-MT 12-fiber point-to-point cable for QSFP28, three meter length is available • 25GBASE-SR multimode fiber MT-to-4×LC fan-out cable for QSFP28, three meter and five meter lengths are available • 25GBASE-LR single mode fiber MT-to-4×LC fan-out cable for QSFP28, three meter length is available • 25GBASE-CR passive, copper Direct Attached Cable (DAC) point-point, up to five meters in length 　ℹ️ **Note:** Requires BASE-R FEC Clause 74 or RS-FEC Clause 91 to be enabled • 25GBASE-CR passive, copper Direct Attached Cable (DAC) QSFP28-to-4×SFP28 fan-out media, up to five meters in length 　ℹ️ **Note:** Requires BASE-R FEC Clause 74 or RS-FEC Clause 91 to be enabled
Fixed Chassis System Dimensions (W × D × H)	440 × 507 × 44 mm (17.32 × 19.97 × 1.73 inches)
Fixed Chassis System Weights	• Hardware only: 22.49 lbs. (10.2 kg) • Shipping: 25 lbs. (11.33 kg)—Approximate (includes rackmount slides, power cords, sync cables, and packaging)
Fixed Chassis System Electrical Power	Two redundant, load-sharing hot-swappable AC, 1000 W 90 to 240 VAC at 50–60 Hz
Fan	Hot-swappable fans with N+1 redundancy
Temperature	Operating: 0 °C to 40 °C (32 °F to 104 °F)

Feature	Specifications
	Storage: -40 °C to 70 °C (-40 °F to 158 °F)
Humidity	0 % to 95 %, non-condensing
Regulatory Compliance Specifications	IEC/EN/UL/CSA 60950-1, IEC/EN/UL/CSA 62368-1, CE (LVD, EMC, RoHS), EN/IEC 55032, EN/IEC 55024, CFR 47, FCC Part 15B, ICES-003, AS/NZ CISPR 32/24, KN32/35, Korea (KCC), Customs Union (EAC)
Transmit Feature Specifications	
Transmit Engine	Wire-speed packet generation with timestamps, sequence numbers and packet group signatures
Max. Streams per Port and Speed	One stream/port for all speeds (100/50/40/25/10GE)
Stream Controls	• Rate and frame size change on the fly • Advanced stream scheduler support
Minimum Frame Size	• 200 bytes at full line rate • 64 bytes at less than full line rate
Maximum Frame Size	9,216 bytes
Fame Length Controls	Fixed, IMIX
Value Lists (Max.) per port	1K/UDF
Hardware Checksum Generation	Checksum generation and verification for IPv4, TCP/UDP
Link Fault Signaling	Reports, no fault, remote fault, and local fault port statistics
Latency Measurement Resolution	1 nanosecond
Intrinsic Latency Compensation	Removes inherent latency error from the 100GE port electronics

Feature	Specifications
Transmit Line Clock Adjustment	Ability to adjust the parts-per-million (ppm) line frequency over a range of +/- 100 ppm on all the ports of a 100GE fixed chassis system
Receive Feature Specifications	
Receive Engine	Wire-speed real-time latency and sequence checking capability
Trackable Receive Flows per Port (Max)	100GE: 1,000 50GE: 512 40GE: 1,000 25GE: 256 10GE: 256
Minimum Frame Size	200 bytes at full line rate
Standard Statistics and Rates	Link state, line speed, frames sent, valid frames received, bytes sent and received, fragments, undersize, oversize, CRC errors, sequence checking frames, sequence checking errors, ARP, and PING requests and replies
Latency and Jitter Measurements	Store and forward
Layer 2-3 Protocol Support	
Routing and Switching	BGP4/BGP4+, OSPFv2/v3, ISISv4/v6

Front Panel

Front Panel (100G Unit)

The UHD100T32 100GE High Density 32-port QSFP28 front panel image is as follows:
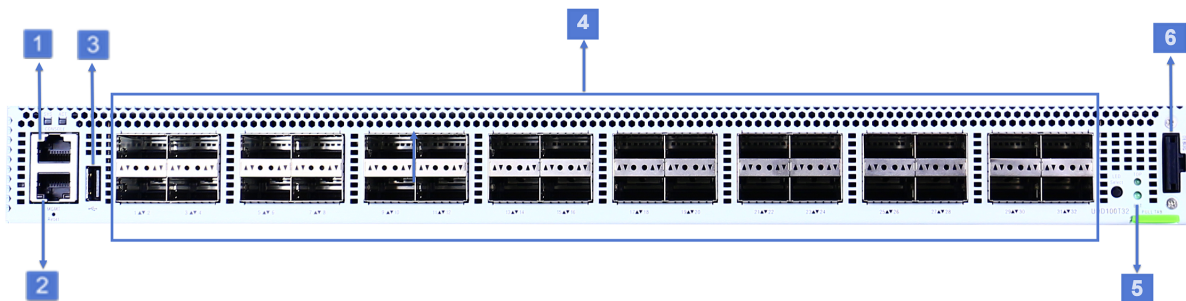
1	BMC Console
2	OOB Ethernet
3	Type-A USB
4	2x16 QSFP Ports
5	Status LED
6	Debug Connector

Channel Status Lamps

A group of four triangular lamps is present between the top and bottom or an odd and even pair of QSFP ports. These are the port channel status lamps.

Based on the setting that you have chosen by using the port LED selector button, the four lamps indicate either the state of the MAC channels on the QSFP ports above the lamps, or the states of the MAC channels on the QSFP ports below the lamps.

The following image shows the port channel status lamps:

LED Selector Button and Bank Indicator Lamps

The port LED Selector button is located at the lower right of the front panel, and is labeled LED Select. There are two bank indicator lamps labeled TOP and BOT to the right of the button. These lamps indicate whether all the port lamps are showing the port state for TOP or BOT.
You can press the LED Selector button to toggle between the two states.

