IPaXiom networks™
Empowering Next Generation Services

About IPaXiom

IPaXiom Networks Ltd is a dynamic, innovative voice in the Wireless-LAN industry. We recognise the need of today's individuals and businesses to:

- **Attain instant, high-speed access to the Internet**
- **Rely on an 'anywhere, anytime' Internet service to support their critical activities**
- **Compete efficiently & successfully in the world of ever-changing, dynamic business.**

Launched in 2004 in the United Kingdom, IPaXiom is a privately held company focused on developing and delivering Wireless Mesh technology and carrier-grade WiMAX solutions to its customers in an efficient, uncomplicated and affordable way.

IPaXiom's Xzone™ Mesh technology is renowned and proven for establishing Wi-Fi Mesh networks close to real time, with straight-forward deployments and effortless integration.

The XzoneMAX™ (XMaX™) WiMAX Base Station now allows greater coverage and multiple applications, especially in environments where wiring is difficult, disruptive, and expensive. Xzone™ Mesh & MAX delivers the scale, security, functionality and flexibility that are so keenly sort after by today's customers.

IPaXiom Xzone™ networks are being deployed world-wide in both commercial and non-commercial settings, delivering innovative and scaleable solutions with tremendous real business benefits.

IPaXiom provides a complete end to end technical and operational service for delivering Mesh networking. Supplying hardware, software, consultancy, installation and support services for customers in any location, so we become your single point of contact for all your wireless needs

So whether it's location-specific or city-wide Metro WLANs, Data, Voice or Video Services, IPaXiom has the Mesh technology and support operations to deploy and manage the best in Mobile Wireless Internet networks and Value Added

IPaXiom has invented a range of innovative products that pushes the wireless Mesh networking boundaries in every way.

The XzoneMesh™ 200 is a lightweight Mesh router that provides fast and simple network deployment. Whether extending the existing wired infrastructure or simply connecting up various peripheral devices, it's a cost-effective alternative to having to route new cabling across (multiple) work floors.

One Internet gateway can be used to cover large areas and accommodate any combination of 802.11a/b/g.

The Indoor XzoneMeshSR200™ can go up to 100 metres with non or near line of sight and can cater for multiple simultaneous users. It comes with Power over Ethernet ability.

The XzoneMeshSR250™ product range extends into the 5.8GHz frequency division along with 2.4GHz radio. 5GHz radio designed primarily for creating a wireless backhaul network, the XzoneMeshSR250™ range has similar features as their 2.4GHz counterparts.

Alongside the Xzone™ is an equally intelligent Network Management System which is comprehensive yet user friendly. The XzoneNMS™ allows operators to keep track of the activities going on inside their wireless networks. Each mesh account on the system has a complete set of network monitoring functions and management facilities, with each individual node accessible remotely for diagnostic or configuration purposes. With the ability to monitor the Xzone™ networks from anywhere in the world, the XzoneNMS™ is a vital part of the comprehensive solution that IPaXiom deliver to its customers.

Xzone Mesh™ sits alongside the IPaXiom WiMAX Base Station, called XzoneMAX™. This is the latest in wireless access technology for enabling backhaul / transit and the last-mile delivery of information.

The Xzone™ Wireless Mesh Routers

The Xzone™ Mesh router is not like other Access Points that are flooding the market today.

The key difference is that the Xzone™ router can deliver both wireless access (like an AP) but also wireless backhaul, eliminating the need for costly Ethernet cable runs up and down building ducts. Hence, the beauty of Mesh Networking, an intelligent device that can 'think' for itself and adapt to its changing, dynamic environment.

What makes the Xzone™ unique is that it can be used in a 2 or 3 radio configuration whilst maintaining its Layer 2 status.

The Xzone™ will deliver the dedicated bandwidth that is required to each user for data and voice applications. This will be done more effectively using a 3 radio configuration, as explained in the Network Architecture section.

Xzone Mesh™ (XMesh™)

Xzone™ Mesh is a system for exchanging information in which each node sends, receives, and forwards data as and when required. The nodes in a Mesh network communicate with each other to discover not only who their neighbours are, but also how well they are performing. They then work together to get information from one place to another based on the connections they discover.

