UNIQUE MICRO DESIGN
...Engineering IoT Solutions

Customer Handbook

2021 Edition

Adding eyes and ears to software




HB-201

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Unique Micro Design Pty. Ltd
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"Engineering IoT Solutions"

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"We are passionate about enhancing customer experience and forming long term partnerships using emerging technologies"
Geoffrey Ramadan
Managing Director

i. Foreword

Since the incorporation of Unique Micro Design (UMD) in 1983, we have continued to redefine how we go about doing what we do, to improve customer productivity and keeping up with technology trends.

There have been 4 distinct “versions” of UMD which has also been reflected in our changing Company by-line:

- UMD Version 1.0 (1983) – Custom Electronic Engineering
  - Electronics hardware design company
- UMD Version 2.0 (1991) – Technologist and suppliers to professional systems integrators
  - Manufacture and distributor of data capture & POS products
- UMD Version 3.0 (2001) – Engineering IT Solutions
  - Edgeware solution provider (including middleware software)
- UMD Version 4.0 (2016) – Engineering IoT Solutions
  - Full-stack-IoT solution provider

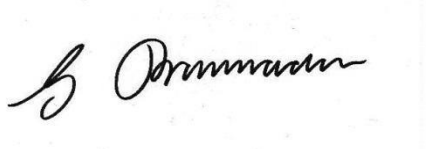
With each evolution, we have added to our solution components, to where we are now in a position to offer *full-stack IoT solutions* encompassing; electronics, ICT and Software (or any combination thereof) to solve customers' needs for productivity solutions.

Much of this has been brought about by the growing complexity of delivering solutions, particularly around IoT (Internet of Things) and the need to integrate with legacy and disparate systems.

This “unique” experience, including our expertise in Radio Frequency Identification (RFID) put’s UMD in an exceptional position to deliver IoT solutions.

This Handbook should give you some insight into how we do this.

I hope you find this Handbook of value.



Geoffrey Ramadan
CEO & Managing Director
Unique Micro Design Pty Ltd

[1] For an introduction to “edgeware” see *http://www.umd.com.au/edgeware*

ii. Table of Contents

Mission Statement

Since 1983 Unique Micro Design (UMD) has been more than just a supplier of hardware, software and services to Customers; we *solve their problems*.

And in many cases, solving very *tough and challenging* problems via our dedicated and diverse team of skill professionals who have a *"can do attitude"*.

We are passionate about creating innovative solutions using our expertise in "*engineering IoT solutions*".

Our solutions are for Customers

- looking for a *point of difference*
- who understand that technology innovation will help them succeed
- and are looking for a long term working partnership

UMD At a Glance

UMD solves customer news for productivity improvement by integrating our products into vertical solutions to service our markets.

What Business Are We In?

Since 1983, UMD has been solving customer's needs for productivity improvement by adding real time visibility and control to software, using Edgeware, IoT and our engineering IoT solution skills, which reflects our "Unique" ability to:

- Design and manufacture IoT devices and Interface electronics
- Source & Integrate ICT products from our agencies
- Support through our professional engineering, software and support services

In simple terms *"we add eyes and ears"* to software

Our Technology Verticals

What Markets Are We In?

Data capture solutions are like computing. All industries need computing, and all industries use Data Capture. UMD services varies industries and markets with a particular interest in the below:

Technologies

- Barcoding
- Cloud IT Services Hosting & The Internet
- Digital Communications (eg. Wifi, BLE, Cellular, Ethernet, LoRa, etc)
- Electronics and physical Interfaces
- Embedded Computing
- IT (computers, networks, servers, peripherals etc)
- Mobility software and hardware devices
- Payment Gateways (Credit Card, EFTPOS, Payment API Integration)
- Point of Service / Point of Sale (POS)
- Radio Frequency Identification (RFID)
- Software (embedded, mobility, application and cloud)

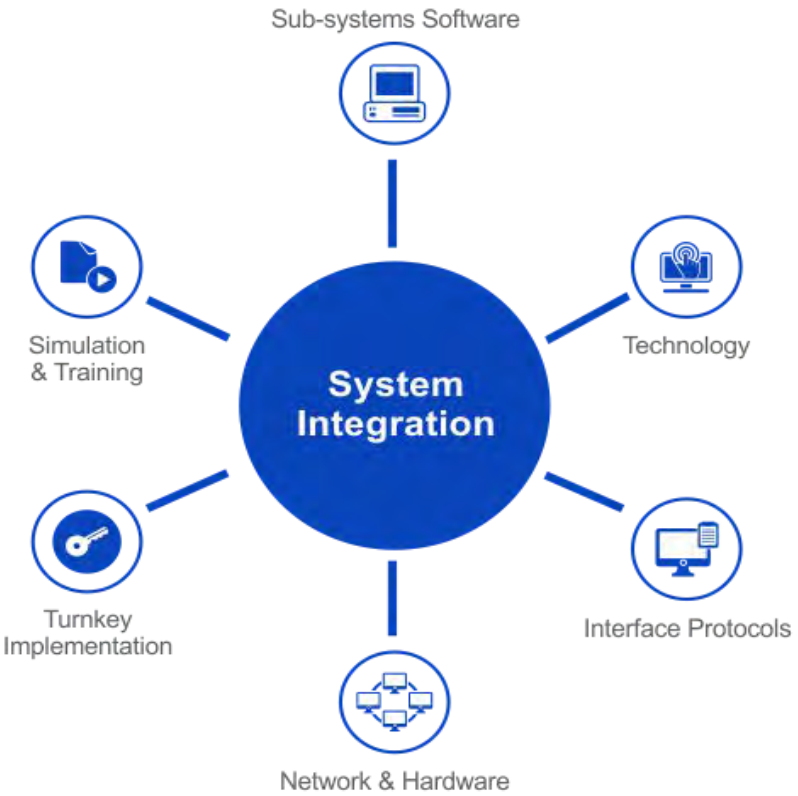



Our Services

- **Software**
  - Cloud application development
  - Mobile application development
  - Embedded application development
  - API development

- **IT**
  - Solutions architecture
  - Systems integrations
  - Systems engineering
  - Network and wireless infrastructure
  - Installation and commissioning
  - After sales support

- **Electronics Engineering**
  - Electronic / microprocessor design
  - Industrial and mechanical engineering
  - Rapid prototyping
  - Manufacturing and assembly

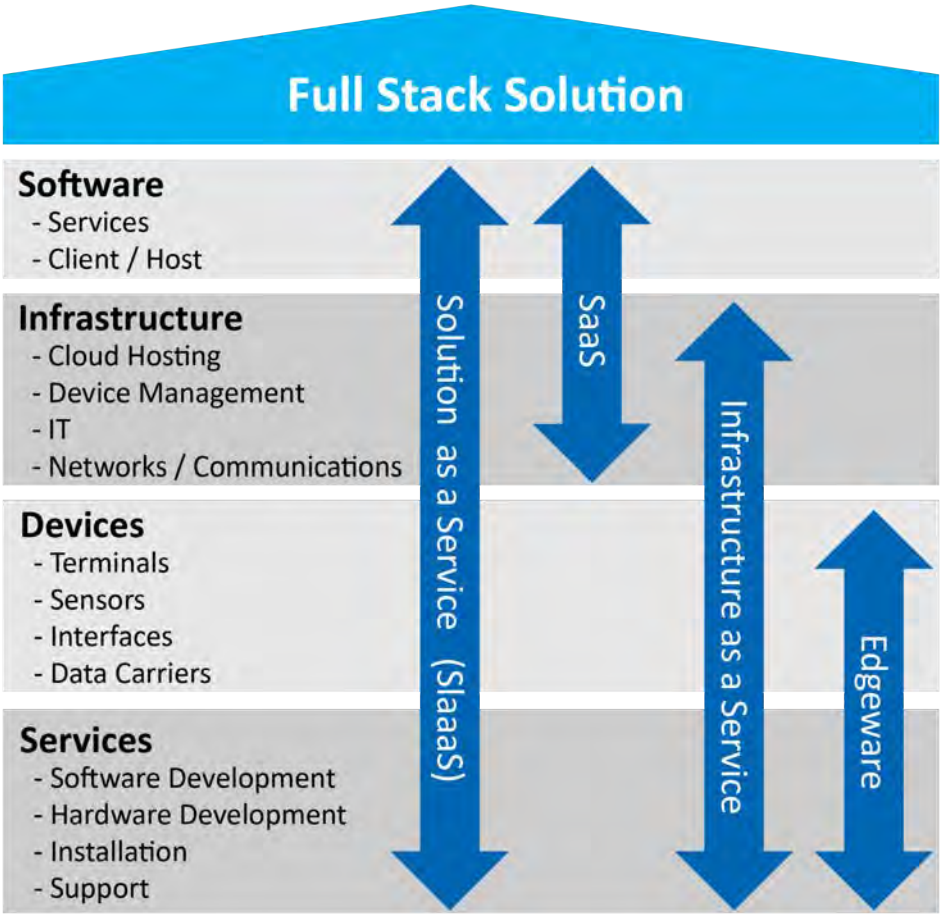


Our Unique Selling Proposition

UMD provides “full-stack” Solutions using Edgeware and IoT technology, in addition to supplying solution components and subsystems with a combination of:

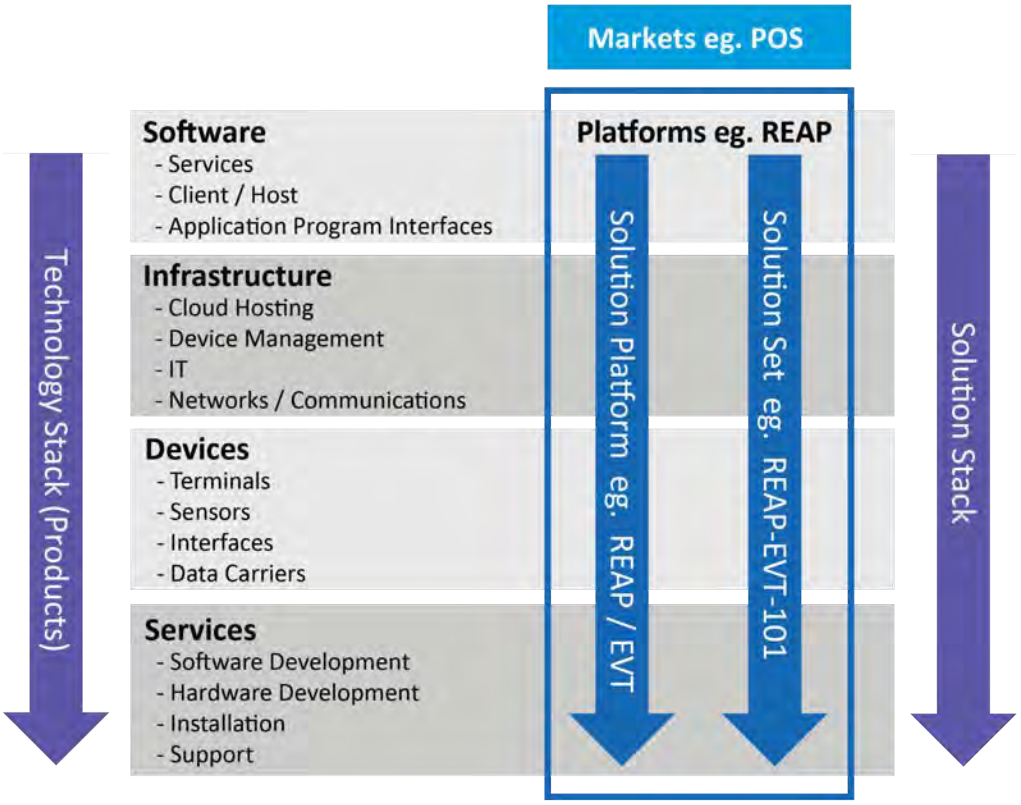
- Electronics & Sensors
- Engineering / Design Services
- Information & Communication Technology
- Software
- Services

We have exceptional experience in “Protocols” and “Interfacing”



UMD – Solutions Architecture & Business Model

UMD *Technology Stack* (i.e. products and systems components) are used to create *Solutions Stack* to service various Vertical Markets



History

Established in 1983, a wholly owned Australian company. UMD has its offices and manufacturing facilities located in the Monash Precinct, Australia's largest concentration of ICT, scientific and medical industries, in Clayton, Victoria.

Our Channels

DIRECT
- Data Capture Systems
- Retail & Payment Technologies
- Patron Access & Ticketing
- Business Support Systems

RESELLERS
- Dealer
- Authorised
- Industrial
- Solutions
- Systems Integrator
- OEM
- Business Solutions Consultant

SERVICE PROVIDERS
- Registered
- Independent
- Authorised

ALLIANCES
- Independent Consultants
- UMD Consulting Group
- REAP Consultant

Industry affiliations

Australian Industry Group

https://www.aigroup.com.au/

IoT Australia Alliance

https://iot.org.au/

Monash Microwave, Antenna, RFID And Sensor Laboratories (MMARS)

http://www.ecse.monash.edu.au/staff/karmakar/index_files/Page349.html

GS1 Australia – Solution Partner

http://www.gs1au.org

GS1 EPCglobal – Member

http://www.epcglobalinc.org

Company Structure

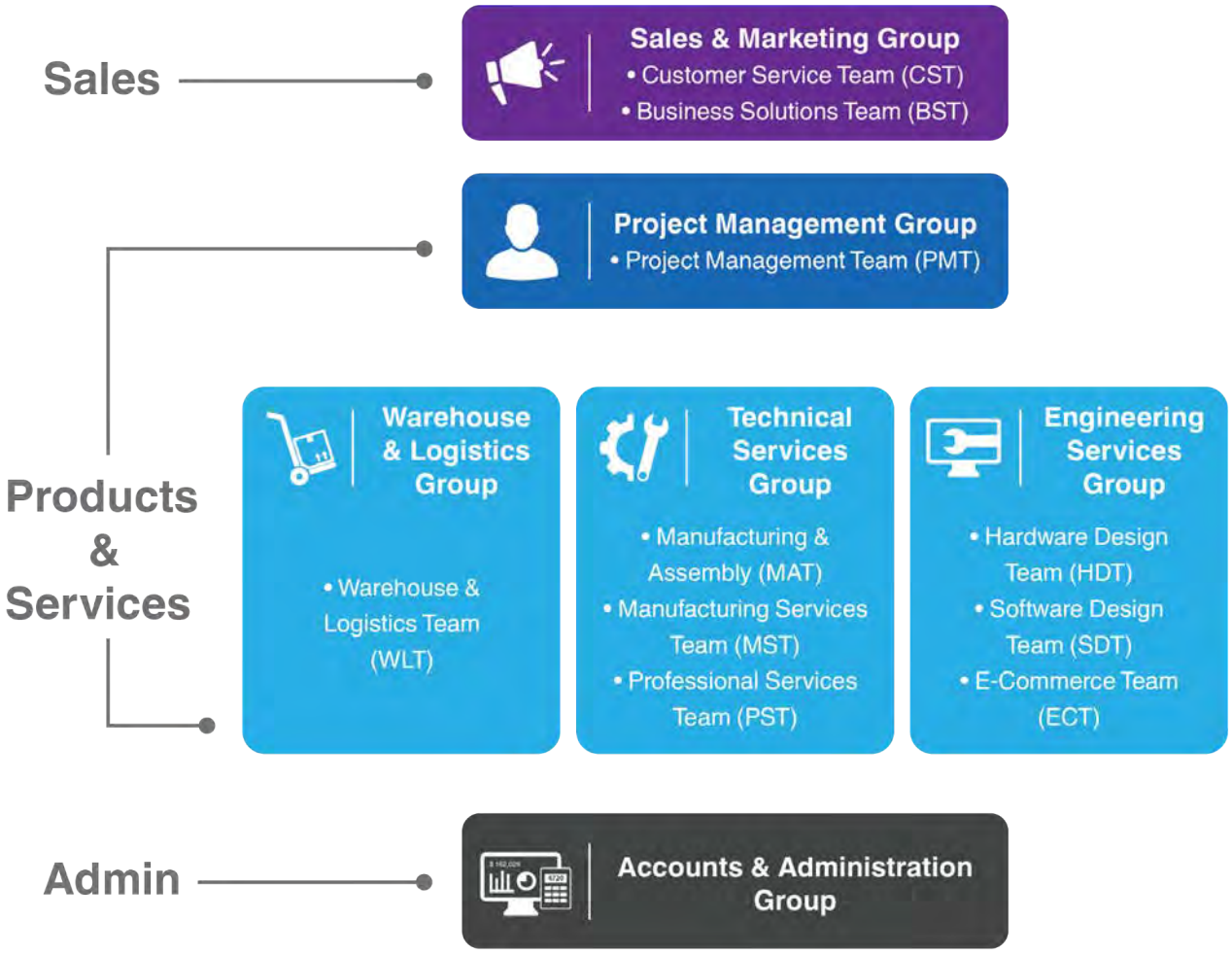
UMD organisational structure is based on **Groups** and **Teams**.

The company is divided into *Groups* representing its functional areas.

Project *Teams* are formed to address specific demands and customer needs. Teams can draw their resources from any internal Group or externally if required.

The Team concept reflects the multi-skilled nature of UMD employees and the integrated nature in which UMD operates, as employees can be associated or support more than one team.

The following diagram details the UMD Group structure:



Awards

Smart Supply Chain Award 2015 - Winner

Melbourne Business Award - Finalist

Melbourne
BUSINESS AWARDS
South East Region

Monash Business Award 2012/2013 - Winner

1. Technology Stack (Products)

UMD has an extensive range of **Products** to support **Edgeware, IoT and RFID** encompassing:

- IoT (Internet of Things)
- RFID solutions
- Mobile computers
- Point Of Service (POS) technology
- Barcode systems
- Wireless infrastructure
- Custom interfaces and controllers
- Consumable supply
- Service and Maintenance
- Professional Services

UMD Brands (develop by UMD)

UMD Brands

Unique Micro Design
(we manufacture and distribute our own product range)

- Bar code readers and interfaces
- Cash drawers
- Custom keyboards
- Custom terminals
- Customer display units
- Industrial terminals
- Interfaces
- Manufacturing facilities
- Microelectronic product design
- Web based Asset Management System
- Venue Access System for Turnstiles
- Turnstile Controllers

Cardgate.Net
(Part of UMD Group of Companies)

- Real Time Payment Gateway

UMD RACE (RFID Advance Controller for Embedded

- IoT Edgware platform to collect RFID data

UMD Chariot

- Cloud based application brocker

UMD VAST

- Cloud based venue access control

UMD Agencies & Supported Vendors

4ID
- RFID Wrist Bands
- RFID Lanyards and Tickets
- Custom RFID Tags

Advantech
- Industrial Computers
- Industrial Touchscreens
- Industrial Networks

Alien Technology
- UHF RFID Chips
- UHF RFID Inlays
- UFH RFID Labels

Arduino
- Embedded Controllers
- Low Cost IoT devices

Avery Dennison
- RFID Inlays and Tags
- LF, HF and UHF

Chainway
- Mobile computers
- RFID Fixed and Mobile Terminals

Confidex
- RFID Tags and Inlays
- LF, HF and UHF
- BLE

Denso
- Handheld barcode scanners
- 2-D barcode readers
- RFID

Epson

- Receipt/docket POS printers
- Printer Mechanisms
- Authorised Service Centre

Hexicore-Apex

- Cloud based analytics
- Overall Equipment Effectiveness

HID

- RFID Tags
- LF, HF and UHF Tags

Honeywell Scanning & Mobility

- Barcode readers
- Mobile computers
- RFID readers and printers

iData

- Mobile Computers
- RFID Terminals

Impinj

- RFID Chips and Inlays
- RFID Readers

Infinitee Software

- Enterprise software platform
- Companion mobile solutions
- Cloud based

Ironbolt

- Enterprise Integration Platform as a Service (EIPaaS)
- Cloud based analytics

Times-7

- UHF RFID Antennas
- Shelf & Cabinet Antennas
- Custom Antennas

Toshiba Auto ID

- Barcode / Label Printers
- Portable Printers
- RFID printers

Urovo

- Mobile Computers
- RFID Terminals

Telpo

- Fixed and Mobile Terminals
- Temperature Monitoring
- Validators

Troi

- Industrial UHF RFID Tags
- Solder Bonded Tags
- Harsh environments (oil and gas industries)

Turck

- Industrial Sensors
- IoT

Xerafy

- Industrial UHF RFID Tags
- Embedded Tags
- World's smallest UHF RFID Tags

Zebra Technologies

- Barcode readers & printers
- Mobile Computers and Tablets
- IoT / RFID
- Consumables

2. Solutions

UMD Technology Stack can be combined in various ways to create *Solution Stack* or *Platforms* to service various markets.

