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# Digital Switchover

Migration for regional/remote sites from analogue to digital MATV

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## *1. Introduction*

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### *1.1 Smart Group Australasia*

Smart Group Australasia Pty Ltd is a privately owned company which was established in 1995.

The company operates two divisions; Avionics & Calibration Services (ACS) and Mining and Resources Communications (MARCOMM).

The company is approved by SGS Quality Assurance to AS/NZS ISO 9001:2008 Quality Management System standards.

MARCOMM is a communications service company which provides sales, service and installation of a wide range of communications equipment and systems with a prime focus on providing communications support to both offshore and onshore mining and resource companies based in Australia. Our capabilities also allow us to also respond to the communications requirements of other local companies and government organisations.

ACS services the regional and general aviation industry in Western Australia providing all facets of avionics support, both aircraft and industrial instrument repair and calibration, aircraft battery maintenance and galley equipment repair from its Perth and Jandakot Airport operations.



### *1.2 Proposal*

With the Digital Switchover from analogue to digital TV, all locations in Australia will no longer have Free to Air TV operating in their locations unless they have made the switch to digital TV infrastructure. More channels will now become available to remote locations and the opportunity exists to plan a coordinated strategy to install one cost effective solution. In conjunction with the digital switchover is the release of the next generation of MATV equipment that brings the ability to reduce maintenance and faults to a negligible level. This proposal explains the switchover procedure, the time frames and the solution to lowering costly site visits and down time for MATV systems.

## *2. Digital Switchover*

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The Digital Switchover started in 2010 and will conclude in December 2013. This Means:

- FTA satellite service changing from Optus Aurora to VAST
- PAY TV services migrating from Analogue modulation to Digital modulation or full service IQ1 or IQ2 STU installations
- Some remote sites no longer eligible for FTA satellite services while some sites which previously received Terrestrial FTA will now need to receive FTA via Satellite

Although all satellite signal, PAY TV and FTA is a digital signal (QPSK) it has always been decrypted and converted to analogue signal for the TV's. Traditionally this has been through a domestic set top unit (STU) which is then re-modulated to a RF analogue signal. For the purposes of this proposal satellite services maybe referred to as analogue when in fact the broadcasting of the service is a digital signal.

### *2.1 FTA Satellite Services*

Currently the majority of remote or regional sites receive their FTA TV channels via the Optus Aurora satellite service. VAST (viewer access satellite service) will replace Optus Aurora and will provide the full 16 digital channels similar to the metropolitan areas.

It is important to note that the new VAST satellite services will only be approved for sites that cannot receive terrestrial services. It cannot be presumed that a site currently receiving TV channels from the existing Optus Aurora satellite service will be eligible for VAST services.

### *2.2 FTA Terrestrial services*

Traditionally satellite service was mainly used for FTA TV channels in regional areas where the analogue terrestrial service was of very poor quality. With digital TV the preference will be to use terrestrial signal. The digital TV signal will have to be of useable quality or there will be no reception at all. Hence the broadcasters will have to ensure high quality signal is broadcast. Terrestrial signal is the preferred option as the reception system has no drop out issues due to rain fade or the line of sight to the satellite being physically blocked.

There may be a delay implementing full freeview services on sites that the government have designated as not eligible to receive the VAST service. Full ABC and SBS services will be available but the commercial stations are under no obligation to provide digital services in low population areas. It can be construed that town sites servicing populations of five thousand plus will eventually receive digital transmissions by 2013 but no information has been forthcoming from the government to confirm this. There may eventually be a resolution offered which may take the form of a mix of terrestrial and satellite broadcasting.

### *2.3 Pay TV*

Foxtel and Austar will continue to operate as per normal as their services are independent of the Freeview services. Although Austar will allow digital modulation, Foxtel currently will not allow digital modulation of their channels. Foxtel have committed to releasing the results of a business study in regards to digital modulation in September.

