

User Manual

AC-SW411-AUHD 18 GBPS 4x1+1 Switcher with 100 Meter HDBaseT Receiver

AC-SW411-AUHD & AC-EX100-UHD-R



USER MANUAL Ver. 1.0

Introduction

The SW411 is an HDMI 2.0(a) 18 GBPS HDMI POE switch designed for switching in home and commercial environments where switching of high-bandwidth AUHD (2160P60 4:4:4) content is required. The AC-SW411-AUHD supports all HDR sources including streamers and new UHD Blu-Ray Players hitting the market in 2016 and 2017. Features 4 HDMI 2.0(a) Inputs and 1 HDMI 2.0(a) output plus a 100-meter single CAT HDBaseT output port and includes the HDBaseT 100-meter receiver with IR, RS-232 and Ethernet. Features digital and analog audio de-embedding of active channel and an Ethernet port and Web GUI for setup, switching, EDID management, firmware updates, remote reset and third party control. Additionally, the AC-SW411-AUHD is controllable via built in RS-232 or IR. Receiver is powered from the AC-SW411 via POE so there is no requirement for extra AC at the sink/display.

Typical Applications:

- Classrooms, Boardrooms, Conference rooms for switching 18GBPS content sources via multiple control options (3rd party controllers, Web GUI, simple remote or front panel buttons)
- High-end home theaters for showing 18GBPS 2.0(a) content with HDCP 2.2 copy protection
- Long distance applications where the rack is up to 100 meters from the display.

What's in the Box?

- 1 x AC-SW411-AUHD
- 1 x AC-EX100-UHD-R
- 1 x 48VDV Power Supply
- 1 X RS232 Breakout Cable
- Remote Control
- User Manual

Features

- HDMI 2.0(a) on all ports.
- 18 GBP/sec video bandwidth HDMI and 10.2 GBPS HDBaseT
- Web GUI Interface
- Supports digital video formats up to 4K AUHD (2160P60 @4:4:4)
- Advanced EDID management includes HDR, Legacy, Downstream and More.
- Includes EDID Rotary switch with 16 canned EDIDs
- Supports uncompressed PCM 2- Ch., 5.1, 7.1, Dolby Digital, DTS, Dolby TrueHD, DTS HD-Master Audio and more.
- IR In and Out jacks (3.5 MM) 3-20VDC - works with everything!
- Bi-directional RS-232 – Control switch or integrate 3rd party control.
- 3.5 Analog Stereo and Digital SPDIF for audio de-embedding
- HDCP 2.2 compliant
- Bonus Ethernet port on HDBaseT Receiver plus IR and RS-232

Specifications

Video Bandwidth

HDMI - 18 GBP/sec
HDBaseT - 10.2 GPBS Max

Video Resolutions

All SMPTE & VESA in HDMI 2.0 Specification. Max SMPTE UHD - 4096x2160P60/RGB/4:4:4 8-bit.

Max for HDBaseT port is 2160P60/4:2:0 8-bit (HDBaseT/CAT limitation)

Color Space

RGB, YUV

Color Bit Depth

8-bit, 10-bit, 12-bit & 16-bit per pixel

Note: Resolution and video bandwidth limited – ex. 2160P60 RGB or 4:4:4 8-bit would use almost the entire 18 GBPS of bandwidth. 2160P60 4:2:2 10-bit (new players with HDR) would exceed the previous 10.2 GBPS maximum of HDMI 1.4a and would not be able to travel over category cable using HDBaseT.

Chroma Subsampling

4:4:4, 4:2:2, 4:2:0

See note above – chroma subsampling or color compression is related to bit depth and video resolution settings with regard to total bandwidth requirements. A 4K/60 signal at 4:4:4 chroma subsampling can have a maximum bit depth of 8 bits.

Audio

HDMI in & Out – Up to Dolby TrueHD and DTS-HD Master
SPDIF – Up to Dolby Digital & DTS 5.1
3.5 Stereo - Analog 2 Channel

Distance - HDMI – Up to 11M @ 4K60 4:4:4, HDBaseT – Up to 100M at 4K/60 4:2:0 8-bit

HDCP - 2.2, 1.4 or None

CEC - Pass through

Connections

- 4 x HDMI type A HDMI Input
- 1 x HDMI type A HDMI Output
- 1 x RJ45 HDBaseT 100M Port (POE)
- 1 x SPDIF Digital Audio Output
- 1 x 3.5MM Analog 2-Channel Audio
- 1 x RJ45 LAN Port for TCP/IP Control
- 1 x 3-pin locking RS-232 port
- 1 x 3.5mm IR in Port (3-20 V)
- 1 x 3.5mm IR Out Port
- 1 x 2-Pin 48V Locking Connector

Temperature – Operating 32-122 F (0-50 C), Humidity: 20-90% non-condensing.