The following image show the LED Selector button and the bank indicator lamps:

The following is an example of how the bank indicator lamps work:

See the leftmost top and bottom pair of QSFP ports on the front panel and assume a configuration of 4 × 25G on each QSFP port (four MAC channels of 25G each). If you select the TOP bank, the four lamps show the state of the top QSFP port's four channels from left to right as follows:

- QSFP Port 1/MAC Channel 1
- QSFP Port 1/MAC Channel 2
- QSFP Port 1/MAC Channel 3
- QSFP Port 1/MAC Channel 4

Port Status LED

The LED port channel status lamp indicates the following:

Color	Port Status
Green	Port/Channel is active (link is up)
Blue	Port/Channel is enabled but the link is not up
Orange	Port/Channel is disabled by an administrator
LED Off	Port/Channel is not enabled or has not been added

Rear Panel

The UHD100T32 100GE High Density 32-port QSFP28 rear panel image is as follows:

CHAPTER 2 Prerequisites

This section contains the prerequisites to configure and to get started with the UHD100T32 fixed chassis.

Section contents:

Hardware requirements

You need a management workstation (such as a laptop) for a serial connection or a monitor and keyboard to perform the initial system configuration.

For a serial connection, the workstation requires the following:

- A 9-pin serial port or a USB-to-Serial converter
- An RJ-45 100 M/1G/10G Ethernet port
- Terminal emulation software that supports SSH and serial connections (we recommend you to use PuTTY as an open source option). Configure the terminal software as follows:
    - Use UTF-8 character set with VT100 terminal (HyperTerminal, PuTTY, TeraTerm, or equivalent)
    - Select the corresponding COM port number for your serial port (for example, COM1)
    - Speed: 9600
    - Data bits: 8
    - Stop bits: 1
    - Parity: None
    - Flow Control: None

Software requirements

The UHD web application uses the UHD100T32 fixed chassis traffic ports. This section outlines the supported versions of these applications.
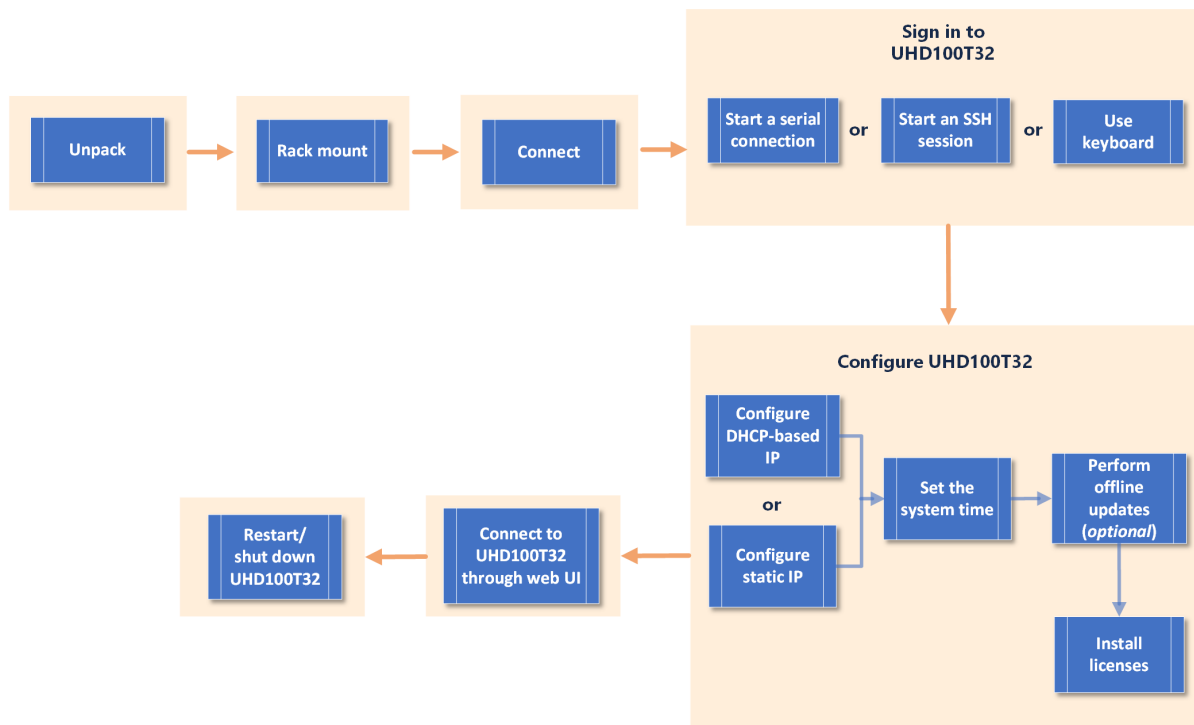
Support for UHD100T32 is provided in the following applications for the indicated software versions:

Application	Version
UHD web application	1.0

We recommend that you periodically check the Ixia compatibility matrix (https://support.ixiacom.com/support-overview/product-support/product-compatibility-matrix) to determine the product versions that are validated for interoperability.

CHAPTER 3 Getting started workflow

The workflow to get started with the UHD100T32 fixed chassis is illustrated as follows:

Sign in to UHD100T32

Unpack → Rack mount → Connect → Start a serial connection **or** Start an SSH session **or** Use keyboard

Configure UHD100T32

Configure DHCP-based IP **or** Configure static IP → Set the system time → Perform offline updates (*optional*) → Install licenses

Restart/ shut down UHD100T32 ← Connect to UHD100T32 through web UI

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CHAPTER 4 How do I...

This section describes the tasks needed to set up the UHD100T32 fixed chassis for operation and to configure it for operation in your network.

