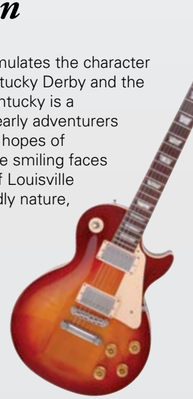

IED
IED®
Innovative Electronic Designs

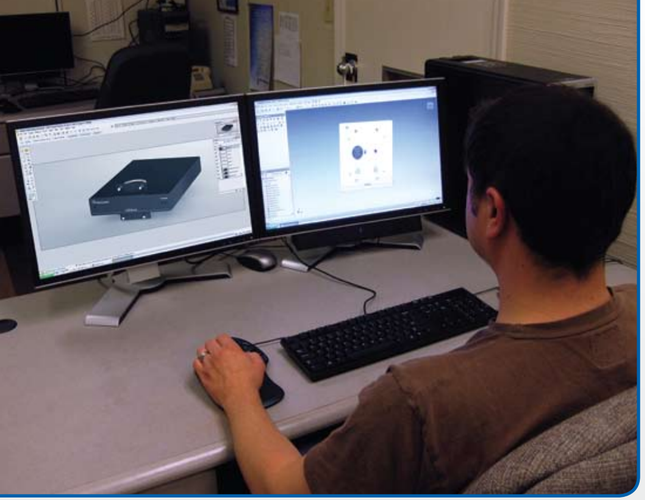
The discerning customers we serve demand only the most world-class audio management solutions for their venues, and for three decades IED has provided them with the most powerful solutions available.

Kentucky Tradition

"Unbridled Spirit and Unbridled Adventure" emulates the character of Kentucky. From the rich tradition of the Kentucky Derby and the sweet caramel taste of Kentucky Bourbon, Kentucky is a one-of-a-kind place. The Cumberland Gap led early adventurers west with a willingness to work hard and high hopes of accomplishing great things. And to this day, the smiling faces and southern hospitality seen on the streets of Louisville represent the incomparable enthusiasm, friendly nature, and spirit that Kentucky offers.

It is only fitting that Louisville is where Innovative Electronic Designs was born. Headquartered still to this day in the original Southern style mansion where it was created over thirty years ago, IED maintains its own strong tradition of passionate employees with 'customer first' attitudes.





TJ Grant

Brad Williams

Who is IED?

IED is in the business of connecting people. Its communication systems are used worldwide to bring people together, keep them safe, and make their lives easier. Whether they are connecting flights in the world's busiest airports, paging the parents of a lost child, quickly evacuating a building during an emergency, or countless other situations, IED stands by its systems as the most reliable and trusted systems in the market today.

With that said, we hope to utilize this opportunity to not only inform you of the products and technologies we offer, but to provide you with a better understanding of who we are from our history and experience in innovative solutions. We'd also like to introduce you to the hardworking people and ideas that represent us now and into the future.

It is not possible to design a large scale communications system without thoughtful consideration to the project and business specifics, which IED offers in return for a trusted and in-depth relationship.

IED has helped design and customize systems for airports, convention centers, transit stations, healthcare facilities, industrial buildings, government offices, and many other types of facilities. But whatever the industry or application, it is through IED's commitment to the people it connects and a deep involvement in each project that helped IED become the industry leader. With incomparable technological advancements and achievements over the years, that is where it has stayed.

Our completely integrated solutions encompass tailored elements of hardware, software, and audio/visual management tools to create state-of-the-art and easy to use communication and management systems.

Georgia Snowden and John Loser

Mark Lewellyn

IED Training Center, Louisville

IED People, Passion and Support

The IED Family
All the success IED has experienced can be traced back to the individuals it incorporates. Every talented person that works with IED is a piece of the puzzle and the atmosphere resembles that of a close knit family. Achieving this in a work environment is not an easy accomplishment. It stems from the right mix of people with a personal passion to succeed and a pride in realizing a goal.

While the IED family has grown and evolved, it still has the entrepreneur spirit and passion for audio from which it was founded on. The original commitment and love for technology, audio equipment, and of course music and sound, represent what IED has and will always stand for.

Hardy Martin
Before founders Hardy Martin and Ray Allen were building IED into the paging and communications specialist it is today, Hardy was a teen obsessed with music and his guitar. He and Ray started the bands The Black Mountain Boys and the Carnations & Trendells before their passion moved beyond the stage. They promoted, recorded, and produced other groups as a successful career. Particularly excited about the technical side of the sound industry, they formed audio/video production house Allen-Martin Productions that recorded nationwide recording artists. Today IED builds some of the most sophisticated communication equipment and software in the world and Hardy is still personally involved in the day to day operations.

Londa Washington

Pat Mullaney

IED People, Passion and Support

Engineering Team

The commitment it takes to be a part of the engineering team at IED is not just getting your job done; it's getting the job done right. IED began as a research and development company and over the years has developed into the standard for technology and products in many markets. The team of dedicated hardware engineers and software developers work from the Kentucky office and in-field every day and are responsible for investigating new technologies and designing new products. Other associates in the systems group provide assembly and commissioning, and are directly involved in the servicing and preventative maintenance of systems to ensure 24/7 availability, provide the benefit of future improvements and maintain long-term value.

It is the engineering team that gave birth to the 510ACS and 8000 series Announcement Controllers, the backbone to the most sophisticated paging systems in use today and over the past 20 years. It is also the team who developed the new Titan digital distribution series, with networked audio, control and DSP, to take the next steps forward in design and innovation.

But as impressive as the hardware is, IED systems also have the best integrated software in the industry. A comprehensive approach is utilized to include configuration, operator GUI, monitoring and supervision functions in a single application that manages the entire system. IED Enterprise software is the encompassing system management tool, designed on the Microsoft .net platform and integrating all audio and visual elements with a single SQL database. Continuous software development has resulted in the patented Flight Announcement System (FAS), Courtesy Announcement System (TCAS) and Visual Information Systems (VIS).

Jody Green, Ken Tench, and Matt Gray

Hope Fothergill

IED People, Passion and Support

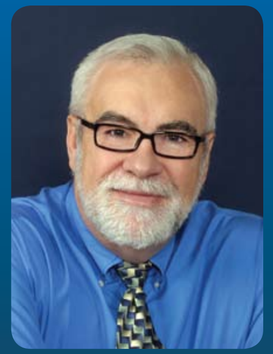
Sales and Customer Support Team

There is no question that products and systems designed and produced from IED are top of the line, but there is an ongoing debate about whether they can be outperformed by one thing – the IED support staff. Of course the two are undeniably connected and reliant on each other, but the sales and support staff take great pride in living up to the same high expectations of the IED products themselves.