Foxtel however have announced that they will now allow T.D.T services. In effect this means the installation of full service IQ STU's in each individual room. The client will not be responsible for any theft or loss of decoders and the service will be charged as per quantity of active decoders. This service brings the following benefits:

- Choice of viewing packages
- Record one channel watch another
- Record channels whilst at work
- HD available at a small extra charge
- Distribution available on any cable system
- Boxes de-activated if rooms are not occupied and client only billed for active decoders

### *3. Timeframe*

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All analogue terrestrial services and current satellite FTA will be switched off by December 2013.

#### *3.1 Satellite*

- Optus Aurora will be Switched off in December 2013
- VAST service will be available to all from August 2011

VAST satellite services will only be allowed to sites that cannot receive terrestrial services.

#### *3.2 Terrestrial*

Analogue terrestrial signal will be switched off State by State

- Metropolitan areas from January 2013 to December 2013
- Regional Victoria has been switched off
- Regional SA has been switched off
- Regional Queensland between July 2011 and December 2011
- Regional NSW between January 2012 and December 2012
- Regional WA and NT between June 2013 and December 2013

Information on specific locations can be supplied as required. Switchover is dependant on the Government maintaining their schedule.

### *3.3 Pay TV*

- Migration to Digital Channels for Foxtel after September 2011
- Migration to Digital Channels for Austar approved
- T.D.T contracts for Foxtel approved

## *4. Digital Migration Benefits*

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With the Digital Switchover comes the introduction of the next generation of MATV headends and together with digital migration the following benefits are now available:

- More Channels with Freeview
- Significant cost savings when compared to equivalent analogue headends
- Remote Monitoring
- Hot swappable Modules
- Reduced Bandwidth requirements
- Future Proofing

### *4.1 Freeview Channels*

Freeview represents free to view digital TV channels inclusive to all Australian Broadcasters.

- ABC
- SBS
- Seven Network
- Nine Network
- Network Ten
- PRIME7
- GWN Television
- WIN Television
- Southern Cross Television.

In total 16 digital channels plus radio stations should be available to all locations in Australia.

### *4.2 Cost Savings*

Next generation MATV headend provide cost savings in the following ways:

- Compact size utilising less real estate
- Reduced site visits (if ever after initial installation)
- Less infrastructure equals less cost, no set top decoders, shelving, less cabling, less labour requirement, shipping costs are reduced etc
- Less power requirements
- Increased reliability

## *4.2 Remote Monitoring*

One of the most significant developments that has coincided with the digital migration has been the development of remote monitoring of the MATV equipment through an internet connection. Remote monitoring has:

- Monitoring of incoming broadcast signal
- Monitoring of outgoing distribution signal
- Equipment programmable from off-site

This ability to monitor from off-site can allow for fault identification and resolution without attending site. Upgrades to the system can also be achieved through hot swappable Modules and remote programming again negating the need for site visits.

## *4.3 Hot Swappable Modules*

Hot swappable modules means that equipment can be removed or added in the headend without powering down the equipment. This has the following benefits:

- No interruption to TV viewing
- Channels can be added without interruption
- Faulty units can be replaced without interruption
- Site maintenance personal can remove or add the equipment while an off-site MATV technician can program the module bringing
- Reduced site visits

## *4.5 Reduced Bandwidth*

From 2014 the government is reducing the bandwidth available to distribute TV signal. We will lose approximately 30% of the available bandwidth. In reality due to the way an analogue MATV system operates if you retain analogue you are in fact losing closer to 50% of your available bandwidth.

Digital signal is a data stream and as such multiple TV channels can be distributed in the same bandwidth as one analogue channel. For example, if you were to take the 16 freeview channels and 10 Pay TV channels and distribute using the normal 2 channel spacing for an analogue system, you would require 364MHz of bandwidth for analogue systems. The maximum bandwidth required for the same amount of channels using digital signal would be 154MHz of bandwidth.

As more services in the form of more TV channels and social networking will undoubtedly increase, available bandwidth will become a crucial factor in TV systems.

