

TM-102

Technical Description

TM-102 DC, 19"/ETSI/23" (TM102-DC)
TM-102 passive, 19"/ETSI/23" 1xL+1xS (TM102-PAS-L-S)
TM-102 passive, 19"/ETSI/23" 3xS (TM102-PAS-3S)



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Contents

1 Introduction.....	1
1.1 Document Revision History.....	1
2 Functional Description	2
2.1 TM-102 Basic Configuration	2
2.2 Rack Mount Options.....	3
2.2.1 19", ETSI or 23"	3
2.2.2 300mm or >300mm rack mount	4
3 Active TM-102.....	5
3.1 Primary Power Alternatives.....	5
3.2 Slot Numbering.....	6
3.3 Management Access.....	6
4 Passive TM-102	7
5 Running nodes without a CU	8
6 Supported Plug-in Units	9
7 Plug-in units in TM-102	1
8 Labels	7
9 Technical Data	9
9.1 Environmental conditions	9
9.2 Revision Data	9
9.3 Ordering Data.....	10
9.3.1 Spare Parts.....	10

1 Introduction

This manual provides an overview of the TM-102 chassis.

1.1 Document Revision History

Table 1 Document Revision History

Revision	Date	Description of changes
A	2012-03-07	Due to introduction of a new documentation tool, the revision is reset to A. For details on previous document changes/updates, please see corresponding document in System Manual release R18. There are editorial changes in this version compared to the R18 version.
B	2012-08-20	Updated/improved chapter on supported plug-in units
C	2013-03-19	Removal of incorrect data on AC/DC module in chapter 9. Misc edits.
D	2013-03-19	R21 updates: Updated plug-in unit compatibility matrix.
E	2013-11-10	R22 updates: Updated plug-in unit compatibility matrix.
F	2014-05-15	R23 updates: Updated plug-in unit compatibility matrix.
G	2014-09-15	R23.1 updates. Updated plug-in unit compatibility matrix.
H	2014-12-20	R24.0 updates. - Updated SW release number in plug-in unit compatibility matrix. - R-state change on passive TM-102 chassis versions. See chapter 9.2 - A passive TM-102 can manually be entered in the ENM as a slave to an active TM-102.
I	2015-06-01	Changes to reflect R25 additions.
J	2015-06-01	Changes to reflect R26 additions.
K	2016-03-16	Changes to reflect R26.1 additions.
L	2016-06-16	Changes to reflect R27.0 additions.
M	2017-04-16	Changes to reflect R28.1 additions.
N	2017-06-20	Changes to reflect R29.0 additions.
O	2017-09-20	Changes to reflect R29.1 additions.
P	2017-12-15	Changes to reflect R30.0 additions.
Q	2018-04-15	Changes to reflect R30.1 additions (only changed release references).
R	2018-06-25	Changes to reflect R31.0 additions (only changed release references).

2 Functional Description

2.1 TM-102 Basic Configuration



Fig. 1 Active TM-102 chassis



Note

The TM-102 chassis is no longer orderable. It is replaced by the more recent TM-102/II chassis. The information in this document is for reference only. Spare parts are still available.

The TM-102 chassis is provided in three versions. One “active” version that is DC or AC powered and two “passive” versions without any powering at all.

The active TM102–DC can house both active plug-in units (e.g. Transponders) and passive filters (e.g. DWDM filter).

The two passive chassis options have no primary powering and can only house passive boards, such as DWDM/CWDM filters and optical couplers. Even though these passive boards need to electrical power to function, they have an onboard EEPROM circuit to enable extraction of inventory data. In the active TM102–DC chassis this inventory information can be extracted and made available via the Embedded Node Manager or DNA-M Network manager. The no-powered versions of the TM-102 chassis have not this capability. Even so, they can be manually added in the DNA-M to be part of the network topology.

The ordering code (see table below) includes the chassis mechanics (item code), mounting material, cover panels and relevant DC power cables etc.

Table 2 TM-102, Active and passive slots

Ordering code	Item code	Slot types	Comment
TM102-DC	M102/ENC	1 full-height + 1 half-height	DC or AC powering
TM102-PAS-L-S	M102/PAS	1 full-height + 1 half-height	No primary power
TM102-PAS-3S	M102/PAS/3	3 half-height	No primary power



Note

The TM-102 does not have any slot for a Control Unit (CU). All TM-102 configurations are “CU-less”.

For information on which plug-in units that can be mounted in a TM-102 chassis, see separate chapter within this document.

For AC primary power configurations, a separate AC/DC converter is used. Two AC/DC units are required to provide dual/redundant primary power configurations.

