

NETWORKING AND REMOTE MANAGEMENT PRODUCT GUIDE

2020

WELCOME TO OUR NETWORKING AND REMOTE MANAGEMENT GUIDE



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MICHAEL ROBERTS

Business Manager

I have spent the last 10 years working for Invision and have built a vast knowledge of all products we supply to the custom install market. As Business Manager I work closely with our manufacturers to ensure our range meets the needs of this market.

This guide has been created for you, to give you the necessary knowledge to create a seamless and reliable network, whether big or small, using the latest Luxul product range. With Domotz you can remotely monitor and manage your customer's networkings, to enhance customer service and increase efficiency. Should you require any further support on Luxul or Domotz, please do not hesitate to contact me.

Michael Roberts Business Manager



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MARK TAYLOR

Commercial Director

Invision is the UK's fastest growing distributor of market leading systems for today's Smart Home, supplying professional installers with innovative products and integrated solutions.

Our investment in products, training, service and support will continue during 2020, to provide you with one stop access to all the products you need for your next installation. Remember that we stock so you don't have to! All products are available on a next day delivery service to UK mainland destinations.

Our new 2020 product guides, organized by market category, are designed to bring you the very latest information from our exceptional product portfolio and I would welcome your feedback.

Mark Taylor Commercial Director



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LUXUL

ABOUT LUXUL





WHAT LUXUL OFFERS...

Luxul is the leading innovator of simple-to-deploy professional grade IP networking solutions for use by custom installation professionals. Designed for use in both residential and commercial environments, the Luxul family offers a complete line of products that simplify network design and deployment, resulting in a scalable network that is both powerful and easy to install.

With Luxul, installers can deliver the ultimate IP network without the complexity associated with traditional networking gear.

All Luxul products include free lifetime support and a three year limited warranty. Luxul equipment is available exclusively through Invision.

WITH LUXUL, YOU GET:

- Complete line of access points, switches and routers
- Simple installation
- Products not sold online!
- Free lifetime support
- 3 year limited warranty



LUXUL



WIRELESS ACCESS POINTS



WHY USE A LUXUL ACCESS POINT?

Think of an access point as a switch that does not require network devices to have a physical connection. As there are a number of wireless networking methods and technologies, each with its own advantages and disadvantages, we will cover this topic in greater detail in a future article. For now, we will simply discuss the basic issues to be considered.

With wireless networking there is no 'one size fits all' solution. Access points come in a wide variety of form factors and performance options. Consider the following when selecting an access point:

COVERAGE AREA:

Output power, type of antennas used, and the technology standards implemented all play a role in how much coverage you can expect with a given access point. For example, a standard access point has up to 100mW output power and will reasonably cover 2000+ square feet.

ACCESS POINT PLACEMENT:

Depending on where the access point will be placed can determine the type of access point to use. For example, if placed in the centre of the desired coverage area, an access point with omnidirectional antennas is optimal; while placement at the edge of the desired coverage area is better served with the use of a directional antenna. Access point aesthetics may also play a role in the selection process if placement must be on a wall, ceiling, or other high traffic area.

ENVIRONMENTAL ISSUES:

The environment can play a role in determining which access point to use. Outdoor implementations will certainly require an outdoor rated access point. For indoor applications, the type of construction can impact the effectiveness of wireless signals and determine the choice of access point. There are a number of wireless survey tools that can help identify environmental issues as well as be used to demonstrate network reach and effectiveness to the customer. These tools include, Kperf/lperf, InSSIDer, and Ekahau Heatmapper.

XAP-810

The XAP-810 delivers data rates up to 1200Mbps along with excellent wireless coverage for a world class Wi-Fi experience. The sleek design allows for unobtrusive mounting on a ceiling, wall, or other flat surface - making it a great choice for stretching budgets and delivering coverage to smaller places. It is compatible with the XWC-1000 wireless controller and can be used standalone or as part of a multi-AP deployment.



WIRELESS
CONTROLLER
COMPATIBLE

USE THE XAP-810 TO:

- Deliver broader Wi-Fi coverage and eliminate client device roaming issues
- Maximize data rates with concurrent dual-band (2.4GHz and 5GHz) technology
- Optimize VoIP, streaming media, and other demanding applications
- Create a secure guest network*
- Simplify Wi-Fi installation while minimizing setup time and costs
- Minimize unsightly cables and equipment

FEATURES

- 802.11ac Wi-Fi (up to 1200Mbps)
- Concurrent dual-band (2.4GHz and 5GHz)
- Compatible with XWC-1000 controller
- VLAN support for creating a secure guest network*
- Single cable installation with PoE (injector included)
- Installs on ceiling or wall; or use as a desktop access point
- Up to 4 SSIDs per band (8 total)

FOR UPDATES, VISIT: LUXUL.COM/FIRMWARE-UPDATES

For full articles from Luxul, visit www.luxul.com

XAP-1510

The XAP-1510 provides exceptional Wi-Fi performance in a sleek design that allows for unobtrusive mounting on a ceiling, wall, or other flat surface. With leading edge concurrent dual-band 3x3 MIMO technologies, it delivers superior wireless coverage and maximum data rates. The integrated PoE simplifies installation, requiring only a single Ethernet cable for both power and data.


**WIRELESS
CONTROLLER
COMPATIBLE**
USE THE XAP-1510 TO:

- Deliver broader Wi-Fi coverage and eliminate roaming issues
- Maximize data rates with concurrent dual-band technology
- Optimize VoIP, streaming media and other demanding applications
- Create a secure guest network*
- Simplify Wi-Fi installation while minimizing setup time and costs
- Minimize unsightly cables and equipment

FEATURES

- 802.11ac Wi-Fi (up to 1900Mbps)
- Concurrent dual-band (2.4GHz and 5GHz)
- Data transfers of up to 1900Mbps
- Compatible with XWC-1000 controller
- VLAN support for creating a secure guest network*
- Single cable installation with PoE (injector included)
- Installs on ceiling or wall; or use as a desktop access point
- Up to 128 wireless clients supported

* VLAN setup requires the use of additional hardware. See page 11 of this guide for more information

XAP-1240

The XAP-1240 300N outdoor access point is the perfect option for delivering broad Wi-Fi coverage to outdoor areas. It is compatible with the XWC-1000 wireless controller and can be used standalone or as part of a multi-AP deployment. Installation is simple, requiring only a single Ethernet cable that delivers both power and data through the integrated PoE port. The weather resistant enclosure is designed to be either surface or pole mounted.


**WIRELESS
CONTROLLER
COMPATIBLE**
USE THE XAP-1240 TO:

- Provide broad outdoor wireless coverage
- Deliver seamless client roaming when used with XWC-1000 wireless controller
- Optimize VoIP, streaming media and other demanding applications
- Create a secure guest network*
- Simplify Wi-Fi installation and minimize setup time

FEATURES

- Data transfers up to 300Mbps
- Patented signal propagation technology
- VLAN AND QoS support*
- Up to 4 SSIDs
- Single cable installation with PoE (injector included)
- Weather resistant IP-66 compliant enclosure
- Up to 50 wireless clients supported

* VLAN setup requires the use of additional hardware. See page 11 of this guide for more information

XWO-BAP1

Use standalone or in multiples as wireless outdoor bridging APs to provide connectivity to remote locations such as an outbuilding or guest house; or to connect IP cameras and other devices. The XWO-BAP1 combines leading-edge dual-band 802.11ac Wi-Fi technology with high output power. The reliable and rugged IP-65 rated design offers flexible pole or wall mounting options - making it a great choice for delivering superior outdoor wireless bridging and coverage.

**RESIDENTIAL APPLICATIONS:**

- Bridge to guest house, boat dock, or garage
- Connect gates and cameras
- Outdoor/ pool coverage

COMMERCIAL APPLICATIONS:

- Bridge to warehouse, shop, or other buildings
- Outdoor connectivity
- Cameras and security

FEATURES

- Dual-band 2.4GHz and 5GHz
- High output power for maximum coverage
- Data transfers up to 1200Mbps
- Concurrent dual-band wireless 802.11ac (up to 1200Mbps)
- Support for point-to-point and point-to-multipoint wireless bridging
- Up to 4 SSIDs per band (8 total)
- Weather resistant enclosure (IP-65)

* VLAN setup requires the use of additional hardware. See page 11 of this guide for more information

COMPARISON TABLE

Product code	802.11ac with beamforming ON 2.4GHz or 5GHz	Wireless transmit speed	Ethernet Ports	No. of clients supported	Signal Pattern	SSID	VLAN Support	MIMO	Dimensions (HxWxD)
XAP-810	Yes 2x2	1200Mbps	1x Gigabit	50+	Omni	8 (4 per band)	Y	2	158x158x44mm
XAP-1510	Yes 3x3	1900Mbps	2x Gigabit	125+	Omni	8	Y	3	184x184x51mm
XAP-1240	No 2x2	300Mbps	1x Gigabit	50	Omni	4	Y	2	95x270x70mm
XWO-BAP1	N/A	1200Mbps	2 x Gigabit	50	7dbi	4	Y	N/A	229x229x149mm

VLANS

Creating a secure guest network is probably one of the most common requests you get from your customers.

They want you to give friends and family access to the Wi-Fi network but not give them any visibility of other devices. This could be for security reasons, to keep sensitive information away from guests, or simply to stop them downloading an app and taking control of the devices in their home.

With Luxul, this is very easy to configure but does require the correct hardware to do it. This is where using any managed switch from the Luxul range is required.

A managed switch is needed to create a Virtual Local Area Network, or VLAN, to segregate the guest network from the main network.

To learn more about VLANs please visit www.invisionuk.com/training to find out about training courses we have available to teach you how to implement a secure guest network.



SCAN THIS QR CODE
FOR VLAN SETUP VIDEO

LUXUL



WIRELESS CONTROLLER & BUNDLES



SETTING UP THE CONTROLLER

1.

Use an Ethernet cable to plug the XWC-1000 wireless controller into the network.

DO NOT CONNECT ANY ACCESS POINTS TO THE NETWORK YET

Note: Be sure a DHCP server is present on the network and that all Luxul access points and the XWC-1000 wireless controller will share the same subnet. If your network uses a 192.168.0.X IP address scheme, you are ready to start the setup process. If not, you will need to manually change the IP address of your computer to be able to configure the XWC-1000 wireless controller so that it is on the same subnet as your network.

3.

Follow the built-in Setup Wizard in the wireless controller. The Wizard will direct you to power the access points on at the appropriate time and walk you through completing the setup.

2.

To access the Setup Wizard, open your web browser and enter the wireless controller's default 192.168.0.19 IP address in the address field. Log into the wireless controller using the default user name and password:

Default IP : 192.168.0.19

Username : admin

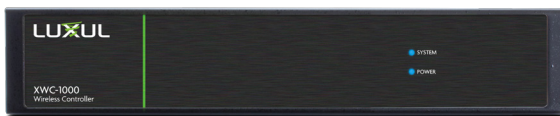
Password : admin

Note: If there is another device on the network already using the 192.168.0.19 address, you'll need to either temporarily disconnect or reconfigure that other device, or manually configure the wireless controller on a separate isolated network.



XWC-1000

The XWC-1000 wireless controller uses Luxul's exclusive Roam Assist™ technology to ensure seamless roaming of mobile client devices within wireless networks that utilise more than one access point, while providing simple, centralised deployment of up to 16 Luxul access points through an easy-to-use setup wizard. With seamless roaming, installation simplicity, and sensible pricing, the XWC-1000 is purpose built to meet the needs of the residential and light commercial custom installation professional.



USE THE XWC-1000 TO:

- Seamlessly roam between multiple access points
- Simply configure up to 16 access points
- Create a secure guest network with broad coverage*
- Cost effectively deliver centralised WLAN configuration and control

FEATURES

- Seamless client roaming between access points
- Simple central control and configuration of Luxul access points
- Secure guest networking*
- Supports up to 16 wireless access points
- Durable 1U metal enclosure for rack mount or desktop use
- 3 year limited warranty

* VLAN setup requires the use of additional hardware. See page 11 of this guide for more information

ACCESS POINT PLACEMENT

SITE CONDITIONS AND AP PLACEMENT

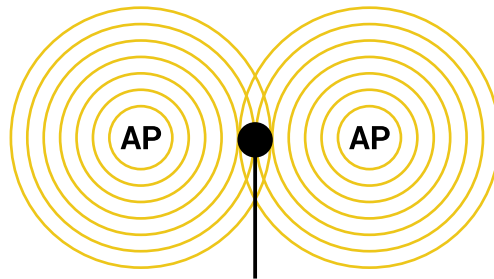
Any material can block a Wi-Fi signal, but some materials are worse than others. Wood, drywall, and glass don't affect the signal as much as brick, stone, or water. The worst materials for Wi-Fi transmission are ceramics, concrete, and metal. As you can imagine, a large concrete fireplace wrapped in metal lath and stone does a very good job blocking Wi-Fi signals.

Note: Signals pass through walls better at perpendicular angles than they do at oblique angles.

AP SEPARATION AND OVERLAP

In general, you should place access points to ensure adequate coverage, but not so far apart that there is no signal overlap. Adjacent access point signals should overlap enough that a client device has a good connection to the access point to which it is currently attached, but also sees the next nearest access point.

Ideally, roaming clients should see signal strength of two overlapping access points in the range of -60 to -70 dBm at the midway point between two access points.



signal strength overlap of -60 to -70 dBm at the midway point between 2 AP's

WIRELESS CONTROLLER KITS

XWS-1810 CONTROLLER KIT

- Includes:
- 1x XWC-1000
- 2x XAP-810 APs
- 2x PoE Injectors



WS-80 CONTROLLER KIT

- Includes:
- 1x XWR-1200
- 1x XAP-810 AP
- PoE Injector



XWS-2510 CONTROLLER KIT

- Includes:
- 1x XWC-1000
- 2x XAP-1510 APs
- PoE Injectors



WS-250 CONTROLLER KIT

- Includes:
- 1x XWR-3150
- 1x XAP-1510 AP
- PoE Injector



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WIRELESS PRINCIPLES & HEATMAPS



OVERVIEW

The 802.11 family consists of a series of half duplex over the air modulation techniques that use the same basic protocol. 802.11-1997 was the first wireless networking standard in the family, but 802.11b was the first widely accepted one, followed by 802.11a, 802.11g, 802.11n, and 802.11ac. Other standards in the family (c-f, h, j) are service amendments and extensions or corrections to the previous specifications.