Section contents:

Unpack UHD100T32

You need to unpack the unit before physically setting it up for operation. To unpack, do the following:

1. Unpack the unit from the shipping container, and verify that you have all the required components.

    The shipping carton contains the following items:

    - One UHD100T32 fixed chassis
    - One rack mounting kit (two front-post brackets, two rear-post brackets, 20 screws, two ear-locking screws)
    - Two 90-240VAC power cords
    - One RJ45 to DB9-F cable
    - One USB to DB9-M adapter
    - Ixia standard warranty notice

- One UHD100T32 Getting Started Guide
- Any additional items that you ordered (such as transceivers and cables)

If any items are missing or damaged, contact Ixia Support. See Contact Us for contact information for each Ixia region.

2. Place the unit in the operating location that you have chosen.

   You can operate the fixed chassis as a desktop unit or a rack-mounted chassis. For rack mount instructions, see Rack mount UHD100T32.

Rack mount UHD100T32

UHD100T32 is a compact chassis that you can set up as a stand-alone desktop unit or a rack-mounted chassis. It is a 1U (1 rack unit) device but quite heavy.

We recommend two people to install the device in a rack.

The following sub-sections provide the specifications and instructions for rack mounting the unit:

- Rack mount size and weight
  For complete information about rack mount size and weight, see Hardware Specifications.
- Rack mount precautions
  For complete information about rack mount precautions, see Product Safety Information.
- Rack mount instructions
  For detailed explanation on rack mount instructions, see the following sections.

You can rack mount UHD100T32 by performing the following steps:

- Mount the chassis
- Ground the chassis
- Connect to the power supply
- Verify basic chassis operation
- Connect network cables

Mount the chassis

To mount the chassis, do the following:

1. Attach each of the front-post and rear-post brackets to the device by using four of the included bracket screws.
2. Use an additional two screws to secure each of the rear-post brackets at the mid-point on the sides of the device.
3. Use the screws and cage nuts supplied with the rack to secure the device in the rack.
4. Lock the position of the rear-post bracket ears by using the position-locking screws that are included.

You can also adjust the rear-post bracket ears to fit different rack depths from 56 cm to 85 cm.

The following image illustrates the steps:
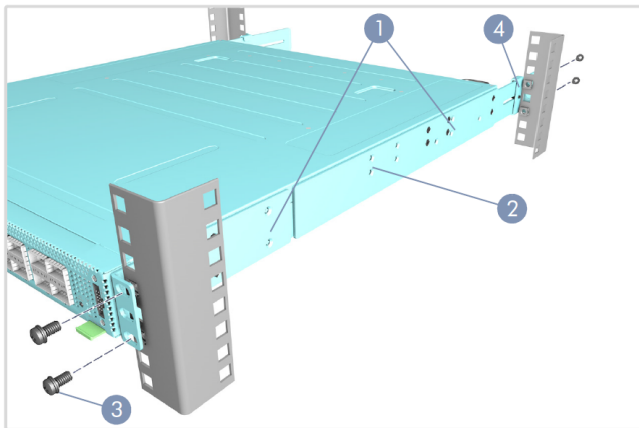
⚠️ CAUTION: Installing the device in a rack requires two people. One person should position the device in the rack, while the other secures it by using the rack screws.

ATTENTION: L'installation de l'appareil dans un rack nécessite deux personnes. Une personne doit positionner l'appareil dans le rack, tandis que l'autre le fixe à l'aide des vis du rack.

Ground the chassis

To ground the chassis, do the following:

1. Ensure that the rack on which the system is to be mounted is properly grounded and in compliance with ETSI ETS 300 253. Verify that there is a good electrical connection to the grounding point on the rack (no paint or isolating surface treatment).

2. Attach a lug (not provided) to a #18 AWG minimum grounding wire (not provided), and connect it to the grounding point on the system rear panel. Next, connect the other end of the wire to rack ground.

The following image illustrates the steps:
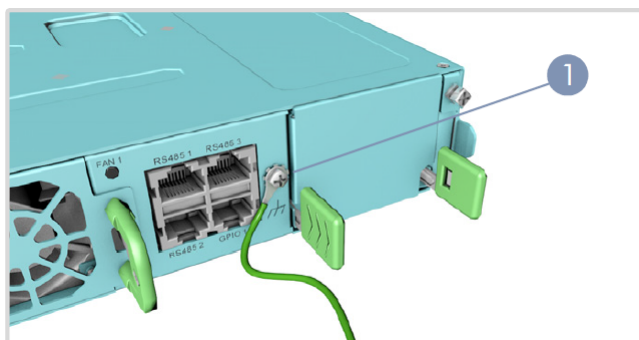
⚠️ CAUTION: The chassis ground connection must not be removed unless all supply connections have been disconnected.

ATTENTION: Le raccordement à la terre ne doit pas être retiré sauf si toutes les connexions d'alimentation ont été débranchées.

CAUTION: The device must be installed in a restricted access location. It should have a separate protective ground terminal on the chassis that must be permanently connected to a well grounded chassis or frame to adequately ground the device chassis and protect the operator from electrical hazards.

ATTENTION: L'appareil doit être installé dans un emplacement à accès restreint. Il doit comporter une borne de terre de protection distincte sur le châssis, qui doit être connectée en permanence à la terre pour assurer une mise à la terre adéquate du châssis et protéger l'opérateur des risques électriques.