Platforms are uniquely configured to meet customer specific needs.

In broad terms, there are 4 key Solution Platforms provided by UMD

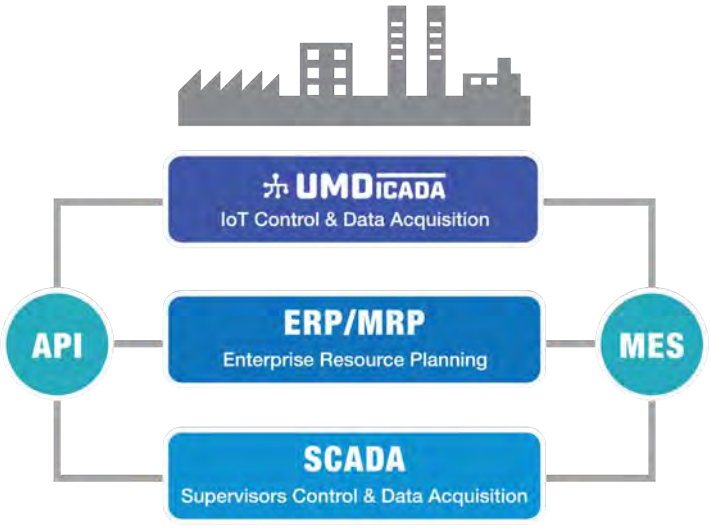
- Data Capture Solutions
- Retail and Payment Technologies
- Patro Access and Ticketing
- Business Support Systems

Data Capture Systems

UMD ICADA

The UMD ICADA (IoT Control And Data Acquisition) Platform is used to:

- build industrial IoT monitoring and control networks
- provide real time visibility across disparate systems
- provides additional inventory or asset control beyond existing systems.



UMD SCM

UMD Supply Chain and Mobility provide a range of products, systems and solutions for a range of industries that utilise specialised mobile devices such as:

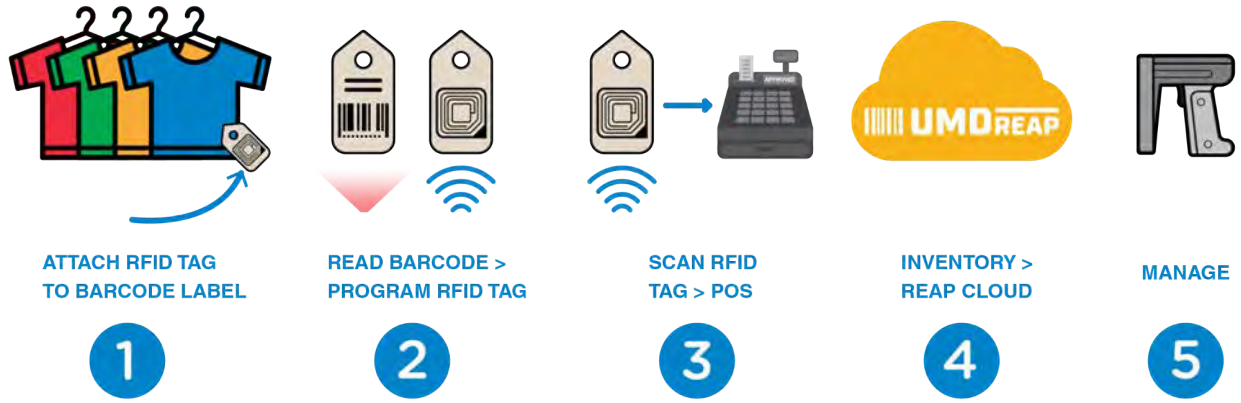
- Mobile touch screen terminal with integrated barcoding and/or RFID scanning
- Tablets and laptops
- Voice based terminals
- Vehicle mount terminals
- Fixed terminals for HID applications.

Retail and Payment Technologies

UMD REAP

The UMD REAP (Retail Edgware Application Platform) is use to:

- Expand POS / Enterprise functionality
- Add RFID to POS (including with no POS software changes)
- Add marketing redemptions to POS



CARDGATE

Cardgate is a credit card payment service provider and is used to:

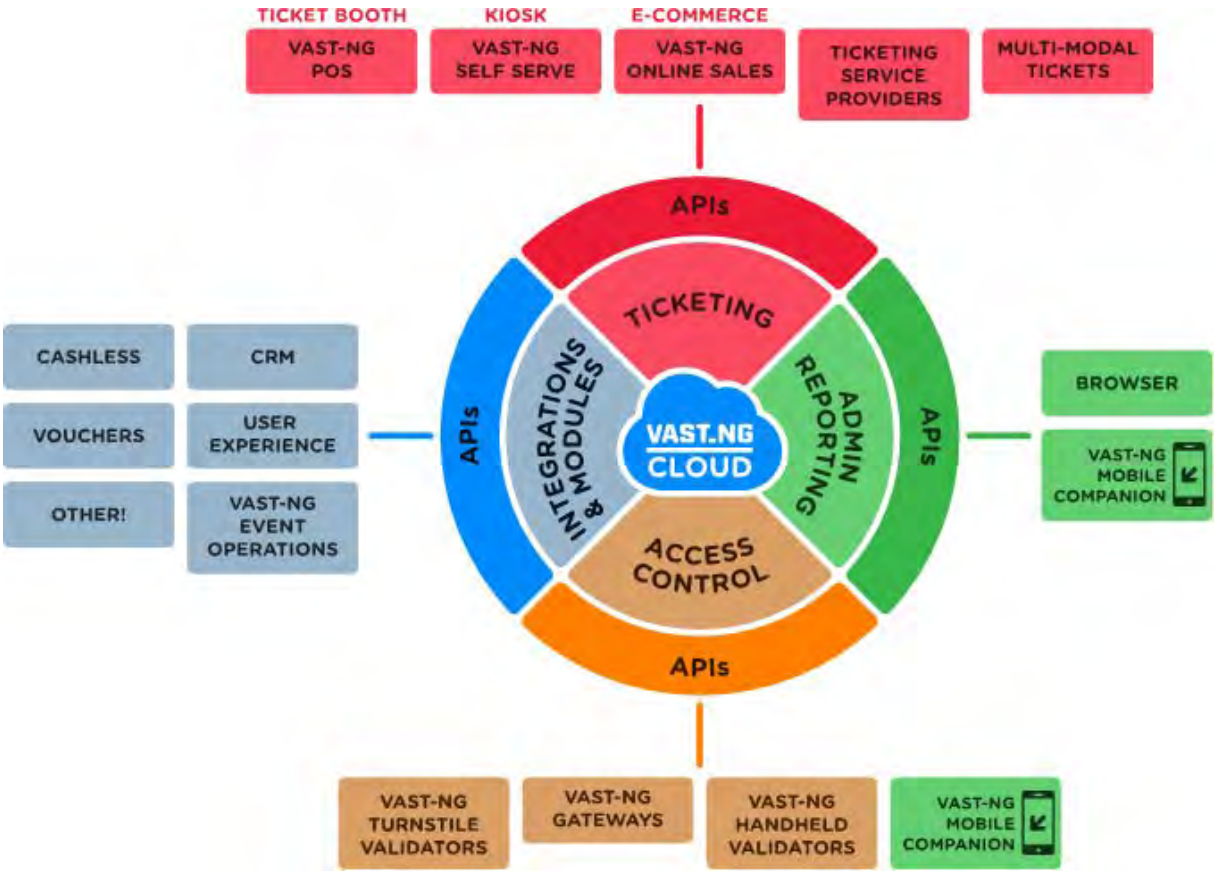
- Add credit card payments to application
- Build payment solutions such a SPS (Simple Payment Service)

SPS

Patron Access & Ticketing

The UMD VAST is designed support Venues, Attractions, Stadia and Ticketing by adding:

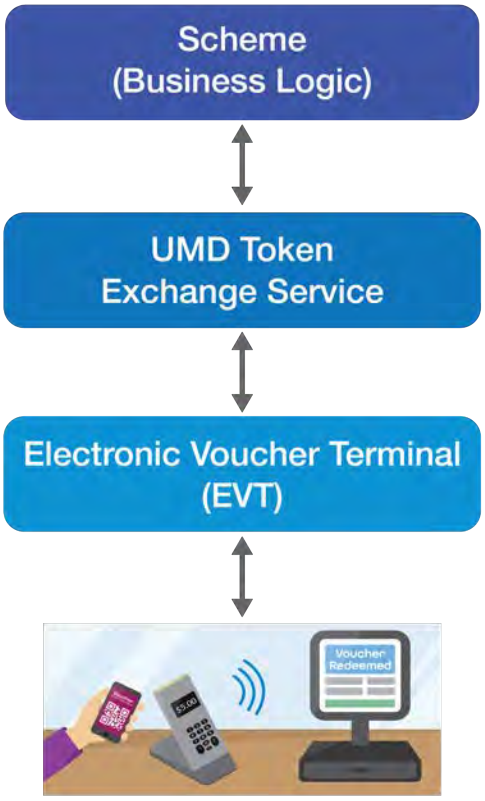
- Cloud based ticketing
- Validate tickets and provide access control to fixed or mobile validators
- Provide ticket life cycle management
- Support multi-source tickets



UMD TXP

The UMD TXP, Token eXchange Platform, is designed integrate across disparate systems in retail, venues and business in general and is designed to:

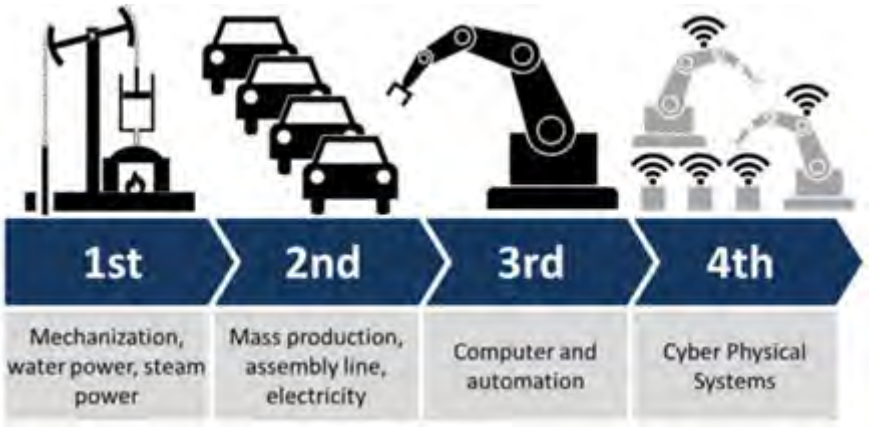
- Facilitate agnostic integration into any POS or PC system with no software changes
- Use to manage the redemption of vouchers and cashless at POS
- Use to attach vouchers or cashless to any token



Business Support Systems

The UMD BOC, Business Operations Central, is a cloud based application designed to:

- Build business support systems (cloud and mobile)
- Provide Industry 4.0 solution by integrating to things and machines
- Integrate with UMD edgware / IoT platforms
- Use as either a middleware and enterprise applications.



Examples of Solution Platforms:

BOC SMART.ASSET

For Asset Management

BOC ENTERPRISE

For Enterprise Software

BOC SOS

For Security Operations Central

UMD Web Services

UMD Web Services are a range of services and infrastructure used to deliver web based hosted applications.

Cloud services are accessed via web browsers, or web services (for computer to computer communications) which make them ideal for easy deployment.

UMD cloud service offering is hosted on high reliability, redundant and secure computer infrastructure.

Advantages:

- Operates independently of host applications
- Flexible – customised to meet each implementation's unique requirements
- Scalable – scale out (multiple servers) and/or scale up (larger server)
- Reporting – reports can simply be downloaded, including support for external integration
- Real-time monitoring of traffic
- Application Updating – no need to update client applications
- User access via Web browser – allowing for easy "zero installation" deployment
- Integration – host application can link to other applications and databases
- Troubleshooting tools
- Three stage development platform – development, testing and live. Enabling development and testing to be conducted using "real" data (copy) and not interfere with Live system and data.
- Data aggregation – ideal for aggregating data from a range of locations and devices
- Device Independence – application can be accessed from a range of devices including desktops, laptops, tablets and smartphones.
- Web Services – allows for easy integration into other web based applications.

UMD currently offers cloud/hosted services in:

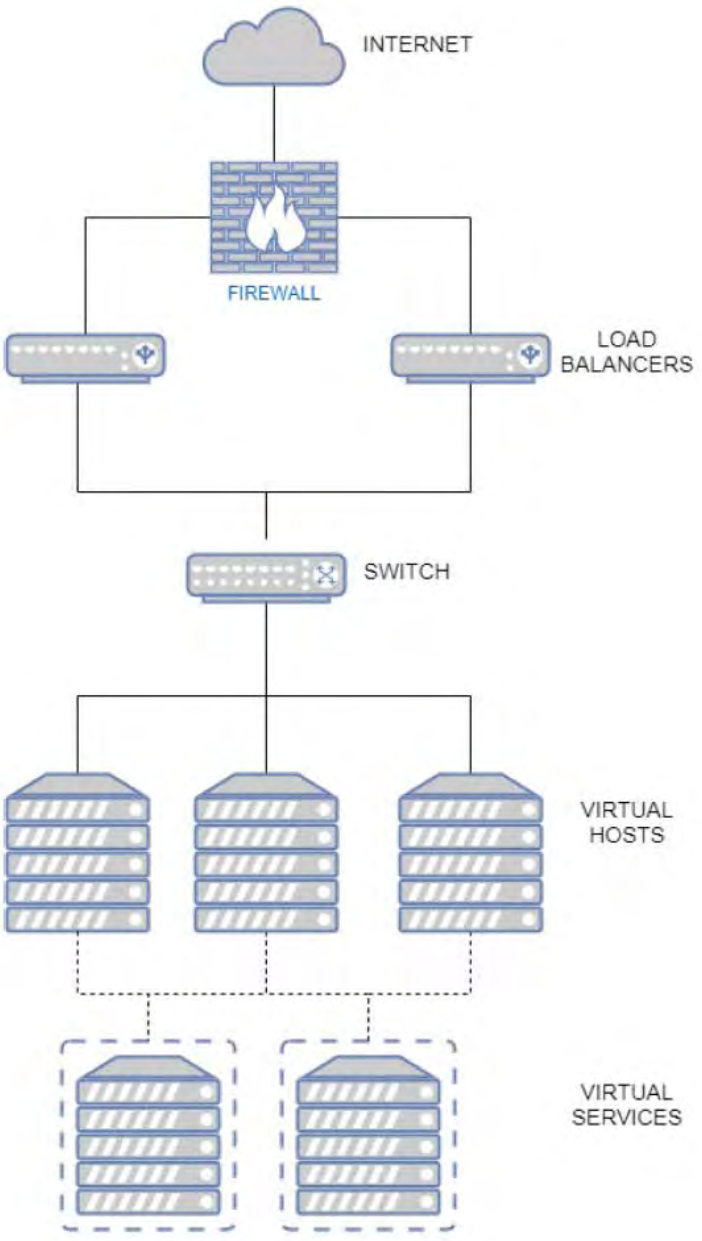
- Asset Management Systems
- Inventory Management Systems
- Ticket Servers
- Payment gateways
- Marketing Redemption
- Access Control

Infrastructure

UMD maintains two data centres for redundancy; One on-site and a one off-site location, including a range of telecommunication service providers for further redundancy.

UMD Cloud Service is based on our experience in developing and operating Cardgate.Net (http://www.cardgate.net), a credit card payment gateway supplier.

UMD Web Services are hosted on high reliability, redundant and secure computing platforms.



3. Professional Services

Pre-Sales

Pre-Sales Consulting

Pre-Sales Consulting Services reflect both the time and effort taken to develop proposals and quotations. They also reflect the associated investigation work that may be undertaken by UMD to ensure that the solution is technically feasible, economically viable and culturally acceptable.

Pre-Sales Consulting Services are generally included in proposals as a line item and are payable once the Customer accepts the proposal.

Site Audits

Site-Audits are similar to *Pre-Sales Consulting Services*, but reflect the effort and time taken to investigate specific Customer sites, in order to develop an appropriate solution. As with all Pre-Sales activities, *Site Audits* may be listed as a line item in the proposal and are payable only if the Customer accepts the proposal.

RFID Evaluation

An *RFID Evaluation* is essential to successfully undertaking any Radio Frequency Identification project. To design a solution that matches the customer's unique requirements, a vendor must thoroughly understand the technology, RFID standards, Australian regulatory issues, middleware software, tag selection, environmental issues and interface protocols.

RFID Evaluation usually takes the form of a 'workshop' where these issues are discussed, and the customer's specific requirements are analysed. The customer will complete the workshop with a clear understanding of the issues involved in implementing RFID in their own environment, probable timelines and costs.

Consulting

Site Surveys

Site Surveys encompass physical site visits to develop an understanding of the Customer's physical environment. Consideration is given to layouts, equipment mountings, cable installations and other elements that will impact on the *implementation* of the solution.

Radio Frequency Site Surveys

The *RF Site Survey* is an essential procedure for developing an effective wireless network infrastructure and ensuring effective radio coverage. The physical site, where wireless devices are to be installed, must be examined and measurements taken so as to establish the types, quantities and locations of wireless access points, antenna arrays, mounting options, cabling and power management details.

Desktop Radio Frequency Site Surveys

In some circumstances, it is not always possible to conduct a physical site survey, nor may it be warranted in the first instance. In such cases a *Desktop RF Site Survey* can be conducted. This consists of obtaining, where possible, details of: site drawings, construction material of buildings as well as network and power cable diagrams.

The *Desktop RF Site Survey* is for reference only and is useful in supporting quotations and proposals. A physical RF Site Survey will usually also be required to confirm coverage and system requirements.

Systems Analysis

Systems Analysis utilises a variety of analytical tools, design methods and evaluative techniques to determine process requirements and appropriate software solutions. Also, an appreciation of the incumbent software environment is gained, which will assist in the investigation and implementation of the chosen solution.

Network Auditing

Our *Network Auditing Service* Team performs networking audits, which review and clarify the architectural issues and features of the incumbent network in order to successfully optimise and integrate the two networks. The audit process also highlights security issues which can be addressed and included in the final solution.