Passive versions of the TM-102 :

TM102–DC characteristics:

- Only front access.
- 1U high.
- One active slot and one passive slot
- Dual DC power. External AC/DC converters.
- Fixed fan units.

2.2 Rack Mount Options

At delivery the TM–102 chassis is equipped with 19" mounting brackets.

For details on the installation procedure, see the *TM-102 Installation Guide*

2.2.1 19", ETSI or 23"

For ETSI and 23" mounting a set of extension brackets are mounted on the 19" brackets as shown in the figure below.

The TM-102 is delivered with the both ETSI and 23" extension brackets. Two mounting options are provided that places the chassis at different depths within the rack.



Fig. 2 Extension brackets for 23" mounting

2.2.2 300mm or >300mm rack mount

The ETSI and 19" standards include 300mm deep racks. The brackets mounted on the TM-102 chassis are for 19" and for mounting depths >300mm. An additional pair of mounting brackets is provided that enables the TM-102 chassis to be mounted in 300mm racks, both for ETSI as well as 19" mounts.

The front of the TM-102 chassis will consequently extend closer to the rack front. Caution must be taken so that fiber patch cords are not affected by any doors covering the rack front.

3 Active TM-102

3.1 Primary Power Alternatives

The TM-102 can be powered via dual DC power inlets. The two DC inlets are placed on the front side of the chassis as shown in 3.

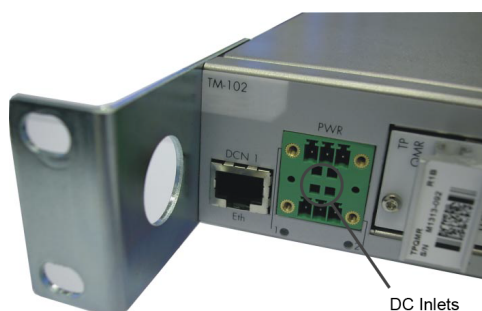


Fig. 3 DC Inlets

For AC primary power configurations, a separate AC/DC converter is used. Two AC/DC units are required to provide dual/redundant primary power configurations. The index indicates type of AC plug on the AC power cord. The AC cable is of 2.5m length with an power plug depending on selected country code and with an appliance connector of type C13 (IEC 60320-1). The AC appliance connector type of the PSU is C14 (IEC 60320-1)



Fig. 4 External AC/DC converter

Table 3 AC/DC converters for TM-102 chassis

Item name	Item code	Comment
AC/DC Unit 3p Plug 3.81mm PSM2 EUR	PS3A-10003/01	European plug. CEE 7/VII
AC/DC Unit 3p Plug 3.81mm PSM2 US	PS3A-10003/02	US plug NEMA 5-15
AC/DC Unit 3p Plug 3.81mm PSM2 GB	PS3A-10003/03	UK plug BS1363/A (C18)
AC/DC Unit 3p Plug 3.81mm PSM2 JP	PS3A-10003/04	Japan plug
AC/DC Unit 3p Plug 3.81mm PSM2 AU	PS3A-10003/05	Australia Plug
AC/DC Unit 3p Plug 3.81mm PSM2 CH	PS3A-10003/06	Swiss plug SEV 6534-2

For more technical details on primary power, see 9 *Technical Data*.

3.2 Slot Numbering

The board slots are numbered to ease installation instructions and for entering of circuit information used in the DNA-M. Slot no 1 is always dedicated for a Control Unit (or similar). Since the TM-102 is only for CU-less configurations, the first slot starts with number 2.

The active, full-sized slot has number 2, the passive slot has number 3.

The slot numbers are written on the front, under the card slots.

3.3 Management Access

Ethernet-based access is done via the RJ-45 connector located on the front side (DCN 1).

The electrical Ethernet interfaces can be connected to its interfacing equipment with an Ethernet cable and is suitable for connection to intra-building wiring only. The maximum allowed physical length of the cable is 100 m, provided that a Cat 5e class shielded cable is used and the shield is grounded at both ends. Unshielded cable usage is not warranted by Infinera and such usage is discouraged.



Fig. 5 DCN Access

Serial access is done via the RJ-45 connector on the Traffic Unit (Console RS232).

4 Passive TM-102

There are two passive versions of the TM-102:

- TM102-PAS-L-S : 1 full-sized and 1 half-sized. Any passive full- or half-height can be mounted in the passive TM-102 chassis.
- TM102-PAS-3S: 3 half-sized slots.