Using intelligent devices such as the XMesh™ routers means that networks are **self-organising** structures, rather than constantly relying on manual intervention for optimising traffic. Each node is aware of its surroundings and can switch to any route it find more productive or safer to use. XMesh™ networks therefore also provide **self-healing** structure and removing the reliance on single points of potential failure.

As new nodes come on line or are removed from the network, the Mesh nodes perform **self-routing** and the network is adjusted dynamically, making any potential solution highly scaleable and flexible.

Mobility can be achieved and effectively delivered for the end user. As the XzoneMesh™ router performs as a Layer 2 switch (with added Mesh intelligence), services can be managed and controlled centrally. Users can be assigned IP addresses from a centrally based DHCP server which again aids roaming and seamless handover from node to node.

Users will have the ability to roam within the coverage area and connect to internet services from anywhere within the cloud.

The XMesh™ routers can also be managed remotely via the Xzone™ Network Management System (XzoneNMS™).

Main Benefits:

Multiple radios

- Two or Three multi-function radio setups
  - Individual radios for Meshing (up/downstream) and Client Access
- Xzone™ multiple radio systems, nodes can switch to other channels to avoid channel interference from near by nodes operating in another segment of the network.

Self Organising

- Each node works the routing dynamically, providing network and node redundancy and saving time and effort in administration.
- The self organising functions run continuously, so when changes occur to connections and reception the Xzone network will automatically re-route around blockages in real time.
- IPaXiom Mesh supports multi-point to multi-point but with self configuration and self healing.

Supports Multiple Backhaul Radios

- Multiple radio root configurations - where there are two or more downlinks on the root node enables even bandwidth dispersion from a central Ethernet backhaul link.
- Up to 4 backhaul paths feeding into the same Ethernet link can be supported.
- Structured Mesh emulates wired switch stacks. As such, they support multiple input and output interfaces. Special configurations include two service radios to separate VOIP traffic with data traffic.

Layer 2 Switching technology

- True mobility as IP is assigned centrally to user and communicated throughout the Mesh network.
- 'Transparent' access layer allows simple integration into complex IT environments
- Providing VOIP phones over WLAN or Video over WLAN in dense environments

IPaXiom Network Management System

The Xzone™ Network Management System (XzoneNMS™) provides monitoring, local and remote management of IPaXiom Xzone™ wireless mesh networks, from anywhere in the world. The platform features a user-friendly GUI that provides complete control over the entire network and also to individual nodes that comprise the Mesh.

With the ability to perform remote diagnostics, change router settings, transmit power, regulate security conditions, provision VLANs, set traffic priority levels and much more, the

Xzone™ NMS has everything a support engineer needs to manage the network and the customer.

The XNMS visually displays the actual wireless links between all of the nodes that make up a Mesh network. Not only does the operator see what nodes are neighbours and how they are all connected, but the NMS also highlights the strength of each link. This way, the operator can quickly evaluate if there are any fluctuations between each Xzone™ node and the link quality of the network.

Benefits:

Rogue Node Detection: The Xzone™ NMS illustrates the foreign routers that the Xzone™ node has detected within its coverage patterns. Their unique MAC address is also shown for the record. The Secure Access Controller goes one step further to triangulate their location and 'kill' them off.

Topology: Visual displays of the Xzone™ network(s) and how they are connected.

Alerts: LEDs to indicate Node Status, temperature, Bit rate and signal strength.

Customer Information: To manage authorised connections through various back-end systems, the Network operator can view each customers/users connection details.

Dynamic Load Balancing: The NMS displays real time information relating to the traffic that each Xzone™ node is processing and managing. This allows the support engineer to see immediately the workload of each node and the network as a whole.

Dynamic Visual Meshing: See the links from each node change to show the fastest and shortest route to the neighbouring nodes

XzoneMaX™ (XMaX™)

The IPaXiom solutions set offer a compelling business model for operators targeting Wireless Broadband Access applications for Residential and Business customers. The Hybrid WiMAX and DVB technology allows one-way broadcast operators (DBS, DVB-T, MMDS and One-way Cable) to extend their existing infrastructures (e.g., dish on the roof, existing coax wiring, etc.) and offer a complete bundle of attractive "Triple Play" services including Internet access, telephony, Video on Demand, interactive TV services and future mobile support. Our solutions can be used for building new networks, expanding existing networks or as the low-cost and immediate last-mile distribution for enterprises, campuses or complementary fiber networks. We complete our solutions offering with complementary backhaul Transport solutions for various applications.

