DrayTek

Vigor160 Series

35b/G.Fast Modem

QUICK START GUIDE

V1.1

Vigor 166 series
G.Fast / VDSL2 Modem
Quick Start Guide

Version: 2.0

Firmware Version: V4.1.0 BT

Region: United Kingdom & Ireland

For updates and support, visit www.draytek.co.uk

Date: March 2020

Note: Product specification is subject to continuous evolution which may not always be reflected in current documentation. For the formal specification and details of the supported features of your product, please refer only to the web site at www.draytek.co.uk

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Safety Instructions and Approval

Safety Instructions	● Read the installation guide thoroughly before you set up the modem. ● The modem is a complicated electronic unit that may be repaired only be authorized and qualified personnel. Do not try to open or repair the modem yourself. ● Do not place the modem in a damp or humid place, e.g. a bathroom. ● Do not stack the modems. ● The modem should be used in a sheltered area, within a temperature range of 0 to +45 Celsius. ● Do not expose the modem to direct sunlight or other heat sources. The housing and electronic components may be damaged by direct sunlight or heat sources. ● Do not deploy the cable for LAN connection outdoor to prevent electronic shock hazards. ● Keep the package out of reach of children. ● When you want to dispose of the modem, please follow local regulations on conservation of the environment.
Warranty	We warrant to the original end user (purchaser) that the modem will be free from any defects in workmanship or materials for a period of two (2) years from the date of purchase from a DrayTek authorized dealer in the UK/Ireland. Please keep your purchase receipt in a safe place as it serves as proof of date of purchase. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, we will, at our discretion, repair or replace the defective products or components, without charge for either parts or labor, to whatever extent we deem necessary tore-store the product to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal value, and will be offered solely at our discretion. This warranty will not apply if the product is modified, misused, tampered with, damaged by external factors, used with unapproved accessories or subjected to abnormal working conditions. Warranty applies to hardware only, not software or firmware. Defects which do not significantly affect the usability of the product will not be covered by the warranty. We reserve the right to revise the manual and online documentation and to make changes from time to time in the contents hereof without obligation to notify any person of such revision or changes.

EU Declaration of Conformity

We DrayTek Corp. , office at No.26, Fu Shing Road, HuKou County, Hsin-Chu Industry Park, Hsinchu 300, Taiwan , R.O.C., declare under our sole responsibility that the product

- **Product name:** **35b/G.Fast Modem**
- **Model number:** **Vigor165, Vigor166**
- **Manufacturer:** **DrayTek Corp.**
- **Address:** **No.26, Fu Shing Road, HuKou County, Hsin-Chu Industry Park, Hsinchu 300, Taiwan , R.O.C.**

is in conformity with the relevant Union harmonisation legislation:

EMC Directive 2014/30/EU , Low Voltage Directive 2014/35/EU , ErP 2009/125/EC and RoHS 2011/65/EU with reference to the following standards

Importer: SEG, 11 Capital Business Park, Borehamwood, Herts WD6 1GW.

Standard	Version / Issue date
EN 55032	2012+AC:2013 class B
EN 61000-3-2	2014 Class A
EN 61000-3-3	2013
EN 55024	2010+A1:2015
EN 62368	2014+A11:2017
EC No. 1275/2008	2008

Calvin Ma

Hsinchu	**20th September, 2019**	**Calvin Ma / President .**
(place)	(date)	(Legal Signature)

Regulatory Information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device may accept any interference received, including interference that may cause undesired operation.

Regional and Network Compatibility

For all models, please check that you have been supplied with a device intended for your geographic region and networks. Hardware and software varies by region, as well as local support and warranty services. To be sure of compatibility and local support, ensure that you are buying the correct product through authorized channels. The outside of the product's box will state the region compatibility (e.g. "Applied Region: UK"). If you are unsure, check with DrayTek or your supplier. The use of unofficial components (e.g. PSUs) or adapting interfaces or the use of unauthorized software/firmware may cause malfunction, product damage or personal danger and invalidates your warranty and access to support services.

The external power supply used for each product will be model dependent.

		1	2	3	4	5	6	7	8	9
A	Manufacturer	CWT	CWT	CWT	CWT	CWT	APD	APD	APD	APD
B	Address	No. 222, Sec. 2, Nankan Rd., Lujhu Township, Taoyuan County 338, Taiwan	No. 222, Sec. 2, Nankan Rd., Lujhu Township, Taoyuan County 338, Taiwan	No. 222, Sec. 2, Nankan Rd., Lujhu Township, Taoyuan County 338, Taiwan	No. 222, Sec. 2, Nankan Rd., Lujhu Township, Taoyuan County 338, Taiwan	No. 222, Sec. 2, Nankan Rd., Lujhu Township, Taoyuan County 338, Taiwan	No.5, Lane 83, Lung-Sou St., Taoyuan City 330, Taiwan	No.5, Lane 83, Lung-Sou St., Taoyuan City 330, Taiwan	No.5, Lane 83, Lung-Sou St., Taoyuan City 330, Taiwan	No.5, Lane 83, Lung-Sou St., Taoyuan City 330, Taiwan
C	Model identifier	2ABB012F UK	2ABB018F UK	2ABL024F UK	2ABL030F UK	2ABN036F UK	WA-12M12FG	WB-18D12FG	WA-24Q12FG	WA-36A12FG
		2ABB012F EU	2ABB018F EU	2ABL024F EU	2ABL030F EU	2ABN036F EU	WA-12M12FK	WB-18D12FK	WA-24Q12FK	WA-36A12FK
D	Input voltage	100-240V	100-240V	100-240V	100-240V	100-240V	100-240V	100-240V	100-240V	100-240V
E	Input AC frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
	Output voltage DC	12.0V	12.0V	12.0V	12.0V	12.0V	12.0V	12.0V	12.0V	12.0V
F	Output current	1.0A	1.5A	2.0A	2.5A	3.0A	1.0A	1.5A	2.0A	3.0A
G	Output power	12.0W	18.0W	24.0W	30.0W	36.0W	12.0W	18.0W	24.0W	36.0W
H	Average active efficiency	84.9%	86.2%	87.6%	87.8%	89.8%	83.7%	85.4%	88.6%	88.2%
I	Efficiency at low load 10%	73.6%	78.0%	81.3%	83.3%	83.7%	74.5%	80.5%	86.4%	85.4%
J	No-load power consumption	0.07W	0.07W	0.07W	0.07W	0.07W	0.07W	0.10W	0.07W	0.10W

External power supply (Power Adapter) information.

