

# Medium Optical Distribution Frame

Telecommunications

## Document information

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## 1. Purpose

a) The Purpose of this specification is to provide contractors and VicTrack operations staff a technical requirement which must, unless otherwise directed by VicTrack Telecommunications Engineering, be followed with when performing the installation and configuration of a Medium Optical Distribution Frame (MODF).

## 2. Scope

a) This specification applies to the design, installation, configuration, labelling, operations and support of a VicTrack Medium Optical Distribution Frame, within a telecommunications room.

## 3. Abbreviations

Abbreviation	Description
a/c	Air conditioner
AFFL	Above Finished Floor Level
AIRAH	Australian Institute of Refrigeration, Air Conditioning and Heating
AS	Australian Standard
AS/NZS	Australian and New Zealand Standard
BMS	Building Management System
CAP	Cable Attachment Plate
CCTV	Closed Circuit Television
CER	Communications Equipment Room
CET	Communications Earth Terminal (AS/ACIF S009)
CEMT	Cable Element Management Tray
CIS	Customer Information System
CSM	Cable Strength Member
DB	1. Dry Bulb (in the context of temperatures) 2. Distribution Board (in the context of electrical wiring)
DTRS	Digital Train Radio System

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Abbreviation	Description
DNO	Distribution
ELCB	Earth Leakage Circuit Breaker
EMI	Electro Magnetic Interference
EPR	Earth Potential Rise
ERDB	Equipment room distribution board
FFE	Fittings, Furniture, and Equipment (supplied by purchaser)
FTP	Fibre Termination Panels
GPO	Electrical general purpose outlet (10A unless otherwise specified)
HVAC	High Voltage Alternating Current
IDF	Intermediate Distribution Frame
IEC	International Electro technical Commission
IFR	Issue for Review
IPnn	Ingress Protection Rating – Where nn = 2 digit number
LED	Light Emitting Diode
LODF	Large Optical Distribution Frame
LTR	Local Train Radio
MDB	Main Distribution Board
MDF	Main Distribution Frame
MODF	Medium Optical Distribution Frame
MTM	Metro Trains Melbourne
NUTR	Non-Urban Train Radio
OCS	Operational Control Systems
PCER	Prefabricated Communications Equipment Room
PTV	Public Transport Victoria
RAS	Remote Access System

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Abbreviation	Description
RCD	Residual Current Device
SNMP	Simple Network Management Protocol
SODF	Small Optical Distribution Frame
SWR	Safe Working Radio
TRT	Train Radio Tower
UPS	Uninterruptable Power Supply
VT	VicTrack
WB	Wet Bulb

## 4. Definitions

Definitions	Description
24x7	24 hours per day, 7 days per week When in regard to equipment availability, services may be temporarily unavailable allowing for scheduled maintenance, upgrades/renovation, or emergency repair.
Shall	Is used as the descriptive word to express a requirement that is mandatory to achieve conformance to the standard.
Should	Is used as the descriptive word to express a requirement that is recommended in other to achieve compliance to the standard. Should can also be used if a requirement is a design goal but not a mandatory requirement.
Specification	A set of high-level requirements that are mandatory to be adhered to achieve VicTrack's objectives.

## **5. Standards & References**

The design and construction of all facilities will comply with but not be restricted to the minimum requirements as stated in the following Australian or International Standards and or Recommendations.

### **5.1. Australian Standards**

Building Code of Australia:

- AS 1170 - Structural Design Actions (various);
- AS 1939 - Degrees of protection provided by enclosures for electrical equipment (IP Code);
- AS 9001 - Quality Systems;
- AS 1345 - Identification of Contents of Pipes, Conduits & Ducts;
- AS 1768 - Lightning protection;
- AS 2312 – Guide to the protection of structural steel against atmospheric corrosion using protective coatings;
- AS 3000 - Electrical Installations – Buildings, Structures & Premises (SAA Wiring Rules);
- AS 3008 - Electrical Installations – Selection of Cables;
- AS 3011 - Electrical Installations – Secondary batteries in buildings – Sealed Cells;
- AS 3013 - Electrical Installations – Classification of the fire and mechanical performance of wiring systems;
- AS 3080 - Telecommunications Installations- Integrated Telecommunications Cabling Systems for Commercial Premises;
- AS 3084:2003 - Telecommunications installations - Telecommunications pathways and spaces for commercial buildings;
- AS 3085 - Telecommunications Installations - Administration of Communications Cabling Systems;
- AS 3100 - Approval and test specification – General requirements for electrical equipment.