Connect to the power supply

To connect to the power supply, do the following:

1. Install two universal AC power supply units (PSUs) in the system.
2. Connect an external AC power source to the PSUs.

The following image illustrates the steps:
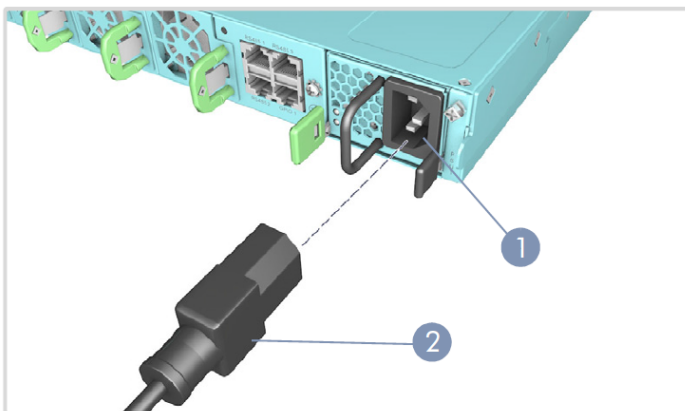
⚠️ CAUTION: Use the AC power cord supplied with the device. For international use, you may need to change the AC line cord. You must use line cord sets that have been approved for the socket type in your country.

ATTENTION: Utilisez le cordon d'alimentation secteur fourni avec l'appareil. Pour une utilisation internationale, vous devrez peut-être changer le cordon d'alimentation. Vous devez utiliser des jeux de cordons d'alimentation approuvés pour le type de prise de votre pays.

Verify basic system operation

Verify the basic system operation by checking the SYS LED. When operating normally, the SYS LED

should be on green. The following image illustrates the step:
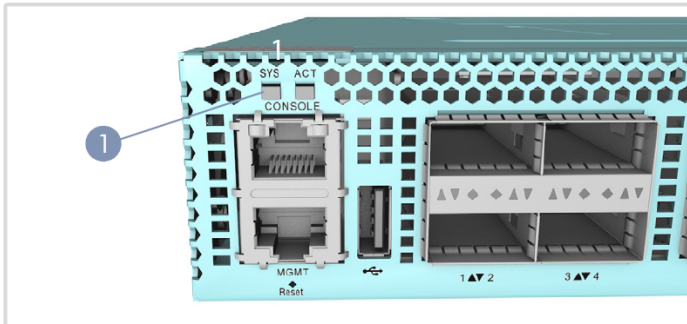

Connect network cables

To connect network cables, do the following:

1. Connect a 100 ohm category 5e (or better) twisted-pair cable to the 1000BASE-T RJ-45 management port.

2. Connect network cables to QSFP28 interfaces:

   - If you are connecting fiber optic cables, install QSFP28 fiber transceivers, and then connect fiber optic cabling to the transceiver ports.
     The following transceivers are supported:
     - CLR4 100G
     - LR4/LR4-lite 100G
     - CWDM4 100G
     - OpenOptic 100G

   - If you are using twinax copper cables (DAC cables) for port connections, connect the QSFP28 transceivers on the end of the DAC cables directly into the QSFP28 slots.
     You can configure the QSFP28 ports as single-lane 100G mode, dual-lane 50G mode, single-lane 40G mode, four-lane 25G mode, or four-lane 10G mode. The following cable types are supported:
     - 100 GbE to QSFP28 100 GbE cable: 1 m, 2 m, and 3 m
     - 100 GbE to 2 × QSFP28 50 GbE split cable (Y-cable): 1 m, 2 m, and 3 m
     - 100 GbE to 4 × SFP28 25 GbE fanout cable: 1 m, 2 m, and 3 m

   The following image illustrates the steps:
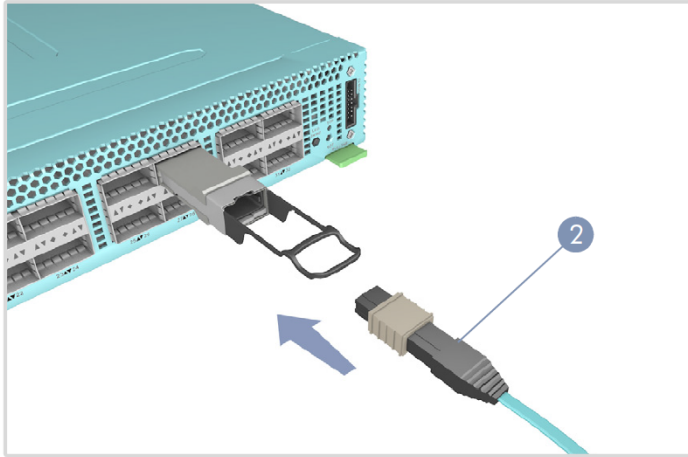
Connect UHD100T32

You need to connect the UHD100T32 fixed chassis to physically set it up for operation. To connect the chassis, do the following:

1. Record the following information before connecting the chassis:

    -   Host Name (for example, U100-CN19520035) from a label at the bottom of the unit and also on the green pull tab on the right side of the front panel
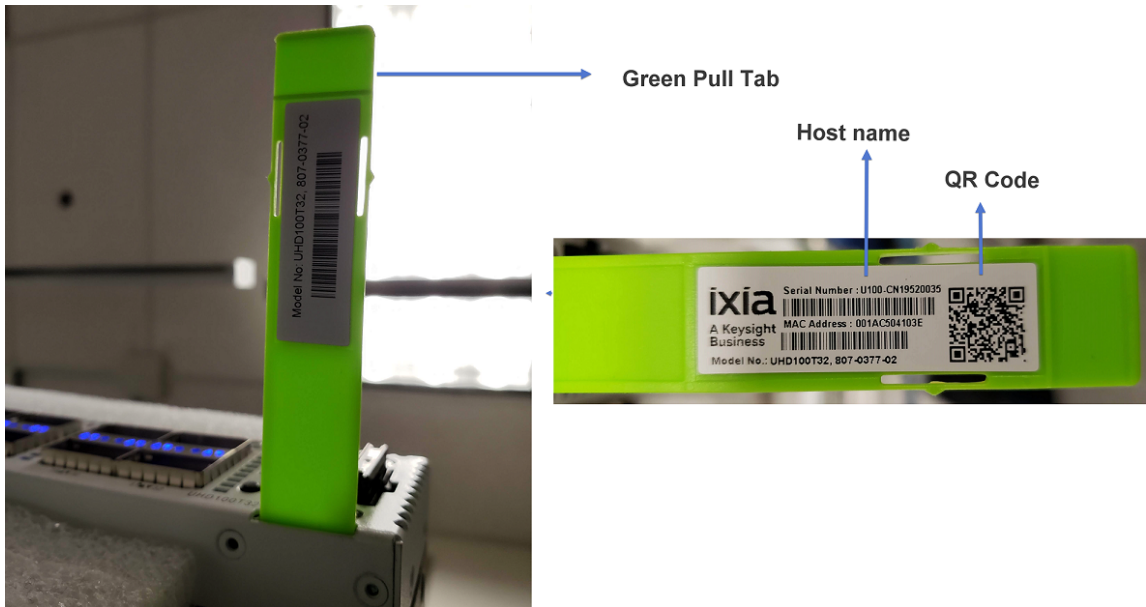
    -   Part number (for example, 944-1180) from a label at the side of the unit

    You can record these on the form Record product information.

2. Connect the MGMT LAN port on UHD100T32 to your network. This port supports 100 M, 1G, and 10G ethernet.
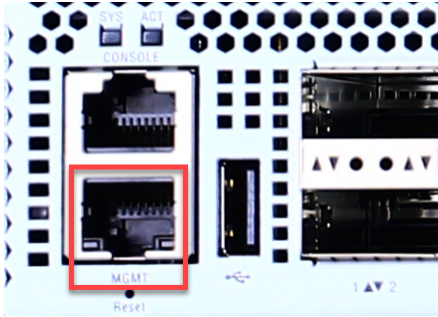
3. Connect the two power supplies to a 90 to 240 VAC power source.

4. Push the power button on the UHD100T32.

5. Verify the LED indicators to ensure that your system is operating correctly.
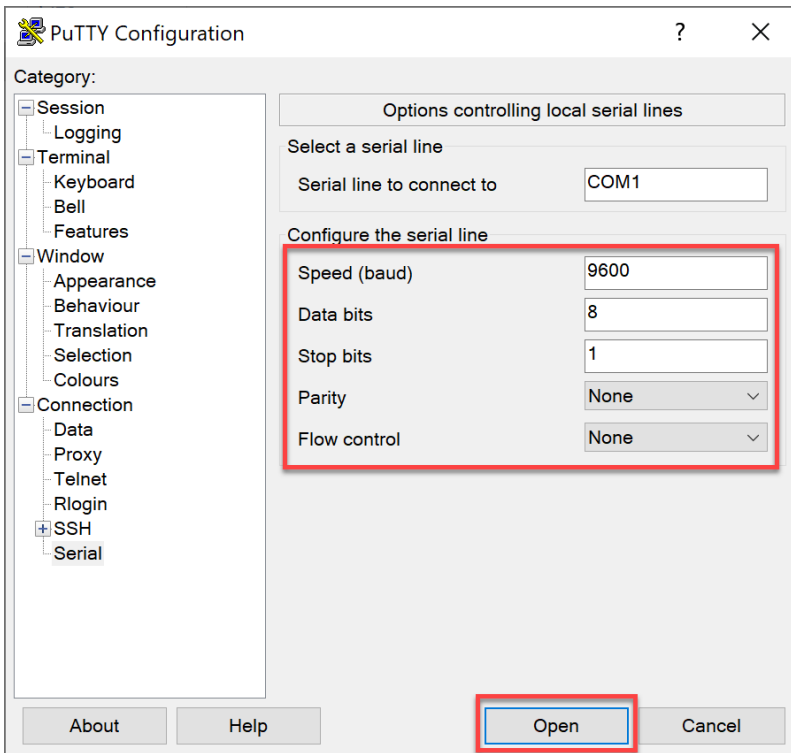
Sign in to UHD100T32

As a new user, you need to sign in to the UHD100T32 fixed chassis. To sign in and access the UHD100T32 Administrative Console, you can use any one of the following options:

- Serial connection
- SSH session
- Keyboard

Serial connection

To start a serial session, do the following:

1. Open the serial connection from your terminal emulation application.

The Administrative Console prompts you to sign in.

2. Enter the following credentials:

- User ID: admin
- Password: admin

Thevcommand line interface prompt appears.

```
login as: admin
admin@10.36.70.58's password:
Welcome to KCOS shell.
Type 'kcos-help' in order to list the available commands.

**WARNING**
The commands (their names, semantics, list of arguments) are not frozen and
backward incompatible changes are possible in future revisions.
IP: 2620:17b:3:c000::2:b738/128 169.254.102.84/16 10.36.70.58/22

UHD BMC Update Service: 0.0.2+20200325.111553.6b143725
KCOS Host System: 1.0.25+20200407.024422.b0333654
UHD Hardware Services: 0.0.16+20200401.004037.fa9e0331
UHD Web Server: 0.3.8+20200407.024137.2374f974
UHD Server: 0.2.8+20200402.011938.708da3aa
KCOS UHD Framework: 0.0.2+20200327.231259.2920fd6d
kcos-framework-shell-5bb949bd86-6q4mn:~$
```