## 4.6 Future Proofing

- At some point you will be unable to purchase TVs with analogue tuners and a system already converted to digital will give the site the best buying power and flexibility in purchasing new TVs.
- System suitable for delivery over co-axial or fibre cable
- System suitable for integration into a GPON network
- Equipment suitable for a combination of up to 26 digital or analogue 7MHz channels, potentially up to 156 digital TV and radio channels from one headend
- MPEG4 and MPEG2 compatible
- Compatible for all types of Australian receive and distribution signals

## 5 Installations

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To ensure reliability and protect the client's warranty, certain basic upgrades will be conducted at each site. Upgrades will be to ensure compliance with Australian and Industry Standards. Upgrades will also be to ensure that the new equipment is supplied with reliable and quality signal and is protected from non-warrantable damage.

- Antenna receive equipment correctly positioned
- Antenna receive equipment fitted with a new Quad LNBF for the increased satellite bandwidth and to ensure reliability
- Cable checked between antennas receives equipment and headend for compliance and serviceability. Changed if required
- F-type connectors checked for workmanship and compliance upgraded to current industry standards if required.
- New equipment connected to a UPS (uninterruptible power supply)
- Earthing to Australian Standards 1367:2000, 3000, (earthing conductors)

The above points are where traditionally 80% of all signal faults originate.

### 5.1 Scope of work: VAST Satellite installation

#### Supply and Install

- X1 MATV headend capable of supplying all freeview channels utilising QPSK to CODFM processing.
- X1 Remote Monitoring unit, integral to MATV headend
- X1 10.7 Quad LNBF (appropriate to dish type)
- X1 24way Active Multiswitch
- Grounding Blocks for Coaxial cable feeds
- X1 Common Earth Terminal (C.E.T)
- UPS (uninterruptable power supply)
- Integration into existing MATV infrastructure

- Cable labelling of all equipment to assist remote fault identification and any subsequent upgrades
- Commissioning Documentation
- Field Report
- Consumables
- Labour

### *5.2 Scope of work: Freeview Terrestrial Installation*

#### Supply and Install

- X1 MATV headend capable of supplying all freeview channels utilising CODFM channel processing
- X1 Remote Monitoring unit, integral to MATV headend
- X1 Appropriate Digital FTA antenna
- X1 24way Active Multiswitch
- Grounding Blocks for Coaxial cable feeds
- X1 Common Earth Terminal (C.E.T)
- UPS (uninterruptable power supply)
- Integration into existing MATV infrastructure
- Labelling of equipment and cables to assist remote fault identification and any subsequent upgrades
- Commissioning Documentation
- Field Report
- Consumables
- Labour

### *5.3 Digital Modulation Pay TV*

Currently at this time there is no benefit in switching immediately to digital signal for distributing Pay TV channels. At this point the modulated digital signal will be sourced from an analogue composite signal and hence low quality and realistically, no better than a good quality analogue picture. There will be a need to change to digital before 2014(see section 4.5 Reduced bandwidth) or sooner if the site can no longer source TVs with analogue tuners.

It should also be noted that until Foxtel release their approved method for digital modulation any site using digital modulation for Foxtel content will be in breach of their contract with Foxtel.

There will be some work conducted on site to prepare for digital modulation of Pay TV. The quality of the satellite signal will be checked, labelling of equipment to correctly identify components for on-site personnel and installation of a Multiswitch.

#### *5.4 Commissioning Documentation*

Commissioning documentation for installation work will be supplied as an electronic manual in PDF format containing the following:

- Scope of Works
- List of all components used, brand names, model numbers
- Manufacturers Literature on all components
- As-built drawings
- Commissioning test results in data log format
- Warranties
- Endorsed Antenna Installer Advice Form
- TCA1 Cabling Advice Form

#### *5.5 Field Report*

Field reports will consist of

- Data logs of incoming and outgoing signals from each distribution amplifier or percentage of duplexers in a fibre network.
- Data logs from two wallplates serviced by each distribution amplifier
- Commissioning documentation for headend installation
- Report on general condition of distribution system
- Recommendations, if any on upgrades to fix faults or improve reliability
- Feasibility study on implementation of T.D.T services with cost benefit analysis.

