

Preparation & installation guide

Multi dwelling unit (MDU)

Fibre-to-the-premises (FTTP)



OPTICOMM
Networks

Table of contents

Document control.....	4	Conduit bend radius	12
Definitions	5	Minimum separation requirements	13
Purpose.....	5	RDT – Rapid Distribution Terminal.....	15
Roles and responsibilities overview	6	FDH – Fibre Distribution Hub	15
Building cable pathway specification.....	7	Summary of comms riser equipment dimensions.....	17
Opticomm headworks - MDU	9	Typical riser design RDT only	17
Headworks equipment dimensions	9	Opticomm apartment spatials – MDU	19
Headworks roles and responsibilities.....	10	Apartment responsibility matrix	19
Opticomm pathway and riser spatials	11	ONT – Optical Network Terminal.....	21
Pathway definition	11	Simple guidelines for Foxtel cable	25
Lead-in conduit.....	11	Document requirements from the developer	25
Cable tray - horizontal & vertical.....	11	Documents required.....	25
End user conduit/apartment conduit	11	Opticomm service provider directory	25
		Services	25



Document control

Document Title: MDU guidelines

Issue Date: 04 May 2020

Version Number: 6.2

Disclaimer:

This document is subject to constant review and improvement as technology advances. The recipient must exercise its own due diligence to ensure any of the requirements described in this document do not breach its obligations under local and federal laws. The recipient must exercise its own judgement to ensure all activities described in this document are undertaken in a safe manner and not cause harm to persons or the environment.

Definitions

BAS – Building Automation Services.

RSP – Retail Service Provider.

FTTP – Fibre-to-the-premises.

ITU – The International Telecommunications Union is the international body that sets telecommunications standards.

GPON – Gigabit Passive Optical Network (GPON) is covered by ITU standards and is the Optical Fibre Network standard adopted for the NBN in Australia.

ICN - Integrated Communication Network where the FTTP network is also utilised to transport the BAS services via Ethernet on the GPON.

MDU – Multi Dwelling Unit – Any development where two or more premises are joined by a common wall and managed by a Body Corporate.

Open Access – The separation of wholesale and retail functions under the Telecommunications Act to ensure that all RSPs have open access to the NBN on equitable commercial terms.

ONT – Optical Network Terminal. To the device that interfaces the optical network to ethernet, phone, and TV services. (Also referred to as a Network Termination Unit (NTU), or Optical Network Unit (ONU)).

NTD - Network Termination Device.

MATV - Master Antenna Television.

Fibre Pathway – The physical conduit and cable tray pathway between the end user interface such as the NTD or ONT to the point of boundary/building entry.

POTS – Plain Old Telephone Service.

UPS – Uninterruptable Power Supply.

Purpose

This document provides information on equipment space requirements and cable pathways for Multi Dwelling Unit developments intending on deploying an Opticomm Fibre-to-the-premises (FTTP) solution. Its intended audience is consultants, builders, electrical contractors, and developers.

The document is intended to provide general information on the building design requirements to support residential services like internet, phone, Pay TV, and Free-to-air TV.

As an option Building Automation Services (BAS) may be transported across the FTTP via what is termed an Integrated Communications Network (ICN). This uses the common fibre infrastructure that is installed for the telecommunications services but requires some additional equipment to be mounted in risers/and or communications cupboards.

Roles and responsibilities overview

The below matrix outlines the roles and responsibilities of the parties involved in successful deployment of an Opticomm FTTP solution in an MDU.

Line item	Role	Component	Specify	Supply	Install	Commission	Test	Sign Off
1	Backhaul provider	Backhaul connectivity to site	●	●	●	●	●	●
2	Backhaul connection	Optical fibre interlink from external splice point to MDF room	●	●	●	●	●	●
3	Backhaul containment	Pit and pipe connection from MDF room to property boundary	●	●	●	●	●	●
4	MDF room	Suitable air-conditioned MDF room with single phase power	●	●	●	●	●	●
5	Headworks	Install headworks active equipment	●	●	●	●	●	●
6	Cable pathways	Min. 23mm I/D conduit from ONT location in apartment to comm riser cupboard per floor with drawstring. Cable tray in comm riser cupboard. Fire sealing and certification	●	●	●	●	●	●
7	Passive optical network	Fibre connection from each floor to basement	●	●	●	●	●	●
8	Passive optical network	Fibre connection from apartment to comm riser	●	●	●	●	●	●
9	Customer equipment	Supply and install ONT	●	●	●	●	●	●
10	In Apartment Cabling	Apartment copper cabling, TV - phone/internet - data from ONT location to wall outlet. Plus termination of cables onto 4 gang wall plate at ONT location and patch leads into ONT. All TV cabling to conform to Foxtel Satellite Multi Stacker (SMS) spec and labelling of all wall plates	●	●	●	●	●	●
11	In riser RF ONT	Where MATV is fed from an RF ONT in riser instead, the apartment ONT provide amplifiers, splitters and RG6 cable, tested and terminated at the outlet	●	●	●	●	●	●
12	In apartment cabling	Double GPO outlet at ONT location in apartment for ONT & intercom power injector	●	●	●	●	●	●
13	In apartment cabling	Internal ONT enclosure in apartment if required	●	●	●	●	●	●
14	BAS	Supply and install POE multi-port ONT including rack and UPS	●	●	●	●	●	●
15	BAS	Network integration to 3rd party systems	●	●	●	●	●	●
16	BAS	System integration to Opticomm supplied and installed building systems	●	●	●	●	●	●
17	BAS	System integration to 3rd party supplied and installed building systems	●	●	●	●	●	●
18	Documentation	Customer hand-over documentation	●	●	●	●	●	●

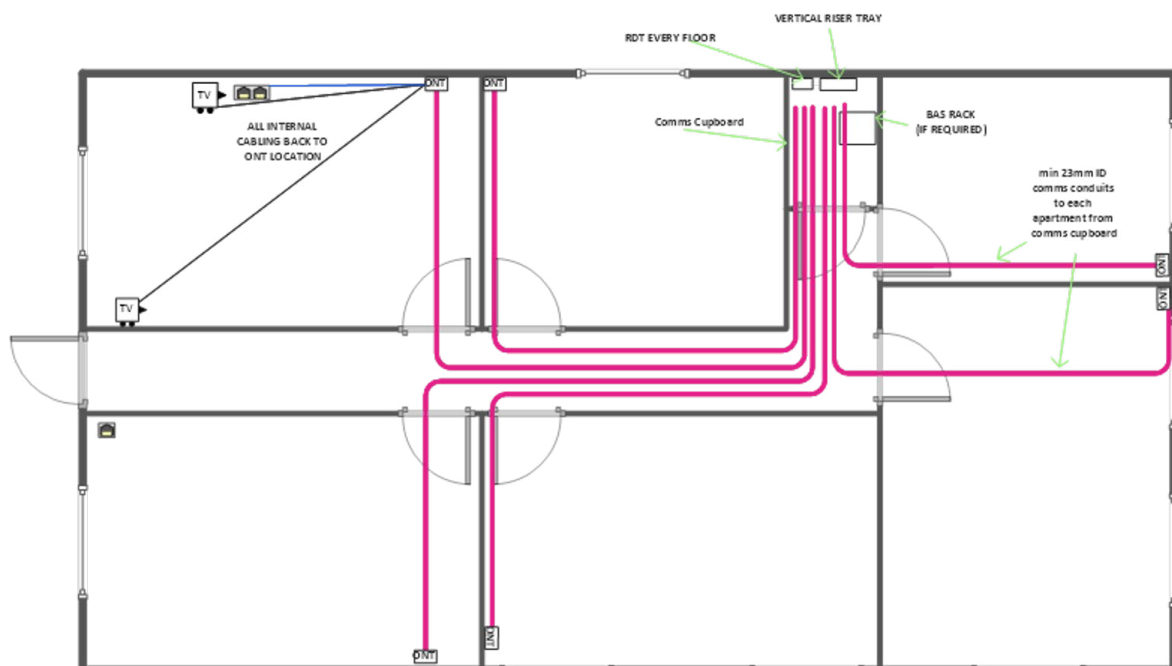
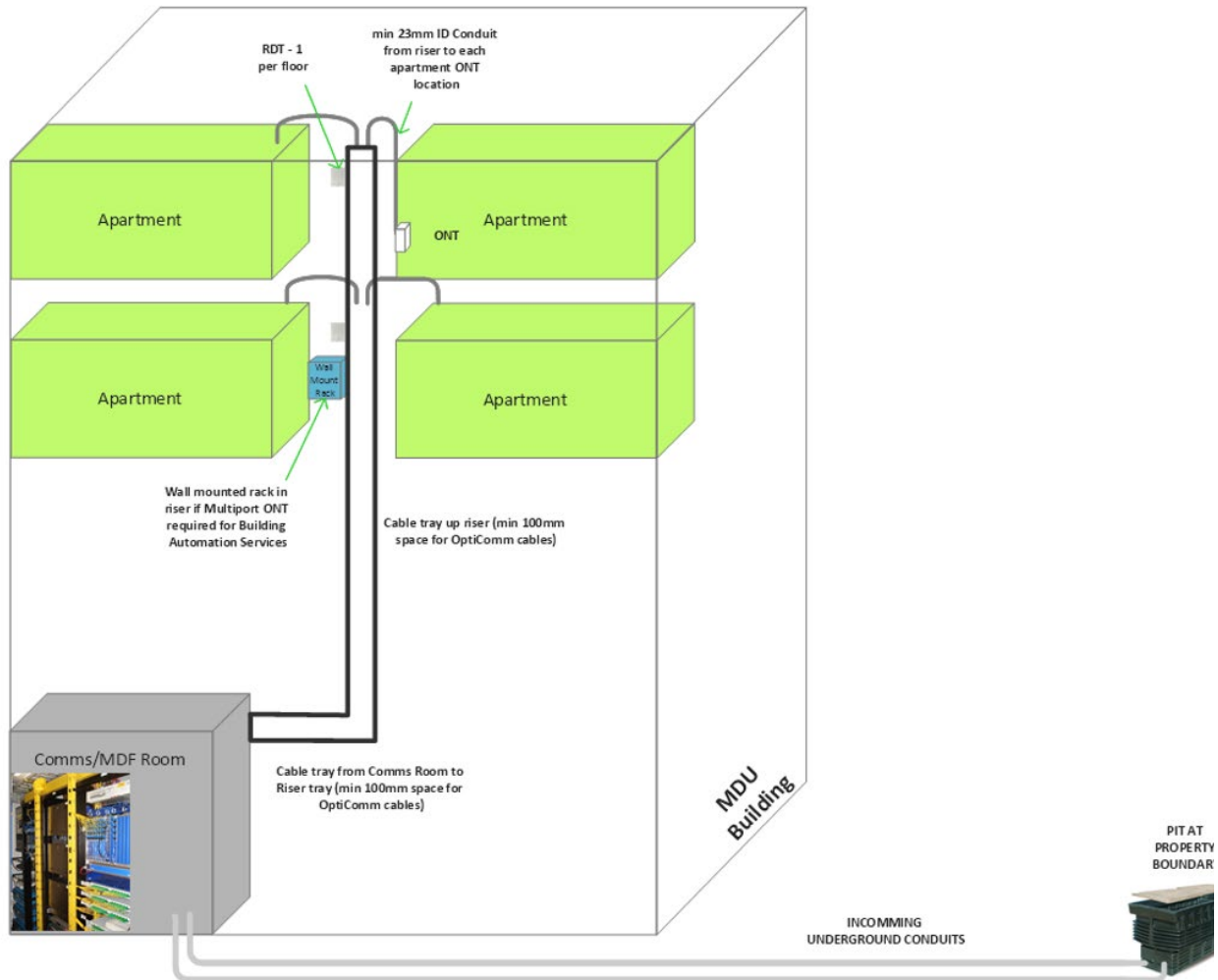
● Opticomm

