



THE UNIVERSITY OF
MELBOURNE

Standards for the Installation of Voice & Data Networks

This document defines standards for the installation of voice and data networks in the University.

For technical inquiries relating to these standards contact one of the following Networks-staff members. Contact details may be found in Section 7.

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- Network Engineer - Ben Warden
- LAN Design and Installation Coordinator – Les Ridge
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Contact details may be found on page 28.

Rev. date – September 2003

The latest revision of this document may be found at:

<http://www-networks.its.unimelb.edu.au/Standards/WiringStandards.html>

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1. General

1.1 Codes of Practice

1.1.1 Current Revision

When referring to the following standards it is essential that the latest revision of the standards be used. The revision date of this document may be found on the cover page.

The current revision may be found at:

<http://www-networks.its.unimelb.edu.au/Standards/WiringStandards.html>

If you are unable to access this web site, Information on the current revision date may be obtained from Networks LAN Design and Installation Coordinators, on 8344 6841 or 8344 8804.

1.1.2 Conditions of Contract and Safety

a) *Standards Compliance*

Adherence to the *Standards for the Installation of Voice and Data Networks* by cabling installation contractors is a condition of contract. These cabling standards are an appendix of the *Project Management and Design Standards* as issued by the Department of Property & Buildings (P&B), University of Melbourne.

b) *Letting of Contracts*

The Networks section of the Information Division (hereafter referred to in this document as 'Networks') provides a network specification and design service. Contracts for structured cabling systems and/or other minor works shall be let solely by P & B. Contracts would be let and managed at the request of the relevant department or faculty.

Contractors working on campus must appear on the P&B maintained list of inducted contractors. This requirement applies to all levels of sub-contract.

c) *Hazard Assessment*

Contracts for cabling work shall only be let if a Part 6 audit has been carried out. Areas that have an audit, and have not been subjected to the installation or modification of other services during the currency of the audit are exempt from this requirement. The audit shall include hazardous materials (including asbestos) and environments (including electrical shock hazard and confined spaces). The Part 6 audit shall be carried out by a qualified hygienist at the expense of the requesting department or project. Contractors wishing to establish the existence of a part 6 audit for a given area may do so through Property & Buildings. Enquiries shall be made through the office of Dr D Daines, Vice Principal (P&B).

In the event that a contractor encounters an electrical power cable that represents an obstacle or hazard, the contractor (or agent) shall contact the University Electrical Maintenance Foreman (8344 6000) for a safe resolution to the problem.

d) *Confined Spaces*

All access to confined spaces by University staff or contractors shall be subject to Clause 7.3 of the University Environmental Health and Safety Manual.

e) *Contractor Induction*

All contractors undertaking voice/data cabling work on University premises shall do so on condition that they have attended a Special Conditions of Contract induction session. Such sessions are held by the Property & Buildings Department of the University. Induction is a condition of contract.

(This section continued overleaf)

1.1.3 Approved LAN Designs

All building LAN cabling designs shall be approved by the Networks group. A copy of the tender specification, schematic and/or floor plan shall be submitted to the Networks group for approval prior to the issuing of documents for tender. Any cabling installation that does not comply with the 'Standards for the Installation of Voice and Data Networks' may not be connected to the University network infrastructure.

1.1.4 Workmanship

All cabling installations, both external and internal, shall be made using the highest practical standard of workmanship and consideration for aesthetics. Such installations shall be commensurate with the enduring and world-class nature of the University. Any cabling installation that does not comply with the 'Standards for the Installation of Voice and Data Networks' may not be connected to the University network infrastructure.

1.1.5 Aesthetics

All cabling installations shall be compliant with University aesthetic requirements. These requirements fall into the following categories:

a) General Access Areas

Such areas include: All teaching spaces (Theatres, Common Learning Spaces, Classrooms, Tutorial Rooms etc.), offices, corridors/foyers and toilets.

Within the confines of general access areas, cabling shall be concealed within wall and/or ceiling cavities wherever possible.

In cases where such concealment is not possible, surface mounted duct fitted with a removable lid shall be supplied. Samples of the proposed duct shall be submitted to the Project Coordinator for final approval prior to commencement of work on site.

Ductwork is to be located on the wall or ceiling as high as possible. In circumstances where a continuous duct plane cannot be achieved due to existing structure or services, the appropriate duct height shall be determined on site by the Project Coordinator.

Horizontal ducting runs to desktop outlet(s) shall be mounted either at skirting level or immediately above the workstation surface. In cases where GPO's are mounted above the workstation, consideration should be given to the distance between the GPO's and the workstation surface, in relation to the possible use of plug-packs. In cases where duct is mounted at skirting board level, the provision of penetrations in the workstation surface to accommodate power and data leads shall be made part of the design. Desks fitted with modesty panels shall not be used in locations that obscure data or power outlets.

Allowance should be made by the contractor to specify PVC duct that matches the colour of the supporting wall. The colour of Moduline duct shall be chosen in a similar manner and samples submitted to the Project Coordinator for approval prior to commencement of work on site. The use of PVC duct and/or conduit shall be regarded as an option of last resort.

b) Public Restricted Areas

Such areas include: Plant-rooms (basement, individual floor and roof), crawl spaces, undercrofts and roof space voids.

Cabling in these areas shall be supported on hot-dipped galvanized tray. Tray shall not be installed at a height less than 2100 mm above the horizontal of the finished floor.

c) Generic Workmanship

In circumstances where a cable route is required to traverse a construction project in progress, the higher aesthetic standard/technique shall prevail within that space.

Penetrations to walls, ceilings and floors shall be kept to a practical minimum size. Any damage to the building fabric resulting from such penetrations shall be made good as follows:

- No damage shall be visible beyond the confines of the duct or service outlet boxes.
- The fabric shall be restored to the original standard, including colour matching.
- The contractor shall ensure that all areas surrounding the work area are kept clear of all materials, dust and handprints through to the completion of works, subject to the satisfaction of the Project Coordinator. *(This section continued overleaf)*

1.1.6 Sub-Contracting

In the case of cabling work being sub-contracted by the prime contractor, a copy of the 'Standards for the Installation of Voice and Data Networks' shall be provided to the sub-contractor by the prime contractor. This requirement shall cover all levels of sub-contracting.

1.1.7 Notice of Work

Prior to commencing any installation works, a minimum of 24 hours notice shall be given to the designated Networks LAN Design and Installation Coordinator. The same notice shall be given to the Department Manger or Head of the requesting Department.

1.1.8 Variations

Any variations to the issued job specification by the requesting Department shall be referred for approval to the Networks LAN Design and Installation Coordinator. Where cabling work is carried out under a Property & Buildings Project, variations are to be referred to the P&B Project Coordinator. All such variations shall be presented in hard copy format.

1.1.9 ACA Requirements

All cabling work on the University voice/data network shall be carried out by ACA registered personnel only.

All cable and cabling products installed by the contractor (voice or data) shall be installed in compliance with the following ACA standards.