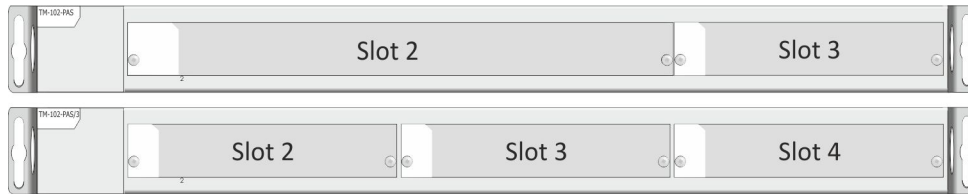


Fig. 6 TM102-PAS-L-S and TM102-PAS-3S

5 Running nodes without a CU

The CU provides an aggregated management view of a Network Element. A TM-102 node has no CU. This means that the microprocessor on the Traffic Unit (i.e. Transponder or MuxPonder) must undertake the functionality of a CU. The complete node management SW, ENM will thus be loaded into the unit microprocessor.

A TM-102 configuration will thus have CLI and GUI (Internet Browser) interface to the node manager ENM with same feature set as for configurations with a CU (i.e. TM-3000 and TM-301 configurations), with some restrictions:

- TM-102 with older Traffic units will not have encryption (SSL/SSH) on the management traffic to/from the NE. Other precautions must be taken to maintain integrity if a public DCN is used. All units introduced in R13 (June 2009) and onwards supports SSL/SSH.
- Equipment/client protection configurations between two Traffic Units cannot be created since it requires that both units are placed in the same card cage. This is an obvious restriction since the TM-102 has only one active slot. Line protection of client protection that is configured within the same board is however fully feasible. As an example, a TPQMR has four Transponder functions on the same board and client protection can be setup between these transponder functions. The Optical Coupler (OCU2) can be placed in e.g. a passive TM-102 chassis.
- Configuration upload from CU to Traffic Units at unit replacement is not available since no CU is present. Upload from DNA-M is the alternative option.
- At “cold start”, i.e. when powered up for the first time or after a complete power loss, the real time clock must manually be set. This is because the Traffic units have no battery back-up functionality to maintain timing data at power loss.

The passive slot in the TM-102 is part of the Management view. A passive unit will thus show up in the management interface and provide inventory data.

Some older Traffic Units do not support management view of the passive slot (HW restrictions);

- TPQMR R1 revision (phased out 2006)
- MXP8 (8-port SDH MuxPonder) — Last Time Buy (LTB) in December 2010
- TPDGBE (Dual GbE DWDM Transponder) — Last Time Buy (LTB) in November 2006
- TPDFC-CSM/yyyy & TPDFC-CMM/yyyy (Dual FC CWDM Transponder) — LTB, November 2006
- TPDFCDSM/xxxxx & TPDFCDMM/xxxxx (Dual FC DWDM Transponder) — LTB, November 2006

6 Supported Plug-in Units

An active unit, e.g. Transponder must fulfill two requirements to be mounted in a TM-102 chassis:

- Support CU-less configuration, i.e. can run without a Control Unit.
- Does not consume more electrical power than ~45W

See chapter below for compatible plug-in units.

7 Plug-in units in TM-102

The table below lists all plug-in units supported at release R31.0 and in which chassis and slot positions they can be inserted. Note that the table also contains units that no longer are orderable.

A “Type” parameter is used to identify the type of units as shown below:

Type	Description
A	Active unit, i.e. must be inserted in an active slot
P	Passive unit, i.e. must be inserted in an passive slot
FH	Full-height unit, i.e. occupies a full-height slot
HH	Half-height unit, i.e. occupies a half-height slot

The board width is also indicated in the Type parameter.

As an example: The TPQMR unit has the type **A/FH-1** meaning that the unit an Active, Full-Height unit that requires 1 slot.

“NA” means that this unit is not supported. “EOA-A” means “End Of Availability - Announced”. The board is in end of life process. “EOA-E” means “End Of Availability - Effective”. The board is no longer orderable.

The 40G and 100G units are not part of the table since they require two or three slots.

