

Telephone access using B4RN router

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Introduction

There are two excellent documents on the B4RN website describing how to set up a VOIP (Voice Over Internet Protocol) telephone service to replace that associated with the now redundant landline. The documents describe using “Vonage” (<https://b4rn.org.uk/wp-content/uploads/2020/09/Vonage-phone-line-help-file-v11-2020.pdf>) and “Sipgate” (https://b4rn.org.uk/wp-content/uploads/2020/04/Sipgate-Guide-2020_04.pdf) and discuss the merits of each.

Since those documents were written, B4RN are now (November 2020) fitting a router with built-in VOIP capabilities, the Zyxel VMG8825_B50B. The purpose of this guide is to describe the router configuration required to connect an ordinary telephone, plugged in to the router, to a Sipgate VOIP account.

Audience

This guide is primarily intended for:

- B4RN customers who want to use their existing telephone instrument(s) and possibly their existing landline number (but not the landline itself), to receive incoming calls. Outgoing calls are also possible – see “Scope” below.
- Those intending (and are confident) to configure the B4RN router - the customer or perhaps a volunteer.

Scope

Initially at least this guide concentrates on configuring the B4RN router and setting up a Sipgate account. Sipgate has been chosen because:

- The service is free to set up and outgoing call charges are “pay as you go” – there are no other ongoing charges. There is, however, a one-off charge of £30 for “porting” an existing landline number to Sipgate.
- It is particularly suitable for those who, in general, want to keep their existing (landline) number for incoming calls. Sipgate can also be used for outgoing calls, but their call charges may be higher than other VOIP and mobile service providers. See “More Options” below.
- An Audio Telephone Adapter (ATA) is neither supplied nor required (because the router has one built in).

Much of this guide could also be used as a basis for other SIP services, but there may be some specific parameter changes for some services. This guide could be updated to include other services in future. Note that Vonage in particular provides an adapter (ATA) as part of their (paid-for) package so it is not necessary to configure VOIP in the router (although doing so would save the additional “box”, ethernet port and power outlet).

The process

- Register for Sipgate account.
- Configure router.
- Arrange transfer (“port”) of telephone number.
- Connect telephone to router
- Cancel landline contract.

Register for a Sipgate account

This can be carried out in advance of B4RN installation. Create a “Sipgate Basic” account at sipgate.co.uk You will be able to choose a geographic telephone number (may change later – see below). There will be a UK address verification procedure for access to emergency services – this will involve some posted documents.

Once the account is fully set up, the service can be tested by using a “softphone” (an application on your computer or smartphone that can connect to VOIP services).

Configure the router

After B4RN is installed, your router can be configured to connect to your Sipgate VOIP service. See the appendix for configuration details.

The service and configuration can be tested using a telephone connected to the router. Note at this stage the telephone number will be the one you chose when you set up the account.

Arrange to “port” your telephone number (optional)

There are certain forms to complete (and a fee to pay) for Sipgate to request to take over (“port”) your landline number from your existing service provider. **It is important not to cancel your landline contract until the porting of your number is complete. If you cancel before this you are likely to lose the number for good.** Your landline number will replace the temporary number you chose from Sipgate.

Connect telephone to router

An RJ11 plug to BT socket adapter will be required in most cases to enable a telephone to be plugged in to one of the two telephone sockets on the router. Using an adapter with a built-in “ring capacitor” will ensure any telephone instrument with a BT plug will work, and costs about £3.30 inc VAT and postage. I will keep a small stock available at cost. Cheaper adapters may work with some more modern telephone instruments, but it is difficult to predict.

The router configuration below assumes a telephone will be plugged into the first socket (port 1).

Cancel your landline

You can now cancel your landline contract.

More options

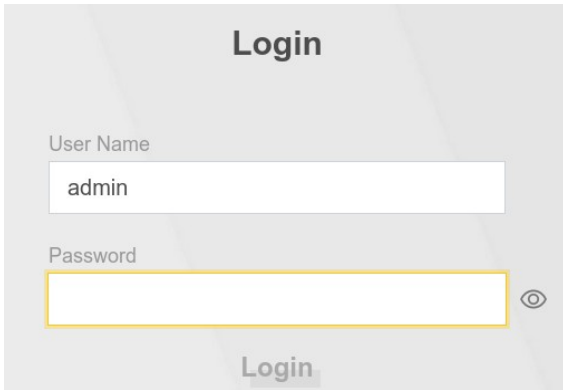
VOIP (and SIP) is very flexible and it is possible to configure other telephone schemes. Examples:

- Because SIP supports concurrent calls on one VOIP account, two telephones (one in each router socket) can have simultaneous conversations.
- Two (or more) SIP accounts from different providers can be configured and each used for different types of call. For example, one account for incoming calls and another for outgoing. Many providers have competitive rates for international calls to specific countries. Have a look at VOIP comparison sites such as www.voip-comparison.com
- Internal calls can be made from one telephone to another, and calls transferred between them.
- If you don't necessarily want to use your existing telephone instruments, you can install a "softphone" app on your smartphone to connect to a SIP service, so your calls are made from and received by it.

Appendix

Configuring the Zyxel VMG8825_B50B router

In your browser (Firefox, Chrome etc) enter “192.168.1.1” in the address bar. Follow the steps in the screenshots below.



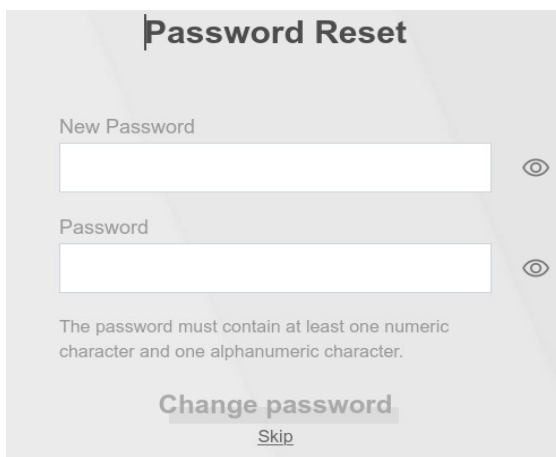
Login

User Name
admin

Password

Login

Log in using the Username and Login Password on the card attached to the router (unless previously changed).



Password Reset

New Password

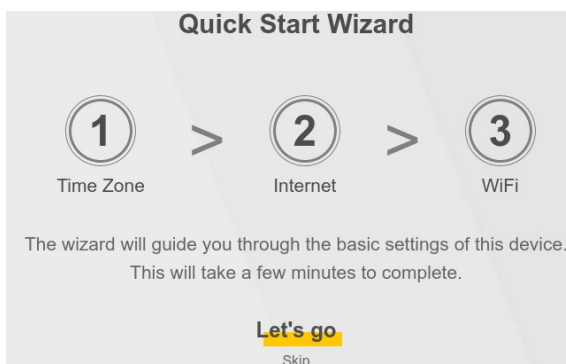
Password

The password must contain at least one numeric character and one alphanumeric character.

Change password

[Skip](#)

The first time the router is accessed it offers a password change. You can skip this or change the password, but make sure it is noted somewhere because it cannot be recovered (and a factory reset will be necessary).



Quick Start Wizard

1 > 2 > 3

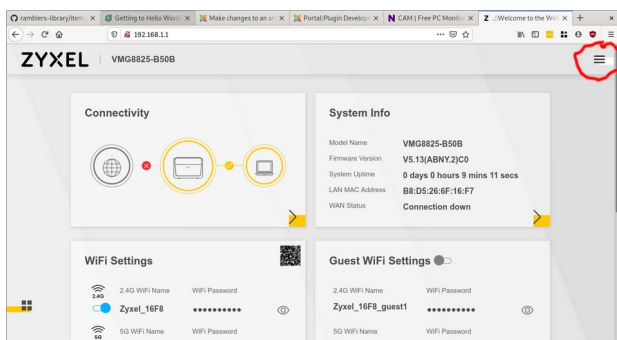
Time Zone Internet WiFi

The wizard will guide you through the basic settings of this device.
This will take a few minutes to complete.

Let's go

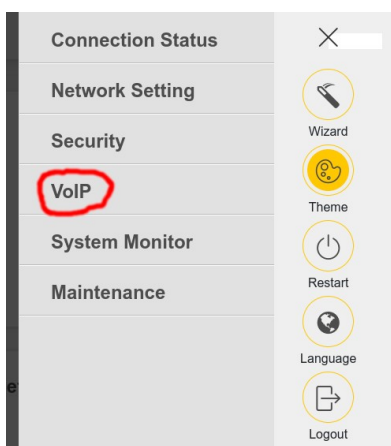
[Skip](#)

Click “Skip” to skip the Quick Start Wizard.

