On the Way to Becoming the Standard for Automatic Retail Fueling
TIRIS Hits Major Milestones

In early '97, the Speedpass™ Program was introduced to Mobil Corporation's major markets in the U.S. The total number of TIRIS tags in use today tops 1.3 million and continues to increase at a rate beyond either Mobil's or TI's expectations. "What more can be said, but that Speedpass is a wild success!" says Tony Sabetti, TIRIS global marketing manager.

Last November '97, Mobil began deploying TIRIS vehicle tags; joining the popular keyring tag to give consumers a choice. The vehicle tag attaches to the back window. Customers simply drive up to the pump; in milliseconds the tag links to a preferred credit card to initiate the purchase process, and the pump turns on.

The new tag uses a patented combination of low and high radio signals that ensures that only the targeted tag is activated and there is no possibility of cross-reads. For a high level of security, the tag includes a challenge/response feature for authentication that prevents duplication. The TIRIS vehicle tag is the only one of its kind in use for this application.

"Since it is the only system widely deployed today, we think TIRIS has become the standard. We encourage other oil companies to get on board using this same approach," said Joe Manai, retail automation manager for Mobil's Marketing and Refining Division.

Shell International Becomes Second Oil Company to Use TIRIS

Shell, in The Netherlands, started testing the TIRIS system in January of this year with several locations in the Rotterdam area. They are the first oil company in Europe to pilot this system. Named E-go, it is undergoing public acceptance tests.

Customers no longer have to go inside the store to pay, and they are still able to claim coupons, loyalty points or air miles as they do today with cash purchases.

Leading Dispenser Manufacturer, Gilbarco, Integrates TIRIS and Rolls Out to Hundreds of Mobil Stations

Gilbarco, based in Greensboro, N.C., is providing the necessary Speedpass equipment to Mobil franchises. They are retrofitting Gilbarco dispensers to include TIRIS readers. By summer, Mobil will have added hundreds more

Continued on back page.

TIRIS Readies for Expansion from Fuel Island to Checkout Counter Point-Of-Sale

Texas Instruments is working with Verifone to develop an in-store, point-of-sale RFID reader system that will help propel the automated payment technology deeper into the retail mainstream.

Customers will be able to carry the same keyring tag that they use today to purchase gas inside the store to speed up the buying experience there. This is expected to trigger wider retail adoption of TIRIS, as the technology makes its way onto the checkout counter and becomes a more familiar part of the shopping experience.

"The upside to RFID is that it is extremely simple for the consumer to use and also an affordable technology upgrade for the retailer," said Tony Sabetti, TIRIS global marketing manager.

"We're witnessing a high level of success with the technology right now out on the fuel island, but the greater retail potential is still largely untapped in our estimation," he added. Working with TI, Verifone is now integrating TIRIS capability into the widely used Everest customer input device. The new in-store units are expected to be available later this year.

TEXAS INSTRUMENTS

Cyanamid Stays One Step Ahead of New Legislation

Tougher environmental legislation in the United Kingdom has presented the agro-chemical industry with a logistics tracking nightmare. New laws require companies to replace the disposable five-liter containers used to ship pesticides and other chemicals with larger, 30-50 liter containers that can be reused for up to five years.

Leading agrochemical manufacturer Cyanamid has responded to the challenge by implementing a TIRIS-based tracking system to manage more than 20,000 pesticide containers produced in Northern France and shipped to customers across the UK and Germany. With the new legislation, the company needed a system to give each container a unique identity and to track the thousands of new pesticide containers throughout production, distribution and recycling channels.

TIRIS technology is supplied to Cyanamid through Contrack, a UK-based systems integrator. The transponder is mounted into the container's upper rim and the

Tags on containers act as up-to-date mobile databases.

antenna and reader is installed over a roller conveyor at the production facility. The reader communicates with a computer that encodes the tags with details such as product name, filling date and delivery destination.

Canisters damaged in the field are taken out of circulation and new product is only filled into containers that have been approved for production. The PC also operates a central database through which the movements of individual containers can be tracked. Data can be written and updated to the multi-page, read/write transponders as the container goes through distribution and back to the plant. Selected pages such as the one holding its unique ID and date of first use can be locked to prevent the identity or selected data from being overwritten. The tags also provide a mobile database that can be accessed throughout its life. When a container that has been in use for more than five years is detected, it is automatically removed from the packaging stream.

TIRIS provides a reliable, cost-effective solution that eliminates problems associated with barcode systems, such as the inability to rewrite new data to barcodes for tracking purposes and the need to align barcodes accurately for reliable reading. The tags can be read in any position and orientation, are unobtrusive to avoid tampering, and are rugged enough to withstand the arduous agriculture environment. "The transponders are designed to have a lifetime at least as long as the container itself," notes Contrack's Mark Perryman. "They could be run over by a tractor without sustaining damage."

For information, contact Mark Perryman, Contrack Limited Tel: +44 (0)1844 351250 Fax: +44 (0)1844 354130.

Keeping Chevy Moving

Did you ever think when you played "Red Light, Green Light" as a kid, that the game of your childhood would become the technological wave of the future? Chevrolet Creative Services recently adopted a "Red Light, Green Light" system at its Wixom, Michigan warehouse to track the shipment of over 3,500 crates containing equipment for 180 trade show events each year. Using TIRIS RFID technology, Chevrolet Creative Services is experiencing greater efficiency in tracking products and filling orders, fewer lost crates and improved profitability.

The system works by mounting TIRIS low-frequency, read-only RFID tags on the outside of each crate. In the warehouse, two bay doors are equipped with TIRIS readers, and a custom antenna designed by systems integrator LAN-Link, is configured in a large double loop and embedded in the concrete floor. As a crate leaves the warehouse and passes over the antenna, the tag's code is captured and sent to a central host computer database where it is compared against an electronic manifest. If the tag's code matches the information in the database, a green

Chevrolet Creative Services tracks trade show equipment crates traveling in and out of warehouse.

light activates, signaling that the crate may be shipped. If no match is found, a red light flashes and the crate is returned to the warehouse.

Crates approved for loading are automatically time/date stamped and stored by tag number in the database. All crates departing from and returning to the warehouse are identified and load times are catalogued. For manual secondary checks, a hand-held reader is available. The RFID technology system replaces an obsolete manual system that was prone to human error. "The old system of floor plans and hand-held paper manifests proved to be time consuming and inefficient," said Tom Liegl, assistant plant manager for Chevrolet Creative Services.

Since the TIRIS system was installed, Chevrolet Creative Services has experienced greater precision in filling shipping orders and a substantial reduction in expenses resulting from emergency shipping charges. Due to the immediate success of the system, Chevrolet Creative Services is currently awaiting the green light to expand the system to other divisions of General Motors.

For more information, contact Larry Dill, LAN-Link at Tel: (314) 537-9800 Fax: (314) 394-6659.

Tagged crate automatically triggers "green light" to allow loading shipment.