Because of the large scale of many IED projects, the IED sales and customer support team is a full service group. This team is present from initial concept and continues to provide services, including upkeep, maintenance, and system support well after installation. In fact, for the lifetime of the system, IED is available for support, upgrades and expansions.

The first step in design is developing a customized system that meets and exceeds the needs of the individual project. Because of their incomparable industry experience, IED excels here; listening to goals, analyzing potential problems and recommending solutions that have had previous success or developing new solutions for any enterprise.

From there, the system is built to the specifications, configured, and installed in the timeframe of your project. Your questions and concerns, even last minute changes and adjustments, are handled by your assigned staff quickly and efficiently to minimize problems later. Plus, in addition to standard maintenance and support after the system is in use, IED On Call assurance plans are available for more proactive and hands-on continued support to extend the service life of the system.



Loyd Ivey: Mitek President & CEO

Mitek Facility: Phoenix, Arizona

Mitek Facility: Monroe, Wisconsin

Mitek Facility: Winslow, Illinois

Mobile Audio Showroom

Commercial Audio Showroom

Residential Audio Showroom

Military Application

Commercial Application

Live Concert Application

Mobile Application

Mobile Application

Residential Application

Military Application

Mitek Electronics and Communications Group

The Perfect Match

In 2008, looking to expand their capabilities and reach an even greater audience with their superior products, IED found an ideal partner in Loyd Ivey and the Mitek Electronics and Communications Group. Mitek, like IED, is a privately-owned American company known for superior manufacturing, exceptional engineering, innovative products and technologies, and world-class customer support. Mitek Electronics and Communications Group includes Atlas Sound, a stalwart of commercial audio for over 70 years, and is one of many reasons Mitek and IED are natural partners. IED has long incorporated speakers, equipment racks, and other components from Atlas Sound to enhance their control and paging systems. Now with the two paired, customers are guaranteed the most reliable system and end-users a distinctive experience from microphone paging station to listeners' ears.

Growing at the Speed of Sound

Through insightful and forward thinking business decisions, Loyd Ivey was able to expand his original company, comprised of one brand, to a corporation that now includes over sixteen different brands serving many different market segments, including commercial, residential, mobile and OEM audio categories. Atlas Sound is one of the largest suppliers of commercial audio equipment in the world. From paging speakers to mic stands, equipment racks to stadium horns, Atlas Sound offers a solution for many commercial or residential audio applications. Having supplied speakers and equipment to thousands of buildings including airports, skyscrapers, sporting arenas, and universities, Atlas Sound can be seen and heard around the world.

Mitek serves the residential audio market by supplying a variety of speakers under several brand names including DCM, MTX, Soundolier and Esoteric Audio USA. Focused on providing customers what they need, when they need it, at a price they want to pay, Mitek residential

Mitek Electronics and Communications Group

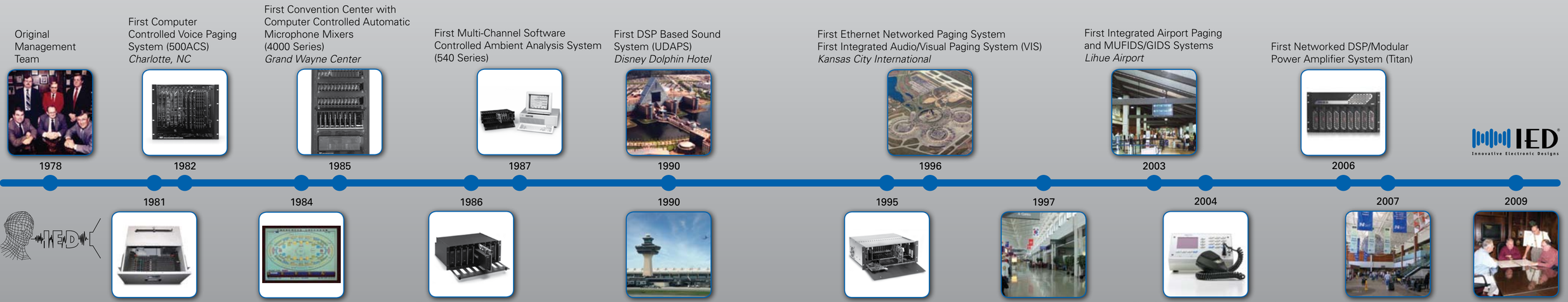
audio brands deliver everything from high end, audiophile cabinet speakers to custom in-wall speakers and everything in between.

MTX Audio is the most well recognized Mitek brand serving the mobile audio industry which also includes Xtant, StreetWires, and Coustic to deliver high performance products to one of the coolest industries on the planet. Mobile audio was Loyd's passion as a young man when he was credited with inventing the first mobile subwoofer enclosure and he hasn't let up since. MTX holds dozens of engineering patents and continues to deliver some of the most in-demand products on the market including the world's largest production subwoofer at 24" and over 400 lbs - a sub that has applications even outside mobile audio.

Mitek also focuses on delivering high quality OEM products to create innovative solutions for other companies. These include an integrated wireless speaker in a ceiling fan for the Hunter Fan Company and innovative aftermarket audio solutions for General Motors. Chances are if you've been listening, you've heard a Mitek product and probably didn't even know it!

The Sun Never Sets on Mitek

As Mitek has continued to grow so has its presence around the world. Along with the home of IED in Louisville, KY, Mitek operates domestic facilities in Winslow, IL, Ennis, TX, Monroe, WI, Dundee, IL, and Phoenix, AZ to name a few. Mitek also has operation facilities in Canada, China, Thailand, and France with many distributor partners elsewhere around the globe. Loyd Ivey believes that business never stops and that Mitek partners should always be looking to improve the customer experience and deliver on the company promise of high quality solutions for any need.



Timeline: IED Industry Firsts and Breakthroughs

Announcement Control System (ACS)
In 1982, Charlotte was the site for the first ever computer controlled voice paging system. This was a great advancement in a time before Apple IIe computers were even released. The system was a simple 24 zones and was capable of zoned announcements and basic messaging, which at its time was revolutionary in public paging systems. Today IED installs can manage an infinite number of zones and include graphical paging stations, sophisticated messaging and integrated visual paging – a capability that STILL leads the industry by a wide margin.

Universal Digital Audio Processing System (UDAPS)
In 1990, before Britney Spears was even a Mousketeer, IED did an install at the Disney Dolphin Hotel in Orlando. This was the first sound system entirely based on Digital System Processing, or DSP. IED was leading the charge into the digital evolution with DSP, which has now become the common method of signal processing and routing, because of its ability to provide flexible configurations and accurate response. In 2006 IED continued the innovation with the first networked DSP power amplifier system in the Titan distribution series.