For more information, please visit www.draytek.co.uk.

Join the UK mailing list	Users in the UK & Ireland can sign up to our mailing list which goes out approximately 4 times per year with products news, updates, hints & tips and offers. For details, please visit **www.draytek.co.uk/list**
Firmware & Tools Updates	Due to the continuous evolution of DrayTek technology and emerging risks, router firmware updates may be issued. Please consult the DrayTek web site for more information on newest firmware, tools and documents: www.draytek.co.uk (For UK/Ireland)

Table of Contents

1. Introduction

Thank you for purchasing this DrayTek Vigor 166 G.Fast DSL modem. It provides Internet connectivity through G.Fast, VDSL and ADSL lines, outputting to 2x Gigabit (1000BaseT) Ethernet ports.

The Vigor 166's primary function is as a transparent bridge modem for G.Fast and xDSL services – not as a router/firewall in itself. It connects a secondary router or other device to your G.Fast / DSL line, where that device does not directly support DSL itself.

As a bridge, the Vigor 166 only provides the physical conversion from G.Fast & xDSL (ADSL or VDSL) to Ethernet, adding the VLAN tag 101 required for communication on the OpenReach VDSL network.

All firewalling, routing and other advanced routing functions are managed by your secondary device, such as; a separate router without built-in xDSL capability, Hardware Firewall, PC-based software router, etc.

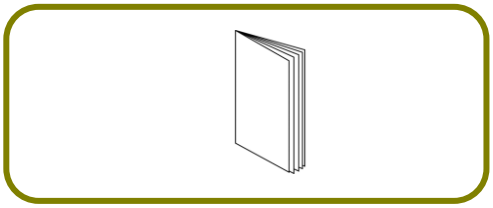
The Vigor 166 comes preconfigured for most UK ISPs. Therefore, in most cases you do not need to perform any setup of the Vigor 166 at all. You only need to physically connect it (plug it in) and then configure your connected router/firewall.

Your ISP username and password go into your router, not the Vigor 166, which just acts as the G.Fast/DSL-to-Ethernet bridge.

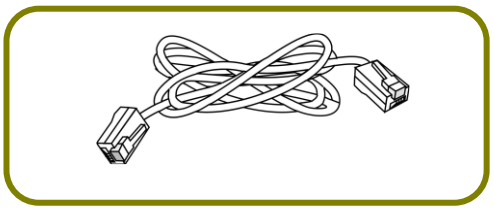
Alternatively, the Vigor 166 can operate as the NAT router on your network, with the Vigor 166 handling the connection to the ISP directly. This allows any devices connected to its network ports to access the Internet.

2. Package Contents

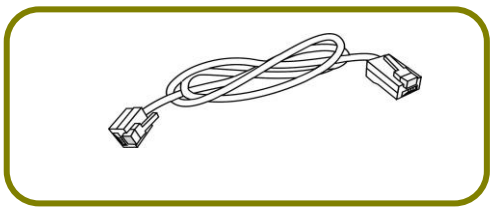
Vigor 166 Modem



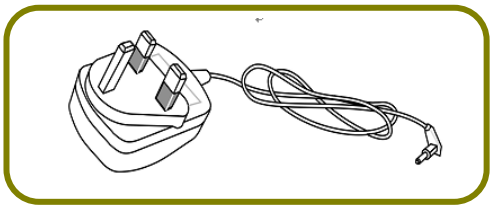
Quick Start Guide



RJ-45 Cable (Ethernet)



RJ-11 to RJ-11 Cable (Annex A)

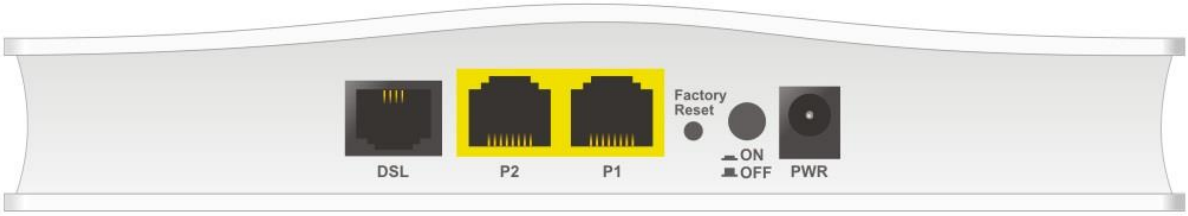


UK-type Power Adapter

The type of the power adapter depends on the country that the modem will be installed. * The maximum power consumption is ***7.5 Watts***.

3. Panel Explanation

LED	Status	Explanation
ACT	Off	The system is not ready or has failed.
	Blinking	The system is ready and operating normally.
P1/P2	On	Ethernet LAN (RJ45) is connected.
	Off	Ethernet LAN is disconnected.
	Blinking	Data is transmitting (sending/receiving).
DSL	On	DSL connection synchronized.
	Blinking	DSL connection is synchronizing.



Interface	Description
DSL	RJ11 Connector for your G.Fast / VDSL2 / ADSL2+ line
P2-P1	RJ45 Connector for connected router/firewall/PC.
Factory Reset	Restore the default settings. Usage: Turn on the modem. Press the button and hold for more than 10 seconds. Then the modem will restart with the factory default configuration.
	ON/OFF: Power switch.
	Connecter for a power adapter. Use only the original PSU supplied with the unit, or an original replacement supplied by DrayTek.

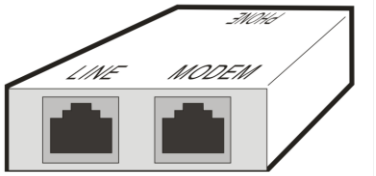
Note Remove the protective film from the router before use to ensure ventilation.

