A Uniti Group Company

# Velocity Premises Installation Guide

OPTICOMM Networks

## Disclaimer

The information in this document is provided for general information purposes only. Recipients must make their own inquiries as to the accuracy and completeness of information contained in this document. Opticomm may update this document from time to time.



Please consider the environment before printing this document.

## Change History

| Version | Description | Effective date |
|---|---|---|
| **1.0** | Released | 30 Jun 2022 |
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## Changes in the Revision

The detailed changes to this document, from Version NA dated NA to Version 1.0 dated 30 June 2022 are outlined in the table below.

| Section / Sub-section | Detailed Changes |
|---|---|
| All | First release |
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# 1 Introduction

This document will help you to correctly prepare your premises and arrange connections to access the OptiComm Network.

## 1.1 Definitions

A list of commonly used terms is defined below

| Acronym | Definition |
|---|---|
| **AC** | Alternating Current |
| **AES** | Advanced Encryption Standard |
| **DC** | Direct Current |
| **FEC** | Forward Error Correction |
| **GEM** | GPON Encapsulation Method |
| **GPON** | Gigabit Passive Optical Network |
| **IGMP** | Internet Group Management Protocol |
| **MDI/MDX** | Medium-dependent interface/MDI crossover |
| **NTD** | Has the meaning given in the ***Product Technical Specification*** |
| **OMCI** | ONU Management Control Interface |
| **ONT** | Also known as NTD, see NTD in this table |
| **PON** | Passive Optical Network |
| **POTS** | Plain Old Telephone Service |

# 2 Pre-Installation Requirements

This section outlines the requirements that need to be met prior to installing the NTDs.

## 2.1 Cabling Requirements

All cabling and infrastructure should have been pre-prepared to the Opticomm standard as outline in the latest versions of the below documents:

- SDU- Preparation-Installation-Guide-Single-Dwelling-Unit-with-TV
- SDU- Preparation-Installation-Guide-Single-Dwelling-Unit-without-TV
- MDU- Preparation-Installation-Guide-Multi-Dwelling-Unit
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The latest versions of the above mentioned documents can be found at https://www.opticomm.com.au/support/resources.

## 2.2 G-010G-R[1]

The recommended tools are as follows:

- #2 Phillips screwdriver
- 1/4 in. (6 mm) flat blade screwdriver
- Wire strippers
- Fibre optic splicing tools
- RJ-45 cable plug crimp tool
- Voltmeter or multimeter
- Optical power meter
- Paper clip
- Mounting screws (for wall mounting the ONT) pan head style of screw head, screw size of M4 or #6

[1] Excerpts and Content from the Nokia ONT G-010G-P G-010G-Q G-010G-R G-010G-T Product Guide, 3FE-45458-AAAA-TCZZA, Issue 17, March 2022

## 2.3 G-240G-A[2]

The recommended tools are as follows:

- #2 Phillips screwdriver
- 1/4 in. (6 mm) flat blade screwdriver
- wire strippers
- fibre optic splicing tools
- RJ-45 cable plug crimp tool
- voltmeter or multimeter
- optical power meter
- drill and drill bits
- pin-in-hex screwdriver
- twist or zip tie

[2] Excerpts and Content from the Nokia ONT G-240G-A Product Guide, 3FE-55691-AAAA-TCZZA, Issue 15, December 2021

# 3 Installation

This section outlines the steps to install the NTDs.

## 3.1 Network Termination Device (NTD) Specifications (referred below as ONT)

For the Velocity footprint, Opticomm will use the Nokia models; G-010G-R and G-240G-A; ONTs as outlined in the specifications below.

### 3.1.1 G-010G-R[3]

The G-010G-R is in indoor unit and provides a subscriber interface for the 7360 ISAM FX.

This model ONT will terminate the PON interface and convert it to a user interface that directly connects to the End Users devices.

#### 3.1.1.1 Inclusions

GPON G-series ONT unit includes:

- 1x 12V, 0.5A AC/DC power cord with 2-pin Australia (AU) variant plug.