A Winning Value
IPaXiom's solutions offering:

Independence in the last mile
IPaXiom's XzoneMaX™ solutions enable service providers to reduce their dependency on other providers by building their own low cost independent service network, cost-effectively reaching customers where available infrastructure is not sufficient or expensive. Our solutions enable increase of customer's application offerings with differentiated services on demand, and achieve long term customer retention with a full Triple-Play service offering (Voice, Data and Video).

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Build a profitable sustainable business
IPaXiom allow service providers to build service networks with minimal initial investment and low turn-on costs. Our network solution supports in-service scalability allowing you to build your network in pace with the growth in customer demand.

Our systems ensure low network operation costs supporting plug-n-play operation and simple and easy network operation and maintenance.

Built for immediate service delivery, our solutions enable recurring revenues from day 1 of operation. Together with controllable capital costs and low operation costs, our solutions enable service providers to build a sustainable business case with a fast Return on Investment (ROI).

Competitive positioning for the future
IPaXiom solutions enable operators to unleash new revenue streams (not just Broadband Internet Access). XMaX1000 systems deliver multi-service bundling of Voice, Video and Data for current and new customers to boost revenues and loyalty. Service can be delivered in a matter of hours or days instead of months today. Our network opens the way to future mobile services as the mobile WiMAX standard matures.

XMAX™–DBS enabling technology for fast and cost-effective triple-play services
Triple-play services are gaining momentum. Cable operators and Telcos are now offering highly attractive service-bundles including TV, Video on Demand (VOD), flat rate voice and high speed Internet over a single discounted bill. To stay ahead of the pack, DBS operators require a fast and cost effective solution for triple-play services.

XMaX™ enables DBS operators to upgrade their existing infrastructure and offer a complete, end-to-end triple-play mobile-ready package using a complementary WiMAX-based broadband wireless access network.

The IPaXiom's HWDV™ (Hybrid WiMAX & DVB) unique solution enables DBS operators to offer cost-effective IP-based triple-play services to residential and SoHo customers. The XMaX™ solution is based on effective reuse of the DBS operator's already deployed infrastructure at the customer premises, including existing dish, coax wiring and STBs. XMaX™ upgrades the existing infrastructure with a bi-directional, high capacity, return channel over the terrestrial broadband wireless network.

XMAX™ Solution Highlights:

- **Reuse of existing infrastructure** – the innovative Hybrid WiMAX & DVB architecture enables to offer complementary triple-play services using the already installed dish, coax and STBs.
- **Low cost of ownership** through simple installation and demand-based build-out, enabling operators to rapidly penetrate new market segments with minimal CAPEX.
- **Compatibility with various infrastructure types at the customer premise** – optimal, cost-effective services distribution using any already installed wiring including copper wires, power lines, coax or wireless (WiFi). No need to rewire the house – save the costs and the customer objection.
- **Pay-as-you-grow architecture** – XMAX™ unique network solution allows providing service coverage at low first time investment and scaling in bandwidth and services with the customer demand.
- **Numerous applications and Services** - Addressing multiple new revenue-generating services, and supporting differentiated multi-services through multiple QoS levels and a variety of classification/prioritization schemes.

The DBS operator benefits:

- **Reduce churn, enhance customer loyalty and increase competitiveness** by adding attractive triple-play service packages over a single bill.
- **Major ARPU increase** through additional always-on services including high speed Internet access, flat rate VoIP packages and On Demand interactive services (gaming, polling, betting, VOD, NVOD, and more).
- **Upgrade path to Mobile services over the same infrastructure** offering an unbeatable quadruple bundle (triple-play plus mobile) that no other operator can provide.

The IPaXiom's Broadband Wireless Access (BWA) solution offers a compelling business model for operators targeting Residential and Business customers or service backhaul.