Dimensions

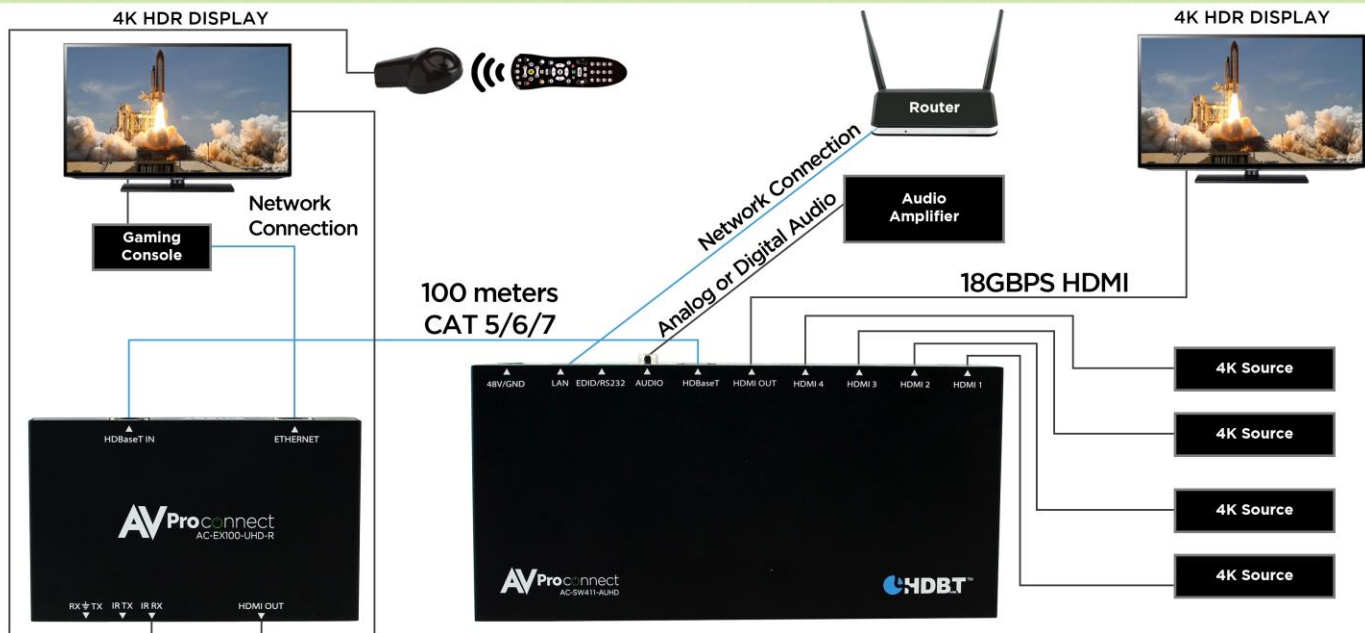
AC-411 - 8 1/2" L x 4 1/8" W x 1 1/2" H
AC-EX100 - 5 1/4" L x 3 1/4" W x 7/8" H