4. Hardware Installation

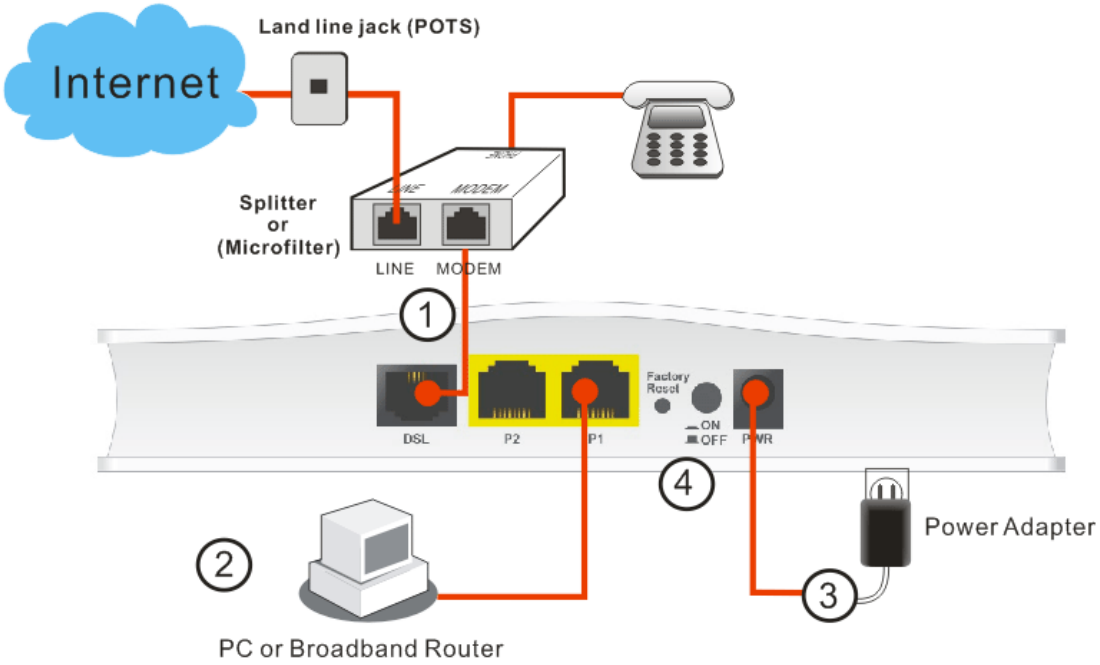
This section details the physical installation of the Vigor 166 modem, connecting up the cables to the modem so that it can be used for Internet access.

The modem can optionally be wall-mounted for secure installation.

4.1 Network Connection



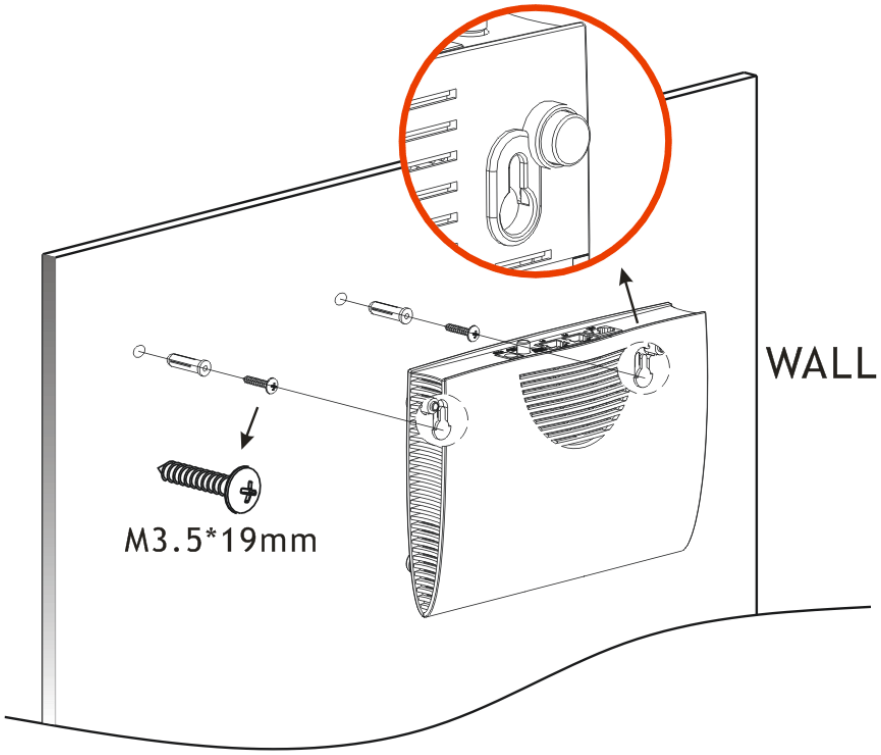
1. Connect the DSL interface to the **MODEM** or **DSL** port of the external splitter/microfilter (not supplied) with the RJ-11 line cable. In most cases, your RJ11 DSL socket will be built-into your phone line socket on the wall and you won't have a separate microfilter/splitter.
2. Connect the LAN port to your router or computer with the RJ-45 cable.
3. Connect the power adapter to the Power port of the modem and plug the power adapter into a suitable mains outlet.
4. Turn the Vigor 166 on using its power switch.
5. Check the **ACT** and **LAN** LEDs light up or blink.



4.2 Wall-Mounted Installation

The Vigor 166 modem has keyhole type mounting slots on the underside for secure wall mounting.

1. A template is provided on the Vigor160 series packaging box to enable you to space the screws correctly on the wall.
2. Place the template on the wall and drill holes at the marked points.
3. Fit screws into the wall using the appropriate type of wall plug.



Note	The recommended drill bit diameter is 6.5mm (1/4”).

4. Fit the Vigor 166 modem onto the protruding screwheads and lower the modem to affix it securely in place on the wall.

5. Setup & Configuration

The Vigor 166 can be used either as a modem, bridging G.Fast or VDSl2 to its Ethernet ports, or as a router, connecting directly to the Internet and providing connectivity to any connected devices.