#### 3.1.1.2 Functionality

The G-010G-R NTD provides the following functionality:

- Advanced data features such as VLAN tag manipulation, classification, and filtering
- IGMP v2/3 snooping
- Support for multicast GEM port
- Auto-negotiation and MDI/MDIX auto-sensing
- AES decryption with key generation and switching
- Optics that support received signal strength indication (RSSI)
- FEC in both directions

[3] Excerpts and Content from the Nokia ONT G-010G-P G-010G-Q G-010G-R G-010G-T Product Guide, 3FE-45458-AAAA-TCZZA, Issue 17, March 2022

- Configurable link pass through mode
- Performance monitoring and alarms
- Fully G.984 series GPON standard compliant
- G984.4 standard-compliant ONT Management Control Interface (OMCI) for ONT management and provisioning
- BBF.247 GPON certification for G-010G-P and G-010G-Q
- Support for upstream DBRu

### 3.1.1.3 Optical parameters

The upstream wavelength operation for the G-010G-R NTD is as follows:

- Minimum: 1290 nm
- Typical: 1310 nm
- Maximum: 1330 nm

### 3.1.1.4 Loop back detection and protection

The G-010G-R ONT supports loop back detection, which can be enabled or disabled using OMCI and is disabled by default.

The loop detect packet VLAN ID is based on the ONT side VLAN ID. If the ONT side ID is untagged, the loop detect packet ID is untagged. If there are multiple ONT side VLAN IDs, the loop detect packet also has multiple VLAN IDs. If the ONT side has mixed tagged and untagged IDs, the loop detect packet also has mixed tagged and untagged IDs. If the ONT has no VLAN filter (no fibre detected), the loop detect packet is untagged.

The loop detect packet length is 128 bytes; the payload contains the port ID (1 byte) and the sequence number (4 bytes).

The ONT alarm LED flashes with 0.7s on and 0.7s off if the ONT loop is detected. The ONT shuts down immediately after the loop is detected. The ONT should disable the source port by configuring it to link down and report a “link down” event to the OLT. The ONT port should be enabled when it is unlocked using OMCI.

### 3.1.1.5 Interfaces and interface capacity

The following table describes the supported interfaces and interface capacity for G-010G-R indoor ONTs.

| ONT type and model | Maximum capacity | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | POTS | 10/100/BASE-T | 10/100/1000 BASE-T | RF video (CATV) | MoCA | VDSL2 | E1/TI | Local craft | GPON SC/APC |
| G-010G-R | — | — | 1 | — | — | — | — | — | 1 |

*Table 1 G-010G-R indoor ONT interface connection capacity*

### 3.1.1.6 G-010G-R connections and components

The following figure shows the physical connections for the G-010G-R indoor ONT.

