XipLink Optimization Software (XipOS)

SCPS-TP Protocol Acceleration
- Fills the wireless link to capacity
- SCPS-TP based TCP acceleration
- Interoperable PEP (I-PEP) Compliant
- XipLink Transport Controls (XTC)
  - Fixed Rate Control Mode
  - Dynamic Rate Control Mode
  - Programmable Rate Control
  - Basic Rate Control Mode
  - Integrated advanced traffic shaping up to 100 QoS classes
    - Configurable committed, maximum rates

Streaming Data Compression
- Exceeds the wireless link bandwidth
  - Delivers 2x to 10x in bandwidth gain
  - Reduces the number of packets

Internet Optimizations
- Makes web surfing fast
  - HTTP Acceleration
  - Dynamic Web Cache hardware option

Security - Optimize Encrypted Data
- Install with any type of encryption
  - Integrated IPSec VPN encryption option

Voice Optimization
- ROHC Header Compression
  - Packet Coalescing

Maximum Wireless Capacity
Increased throughput and reduced cost

XA-Appliances deliver the most advanced satellite and wireless optimization in easy to install appliances, right-sized for the bandwidth and number of users at each location. For small and medium sized sites, set-top-box appliances are easily installed without the need for trained IT staff. For very high speed links or central aggregation sites, fully redundant appliances can optimize links up to 155 Mbps and support thousands of simultaneous sessions, typically increasing bandwidth from 2X to 10X for all TCP applications.

XipLink XA-Appliances Overview

Model XA-50, Model XA-500, and Model XA-500C
Set Top Box

<table>
<thead>
<tr>
<th>Height</th>
<th>Width</th>
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<th>Power</th>
<th>Certifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 mm</td>
<td>290 mm</td>
<td>170 mm</td>
<td>0.9 kg</td>
<td>0° to -60° C</td>
<td>14 W</td>
<td>CE / FCC</td>
</tr>
<tr>
<td>12 inches</td>
<td>11.4 inches</td>
<td>6.8 inches</td>
<td>2 lbs.</td>
<td>32° to 140° F</td>
<td>14 W</td>
<td>CE / FCC</td>
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Model XA-2000
Set Top Box

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</tr>
</thead>
<tbody>
<tr>
<td>35 mm</td>
<td>225 mm</td>
<td>155 mm</td>
<td>1.6 kg</td>
<td>0° to 50° C</td>
<td>60W</td>
<td>CE / FCC</td>
</tr>
<tr>
<td>1.4 inches</td>
<td>8.9 inches</td>
<td>6.1 inches</td>
<td>3.5 lbs.</td>
<td>32° to 140° F</td>
<td>60W</td>
<td>CE / FCC</td>
</tr>
</tbody>
</table>

Model XA-4000 and Model XA-10K
1U - Rack Mount

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<td>3° to 45° C</td>
<td>350W</td>
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<tr>
<td>1.7 inches</td>
<td>16.9 inches</td>
<td>15.5 inches</td>
<td>13.2 lbs.</td>
<td>41° to 113° F</td>
<td>350W</td>
<td>CE / FCC</td>
</tr>
</tbody>
</table>

Model XA-30K with Redundant Power Supplies
2U - Rack Mount

<table>
<thead>
<tr>
<th>Height</th>
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<th>Weight</th>
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<th>Power</th>
<th>Certifications</th>
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<tbody>
<tr>
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<td>430 mm</td>
<td>500 mm</td>
<td>17.0 kg</td>
<td>0° to 40° C</td>
<td>500W</td>
<td>CE / FCC</td>
</tr>
<tr>
<td>3.5 inches</td>
<td>16.9 inches</td>
<td>19.6 inches</td>
<td>37.5 lbs.</td>
<td>32° to 104° F</td>
<td>500W</td>
<td>CE / FCC</td>
</tr>
</tbody>
</table>

XipOS works between users of any two devices of any type. A central XA-Appliance can support remote users of devices with XE-Embedded XipOS, the XS-104 single board computer or users with a XipStick portable optimizer. Based on the SCPS specification, XipOS optimization simultaneously works with secure and un-secure users over any wireless network.