The Vigor 166 is pre-configured to work with most UK ISPs, with ideal settings for connecting to the Openreach G.Fast / VDSL2 network, adding VLAN tag 101 to any traffic passing through it.

Out of the box, the Vigor 166 operates in **Modem/Bridge mode**. To use the Vigor 166 as a modem for G.Fast or VDSL2 connections, connect it up to the DSL line and connect your router to one of the Vigor 166's LAN ports.

In your router's configuration, set up the Internet connection to use PPPoE if your ISP has provided a Username and Password for you to connect to the Internet with. Otherwise, configure the Internet connection to connect automatically (using DHCP) or with a static IP if your ISP has supplied one.

The Vigor 166 can be used as a router, connecting to the Internet directly and providing connectivity to all connected devices.
See section "**5.5 Using the Vigor 166 as a Router**" for more information.

5.1 Accessing the Web Interface

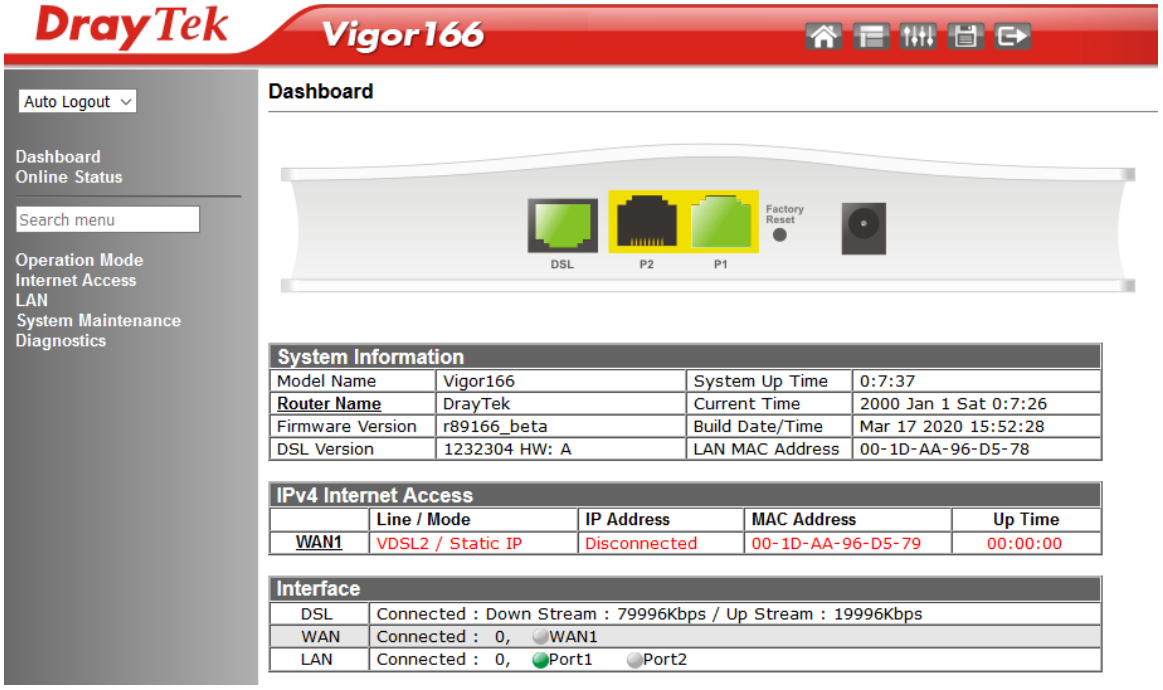
To connect to the Vigor 166's web interface, connect its Ethernet (RJ45) port directly to your PC.

If your PC is enabled as a DHCP client, it will get an IP address from the Vigor 166, otherwise, set your PC to an IP address in the 192.168.2.x subnet (where 'x' is any number between 2-254).

The Vigor 166 should then be accessible on its default address in your web browser of **http://192.168.2.1** and you can login with the default username/password of **admin**/**admin**.

You should change that password from the system maintenance menu before you leave the modem's setup screens.

The Dashboard of the Vigor 166 shows the current DSL sync status and connected ports:



By default, the Vigor 166 is operating in **Modem/Bridge mode**, this means that the interface is streamlined, providing only options required for operating as a modem.

To access all menu items available on the Vigor 166, switch it to **Router mode** as shown in section "**5.5 Using the Vigor 166 as a Router**".

5.2 Using the Vigor 166 as a Modem

The Vigor 166 functions as a modem straight out of the box, bridging a G.Fast or VDSL2 connection directly to whatever is connected to its LAN ports, whether that's a Router, Firewall, Network Appliance or a PC.

Because the Vigor 166 bridges G.Fast and VDSL2 to its LAN ports, your router will need to be configured to establish its connection to the Internet.

To connect to the Internet, some ISPs assign an IP address automatically, while others will require a username & password (supplied by your ISP). The Vigor 166 passes through both types of connection with no further configuration required.

Check your ISP's documentation to determine what type of connection to use.

Refer to your router's documentation to set up an Internet connection.

The Vigor 166 handles the VLAN tag that your ISP might require. We recommend not to configure any VLAN tag on your router as that could stop the Internet connection from establishing.

To use the Vigor 166 as a modem, connect a LAN port (P1/P2) to your router's RJ-45 Ethernet (WAN) port.

Connect the DSL port of the Vigor 166 to your ISP's RJ-11 DSL wall socket or microfilter.