● Developer / electrical contractor

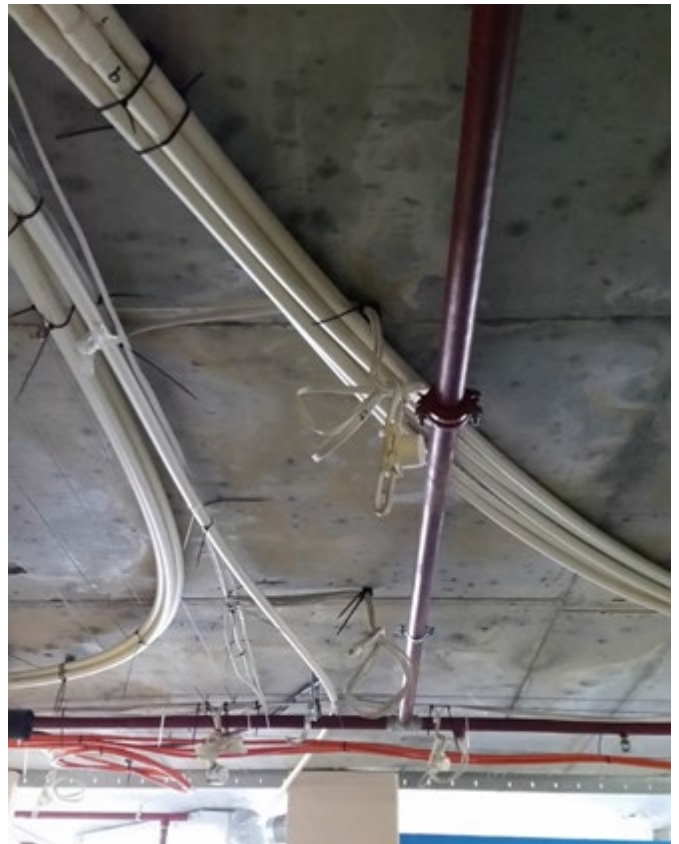
● Builder / developer

● Developer / BAS contractor

Building cable pathway specification



Samples of cable pathways



Opticomm headworks - MDU

Opticomm headworks in MDU developments are typically located in the basement or MDF room and must meet the below requirements.

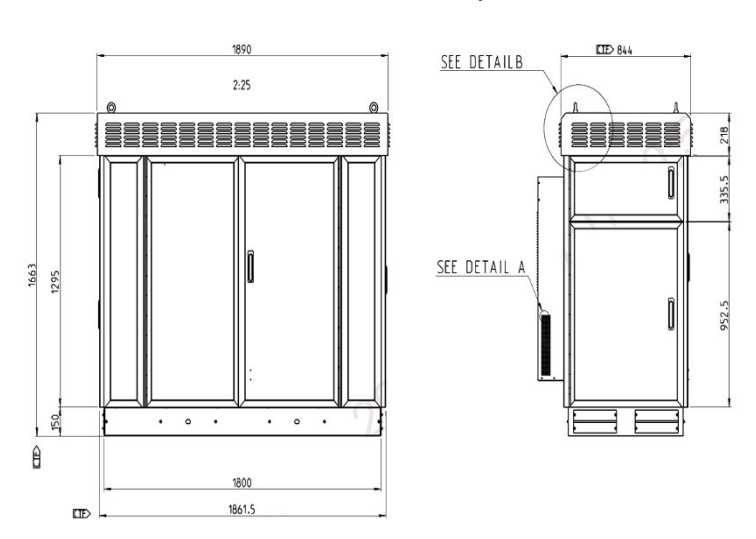
1. The Community Association must grant Opticomm a perpetual fee free licence for use of a space in each building to accommodate up to four 600x600x2100mm equipment racks with access to front and rear in a secure room.
2. Opticomm must be granted unhindered access to the room 24/7. Wherever possible Opticomm prefer a room with exclusive access.
3. The developer must supply and install suitable local dedicated air-conditioning equipment with redundancy (filtered passive ventilation is acceptable) to support a 3kW heat load from the Opticomm equipment and maintain a room temperature of not greater than 30°C.
4. Opticomm will install a reed switch to the door and CCTV in this room to monitor access.
5. The developer must ensure that the room is painted and finished, with all surfaces and penetrations sealed.
6. The developer must provide a metered single phase power connection for Opticomm use (20A min peak capacity) with three 15A GPO circuits provided to the power rack location. The GPO circuits must be non-RCD protected.
7. A communication earth terminal (16mm²) must be provided from the mains distribution board to a position adjacent to the rack location.
8. The room must be available for occupation, including air-conditioning, and permanent power at least 2 months prior to commissioning of the network or any floor within the building.
9. Opticomm will install a UPS system in the comms room. The battery capacity of this UPS system typically exceeds 200Ah and 48V.
10. Where MATV is supplied via the fibre network Opticomm must be granted unhindered access to the MDU roof to install and maintain antennas.

Where no comms room is available, or the MDU is adjacent to an existing Opticomm network, the MDU may be serviced from a roadside cabinet, either within the MDU property boundary or in a road reserve or public open space. This option has limitations on the network supporting extensive BAS services.