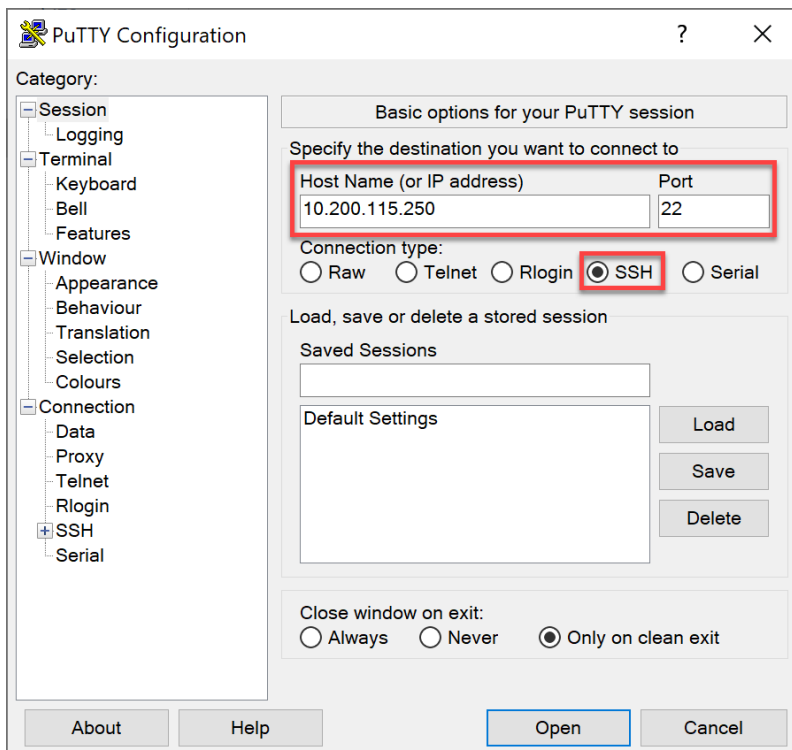Enter the following credentials:

- User ID: admin
- Password: admin

After you have signed in, run the available CLI commands.

> ℹ **Note:** You can see a list of available commands by typing the `kcos-help` command.

SSH connection

Access the UHD100T32 Administrative Console by using an SSH session. To start an SSH session, do the following:

1. Open an SSH session from your terminal emulation application, by specifying the following:

   - The UHD100T32 IP address as the Host Name
   - Port 22

After you open the session, the KCOS console prompts you to sign in.

2. Enter the following credentials:

   - User ID: admin
   - Password: admin

The command line interface prompt appears.

```
login as: admin
admin@10.36.70.58's password:
Welcome to KCOS shell.
Type 'kcos-help' in order to list the available commands.

**WARNING**
The commands (their names, semantics, list of arguments) are not frozen and
backward incompatible changes are possible in future revisions.
IP: 2620:17b:3:c000::2:b738/128 169.254.102.84/16 10.36.70.58/22

UHD BMC Update Service: 0.0.2+20200325.111553.6b143725
KCOS Host System: 1.0.25+20200407.024422.b0333654
UHD Hardware Services: 0.0.16+20200401.004037.fa9e0331
UHD Web Server: 0.3.8+20200407.024137.2374f974
UHD Server: 0.2.8+20200402.011938.708da3aa
KCOS UHD Framework: 0.0.2+20200327.231259.2920fd6d
kcos-framework-shell-5bb949bd86-6q4mn:~$ 
```

After you have signed in, run the available CLI commands.

Keyboard

Access the UHD100T32 KCOS console by using a USB keyboard.

A console sign in screen appears.

Enter the following sign in credentials:

- User ID: admin
- Password: admin

The command line interface prompt appears.

```
login as: admin
admin@10.36.70.58's password:
Welcome to KCOS shell.
Type 'kcos-help' in order to list the available commands.

**WARNING**
The commands (their names, semantics, list of arguments) are not frozen and
backward incompatible changes are possible in future revisions.
IP: 2620:17b:3:c000::2:b738/128 169.254.102.84/16 10.36.70.58/22

UHD BMC Update Service: 0.0.2+20200325.111553.6b143725
KCOS Host System: 1.0.25+20200407.024422.b0333654
UHD Hardware Services: 0.0.16+20200401.004037.fa9e0331
UHD Web Server: 0.3.8+20200407.024137.2374f974
UHD Server: 0.2.8+20200402.011938.708da3aa
KCOS UHD Framework: 0.0.2+20200327.231259.2920fd6d
kcos-framework-shell-5bb949bd86-6q4mn:~$ 
```

After you have signed in, run the available CLI commands.

Configure UHD100T32

This section describes the major tasks required to configure a UHD100T32 fixed chassis for operation in your network.

The following image illustrates the workflow required to configure a UHD100T32 fixed chassis:
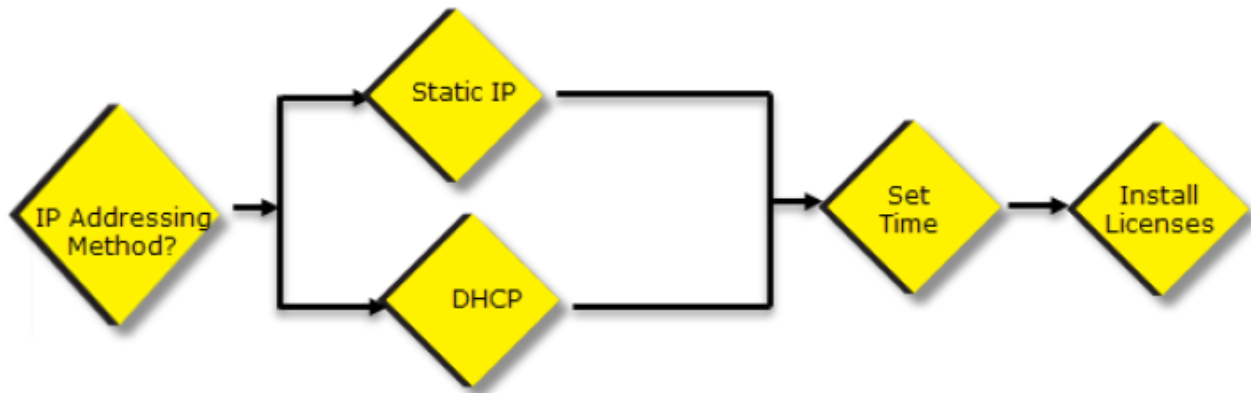
The topics that describe each of the tasks in the workflow are as follows:

- Method 1: Configure DHCP-based IP
- Method 2: Configure static IP
- Set the system time
- Perform offline updates
- Install licenses
- Next steps

Method 1: Configure DHCP-based IP

If your network has a DHCP service available, the UHD100T32 fixed chassis attempts to automatically acquire an IP address.