Residential/Business Wireless Broadband
IPaXiom's offers operators the ability to service areas where xDSL or Cable is expensive or problematic to operate. IPaXiom's XMAX™ is the natural solution for operators targeting residential and SoHo customers who don't have access to broadband connectivity due to the limitations of xDSL and Cable, or for underserved rural areas with low population, currently uneconomic to serve.

A single highly compact IPaXiom's base station located over buildings or towers can serve thousands of home and small business customers with high speed broadband connectivity. Our unique **XMaXMesh**™ roof-hopping technology enables reaching an almost unlimited extended service range.

IPaXiom's BWA solution is the ultimate Greenfield solution. The IPaXiom's BWA solution allows fast deployment with a small startup investment for immediate service delivery and fast return on investment. The IPaXiom's solution allows scaling in service in a build-as-you-grow fashion.

Our products enable a flexible use of licensed (e.g. 2.5Ghz, 3.5Ghz) or publicly available and unlicensed frequency spectrum (e.g. 5.8Ghz) enabling service providers to quickly set up a Wireless MAN without right of way, Fiber cable digging, and other high-budget long-term-operation expenses.

The standard IP interfaces embedded in our products enable the establishment of Point-Of-Presence (POP) connectivity easily and at low set-up and operation costs.

We provide:

- Affordable, fast deployment and network turn-on
- No need for right of way, optic fibers or wire line
- Quick provisioning of service: Video, Voice, Data
- Fast Return On Investment (ROI)
- Differentiated services On –Demand

Service Backhaul

IPaXiom's offers operators the ability to economically provide WiMAX-based backhaul connectivity to selected applications using point-to-point or point-to-multi-point wireless connectivity. Our solutions provide the benefits of license-free MAN/WAN connectivity with cost-effective plug and play systems.

IPaXiom solutions provide a short lead time and highly economic wireless broadband backhaul service for:

- 802.11 Hotspots - Providing broadband connectivity to commercial sites or on-demand events
- 802.16 Base Stations – Providing high-speed broadband connectivity up to a distance of 50Km, eliminating the expenses of leased bandwidth and dependency on local fiber carriers
- Cellular Base-Stations – Providing fast and economic mulit-T1/E1 connectivity from cellular base-station locations to the provider's Point of Presence (POP)

Enterprise Connectivity

IPaXiom offers service providers the ability to offer enterprise customers the following attractive capabilities:

- Private and secure wireless distributed metropolitan enterprise networks
- LAN and Telephony extension to adjacent and remote enterprise locations
- Enterprise and campus wireless distribution
- Flexible last mile SoHo distribution network for Fiber To The Curb (FTTC) or Fiber To The Building (FTTB) networks

XMaX™ is IPaXiom's advanced **Broadband Wireless Access (BWA)** solution offering advanced service suite and network control supporting thousands of users.

XMaX™ is a leading WiMAX compliant Broadband Wireless Multimedia platform for broadband operators seeking to provide fast and cost-effective delivery of IP-based triple-play services to residential and SoHo customers over large geographical areas. **XMaX™** comprises of XMaX3000 and XMaX4000 WiMAX compliant base-stations, XMaX2000 WIMAX compliant CPEs and XMaX1000 multi-service gateways. The XMaX™ product family is available in 3.5Ghz and soon will be available in the unlicensed 5.8Ghz spectrum. Other spectrum versions are in development and will be announced soon. The XMaXNMS (IPaXiom NMS platform) provides a comprehensive end-to-end control over IPaXiom's systems and service delivery.

XMaX™ systems are specially designed for robustness and simplicity. **XMaX™ systems** are extremely simple to deploy, operate and maintain thus offering outstanding operator economics, combining feature-rich service delivery with low deployment and operation costs, for unmatched operator short ROI.