RFID Site Survey and Tag Selection

An *RFID Site-Survey* involves location visits to develop an understanding of the Customer's physical environment. In particular, consideration is given to the positioning of equipment, and the surrounding environment. Also of primary importance is the RFID tag selection. Consideration needs to be given to tag mounting options, orientation, RF permeability of material and other environmental issues.

Implementation

Procurement

Procurement can be conducted by UMD on behalf of the Customer to acquire resources needed to deliver the chosen solution. These resources include products, services and additional items provided by UMD business partners, associates or contractors.

Pre-Configuration

Pre-Configuration Services involve the configuration and preparation of devices in response to specific Customer site parameters prior to installation as determined by the *Site Survey*. This also involves the testing of devices and identification of any quality issues thus ensuring rapid installation and minimising disruption to client workplace environments. This service is generally carried out on UMD premises.

Logistics

Logistics is the management and co-ordination of the *Procurement* and *Pre-Configuration services*, and involves the distribution, maintenance, and the allocation of appropriate resources, materials and personnel. The aim is to fulfil delivery of the agreed solution and services to the Customer's location at the right time.

Installation

Installation services are conducted by UMD and involve the physical process of installing equipment into Customer locations as per the systems requirements identified by *RF Site Surveys, Systems Analysis*, and *Network Auditing Services*.

Commissioning

Commissioning involves the testing of systems once installations have been completed. Technically it could be as simple as 'turning the device on' and ensuring an appropriate response is recorded. However, *Commissioning Services* are normally reserved for more

complex system testing that generally cannot be performed by installers and/or need suitable technical skills to ensure devices are operational eg. Change various network settings, etc.

After Sales Support

Product Support

Product Support is defined as providing advice to the Customer on the operation, maintenance and repair of a device. The maintenance and repair elements of *Product Support* include warranty repairs and servicing through Authorised Service Centres or Independent Service Providers. See *UMD Service and Maintenance Policy*.

Systems Support

Systems Support Services may be required after the system has been successfully commissioned to rectify unforeseen problems and/or assist Customers in areas where their expertise is lacking.

System Support will also be required where Customers have not accepted the recommendation such as whereby deficiencies would have been identified or foreseen, but have become apparent and need rectification.

Systems Maintenance

Systems Maintenance Services involve the on-going support and maintenance of the system (not product support or maintenance) which may include: telephone support, site visits and system log monitoring to ensure ongoing integrity, reliability and confidence in the system and the personnel operating the system.

Systems Monitoring

Systems Monitoring Services involve online real-time monitoring of the installed system. This is used to provide either on-going proactive preventative maintenance or fault finding and diagnostic services. *Systems Monitoring services* will be tailored to each Customer's needs.

Training

Two types of training are available: *Product Training* and *Systems Training*.

- *Product Training* is available via UMD's Service Provider Program which trains and certifies individuals as Certified Service Providers for specific products.

- *Systems Training* is both Customer and systems specific. Training programs will be developed based on Customer requirements.

In addition to these categories, please also refer to After Sales Support section below for detailed information about the full range of after sales support programs offered by UMD.

Software Development

Software Development Service

Working in conjunction with the client, *Software Development Services* are derived from UMD's *Systems Analysis* activity and focus on producing relevant computer programs to fulfil the client's system requirements.

This process is viewed as a *project* in its own right, due to the strategic nature of a customised software. Various additional elements including operational testing schedules, acceptance criteria, sign-off procedures and protocols need to be included in an agreement and implemented as part of this service.

Software development capabilities and experience:

- Embedded systems software
  - Assembler for various microcontrollers
  - .NET / C#, C /C++
  - Linux
- Mobile applications
  - Androids and IOS
  - .NET / C#
- PC Application
  - .NET / C#
- Cloud applications
  - C /C++ / C # / Visual Basic/ Java / JavaScript
  - HTML / Django Web Framework / PERL / PHP / Python
- Databases
  - SQL Database Systems Post / GIS Location Aware Database
- Operating Systems
  - Linux / Unix
  - Microsoft

Engineering Services

Research & Development

Research and development is required to ensure the appropriate selection and suitability of technology; new or emerging technologies. This typically includes technology literature research, technology evaluation and prototyping.

Hardware Design

This includes the full design cycle of evaluating, designing, developing, prototyping, programming and testing of electronic circuit boards and device packaging. Typically, they are microcontroller and digital based circuit boards for terminal and interface devices.

Hardware development capabilities:

- PCB layout and digital circuit design
- Embedded systems hardware
- RFID hardware and software
- BLE readers and gateways
- Display technologies
- Automatic data capture technologies, eg bar code, magnetic stripe decoding
- Communications interfacing and protocols
- Programmable logic
- Radio Frequency
- Rapid prototyping

Semi-Custom Design

In many cases, UMD already has an existing microcontroller or interface board that can be adapted to meet customer specific needs. Furthermore, most UMD designed boards have features specifically incorporated to allow for such customisation.

Manufacturing Services

Under the direction of the *Engineering Services Group*, the *Manufacturing Services Team* provides electronic product assembly, modification and testing services.

Project Management

The Project Manager has overall responsibility for delivery on project outcomes as defined during the consulting process. The key responsibilities of a Project Manager are to define project objectives, develop implementation plans, and to monitor and manage the implementation process. The Project Manager will set project milestones and test procedures to determine project closure, thus ensuring project objectives and customer expectations are met.

The Project Manager also provides a single point of contact for all project communications.

Rapid Prototyping Manufacturing Equipment

UMD has in-house resources to design and manufacture prototypes and small product run of customised housing and mounting hardware using our 3D printer and laser cutter

4. After Sales Support

The *After Sales Support Group* provides a range of services tailored to your needs, from a return-to-base repair, supply of spare parts, through to an inclusive on-site maintenance and support program.

Customised support packages can also be developed to meet your specific needs. Please refer to *UMD After Sales Support Handbook (HB-220)* for details.

In summary, the *After Sales Support Group* is comprised of three teams, each responsible for delivering and supporting the overall After Sales Support Group:

- After Sales Support Team (AST)
- Service and Maintenance Team (SMT)
- Systems Laboratory Team (SLT)

The *After Sales Support Team's* (AST) key responsibilities are providing support to systems and solutions typically including hardware, software and comprises:

- Systems / technical Support
- Software support
- Systems monitoring
- Service contracts (on and offsite)
- Maintenance contracts
- Device management (remote and local)
- Exchange programs
- Training

The *Service and Maintenance Team* (SMT) are responsible for providing physical service and repairs and include:

- Warranty repair
- In-house equipment repairs
- Managing Vendor repairs and service contracts
- Supporting third-party service centres
- Preventative maintenance
- Supply of spare parts

The *Systems Laboratory Team* (SLT) has several key responsibilities:

- Assembling systems
- Loading and pre-configuring firmware and software
- Testing of devices and systems
- Reconfiguring devices and systems after service

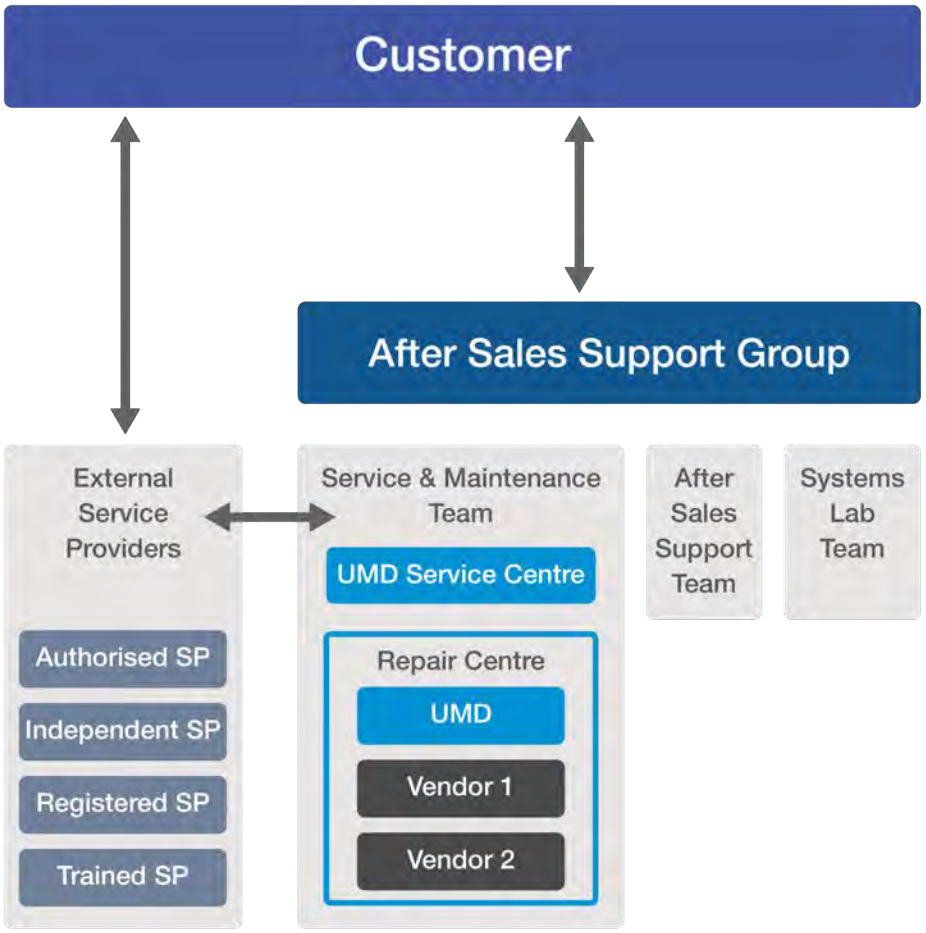
UMD Plus™ - After Sales Support Programs

The *UMD Plus™* Program is UMD's comprehensive service and maintenance offering consisting of several service components that "*plus"* or add value to the products, systems or solution provisioned by UMD. These services add reliability, save time and increase the value of the devices and systems and include:

- *Asset Plus* - UMD's unique database for managing devices, systems and service that the customer manages. Asset Plus ties into the other support programs and simplifies the delivery of their features.
- *Repair Plus* - Break-fix repairs managed by UMD and provisioned by UMD itself or product vendors. It can be managed and scheduled through Asset Plus.
- *Priority Plus* - This is a priority version of Repair Plus and also uses a dedicated portal for priority handling and reduced turn-around times.
- *Warranty Plus* - Extended the device's warranty up to 3 years and includes fair wear and tear.
- *Exchange Plus* - Loan equipment during repairs to preserve business continuity.
- *Maintenance Plus* - Provides routine maintenance including parts and labour.
- *Vendor Plus* – Augmenting vendor maintenance programs by reloading software/firmware and reconfiguring by UMD prior to return.
- *Manage Plus* – Cloud based device management for real-time device optimisation, device usage dashboards.
- *Support Plus* – Pre-paid support for hardware, software and development.
- *Print Plus* – A program to convert the cost of printer purchase, maintenance and consumables into a single per use charge.
- *Training Plus* – Tailor-made training for your trainers or end-users to get the most from the devices and systems in place.
- *Enterprise Plus* – A customised support program for enterprise-class installations of devices or systems.

Refer to UMD Handbook HB-220 After Sales Support for details. .

Aftersales Support Group - Structure



After Sales Support Contact Details

After Sales Support Team (AST)

E-Mail:	Support@umd.com.au
Phone:	Local (03) 9582-7050 International +61-3-9582-7050

Service and Maintenance Team (SMT)

On-Line Service System:	www.umd.com.au/smd/olss/
E-Mail:	Service@umd.com.au
Phone:	Local (03) 9582-7060 International +61-3-9582-7060

Common

Phone:	Local (03) 9582-700 International +61-3-9582-7000
Return Address:	Unique Micro Design Pty Ltd Rear Unit 1, 200 Wellington Road (Enter via Garden Road) Clayton, VIC 3068 AUSTRALIA.

5. UMD Ethics

Ethics

UMD will perform its work with professional ethics, avoiding conflicts of interest, and striving to improve the activities through good works and professional responsibility. UMD will present the truth in its advertising and services, in order to ensure total customer confidence.

Value

UMD will offer value-added services that are highly competitive, and offer opportunities for true value to our customers. UMD will continue to offer a variety of free services and information in order to promote our industry and enhance workplace efficiencies.

Quality

UMD will provide the highest level of quality to its customers, by analysing each customer's needs and providing appropriate service to satisfy those needs. For all projects and opportunities, UMD will endeavour to provide its services without interruption of the customer's normal operations, and without undue burden on the customer's management.

Usefulness

UMD will provide services and products that are inherently beneficial to our customers, and utilise our customer feedback to re-assess that usefulness. UMD will not market products or services that do not provide a meaningful and practical application solution.

6. Policies

Freight

UMD is able to provide shipping to all regions of Australia based on the rate table below. All on-line shop orders http://shop.umd.com.au/) are supplied Free-In-Store Australia wide.

UNIQUE MICRO DESIGN ...Engineering IoT Solutions

Policies & Procedures

Freight Charges

UMD is able to provide shipping to all regions of Australia based on the rate table below. The postcode to zone guide is on the following page. All on-line shop orders (http://shop.umd.com.au/) are supplied Free-In-Store Australia wide.

Area	Shipping Zone	Up to 3kg	Up to 5kg	Up to 10kg	Up to 20kg	Up To 50kg	50kg +
Area 1 - Melbourne, Geelong, Bendigo, Ballarat	Local, VV1	$18	$18	$18	$18	$30	Quote
Area 2 - Albury / Wodonga, Adelaide, ACT, Sydney, Newcastle, Wollongong, Tasmania	VV2, VV3, NN1, NN5, SS1, TA1, TA2	$18	$25	$25	10kg rate plus 75c Per Additional Kg		Quote
Area 3 - NSW Country	NN2, NN3, NN4, NN6	$18	$30	$30	10kg rate plus 90c Per Additional Kg		Quote
Area 4 - Brisbane, Toowoomba, SA Country (Part)	QQ1, SS2	$18	$30	$35	10kg rate plus $1 Per Additional Kg		Quote
Area 5 - SA Country (Part), QLD Country South	SS3, QQ2	$18	$30	$40	10kg rate plus $1.30 Per Additional Kg		Quote
Area 6 - Perth, Alice Springs	WW1, NT2	$18	$30	$45	10kg rate plus $1.55 Per Additional Kg		Quote
Area 7 - Darwin, Cairns, Townsville, QLD Country (Part)	NT1, QQ3	$20	$35	$50	10kg rate plus $2.15 Per Additional Kg		Quote
Area 8 - NT, WA Country (Part), QLD Country (Part)	NT3, WW2, QQ4	$20	$35	$55	10kg rate plus $2.75 Per Additional Kg		Quote
Area 9 - WA Country (Part), QLD Country (Part),	WW3, QQ5	$25	$35	$60	10kg rate plus $3.95 Per Additional Kg		Quote
Area 10 - WA Country (Part)	WW4	$25	$35	$65	10kg rate plus $4.40 Per Additional Kg		Quote

Terms and Conditions:

1. Pricing excludes GST
2. Quotes will be provided by our Sales Team once the order is processed.
3. Freight rates are based on UMD standard nominated couriers using “Express Services”. Expedited services are available and will be quoted on request.
4. Weight used is based on the greater of either the “actual” (scale) or ”volumetric” (size) weight

Returns

Inevitably, product returns need to be made from time to time, please contact UMD Sales for a *Return Authorisation Number* (sales@umd.com.au or 03-9582-7070).

Servicing

UMD has developed in-house an **On-Line-Service-System** (OLSS) which allows anyone to manage and arrange return of products to UMD for repairs.

The UMD OLSS involves you in the repair process. Before you ship your repair to us, you can enter your repair details and receive a *Service Request number automatically*. Logging on at any time enables you to see the status of your repairs.

Automatic Emails will also be used to keep you up to date.

http://www.umd.com.au/smd/olss

Sales Terms and Conditions

UMD complete Sales Terms and Conditions can be found online at: http://www.umd.com.au/ftp/pub/D21-02_UMD_Sales_Terms_&_Conditions.pdf

Sales Terms and Conditions relating to UMD product customisation and development work can be found at:

http://www.umd.com.au/ftp/pub/D21-03_UMD_Sales_Terms_&_Conditions_For_Custom_Products.pdf

UMD Sales terms and Conditions can also be found in Section 10 of this handbook.

7. Contact Details

Main Contact Details

Area	*Telephone Number*	*E-Mail Address*
Reception	Local (03) 9582-7000 International +61-3-9582-7000	reception@umd.com.au
Sales	Local (03) 9582-7070 International +61-3-9582-7070	sales@umd.com.au
Service	Local (03) 9582-7060 International +61-3-9582-7060	service@umd.com.au
Support	Local (03) 9582-7050 International +61-3-9582-7050	support@umd.com.au
Accounts	Local (03) 9582-7010 International +61-3-9582-7010	accounts@umd.com.au
Cardgate	Local (03) 9582-7000 International +61-3-9582-7000	sales@cardgate.net

Other Contact Details

Area	E-Mail Address
Dealer Administration	*DealerAdmin@umd.com.au*
Purchasing	*purchasing@umd.com.au*
Marketing	*marketing@umd.com.au*

Address Details

Physical Address
Unique Micro Design Pty Ltd Wellington Road Business Park Unit 1, 200 Wellington Road Clayton, Victoria 3168 Australia
Postal Address
Unique Micro Design Pty Ltd PO Box 4297 Mulgrave, Victoria 3170 Australia
Delivery Address & Customer Service Counter
Unique Micro Design Pty Ltd Rear Unit 1 200 Wellington Road (Enter Via Garden Road) Clayton, Victoria 3168 Australia

Operating Hours

Sales	*9 am to 5.30 pm*
Service	*9 am to 5.30 pm*
Stores	*9 am to 4.00 pm*
Customer Service Counter	*9.00 am to 4.00 pm*

8. Procedures

Ordering

- We require all orders to be in writing.

- Orders can be placed via

  - Email: sales@umd.com.au

  - Online for consumable orders
    (requires credit card payment)

    http://shop.umd.com.au

    Note all online orders are supplied free in store Australia wide.

- *Non-Account* customer orders will be confirmed in writing advising:

  - Pricing
  - Availability
  - Payment options

- *Account* customers will only be advised if:

  - Pricing does not match order
  - Items are not in stock
  - We are unable to meet the expected delivery date

Payment Terms

Unless a Trading Account facility has been established, payment prior to delivery will be required. Sales will issue an “Order Confirmation” form with payment options.

Once a trading history has been established, customers are welcome to apply for credit trading account. Fount at:
http://www.umd.com.au/ftp/pub/D63-04_UMD_Trading_Account_Application_Form.pdf

Payment Details

Payment Type	Payment Method
*For **Electronic Funds Transfer** (EFT) Only, with payments made in Australian Dollars (AUD):*	▪ *Bank: CBA* ▪ *Account Name: Unique Micro Design Pty Ltd* ▪ *BSB Number (Branch): 063-010* ▪ *UMD Account No.: 12890644*
*For All deposits made in **US Dollars** (USD):*	▪ *Bank: CBA* ▪ *Account Name: Unique Micro Design Pty Ltd* ▪ *BSB Number (Branch): 063-010* ▪ *UMD Account No.: 13030531* ▪ *S.W.I.F.T. Code: CTBAAUS2*
Via Internet	▪ *Online credit card payments for invoices, statements or sales orders can be made via UMD's secure payment service https://www.cardgate.net/~umd/.* ▪ *Mastercard, Visa and Bankcards are accepted.* ▪ *UMD Reserves the right to charge a processing fee on large credit card payments.* ▪ *Currently, only payments in Australian Dollars can be processed.* ▪ *This online, real-time credit card processing facility is provided by www.cardgate.net. UMD's E-Commerce sister company.*

Customer Service Counter

UMD operates a *Customer Service Counter* for service/repair drop offs and pick-ups and a trade counter for casual purchases without a written order.