To enable DHCP on a management interface, do the following on the UHD100T32 KCOSconsole:

1. Use the following KCOS command:
   `kcos-enable-dhcp`

2. Ensure that your management workstation and the UHD100T32 fixed chassis are connected to the same management switch.

3. Search for the unit's host name. Host Name is the Serial Number that is present on a label at the bottom of the unit and also on a green pull tab at the right side of the front panel.

4. Use the `kcos-show-interface-status` command to return the system's IP address as follows:

```
kcos-framework-shell-5bb949bd86-6q4mn:~$ kcos-show-interface-status
{
  "dnssearches": [
    "lbj.is.keysight.com"
  ],
  "dnsservers": [
    "10.24.49.10",
    "156.140.24.15",
    "2620:17b:3:a000::1:11"
  ],
  "ipaddresses": [
    "10.36.70.58/22",
    "2620:17b:3:c000::2:9287/128",
    "169.254.228.236/16"
  ],
  "macaddress": "00:90:fb:6b:d1:dd",
  "name": "mgmt0",
  "state": "UP"
}
kcos-framework-shell-5bb949bd86-6q4mn:~$
```

> **Note:** If your network does not have a DHCP service available, configure a static IP address, as described in the next section.

Method 2: Configure static IP

If you are not using DHCP-based IP addressing, you will need to configure a static IP address. Static IP configuration requires that you use the RS232 port or the keyboard.

To configure the static IP address, do the following on the UHD100T32 KCOS console:

1. Open the serial connection from your terminal emulation application.

The KCOS console prompts you to sign in.

2. Enter the following credentials:

- User ID: admin
- Password: admin

The command line interface prompt appears.

```
login as: admin
admin@10.36.70.58's password:
Welcome to KCOS shell.
Type 'kcos-help' in order to list the available commands.

**WARNING**
The commands (their names, semantics, list of arguments) are not frozen and
backward incompatible changes are possible in future revisions.
IP: 2620:17b:3:c000::2:b738/128 169.254.102.84/16 10.36.70.58/22

UHD BMC Update Service: 0.0.2+20200325.111553.6b143725
KCOS Host System: 1.0.25+20200407.024422.b0333654
UHD Hardware Services: 0.0.16+20200401.004037.fa9e0331
UHD Web Server: 0.3.8+20200407.024137.2374f974
UHD Server: 0.2.8+20200402.011938.708da3aa
KCOS UHD Framework: 0.0.2+20200327.231259.2920fd6d
kcos-framework-shell-5bb949bd86-6q4mn:~$
```

3. Use the `kcos set-staticip` command.

    Usage: `kcos set-staticip <ip/prefix> <gateway>`
    For example: `kcos-set-staticip 10.36.70.58/24 10.36.76.1`

    ```
    kcos-framework-shell-5bb949bd86-6q4mn:~$ kcos-set-staticip 10.36.70.58 10.36.76.1
    ```

4. Restart the fixed chassis for the changes to take effect.
    Use the `kcos-control-reboot` command to restart the fixed chassis.

5. After you restart the fixed chassis, type `exit` to close the command line interface.

At the completion of this procedure, the UHD100T32 IP addressing would be similar to the configuration in the KCOS console.

Set the system time

We recommend you to set the UHD100T32 system time by using an NTP server before you install any licenses.
To set the time, do the following on the UHD100T32 KCOS console:

1. Open a serial connection, SSH connection, and then use the keyboard to connect to the KCOS console.

2. Sign in with the following credentials:
    - User ID: admin
    - Password: admin

3. Do the following:
    a. Set up the NTP server:

        Usage: `kcos-set-ntp [-e(nable)/--d(isable)] [<ntp server>]`

        `Enables or disables NTP, sets the NTP server.`
        `arguments: <ntp server> IP or hostname of the NTP server`

        For example: `kcos-set-ntp-e 10.32.78.5`
        ```
        kcos-framework-shell-5bb949bd86-6q4mn:~$ kcos-set-ntp-e 10.32.78.5
        ```

b. Set the date and time manually:

Usage: `kcos-set-time <datetime>`

Use the following parameters for this command:

- <yyyy-mm-dd>: This is the value that you need to set for the date.
- <hr:mm:ss>: This is the value that you need to set for the time.

For example: `kcos-set-time 2020-04-08 03:48:14`

```
kcos-framework-shell-5bb949bd86-6q4mn:~$ kcos-set-time 2020-04-08 03:48:14
```

> ℹ **Note:**
> - Ensure that you disable the NTP server manually, and then set the time.
> - Ensure that you use a valid date and time, because licensing may become invalid by large changes to time and date.

4. After you restart the fixed chassis, type `exit` to close the command line interface.

Perform offline updates

You can perform offline updates for systems that do not have direct internet access. To update the system software offline, do the following:

1. Download one or more offline software packages from the Keysight updates website.
2. Copy the downloaded files to the system that you need to update, for example, by using the `scp` command line tool.
3. In the system, deploy (install, update, or downgrade) the components that are embedded in the downloaded packages by using the CLI.