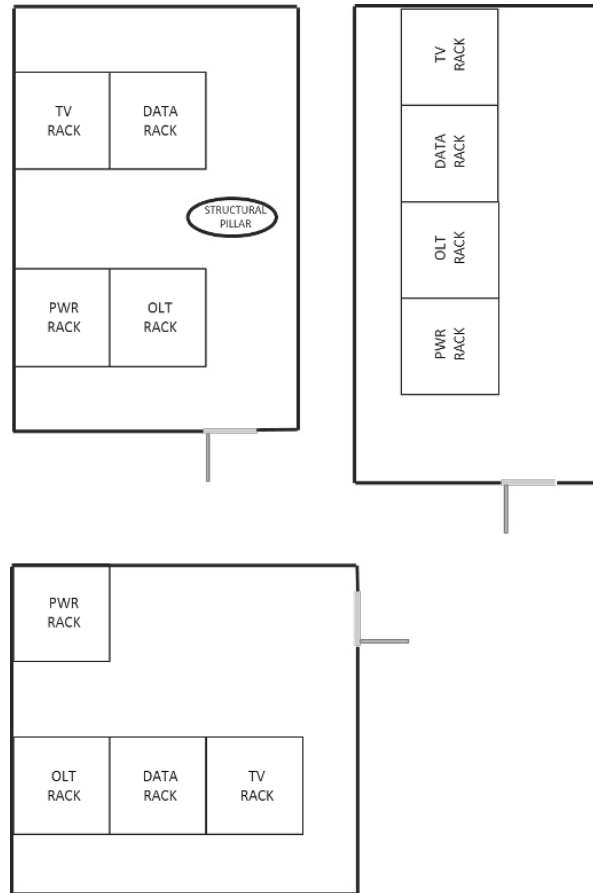
Headworks equipment dimensions

Head end equipment		Equipment dimensions (HxWxD) (mm)			Space requirements
Product name	Acronym	H (mm)	W (mm)	D (mm)	
42-47 RU rack	TV/DATA/OLT	1991	600	1070	max 2400(H) x 2500(W) x 3000(D) mm
Power rack	PWR	2000	600	600	
Free-to-air antenna	FTA	Site specific			1.2m ²
Satellite dish	DISH		1200	1360	1.4m ²

Alternative where a comms room is not available - roadside cabinet. May be mounted external to the building or in a carpark.



Headworks floor plan (typical examples)



HEADWORKS FLOOR PLANS (TYPICAL)
RACK FOOTPRINT 600x600x2100mm

Headworks roles and responsibilities

Line item	Building name	Component	Specify	Supply	Install	Commission	Test & sign off
1		Comms room construction	●	●	●	●	●
2		AC power and switchboard, air-conditioning, lighting, door locks, flooring etc. Comms room base building services fit-out	●	●	●	●	●
3		Racks, DC power, FTTP & MATV, Foxtel equip, street fibre termination etc. Comms room FTTP & MATV fit-out	●	●	●	●	●
4		Fibre install for backhaul from Opticomm POI	●	●	●	●	●
5		Free-to-air TV and Foxtel antennas and feeder cable from roof top to MDF room	●	●	●	●	●
6		Intercomm and access control supply and installation	●	●	●	●	●
7		Copper cabling from BAS or BMS devices to multi-port ONT location in comms riser	●	●	●	●	●

Opticomm pathway and riser spatial

Opticomm's fibre cables are deployed and installed to industry specific standards. A minimum of a 100mm cable tray space is required for the fibre network. All cables used are low smoke zero halogen and comply with building standards.

Pathway definition

Telecommunications pathway means the physical conduit and cable tray pathway between the end user interface such as the NTD or ONT to the point of boundary/building entry. A pathway must be provided for every end point in the building.

Lead in conduit

- Minimum 1x P100 from a P6 pit on the property boundary to the comms room/MDF < 1000 end points.
- Minimum 2x P100 from a P6 pit on the property boundary to the comms room/MDF > 1000 end points.

Cable tray - horizontal & vertical

- Continuous accessible perforated cable tray min 100mm wide.
- A shared cable tray with a minimum of 100mm dedicated portion/side allocated to Opticomm.

End user conduit/apartment conduit

- Continuous minimum P20 conduit (23mm inner diameter) for exclusive use by Opticomm.
- Sweeping bends of min 300mm only - no right angles.
- Industry standards state no more than 3 sweeping bends from riser to apartment without a access opening for hauling. The conduit may sweep at a large radius of greater than 2m and not be counted as a bend.
- Mandril of 90% diameter of the conduit must be able to be passed through.
- A drawstring must be installed in every conduit.
- The conduit must be labelled with apartment and/or lot number at the riser end.
- Opticomm is not responsible for firestopping of the apartment conduits but may seal the conduit ends in some installations.

Conduit bend radius

The below table is extracted from AS/CA S009:2020 Installation requirements for customer cabling (wiring rules).

Conduit, curves bends and distances between access points

Nominal inside diameter (ID) of conduit (mm)	Typical actual inside diameter (mm)	Minimum curvature radius (130 x ID) (mm)	Minimum bend radius mid-run (mm)	Minimum bend radius within 500mm of an access point (mm)	Maximum distance between access points (m)
20	23	2600	300	100	50
50	53	6500	800	300	100
100	105	13000	5000	800	100

Note 1: The conduit sizes are rounded to the nearest integer and are based on the values listed in AS/NZS 1477 for PN 9 and PN 12 PVC pressure pipes, which are the values used by carriers for their conduit.

Note 2: The dimensions of polyethylene 'bore pipe' used in underboring may vary.

Minimum separation requirements

The below diagrams and tables are extracted from AS/CA S009:2020 Installation requirements for customer cabling (wiring rules)

Customer cabling - minimum separation requirements from other services in or on a building (informative)

Customer cabling situation	Electricity				Oxygen or flammable gas			Water or waste ⁹			Heating oil, steam or compressed air	
	ELV		LV		HV		Pipe Connection	Meter	Cylinder	Pipe Connection	Meter	Pump/ Cistern
	Cable	Connection	Cable	Connection	MC ⁵	SC ⁵						
Metallic cable	Unenclosed	0	50 ²	150 ³	300 ⁶	450	150 ⁷	150	50	150 ⁷	150	150
	In conduit	0	0	150 ³	150	450	150 ⁷	150	0	150 ⁷	150	150
	Connection to or joint	0	150 ³	50 ²	150 ³	450	150	Outside hazardous area ⁸	150	150		150
Optical fibre cable ¹	Unenclosed	0	0	150 ³	0	450	150 ⁷	150	50	150 ⁷	150	150
	In conduit	0	0	150 ³	0	450	150 ⁷	150	0	150 ⁷	150	150
	Connection or splice	0	150 ³	0	150 ³	450	150	Outside hazardous area ⁸	150	150		150

Note 1: If the optical fibre cable contains any electricity conductive elements (e.g. a metallic strength member, armouring or tracer), it is to be treated as a metallic cable.

Note 2: If the cables are separated by a barrier of durable insulating material or metal or within a conduit, no further separation is required unless the cables are within 50mm of any securing face of building structure that may be screwed or nailed.

Note 3: Cabling providers working on customer cabling are to be protected against accidental contact with ELV or LV electrical connections by effective means (for example, an insulated barrier, a shield, shroud or suitable distance). The customer cabling connections are to be separated from ELV/LV electrical connections by at least 150mm by a permanent, rigidly fixed barrier of durable insulating material or earthed metal. In the case where such a fixed barrier is applied, no further separation is required.

Note 4: The installation of customer cabling conductors or terminations in the same enclosure as any HV conductor or terminations is not permitted.

Note 5: MC = Multi-Core SC = Single-Core

Note 6: This may be reduced to a minimum of 150mm if the cables are separated by a permanent, rigidly fixed barrier of durable insulating material or earthed metal provided that a minimum clearance between the cables through air anywhere around or over or under the barrier is at least 175mm.

Note 7: Separation by a suitable barrier or heat insulation, as appropriate, is acceptable at crossings, within wall cavities or within shared trunking.

Note 8: Connection devices, telecommunications outlets, joints or splices are not to be installed within a hazardous area unless they are selected and installed in accordance with Clause 7.1.3.7.

Note 9: These are the recommended minimum separation distances to ensure compliance with Clause 9.2.1 and to provide adequate clearance to install or access the telecommunications cabling.

Note 10: All dimensions given are in millimetres (mm).