A field report is important to both the site and installer as Marcomm will not be responsible for, or warranty work not conducted by Marcomm. To avoid misunderstandings proof of the current condition of the MATV distribution system, in the form of data logs will be provided through the field report and the commissioning documentation.

#### *5.6 Standards*

Each installation will comply to the following standards

- AS/NZS 1367-2007 (co-axial cable and optical fibre systems for RF dist of analogue and digital TV installations)
- A/S/NZS 1367:2000, AS/NZS3000, (earthing conductors)
- AS/ACIF S009 2006 (Wiring Rules)
- Foxtel Satellite Installation FD/T/E/2207-ISSUE 9 Revision 11

## *6. Pricing Structure*

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The pricing structure submitted to customers by MARCOMM only applies to the installation and necessary upgrades to supply Freeview services utilising the VAST satellite service, terrestrial services or a combination of both.

Sites will be surveyed for Foxtel T.D.T services and viability of introducing Subscriber (Pay TV) T.D.T services will be addressed in the site report.

Manufacturers discounts passed directly to the client by MARCOMM are available for clients with multiple sites who commit to upgrading all their sites through MARCOMM.

Please Contact MARCOMM for details of system pricing.

### *6.1 Maintenance Contract*

A maintenance contract can be provided upon negotiation, to supply 24/7 technical support.

### *6.2 Ordering Procedure*

The following are required from each site that takes part in this proposal:

- Purchase order and Job Cost Centre number from each site
- Digital photograph of existing MATV headend
- Digital photograph of any existing Satellite Dishes
- Digital photograph of LNBS for any dishes
- Digital photograph of line of sight from satellite Dish (direction satellite dish is pointing)
- Site contact and the site address, required to pass onto Optus for access to VAST

Upon receiving the above, the site will be contacted and equipment ordered

- The application for VAST services will be made by Marcomm on behalf of the site
- Smartcards for VAST service will be activated before equipment is delivered to site. Optus have advised that up to a two week delay may occur before activation of the smartcards
- Terrestrial receive only sites will have equipment delivered direct to site
- Technicians will not attend site until confirmation that all equipment has been received by the site and is undamaged

## 7. Glossary

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Antenna	Can either be a satellite dish or terrestrial antenna
CAM	Conditional Access Module (CAM)
CODFM	Coded Orthogonal Frequency Division Multiplexing (Digital Terrestrial Signal)
Data Logs	Capture of digital and analogue signal providing all relevant measurements
FTA	Free to Air, Free to View satellite or terrestrial TV channels
Freeveiw	Free digital television service in Australia. It comprises all the channels from Australia's broadcasters including ABC, SBS, Seven Network, Nine Networks, Network Ten, PRIME7, WIN Television and Southern Cross Television
Grounding Blocks	To earth coaxial cable lead-ins from antennas
LNB/F	Low noise block Feed: Signal is focused from the dish to the antenna Located at the end of the arm of the dish
MATV	Master Antenna Television: Generic term for multiple outlets
Optus Aurora	Satellite service providing current 4-5 FTA channels
Pay TV	Channels provided at a monthly fee under contract by a provider
QAM	Quadrature amplitude modulation, alternative technique to QPSK to delivers signals to lower bandwidth coaxial cable systems
QPSK	Quadrature Phase Key Shift (Digital Satellite Signal)
SMATV	Satellite Master Antenna Television
STU	Set Top Unit or decoder
Smartcard	Smartcards provide access to encrypted signal
T.D.T	Transparent Digital Transmodulator (TDT) devices used to convert QPSK digital signals into QAM format digital signals
Terrestrial	Ground based transmitters
VAST	Viewer Access Satellite Television: Provides Freeveiw via Satellite
Multiswitch	Device used to distribute satellite/terrestrial signal to multiple outlets

## 8. Contacts

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