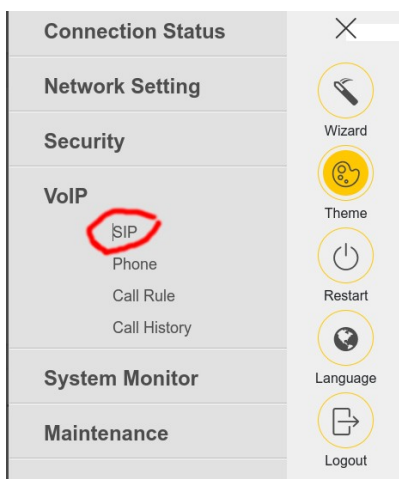


It is advisable to make a backup of the router configuration before proceeding. Click the “settings” icon top right (3 bars). Select Maintenance then Backup/Restore. Follow the instructions for backup, which will download the configuration to the download folder on your computer. You can restore from this if things go horribly wrong!

Parameters listed should be changed or set as shown.



Click the “settings” icon again (top right (3 bars)). Select VOIP.



Select SIP

SIP

SIP Account SIP Service Provider

In order to make Internet phone calls, a valid SIP account is essential. You may need to consult your SIP service provider for the following settings. This configuration should be used in conjunction with SIP Service Provider.

+ Add New Account

#	Enable	SIP Account	Service Provider	Account Number	Modify
1	Disabled	SIP1	ChangeMe	ChangeMe	
2	Disabled	SIP2	ChangeMe	ChangeMe	

Click “Modify” to change the first SIP account

SIP Account Entry Edit

SIP Account Selection
SIP Account Selection SIP1

SIP Service Provider Association
SIP Account Associated with

General
 Enable SIP Account

SIP Account Number

Authentication
Username
Password

Tick “Enable SIP Account” and enter your SIP ID in two places and SIP password (provided by Sipgate) as shown. Click OK.

SIP

SIP Account SIP Service Provider

SIP Service Provider offers services of making Internet calls using VoIP technology. You may need to consult your SIP Service Provider for the following settings. This configuration should be used in conjunction with SIP Account.

+ Add New Provider

#	SIP Service Provider Name	SIP Proxy Server Address	REGISTER Server Address	SIP Service Domain	Modify
1	ChangeMe	ChangeMe	ChangeMe	ChangeMe	

Select the “SIP Service Provider” tab, then click “Modify” on the existing Provider.

Provider Entry Edit

SIP Service Provider Selection
 Service Provider Selection: **Sipgate**

General

SIP Service Provider: Enable SIP Service Provider

SIP Service Provider Name:

SIP Local Port: (1025-65535)

SIP Proxy Server Address:

SIP Proxy Server Port: (1025-65535)

SIP REGISTRAR Server Address:

SIP REGISTRAR Server Port: (1025-65535)

SIP Service Domain:

Enable this provider and complete the fields as shown: “Sipgate” for the Provider Name and “sipgate.co.uk” for the other fields. Do not click “OK” yet; instead click the yellow rectangle to show more settings.

RFC Support

PRACK (RFC 3262, Require: 100rel)

VoIP IOP Flags

Replace dial digit '#' to '%23' in SIP messages

Remove the 'Route' header in SIP messages

Bound Interface Name

Bound Interface Name: AnyWAN MultiWAN

Outbound Proxy

Outbound Proxy Address:

Outbound Proxy Port: (1025-65535)

Use DHCP Option 120 First

RTP Port Range

Start Port: (1026-65482)

End Port: (1044-65500)

Enter “sipgate.co.uk” for the Outbound Proxy as shown. Scroll down for more options.

SRTP Support

SRTP Support

Crypto Suite: AES_CM_128_HMAC_SHA1_80 (Encrypt & Authenticate)

DTMF Mode

DTMF Mode: RFC 2833

Transport Type

Transport Type: UDP

Ignore Direct IP

Enable Disable

FAX Option

G.711 Fax Passthrough T.38 Fax Relay

QoS Tag

SIP DSCP Mark Setting: 46 (0-63)

RTP DSCP Mark Setting: 46 (0-63)

Select "RFC2833" for DTMF mode. Scroll for more options.