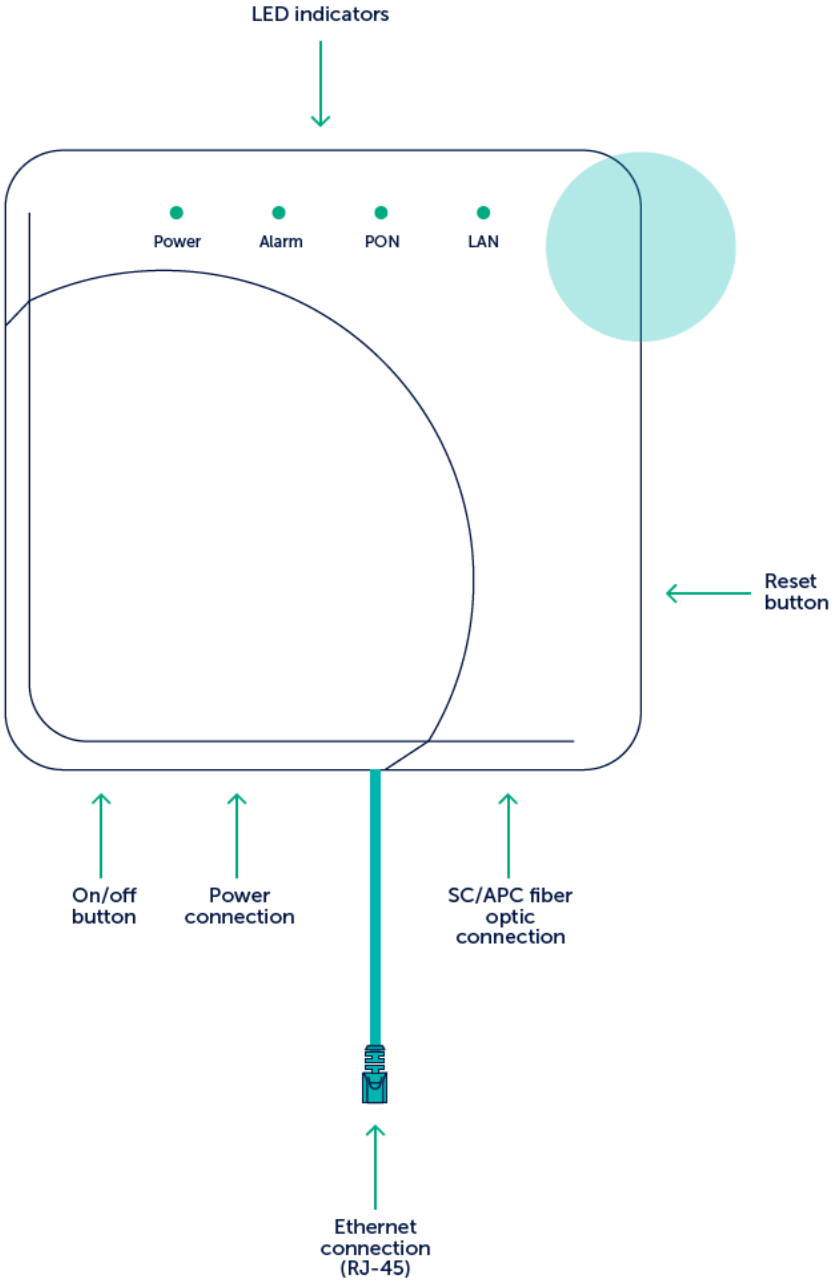


*Figure 1 Physical connections on G-010G-R indoor ONT*

The G-010G-R indoor ONT supports data services from one 10/100/1000BASE-T Ethernet port (CAT5 or better UTP cable). Full-duplex operation and autonegotiation between 10 Mb/s, 100 Mb/s, and 1000 Mb/s are also supported.

*Note: The G-010G-R indoor ONT is suitable for connection to intrabuilding or non-exposed wiring or cabling only.*

The following table describes the physical connections for the G-010G-R indoor ONT.

| Connection [1] | Description |
|---|---|
| Fiber optic port | The SC/APC connection is provided through a fiber optic cable. |
| Ethernet port | This connection is provided through an Ethernet RJ-45 cable. One Ethernet connection is supported. The Ethernet port supports both data and in-band video services. |
| Reset button | Pressing the Reset button for less than 10 seconds reboots the ONT, keeping the key parameter values and the LOID/SLID.<br>Pressing the Reset button for 15 seconds resets the ONT to its factory defaults, except for the LOID/SLID.<br>Pressing the Reset button for any length of time will cause all LEDs to blink. |
| ON/OFF button | This button turns the ONT on or off. |
| Power | This connection is provided through a power cable with a barrel connector. |

**Notes:**

1. The primary path for the earth ground for these ONTs is provided by the 12V Return signal in the power connector.

*Table 2 G-010G-R indoor ONT connections*

## 3.1.1.7 G-010G-R detailed specifications

The following table lists the physical specifications for the G-010G-R indoor ONT.