Check the LED lights on the Vigor 166 to determine its connection status:

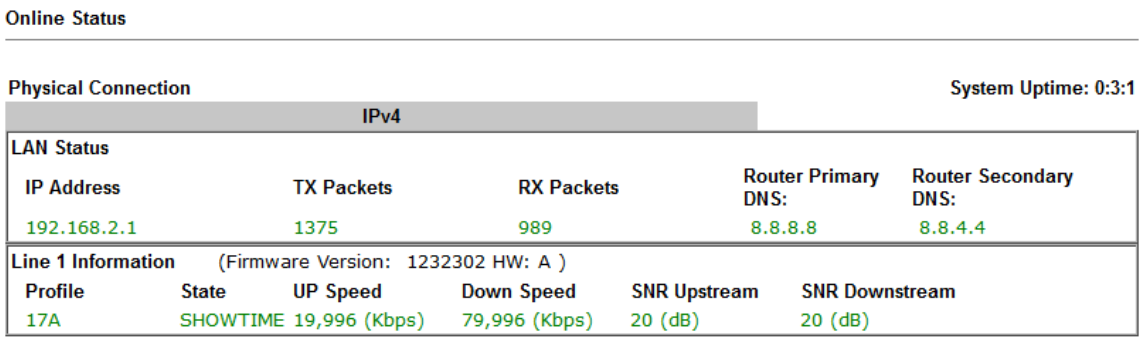
- The **ACT** light should be flashing slowly to indicate normal operation.
- The **DSL** light will be lit solidly when it has connected to a G.Fast or VDSL2 connection and is ready to pass-through connectivity.
- The **P1** or **P2** LAN port light that's connected to your router will be lit to indicate connectivity.

Once your router's Internet connection settings are configured with the correct settings for your ISP the Internet connection will establish shortly after. If your ISP provides a username and password, then your router should be configured to PPPoE mode.

5.3 Checking G.Fast & DSL Status

Once the Vigor 166 is connected to your G.Fast / DSL line, you can check the **[Online Status] > [Physical Connection]** page for more information.

This displays connection status, DSL type, signal quality and the link speed (e.g. 80Mb/s as shown below):



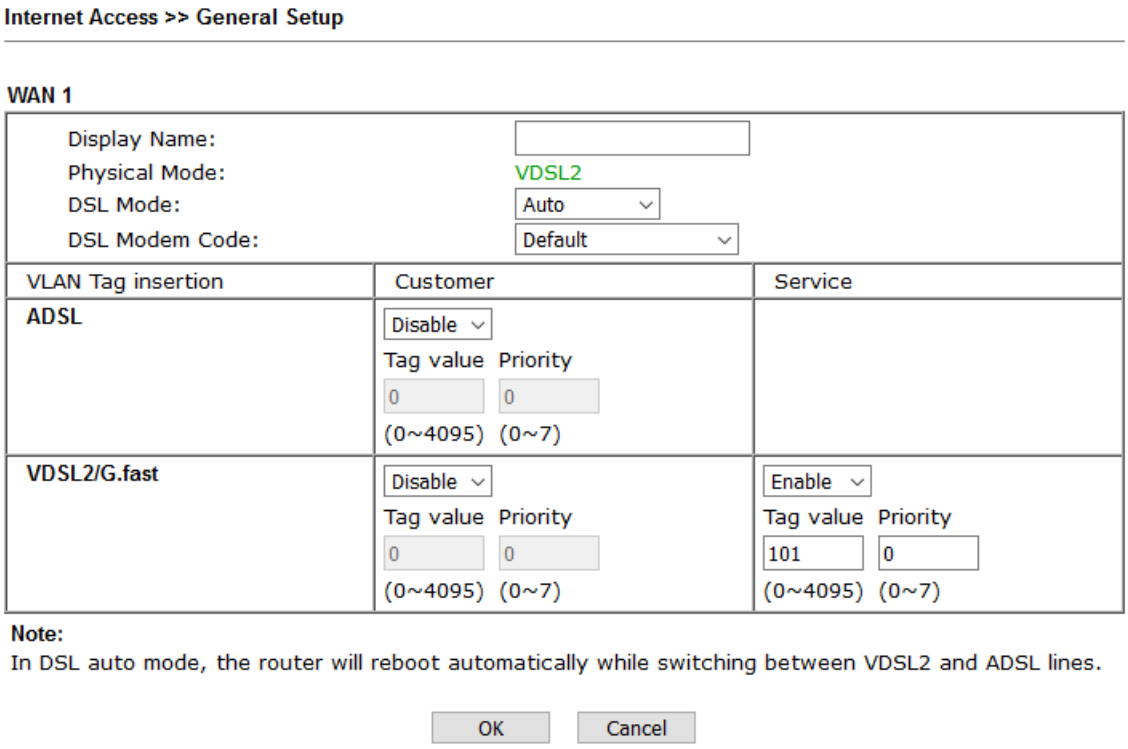
The **[Dashboard]** also shows a summary of DSL information with DSL port status and the DSL link speed.

5.4 Changing VLAN Tag Configuration

To check the VLAN tag setting that will be applied to traffic going through the modem to the ISP, go to the **[Internet Access] > [General Setup]** page.

The default setting of VLAN tag 101 does not normally need to be changed.

The modem adds VLAN tag 101 for any VDSL2/G.Fast connections, so your router does not need to be configured to add its own VLAN tag.

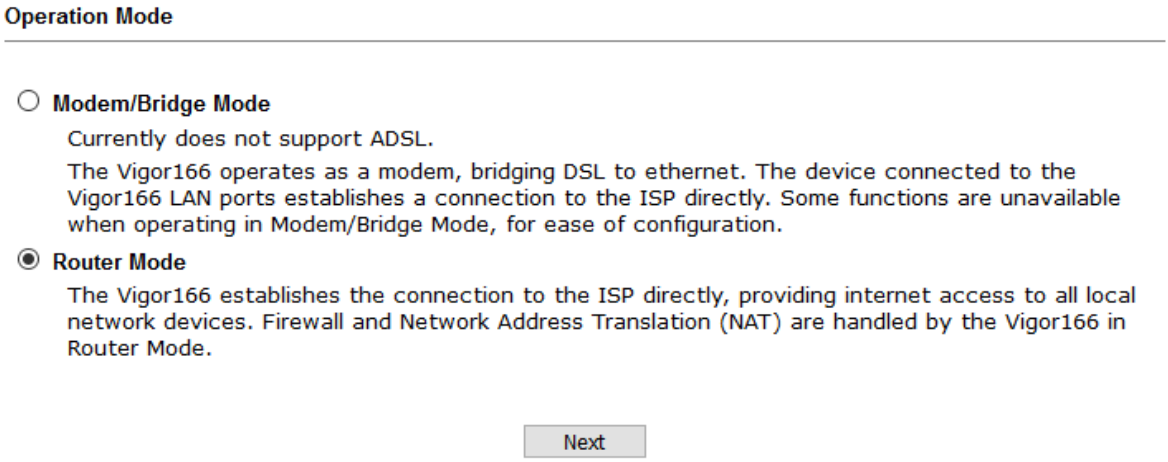


Note	This value is correct for ISPs that operate over the Openreach VDSL2 & G.Fast network. If your ISP operates over a different xDSL network, this tag value may differ. Please check with your ISP or the DrayTek UK Knowledgebase for ISP specific guides.