Access via Rear Unit 1, 200 Wellington Road, (Enter via Garden Road) Clayton, Victoria, 3152

Web Services

An extensive range of information and resources can be found on our web site.

The following list highlights some of the common links:

- **UMD Web Page:**
  - http://www.umd.com.au
- **UMD On-Line Service System:** To arrange and manage product returns for service and repairs.
  - http://www.umd.com.au/smd/olss
- **UMD On-Line Shop:** For supply of media and consumable items:
  - http://shop.umd.com.au
- **Courier Tracking**
  - http://www.umd.com.au/trakcing.html
- **Cardgate:** (UMD's sister company) For real time payment of credit cards.
  - http://www.cardgate.net

9. Company Experience

Aquaculture Traceability Solution - RFID RACE Portal

The Customer:

An Australian leader in the production of aquaculture solutions approached Unique Micro Design to develop a traceability solution to meet their growing customer base and traceability requirements.

The Requirement:

The customer's requirements were to provide a data capture solution to provide traceability requirements, visibility to stock and track assets within the various warehouse locations, customer reporting, and to investigate the use of Radio Frequency Identification (RFID) Technology. To initiate the process the customer was willing to invest and conduct a proof of concept / trial to demonstrate the viability.

In particular, the customer wanted to investigate.

- A solution that results in 99.9% RFID tag read rate, when their stock items pass through the RFID RACE portal (explanation overleaf).
- The selection of a suitable RFID tag and RFID tag attachment method.
- Consideration for an appropriate RFID tag data numbering schema.
- A solution for the encoding of the RFID tag while items are moving on a conveyor
- A mobile solution that allows for quick deployment

The Solution:

UMD proposed the supply of its new UMD Model A250 RACE Portal. This is a self contained system comprising of:

- Housing
- RFID Controller based on the RFID RACE Architecture
- RFID Reader and Antenna

UMD RFID RACE Portal

The UMD RFID Advance Controller for Embedded (RACE) architecture is an industrial computing platform designed for collecting and visualisation of RFID and other data.

The RACE architecture is based on an embedded controller that is used to interface to any UMD Protocol based UHF RFID Reader/Writers. It controls all aspects of systems operation including RFID data capture, sensor integration, diagnostics, database and network communications. The solution can be stand alone, or can be integrated to the RACE Cloud solution for enterprise data capture and management.

For the Proof Of Concept (PoC) and validation, the A250 was configured as a stand-alone solution, with a dashboard reporting on the operation of the system, and data capture.

The scope of works for the PoC were;

Pre Installation

- Appropriate selection of an RFID Tag
- Appropriate method to attach the RFID Tag to the goods
- Site preparation (confirm network connection point and mains 240V power) where the portal was to be installed – confirmation of indoor or outdoor installation
- Confirm data output format and data posting method
- RFID Tag Data Schema (may require GS1 encoding format)
- RFID Tag Programming Software – Handheld Unit

Site Installation / Commissioning

- Installation of portal
- Portal operation adjustments - adjust portal settings for optimum data collection
- Monitor workflow
- Review RFID data captured and post data to host system
- Professional Services to deliver the PoC solution

UMD RFID RACE Mobile

The Outcomes

Once the system was commissioned, the data capture and analysis process was monitored for 1 month. The customer was able to validate the receipt and dispatch of goods at the remote site, access the solution dashboard to view real-time data capture, and portal operations including light stack operation, RFID reader operation, and time of day data capture.

The successful result of the PoC had directly led to the next stage of the project to fully implement an RFID RACE Solution. The scope of works for the project implementation now includes the installation of both fixed and mobile RFID RACE portals and mobile terminals at remote secondary for several customer sites throughout Australia.

Paper Pulp Product - RFID RACE Solution

The Customer:

The customer has a proud history in local paper manufacturing. The manufacturing facility located in regional Victoria has been operating from 1937 and has since grown to be one of the largest employers in the region, manufacturing close to 600,000 tonnes of paper and board annually. Being a vertically integrated manufacturer of pulp and paper, and Australia's only manufacturer of copy, printing and inkjet papers, and bag, sack, and industrial papers.

The Requirement:

The customers current system utilised bar code technology, however, to further automate the process and improve OHS, the customer approached Unique Micro Design to implement a solution to improve workflow, and increase production visibility.

The Solution:

Following a site visit, and workflow analysis, a number of technologies were investigated. The first stage of the process was to implement a Proof Of Concept (PoC); investigation to test the technical and business viability for the use of RFID technology. The PoC involved installing a self contained RFID RACE portal to investigate the data capture locations, the type of RFID label and inlay and the mounting location for the label. Following the PoC the review resulted in the business decision to proceed with the implementation of the RFID RACE solution.

UMD RFID RACE - Paper Roll Data Capture

The decision to move forward with the implementation of the RFID RACE solution allowed for the scope of the requirements to expand by utilistings UMD's engineering experience provided, additional solutions for the integration of bar code scanning, and connectivity to their scale.

UMD RFID RACE - User Dashboard

The Outcomes

The Customer achieved the following results:

- Automation data capture improvement, including direct connection to host ERP systems
- Real time inventory visibility
- OHS Safety (no need to inspect the label)

Toll Shipping (Melbourne) - RFID Container Tracking

The Customer:

Toll Shipping provides shipping container shipping services between Melbourne / Victoria and Burney / Tasmania.

The Requirement:

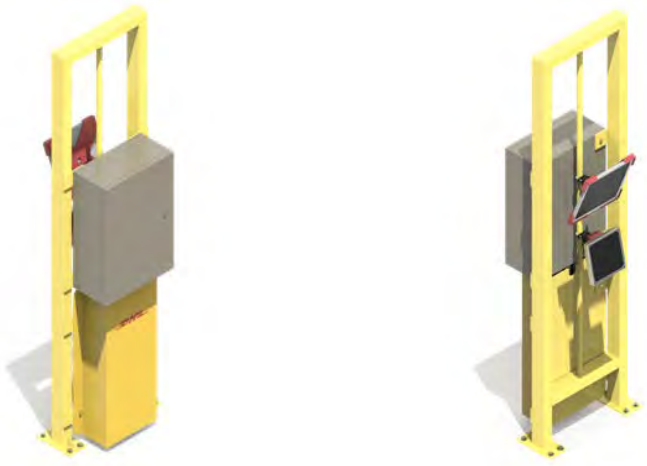
With anticipated growing volumes of shipping containers, a larger drive on/drive off ship was commissioned by Toll Shipping.

This also necessitates the improvement in work practices and technology in order to increase anticipated throughput.

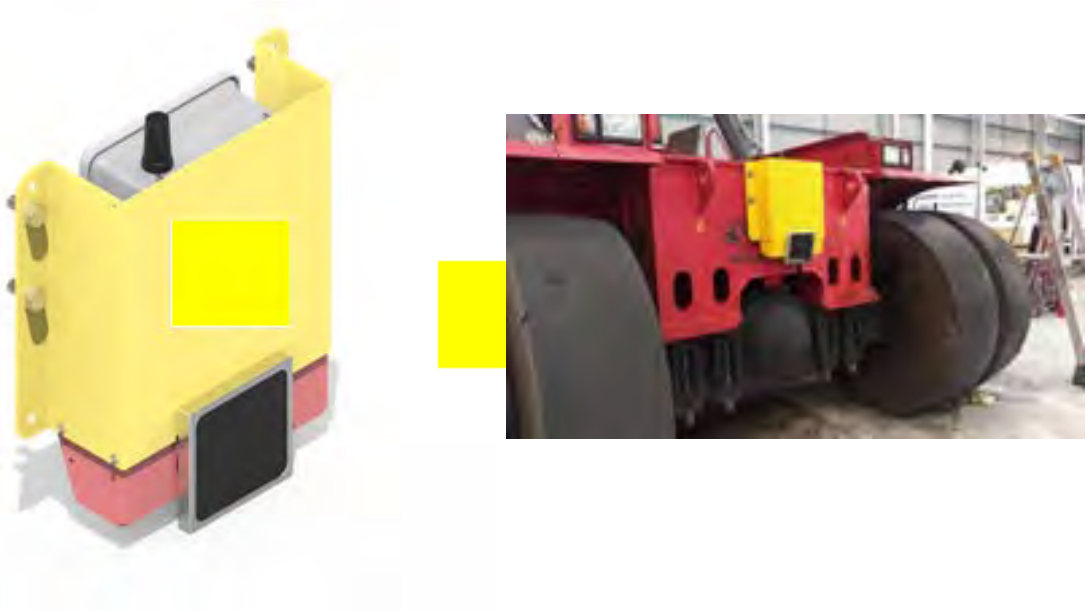
The Solution:

UMD worked in conjunction with a software company that was commissioned by Toll Shipping to develop a Wharf Management System, to ädded “eyes and ears” via RFID technology.

Key Technology Components



UMD custom RFID Control Boxes and Outdoor Ports for Gates (x16)



UMD Custom Vehicle RFID Readers (mounted or reach/stackers) (x46)

RFID Tag Programmer (x2) and RFID Tags (x50,000)

Melbourne Water - PoC

The Customer:

Melbourne Water manages and protects the city's major water resources, which in turn makes Melbourne city a fantastic place to live.

They are also responsible for managing assets with field service crews.

The Requirement:

Melbourne Water required a traceable solution on their tools from the central stores to various field jobs and return.

Melbourne Water was interested in understanding how RFID could be used and commissioned UMD to develop Proof of Concept.

In particular, they wanted to investigate three scenarios.

- Ability to RFID tag and audit tools stored in the central store
- Ability to automate the association of taken tools with Field technician (by means of portal)
- Ability to automate the identification of tools in vehicles, to ensure tools are not left behind.

The Solution:

UMD custom built two RFID systems.

- RFID Portal (Tunnel)
- RFID Vehicle Reader - systeem would read Tools (assets) when door was closed.

UMD also developed a mobile application to conduct auditing and cloud service to collect and analyse data.

UMD Custom Vehicle Reader

UMD Customer Portal

UMD Mobile RFID Reader for Auditing

Fenwick Software ToxFree - Waste Contract Management

The Customer:

Fenwick Software provides IT solutions to small to medium sized companies across Australia and is a Gold Partner of Microsoft.

The Requirement:

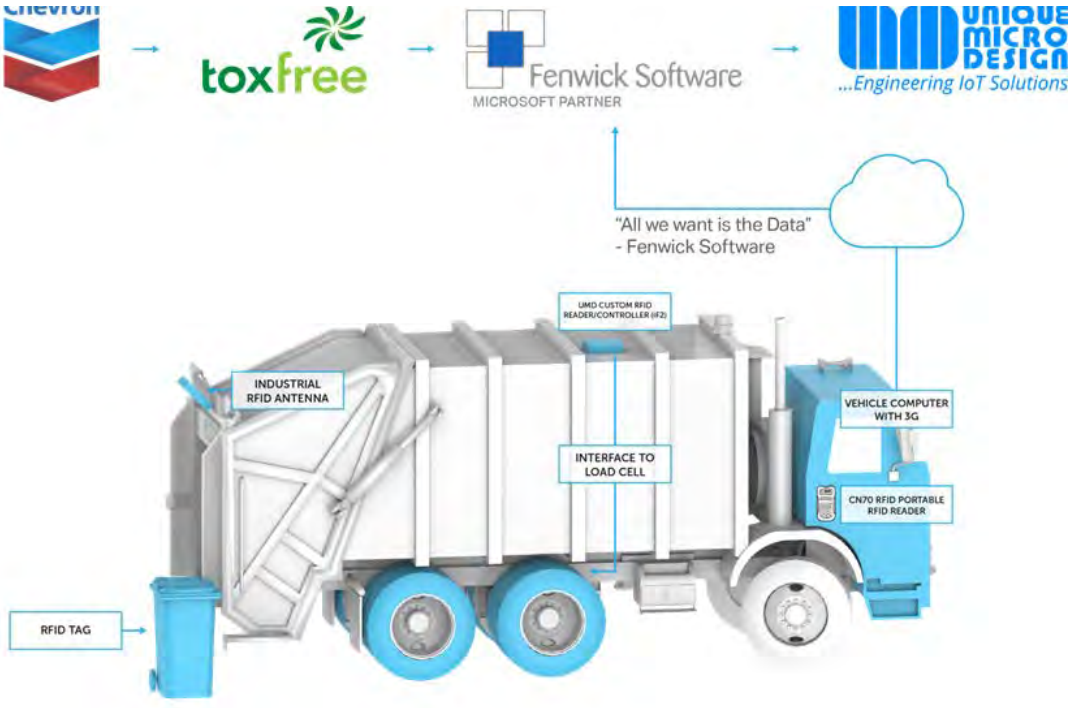
Fenwick Software had won the contract to supply waste management for ToxFree who in turn secured the Chevron contract to supply waste management for Chevron (gas plant in WA)

They wanted to automate the capture of waste metrics as part of their environmental compliance reporting.

The Solution:

UMD develop a custom RFID solution consisting of:

- Vehicle RFID reader controller
- Interface to existing vehicle scale interface
- UHF RFID bin tags
- UHF RFID industrial antenna
- In vehicle tablet and communications
- Software to manage the data capture process and push data to Fenwicks cloud solution.



Cotton On – Try on Your Sound

Extract from http://www.rfidjournal.com/articles/view?9539

May 22, 2012—Customers trying on clothing at Australian fashion retailer Cotton On can listen to music specifically chosen to suit the style of a particular garment, following the introduction of radio frequency identification technology at one of its Queensland stores.

In fitting rooms within its store located in the Brisbane suburb of Carindale, the retailer has launched its Try On Your Sound service, in which selected denim jeans carrying an RFID tag will trigger a playlist of music individually chosen to match that clothing.

Cotton On contacted Australian RFID solutions provider Unique Micro Design (UMD) to develop and implement the solution over a period of just six weeks, as the Carindale store was being refurbished. This, Coombes says, provided the best opportunity to install the new system into the fitting rooms.

Geoffrey Ramadan, UMD's managing director, says the design concept, procurement of parts, software development and rollout were all accomplished in quick succession.

"We had planned to do a formal pilot in one store, but did not get the chance," Ramadan explains. "However, we were able to assemble a system at our facilities for testing and software development, and used a corner of our office to provide a basic simulation of a change room."

A range of men's and women's denim jeans were tagged with Alien Technology ALN-9634 "2x2" wet (adhesive) inlays, which comply with

the EPC Gen 2 and ISO 18000-6C standards, and operate on a frequency between 840 MHz and 960 MHz.

The tags, designed specifically for apparel applications, were chosen without first being tested, due to the short time involved in developing the system, but Ramadan says he was pleased with the tags' performance during the rollout phase.

UMD designed an RFID interrogator that incorporates a SkyeTek RFID reader module, and configured the module to comply with Australian regulatory frequency requirements, 920 to 926 MHz.

"The RFID tags are attached at store level, with staff simply sticking the RFID tag to existing swing tags [hangtags] on the clothes," says Ramadan. "We custom-developed a tag programmer, which consisted of a small controller, SkyeTek reader and Honeywell 1900 USB bar-code scanner. The operator simply scans the item bar code on the apparel swing tag and places the RFID tag on the 'target' printed on the box. The device then converts this to a GS1-format EPC number, and programs and verifies the tag."

With each changing room, the reader was mounted behind an access door, with just a small Laird Technologies RFID antenna and a passive infrared sensor to activate the system when someone enters that room. In total, readers were installed within 12 changing rooms.

The information is collected and monitored via UMD's cloud-based system, known as UMD-REAP Retail Edgeware Application Platform). In the future, Cotton On reports, the middleware could integrate with the retailer's RFID tag programmer and point-of-sale system for managing inventory, including the use of handheld interrogators for stocktaking.

In addition, Cotton On plans to roll out the $50,000 solution to other stores as they are refurbished—up to 40 sites nationwide—and to tag new apparel lines as they are introduced.

Coombes says shoppers can share their experience in the RFID-enabled fitting rooms with friends and Cotton On through Twitter by adding #tryonyoursound to their tweets. He says the customer feedback received in this way will help shape Cotton On's future application of RFID technology and further developments of the fitting rooms.

"All going well, we plan to roll this out in every major city in the world where there is a flagship Cotton On store," Coombes reports

Skybus – Bus Ticketing System

The Customer:

SkyBus is a Melbourne based private bus company that specialises in providing express bus services between Melbourne Airport at Tullamarine and Southern Cross City Train Station in Melbourne. It also provides complimentary bus hotel transfer service within the Melbourne Central business district.

The Requirements:

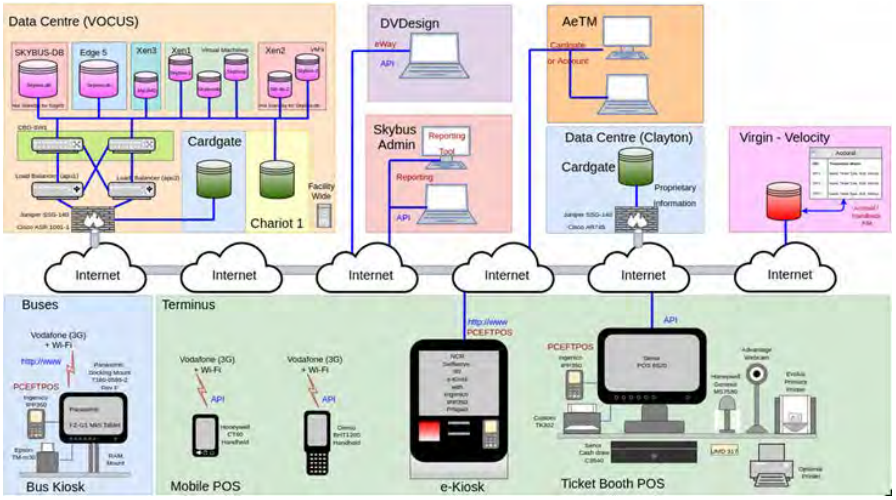
SkyBus's current ticketing system was aging and became challenging and costly to maintain. SkyBus wanted to upgrade their ticketing system, improve customer service and the administrative operational cost.

The ticketing system had to support:

- Sales of tickets from Ticket booths
- Sales of tickets via the Internet
- Sales of pre-printed ticket books
- Support for single and multi-use tickets
- Real time ticket validation (when boarding buses)
- Management and shift reports

The Solution:

Unique Micro Design (UMD) used its "engineering ICT solutions expertise to design and implement a fully integrated bus ticketing system to meet SkyBus's exacting requirements.



The Results/Outcome:

UMD's SkyBus system went live on 12th April 2012. Change-over was coordinated at night to minimise any impact. In the 12 months since deployment, SkyBus has been selling and processing tickets reliably and continuously on the UMD system with no break to SkyBus's commercial operations in that time resulting in a cost effective solution.