Table 4 Plug-in units, TM-102 compatibility (Release R31.0 content)

Category	Item Name	Item ID	Type	TM-102	TM-102-PAS-L-S	TM-102-PAS-3S	EOA status
Transponders, Muxponders @2.5G line rate	Quad MultiRate xWDM Transponder	TPQMR	A/FH-1	2	NA	NA	EOA-E
	Double DGBE xWDM, Basic Unit	TPDDGBE	A/FH-1	2	NA	NA	
	8p SDH/SONET 2,5G Muxponder v2	MXP8/II	A/FH-1	2	NA	NA	EOA-E
@4G line rate	MultiService Muxponder	MS-MXP	A/FH-1	2	NA	NA	
	Quad MultiService Transponder	TPQMS	A/FH-1	2	NA	NA	EOA-E
	Quad MultiProtocol Transponder	TPQMP	A/FH-1	2	NA	NA	EOA-E
@10G line rate	Double 10Gb/s Lite Basic Unit	TPD10G-L-BU	A/FH-1	2	NA	NA	
	Hex MultiRate 16G Lite Transponder	TPMRHEX-L/16G	A/FH-1	2	NA	NA	
	10Gb/s C-band Tunable Ext Reach	TP10G/TC-ER	A/FH-1	2	NA	NA	EOA-E
	10G C-band Tunable OTN Transponder	TP10GOTN/TC	A/FH-1	2	NA	NA	EOA-E
	10G Hex Transponder OTN	TPHEX10GOTN	A/FH-1	NA	NA	NA	
	OTN Muxponder 10G	MXP10GOTN	A/FH-1	2	NA	NA	

Table 4 Plug-in units, TM-102 compatibility (Release R31.0 content) (cont'd.)

Category	Item Name	Item ID	Type	TM-102	TM-102-PAS-L-S	TM-102-PAS-3S	EOA status
	MultiService Muxponder 10G	MS-MXP/10G	A/FH-1	2	NA	NA	
	Fronthaul Access unit	FHAU/1	A/FH-1	NA	NA	NA	
	FrontHaul Muxponder 10G	FH-MXP10G	A/FH-1	2	NA	NA	
	MultiService MXP Tunable 10G ER	MS-MXP10G/TC-ER	A/FH-1	2	NA	NA	EOA-E
	9xGbE/10Gb Muxponder, BU	GBE9-MXP10G	A/FH-1	2	NA	NA	EOA-E
	9xGbE/10G FEC Muxponder	GBE9/MXP10GFEC	A/FH-1	2	NA	NA	
	Double 10Gb/s FEC Basic Unit	TPD10GBE-BU	A/FH-1	2	NA	NA	
	Quad 10G FEC Transponder 1-slot	TPQ10GFEC/I	A/FH-1	NA	NA	NA	
	Quad MultiService 10G FEC Transp	TPQ10GFEC	A/FH-2	NA	NA	NA	EOA-E
	4xSTM-16/STM-64 Muxponder	4x2G5-MXP10G	A/FH-1	2	NA	NA	EOA-E
@100G line rate	Flexponder 400G OTN	FXP400GOTN	A/FH-1	NA	NA	NA	
Layer-2	10xGbE/10GbE Ethernet Muxponder-II	GBE10-EMXP10/II	A/FH-1	2	NA	NA	
	22xGbE/10GbE Ethernet Muxponder-II	GBE22-EMXP10/II	A/FH-2	NA	NA	NA	
	8x10GbE Ethernet MuxPonder-II	EMXP80G/II	A/FH-2	NA	NA	NA	EOA-E
	4x10GbE Ethernet MuxPonder-II	EMXP40G/II	A/FH-1	2	NA	NA	EOA-E
	22xGbE/4x10GbE Eth MuxPonder-Ile	EMXP62/IIIE	A/FH-2	NA	NA	NA	
	8xGbE/4x10GbE Eth MuxPonder-Ile	EMXP48/IIIE	A/FH-1	NA	NA	NA	
	12x10GbE Eth MuxPonder-Ile	EMXP120/IIIE	A/FH-2	NA	NA	NA	
	1x100G/12*10G Ethernet MuxPonder-Ile	EMXP220/IIIE	A/FH-2	NA	NA	NA	
	24x10GbE Ethernet MuxPonder-Ile	EMXP240/IIIE	A/FH-2	NA	NA	NA	
	8xMPO Ethernet MuxPonder-III	EMXP/III	A/FH-2	NA	NA	NA	
	4x100G PT-Fabric I/O Unit	PTIO-100G	A/FH-1	NA	NA	NA	
	12x10G PT-Fabric I/O Unit	PTIO-10G	A/FH-1	NA	NA	NA	
	2x100/200G, 12x10G, 1xMPO Ethernet MuxPonder-III	EMXP440/III	A/FH-2	NA	NA	NA	

Table 4 Plug-in units, TM-102 compatibility (Release R31.0 content) (cont'd.)

