

AUSTAR Multi Dwelling Unit Installation Guidelines 2008

Document Control Sheet

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Preface

The objective of this document is to provide technical and operational guidelines for the cabling of a range of premises and buildings to meet AUSTAR MDU standards. The intention is to ensure every one has a very clear understanding of what is required and what standards must be met. All technical information should be referenced back to the AUSTAR Multi Dwelling Unit Technical Specification V5 230908. In all cases reference must be made to the Australian Standard AS/NZS 1367; 2007 4th edition which includes changes in the transmission formats. All components used must be on the AUSTAR Approved Parts List.

Optical

DVB-T

DVB-C

DVB-S

This edition supersedes AS/NZS 1367; 2000 and has many new updates which must be used as reference data and complied with

Submitting the Commissioning Reports must be sent to

tek@austar.com.au

Record of changes

Issue No.	Issue Date	Nature of Amendment
Draft	27/05/08	Removal of internal requirements and standardising for external developers etc
Version 1	01/07/08	Updated for PDR
Version 2	23/09/08	Revised contact detail and updated signal level
Version 3	24/02/11	Added MDU contact detail.

MDU Installations Guidelines

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1 INTRODUCTION

AUSTAR customers currently receive television services transmitted from the Optus C1 satellite.

The Optus C1 satellite has transponders on both Vertical and Horizontal polarities to transmit current services provided by AUSTAR.

The following document explains the required installation process and minimum standards design to make your residential building AUSTAR ready.

* Please note that AUSTAR has not accepted designs submitted for single polarity I.F. distribution (commonly known as B3 specifications) since 1st March 2004. Please also note that this standard has been upgraded to include capability for full MyStar functionality at a minimum of one outlet per unit.

1.1 AUSTAR Multi Dwelling Unit Categories

An MDU is defined as a complex that has three (3) or more permanent residential dwellings that are;

- Either attached or detached,
- In a single building, a development or a townhouse complex.
- Part of a Strata, Community Title, or Torrens (self) Title scheme/plan.
- Managed by a Strata Manager, Body Corporate/Owners Corporation or is self-managed.

1.2 Satellite MDU System Topologies

AUSTAR MDU Satellite Installations have been divided into the following two categories:

1.2.1 Simple MDU

A "simple" MDU, is generically an MDU with between 3 and 8 units per building and where all parts of the roof can be accessed from a standard three storey ladder (up to 8.5m from ground to gutter). Additionally the cabling requirements are such that the system is;

- Not integrated with the buildings Free To Air (F.T.A), and
- Requires no amplification of the satellite signal, and
- Requires no inline power injectors.

A building which satisfies the above requirement may be offered a Simple Right of Access (ROA) Agreement by AUSTAR. By signing this agreement the Body Corporate allows AUSTAR to build the network as customers request connections. A simple ROA allows AUSTAR to install a dish per customer and run external cabling in order to facilitate a customers connection. AUSTAR will endeavour to minimise the number of dishes used however where technical or physical restrictions exist (firewalls), multiple dishes will be installed.

1.2.2 Major MDU

A building which does not meet the above requirements will be offered a Major Right of Access Agreement by AUSTAR. By signing this agreement the Body Corporate gives AUSTAR the right to market to the building and conduct customer connections. AUSTAR does not assume ownership of the network and is not responsible for ongoing maintenance.

A major MDU is generally described as a building with;

- More than 8 units, or
- where all parts of the roof are not accessible from a standard three storey ladder (i.e. the height from the ground to the gutter is greater than 8.5m), or
- A building where the I.F. distribution system is to be integrated with the existing F.T.A, or
- A building that requires amplification of the satellite and/or F.T.A signal, or

- A building where the distribution system requires earthing and a 240 Vac GPO installed due to the addition of active multiswitches, amplifiers or power injectors, or
- A building where the body corporate does not accept AUSTAR's offer of a simple ROA.

This document describes the process and minimum requirements for provisioning both "Simple" and "Major" Multiple Dwelling Units.

2 MDU DUAL POLARITY SYSTEM TOPOLOGY

There are two types of MDU dual polarity system topologies that are covered in this manual.

- 1) Home run technique or Star Topology using end of line multiswitches; or
- 2) Cascaded tap technique or tree and branch topology using end of line multiswitches;

Included within this document are examples of small, medium and large residential AUSTAR Multi Dwelling Unit rated subscriber television systems, designed using both Star Topology and cascaded tap / multiswitch topology.

2.1 Method 1 (SAT I.F Only):

This is the preferred method in existing Free To Air (F.T.A) only Master Antennae Television installations (M.A.T.V)

A separate dual trunk satellite I.F. cable system is installed independently of the F.T.A. system.

Installing a stand-alone satellite system will minimise the chance of interference or unwanted signals entering the I.F. system. Dual I.F. trunks are installed supplying separate Vertical and Horizontal polarity I.F. satellite services which are then distributed via taps / splitters into 2 input multiswitches.

Dual drop cables connect the AUSTAR subscriber dual F-type wall plate back to the multiswitch, providing access to both satellite I.F. polarities only on each cable.

2.2 Method 2: (SAT I.F + F.T.A 3-wire system)

Use this method to supply F.T.A + satellite I.F. in a 3-wire distribution system as follows:

Trunk 1 & 2 supplying separate vertical and horizontal polarity I.F. satellite services, and a 3rd trunk supplying local F.T.A and other modulated services (eg security cameras, in-house VCR channel, etc).

