PRODUCT QUICK REFERENCE
PATTON ELECTRONICS COMPANY

Product Brief

Carrier High-Speed Access Solutions

Product Model	**IpLink™ Model 2888**
Product Name	**Multi-Megabit Inverse Mux**
Usage	**Carrier Access Bandwidth**

Product Description

The Model 2888 Multi-Megabit Inverse Mux is a transparent Ethernet bridge with two (2) Gigabit Ethernet ports and either two (2) or four (4) T1/E1 ports. The Inverse Mux transparently extends Ethernet/IP over bonded T1/E1 circuits, creating up to an 8 Mbps Ethernet connection. Complete with Layer 2/3 filtering, traffic shaping and Active QoS, the Model 2888 enables the delivery of multi-service access over existing facilities to enterprise subscribers outside the range of DSL and fiber.

Who is it for?

The Model 2888 Multi-Megabit Inverse Mux is designed for Tier I carriers that own TDM networks or alternative service providers with access to wholesale T1/E1 circuits. Service providers using the Multi-Megabit Inverse Mux can offer high-speed access service over existing facilities in areas where the network infrastructure, such as fiber and DSL, is not yet in place. They can also provide known TDM based packet services to those subscribers resisting the adoption of emerging broadband technologies.

Position Statement

For service providers needing to deliver symmetric IP or Ethernet access at speeds greater than a single T1/E1 but less than a T3/E3, the IpLink™ Multi-Megabit Inverse Mux transparently bridges Ethernet over bonded T1/E1 circuits. Unlike other solutions that require difficult routing configurations, the Inverse Mux offers simple high-speed Ethernet transport over established TDM infrastructures.

Feature Benefit Summary

Feature	Advantage	Benefit
Bonded T1/E1	**Bridge the bandwidth gap between a single T1/E1 and a T3/E3**	**Provide symmetric high-speed service that is affordable to and right-sized for the customer need**
Transparent Ethernet Bridging	**Transparently bridge point-to-point Ethernet traffic to simplify WAN configuration**	**Avoid complicated IP routing configurations needed to create redundancy**
Active QoS	**Prioritize different traffic flows**	**Guarantee real-time applications the bandwidth they need**
Multi-Link PPP	**Resilient WAN protocol**	**Dynamically adjust bandwidth as circuits fail and are restored without operator intervention**

PRODUCT QUICK REFERENCE
PATTON ELECTRONICS COMPANY

Product Brief

Solution Description

Rapid service deployment is the key to grabbing market share, the lifeblood of carrier business economics. Sometimes the infrastructure needed to support subscriber services is not in place, creating delays that can cost millions in long-term lost revenues. Other times subscribers prefer to avoid emerging technologies. To combat these ills carriers with inexpensive T1/E1 circuits can reuse the already installed TDM network to bridge customer Ethernet traffic, avoiding endless hours of complex IP routing configurations and providing their subscribers a right-sized service.

Problem	Issue	Impact	Our Solution
Service Providers are Losing Market Share	A single T1/E1 is not fast enough for customers, a T3/E3 is overkill	Millions of dollars lost in potential long-term revenue streams	Bond well-known T1/E1 circuits together for greater speed
Complex Network Infrastructure Installations	Complex equipment is installed for simple access applications	Slows the pace of service provisioning and makes troubleshooting problems difficult	Deliver plug-and-play broadband access with routed edge services over standard facilities
Customers resisting switch to broadband	Customers still distrust the reliability of broadband service	Customers are demanding TDM solutions	Provide broadband-speeds over bonded TDM circuits

Unique Selling Position

The IpLink™ Model 2888 Multi-Megabit Inverse Mux provides broadband Ethernet/IP bandwidth over existing TDM circuits, increasing service deployment speed and reach, reducing configuration complexity, and enabling low-cost immediate service roll-out without changes to the network infrastructure.

Top FAQs

Q. If all my traffic is IP why should I use Ethernet bridging?
A. The other alternative, configuring a router for load-balancing can be a difficult task. First of all, a router can load balance outbound traffic only. To get bidirectional load balancing requires complex configuration at both ends. Secondly, both routers must be configured to assign the same administrative distance and cost to a destination. Lastly, load balancing at the IP packet layer creates a situation where packets can reach the destination out of order, creating a problem for streaming media such as video. By using Ethernet bridging and relying on ML-PPP, the configuration is simplified and the out of order packet problem eliminated.

Q. What happens if one of my T1/E1 fails, does my entire link go down?
A. No, with ML-PPP, if a T1/E1 goes down, the Ethernet traffic will continue to flow across the active links. When the failed link comes back up, full bandwidth is automatically restored without manual intervention.

Q. Does the Inverse Mux use ATM to multiplex the T1/E1 circuits?
A. No. The Inverse Mux uses Multi-Link PPP (ML-PPP) which is 18% more efficient than ATM when using 256 byte packets. Efficiency increases further with packet sizes of over 1,000 bytes which are typically used by streaming video.

Q. Does the IpLink™ Inverse Mux support VLANs?
A. Yes. The Inverse Mux can be configured to apply QoS based on VLAN tags as well as tag untagged VLAN traffic. It can likewise transparently pass VLAN, Cisco ISL and MAC-in-MAC (PBB) frames as well as MPLS tagged traffic.