2.4GHz	5GHz
	802.11a
802.11b	
802.11g	
	802.11n
	802.11ac

802.11a - 5GHz / 54Mbps

The 802.11a standard uses the same data link layer protocol and frame format as the original standard, but with an OFDM based air interface (physical layer). It operates in the 5GHz band with a maximum net data rate of 54Mbps.

Since the 2.4GHz band is heavily used to the point of being crowded, using the relatively unused 5GHz band gives 802.11a a significant advantage. In theory, 802.11a signals are absorbed more rapidly by walls and other solid objects in their path due to their smaller wavelength and as a result, cannot penetrate as far as those of 802.11b.

802.11b / g - 2.4GHz / 11Mbps - 54Mbps

The 802.11b standard has a maximum raw data rate of 11Mbps and uses the same media access method defined in the original standard. The dramatic increase in throughput of 802.11b (compared to the original standard) along with simultaneous substantial price reductions led to the rapid acceptance of 802.11b as the definitive wireless LAN technology. Details of making 'b' and 'g' work well together occupied much of the lingering technical process; in an 802.11g network however, activity of an 802.11b participant will reduce the data rate of the overall 802.11g network.

Devices using 802.11b/g experience interference from other products operating in the 2.4GHz band. Devices operating in the 2.4GHz range include microwave ovens, Bluetooth devices, baby monitors, cordless telephones, and some amateur radio equipment.

802.11n - 2.4GHz & 5GHz / 150, 300, 450Mbps per frequency

802.11n operates on both the 2.4GHz and the lesser used 5GHz bands. Support for 5GHz bands is optional. It operates at a maximum net data rate from 54Mbps to 600 Mbit/s. Prior to the final ratification, enterprises were already migrating to 802.11n networks based on the Wi-Fi Alliance's certification of products conforming to a 2007 draft of the 802.11n proposal.

20/40MHz - the 2.4 GHz ISM band is fairly congested. With 802.11n, there is the option to double the bandwidth per channel to 40 MHz which results in slightly more than double the data rate. However, when in 2.4 GHz, enabling this option takes up to 82% of the unlicensed band, which in many areas may prove to be infeasible.

Spatial Multiplexing - MIMO is a technology that uses multiple antennas to coherently receive more information than possible using a single antenna. One way it provides this is through Spatial Division Multiplexing (SDM), which spatially multiplexes multiple independent data streams, transferred simultaneously within one spectral channel of bandwidth. MIMO SDM can significantly increase data throughput as the number of resolved spatial data streams is increased. Each spatial stream requires a discrete antenna at both the transmitter and the receiver.

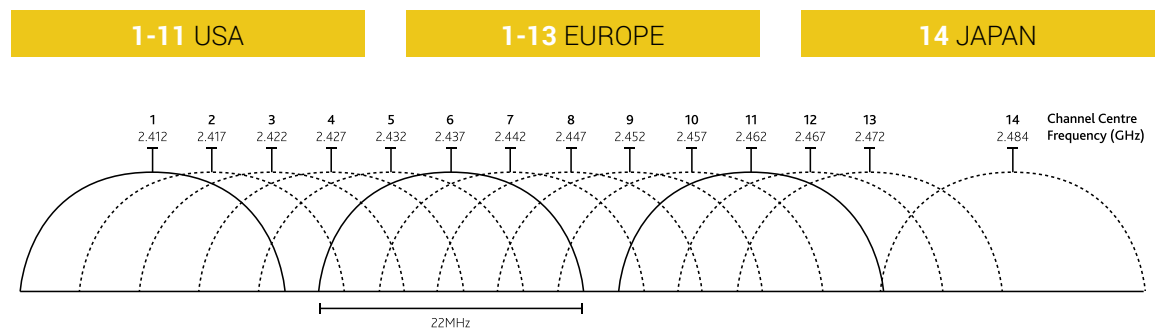


802.11ac - 5GHz / 433Mbps per stream / 2 streams 866Mbps, 3 streams 1.3Gbps

802.11ac is an amendment to IEEE 802.11, that builds on 802.11n. Changes compared to 802.11n include wider channels (80 or 160MHz versus 40MHz) in the 5GHz band, more spatial streams (up to eight versus three), higher order modulation (up to 256-QAM vs. 64-QAM), and the addition of multi-user MIMO (MU-MIMO). High end implementations support 80MHz channels, three spatial streams, and 256-QAM, yielding a data rate of up to 433.3 Mbps per spatial stream, 1300 Mbps total, in 80MHz channels in the 5GHz band.

2.4GHz EXPLAINED

There are 14x 2.4GHz channels in total in use worldwide.

**HEATMAPPER CAN BE USED FOR SEVERAL PURPOSES, FOR EXAMPLE:**

- Map signal coverage of yours and all other access points in the neighbourhood
- Find optimal location or configuration (such as channel) for your access point(s)
- Check that the settings (security, channel, SSID) of your access points are correct
- Find all the Wi-Fi networks (access points) in the area, and their locations
- Detect and locate open, unsecured networks
- See Wi-Fi coverage on a map

BEFORE WALKTHROUGH

It's important to have a floor plan if you have one. If you don't have a floor plan, there are a variety of applications like RoomScan Pro which requires no measuring. Simply place your device (phone/tablet) at each wall and click. The app takes care of the rest and can create a detailed floor plan of the property. Alternatively property sites such as Zoopla may have plans that can be found for your initial planning phase.

DURING SITE SURVEY

- Start walking around the facility (also called surveying)
- Left click when you turn, stop, or start walking
- Right click when you are done

You can perform as many surveys as you want, although HeatMapper's limited to 15 minutes of surveys. The more reference points, the more accurate the survey.

AFTER SITE SURVEY

- You will see a heatmap of the overall coverage after the survey
- You will also see the access points/routers on the map after the survey
- To see the coverage of just one router/access point, move the mouse over one
- Take a screenshot of your site survey to add to your quote



Scan this code to download HeatMapper now!
or visit www.ekahau.com

USING WI-FI SIGNAL MAPPING TECHNOLOGY AS A SALES TOOL

Installers of wireless networks can influence customer satisfaction by demonstrating a high level of expertise and knowledge specific to the customer's network. As any network installer knows, Wi-Fi is not an exact science and requires a certain amount of know-how to deliver reliable and seamless coverage. Wi-Fi users can be demanding, and often times skeptical about the value being delivered. This being the case, what if you could show a customer a map of their entire building, complete with a graphical representation of actual wireless coverage? Now, take that concept one step further and show them a comparison between old and new network coverage; or perhaps as a comparison between alternative technologies. How would the use of such a tool improve your ability to demonstrate and charge for expertise, while also giving you confidence in making recommendations that you can stand behind?

The good news is that such Wi-Fi signal mapping tools are readily available and simple to use and also won't cost you thing?

WHY USE WI-FI SIGNAL MAPPING TOOLS?

There are a number of ways network installers use Wi-Fi mapping tools to demonstrate value to their customers while also increasing reliability and confidence in their installations. As a manufacturer of fantastic Wi-Fi equipment, Luxul always recommends that installers use Wi-Fi signal mapping tools to:

- Perform before and after comparisons
- Compare different Wi-Fi technology options
- Identify potential problem areas; and
- Optimize network coverage

WHAT EQUIPMENT IS NEEDED?

Using Wi-Fi mapping tools effectively is easier than one might think and requires no special equipment. Testing will require the following:

- One computer- Windows-based laptop with a wireless network adapter
- One or more wireless routers or access points - Note: the Ekahau HeatMapper can simultaneously map multiple wireless networks
- Ekahau HeatMapper - installed on the Windows laptop
- Image of the floor plan or environment to be mapped - this is not absolutely necessary, but can be helpful to get an accurate survey of the desired coverage area

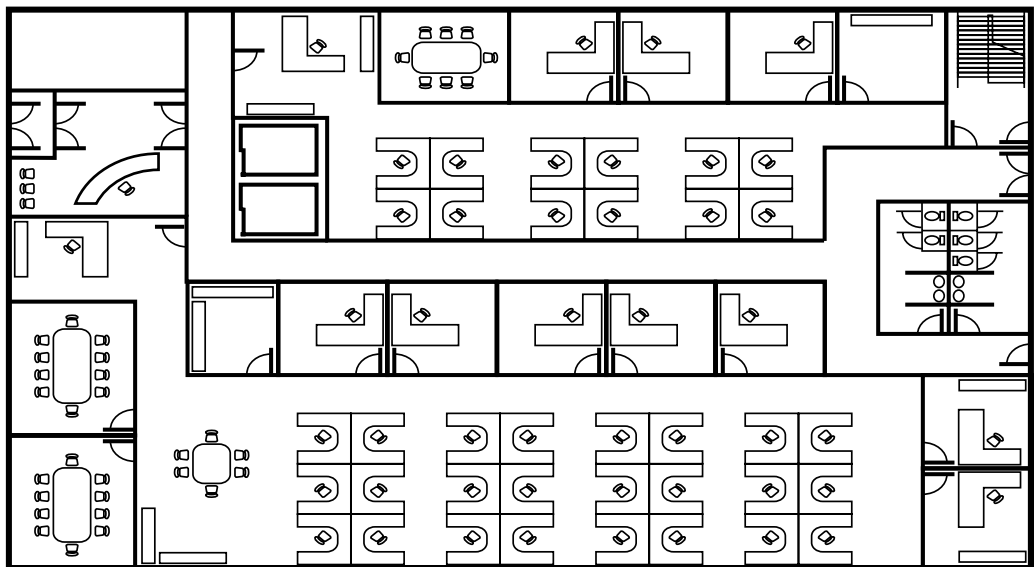


IMAGE 1: FLOOR PLAN OF BUILDING TO BE SURVEYED

WHAT WI-FI SIGNAL MAPPING TECHNOLOGY SHOULD I USE?

There are multiple excellent products available on the market to perform Wi-Fi signal mapping—each of which has certain advantages and disadvantages. Because of its cost effective nature (i.e. free) and relative ease of use, Luxul typically recommends the use of Ekahau HeatMapper. HeatMapper allows for the creation of colour-coded heat maps, showing wireless coverage within a particular environment. For PC use, it can be downloaded freely at: www.ekahau.com/products/heatmapper/overview.html

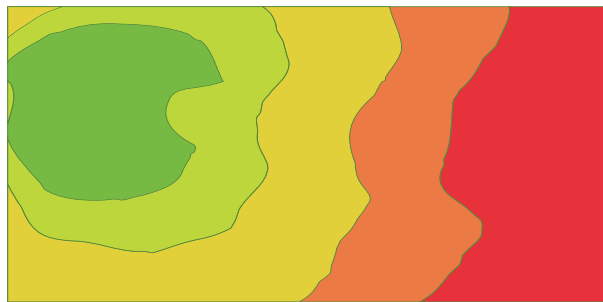
For MAC users, Luxul recommends Netspot: www.netspotapp.com

WHEN MAPPING SIGNAL COVERAGE, WHAT AM I LOOKING FOR?

Wireless technologies are not created equal. The choice of router or access point (AP), antenna technologies, and other components will all have an impact on Wi-Fi network performance. When evaluating the use of different products as part of an overall Wi-Fi network deployment strategy, signal mapping is an important part of the optimisation process. When evaluating the wireless network signal reach and comparing the efficiency of different technologies within the network environment, it is suggested to test the following:

WIRELESS COVERAGE - If a wireless network already exists or different technologies are being evaluated, test to determine wireless equipment capabilities and identify where there are holes in coverage. This will help to determine optimal device placement for maximizing coverage area, as well as to make decisions about what equipment to use.

DISTANCE - At short range, standard APs with dipole antennas will likely provide sufficient coverage. However, at longer ranges and wherever there are possible obstructions, other types of antennas (i.e. high gain directional and Circular Polarized) as well as higher powered AP technologies should be considered. With Ekahau HeatMapper, multiple technologies can be compared simultaneously to help determine an optimal solution for both coverage and distance. Once set up, HeatMapper will identify the approximate location of each active radio on the map as demonstrated in Image 2. When a highlighted radio is selected, the heat map for that radio is then displayed in colours that indicate the following:



Green - (Best Signal Available)
Light Green - (Excellent)
Yellow - (Very Good Signal)
Orange - (Good Signal)
Red - (Poor Signal)

WHEN MAPPING SIGNAL COVERAGE, WHAT AM I LOOKING FOR?

As demonstrated by the heat map in Image 2, the selected radio shows a good signal profile throughout a large portion of the building. Other active radios within the environment can also be seen, which can introduce signal and interference challenges that can now be more easily addressed by understanding the entire environment. Mapping the coverage area of a wireless signal can be a fantastic sales tool that demonstrates installer knowledge, while also ensuring optimal Wi-Fi network functionality. In addition, mapping out the wireless signal can save significant time and effort by identifying potential issues before the installation is complete.



FOR MORE
 INFO ON LUXUL
 RECOMMENDED
 TESTING AND
 TOOLS, SEE PAGE 50

IMAGE 2: COMPLETED SURVEY OF FLOOR PLAN BY EKAHAU HEATMAPPER

LUXUL



LUXUL SWITCHES



LUXUL SWITCHES

Managed or Unmanaged...

Ethernet switches can be either unmanaged plug and play devices with no user definable settings, or managed, allowing for optimisation and prioritisation of certain ports and applications. When should you use a managed switch? Here are a few cases where a managed switch will help you deliver the best possible solution to your customer:

- Whenever using VoIP, streaming media or other critical applications. Most managed switches support Quality of Service (QoS) functionality, which allows you to set priorities for these applications and ensure optimal performance.
- If you need to set up a secure guest network or otherwise isolate network traffic of certain applications, a managed switch can be used to configure a Virtual Local Area Network (VLAN).
- Any applications that call for specific protocol support, such as IGMP (Internet Group Management Protocol), or STP-RSTP-MSTP (Spanning Tree Protocols) will require a managed switch.
- The number of devices on the network may determine whether or not to use a managed switch. With more devices, you have more switches. Any time you have a network with three or more switches, a central managed switch is recommended for optimal control and configuration.
- Another practical benefit of a managed switch is the ability to gather data. With Port Statistics, SNMP (Simple Network Management Protocol), and Syslog support there are many different ways to see what is going on and even be notified when you are off site (through a supported SNMP management suite).

The choice of managed or unmanaged depends on the circumstances and is typically even a mix of both when using multiple switches. The primary consideration really comes down to understanding how many and what types of devices will be on the network as well as any extra support that may be required by the devices or applications.