These three trunks will then be distributed by using taps / splitters, and integrated using 3 input multiswitches.

Dual drop cables connect the subscriber wall plate back to the multiswitch, providing access to all services as required. The wall plate must be an AUSTAR approved diplexed tri output IF + F.T.A type. The IF ports must be power passing.

2.3 Method 3. (Sat I.F + F.T.A – 5 wire system)

Use this method to supply F.T.A + satellite I.F. in a 5-wire distribution systems as follows:

Trunk 1, 2, 3 & 4 supplying separate vertical and horizontal polarity I.F. satellite services, and a 5th trunk supplying local F.T.A and other modulated services (eg security cameras, in-house VCR channel, etc).

These five trunks will then be distributed by using taps / splitters, and integrated using 5 input multiswitches.

Dual drop cables connect the subscriber wall plate back to the multiswitch, providing access to all services as required. The wall plate must be an AUSTAR approved diplexed tri output IF + F.T.A type. The IF ports must be power passing.

All 5-Wire systems must be built completely with five wires throughout and must be fed from one dish combined with a Quad LNB.(Refer to AUSTAR's approved parts list for more information).

2.4 Method 4: (SAT I.F. + FTA + AUSTAR For Business bulk headend channels)

Refer to AUSTAR For Business Installation Guidelines

3 SIMPLE MDU BASICS

3.1 Examples of Simple MDU residential installations

Examples of typical residential "Simple" build installations:

- A Duplex;
- A Small block of units, comprising of 3 to 8 residential units requiring 1 x 4 way or 8 way multiswitch.

3.2 Definition of a Simple MDU installation

A simple MDU installation is one that meets the following criteria:

- It has not more than 8 residential units.
- all parts of the roof can be accessed from a standard three storey ladder.
- The multiswitch is not powered by common or universal power.

3.3 Dish size

The dish size selected must achieve a minimum of 13 dB C.N.R and 12db MER in clear sky at the L.N.B across all AUSTAR transponder streams wherever multiswitches with no additional I.F. amplification are installed. Refer to the AUSTAR Technical Specifications Document.

3.4 Dual Output LNB requirements

A dual output L.N.B.F must be installed to provide vertical and horizontal signals to an outlet within a unit, via a dual cable run from each L.N.B output port to the wall plate.

(Both output ports on a dual output L.N.B can provide either polarity, governed by the decoder output voltage, which in turn is governed by the AUSTAR program channel selected.).

The dual LNB must be listed on the AUSTAR approved parts list.

3.5 Headend Considerations

The headend in a Simple MDU with more than 2 outlets will now consist of a single multiswitch. You must locate the Multiswitch in an accessible area beneath the roof at the point of entry of the dish cables, provided there is easy access to this position from common property.

3.6 External Multiswitch Enclosures

For buildings that have flat tin or concrete roofs with no common roof areas, a weatherproof enclosure rated to IP55, UV stable plastic housing can be installed under the eaves or in a lockable wall mounted cabinet in a common area to house the multiswitch.

3.7 Dish Lead in cables

The installation of two satellite I.F.Quad shield lead-in cables is required from the dual output L.N.B.F to the multiswitch.

3.8 Powering the L.N.B and Multiswitch

The subscribers set top box powers the L.N.B and multiswitch. Each decoder must have the L.N.B power source switched on to supply power to the multiswitch and L.N.B.

3.9 L.N.B Alignment

It is critical to precisely align the L.N.B with respect to the vertically and horizontally polarized satellite signals.

3.10 Termination of Unused Ports

All unused multiswitch ports must be terminated with 75-ohm load terminators. Any end of line cascaded multiswitch with power passing through-ports must be terminated with DC isolated, or capacitive load terminators. Normal resistive terminators must not be used on power passing through-ports.

3.11 Splitters Are Not Permitted between multiswitch and wall outlet

If a single unit requires two satellite I.F. outlets, both outlets must each be connected directly to the multiswitch.

No splitters are permitted between the customer wall plate and the multiswitch, as they may disable the switching function.

3.12 Cavity drops

Cavity drops are AUSTAR's preferred method for running cables. Where this is not possible, you must supply a detailed scope stating why cavity drops are not possible.

3.13 External Cables

(Retro fit scenario) The cable should be run down the cavity where possible and the installation of external cables in ducting or conduit should be carried out as a last resort. Underground cable runs must use flooded quad shielded cable and be installed in heavy-duty underground (orange) conduit.

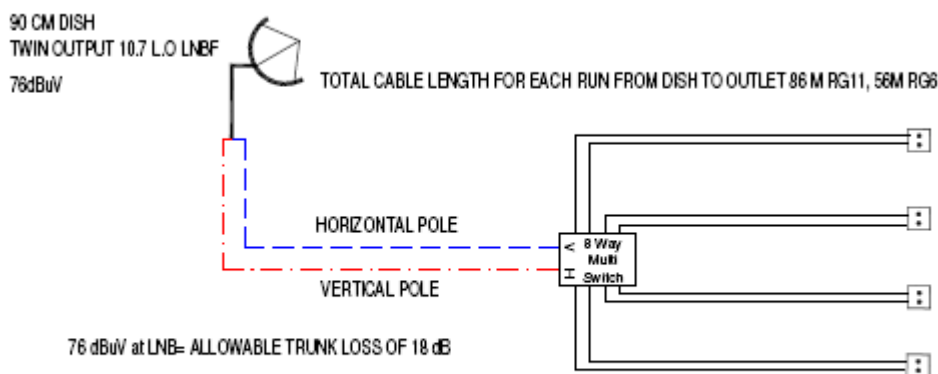
3.14 External Cabinets

For buildings that have flat tin or concrete roofs with no common roof areas, a weatherproof IP 55 rated UV stable plastic housing can be installed under the eaves or in a wall mounted lockable cabinet in a common area to house the multiswitch.