5.5 Using the Vigor 166 as a Router

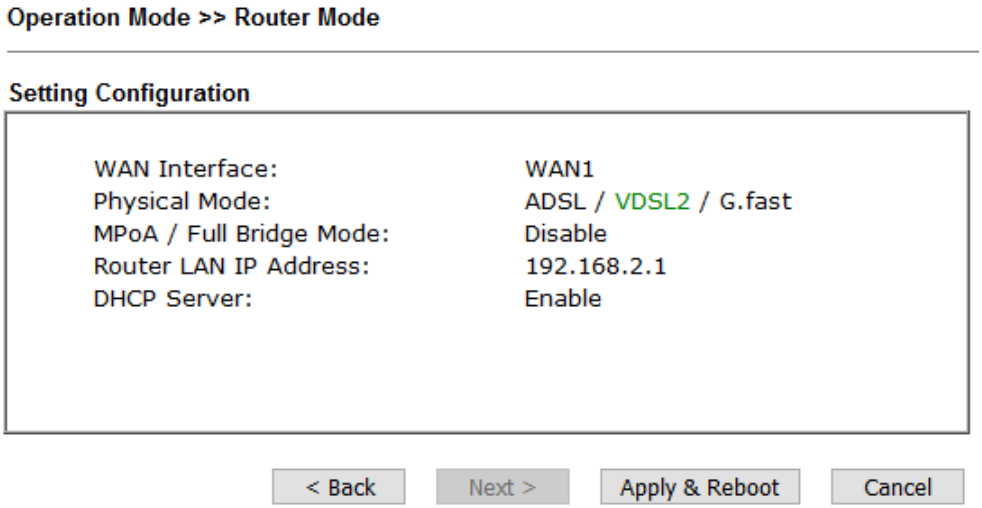
The Vigor 166 can be used as either a modem or router, with the default being **Modem/Bridge mode**.

To configure the Vigor 166 as a router, access the web interface and go to the **[Operation Mode]** menu:



Select **Router Mode** and click **Next**.

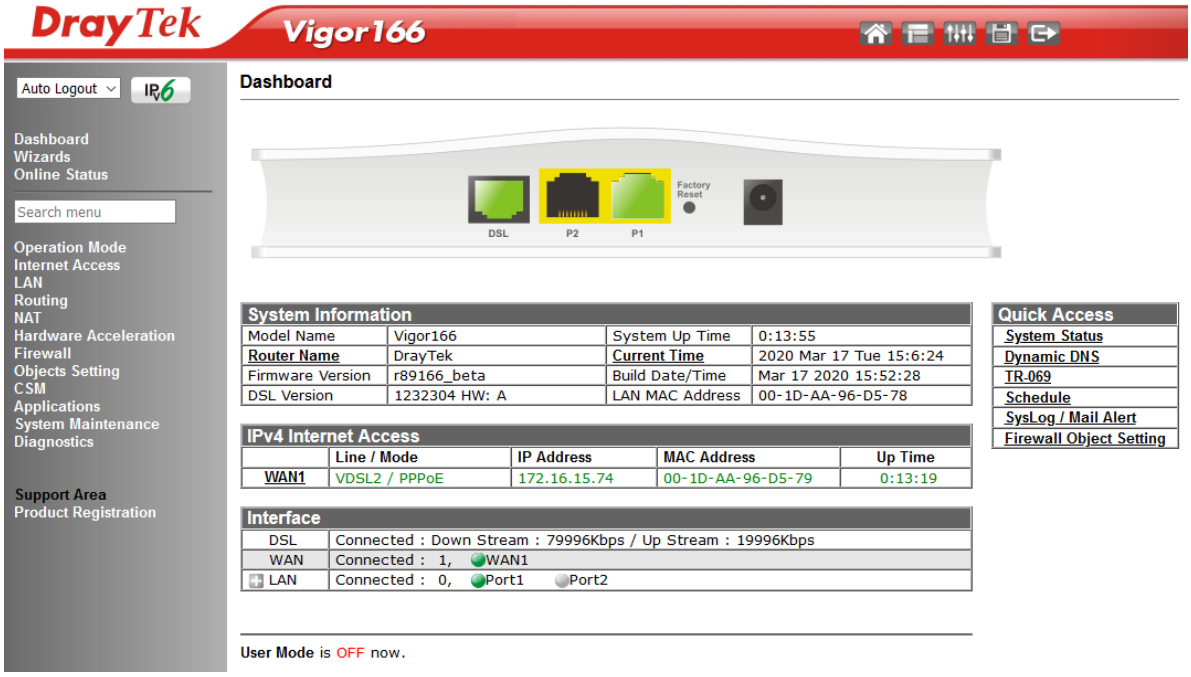
Go through the steps in the setup wizard to complete the process, which configures the Vigor 166's new LAN IP and its Internet connection type.



Click **Apply & Reboot**.

Upon restarting, access the web interface of the Vigor 166 from the Router LAN IP Address that was configured in the Router Mode setup wizard.

When accessing the web interface of the Vigor 166, it will now show additional menu options:



To configure your Internet connection, refer to the next two sections of this quick start guide.

If these settings don't work for you, or if you're not sure what to set, see the DrayTek knowledgebase on **www.draytek.co.uk/support** for further information (for UK/Ireland users – other countries or regions will likely be completely different).

