



1645 Installation Guide

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Safety requirements

Carefully read the safety instructions, installation precautions and connection precautions as stated in [chapter 2 - Installing and connecting the 1645 on page 12](#).

Statements



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Hereby, OneAccess declares that this 1645 complies with the essential requirements and other relevant provisions of Directive 1999/5/EC.



Hierbij verklaart OneAccess dat deze 1645 overeenstemt met de essentiële vereisten en andere relevante bepalingen van Richtlijn 1999/5/EC.



Par la présente, OneAccess déclare que ce 1645 est en conformité avec les exigences essentielles et autres articles applicables de la Directive 1999/5/EC.



Hiermit, OneAccess erklärt daß dieser 1645 in Fügbarkeit ist mit den wesentlichen Anforderungen und anderen relevanten Bereitstellungen von Direktive 1999/5/EC.



Mediante la presente, OneAccess declara que el 1645 cumple con los requisitos esenciales y las demás prescripciones relevantes de la Directiva 1999/5/CE.



A OneAccess declara que o 1645 cumpre os principais requisitos e outras disposições da Directiva 1999/5/EC.



Col presente, OneAccess dichiara che questo 1645 è in acquiescenza coi requisiti essenziali e stipulazioni attinenti ed altre di Direttivo 1999/5/EC.



Με το παρόν η OneAccess δηλώνει ότι το 1645 είναι συμμορφούμενο με τις βασικές απαιτήσεις και με τις υπόλοιπες σχετικές διατάξεις της οδηγίας 1999/5/EC.

Environmental information



The crossed-out wheeled bin means that within the European Union the product must be taken to separate collection at the product end-of-life. This applies to the device but also to any accessories marked with this symbol. Do not dispose of these products as unsorted municipal waste. If you need more information on the collection points where you can present your end-of-life equipment for recycling, please contact your local importer. For Belgium, you can contact rma@oneaccess-net.com.



De doorstreepte container wil zeggen dat binnen de Europese gemeenschap het product voor gescheiden afvalverzameling moet worden aangeboden aan het einde van de levensduur van het product. Dit geldt voor het toestel, maar ook voor alle toebehoren die van dit symbool voorzien zijn. Bied deze producten niet aan bij het gewone huisvuil. Indien u meer informatie wenst over het inzamelpunt waar u afgedankte apparatuur kan aanbieden voor recyclage, gelieve dan uw lokale importateur te contacteren. Voor België kan u contact opnemen met rma@oneaccess-net.com.



Le symbole de la poubelle sur roues barrée d'une croix signifie que ce produit doit faire l'objet d'une collecte sélective en fin de vie au sein de l'Union Européenne. Cette mesure s'applique non seulement à votre appareil mais également à tout autre accessoire marqué de ce symbole. Ne jetez pas ces produits dans les ordures ménagères non sujettes au tri sélectif. Si vous souhaitez plus d'information concernant le point de collecte où vous pouvez apporter vos appareils usagés afin qu'ils soient recyclés, veuillez contacter votre importateur local. Pour la Belgique, vous pouvez prendre contact avec rma@oneaccess-net.com.



Das Symbol der durchgestrichenen Abfalltonne auf Rädern bedeutet dass das Produkt in der Europäischen Union einer getrennten Mülsammlung zugeführt werden muss. Dies gilt sowohl für das Produkt selbst, als auch für alle mit diesem Symbol gekennzeichneten Zubehörteile. Diese Produkte dürfen nicht über den unsortierten Hausmüll entsorgt werden. Falls Sie weitere Auskünfte brauchen im Betracht der Sammelplätze für ausrangierte Apparate, wenden Sie sich bitte an Ihren örtlichen Importeur. Für Belgien, bitte kontaktieren sie rma@oneaccess-net.com.

Documentation set

For all devices, the documentation set currently consists of the following:

Document	Description
1645 installation guide	This is this document, it shows you how to install and connect the 1645.
TDRE manual	<p>The user part of the TDRE manual explains how to configure a device and provides information about all features that can be configured in TDRE, i.e. encapsulations, routing, bridging, QoS, tunnels, IPSEC, ...</p> <p>The reference part of the TDRE manual contains a complete description of all the configuration, status, performance and alarm parameters for look-up purposes.</p> <p>The proxy management (also called Orchid function) parameters are described in the Orchid function manual.</p>
Maintenance tools user manual	<p>The 1645 can be maintained and managed by a variety of maintenance and management tools.</p> <p>The Maintenance tools user manual describes these tools.</p> <p>Refer to the installation guides of the OneAccess devices, for an introduction on these tools.</p>
TMA Quick Start Guide	This guide briefly highlights the Total Maintenance Application or TMA

All these documents, together with the free maintenance tool TMA and the firmware of the TDRE devices, can be found on the OneAccess Products distribution CD that is delivered with all TDRE products.

Organisation of this installation guide

This manual contains the following main parts:

Part	This part ...
Installation Guide	shows you how to install and connect the 1645. It also explains how to connect to the 1645 on the pc.
Annex	gives some additional information.

Refer to the [Table of contents on page 1](#) for a detailed overview of this manual.

Typographical conventions

The following typographical conventions are used in this manual:

The format ...	indicates ...
Normal	normal text.
<i>Italic</i>	<ul style="list-style-type: none"> new or emphasised words application windows, buttons and fields. E.g. In the <i>Filename</i> field enter ...
Blue	references to other parts in the manual. E.g. "Refer to xx - Title for more information".
Blue underline	<ul style="list-style-type: none"> a hyperlink to a web site. E.g. www.oneaccess-net.com a reference to another manual. E.g. "Refer to the TMA manual (PDF) for more information". The abbreviation between brackets is an indication of the file format (PDF = Portable Document Format / CHM = Compiled HTML Help).

Graphical conventions

The following icons are used in this manual:

Icon	Name	This icon indicates ...
	Remark	remarks or useful tips.
	Caution	text to be read carefully in order to avoid damage to the device.

TDRE

The Total Dynamic Routing Engine (TDRE) is a feature-rich operating system that guarantees a common feature set across the different OneAccess product lines and a uniform support by maintenance and management tools.

Audience

This manual is intended for computer-literate people, who have a working knowledge of computing and networking principles.

Your feedback

Your satisfaction about this purchase is an extremely important priority to all of us at OneAccess. Accordingly, all electronic, functional and cosmetic aspects of this new unit have been carefully and thoroughly tested and inspected. If any fault is found with this unit or should you have any other quality-related comment concerning this delivery, please submit the Quality Comment Form on our web page at www.oneaccess-net.com → Support → Quality Comment Form.

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Installation Guide

1 Introducing the 1645

This chapter gives an introduction to the 1645. The following gives an overview of this chapter:

- [1.1 - General description on page 3](#)
- [1.2 - 1645 Family Overview on page 5](#)
- [1.3 - Versions Mapping on page 6](#)
- [1.4 - Maintenance and management tools on page 7](#)
- [1.5 - Maintenance and management tools connection possibilities on page 11](#)

1.1 General description

Fibre Ethernet Access Device

The 1645 series of Ethernet Access Devices (EAD) offers service providers a cost-effective gigabit Ethernet access solution and enables them to offer managed Ethernet services to their business customers. As Ethernet Demarcation Device it is possible to monitor and control Ethernet services end-to-end and to provide SLA reports. In addition to comprehensive layer-2 functionality the device also offers a layer-3 router implementation which makes it an ideal choice to deliver carrier Ethernet, Internet and IP services with one device. The equipment is interoperable with any standards-based carrier Ethernet equipment and can be integrated into any existing management environment.

Fibre Access

The 1645 provides network operators the means to deliver advanced carrier Ethernet services to their business customers at minimal cost. A Gigabit Ethernet Combo interface provides copper or fibre connectivity to the rest of the carrier Ethernet infrastructure; a second Gigabit Ethernet Combo interface can be provided, which can be used as backup of the first uplink. The 4-port GigE switch provides the interface to the user applications.

Extensive Feature Set

At the heart of this platform is a high performance Ethernet switch/router incorporating advanced Layer 2 and Layer 3 forwarding, security and Quality of Service capabilities as standard. The software-based switching and routing core offers a very high degree of flexibility when compared to hardware-based designs in terms of features, software maintenance and upgrades.

Metro Ethernet Services

As a demarcation device the unit can deliver standard Ethernet services such as Ethernet Private Lines (EPL), Ethernet Virtual Private Lines (EVPL) and Ethernet LAN services (ELAN). The 1645 fully complies with the MEF.9 and MEF.14 requirements as defined by the Metro Ethernet Forum.

OAM Monitoring

Monitoring quality and availability of every dataflow as part of the carrier Ethernet service gives a clear view on the status and the performance of the Ethernet service. The 1645 supports both point-to-point OAM monitoring (IEEE 802.3ah) and end-to-end performance monitoring (IEEE 802.1ag & ITU-T Y.1731) on all Ethernet interfaces.

Accelerated Deployment And Service Provisioning

The OneAccess 1645 Fibre EAD can be integrated in any managed environment and supports all the common management interfaces such as SNMP, Telnet, SSH, HTTP and HTTPS. In addition to these interfaces a number of management tools are available to facilitate the integration of these access devices in a managed environment. These include:

- TMA GUI application
- A customisable Web-configuration utility
- A CLI for scripting and simple integration with provisioning and management systems
- Element and Inventory Management for control and monitoring of large access networks

Quality Monitoring And Service Level Agreements

The 1645 keeps statistics of the last 15 minutes, 2 hours, 24 hours and 7 days. Selected statistics can be stored over a longer period on the device for later retrieval and processing on a management platform. Traffic quality monitoring provides all the information needed to offer Service Level Agreement reports to the customer.

