Opera 240 System Manual

Safety Notes

- **This unit should only to be opened by service personnel.**
- **There are no serviceable parts inside the housing**

Specifications are subject to change without notice.

Facilities described may or may not be supported by your network.
Opera 240 and Operafone are the registered trademark of MDS Gateways.
This documentation refers to:
software version 20.044 or higher for the IP system phones and
software version 13.111 or higher for the Opera 240 system.

DM 966 rev 13

Contents

1. Introduction

1.1. Overview of the Opera 240

The Opera 240 is a next generation IP voice switch for small and medium business applications. The full IP internal architecture of the system allows seamless connection to VoIP networks using IP system phones and traditional analogue phones. The Opera 240, depending on its configuration may also connect to the ISDN public network making it the ideal migration platform to the next generation network for the small business.

Users make or receive calls via a SIP server in the public network, or via the ISDN network, using a simple analogue phone or an Operafone IP Executive phone or an Operafone IP Professional phone or a two-wire digital system phone.

In its basic configuration, the Opera 240 connects eight analogue telephones and up to 240 IP system phones to a VoIP service provider. The control unit is a 19" rack with three slots for plug-in modules. The system capacity can be increased by adding either eight-port analogue modules, eight-port digital extension modules, four-port BRA modules or single port PRI modules.

The Operafone Executive is an advanced multi function system phone with 16 programmable keys, 6 fixed keys, full handsfree and a blue backlit 4-line display. The Operafone Executive is available in both IP and digital technologies, both having similar user interfaces.

The Operafone IP Professional is an IP multi function system phone with 6 flexible keys, full handsfree and a blue backlit 4-line display.

The Operafone Standard is a digital system phone with a single-line backlit display. It has 6 fixed keys and a loudspeaker.

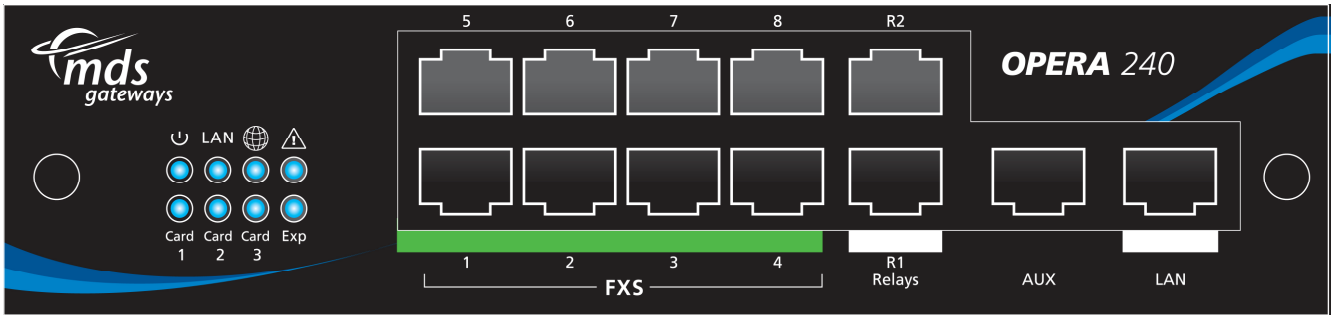
The Operafone Soft is PC or iPhone based version of the Operafone Executive, with full system phone functionality, over the LAN or WAN.

Up to two hundred and eight IP system phones may be connected locally to the Opera 240 system or remotely over broadband Internet. Remote IP system phones have full system functionality. The IP system phones have a two-port Ethernet hub, which allows a single cable to the desktop for the phone and the PC.

The Opera 240 has a full range of PBX features including voicemail, automated attendant, least cost routing, speed dials, address books and call lists. Features such as Auto-Attendant, Call Record, Conference bridge meeting room, softphone registration and networking of multiple systems on different sites require a license. Licenses can also be installed to expand the number of users on the system, the number of trunks or the number of voicemail boxes.

1.2. Status LEDs

There are eight LEDs on the fixed section of the front panel.