XMS-2624P (MANAGED)



AGS-1016 (UNMANAGED)

invision
TRAINING ACADEMY

EXPAND YOUR NETWORKING SKILLS BY
REGISTERING FOR OUR
LUXUL WIRED & WIRELESS NETWORKING COURSE

SCAN THIS QR CODE TO
REGISTER NOW



Power over Ethernet (PoE)

PoE lets you run both data and power to a device using a single Ethernet cable, making device installation very simple and cost effective. This capability can be especially helpful if the device is in a difficult to reach location or if there is no local power available. It's especially useful for IP security camera placement. Another great benefit is that an Ethernet cable is relatively inexpensive, and pulling it does not require a licensed electrician.

Switches that support PoE are available with the same basic options as non PoE switches (i.e. managed, unmanaged, Gigabit, Fast Ethernet). A managed PoE switch will typically provide similar capabilities as a managed non PoE switch, plus it will give you the capability of remotely managing and power cycling your PoE devices.

Before selecting a PoE switch, be sure to understand the PoE power requirements of the devices that will be connected to the switch. PoE is currently available in three different varieties:

1. 802.3af PoE (Autosensing 48VDC 15.4 Watts)

2. 802.3at PoE+ (Autosensing 48VDC 30 Watts)

3. Legacy PoE (48VDC 48 Watts continuous power)

Most modern switches are either 802.3af or 802.3at (backwards compatible with 802.3af). Some switches, such as the Luxul 24-port Gigabit Managed PoE Switch, can support both. Most modern PoE switches are incapable of supporting Legacy PoE.

With so many Ethernet switch choices and options available, the decision of which switch or switches to use is really a function of the specific installation and application requirements. There is no one size fits all and it is important for an installer to understand the implications of using each of the various options in order to best deliver an efficient and affordable network solution.



Luxul **AMS-2624P** supports both 802.3af and 802.3at

GIGABIT SWITCHES

Based on the newest standards and highest quality design, Luxul Gigabit switches offer a scalable and affordable choice for network expansion or setting up a VoIP, multimedia, control, or surveillance system. All Luxul switches offer non blocking full duplex Gigabit performance.



The **AMS-1208P** (image above) 12 port/8 PoE+ Gigabit managed switch, is an ideal solution for use with an 8 channel NVR security system. The 8 Gigabit PoE+ ports ensure that all 8 cameras can be connected while still offering two additional Gigabit ports for use as uplinks to your router, main switch, or even directly to the NVR. With a healthy budget of 130W and a max of 30W per port, you'll have sufficient power for even the most demanding projects. This also offers powerful management features, such as remote reboot of connected IP cameras, VLAN support, and specific PoE management features that ensure optimal benefit from your network.

USE THE AMS-1208P TO:

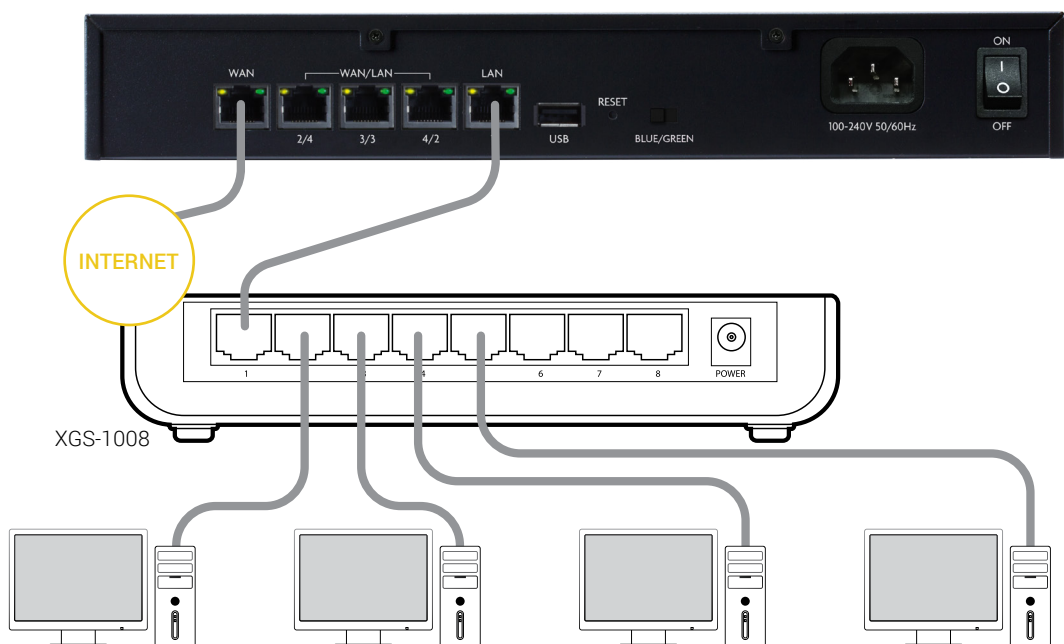
- Connect up to 12 IP Cameras or other PoE enabled devices
- Add PoE/PoE+ capability to your network (max output 130 Watts)
- Optimise your network with VLAN, QoS and network security features*
- Simply plug and play

FEATURES

- 12 Gigabit RJ45 ports & 8 802.3af/at PoE+ ports
- Total power budget of 130W
- Up to 30 Watts per port
- 20Gbps back plane speed
- 802.1Q VLAN support with trunking*
- Quality of Service (QoS)

CONNECTING SWITCHES CORRECTLY

Use standard Ethernet CAT5e or CAT6 cable to connect the XGS-1008 to a device (at least CAT5e must be used in order to achieve full Gigabit bandwidth). The XGS-1008 will automatically adjust to the characteristics (speed/duplex) of the device to which it is connected. When a device is properly connected, the Link/Activity LEDs for each port light up green/orange.



* VLAN setup requires the use of additional hardware. See page 11 of this guide for more information

NETWORK HD INTEGRATION

Luxul switches offering support for WyreStorm NetworkHD include the XMS-5248P, XMS-7048P, AMS-2616P, AMS-1208P, and AMS-4424P models. Also supported is the XMS-2624P, which offers a traditional front facing port alternative. As a leading innovator of high performance Wi-Fi and wired networking products, Luxul has expertise in delivering highly reliable solutions for use in the most demanding network deployments, ranging from residential and commercial LANs and WLANs to mobile Wi-Fi connectivity in heavy industrial and military applications.



NETWORK HD

“WyreStorm NetworkHD is the most powerful, yet simplest range of HD over IP products on the market today, and it is important that our switch manufacturer partners are as well. Luxul’s new range of AV switches have simple tick box configuration for NetworkHD to get the system set up in seconds, meaning that even the largest of installs is configured in a little more time it takes to plug in all the equipment.”

James Meredith | **WyreStorm NetworkHD and Enado Global Product Manager**

Just Add Power

JUST ADD POWER

Just Add Power, a manufacturer of the scalable HD over IP Ethernet based video distribution systems, added four Luxul models of managed PoE+ switches to its lineup of fully supported Layer 2/3 managed Ethernet switches.

According to Just Add Power, using Luxul’s **AMS-2616P, AMS-1208P, XMS-5248P, XMS-2624P, or Stackable AMS-4424P+ & XMS-7048P** switches alongside its HD over IP transmitters and receivers, integrators can build scalable video matrices that offer up to 4,000 inputs x 65,000 outputs.

“The new Luxul switches are the BEST choice for HD over IP. We know our integrators will benefit from support being added for these new Luxul models.”
Ed Qualls | **CEO of Just Add Power**

SWITCHES FOR IP CAMERAS

With advancements made in Megapixel technology, IP cameras have increasingly become part of the residential and commercial security environment. These megapixel IP cameras deliver significant enhancements over traditional analog cameras. At the same time, they require considerable network bandwidth and power which, when attached as part of the wired network, is typically not an issue. But what about when an IP camera is needed in a remote location with limited network access? It used to be there were only two variable options for reliably delivering sufficient bandwidth:

1. Run outdoor rated Ethernet cable, which is limited to a distance of 328 feet
 2. Run outdoor rated Fiber, which works at distances greater than 328 feet but is fragile and expensive.
- Today there is a third alternative that is much friendlier to the installer and to the wallet - wireless bridging.

2 GB UPLINK PORTS TO MAIN SWITCH, NVR, ROUTER, ETC...	<p>PoE/PoE+ Switches 16 Cameras AMS-2624P</p>
2 GB UPLINK PORTS TO MAIN SWITCH, NVR, ROUTER, ETC...	<p>PoE/PoE+ Switches 8 Cameras AMS-1208P</p>
4 UPLINK PORTS TO MAIN SWITCH, NVR, ROUTER, ETC...	<p>PoE/PoE+ Switches 4 Cameras XFS-1084P</p>

MANAGED SWITCHES

Luxul managed Gigabit switches provide an intuitive web based interface for optimizing, managing, and protecting the network. These switches make it simple to set up and enable advanced network features, such as QoS, network security, and guest networking via VLANs.



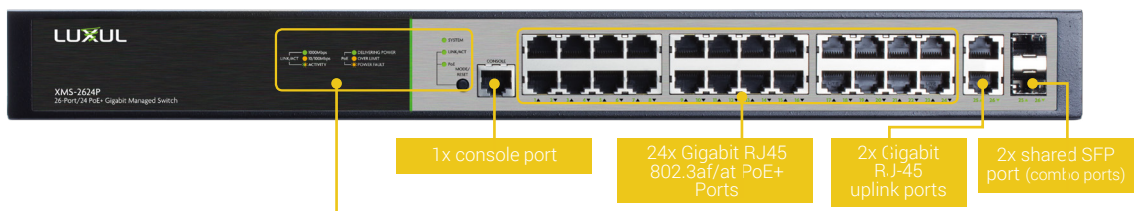
The **XMS-2624P** 26 port/24 PoE+ Gigabit managed switch is an excellent choice for expanding your network when using PoE enabled devices, such as VoIP, IP cameras, and access points. The switch includes 24 PoE+ ports, with a total power budget of 370 Watts. It also features two Gigabit RJ-45/SFP combo ports for easy network expansion. The XMS-2624P helps optimise your network with support for Layer 3 static routing between VLANs while featuring simple to use management, VLAN and security capabilities to ensure optimal benefit from your home or office network.

USE THE XMS-2624P TO:

- Connect up to 24 IP cameras or other PoE-enabled devices
- Add 802.3af/at Gigabit PoE+ capability to your network
- Optimise your network with VLAN, QoS, and PoE management
- Enhance network performance with Layer 3 static routing
- Simply plug and play with intuitive management

FEATURES

- 24 Gigabit RJ45 802.3af/at PoE ports
- 2 Gigabit RJ-45 uplink ports and 2 shared SFP ports (combo ports)
- 370 Watt power budget; 52Gbps switching capacity
- Layer 3 static routing
- 802.1Q VLAN (with trunking) and QoS support
- Standard 19" rack-mount



Indicator	LED	Description
System	Flashing	Indicated that the unit is running normally
	Green	Booting up or indicates a malfunction
	Red	Indicates the unit in power on system initialisation process
	Off	Indicates the unit is in start up and initialisation process; is not on
Speed/ PoE Button	Speed On	Port LEDs display speed status
	PoE On	Port LEDs display PoE status
Speed	Green	The Link/Activity LED of the port will be on if there is a 1000Mbps device connected to the port
	Yellow	The Link/Activity LED of the port will be on if there is a 10/100Mbps device connected to the port
	Flashing	The Link/Activity LED flashes when a port is receiving or transmitting data
	Off	There is nothing connected to the port
SYS	On	Connected device is receiving PoE power
	Off	Connected device is not receiving PoE power
	Green	Power being supplied within PD specified limits
	Yellow	Power exceeds PD specified limits
	Yellow Flashing	PoE fault (e.g. problem with Ethernet cable or PoE device)



Each port has one Link/Activity/ PoE LED. A push button switch with LED indicator switches the display between Link/Activity and PoE.

- At startup, port LEDs will flash for one second as a self test.
- When an SFP optical interference is in use, the Link/Activity LED of the corresponding Ethernet port will indicate the SFP status.

AV-SERIES SWITCHES

The **AMS-2624P** AV-series 26-port/24 PoE+ Gigabit managed switch features rear panel ports and front facing LEDs (user selectable blue/green colours) for clean integration with AV rack systems. It is an excellent choice for expanding your network when using PoE enabled devices, such as VoIP, IP cameras, and access points. The 26-port Gigabit switch includes 24 PoE+ ports, allowing you to use standard Ethernet cable to deliver both power and high speed data to 802.3af/at compliant devices. It also features advanced management, VLAN, and security capabilities to ensure optimal benefit from your home or office network.

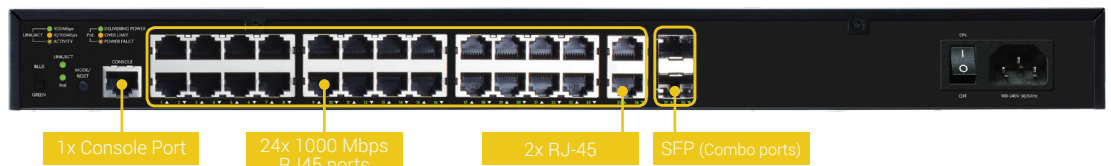


USE THE AMS-2624P TO:

- Cost effectively add Gigabit Ethernet and 802.3af/at PoE capability to the AV rack based network
- Deliver power and data for up to 16 PoE+ enabled network devices with a maximum output of 250 Watts
- Simplify PoE device installation, including IP security cameras, VoIP devices, and access points
- Future proof the network with Gigabit speeds
- Optimise and protect the network with advanced VLAN, QoS, and network security features

FEATURES

- 24 Gigabit RJ45 ports; two Gigabit RJ-45 uplink ports with two shared SFP ports (combo ports) and 24 ports support 802.3af/at PoE+ with 250 Watt power budget
- 52Gbps switching capacity (non blocking and full duplex)
- 802.1Q VLAN (with trunking) and QoS support
- Port based authentication
- Intuitive management
- User selectable green or blue front facing LEDs
- Variable speed fans for quiet operation
- Standard 19" rack mount



The rear panel of the AMS-2624P switch includes one console port, 24 1Gbps RJ45 and 2RJ-45/2xSFP combo ports, as well as LED indicators for each port. Each 1Gbps port has one Link/Activity/PoE LED. A mode/reset button switches the display between Link/Activity and PoE modes.



Indicator	LED	Description
Power	On	This LED indicates there is power to the AMS-2624P
	Off	If LED is off, check the power connection on the back of the unit
System	Flashing	Indicates the AMS-2624P is running normally
	On	Indicates a malfunction
	Off	Indicates the AMS-2624P is in startup and initialization process or is not on
Link Act / PoE mode	Link Activity	Port LEDs display Link/Activity status
	PoE Mode	Port LEDs display PoE status

Each port has one Link/Activity/PoE LED. A mode/reset button on the rear panel switches the LED display between Link/Activity and PoE modes.

