

## Integrated Access Devices

Leverage Existing Copper and ATM Infrastructures



VoDSL

- Most efficient use of network bandwidth
- Enable revenue-generating value-added services
- Guarantee Quality of Service (QoS) to customer premises
- Reduce maintenance and operating costs

## Offer Value-Added Revenue-Generating Services to SMEs over DSL Infrastructure

Carriers are searching for ways to provide quality voice, data and other services to new and existing customers at competitive prices, without investing enormous amounts of money in new infrastructure. One of the most attractive solutions is Voice over Digital Subscriber Line technology, or VoDSL.

With high speed transmission at relatively low cost, DSL has proven a reliable technology for carriers wishing to provide data services, such as Internet access and remote LAN connectivity, to small and medium-sized businesses. Today, carriers are realizing an even greater potential for DSL access networks: data/voice convergence. Voice over DSL technology enables these carriers to diversify services by bundling voice and data over their existing copper lines. The extra business generated by converged services leads to new revenues, which combined with savings in infrastructure and provisioning, result in increased profitability.

### RAD's Link Access Family

RAD's Link Access™ integrated access devices (IADs) offer cost-effective voice and data convergence over DSL lines. These IADs guarantee Quality of Service (QoS) and end-to-end management up to the customer premises. They are interoperable with major DSLAM and Voice Gateway vendor equipment.



### LA-110

This dedicated, compact, low-cost ATM IAD enables service providers to offer voice, LAN and data to small and medium-sized businesses over a single access line. On the user side, it supports four ISDN/analog voice ports or one E1 port and an additional 10/100BaseT LAN port.

The LA-110™ statistically multiplexes voice and data onto an ADSL or SHDSL WAN link. It ensures reliable services and better utilization of the ATM uplink through traffic shaping. Life-line support for voice is provided by means of a battery backup or by remote power feeding.

### LA-140

This fully modular ATM IAD combines maximum flexibility with ease of use and scalability. The LA-140™ enables service providers to offer voice, LAN and data to small and medium-sized businesses over a single access line. On the user side, it supports up to 12 ISDN/analog voice ports, as well as an E1/T1 port, and up to two data ports and one 10/100BaseT port. On the WAN side, it supports xDSL (ADSL, SHDSL, SDSL) and E1/T1 interfaces.

The LA-140 uses AAL1 or AAL2 for voice and AAL1 or AAL5 for data. It offers QoS based on OAM, traffic shaping and SNMP. For fail-safe voice, the LA-140 offers a backup link to the PSTN.

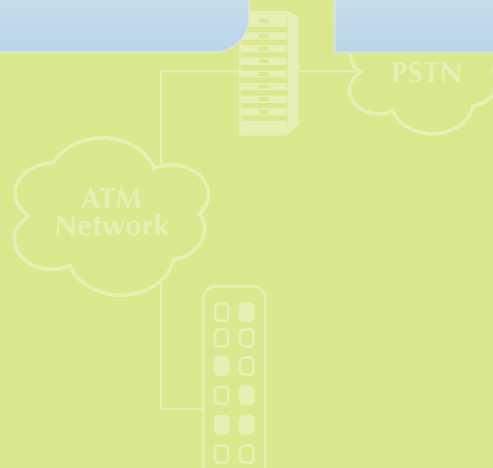
## LA-110

Compact, Low Cost ATM IAD



## LA-140

Modular ATM IAD



## Cost-Effective Convergence

VoDSL enables carriers to deliver multiple voice and data services simultaneously over the same copper access line that had previously provided only data.

VoDSL offers SMEs multiple telephone lines and continuously “on-line” Internet access (meaning that there is no need to establish dial-up connections to access the Internet) at significantly lower cost than separate voice and data services.

The extra business generated by converged services means carriers can enjoy faster payback of capital expenses (capex) for equipment deployed at the central office (CO) and customer premises. They also save space in crowded points-of-presence (PoPs) by deploying a single access node and fewer switches.

### VoDSL IADs

Integrated access devices with VoDSL technology feature a router to connect to LANs (for data traffic) and multiple phone jacks to connect to POTS, ISDN or a PBX (for voice traffic). The IAD packetizes the voice traffic and passes it over ATM over the DSL line. Data is sent to the ISP, and voice is sent to the Voice Gateway.

Unlike TDM-based services which are channelized, DSL access networks are packet-based, allowing VoDSL solutions to use bandwidth dynamically and efficiently. Carriers can therefore maximize the potential of each DSL connection. The IADs guarantee QoS by giving telephony packets priority over data packets.

In addition, all telephone features and functionality are maintained, as DSL can support services such as call waiting, caller ID and call forwarding.

## The Solution for Small and Medium-Sized Businesses

Benefits of RAD's Link Access Products:

- › Modular units provide flexibility and scalability
- › Support current voice services (analog and/or ISDN)
- › SHDSL, ADSL, SDSL and E1/T1 support on the uplink
- › Optimized to IP services (LAN and Internet connectivity)
- › QoS assurances and traffic shaping
- › SNMP management
- › Assurance for multiple traffic types
- › Interoperability with DSLAM and Voice Gateways