3.15 Example of Simple 4 outlet MDU system

Example of a system design for residential builds with 3-4 outlets:

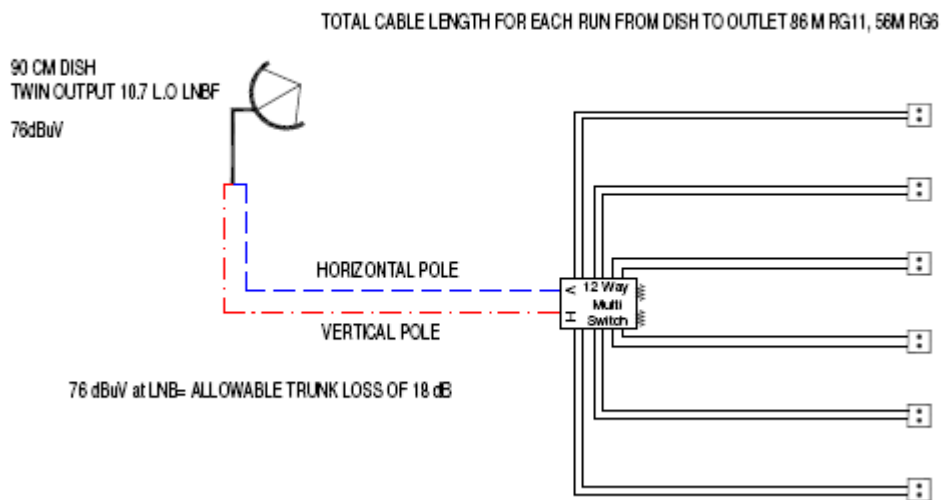
Four decoders connected to a line powered 8 way multiswitch. In this example, the multiswitch model has +2 dB inbuilt gain, allowing a total cable loss of 18 dB to deliver 60 dB at each outlet.



In this example, the maximum cable run is 86 m of RG11 or 56 m of RG6.

* These system calculations are based on a multiswitch with a nominal 2 dB gain, but multiswitch specifications vary with make and model. (Refer to AUSTAR Approved Parts List Appendix and cable attenuation table for further information). This assumes that there no other losses due to cable joiners, cable damage, etc.

3.16 Example of a Simple 6 outlet MDU system



In this example, the maximum cable run is 86 m of RG11 or 56 m of RG6.

These system calculations are based on a multiswitch with a nominal 2 dB gain, but multiswitch specifications vary with make and model. (Refer to AUSTAR Approved Parts List Appendix and cable attenuation table for further information). This assumes that there are no other losses due to cable joiners, cable damage, etc.

4 MAJOR MDU BASICS

4.1 Dish installation

Dish size selection is determined by the MDU geographic location in relation to the Optus C1 signal footprint.

Installations requiring 1 additional I.F. amplifier before the multiswitch must achieve a minimum carrier to noise ratio (CNR) of 15 dB and 13db MER in clear sky across all AUSTAR transponder streams as measured at the LNB.

2 additional I.F. amplifiers before the multiswitch must achieve a minimum CNR of 16 dB and 14db MER as measured at the LNB.

Hybrid Fibre Cable systems with 2 x I.F. amplifiers before the multiswitch must achieve a minimum CNR of 17dB and 15db MER as measured at the LNB. Refer to AUSTAR Technical specifications

4.2 Installation of drop cables in an IF only system

All drop cable connections from multiswitches to wall plates should form part of the initial installation in larger I.F. only MDU's. 'Customer Connection Code' must be clearly stated in the Commissioning report supplied to AUSTAR.

4.3 Powering the L.N.B and Multi- switch

Consideration should be made for DC power injectors where additional I.F. line amplifiers require line powering over cable distances exceeding approximately 50 meters (RG6) or 80 meters (RG11) between multiswitch and dish location.

4.4 Installation of drop cables in an integrated F.T.A + IF system

When installing an integrated backbone including the F.T.A service, drop cables MUST be installed between all multiswitches and all wall plates at time of construction.

All unused splitter, tap and multiswitch ports must be terminated.

4.5 Customer Connection Code

All AUSTAR cabling networks need to be completed to the wall plate. Any future customer connections should simply be a decoder hook up.

4.6 Earthing

A mains powered multiswitch and any other ancilliary equipment must be earthed in compliance with AS/NZS 1367:2007. Consideration needs to be taken to ensure any transient and fault protection is complied with (Refer to AUSTAR Technical Specification and AN/NZS 1367; 2007 2.5 for further information).