Weight

AC-411 - 1.4 pounds
AC-EX100 - .6 pounds

Certifications/Compliance

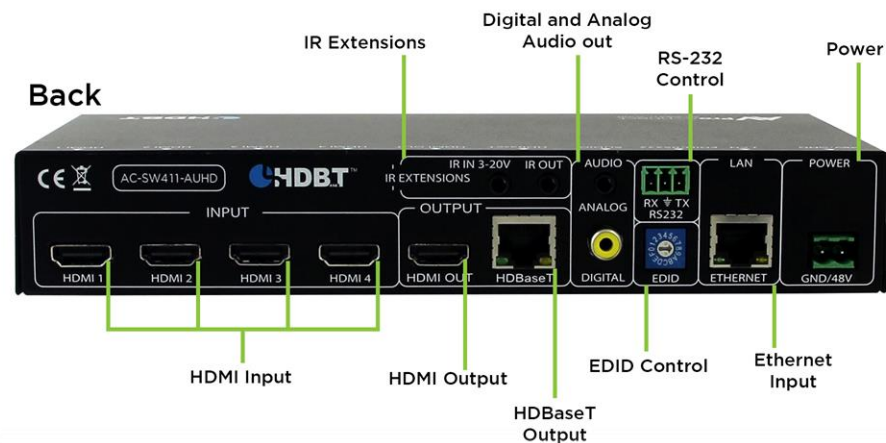
FCC, HDBaseT, CE, RoHS, HDCP, HDMI



Front



Back



General Operation

Method 1 – Use as a 4x1 AUHD Switch where **content is above 10.2 GBPS** and content will be sent to one HDR Display or Projector via HDMI cable.

- Connect up to four 4K60 (or lower) sources to the SW411 HDMI ports
- Connect one HDMI cable between the SW411 HDMI out port to an HDR Projector or Display (max is about 15M as of this writing)
- Connect RJ45 cable to internet access point or directly to setup computer.
- Connect either analog 3.5 stereo or SPDIF digital coax to amplifier or AVR
- Connect IR Receiver (eye) to IR in port for using remote control

Out of the box if no setup or configuration is done and the supplied remote control is used you should be able to switch between the 4 sources. You can also use the front panel buttons to switch sources. If one of more of the sources do not come up check cables and connections first, then refer to EDID management section to customize settings.

Note: The HDBaseT port is inactive/not functional in this setup since the content is above 10.2 GBPS

Method 2 – Use as a 4x1+1 Switch where **content will be under 10.2 GBPS** (via EDID Management or native to the source) and a Display will be connected locally and a projector or display will be connected remotely (on a ceiling or...)

- Connect up to four 4K60 4:2:0 (or lower) sources to the SW411 HDMI ports (if the sources are capable of operation above 10.2 GBPS that is not a problem, via EDID the maximum signal that can pass through the system will be selected automatically).
- Connect one HDMI cable between the SW411 HDMI out port to an 4K Projector or Display (max is about 15M as of this writing)
- Connect a single CAT5e or higher cable between the HDBaseT port on the SW411 and the HDBaseT port on the EX100 (Receiver)
- Connect HDMI cable between EX100 and remote display or projector
- Make IR, RS232 and LAN connections as required for the application – IR for using remote to control the sources, bi-directional RS232 for connection into a 3rd party controller, and LAN for Web GUI access or as a spare LAN port for a SMART TV or a third party controller.
- Connect RJ45 cable to Internet access point or directly to setup computer. If connected to Internet access point the connection is shared at the extender and acts as a simple router.
- Connect either analog 3.5 stereo or SPDIF digital coax to amplifier or AVR
- Connect IR Receiver (eye) to IR in port for using remote control

Out of the box if no setup or configuration is done and the supplied remote control is used you should be able to switch between the 4 sources. You can also use the front panel buttons to switch sources. If one of more of the sources do not come up check cables and connections first, then refer to EDID management section to customize settings. On the remote side (at RX) all ports are now active and available.



RS232 Routing Diagram





AC-SW411-AUHD Remote Control

AC-SW411-AUHD remote control can be used for switching between inputs and powering the AC-SW411-AUHD up or down.

AVProconnect

AC-SW411-SUHD

Device Name:sw411-0000

INPUT

Input 1

Input 2

Input 3

Input 4

Refresh

EDID Management

For custom EDID tables, make sure rotary switch is set to 'F'

EDID table: 2160p60 HD Audio

Upload custom EDID file: (sw411.edid)