AS/NZS 3080:2003	Telecommunications installations – integrated.
AS/NZS 3087:2000	Generic cabling systems – Specification for the testing of balanced communication cabling in accordance with AS/NXS 3080:2000.
AS3084: 1993	Telecommunications installations – telecommunications pathways and spaces for commercial buildings.
AS/NZS 3085. 1: 1995	Telecommunications installations – Administration of communications cabling systems.
AS/ACIF S009: 2001	Installation requirements for customer cabling (wiring rules).
AS/ACIF S008: 2001	Requirements for authorized cabling products.

Such installations shall also meet all requirements as set out in the University of Melbourne Standards for the Installation of Voice & Data Networks.

All cable and cabling products (voice or data) provided or installed by the contractor shall be ACA approved or ACA listed products.

1.1.10 Structured cable installation warranty.

All structured cabling installations shall be covered by a minimum of ten years warranty provided through the installing contractor from the cable product vendor. Acceptable product integrators are: Panduit and Krone.

1.1.11 Building LAN Infrastructure

All new and additional building voice/data cabling installations shall be made using UTP/Optical fibre technology (see sections 2 & 4). All such cabling installations shall include the provision of all patch and drop leads that comprise the installation contract.

1.1.12 Documentation

The contractor shall provide installation documentation at the completion of the structured cabling system installation. This documentation shall be provided to Networks a minimum of three days prior to the cabling commissioning date. This requirement shall also apply to **each** stage of a multi-staged project.

The documentation shall include the following:

- A floor plan illustrating outlet number and location, transition point location (where applicable) and all major cable routes. Plans shall be presented as CAD documents where practicable. Documentation shall be presented in both electronic and hard copy formats.
- Scanner test results. These may be presented in either hard copy or as an ASCII text document on a 3.5" HD floppy disk, CD-ROM or e-mail attachment. The scanner test results shall have the fields pertaining to building name, department, floor number and outlet number as prescribed by these Standards filled adequately. The testing technician shall sign hard copy test results. The label of the floppy disk or CD-ROM

shall also be signed by the testing technician. Test results in summary format shall not be accepted.

At least three copies of documents describing a data cable installation shall be provided.

A copy to be supplied to:

- The relevant Department Head.
- The Department of Property & Buildings (attention: the University Engineer).
- The Information Division (attention: the LAN Design and Installation Coordinator, Systems & IT Infrastructure).

1.2 Cable Installation

1.2.1 General

All cable and cabling products (copper and fibre) that form part of a voice/data cable installation shall be specified and installed only with the approval of Networks.

In multistory installations, cables shall not be installed between floors except via an approved communications cabling riser or duct. All fire-rating materials removed for the installation of cables shall be replaced such that the original fire rating is preserved.

In cases where adherence to the mandatory separation rules is problematic, the data cables in question shall be housed in PVC conduit or duct over the route length in dispute.

Non-terminated "future capacity" cables are not permitted on University property, unless explicitly exempted. All installed cables on University property shall be terminated at each end and documentation, labelling and (where applicable) test results shall be provided. This applies to **all** permanently installed cable types.

1.2.2 Inter-building Cable Housing

Access:

All duct, pits, conduit and cable (Optical Fibre and copper) owned by the University shall be regarded as University property. Access to such property shall be made through formal agreement only.

Installation:

All cables installed beyond building perimeters shall be enclosed/supported as specified for the following environments:

- **Trenches** - white PVC conduit with a minimum inside diameter of 100mm.
- **Tunnels** - galvanized cable tray with a minimum size of 75mm.
- **Pits** - The minimum size shall be 'P5'. The pit shall be fitted with a traffic-rated reinforced concrete lid, bearing a nameplate inscribed "University of Melbourne Communications". The plate shall have minimum dimensions of 150 mm x 100 mm, and lettering not less than 10 mm in height. The pit shall be dimensioned such that the cable manufacturer's minimum bend radius specification is not exceeded. A minimum of one pit per 100metres of conduit/duct shall be installed.
- **Building external walls** - UV stabilized white PVC conduit. The use of exposed tray is not permitted. External cabling shall only be permitted with the express approval of Property & Buildings/Maintenance and Networks after all other route possibilities have been exhausted. UTP cable shall not be run external to a building.

At the time of installation, all new tray, duct and conduit shall be dimensioned to provide a minimum of 50% expansion capability.

1.2.3 Intra-building Cable Housing

All cables installed within a building perimeter shall be contained or supported as follows:

- **Communications riser** - galvanized cable tray or PVC duct. NB: The use of catenary support is not permitted. Floor penetrations made in concrete slabs as part of a communications riser shall be sleeved with PVC conduit (white). The sleeve shall be cut flush with the surface of the slab or wall at each end.
- **Exposed areas** (ceiling area or wall space) - PVC duct or conduit. Galvanized tray may only be used in communications closets/rooms and plant rooms. Other areas may be exempted at the discretion of Networks.
- **Above false ceilings** (suspended) - catenary wires shall be used in all such areas. A catenary wire shall be used to support no more than 24 UTP cables. In cases where the number of cables sharing the same route exceeds 24, galvanized tray shall be used to support the cables. Cable routes are to avoid close proximity (no less than 50 mm) with fluorescent light fittings. Cables are not permitted to be in contact with any part of a false ceiling.
- **Under a floor** - one or more catenary wires shall be used in all such areas. In circumstances where a catenary cable is impractical due to inadequate access and/or obstacles, PVC duct and/or hose may be used in place of a catenary. Cables are not permitted to be in direct contact with the lower surface of the under-floor space.

1.2.4 Inter-building Cabling

Dual Redundancy:

Buildings that contain a building switch (a component of the University core network infrastructure) shall be connected to the University core network via two physically separate cable routes. The routes shall be designed to ensure continued core network connectivity in the event of damage to any one cable. The destinations of the two cable routes shall provide connection to two disparate core network patching hubs.

Special Departmental requirements:

Departments/Faculties requiring special inter-building network links should contact the Networks Manager (see section 7 - Contact Details) at the planning stage.

Building Earth Isolation:

In situations where network cabling spans two or more buildings not sharing the same earth system, the following mandatory constraints apply:

An inter-building data link shall consist of not less than 12 cores of single mode optical fibre cable terminated in SCA connectors. Multi-mode cable may be used for this purpose at the discretion of Networks.

1.2.5 Intra-building Links

Links between individual network equipment locations within a building shall comprise a minimum of three data paths (three UTP cables, or three optical fibre pairs).

1.3 Network Equipment

The installation, removal or configuration of non-departmental LAN infrastructure equipment shall be carried out by Networks staff only. The connection of departmental switches to the core University network shall only be carried out by Networks staff, or an approved service provider.

Departments/faculties purchasing network equipment for their own use shall ensure that the following items are included:

- A minimum of 10Mbps switched connectivity to the desktop.
- All programming of the switch
- Staging and physical installation

- Maintenance of hardware and software

Maintenance is not required for switches currently under lifetime warranty from Cisco and supported by the hot spare program operated by Networks. It is recommended that networks be contacted prior to any purchase in order to clarify the issue of maintenance.