4.7 External Pedestals

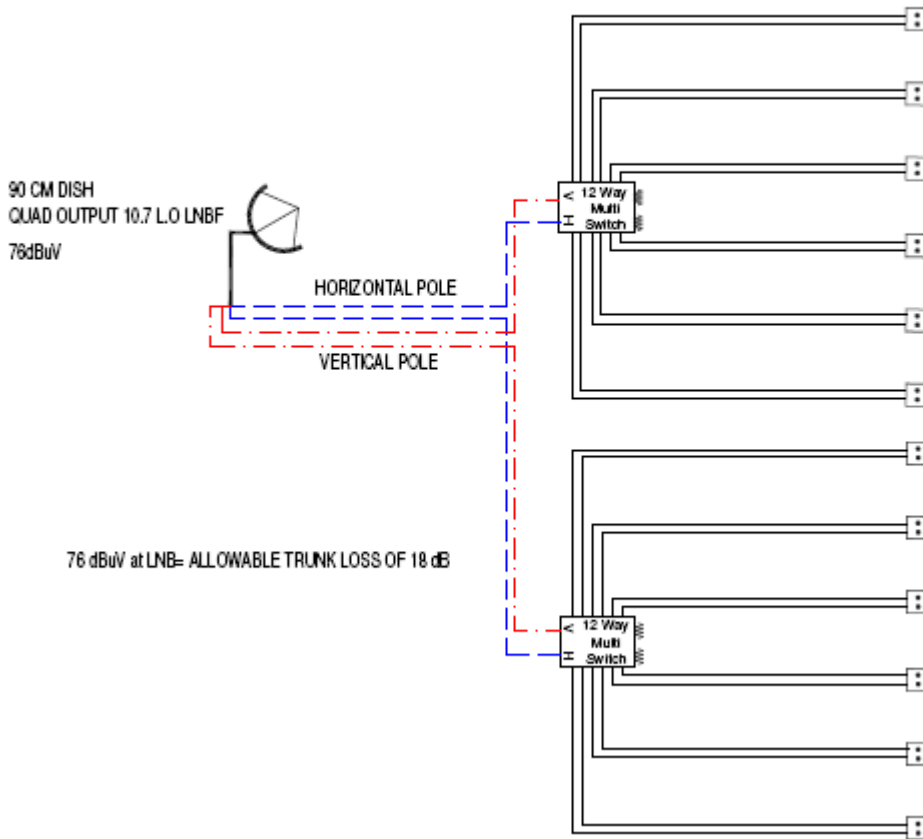
All external S.M.A.T.V distribution pedestals must be an aboveground design to avoid water ingress. In-ground pedestals and pits are not permitted. All external passive and active devices must be board mounted within the pedestal and located above ground level.

4.8 Distribution Design Examples

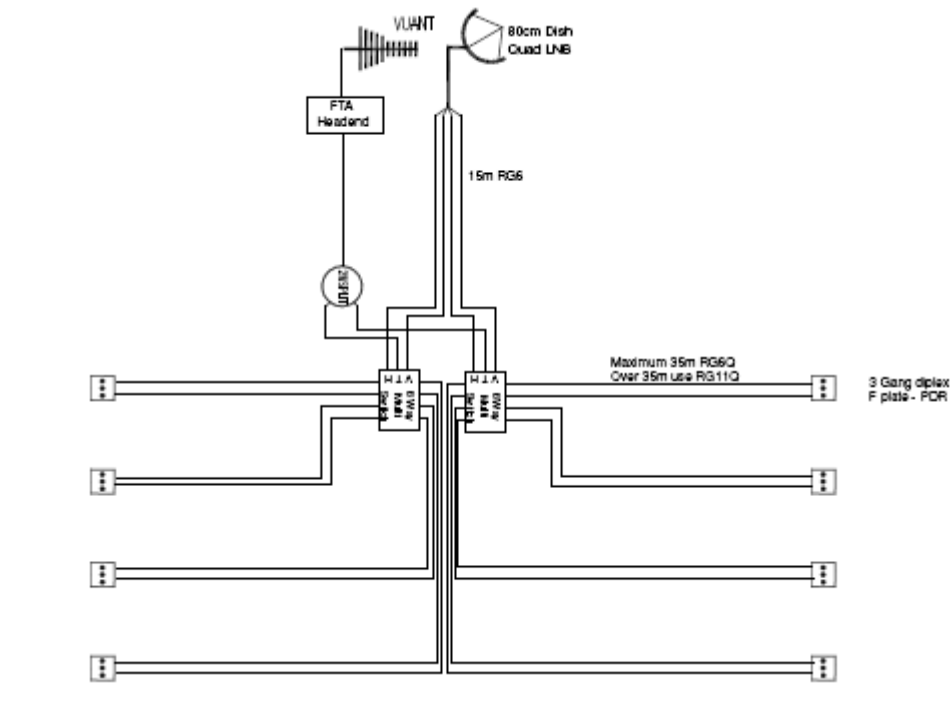
Major system designs are outlined in the following pages to assist in demonstrating basic design concepts.