* VLAN setup requires the use of additional hardware. See page 11 of this guide for more information

AV RACK INTEGRATION

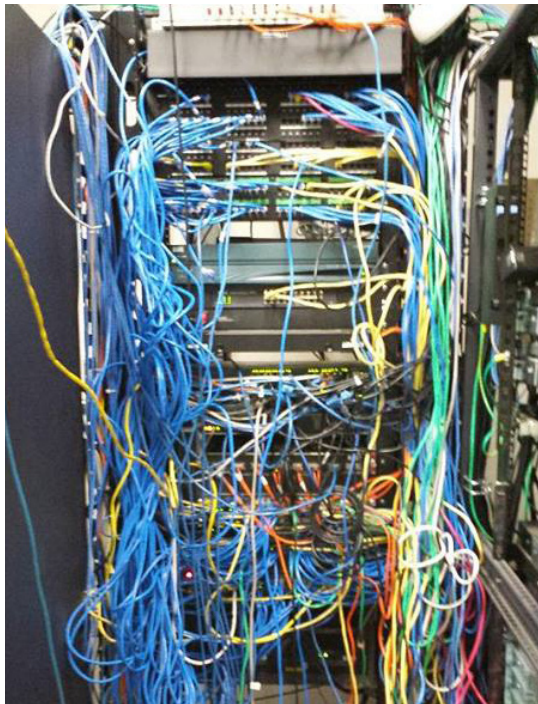
Luxul's AV series switches are purpose-built for use with AV equipment. Luxul's AV switches feature rear panel ports and front facing LEDs for a seamless integration with AV rack systems, while also offering user selectable blue/green LEDs that allow for consistency with other rack mount equipment. Luxul's rear panel ports allow for smart and organised rack systems that switches with front facing ports can't supply.



REAR PORTS

Using Luxul's AV series switches, featuring their rear panel ports and front facing LEDs, allows for a smart and organised rack system you can see in the image to the left.

Luxul's AV series switches also reduce the risk of cables being unplugged or pulled from their ports and simultaneously makes for a clean and neat look



FRONT PORTS

Comparing the image above to this one on the left, it is clear to see the huge difference Luxul's neat rear panel ports make for integration with AV racks.

Front facing ports have a higher risk of being knocked or unplugged and lead to a more unorganised appearance.

PRODUCT COMPARISON

COMPARING SWITCHES

Product Code	Ports	Port Speed	SFP Expansion Ports	Back Bone Speed	Managed	Web Interface	PoE Budget	PoE/PoE+ & no. of Ports	Rack Mountable	
Fast Ethernet Switches	XGS-1005	5	1 Gbps	-	-	-	-	-	-	
	XFS-1084P	8	10/100Mbps	-	-	-	57W	4	-	
	XFS-1816P	18	10/100Mbps	1	-	-	230W	16	Yes	
Gigabit Switches	XGS-1008	8	1 Gbps	-	16Gbps	-	-	-	-	
	XGS-1024S	24	1 Gbps	-	48Gbps	-	-	-	Yes	
SMART Switches	XMS-1010P	10	1 Gbps	-	20 Gbps	Yes	Yes	130 Watts	8	Yes
	XMS-1208P									
	XMS-2624P*	26	1 Gbps	2	52 Gbps	Yes	Yes	570 Watts	24	Yes
	XMS-5248P*	52	1 Gbps	2	104 Gbps	Yes	Yes	740 Watts	48 PoE+	Yes
	XMS-7048P*	52	1 Gbps	2	104 Gbps	Yes	Yes	740 Watts	48 PoE+	Yes
AV-Series Switches (Ports on rear)	AGS-1024	24	1 Gbps	-	48 Gbps	-	-	-	-	Yes
	AGS-1016	16	1 Gbps	-	32 Gbps	-	-	-	-	Yes
	AGS-1008M	8	1 Gbps	-	16 Gbps	-	-	-	-	Multiple Options
	AMS-1208P*	12	1 Gbps	-	24 Gbps	Yes	Yes	130 Watts	8	Yes
	AMS-1816P									
	AMS-2624P*	26	1 Gbps	2	52 Gbps	Yes	Yes	250 Watts	24	Yes
	AMS-4424P*	26	1 Gbps	2	88 Gbps	Yes	Yes	250 Watts	24	Yes

* Integrates with Network HD & Just Add Power

NETWORK HD

Just Add Power



EXPAND YOUR NETWORKING SKILLS BY REGISTERING FOR OUR LUXUL WIRED & WIRELESS NETWORKING COURSE

SCAN THIS QR CODE TO REGISTER NOW



LUXUL



LUXUL ROUTERS



WIRED

Luxul commercial grade routers are designed for use in high capacity residential and commercial networks. A router is the interface between the Internet and the local network and is the foundation for a reliable network. Luxul's complete line of full featured high performance routers feature firewall, QoS, VLAN, VPN, and other capabilities that ensure optimal network performance, scalability and security.

OR**WIRELESS**

Luxul wireless routers combine wired router functionality with concurrent dual-band wireless technology. They are a great choice for setting up an affordable and highly reliable residential or light commercial network. Luxul wireless routers support Firewall, QoS, VPN and now Roam Assist™ for seamless roaming and optimised network performance and security.

COMMERCIAL GRADE ROUTERS

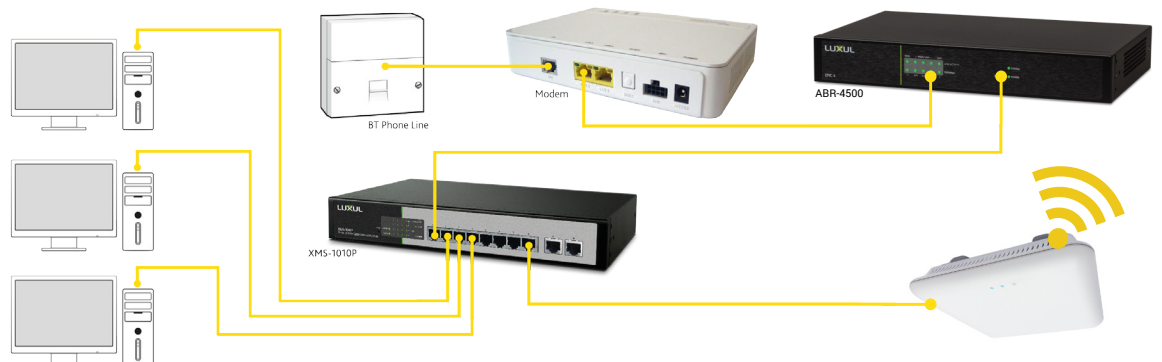
The **ABR-4500** AV series high performance Gigabit router provides an optimal platform for setting up the ultimate residential or commercial network. It features rear panel ports and front facing LEDs (user selectable blue/green colours) for clean integration with AV rack systems. This commercial grade router allows for up to 512 concurrent device routing entries. It features an intuitive interface with advanced management, as well as firewall, QoS, VPN and other capabilities that ensure optimal performance, scalability and security of your network.

**USE THE ABR-4500 TO:**

- Provide core network functionality for your Luxul network
- Protect your network with advanced firewall and security features
- Enable secure remote access to the network via VPN
- Optimise VoIP, streaming media and other demanding applications
- Create a secure guest network*

FEATURES

- 1x dedicated WAN, 1x dedicated LAN, 3x LAN/WAN configurable ports
- 2x USB 2.0 ports for sharing and printing
- Auto failover between WAN ports
- Content filtering
- VPN, QoS & VLAN*
- Network security and firewall
- Intuitive management
- Load balancing

CONNECTING YOUR ROUTER

* VLAN setup requires the use of additional hardware. See page 11 of this guide for more information

WIRELESS ROUTERS

The **XWR-3150** dual-band AC3100 Gigabit router features advanced 4x4 MIMO (wave 2) technology; the XWR-3150 represents the latest in Wi-Fi technology for a superior Wi-Fi experience. Plus, it has a built-in wireless controller with Luxul's exclusive Roam Assist™ capability - allowing you to easily add up to two or more wireless APs for a seamless whole-home Wi-Fi experience.



USE THE XWR-3150 TO:

- Adds powerful routing and Wi-Fi coverage to larger homes or small businesses.
- Easily expand Wi-Fi network with up to 2 additional APs
- Enables VPN remote access to the network
- Manage networks from anywhere using built-in Domotz remote management.

FEATURES

- Roaming solved with Luxul Roam Assist™
- 4x4 MU-MIMO (wave 2)
- Built in remote management (Domotz)
- Concurrent dual-band wireless AC
- Secure guest networking*
- VPN, VLAN and QoS
- High power for extended range

INDICATOR MEANINGS

INDICATOR	STATUS	DESCRIPTION	INDICATOR	STATUS	DESCRIPTION
	ON	The XWR-3150 is ready for WPS pairing		ON	A USB enabled device is connected and configured
	ON	5GHz wireless network is broadcasting		ON	The XWR-3150 is booting
	ON	2.4GHz network is broadcasting		FLASHING	The XWR-3150 is connected and configured
	ON	A device is connected to the Ethernet port number		OFF	The XWR-3150 will not boot
1234	FLASHING	Data packets are being transmitted to the connected device		ON	Indicates power is applied
	ON	Is connected to the ISP		OFF	Indicates power is not applied
	FLASHING	Data packets are being transmitted			For future feature additions

	ABR-5000	ABR-4500 / XBR-4500	XWR-3150	XWR-1200
Network Ports	2x WAN dedicated 5x LAN	1x WAN dedicated 4x LAN configurable	1x WAN dedicated 4x LAN	1x WAN dedicated 4x LAN
WAN Speed	1 Gbps	650 Mbps	450 Mbps	300 Mbps
Wi-Fi	-	-	Dual-Band	Dual-Band
Spacial Streams	-	-	4 x 4 MU-MIMO	2 x 2
Wireless Bands	-	-	2.4GHz, 5GHz	2.4GHz, 5GHz
VPN	Yes	Yes	Yes	Yes
Port Forwarding	Yes	Yes	Yes	Yes
Domotz on board	Yes	Yes	Yes	No

* VLAN setup requires the use of additional hardware. See page 11 of this guide for more information

LUXUL



REMOTE ACCESS AND WEB MANAGEMENT



WHAT DOES IT DO FOR YOU

Never go on an unnecessary site visit again! With the Domotz box you can monitor the status of any device on your customer's network remotely. This means no more call outs for your quick fixes and no more time wasted when a minor issue occurs.

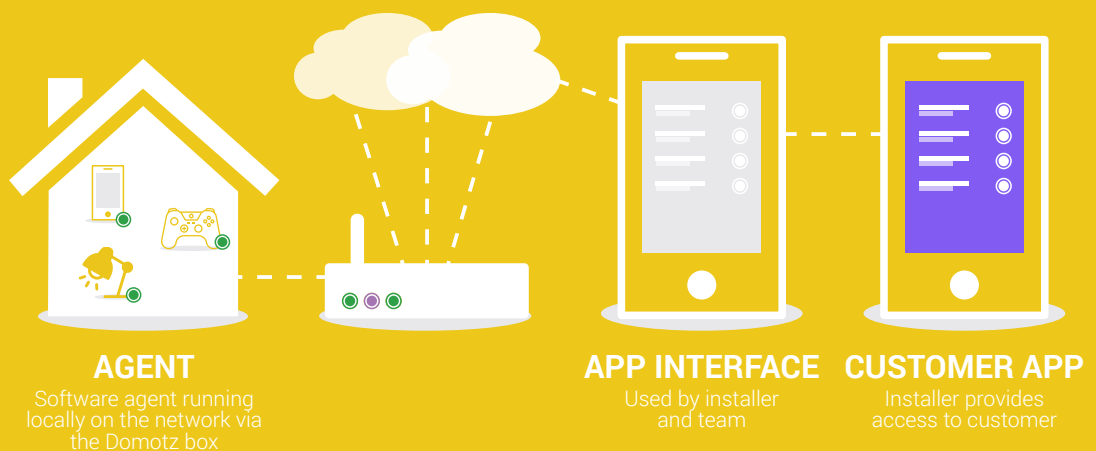
SAVING YOU TIME

Simple connection and setup
With the Domotz box, there is no set up required. The hardware is as simple as plug and play! The Domotz box just needs connecting with a power supply and a network cable, and it is good to go. Complete with automatic software updates over the network, Domotz will scan your customer's network, identifying all connected devices as it scans, giving you a remote view into the health status of each of these devices. As well as just seeing what is on the network, Domotz can remotely control different ports and triggers to help get your customer's systems working again without ever having to visit the site.

domotz



HOW IT WORKS



MONITORING ACCESS VLANS

To setup monitoring across VLAN's, you first need to log into the configuration page of your Domotz Box. This page can be found by entering the IP address of your Domotz Box followed by port 3000 into your web browser (e.g. 192.168.0.99:3000). This will then present you with 5 tabs down the left-hand side, click on Network Info. You will then see the VLAN config section. Click on config and enter the VLAN ID you have setup on your router. You will need to give the Domotz Box an IP address in each VLAN. We advise you give it the same IP address in each VLAN (e.g. VLAN 1: 192.168.0.99, VLAN 2: 192.168.1.99 etc...)

You then need to configure the port mode your Domotz Box is connected to on your managed network switch. This will vary between switch manufacturers.