Building switches purchased under a building works program shall also include all programming, staging, installation and three years software and hardware maintenance.

1.4 Network Equipment Environment

1.4.1 Locations

The location and housing of network equipment shall be clearly defined in the project design documentation and have the approval of Networks and the requesting department.

1.4.2 Secure Rooms or Closets

If network switch equipment is to be located in a secure room or large closet, such equipment shall be mounted in a *Lab Rack*. A 39RU or 45RU unit approved by Networks shall be used. If a lab rack is supplied having floor-mounting brackets in place of the preferred rigid plinth, the rack shall be bolted to the floor and braced to the closest wall at the top. Such bracing at the top of the rack may form part of a field cable duct or tray.

1.4.3 Room Size & Facilities

All existing or purpose built rooms that are used to house network equipment are to be included in the building fire detection system. An extinguisher suitable for electrical fires shall be provided and installed within the room. Such rooms or closets shall be a minimum of 1.5 metres deep by 2.5 metres wide (internal dimensions). A fluorescent light with switch inside the closet and a dedicated double 15Amp GPO shall be provided as part of the closet.

The switch for the light shall **not** be mounted on the GPO plate. Adequate through-flow ventilation shall be provided in a manner that does not compromise the security of the closet. The door shall be equipped with a lock to Networks specification for that location.

Floor standing cabinets shall be located in such a way as to provide a minimum of 650mm clearance behind the cabinet and a minimum of 1 metre at the front of the cabinet.

All communications closets located in areas subject to building works shall be thoroughly cleaned before any data cable termination work is carried out. The cleaning shall be such that all visible traces of brick and plaster dust are removed from the closet floor, walls and ceiling. The same shall apply to all racks, patch panels, cable management ducts and cable tray located in the closet.

1.4.4 Non-Secure Locations

Where equipment is to be located in a non-secure location, an enclosure of one of the following types shall be used:

Up to and including 12RU - a 450mm deep enclosure approved by Networks shall be used. This enclosure shall be equipped with a rear swing mount to facilitate rear access to cabling and active equipment.

Above 12RU - a 600mm deep, internal swing frame enclosure approved by Networks shall be used. Where permissible, enclosures that are above 18RU should be floor standing fully enclosed cabinets.

1.4.5 Cabinet Details

Floor standing cabinets shall be 800 series with four mounting rails adjusted to the 19" standard. A minimum of ten (five per side) vertical cable support rings shall be provided.

All cabinets or enclosures are to be fitted with a solid steel front and rear door (where applicable). Perspex or glass panels are not permitted.

The mounting height of a wall mount cabinet shall be in accordance with the relevant ACA regulation.

(This section continued overleaf)

1.4.6 Cable Support & Dressing in Cabinets & Racks

Suitably dimensioned cable tray or duct shall be installed to support horizontal and vertical cables leading into a lab rack or cabinet.

Cables run within the confines of a lab rack or cabinet shall not intrude into the area to be occupied by network equipment.

Horizontal cable management ducts shall be provided for field and link cables and patch leads. One panel shall be provided per 24-way patch panel.

Lab racks shall be fitted with full height, front and rear, vertical cable management ducts. Field and link cables shall be led into the rack via the rear ducts.

1.4.7 Cabinet/Rack Identifier

Each cabinet and or rack within a communications room shall carry a unique identification label.

1.5 Funding Matters

Below are detailed procedures and principles for the funding of the installation and maintenance of voice and data networks.

1.5.1 Maintenance

The Information Division is responsible for the operation and maintenance of University infrastructure by which department LANs and PABX-based telephone services are interconnected. Departments are responsible for the installation and maintenance of their LANs and any associated project and ongoing costs (including maintenance and usage). Departments are responsible for the cost of telephone use, installation and changes.

1.5.2 Inclusive Budgeting

Any changes to voice and data networks, including those changes due to refurbishment or relocation, which change capital and/or recurrent costs must be properly budgeted. Neither the Information Division nor any other part of the University have funds set aside for unplanned network changes.

1.5.3 Project Impact on Infrastructure

Early in the planning of something that involves network changes, an explicit written statement must be obtained from the Senior Network Project Manager (for LAN changes) and/or the Telephone Systems Manager (for telephone changes) advising any University infrastructure changes that may be necessary to support the project, and the corresponding costs. The capital and current year maintenance costs must then be included in the project budget together with the costs associated with department systems. The costs may include equipment, contractors, staff and project management and inter or intra building cabling costs. Project managers must ensure that ongoing costs are clear, and that relevant departments are advised to consider the matter in their budgets.

1.5.4 Maintenance Funding

In the case of University departments, the first network device in a building is maintained centrally by the Information Division as the budget cycle allows. Similarly University Telephone Exchanges (PABXs) for the Parkville campus are maintained centrally through the Information Division. University affiliates and third parties are charged recurrent costs reflecting the full cost of service provision.

2. Unshielded Twisted Pair (UTP) Category 5e/6

2.1 General

2.1.1 Network Configuration Constraints

Each basic link shall comprise of a four pair Category 5e cable and connectors.

Maximum link length - 90 metres

Maximum channel length - 100 metres

Maximum number of stations per segment - 1.

2.1.2 Installation Standards

All new cabling installations shall meet the TIA/EIA-568-A-5 Category **5e** standard.

Cat 6 installations may be permitted, subject to consultation and approval by Networks. See section 2.3 for details.

The cabling system shall include all patch panels, horizontal cables, transition blocks, vertical cabling, modular jacks, system cables, patch cables, drop-leads, cable management, and a comprehensive labelling system.

The cable interconnecting a network outlet and a horizontal distribution panel/transition point or patch panel shall be of one continuous length with no intermediate joins, splices or taps.

NB Transition/consolidation points shall only be used with the specific approval of Networks.

Where horizontal cabling is part of an integrated voice and data installation, both voice and data cables shall be terminated on common patch panels.

Additions/repairs to existing Cat 5 cabling shall be made using Cat 5e standard components and cable.

2.1.3 Installation Warranty

All new cabling installations shall include a minimum 10-year manufacturer's warranty. Such warranted cabling systems shall cover the cabling channel, and therefore include all patch and drop cables.

2.1.4 Number of Outlets Per Workspace

The following information represents a **minimum** requirement for the number of UTP outlets that shall be installed in each type of workspace.

a) *General Staff or Post Graduate Office/Workspace*

Three outlets shall be cabled to each staff or postgraduate office or workspace.

b) *University Student Access Carrel/University Common Lab*

Carrels shall have a **minimum of one** outlet per workspace. Thus, if a carrel or bench area is designed to accommodate more than one person, as many outlets as workspaces shall be installed.

c) *Departmental Student Computer Lab*

Departmental computer labs shall have a **minimum of one** outlet allocated per seating space.

d) *Lecture Theatre/Teaching Space*

A **minimum of three** UTP outlets shall be provided to each standard lectern. A **minimum of two** outlets shall be provided for a "mini lectern". Network access via lectern outlets shall be controlled by a security system approved by Networks.

If a student seat in a teaching space is to be provided with a network outlet, **one** UTP outlet shall be installed per seat.