TI Tightens Grip on Auto-Theft Market

Chrysler added to list using TIRIS for immobilizers

Chrysler is the latest addition to the list of leading auto makers electing to factory-install TIRIS transponders in their immobilizer systems. This business is a result of TI's relationship with auto industry, Detroit-based OEM Siemens Automotive. The anti-theft systems are being installed in a variety of European export models. Popular minivan and Grand Cherokee platforms constitute the bulk of Chrysler's current
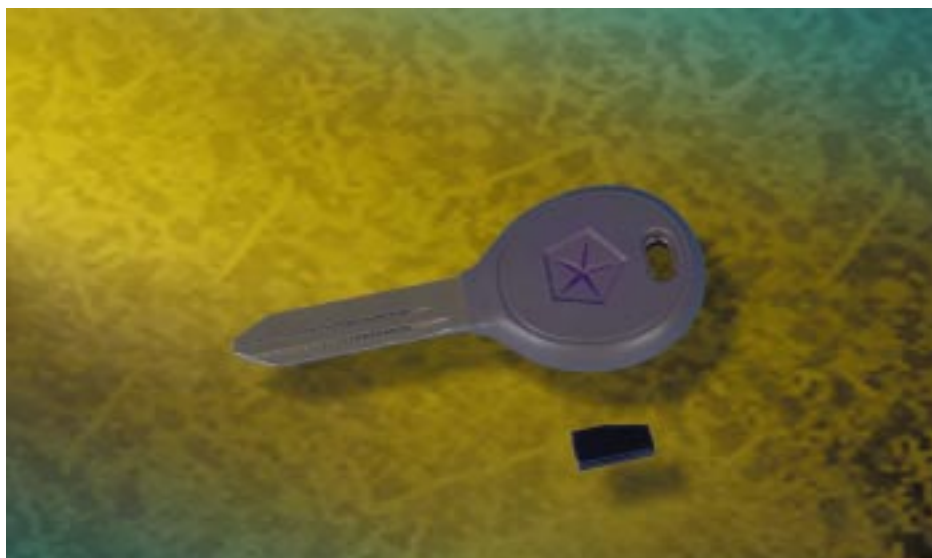

Chrysler key includes TIRIS wedge transponder.

European plans.

Pivotal to attracting Siemens' interest was TI's patented encrypted-code technology. Chrysler, who markets the technology under the SKIM® product name, is the first auto manufacturer to make encryption coding available to the public.

TIRIS radio frequency-based vehicle immobilizer systems are theft-deterrent devices that automatically kill a car's electronic functions if anything other than the designated key is placed in the ignition-or if the car is hot wired.

This class of anti-theft systems is so effective that European Union nations banded together to pass a sweeping mandate requiring all vehicles sold in member countries to be equipped with immobilizers. The edict, Directive 95/56/EC, went into effect in January 1998.

Where European lawmakers have taken a proactive approach to dealing with car theft, North America is more sluggish. In the U.S., there is no legislation that forces car manufacturers to install security devices on the vehicles they sell. However, the industry is discussing the topic.

"Siemens is the unrivaled leader among OEMs serving the immobilizer needs of the automotive industry," said Michael Knebelkamp, automotive strategy manager. "Similarly, our technology has gained a high level of industry acceptance, and sales are surpassing expectations. But linking with a heavyweight like Siemens gives us the type of market leverage needed to displace competitors and become the decisive industry standard."

TIRIS Improves Quality Monitoring in Hospitals

The flexibility of TIRIS technology opens the door to a seemingly endless variety of innovative applications. Nowhere is this more apparent than in a new quality monitoring system developed by UK-based Automotive Software Process Development Ltd. (AuSPeD). Originally used to monitor the quality of hospital cleaning services, AuSPeD is now applying their monitoring system to such diverse areas as security patrols and hospital food service.

The new TIRIS-based system turns traditional tracking processes on their head. Instead of mobile tags and stationary readers, fixed tags are installed at strategic locations, with each tag's unique code corresponding to a specific monitoring point. When they reach a

Supervisor reads transponder at specific location to get display of requested tasks.

TIRIS-tagged sign, cleaning supervisors use a hand-held unit with a built-in TIRIS tag reader to read its ID. Software in the terminal then displays a checklist of tasks to be completed. The supervisor fills in the on-screen form and at the end of the round, quality scores are downloaded to a computer which collates the figures and reports the results.

Previously, supervisors checked quality by manually filling out forms and there was no way of verifying whether they had actually visited the required areas. "The TIRIS system makes the quality monitoring process quicker and more reliable. Better information has led to improved service and traceability" said Martin Gladding of AuSPeD.

Developed in partnership with Marriott Hotels International, the AuSPeD concept was so successful in its first application at Derby City General Hospital, that it is now being used in several other hospitals throughout the United Kingdom. AuSPeD is also expanding into security applications, using fixed TIRIS tags to provide discreet checkpoints for routine rounds. Data is entered by guards during their watch and downloaded later to a

central computer. AuSPeD software then delivers confirmation that security procedures have been carried out.

AuSPeD and TIRIS are also enabling hospitals to accurately monitor a variety of hospital services. TIRIS tags, for example, can be fitted to food trolleys and to the entrances of wards and kitchens. The AuSPeD system records when each trolley leaves the kitchen and arrives in the ward, providing the ability to log food temperature and enabling managers to identify and address the reasons behind patients' complaints about meals.

After such a string of successes, AuSPeD is working to develop other TIRIS-based monitoring applications for hospitals, airports and offices.

For more information, contact Martin Gladding, ASPed
Tel: +44 (0)1705 355000
Fax: +44 (0)1705 649755.

TIRIS Speeds Miele Product Distribution

The family-owned German company, Miele & Cie. GmbH & Co., is a well-known manufacturer of household appliances. Total revenues for last year were DM 3.4 billion.

Miele recently reorganized its spare parts handling system and centralized the shipment of spare parts.

Today, spare parts for all types of equipment are no longer supplied by subsidiaries and distributors, they are dispatched directly from Miele's main site in Gütersloh. Delivery times have to be as quick as possible. Faultlessly putting together an order for shipping is a pivotal task in the whole process.

To optimize this task, Miele adopted automatic identification of consignment containers using TIRIS read/write tags. Prior to using the TIRIS system, the collection of goods for consign-

Spare parts order picking sped up with tagged box system.

ments was prone to error. It was done empirically in a computer by modeling the logistics conveyor path that transported the plastic containers to various packing locations. When a container was removed relative to the others, the entire system was thrown off.

The TIRIS system was installed by Grosse Elektrotechnik. Reader stations are located with read out antennas between the

rollers of the conveyor. The tags are attached to the front bottom edge of each plastic container and are programmed with a unique number that correlates to one that appears on the outside of the container. The system uses the Profibus-DP bus structure that allows for a maximum of 127 polling points, i.e. read stations, and is controlled by a Siemens S5 155U Programmable

Logic Controller (PLC). Each container represents a specific order documented in the main database, and the order is associated with the container's unique number. Using this management scheme, the container can be sent most efficiently and quickly to the pick locations needed to fulfill the order. After the order is filled, the end location is written into the tag. The container proceeds on and readers along the way signal how it should be directed through the conveyor distribution system to its destination.

This new system has resulted in accelerated material flow—the throughput of packages has increased from 1,500 to 2,500 per day, and an error-free operation.

For more information, contact Mr. Karl-Heinz Grosse
Grosse Elektronik GmbH
Tel: +49/7152/22026
Fax: +49/7152/28772.

TI Attracts Large Audience at Roundtable During the NacsTech Show

With the title, "Building Business: Can RFID work for you?", over 120 people showed up to listen to leading industry press representatives question a panel of experts that included Mobil's Rick Ellison, Verifone's Rob Randelman, and TI's Joe Pearson at the NacsTech venue on March 24th. Tom Agan, a retail expert from Kurt Salmon Associates acted as the moderator.

The audience heard answers to questions that covered the justification for installing RFID for pay-at-the-pump, the extent of

Editors asked several tough questions about return on investment to Mobil.

Speedpass' success, when RFID will transition from the fuel island to in-store, the facts about security issues, and the details about installing RFID in the fuel station environment. Members of the press included: Pete Hisey, Editor, Credit Card News, Jay Gordon, Editor, Convenience Store Decisions, John

Callahan, Publisher, Journal of Petroleum Marketing, and Kally Fraser, Editor in Chief, Petroleum Equipment & Technology.

Copies of the resulting white paper form this roundtable can be ordered free-of-charge from Bridgeman Communications
Tel: (617) 742 7270
Fax: (617) 742 7548
e-mail: WendyD@bridgeman.com

Panelists: Rick Ellison, Mobil, Rob Randelman, Verifone, and Joe Pearson,

The audience included oil company and convenience store representatives, and a variety of retailers.