Category	Item Name	Item ID	Type	TM-102	TM-102-PAS-L-S	TM-102-PAS-3S	EOA status
MBA	MS Access Hub 4xSTM-1/OC-3 +16xEth	MXP-MBH/1	A/FH-2	NA	NA	NA	
DWDM Optical Add/drop	1ch DWDM Add-Drop Unit, AB 1ch DWDM Add-Drop Unit, BA	AD1AB/xxxxx AD1BA/xxxxx	P/HH-1	3	3	2-4	EOA-E
	2ch DWDM Add-Drop Unit, AB 2ch DWDM Add-Drop Unit, BA	AD2AB/xxxxx AD2BA/xxxxx	P/HH-1	3	3	2-4	EOA-E
	4ch DWDM Add-Drop Unit, AB 4ch DWDM Add-Drop Unit, BA	AD4AB/xxxxx AD4BA/xxxxx	P/HH-1	3	3	2-4	EOA-E
	2ch OA DWDM Add-Drop Unit AB 2ch OA DWDM Add-Drop Unit BA	AD2OAAB/xxxxx AD2OABA/xxxxx	P/HH-1	3	3	2-4	EOA-E
	1ch/2F A/D DWDM Add-Drop	AD1-2F/xxxxx	P/HH-1	3	3	2-4	
	4ch/2-fiber DWDM Add-Drop	AD4-2F/xxxxx	P/HH-1	3	3	2-4	
	2ch DWDM OADM xxx/yyy	OADM2CH/xxx	P/HH-1	3	3	2-4	
	4ch DWDM Add-Drop Even 50GHz	AD4/50G-E/xxx	P/HH-1	3	3	2-4	
	4ch DWDM Add-Drop Odd 50GHz	AD4/50G-O/xxxx	P/HH-1	3	3	2-4	
	1x5 Band Splitter Unit / EVEN 50GHz	BSU1X5/EVEN50G	P/HH-1	3	3	2-4	
	1x5 Band Splitter Unit / ODD 50GHz	BSU1X5/ODD50G	P/HH-1	3	3	2-4	
	1x2 ROADM 100GHz	1x2ROADM/100G	A/FH-1	NA	NA	NA	
	1x2 ROADM 50GHz	1x2ROADM/50G	A/FH-1	NA	NA	NA	
	1x4 ROADM unit F-model	1x4ROADM-F	A/FH-1	NA	NA	NA	
	1x9 ROADM unit F-model	1x9ROADM-F	A/FH-1	NA	NA	NA	
	1x4 ROADM 100GHz	1x4ROADM/100G	A/FH-2	NA	NA	NA	
	1x8 ROADM 50GHz	1x8ROADM/50G	A/FH-2	NA	NA	NA	
DWDM OpticalMux/ DeMux	8ch Mux/DeMux, Extendable	MDU8-E	P/FH-1	NA	2	NA	
	8ch Mux/DeMux, Terminal	MDU8-T	P/FH-1	NA	2	NA	
	8ch Even Mux/DeMux, Extendable	MDU8-E/EVEN-C	P/FH-1	NA	2	NA	
	8ch Even Mux/DeMux, Terminal	MDU8-T/EVEN-C	P/FH-1	NA	2	NA	

Table 4 Plug-in units, TM-102 compatibility (Release R31.0 content) (cont'd.)