Flight Announcement System (FAS)
Also in 1990, Washington Dulles Airport became the first ever airport to utilize an automated flight announcement system. This IED advancement allowed pre-recorded messages to be broadcast with up to date preboarding, general boarding, and baggage claim information. This increased announcement accuracy and efficiency and freed up staff for more customer assistance. FAS is now standard in most airports and only IED has patented automated gate announcements that are fully integrated with visual paging and gate information displays.

Courtesy Announcement System (CAS)
Dulles progressed again in 1997 when they installed the first courtesy announcement system. By adding courtesy paging - live, recorded, text-to-speech, and pre-built templates - IED has created a pioneering multi-tiered announcement management system with a simplified, web-enabled user interface. Today, sophisticated courtesy announcement systems are multi-lingual, logged and archived, and incorporate auditory and visual announcements.

IED Announcement Control Systems can be found in airports across the world.

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Airport Installations

IED systems are also used in transportation and military facilities, as well as convention centers, arenas, and conference rooms.

International Installations

Hong Kong Convention and Exposition Center
Mexico City Convention Center
Sun Atlantis Casino
Suntec City Convention Center

Gottleib Daimler Stadium
Hong Kong Jockey Club
Opera Leipzig
Sha Tin Jockey Club

Deutsche Bank
Deutscher Bundestag
Samsung Boardroom

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Transit and Military Installations

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Convention Center and Arena Installations

Project Profiles: Honolulu International Airport

As a vastly popular tourist destination and a main international hub, Honolulu can see over 21 million passengers a year through its 80 plus gates. That means that it has stringent and specific communication needs to make sure customers have the best experience possible. At the project's beginning, Honolulu's International Airport had a legacy IED paging system. And along with updating the announcement and paging objectives – in six different languages – IED was tasked with providing and integrating the Gate Information Display System (GIDS) and Baggage Information Display System (BIDS) with new Multi-user Flight Information Display (MUFIDS) and a Gate Management System (GMS). Airport-wide visual paging was also required to be integrated with the aural paging to comply with the Americans with Disabilities Act.

With five flexible 510ACS mainframes, redundant servers for reliability, and IED's customized Enterprise software, the challenges of the Honolulu airport were easily overcome. To integrate the various systems, IED provided the first airport-wide Ethernet network. This Gigabit network is fully monitored by IED Support Services in Louisville by using a Fluke OptiView Integrated Network Analyzer. The IED Flight Announcement System was enhanced to provide multi-departure flight announcements from the heavily used commuter gates that board multiple flights simultaneously. Nearly 250 LCD displays were added for dedicated information from multitask gate and flight information to courtesy paging. A total of fifty-one TCAS Courtesy Announcement Workstations were installed, including one at every gate hold room so gate agents can create and manage formatted courtesy and ad hoc announcements for local or airport-wide audio and visual paging. Flight and courtesy announcements were all provided in multiple languages including English, French, Japanese, Korean, and Chinese for Hawaii's diverse passenger groups.

Project Snapshot - Honolulu International Airport

- At a glance: A full scale paging and announcement system with integrated flight, gate, and baggage information, ADA compliant visual displays
- Completed in 2008
- Select Equipment: (5) 510ACS mainframes, (119) 528 Network Paging Stations, (207) Titan Amplifier Channels, (17) Titan DSP Mainframes, (51) TCAS Courtesy Announcement Workstations, Common Gigabit Ethernet Network for all paging and visual display systems, (34) ProCurve Switches, redundant Core Switches and Mid-Span PoE Power

General Needs for Large Airport Installations

- **ADA compliance mandates the installation of visual paging throughout the airport.**
  IED is the only airport system manufacturer that can provide automatic visual paging for all types of announcements and messages. IED's patented technology is the only system that provides fully synchronized messages regardless of message length as required by most ADA representatives.
- **Modern airports have complex system requirements to serve the needs of various users.**
  Airport communications systems are used to not only inform passengers, but employees, guests, and public safety workers. The IED system manages dozens of simultaneous announcements and messages over hundreds of speaker zones, in multiple languages, with dynamic priority levels; and does it with the highest reliability.
- **System integration is critical for efficient operations.**
  Audio and visual information systems need to be highly integrated to minimize conflicting information and duplicate entry. IED uses a common information database to eliminate conflicting information, and automatically generates visual messages to match audio messages when directed.

Project Profiles: Lexington Blue Grass Airport

Less than 100 miles from IED headquarters in Louisville, the Lexington Blue Grass Airport represented a different set of challenges for the IED team altogether. Compared to the larger international base in Honolulu with its near 900 flights a day, Lexington is a regional hub supporting an average 200 flights every day. Just four miles from Lexington's central business district and as a major connection point for many U.S. Southern and East Coast cities, Lexington Blue Grass is an expanding airport especially for business and commuter passengers.

Efficiency is key in this environment and was the major objective when IED updated its old paging and display technology. The new communication system needed to be flexible for the many operating airlines and it needed to be easily expanded as an airport of less than 1000 acres grew to meet future demands.

Lexington Blue Grass had these specific and customized requirements that could develop as they did, but not overcomplicate a modest design with complex features, overstated equipment, or a budget that was beyond their means. By utilizing a single Ethernet network over standard structured cabling, the IED system eliminated proprietary cable and non-standard equipment. Out of date technology was replaced with a 510ACS and Titan DSP amplifiers to control the new paging stations and zones to match the systems current needs with the ability to quickly add others during the scheduled expansions. By using IED's network solution, Lexington Blue Grass was able to interconnect the audio and visual paging over the entire airport. This provides automated flight announcements tailored to each airline, synchronized visual paging, and common gate information displays with up to four flights – without rigid airline specific displays. After the paging system was installed, the airport proceeded to replace their Multi User Flight Information System as well by simply installing PRIZM MUFIDs software on the IED server and adding groups of LCD displays to the network.

Project Snapshot - Lexington Blue Grass Airport

- At a glance: An efficient system designed to simplify audio and visual announcements with increased flexibility and easy expansion for the high potential of future growth
- Completed in 2008
- Select Equipment: (1) 510ACS mainframes, (24) Titan Amplifier Channels, (2) Titan DSP Mainframes, (250) Atlas Sound FAP42T speakers

General Needs for Regional Airport Installations

- **Smaller airports require the same sophisticated features as large airports.**
  Every airport has similar flight operations, emergency notification and public information requirements - just on a different scale. IED systems range from a few gates to the world's largest hubs and every system can be delivered with the same standard and optional features.
- **Airport communication systems must be adaptable in a changing environment.**
  Regional airports must be agile to react to shifting competition and air carrier service. IED's modular networked architecture and full software control allows moves, adds, and changes to be accomplished with minimal effort and no down time.
- **Meet the budget of today with the efficiency for tomorrow.**
  Part of the changing environment is the possibility of rapid growth. IED does not over design systems with features that aren't needed, but the systems can handle future desires because of their effectiveness and ease of expansion.