4.8.1 Example of 12 outlet Major MDU (I.F using Quad LNB and 2 input multiswitches)

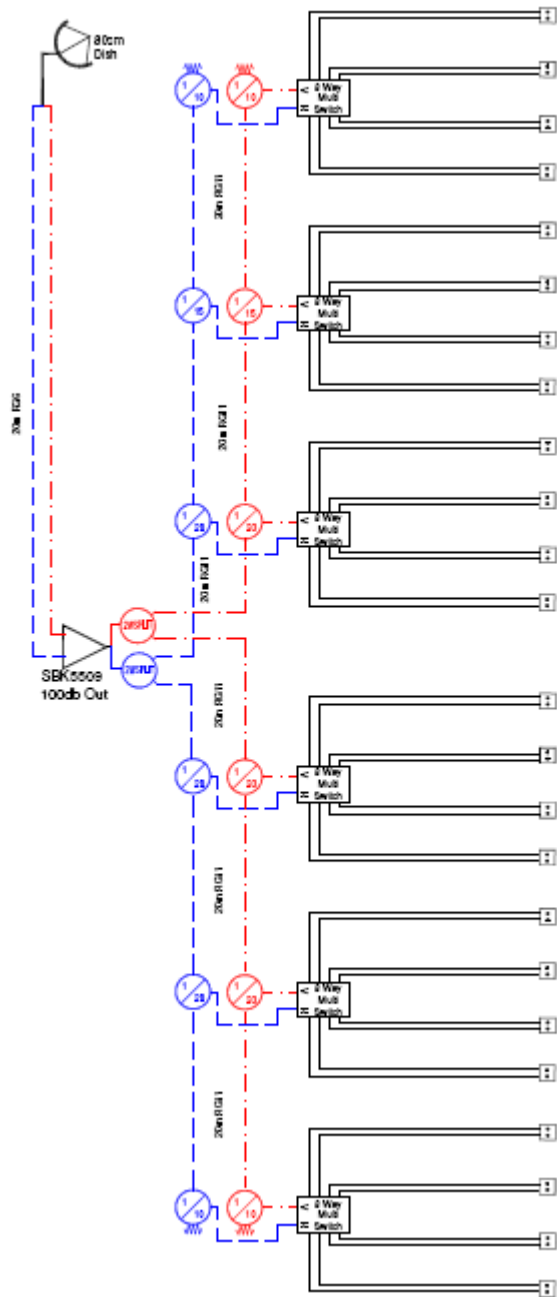
TOTAL CABLE LENGTH FOR EACH RUN FROM DISH TO OUTLET 86 M RG11, 58M RG6



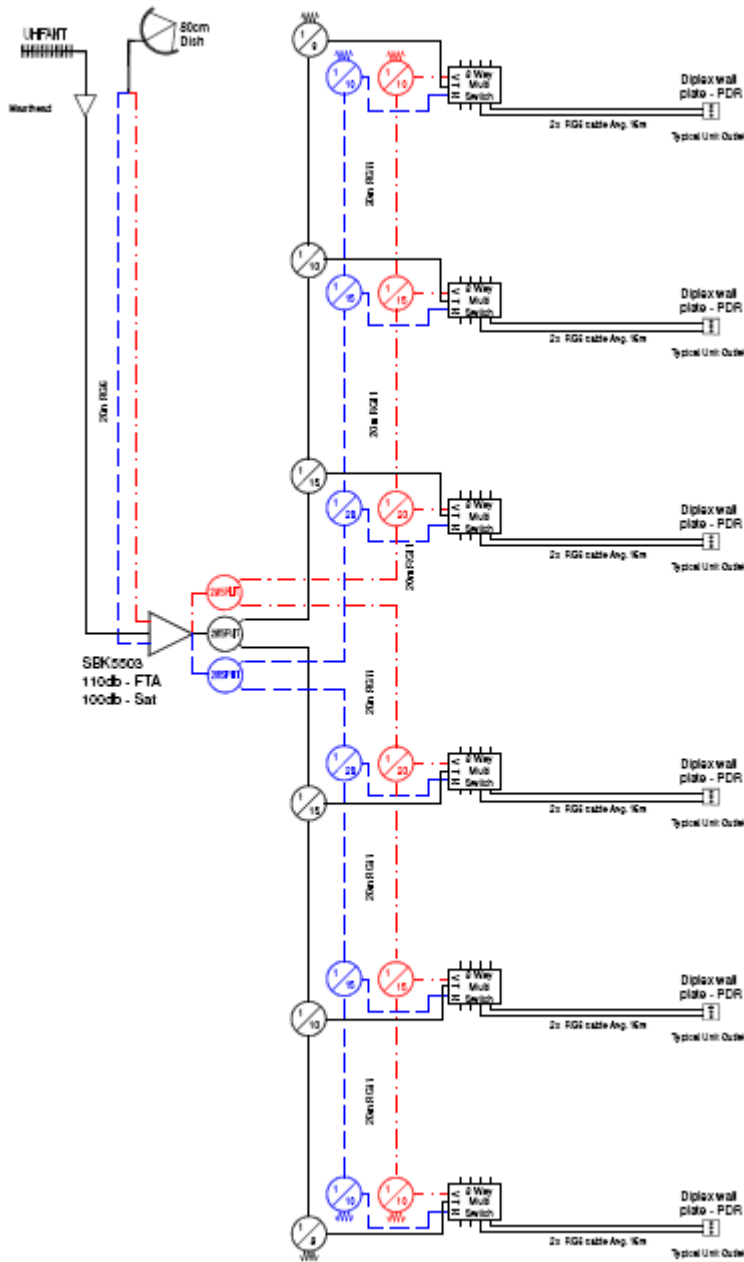
4.8.2 Example of 8 outlet Major MDU (Integrated I.F + F.T.A using line powered 3 input multiswitches)