Safeguarding Recreation Vehicles with TIRIS

Called "caravans" in Europe, about 24,000 are purchased each year in the UK alone, and they are tempting targets for thieves. At one time, they were in danger of becoming non-insurable.

In 1992, the National Caravan Council (NCC) launched the Caravan Registration Identification Scheme (CRIS) to offer owners security measures free of charge. Vehicle checking agency Equifax HPI was appointed to administer CRIS.

CRIS involves marking caravans with a unique 17-character alphanumeric identification code, called the "vehicle identification number" (VIN), similar to that used for automobiles.

Strengthening Security Measures In 1997, Selectamark Security Systems plc of Locksbottom, UK won a contract to supply a marking and tagging scheme, which includes secure marking of windows using chemical etching and RFID tags.

This method of electronic tagging, designed to help police return stolen caravans to their rightful owners, has been introduced to all 1998 model year caravans manufactured in the UK.

TIRIS card transponders, that hold the VIN via a "locked-in" programming process, are incorporated in to the body work of each caravan in a hidden location during production. Even if located, the caravan would be permanently damaged if the tag were removed. The code can not be altered.

For purposes of quality control, caravan manufacturers can use the MiniMax hand-held tag reader from German-based company, DTE GmbH, to read tags once they are embedded.

According to Chris Taylor, Director and General Manager of Selectamark, "We chose TIRIS tags because of the long read range, credit card format, WORM (write once, read many) feature and data integrity".

"These tags can be read by the police. If a caravan is discovered with replaced windows, the police are able to check the VIN and liase with CRIS who will be able to provide the rightful owner's name and address to the police," said Nick Lindsay, business development manager at Equifax.
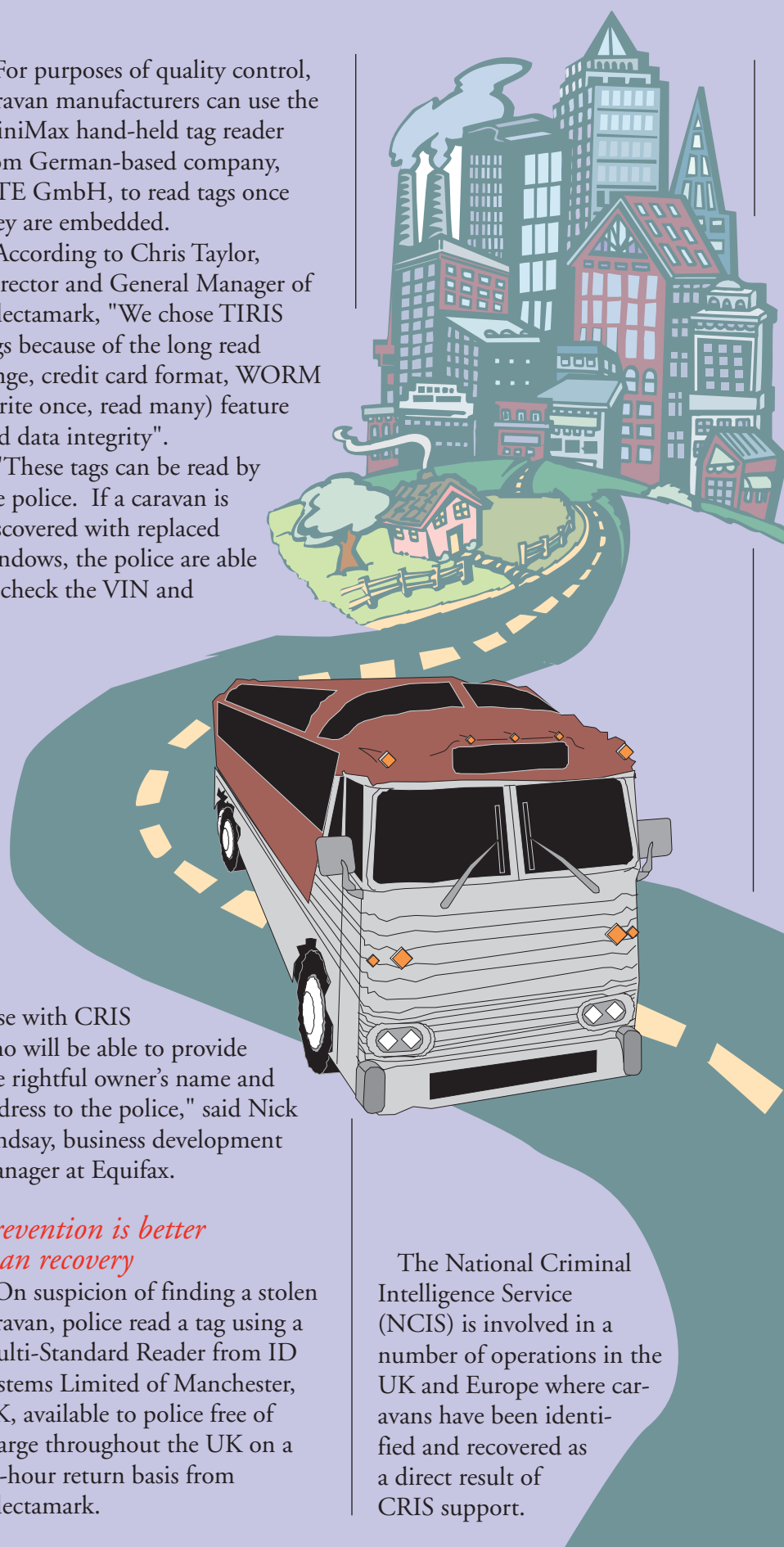
Prevention is better than recovery

On suspicion of finding a stolen caravan, police read a tag using a Multi-Standard Reader from ID Systems Limited of Manchester, UK, available to police free of charge throughout the UK on a 24-hour return basis from Selectamark.

The National Criminal Intelligence Service (NCIS) is involved in a number of operations in the UK and Europe where caravans have been identified and recovered as a direct result of CRIS support.

Extending the scheme

The tagging scheme is being extended to caravans manufactured between 1992 and 1997. The NCC is also considering a further extension of the scheme to pre-1992 models. Such steps will ensure second-hand caravans are as traceable as the latest models.

For information, contact, Selectamark Security Systems plc, Chris Taylor, Tel:+44 1689 860757 Fax: +44 1689 860693, DTE Hard-und Software Produktionsges mbH Mr. Struckmeier Tel: +49 5221 101-230 Fax: +49 5221 101-201.

CEBIT Expo, Hannover, Germany, March 1998

TIRIS participated in CEBIT this year, just about the largest trade show in the world.

The exhibit featured a PC-based interactive demonstration where visitors could explore how to apply a specific LF transponder to a particular application. For instance, a visitor could click on the words "parking lot access" and get information about the TIRIS windshield transponder.

"We've done the CEBIT show as a part of the Automatic Identification Hall, for several years now. Each year, I am surprised at how much more knowledgeable people are about RFID," said Horst Mollik, Germany's sales manager.

University of California at San Diego Goes Hi-Tech on Trash Reports

Hardy Instruments, Inc. is providing an automated weighing system based on TIRIS to Coast Waste Management for the UCSD. This system helps identify high-volume customers at campus pickup points to help satisfy a new state law that intends to reduce refuse production by 50% by the year 2000.

For more information on the STRATEGY Computerized Collection System, contact Hardy Instruments, Tel: (619) 278-2900, Fax: (619) 278-6700.

Tag-it™ — The New World of Smart Labels

Texas Instruments Introduces Tag-it — The Industry's First Smart Label Technology That Sets a New Price-Performance Standard for RFID

In the fourth quarter of 1997, TIRIS announced Tag-it™, a new consumable RFID transponder, that breaks through the technology, price and size barriers of traditional RFID systems. Tag-it is an ultra-thin transponder that can be laminated into paper or plastic label, tag and ticket formats.