Tutorial/Seminar rooms shall be provided with **two** outlets. A level of network access security approved by Networks shall be provided for all such installed outlets.

Cabling provision shall also be made for a University telephone extension within the room.

e) *Print/Photocopy/Fax Room or Location*

A **minimum of three** UTP outlets shall be provided in each dedicated printer/photocopy/fax room or location.

f) *Information Kiosks*

A **minimum of One** outlet shall be run to an information kiosk.

2.1.5 Network Outlet & Labelling

The outlet shall be fitted with a clear and permanent label that depicts the unique outlet identifier. The identifier shall contain the following elements:

- Cabling zone identifier (A - Z)
- Patch panel identifier (A - Z)
- Patch panel jack identifier (1 - 24)

For example: An outlet having a label - 'BC15' will be cabled back to the 15th jack on the third patch panel (C) in the distribution location servicing the second zone (B) in the building.

Cabling zones may cover multiple floors and floors may have multiple zones. In general, zones will relate to specific departments or tenants within a building, or specific geographic locations within a single occupancy building. The physical boundaries of Cabling zones shall be defined by the requesting department in consultation with Property & Buildings, the project consultant and Networks.

Patch panels used to terminate integrated voice and data cables shall be labelled according to this scheme with both voice and data cables sharing the same numbering sequence.

2.1.6 Cable Installation

Cable termination onto a horizontal distribution panel or patch panel shall be undertaken in a manner that permits additional cables to be terminated without unduly disturbing previously installed cables. One horizontal cable management (patch lead minder) panel shall be used for each patch panel. The horizontal cable management panel/s shall be dimensioned to accommodate 24 patch leads. All field cables shall be led through the rear cable management duct prior to termination on the patch panel jack.

No more than 24 cables shall be cable tied in a bunch.

A 2-metre loop of cable shall be left within or on the approach to each communications room/enclosure to facilitate future re-termination of the cable. Such cable slack shall be coiled and supported in a neat and practical manner.

A 0.5-metre loop of cable shall be left in the ducting on the approach to each network outlet to facilitate future re-termination of the cable, should this be required.

Precautions shall be observed to eliminate cable stress caused by tension in suspended cable runs and tightly strapped bundles.

Cable bundles shall not rub on, or be unduly compressed against any cable tray, equipment racking, or other cable support.

Cable bundles shall not obstruct the installation and removal of equipment in equipment racks.

Where UTP cables are run parallel with electrical cables, current ACA rules for minimum separation shall be observed.

Where UTP cables are run in the proximity of electrical motors or transformers the minimum separation shall be 1 metre.

In situations where the above minimum distances cannot be applied due to a lack of available space, data cables shall be enclosed in rigid and/or flexible PVC conduit. In cases where the number of data cables renders conduit impractical, PVC duct shall be used

In cases where *Moduline* duct is interrupted by a wall, segregation of cables shall be maintained through the wall, and throughout all cavities between the two lengths of duct.

(This section continued overleaf)

2.1.7 Testing

Prior to undertaking testing, all outlets must be labeled according to clause 2.1.5 of this Standard.

Cabling shall be tested according to the proscribed standard (see sections 2.2 and 2.3). All tests shall be made using a *Fluke* DSP 4000 series or higher specification cable tester. Testing shall be carried out with building electrical services operating (lighting, power, air-conditioning plant and lift services where applicable). Where this is not practical, cable testing shall be carried out on all installed cables within the project time frame. At the discretion of Networks, further testing shall then be carried out on not less than 10% of the total installed cable plant with all electrical services operating. This test shall be carried out within one month of the project schedule test. The cables selected for live condition testing shall be selected from **all** patch panels installed. If this delayed testing is required, the cabling installation shall be deemed incomplete, and payment withheld pending the outcome of the delayed tests.

Networks reserves the right to observe the test procedure at any time and to perform its own tests on the cable installation.

2.1.8 Documentation

See section 1.1.12

2.1.9 Structured Cabling Components

a) Patch Panel & Outlet Specification

Patch panels and voice/data outlets shall be an integral part of a structured cabling system that is warranted by the one supplier. All installed structured cabling systems shall be subject to the approval of Networks.

B) Patch and Drop-lead Cables

All patch and drop cables shall be certified to the category of cabling being installed. Hand-made patch and drop cables shall not be permitted. Patch and drop cables from one category shall not be used in an installation cabled to a differing category.

Two *Velcro* cable ties suitable for securing 24 UTP cables shall be supplied for each patch panel installed.

The maximum length of a patch or drop-lead shall be 5 metres. Lead lengths greater than 5 metres shall be specifically approved by Networks.

Patch leads shall be colour coded according to the following convention:

Service	Colour
Data	Blue
Data cross over	Red
Core Network	Pink
Powered Ethernet	Purple
Voice	Yellow
Serial data	Green
Fire, Security, BAS	Orange

(This section continued overleaf)

2.2 Cat 5e Specific

2.2.1 Channel Specification

The channel shall consist of cable and connecting hardware meeting or exceeding the Category 5e specification. Pairs shall be terminated according to the **T568A** wiring scheme.

2.2.2 Installation Standard

All cabling infrastructures shall be installed in accordance with AS3080-2002, and according to all other requirements set out in this specification.

2.2.3 Testing

All installed cables shall be tested to the **Basic Link** configuration

2.3 Category 6 Specific

2.3.1 Channel Specification

The channel shall consist of cable and connecting hardware meeting or exceeding the Category 6 specification according to the **TIA/EIA 568 B.1 & B.2** standards. Pairs shall be terminated according to the **T568A** wiring scheme.

2.3.2 Installation Standard

All Cat 6 structured cable systems shall be made using products, cable and installation practices that comply with **TIA/EIA-568-B.1 & B.2..** The installation of all Category 6 cabling systems shall be conditional on approval by Networks.

2.3.3 Testing

All installed cables shall be tested to the **Permanent Link** configuration. Such tests shall be carried out using an appropriate cable manufacturer's personality module. All marginal passes shall be treated as a failed test.