| Description | Specification |
|---|---|
| Length | 3.5 in. (8.9 cm) |
| Width | 3.2 in. (8.2cm) |
| Height | 1.1 in. (2.7 cm) |
| Weight | 0.22 lb (100 g) |

*Table 3 G-010G-R indoor ONT physical specifications*

The following table lists the power consumption specifications for the G-010G-R indoor ONT.

| Mnemonic | Maximum power (Not to exceed) | Condition | Minimum power | Condition |
|---|---|---|---|---|
| G-010G-R | 2.44 W | 1 Gig-E operational | 2.1 W | Idle |

*Table 4 G-010G-R indoor ONT power consumption specifications*

The following table lists the environmental specifications for G-010G-R indoor ONT.

| Mounting method | Temperature range and humidity | Altitude |
|---|---|---|
| Desk or wall mounted | Operating:<br>23°F to 113°F (-5°C to 45°C) ambient temperature<br>5% to 95% relative humidity, non-condensing | Contact your Nokia technical support representative for more information |
| | Storage:<br>Contact your Nokia technical support representative for more information | |

*Table 5 G-010G-R indoor ONT environmental specifications*

The following table lists the dimension data specifications for G-010G-R indoor ONT.

| Dimension | Specification |
|---|---|
| Packet size supported | 2000 |
| Number of IP addresses supported (or ranges) | — |
| Number of supported Wi-Fi clients (per radio, per device, per mesh) | — |
| Number of supported beacons /APs in a mesh | — |
| Number of supported WAN interfaces | — |
| Number of supported VLANs | 8 |
| Number of Tconts and GEM ports in the ONTs | 9 Tconts (including one dedicated OMCI T-CONT for G-010G-P and G-010G-Q) |
| | 10 Tconts (including one dedicated OMCI T-CONT for G-010G-R and G-010G-T) |
| | 32 GEM ports (including multicast GEM, broadcast GEM, remote SSH GEM) |
| Number of LLIDs in the ONTs | — |
| Number of priority queues, overall buffer size | 8 upstream priority queues per T-CONT<br>32 upstream priority queues per ONT<br>8 downstream priority queues per UNI<br>8 Mbit shared buffer for upstream<br>8 Mbit shared buffer for downstream for G-010G-R, 1 Mbit shared buffer downsteam for G-010G-P and G-010G-Q |
| Number of multicast groups (DACL entries) | 1024 |

*Table 6 G-010G-R dimension data specifications*

### 3.1.1.8 G-010G-R GEM ports and T-CONTs

The following table lists the maximum number of supported T-CONTs and GEM ports. Not all ONTs will be supported in all of the releases indicated the table. See the appropriate release Customer Release Notes for the most accurate list of supported devices.

| ONT or MDU | Maximum | Notes |
|---|---|---|
| GEM ports per indoor or outdoor ONT | 32 per UNI | 32 are present: 30 are available, 2 are reserved for multicast and debugging |
| T-CONTs per indoor or outdoor ONT | 9 | 9 are present, 1 is reserved for OMCI for G-010G-P and G-010G-Q |
| | 10 | 10 are present, 1 is reserved for OMCI for G-010G-R and G-010G-T |

*Table 7 G-010G-R indoor ONT capacity for GEM ports and T-CONTs*

## 3.1.2 G-240G-A[4]

The G-240G-A is an outdoor unit.

### 3.1.2.1 Inclusions

The G-240G-A temperature-hardened ONT unit, version A supports 2 POTS interfaces and 4 Gigabit Ethernet interfaces, and includes:

- 2-Pin Wall-mounted,12V/1.5A with AU Plug, 2-In 2-Out Connector and DC Cable assembly (0.5 mtr) with molex and 2-in 2-out connector

### 3.1.2.2 G-240G-A interfaces and interface capacity

The below table describes the supported interfaces for the G-240G-A ONT.

| ONT category description | Interface capacity | | | | |
|---|---|---|---|---|---|
| | POTS ports | Ethernet ports | VDSL2 interfaces | MoCA interface | RF Video interface |
| Single-residence Gigabit Ethernet ONTs with POTS and without RF video (G-240G-A ONTs) | 2 | 4 | 0 | 0 | 0 |

[4] Excerpts and Content from the Nokia ONT G-240G-A Product Guide, 3FE-55691-AAAA-TCZZA, Issue 15, December 2021

*Table 8 G-240G-A ONT interfaces*

## G-240G-A connections and components

The below figure shows the G-240G-A ONT physical connections.

