One of Webster’s definitions of communications is listed as “a process by which information is exchanged...”. He, of course, was referring to communications between individuals; however, data communications is really no different! Person-to-person communications can be difficult at times because of barriers such as culture, language, or simply no connection. Accordingly, it is true with data but we call it ‘protocol’, ‘data rates’, ‘media’, ‘message format’, etc. How well this process works—or does not work—is dependent upon several factors.

As with people, the data format has many ‘languages’. For you to be able to read this article, we must have a common set of rules and vocabulary that we work by. If this article was written in another language, and you did not understand that language, then the exchange of information would not be possible. Likewise, for data exchange between devices a set of rules or conventions are set out in a technical specification called a communication protocol standard.

Communications is often the forgotten link. Figure 1 shows a familiar block diagram. Because the Central System and Field Devices are so well known and visually prominent in a system, it is where most of the effort and attention is spent. The communications Network that links it all tighter is often forgotten or underplayed—it becomes an after-thought resulting in poor system performance.

Figure 1: System Block Diagram

Communications to and from traffic control devices has been problematic since the invention of multiple dial controllers in the 1930s. The distances involved, the location of devices, and the data to be transmitted and received has been an obstacle for many agencies. First, we had seven-wire interconnect; then agency-owned cable; then serial data using Frequency Shift Keying (FSK) over leased Telco lines; then Synchronous Optical Network (SONET); and now Ethernet. As the communications world has progressed and standards were developed, the industry has produced reliable and low-cost devices. Consequently, the traffic control industry moved towards these low cost communications methodology.

Whereby the old seven-wire or FSK communications methodologies were limited to just one method of communications, new protocols such as Ethernet permit the use of many devices. As a result, data communications can ‘jump’ from one media to another with little effort. The data can start over the agencies fiber backbone, jump to wireless, back to fiber, then maybe jump to DSL. Ethernet has become such an all-embracing standard that it almost is impossible to find a device that won’t ‘talk’ Ethernet.

So what does this mean to the traffic signal system implementer? In simple terms, it opens a completely new paradigm. The ability to route data over the agencies existing backbone, jump to a private service provider, then move over to a wireless broadband network and finally back to city owned cable all the time staying with an industry standard protocol removes many of the ‘hand-tying’ restrictions we had in the past. It wasn’t that long if you did not have a direct connection from the central office to remote device it just did not get connected. This situation, in part, led to the development and subsequent proliferation of ‘closed-loop’ systems. The closed loop system architecture allowed for simple interconnect on a local basis thereby reducing the dependency on a costly (and sometimes unreliable) communications network.

Two events changed how we design and implement a traffic management system. One was the push into the ITS world in the mid-1990s. ITS, by its very nature, requires a lot of data, and most of that data is needed at central for area-wide or strategic decision making as well as sharing with other sub-systems.

The second was the availability of a low-cost, easy to implement communications protocol that permits several devices to share a data channel. Ethernet, which had been with us since the 1970s, was becoming the commercial standard for data transmission, so it just made sense for the ITS world to climb on board.

In a parallel world, the ITS gurus were searching for a method to allow all ITS devices to communicate together. Remember that up until this point most, if not all, communication protocols were proprietary - to make efficient use of the older style media. The new NTCIP protocols provided inter-operability and inter-changeability but with a price—larger bandwidths were required.

As a result of these stars aligning, we now have a multitude of options at our finger tips. There are many manufacturers that produce environmentally-hardened devices that ‘talk’ Ethernet and operate with...
runtimes and one that supports fast recharge times of batteries to ensure rapid availability of battery power after an outage.

**Conclusion:**
While there are a wide variety of considerations in selecting a UPS, in general, a Line Interactive UPS offers the most cost effective solution for the majority of applications. Only in those applications where zero transfer time is critical does an online UPS become the preferred choice. When choosing a UPS, key considerations include required runtime, environmental conditions and expected outage duration.

**About the Author**
Kevin Binnie is the Senior Product Portfolio Manager at Alpha Technologies Ltd. He has over 20 years of professional management experience, including 10 years of product management experience with over 8 years in power electronics and battery based solutions. Kevin holds a Computer Engineering degree from the Royal Military College of Canada and an MBA from Simon Fraser University and has worked with industry leading technology companies including Nokia, Xantrex, Colligo Networks and Spectrum Signal Processing.

**About Alpha Technologies**
Alpha Technologies Ltd. is an established leader in the design, manufacture, service and installation of powering solutions for the Telecom, Traffic, ITS, CATV, Security, Medical, Industrial, and Renewable Energy industries. The Company offers a broad portfolio of high-quality, feature-rich solutions that can be customized to suit almost any application and environment, offering the highest performance and best value in the industry. With a focus on being your power solutions partner, Alpha builds on over 30 years of outdoor power manufacturing experience to develop solutions that solve customers’ unique powering challenges.

As a member of The Alpha Group, ATL is part of a global alliance of companies that share a common philosophy – to create world class powering solutions for communication, commercial, industrial and renewable energy markets.

**Traffic Management System Communications**

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a very low latency value (for those systems that need fast response times). Figure 2 illustrates a communications architecture that takes advantage of this new paradigm. All data is ‘transported’ by Ethernet (TCP/IP for the techies) until the very last ‘inch’ where it can be translated into a format needed by the device - or as we are seeing more and more devices are Ethernet compliant.

Thanks to the suppliers who meet our needs and to the agencies who are willing ‘work outside the box’, our industry just keeps getting better. Something to think about!

Comments welcomed. Ron may be reached at: ron.whitelock@bell.net.

**Figure 2: Modern Traffic Management Communications Architecture**