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XMaX™ highlights:

- Low operation power - Environmentally friendly
- Long distance coverage (up to 30 miles) using unique roof-to-roof hopping techniques
- NLOS (non-Line-Of-Site) operation
- Multi-sector support (60 ° -360 °)

- Flexible base-station structure (stand-alone or chassis based Access Units)
- Rooftop or wall-mounted
- Compact, low-cost, easy to install and maintain
- Flexible frequency support: 3.5Ghz, 5.8Ghz
- Full-duplex broadband channel (up to 20Mbps net throughput for 3.5Mhz bandwidth)
- Enhanced QoS for differentiated service support

XMaX™2000 – WiMAX CPE

XMaX™ 2000 is an outdoor unit that provides complete WiMAX-based broadband wireless access functionality to a range of indoor Multi Services Gateways to support diverse services and needs. The multi-purpose outdoor unit enables connecting to the indoor equipment using a single coax or CAT 5 cable, thus minimizing installation costs. The cable serves for bi-directional transfer of data and signalling as well as for power feeding to the outdoor equipment.

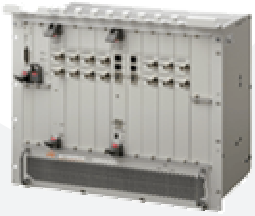
XMaX™2100 – Multi-Tenant Subscriber Unit

XMaX2100 is a high-performance outdoor unit specifically designed to offer a competitive and cost effective solution for Multi-Tenant Unit deployment (MTU). **XMaX2100** is a complete answer for broadcast operators to deliver data, voice and video to high rise buildings making triple play services available in high dense urban areas.

A single **XMaX2100** Outdoor Unit (ODU) is required on each roof-top of the multi-tenant building. This unit will simultaneously support all dwellings. Each resident that requests DBS Triple-Play Services may self-install a XMaX1100 Multi-Service Gateway by simply connecting to the existing MTU coax. Services will then be made available. In the MTU environment, the service providers save large equipment investment costs (one ODU per MTU) and save further costs in installation (one installation per MTU).

By using a single Outdoor Unit and the existing infrastructure to deliver the content, the broadcast operators achieve a fast deployment and low Capex solution, and are able to instantly deliver video, voice and data to multiple customers.

XMaX™3000 – High Capacity WiMAX Base Station



The **XMaX 3000** high-density modular Base Station supports up to six sectors, with up to a total of 3,000 subscriber units per base station.

The 8U high chassis fits into standard 19" or 21" racks. All the Base Station modules are hot swappable and high availability can be provided through multiple redundancy schemes.

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XMaX™4000 – WiMAX Micro Base Station

The **XMaX 4000** Micro Base Station Unit is designed to provide an alternative and low cost solution to the high-density modular Base Station in places were the number of subscribers is limited. The use of the same AU-ODU that is used by the modular Base Station provides an easy migration path and protection of the initial investment when the customer base increases and there is a need to upgrade the Micro Base Station to a full, modular Base Station. The Micro Base Station can serve up to 500 subscriber units.

XMaX™1000 – Triple Play Multi-service Gateways

XMaX1000 family of Multi-Service Gateways is especially tailored for the diverse needs of residential and Small office / Home office (SoHo) end-users.

XMaX1000 products offer complete video, data and voice solutions in a single box, eliminating the need to purchase, install and maintain several separate units to support multiple applications.

XMaX1000 systems offer full MSP (Multi Service Provisioning) service capabilities, including Ethernet switching, routing, Voice over IP, Broadband internet, On Demand (OD) Interactive TV functionalities and Video distribution.

XMaX1000 units are available with a wide range of built-in customer-premise networking options, offering a complete Home Networking experience in any room without the need to rewire the house. The XMaX1000 integrates with any home wiring, including telephone lines,

XMaX™1100 - E1/T1 WiMAX Gateway

IPaXiom's **XMaX1100** Data Gateway is a member of the XMaX family, a line of WiMAX-based Broadband Wireless Access systems and Multi-Service Gateways. XMaX systems are designed for robustness and simplicity, offering high speed data services with low deployment and operation costs, for unmatched operator competitiveness and fast ROI.

XMaX1100 Data Gateway is especially tailored for the diverse needs of residential and Small office / Home office (SoHo) end-users. **XMaX1100** offers a complete data solution in a compact box. Other service capabilities such as: Ethernet switching, routing, Voice over IP may be supported by external boxes connected via the LAN interface to the **XMaX1100**.