1.2 1645 Family Overview

The following gives an overview of the 1645 versions:

Standard version	Gigabit Ethernet combo (UTP & SFP)	4-pair SHDSL.bis ATM/EFM	VDSL	4-port Gigabit Ethernet Switch	USB
1645 Gb5TU	1	-		X	X
1645 MGb5TU	1	X		X	X
1645 2Gb6TU	2	-		X	X
1645 M2Gb6TU	2	X		X	X
1645 AV2 Gb5TU	1	-	1	X	X

1.3 Versions Mapping

The products are US certified under a different name as the commercial name. In this table, you can find the mapping between the certification name and the commercial name:

Commercial Name	Certification Name
1645 2Gb6TU MB	MB90 SLHs1UFPE0SNn+RTC LW901G
1645 Gb5TU MB	MB90 SLHs1UFPE0SNn+RTC
1645 M2Gb6TU MB	MB90 SLHs4GI1UFPE0SNn+RTC LW901G
1645 MGb5TU MB	MB90 SLHs4GI1UFPE0SNn+RTC

1.4 Maintenance and management tools

This section gives a quick overview of the various maintenance and management tools that can be used to manage the 1645.

The following gives an overview of this section:

- [1.4.1 - Overview of various tools on page 8](#)
- [1.4.2 - Upgrading the software on page 10](#)

1.4.1 Overview of various tools

The 1645 is manageable in many different ways. This section gives a quick overview of the various maintenance and management tools. These are:

Maintenance or management tool	Description and reference
TMA	<p>TMA (Total Maintenance/Management Application) is a free Windows software package with a comprehensive graphical user interface that enables you to control the OneAccess products completely. I.e. to access their configuration attributes and look at status, performance and alarm information.</p> <p>For more information, refer to:</p> <ul style="list-style-type: none"> • the TMA Quick Start Guide (PDF), this will set the user on the right track as quickly as possible, when starting with and using TMA. • the TMA user manual (PDF), for a detailed and extensive explanation about TMA and its use.
TMA Element Management	<p>TMA Element Management is a management application designed to monitor large numbers of OneAccess devices. It combines the easy to use graphical interface of the stand-alone version of TMA with an event-logging application called the Element Viewer.</p> <p>Refer to the TMA Element Management manual (PDF/CHM) for more information.</p>
TMA CLI	<p>TMA CLI (TMA Command Line Interface) enables you to use its commands in scripts in order to automate management actions. This is particularly useful in large networks. TMA CLI is a complementary product to TMA and TMA Element Management.</p> <p>Refer to the TMA CLI manual (PDF) for more information.</p>
CLI	<p>CLI is also a Command Line Interface, although not so extensive as TMA CLI. Experienced users who are familiar with the syntax can access the TDRE devices more quickly than with TMA.</p> <p>Refer to the Maintenance tools manual (PDF) for more information.</p>
Web Interface	<p>The web user interface is by default a TMA like GUI. The web GUI can also be customised.</p> <p>Refer to the Maintenance tools manual (PDF) for more information.</p> <hr/> <p> Note that the HTTP interfaces are not only available on port 80, but also on port 8080. This allows connecting to the HTTP interfaces in case a NAT service is defined on port 80.</p> <hr/>

Maintenance or management tool	Description and reference
SNMP	<p>You can manage the 1645 through SNMP using any SNMP browser. The 1645 supports MIB2 and a private MIB, including traps.</p> <p>The private MIB files come with your copy of TMA. After installation of the TMA data files, the private MIB files are available in directory C:\Program Files\TMA\snmp¹.</p> <p>The “old” MIB files, from before the SNMPv2 era, can be recognised by the following format: <filename>.mib².</p> <p>The “new” MIB files can be recognised by the following format: <filename>_smiv2.mib</p> <p>Refer to the TDRE book for more information on MIB ‘s and SNMP; also refer to the SNMP configuration attributes in the TDRE book and the documentation of your SNMP browser for more information.</p>
Easy Configurator	<p>The Easy Configurator allows you to add HTML pages on top of the standard Web Interface by adding a set of specific files on the file system of the 1645. These files can be made either by OneAccess or by the customer itself.</p> <p>The goal is to offer a simple, custom made web interface which allows only to change or show those parameters that are relevant for a certain application or customer.</p> <p>Refer to the Maintenance tools manual (PDF) for more information.</p> <hr/> <p> Note that the HTTP interfaces are not only available on port 80, but also on port 8080. This allows connecting to the HTTP interfaces in case a NAT service is defined on port 80.</p> <hr/>

1. The first part of the directory path may be different if you did not choose the default path during the installation of the TMA data files.
2. The filename is product dependent. To determine which MIB file corresponds with which product, refer to the *models.nms* file (located in *C:\Program Files\TMA\model¹*).

1.4.2 Upgrading the software

Some devices are equipped with boot, loader and application software, while others only have boot and application software:

- The boot software takes care of the initial phase in the start-up sequence of the device. It is located on the lowest software level.
- The loader software takes care of the second phase in the start-up sequence of the device. It is located on the middle software level.
- The application software, also called control software or firmware, completely controls the device. It is located on the highest software level.

How to upgrade the device software, has been described in detail in:

- the TMA Quick Start Guide ([PDF](#)), for upgrading with TMA.
- the Maintenance Tools manual ([PDF](#)), for upgrading with the other tools mentioned in this chapter.

1.5 Maintenance and management tools connection possibilities

The following table gives an overview of all the maintenance and management tools and how you can connect them with the 1645:

Maintenance or management tool	Tool - 1645 connection	
	Serial	IP ¹
CLI	-	X ²
TMA	-	X
TMA CLI	-	X
TMA Element Management	-	X
SNMP ³	-	X
Web Interface ⁴	-	X

1. An IP connection is a connection between your PC and the 1645 over an IP network.
2. Using Telnet.
3. Using an SNMP browser.
4. Using a web browser.

2 Installing and connecting the 1645

First this chapter gives some important safety instructions. Then it explains how to install and connect the 1645.



You are advised to read this chapter from the beginning to the end, without skipping any part. By doing so, your 1645 will be completely installed and ready for configuration when you reach the end of this chapter.

The following gives an overview of this chapter:

- [2.1 - Safety instructions / Consignes de sécurité on page 13](#)
- [2.2 - Unpacking on page 15](#)
- [2.3 - Selecting a site on page 16](#)
- [2.4 - Mounting the 1645 on a wall on page 17](#)
- [2.5 - Mounting the 1645 in a 19" rack on page 19](#)
- [2.6 - Connection precautions on page 20](#)
- [2.7 - Connecting the 1645 on page 21](#)
- [2.8 - The front panel LED indicators on page 27](#)
- [2.9 - Powering up the 1645 on page 31](#)

2.1 Safety instructions / Consignes de sécurité



Information to user	Informations envers l'utilisateur
<ul style="list-style-type: none"> • Any changes or modifications not expressly approved by OneAccess could void the user's authority to operate the equipment. • The external power supply may be delivered together with the 1645. 	<ul style="list-style-type: none"> • Tout changement ou modification non expressément approuvé par OneAccess peut invalider l'autorisation accordée à l'utilisateur de mettre l'équipement en service. • L'adaptateur ou le câble d'alimentation électrique prescrit par OneAccess peut être livré d'origine avec l'équipement.



Connection to power supply	Raccordement à l'alimentation
<p>To connect the power supply, always respect following steps:</p> <ol style="list-style-type: none"> 1. Plug power supply connector in the corresponding device's input power connector. 2. Secure power supply cable by looping it once around holding clip foreseen on device to avoid unwanted power supply cable disconnection. (Only valid if device is equipped with such a holding clip). 3. Connect the power supply plug to the electrical power network; refer to 4.8 - Power requirements on page 42. 	<p>Pour alimenter l'équipement, toujours respecter les étapes suivantes:</p> <ol style="list-style-type: none"> 1. Enfichez le connecteur d'alimentation dans le connecteur d'entrée d'alimentation correspondant de l'équipement. 2. Rebouclez le câble d'alimentation autour de la bride de maintien prévue à cet effet sur le panneau arrière pour éviter l'arrachage accidentel du connecteur d'alimentation. (Uniquement pour les équipements qui sont pourvus d'une bride de maintien) 3. Branchez la fiche d'alimentation au réseau d'alimentation électrique; voir 4.8 - Power requirements on page 42.



Over-current Protection	Protection contre les surcharges
<ul style="list-style-type: none"> • Do not use another type of power supply than the one delivered or prescribed by OneAccess. • Always use a power cable approved for this use as the one delivered or prescribed by OneAccess. • This device requires that the building's electrical installation is designed for protection against short-circuit (over-current) protection. A fuse or circuit breaker no larger than 10A must be used on the phase conductor (AC) or the active conductor with respect to the protective earth (DC). 	<ul style="list-style-type: none"> • Ne pas utiliser d'autre type d'adaptateur que celui livré ou prescrit par OneAccess. • Toujours utiliser un type de câble d'alimentation agréé pour cet usage comme celui livré ou prescrit par OneAccess. • La protection contre les courts-circuits de cet équipement dépend de l'installation électrique du local à laquelle il est raccordé. Vérifier qu'un fusible ou disjoncteur de maximum 10A est installé sur le conducteur de phase (AC) ou le conducteur actif par rapport à la terre (DC).