VSAT - TDMA / SCPC / Mesh / MSS
3G / 4G Cellular - Interconnect and Backhaul
Terrestrial Point-to-Point and Point-to-Multipoint
LTE / WiMax / WiFi - CPE to Base Station links

Interoperable PEP (I-PEP) Compliant
- XipLink Transport Controls (XTC)
  - Fixed Rate Control Mode
  - Dynamic Rate Control Mode
  - Programmable Rate Control
  - Basic Rate Control Mode
  - Integrated advanced traffic shaping up to 100 QoS classes
    - Configurable committed, maximum rates

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Voice Optimization
- ROHC Header Compression
  - Packet Coalescing

Voice Optimization
- ROHC Header Compression
  - Packet Coalescing
Dynamic Web Caching.

Board computers and portable devices with options for integrated IPSec VPN and Protocol Specification (SCPS).

Wireless communication links using extensions of the Space Communication XipLink Optimization Software (XipOS) delivers maximum bandwidth across out-of-path deployment.

To maximize deployment flexibility, XipLink Lightweight Tunnels permit based remote device, typically from 2X to 10X for all TCP applications. Immediately increase the bandwidth for those users that also utilize a SCPS appliance at the hub-side or logical center of any wireless network and establishing a foundation that allows a network operator to deploy an XA-Appliance for Maximum Bandwidth.

There are no topology limitations or tunnels in a system based on SCPS, enabling on-board 128 / 256 bit AES encryption.

Remote user sessions are transparently split, or proxied, with new sessions opened across the link using protocol acceleration and streaming data compression to overcome common wireless issues:

- Varying latency (delay) because of long links and users roaming
- High bit error rates because of constantly changing RF link conditions
- Varying latency (delay) because of long links and users roaming
- Link asymmetry because of smaller, lower power remote radios

XipOS offers multiple techniques to optimize web browsing, providing both capacity savings and faster browsing. All products incorporate basic HTTP Acceleration capabilities. The dynamic caching option will save a typical 20-30% of the bandwidth. XiPix image compression can save a further 50% of the bandwidth.

There are no topology limitations or tunnels in a system based on SCPS, establishing a foundation that allows a network operator to deploy an XA-appliance at the hub-side or logical center of any wireless network and immediately increase the bandwidth for those users that also utilize a SCPS based remote device, typically from 2X to 10X for all TCP applications. To maximize deployment flexibility, XipLink Lightweight Tunnels permit out-of-path deployment.

**Easy to Deploy and Manage**

- Completely transparent to users
- Layer 2 - Bridge installation (typical remote)
- Layer 3 IP Router installation (typical hub site)
- RIP / OSPF / BGP routing protocols
- Redundant appliances use CARP
- Centralized configuration option

**Optimize any Wireless Network Topology**

- VSAT - Star Topologies
- Mesh networks of any size
- Dedicated SCPC links
- Terrestrial Point to Point links
- Terrestrial Point to Multi-Point links

**SCPS-TP Protocol Acceleration**

- Fast Start algorithms
- Acknowledgment Frequency Reduction
- Selective Negative Acknowledgements

**Streaming (across packets) Data Compression**

- Proprietary streaming data compression
- X1 and X2 modes for efficiency
- Dynamic Active Resource Management

**Internet Optimizations**

- HTTP Acceleration
- DNS Caching
- Dynamic Web Cache hardware option
- XiPix (XA-30K Product Only)

**XipOS Transport Controls (XTC)**

- Fixed Rate Control
- Dynamic Rate Control
- Programmable Rate Control
- Basic Rate Control

**Flexible Deployment Options**

- XA-Appliances
- X5-Specialty Products
- XipStick Portable Optimizer
- XS-104 Single Board Computer
- XE-Embedded XipOS
- BSO, Linux, Windows devices

**SCPS-TP Protocol Acceleration**

- Kernel based using XipLink Dynamic Socket Buffers
- Transparent operation as SCPS-TP proxy gateway
- Satelis I-PEP compliance for interoperability
- XipOS Transport Control modes for full bandwidth utilization on dedicated and dynamic links
- Selective acceleration