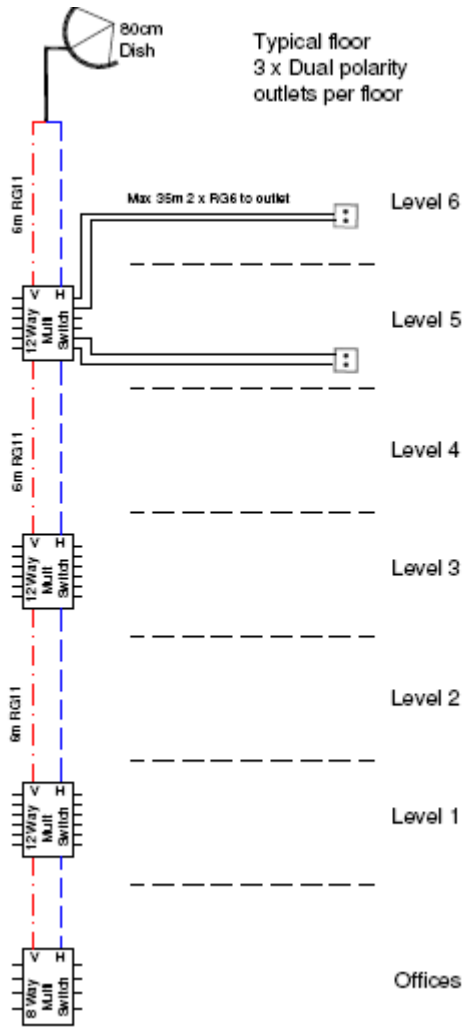
4.8.3 Example of a 24 outlet Major MDU (I.F. only using line powered 2 input multiswitches)



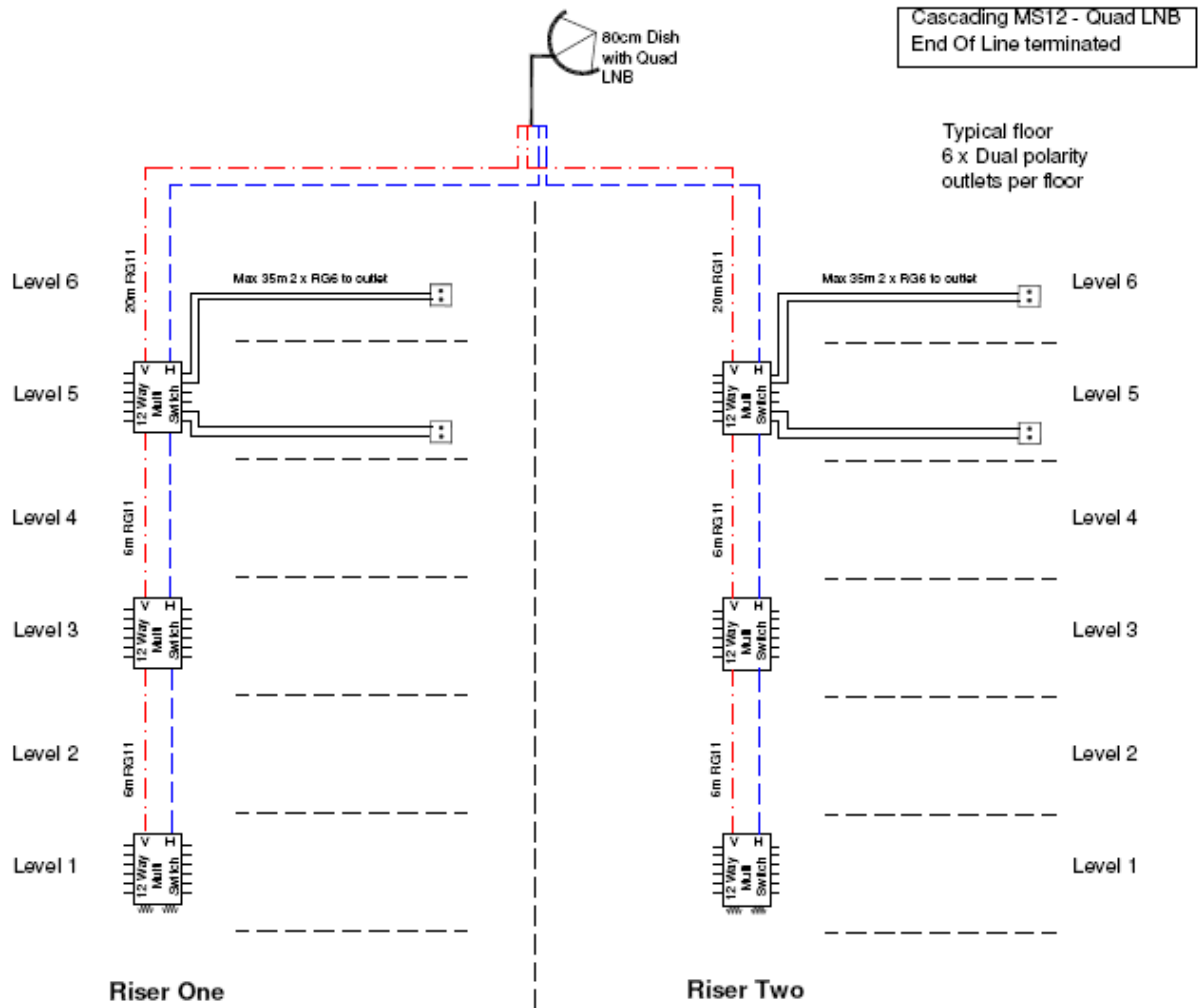
4.8.4 Example of a Major MDU (Integrated I.F + F.T.A using line powered 3 input multiswitches)