2.3.4 Supplementary installation constraints

As a direct result of the critical nature of Link and Channel impedance compliance in a Cat 6 system, the following supplementary installation constraints are mandatory:

- a) The maximum basic link length of 90metres shall be reduced by 0.4% per degree Celsius above an ambient of 20 Deg C. For LAN design purposes a maximum link length of 75m is strongly recommended.
- b) Basic links that contain a consolidation/transition point shall have a minimum cable length between connectors of no less than 15m.
- c) Structured cabling systems shall comprise cable and connectors from one cabling integrator only. This requirement is based on interoperability and warranty considerations
- d) Cat 6 cable shall **not** be installed in buildings constructed prior to 1970. Exemptions may be made for refurbished or extended areas that meet the current building construction codes
- e) Catenary wires shall not be used to support cables in ceiling or under-floor areas. Cables run through such areas shall be laid up on galvanized steel tray or housed in PVC duct, conduit or flexible hose
- f) A change of plane (e.g. from the vertical to the horizontal) in a tray installation shall be accomplished through the use of sections of waterfall. The same shall apply to locations where bunches of cables exit the main route and leave the tray
- g) Nylon cable ties shall not be used to bunch or secure a cable or cables. All bunching and securing shall be accomplished with Velcro type strips
- h) Cable slack at the cabling hub location shall be laid up in a figure-of-eight configuration and suspended in the vertical plane by *Velcro* strips
- i) The location of cable slack at the data outlet will be conditional on the availability of suitable space that will accommodate the bend radius of the cable. All effort shall be expended in identifying and using such a space where practical
- j) In locations where a stud wall is present, the use of a flush mount outlet plate on the plaster wall shall be used in preference to any type of cable duct

2.3.5 Surface Cable Duct & Raceway

Surface cabling duct for data, voice and power cables shall be sourced from the *Panduit* range of surface raceway products. In locations requiring the enclosure of both data and power cables, one of the following options shall be used:

- a) *Panduit* TG-70 raceway with one segregation divider and data and power outlets mounted flush to the cover.
- b) *Panduit* 'Twin-70' raceway with one compartment used for power and the other for data. All outlets may be flush mounted
- c) *Panduit* T-70 raceway with one segregation divider. Data outlets may be flush mounted, but the power outlets shall be mounted on an offset box either above or below the raceway.

NB: All data outlets mounted on the above raceways shall be mounted on 45 Deg. Mounting plates, eg *Panduit Mini-Com Sloped Face Plate CFPSE4IW*

In locations requiring the enclosure of data cables only, any of the above *Panduit* raceway may be used with flush mounted outlets. *Panduit* T-45 raceway may be used where a minimum of cables are to be enclosed. Outlets shall be mounted external to the raceway by the use of offset boxes.

2.3.6 Moduline Duct

Moduline cabling duct shall be used only with the approval of Networks

In the event *that Moduline* duct is permitted, the following shall apply:

- a) *Moduline* duct shall have a minimum depth of 50mm and a data compartment height greater than the minimum bend radius of the installed cable
- b) Inside and outside right-angle bends shall be made in such a way as to accommodate the bend radius requirements of **all** of the cables to be installed
- c) Sharp edges on covers at inside bends shall be removed and cables protected from possible sheath damage and compression
- d) Where practical all data/voice outlets shall be mounted external to the duct space
- e) Data outlet jacks mounted on *Moduline* duct shall be fitted to angled face plates eg *Panduit Mini-Com Sloped Face Plate CFPSE4IW*

3. Telephones

3.1 Provision of Telephone Services

Building telephone infrastructure may use Cat 3 twisted pair cable, i.e. building MDF to IDF. Reticulation to the desktop shall only be made through a fully integrated Cat 5e/6 structured cabling system. All references in these standards to Cat 3 non-integrated cabling system products are made for the express purpose of maintenance and limited expansion of existing cabling installations. The installation of new, or expansion of existing Cat 3 cabling systems shall be at the discretion of Networks.

3.1.1 Specific Service Classes and their Connection

Specific services shall be provided to University buildings as follows:

- **Facsimile** machines may be connected to either a University PABX extension or to a Direct Exchange Line (DXL)
- All **fire alarm** systems shall be connected via a DXL or other leased line. University PABX extensions shall not be used for this service
- **Lift telephones** shall be connected via a DXL or other leased line. University PABX extensions shall not be used for this service

3.1.2 Use of Existing Infrastructure cabling (excluding expansion)

In cases where the existing building telephone infrastructure is used (including MDF and IDFs), Networks will undertake to provide the following:

- Telephone handsets (including plug in and test)
- PABX programming
- PABX MDF jumpering
- Building MDF jumpering
- Building IDF & FDP jumpering

NB: All costs for the above services are to be borne by the requesting department or project budget.

3.1.3 Replacement/Upgrade of MDFs

In cases where the building MDF and/or IDFs are replaced/upgraded, the installing contractor shall provide the following:

- Termination of the incoming cable/s on the 'A' side of the building MDF
- Termination of the IDF feeder cables on the 'B' side of the building MDF
- Jumpering between the 'A' & 'B' sides of the building MDF in order to restore pre-existing telephone services and any additional services as specified in the project.

NB: All costs for the above work are to be borne by the requesting department or project budget.

3.2 Handsets

Handsets may be purchased through the Telephone Service Coordinator, Information Division (8344 7000). Handsets purchased from other sources (commercial) are permitted under the following provisions:

- The handset and/or accessories carry an ACA permit number
- All maintenance of the handset is the responsibility of the purchaser

3.3 Outlets (non integrated voice/data installation)

Outlets may be from the *Krone* or *Panduit* range. A mix of the two product ranges is not permitted.

(This section continued overleaf)

Krone Products:

For use on solid walls or duct:

Enhanced Cat 5 *Highway System* range:

SMK 1 Single 8x8 RJ45, Category 5 Surface mount RJ45, T568A

Part number: 6467 1 075-10 (ivory).

For use on plaster cavity walls:

Flush-mount (FMK) 8x8 RJ45 T568A part number 6467 1 072-00 mounted on a standard faceplate (*HPM* or *Clipsal*).

Panduit Products:

For use on plaster cavity walls:

4 Module Space, Single-Gang Sloped Faceplate Kit. Part number CFPSE4xx (choose colour to suit décor of installation).

For use on solid walls or duct:

MINI COM 2 Module space Surface Mount Box. Part number CBXJ2xx-A (choose colour to suit décor of installation).

RJ45 jack for above mounting plates:

Mini Com Jack part number - CJ588AYL.

3.4 Outlet Labelling

Voice outlets in an integrated voice and data system shall be labelled according to the scheme as set out in section 2.2.4

Voice outlets in a non-integrated voice and data system shall be labelled Vxx (where xx is a two-digit sequence number for the FDP/IDF) both at the outlet jack and also at the IDF/FDP.

3.5 Permitted Attachments

All equipment intended to be attached to the University telephone system shall be of an approved type and be fitted with a label displaying the relevant ACA permit number.

3.6 Cabling Installation & Alterations**3.6.1 Installers & Standards**

All cabling work on the University telephone network shall be carried out by ACA licensed personnel only. All such work shall meet the minimum requirements of ACA standard TS 009. If such cabling installations are not being managed by Networks, the approval of Networks shall be gained before the work commences.

3.6.2 Infrastructure Cable (Inter & Intra Building)

Underground service cables shall be specified as 1/0.4 mm² jelly filled underground telephone cable.

Internal telephone trunk cabling shall be specified as indoor grade 1/0.50 mm² standard telephone cable.

Cable installed between MDFs and IDFs in new installations shall provide a minimum of 25% spare capacity.

3.6.3 Cat 3 Applications

Cat 3 cable shall only be used in the following instances:

- Inter building trunk cabling
- Tie cables between an MDF/IDF and a voice distribution patch panel
- IDF/FDP to outlet cabling in a non-integrated voice and data cabling installation

(This section continued overleaf)

Cat 3 cable shall not be terminated on an RJ45 voice/data outlet (RJ45 jacks on a voice link patch panel are exempted).