G.711 Fax Passthrough T.38 Fax Relay

QoS Tag

SIP DSCP Mark Setting: 46 (0-63)

RTP DSCP Mark Setting: 46 (0-63)

Timer Setting

SIP Register Expiration Duration: 600 (20-65535) second

SIP Register Fail Re-try Timer: 1800 (30-65535) second

Session Expires (SE): 900 (100-3600) second

Min-SE: 600 (90-1800) second

Dialing Interval Selection

Dialing Interval Selection: 3 second

DNS SRV

Enable DNS SRV

Cancel OK

Change the Expiration Duration to 600 as shown. Then press "OK" to save changes.

ZYXEL | VMG8825-B50B

SIP

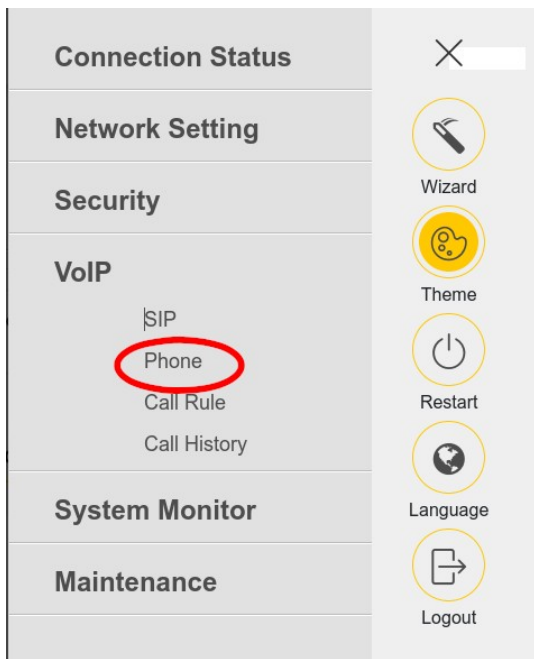
SIP Account: SIP Service Provider

SIP Service Provider offers services of making Internet calls using VoIP technology. You may need to consult your SIP Service Provider for the following settings. This configuration should be used in conjunction with SIP Account.

[Add New Provider](#)

#	SIP Service Provider Name	SIP Proxy Server Address	REGISTER Server Address	SIP Service Domain	Modify
1	Sipgate	sipgate.co.uk	sipgate.co.uk	sipgate.co.uk	

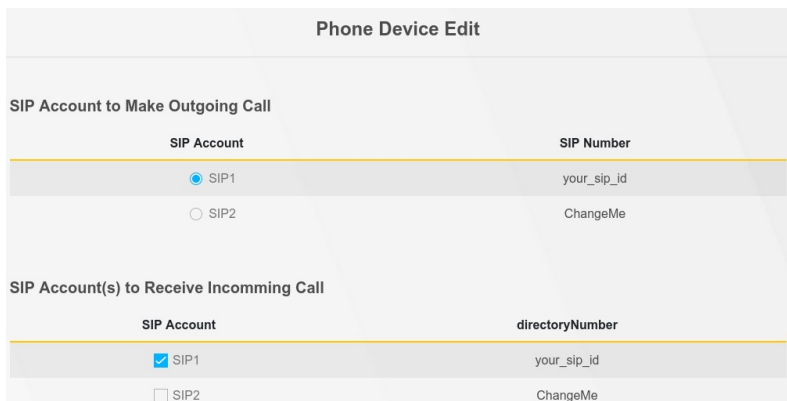
Now click the 3 bars again...



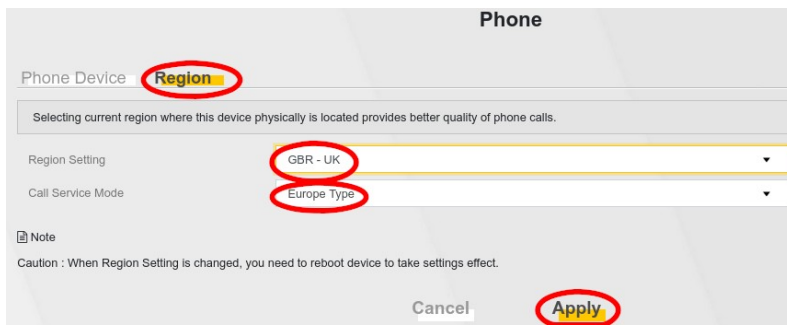
... and select "Phone"