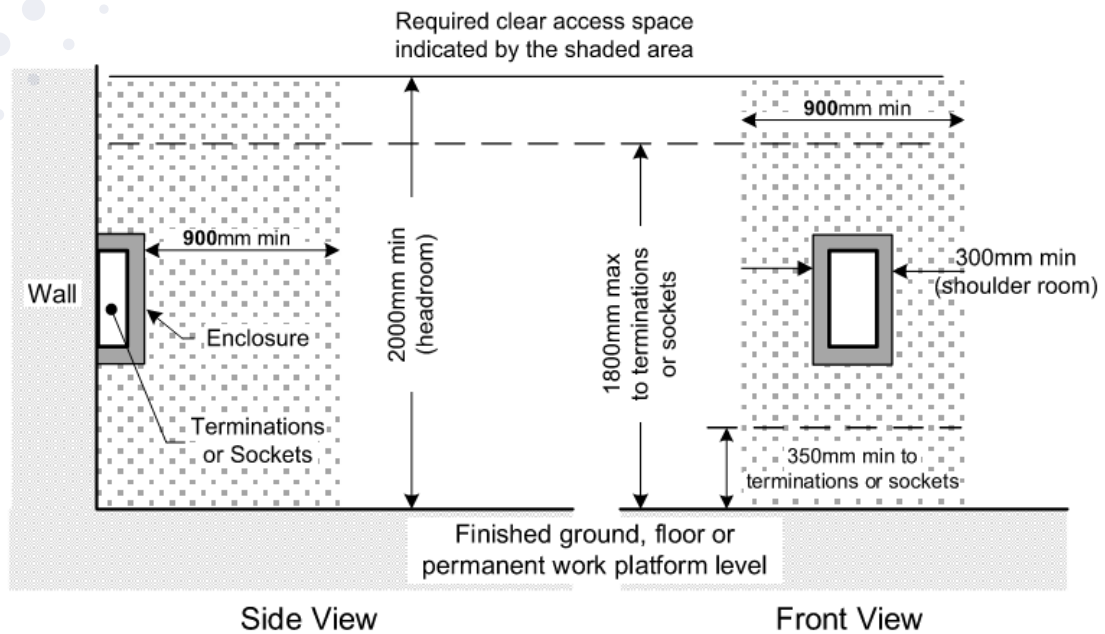
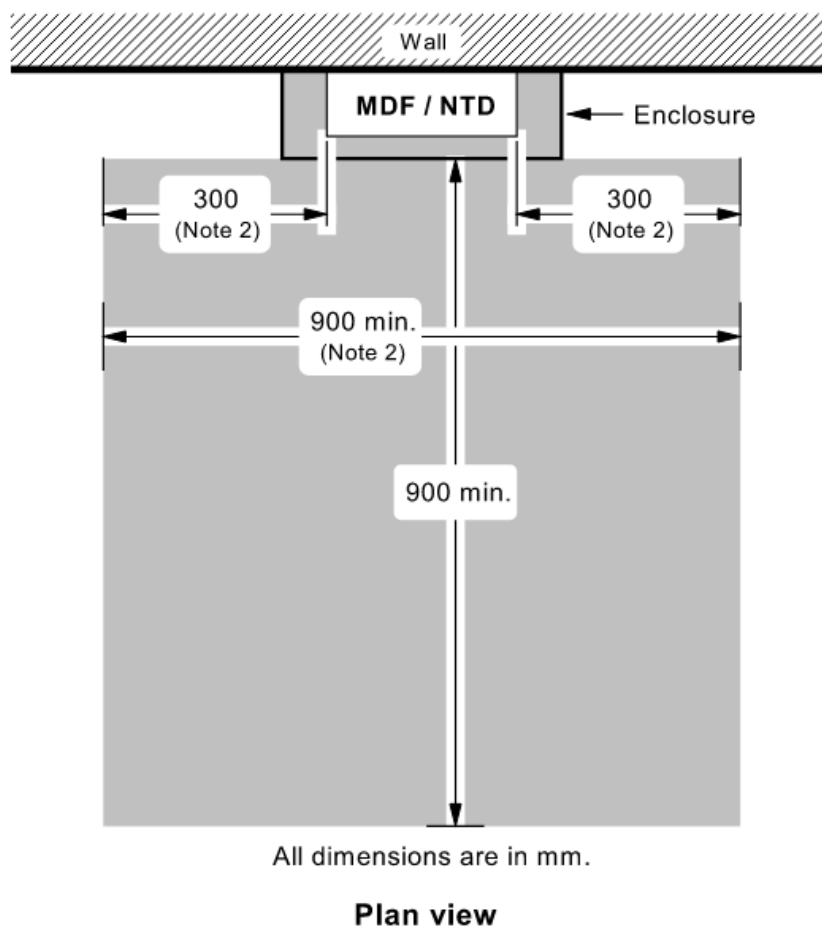


Figure D2
Access clearances for a wall mounted MDF or NTD

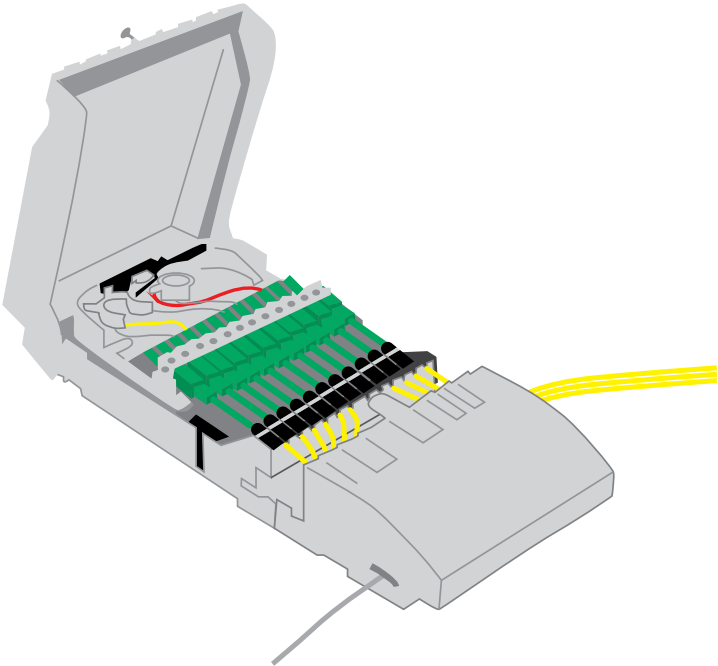


Note 1: The shaded area indicates the space that should be kept clear of obstacles.

Note 2: The 300 mm side clearance provides 'shoulder room' for working on the MDF/NTD. The minimum required total clearance width in front of the device is 900 mm.

RDT – Rapid distribution terminal

An RDT is installed in the riser comms cupboard at every level where a fibre service is required.

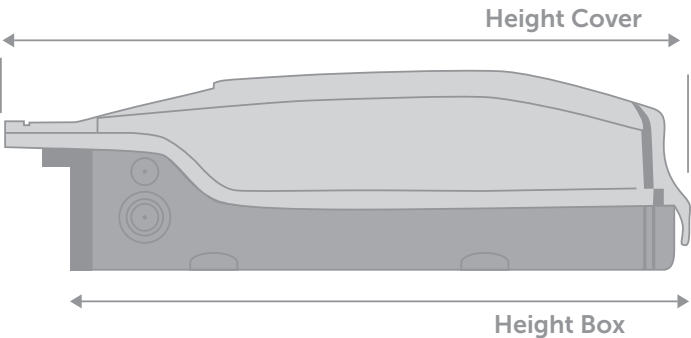


FDH – Fibre distribution hub

The FDH houses passive equipment and can feed up to 16 12 fibre RDTs.

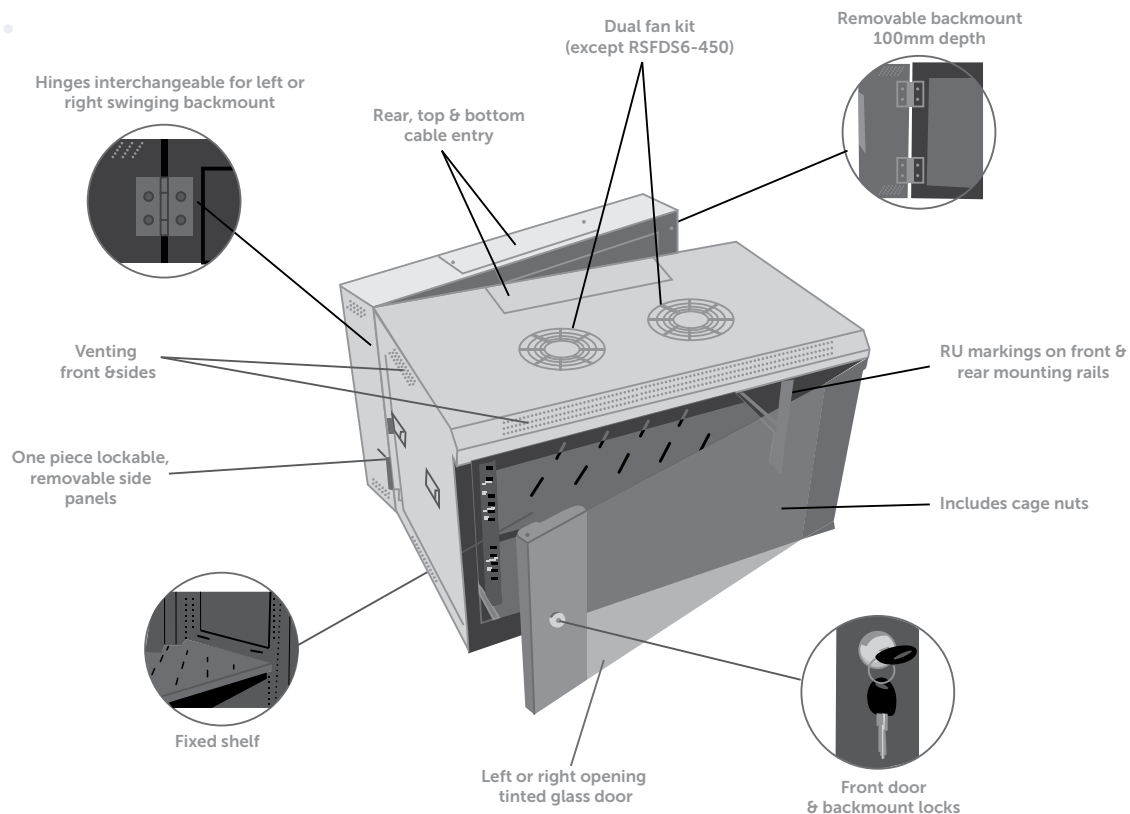
BUDI-M & S - connectorised

Size	BUDI-M	BUDI-S
Height box (mm)	480	425
Height cover (mm)	550	500
Width (mm)	360	295
Depth (mm)	175	145
SC ports w-w/o basetray	48-60	24-36
LC ports w-w/o basetray	96-120	48-72
Ptp tray cable termination	8F	8F
Number of splitter modules (OCM6)	6	4