Project Profiles: US Capitol Hill Complex

A communication and mass notification system unfortunately can't stop an emergency from occurring, but it can drastically help prevent its escalation and lessen its magnitude. IED is very passionate about keeping people safe, and work extremely hard to ensure utmost system reliability. This applies to all IED projects but perhaps none is a better example than the US Capitol Hill Complex, the large government area consisting of 14 buildings in total including the US Capitol, the Supreme Court, Library of Congress, and House and Senate Offices.

It was paramount that a completely reliable fail-safe system be used for emergency announcements and evacuation of employees, officials, and visitors; in addition to day-to-day paging and announcement requirements under normal conditions.

IED was the perfect choice as it is recognized as providing the most reliable large scale systems available. IED took these specific needs into consideration and developed a sophisticated, yet easy-to-use control method to initiate announcements and complex messages to various zones. It has customized incident specific messages for the wide range of possible threats and situations and delivers immediate high bandwidth, high intelligibility communication as traditional telephone or VoIP quality would not suffice. Finally, IED created a layered system for dependability without a single point of failure.

A series of control locations were installed to address all possible failure scenarios. The primary networked audio and 510ACS core controller has redundant CPUs, hard drives, and power supplies and is transported via the Capitol Police Physical Security Division Network for added security. The primary system is backed by a secondary analog wiring in the event of network failure. Each remote building is equipped with its own IED 8000 series node, which can control the system if the ACS has failed. An RF paging message interface is provided to inform staff and first responders. IED's regular and continual testing ensures notification of potential problems before they can affect the system.

Project Snapshot - US Capitol Hill Complex

- At a glance: A fail-safe mass notification, emergency, and evacuation system for multiple high government buildings
- Operational since 2005
- Select Equipment: (1) 510ACS mainframes, (17) 8000 series announcement controllers with equalization and ambient analysis on each output, (136) 6270 amplifiers, (17) mainframes, (17) 6416S backup amplifier switchers
- Multiple layers of redundancy: User Graphical User Interface, Network, CPUs, Power Supplies, Servers, Local System Nodes, and Power Amplifiers

General Needs for Government and Institutional Installations

- **Mass notification reliability is the first priority.**
  When fail-safe operation with multiple levels of redundancy was identified as a requirement after September 11th, only IED could provide a solution that met all of the requirements and support it with the physical infrastructure.
- **Paging must be of the highest quality possible with maximum intelligibility.**
  Quality mass notification with maximum intelligibility requires full-band width audio. Telephone grade or voice-over-IP (VoIP) is not acceptable for critical applications. IED systems provide full 20Hz to 20kHz of announcement audio bandwidth.
- **A customized, easy-to-use user interface is necessary to achieve all functions.**
  To guarantee security personnel can operate any system in an efficient manner under emergency conditions, IED develops custom Graphic User Interfaces (GUI) which put building and zone selections, canned messages, and assembled messages for any type of incident at their fingertips.

Project Profiles: Eli Lilly and Company

Fortune 500 company Eli Lilly and Company maintains an expansive and global operation with multiple site locations and over 40,000 employees. As one of the 10 largest pharmaceutical corporations in the world, superior communication is vital to their continued success and optimum effectiveness.

Corporate communication systems have to consider employee safety as top priority. In Eli Lilly research and advancement centers, preparation for any situation is particularly critical. IED customized an emergency paging system throughout its 6 Indiana sites and its Lilly Del Caribe site in Puerto Rico that was both precise in location and expansive as a part of the overall project. Each site included numerous buildings; the Lilly Technology Center, for example had over 50 buildings from laboratories to offices. One of their more specific needs was to incorporate incident specific emergency messages initiated from potential hazards of fire/smoke, chemical spills, biological hazards, help/man down alarms, etc. and interface with an external alarm system. Information on the type of problem and the required actions needed to be quickly provided to every person. They also needed to test every alarm in every building monthly without disturbing personnel, requiring a scheduled full system diagnostic with urgent situation and response monitoring.

Because of these requirements and the overall scope of the project, a distributed network of 8000 series controllers was used as the primary system. This allowed each facility to initiate emergency messages and monitor activity from a custom Graphic User Interface (GUI). A redundant copper analog system was installed in each location for a backup to the private Ethernet network for increased reliability. The IED system tied to an in-depth alarm code from a simple printer output, making it possible to use the IED database to assemble dynamic messages that inform occupants what and where the hazard is plus give specific instructions on what to do. To accommodate this and the comprehensive alarm testing requested by Eli Lilly, IED created a "preaction alarm feature" which allows alarms to be initiated, held for a defined time period for verification, and released to play if not cancelled.

Project Snapshot - Eli Lilly

- At a glance: A focused emergency notification system that incorporates specific alarms and extensive testing into messaging over large industrial areas with multiple sites
- Operational since 1995, varies by facility
- Select Equipment varies by Facility: 8000 series nodes, Custom Graphical User Interfaces (GUI), 6000 series amplifiers with automatic backup amplifier switching

General Needs for Industrial and Corporate Installations

- **Solutions that fully interface with fire and hazard alarm systems for worker safety.**
  IED offers system solutions that can integrate with existing alarm systems to provide initiation of a wide range of alarm types, and respond with hazard-specific messages to ensure employee safety.
- **Wide band width audio for high intelligibility and guaranteed response.**
  Telephone or VoIP quality is not consistent with the critical requirement for intelligibility under all conditions. IED's full band width architecture ensures the paging system is not a limiting factor in evacuation.
- **Quick response to custom and changing needs through continued new technology development.**
  IED has a reputation for customization to meet any customer's requirements and continuous product development. Our commitment to long term relationships mean our success is contingent on that of our customers and we continue to develop new solutions to meet their changing needs.

Project Profiles: Chicago Transit Authority

One of the busiest public transportation systems in the world, Chicago's Transit Authority has hundreds of millions of passengers each year. The famous 'L' trains, started in 1892, now rumble through the city 24 hours a day over 100 miles of track with 600,000 passengers each weekday heading to work, Wrigley Field, O'Hare, or another of the Second City's many destinations.

When a new communication system was needed, not all of the 144 stations could be shut down at the same time. Only IED could design and implement a system with incremental station upgrades over long-term expansion and revitalization and connect individual stations over such a large distance.

