

# High-Density Protection and Integrated Cross Connection Solutions

## Migration to Next Generation Networks

### Introduction

Wireless and wireline carriers alike continue to upgrade their networks in an ongoing effort to satisfy their subscribers' demands for more bandwidth and more advanced services. To ensure their networks can support current applications and emerging broadband services, leading wireless carriers still deploy picocells and base station controllers to establish indoor "hot spots" in airports, hotels, cafes, etc. At the same time, they are deploying outside "universal base stations" (UBS's) to support a growing range of applications; UBS's essentially are base station controllers modified for use in outdoor cabinets. On the wireline side, many of the carriers that have built fiber-to-the-node (FTTN) networks are implementing faster access technologies to make sure their copper lines can deliver that all-important triple play of voice, video and data services. They also are moving equipment from central offices into outdoor cabinets, so high-bandwidth services, with their limited physical reach over copper pairs, can get to the customer premise.

In executing these migration strategies, both sets of carriers are placing outdoor cabinets in neighborhoods and office parks, thus bringing their networks outside and physically closer to their customers. As a result, carriers must tackle a series of issues, each of which is related directly or indirectly to protecting the network to the maximum extent possible from overvoltage surges. These issues include future-proofing the network; network reliability; neighborhood aesthetics; and consumer safety.

### Protection that Future-proofs the Network

Wireless carriers are turning to UBS's which can support not only today's dual-mode voice/data applications but also emerging technologies such as Long-Term Evolution (LTE), aimed at improving the UMTS mobile phone standard, and Ultra Mobile Broadband, aimed at strengthening the CDMA2000 mobile phone standard. Wireline carriers are migrating their broadband networks from ADSL and ADSL2+ to support the ever-higher bandwidths and frequencies, up to VDSL2, needed to deliver voice, high-speed Internet access, video on demand, IPTV and HDTV services. Taking a long-term perspective with their capex and opex budgets, both wireless and wireline carriers want a protection system that will take care of current and future technologies and the high-bandwidth/high-frequency services riding on them.

### Protection that Ensures Network Reliability

With more and more sensitive equipment housed in outdoor cabinets, carriers need a system designed to protect that equipment from just about anything that comes along in the uncontrolled outside environment: lightning surges, salt, fog, rain, fungus and airborne contaminants. They also need a protection system with a smaller number of connection points, so that technicians can install and turn up circuits quickly and accurately and thereby reduce the number of network failures.

APPLICATION NOTE





# High-Density Protection and Integrated Cross Connection Solutions

## Migration to Next Generation Networks

### Protection that Takes the 'Small is Beautiful' Approach

As more outside cabinets crop up in neighborhoods, more residents complain the enclosures are too big and too unsightly. Consequently, carriers want a high-density protection system that increases the pair capacity in each cabinet, thereby enabling the cabinet itself to be as small and unobtrusive as possible.

### Protection that Keeps Both Equipment and People Safe

With electrical network components operating closer than ever before to where people live and work, wireless and wireline carriers alike want protection systems that have been certified by the Underwriters Laboratories (UL). They are specifying protection systems with a UL 497 listing, which, according to the UL Web site, applies to circuit protectors that are "intended to protect equipment, wiring, and personnel against the effects of excessive potentials and currents in telephone lines caused by lightning, contacts with power conductors, power induction, and rises in ground potential."

### Choose the Compact Protection Solution that Fits Your Network

Although all wireless and wireline carriers need protection solutions for their equipment, there is no single protection system that will satisfy all carriers' requirements. In selecting the right solution, each carrier obviously must take into account not only the four factors listed above but also its own network architecture, capex/opex budgets, service portfolio and business strategy.

Accordingly, ADC has expanded its OmniReach® broadband service delivery portfolio to offer wireless and wireline carriers a choice of two protection solutions for their outside plant equipment: the ComProtect® Solid-State single-pair protector and the ComProtect Gas Discharge Tube (GDT) module. Both are high-density systems designed to provide maximum overvoltage protection in a minimum amount of cabinet space. Plugging directly into ADC's LSA-PLUS® Series 2 switching blocks, each module combines protection and cross-connect fields in a single block, thus saving cabinet space. In fact, with no additional interconnect terminal blocks necessary, the ComProtect modules reduce by as much as 50 percent the amount of cabinet space required for traditional protection systems, which use separate protection and cross-connect fields.

Recognizing that each carrier, depending on its experience and unique requirements, may have a preference for either solid-state or GDT technology, ADC designed both ComProtect modules with the following features:

- LSA-PLUS technology reduces network-failure frequency rates and offers monitoring and look-both-ways testing (without lifting cross-connect jumpers)
  - Provide gas-tight, corrosion-resistant terminations for the outside plant, using 45-degree-angled silver-plated contacts and special clamping ribs to reduce movement after pairs are terminated
  - Allow double jumper terminations on a single pair of contacts
- Protection and cross-connection in the same footprint
- Meets the applicable Telcordia standards
  - ComProtect Solid-state module: GR-974-CORE, GR-78-CORE and GR-63-CORE
  - ComProtect GDT module: GR-974-CORE, GR-1361-CORE, GR-63-CORE, GR-78-CORE, GR-1252-CORE and SR-NWT-2759
- NEBS Level 3 compliance
- listed to UL 497



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### Which Protection Module is Right for Your Network--and When?

When choosing solid-state or GDT protection, each wireline service provider and each wireless service provider, as noted earlier, obviously must take into account its unique network configuration and requirements. However, there are some generic guidelines which may help in making the selection, beginning with some advantages and limitations of both solid-state and GDT solutions, as shown in the following table:

	Advantages	Limitations
Gas Discharge Tubes (GDT) Ideal for VDSL application (high-frequency spectrum)	<ul style="list-style-type: none"> <li>• High surge current</li> <li>• Low capacitance - handles high-frequency signals well</li> </ul>	<ul style="list-style-type: none"> <li>• Limited shelf life</li> <li>• Performance degrades with usage</li> <li>• Slower response time than SS</li> </ul>
Solid State (SS)	<ul style="list-style-type: none"> <li>• Fast response time</li> <li>• Stable electrical characteristics</li> <li>• Long-term reliability</li> </ul>	<ul style="list-style-type: none"> <li>• Can't handle as much current as GDT</li> <li>• Higher capacitance than GDT - unable to handle highest frequencies</li> </ul>

Wireline carriers deploying access technologies up to and including ADSL 2+ likely will find the ComProtect Solid-State solution delivers the protection performance they require. As they migrate their networks to higher-bandwidth/higher-frequency technologies such as VDSL/VDSL2 (up to 100 MHz), however, many choose to future-proof their infrastructures by using a GDT solution. In that case, they can preserve cabinet connectivity and protection simply by changing out the ComProtect Solid-State module with the ComProtect GDT module.

On the wireless side, service providers looking primarily for overvoltage-surge protection may opt for the very-fast-reacting ComProtect Solid-State module. For those seeking overvoltage-surge protection plus protection for their customer-output pairs, the ComProtect GDT module, with its ability to absorb much more current, may be their preferred solution.

### Conclusion

As part of ADC's expanding line of OmniReach® FTTx solutions, the high-density ComProtect Solid-State and ComProtect Gas-Discharge Tube (GDT) modules allow both wireline and wireless carriers to protect their sensitive network equipment, their customers and their infrastructure investments. No matter which module better suits their individual requirements, ADC's ComProtect solution delivers the performance, reliability and space-savings that all service providers demand.

## APPLICATION NOTE



### **Web Site: [www.adc.com](http://www.adc.com)**

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