Category	Item Name	Item ID	Type	TM-102	TM-102-PAS-L-S	TM-102-PAS-3S	EOA status
	40ch MDU, even 50GHz DWDM	MDU40/50G-EVEN	A/FH-3	NA	NA	NA	
	40ch MDU, odd 50GHz DWDM	MDU40/50G-ODD	A/FH-3	NA	NA	NA	
	40ch MDU-Lite , even 50GHz DWDM	MDU40/50G-EVEN-L	A/FH-3	NA	NA	NA	
	40ch MDU-Lite , odd 50GHz DWDM	MDU40/50G-ODD-L	A/FH-3	NA	NA	NA	
	MDU-E 8ch Even 50GHz DWDM	MDU8EE919-926	P/FH-1	NA	2	NA	
	MDU-E 8ch Even 50GHz DWDM	MDU8EE927-934	P/FH-1	NA	2	NA	
	MDU-E 8ch Even 50GHz DWDM	MDU8EE935-942	P/FH-1	NA	2	NA	
	MDU-E 8ch Even 50GHz DWDM	MDU8EE943-950	P/FH-1	NA	2	NA	
	MDU-E 8ch Even 50GHz DWDM	MDU8EE951-958	P/FH-1	NA	2	NA	
	MDU-E 8ch Odd 50GHz DWDM	MDU8EO9185-9255	P/FH-1	NA	2	NA	
	MDU-E 8ch Odd 50GHz DWDM	MDU8EO9265-9335	P/FH-1	NA	2	NA	
	MDU-E 8ch Odd 50GHz DWDM	MDU8EO9345-9415	P/FH-1	NA	2	NA	
	MDU-E 8ch Odd 50GHz DWDM	MDU8EO9425-9495	P/FH-1	NA	2	NA	
	MDU-E 8ch Odd 50GHz DWDM	MDU8EO9505-9575	P/FH-1	NA	2	NA	
	16p Colorless MDU 50GHz	MDU16-CL/50G	A/FH-3	NA	NA	NA	
Misc DWDM	Optical Interleaver Unit 100/200GHz	OIU-C-100/200	P/HH-1	3	3	2-4	
	Optical Interleaver Unit 50/100GHz	OIU-C-50/100	P/HH-1	3	3	2-4	
	2-port OCM	OCM/2p	A/FH-1	2*)	NA	NA	
	8ch Variable Optical Attenuator – II	VOA-8CH/II	A/FH-1	2	NA	NA	EOA-E
	8ch SFP-based VOA unit	VOA-8CH/SFP	A/FH-1	2	NA	NA	
	2ch Variable Optical Attenuator	VOA-2CH	A/HH-1	3	NA	NA	
	Optical Band Unit	OBU1300/1550	P/HH-1	3	3	NA	
	2xOptical Coupler Unit	OCU2	P/HH-1	3	3	2-4	
	4xOptical Coupler Unit	OCU4	P/HH-1	3	3	2-4	
	Protection Control Unit	PCU/2P	A/HH-1	NA	NA	NA	
Optical Amplifiers	FPU unit	FPU/1	A/FH-1	2	NA	NA	
	Optical Line Amplifier 17dBm C-band	OA17C	A/FH-1	2	NA	NA	

Table 4 Plug-in units, TM-102 compatibility (Release R31.0 content) (cont'd.)

Category	Item Name	Item ID	Type	TM-102	TM-102-PAS-L-S	TM-102-PAS-3S	EOA status
	Dual Optical Line Amplifier 17/17dBm C-band	OA2-17/17CC	A/FH-1	2	NA	NA	
	Optical Line Amplifier 20dBm C-band	OA20C	A/FH-1	2	NA	NA	
	Dual Optical Line Amplifier 20/20dBm C-band	OA2-20/20CC	A/FH-1	2	NA	NA	
	Opt Low Gain Amp C-Band 20dBm	OA20C/LG	A/FH-1	2	NA	NA	
	Dual Opt Low Gain Amp C-Band 20dBm	OA2-20/20/CC/LG	A/FH-1	2	NA	NA	
	Variable Gain Opt Ampl 20dBm C-band	OA20C/VG	A/FH-1	2	NA	NA	
	Dual Var Gain Opt Ampl 20dBm C-band	OA2-20/20/CC/VG	A/FH-1	2	NA	NA	
	Opt Flat Gain Amp C-Band 10 dBm	OA10C/FG	A/FH-1	2	NA	NA	
	Variable Gain Ampl 20dBm C-band-II	OA20C/VG/II	A/FH-1	2	NA	NA	
	Dual Var Gain Ampl 20dBm C-band-II	OA2-20C/VG/II	A/FH-1	2	NA	NA	
	RAMAN/EDFA 21dBm HG	OA-RAED-21HG	A/FH-2	NA	NA	NA	
	RAMAN/EDFA 20dBm LG	OA-RAED-20LG	A/FH-2	NA	NA	NA	
CWDM AD-filters	1ch Add/drop CWDM (single-fiber)	ADCWDM/yyyy	P/HH-1	3	3	2-4	EOA-E
	1ch CWDM Add/drop (single-fiber)	AD1C/yyyy	P/HH-1	3	3	2-4	
	2x1ch Add/Drop CWDM (single-fiber)	AD2X1C/yyyy	P/HH-1	3	3	2-4	
	1ch/2-fiber CWDM Add-Drop	AD1C-2F/yyyy	P/HH-1	3	3	2-4	
	OSC and OTDR filter	AD1C-2F-OTDR/1510	P/HH-1	3	3	2-4	
CWDM OpticalMux/DeMux	4ch MDU CWDM, single fiber, TA 4ch MDU CWDM, single fiber, TB	MDUC4-TA/1470 MDUC4-TB/1470	P/HH-1	3	3	2-4	
	4ch MDU CWDM, single fiber, EA 4ch MDU CWDM, single fiber, EB	MDUC4-EA/1270 MDUC4-EB/1270	P/HH-1	3	3	2-4	

Table 4 Plug-in units, TM-102 compatibility (Release R31.0 content) (cont'd.)