The new transponders feature read/write capabilities so stored information can be updated "on-the-fly," and simultaneous identification so that multiple tagged items may be identified without singulation or orientation, although they may be overlapping one another on a conveyor. Opening up a host of new identification and tracking applications to RFID, Tag-it can be used to help automate airline baggage identification and passenger matching, offer item identification to manufacturing and distribution processes, achieve secure product authentication, speed overnight package/express parcel delivery, and improve speed and security with leisure events and passenger transport tickets.

Designed for industries that need to quickly and accurately identify, track and manage mil-

Smart bag tag

Fits Seamlessly Into Existing Systems

The ultra-thin profile, flexibility and robustness of a Tag-it means it can be easily printed on existing printing, imaging or ticket issuing machines. Labels with embedded Tag-it transponders can also be easily manufactured with magnetic strips, or marked with bar codes or other printed information, creating compatibility with existing auto ID, logistics, tracking or ticketing systems.

Simultaneous Identification

Unlike bar code or other ID
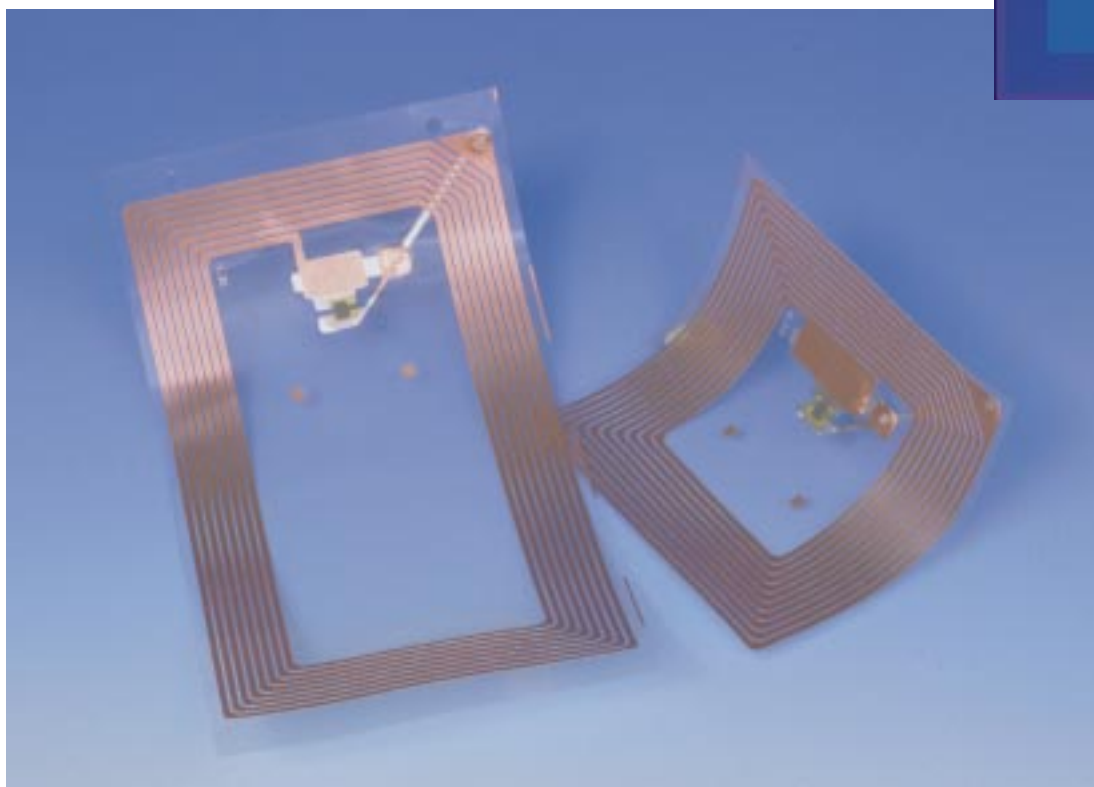
Dynamic Read/Write Data Capture

Tag-it transponders also have an advanced read/write feature that lets system operators program application-specific data such as delivery checkpoints,

chain automation beyond what a simple security tag, such as an EAS (Electronic Article Surveillance) tag can do.

Tag-it transponders offer all the benefits of traditional RFID such as durability in harsh environ-

Markets include: airline baggage tracking, express parcel delivery, product ID and anti-counterfeiting.

Tag-it transponders in two standard sizes.

Smart label

lions of objects, Tag-it provides the first easy-to-integrate, cost-effective, consumable tag in very high volumes, similar to a bar coded label. Each transponder chip is also factory-programmed with a unique ID code that is virtually impossible to replicate.

systems where items have to be physically separated and read individually, Tag-it has a unique and powerful simultaneous identification capability — identifying multiple labels, packages or assets all at the same time as they pass a reading location.

places of origin/destination, pallet assignments, or inventory numbers. Transponders can also be written "on-the-fly" at any reading location, to add information such as dates and security status. This opens up a host of benefits in the area of supply

ments, an independent, unique ID, the features of a portable data file, plus they can be easily embedded in products and labels.

The Case for Co-Existence

by Chris Hook – Tag-it Strategy Manager

"Co-existence" describes the situation where similar RFID products from more than one manufacturer can live harmoniously in the same data capture environment; where, in the absence of standards, those products do not obey a common communications protocol. Hence there is the need for those products to "co-exist" by behaving in an orderly manner, i.e. not respond inappropriately. Otherwise, it might not be possible for an RFID reader to reliably capture information from tagged objects. Another term for this is "tag pollution".[1]

Consider the practical example of an express parcels carrier, who uses a "smart label" from RFID supplier "A" to identify and track each of their consignment items. Items or products in the consignment may have been tagged at source using "A" tags or tags from supplier "B" and "C" as well. RFID tags from different sources may appear in the carrier's data capture environment, giving rise to potential problems.

Since RFID design engineers are governed by and large by the same rules, such as, laws of physics, radio frequency emission regulations, and environmental constraints, products from different manufacturers will have some common characteristics--operating frequency and modulation techniques being the most obvious. The likely consequence is that when tags from manufacturer "A" are energised by signals from a reader made by manufacturer "B" (both operating at roughly the same frequency), if design provisions have not been made, then it is possible that a "A" reader cannot read its own tags when "B" tags are present.

Lack of practical standards for RFID products has arguably been one of the biggest impediments to market growth, and is perhaps the next big hurdle. The case for co-existence seeks to find a practical work-around during the inevitable long gestation period as practical standards are developed. What I'm getting at here is--let not the lack of standards be an impediment to the application of new products in the short or medium term.

Manufacturers have a responsibility to design with a recognition for real-world application problems. In this case, the need for co-existence that anticipates the explosive growth of RFID tags for item level identification. This can be done by designing tags that only respond to a complex "excitation command" from the reader and not to a simple unmodulated signal. In other words, tags would only answer when addressed, thereby eliminating the chance for interference.

The benefits of this "smart designing" fall to customers who then have an increased freedom of choice, and assurance of reliable performance in their systems.

In the case where it is known that tags from different families might be present at an identification point, readers could be designed to either gather data only from one family of tags, or to gather data from all tags present. Such products (referred to by some as "multi-standard readers") have been shown to work with differing low frequency (LF) tags, which do not all operate within a narrow frequency band. I suggest that it should be practical to design and manufacture readers such that they can "catch all" or "catch some", dependent upon applications needs.

I believe that harmonious co-existence between differing families of largely similar tags is both possible and practical, provided that RFID product manufacturers take an enlightened view, are fully cognisant of the problems I've described, and are prepared to design sufficiently smart products so that they can "co-exist" with similar products from other vendors.

Tag-it has been designed with this co-existence in mind, and we will avidly watch for other suppliers to design with responsibility in mind.

> " I believe that harmonious co-existence between differing families of largely similar tags is both possible and practical. "

[1] Term coined by Peter Hawkes, British Technology Group plc.

