



Grandstream Networks, Inc.

HA100

User Manual



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CHANGE LOG

This section documents significant changes from previous firmware versions. Only major new features or major document updates are listed here. Minor updates for corrections or editing are not documented here.

Firmware Version 1.0.0.1

- This is the initial version for HA100.



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CAUTION

Changes or modifications to this product not expressly approved by Grandstream, or operation of this product in any way other than as detailed by this User Manual, could void your manufacturer warranty.

WARNING

Please do not use a different power adaptor with your devices as it may cause damage to the products and void the manufacturer warranty.



GNU GPL INFORMATION

HA100 firmware contains third-party software licensed under the GNU General Public License (GPL). Grandstream uses software under the specific terms of the GPL. Please see the GNU General Public License (GPL) for the exact terms and conditions of the license.

Grandstream GNU GPL related source code can be downloaded from Grandstream web site from:
<http://www.grandstream.com/support/faq.gnu-general-public-license.gnu-gpl-information-download>



INTRODUCTION

Thank you for using Grandstream HA100. To meet the requirements of our customers, Grandstream releases the HA100 which is a module designed to achieve High Availability function for our enterprise grade IP-PBX UCM6510. It contains a set of external ports and splits each of them into two internal ports: Port A and Port B. The ports on the 2 UCM6510s should be connected to each Port A and Port B respectively and the external ports on the HA100 provide PBX service. Powered by an advanced hardware platform and revolutionary software functionalities, the connection between the UCM6510 and HA100 offers a breakthrough turnkey solution for converged voice, video, data, fax, security surveillance, and mobility applications out of the box without any extra license fees or recurring costs.



Figure 1: High Availability



PRODUCT OVERVIEW

Feature Highlights

The following tables contain the major features of the HA100:

Table 1: HA100 Features at a Glance

HA100 	<ul style="list-style-type: none"> Designed to provide a failover solution for the UCM6510. Connect two UCM6510s to the HA100 to create a back-up solution and automatically switch to a secondary UCM6510 if the main one fails. An ideal complimentary connector to the UCM6510 for businesses that need a reliable UC system without any interruptions or failures. Up to 14 LED indicators that can be controlled by GPIO ports.
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HA100 Technical Specifications

The following table resumes all the physical and technical specifications for HA100:

Table 2: HA100 Technical Specifications

Back Panel Interface	
Analog Telephone FXS Ports	2 ports
PSTN Line FXO Ports	2 ports
T1/E1 Interface	1 port
Network Interfaces	1 LAN/ 1 WAN
RS-485	2; 1 for Primary UCM6510; 1 for Secondary UCM6510
Reset Switch	Yes
Universal Power Supply	DC Power Port
Front Panel Interface	
Analog Telephone FXS Ports	2; 1 FXS A, 1 FXS B
PSTN Line FXO Ports	2; 1 FXO A, 1 FXO B
T1/E1 Interface	2 ports; T1/E1 A, T1/E1 B
LED Indicators	Power, T1/E1, FXS, FXO, LAN, WAN
CPU	ARM Coretex-M0 +
Memory & Flash	4KB SRAM Memory, 16KB Flash
Microchip	Atmel SAM D11D 24-pin QFN



Equipment Packaging

The following diagram illustrate the equipment packaging for the HA100:

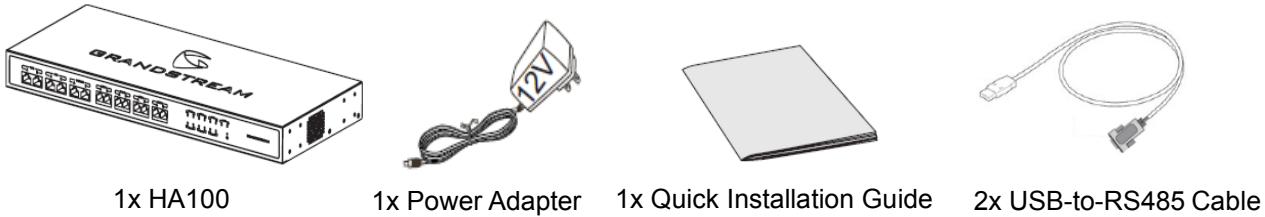


Figure 2: HA100 Package Contents

Note: Check the package before installation. If you find anything missing, contact your reseller/distributor.

INSTALLATION

Before deploying and configuring the HA100, the unit needs to be properly powered up and connected. This section describes detailed information about the HA100 interfaces and also the steps needed for installing and connecting the HA100.

HA100 Interfaces

The HA100 device contains 24 ports, 1 reset button and 1 ground interface.