XMaX1100 is designed to complement XMAX Broadband Wireless Access systems, allowing support of multiple customer types over the same infrastructure. The **XMaX1100** connects to XMaX2000 WiMAX-based outdoor units over a coax. The coax serves for bi-directional transfer of data over wired infrastructure to the WiMAX based ODU which will transmit and receive the information over the wireless network.

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XMaX™1500

Featuring one E1/T1 service port and one Ethernet service port, the **XMaX1500** allows carriers and enterprises to seamlessly and reliably connect TDM-based equipment and organization LAN over a unified WiMAX uplink without any voice quality degradation.

XMaX1500 operates transparently to TDM signaling, ensuring seamless connectivity to any equipment that has physical E1/T1 interfaces such as PBX or cellular base stations.

The **XMaX1500** supports precise E1/T1 clock transmission and recovery over packet networks, and complies with ITU-T G.823 and G.824 timing standards while ensuring uncompressed toll voice quality.

Applications:

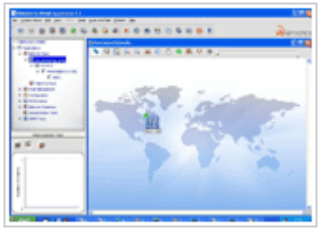
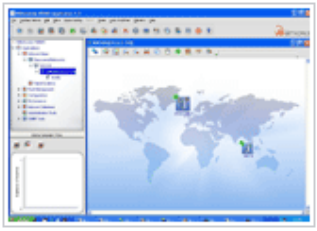
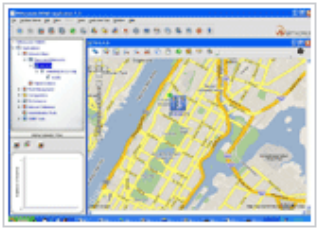
- Cellular E1/T1 backhaul
- Branch and campus PBX/LAN connectivity

XMaX™NMS

Your success in today's competitive markets is promoted by a rapid response to customer and infrastructure needs, and the ability to control service delivery.

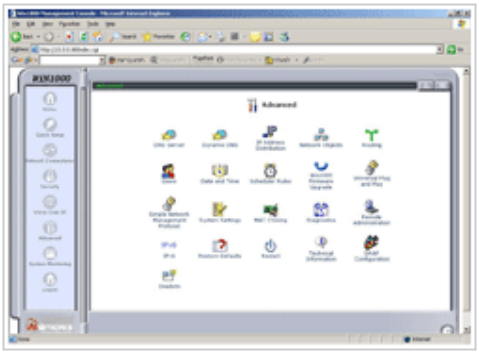
XMaXNMS is an intelligent multi-platform SNMP-based **Network Management System (NMS)**, especially designed to provide operators with an edge in providing Tripe-Play services to their customers.

XMaXNMS enables operators to control, configure, and monitor all deployed IPaXiom units, while providing enhanced and differentiated service management for Voice, Data and Video services.

XMaXNMS highlights:

- Remote operation
- End-to-end full network management
- Comprehensive Configuration, Alarm , Maintenance , Performance monitoring and Security tools (FCAPS)
- Reduced downtime with immediate fault detection, remote diagnostics, enhanced performance monitoring with detailed history logs
- On -demand service delivery



- Enhanced service control with sophisticated quality of service (QoS) and SLA -based differentiated control
- Special treatment for real-time Video and voice media
- Multi-user operation
- Easy and friendly operation
- Standard northbound interface for smooth integration with operators' legacy billing and control systems

IPaXiom's **Unit Manager** is an easy to use Craft Terminal, for technician installation and maintenance. The Unit Manager is used at installation to set the customer's specific parameters, including profile, network addressing, passwords, and service level agreement.

Using the **Unit Manager** operators can pre-configure their network in advance and achieve unprecedented quick uptime at installation.

IPaXiom's **Unit Manager** may be used to access the networking elements locally or remotely for maintenance purposes, providing a complete view of the elements' status and diagnostics information.

Summary:

IPaXiom Xzone technology will be used to cater for the access requirements, creating the ultimate experience for users, blending mobility with reliability, security and adaptability.

IPaXiom Intelligent Networking solutions allow XzoneMesh™ routers and XzoneMaX™ base-stations to work together in complete synchronisation to provide optimum coverage and accessibility to even the most difficult target areas.

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