Category	Item Name	Item ID	Type	TM-102	TM-102-PAS-L-S	TM-102-PAS-3S	EOA status
	8ch CWDM Mux, fiber-pair	MU-2F/1470	P/HH-1	3	3	2-4	
	8ch CWDM De-Mux, fiber-pair	DU-2F/1470					
	4ch CWDM MDU fiber-pair Extendable	MDU4-E-2F	P/HH-1	3	3	2-4	
	4ch CWDM MDU fiber-pair Terminal	MDU4-T-2F	P/HH-1	3	3	2-4	

*) The OCM/2P can be mounted in a TM-102 chassis as long as it is not included in an Optical Control Loop.

8 Labels

The TM-102 chassis is marked with a Product Label and a System Label. Both are placed on the top of the chassis, on the left, front side.



Fig. 7 Labels

The Product label contains:

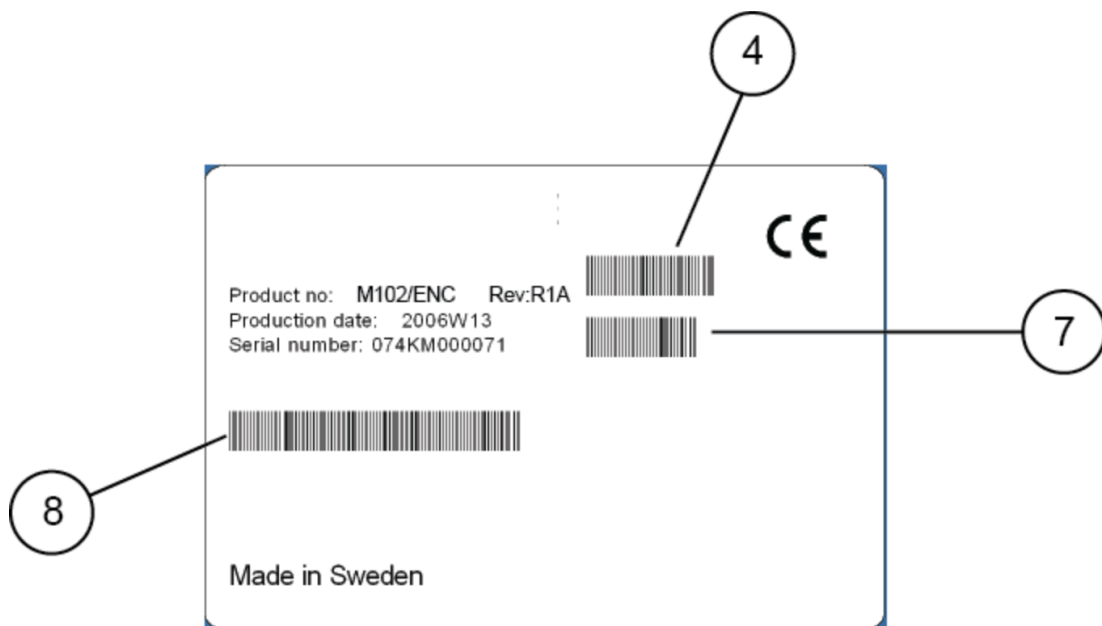


Fig. 8 Product Label

1. Infinera logotype
2. Product number
3. Product revision
4. Barcode 128 containing: product number "space" revision
5. Production date: yearWweeknumber
6. Serial number
7. Barcode 128 containing: serial number
8. Barcode 128 containing: product number, revision, production date, serial number
9. Approval markings

This information is not accessible via the inventory function in the management system. Inventory data on CU's and Traffic Units are available via the inventory functionality.

The System Label contains:

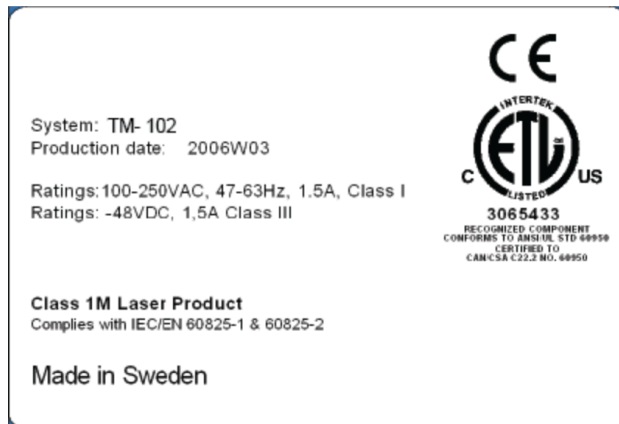


Fig. 9 System Label

1. Infinera logotype
2. System type
3. Production date: yearWweeknumber
4. Ratings
5. Laser class
6. Compliance info
7. Approval markings