Create a new VLAN

ID
2

IP Address
192.168.2.99

Subnet mask
255.255.255.0

◆ **MAKE SURE**

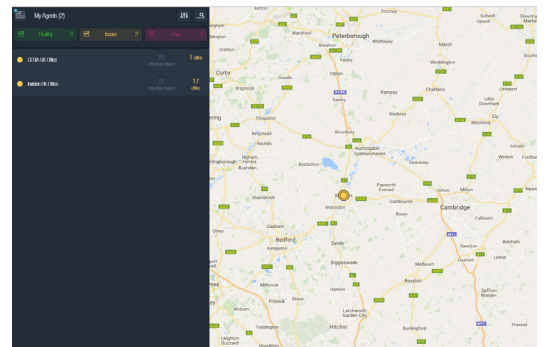
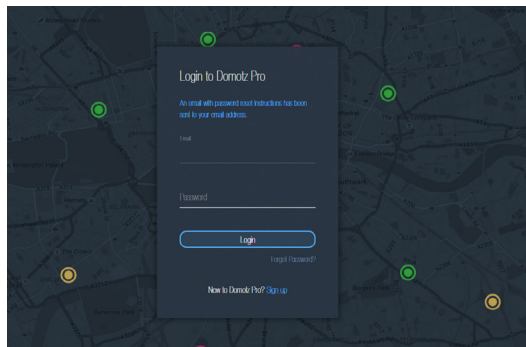
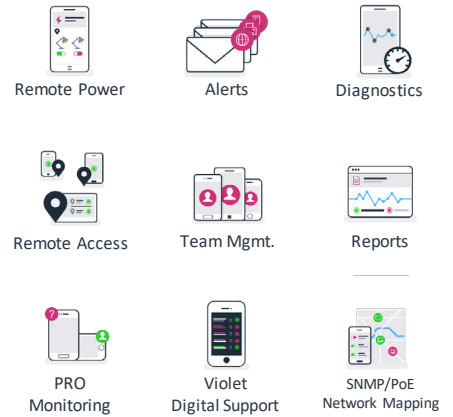
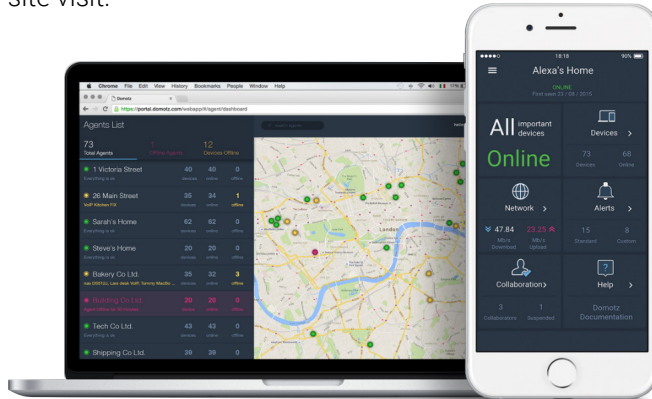
- The IP that you set is not associated to any device
- The interface port of the switch which will be used to connect the Domotz Box/Pi is configured:
 - In Access mode / Untagged for the main interface used by the Domotz Box/Pi to communicate with the gateway (e.g., eth0)
 - In Trunk 802.1q mode / Tagged for the additional VLANs to be monitored (e.g., the eth0.10 used for LAN 10)

Please refer to your specific switch/model guide on how to configure Trunk 802.1q and Access mode

TRUE REMOTE CONTROL

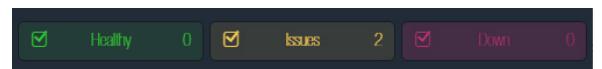
Access

Remote access is as simple as just logging in. As long as you have an Internet connection, you can connect from anywhere in the world to rescue your customers without the need for a physical site visit.



Status Check

Instantly see the status of all your clients' installations. With a simple traffic light system, you can see exactly where the problem lies. Domotz also allows you to configure custom alerts to warn and pre-empt you when certain problems arise that may be crucial.

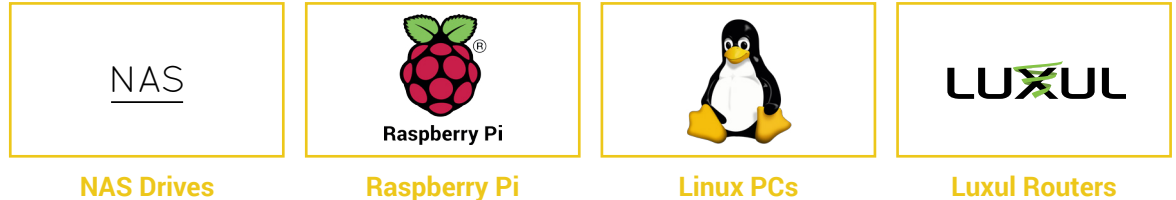


Cure

Once online, you can see every device connected to your customer's network and any ailments they may have. Once you have found the problem device, you can head through and take full control via the available remote methods (in the Luxul example below we can access the router via direct console access or by using the Luxul network web portal).

AGENT PLATFORMS

As well as offering dedicated hardware, Domotz can also be installed as an Agent on platforms such as:

NAS Drives

Raspberry Pi




Linux PCs

Luxul Routers

DOMOTZ PRO PRICING

The Domotz solution includes three components: the Domotz Pro Mobile Application, the Domotz Cloud and the Domotz Network Agent. This solution helps IT professionals take better care of their customers, reduce support costs, and operate their business more efficiently.

AVAILABLE PRICING OPTIONS:

Lite	Advanced	Premium
 <p>£3 Per Site, Per Month.</p>	 <p>£6 Per Site, Per Month.</p>	 <p>£19 Per Site, Per Month.</p>
Ideal for Residential Integrators	Ideal for IT Professionals, Security Integrators, Commercial Integrators for SMB	Ideal for MSPs, Franchises, Hospitality, Retail, Corporate offices, Commercial Integrators for Large Business

WEB MANAGEMENT

TAKE BACK THE INTERNET

What do you get with Router Limits? Protection, control and visibility! The Router Limits comprehensive web management system gives you:



FULL ON FILTERING

Completely customisable on a device by device basis. Control access to specific websites or categories, hour by hour, day by day.



SUPERIOR SCHEDULING

Manage screen time like a boss! Set Internet access schedules that fit the needs of each member of your family. Pause the Internet from anywhere, any time!



ACTUAL ACCOUNTABILITY

View web use and browsing history data right at your fingertips from anywhere.



EVERYWHERE

Safety and control no matter where they go.



EFFORTLESS

Set up is a cinch. No software to install. Top notch support.



POWERFUL

Always on. Always up to date. Always improving.

HOW IT WORKS

Managing your family's Internet at the network level means you can regulate **ALL** your connected devices individually. We're talking computers, tablets, gaming consoles, phones, smart TV's; you name it. There is no software to install, and our Cloud Management System means you're always up to date. It's as easy as 1 2 3!



HOOK UP

Hook up your Router Limits enabled hardware to your internet connection.



CONNECT

Connect your devices to the new router.



MANAGE

Manage your devices from anywhere via the Router Limits cloud.

LUXUL ENABLED HARDWARE

The latest hardware from Luxul has been configured to work directly with Router Limits. The products that currently include these features are the ABR-4500, ABR-5000, XWR-3100, XWR-1200 and XWR-3150 routers. For more information visit www.luxul.com

LUXUL



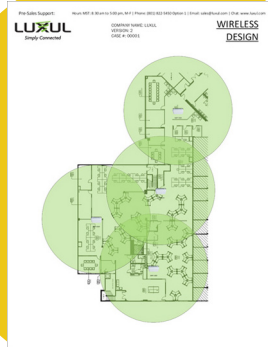
TECHNICAL SUPPORT



LUXUL ASSURANCE PROGRAM

When you install a Luxul certified network we guarantee the performance of the network-including wifi coverage. If the network doesn't perform or provide full coverage, we will make it right at no additional cost to you.

The elements of a reliable network:



1. The Right Design

Based on your project plans, Luxul engineers will provide a custom network design.



2. The Right Equipment

The certified design will provide you with a list of both required and optional equipment.



3. The Right Management

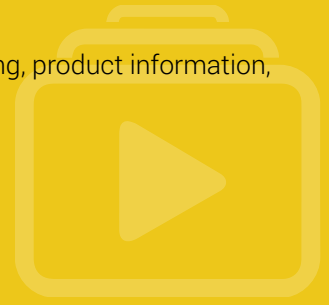
Complete the network design with Domotz for remote monitoring and management.

LUXUL HOW TO VIDEOS

Luxul 'How To' videos help explain different elements of networking, product information, set-up procedures and wireless network tools.

- Wireless Controller Set Up
- Updating Firmware
- Setting a Static IP Address
- Advanced Product Configuration
- Productivity and Measurement Tools

And many more!

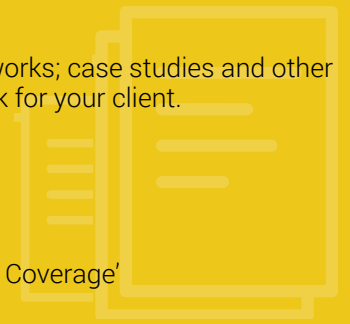


LUXUL DOCUMENTS

Luxul 'Documents' are extremely informative for setting up networks; case studies and other educational articles to help you create the best wireless network for your client.

- Basic Product Configuration
- Operating Systems
- Productivity and Measurement Tools
- Professional Installer's Guide to IP Networking
- 'Simple and Affordable 'Whole-Home' Wireless Network Coverage'

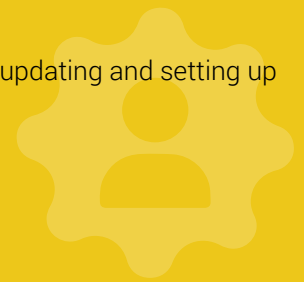
And many more!



LUXUL SUPPORT RESOURCES

Luxul 'Support Resources' includes all information you may need for updating and setting up a wireless network.

- Firmware Updates
- IP Addressing
- Wireless Controller Set Up
- 'How To' videos

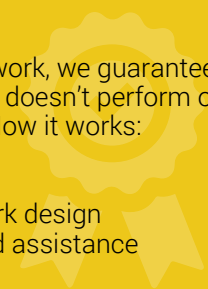


LUXUL ASSURANCE PROGRAM

Reliable network, reliable system - when you install a Luxul certified network, we guarantee the performance of the network-including Wi-Fi coverage. If the network doesn't perform or provide full coverage, we will make it right at no additional cost to you. How it works:

- Register your project
- Build a network - Luxul engineers will provide a complete network design
- Support - Invision's advanced support team engages if you need assistance

www.luxul.com/assurance-program.aspx



For videos, full articles and product information from Luxul, visit www.luxul.com or scan the QR code here



LUXUL

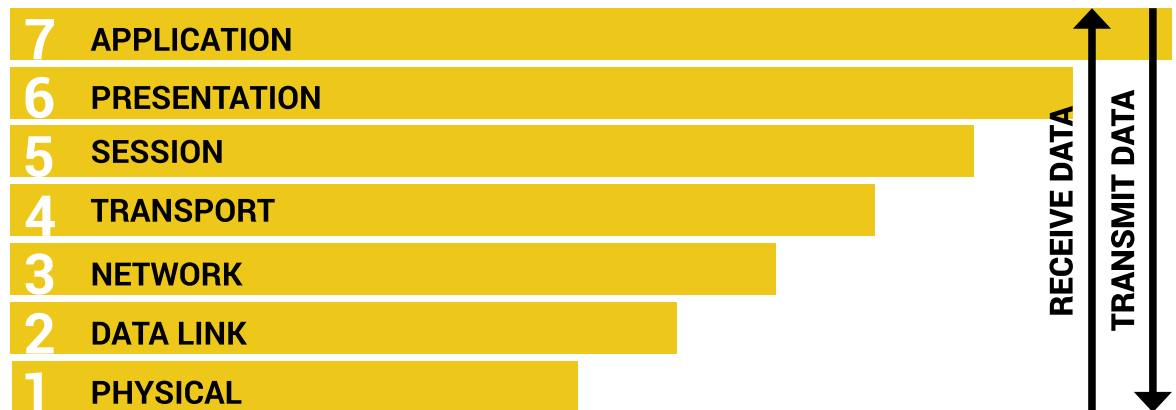


WIRING, TESTING AND GLOSSARY



THE OSI 7-LAYER MODEL

The OSI, **OPEN SYSTEM INTERCONNECTION**, Model defines a networking framework to implement protocols in seven layers. Control is passed from one layer to the next, starting at the application layer in one station, and proceeding to the bottom layer, over the channel to the next station and back up the hierarchy. The OSI Model doesn't do any functions in the networking process, it is a conceptual framework so we can better understand complex interactions that are happening. The OSI Model takes the task of Internet working and divides that up into what is referred to as a vertical stack that consists of the following layers:



1 - PHYSICAL

This layer conveys the bit stream electrical impulse, light or radio signal, through the network at the electrical and mechanical level. It provides the hardware means of sending and receiving data on a carrier, including defining cables, cards and physical aspects. Fast Ethernet, RS232, and ATM are protocols with physical layer components.

2 - DATA LINK

At this layer, data packets are encoded and decoded into bits. It furnishes transmission protocol knowledge and management and handles errors in the physical layer, flow control and frame synchronisation. It is divided into two sub layers: the Media Access Control (MAC) layer and the Logical Link Control (LLC) layer. The MAC sub layer controls how a computer on the network gains access to the data and permission to transmit it. The LLC layer controls frame synchronisation, flow control and error checking.

3 - NETWORK

This layer provides switching and routing technologies, creating logical paths, known as virtual circuits, for transmitting data from node to node. Routing and forwarding are functions of this layer, as well as addressing, internet working, error handling, congestion control and packet sequencing.

4 - TRANSPORT

This layer provides transparent transfer of data between end systems, or hosts, and is responsible for end to end error recovery and flow control. It ensures complete data transfer.

5 - SESSION

This layer establishes, manages, and terminates connections between applications. The session layer sets up, coordinates, and terminates conversations, exchanges and dialogue between the applications at each end. It deals with session and connection coordination.

6 - PRESENTATION









This layer provides independence from differences in data representation (e.g. encryption) by translating from application to network format, and vice versa. The presentation layer works to transform data into the form that application layer can accept. This layer formats and encrypts data to be sent across a network, providing freedom from compatibility problems. It is sometimes called a syntax layer.

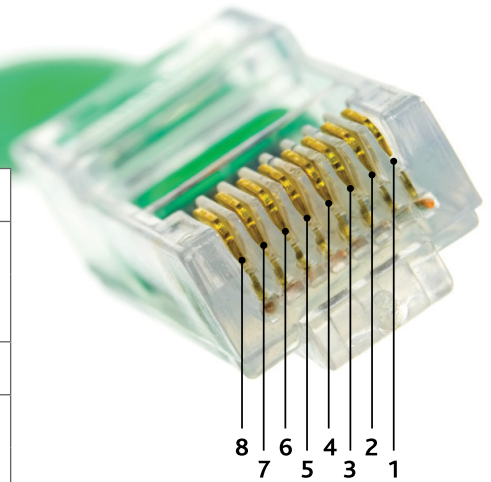
7 - APPLICATION

This layer provides transparent transfer of data between end systems, or hosts, and is responsible for end to end error recovery and flow control. It ensures complete data transfer.