The 24 ports include 7 pairs of internal ports, 7 external ports, 2 RS485 ports and 1 power port.

HA100 Back Panel

The following screenshot illustrates the back panel of the HA100 containing the external ports:

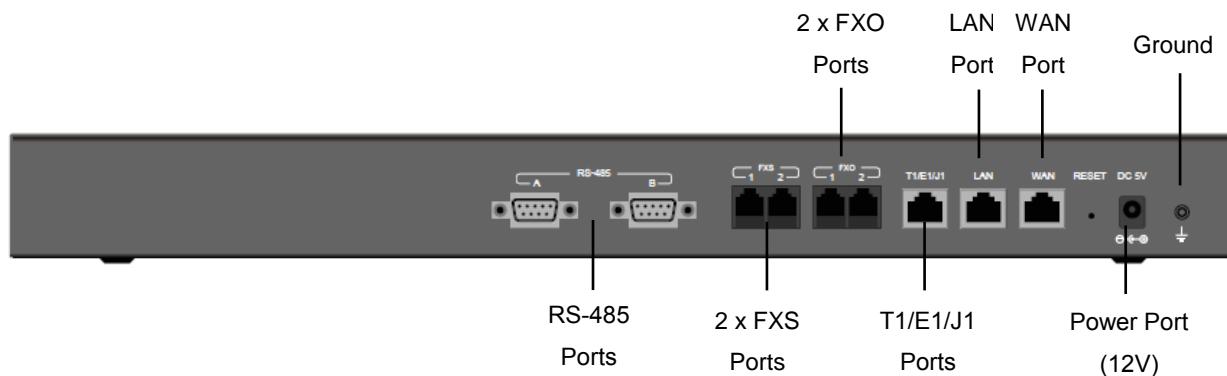


Figure 3: HA100 Back Panel

The back panel contains the external HA100 ports:

- 2 FXS ports.
- 2 FXO ports.
- 1 WAN port.
- 1 LAN port.
- 1 T1/E1/J1 port.
- 2 FXS ports.
- 2 FXO ports.
- 1 WAN port.
- 1 LAN port.
- 1 T1/E1/J1 port.



HA100 Front Panel

The following screenshot illustrates the front panel of the HA100 containing the external ports:

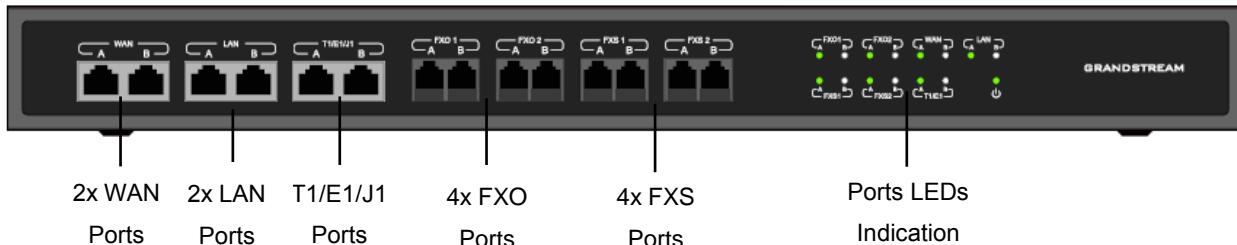


Figure 4: HA100 Front Panel

The front panel contains the internal HA100 ports:

- 1 pair of internal WAN ports (WAN-A, WAN-B)
- 1 pair of LAN ports (LAN-A, LAN-B)
- 1 pair of T1/E1/J1 ports (T1/E1/J1-A, T1/E1/J1-B)
- 2 pairs of internal FXS ports (FXS 1-A, FXS 1-B, FXS 2-A, FXS 2-B)
- 2 pairs of internal FXO ports (FXO 1-A, FXO 1-B, FXO 2-A, FXO 2-B)

RS-485 Interface

The HA100 contains also 2 RS485 ports on its back panel as displayed on the following screenshot for defining and transmitting the electrical characteristics of drivers and receivers when using a serial communication.

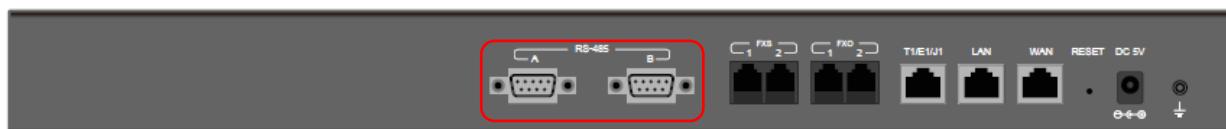


Figure 5: RS485 Ports on the UCM

LED Indication

There are total of 15 LED lights on HA100, including 1 power indicator and 7 pairs of internal port indicator.