"UMD was a collaborative partner in developing and implementing a new system. They were never fazed by our custom requirements. Their experience in hardware, software, and payment systems enabled them to provide an integrated solution. After the initial implementation, they have continued to work with us to refine the functionality and reliability."

Simon Cowen, Managing Director, Skybus

Key Solution Components

HARDWARE

POS Terminal		Senor ISPOS Integrated 15" LCD touch screen terminal with integrated computer housed in a rugged aluminium housing.

Ticket Printer		The Custom Engineering TK300 Series are the most advanced ticket printers on the market for applications requiring durability with reliability and latest technologies, where heavy-duty printing is required. TK300 printing is fast — with up to 200 mm/s print speed for tickets — and is able to print widths from 20 to 82.5 mm. This is easily adjustable by the user. Paper/ticket thicknesses from 80 to 255 gsm are supported.
Barcode Scanner		The Honeywell MS7580 Genesis, the world's first presentation area-imaging scanner engineered to decode all standard 1D, PDF and 2D codes, provides enhanced productivity and revolutionary imaging technology in an elegant, yet durable design. Its form factor make this product suitable for environments ranging from manufacturing to healthcare to retail POS.
Wireless		The Ubiquiti **airMAX** Pico-Station access points provide a simple, flexible and powerful solution set of products for WiFi deployment in challenging environments and do so highly cost effective manner.
Mobile		The Casio IT-800 is a handheld computer that has been designed to combine toughness and durability into a compact and elegant design, suitable for use in a wide variety of environments. The IT-800 is supplied standard with Windows Mobile 6.5, a high impact resistant display, WiFi, Bluetooth, NFC RFID Card Reader/Writer, 2D barcode scanner, Camera, 3G connectivity and GPS.

SOFTWARE

POS	T-POS (Terminal POS) software was developed by UMD to meet SkyBus's exact needs. This included tickets sales, integrated EFTPOS including split payments and refunds. Reports were custom written to match SkyBus's reporting requirements including reconciliation and management reporting.
Mobile	M-POS (Mobile POS) software was developed for the Casio IT-800 to validate tickets, which were barcode-scanned on entry to the bus. The system was developed to work both on-line and off-line.

SERVICES

Development	UMD's Software Development Team developed all software applications in-house
Ticket Server	The UMD Hosted Ticket Server was developed to issue and validate tickets to various point-of-service devices like POS terminals, On-Line sales and eventually Agents sales.
On-Line	UMD's on-line ticket sales system was developed and used by SkyBus to sell tickets on-line. Online ticket sales integrated with the Hosted Ticket Server and used the Cardgate.Net credit card payment gateway. http://skybus.umd.com.au/skybus/sales/
Payments	UMD's Cardgate service (http://www.cardgate.net) was used to integrate credit card payments facilities to online ticket sales.
Tickets	UMD organised the supply of all consumables covering tickets, ticket books and RFID vehicle and locations tags.
Engineering	Custom design and fabrication of metal ticket catchers and modification to vehicle dock mounting and power management.

RFID Stillage Tracking - Plant Access-Green Life Logistics

The Customer:

Plant Access is a specialised logistics services provider catering for the green life industry. They provide a highly efficient service utilising a unique, innovative stillage design to deliver plants to Bunnings across Victoria and South Australia.

The Requirement:

With thousands of re-usable stillages spread across hundreds of sites in the supply chain, knowing where an order is can be difficult to establish at any one time. A system was required to capture data from supplier sites, cross-dock logistics facility and the final customer sites to maintain an accurate and up-to the minute visibility of orders location.

In addition, real time notification was required to detect any items leaving in the wrong consignment, to prevent any costly delivery mistakes.

A mechanism was required to be able to manage contracts based on autonomous data capture and reporting.

The Solution:

Plant Access commissioned UMD to design and develop a system to track the stillages using RFID, and therefore provide an automated system to improve visibility across the supply chain, to provide real time updates on the location of customer orders as they arrive on site.

This consisted of the following components
:

1) RFID tagging of the metal reusable stillages

- *Passive Ultra-High Frequency RFID tags (EPC Gen2) fitted to metal items – providing many meters of read range*

2) Nursery Mobile Handheld Application

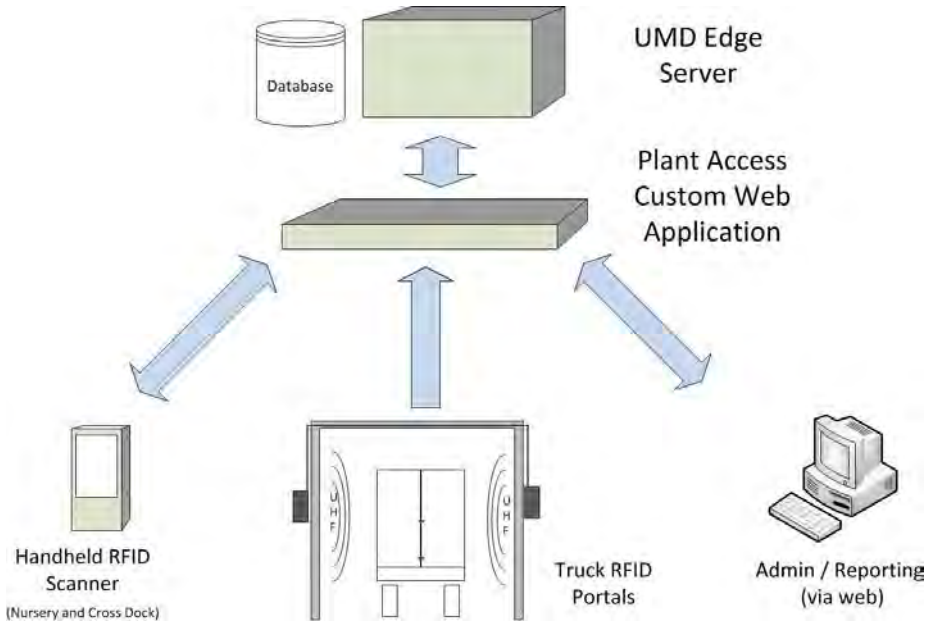
- *Built-in RFID scanner associates the stillage with the Purchaser Order and its contents, as it is packed at the supplier site.*

3) RFID capture portal for Semi-Trailer trucks

- *Multiple Readers and antennas to capture full height Semi-trailers, containing 100 or more of stillages*

4) UMD implemented the EdgeNet Web Service

- *Collect data from both the Handheld app and RFID portals, and*
- *Present the data for real time visibility on the internet*



Key Components

Intermec IF61 and IF2 RFID Readers

Industrial RFID Readers to capture tags, process, and update the web server in the cloud autonomously. UMD integrated SICK Photoelectric sensor for detecting trucks as they approach, and output light-stack indicator to confirm each time reading is occurring.

Intermec CN70 Handheld Mobile Computer with integrated UHF RFID reader, scan engine, touchscreen, Wi-Fi 3G and GPS, running Windows Mobile 6.5.

A custom UMD application integrates to the cloud-based web service, which allows automatic download of supplier orders to be fulfilled, pick-and-pack functions for staff, and automatic update as soon as orders are packed.

IT75 Tags

These ruggedised, metal-mount passive UHF tags, were selected as the appropriate tag type for permanent fixture on returnable assets for the job, after UMD's RFID testing and Proof-of-Concept stage was completed.

UMD Services

The key engineering services and software development required to create the fully integrated and complete end-to-end system. UMD provides the right mix of RF, ICT networking and software specification and development disciplines, along with Project Managed for successful project delivery.

The Outcomes

Real time updates were successfully achieved for orders both leaving the supplier site and arriving at the Plant Access cross-dock facility enabling our client full visibility..

This ensured new business intelligence tools, from checking orders for accuracy as they leave site, to overall reporting of asset locations to aid in planning and optimisation.

Suppliers (Nurseries) also receive the benefit of a new paperless system to help them pack orders. The handheld app shows staff the items they need to pick for each order, and then updates the order status as soon as the items are all packed ready for shipment.

Ultimately, this data can also be provided to the end customer to provide real time information as to what they are receiving now, what they can expect to receive, and what is outstanding from an order, to vastly improve accountability of their products.

RFID provides the ability to charge for services based on actual usage and confirmed deliveries.

Government Voucher Program

To aid in funding for the development of the RFID system, Plant Access applied for the Victorian Government's Technology Voucher Program, which provides funds to helps companies to adopt and develop new technologies.

"Reflecting the maturity of the ICT market in Victoria, the program will support ICT applications for projects that involve new technology development or exploration and/or testing the application of existing technologies in innovative or novel ways." [1]

Unique Micro Design, as a developer of innovative ICT technology, is an approved supplier for this program.

"This project has succeeded in capturing asset location data at critical points in the supply chain and providing this information in real time"

"We and our customers stand to benefit from the improved visibility the RFID tracking system can offer"

Richard Smithells
Plant Access

[1] Extract from Victoria Government website, April 2014:
http://www.business.vic.gov.au/grants-and-assistance/programs/technology-voucher-program/technology-implementation-voucher


Intermec
Intermec


superspan.com.au

Process Group - Pipe Tracking

The Customer:

The Process Group fabricates pipes and vessels for chemical process plants. They also pre-assemble plants into modules.

The Requirement:

Fabricated pipes need to be painted and inspected (x-ray) by a third party which can take upto 12 weeks, which are then returned for assembly into modules.

However, the Process Group had no visibility on which part or when they would be returned. This resulted in significant delays in the module assembly process.

The Solution:

UMD provided industrial RFID tags which would be tied to fabricated parts prior to shipment for painting and inspection.

The Third party was given a cellulare connected RFID mobile reader. They were instructed to RFID scan the pipe in order to receive instruction on what color to paint the pipe.

The UMD custom mobile application could transmit this data back to the Process Group giving them advance information on process and estimate they were likely to receive the returned parts.

Noken® Credit Card Activation System – Play to Time

The Customer:

Jason Wallace, has been involved in the amusement industry since 1991 and has established *Play to Time Systems Pty Ltd* to provide timely information and systems to assist operators of small to medium sized family entertainment centres, and developed the *Noken® Credit Activation* System to facilitate this goal.

The Requirement:

Jason has identified that the coin operated amusements machines used by family entertainment centres were not being leveraged properly, especially during functions like birthday parties. Due to the complexity of managing functions, where staff had to manually override the coin machines, operators tended not to offer such functions as they were labour intensive.

Jason wanted to provide a solution that solved this problem through the use of RFID technology.

The Solution:

Jason commissioned UMD to design and develop the *Noken® Credit Activation System* to his specifications. This consisted of the following core components:

5) *Noken®* RFID tokens which could either be based on RFID wristbands or ID cards. The RFID chips are uniquely encoded to control the operation of an amusement machine fitted with a *Noken® Game Controller.*

6) UMD custom designed *Noken® Game Controller* and external RFID reader module, which was designed to be retrofitted into existing coin operated amusement machines and other attractions. These modules were designed to operate autonomously and could be uniquely configured to match the game machine various operating modes, price structures and user groupings.

7) UMD developed Point of Service software and RFID reader/writer (*Noken® Tag Programmer*) which enabled operators to configure “party packs” to their requirements and program the *Noken® RFID Tokens* accordingly and provide reports.

The Outcomes

Operators using the *Noken® Credit Activation Systems* were able to offer functions such as “parties” seamlessly without the requirement of additional staff while enhancing their customer experience, resulting in increased margins and sales.

“The system developed has met expectations and provided our customer’s a system to support and enhance their business. The ability for the system to adapt and grow as required will provide ongoing opportunities.

This system also enabled me to develop new business lines. “

Jason Wallace, Managing Director
Play to Time Systems Pty Ltd

jasonw@playtotime.com.au

www.playtotime.com.au

Hazeldenes' Chicken Farm – Conveyor System

The Customer:

Hazeldene's Chicken Farm Pty Ltd is an Australian owned family operated regional poultry processor. The Victorian-based company supplies wholesalers and distributors, butchers, food markets, takeaway shops and the like with various chicken products from whole birds to offal. Hazeldene's is one of the few Free Range Accredited operations in Australia.

The Requirement:

At the end of the production process, all finished packed goods move along a single lane finished goods conveyor belt, which transports them from the production area to the cold storeroom.

In the coolroom, the products were then manually separated into 3 gravity rollers by hand, to be palletised and stored in pallet racking until required for dispatch.

This process required a large amount of manual handling to sort the correct products off the main conveyor down into the correct lanes.

A more automated solution was required, to improve efficiency and limit the manual handling for thousands of boxes every day.

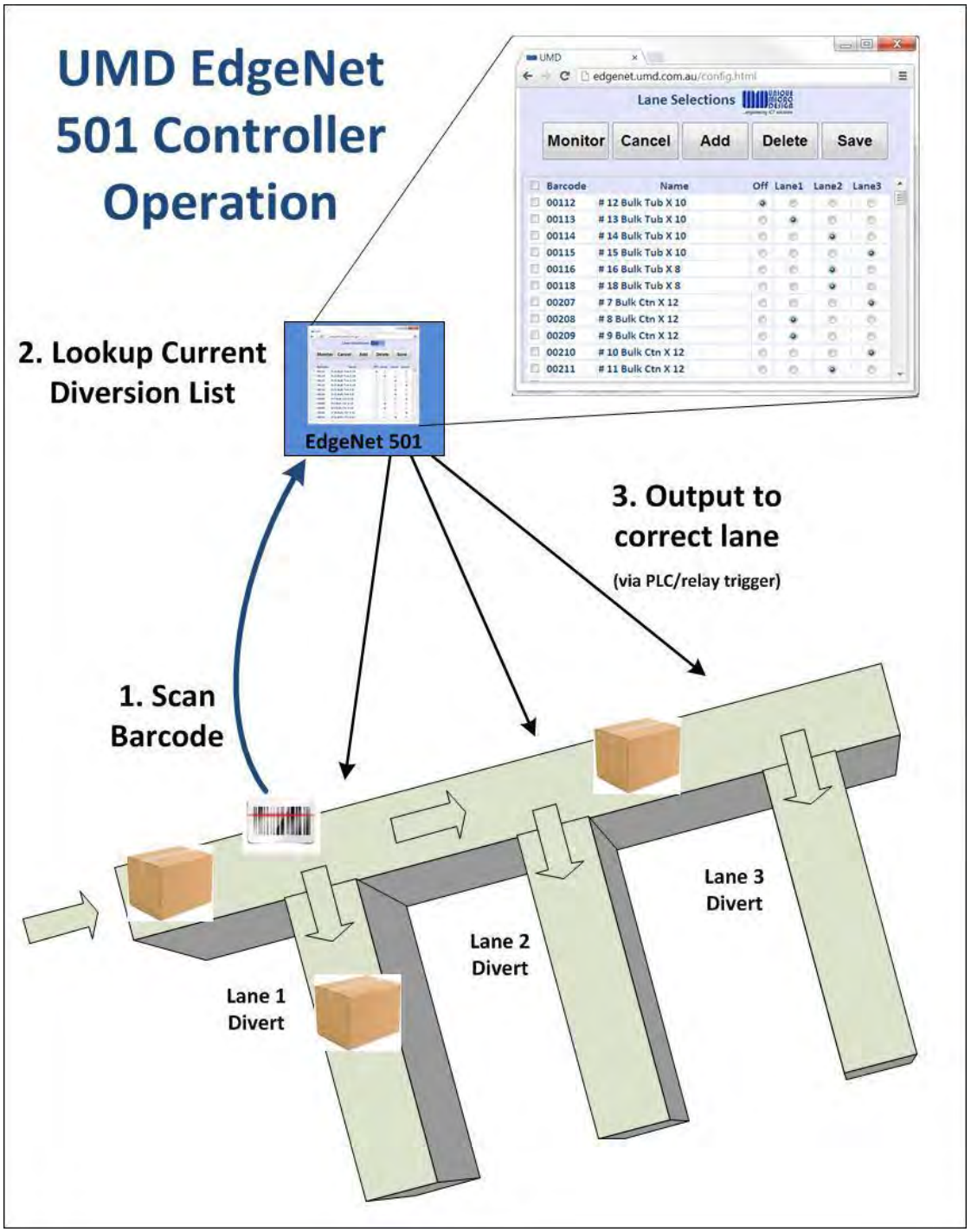
Hazeldene had already sourced 3 mechanical knock-off mechanisms, but needed a control system to automatically identify products via barcodes, and to trigger the mechanisms appropriately.

The Solution:

UMD's solution uses industrial barcode scanners from Sick to scan each product box as it comes down the line. The UMD 501 Controller, running the Edge.Net platform, receives the product code via Ethernet and then performs a lookup to determine which lane it should be diverted to.

This then drives the correct "knock off" mechanism that removes the product from the line, rather than having an operator do it.

Furthermore, the system allows a supervisor to configure the Edge.Net system on the fly from a standard web browser. This means changes as to which product goes down which lanes can be easily identified.


UMD EdgeNet 501 Controller Operation
UMD
edgenet.umd.com.au/config.html
Lane Selections
Monitor
Cancel
Add
Delete
Save
Barcode
Name
Off
Lane1
Lane2
Lane3
00112 # 12 Bulk Tub X 10
00113 # 13 Bulk Tub X 10
00114 # 14 Bulk Tub X 10
00115 # 15 Bulk Tub X 10
00116 # 16 Bulk Tub X 8
00118 # 18 Bulk Tub X 8
00207 # 7 Bulk Ctn X 12
00208 # 8 Bulk Ctn X 12
00209 # 9 Bulk Ctn X 12
00210 # 10 Bulk Ctn X 12
00211 # 11 Bulk Ctn X 12
2. Lookup Current Diversion List
EdgeNet 501
3. Output to correct lane
(via PLC/relay trigger)
1. Scan Barcode
Lane 1 Divert
Lane 2 Divert
Lane 3 Divert

Wireless Alert System- Peninsular Hot Springs

The Customer:

Peninsula Hot Springs Pty Ltd is the first natural hot springs and day spa centre in Victoria, located 90 minutes from Melbourne. The award winning facilities include a multitude of bath and spa experiences both indoor and outdoor, across the 42 acre site. On any given day hundreds of patrons enjoy the natural thermal mineral waters (including a hilltop pool and a cave pool). A full range of treatments and catering services are also provided on site.

The Requirement:

An existing alert system was in place which accommodated only 6 duress buttons located around the site and a simple light and buzzer in the first aid office. Due to expanding facilities, a more sophisticated and scalable system was required.

Additionally there was a requirement for staff to be notified if they were out of the office, anywhere on site at the time of an alert being triggered.

The Solution:

UMD's solution uses a combination of technologies to provide a simple but effective alert system, up to 30 transmitters with email and SMS notification capability.

UHF transmitters and receivers were chosen to transmit over long range through trees and buildings.