### **5.2. Australian Communications Authority Standards**

- ACA TS 001 - Technical Standard - Safety Requirements for Communications Equipment;
- ACA TS 008 - Technical Standard - Requirements for Authorised Cabling Products;
- ACA TS 009 - Technical Standard - Installation Requirements for Customer Cabling (Wiring Rules).

### **5.3. VicTrack Standards**

- TS-ST 005 Telecommunications Earthing Specification;
- TS-SP 013 Communication Cable Installation Specifications.

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## 5.4. European Telecommunication Standards Institute Standards

(Re: Classification of environmental conditions)

- ETS 300 019-1-0 – Part 1-0 Introduction;
- ETS 300 019-1-1 – Part 1-1 Storage;
- ETS 300 019-1-2 – Part 1-2 Transportation;
- ETS 300 019-1-3 – Part 1-3 Stationary use at weather protected locations.

## 5.5. References

- TIA 942 Telecommunications Infrastructure Standard for Data Centres;
- 2008 ASHRAE Standard – American Society of Heating, Refrigeration and Air- conditioning Engineers;
- TS-SP 013 Communication Cable Installation Specifications;
- TS-ST 042 Communications Equipment Room Brief;
- Australian Communications Industry Forum AS/ACIF S009:2006 Installation requirements for customer cabling (telecommunication networks).



## 6. Technical Requirements

### 6.1. Design

- a) Medium Optical Distribution Frame (MODF) is the VicTrack term for a specific racking solution for Optical Fibre Termination, splicing and patching for core or aggregation sites.
- b) The MODF is a scalable modular system capable of supporting optical fibre lead in splice/patch core counts of at least 168 cores.
- c) The main advantages that the MODF offers over installing Fibre Termination Panels (FTP) in equipment racks is better fibre management provided within the smallest possible footprint.

### 6.2. Vendor Documentation

- a) The vendor provided documentation must be adhered to when installing a MODF, unless otherwise specified in this document.

### 6.3. MODF Specifications

Item	Description
A	The MODF shall be no greater than 600mm wide, 300mm deep and 2200mm high.
B	The MODF shall have solid side panels with a lockable door.
C	The MODF shall have light coloured panels and frames.
C	The optical fibre cable entries shall be either top or bottom entries, but not both simultaneously.
D	The optical fibre cable shall be managed and secured internally within the frame.
E	Any optical fibre cable's loose tubes shall be protected between the CEMT and sub racks.
F	Each optical fibre cable shall be fully terminate in a single FTP, and not to be split between FTPs, unless explicitly outlined in the fit out detail design pack.
G	Optical fibre pigtailed shall be organised, stored and mechanically protected within each sub rack.
H	Each MODF layout, including sub racks, shall be provided as per each fit out's detail design pack.
I	All optical fibres shall be fully terminated and presented to the MODF front presenting SC/APC through connectors in sub racks.
J	Optical fibre patch leads shall be organised, stored and mechanically protected within the MODF.
K	Optical patch leads shall have flexible length management internally of the frame.
I	Minimum bend radii for all optical fibre cables and optical fibre patch leads shall be maintained.

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1. An Example of a MODF

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## 6.4. Sub Rack

Item	Description
A	The MODF will use SC/APC through connectors, front presenting.
B	The MODF shall support 19" mounting for FTPs.
C	The MODF shall allow fitment and mounting of 1RU, 2RU and 3RU 19" FTPs.
D	The MODF shall have front presented SC/APC connectors on FTPs.
E	SC/APC connectors on flat tray type FTPs not allowed.

## 6.5. Deployment Rules

Item	Description
A	The VicTrack MODF is intended for deployment where equipment rack mounted FTP is not suitable.
B	The VicTrack MODF can be used as method of network demarcation for interconnects and cross connect.

## 6.6. Rack Layout

Item	Description
A	<b>Optical fibre cables</b>  Optical fibre cables will enter from either the top or bottom (under floor) entry, and managed behind the cable guide/spool management tray, or via base ducts for underfloor cables.
B	<b>Optical fibre cables</b>  Optical fibre cables will have their sheaths and strength members secured on C-profile bars and Cable Attachment Plates (CAP).
C	<b>Sub racks</b>  Sub racks will occupy the opposite half of the MODF from the optical fibre cable entry, and their fit outs detailed in design pack.
D	<b>Equipment Rack Patch Leads</b>  Optical fibre patch leads between equipment racks and MODF will follow the patching methodology as per vendor and manufacturer's specifications, except where this document directs otherwise.
E	<b>Cross Connect Patch Leads</b>  Optical fibre cross connecting patch leads within the MODF, will be 2mm SMOF patch leads, and will be managed within the MODF

## **7. Installation**

### **7.1. Assembling MODF**

a) Installers must follow the vendors and manufacturer's Installation Guide except where this document directs otherwise.