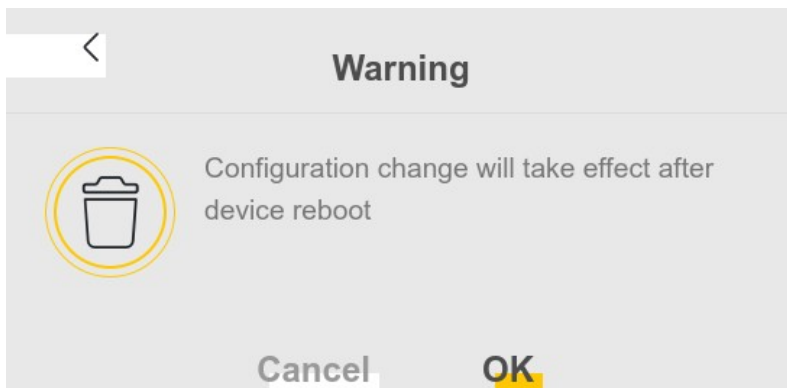
Check that your SIP ID is set for both incoming and outgoing calls on the first Phone entry (#1). If not, click "Modify" on the first phone...



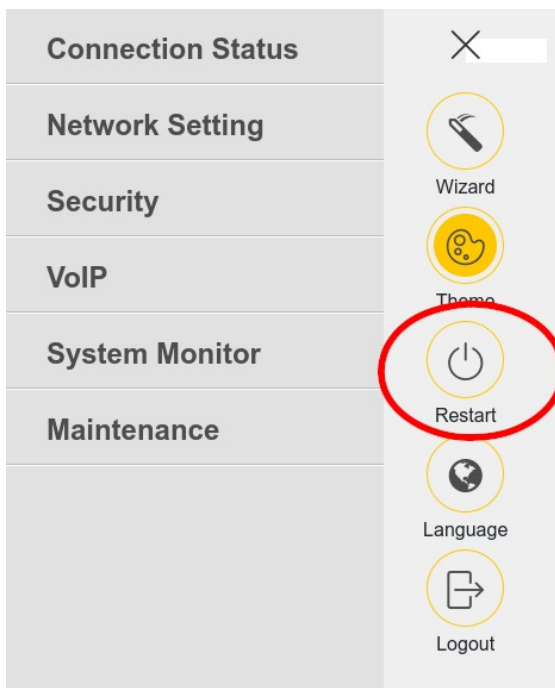
... and set SIP1 for both incoming and outgoing calls. Click OK.



Now click the “Region” tab. Choose “GBR-UK” for the Regional Setting and “Europe Type” for Call Service Mode. click “Apply”



This warning will be displayed. Click OK and you will return to the previous screen.



Finally, click the “3 bars” again and select “Restart”. This will reboot the router. Wait for the router to complete start-up. If the Sipgate account is active the router should register with the service, and the green “Phone” indicator on the router will come on. If it doesn’t, check your parameters carefully.

Summary of parameters

Table 1: Sip Account

Parameter	Value
SIP account selection	eg SIP1
Associated service provider profile	e.g. Sipgate
Enable SIP account	tick
SIP account number	SIP-ID (from Sipgate)
User name	SIP-ID (from Sipgate)
Password	SIP password (from Sipgate)

Table 2: Sip Service Provider

Parameter	Value
Service provider name	Sipgate (for example)
Enable SIP service provider	tick
SIP proxy server	sipgate.co.uk
Registrar (or Register) server	sipgate.co.uk
SIP service domain	sipgate.co.uk
Outbound proxy	sipgate.co.uk
DTMF mode	RFC2833
SIP Register Expiration Duration	600

Table 3: Phone device (usually PHONE1 for the first telephone port)

Parameter	Value
SIP Account to Make Outgoing Call	eg SIP1 (the SIP account as above)
SIP Account(s) to Receive Incoming Call	eg SIP1 (the SIP account as above)

Table 4: Phone region

Parameter	Value
Region setting	GBR-UK
Call service Mode	Europe Type

Testing

With a telephone plugged into the first telephone port:

- Dial **10000** to check successful service registration
- Dial **10005** to check call quality
- Dial **10020** to check dialling tones are set up correctly
- Call another telephone number and check conversation is possible.
- Ring your VOIP telephone number from another device (e.g. mobile phone) and check the phone rings. If it doesn't ring, it may be because an unsuitable adapter has been plugged in the telephone port; see "Connect telephone to router" on page 3. Answer the call and check conversation is possible

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