4.8.5 Example of a cascading MS12 with MS8 end of line



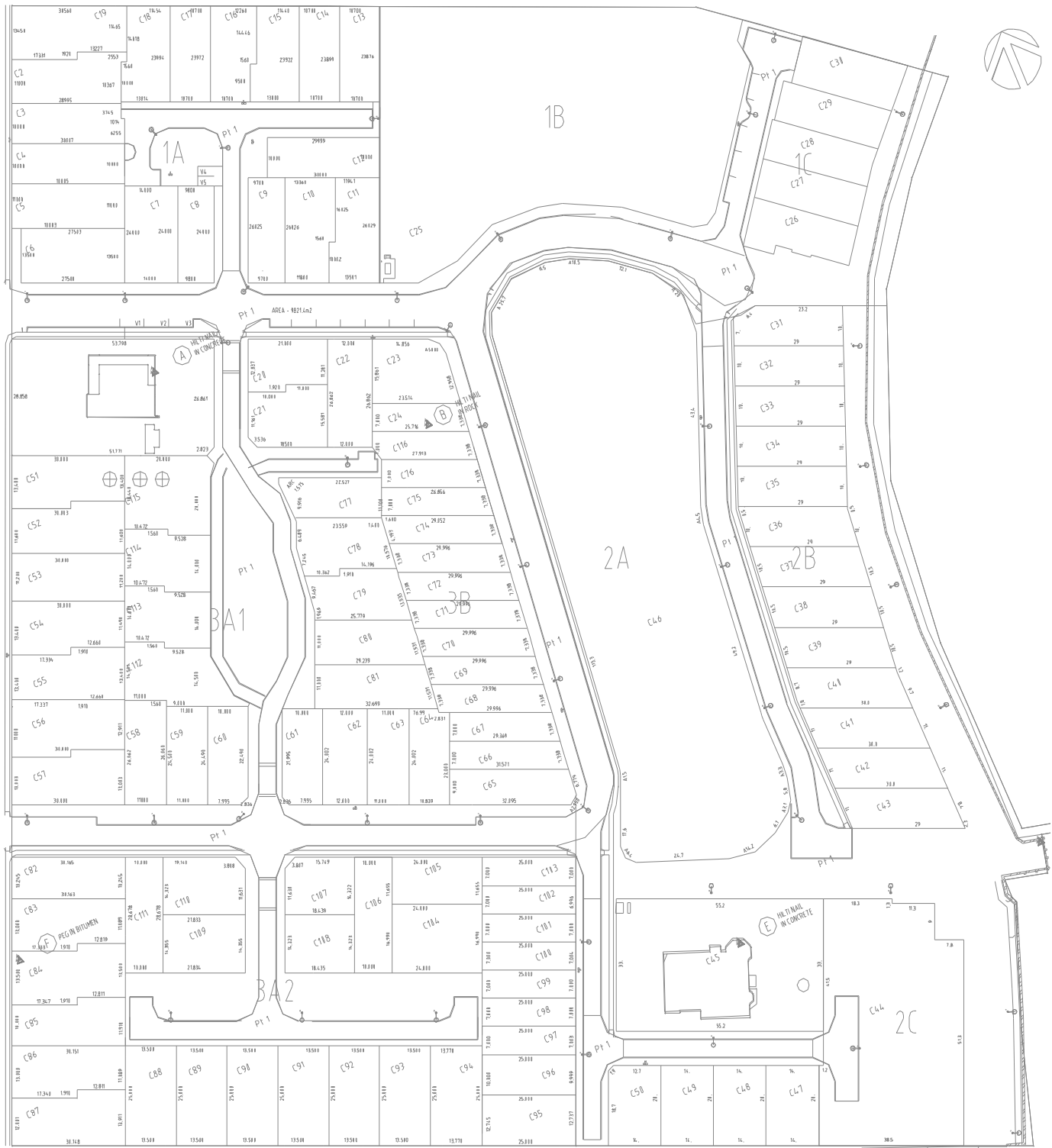
4.8.6 Example of a cascading MS12 with Quad LNB