### **7.2. Mounting MODF to Solid Floors**

a) In conjunction with the Installation Guide, the rack is to be secured to the floor with suitable masonry anchors. Dynaset™, Ramset™, and Dynabolt™ are examples of acceptable masonry anchors.

### **7.3. Mounting MODF on Raised Floors**

a) Where overhead superstructure is available, the rack shall be secured to the overhead at no less than two points.

b) Where overhead superstructure is not available, the rack is to be secured to a length of Unistrut (Typically the total length of the rack assembly) which is mechanically secured to the slab under the raised floor.

c) The Rack is then to be secured to the Unistrut through the raised floor tile by M12 threaded rod.

### **7.4. Wall Mounting of MODF**

a) Where the MODF is to be secured to a wall, the standard supplied wall mounting bracket is to be used with the appropriate fastening methodology.

### **7.5. Mounting Sub Racks**

a) Assemble and configure the fibre termination sub racks as per vendor and manufacturer's instructions.

### **7.6. Sub Racks and Fibre Termination (FT) Numbers**

a) All Sub Racks will require a VicTrack specific port numbering label to be applied.

b) These labels will replace the manufacturer's standard label on the flip down cover label and splice tray label.

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1	2	3	4	25	26	27	28	49	50	51	52
5	6	7	8	29	30	31	32	53	54	55	56
9	10	11	12	33	34	35	36	57	58	59	60
13	14	15	16	37	38	39	40	61	62	63	64
17	18	19	20	41	42	43	44	65	66	67	68
21	22	23	24	45	46	47	48	69	70	71	72

## 2. Example of VicTrack Sub Rack port layout

### 7.7. Labelling

a) Label the MODF as per detailed design pack.

b) The following items are to be labelled:

#### 7.7.1. MODF

a) Each MODF is to be labelled as per the detailed design pack.

b) The label is to be placed on the frame's top and centre of the beam, in Black on White lettering no smaller than 30mm font.

c) RU mounting labels will need to be applied to both sides of the rack. These are to be Rack Technologies P/N 9250 or equivalent.

#### 7.7.2. Sub Rack

a) The sub rack label must be attached to the outside and inside of the swing down cover. The label is to include in this order: FT number, panel letter, and fibre range.

Example: FT1111-A 1-72

b) The label is to be no smaller than 10mm, Black on White.

c) Where cable loose tubes are split across sub racks, the fibre range is to be adjusted.

Example:

FT1111-A 1-72

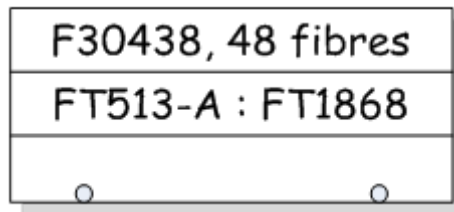
FT1111-A 73-144

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## 7.7.3. Optical Fibre Cable Sheath

- a) The optical fibre cable sheath is to be labelled after the sheath clamp on the C profile bracket and before the break out box.
- b) The label will be Panduit Self Laminating Tag part number PST-FO or equivalent.
- c) The Label is to include in this order: Cable number, fibre core count, A-End, FT number, B-End, FT number.

Example:



3. Typical Cable Sheath Label

## 7.7.4. Loose Tube Nylon Conduits

- a) The loose tube nylon conduits are to be labelled between the break out box and the first U clamp. The label will be Panduit Self Laminating Tag part number PST-FO or equivalent.
- b) The Label is to include in this order: Cable Number, Core Count

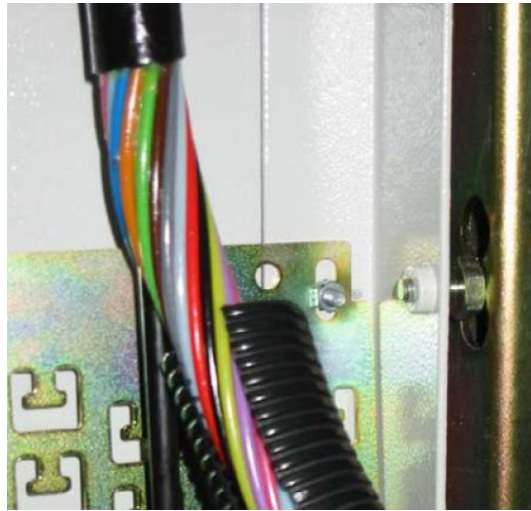
Example:

F30675 73-144

## **8. Optical Fibre Cabling Methodology**

### **8.1. Optical Fibre Cable Entry and Management**

- a) Optical fibre cable entries are typically via the top and proceeds down behind the duct plate.
- b) Where the optical fibre cable is to enter from the base of the frame a CEMT is to be used to manage and secure the fibre cable.
- c) The slotted 21mm Nylon conduit is placed over the cable sheath with the slot aligned with the strength member and secured with a cable tie.



**4. Slotted Conduit and Strength Member**

## **9. Optical Fibre Patching Methodology**

### **9.1. Equipment Rack Patch Lead Entry and Management**

- a) Optical fibre patch leads from equipment racks into the MODF shall be routed via one (and only one) of the flexible length management guides, as per vendor and manufacturer's specifications.
- b) Optical fibre patch leads from equipment racks into the MODF shall use provided fibre ducting and conduits to the equipment rack.

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c) Only a limited span of excess patch lead lengths can be managed via the flexible patch lead management area.

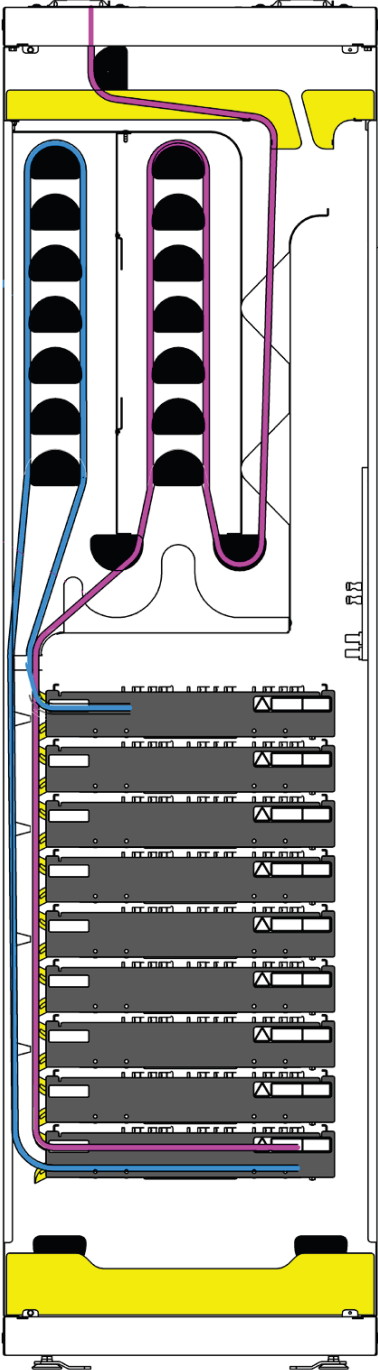
### **9.2. Cross Connect Fibre Patch Lead Within MODF**

a) Cross connecting fibre patch leads within the MODF shall be routed from the relevant sub rack, over their associated guide/spool, and then via one (and only one) of the flexible length management guides, as per vendor and manufacturer's specifications.

b) Only a limited span of excess patch lead lengths can be managed via the flexible patch lead management area.



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**5. Example of Optical Fibre Patching Methodology**

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## 10. Document Review and Approval

Delegation	Name	Position	Version	Date
Owner	Kathryn Shoolman	Manager Infrastructure Design	1.0	07/02/2020
Author	John Berti	Manager Engineering Standards and Specifications	1.0	07/02/2020
Reviewer	Choy Hardisty	Fibre Design Officer PDG	1.0	07/02/2020
Reviewer	Jeremy Rodrigues	Fibre Designer Telecommunications Group	1.0	07/02/2020
Reviewer	Ross Johnston	Team leader Internal Plant	1.0	07/02/2020
Endorser	Ezio Lattanzio	Group Manager Operations	1.0	07/02/2020
Approver	Bruce Moore	General Manager Telco	1.0	07/02/2020

## 11. Document History

Version	Name	Change/review details	Date
1.0	John Berti	First release	07/02/2020
0.5	Choy Hardisty	Initial Draft	24/10/2019

## 12. Review Period

This standard will be reviewed at every two (2) years by the document owner, or amended as appropriate.