- **Power indicator:**

The indicator will be in solid green once HA100 is powered on.

- **Internal port indicator:**

Each internal A and B port has a LED indicator for it. The LED indicator will be in solid green when the internal port is connected to UCM. For each pair of port A and port B, only 1 LED indicator will be in solid green at one time.





Figure 6: HA100 LEDs



HA100 CONNECTION

This section provides the connection types and steps needed for connecting the HA100 with 2 UCM6510.

Powering And Connecting the HA100

The external connections are used on the external ports for following purposes:

Powering up the HA100, network connection, PSTN lines connection, Analog/Fax connection and also digital (T1/E1/J1) connections.

Please refer to following steps for the basic connection on the HA100:

1. Connect one end of the Ethernet cable to the WAN port of the HA100, connect the other end of the cable to the uplink of a hub or switch.
2. Connect 12V power adapter to the 12V power port on HA100, connect the other end to the power jack.



Figure 7: Basic Connection on HA100

Optional Connections

Please refer to followings steps for the optional connections on the HA100:

1. **For PSTN connection:** Connect a PSTN cable to the FXO external port on HA100.
2. **For Analog phone/Fax connection:** Connect analog phone or FAX machine to the FXS external port on HA100.
3. **For T1/E1/J1 connection:** Bring your digital connection cable from the service provider side to the T1/E1/J1 external port on HA100.
4. **For LAN connection:** Connect one end of the Ethernet cable to the LAN external port on HA100, connect the other end to switch, hub or etc.



Connecting The HA100 with 2 UCM6510

This is the connection between HA100 and the 2 UCM6510s, one acting as primary server (providing online service) and the other as backup server (it doesn't provide service until the primary server is down).

Environment

For the internal connection, we will assume that users have already the following environment items ready:

- 4 Ethernet cables and 2 T1/E1/J1 cables.
- 8 PSTN cables.
- 2 USB-to-RS485 serial cables.
- 2 UCM6510 (UCM A and UCM B).

Connection Steps

Please refer to followings steps for the basic internal connections between HA100, UCM A and UCM B:

1. Connect respectively the FXO port, FXS port, E1/T1/J1 port, WAN port and LAN port on UCM A to the FXO-A port, FXS-A port, E1/T1/J1-A port, WAN-A port and LAN-A port on HA100.
2. Use the USB-to-RS485 serial cable to connect UCM A's USB port to the RS485-A port on HA100.
3. Connect respectively the FXO port, FXS port, E1/T1/J1 port, WAN port and LAN port on UCM B to the FXO-B port, FXS-B port, E1/T1/J1-B port, WAN-B port and LAN-B port on HA100.
4. Use the USB-to-RS485 serial cable to connect UCM B's USB port to the RS485-B port on HA100.
5. Use Ethernet cable to connect the Heartbeat ports on Primary UCM A and Backup UCM B.

The following diagram illustrate the connection between the HA100 and 2 UCM6510 PBXs.

In this scenario, the HA100 separates the external port into the corresponding internal ports (A and B), by default, the port A is always connected and port B is always disconnected, so only one UCM device is successfully connected at one time. If the primary UCM (UCM6510 A) detects problem on itself, it will send signaling to HA100 via USB-to-RS485 cable to switch the connection towards the backup server, or in case the primary server is down by any reasons, for instance power outage, the HA100 will then switch the connection from port A to port B, making port B successfully connected and having backup UCM (UCM6510 B) to provide service.