Use Precautions	Précautions d'usage
<ul style="list-style-type: none">• To avoid damage to the device, please observe all procedures described in this chapter.• Disconnect the power supply before installing, moving or servicing the device. Always disconnect the electrical power supply first.• Ensure that the unit and its connected equipment all use the same power and earth wiring, to reduce noise interference and possible safety hazards caused by differences in earth potentials.	<ul style="list-style-type: none">• Pour éviter d'endommager l'équipement, veuillez respecter toutes les procédures décrites dans ce chapitre.• Débranchez l'alimentation de la prise réseau électrique avant d'installer, déplacer ou intervenir sur l'équipement. Débranchez toujours l'alimentation réseau électrique en premier.• Assurez-vous que l'équipement et ses périphériques soient tous branchés sur un même réseau d'alimentation électrique et une équipotentielle de terre afin de réduire les interférences perturbatrices et de possibles risques de sécurité causés par des différences de potentiel entre prises de terre.

2.2 Unpacking

Checking the shipping carton

Rough handling during shipping causes most early failures. Before installation, check the shipping carton for signs of damage:

- If the shipping carton is damaged, please place a claim with the carrier company immediately.
- If the shipping carton is undamaged, do not dispose of it in case you need to store the unit or ship it in the future.

Package content

The 1645 package includes the following items for standard items:

- 1645 device.
- External Power Supply with power cord (2 meter). This item may be omitted in some cases.
- Stickers printed with the sales item number, description, serial number and used input voltage. The label is attached to the housing and to the outside of the container.
- CD-ROM including the manuals in PDF format.
- Printed security instructions.
- 2 straight line cables for 4-pair version. The cable colour is violet.
- A yellow straight Ethernet cable 2m RJ45-RJ45.

2.3 Selecting a site



Warning	Avertissement
<ul style="list-style-type: none">• Always place the unit in such a way that the air vents are not blocked.	<ul style="list-style-type: none">• Placez toujours l'appareil de sorte que les ouïes d'aération ne soient pas obturées.



Caution	Attention
<ul style="list-style-type: none">• Install the unit in an area free of extreme temperatures, humidity, shock and vibration. Position it so that you can easily see and access the front panel and its control indicators. Leave enough clearance at the back for cables and wires.• The AC/DC adapter is used to switch the device on or off by plugging it in or disconnecting it, respectively. The socket outlet shall be installed near the device and easily accessible.	<ul style="list-style-type: none">• Installez l'appareil dans une zone exempte de températures extrêmes, d'humidité, de chocs et de vibrations. Positionnez-le de sorte que vous puissiez aisément accéder au panneau avant et voir ses témoins de contrôle. Laissez suffisamment d'espace à l'arrière pour les fils et les câbles.• Le convertisseur d'alimentation AC/DC est utilisé comme dispositif interrupteur. La prise de courant doit être installée à proximité de l'appareil et facilement accessible.

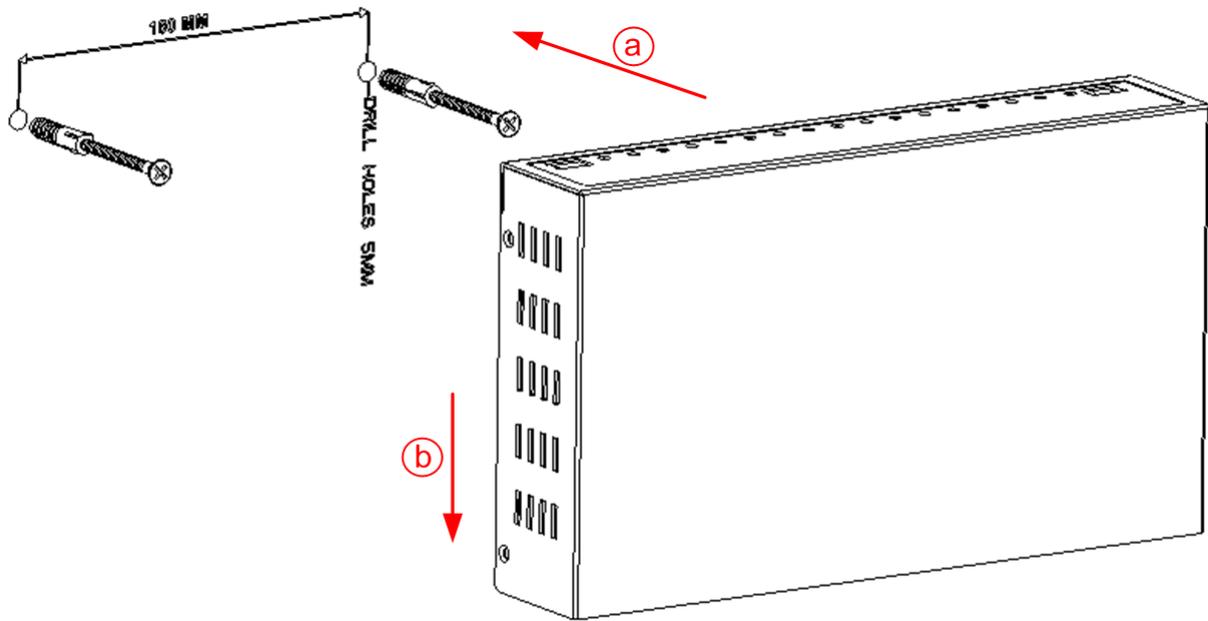
2.4 Mounting the 1645 on a wall

Procedure

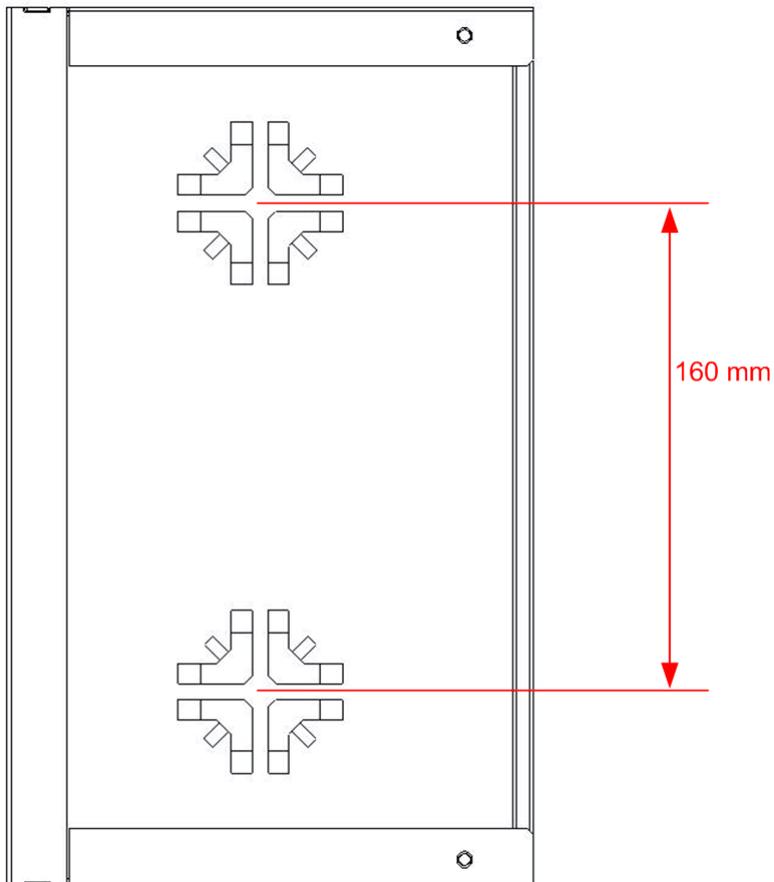
The bottom plate of the 1645 has 2 notches in order to enable wall mounting. Refer to the figure below, for the position of these notches. By installing two screws at the required distance, the device can be hung on any vertical surface.

In order to do so, proceed as follows:

Step	Action
1	Drill two holes in the wall, according to the following specifications: <ul style="list-style-type: none">• hole diameter: 5 mm• distance between the holes: 160 mm• hole depth: at least 50 mm
2	Insert two standard wall plugs in the holes. The plugs should have the following dimensions: <ul style="list-style-type: none">• diameter: 5 mm• length: < 50 mm
3	Screw in two standard screws in the plugs. Leave a distance of 5 mm between the wall and the head of the screw. The screws should have the following dimensions: <ul style="list-style-type: none">• diameter: 3 mm• length: 30 mm• The head of the screws may have a diameter of maximum 8 mm.
4	Slide the 1645 over the screws until it touches the wall, and gently push it down. If necessary, adjust the screws in the notches of the device.