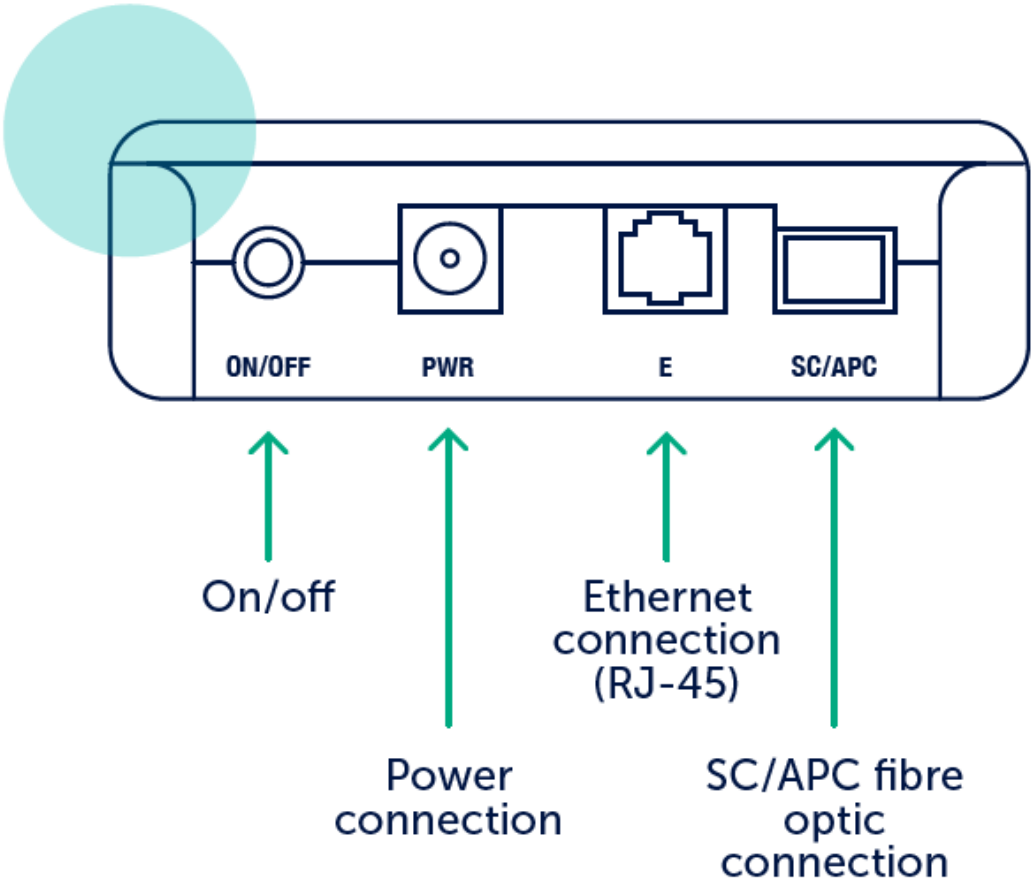


*Figure 2 G-240G-A ONT connections*

The below table describes the G-240G-A ONT physical connections.

| Connection | Description |
|---|---|
| POTS | This connection is provided through RJ-14 ports. |
| Ethernet ports | This connection is provided through Ethernet RJ-45 cables. Four Ethernet connections are supported.The Ethernet ports can support both data and in-band video services on all four interfaces. |
| Power | This connection is provided through a power cable with a Molex connector to the power connector. |
| Fiber optic | This connection is provided through an SC/APC fiber optic cable and connector. |

*Table 9 G-240G-A ONT physical connections*

### 3.1.2.3 G-240G-A LED location

The below figure shows the G-240G-A ONT LEDs.