IED has already replaced half of the entire city's transit system in this ongoing project. The job is done in 4 major phases. As stations are renovated, IED provides 8000/6000 packages as drop-in replacements for the old system. These are compatible with the existing command center and add new features with the new head end. Second, a comprehensive 510ACS command center was installed to work with both the upgraded and the yet-to-be-replaced stations through a custom interface so the entire system operates on the new CTA Wide Area Network with Ethernet control and wide-band audio-over-IP. The third phase installs an advanced GUI in the primary and secondary command centers located in separate facilities. Lastly, the remaining CTA stations will receive the 8000/6000 packages or newer IED transit products as renovations continue.

The new system improves audio quality, response time, and real time customer interaction with professionally recorded automatic messaging and train arrival information. The system integrates with up to 3 different LED and LCD display technologies in each station and has two-way audio from each station to command operators for monitoring actual trackside announcements and delays - giving customers vital, up to the minute information from ticketing to platform.

Project Snapshot - Chicago Transit Authority

- At a glance: A complete announcement system that integrates visual and audio messages and must integrate with existing technology through an extended multiple phase installation across an entire system
- IED station replacements began in 2001 with total system replacement projected to be completed in 2010
- Select Equipment: Each station includes an 8000 series mainframe, (5) 6270 power amplifiers, 6416 backup amplifier switcher, custom ambient/monitoring sensors and custom stainless paging stations. Each head end includes a 510ACS with redundant CPU's and (3) T9032DSP line routers

General Needs for Mass Transit Installations

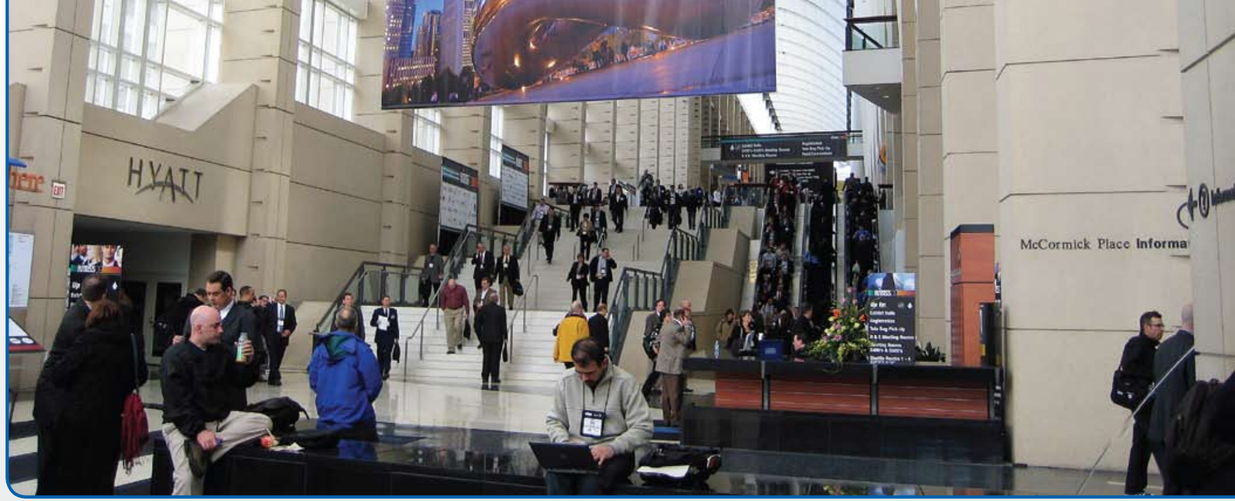
- **Experienced paging systems designed and manufactured specifically for transit use with matching performance.**
  IED not only provided off-the-shelf equipment specifically designed for transit, but had experience in transit system command centers and customized software. Compared to installing and using systems assembled with various third party equipment and software unresponsive to expansion, IED offers comprehensive system upgrades.
- **Compact off-the-shelf station controllers designed specifically for audio and visual stations.**
  IED offers tightly integrated station controllers that are compact, robust and provide a full feature set; adding significant new features and can reduce rack space required by nearly 75% in each station.
- **Comprehensive macro infrastructure spread over distanced micro sites.**
  From individual station to system-wide control and monitoring, IED networked solutions are ideally suited to transportation needs. Redundant command centers, shared data transport and tight integration with local stations create a system with high reliability and operational efficiency.

Project Profiles: McCormick Place, Chicago IL

With 2.6 million square feet of exhibition halls and 173 meeting rooms encompassing an additional 600,000 square feet, McCormick Place in Chicago is one of the largest convention and conference centers in the world. Its largest ballroom could hold a football field and through its many events, it annually sees close to 3 million visitors.

Like most convention spaces, McCormick Place rarely sees downtime but is in regular need of change and expansion. Therefore, reliability is the highest priority for it to continue to function. With the size and quantity of shows it hosts, failure of any system during events is not an option. Communication in particular must be incredibly yielding for each meeting room and exhibit hall use under different system constraints. Intelligibility and volume levels must be apt in all locations, at all times from high ceiling halls to public concourses, food courts, and lobby areas. It was preferred that meeting rooms have limited control available with system controls elsewhere and as with most public areas, a reliable emergency notification system was required. IED has been the vendor of choice for every McCormick Place expansion since 1993 mainly because the extreme reliability and flexibility offered meet all of their specific needs. The overall system is networked with a 510ACS mainframe for system wide paging and is controlled from a custom IED Convention Center GUI. Control rooms manage combining for the meeting rooms and gathering areas throughout the center and the GUI supports dynamic stage mapping, which allows the ability to drag and drop stage locations in the exhibition halls and automatically configure time delays for source localization.

System processing and room combining for all meeting rooms and exhibition halls is provided by an array of T9032DSP nodes but the architecture also includes analog 4800 automatic mixers and 6000 power amplifiers in the local communication rooms for local control of the inputs and a full analog bypass in case of a core DSP problem. Ambient analysis is used to ensure proper volume while IED's emergency and evacuation system was added to protect those in attendance.



Project Snapshot - McCormick Place, Chicago IL

- At a glance: A very large announcement, paging, and communication system with multiple control centers tied to the overall controls with flexible user adjustments and total system reliability
- Began in 1993, last phase completed in 2008
- Select Equipment: (1) 510ACS, (15) T9032DSP, (73) 4800 Mixers, (149) power amplifier cards, (23) power amplifier mainframes, (2) redundant Dell system servers, (22) AH5040CD, (63) FA138T167, (910) GD87W, (150) SM12CXT, (15) SM82T, (52) 12CXT60, (20) 8CXT60

General Needs for Convention Center Installations

- **Each convention center has preferences for general operation and control methods.**
  IED has products to match the needs of the center from the finest automatic analog mixers available (4800 series) to full digital solutions (Titan series) for the highest quality, reliability, and ease of use.
- **Facility size and day-to-day operations require high flexibility in room combining.**
  The expansive size of convention spaces and their limited staff require systems that are managed from central locations and easily monitored. IED customizes GUIs to provide the ability to control and monitor system status at a glance.
- **Minimizing cable requirements and network operation is necessary for an efficient installation and tight budgets.**
  IED continues it's innovation of fully networked systems and distributes all audio and control to equipment rooms over Ethernet and the building's structured cable system.