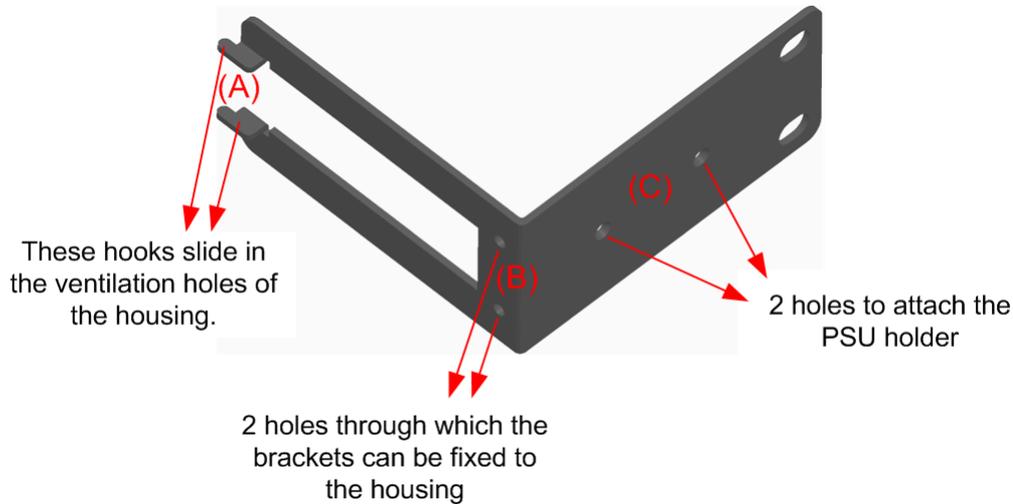


Bottom plate of the 1645



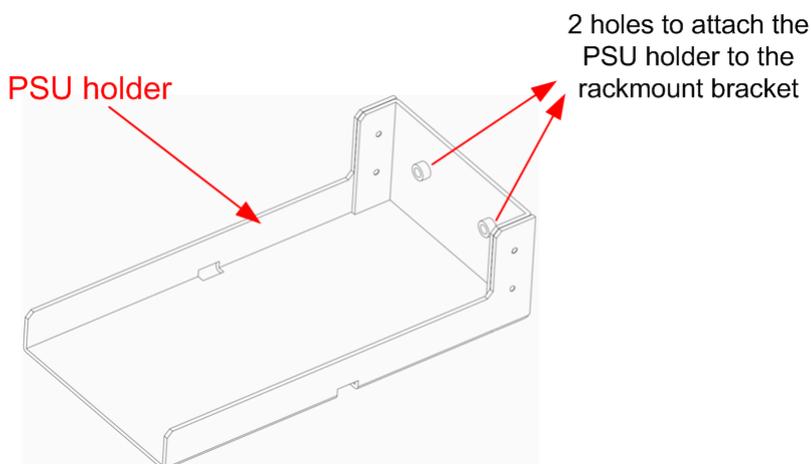
2.5 Mounting the 1645 in a 19" rack

- The 1645 can be mounted in a 19" rack by using an optional Rackmount Kit.
- The Rackmount Kit consists of 2 identical brackets, 4 M3x6 screws, 4 medium washers and 4 M6x16 screws:



The hooks, marked with (A) in the figure above, slide in the ventilation holes in the side panels of the housing; via the 2 holes, marked with (B), each bracket can be fixed to the housing with 2 M3x6 screws.

- The device, with attached brackets, can then be fixed in a 19" rack with 4 medium washers and 4 M6x16 screws.
- In case the 1645 is mounted in a rack and the standard wall plug power supply is not convenient, the unit can also be ordered with a desktop power supply. In such case, an additional PSU Holder can be mounted to put the power supply on. The PSU Holder can be attached to one of the brackets via the holes marked with (C) in the figure above:



The power adapter of the 1645 can be placed in this PSU holder when installing the device in the 19" rack.



Note that the Rackmount Kit and PSU Holder are optional items that need to be ordered separately; the Rackmount Kit and PSU Holder are 2 different sales items.

2.6 Connection precautions



ESD WARNING

The circuit boards are sensitive to electrostatic discharges (ESD) and should be handled with care. It is advisable to ensure an optimal electrical contact between yourself, the working area and earth before touching any circuit board. Take special care not to touch any component or connector on the circuit board.



NOTE

This unit may be powered by an *IT power system*.
For the definition of an *IT power system*, refer to *Annex V - AC power distribution systems of EN60950-1*, section *V.4 IT power distribution systems*.

The connectors of the 1645 should only be connected to the following circuit types:

Interface type	Interface identification	Connector type	Circuit type
SHDSL	DSL 1-2 DSL 3-4	RJ11	TNV-3
ADSL2+/VDSL2	VDSL / ADSL	RJ11	TNV-3
LAN ¹	ETH1 1...4	RJ45	SELV
UTP ²	ETH2 UTP ETH3 UTP	RJ45 RJ45	SELV SELV
SFP slot ³	ETH2 SFP ETH3 SFP	SFP slot SFP slot	- -
RS232 ⁴	Console	RJ45	SELV
USB ⁵		USB	SELV

1. 4 port Ethernet switch with 10/100/1000 Base T ports
2. Ethernet 10/100/1000 Base T port
3. Gigabit Ethernet slot
4. V.24
5. USB *master* port

- Inside building circuit: Circuit remaining inside building and not subject to telecom network primary nor secondary lightning strikes.
- Outside building circuit: Circuit routed going outside building and possibly subject to telecom network secondary lightning strikes.
- SELV or *Safety Extra Low Voltage*: Inside building circuit designed to not exceed safe voltage value.
- TNV or *Telecom Network Voltage*: User's accessible internal circuit designed to not exceed specified voltage limits:
 - TNV-3 : Outside building circuit exceeding SELV voltage limits but respecting TNV voltage limits

2.7 Connecting the 1645

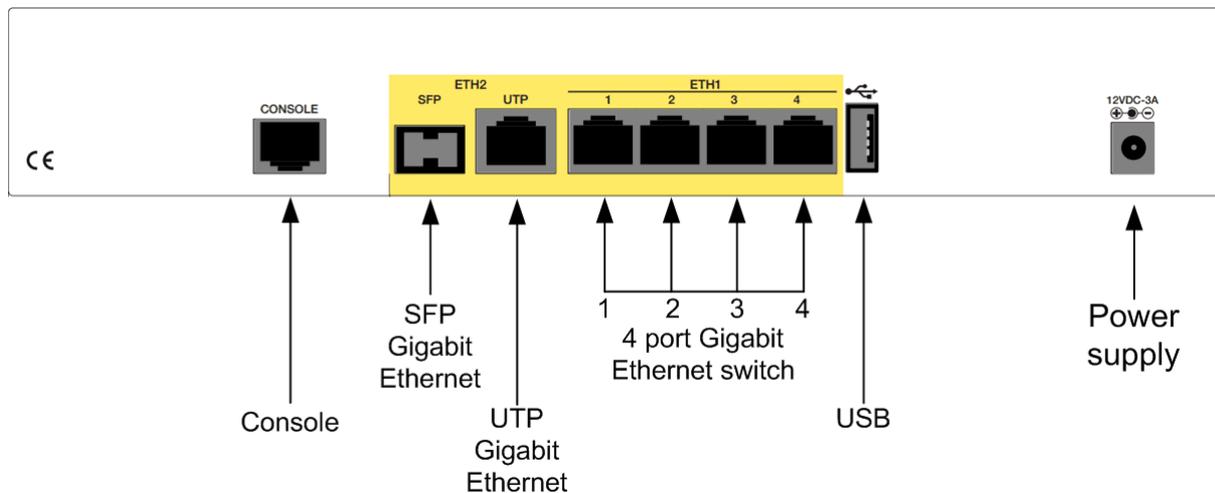
This section describes the 1645 rear panel. It identifies the interface type and port numbering, and explains how to connect the device.

The following gives an overview of this section:

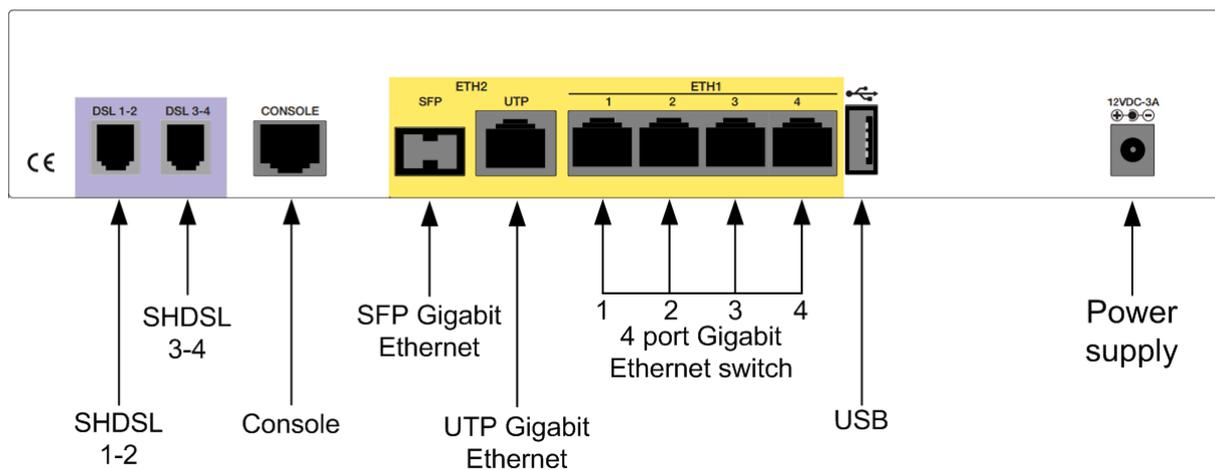
- [2.7.1 - Rear view of the 1645 on page 22](#)
- [2.7.2 - The different parts of the 1645 on page 25](#)