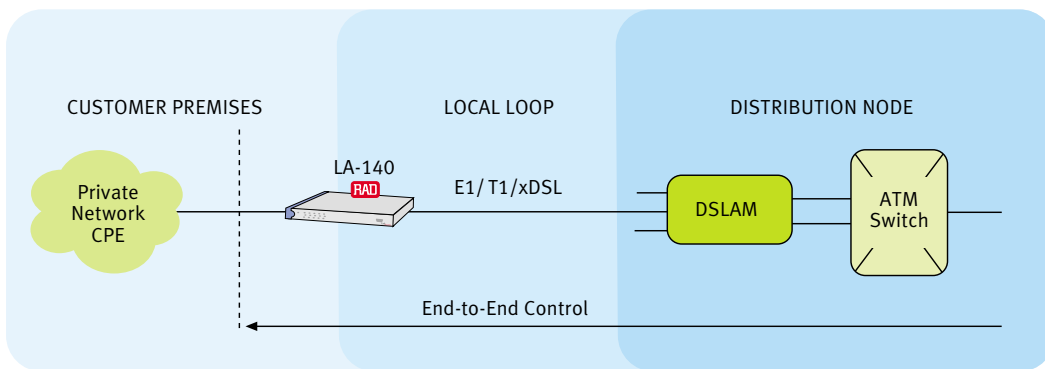
## Intelligent Customer-Located Equipment

With the deregulation and liberalization of the telecommunications industry, carriers are forced to meet customer demand for multiple service offerings and high QoS assurances. Customer-located equipment (CLE) plays an integral part in next generation service models. Located at the customer premises, these devices provide end-to-end control and an array of managed services. Simple to operate and maintain, RAD's Link Access products feature a wide range of superior management capabilities. They pass OAM (operation, administration and maintenance) cells, providing complete end-to-end control of the network. RAD's products enable fault notification, and performance and connectivity

monitoring, including delay measurement, across the network. Link Access products also feature enhanced carrier-class traffic shaping per VC or aggregate.

## Interoperability with DSLAMs and Voice Gateways

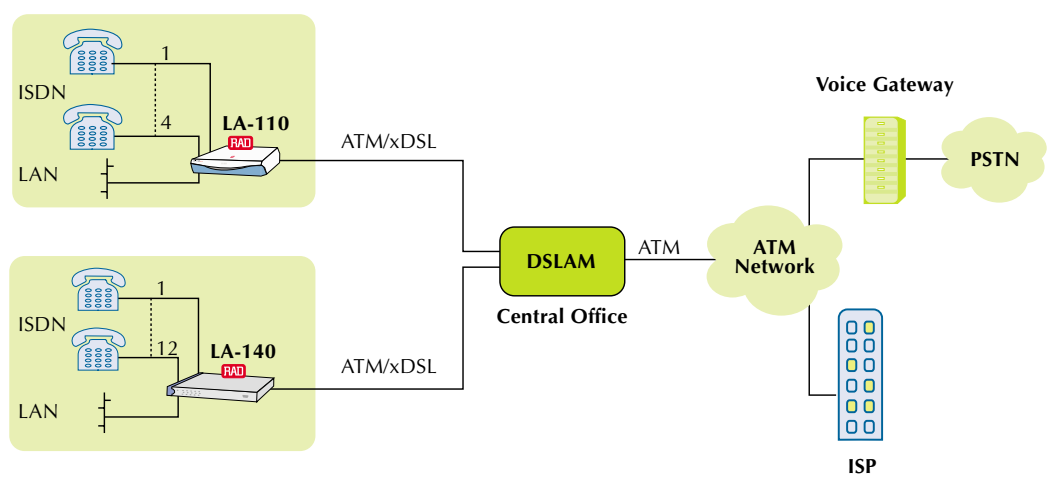
Seamless interoperability among IADs, DSLAMs and Voice Gateway equipment from diverse manufacturers is the key to successful deployment of VoDSL networks. RAD's IAD product line has undergone extensive lab and field testing with leading DSLAM vendors such as Alcatel, Nokia, Ericsson, Siemens, Lucent, ADC, NEC, Marconi, ECI, Cisco and Zhone, and Voice Gateway equipment suppliers including Jetstream, Tdsoft, CIRPACK, and Alcatel.



## Applications and Solutions

### Providing ISDN Services to SMEs

RAD's LA-140 can run ISDN over ATM AAL2 for quick and cost-effective convergence of services. It connects up to 12 ISDN ports for voice services and LAN, and has a built-in router that interfaces between the different technologies.



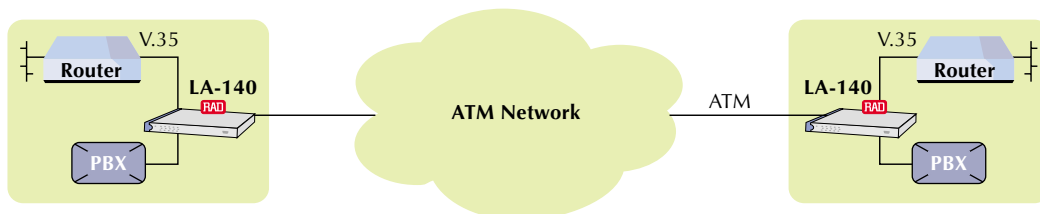
### Unique features to look for when choosing an IAD

- ISDN BRI user interface
- E1/T1 uplink and user interface
- User data ports (V.35, X.21)
- AAL1 service support (for “leased lines” over ATM)



## Multiple Services over Low Rate ATM

The existing DSL infrastructure may be used to extend “virtual E1/T1 services” over the ATM backbone. Service providers benefit from better utilization of their infrastructure while enterprise customers enjoy the advantages of ATM’s dynamic bandwidth allocation and Quality of Service.



## Your Global Partner for Service and Quality

In an era when even local applications can quickly become global, it is essential to choose a vendor with truly international capabilities.

With a sales and service network of distributors and value-added resellers in more than 100 countries,

RAD is in an ideal position to offer worldwide installation and management for even the most complex projects. The company's international service policy, which offers a single point of contact for project administration, can assist you in designing and implementing a system that meets your needs.



**data communications**

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