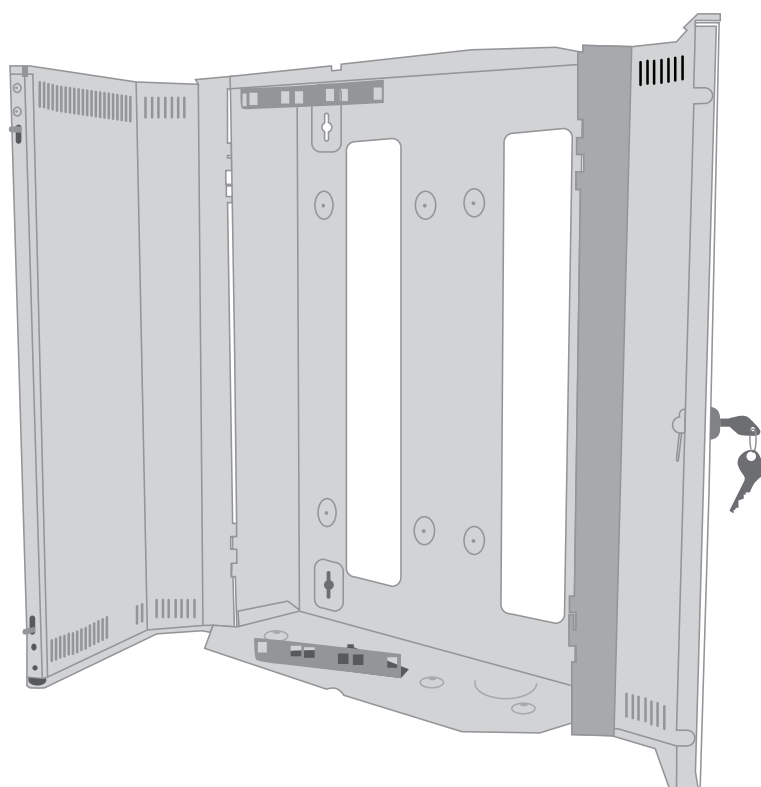


Wall mounted rack

A wall mounted rack is installed in the Comms riser cupboard wherever a BAS multiport ONT is required.



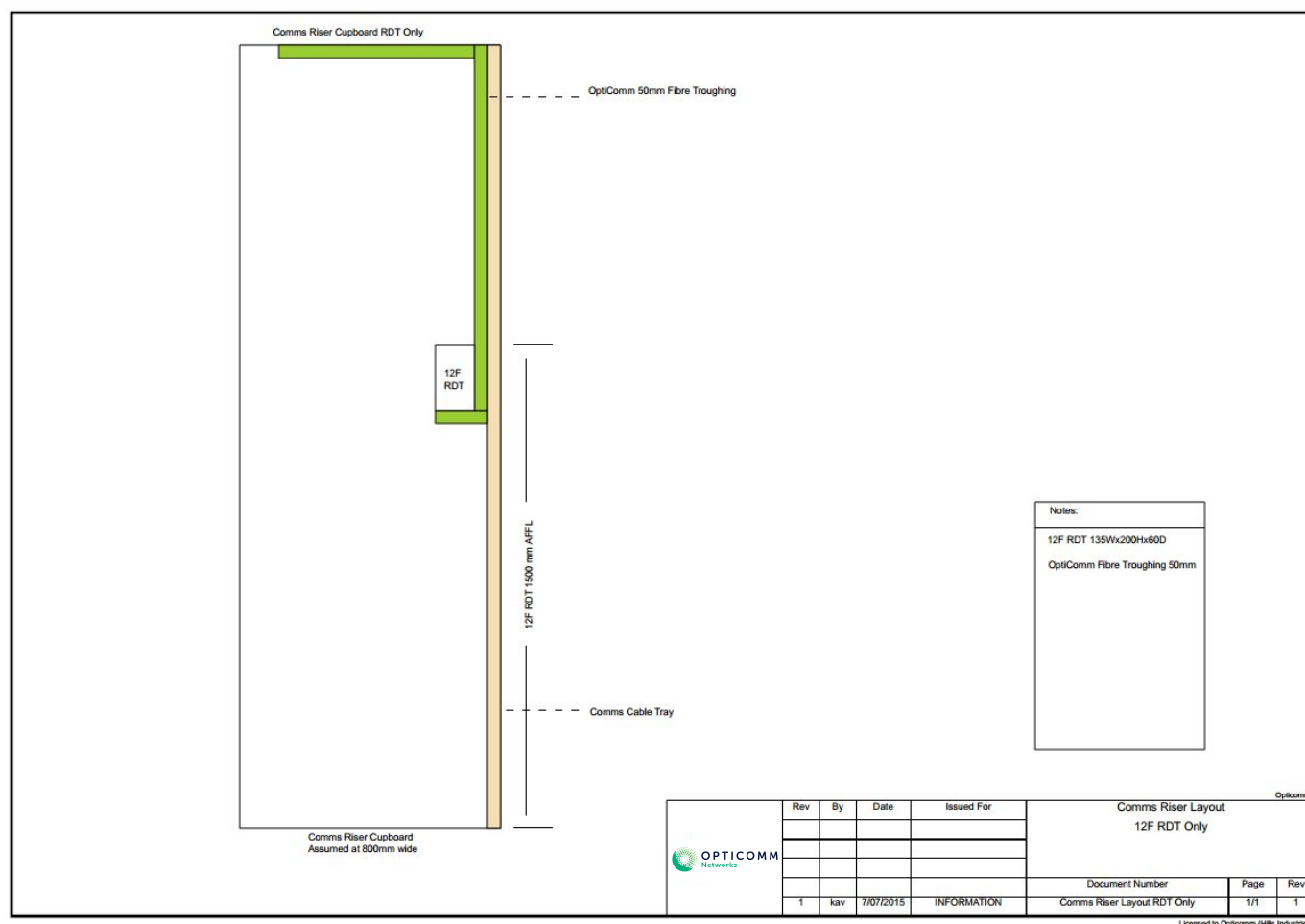
Slimline optional alternative rack for limited riser space.