Project Profiles: Good Samaritan Medical Center, Kearney NE

Healthcare facilities have some of the most demanding communication needs of any application. In an emergency situation, most other applications require all encompassing notification – evacuation for example – but in hospital and medical centers their emergency needs also include immediate paging and specific response over areas both large and small. And with a wide variety of specialties and departments, urgent paging is often required simultaneously.

The Good Samaritan Medical Center in Kearney, NE is one such center. This regional medical complex provides care for some 350,000 residents in Nebraska and Kansas. It was in need of a full featured paging and messaging system to accommodate its core center, remote clinics, and planned future buildings. As in most healthcare facilities, the system needed to incorporate a variety of integral input sources. Microphone paging stations, zone telephony and data communication paging, background music, and safety systems including fire and severe weather alarms needed to be built-in. System supervision and monitoring needed to be in-depth to assure system availability and widely varying ambient noise levels that require automatic volume adjustments.

The IED 8000 system was selected to support all required features today and provide the ability for unlimited expansion into the future. The main buildings included 34 zones with complete supervision and automatic backup amplifier switching for redundant system protection. IED utilized ambient analysis and control to maintain appropriate volume levels in each zone; this real time feature automatically adjusts to the suitable listening level whether pages are in the middle of the night while patients are sleeping or in the busy and crowded ER.

Since the initial project design and installation, Good Samaritan has already expanded on their system to include new buildings. Two additional 8000 systems were installed in subsequent new building developments and are networked to the main system, yet provide standalone operation for local paging and distributed fault tolerance.

Project Snapshot - Good Samaritan Medical Center, Kearney NE

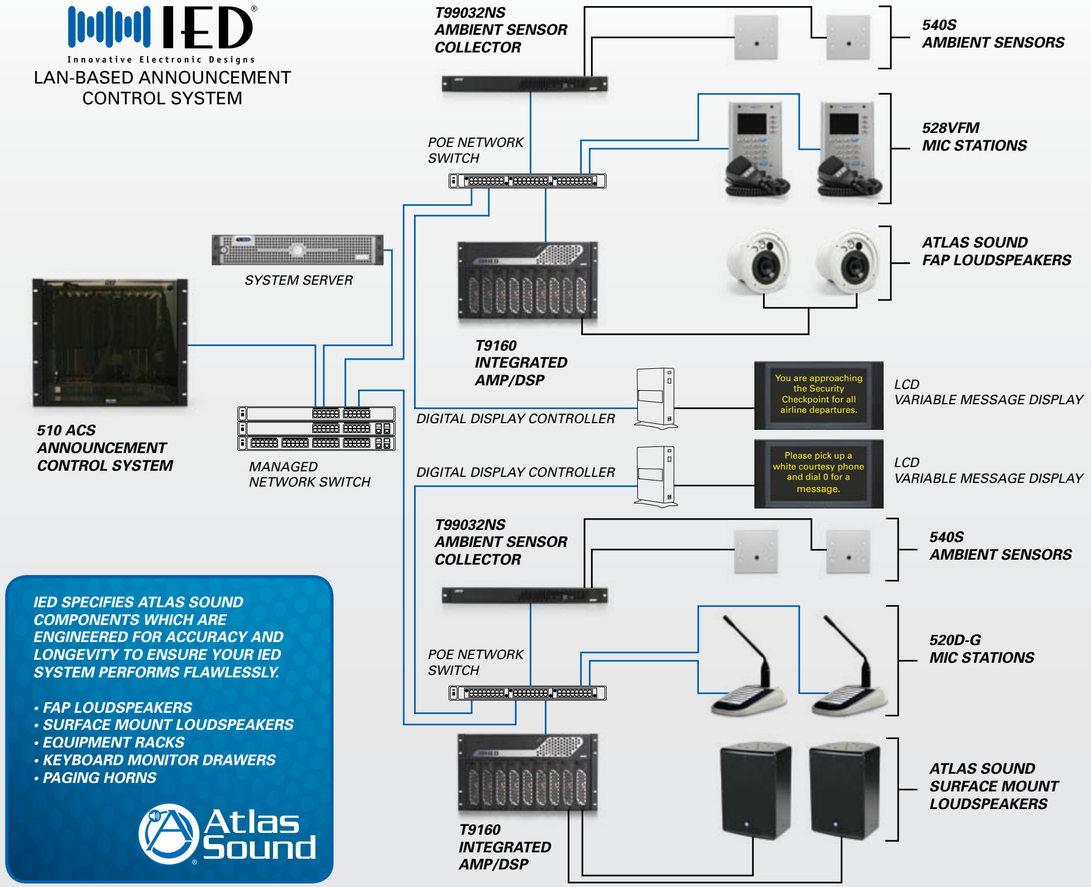
- At a glance: A full featured paging and messaging system that supports multiple sources and integration with simultaneous paging over numerous zones
- Operational since 2002
- Select Equipment: (3) 8000 series systems, (48) 6272 power amplifier channels, 6416 Backup Amplifier Switching, (11) 508 series paging stations and telephone interfaces

General Needs for Medical Healthcare Installations

- **Manage announcements and messages from a variety of sources.**
  Medical centers need to be able to manage a number of diverse sources simultaneously and with appropriate priority levels. IED provides management of microphone paging stations, telephone paging, background music, nurse call paging and integral messaging with appropriate store-and-forward announcements and 64 priority levels.
- **Easy expansion as facility grows and feature requirements change.**
  IED considers the future needs of medical centers and works on systems that allow for easy and unlimited expansion. IED can handle a small to medium size facility with a single mainframe and as needs grow network mainframes together to create systems of any size without ever replacing hardware.
- **Guaranteed system availability 24/7/365.**
  IED provides continuous self testing and supervision of mainframes, amplifiers, speaker loads, et al. Supervision is required in most healthcare facilities where the system is used for patient information and emergency notification.

IED
Innovative Electronic Designs

LAN-BASED ANNOUNCEMENT CONTROL SYSTEM



IED SPECIFIES ATLAS SOUND COMPONENTS WHICH ARE ENGINEERED FOR ACCURACY AND LONGEVITY TO ENSURE YOUR IED SYSTEM PERFORMS FLAWLESSLY.