Texas Petroleum Marketers and Convenience Store Show

The TIRIS team was present in force in April at a recent show for gas station/convenience store retailers held at the Dallas Convention Center. The TI booth was visited by "jobbers", who are independent gas station owners. Everyone seemed to know about the use of RFID in the retail fueling industry, and wondered when the fuel brand they carried in their store would adopt this leading-edge technology.

Staffers included: Henk Dannenberg, Susy d'Hont, Tammy Stewart, Tony Sabetti,, and Mayako Takayama.

Highway Systems Sold to SIRIT

At the end of 1997, TIRIS finalized a sale of its Highway Systems technology and product line to SIRIT, a Canadian-based public company. SIRIT has many years experience marketing RFID systems for hands-free parking access, fuel and fleet management, and more recently electronic toll collection.

Under the terms of the agreement, TIRIS retains the majority of the TIRIS business unit.

To contact SIRIT, call (905) 940-4404.

Madge Networks Installs State-of-the-Art Tracking System at Flagship Site

TIRIS RFID systems are paving the way to faster, more reliable product tracking.

Where traditional paper tags or barcode-based systems present certain drawbacks and limitations, companies searching for a reliable method of tracking products through production are increasingly looking at solutions based on RFID.

Ireland-based Madge Networks recently installed a TIRIS system for assembly tracking and control in their new electronics manufacturing facility in Dublin. The system uses TIRIS transponders and associated reader systems to track products through an advanced new "box-build" assembly line. Box build means that all the components required are delivered to an individual operator station where the whole assembly process is then performed.

A leading supplier of switched networking solutions for enterprises (best known in the Token Ring arena), Madge recently began manufacturing products that will ease migration to ATM, the next generation data communications architecture (that combines voice,

video, and data traffic.) To ensure security of product supply and complete control over production, Madge opted to move partially away from contract manufacturing to an in-house production system for their new product line. Starting from scratch with a new facility allowed Madge to choose exactly the right production tracking system.

Madge's new $15 million plant was built as the company's flagship manufacturing facility. Given the opportunity to develop a state-of-the-art production process, Madge surveyed the systems used by several leading electronics manufacturers and quickly came to two decisions. The first was to avoid conventional barcode systems, which require several expensive scanners and accurately positioned barcodes, leading to less dependability and higher costs.

The other key decision was to use the services of ADM Automation Ltd, who had already developed several successful solutions based on TIRIS products. Impressed by the speed and flexi-

Box-build assembly process made easier by tagging conveyor pallets.

bility of these solutions, Madge contracted with ADM for a system based on TIRIS tags built into conveyor pallets, which carry, via a Bosch TS2 Conveyor System, parts and product throughout the plant. Read/Wite glass capsule transponders, with 1K of data capacity, are embedded in an off-center rubber compound. The TIRIS antennas situated along the

conveyor system can then easily read a tag, no matter how the pallet is loaded. The TIRIS antennas ensure that each pallet is accurately tracked and sent to the correct destination. The solutions uses 4-channel multiplexors in the assembly areas.
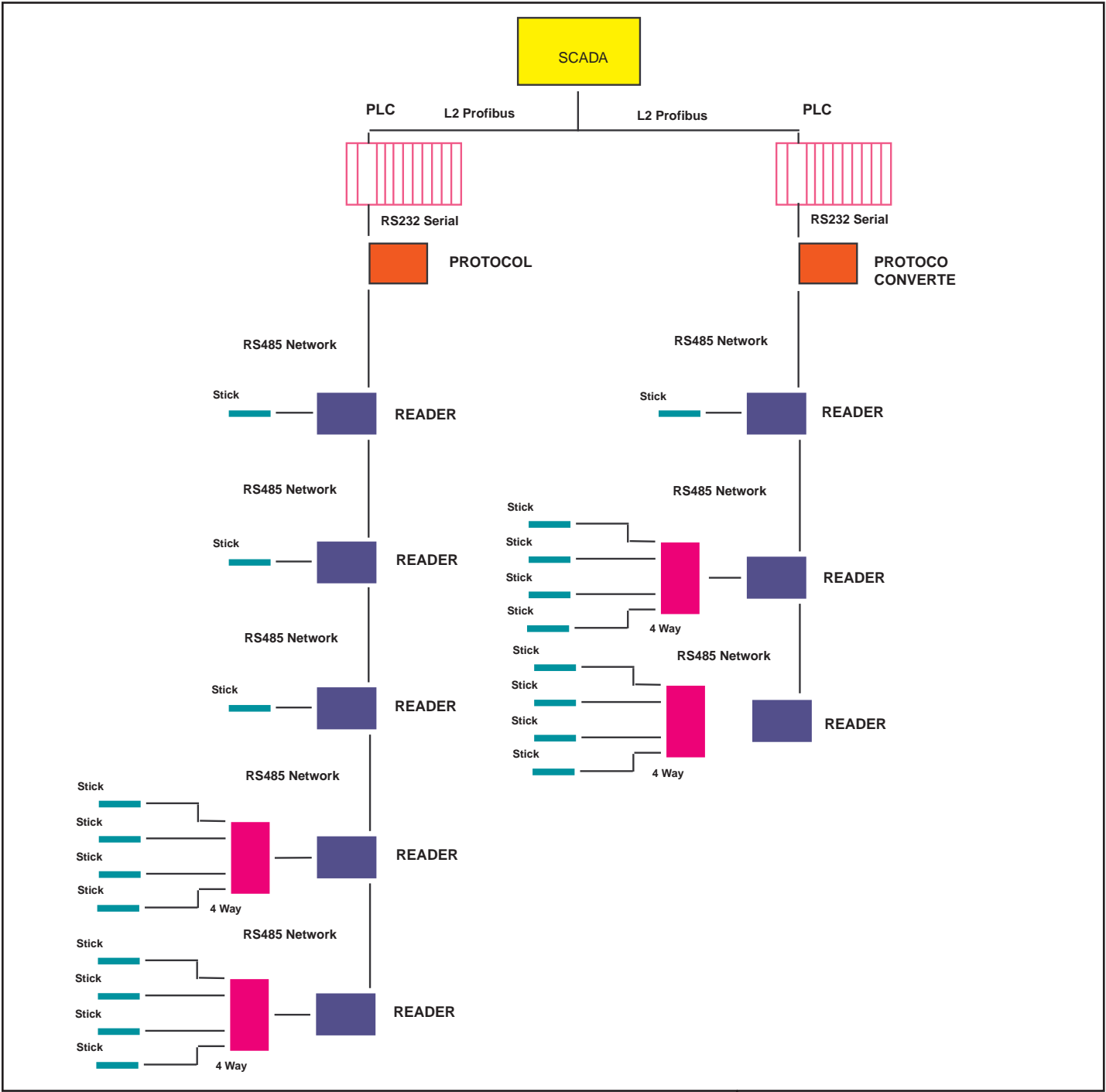
Kits are loaded onto the conveyor from flight cases according to line demand. As the operator does so, information is written to the tag from the production line's InTouch SCADA system. Typically, this identifies the kit according to the final product being built. After loading, the pallet is automatically directed to the operator station that has been waiting longest. The tag is written with the relevant identifier at the load position, then the pallet travels along an in-feed conveyor to the operator station.

After assembly, the operator presses a button which writes a further identifier to the pallet's tag. Finished units are then tested and the pass/fail status is written to the TIRIS tag. The pallet is then directed to either the de-bug area or to the final production stages of visual inspection and packing.

Integration of the Madge system was completed on budget and on time. Reducing the number of tag readers played a part in keeping costs low overall. Madge now has a problem-free system that is five or six times faster than conventional assembly methods.

For information, contact Jonathan Howarth, ADM Automation Ltd., Tel: +44 (0)191 519 5500, Fax: +44 (0)191 519 5511, or UK TIRIS distributor, Graham Lane, RFID Components, Tel: +44 (0)1234 840102 Fax: +44 (0) 1234 840707.