2.7.1 Rear view of the 1645

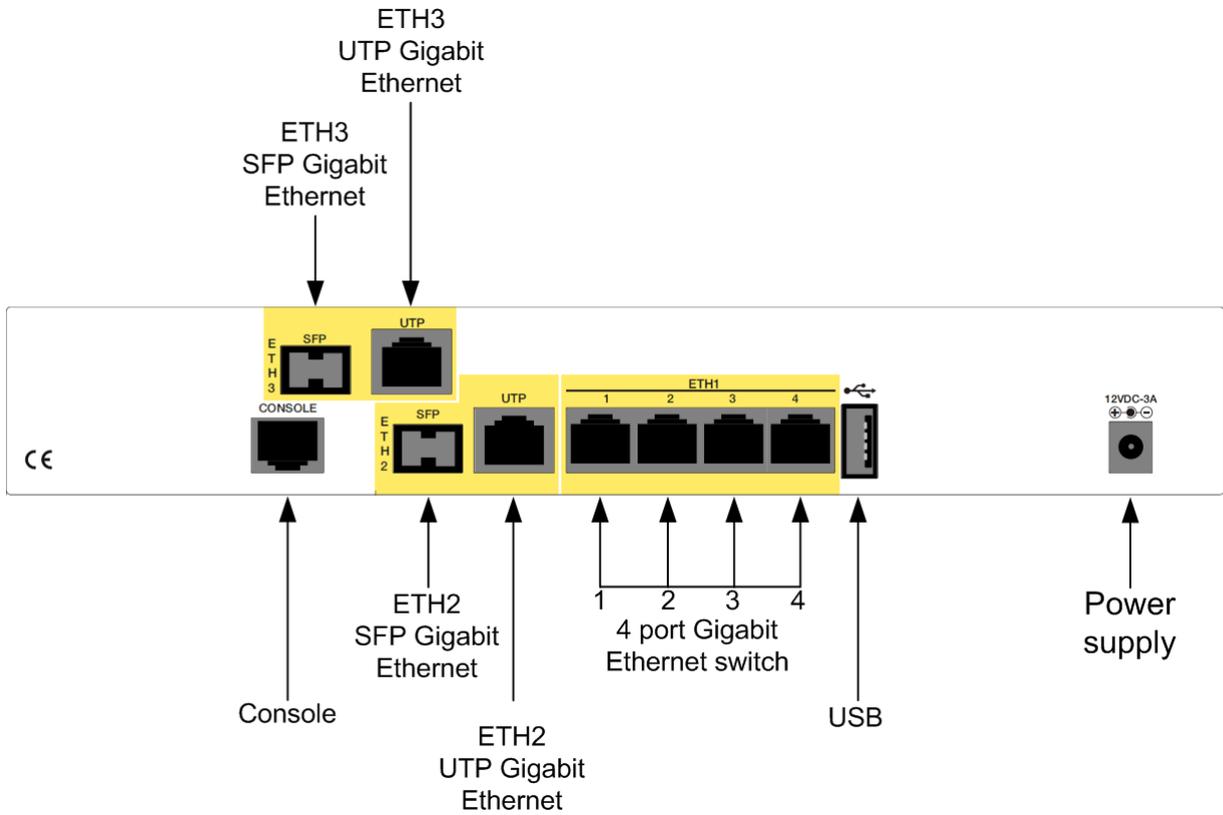
The following figure shows the back panel of the 1645 Gb5TU:



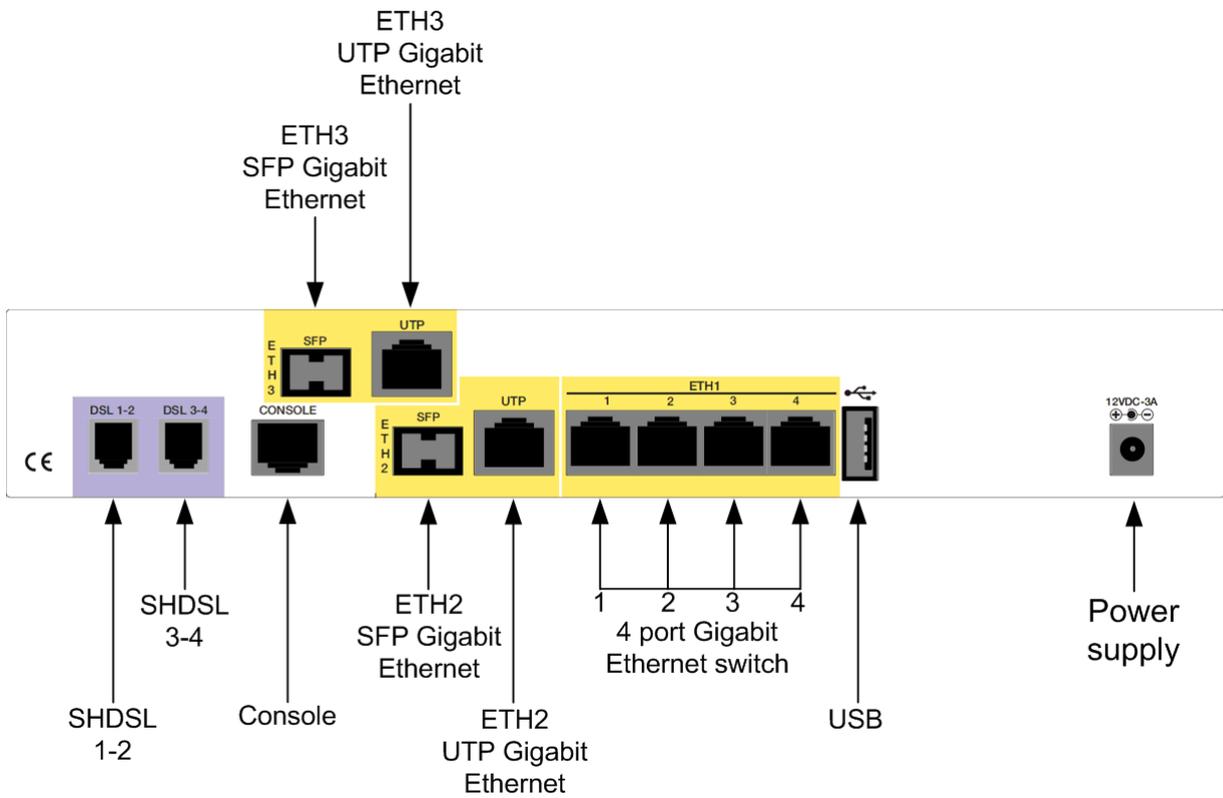
The following figure shows the back panel of the 1645 MGb5TU:



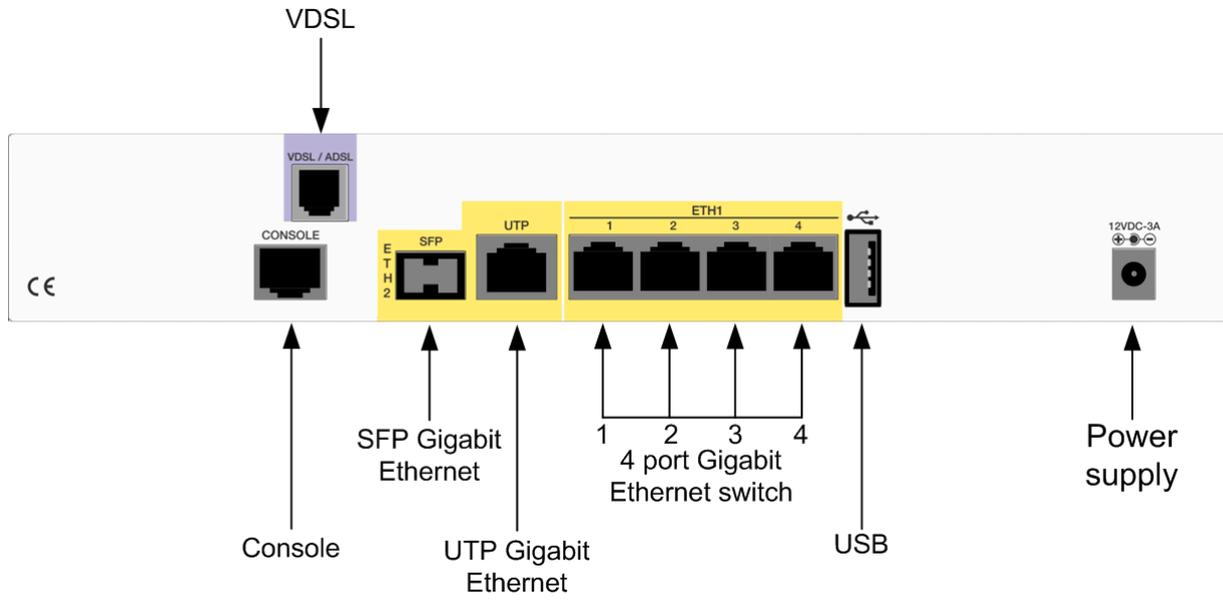
The following figure shows the back panel of the 1645 2Gb6TU:



The following figure shows the back panel of the 1645 M2Gb6TU:



The following figure shows the back panel of the 1645 AV2 Gb5TU:



2.7.2 The different parts of the 1645

The following table gives an overview of the possible connectors located at the back of the 1645 and explains their function:

Interface identification	Interface function
DSL 1-2 DSL 3-4	<p>These RJ11 connectors are SHDSL line connectors.</p> <p>Connect one side of an SHDSL line cable (not included) to the DSL connector(s) of the 1645 and the other side to an SHDSL outlet.</p> <hr/> <p> For optimum performance, the used line pairs have to be properly twisted.</p> <hr/> <p>Refer to 4.1 - SHDSL line specifications on page 35 for more information.</p>
VDSL / ADSL	<p>This RJ11 connector is the ADSL2+/VDSL2 line connector.</p> <p>Connect one side of a VDSL/ADSL line cable to the ADSL2+/VDSL2 connector of the 1645, and the other side to an VDSL/ADSL outlet.</p> <p>Refer to 4.2 - VDSL and ADSL line specifications on page 36 for more information.</p>
CONSOLE	<p>This RJ45 connector is a V.24 DTE interface. This enables you to manage the 1645 locally.</p> <p>Refer to 4.7 - Console port specifications on page 41 for more information.</p>
	<p>This is a USB version 2.0 interface and can operate as a master. It can deliver up to 1000mA at 5V. It can be used to connect a mobile USB device for backup of the DSL connection over the mobile 3G network.</p> <p>Refer to 4.6 - USB interface specifications on page 40 for more information.</p>
ETH1 1...4	<p>This is a 4 port Gigabit Ethernet switch.</p> <p>Connect one side of an Ethernet LAN cable to one of the LAN connectors and the other side to an Ethernet network outlet. Each LAN interface supports 10/100/1000 Mbps auto-sense and auto cross-over.</p> <p>Refer to 4.3 - ETH1 4 port Ethernet switch specifications on page 37 for more information.</p>
ETH2 UTP ETH3 UTP	<p>This RJ45 connector is a Gigabit Ethernet port.</p> <p>This separate Gigabit Ethernet interface can be used as main WAN link or as a back-up WAN link.</p> <p>To connect ETH2 or ETH3, connect one side of an Ethernet LAN cable to LAN connector and the other side to an Ethernet network outlet; the LAN interface supports speeds of up to 1000 Mbps.</p> <p>Refer to 4.4 - ETH2/ETH3 UTP interface specifications on page 38 for more information.</p>

Interface identification	Interface function
ETH2 SFP ETH3 SFP	<p>This is a fibre Gigabit Ethernet SFP slot to connect the user side, i.e. the local network.</p> <p>Connect one side of an optical cable to the SFP module inserted in the SFP slot; connect the other side to a local optical network outlet.</p> <p>The SFP slot supports speeds of up to 1 Gbps.</p> <p>Refer to 4.5 - ETH2/ETH3 SFP interface on page 39 for more information.</p>
12VDC-3A	<p>This is the power input. Insert the plug of the external power supply in this socket. Secure the power supply connection by installing the DC power supply cord into the plastic ring provided on the back panel.</p> <p>Refer to 4.8 - Power requirements on page 42 for more information.</p>

2.8 The front panel LED indicators

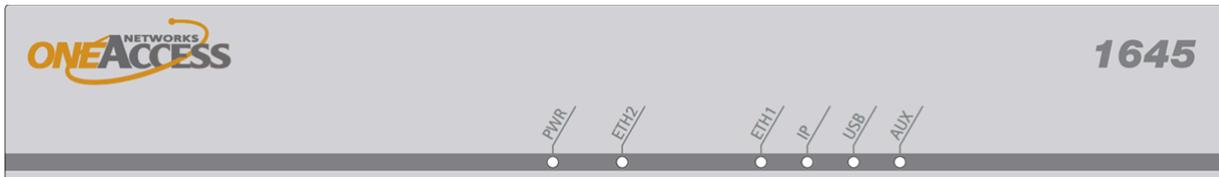
This section gives an overview of the front panel LEDs and what they indicate. The following gives an overview of this section:

- [2.8.1 - Introducing the front panel LEDs on page 28](#)
- [2.8.2 - LED states on page 29](#)

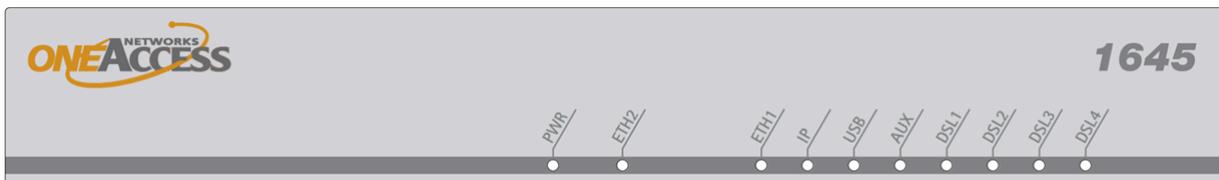
2.8.1 Introducing the front panel LEDs

When all the connections are made and the 1645 is powered, the LEDs on the front panel reflect the actual status of the device.

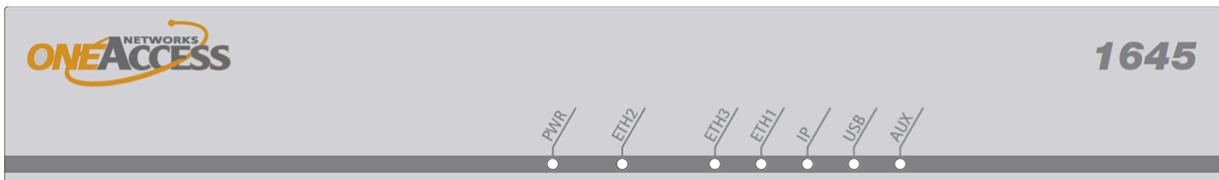
The following figure shows the front panel LED indicators of the 1645 Gb5TU:



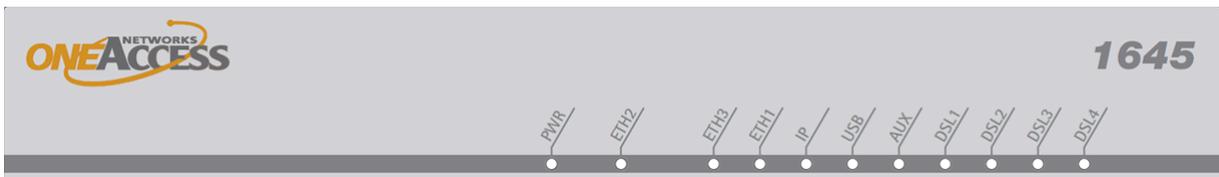
The following figure shows the front panel LED indicators of the 1645 MGb5TU:



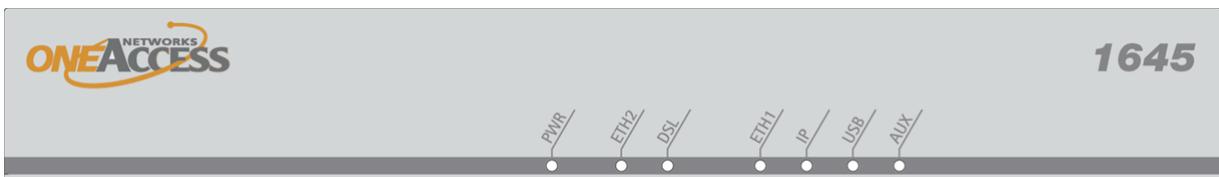
The following figure shows the front panel LED indicators of the 1645 2Gb6TU:



The following figure shows the front panel LED indicators of the 1645 M2Gb6TU:



The following figure shows the front panel LED indicators of the 1645 AV2 Gb5TU:



LED states

One front panel LED can reflect different status modes by the way it lights up. The front panel LEDs can light up as follows:

LED state	LED duty cycle	Description
OFF	0 %	The LED never lights up.
ON	100 %	The LED lights up continuously.
blinking	50 %	The LED is alternating 0,5 seconds ON, and 0,5 seconds OFF.

2.8.2 LED states

The state of the LEDs indicates the following:

LED name	Colour	Description
PWR	Bicolour	<ul style="list-style-type: none"> • OFF: No input power. • ON - Green: Switched on and operational. • ON - Red: Switched on and not operational. • Blinking green : (Re)boot in progress.
DSL1 DSL2 DSL3 DSL4	Green	<p>These LEDs are present on the devices equipped with an SHDSL interface.</p> <ul style="list-style-type: none"> • OFF: The SHDSL line pair is not configured, or the SHDSL line pair does not get any reaction of the other side of the SHDSL line pair (although it is configured). • Blinking green: The SHDSL synchronisation is in progress on the line pair. • ON - green: The SHDSL line pair is synchronised.
DSL	Bicolour	<p>This LED is present on the devices equipped with an ADSL2+/VDSL interface.</p> <ul style="list-style-type: none"> • OFF: The DSL interface is not configured. • ON - Red: The DSL interface does not get any reaction of the other side of the DSL link on any of the line pairs (although it is configured). • Blinking green: The DSL synchronisation is in progress. Less than minActiveLinks are yet synchronised in case of multipair with EFM or IMA. • ON - Green: The DSL uplink is synchronised. In case of multipair with EFM or IMA at least minActiveLinks are in use.
IP	Green	<ul style="list-style-type: none"> • OFF: No IP interfaces are in use or all IP interfaces are down.^{1,2} • ON - Green: All IP interfaces are up. • Blinking green: At least one IP interface is up and at least one is not up.
ETH1	Green	<ul style="list-style-type: none"> • OFF: None of the ports on the Ethernet switch is active. • ON - Green: At least one of the ports on the Ethernet switch is active. • Blinking green: Traffic in progress on at least one of the ports on the Ethernet switch.