Cat 5e/6 cable shall be used in all other voice cabling instances, and shall be terminated on RJ45 outlets.

The unused pair (pair 4) of a Cat5/5e/6 structured cabling system shall not be spliced or extended at the terminating jack in any manner. The outlet jack in such a cabling system shall not be utilized as a voice FDP.

Tie cables installed between a building MDF/IDF and a fully integrated voice and data system enclosure shall comprise Cat 3 telephone cable terminated on a Voice Tie patch panel. One pair of the tie cable shall be terminated on each RJ45 jack according to the **T568A** wiring scheme.

3.6.4 Splitters

Types of splitters and their specific uses:

<u>Voice/data break out</u>	Provides one jack for access to pairs 2 & 3 (Data) Provides one jack for access to pairs 1 & 4 (Pri & Sec Voice)
<u>Voice pri/sec break out</u>	Provides one jack for access to pair 1 (primary voice) Provides one jack for access to pair 4 (secondary voice or power)
<u>Voice parallel</u>	Provides two jacks that are both connected to pair 1

The use of splitters is not supported nor recommended by Networks and they may only be used according to the following conditions:

- The use of splitters shall be restricted to installations where the running of an additional link cable is impractical on a cost or environmental basis. Designs for new cabling systems shall not include the use of splitters.
- Voice /data break out splitters may be used to provide one data and one voice connection over one cat 5/5e/6 link. The link data rate shall not exceed 100Mbps. The splitter shall be approved for use at 100Mbps.
- Voice pri/sec break out splitters may be used to provide two individual voice circuits over one Cat5/5e/6 link.
- Voice parallel splitters may be used to provide two parallel voice outlets over one Cat5/5e/6 link.
- The same type of splitter shall be used at each end of a link.
- Cascaded splitters shall not be permitted.
- Adequate patch cable management shall be used in the patch panel area where a splitter is installed.

In all of the above cases the following shall apply:

- All equipment (voice &/or data) shall be located in the same room as the data outlet providing the services.
- In the case of open plan office spaces and laboratories, the equipment shall be connected to the local splitter with drop cables not exceeding 5 metres.
- Drop cables shall be kept to a minimum length and installed in a manner that complies with OH&S requirements.

3.7 Termination Frames

MDFs, IDFs and FDPs shall be specified as *Krone* Insulation Displacement Terminating Systems employing the *LSA-PLUS* quick connection type modules.

All termination frames shall be located according to ACA height and working space requirements. Termination frames shall not be installed above doorways, in false ceilings or under-floor spaces.

(This section continued overleaf)

3.8 Jumpering & Patching

All new jumpers shall be fed through fitted jumper rings along the jumper route, and installed in a neat and tidy manner. Diagonal paths and other 'short-cuts' are not permitted. All redundant jumpers shall be removed from the terminating frame as part of the installation of new jumpers.

The following non-voice services shall be clearly identified in all distribution frames carrying such services:

Service	Plug Colour	Krone part No.
Fire alarm	Red	6 089 300 600
Security alarm	Green	6 089 300 602
Security camera	Green	6 089 300 602

Distribution frames using *Krone LSA-PLUS* modules shall be fitted with plastic marker plugs according to the above list.

Tag strip distribution frames shall have green or red PVC tubing placed over the tags occupied by any of the listed services. The tubing shall effectively block the attachment of test equipment to the non-voice services.

Jumpers installed on solder-tag type frames shall be soldered.

Where patch-leads are required in an integrated voice and data installation, **yellow** patch-leads shall be used. The length of the patch-lead shall be chosen to minimize excessive slack and avoid the need for shortcuts.

3.9 Testing

In all cases where cables are terminated or re-terminated, the contractor shall carry out the following tests on all effected pairs:

- Shorted pair
- Open circuit pair
- Crossed pair or mate

All faults detected shall be entered in the relevant record book.

The installing contractor shall guarantee a one-to-one correspondence of all colours and mates of an installed cable from end to end.

NB: All costs for the above testing are to be borne by the requesting department or project budget.

3.10 Documentation

The installation contractor shall record all additions/alterations to the University telephone network in the appropriate record books in a clear, complete and legible manner.

In the case of new installations, record books must be provided and secured by the installation contractor at each building MDF and floor IDF. All record books and FDP cards shall be filled in by the installation contractor (both 'A' & 'B' sides). The 'A' side detail shall include information on the trunk cabling and the 'B' side must include the PABX extension number and room details.

Building MDF record books must be located and secured on site.

Tie cables installed between a building MDF/IDF and a fully integrated voice and data system enclosure shall be provided with a new record book at the patch panel location. The installation contractor shall provide the record book and shall fill in the 'A' - side information.

Contractors employed to install jumpers and/or patch leads in integrated and non-integrated cabling systems shall record the 'A' and 'B' side information in all record books for that system. This requirement shall include patch panel record books where relevant. If a record book cannot be found for a specific location, a replacement book shall be obtained from the Telephone Services Coordinator. All details of the current work shall be entered into the new book.

(This section continued overleaf)

3.11 Liaison

Specific inquiries are to be directed to Information Division staff members as indicated below:

- New installations, moves and changes - Telephone Service Coordinator
- Technical/managerial telephone issues - Manager, Telephone Systems
- Telephone cable installation issues - Network Engineer
- Telephone Systems Web Site - <http://www-networks.its.unimelb.edu.au/telephones/>

4. Optical Fibre Cable

4.1 Installation Constraints

Minimum bend radii, both during and post installation, shall be maintained within the cable manufacturers specification. The same shall apply to all pulling forces used to install the cable.

Cable slack shall be provided as follows:

- Within pits – 2 metres minimum (where available space permits)
- At a termination location – 5 metres minimum
- Within a termination enclosure – 0.5 metre minimum

NB: the manufacturer's minimum bend radius specification shall not be exceeded in any of the above locations.

All fibre cable terminations shall be made in Networks approved wall or rack mount enclosures. When using rack mount enclosures a patch cord protector shall be included in the installation. Two *Velcro* cable ties suitable for securing Optical fibre duplex patch cables shall be supplied for each fibre enclosure installed.

All cable installations are to include suitable patch cables as part of the installation. Patch cable length and termination type is to be determined by Networks.

All locations of the cable run that may be accessed by service personnel are to be fitted with a *Laser hazard-warning* label.

Networks is to be consulted with respect to all cable route variations or route clarification.

4.2 Labelling

All cables entering and/or leaving a pit, building, riser or termination enclosure shall be fitted with a durable label indicating the following:

- Type of cable (Fibre)
- Unique cable identifier (in the case of multiple cables)
- Number of cores
- Source and destination buildings

E.g. 201-193-24-2 indicates the second 24-core cable going to building No. 193 from building No. 201.

In accessible areas of the cable route, the cable and/or covers of the cable shall be labeled with appropriate hazard warning labels. The labels shall be affixed at 10m intervals.

4.3 Documentation

Refer to section 1.1.12 for general documentation requirements.