NETWORK CONFIGURATION

Engineer's Column

PLC-triggered Synchronization for Multiple TIRIS Readers Operating in the Same Area

by Allan Goulbourne, TIRIS Application Engineer

Allan is based in the U.K. He joined TIRIS in 1990 when the business was first established, and has been assisting customers in applications development ever since.

When multiple RFID readers are operating in the same area, it is important to co-ordinate their transmissions to minimize interference that might occur. A number of built-in methods are available, using either wireless or wired techniques, but there are occasions when external triggering is required.

Triggered synchronization of the readers may be needed to match the reading cycle to an external process, or to allow different length 'windows' for reading and writing, or to be able to cascade different sets of readers. All these events can be managed with the following triggered synchronization technique.

All TIRIS readers have a built-in synchronisation circuit that allows individual readers to be linked by an RS485 bus, with each synchronisation bus having up to 32 readers. With normal synchronisation, one of the readers on this bus is defined as 'Master' and the others as 'Slaves'. The Master unit controlling when all the connected Slaves transmit, and optionally, waiting for each Slave to

acknowledge completion. With triggered synchronisation, all readers are configured as Masters, but are fooled into thinking that the PLC input is the response from a Slave to indicate that the next transmission can start.

One reader on the bus (normally the first) has to have the synchronisation circuit modified by an additional 180 W resistor. The modification makes the voltage of the bus undefined (2.5V) until the solid state relay, driven by the PLC is closed.

Each reader only looks at the voltage level on the synchronisation bus at the end of the last read cycle (or more correctly, before the start of the next cycle), so the relay should not be closed longer that the intended cycle time. If the pulse is greater than the cycle time (say 70 ms), the reader would see the raised voltage level and interpret it as the next pulse – in effect the reader would be free running – the condition we are trying to avoid. Ideally, the relay need only be closed for 5 ms, but in practice, most PLCs can only manage 20 ms.

This technique has been used in one application where 12 reader antennas were very close together. Before using this method, as long as there was a tag over each antenna, the system operated OK. But, an antenna without a tag was able to read tags up to three antennas away. With this method, three synchronisation buses were used
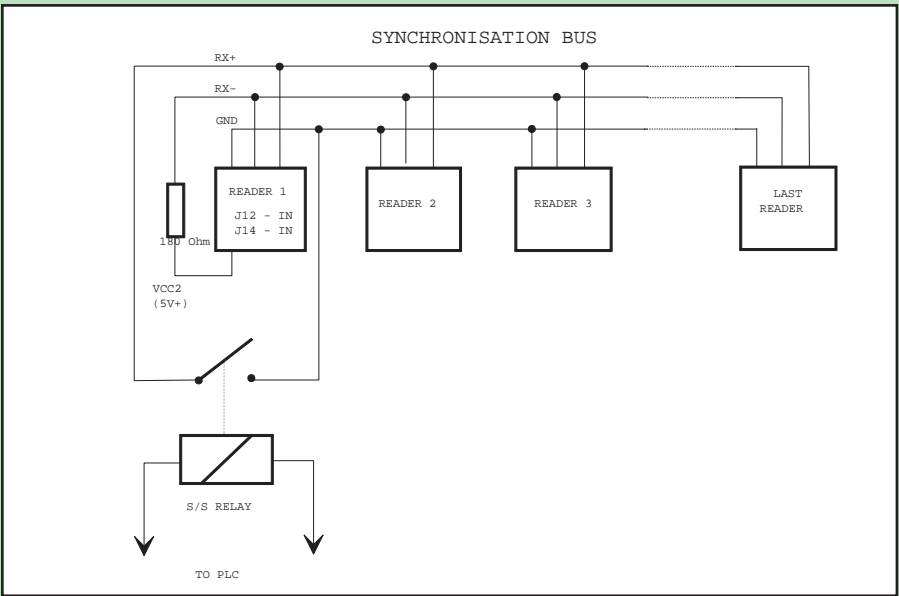

Figure 1 A Triggered Synchronisation Bus

and every third antenna was on the same bus. Each bus was triggered in turn and because there were now two inactive antennas

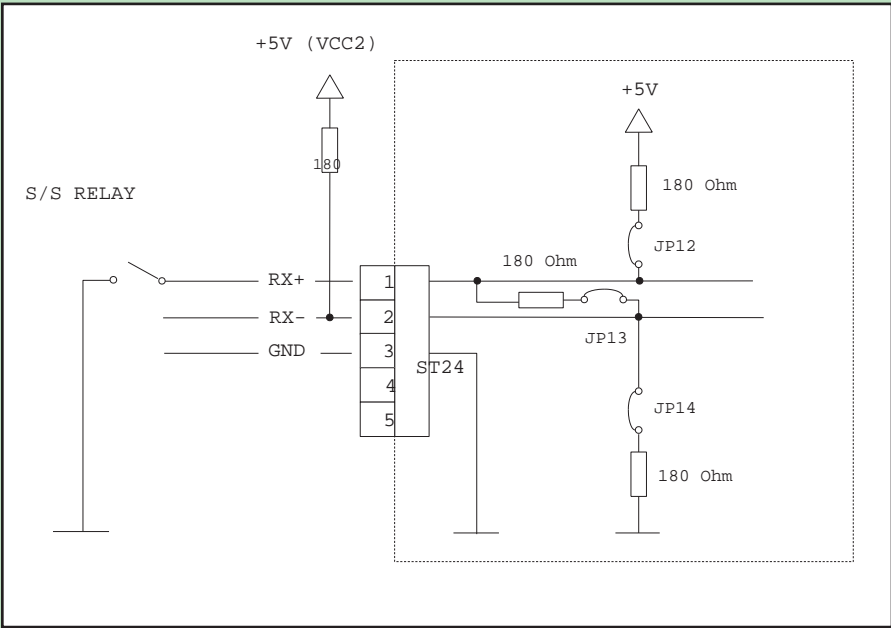between those transmitting, readings from other locations were not returned. ■

Figure 2 Modifications to First Reader

Savi Uses TIRIS for Control System at Toyota

TIRIS technology can now be found at Toyota Motor's plant in Georgetown, Kentucky – one of the largest automotive manufacturing plants in the U.S. Partnering with Savi Technology, TIRIS tags are being used in the automated control systems for the delivery of parts and materials to the facility.

Savi GateMaster™ and Savi DockMaster™ modules were installed as part of a major upgrade to the plant's information system and will support a planned increase in production volume from 400,000 to 475,000 vehicles annually. The Savi system eliminates miscommunication and inefficiencies by automating the delivery process for parts and materials coming into the plant.

The Savi system has streamlined

the delivery process by enabling hands-free identification and tracking of trailers as they enter and leave the yard and arrive at a

Delivery vehicles are ID'd upon arrival at entrance to Toyota Kentucky plant.

dock. A TIRIS tag is mounted on each trailer and read by in-ground antennas at the two entrances to

the plant. Guards read the data captured and direct trailers to the various unloading docks according to the parts they are carrying.

When the trailer is backed into the unloading area, the tag is read again to ensure that it's in the right area. The system also monitors when trailers arrive and how long they are parked, greatly improving the efficiency of the plant's delivery process.

The system requires minimal maintenance, while the TIRIS readers can be located away from antennae, minimizing their exposure to dock vehicles and machinery, as well as to the outdoor

environment.

Toyota selected the Yard Management System modules from Savi Technology after evaluating a number of different automatic identification technologies. Savi Technology offered Toyota a system-level solution, backed by years of experience designing and installing advanced RFID systems. The Savi Technology installation team worked around the demanding schedule of a high-volume automotive plant, which often involved scheduling on-site work for overnight shifts. The system was brought on-line in the fall of 1997.