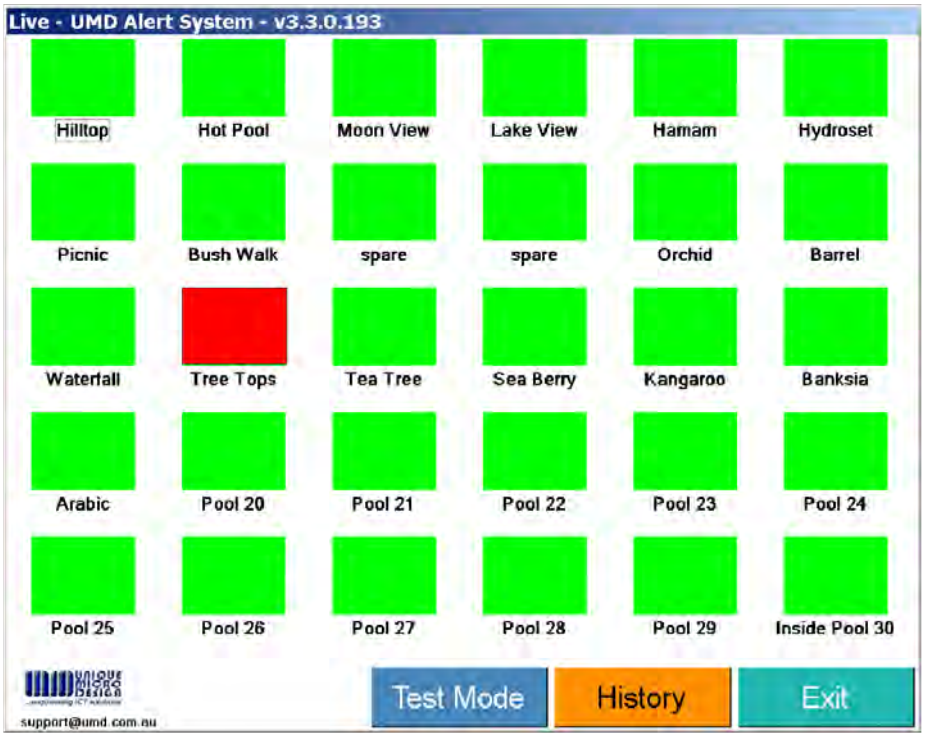
The receiver was combined with an Advantech touchscreen Panel PC, with UMD customised software positioned in the first aid room, which gave immediate and clear indication to Staff which alert had been triggered. Digital outputs from the PC triggered strobe light and buzzers, and logging of events and a Test feature were also provided to give the system maximum usefulness.

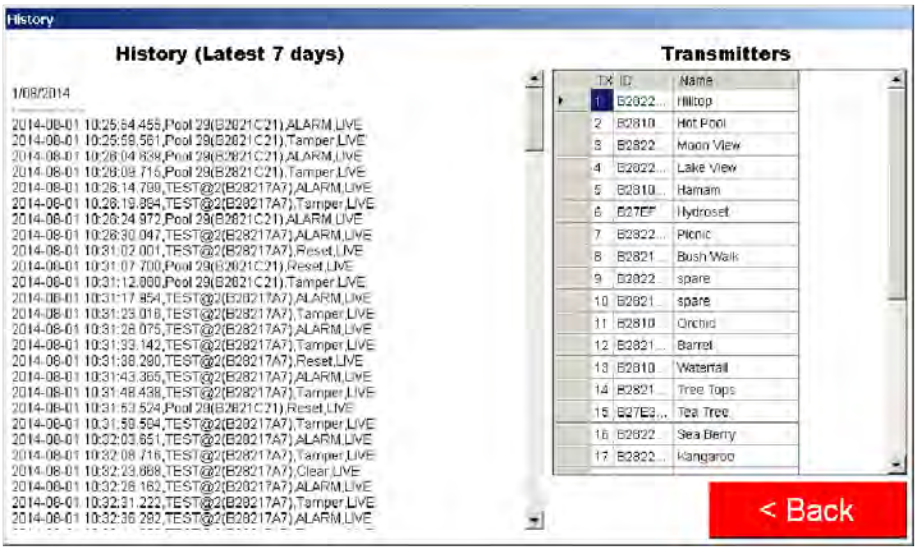
The system also leveraged the customer's existing email and internet to provide email and SMS alerts to designated first aid mobile phones, providing a message wherever staff are on site, giving the quickest possible response time.

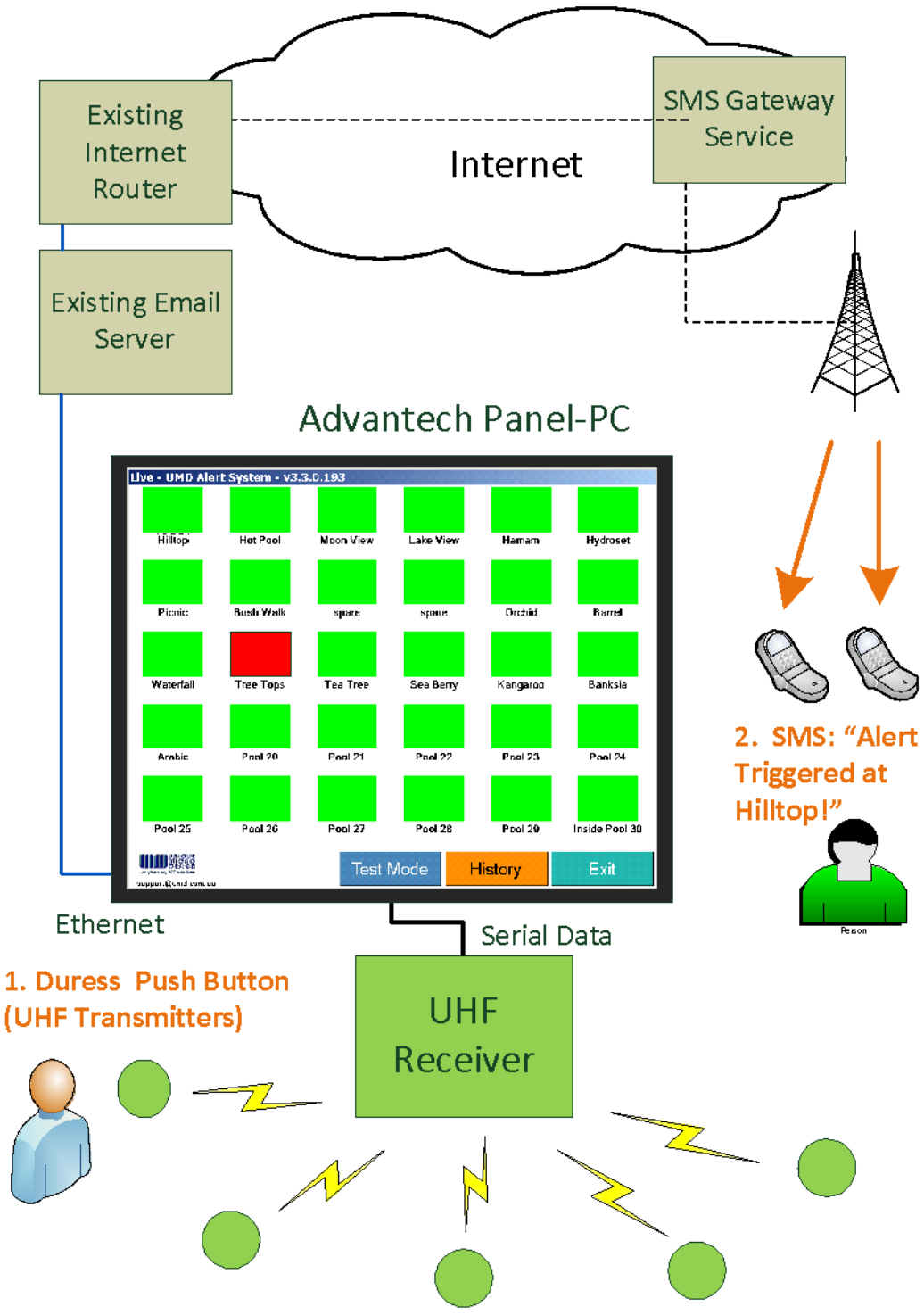
The Outcomes

Peninsula Hot springs has increased capability and confidence in being able to respond to any patron emergency or issue quickly.

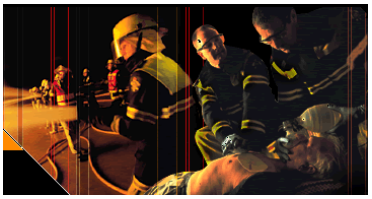
The software enabled transmitters to be added or changed as required and also to easily customise alert notifications (SMS and email destinations).






Existing Internet Router
Internet
SMS Gateway Service
Existing Email Server
Advantech Panel-PC
Live - UMD Alert System - v3.3.0.193
Hilltop
Hot Pool
Moon View
Lake View
Hamam
Hydroset
Picnic
Bush Walk
spare
spare
Orchid
Barrel
Waterfall
Tree Tops
Tea Tree
Sea Berry
Kangaroo
Banksia
Arabic
Pool 20
Pool 21
Pool 22
Pool 23
Pool 24
Pool 25
Pool 26
Pool 27
Pool 28
Pool 29
Inside Pool 30
Test Mode
History
Exit
2. SMS: "Alert Triggered at Hilltop!"
Person
Ethernet
Serial Data
1. Duress Push Button (UHF Transmitters)
UHF Receiver

Metropolitan Fire Brigade – RFID Based Total Apparel Management System



The Customer:

The Metropolitan Fire Brigade (MFB) (www.mfb.vic.gov.au) is a community safety organisation committed to providing world-class protection from fire and other emergencies in the greater city of Melbourne.

MFB firefighters work closely with diverse communities and identified at-risk groups of all ages, to promote community safety and coordinate emergency prevention and preparedness activities.

The MFB has consistently reported some of the fastest emergency response times and achieved the highest percentage of fire containment to room of origin among all other fire services in the nation. MFB firefighters also respond to specific medical emergencies under the Emergency Medical Response, First Responder program.

The MFB has over 1,600 career firefighters who provide community protection, education services and emergency response from 47 fire stations and specialist departments located throughout the city.

The Requirement:

MFB's uniforms are supplied and managed by the Australian owned *Stewart & Heaton Clothing Company* (SHCC) (www.shcc.com.au). Since its inception in 1991, SHCC has grown to become one of Australia's leading Protective Apparel and Apparel Service suppliers.

SHCC's focus is on two core businesses:

- Specialist Apparel for specialist end use applications
- Total Apparel Management (TAM)

It has developed considerable expertise in flame retardant fabrics and garments and has a major position in the fire services sector across Australia. Its commitment to local support and innovative e-commerce solutions has seen its TAM operations expand dramatically.

To enhance its market position, SHCC wanted to incorporate leading edge RFID tracking technology into its products, its first customer being the MFB. SHCC needed a system to manage, track and report on the complete life cycle of MFB garments and to integrate this into its existing management system.

This includes:

- A "Cradle to Grave" asset management solution
- The issuing of new uniforms including spares pools (incorporating RFID tags)
- The management and issue of uniforms to Officers
- A cleaning & repair process of uniforms & decontamination
- Officer reporting of service needs
- Complete reporting of all events and transactions
- The management of uniform returns and dispositions, including asset depreciation based on "life points", which takes into consideration process applied to asset (eg. Type of cleaning)

The Solution:

The Unique Micro Design (UMD) solution involved the development and supply of an RFID based tracking and management system based on the UMD-Edge™ Edgeware Application Development Platform. The solution consisted of:

Hardware

- High Frequency (HF) 13.56MHz ISO15693 compliant RFID laundry tags for insertion into apparel and uniforms.
- HF RFID Hand Readers with USB interfaces for tag reading, which are used at all reading points within the laundry process
- Industrial panel mount computer with touch screen interface for the laundry shop floor
- Mobile asset verifier based on GPRS based PDA with integrated RFID Reader

Software

- UMD-Edge™: Edgeware Application Development Platform. This is an Information and Communications Technology (ICT) development system based on a range of platforms and methodologies, which when combined with UMD's professional services, enables the rapid design, development and deployment of "edgeware" customer specific applications. It is particularly suited to managing devices at the edge of the enterprise such as intelligent sensor networks, RFID, barcode readers, actuators, sensors, interfaces and human interface terminals. UMD-Edge™ is based on next generation message management software and service oriented architecture (SOA) which moves data capture functionality from enterprise systems to locally based network devices.

Services

- Professional services – to customise UMD-Edge to specific needs
- Installation of equipment
- Hosting the UMD-Edge™ based apparel management software for access by MFB and SHCC over the internet
- Support and maintenance

The Outcome:

The UMD-Edge web based interface enables rapid deployment and easy use of the system with minimal training. IT investment by MFB and SHCC was kept to a minimum as UMD-Edge was provisioned as a hosted service and integrated into SHCC existing Navision ERP system. This allowed SHCC to deliver on their promise to MFB to supply Total Apparel Management.

"*The solution represented a significant rise in available data to the customer, which allows for timely & predictive decision making by both us and our Customer*"

Sean Underwood
Inventory & Systems Manager - Stewart & Heaton Clothing Co Pty Ltd

UMD Garment Tracking System has been installed in:

- Metropolitan Fire Brigade (MFB – Melbourne)
- Country Fire Authority (CFA – Victoria)
- Fire & Emergency Services Authority of Western Australia (FESTA)

Racing Victoria Ltd – RFID Reader for Horses

As of 2003, all thoroughbreds born in Australia require an RFID microchip to be inserted near its neck to assist with identification. As a consequence, equipment, techniques and systems needed to be developed to read these microchips. The traditional device to read the microchips was too large and obtrusive for the horses, causing them to stir. Racing Victoria was searching for a solution that would allow the microchip to be read without frightening the horse. UMD, in consultation with Racing Victoria developed the eMitt microchip reading solution.

Methodology

Over recent years UMD has developed expertise in RFID, particularly with animal tag readers and interfaces. UMD worked closely with Racing Victoria and Biowatch to develop a solution that best suited the requirements of the reading operation. Factors considered included the 'flighty' nature of horses on race day, the tendency for horses to rear and shift about whilst in a nervous state and the natural inquisitiveness of horses to anything unusual in their environment. Once UMD understood Racing Victoria's needs, it used its 'engineering ICT solutions' skills to develop a mobile RFID reader in the form of a glove called 'eMitt'.

A glove reader design was chosen due to its ability to be operated with both hands free, in turn removing the possibility of the reader dropping to the ground or being stepped on by the horse. With this novel design, the user wears the eMitt glove and strokes the horse. Once it passes over the embedded RFID microchip, it will read the unique identification number. This number is then wirelessly transmitted via Bluetooth to a mobile computer for processing.

Nuts and Bolts

The project took six months and four staff, from inception to rollout.

Outcomes and Benefits

Portable RFID readers are unobtrusive for the user and the animal and more efficient – identification is quicker and easier. The glove form provides safety benefits for both the user and animal as allows hands-free operation by the user. Additionally, it uses Bluetooth to transfer data to a pocket computer

Customer feedback

"Microchips are a great assistance to stewards in monitoring horse identification. On race day all that the stewards need to do is run the eMitt scanner on the horse's neck and its details will come up on the hand-held computer. When we get to the stage where it is accessible and easy for stable hands to use scanners, then down the track we might do away with branding.' Des Gleeson, Chief Steward, Racing Victoria.

Davies Collison Cave – RFID Document Tracking System

The Customer:

Davies Collison Cave (www.davies.com.au) is Australia's Leading Intellectual Property Legal practice. Intellectual property has the potential to be extremely valuable. In today's intensely competitive commercial environment with its shifting ground and unpredictability, it is essential to gain the best advice to secure and protect intellectual property effectively.
This applies not only to the traditional interpretation of intellectual property such as patents, trademarks and copyright, but encompasses a much broader, more diverse spectrum of areas that include everything from databases and domain names to medical breakthroughs and beyond.
Davies Collison Cave is unmatched in its ability to combine leading intellectual property law services with Australia's largest and most respected patent and trade mark attorney firm. They work openly, responsively and in close collaboration with their customers to ensure that, at every stage, an optimum commercial outcome is achieved

The Requirement:

Davies Collison Cave (DCC), as a large legal practice, has over 30,000 document wallets associated with customer patents and trademarks. These document wallets are stored in several locations, across several floors of the DCC building, typically on metal shelving.

Due to the critical nature of the documentation being stored, with such a large volume of documents and a large number of storage locations, DCC identified that logistically, enhancements were required within their business practices to help manage the storage and retrieval of these documents.

DCC wanted to incorporate leading edge RFID tracking technology to its library/document management, along with a system to manage, track and report on the location of these documents. The aim was to reduce the time spent by library staff in searching for requested files by ensuring they were stored in the correct location, and if not, provide a mechanism to quickly identify where a document may be located.

The Solution:

The Unique Micro Design (UMD) solution involved the development and supply of an RFID based document tracking and management system based on the UMD-Edge™ Edgeware Application Development Platform. The solution consisted of:

Hardware

- Alien Ultra Frequency (UHF) 920MHz EPC C1G2 compliant RFID paper tags for attachment to document wallets
- Intermec CN3/IP30 UHF RFID Portable Readers with WiFi interface for tag reading and user interface, connected to the UMD Document Tracking system (DTS).
- UMD Developed UHF RFID USB Pad reader, for connection to a PC operated by a legal secretary.

Software

- **UMD-Edge™**: Edgeware Application Development Platform. This is an Information and Communications Technology (ICT) development system based on a range of platforms and methodologies, which when combined with UMD's professional services, enables the rapid design, development and deployment of "edgeware" customer specific applications. It is particularly suited to managing devices at the edge of the enterprise such as intelligent sensor networks, RFID, barcode readers, actuators, sensors, interfaces and human interface terminals. **UMD-Edge™** is based on next generation message management software and service oriented architecture (SOA) which moves data capture functionality from enterprise systems to locally based network devices.
- Developed initially as a standalone system, the DTS was designed to allow future integration with DCC's own library management system, providing enhanced functionality to a system already familiar to users.
- The DTS was designed to allow users to stocktake areas, flag files as lost, find files, and provide a picklist for library staff to work from. Desktop RFID readers are used at workstations to track files from one legal partner to the next, providing full visibility and audit of file locations

Services

- Professional services – to customise UMD-Edge to specific customer needs
- Installation and configuration of equipment
- RFID Services – Tag testing, tuning, configuration and deployment
- Support and maintenance

The Outcomes:

The UMD-Edge Document Tracking system provides a standalone, web based interface which enables rapid deployment and easy use of the system with minimal training. A staged deployment program allowed DCC staff to adjust to the new technology, verify the integration of the necessary components as needed and produced an integrated document handling system.

Kmart Tyre & Auto Services – Ethernet Cash Drawer Solution

The Customer:

Kmart Tyre & Auto Service (KTAS) is a large automotive service company with many local stores around Australia providing easy-to-understand information, clear quotes, fast repair turnarounds and an industry-leading Nation-wide guarantee. Each store is run by a dedicated team of trained technicians and is an important part of the local community.

The Requirement:

The KTAS IT Support Team needed a way to allow for one cash drawer to be shared with up to six terminals at each of their stores, ensuring that all of the terminals were configured identically and not dependant on one of the terminals being a master to allow connection and control of the cash drawer.

The Solution:

Unique Micro Design (UMD) extended its range of cash drawer trigger modules to include an Ethernet version. The module used for KTAS is based on standard mounting hardware, which allows any of these trigger modules (M311 serial, M317 USB and M319 Ethernet) to be installed into the rear of standard sized cash drawers.

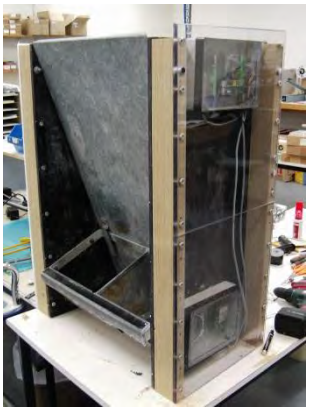
Factory configuration of this module ensures network security with each drawer given a specific IP address and a unique password. Connection is limited to 5 seconds, thereby enabling other terminals to connect as required. Configuration is enabled through a simple web browser interface, with a dedicated configuration username and password. Other security features are available, such as SSL, however these were not required in the KTAS environment.