The documentation shall include the following specific information:

- Cable type
- Route followed
- Pit locations (where applicable)
- Building names
- Parameter thresholds set on test equipment (including wavelength).
- "Loss Budget" calculations relating to each core
- Light Source Power Meter Link Loss
- Length measurement

OTDR test results. Results shall be presented in hard copy format and also on magnetic or optical media

(This section continued overleaf)

4.4 Test Procedures

All tests shall be carried out in accordance with AS3080:2002

OTDR tests shall be carried out with the point of injection being at both the 'A' and 'B' ends of the cable.

The optical link loss budget shall be according to TIA568B and ISO 11801, 2nd edition

An appropriate lead-in cable shall be included in all OTDR measurements.

4.5 Cable Specification

Cable specification shall comply with AS 3080:2002

4.5.1 Multi-mode Fibre:

Termination:

All multi-mode terminations shall be made with SC connectors. ST connectors may be used in the expansion of ST equipped enclosures.

Use of the 50-micron variant multimode fibre compliant with TIA OM3 shall be subject to the approval of Networks

4.5.2 Single-mode Fibre

Termination:

All single-mode inter-building terminations shall be made with **SCA** connectors (or as specified by Networks). Intra-building connections shall be **SC**.

4.6 Considerations for Gigabit and 10 Gigabit services

4.6.1 Selection criteria

The choice of fibre type shall be based on the following parameters:

- Throughput requirement
- Type of equipment to be used
- End to end distance
- Environmental requirements

4.6.2 Fibre Designations

The following TIA fibre types shall be considered:

- OM1 (essentially 62.5/125 micron)
- OM2 (50/125 micron)
- OM3 (new generation 1500/500 MHz.Km fibre in either 50 or 62.5/125 micron)
- OS1 (single mode)

NB: The above designations are, at the time of this revision, at proposal stage for inclusion in ISO 11801

Table 1 - TIA designation Versus Modal Bandwidth

	Fibre Core Diameter	Launch Bandwidth		
		850nm	1300nm	1550nm
OM1	50 or 62.5um	200MHz/Km	500MHz/Km	
OM2	50 or 62.5um	500MHz/Km	500MHz/Km	
OM3	50um	1500MHz/Km	500MHz/Km	
OS1	9um			2200MHz/Km

(This section continued overleaf)

Two distance based equipment types are available – SX and LX.

SX operates at 850nm and is suitable for both multi and single mode short distance applications.

LX operates at 1300nm and is suitable for single mode long distance applications.

Tables 2 and 3 illustrate the relationship between key parameters for 1000Base SX and LX installations. These tables may be used to determine the unknown variable in the Equipment – Cable Type – Distance equation.

Table 2 – 1000Base SX

<i>Core Diameter</i>	<i>Modal Bandwidth</i>	<i>Max Distance</i>
62.5um	200MHz/Km	275m
50um	400MHz/Km	500m
50um	400MHz/Km	550m

Table 3 – 1000Base LX

<i>Core Diameter</i>	<i>Modal Bandwidth</i>	<i>Max Distance</i>
62.5um	500MHz/Km	550m
50um	400MHz/Km	550m
9um	N/A	5000m

5 Wireless Local Area Networks (WLANs)

The provision and deployment of Wireless Local Area Networks is permitted by the University of Melbourne.

WLANs may be deployed within a departmental/faculty space, and optionally be interconnected with the University wide Wireless Local Area Network (MUWIRELESS). All such WLAN installations and/or connections to MUWIRELESS shall be made according to the following conditions and standards.

5.1 Wireless Spectrum

The portions of the wireless spectrum designated for Wireless Networks are considered a University wide resource. All devices that use the spectrum shall be approved by Networks. Networks may require devices that cause interference to be switched off or reconfigured at its discretion.

5.2 Standards

All local area wireless base stations shall conform to the 802.11b or 802.11g standard. Use of base stations conforming to other standards shall be subject to approval by Networks.

5.3 Safety

All wireless devices shall be compliant with Australian and International radiation standards.

5.4 Access, security and Authentication

All WLANs shall include a mechanism that blocks access to all but the following nominated groups: University staff, student, and honorary appointees. Departmental/Faculty WLANs shall provide users with a data encryption option. The selected data encryption option(s) shall be approved by Networks.

5.5 Connecting a Wireless Base Station to MUWIRELESS

Departments wishing to connect a wireless base station to MUWIRELESS may do so in consultation with Networks. Departments shall acknowledge that Networks will configure, monitor and retain software control for each connected device. This will include base stations, cards, antennas and intermediate switches as required.

Departments are responsible for all costs associated with the purchase, installation, physical security and physical maintenance of all devices (within departmental spaces). This shall include all cabling and associated costs required to connect the base station exclusively to a Networks managed building switch (to Network's satisfaction).

The MUWIRELESS VLAN shall not be connected or trunked to departmental switches containing VLANs other than MUWIRELESS. Departments shall acknowledge that no connections other than approved base stations shall be connected to infrastructure designated as Wireless Network Infrastructure.

5.6 Inline Power

Wireless base stations may be connected to inline power adaptors via UTP with the approval of Networks. This shall be conditional on the UTP cable being clearly labelled and patch leads being purple sheathed. Documented evidence of Network's acceptance of the inline power installation shall be obtained by the department.

5.7 WLAN Documentation

A wireless LAN coverage map shall be provided to Networks. The map shall include the following:

- Signal strength of specific zones within the proscribed service area. Expressed in dB relative to the base station/s reference level
- Operating frequency and channel of each base station
- A marked up floor/grounds plan indicating all hard-wired components of the WLAN

(This section continued overleaf)

5.8 Other Information

Information regarding Wireless networking at the University of Melbourne can be obtained from:

<http://www.infodiv.unimelb.edu.au/wireless> or e-mail: wireless-info@unimelb.edu.au

6 Microwave LAN/WAN Links

The establishment and use of microwave based LAN or WAN links on the University network is permitted. All such links shall be subject to the approval of both Networks and Property & Buildings, when deployed on University property.

Microwave links may be used to link or extend existing LANs, or be a functional part of a WAN. All such microwave links shall be made according to the following conditions and standards.

6.1 Wireless Spectrum

Microwave links may either be of the spread-spectrum, or fixed frequency type. Where required by the ACA, a license shall be obtained and its currency maintained.

6.2 Procedures and Requirements for Establishing a Microwave Link

The following prerequisites shall be submitted to the Engineering section of Property & Buildings for referral to the Buildings and Estates Committee:

6.2.1 Remote Site Authorization

Written authorization shall be obtained from the administrator of the remote site. Such authorization shall include the following:

- A statement of the legal right of the University to occupy such space(s) as set out in the design document
- Agreement to the scope of works
- Specific access and induction issues pertaining to the remote site

6.2.2 System description

A comprehensive description of the proposed microwave system shall be supplied, and shall include a statement of compliance with the design criteria, or job description, from either the equipment supplier or the installer.

6.2.3 Statement of non-interference

Written confirmation shall be supplied that the proposed installation will not directly, or indirectly, cause interference to existing services at either end of the link or en-route.