Choose Files

no files selected

Upload EDID

ADMINISTRATION

Serial:123456780000

Firmware:0.99

Hardware:0

IP Address:192.168.1.55

Hostname

Change Name

Factory Reset

Choose Files

no files selected

Upload Firmware

Reset SW411

Install Update

NOTES

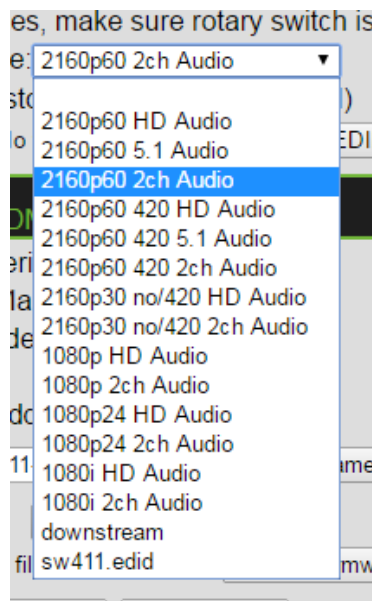
Notes

Save Notes

AC-SW411 Web GUI

SW411 GUI Operation

- **Device Name** – This is the default device name SW411-[XXXX] where XXXX is last 4 digits of the serial number. This can be found on the box and on the device itself. Use this to access the Web GUI as follows:
 - PC/Android – in a browser – type in: <http://SW411-XXXX/>
 - Apple Mac or IOS device – in a browser – type in: <http://sw411-XXXX.local>
- **Input Select** – Click on the thumbs up over the input you want to select.
- **EDID Management** – Make sure the rotary dial on the SW411 is set to “F” – this forces EDID selection via Web GUI. This allows advanced features such as:
- Uploading a custom EDID from your PC or MAC



- Selecting Custom EDIDs from the table above.
- There are several conditions in the Web GUI (custom mode) that automatically address conditions related to EDID management under unique operating environments, for example:
 - In **any custom mode**, there will never be re-flashing sync events when plugging/unplugging any of the four outputs.
 - In **downstream mode**, the EDID will be mixed every time when either of the outputs is plugged/unplugged. The mixing is based on the minimum shared capabilities in order to always show a picture and audio. When only one is connected then of course that display is copied.
 - The top 3 EDIDs allow everything, up to 600MHz including 420 12-bit deep color, bt2020 and HDR
 - Then the capabilities gradually lessen when selecting the lower EDIDs.
 - The default position of the rotary is “0” from the factory so it means **downstream mode** is selected.

- **Administration** - Use this section for renaming the device (CR1, CR2 etc.), completing a factory reset or loading new firmware.
- **Note Section** – This is for installer/user notes perhaps on EDID selections or the like.

EDID Management via Rotary Switch

- Rotary positions are 0,1,2,3,4,5,6,7,8,9, A, B, C, D, E, F
- 0 = downstream EDID and is the factory default – this is essentially automatic EDID selection based on commonality of the displays for selecting the best possible audio and video signal for the source being used.
- 1 - E are fixed tables matching the table below
- F = Custom tables. This mode opens up the selectable menu on the web page. When the rotary dial is in the “F” position, then any of the custom tables can be selected. You can also upload any EDID file from your PC in this “F” mode.

| Rotary Position | EDID |
|-----------------|--------------------------|
| 0 | Downstream (Mix) |
| 1 | 2160p60 HD Audio (18G) |
| 2 | 2160p60 5.1 Audio (18G) |
| 3 | 2160p60 2ch Audio (18G) |
| 4 | 2160p60 420 HD Audio |
| 5 | 2160p60 420 5.1 Audio |
| 6 | 2160p60 420 2ch Audio |
| 7 | 2160p30 no/420 HD Audio |
| 8 | 2160p30 no/420 2ch Audio |
| 9 | 1080p HD Audio |

| Rotary Position | EDID |
|-----------------|-----------------------|
| A | 1080p 2ch Audio |
| B | 1080p24 HD Audio |
| C | 1080p24 2ch Audio |
| D | 1080i HD Audio |
| E | 1080i 2ch Audio |
| F | Custom (Use Software) |
| | |
| | |
| | |

Additional Info:

- In any custom mode, there will never be re-flashing sync events when plugging/unplugging either of the two outputs.
- In downstream mode, the EDID will be mixed every time when either of the outputs is plugged/unplugged. The mixing is based on the minimum shared capabilities in order to always show a picture and audio. When only one is connected then of course that display is copied.
- The top 3 EDIDs allow everything, up to 600MHz including 420 12bit deep color, bt2020 and HDR
- Then the capabilities gradually lessen when selecting the lower EDIDs.
- The default position of the rotary is “0” from the factory so it means downstream mode is selected.

RS-232 and Ethernet Commands and Syntax

Note: Commands are the same in both IP and RS-232 except you need to preface all RS-232 command with the "@" sign. Do not use any brackets like ("`</>`")

For selecting input:

insel: HDMI Input Selection

usage example: insel <1|2|3|4>

For getting device status:

st: Get Device Status

usage example: st

To power the device on or off:

power: power AVP-X411 on/off

usage example: power <on|off>

To print a summary of commands:

help: Responds with command list

usage example: help

To get a report of system up time:

uptime: Responds with System uptime

usage example: uptime

To check the firmware revision:

version: Responds with Firmware Version

usage example: version

NOTE: The RS232 port is also connected to the HDBT extender, and available on the remote end. We allow a control system to communicate both with the device on the other end as well as the SW411 directly. To do this, the commands above must be prefixed with either @sw411 or @<hostname> where <hostname> is the name configured through the web page (defaults to sw411-XXXX).