CATEGORY CABLE STANDARDS

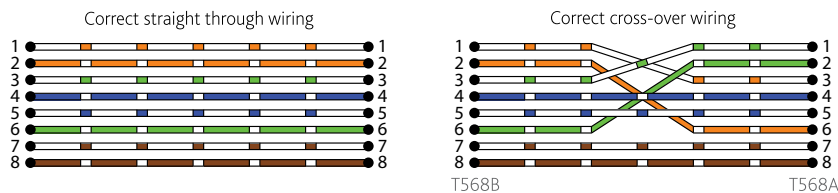
Correct CAT-5e termination is the most vital element of making your network install work properly. Here is a brief overview on how to terminate correctly and how to test your cabling prior to install.

Pin	1	2	3	4
T568B Colour	 White/Orange stripe	 Orange	 White/Green Stripe	 Blue
Pin	5	6	7	8
T568B Colour	 White/Blue stripe	 Green	 White/Brown stripe	 Brown



WIREMAPPING

The wiremap shows some common examples of incorrect terminations that can show up in testing. These are used for testing to make sure pin 1 on patch panel goes to pin 1 on outlet, etc. Additional testing is possible for: continuity, shorts, crossed pairs, reversed pairs. Split pairs will not be detected by a simple wiremap test; they will undermine balanced line operation. More sophisticated tests are required to detect split pairs.



CAT-5e STANDARDS

The specification for CAT-5e cable was defined in ANSI/TIA/EIA-568-A, with clarification in TSB-95. These documents specify performance characteristics and test requirements for frequencies from 100MHz. Cable types, connector types, and cabling topologies are defined by TIA/EIA-568-B. Nearly always, RJ45 connectors are used for connecting CAT-5e cable. The cable should be terminated in the T568B scheme, but T568A can be used. The two schemes work equally well and may be mixed in an installation as long as the same scheme is used on both ends of each cable.

Each of the four pairs in a CAT-5e cable has a differing precise number of twists per metre to minimise crosstalk between the pairs. Although cable assemblies containing four pairs are common, CAT-5e is not limited to four pairs. Backbone applications involve using up to 100 pairs. This use of balanced lines helps preserve a high signal to noise ratio despite interference from both external sources and crosstalk from other pairs.

The cable is available in both stranded and solid conductor forms. The stranded form is more flexible and withstands more bending without breaking. Permanent wiring (e.g. the wiring that connects a wall socket to a central patch panel) is solid core, while patch cables (e.g. cable that plugs a computer into the network port in the wall) are stranded.

CAT-6/6a STANDARDS

CAT-6 cable is a standardised cable for Gigabit Ethernet and other network physical layers that is backward compatible with the CAT-5/5e cable standards. Compared with CAT-5e, CAT-6 features more stringent specifications for crosstalk and system noise. The cable standard provides performance of from 250MHz and is suitable for 10BASE-T, 100BASE-TX (Fast Ethernet), 1000BASE-T/1000BASE-TX (Gigabit Ethernet), and 10GBASE-T (10-Gigabit Ethernet).

Whereas CAT-6 cable has a reduced maximum length when used for 10GBASE-T, CAT-6a cable (or augmented Category 6), is characterised from 500MHz and has improved alien crosstalk characteristics, allowing 10GBASE-T to be run for the same distance as previous protocols. CAT-6 patch cables are normally terminated in RJ45 connectors. If CAT-6 rated patch cables, jacks and connectors are not used with CAT-6 wiring, overall performance is degraded and will not meet CAT-6 performance specifications.

WHO ARE CEDIA

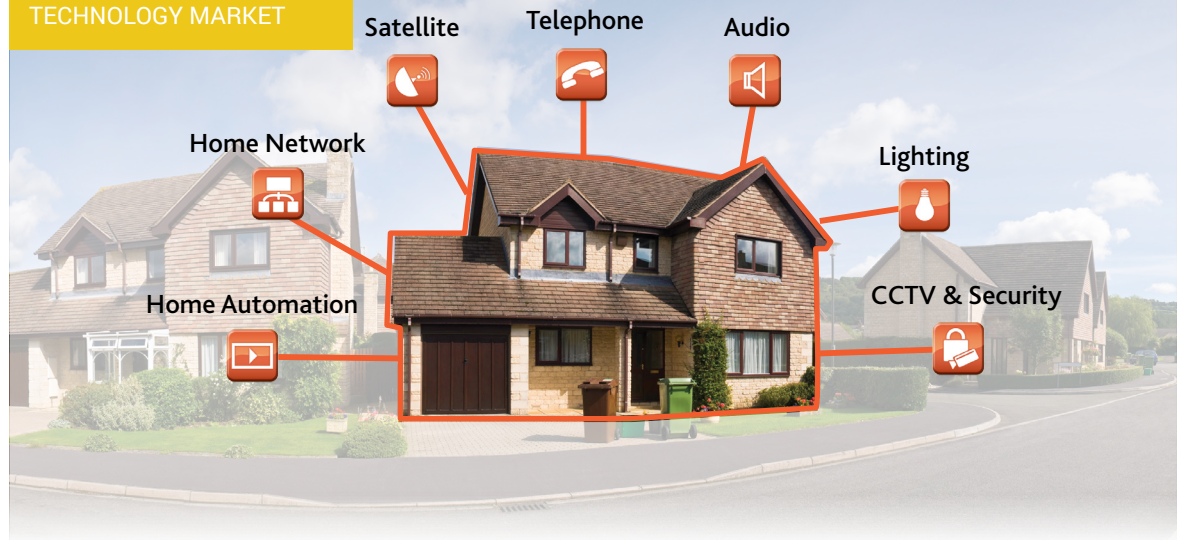
The Custom Electronic Design and Installation Association (CEDIA) is the international trade organisation representing the home electronic systems industry.

Their members specialise in the planning, design, supply and installation of automated electronic systems for the modern, intelligent home. The association was founded in 1989 and has more than 3000 member companies worldwide. CEDIA is a not for profit Association and has offices located in the UK, the US, China and Australia.

CEDIA was created to develop and deliver educational programmes, certification and trade shows to make sure that the industry is kept up to date with skills and technology relevant to this specialist market. Core to CEDIA is also raising the awareness and profile of the industry and the association's members to a wide variety of audiences.

Home owners, builders, architects, and interior designers are increasingly recognising CEDIA members as a professional resource. CEDIA is governed by its members, many of whom volunteer generously to ensure their peers have the finest education and industry support possible.

RAISING STANDARDS AND
AWARENESS OF THE HOME
TECHNOLOGY MARKET



CEDIA'S AIM

The aim of these CEDIA Recommended Wiring Guidelines is to provide homeowners, builders, electricians, and developers with guidance for the installation of the cabling infrastructure that is important to support today's digital and connected lifestyles.

CEDIA understands that though they would always recommend you talk to a CEDIA specialist as soon as possible in your project life cycle, you may wish to undertake the project yourself. If at any time there is ever ambiguity, uncertainty or you would like further advice, please contact a CEDIA member company (www.cedia.org). The most expensive cable that can be installed is the one that did not get installed in the first place. Mistakes can be costly, so it is vital to get the cabling infrastructure correct the first time round.

CEDIA™

The following information was supplied to us by CEDIA.
Full details on wiring guidelines can be found on the CEDIA website.

Scan code to download your copy NOW
or visit <http://www.cedia.co.uk/publications>



GRADES OF INSTALL

GRADES OF INSTALL

Each CEDIA wiring Grade has a minimum cabling requirement defined as a benchmark to correctly wire the services within the home. As the Grade level increases, so does the complexity and level of product/technology that is required to correctly specify and design a system. **Grade 1** systems are simple enough that they can be installed by a homeowner with confident technical abilities, or by a qualified electrician. **Grade 2** system cabling demands some additional design input; they also can require a more complex installation, depending on the multi room equipment to be installed and so may need help from a specialist CEDIA member. Due to the bespoke and customisable nature of **Grade 3** systems, it is always recommended that a CEDIA member is consulted as early as possible in the project cycle life.

GRADE 1

A Grade 1 cabling infrastructure involves installing a combination of twisted pair data cable (called Cat 5e or Cat 6a) in combination with TV and satellite Coaxial cable (typically called CX100 or WF100) to most rooms in the house, excluding lavatories and bathrooms. This will allow easy delivery of internet services, home networking, TV, satellite, radio, telephone, conferencing and other entertainment services to these rooms. Modern construction techniques are very unfriendly to high speed wireless connections (Wi-Fi) and a cable infrastructure will allow the wireless equipment to be optimally located for good signal strength and speed.

MINIMUM CABLING



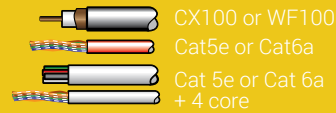
INSTALLATION

A homeowner or qualified electrician

GRADE 2

A Grade 2 cabling infrastructure includes all the cables in a Grade 1 infrastructure in addition to cables designed to enable the installation of whole house entertainment systems. These systems allow the use of discreetly hidden speakers and in-wall control points to deliver and control a wide range of entertainment options. Used in conjunction with the cables installed for Grade 1, a Grade 2 system can deliver high quality music and TV pictures around a home fed from a central equipment hub.

MINIMUM CABLING



INSTALLATION

A qualified electrician (with audio system installation experience) or CEDIA member

GRADE 3

A Grade 3 system encompasses all the cables in a Grades 1 and 2 in addition to cables designed for home automation. This functionality can include a lighting control system, motorised curtains and blinds access control systems, CCTV networks, environmental and heating control, as well as systems that allow all of the above to be controlled and integrated by a single control system, using in-wall controls and hand held remote controls. Due to the bespoke nature of some of these systems, unlike Grade 1 and 2, generic recommendations cannot be made, so it is essential to discuss your requirements for these advanced systems with a CEDIA member.

MINIMUM CABLING

Bespoke, depending on design

INSTALLATION

CEDIA member only

SERVICE DESCRIPTION	DESCRIPTION	GRADE 1	GRADE 2	GRADE 3
Satellite, radio, digital and cable TV	Cabling for satellite television, Freeview TV and radio. Also provision for cable TV.	✓	✓	✓
Home network - Broadband and Wireless Internet	Cabling for a wired home network and a robust wireless network.	✓	✓	✓
Telephone	Cabling for telephone points and for devices requiring a telephone line connection (such as Sky).	✓	✓	✓
Multi room audio	Cabling for speakers (such as in-ceiling) and audio control points from a AVHE (Audio Video Head End) location.		✓	✓
Scene setting lighting and blind control	Cabling for lighting control system and automated blinds; cabling and systems can vary.			✓
Home automation	Bespoke cabling to allow control of multiple systems within the home.			✓
CCTV and security	Bespoke cabling for CCTV and security coverage of the home, usually following a security risk assessment and design.			✓

GRADE 2 SERVICES

In addition to services provided in Grade 1, a Grade 2 wired home includes the provision of wiring a number of multi-room audio zones.



GRADE 2 DESCRIPTION

Cabling as listed in **Grade 1** PLUS:

Additional 4 core speaker + Cat5e cabling for a multi-room audio system.

Each speaker cable and Cat5e are run together, and provide wiring for an 'audio zone'. These cables must all start from a single location, known as the AVHE (Audio Video Head End). The AVHE is located at ELVHE location.

Additional cabling must be run to a suitable main living space location, where **Grade 1** cabling has been terminated - e.g. the main lounge. This cabling is referred to as the 'Remote AVHE cabling*', and provides links to the AVHE for additional audio sources.

	DESCRIPTION	CABLING	CONNECTIONS (A TO B)
AUDIO ZONE	2 x speakers locations 1 x control point	1 x Cat5e 1 x 4 core speaker 1 x WF100	Speakers via control point — AVHE
REMOTE AVHE	Additional cabling for audio sources	2 x Cat5e 2 x WF100 + Grade 1 cabling	Remote AVHE location — AVHE

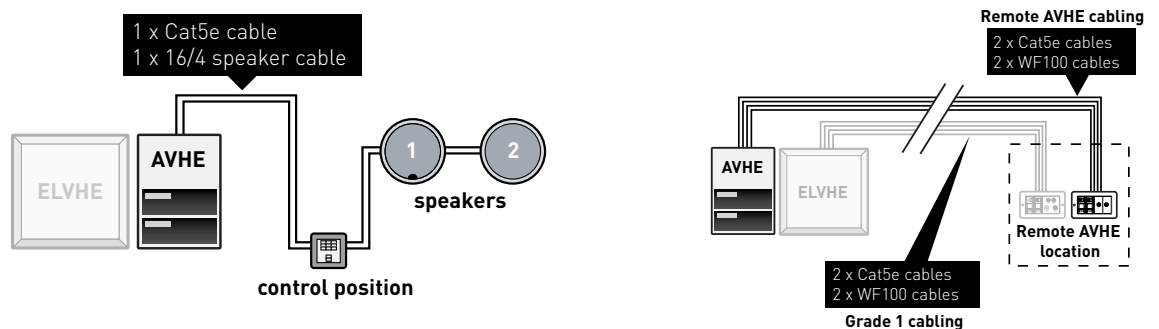
Each audio zone to be wired for multi-room audio will have a Cat5e+4 core speaker cable run via a suitable control position (typically a switch level backbox), and then from the control position to the first speaker, then looped to the second speaker. This is the principle of the CEA/CEDIA 2030-A standard. Wiring in this way allows for the following options:

OPTION 1 - a remote keypad to be located in each room with a central amplifier.

OPTION 2 - a remote sensor installed at each speaker with a central amplifier.

OPTION 3 - a Cat 5e based speaker (with internal amplifier) with the speaker cable being used for power.

*Remote AVHE cabling - two additional Cat 5e and two additional Coax cables should be run to the AVHE location from the ELVHE. Grade 1 cabling should also be available at this location.