The Outcomes

The KTAS Point Of Sale solution was simplified to allow cash drawer control directly from within their server interface only, providing more secure and reliable control of access to cash in store.
More than 250 Drawers over a 12-month period were supplied to individual KTAS and Coles Express stores as their IT infrastructure was upgraded.

Department of Primary Industry – RFID Pig Reader

The Customer:



The Victorian Department of Primary Industries (DPI) supports the agriculture, fisheries, petroleum, minerals, energy and forest industries in Victoria. DPI uses a collaborative approach to influence improvements in industry performance and to encourage the adoption of new technologies and development practices. It does this by using its expertise in science and technology to provide information and advice on the use and management of resources.

The Requirement:

The DPI wish was to investigate husbandry practices relating to pigs and in particular their feeding habits. In order to measure this, a mechanism was required to identify individual animals and time spent feeding.

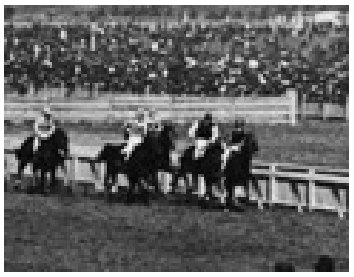
The Solution:

UMD recommended the use of low frequency RFID tags, as currently used in Cattle livestock tracking. UMD modified an existing pig-feeder (as supplied by DPI) and installed a UMD MP2084 LF RFID Reading Module, antennas, UMD Model 620 Controller with specialised synchronisation software and host computer interface. Special emphasis was made to ensure the robustness of the construction of the system, as pigs can be very destructive.

The Outcomes

The reading performance of the system was considered exceptional, given that up to 3 animals could be identified in the pig-feeder at any one time. The pig-feeder was designed to feed two pigs. The resulting system was also robust and sturdy.

Victoria Racing Club - Access Control



Unique Micro Design placed a non-conforming, alternative bid for the **Victoria Racing Club** access control system tender in early 2006. The VRC and their consultants immediately recognised the value of our proposal, which ultimately led to the successful development and deployment of the first generation UMD-VAST™ access control software (known by VRC as "AVID"). It has been used successfully ever since, including the 2006 and 2007 **Melbourne Cup Carnivals**.

The VRC venue is unique with its geographically large area, large number of turnstiles, high usage volume due to many entries *and* exits and many controlled zones.

UMD-VAST™ manages the complex ticketing structure and provides real-time data to the VRC event staff. One of the many immediate benefits has been the **greatly reduced waiting** time for member **queries** at the Race Day Office.

The infrastructure at the venue consists of fixed and temporary turnstiles, and Portable Data Entry units configured as "**Mobile Turnstiles**" operating over a **wireless network**.

BASS/AAMI Stadium - Access Control

BASS South Australia have been using the UMD-VAST™ solution at **AAMI Stadium** since the start of the 2007 AFL season. The **BASS ticketing system** is **interfaced to UMD-VAST™** using a **real-time web service** interface, enabling tickets to be sold at the ground to gain instant access. One of the reasons BASS chose UMD-VAST™ was its ability to interface to the existing turnstile infrastructure as well as their ticketing system. To be able to **interface** to any turnstile and **ticketing system** is a key feature of UMD-VAST™'.

The infrastructure at the stadium consists of fixed turnstiles and Portable Data Entry units configured as "Mobile Turnstiles" operating over a wireless network.

Summary of Access Control Installations

The UMD Venue Access Systems for Turnstiles (VAST) has been installed in the following major venues:

- Victorian Racing Club - Flemington (Melbourne, Australia)
- AAMI Stadium (Adelaide, Australia)
- Melbourne Racing Club - Caulfield (Melbourne, Australia)
- Moonee Valley Racing Club - Moonee Valley (Melbourne, Australia)
- Sydney Turf Club - Rosehill & Canterbury Racecourse(Sydney, Australia)
- Australian Jockey Club - Royal Randwick Racecourse (Sydney, Australia)
- Wenthworth Park – Greyhound Racing (Sydney, Australia)
- Dairy Farmers Stadium – Rugby (Townsville, Australia)
- Hindmarsh Stadium (Adelaide, Australia)
- Bangladesh Cricket Club (Bangladesh)
- Royal Melbourne Show (Melbourne, Australia)
- Parramatta Stadium - (Sydney, Australia)
- WIN Stadium (Sydney, Australia)
- Mystery Creek Exhibition Centre (Mystery Creek, New Zealand)
- 1300 Smiles Stadium (Townsville, Australia)
- Kalgoorlie-Boulder Racing Club (Kalgoorlie, Australia)
- Luna Park (Sydney, Australia)
- South Australia Jockey Club (Adelaide, Australia)

PMSI Group - Universal Turnstile Controller

The **PMSI Group** has used the Unique Micro Design, **designed** and **manufactured**, **Universal Turnstile Controller** in their range of Australian manufactured turnstiles, as used by the following venues over the last 15 plus years:

- AAMI Stadium
- ACER Stadium
- Aussie Stadium
- Australian Jockey Club (Randwick and Warwick Farm)
- Caulfield Racecourse
- Flemington Racecourse
- Melbourne Olympic Park
- Moonee Valley Racecourse
- Optus Oval
- Parameter Stadium
- Rod Laver Tennis Centre
- Royal Agricultural Society (Homebush) Showgrounds
- Royal Melbourne Showgrounds
- Sandown Racecourse
- Sydney Cricket Ground
- Sydney Turf Club
- Suncorp Stadium
- Telstra Stadium
- Vodafone Arena
- Westpac Stadium (Wellington)
- West Australia Cricket Oval
- WIN Stadium

The Universal Turnstile Controller is a **microcontroller** based module which resides within the turnstile housing and controls all aspects of its operation. The controller handles motor control, barcode image decoding, magnetic card reader interface, serial port for barcode scanner input and optically isolated RS485 serial communications. The firmware handles all its tasks in a mult-tasking environment, including implementation of the specialised, multi-drop communications protocol with the host.

An interesting customisation was to adapt the Universal Turnstile Controller to enable NSW State Rail Authority's **rail tickets** to be used for entry to the Royal Agricultural Show, NSW.

NHP Electrical Engineering Products – RF Warehouse

The Customer:

NHP Electrical Engineering Products Pty Ltd (www.nhp.com.au) are industrial switchgear and automation specialists. They have over 500 staff and offices throughout Australian and New Zealand.

The Requirement

As part of the construction of a new state-of-the-art National Distribution and Manufacturing facility based in Laverton, Victoria, NHP required the supply of an RF wireless network to compliment the new Warehouse management Software system being implemented. The new facility was designed to deliver even greater levels of service, responsiveness and inventory management to NHP customers and accordingly more accurate receiving, putaway and despatch functions were required. UMD's role was to supply and commission the RF wireless network to ensure coverage throughout the warehouse as well as providing adequate coverage and throughput to support the implementation of a Cisco IP phone system.

The Solution

UMD undertook a Professional Site Survey for the wireless LAN infrastructure to determine the most suitable locations for the access points to be mounted as well as the most suitable antenna types. The area was especially difficult to cover as an area above and below a metal mezzanine floor was needing coverage. Steel shelving and a low ceiling also presented additional obstacles to coverage.

Upon installation of the access points excellent coverage was achieved in all required areas with suitable redundancy in case of access point failure.

All equipment was configured and commissioned for NHP with UMD supporting the rollout of the equipment at the point of go live.

Equipment

- Intermec 2435 RF handheld scanners
- Intermec 2455 RF Vehicle Mount terminals
- Intermec PL4 wireless label printer
- Intermec PM4i Barcode label printers
- Intermec 1551 tethered barcode scanners
- Intermec 1553 tethered barcode scanners
- Cisco 1200 Access points

Summary of RF Warehousing Installations

Electronic Football Whiteboard – Champion Data

The Customer:

Champion Data is a privately owned Australian company providing sports statistics, analysis, research, content, and technology solutions to media and professional clients.

Their expertise is focused mainly on field sports such as cricket, soccer, rugby union, rugby league, and Australian Rules Football.

The Requirement:

Australian Rules Football Coaches currently use whiteboards to provide a visual representation of Player positioning and match ups.

Champion Data wanted to collect this information in real time, without having to key in the data, while maintaining the use of the Whiteboard visual effect.

The Solution:

UMD developed a special electronic whiteboard which uses iButton tags as players and fixed location readers (for player positions) A small microcontroller constantly polls these tags and outputs the positions via a USB computer interface.

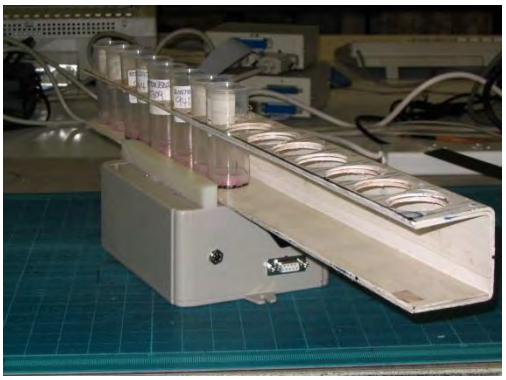
By simply moving the player positions (iButton tags) the system automatically recorded the change.

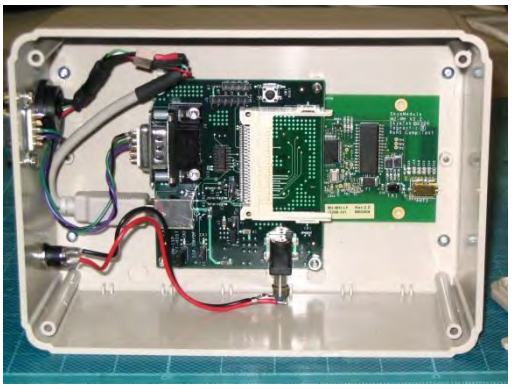
Champion Data then collects this data for processing.

The Outcomes

The Electronic Whiteboard worked as expected and was almost operationally identical to what coaches are used to.

Skyetek RFID Reader – Gippsland Herd Improvement





The Customer:

The Gippsland Herd Improvement (GHI) Co-operative provides a wide range of services to its customers across the Gippsland region, one of the major dairy areas in Australia. From about 3000 farms, Gippsland provides nearly a third of Victoria's dairy product and some 17.5 percent of the nation's milk.

The Requirement:

GHI use plastic Vials which have an embedded RFID tag in the base of the vial, for testing of milk products for quality control purposes. They have an existing HF (13.56Mhz) RFID reader to read these tags, however the existing reader will read multiple tags as they are passed over the reader, hence making it difficult to determine which tag is read and in which order.

GHI have designed a vial holder and are looking to pass this over a focused RFID reader so that only one tag can be read at a time.

The requirement was to provide a replacement RFID reader which would only read single tags at a time

The Solution:

UMD constructed a pad reader which used a Skyetek RFID board and interface module. The RFID module chosen was the "M2" module which has an on-board antenna and very low power output. This reader is only capable of reading one tag at a time over a very short distance and area using the on-board antenna. This was perfect for restricting the coverage area of the RFID signal, and was completely compatible with the existing RFID tags.
The M2 module was mounted in a small enclosure with an interface board and guide rails were installed to provide the vial container with a defined route for consistent successful reading.

Multi-Lane LF RFID Reading System – Wagga Sales yard

The Customer:

The Wagga Wagga Livestock Marketing Centre (located in Wagga Wagga NSW) is the premier livestock market in Australia. Established in 1979, it has since led the way in the selling of Livestock for over 20 years.
Each year about 1½ million sheep and 130 000 cattle are sold through the Centre.

The Requirement:

The Wagga Wagga Livestock Marketing Centre had originally installed RFID readers to meet their regulatory obligations to collect cattle RFID tag data, and transfer this data to the National Livestock Identification System (NLIS) (https://www.nlis.mla.com.au/). A total of eight lane readers were installed to read cattle tags as the cattle were transferred from sorting pens to the sale pens. Each lane reader consisted of four RFID panel readers. To date, the system had proven unreliable, as they had been unable to consistently read RFID tagged cattle on their first pass through. This resulted in costly delays as cattle had to be rescanned.

The Solution:

After a site visit by UMD Design Engineer, Alan Walker, it was clear why the system had experienced problems. The combination of undesirable antenna placement within the saleyard structure and the complexities of an intricate system of gates and fences provided multiple pathways for signals from panels to interfere with each other.
The resulting solution involved the custom design and manufacture of a synchronisation interface and controller to coordinate all 32 panels simultaneously thus eliminating the interference.

The Outcomes

The installed system has resulted in near 100% read rates and an ecstatic response from the Operations Manager which solicited the following customer feedback:

"I can't praise or recommend your company and work highly enough"
Paul Martin, Manager Wagga Wagga Livestock Marketing Centre.

UMD Project Design Experience

Some examples of **design project work** that we have performed include:

- Design and manufacture production monitoring systems for carpet weaving mill
- Design and manufacture of low volume flow meter for ACI glass
- Design and manufacture of digital pressure gauges
- Design and manufacture of warehouse data collection terminals for David's and Franklin's warehouses.
- Design and manufacture of turnstile controllers. (eg used at the Sydney Olympics)
- Design and manufacture of drivers licence engraving system (NSW Drivers Licence Project)
- Design and manufacture of remote vibration monitor system for use in predictive maintenance system developed by Monash University.
- Design and manufacture of various barcoding to host computer interfaces (OEM to Datalogic and Sick)
- Design and manufacture of Cattle Drafting System
- Design and manufacture of Hand Held RFID Reader for equine industry
- Design and manufacture smart card based loyalty terminal
- Design & Manufacture production monitoring system for Carpets
- Design & Manufacture industrial kiosk to dispense water and web based real time monitoring system.
- Design & Manufacture RFID RACE portals
- Design & Manufacture micro RACE controller (chip based solution)
- Design & Manufacture Battery Eliminator for Handheld brand tablet

UMD Hardware Product Design Experience

UMD also has an extensive range of fixed and mobile terminals devices which have been developed to meet a variety of market requirements. Many of these products are modified to meet customer specific requirements. (Only current models shown)

UMD Standard Product Models:

- UMD Model 125 Computer Cash Drawer
  http://www.umd.com.au/itd/products/m125.html
- UMD Model 153 RS232 to RS422/485 Converter
  http://www.umd.com.au/itd/products/m153.html

- UMD Model 154 USB to Serial Converter
  http://www.umd.com.au/itd/products/m154.html
- UMD Model 211 Custom Industrial Terminal
  http://www.umd.com.au/itd/products/m211.html
- UMD Model 250 Custom Industrial Keyboard
  http://www.umd.com.au/itd/products/m250.html
- UMD Model 264 Custom POS Keyboard
  http://www.umd.com.au/itd/products/m264k.html
- UMD Model 265 Custom POS Keyboard
  http://www.umd.com.au/itd/products/m265.html
- UMD Model 280 Serial Terminal Wedge Interface
  http://www.umd.com.au/itd/products/m280.html
- UMD Model 301 ProtoLink Controller
  http://www.umd.com.au/itd/products/umd_m301.html
- UMD Model 315 Kitchen Printer Buzzer Interface
  http://www.umd.com.au/itd/products/m315.html
- UMD Model 316 RS232 Cash Drawer Trigger Module
  http://www.umd.com.au/itd/products/m316.html
- UMD Model 317 USB Cash Drawer Trigger Module
  http://www.umd.com.au/itd/products/m317.html
- UMD Model 330 Custom Wall Mount Terminal
  http://www.umd.com.au/itd/products/m330.html
- UMD Model 331 Custom Desktop Terminal
  http://www.umd.com.au/itd/products/m331.html
- UMD Model 335 Custom Desktop Terminal
  http://www.umd.com.au/itd/products/m335.html
- UMD Model 363 Multi-Serial/Keyboard Wedge I/F
  http://www.umd.com.au/itd/products/m363.html
- UMD Model 363 Keyboard Wedge Interface
  http://www.umd.com.au/itd/products/m364.html
- UMD Model 366 Serial to USB HID Interface
  http://www.umd.com.au/itd/products/m366.html
- UMD Model 490 Custom Industrial Terminal
  http://www.umd.com.au/itd/products/m490.html
- UMD Model 620 PXA Controller
  http://www.umd.com.au/itd/products/umd_m620.html
- UMD Model 631 iButton Reader with Bluetooth I/F
  http://www.umd.com.au/itd/products/umd_m631.html
- UMD Model 641 RFID Horse Identify Verifier
  http://www.umd.com.au/itd/products/umd_m641a02.html
- UMD Model 652 RFID UHF Desktop USB Reader
  http://www.umd.com.au/itd/products/umd_m652.html
- UMD Model 654 RFID Wall Mount Pad Reader
- UMD Model 690 RFID ActivFrame
  http://www.umd.com.au/itd/products/umd_m690.html
- UMD Model 710 Vehicle Access Controller
- UMD Model 711 RFID Gun Safe / Logger
- UMD Model 730 Intelligent RFID UHF Reader
- UMD Model 740 BLE Portal Reader
- UMD Model 780 Marketing Redemption Terminals
- UMD Model 782 Electronic Voucher Terminal

UMD Standard PCB Interface Product:

- UMD Model MP1040 301 I/O Expansion Board
  http://www.umd.com.au/itd/products/umd_mp1040.html
- UMD Model MP1281 Temperature Monitoring System
  http://www.umd.com.au/itd/products/mp1281.html
- UMD Model MP2065 Wheatsone Bridge Interface
  http://www.umd.com.au/itd/products/mp2065.html
- UMD Model MP2069 EV Barcode Scanner Interface
  http://www.umd.com.au/itd/products/mp2069.html
- UMD Model MP2096 USB 6 Port I/O Controller
  http://www.umd.com.au/itd/products/mp2096.html
- UMD Model MP2100 EA Barcode Scanner Interface
  http://www.umd.com.au/itd/products/mp2100.html
- UMD Model MP2150 Game Controller
- UMD Model MP2180 Ethernet Cash Drawer Interface
- UMD Model MP3050 NFC Antenna Line Extender
- UMD Model MP3060 Arduino RFID Shield
- UMD Model MP3070 Raspberry Pi Power PCB
- UMD Model MP3080 Battery Eliminator

UMD Standard Assemblies (Reference Designs):

- UMD Model A100 Series – RFID Tunnel Reading Portal
- UMD Model A110 Series – RFID Antenna Mounting Assy
- UMD Model A120 Series – RFID Readers Assemblies
- UMD Model A123 Series - RFID Control Box
- UMD Model A130 Series – Charging Bay Assembly
- UMD Model A200 Series – RFID Mounting Frame
- UMD Model A240 Series - Bus Ticket Validator
- UMD Model A250 Series – RACE Reader
- UMD Model A290 Series - Panel Mount Display
- UMD Model A320 Series - Denso QK3x Desk Mount
- UMD Model A330 Series - Moulded Silicon Terminal Pouch
- UMD Model A340 Series - NFC Phone Antenna Extender
- UMD Model A360 Series - DIN Control Box

UMD Software Product Design Experience

UMD Software Development team are proficient at developing software solutions incorporating complex protocols and communications. Such experience is a direct result of hardware and embedded systems design which demand in depth understanding of protocol and interface issues. (Following standard software products are also current)

- Cardgate: Credit Card Transaction Payment Gateway
  http://www.cardgate.net/

- UMD-EDGE: Edge Device Management Platform http://www.umd.com.au/itd/products/umd_edge.html
- UMD-VAST: Venue Access System for Turnstiles http://www.umd.com.au/itd/products/umd_vast.html
- UMD Model S143 ProtoLink Programming Utility http://www.umd.com.au/download.html
- UMD Model S180 EFLink EFTPOS Interface S/W http://www.umd.com.au/itd/products/s180.html
- UMD GST – RFID Garment Tracking System
- UMD DTS – RFID Document Tracking System
- UMD-RATS – RFID Returnable Asset Tracking System
- ASTUTE – Web based RFID asset management System. http://www.myastuteasset.com.au/
- UMD-IPAS – Integrated POS and Access System
- UMD-VPP – Virtual Play & Pay, mobile event entry and cashless payment system
- UMD-HTS – Hosted Ticket Sever

RFID Solutions

- Over 15 years' experience in RFID technology
- Metropolitan Fire Brigade (uniform tracking)
- Country Fire Authority (uniform tracking)
- Davies Collison Cove (IP Lawyers) Document Tracking
- Design and development of fixed RFID Low Frequency readers for Cattle
- Design and development of hand held RFID Low Frequency readers for horses
- Performed many "proof of concept " trials
- RFID tracking of Forklift Tucks
- RFID Fixed Readers for Pigs
- Design and development of Low Frequency Antennas
- UMD-RATS – RFID Returnable Asset Tracking System
- ASTUTE – Web based RFID asset management System. http://www.myastuteasset.com.au/
- Design and development of RFID turnstile readers for Luna Park Sydney
- Design and development of RFID active frames
- UMD-dQue – mobile entry and cashless payment system

Major roll-outs of equipment

- Australia Post – 4500 cash drawers, cables and printers
- Spotlight stores – Point-of-sale equipment Australia Wide
- Tandy Electronics –Australia Wide
- KFC & Hungry Jacks – Australia Wide POS
- Mobil Service Stations – Australia Wide POS
- Symbion Pharmacies – Warehouse (National)
- Symbion Pharmacies – RFID (National)
- Kodak (Klikk stores) – Australia Wide POS
- Witchery – Australia Wide POS
- VicGrain – Victoria 15 sites in 2 weeks

UMD Press Releases & Projects

Mazda Zoom Zooms with UMD!
As part of Mazda's development of its new 20,000 square metre spare parts warehouse in Somerton Victoria, UMD has supplied and installed infrastructure consisting of Intermec CK3 wireless hand held terminals, Intermec PB50 portable printers, Aruba Networks redundant wireless controllers and access points, UMD custom multi-device charging bay and all electrical and data services.