6.2.4 Design Schematic

A design schematic, which accurately depicts all of the major components of the proposed link, shall be provided.

6.2.5 Design Certificate

A design certificate shall be obtained from a structural and/or civil engineer. The certificate shall warrant the following:

- The structural integrity of the completed antenna and support system. When completed in accordance with the engineer's documented design and job instructions, the system shall be structurally adequate.
- Compliance of the structure(s) with current Australian Standards covering loading, wind force and steel and concrete structures.
- Compliance with the Building Amendment Act and the Building Code of Australia.

6.2.6 Construction Drawings

Engineering drawings clearly and accurately depicting all fabrications fixings and fasteners that are a part of the installation shall be provided.

(This section continued overleaf)

6.3 Labelling

All microwave antennas and head units shall be fitted with a weatherproof and durable label that shall include the following information (License related information shall be exempted in cases where a license is not required):

- The words “DO NOT REMOVE” (point size to be no less than 14pt)
- The Transmitter Spectrum Access Number (ref. License)
- The transmit and receive frequencies (ref. license)
- Location information regarding the far end of the link path (i.e. “Redmond Barry, University of Melbourne” or “Centaur building, Austin Repat”)
- The link antenna polarization (ref commissioning documents)
- The body responsible for the link (i.e. Networks Manager, Information Division, University of Melbourne 8344 7477)

6.4 Recurrent costs

Provision shall be made in the project budget for the engineering and other reports required in section 6.2 above, ACA license fees and the maintenance contracts relating to the microwave link equipment and the network router.

7. Contact Information

Position **Senior Network Project Manager**
Staff Member Dr. Mark Munro
Phone 8344 7477
Mobile 0408 101 287
E-mail mcm@unimelb.edu.au

Position **Network Engineer**
Staff Member Ben Warden
Phone 8344 5733
Mobile 0409 001 618
E-mail ben@unimelb.edu.au

Position **LAN Design and Installation Coordinator**
Staff Member Phill Solomon
Phone 8344 8804
Mobile 0407 509 709
E-mail p.solomon@unimelb.edu.au

Position **LAN Design and Installation Coordinator**
Staff Member Les Ridge
Phone 8344 6841
Mobile 0407 505 209
E-mail lesliejr@unimelb.edu.au

Position **Manager Telephone Systems**
Staff Member Linda Bolton
Phone 8344 7111
E-mail lbolton@unimelb.edu.au

Position **Telephone Services Coordinator**
Staff Member Carolyn Gregory
Phone 8344 7000
E-mail c.gregory@unimelb.edu.au

Position **Vice Principal (Property & Buildings)**
Staff Member Dr D Daines
Phone 8344 6104
E-mail d.daines@unimelb.edu.au

For inquiries regarding cable installations and modifications please contact LAN Design and Installation Coordinator – Les Ridge on 8344 6841 or email netinst@its.unimelb.edu.au

8. Glossary

The following glossary is intended to define and clarify frequently used words and acronyms within this standard.

Word or acronym	Definition
45RU	45 Rack Units. 1 Rack Unit = 44.45mm (1 3/4").
ACA	Australian Communications Authority.
AS3080-2002	ACA standard – integrated telecommunications cabling systems for commercial premises.
ATM	Asynchronous Transfer Mode. Protocol for transporting data over a communications link.
AWG	American Wire Gage. Imperial unit used to specify electrical conductor size.
BAS	Building Automation System.
Basic Link (Cat 5e only)	A structured cable installation comprising a patch panel jack, UTP cable and an outlet jack. A basic link may also include a consolidation or transition point. Testing is carried out using patch/drop cables that are an integral part of the test head.
Cable support	Galvanized steel or PVC structure used to provide support and segregation for multiple cables.
Category 5	Specification for a structured cabling system involving unshielded twisted pair cable and data rates up to 100Mbps.
Category 5e	Cat 5 cable with an enhanced specification that meets the increase in performance criteria as formulated by the international standards body.
Catenary	A taut steel cable fixed horizontally in ceiling spaces, used to support bunches of UTP cables.
Channel	A basic link structured cable installation plus a patch and drop cable.
Confined Space	A work environment that presents a personal safety hazard due to a lack of space and compromised access.
Consolidation Point	A location within the basic link that serves as a local distribution and configuration point (analogous to a telephone FDP).
FDP	Final Distribution Point. A distribution frame used to connect between horizontal/block cabling and local facilities cabling.
Drop-lead/cable	A means of connecting a PC/printer etc. to a network outlet.
GPO	General Purpose Outlet. Used to distribute 240V ac power. May be 10A or 15A rating.
Horizontal cabling	The cabling reticulation that serves a particular floor.
IDF	Intermediate Distribution Frame. A distribution frame used to connect telephone cable between the building Main Distribution frame and Final Distribution Points (FDP).
Krone	Manufacturer of cabling products.
Lab Rack	A 19" rack mount device, comprising a plinth and a 19" mounting frame. Provides no security for rack mount equipment, but affords total accessibility.
LAN	Local Area Network. A combination of network equipment and a structured cabling system that provides a means of transporting data from one location to another. A LAN may exist within a building or span many buildings within the same locale.
MDF	Main Distribution Frame. A distribution frame used to connect entrance cable to building block cabling.

Mini lectern	A small lectern not having the University standard multi media fit-out. Typically found in small teaching spaces
Moduline duct	Steel and aluminium segregated duct with modular covers. Designed to accommodate data outlets and power GPOs.
MUWIRELESS Networks	the University wide Wireless Local Area Network A section of Systems and IT infrastructure within the Information Division of the University of Melbourne.
NEXT	Near End Cross Talk. The level of unwanted data signal from an adjacent pair. Measured at the test signal source (near end).
Panduit	Manufacturer of cabling products.
Part 6 Audit	Refers to Part VI of the Occupational Health and Safety Act 1985
Patch cable	A means of connecting a patch panel jack to a switch, hub or router port.
Permanent Link (Cat 6 only)	A Basic Link configuration using Cat 6 components. Testing is carried out using patch/drop cables that are an integral part of the test head.
P&B	Property and Buildings department of the University.
PVC duct	A means of containing and protecting multiple cables. Also a means of providing segregation from hazardous services. Manufactured from Poly Vinyl Chloride or similar insulating material.
RJ45 IDC	Connector used in structured cabling systems employing the Insulation displacement method of termination.
T568A	Standard for the pin/pair scheme used with RJ45 connectors and UTP cable.
Transition Point	A location within the basic link demarcating the transition from vertical (spine) to horizontal (floor) cabling.
UTP	Unshielded Twisted Pair. A four pair cable used for voice and data cabling.
Velcro	Proprietary name for 'hook & eye' re-usable fastening tape.
WAN	Wide Area Network. A combination of network equipment, a structured cabling system and/or electromagnetic spectrum based links (satellite and/or terrestrial) that provide a means of transporting data from one LAN to another. A WAN may be regional, national or global.
WLAN	Wireless Local Area Network. A Local Area Network in which data is transported via the UHF (Ultra High Freq) and SHF (Super High Freq) bands of the electromagnetic spectrum.