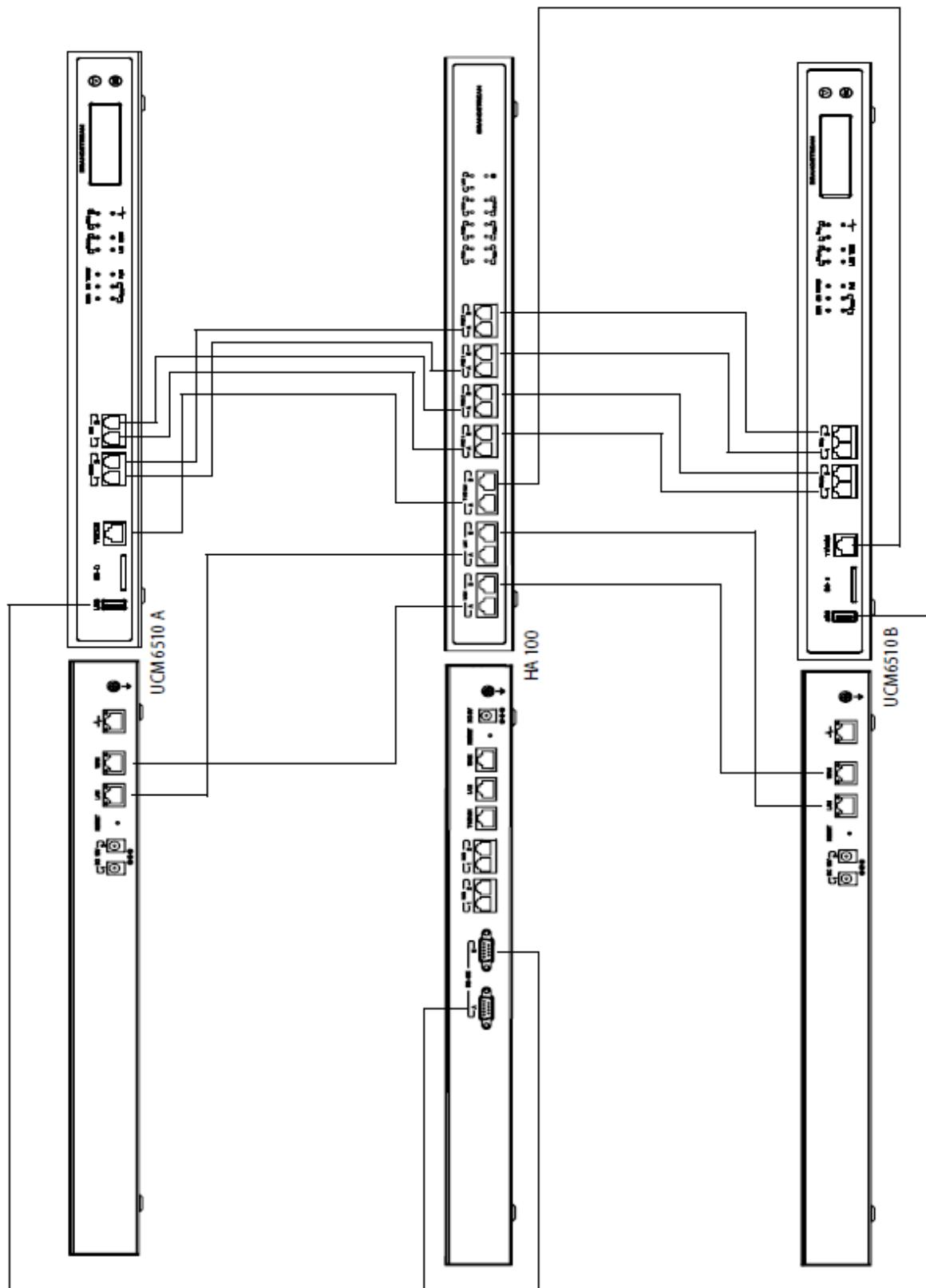


Figure 8: HA100 Connection with UCM A and UCM B

Function Description

HA100 separates the external port into the corresponding internal ports (A and B). By default, port A is always connected and port B is always disconnected, so only one UCM device is successfully connected at one time. When the 2 UCMs connect to HA100 via port A and port B, the primary UCM uses the external port on HA100 for data transmission. Additionally, the RS485 port on HA100 receives signaling from UCM to achieve the switch between port A and port B.

If the internal port A on HA100 is connected successfully with the corresponding port on primary UCM, the LED indicator for port A on HA100 will be in solid green. The primary UCM uses the external ports on HA100 to provide service. In this case, the LED indicator for port B on HA100 will not light up and the backup UCM doesn't provide service.

If the primary UCM detects problem on itself, it will send signaling to HA100 via USB-to-RS485 cable. HA100 will then switch the connection towards the backup server or in case the primary server is down by any reasons, for instance power outage, the HA100 will then switch the connection from port A to port B, making port B successfully connected and having backup UCM to provide service. In this case, the LED indicator for port B on HA100 will light up in solid green while the LED indicator for port A will be off.



EXPERIENCING HA100

Please visit our Website: <http://www.grandstream.com> to receive the most up- to-date updates on firmware releases, additional features, FAQs, documentation and news on new products.

We encourage you to browse our [product related documentation](#), [FAQs](#) and [User and Developer Forum](#) for answers to your general questions. If you have purchased our products through a Grandstream Certified Partner or Reseller, please contact them directly for immediate support.

Our technical support staff is trained and ready to answer all of your questions. Contact a technical support member or [submit a trouble ticket online](#) to receive in-depth support.

Thank you again for using Grandstream HA100 module, it will be sure to bring reliability to your business Telephony infrastructure.



FCC Compliance Statement:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

※※※ **End of user's manual** ※※※