LED name	Colour	Description
ETH2 ETH3	Bicolour	<ul style="list-style-type: none"> • OFF: The Ethernet port is not connected. • Green: The Ethernet port is active. • Blinking green: Traffic in progress on the second (ETH2) / third (ETH3) Ethernet port. • RED blinking: Media type is configured to SFP but SFP module is not present. <p>Note that the second (ETH2) and third (ETH3) port is either the SFP module or the UTP LAN interface.</p>
USB	Bicolour	<ul style="list-style-type: none"> • OFF: USB port has not been configured. • ON - Red: USB port configured, but there is no connection with the USB dongle. • Blinking red : USB port configured, and initialising connection with USB dongle. • ON - Green: USB port configured and ready for use (registered to 3G network). • Blinking green: USB port configured and active connection to the 3G network (indication of data traffic)
AUX		<ul style="list-style-type: none"> • For future use.

1. An IP interface is a physical or logical interface (e.g. ATM PVC, PPP session, VLAN, IP interface in a bridge group) which is configured for IP traffic (routed mode) and is not in the administrative *down* status. The loopback interfaces (*softwareLoopback* and *usrLoopback*) are excluded. An IP interface is up if its operational status is *up* or *dormant* (interface is up on layer 2 and it has either obtained a dynamic IP address (e.g. from IPCP or DHCP) or a static IP address is configured. The status of loopback interfaces is ignored.
2. The above definition means that the IP LED will function as soon as the device is IP manageable or it has any active routed interfaces.

2.9 Powering up the 1645

To power up the 1645, always follow these steps:

- Connect the DC power input jack from the power supply to the DC power input of the rear panel of the device.
- Connect the power supply to the AC mains.

Self test

A few seconds after the power is switched on, the 1645 performs a series of self-tests and loads the software into memory (RAM), during which the *PWR* LED on the front panel blinks.

At the end of the software loading, after about 30 seconds, if:

- the *PWR* LED remains green continuously, it means that the software initialization was successful.
- the *PWR* LED blinks, it means that:
 - the software was absent,or,
 - there was an error during the software loading process.

3 TMA sub-system picture

The sub-system picture is a TMA tool that visualises the status information of the 1645. This chapter explains how to display the sub-system picture, and how to interpret the visual indications.

How to display the sub-system picture?

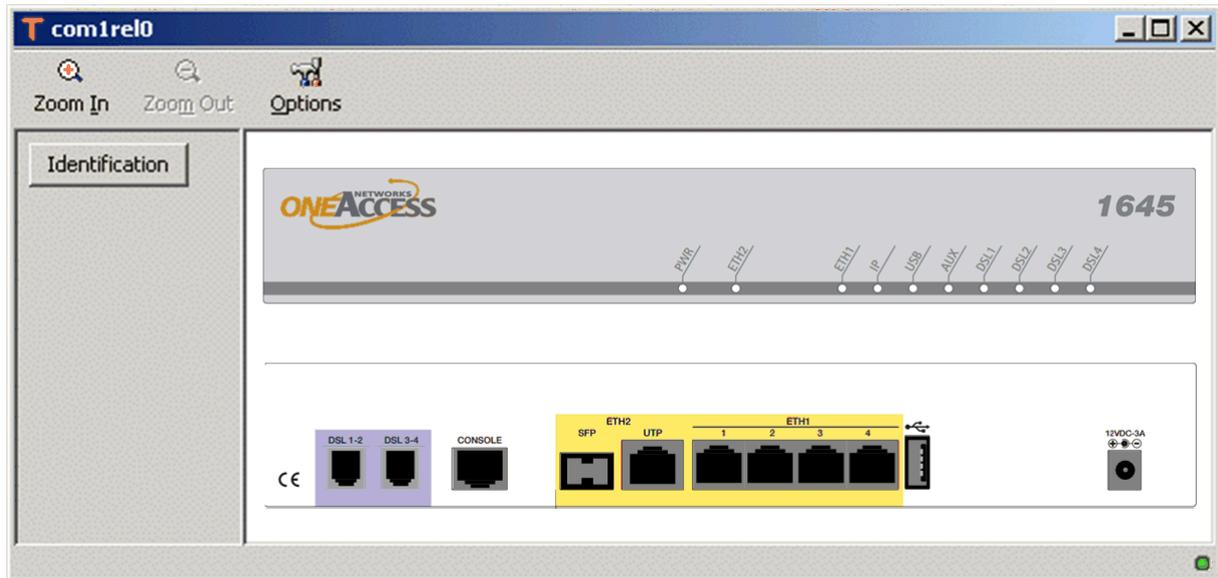
To display the sub-system picture of the 1645, click on the sub-system picture button located in the TMA toolbar:



Structure of the sub-system picture

This paragraph displays and labels the different elements of the sub-system picture. It also explains how the visual indications should be interpreted.

Below, the sub-system picture of the 1645 MGb5TU is displayed:



The following table gives an overview of the sub-system picture elements and what they indicate:

Element	Description
LEDs on front panel	<p>These reflect the actual status of the device.</p> <p>The LED indication on the sub-system picture corresponds with the LED indication on the 1645 itself.</p> <p>Refer to 2.8 - The front panel LED indicators on page 27 for more information on the interpretation of the LEDs.</p>
interfaces on back panel	<p>These reflect the status of the interfaces. The possible indications are:</p> <ul style="list-style-type: none"> • green. There is no alarm active in the corresponding interface object. • red. An alarm is active in the corresponding interface object. <p> The colours of the interfaces only change if the alarms related to the interface object are set to <i>enabled</i> in the alarmMask.</p>

4 Technical specifications

This chapter gives the technical specifications of the 1645. The following gives an overview of this chapter:

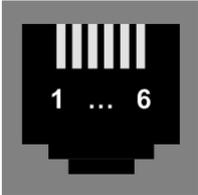
- [4.1 - SHDSL line specifications on page 35](#)
- [4.2 - VDSL and ADSL line specifications on page 36](#)
- [4.3 - ETH1 4 port Ethernet switch specifications on page 37](#)
- [4.4 - ETH2/ETH3 UTP interface specifications on page 38](#)
- [4.5 - ETH2/ETH3 SFP interface on page 39](#)
- [4.6 - USB interface specifications on page 40](#)
- [4.7 - Console port specifications on page 41](#)
- [4.8 - Power requirements on page 42](#)
- [4.9 - Dimensions on page 43](#)
- [4.10 - Safety compliance on page 44](#)
- [4.11 - Over-voltage and over-current protection compliance on page 44](#)
- [4.12 - EMC compliance on page 45](#)
- [4.13 - Environmental compliance on page 46](#)

4.1 SHDSL line specifications

- Single pair, dual pair, 4 pair line access
- Connector: RJ11
- Impedance: 135 Ω
- Cable to be used: CAT5E twisted pair
- Coding: TCPAM, compliant to ITU-T G.991.2; G.SHDSL, and G.SHDSL.bis via TCPAM-16 and TCPAM-32
- Line speeds:
 - Single pair: 192 ... 5696 in steps of 64kbps
 - Two pair: 384 ... 11392 in steps of 128kbps
 - Four pair: 768 ... 22784 in steps of 256kbps
- Handshaking: compliant G.994.1 (automatic speed negotiation) or fixed speed
- Performance monitoring: compliant G.826 (errored seconds, severely errored seconds, unavailability seconds)

The line connector lay-out

The following table shows the connector layout of the RJ11 line connector for SHDSL line pair 1-2:

Pin	Signal	Figure
2	line 2	
3	line 1	
4	line 1	
5	line 2	

The following table shows the connector layout of the RJ11 line connector for SHDSL line pair 3-4:

Pin	Signal	Figure
2	line 4	
3	line 3	
4	line 3	
5	line 4	

4.2 VDSL and ADSL line specifications

- Single pair line access
- Connector: RJ11
- Impedance: 135 ohm
- Cable to be used: CAT5E twisted pair
- Coding compliant to:
 - ANSI T1.413 Issue 2
 - ETSI TS 101 388 v1.3.1
 - ITU-T G.992.1 (ADSL G.dmt), ITU-T G.992.2 (ADSL G.Lite), ITU-T G.992.3 (ADSL G.dmt.bis) ITU-T G.992.4 (ADSL2), ITU-T G.992.5 (ADSL2plus) - annex A & B
 - ADSL2+ Annex M (optional)
 - ADSL EOC and HLOG (attenuation)
 - ITU-T G.993.1 (VDSL), ITU-T G.993.2 (VDSL2); VDSL2 profiles 8a, 12a, 17a & 30a annex A & B with ADSL2+ fallback
 - VDSL Interop: Ikanos and Broadcom (UPBO and EL)
- Performance monitoring: compliant G.826 (errored seconds, severely errored seconds, unavailability seconds)

The line connector lay-out

The following table shows the connector layout of the RJ11 line connector:

Pin	Signal	Figure
1	not used	
2	Tip	
3	Ring	
4	not used	

4.3 ETH1 4 port Ethernet switch specifications

- 4 port Ethernet switch with 10/100/1000 Base T ports
- Connectors: RJ45 (EIA/TIA 568B)
- Cable to be used: standard Ethernet cable, minimum category 5

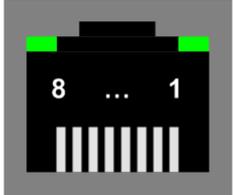
Each UTP Ethernet port supports:

- Applicable standards:
 - IEEE 802.3 (10Mbps Ethernet Half Duplex or Full Duplex)
 - IEEE 802.3u (100Mbps Ethernet Half Duplex or Full Duplex)
 - IEEE 802.3ab (1000Mbps Full duplex)
- 10/100/1000 Mbps auto-sense
- Auto cross-over MDI/MDI-X for automatic connection to a terminal or switch
- The following LEDs are available built-in on each Ethernet interface connector:

Colour	Description
Green (left ¹)	<ul style="list-style-type: none"> • OFF: link inactive. • ON: link active.
Green (right ¹)	<ul style="list-style-type: none"> • OFF: no traffic in progress. • ON: traffic in progress.