AUDIO CABLING

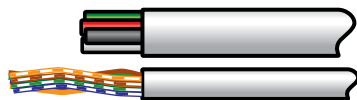
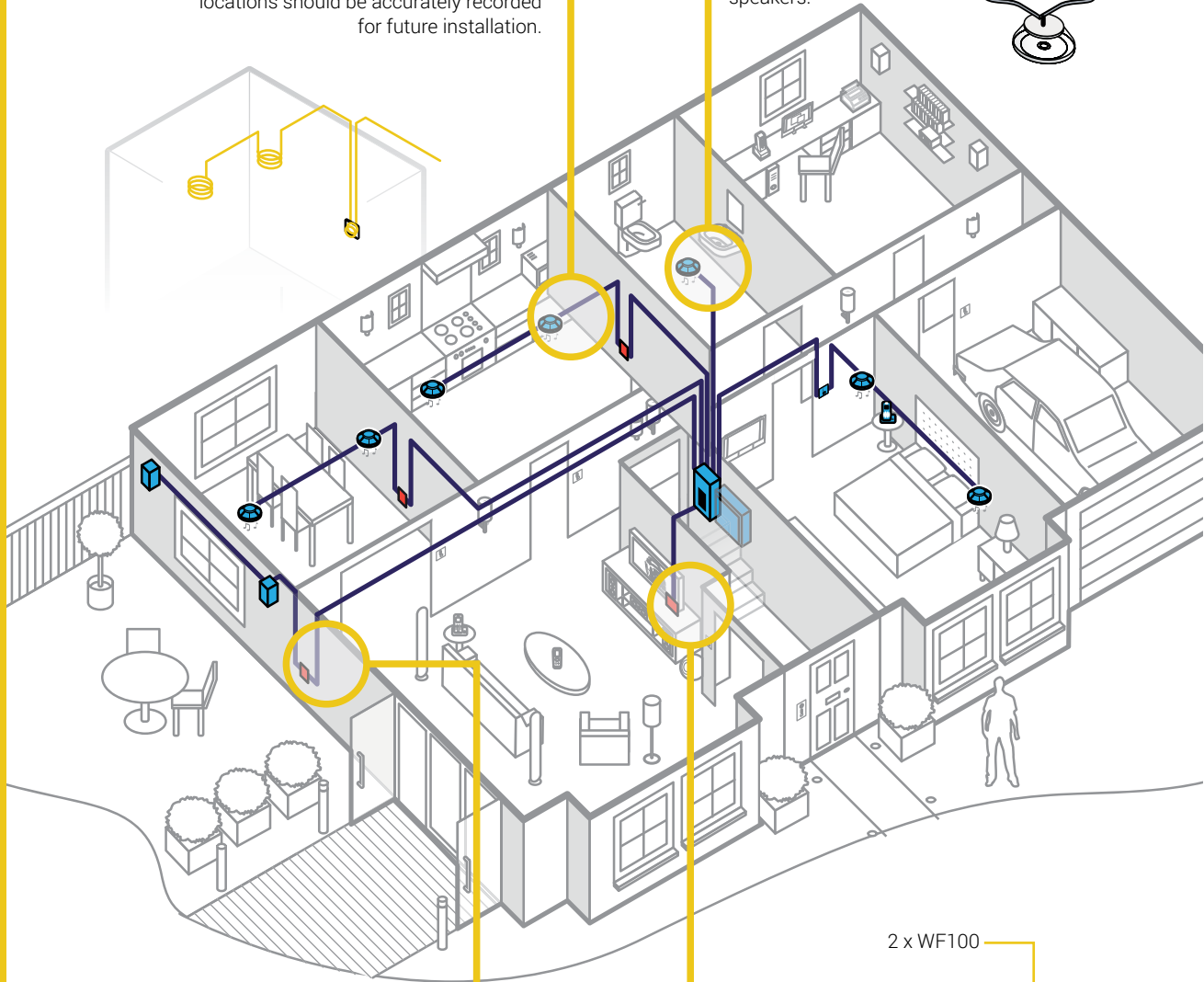
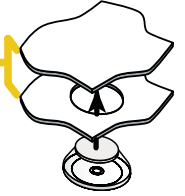
Cat5e (reference standard - TIA/EIA-568A) and 4 core speaker cabling (4 core speaker cable with 4 cores of 16 gauge). A 'shotgun' Cat5e and 4 core speaker cable helps to minimise cable runs.



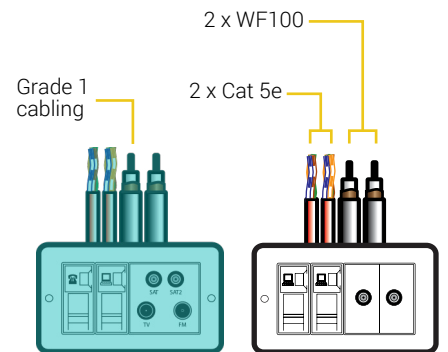
GRADE 2 INSTALL

15cm cable coils should be left at speaker pre-wire locations and 30cm coils in backboxes. All speaker locations should be accurately recorded for future installation.

In-ceiling speaker locations will need to be coordinated so that an unobstructed installation is possible. Avoid locating next to joist, beam or pipework. Minimum 200mm diameter void; 100mm clear depth required for installation of in-ceiling speakers.



1x Cat 5e + 1x 4 core speaker cable run via a control point location to speakers. This is called an Audio Zone. Shotgun cable can help minimise cable runs.

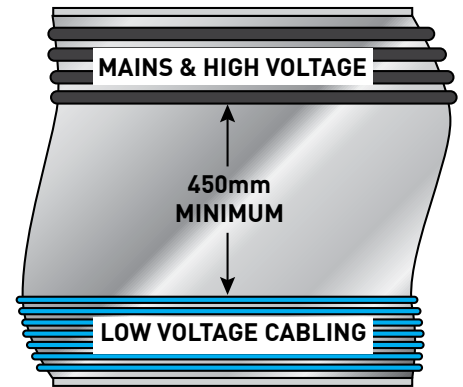


Additional cabling (2x Cat 5e + 2x WF100) is required for the REMOTE AVHE. Grade 1 cabling (2x Cat 5e + 2x WF100) should also be available here.

ELECTRICAL REQUIREMENTS

Low voltage and Extra Low voltage cabling requires some special consideration when being run around the property. Due to the type of signals they carry, they are susceptible to interference from mains and high voltage cabling. A qualified electrician will be able to run these cables with this in mind; some guidelines are:

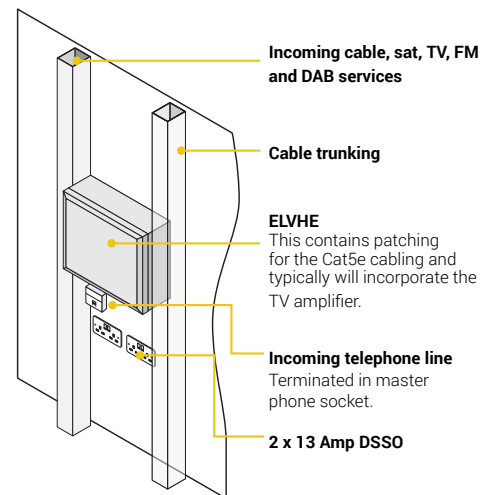
- Ensure all exposed cables (or those run underground) are sufficiently protected
- If sockets are not to be terminated, leave tails on all cables - 3 metres at the equipment site; 30cm at a backbox
- Label cables in a unique fashion using the supplied labels; fix near the backbox
- Ensure cable entry into backboxes is from the bottom of or top of the backbox
- Cables shouldn't run parallel to mains/lighting cables for any distance greater than 2m, unless at least 4550mm apart; there are no problems if cables just cross at 90 degrees



EXTRA LOW VOLTAGE HEAD END (ELVHE)

The ELVHE is where the incoming services and most cables will run back to. A location for this needs to be determined for the electrical contractor at an early stage. The ELVHE can be hidden away under the stairs or in a utility room, for example. It needs to be placed somewhere accessible and at an appropriate height from the floor so an electrician or engineer can safely work on it.

The panel needs 2 x 13 Amp double switched socket outlets located close to it. It is recommended that cable management be provided to run the cables to the ELVHE. Trunking can be used to feed cables directly into the cable knock-outs, or run alongside as indicated. The electrical contractor will decide the best way of managing the cables.

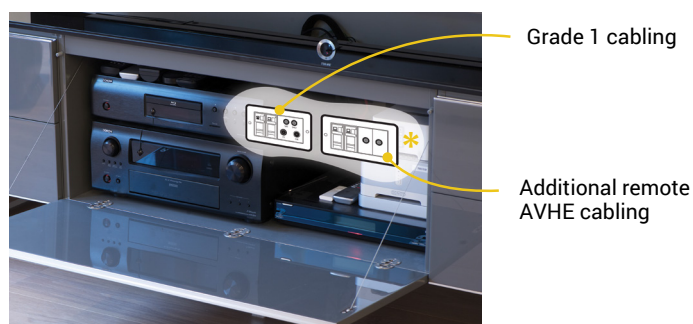


AUDIO VIDEO HEAD END (AVHE)

The AVHE is located at the ELVHE. A suitable patch or enclosure panel may be installed, or shelving could be provided for the equipment (with the cables being terminated in a backbox with a faceplate at the shelving location). Ensure there is appropriate mains power adjacent to any head end equipment. Any AVHE location will need to be suitably ventilated.

REMOTE AVHE CABLING

The remote AVHE cabling should be run to a suitable main living space location where the Grade 1 cabling has been terminated - e.g. the main lounge. Consideration should be made as to where to house the audio sources and amplifier components - this may often be within a piece of joinery. Any equipment will need to be suitably ventilated.



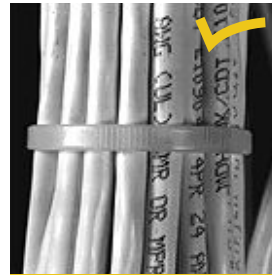
Don't forget that suitable mains power supply will be required for the remote AVHE and any head end equipment.



Use sweeping bends, no tighter than the curve of a Coke can.



Bend ratio = 4x diameter. Don't allow the cable to form right angles or sharp bends.



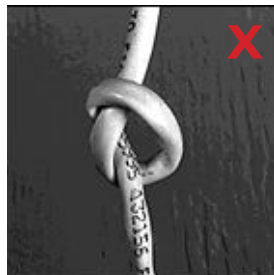
Use tie wraps loosely on large bundles.



Do not overstress cables by over tightening cable ties, especially to the point where crush-stress is visible.



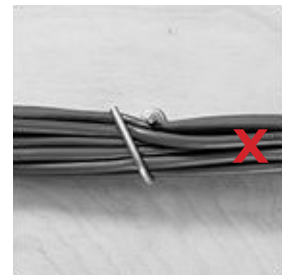
Don't allow the cable to kink, knot, or snag while pulling it off the spool or out of the box; deforming the pair-twist will alter the performance of the cable.



Don't allow the cable to kink, knot or snag while pulling it off the spool or out of the box; deforming the pair-twist will alter the performance of the cable.



Use j-hooks or similar devices designed to support cables.



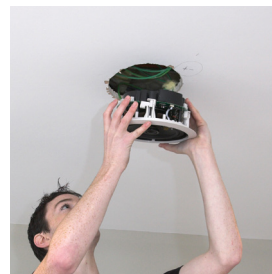
Do not overstress cables by overloading.



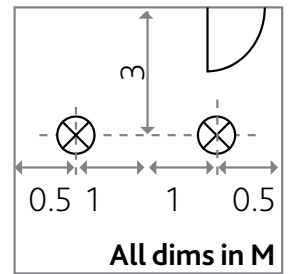
Pull cable using less than 25 pounds (11.3Kg) of pull-force.



Use a cable pulling accessory.



Ensure 15cm cable coils are left at speaker pre-wire locations to allow for easy installation.



Record any pre-wire locations accurately.

IMPORTANCE OF TESTING

"Fixing a fault at second fix is 10 times cheaper than fixing a fault at commissioning."

Do not leave all the testing to the end - perform appropriate testing at each stage. After each Cat5e cable has been terminated, it must be continuity tested and wire mapped.

There are three categories of testing: **Verification, Qualification, Certification**

1 - VERIFICATION

Verification answers the following question:
"Do I have end to end continuity and a proper wiremap on the cable?"

Verification tools provide:
Basic tools
Basic continuity wiremap
Shorts or open in a cable
More advanced tools
Length and tone tracing



2 - QUALIFICATION

Qualification answers the following question:
"Can this cabling link support the bandwidth requirements of the network and applications?"

Qualification tools provide:
Identification of links that will not support certain network speeds and technologies. Distance to performance faults, like crosstalk. Assurance that existing cabling will support new technologies, like Gigabit Ethernet (GBE) and VoIP, before upgrading.



3 - CERTIFICATION

Certification answers the following question:
"Does this cable comply with performance requirements of the International TIA or ISO standards?"

Certification tools provide:
The definition of performance and the level ("Category or Class") of performance is defined by industry standards TIA/EIA-568B defines Cat5e, Cat6a, ISO/IEC 11801 and 61935 define Class C, D, E and F.

Industry standards specify a level of performance based on bandwidth analysis that is independent of a particular network technology.

ICE CABLE CABLE.DONE.RIGHT

What does Ice Cable stand for?

They have re-imagined every aspect of cable to save you time, increase performance and improve safety.



LOW SMOKE; 0 HALOGEN

UNCHANGED WORKFLOW

Change nothing about the way you work; ICE LSZH Cable is compatible with standard connectors and available in the same gauges as regular cable. This means installation is as simple as ever and no time will be wasted in changing the cable to the safer alternative.

THE SAFEST CHOICE

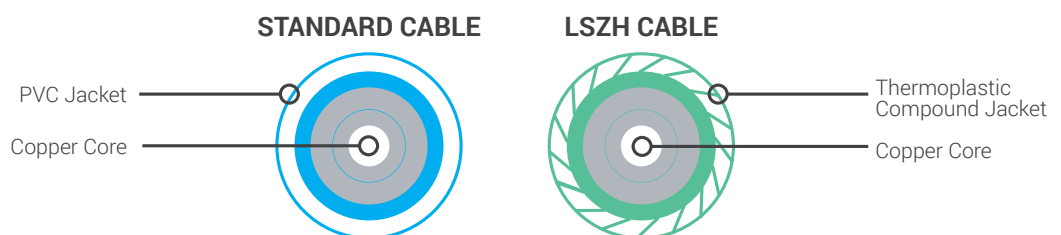
Our LSZH jackets are composed of the finest thermoplastic compounds to ensure that a limited amount of smoke and no halogen is released if the cable is exposed to high sources of heat.

KIND TO THE ENVIRONMENT

By using safer materials, LSZH cable reduces the amount of toxic and corrosive gases that are released in extreme heat. Perfect for poorly ventilated areas, ensure that no further damage is incurred.

FREE OF HALOGENATED MATERIALS

No Fluorine, no Chlorine, no Bromine, no Iodine or Astatine. Our cable jackets contain no halogenated materials, meaning there is no danger of toxic contamination if a fire occurs. Our cables reduce the damage caused to the respiratory systems of anyone nearby in the event of a fire.



NO HALOGEN | LIMITED SMOKE | TOXIC FREE

ICE CABLE

ICE CABLE CABLE.DONE.RIGHT

Certified to be High Quality

ICE Category Cable has been recognised as a certified HDBaseT product, utilising 5Play technology, with excellent ratings at long distance and Ultra HD4K video.