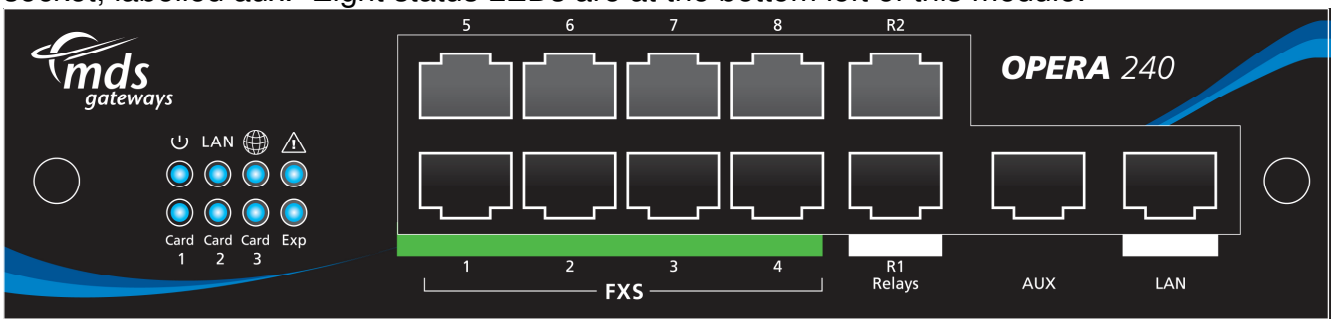
The functions of these LEDs follow.

Status	ON	OFF	Flashing
⏻	System starting	Power off	Power On. Normal operation.
LAN	LAN link present	No LAN link present	LAN activity
🌐	SIP server connection OK	SIP server connection NOT OK	One or more SIP accounts NOT OK
⚠	Fault Condition. Contact technical support	No Fault detected	N/A
Card 1	Card 1 Installed	Card 1 not installed	N/A
Card 2	Card 2 Installed	Card 2 not installed	N/A
Card 3	Card 3 Installed	Card 3 not installed	N/A
Exp	Expansion rack with at least one extn registered at the Master		Expansion rack, but no extension registered at the Master

1.3. Connectors on the basic 19” rack

The basic 19” rack accommodates up to 240 IP users; default IP extension numbers 101 to 340, and 8 FXS analogue a/b interfaces; default a/b extension numbers 333 to 340. Up to 60 SIP trunks may be provisioned.

The Fixed module is on the left of the front panel. It contains eight RJ45 sockets, numbered 1 – 8, for FXS analogue ports in a 2 * 4 configuration. To the right of the FXS sockets there are two door open relay RJ45 sockets, labelled R1 and R2, in a 2 * 1 configuration. To the right of the module are two Ethernet ports: one for connecting to the LAN and a second spare or auxiliary socket, labelled aux. Eight status LEDs are at the bottom left of this module.

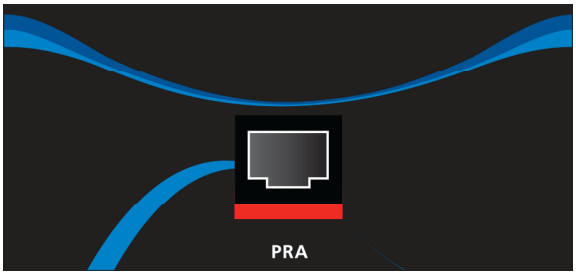


Three hardware expansion slots are located to the right of the Fixed module.

Any of the following plug-in cards may be inserted in the three universal plug-in slots.

1.4. ISDN Primary Rate Interface card

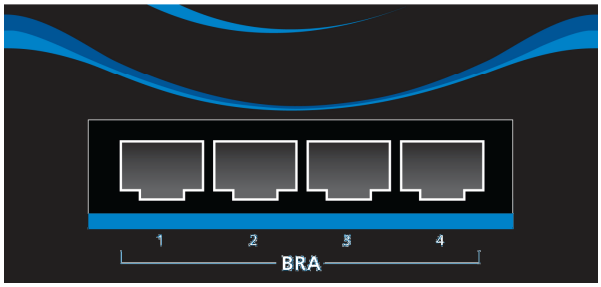
A Primary Rate Access card in the left of the 3 plug-in slots is assigned the trunk line number PR1, in the centre PR5 and on the right PR9. Licensed SIP trunks are assigned the numbers immediately above those assigned to ISDN trunks.



ISDN PRI card (max 2 cards), each with 1 PRI

1.5. ISDN2 Four-Basic Rate Access card

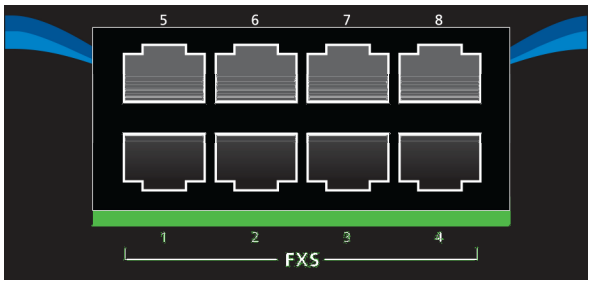
A BRA card in the left of the 3 plug-in slots is assigned the trunk line number T1 to T4, in the centre T5 to T8 and on the right T9 to T12. Licensed SIP trunks are assigned the numbers immediately above those assigned to ISDN trunks.