- ***FAP LOUDSPEAKERS***
- ***SURFACE MOUNT LOUDSPEAKERS***
- ***EQUIPMENT RACKS***
- ***KEYBOARD MONITOR DRAWERS***
- ***PAGING HORNS***

Atlas Sound

Announcement Control Systems

510ACS

The 510ACS Announcement Control System is the choice for superior paging and messaging services in mid to large size facilities. The 510ACS has the flexibility to be scaled from a single mainframe supporting a few paging stations and zone outputs, to a network of many supporting thousands of zones in large facilities or campuses. When combined with IED paging stations and Titan series amplifier distribution, the 510ACS provides a complete enterprise-wide paging, notification and messaging system.

- The 510ACS provides announcement management, multi-channel messaging and program distribution for up to 160 paging stations and 160 zones per ACS node
- The 510ACS is a fully digital system with wide-band width audio for paging and program sources distributed with Cirrus Logic CobraNet and IED dynamic addressing to minimize network bandwidth
- Mainframe construction utilizes plug-in cards for ease of servicing and expansion as well as flexible card configurations to support both fully networked digital systems and legacy analog IED installations
- Dedicated CPU and hard drive for high reliability
- Available with redundant power supplies, hard drives and CPUs for mission critical installations
- Control and networked audio is distributed on fast Ethernet
- Designed for installation on standard premises cable systems
- Powered by the 400PS modular power supply with load sharing power supply cards
- Setup and managed with IED Enterprise Software

400PS

8000

The IED 8000 is a small platform announcement control system. It provides the flexibility for a wide range of paging management, messaging, signal routing, signal processing, control and supervision, all configured in a single device. It is well suited for small to medium facilities or campuses that desire a more distributed approach for the paging and messaging system.

- Utilizes slide-in function cards for customized configurations to meet specific needs
- Dedicated CPU and redundant power supplies for high reliability
- Audio processing capabilities includes paging management, audio routing, equalization, digital signal processing, ambient analysis control and digital gain management
- Control features include IED paging station control, zone management, logic inputs/outputs, voltage inputs/outputs, relays, serial and Ethernet
- Monitoring and supervision includes full internal frame testing and diagnostics, audio monitoring and automatic testing points, and speaker load supervision
- Utilizes standard .wav files for messaging and supports IED assembled messages for incident specific messages
- May be installed as a single frame or deployed as a networked system with dozens of local nodes

Titan Power Amplifier Systems

The Titan series of power amplifiers and collectors are designed to move signal processing and power amplifiers to the edge of the network for greater flexibility, higher reliability and lower installation costs. When controlled on the network by an IED announcement controller or DSP node, the Titan series places amplifiers close to speakers, collectors close to sensors, and provides redundancy for critical installations. All IED power amplifier systems are designed with high efficiency Class D operation for low power consumption and reduced cooling demand.

Amplifier Cards

Titan power amplifier cards are designed to plug into Titan T9160 and T6400 amplifier mainframes. They provide high power Class D efficiency for multi-channel installations requiring high density and long service life. Available in single channel 400 watt cards and dual channel 200 watt cards, they are designed to work in any loading situation with a mix of 100 Volt, 70 Volt, 8Ω and 4Ω models.

T9160 Integrated DSP Amplifier System

The IED T9160 is the world's first networked processing amplifier system. Designed for installation at the network edge, the T9160 provides a network interface, digital signal processing for 16 channels and facilities for 8 Titan amplifier cards. All amplifier control, audio supervision and audio monitoring is provided with a single Ethernet connection.

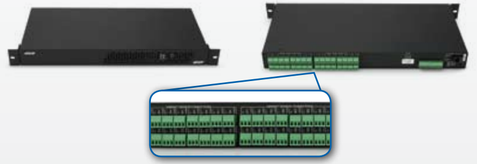
- Designed to integrate with networked 510ACS(es) to control the integral zone manager
- Each channel provides equalization, level control, delay, ambient analysis, monitoring and automatic testing
- Channel audio is distributed with CobraNet and IED's dynamic channel addressing
- Ninth amplifier card slot accommodates backup amplifier card for automatic backup amplifier switching

T6400 Power Amplifier Mainframe

The IED T6400 is a two-card amplifier mainframe designed to accept Titan series power amplifier cards.

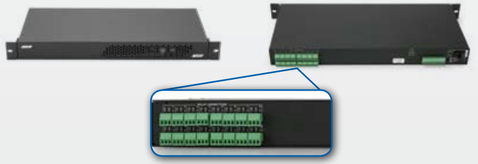
- The cards may be either single channel 400 watt or dual channel 200 watt units
- The frame provides analog audio inputs and outputs for monitoring fan speed, temperature, and logic status
- No signal processing is provided

T9032NS Ambient Noise Sensor Collector



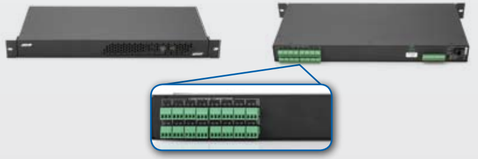
The 9032NS is an interface unit designed to collect real time noise data from IED 540 ambient noise sensors and deliver that data to the network for use by IED DSP amplifiers. Each collector supports and provides remote power for 32 sensors. The T9032NS is powered from a PoE enabled switch port, Mid-span power, or modular power supply.

T9016RY Relay Controller



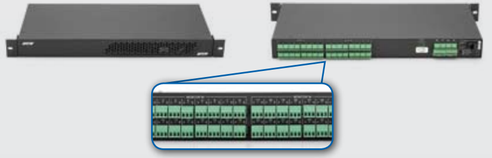
The T9016RY is a general purpose relay controller providing 16 form C relay outputs. The T9016RY is powered from a PoE enabled switch port, Mid-span power, or modular power supply.

T9032LVIO Logic Voltage I/O Collector



The T9032LVIO is a 32-channel GPIO controller. It provides assignment in groups of 8 for logic inputs, logic outputs, voltage inputs or voltage outputs. The T9032LVIO is powered from a PoE enabled switch port, Mid-span power, or modular power supply.

T9032MT Monitor Test Point Collector



The T9032MT is a 32-input monitor/test point collector. It accepts inputs from analog audio and 596SGFI sensors for connection to local T9160 or T90xxDSP. This combination provides automatic testing with reporting and audio monitoring delivered to the network. The T9032MT is powered from a PoE enabled switch port, Mid-span power, or modular power supply.

Paging Stations

Digital Series Microphone Paging Systems are network appliances designed to operate on IED networks with 510ACS, and LANcom announcements controllers. They connect with standard Ethernet switch ports and may be powered from PoE, Mid-span power or a local modular supply. Power, control and CobraNet audio are delivered via a single cat5e connection.