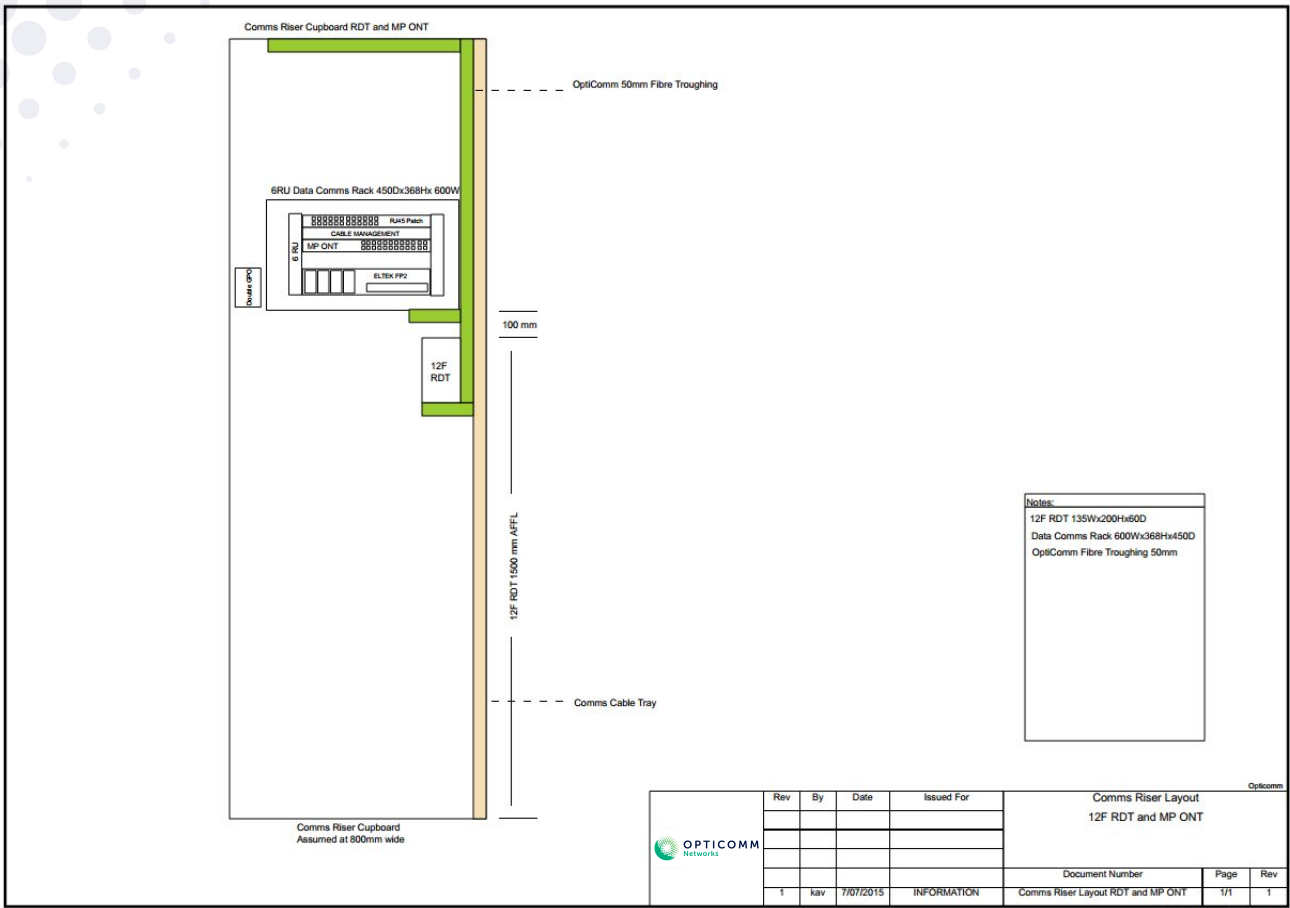
Summary of comms riser equipment dimensions

Comms riser equipment		Equipment dimensions (HxWxD) (mm)			Notes
Product name	Acronym	H (mm)	W (mm)	D (mm)	
BUDI-M	FDH	550	360	175	
Rapid deployment fibre terminal	RDT	281	155	60	
Wall mounted rack	BAS	900	600	600	
Slimline rack	BAS	900	600	150	Cannot house UPS

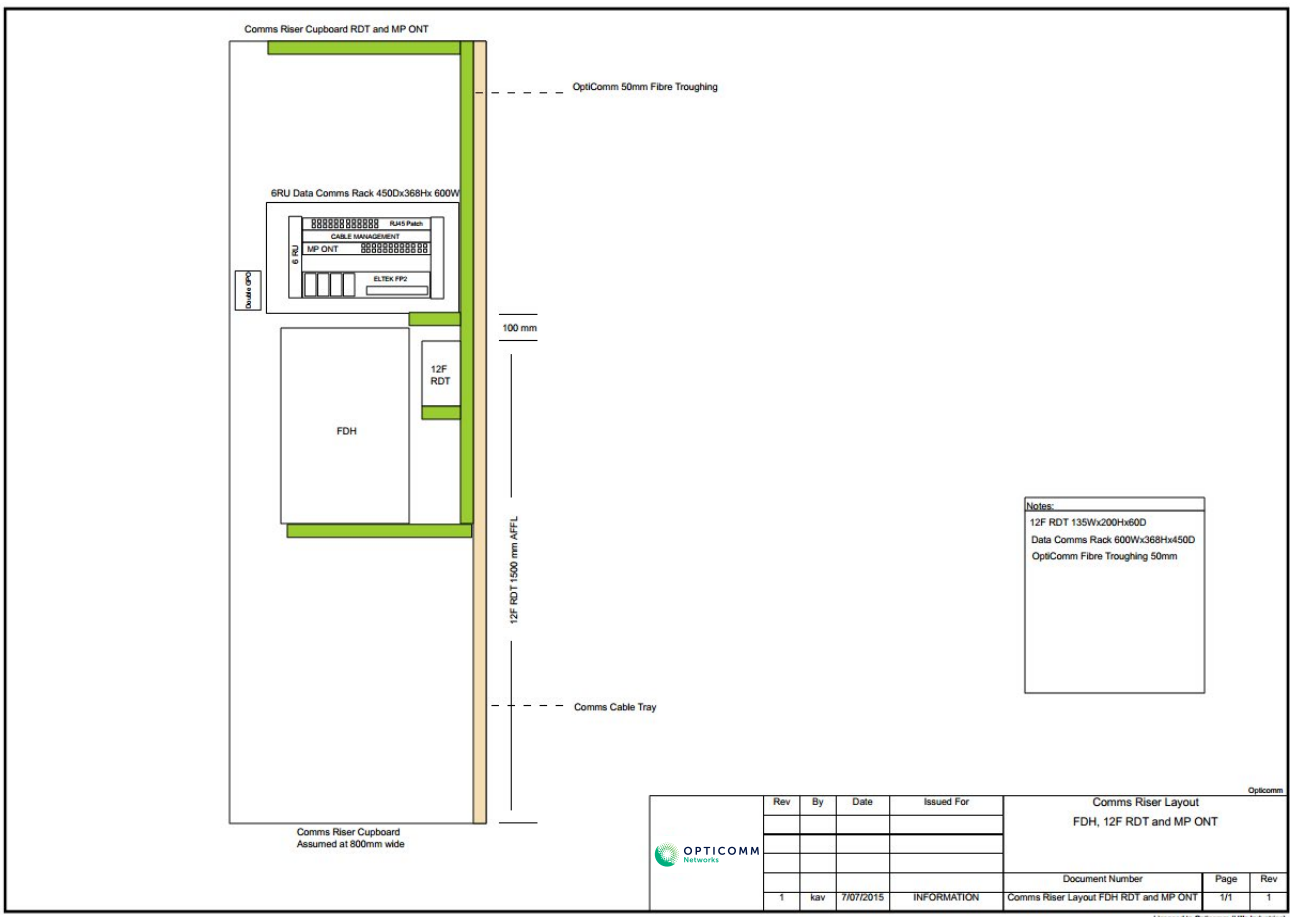
Typical riser design RDT only



Typical riser design RDT & multi-port ONT only



Typical riser design FDH/RDT/wall mounted rack & ONT



Opticomm apartment spatial

– MDU

Apartment responsibility matrix

Line Item	Component	Specify	Supply	Install	Commission	Test	Sign off
1	Fibre optic link from headend to risers	●	●	●	●	●	●
2	All fibre pathways from headend to comms riser and apartments including all cable tray, conduits and drawstrings	●	●	●	●	●	●
3	Double GPO outlet at ONT location within apartment, also location and space (as per attachment below) allowance for ONT and power supply installation within apartment	●	●	●	●	●	●
4	ONT enclosure if required within apartment (see below attachment)	●	●	●	●	●	●
5	Comms riser RDTs/cable to FDH in MDF room	●	●	●	●	●	●
6	Lateral fibre cable from apartment to comms. Riser RDT - RWT	●	●	●	●	●	●
7	ONT and mains PSU - no battery	●	●	●	●	●	●
8	ONT testing and record of serial number	●	●	●	●	●	●
9	Sample testing of TV and data points within each apartment	●	●	●	●	●	●
10	TCA 1 Form by electrical contractor for all data and phone points	●	●	●	●	●	●
11	Apartment cabling	●	●	●	●	●	●
12	Apartment patching from ONT to apartment data, phone and TV points. Note all TV equipment, wall plates, splitters, cabling etc. to be Foxtel Multistacker approved components - see Foxtel website for latest info. TV wall plates to be fed via 12dB	●	●	●	●	●	●