5.5.1 Connect to ISP with Username & Password

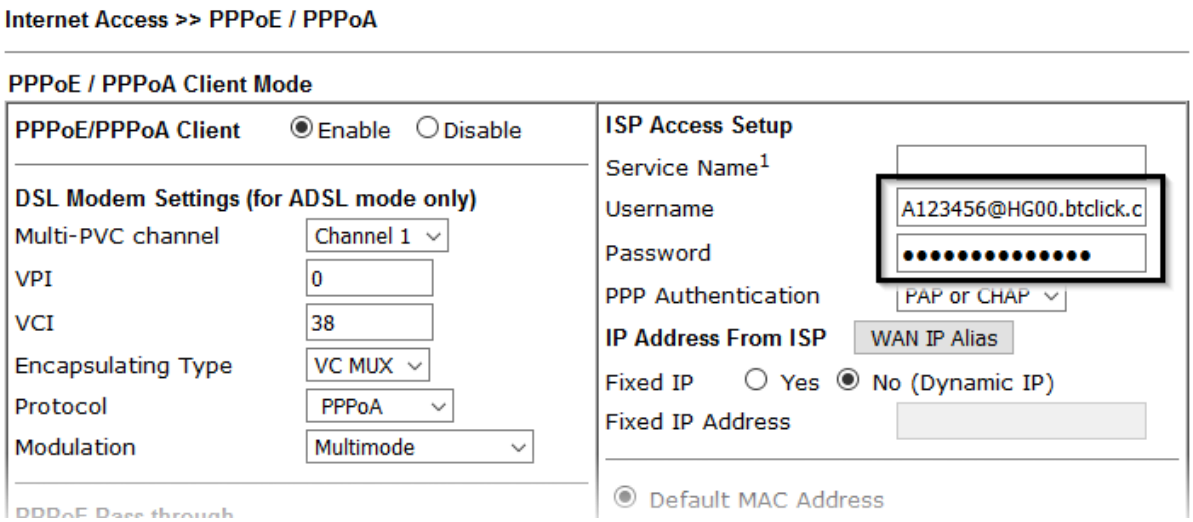
If your Internet connection requires a Username & Password to connect, usually with a username that resembles an email address, configure the Vigor 166 to connect to the Internet with these settings.

Once the Vigor 166 is operating in **Router mode**, go to **[Internet Access] > [PPPoE / PPPoA]**.

Select the **Enable** radio button at the top of the page to enable the interface.

Input the username into the **Username** field and password in the **Password** field, as required. The Service Name does not need to be specified.

If your ISP has provided a static IP address, that can be specified by setting the **Fixed IP** setting to **Yes** and entering the IP in the **Fixed IP Address** field.

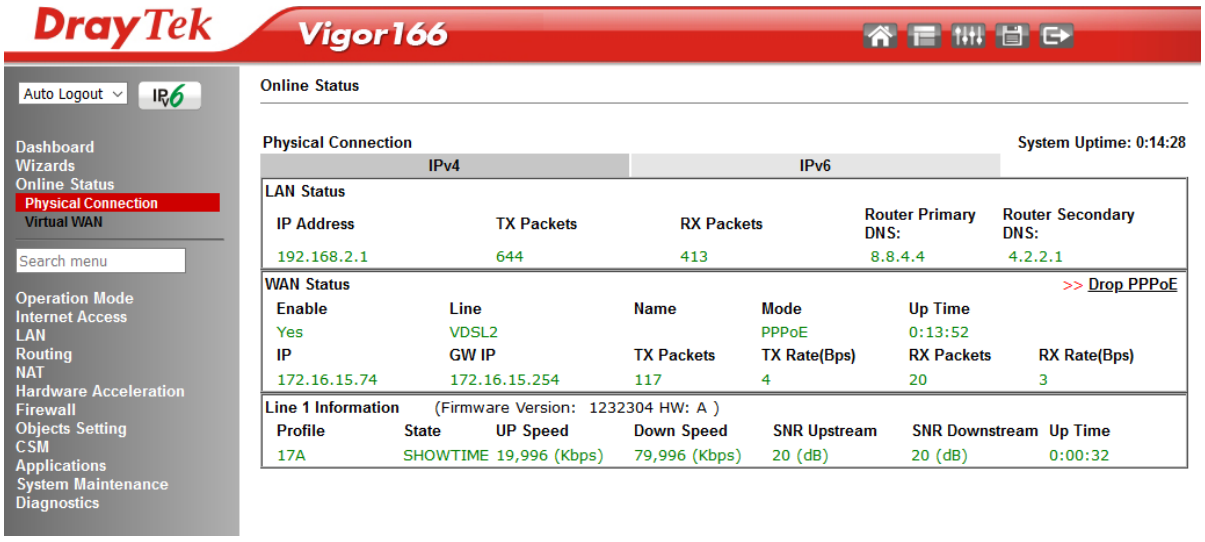


Click **OK** on this page to apply the changes and the router will then prompt to restart.

Click the OK button to restart the router.

Once the router has restarted, the **[Dashboard]** and the **[Online Status] > [Physical Connection]** pages will display the VDSL information and PPP connection status.

When the WAN Status displays in green and shows an IP address, it has connected to the internet successfully:

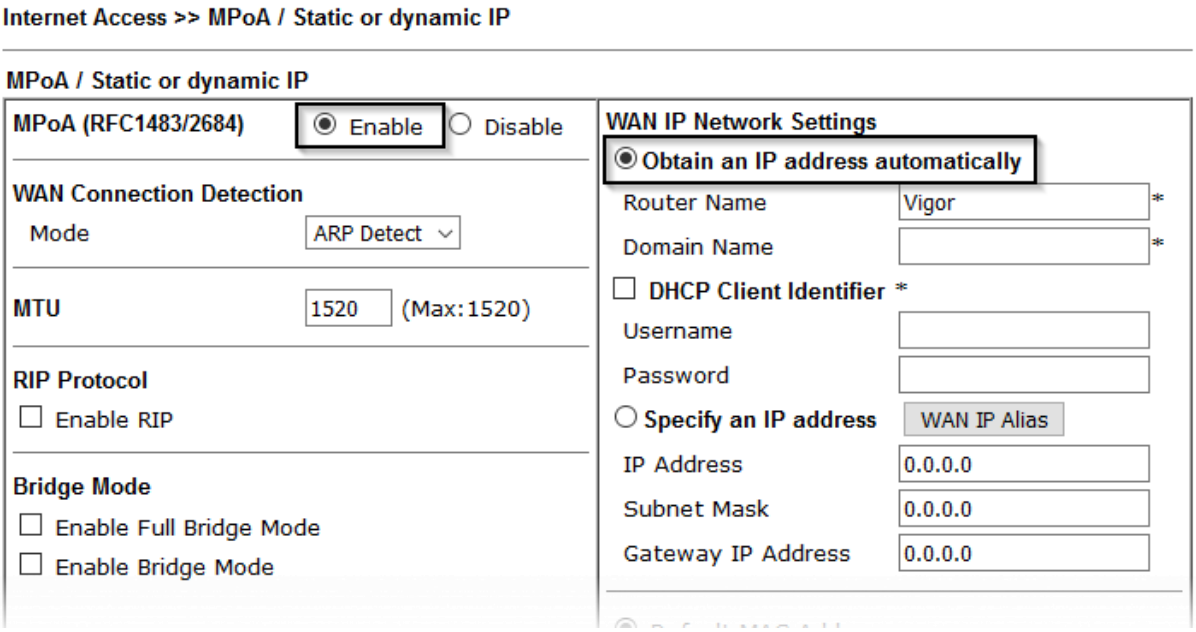


Note	If the WAN IP address displayed begins with 172.16.x.x, it's possible that the ISP has not accepted the supplied Username and Password for the Internet connection. Check that the ISP Access Setup - Username and Password match the details supplied by your ISP.

5.5.2 Connect to ISP with DHCP / Static IP

If your Internet connection does not require a Username & Password to connect or uses a static IP with a subnet mask & gateway address, configure the Vigor 166 to connect to the Internet with these settings.

Once the Vigor 166 is operating in **Router mode**, go to **[Internet Access] > [MPoA / Static or dynamic IP]**.

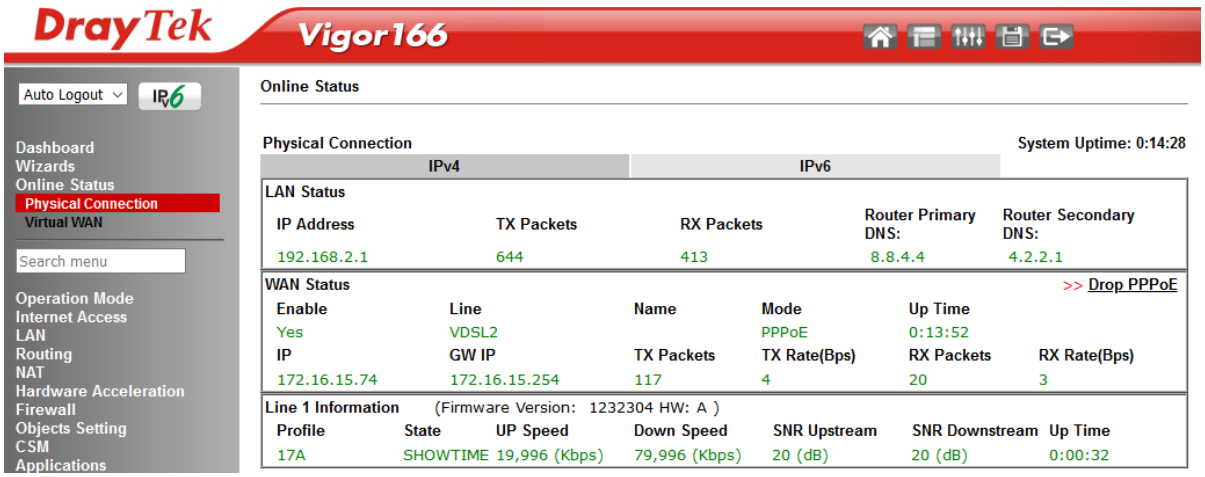


Select the **Enable** option and select **Obtain an IP address automatically** which will obtain an IP from the ISP using DHCP.

If your ISP has provided a static IP range, with a Network address and a Subnet Mask, specify that with the **Specify an IP address** option instead.

Click **OK** on this page to apply the changes and the router will then prompt to restart. Click the OK button to restart the router.

Once the router has restarted, the **[Online Status] > [Physical Connection]** page will display the VDSL information and DHCP connection status, if the WAN1 section shows an IP address, it has connected to the internet successfully:



6. Getting further help

If the modem does not appear to be operating correctly or you cannot get online to the Internet, please visit our web sites for further troubleshooting advice or to contact our support technicians. Always have your serial number to hand.

Users in the UK/Ireland using qualifying products should visit www.draytek.co.uk/support for support options including email support, telephone support, our help knowledgebase and access to the UK user support forums.

If you are **outside** of the UK/Ireland, please contact your own local supplier, email to support@draytek.com or visit www.draytek.com/support

For warranty service, in the first instance, please contact the support services, as listed above, for help in diagnosing or eliminating the problem or issue. The support department can arrange repair or service if then deemed necessary.

The standard Vigor 166 warranty is 'Return to base' (RTB) unless you have VigorCare which provides enhanced services
(see www.draytek.co.uk/vigorcare).

You should keep your proof of purchase (original invoice) safely in case warranty or other service is ever required.

6.1 Keep up to date with our mailing list

Now that your have your DrayTek product, you should keep up to date with product updates (firmware), security advisories and other product news, advice or special offers. Users in the UK/Ireland can subscribe to our mailing list. For details and to subscribe, please visit www.draytek.co.uk/list. In other countries or regions, please contact your local distributor/supplier for local options.

6.2 Firmware Updates

Firmware updates for your product ensure that you have the latest set of features, security updates and improvements for your product. Users in the UK/Ireland can download these from www.draytek.co.uk/support