520 series

The 520 series is an 8-button station available in desk and wall mount versions. Each button is programmable for announcement selections, message initiation, or other actions. Microphone options include gooseneck, telephone handset, telephone headset, and tear-drop microphones.

528 series

The 528 series is a full function communications station capable of initiating audio/visual announcements, messages and programmed operations. It includes a full keypad, color graphical display and soft function buttons for direct operation. Each 528 can accommodate three 520FME or 528SK stations as slaves. The 528 is available in a variety of mounting configurations including, horizontal, vertical, surface mount, flush mount, desk-top and locking door stations.

528SK

The 528SK is an expansion station for the 528 series. It includes 4 soft keys that may be programmed independently of the 528 it is slaved to.

530DNI

The 530DNI is a dual channel digital network and telephone interface that provides a connection to the IED network. It provides a host of features and capabilities for interfacing to other communications systems.

- Connects to the IED Network with a Ethernet port. (control and CobraNet audio)
- Incoming call management with query trees and voice prompts
- Outgoing call management for dialing and message delivery to other systems
- Compatible with standard POTS analog telephone lines and VoIP
- Compatible with WAN audio protocols (future)
- Password control and caller ID authentication
- Integral digital echo cancelling

Analog Series Microphone Paging Systems may be used with legacy 510ACS and 8000 systems when used with the applicable paging station interface cards. They are proven components that use dedicated cabling (up to 4000') for legacy system expansions.

500 series

The 500 series are 4-button stations (500FME does not provide button selections) that allow programming for zone groups or initiation of messages. The 500 is available in a variety of mounting configurations including horizontal, vertical, surface mount, flush mount, desk-top and locking door wall stations.

508 series

The 508 series are full function paging stations that include a 12-button keypad and a 2-line LCD display. Programming from the announcement controller provides a wide range of functions including password log-in, paging to zone groups, message initiation, and status.

DSP Systems

T9008, T9016, T9032
DSP Node Distribution Units

The T9000DSP series are general purpose DSP processing nodes designed to convert analog inputs and outputs into the digital domain and provide signal processing for distribution for those sources.

- Available in 8 Input/Output, 16 Input/Output, and 32 Input/Output configurations
- CobraNet Network interface with 32 Inputs/Outputs (optional second interface)
- Digital signal processing for mixing, routing, EQ, delay, noise gates, programmable gain controls, and T9160 emulation

System Software

All IED systems are software driven to provide maximum flexibility today and accept new features as they are developed. IED provides standard system applications that are optimized for specific markets as well as customized software and graphical user interfaces to support systems and customers of any size.

Enterprise

Enterprise is IED's centralized application manager for configuration and management of all IED top level controllers for product control and specialized markets. It provides a single point of control to manage IED devices, plug-in modules, the security server, and market specific software applications, both online and offline. Enterprise is a server/client application developed in Microsoft .net and uses a Microsoft SQL database.

Flight Announcement System (FAS)

IED Flight Announcement System (FAS) is an SQL server application that provides automated flight announcements for airport operations. When used with a 510ACS announcement controller, FAS provides assembled messages for sequencing arrival announcements, gate departures, baggage and other flight operations. Message templates are customized for each airline's messages and real time flight information may be updated to the SQL database from a variety of flight data sources. The FAS delivers both aural and visual messages for ADA compliance and fully integrates with other IED VIS modules.

Courtesy Announcement System (TCAS)

IED Courtesy Announcement System (TCAS) is an SQL server application that allows creation and management of courtesy announcements from a web browser. Standard and customized templates are used to create common or ad-hoc announcements which may use an IED microphone paging station for audio or an integral text-to-speech engine. Announcements deliver both aural and visual messages for ADA compliance and are available in multiple languages. Management supports private messages, automatic replays, full logging and archiving.

Visual Information Systems (VIS)

Visual Information Systems (VIS) is a suite of server applications that manages and distributes visual paging and airport information on a variety of visual display devices. VIS does not require a dedicated network and is delivered on the same Ethernet network as the IED audio system. Any display may be configured to deliver visual paging, bulletin boards, FIDS, GIDS, BIDS, advertising, customer information, or other content in any combination, both static or dynamic.

Visual Paging (VP)

Visual Paging (VP) provides improved customer service and ADA compliance with synchronized visual displays that match overhead announcements. VP is fully supported by FAS and TCAS and displays visual paging to match flight and courtesy announcements.

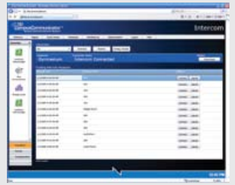
Flight Information Display (FIDS)/Gate Information Display (GIDS)/Baggage Information Display (BIDS)

Flight Information Display (FIDS), Gate Information Display (GIDS), and Baggage Information Display (BIDS) provide a completely integrated solution for airport passenger communications. Utilizing the same SQL database as IED Enterprise, these systems ensure accurate and timely information is provided to patrons regardless of the location in the airport.

IED can provide custom integration and control software for most types of facilities. Whether integrating data for display or providing custom graphical user interfaces for command or emergency notification, IED can provide an integrated paging or display system to meet your specialized requirements.

LANcom

CampusCommunicator



LANcom's CampusCommunicator is the world's first networked school communication system that provides a wealth of sophisticated features required in today's diverse classrooms.

- Provides intercom, public address, messaging, bell scheduling, and emergency notification
- Entirely network based using standard Ethernet and structured cabling
- Full duplex wide-band width audio for CD quality and highest intelligibility
- Highly flexible wizard for creation of independent zones and zone maps for paging, messaging and bells
- Fully integrated with classroom sound reinforcement and infrared wireless microphones
- Web based control and fully supervised for the highest reliability
- Provides both audio and visual paging/messaging for normal and emergency notification
- Developed to be a complete solution for school district communications

Platinum Assurance Plan

The Foremost Service Program Available

Preventive Measures Can Reduce the Risk of Interruptions

Designed with inherent redundancies, IED systems are recognized as being extremely reliable, however failures can occur. The Platinum Assurance Plan from IED On Call provides numerous preventive measures including scheduled system health checks, training of first responders, periodic software upgrades and locally available hardware replacements. Such a comprehensive program will minimize the risk of down time and maintain the long-term operation that IED systems are known for.

Fixed Agreement Price - No Budget Surprises!

The IED Platinum Assurance Plan provides comprehensive support at a fixed price that allows budgeting years in advance. Delaying repairs, software upgrades or computer replacements while waiting for budget approvals or purchasing procedures can intensify problems, potentially endangering those your system was designed to protect.

The IED On Call Platinum Assurance Plan Provides Complete System Support, 24 Hours Per Day, for a Fixed Annual Cost

Eliminate Unexpected Maintenance Costs and Reduce the Risks of Preventable System Failure.

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