Response Structure:

<@hostname> <sp> <parameter> <sp>... <parameter> <sp> <end of response>

<@hostname> = indicates the device initiating the response

<sp> = space, ASCII 0x20

<parameter> = command-specific number of parameters, each followed by a

space 0x20 [hex] <end of response> = newline char \n, ASCII 0xA [hex]

For example:

@sw411 insel 3

@sw411-0000 insel 2

IR Commands

Select Input 1

avpir_sw411_hdmi1:

0000 006e 0000 0022 0156 00ab 0015 003f 0015 003f 0015 003f 0015 003f 0015 003f
0015 003f 0015 003f 0015 003f 0015 0015 0015 0015 0015 0015 0015 0015 0015
0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 003f 0015 0015 0015 003f
0015 0015 0015 0015 0015 003f 0015 0015 0015 003f 0015 0015 0015 003f 0015
0015 0015 003f 0015 003f 0015 0015 0015 003f 0015 1d0b

Select Input 2

avpir_sw411_hdmi2:

0000 006e 0000 0022 0156 00ab 0015 003f 0015 003f 0015 003f 0015 003f 0015 003f
0015 003f 0015 003f 0015 003f 0015 0015 0015 0015 0015 0015 0015 0015 0015
0015 0015 0015 0015 0015 0015 0015 0015 003f 0015 003f 0015 0015 0015 0015
0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 003f 0015
003f 0015 003f 0015 003f 0015 003f 0015 003f 0015 1d0b

Select Input 3

avpir_sw411_hdmi3:

0000 006e 0000 0022 0156 00ab 0015 003f 0015 003f 0015 003f 0015 003f 0015 003f
0015 003f 0015 003f 0015 003f 0015 0015 0015 0015 0015 0015 0015 0015 0015
0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 003f 0015 0015 0015 0015
0015 0015 0015 0015 0015 0015 0015 0015 0015 003f 0015 0015 0015 003f 0015
003f 0015 003f 0015 003f 0015 003f 0015 003f 0015 1d0b

Select Input 4

avpir_sw411_hdmi4:

0000 006e 0000 0022 0156 00ab 0015 003f 0015 003f 0015 003f 0015 003f 0015 003f
0015 003f 0015 003f 0015 003f 0015 0015 0015 0015 0015 0015 0015 0015 0015
0015 0015 0015 0015 0015 0015 0015 0015 003f 0015 0015 0015 0015 0015 0015
0015 003f 0015 0015 0015 003f 0015 0015 0015 0015 0015 003f 0015 003f 0015 003f
0015 0015 0015 003f 0015 0015 0015 003f 0015 1d0b

Power Off

avpir_sw411_poweroff:

0000 006e 0000 0022 0156 00ab 0015 003f 0015 003f 0015 003f 0015 003f 0015 003f
0015 003f 0015 003f 0015 003f 0015 0015 0015 0015 0015 0015 0015 0015 0015
0015 0015 0015 0015 0015 0015 0015 0015 003f 0015 0015 0015 0015 0015 003f
0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 003f 0015 003f 0015
0015 0015 003f 0015 003f 0015 003f 0015 003f 0015 1d0b

Power On

avpir_sw411_poweron:

0000 006e 0000 0022 0156 00ab 0015 003f 0015 003f 0015 003f 0015 003f 0015 003f
0015 003f 0015 003f 0015 003f 0015 0015 0015 0015 0015 0015 0015 0015 0015
0015 0015 0015 0015 0015 0015 0015 0015 003f 0015 0015 0015 003f 0015 003f
0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 003f 0015 0015 0015
0015 0015 003f 0015 003f 0015 003f 0015 003f 0015 1d0b

Toggle Power

avpir_sw411_powertoggle:

0000 006e 0000 0022 0156 00ab 0015 003f 0015 003f 0015 003f 0015 003f 0015 003f
0015 003f 0015 003f 0015 003f 0015 0015 0015 0015 0015 0015 0015 0015 0015
0015 0015 0015 0015 0015 0015 0015 0015 003f 0015 0015 0015 003f 0015 0015
0015 0015 0015 0015 0015 003f 0015 0015 0015 0015 0015 003f 0015 0015 0015
003f 0015 003f 0015 003f 0015 0015 0015 003f 0015 1d0b

■ Maintenance

Clean this unit with a soft, dry cloth. Never use alcohol, paint thinner or benzine to clean this unit.