**Quality of Service**

- Hierarchical Class Based Queuing
- QoS classification and re-marking
- UDP / VOIP or other data prioritization
- Integrated with XipOS Transport Control modes
- Committed and maximum rate options

**Data Compression Algorithms**

- Multiple, simultaneous algorithms (X1 and X2)
- Active Resource Manager for dynamic control

**Internet Optimizations**

- Dynamic Web Cache hardware option (disk)
- HTTP Acceleration
- TTCP Fast Start
- HTTP Compression and XiPix (XA-30K only)

**XipLink Real-Time: Voice Header Compression**

- RHDC Header Compression
- Packet Coalescing

**Management**

- Web based graphical user interface uses HTTPS
- Standard and Proprietary SNMP MIBs for monitoring
- NetConf based central configuration model
- Real time reporting and graphing on each appliance
- Remote upgrades
- Configuration Profiles

**Network and Redundancy Capabilities**

- Installs as Layer 2 Bridge or Layer 3 IP Router
- Dynamic routing protocols - BGP, RIP, OSPF
- Redundant appliances use CARP protocol - Hot Standby
- Remote devices can use simple on-board Fail-to-Wire
- IP Version 6 Routing
- Advanced Anti denial of service capabilities
- Lightweight Tunnels
- NAT
- DHCP Server and Client

**Virtual Private Networking (VPN)**

- XiPix optimization operates over any encrypted network
- Installed in-line to optimize the data before encryption
- IPSec VPN software option for any XA-Appliance
- Enables on-board 128 / 256 bit AES encryption

**Hardware**

- RS-232 serial console serial or out-of-band management
- Flash drive resilience for reliability (image backup)
Dynamic Web Caching.

board computers and portable devices with options for integrated IPSec VPN and enhancements are combined in very efficient, easy-to-install appliances, single Protocol acceleration, streaming data compression and Internet web browsing Protocol Specification (SCPS).

wireless communication links using extensions of the Space Communication XipLink Optimization Software (XipOS) delivers maximum bandwidth across out-of-path deployment.

To maximize deployment flexibility, XipLink Lightweight Tunnels permit immediately increase the bandwidth for those users that also utilize a SCPS appliance at the hub-side or logical center of any wireless network and establishing a foundation that allows a network operator to deploy an XA-Appliance for Maximum Bandwidth

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Bandwidth</th>
<th>Sessions</th>
<th>Typical Use</th>
<th>XipLink Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>XA-50</td>
<td>2 Mbps</td>
<td>50</td>
<td>Small Office / Vehicles</td>
<td></td>
</tr>
<tr>
<td>XA-500</td>
<td>4 Mbps</td>
<td>500</td>
<td>Medium Office / Vehicles</td>
<td></td>
</tr>
<tr>
<td>XA-500C</td>
<td>4 Mbps</td>
<td>500</td>
<td>Web Cache Hardware Option</td>
<td></td>
</tr>
<tr>
<td>XA-2000</td>
<td>8 Mbps</td>
<td>2,000</td>
<td>Medium to Large Offices</td>
<td></td>
</tr>
<tr>
<td>XA-4000</td>
<td>16 Mbps</td>
<td>4,000</td>
<td>Data Center Applications</td>
<td></td>
</tr>
<tr>
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<td>16 Mbps</td>
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<td></td>
</tr>
<tr>
<td>XA-10K</td>
<td>45 Mbps</td>
<td>10,000</td>
<td>Large Office / Teleport</td>
<td></td>
</tr>
<tr>
<td>XA-30K</td>
<td>155 Mbps</td>
<td>30,000</td>
<td>Very High Data Rates</td>
<td></td>
</tr>
<tr>
<td>VPN-xxxx</td>
<td>All</td>
<td>Variable</td>
<td>IPSec Security Option</td>
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XipLink - XA-Appliances Overview

1U - Rack Mount

Model XA-4000 and Model XA-10K

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2U - Rack Mount

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