Parramatta Stadium, home to the **NRL Eels**, has stepped up to the benefits of the UMD-VAST patron access control system. We wish the stadium a happy 25th Anniversary!

In the swim: *UMD VAST™* was implemented just in the nick of time to allow the public to attend the 2012 Australian Swimming Championships at the South Australian Aquatic and Leisure Centre in Adelaide. Here UMD VAST(tm) is connected to Ticketek's ticket issuing system.

Fun and games: The City Of Unley in Adelaide use the UMD-IPAS system(Integrated Point of sale and Access control System) to provide their aquatic centre with an integrated ticketing, access control and point of sale system. Kaba Australia provided the swing gates.

Get your Showbag: The *Royal Melbourne Show* used UMD VAST™ for efficient patron access control for the first time this year. The society appreciated the real time reporting and smooth integration with their ticketing provider Ticketek.

Boosting visitor interest and involvement with exhibitors: ***UMD's RFID-ActiveFrame*** made its debut at the Australian Direct Marketing Association (ADMA) forum at the Sydney Convention Centre on 16 & 17 August 2011 as part of **Centryc Solution's** Customer Interaction Management service.

The ***RFID-ActiveFrame*** incorporates two contactless RFID readers, WiFi communications and a software customisable embedded controller behind a versatile A4 poster clip-frame. The frame was used to display printed marketing collateral encouraging registered users to record their interest in a particular stand by touching an RFID wristband against defined areas on the frame.

The system works by transmitting in real-time the ID of the wristband via WiFi wireless communications to Centryc's internet based service which, for example, prompts users via SMS to visit a random selection of stands.

Edgeware at Luna Park: UMD was a pivotal "edgeware" technology partner for the iconic *Luna Park* Sydney's "My Experience" interactive entertainment initiative as launched on Saturday, 2 July 2011. UMD provided the "eyes and ears" to the *Centryc Solution* marketing platform which formed the basis for the initiative. UMD provided its new range of RFID Pad Readers to read the *RFIDnPrint* supplied contactless wristbands.

It also developed custom technology and middleware to seamlessly interface to the legacy back office access system and provide mobile kiosk M2M communications. Read the Luna Park press release for further detail.

Aussies at Bangladesh: UMD have supplied *Honeywell Singapore* a patron access control system comprising *UMD-VAST™* software, mobile computers and custom turnstile electronics for the *Bangladesh Cricket Board*. This was installed for the 2011 World Cup Cricket in preparation for the ICC Cricket World Cup 2011. See here for details.

UMD at the races: The *Australian Turf* (nee *Sydney Turf Club* and *Australian Jockey Club), Melbourne Racing, Moonee Valley Racing* and *Victoria Racing clubs* all use UMD VAST™ to manage patron access.

Edgeware watches the washing:
Stewart & Heaton Clothing Company selects UMD to deliver RFID track and trace system based on *UMD's Edgeware Application Development Platform* for their MFB supply contract. **Details...**

Warehouse mobility:
Symbion Pharmacy Services have selected UMD for the implementation and upgrade of their Warehouse Distribution Centers in Melbourne, Adelaide and Perth, utilising the Intermec CK31 Mobile Terminal and Cisco Network Infrastructure.

10. Sales Terms and Conditions

Unique Micro Design Pty Ltd A.C.N. 007-419-490 ("UMD") agrees to supply the Customer Goods and Services including UMD Customised goods and services subject to the terms and conditions set out below. The Customer in placing an order with UMD for any goods and/or services specified on the order agrees to the said terms and conditions.

Customisation

1. Any customised goods and services are developed by UMD to meet customer specific requests. These developments include, but are not limited to:
(a) modification of existing product (hardware, software or firmware)
(b) development of new product (hardware, software or firmware)
(c) packaging design, including cosmetic (eg colour) and Customer specific graphic elements (e.g. logo)

Placement of orders

2. The Customer shall order Customised goods and services from UMD in writing. The order shall specify:
(a) The date of the placement of the order;
(b) The goods and services ordered;
(c) A preferred delivery date for the goods;
(d) Prices;
(e) For goods shipment, courier details (UMD's or Customer nominated).

Declining Order

3. UMD may decline to accept any order received from the Customer.

Cancellation of orders

4.1 If the Customer requests UMD to cancel or postpone delivery of an order for goods or services, UMD may agree to the requested cancellation or postponement if the Customer pays UMD a cancellation/postponement fee for all direct or indirect losses or expenses that UMD has suffered as a result of the cancellation or postponement including without limitation:
(a) the costs and expenses incurred by UMD in processing the order up to the date that UMD receives the Customer's request for cancellation or postponement of the order;
(b) moneys paid or payable by UMD to third parties for goods or services ordered and/or received from third parties on behalf of the Customer for the purpose of fulfilling the order;
(c) any penalties or cancellations or other fees payable to third parties for cancellation and/or postponement of delivery for goods or services ordered by UMD on behalf of the Customer;
(d) any claims for losses or expenses made by third parties from UMD for cancelled or postponed order of goods or services ordered on behalf of the Customer;
(e) pre-production and production costs incurred by UMD up to the date it receives the request for cancellation or postponement of the order.
4.2. UMD shall be entitled to cancel or suspend an order for goods or services, without liability to the Customer, by giving the Customer written notice.

4.3 UMD shall not be liable in any way for loss or damage (including loss of trade or profit and economic loss) incurred by the Customer in the event that delivery or supply of the goods or service ordered is frustrated or delayed by, strikes, riots, disasters, trade disputes, acts of restraint of Governments, the imposition of export restrictions, default of suppliers and sub-contractors unavailability or shortage of supply of components used in the manufacture of the goods or any other circumstances beyond the reasonable control of UMD.

Packing of Goods

5. UMD shall ensure goods are safely and securely packed for transportation to the Customer having regard to:
(a) The fragility of the goods;
(b) The distance the goods are likely to travel; and
(c) The method of transportation used to transport the goods.

Delivery of Goods
6. Delivery of goods shall be ex UMD's premises. UMD shall notify the Customer if required when the goods are available for collection by the Customer or the Customer's nominated carrier from UMD's premises. If requested by the Customer, UMD can arrange delivery to the Customer's address by UMD's carrier. The cost of delivery of the goods and of any special packing and packing materials used in relation to the goods shall be at the Customer's expense, notwithstanding that such costs may have been omitted from any original quotation by UMD.

Missing Goods
7. The Customer shall notify UMD within five (5) working days of delivery of the goods to the Customer of any missing items from the shipment.

Loss or Damage in Transit
8. UMD is not responsible for any loss or damage:
(a) to the goods during loading and unloading of the goods by the carrier or the Customer, whilst the goods are in transit;
(b) suffered by the Customer due to a delay in delivery of the goods by UMD's nominated carrier or the Customer's nominated carrier.
Freight insurance for loss and damage to the goods during loading/unloading and whilst in transit or otherwise is the responsibility of the Customer. UMD shall at the Customer's request provide the Customer with copies of all documents evidencing proof of collection by the nominated carrier.

Payment
9.1 Unless the Customer has been granted credit facilities by UMD, payment terms in respect of each order are strictly Cash Before Delivery ("CBD"). For CBD Customers, UMD shall issue the Customer with a tax invoice upon delivery of the goods.

9.2 To apply for credit facilities with UMD the Customer must complete a *UMD Trading Account Application Form*. The granting of credit facilities to the Customer and the determining of payment terms and limit of credit to the Customer is at the sole discretion of UMD and will be confirmed in writing. UMD reserves the right to cancel credit facilities granted to a Customer without notice and for any reason whatsoever.

9.3 Where credit facilities have been granted by UMD to the Customer, UMD shall invoice the Customer for goods and services delivered and the Customer shall pay each invoice issued within the trading terms as agreed in writing.

Price
10.1 The price of the goods shall be the price published in UMD's published price list issued from time to time by UMD unless the parties have agreed otherwise in writing.

10.2 Unless otherwise stated, all prices quoted by UMD are exclusive of Goods and Service Tax (GST). The cost of the GST will be included in the invoice total.

Intellectual Property Rights
11.1 Intellectual Property Rights means all intellectual property rights including:
(a) patents, copyright, rights in circuit layouts, registered designs, trade marks and the right to have confidential information kept confidential; and
(b) any application or right to apply for registration of any of those rights.

11.2 This agreement does not transfer to Customer any intellectual property rights in the Customised Product, except in licence granted in clause 11.3
11.3 Where the Customer provides intellectual property, which is incorporated into the Customised Product, UMD grants an exclusive licence to distribute the Customised product by the Customer. Specifically UMD:

(a) must supply, where possible, Customised product to Customer
(b) grants to Customer an exclusive licence to Distribute including the ability to sub-distribute the Customised product.
(c) grants Customer ability to Assign these rights to a third party
11.4 UMD is not restricted in developing similar or same Customised products provided;
(a) Customers confidentiality is not breached
(b) Customer's Intellectual Property is not used.

Ownership of Goods
12.1 Ownership of the goods only passes to the Customer when UMD has been paid in full by the Customer in cash, bank cheque or cleared bank funds. Until such payment is made by the Customer to UMD for the goods, the relationship between the parties is a fiduciary relationship and the Customer holds the goods as bailee and is authorised by UMD to sell the goods in the ordinary course of its business. The Customer shall pay the proceeds of the sale into a identifiable bank account and keep separate sales records of the said goods, pending payment to UMD for the goods.

12.2 If payment for the goods is not received by UMD within seven (7) days of the due date, or the Customer becomes insolvent, the Customer licences UMD or its agent to enter any premises owned, occupied, leased or controlled by the Customer or any associated company or agent to repossess the goods. UMD shall apply towards satisfying the outstanding indebtedness of the Customer to UMD;
(a) the value of any goods repossessed; or
(b) if the repossessed goods are sold by UMD, the proceeds of sale less the cost of repossession (including legal costs on a solicitor/client basis) and sale.

Passing of Risk
13. Risk of loss or damage of the goods shall pass to the Customer upon delivery of the goods to the Customer or his agent.

Returned Goods
14.1 The Customer must obtain a Return Authorisation Number (RAN) from UMD before returning any goods to UMD for credit or repair or replacement. The RAN must appear on the packing boxes of the goods being returned.

14.2 Goods may not be returned for credit to UMD without written prior consent of UMD. UMD may grant its consent for the return of goods for credit requested by the Customer subject to conditions including the payment by the Customer to UMD of a re-stocking fee. UMD in calculating the amount of the re-stocking fee shall have regard to the following:
(a) When the original goods had been invoiced to the Customer;
(b) The condition of the returned goods including the original packing and merchandisability; and
(c) Whether the goods are part of UMD's product range or have been specifically procured or manufactured for the Customer.

Warranties
15.1 The benefits conferred by the warranties set out in sub-clause 15.2 below are in addition to all other rights and remedies that the Customer has in respect of the goods and services under the Trade Practices Act 1974 (Cth) and similar laws of the states and Territories of the Commonwealth of Australia and any other laws applicable to these terms and conditions which may not be modified or excluded.

Goods
15.2 UMD warrants the goods manufactured and supplied by UMD to the Customer are free from defects in material and workmanship of the period specified in the UMD Equipment Service and Maintenance Policy.

15.3 The warranty referred to in sub-clauses 15.2 does not extend to or include:
(a) defects that have been caused by misuse, mishandling, neglect, adjustments, damage caused by accident, non adherence to operating and maintenance instructions and/or improper voltage;

(b) failure resulting from use of the goods under arduous or unreasonable climatic or operating conditions.
(c) the goods have been serviced by unauthorised personnel;
(d) failure resulting from installation errors or incorrect installation procedure;
(e) failure caused by consumables not complying with manufacturer's recommendation or acceptable industry standards;
(f) goods that have had identification marks and numbers altered or removed;
(g) paper jams in printers;
(h) normal maintenance and service adjustment as part of goods operating instructions;
(i) Consumables. This includes, but not limited to, the following items: belts, cathode ray tubes, diskettes, lamps, laser tubes, lenses, magnetic heads, print ribbons, print heads, protective stationary and windows;
(j) goods that have been returned to UMD in inadequate or unsuitable packaging.

15.4 UMD does not warrant that where the goods comprise of or include software that the software will be completely error free.

15.5 Warranty repairs of goods shall be undertaken by UMD or on its behalf by an Authorised Service Centre in accordance with the UMD Equipment Service and Maintenance Policy.

15.6 The Customer can purchase from UMD hardware maintenance, such as extended warranty, for the goods. The hardware maintenance terms and conditions are contained in the UMD Equipment Service and Maintenance Policy.

Services
15.7 UMD warrant that the service will be rendered with due care and skill and that any material supplied in connection with those services will be reasonably fit for the purpose for which they are supplied.

15.8 UMD give no express warranties other than those set out in clause 15.2 above and the UMD Equipment Service and Maintenance Policy.

15.9 Except where:
(a) conditions or warranties are implied into these terms and conditions for the supply or services by UMD to the Customer, by the Trade Practices Act 1974 (Cth), other similar laws of the state and Territories of the Commonwealth of Australia or any other applicable laws; and
(b) such implied conditions or warranties cannot lawfully be excluded.

UMD excludes all implied condition and warranties, including, but not limited to, implied conditions or warranties with respect to merchantability or fitness for particular purpose.

Fitness for Purpose
16 Given the complexities of developing customised goods or services, no fitness for purpose is provided by UMD. It is therefore the responsibility of the Customer to:
(a) verify the customised goods or services meets their functional requirements; and
(b) establish their merchantability and fitness for the purpose of the customised goods or service.

Limitation of Liability
17.1 Subject to the provisions of clause 17.2 and where such limitation of liability is not prohibited or avoided by the Trade Practices Act 1974 (Cth) as amended, other similar laws of the States and Territories of the Commonwealth of Australia or any other applicable laws the liability of UMD or:
(a) any breach of any implied or express conditions and warranties (other than implied conditions and warranties as to title, encumbrances and quite enjoyment of the goods supplied by UMD); and/or
(b) any loss or damage (including economic loss and special and consequential damages)
arising out of or in relation to the supply of any goods or services by UMD to the Customer shall be limited, at UMD's option to any one or more of the following:

(a) in the case of goods -
(i) the replacement of the goods or the supply of equivalent goods;
(ii) the repair of the goods;
(iii) the payment of the cost of replacing the goods or of acquiring equivalent goods;
(iv) the payment of the cost of having the goods repaired; or
(b) in the case of services -
(i) the supplying of the services again; or
(ii) the payment of the cost of having the services supplied again.

17.2 The Customer agrees that to the extent that such liability may be limited under the Trade Practices ACT 1974 (Cth) as amended, other similar laws of the states and Territories of the Commonwealth of Australia or and any other applicable laws, UMD shall not be liable for any special, direct or indirect incidental and/or consequential damages or loss including but not limited to economic loss, loss of use of goods or loss of data or information of any kind arising out of the supply of the goods and/or services or the negligence of UMD, its employees or agents or however otherwise caused or failure of the goods to work or perform in any way or any liability to End Users, Dealers or third parties except as set out in clause 17.1.

Customised and Development Work

These additional terms and conditions apply to any work that incorporates development of any intellectual property by UMD.

Customisation
1.0 Customised goods and services are developed by UMD to meet customer specific requests. These developments include, but are not limited to:
(a) modification of existing product (hardware, software or firmware)
(b) development of new product (hardware, software or firmware)
(c) packaging design, including cosmetic (eg colour) and Customer specific graphic elements (e.g. logo)

Intellectual Property Rights
2.0 Intellectual Property Rights means all intellectual property rights including: patents, copyright, rights in circuit layouts, registered designs, trade-marks and the right to have confidential information kept confidential; and any application or right to apply for registration of any of those rights.
2.1 This agreement does not transfer to Customer any intellectual property rights in the Customised Product, except in licence granted in clause 2.2
2.2 Where the Customer provides intellectual property, which is incorporated into the Customised Product and provided UMD has accepted and acknowledges the use of Customer's intellectual property, which is to be incorporated into the UMD developed product, then, UMD shall grant an exclusive licence to distribute the Customised product by the Customer. Specifically, UMD:
(a) must supply, where possible, Customised product to Customer
(b) grants to Customer an exclusive licence to distribute including the ability to sub-distribute the Customised product.
(c) grants Customer ability to Assign these rights to a third party
2.3 UMD is not restricted in developing similar or same Customised products provided;
(a) Customers confidentiality is not breached
(b) Customer's Intellectual Property is not used.

Fitness for Purpose
3.0 Given the complexities of developing customised goods or services, no fitness for purpose is provided by UMD. It is therefore the responsibility of the Customer to:
(a) verify the customised goods or services meets their functional requirements; and
(b) establish their merchantability and fitness for purpose of the customised goods or service.

Appendix – Product Information