9 Technical Data

Table 5 Mechanical & Electrical Data, TM-102

Parameter	Value
Height	1U / 44 mm
Depth	249mm excl mounting brackets
Width (excl. mounting brackets)	448mm
Primary Power	DC-inlets. Redundant. Fixed.
Cooling	Fixed fans
Mounting	ETSI, 19"
Fiber management	No
LAN/Mgmt connections	RJ45
Primary power range AC	External AC/DC-converter 100-240VAC, 50/60Hz, 1.1A Class I
Primary power range DC	48VDC (40.8 – 57.6VDC), 3A Class III
Max Inrush current @ -48VDC	1,9A / 30ms
Max power at AC powering	55 W
Max power at DC powering	50 W
Max power consumption in card cage	~45W
Weight DC-powering:	~3,4 kg
DC cable size	1.5 mm ² (connector limit) Standard 1,0 mm ²
Operating conditions	ETSI EN 300 019-1-3 class T3.1

9.1 Environmental conditions

Configurations with the TM-102 chassis supports ETSI EN 300 019-1-3 T3.1 (+5 to +40°C (+41 to 104°F)) and ETSI EN 300 019-1-3 T3.1E (–5 to +45°C (+23 to 113°F)). See also “XTM Series Overview Description” within the System Manual.

9.2 Revision Data

A TM-102 chassis has an order level that includes mechanics, cables etc. The table shows revision data on the basic card cage mechanics.

Table 6 Revision Data

Ordering code	Product number	Rev	Introduced Release	
TM102-DC	M102/ENC	R1A	R10.0	1st released version
		October 2015: Product in EOL-Effective, i.e. no longer orderable. Replaced by TM-102/II. See 100025-PTN00018.		
TM102-PAS-L-S	M102/PAS	R1A	R12.0	1st released version
		R1B	R24	Change in thickness of metal
TM102-PAS-3S	M102/PAS/3	R1A	R15.0	1st released version
		R1B	R24	Change in thickness of metal

Note that orders are placed on specific sales objects, listed in section 9.3 *Ordering Data*.

9.3 Ordering Data

Table 7 Ordering Data

Item Name	Item code
TM-102 DC, 19"/ETSI/23"	TM102-DC
TM-102 passive, 19"/ETSI/23" 1xL+1xS	TM102-PAS-L-S
TM-102 passive, 19"/ETSI/23" 3xS	TM102-PAS-3S

The TM-102 ordering numbers includes the following items:

- Chassis mechanics
- Dummy panels, half-sized (1 items)
- DC cable, 2.5m (2 items, not for passive options)
- Ethernet cable, 2m (1 item, not for passive options)
- DSUB adapter RJ45/DB9 (1 item, not for passive options)
- ESD wrist wrap with strap (1 item)
- Mounting material in rack; nuts, plastic plates, screws (2 sets)
- Mounting brackets 19" for >300mm rack depth (mounted, 2 per chassis)
- Mounting brackets ETSI for >300mm rack depth (2 per chassis)
- Mounting brackets 19" for 300mm rack depth (2 per chassis)
- Mounting brackets ETSI for 300mm rack depth (2 per chassis)
- Extension brackets 19" to ETSI and 23" (2 per chassis)

Table 8 AC/DC Converters

Item name	Item code	Comment
AC/DC Unit 3p Plug 3.81mm PSM2 EUR	PS3A-10003/01	European plug. CEE 7/VII
AC/DC Unit 3p Plug 3.81mm PSM2 US	PS3A-10003/02	US plug NEMA 5-15
AC/DC Unit 3p Plug 3.81mm PSM2 GB	PS3A-10003/03	UK plug BS1363/A (C18)
AC/DC Unit 3p Plug 3.81mm PSM2 JP	PS3A-10003/04	Japan plug
AC/DC Unit 3p Plug 3.81mm PSM2 AU	PS3A-10003/05	Australia Plug
AC/DC Unit 3p Plug 3.81mm PSM2 CH	PS3A-10003/06	Swiss plug SEV 6534-2

The ordering numbers includes the following items:

- AC cable (2.5m) with AC-plug (type depending on country code).
- AC/DC converter with mounted DC cable (2.25m) and connector.

9.3.1 Spare Parts

The TM-102 chassis has the following spare part items:

Table 9 Spare parts

Item name	Item code	Comment
Dummy panel 6HE inkl ovl o EMC-list	M3-DU/6HE	Full-height slot cover panel
Dummy panel 3HE inkl ovl o EMC-list	M3-DU/3HE	Half-height slot cover panel