For information, contact Savi Technology,
Tel: (415) 428-0550
Fax: (415)-428-0444. ■

TIRIS Teams With Distributors to Expand Presence

Electronics distributors in Europe have added TIRIS products to their portfolio and are successfully marketing to systems integrators and customers—resulting in many completed application installations to date. Following is a list of some of these distributors with contact information:

Benelux

Eurodis Texim Electronics B.V.
Nijverheidsstraat 16
NL-7482 GZ Haaksbergen

Tel: +31 (0)5357 33 333
Fax: +31 (0)5357 33 888

Oorlogskruiseniaan 116
B-1120 Brussels

Tel: +32 (0)2 247 4951
Fax: +32 (0)2 215 5895

France

Cipam
La Pardieu BP 14
25 rue Joseph Desaymard
63063 Clermont-Ferrand Cedex 1

Tel: +33 (0)47326 9516
Fax: +33 (0)47328 2723

Germany

Spoerle Electronic
Hdqts: Central Europe
Max-Planck-Str. 1-3
D-63303 Dreieich
Postfach 10 21 40

Tel: +49 (0)6103/304-576
Fax: +49 (0)6103/304-425
web site: www.spoerle.com

D-63267 Dreieich

Grosse Elektrotechnik GmbH
Tilgshausenstrasse 35
   D-71229 Loenberg
   Postfach 61 26
   D-71214 Leonberg

Tel: +49 71 52 22026
Fax: +49 71 52 228772

Eurodis Enatechnik Electronics GmbH
Pascalkehre 1
25451 Quickborn

Tel: +49 (0)4106 7010
Fax: +49 (0)4106 701268

Italy

Eurodis Fanton
Via Savelli, 1
35129 Padova

Tel: 39 (0)49 775822
Fax: 39 (0)49 8070521

Israel

Advanced I.D. Systems
Box 84 Mazor 73160
Contact: Eli Holtzman

Tel: 972 3 9369222
Fax: 972 3 9331512

Odem Electronic Ltd.
20 Freiman Street
Rishon Lezion
Contact: Avidan Zelikovski

Tel: +972 3 9660340
web site: www.odem.co.il

Scandinavia

Oy Labko AB
Labkotie 1
FIN-36240 Kangasala, Finland

Tel: +358 3 2855 111
Fax: +358 3 2855 330
web site: www.labko.fi

Jakob Hatteland Electronic A/S
Ved Klaedebo 18
DK-2970 Hoersholm, Denmark
Contact: Mr. Oskar Vejle

Tel: +45 70 10 22 11
Fax: +45 87 24 66 60
web site: www.hatteland.no

Spain/Portugal

Gesimpex
C/.Pau Claris, 165 5
C-D Barcelona

Tel: +34 93 487 85 99
Fax: +34 93 215 38 08

South Africa

Pace Electronic Components (Pty) Ltd.
Cur. Vanacht & Gewel Streets
P.O. Box 701 Isando 1600
Republic of South Africa
Contact: Cristof Tolken

Tel: +27 11 974 1211
Fax. +27 11 974 1271
e-mail: ctolken@pixie.co.za

Turkey

TARGET
Hosdere Caddesi #216/6
06550 Cankaya, Ankara
Contact: Yalcin Onyuru

Tel: +90 312 441 5682/84
Fax: +90 312 441 5685/86
e-mail: eta@doiminet.in.com.tr

ETA Elektronik Tasarim
Nasuh Akar Mah.6.Sokak #3
06520 Balgat, Ankara
Contact: Hursel Kendir

Tel: +90 312 284 5293/95
Fax: +90 312 284 5290/91

United Kingdom

RFID Components
8-10 Railton Road
Wolseley Business Park
Kempston
Bedfordshire
MK42 7PW

Tel: +44 (0)1234 840102
Fax: +44 (0)1234 840707
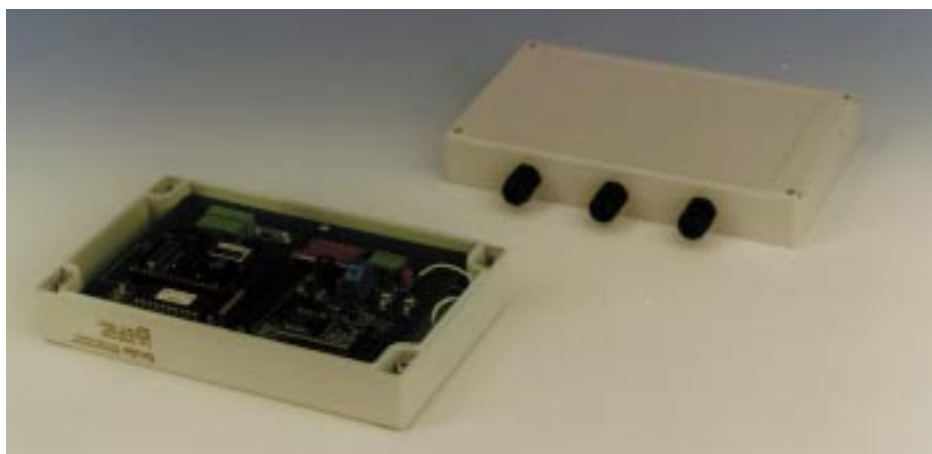e-mail: glane@rfid.co.uk

Sentinel Introduces Multi-point, Multi-function Interface Board that Includes Weigand Capability

The Sentinel S-28XX-AW interface board is a multi-point, multi-function board that works with the TIRIS Remote Antenna Reader modules and TIRIS transponders to provide a complete system solution for access control (people and vehicles), and asset tracking applications. Supporting up to 16 antennas, this product enables very low cost read points (under $150). It includes four output ports with 26-55 bit Weigand format, and can be optionally housed in a NEMA enclosure.

For more information on prices and how to order, contact Madhu Nerlikar, Sentinel ID Systems, Inc. Tel: (972) 491-3005 Fax: (972) 618-2302.

Grosse Offers Series 7000 Prox Reader

A reader based on the TIRIS Microreader is available today from Grosse Elektrotechnik. The Series 7000 Read/Write station supports the five different communication interfaces: RS-232, RS-422, Interbus-S, Profibus-DP and parallel. The reader has a 15 cm read range and is enclosed in an IP65 box.

For more information on prices and how to order, contact Grosse Tel: +49 715 222 026 Fax: +49 715 228 772.

New General Purpose Gate Antenna

The general purpose gate antenna, ANT-G01E, was designed to achieve maximum read ranges with low frequency transponders. Measuring 715 mm X 270 mm (about 28 inches X 10.5 inches), it can be easily mounted with nonmetal clamps, or standard screws to walls or other

Achieves max read ranges with TIRIS LF tags.

surfaces. The antenna is robust enough for use indoors or outdoors.

Plant Growers Track Flora Automatically

A mid-west based national nursery chain has automated the tracking of their plant trays from seedlings to retail distribution using TIRIS card transponders attached by velcro to the 2 x 3 foot plastic trays. The system installed by Sentinel ID Systems uses an RS-485 network to centrally oversee the movement of the 1500 trays passing by 100 read points. The trays are carried by metal trolleys along a conveyor system as the plants mature from germination to baby plants during a 3 week timeframe. With this automation, the company has instant knowledge about inventory and the movement of their products.