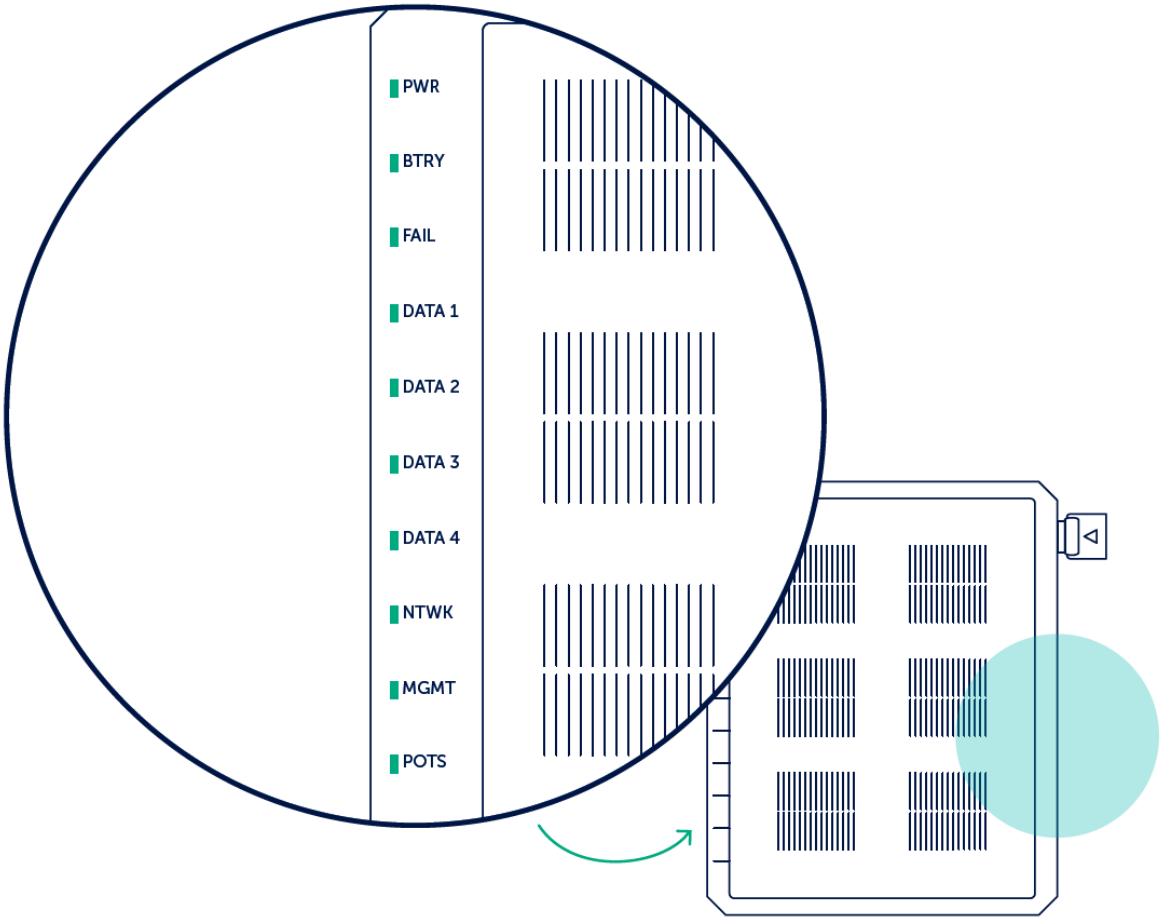


*Figure 3 G-240G-A ONT LEDs*

See section *6.2.2 G-240G-A LEDs* for the list of LED descriptions and troubleshooting.