Use the following command to perform an offline software update:

- `kcos-deployment-deploy-offline <package>`: Installs, upgrades, or downgrades the software components embedded in the package file that is provided.
  Use this command to install the kcos-system.tar package and the artifacts.tar package.

Install licenses

This section describes the licensing requirements for Ixia software that use the UHD100T32 test ports.

Before installing licenses

Before you install the licenses, set the time on the fixed chassis manually, as described in Set the system time. Time discrepancies that are detected by UHD100T32 will invalidate the licenses.

Licensing requirements

The software licensing requirements for the UHD100T32 fixed chassis are as follows:

- Basic package for UHD100T32
- Basic routing bundle for UHD100T32

Next steps

After you have completed all the tasks in this section, your UHD100T32 fixed chassis is ready for use. We recommend the following next steps:

- Connect at least one of the test ports to your device under test.
- Run a small sample test to verify successful operation.

If you need assistance, see the following topics:

- FAQs
- Contact Us

Connect to UHD100T32

You can connect to UHD100T32 through the UHD web application, which is a web-based client UI.

To connect to UHD100T32 through the web UI, do the following:

1. Provide the IP address of the UHD100T32 fixed chassis in the URL.
2. Enter your credentials and select **LOGIN**. The UHD100T32 web UI page appears.
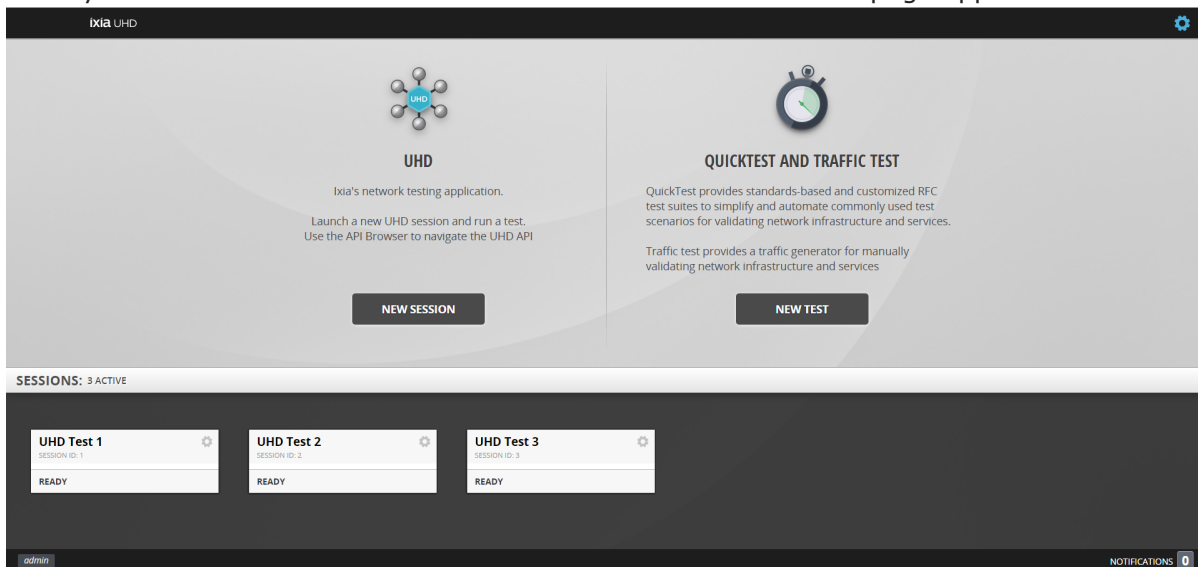
3. Select **NEW SESSION** to create a new session.

Restart UHD100T32

We recommend you to restart UHD100T32 by using the KCOS console.

To restart UHD100T32, do the following:

1. Open a serial connection or an SSH connection from your terminal emulation application.

    The KCOS console prompts you to sign in.

2. Enter the following credentials:

    - User ID: admin
    - Password: admin

    The command line interface prompt appears.

3. Type `kcos-control-reboot`.

UHD100T32 runs an orderly shut down of all processes, and then restarts the system. The operation may take several minutes to complete.

Shut down UHD100T32

We recommend you to use the KCOS console to shut down UHD100T32.

To shut down UHD100T32, do the following:

1. Open a serial connection or an SSH connection from your terminal emulation application.

    The KCOS console prompts you to sign in.

2. Enter the following credentials:

    User ID: admin

    Password: admin

    The command line interface prompt appears.

3. Type `shutdown`.

4. Select **Enter** to start the graceful shutdown.

UHD100T32 runs an orderly shut down of all processes, and then turns off the system.

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CHAPTER 5 FAQs

This section provides guidance to interpret the operational status of your UHD100T32 unit and to troubleshoot issues that may arise.

If you need assistance, contact Ixia Technical Support by using the contact information provided in Contact Us.

How do we know the status of ports?

The UHD100T32 fixed chassis provides LED indicators that provide a visual presentation of the operational status of the device and its individual ports. The About UHD100T32 topic provides complete information about LED indicators.

Which IP addresses need to be assigned?

The UHD100T32 chassis system requires a management IP address.

If your network implements a DHCP service, the UHD100T32 IP addresses are automatically assigned by that service, unless you choose to assign a static IP address instead. When assigning static IP addresses, you must observe the following requirement:

The address cannot be on the following subnets:

10.0.x.x/16

10.1.1.x/16

These subnets are reserved for internal chassis and card communications.

Failure to observe these requirements may result in connectivity failures.

What licensing issues can result in problems?

Following is a list of licensing issues that can result in operational problems:

- Licensing: You need a license to run UHD100T32.
- License invalidation: Time discrepancies between the <product> and UHD100T32 will invalidate the installed licenses. For instructions, see Install licenses.

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