1. Defined as looking from the back.

- The following table shows the connector layout of the RJ45 Ethernet LAN interface connectors:

Pin	Signal 10/100 BASE-T	DTE	DCE	Signal 1000 BASE-T		Figure
				MDI	MDI-X	
1	transmit (+)	Out	In	BI DA+	BI DB+	
2	transmit (-)	Out	In	BI DA-	BI DB-	
3	receive (+)	In	Out	BI DB+	BI DA+	
4	not used	-		BI DC+	BI DD+	
5	not used	-		BI DC-	BI DD-	
6	receive (-)	In	Out	BI DB-	BI DA-	
7	not used	-		BI DD+	BI DC+	
8	not used	-		BI DD-	BI DC-	

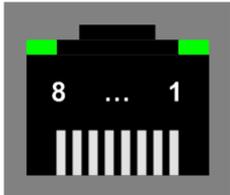
4.4 ETH2/ETH3 UTP interface specifications

- Connector: RJ45 (EIA/TIA 568B)
- Cable to be used: standard Ethernet cable, minimum category 5
- Applicable standards:
 - IEEE 802.3 (10Mbps Ethernet Half Duplex or Full Duplex)
 - IEEE 802.3u (100Mbps Ethernet Half Duplex or Full Duplex)
 - IEEE 802.3ab (1000Mbps Full duplex)
- 10/100/1000 Mbps auto-sense
- Auto cross-over MDI/MDI-X for automatic connection to a terminal or switch
- The following LEDs are built-in on the Ethernet interface connector:

Colour	Description
Green (left ¹)	<ul style="list-style-type: none"> • OFF: link inactive. • ON: link active.
Green (right ¹)	<ul style="list-style-type: none"> • OFF: no traffic in progress. • ON: traffic in progress.

1. Defined as looking from the back.

- The following table shows the connector layout of the RJ45 Ethernet LAN interface connectors:

Pin	Signal 10/100 BASE-T	DTE	DCE	Signal 1000 BASE-T		Figure
				MDI	MDI-X	
1	transmit (+)	Out	In	BI DA+	BI DB+	
2	transmit (-)	Out	In	BI DA-	BI DB-	
3	receive (+)	In	Out	BI DB+	BI DA+	
4	not used	-		BI DC+	BI DD+	
5	not used	-		BI DC-	BI DD-	
6	receive (-)	In	Out	BI DB-	BI DA-	
7	not used	-		BI DD+	BI DC+	
8	not used	-		BI DD-	BI DC-	

4.5 ETH2/ETH3 SFP interface

- 100 or 1000 Base X port
- INF-8074 and SFF-8472 compliant
- The following working modes are supported and/or can be forced:
 - Full duplex 100 Mbps
 - Full duplex 1000 Mbps
 - Speed selection: by configuration only
- The following OA SFP modules are supported:

Description	Rate (Mbps)	Mode	Fibre	Distance (km)
SFP-100BASE-FX	100	MM	2FO	2
SFP-100BASE-LX15	100	SM	2FO	15
SFP-100BASE-LX50	100	SM	2FO	50
SFP-100BASE-BX10 ¹	100	SM	1FO	10
SFP-100BASE-BX20 ¹	100	SM	1FO	20
SFP-100BASE-BX40 ¹	100	SM	1FO	40
SFP-1000BASE-SX ²	1000	MM	2FO	0,5
SFP-1000BASE-LX10 ²	1000	SM	2FO	10
SFP-1000BASE-LX20 ²	1000	SM	2FO	20
SFP-1000BASE-LX40 ²	1000	SM	2FO	40
SFP-1000BASE-BX10 ^{1,2}	1000	SM	1FO	10
SFP-1000BASE-BX20 ^{1,2}	1000	SM	1FO	20
SFP-1000BASE-BX40 ^{1,2}	1000	SM	1FO	40

1. Modules for single fibre must be used in pairs: BX at one side and BX-D at the other side of the link.
2. Only Gbit Ethernet SFP modules can be used on versions with a Fibre SFP Gbit Ethernet interface; do not use Fast Ethernet SFP modules in a Gbit SFP slot.

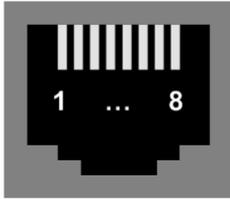
4.6 USB interface specifications

- Standard Type A USB connector.
- USB version 2.0 interface.
- The USB interface can operate as a master.
- The USB master interface can deliver up to 1000mA at 5V.
- The following table shows the connector layout of the USB connector:

Pin	Signal	Function	Figure
1	Vcc	+5V	
2	D-	Data-	
3	D+	Data+	
4	GND	Ground	

4.7 Console port specifications

- Connector: RJ45 (EIA/TIA 568B)
- Data:
 - RS232
 - 9600 bps
 - 8 data bits
 - no parity
 - 1 stop bit
- The following table shows the connector layout of the RJ45 Console connector:

Pin	Abbreviation	DCE	Figure
1	TX	Out	
2	RX	In	
3	GND	-	
4	NC	-	
5	NC	-	
6	NC	-	
7	NC	-	
8	NC	-	

A console cable for device configuration and maintenance only requires TX, RX and GND to be connected; refer to [Annex A: - Console cable on page 48](#) for more information about the cable.

4.8 Power requirements

Power supplies to be used:

- Switched Power Module
- Input: 100-240 Vac in; 50/60 Hz
- Output: Vout=12 Vdc; Iout=3 A
- Limited Power Source (LPS)

Optionally, the device can also be powered by a 48Vdc power supply:

- Switched Power Module
- Input: 18-60 Vdc
- Output: 12 Vdc; 2,9 A; 35W
- Limited Power Source (LPS)



Do not use another type of power supply than the one recommended by OneAccess.

4.9 Dimensions

The 1645 has a metal housing with the following characteristics:

- Width: 275 mm
- Height: 55 mm
- Depth: 146 mm
- Total weigh of the device: 1,26 kg

The weight of the external power adaptors is as follows:

Description	Weight (kg)
Various AC power plugs	0,1
48 Vdc power plug	0,4

4.10 Safety compliance

- EN60950-1: Safety of information technology equipment, including electrical business equipment.
- Devices with earth stud:
 - Class I equipment (powered by Class II AC/DC adapter)
- Devices without earth stud:
 - Class III equipment (powered by Class II AC/DC adapter)

4.11 Over-voltage and over-current protection compliance

The over-voltage and over-current protection complies with ITU-T K.44 and ETSI EN 300 386 recommendations.

4.12 EMC compliance

- CE
- EN55022 B Emissions
- EN55024 Immunity
- EN61000-3-2 Harmonics
- EN61000-3-3 Voltage fluctuations and flicker
- EN61000-4-2 ESD
- EN61000-4-3 Radiated immunity
- EN61000-4-4 EFT/burst
- EN61000-4-5 Surge
- EN61000-4-6 Conducted immunity
- EN61000-4-8 Power magnetic field immunity
- EN61000-4-11 Voltage dips & drops
- EN300386 EMC Requirements

4.13 Environmental compliance

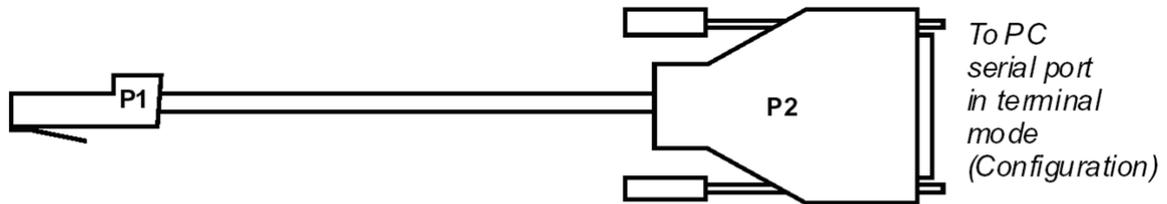
- Storage conditions: ETSI ETS 300 019-1-1 Class 1.1. In addition, the storage temperature has to be between -25 to +70°C, with a relative humidity between 0 and 95% non-condensing.
- Transport conditions: ETSI ETS 300 019-1-2 Class 2.3.
- Stationary use conditions: ETSI ETS 300 019-1-3 Class 3.2. In addition, a relative humidity between 0 and 95% non-condensing and an ambient operational temperature between -10 to 50°C is supported.
- International protection (IP) class of protection against solid and liquids: IP30.

Annex

Annex A: Console cable

Standard console cable

The following figure shows the console cable assembly; it has reference code 501288:



P1 RJ45	P2 SUB-D 9 pins Female	Signal
1	2	TX
2	3	RX
3	5	GND

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