■ Product Service

● Provided Service

1) Damage Requiring service: The unit should be serviced by qualified service personnel if:

- The DC power supply cord or AC adaptor has been damaged;
- Objects or liquids have gotten into the unit;
- The unit has been exposed to rain;
- The unit does not operate normally or exhibits a marked change in performance;
- The unit has been dropped or the cabinet damaged.
-

2) Servicing Personnel: Do not attempt to service the unit beyond that described in these operating instructions. Refer all other servicing to authorized servicing personnel.

3) Replacement parts: When parts need replacing ensure the service uses parts specified by the manufacturer or parts that have the same characteristics as the original parts. Unauthorized substitutes may result in fire, electric shock, or other hazards.

4) Safety check: After repairs or service, ask the service to perform safety checks to confirm that the unit is in proper working condition.

● Mail-In Service

When shipping the unit, carefully pack and send it prepaid, adequately insured and preferably in the original carton. Include a letter detailing the complaint and provide a daytime phone and/or email address where you can be reached. If repair is needed during the limited warranty period, the purchaser will be required to furnish a sales receipt/proof of purchase indicating date of purchase, amount paid and place of purchase. Customer will be charged for the repair of any unit received without such proof of purchase.

● Warranty

If your product does not work properly because of a defect in materials or workmanship, AVProConnect (referred to as “the warrantor”) will, for the length of the period indicated as below, (10 Years) which starts with the date of original

purchase ("Limited Warranty period"), at its option either (a) repair your product with new or refurbished parts, or (b) replace it with a new or a refurbished product. The decision to repair or replace will be made by the warrantor. During the "Labor" Limited Warranty period there will be no charge for labor. During the "Parts" warranty period, there will be no charge for parts. You must mail-in your product during the warranty period. This Limited Warranty is extended only to the original purchaser and only covers product purchased as new. A purchase receipt or other proof of original purchase date is required for Limited Warranty service.

● **Warranty Limits and Exclusions**

1) This Limited Warranty ONLY COVERS failures due to defects in materials or workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage. The Limited Warranty ALSO DOES NOT COVER damages which occurred in shipment, or failures which are caused by products not supplied by the warrantor, or failures which result from accidents, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, set-up adjustments, misadjustment of consumer controls, improper maintenance, power line surge, lightning damage, modification, or service by anyone other than a Factory Service Center or other Authorized Service, or damage that is attributable to acts of God.

2) There are no express warranties except as listed under "limited warranty coverage". The warrantor is not liable for incidental or consequential damages resulting from the use of this product, or arising out of any breach of this warranty. (As examples, this excludes damages for lost time, cost of having someone remove or re-install an installed unit if applicable, travel to and from the service location, loss of or damage to media or images, data or other recorded content. The items listed are not exclusive, but are for illustration only.)

Safety Instructions:

After Sale Service

To ensure reliable operation of this product as well as protecting the safety of any person using or handling this device while powered, please observe the following instructions.

1. Use the power supplies provided. If an alternate supply is required, check voltage, polarity and that it has sufficient power to supply the device it is connected to.
2. Do not operate these products outside the specified temperature and humidity range given in the above specifications.
3. Ensure there is adequate ventilation to allow this product to operate

efficiently.

4. Repair of the equipment should only be carried out by qualified professionals as these products contain sensitive devices that may be damaged by any mistreatment.

5. Only use this product in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with these products.

After Sale Service

1. Should you experience any problems while using this product, firstly refer to the Troubleshooting section in this manual before contacting Technical Support.

2. When Calling Technical Support, the following information should be provided:

- Product name and model number
- Product serial number
- Details of the fault and any conditions under which the fault occurs.

3. This Product has a ten-year standard warranty, beginning from the date of purchase as stated on the sales invoice.

4. Product warranty is automatically void under any of the following conditions:

The product is already outside of its warranty period

- Damage to the product due to incorrect usage or storage
- Damage caused by unauthorized repairs
- Damage caused by mistreatment of the product

5. Only use this product in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with these products.

Thank you for your purchase!