### 3.1.2.4 G-240G-A detailed specifications

The below table lists the physical specifications for the G-240G-A ONT.

| Dimensions | Specifications |
|---|---|
| Length | 8.2 in. (20.8 cm) |
| Width | 5.6 in. (14.2 cm) |
| Height without fiber storage tray | 1.3 in. (3.3 cm) |
| Height with fiber storage tray | 1.9 in. (4.9 cm) |
| Weight without fiber storage tray [within ± 0.5 lb (0.23 kg)] | 0.57 lb (0.26 kg) |
| Weight with fiber storage tray [within ± 0.5 lb (0.23 kg)] | 0.71 lb (0.32 kg) |
| **G-240G-A ONT when installed inside an outdoor enclosure** | |
| Height | 13.5 in. (34.3 cm) |
| Width | 12 in. (30.5 cm) |
| Depth | 4.3 in. (10.9 cm) |

*Table 10 G-240G-A ONT physical specifications*

The below table lists power consumption specifications for the G-240G-A ONT.

| Mnemonic | Maximum power (not to exceed) | Condition | Minimum power | Condition |
|---|---|---|---|---|
| G-240G-A | 7 W | 2 POTS off-hook, 4 Gig-E operational | 4.5 W | 2 POTS on-hook, other interfaces/services not provisioned |

*Table 11 G-240G-A power consumption specifications*

It is important to note that, for non-Velocity Network, Opticomm may use a different NTD specific to an area and/or network build.

## 3.2 Cabling Prerequisites

All cabling requirements should have been met prior to installation.

For further information on cabling see section *3.1 Cabling*

# 4 Testing

Testing of the incoming fibre should be completed at the start of the installation.

This will include:

- Light on the fibre at the End User Premises
- Testing 1310, 1490 and 1550 mm with PON power meter – inspect and clean prior to re-installing.

Upon completion of the installation, the information updated via the Mobility App will provide a pass/fail status with relevant details where a failure occurs.

Where a failure occurs, you will need to complete the troubleshooting outlined in *section 6. Troubleshooting*.

# 5 Troubleshooting

## 5.1 Free to Air TV (FTA)

The latest version of the below document can be found at https://www.opticomm.com.au/support/resources

- Free-to-air-Troubleshooting-Guide

## 5.2 LED Descriptions

For the Velocity footprint, Opticomm will use the Nokia models; G-010G-R and G-240G-A; ONTs as outlined in section *3.1 Network Termination Device (NTD) Specifications (referred below as ONT).*

### 5.2.1 G-010G-R LEDs[5]

The G-010G-R indoor ONT physical connections can be found in section *4.1.1.6 G-010G-R connections and components*

The following figure shows the G-010G-R indoor ONT LEDs.

[5] Excerpts and Content from the Nokia ONT G-010G-P G-010G-Q G-010G-R G-010G-T Product Guide, 3FE-45458-AAAA-TCZZA, Issue 17, March 2022

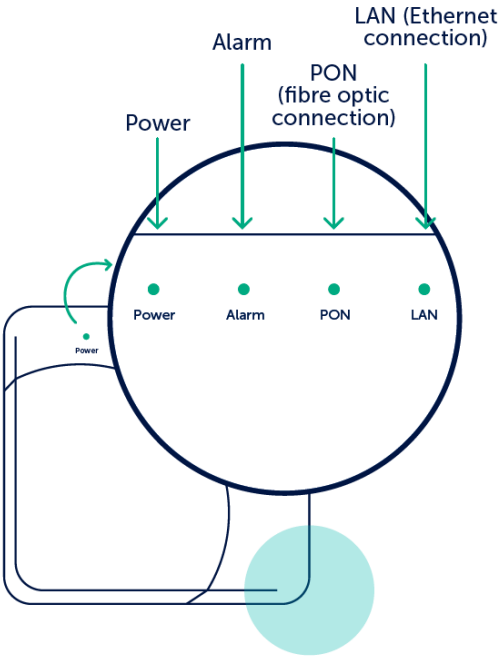


*Figure 4 G-010G-R indoor ONT LEDs*

The following table provides the G-010G-R indoor ONT LED descriptions.