For more information, contact Sentinel
Tel: (972) 491-3005
Fax: (972) 618-2302
e-mail: Sentinelid@aol.com
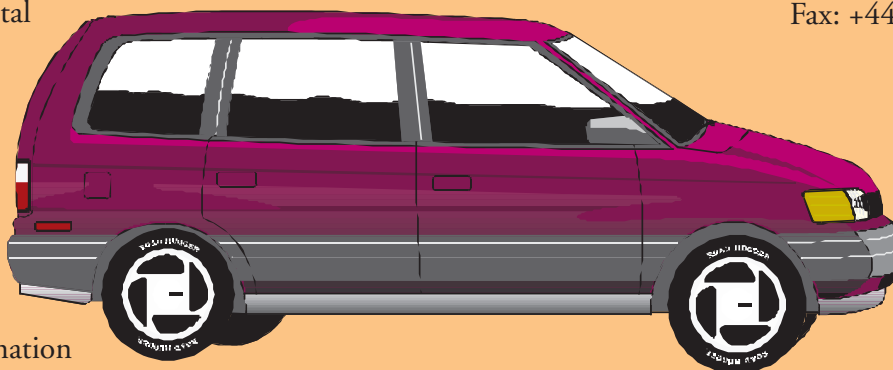
Total Control Over Who Can and Cannot Come In

The Barleylands Depot in Basildon (that's Essex, England) gets two types of visitors: the public coming to the recycling plant and a range of council vehicles entering the secure area. Both share the same access road. How to separate the "cans" from the "can-nots" in entering the secure area? The Basildon District Council has applied TIRIS windshield transponders to their vehicles that include mini-vans, tractors, refuse collection trucks and heavy vehicles. Explains depot manager, Taff Roberts, "It takes no time to fit the TIRIS tag to a new vehicle, and it is easy to program the system to void tags if, for example, a vehicle or tag is stolen. It leaves us in total control of security."

Over 200 vehicles enter the depot daily. This system also provides the depot manager with information about which vehicles are on site at any time. Mike Craswell, Alfia Services project engineer who manage the system says, "The vehicles vary widely in height. It would be impossible for drive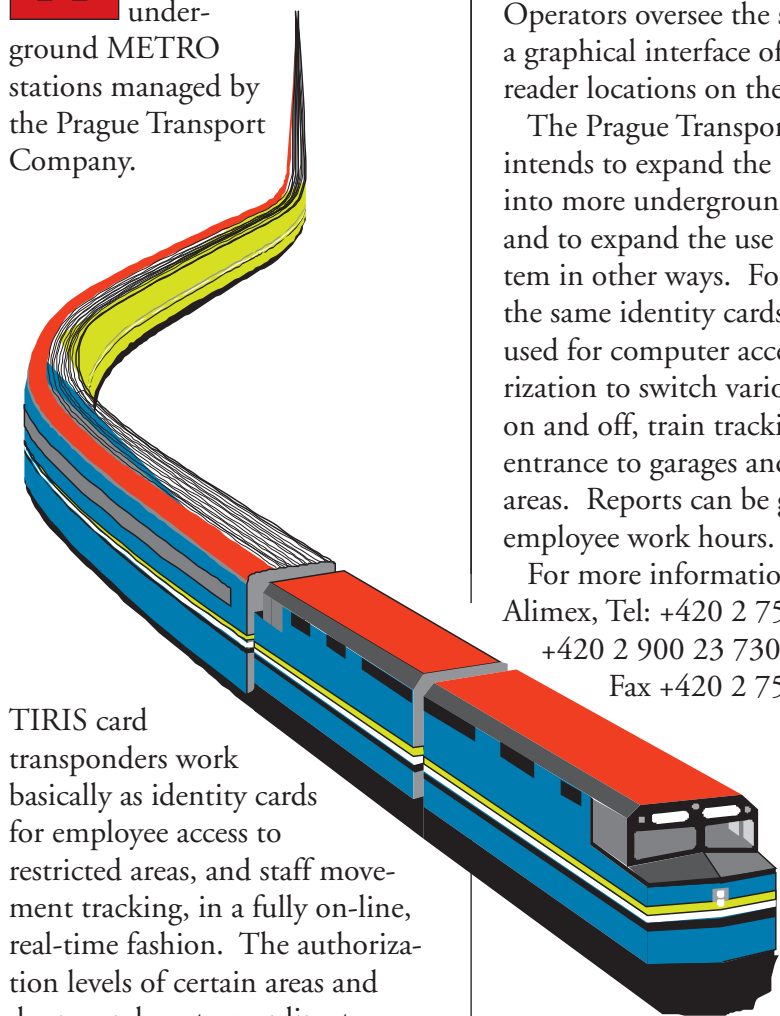rs to climb out of their cabs in order to insert a magnetic strip card." "TIRIS gives us ease and effectiveness," he added.

For more information, contact Steve Blackler Nortech Control Systems Ltd. Tel: +44 (0) 1633 485533 Fax: +44 (0) 1633 485666.

Prague METRO Uses RFID System from Alimex

Altex (Access and Surveillance System) from Czech company Alimex is installed in 29 underground METRO stations managed by the Prague Transport Company.
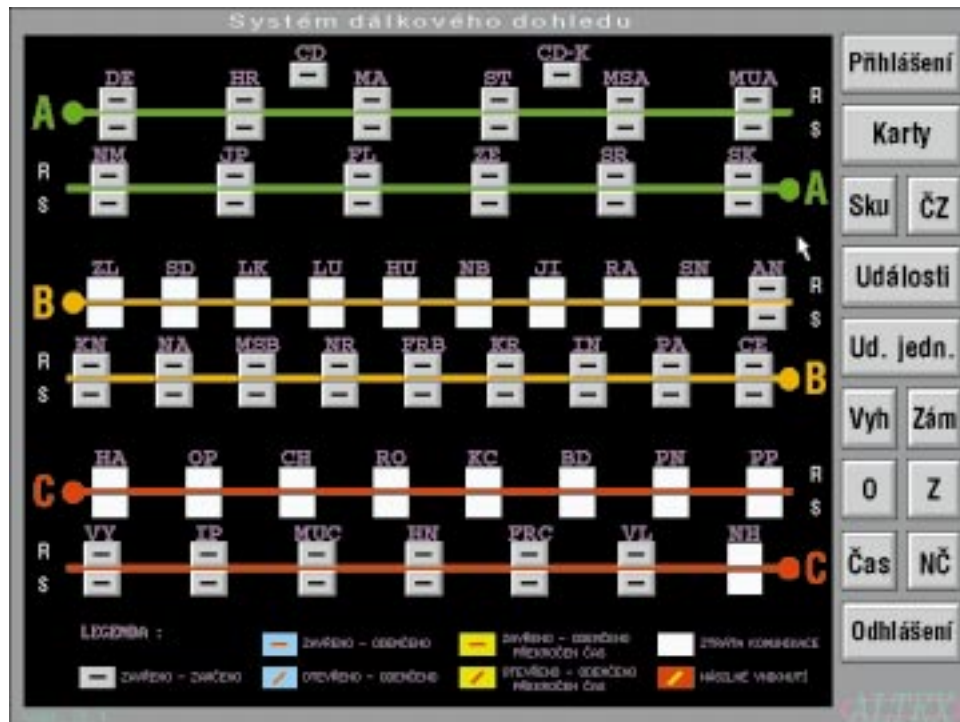
TIRIS card transponders work basically as identity cards for employee access to restricted areas, and staff movement tracking, in a fully on-line, real-time fashion. The authorization levels of certain areas and doors can be set according to times and changed easily from a central location. The locks can also be managed from a remote surveillance center. Complete records of past history are also kept in the central database. Operators oversee the system using a graphical interface of all the reader locations on the site.

The Prague Transport Company intends to expand the use of Altex into more underground stations and to expand the use of the system in other ways. For instance, the same identity cards can be used for computer access, authorization to switch various systems on and off, train tracking, and entrance to garages and parking areas. Reports can be generated of employee work hours.

For more information, contact Alimex, Tel: +420 2 751241, +420 2 900 23 730 Fax +420 2 751241. ◼

Operators oversee the entire system using a graphical, on-line interface from a central command post.

Automatic Retail Fueling

Continued from page 1.

Speedpass stations to the thousands that already exist throughout the U.S.

"We are pleased to have Gilbarco involved with this technology and able to provide the system. This effort expands our ability to provide customers faster, easier purchasing experiences," said Joe Manai.

Gilbarco plans to offer the TIRIS system as a factory-installed option on new dispensers in the third quarter of 1998. ◼

Write or Call

TIRIS Sales and Application Centers