● Opticomm

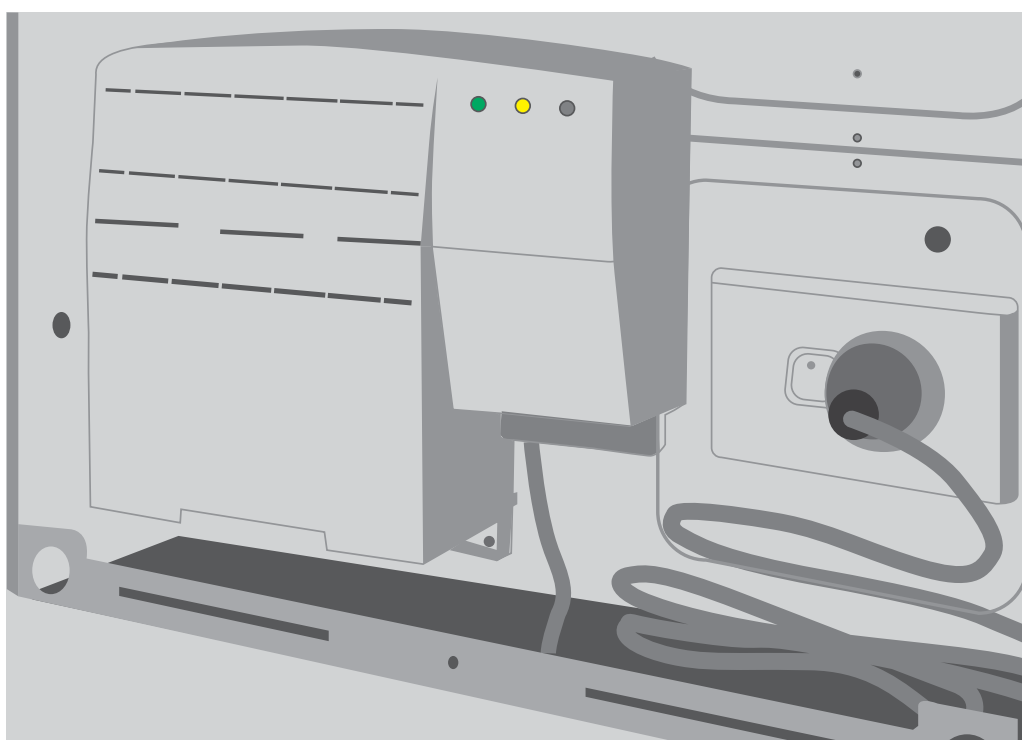
● Builder / developer

● Developer / electrical contractor

Apartment equipment dimensions

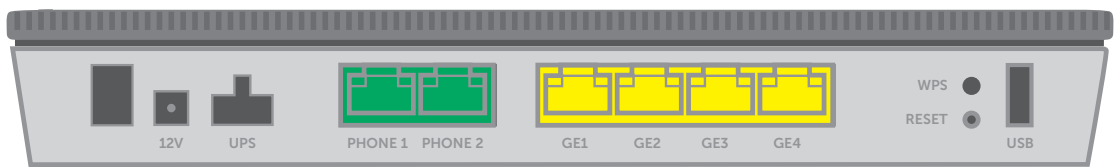
Apartment equipment		Equipment dimensions (HxWxD) (mm)			Notes
Product name	Acronym	H (mm)	W (mm)	D (mm)	
Face plate	RFP	75	115	15	
ONT	ONT	140	90	40	
ONT housing	ONT	262	302	65	Optional - in lieu of builder enclosure
UPS	UPS	190	241	76	Optional - on individual owner request

UPS – Uninterrupted power supply

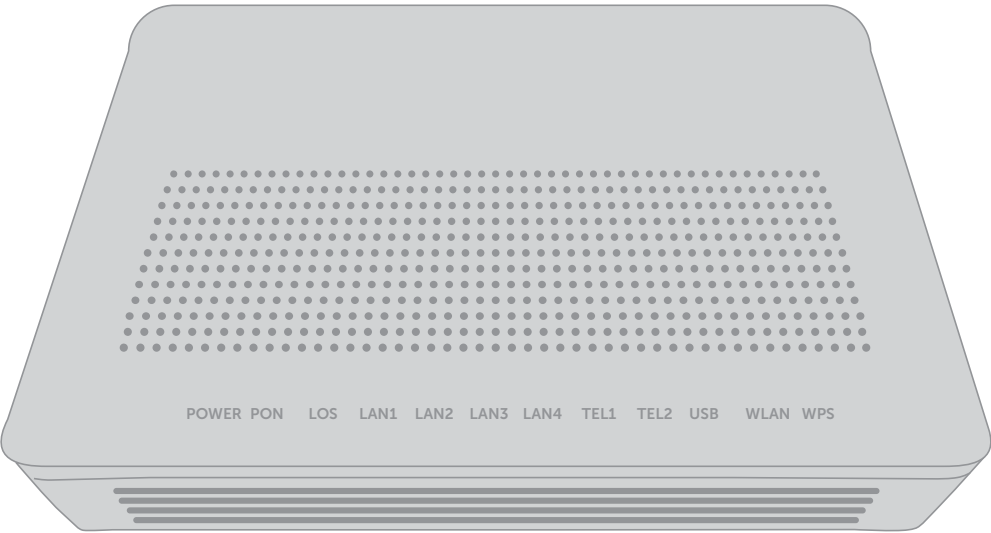


ONT – Optical network terminal

Figure 1-8 Ports and buttons on the rear panel

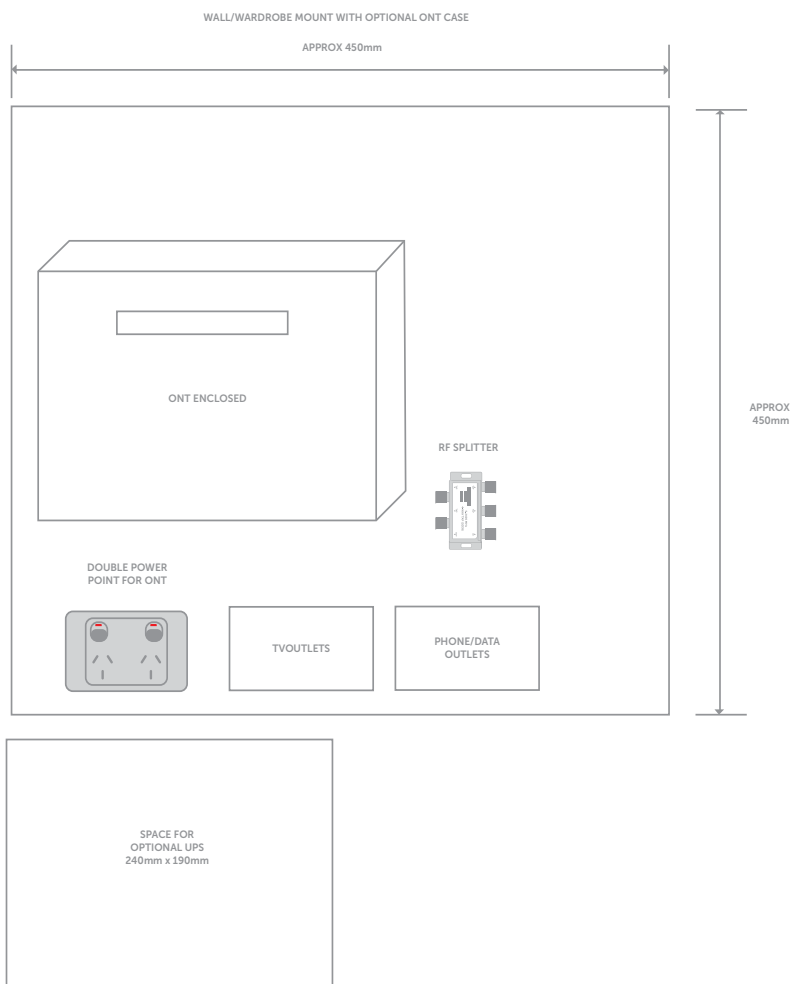
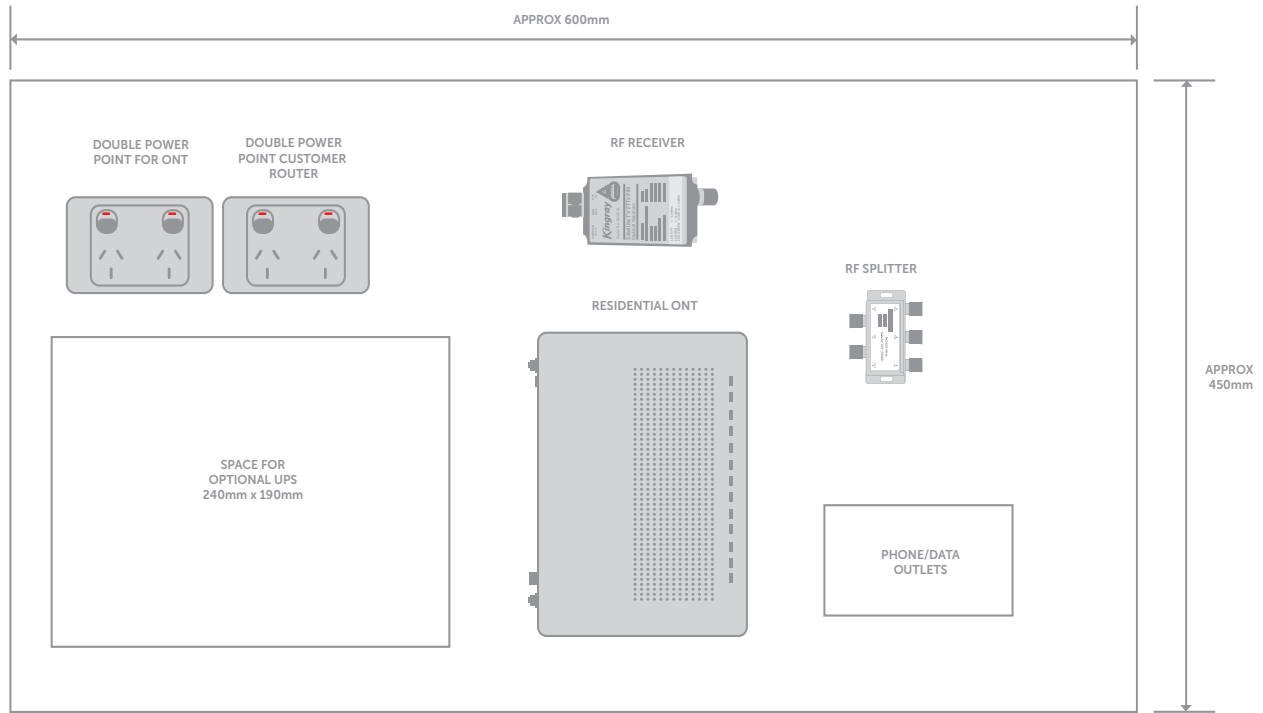