| Indicator | LED color and behavior | LED behavior description |
|---|---|---|
| POWER | Green | Operating on AC power |
| | Off | Power off |
| ALARM<br>(3FE 45457 AC variant) | Red, flashing fast | Software upgrade in progress |
| | Red, flashing slowly | Software upgrade failed<br>LOS/LOF |
| | Red solid Off | Optical power normal |
| ALARM<br>(other variants) | Red solid | LOS/LOF |
| | Off | Optical power normal |
| CONNECTION/PON<br>(PON in 3FE 45457 AC, AD and G-010G-Q variants) | Green | ONT ranged and password authenticated |
| | Green flashing | ONT ranging and synchronizing, not yet authenticated |
| | Off | Fiber not connected or link failure (LOS/LOF) |
| ETHERNET/LAN<br>(LAN in 3FE 45457 AC, AD and G-010G-Q variants) | Green | Ethernet link up |
| | Green flashing | Ethernet link up and data activity (transmit and receive) |
| | Off | Ethernet link down or ONT not ready for Ethernet service |

*Table 12 G-010G-T indoor ONT LEDs description*

## 5.2.2 G-240G-A LEDs[6]

The G-240G-A indoor ONT physical connections can be found in section *4.1.2.2 G-240G-A interfaces and interface capacity.*

The location of LED's can be found in section *4.1.2.3 G-240G-A LED location*

The below table lists and describes the G-240G-A ONT LEDs.

| Indicator name | LED color and behavior | LED behavior description |
|---|---|---|
| PWR | Off<br>Green | No power<br>Operating on AC power |
| BTRY | Off<br>Green | Battery alarm set or battery not provisioned (not affected by AC power failure)<br>Battery charged; no battery alarms |
| FAIL | Off<br>Red | ONT is operating without failure<br>ONT operation failure (not ranged) |
| DATA 1 to 4 | Off<br>Green | Not provisioned or no Ethernet connection<br>Link detected/operational |
| NTWK | Off<br>Green solid | 1490 nm data path is not available<br>1490 nm data path is available/operational |
| MGMT | Green solid<br>Green flashing (fast)<br>Green flashing (slow) | Full communication, ranging, sync between OLT and ONT<br>ONT software downloading<br>ONT is disabled |
| POTS [1] (when the device is not connected to the PON) | Off<br>Green flashing periodic<br>Green flashing patterned | No SLID activity and all phones on-hook<br>SLID input mode Provisioned SLID in SLID output mode<br>Provisioned SLID in SLID output mode |
| POTS (when the device is connected to the PON) | Off<br>Green solid | No POTS provisioned (all phones on-hook or no phones connected)<br>One or more phones is off-hook. |

**Notes:**

1. In the G6 H248 environment, voice related POTS LEDs use the same LED behavior as long as the user is either: off-hook, basic call, call waiting, call holding, call conference, or call transfer.

*Table 13 G-240G-A ONT LEDs descriptions*

[6] Excerpts and Content from the Nokia ONT G-240G-A Product Guide, 3FE-55691-AAAA-TCZZA, Issue 15, December 2021

The below table describes the G-240G-A ONT RJ-45 LEDs.

| Indicator | LED color and behavior | LED behavior description |
|---|---|---|
| LINK (RJ-45 right) | Off Green solid Green flashing | Link not detected Ethernet link detected Ethernet link detected and activity present |
| MODE (RJ-45 left) | Off Green solid Green flashing | 10/100 Mb/s 1000 Mb/s Not defined |

*Table 14 G-240G-A RJ-45 LEDs*

# 6 Relocation

Opticomm is not responsible for relocating an NTD and will only replace the NTD with a like for like model or upgraded model where a like for like is not available.

If an End User wishes to relocate they will need to contact the Customer Connection Information Desk (1300 137 800) for relevant quoting and booking of works.