Certified HDBaseT™

Incorporated in 2010, the HDBaseT™ alliance was founded by LG, Samsung, Sony, and Valens to standardise HDBaseT technology for home and commercial distribution.

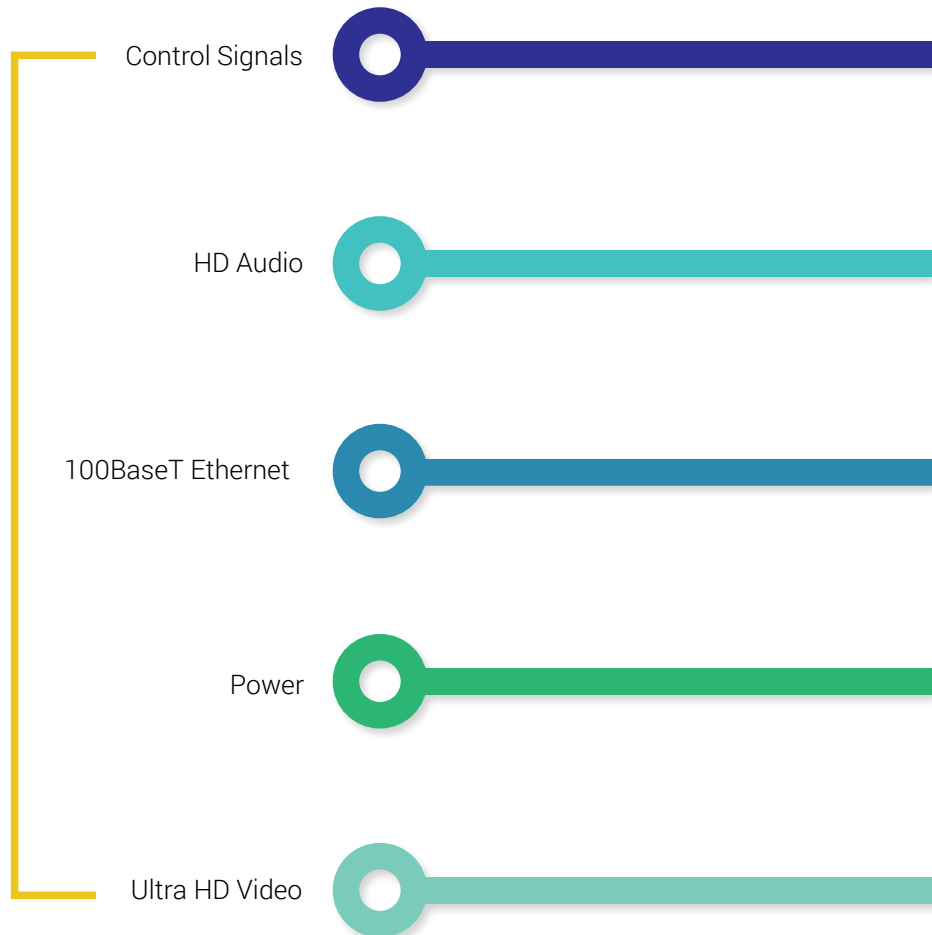


5Play™

The cornerstone of HDBaseT technology, 5Play is a feature set that joins uncompressed full HD digital video, audio, 100BaseT Ethernet, Power, and various controls signals into a single LAN cable.



ALL THIS IN ONE CABLE



CABLE INSTALLERS

What does CPR mean for installers?

The Construction Products Regulation (CPR) is a game changer for the supply of cable into the UK market, as it makes it a legal requirement for cable to be tested and approved to agreed performance criteria.

Up until this point, it has not been illegal for substandard cable to be imported and sold in the UK. For contractors therefore, and for reputable cable manufacturers, the introduction of CPR is to be heartily welcomed as it introduces some legally binding regulations around the quality of cable offered for sale.

From 1st July 2017, all cable to be used for permanent installation in buildings must be tested for its performance in relation to fire. The tests required relate to the way the cables behave in a fire, rather than the ability of the cable to resist the effect of fire.


To be CPR compliant, a cable must be accompanied by a Declaration of Performance (DoP) to demonstrate that it has been tested and certified by a legally appointed notified testing body to comply with the relevant performance tests.

This puts a whole new level of responsibility on the manufacturers, distributors, and wholesalers of cables, but makes life easier for contractors and installers.

As you would expect, ICE Cable has been working towards this new regulation for years and all Ice cable is fully compliant with the regulations. ICE Cable is delighted that the new regulations will help to remove substandard cable from the market: another step forward in the drive to improve the safety of products used in UK buildings.

For contractors buying cable made by reputable manufacturers and supplied through reputable wholesalers, the new regulation simply provides further assurance that the cable purchased performs as it should.



 XXXX	<i>CE marking, consisting of the "CE"-symbol</i> <i>Identification number of the product certification body</i>
AnyCo Ltd, PO Box 21, B-1050, Brussels, Belgium 13 (To be given by the manufacturer)	<i>Name and the registered address of the manufacturer, or identifying mark</i> <i>Last two digits of the year in which the marking was first affixed</i> <i>Reference number of the DoP</i>
EN 50575: 2013 (To be given by the manufacturer) Supply of electricity in buildings and other civil engineering works with the objective of limiting the generation and spread of fire and smoke Reaction to Fire: B2_{ca}-s1,d1,a1 Dangerous substances: none	<i>No. of European standard applied, as referenced in OJEU</i> <i>Unique identification code of the product-type</i> <i>Intended use of the product as laid down in the European standard applied</i> <i>Class of performance</i>



MURIDEO TESTING EQUIPMENT

Murideo was created out of the need to bring more modern tools to the Custom/Commercial AV Integrator market. With in depth knowledge brought on from years of experience in the electronics industry, Murideo are determined to bring cutting edge tools to the world at large that were previously only available to select groups.



FRESCO SIX-A UHD AND HDR ANALYZER

This is a 18Gbps 4K Analyzer that can read HDR data at the same time as giving you live video preview. This is the new standard in analyzers, and paired with the Fresco SIX-G Generator becomes a full calibration and testing system.



FRESCO SIX-G GENERATOR

The Murideo SIX-G is for the AV Integration market to confirm HDMI 2.0(a) and HDCP 2.2 operation at the 18Gbps level. Additionally, the SIX-G is an excellent troubleshooting tool for distributed HDMI systems and a reference source for video calibration and is compatible with calMAN.



FOX AND HOUND TESTING KIT

This 18Gbps Generator and Analyzer kit was built as the ideal testing unit for all custom and commercial integrators. The Fox & Hound Test Kit comes with an 18Gbps Generator and 18Gbps Analyzer, these tools allow you to confirm correct bandwidth, HDCP, resolution, timing, HDR metadata and many more options that could cause system hiccups if not treated correctly.



FRESCO SIX-G AND SIX-A TEST SUITE

The Murideo Fresco pair comes with an 18Gbps Generator and 18Gbps Analyzer, these tools allow you to confirm correct bandwidth, HDCP, resolution, timing, HDR metadata and many more options. You are able to connect these devices directly to your computer to expanding your testing with a free software that comes with your pair. The Murideo Fresco pair is a must have for any HDMI Specialist, Calibrator, AV Product Manufacture, HDMI Cable Manufacture, Custom/Commercial Integrators, Content Masters and more.

#

802.11a

An IEEE wireless networking standard that specifies a maximum data transfer rate of 54Mbps and an operating frequency of 5GHz.

802.11ac

An IEEE wireless networking standard that specifies a minimum throughput of 1Gbps and an operating frequency of 5GHz.

802.11b

An IEEE wireless networking standard that specifies a maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz.

802.11g

An IEEE wireless networking standard that specifies a maximum data transfer rate of 54Mbps, an operating frequency of 3.4GHz, and a backward compatibility with 802.11b devices.

802.11n

An IEEE wireless networking standard that improves on previous standards by allowing multiple input multiple output (MIMO) antennas on both the 2.4GHz & 5GHz frequencies.

A

ACCESS POINT

Device that allows wireless equipped computers and other devices to communicate with a wired network. Also used to expand the range of a wireless network.

B

BANDWIDTH

The transmission capacity of a given device or network.

BIT

A binary value (1 or 0). 8bits are equal to 1Byte.

BRIDGE

A device that connects two different kinds of local networks, such as a wireless network to a wired Ethernet network.

BUFFER

A block of memory that temporarily holds data to be worked on later when a device is currently too busy to accept the data.

D

DATABASE

A collection of data that is organised so that its contents can easily be accessed, managed and updated.

DDNS (DYNAMIC DOMAIN NAME SERVER)

The capability of having a website, FTP, or email server with a dynamic IP address use a fixed domain name.

DEFAULT GATEWAY

A device that forwards internet traffic from your local area network.

DHCP (DYNAMIC HOST CONFIGURATION PROTOCOL)

A protocol that lets one device on a local network, known as DHCP server, assign temporary IP addresses to the other network devices, typically computers.

DNS (DOMAIN NAME SERVER)

The IP address of your ISP's server, which translates the names of websites into IP addresses.

DOMAIN

A specific name for a network of computers.

DSL (DIGITAL SUBSCRIBER LINE)

An always on broadband connection over traditional phone lines.

DYNAMIC IP ADDRESS

A temporary IP address assigned by a DHCP server.

E

ENCRYPTION

Encoding data to prevent it from being read by unauthorized people.

ETHERNET

An IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium.

F

FIREWALL

Security measures that protect the resources of a local network from intruders.

FIRMWARE

1. In network devices, the programming that runs the device. 2. Programming loaded into read only memory (ROM) or programmable read only memory (PROM) that cannot be altered by end users.

FTP (FILE TRANSFER PROTOCOL)

A standard protocol for sending files between computers over a TCP/IP network and the internet.

G

GATEWAY

A system that interconnects networks.

H

HTTP (HYPERTEXT TRANSPORT PROTOCOL)

The communications protocol used to connect to servers on the World Wide Web.

I

IEEE (THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS)

An independent institute that develops networking standards

IP (INTERNET PROTOCOL)

A protocol used to send data over a network.

IP ADDRESS

The address used to identify a computer or device on a network.

IPSec (INTERNET SERVICE PROVIDER)

A VPN protocol used to implement secure exchange of packets at the IP layer, Cisco propriety.

ISP

A company that provides access to the internet.

L

LAN (LOCAL AREA NETWORK)

The computers and networking products that make up the network in your home or office.

M

MAC (MEDIA ACCESS CONTROL) ADDRESS

The unique hardware address that a manufacturer assigns to each networking device.

Mbps (MEGABITS PER SECOND)

One million bits per second; a unit of measurement for data transmission.

N

NETWORK

A series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.

P

PING (PACKET INTERNET PROPER)

An internet utility used to determine whether a particular IP address is online.

PDU (POWER DISTRIBUTION UNIT)

Used to distribute power to all connected devices.

POP3 (POST OFFICE PROTOCOL 3)

A standard protocol used to retrieve email stored on a mail server.

PORT

1. The connection point on a computer or networking device used for plugging in a cable or adapter. 2. The virtual connection point through which a computer uses a specific application on a server.

PoE (POWER OVER ETHERNET)

A technology enabling an Ethernet network cable to deliver both data and power.

PPPoE (POINT TO POINT PROTOCOL OVER ETHERNET)

A type of broadband connection that provides authentication (username and password) in addition to data transport.

PPTP (POINT TO POINT TUNNELING PROTOCOL)

A VPN protocol that allows the Point to Point Protocol (PPP) to be tunneled through an IP network. This protocol is also used as a type of broadband connection in Europe.

R

RADIUS (REMOTE AUTHENTICATION DIAL IN USER SERVICE)

A protocol that uses an authentication server to control network access.

RJ-45 (REGISTERED JACK-45)

An Ethernet connector that holds up to eight wires - also known as 8-pin 8-connector.

ROAMING

The ability to take a wireless device from one access point's range to another, within the same network.

ROUTER

A networking device that connects multiple networks together, such as a local network and the internet.

RTS (REQUEST TO SEND)

A packet sent when a computer has data to transmit. The computer will wait for a CTS (Clear To Send) message before sending data.

S

SERVER

An computer whose function in a network is to provide user access to files, printing, communications, and other services.

SMTP (SIMPLE MAIL TRANSFER PROTOCOL)

The standard email protocol on the internet.

SNMP (SIMPLE NETWORK MANAGEMENT PROTOCOL)

The standard email protocol on the internet.

SSID (SERVICE SET IDENTIFIER)

Your wireless network's name.

STATIC IP ADDRESS

A fixed address assigned to a computer or device that is connected to a network.

STATIC ROUTING

Forwarding data in a network via a fixed path.

SUBNET MASK

An address code that determines the size of the network.

SWITCH

Device that is the central point of connection for computers and other devices in a network, so data can be shared at full transmission speeds.

T

TCP/IP (TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL)

A network protocol for transmitting data that requires acknowledgment from the recipient of data sent.

TFTP (TRIVIAL FILE TRANSFER PROTOCOL)

A version of the TCP/IP FTP protocol that uses UDP and has no directory or password capability.

THROUGHPUT

The amount of data moved successfully from one node to another in a given time period.

TOPOLOGY

The physical layout of a network.

U

URL (UNIFORM RESOURCE LOCATER)

The address of a file located on the internet.

V

VPN (VIRTUAL PRIVATE NETWORK)

A secure connection over the internet to join another network.

W

WAN (WIDE AREA NETWORK)

The Internet.

WLAN (WIRELESS LOCAL AREA NETWORK)

A group of computer and associated devices that communicate with each other wirelessly.

LUXUL RECOMMENDED TESTING & TOOLS

There are several third party software tools Luxul recommends to help evaluate site conditions and network performance.

iPERF

Use iPerf to measure network throughput, bandwidth, packet loss, and other TCP/UDP performance factors.

Download iPerf from iperf.fr
Or scan QR code to download now

**SpeedTest**

You can use SpeedTest, the world's most popular Internet speed test, to check Internet connection speed on wired and wireless LAN connections or to compare the two.

Use SpeedTest at www.speedtest.net
Or scan QR code to download now

**InSSIDer**

InSSIDer allows you to visualise your wireless environment and test Wi-Fi signal strength so you can modify AP settings and placement for optimal Wi-Fi performance. Available for Windows or MAC.

Download InSSIDer from www.inssider.com
Or scan QR code to download now

**Ekahau HeatMapper**

Use Ekahau HeatMapper to assist with the process of mapping and analysing Wi-Fi coverage.

Download Ekahau HeatMapper from www.ekahau.com
Or scan QR code to download now



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