Port/button	Function
ON/OFF	Indicates the power button. It is used to power on or power off the device.
POWER	Indicates the power port, used to connect to the power adapter or backup battery unit.
TEL1-TEL2	Indicates VoIP telephone ports (RJ-11), used to connecting to the ports on telephone sets.
LAN1-LAN4	Indicates auto-sensing 10/100/1000M Base-T Ethernet ports (RJ-45), used to connect to PCs or IP set-top boxes (STBs).

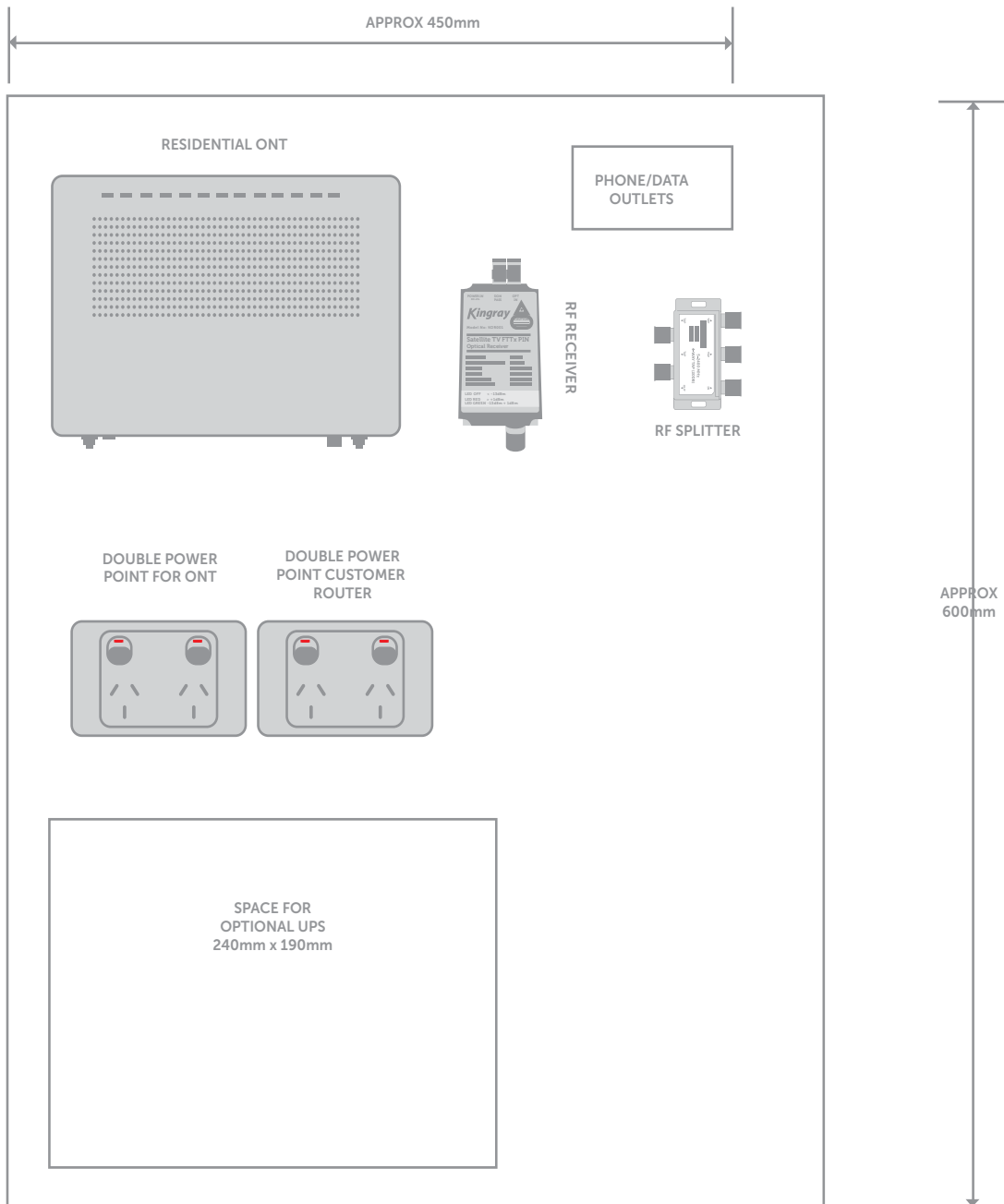


Typical apartment equipment layouts

BUILDER SUPPLIED ENCLOSED OR CABINETARY
(LANDSCAPE OR PORTRAIT ORIENTATION ALLOWED)



BUILDER SUPPLIED ENCLOSED OR CABINETARY
(LANDSCAPE OR PORTRAIT ORIENTATION ALLOWED)



In apartment cabling

In apartment cabling is the responsibility of developer/builder/electrician however apartment cabling installation should follow a few basic rules and more specifically industry standard installation practices.

Simple guidelines for telecoms 'category cable' (internet)

- Low smoke zero halogen category 5e or 6 should be used where possible
- Required minimum separation from power and other services must be maintained
- RJ45 sockets/plugs to be used
- All ethernet terminations to be terminated to T568A standard unless otherwise specified
- Twists should be maintained as close to the termination as physically possible
- Runs must be continuous and no more than 90 metres in length
- All cables & sockets to be clearly labelled
- For in apartment cabling advice refer to:
http://www.commsalliance.com.au/data/assets/pdf_file/0017/39203/S00_9_2013.pdf
- TCA1 forms to be supplied:
http://www.acma.gov.au/webwr/_assets/main/lib310111/t019-telecomms_cabling_advice-tca1.pdf

Simple guidelines for telecoms 'category cable' (phone)

- Low smoke zero halogen category 5e or 6 should be used where possible
- Solid core conductors no greater than 24 AWG (not stranded core) should be used
- Required minimum separation from power and other services must be maintained
- RJ12 sockets/plugs to be used
- All cables & sockets to be clearly labelled
- TCA1 forms to be supplied:
http://www.acma.gov.au/webwr/_assets/main/lib310111/t019-telecomms_cabling_advice-tca1.pdf

Simple guidelines for Foxtel cable

- All components must be from the Foxtel Multistacker approved parts list:
<https://www.foxtel.com.au/content/dam/foxtel/support/pdf/installer-product-list.pdf>
- Foxtel approved quad shield RG6 cable to be used
- All TV points to be terminated with Foxtel approved products
- Required minimum separation from power and other services must be maintained
- All cables & sockets to be clearly labelled
- All Foxtel installations should follow the Foxtel Multistacker standard:
<https://www.foxtel.com.au/content/dam/foxtel/support/pdf/FXTL-T-0219%20Satellite%20Multistacker%20Installation%20Requirements%20Issue%201%0rev.pdf>

Document requirements from the developer

Opticomm require the following documents to be completed and supplied by the developer.

Documents required:

- Apartment matrix (Opticomm document supplied to developer to be completed & returned)
- Address list (Opticomm document supplied to developer to be completed & returned)
- Electrical/cable tray reticulation design of every floor
- Riser layout design and dimensions
- Apartment end point location and dimensions
- Headend/MDF room design and dimensions

Opticomm service provider directory

Services

Please check the Opticomm website for a list of RSPs as new providers are added daily.

Get in touch with Opticomm

Welcome to the Opticomm preparation and installation guide. This document will help you to correctly prepare your premises and arrange connections to access the Opticomm network.

The guide has been created with builders, owners and developers in mind, where the developer has an agreement with Opticomm to provide optical fibre broadband to the premises within a new development.

© Copyright Opticomm 2019; this document cannot be reproduced in whole or part for any purpose without prior written consent of Opticomm.

Builders and developers using this guide take full responsibility for researching applicable local codes, laws and standards and following steps described in this document while complying with said codes, laws and standards. The Opticomm installation guide for builder and developers is provided only as an informational resource.



OPTICOMM
Networks

www.opticomm.com.au