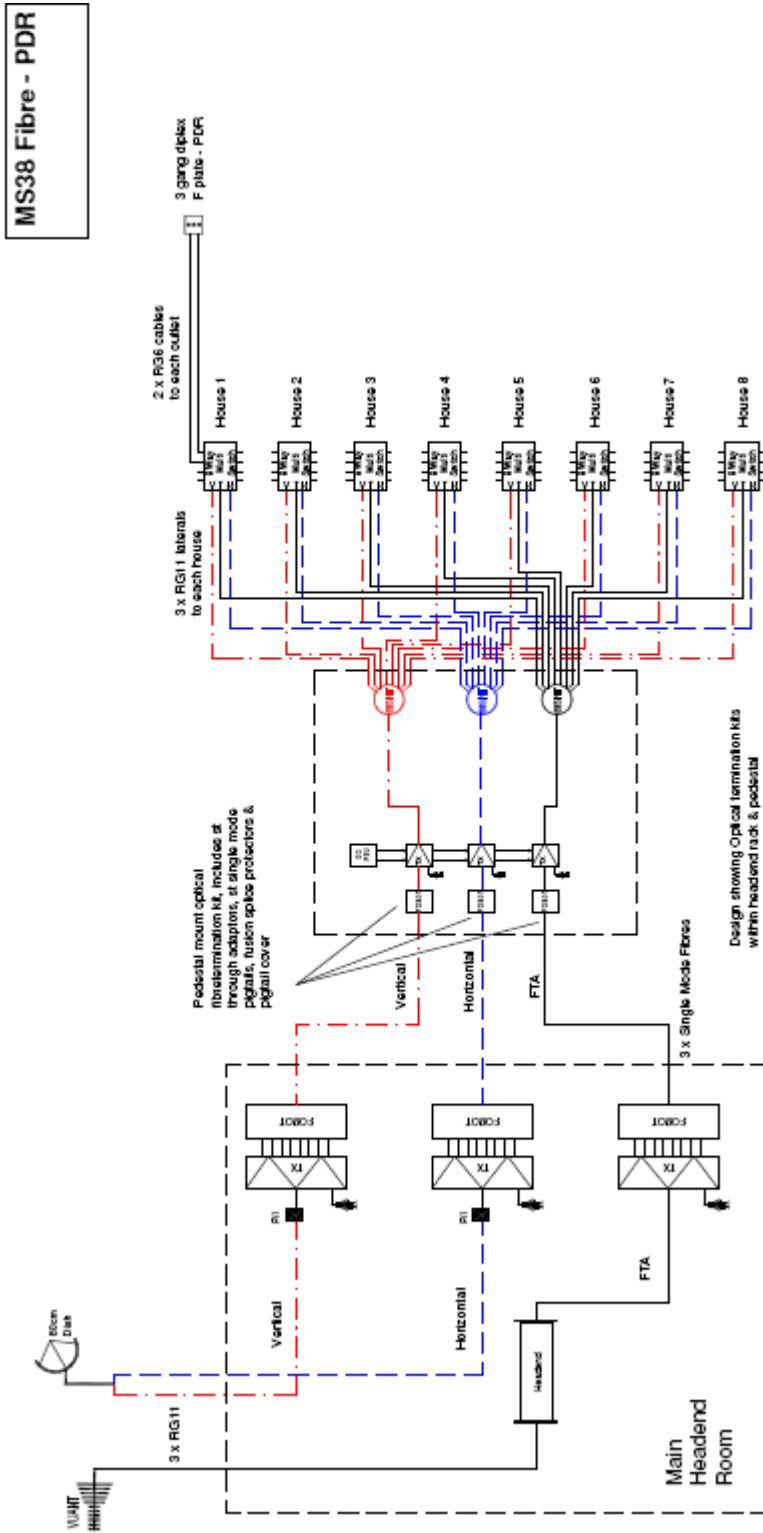
4.8.7 Example of a Major “Buried Cable” Survey Plan

The following plan shows a typical estate that is made up of single homes with one high rise tower in area 1B, one mid rise tower in area 2 A, and one low rise development in area 2C.

The objective with this type of installation is to distribute thru F.T.A and AUSTAR satellite signal to all buildings using the installed S.M.A.T.V system, usually based around a hybrid fibre-coax (HFC) system.



4.8.8 Example of a small Hybrid Fibre - Coaxial (HFC) S.M.A.T.V System layout



5 COMMISSIONING REPORT

5.1 Introduction

AUSTAR will only activate services upon the successful completion and subsequent approval of a contractor's commissioning report. Within two working days of receiving a commissioning report AUSTAR will either accept or reject the report and will notify the contractor of any reasons for rejection. The commissioning process is a critical stage in the installation process and must include all the relevant Digital FTA requirements.

AUSTAR commissioning requirements are provided in the report for:

- The headend performance; for all the services provided
- The signal level, quality and MER readings for all services at sample outlets.

5.2 Headend Commissioning

The following tests need to be performed at the headend to ensure compliance with the technical specifications outlined in this manual:

- Local oscillator (I.F.) signal levels measured at T10 and T20 on both LNB ports. L.N.B I.F. output levels and MER readings must be stated in the As Built drawing, and in the commission report.
- Local oscillator (I.F.) Carrier to Noise Ratio and MER at T10 and / or T20 on both L.N.B ports.
- Local oscillator (I.F.) L.N.B cross polarity on both ports at T20
- Local oscillator (I.F.) minimum and maximum launch levels and MER on both launch amplifiers and line extension amplifiers if applicable.
- Local oscillator (I.F.) output Carrier to Noise ratio and MER on both vertical and horizontal I.F. launch amplifiers if applicable.
- Minimum and Maximum channel launch levels for analogue free to air services if applicable;
- Minimum and Maximum channel launch levels and MER for digital free to air services if applicable;
- The inclusion of a digital photo of the installed headend, Satellite dish, FTA antenna, multiswitch, communications box, location and all relevant information is required as evidence of the work completed.

5.3 Outlet Commissioning

The following tests need to be performed in accordance with minimum outlet sample quantities as described in the commissioning report, (depending on the number of units involved), to ensure compliance with the technical specifications outlined in this manual:

- Local oscillator (I.F.) levels measured at outlets for T10 and T20;
- Local oscillator (I.F.) Cross Polarity measurement at outlets for T10 and T20;
- Outlet levels for both analogue and digital free to air services including MER for the digital services as applicable;
- CCIR picture quality for analogue free to air channels;
- Vision carrier level spread across all analogue free to air channels;
- An end of line sample must be included in all commission reports, as defined by the outlet with the longest home run drop to the multiswitch located the furthest distance from the headend.

5.4 SUBMITTING THE COMMISSIONING REPORT

All commissioning reports should be e-mailed to: tek@austar.com.au.

Please email tek@austar.com.au if you need a blank Commission Report template and/or a completed example outlining the commissioning standards of this manual.