ISDN BRA card, with 4 x T0

1.6. Eight-FXS analogue a/b phones (pots) card

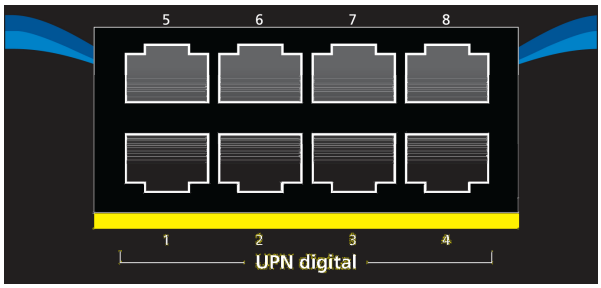
An 8 FXS analogue a/b card in the left of the 3 plug-in slots is, by default, assigned the extension numbers 101 to 108, in the centre 109 to 116 and on the right 117 to 124.



FXS Analogue POTs extensions' card, with 8 a/b

1.7. Eight-UPN digital system phones' card

An 8 UPN digital system phone card in the left of the 3 plug-in slots is, by default, assigned the extension numbers 101 to 108, in the centre 109 to 116 and on the right 117 to 124. This numbering plan can be altered in Browser programming, as described later.



UPN Digital system phones card, with 8 extensions

1.8. Features and Dialling Codes

Feature	Code
Any trunk line	0
Any SIP trunk line	*00
Trunk lines 1 to 8 (ISDN T1 to T8 in default)	* 9 1 to * 9 8
SIP trunk lines 1 to 10	* 901 to * 909, *900
Call User	User number (e.g. 101 – 340)
Groups 80 to 88	80 to 88
Operator Group	9
Auto-Attendant	700 -799
Forward all calls for user	* 2 1 * < destination > # destination examples: User number (101 – 340), Voicemail (*99), External number on any trunk (0 xxxxxxxxxx) External number using a trunk (*91 xxxxxxxxxx) Group (80 – 88), Operator Group (9), Common address book number (*4000 - *4199), Personal address number (*800 - *849), Auto-Attendant (700 -799) Networked user (network user number)
Cancel forwarding of all calls for user	# 2 1 #
Forward all calls for Group	If leader: * 2 1 * < group number > * < destination > # If not leader * 2 1 * < group number > * < destination > *< group PIN > #
Cancel forwarding of all calls for Group	If leader: # 21 * < group number > # If not leader: # 21 * < group number > * < group PIN > #
Restrict your outgoing CLI	* 30 #
Send your outgoing CLI	* 31 #
Redial Last external number	* 5
Forward on No Answer for user	* 6 1 * < destination > #
Forward on No Answer for user with timer	* 6 1 * < destination > * <timer> #
Cancel Forward on No Answer for user	# 6 1 #
Forward on No Answer for group	If leader: * 6 1 * < group number > * < destination > * # If not leader * 6 1 * < group number > * < destination > * * < group PIN > #
Forward on No Answer for group with timer	If leader: *6 1 * < group number > * < destination > * < timer > # If not leader * 6 1 * < group number > * < destination > * < timer > * < group PIN > #
Cancel Forward on No Answer for group	If leader: # 61 * < group number > # If not leader: # 61 * < group number > * < group PIN > #
Camp On (Call Back on busy) internal	5
Do Not Disturb	* 6 2 #
Cancel Do Not Disturb	# 6 2 #
Opt out of a group	* 6 2 * <group number(80 – 88)> #

Opt into a group	# 6 2 * <group number(80 – 88)> #
Set Alarm Call	* 641 * HHMM #
Clear Alarm Cal	# 641 #
Forward on Busy for user	* 6 7 * < destination > #
Cancel Forward on Busy for user	# 6 7 #
Forward on Busy for group	If leader: * 6 7 * <group number > * < destination > # If not leader * 6 7 * <group number > * < destination > * < group PIN > #
Cancel Forward on Busy for group	If leader: # 6 7 * < group number > # If not leader: # 6 7 * < group number > * < group PIN > #
Activate Roaming PIN	* 6 8 <Roaming Account> <Roaming PIN> #
Deactivate Roaming PIN	# 6 8 #
CallPickUp/CallPickOff	* 7 1 < user number >
Universal pickup	* 7 1 0
Call Transfer Explicit (at dial tone with two calls on hold)	* 7 2
Conference (at dial tone with two calls on hold)	* 7 3
Meet-me Conference bridge access	6900 - 6901
Park/Unpark a call	* 7 4
Retrieve a parked call from an internal user	* 7 5 < user number >
Answer a universal page	* 7 6 *
Answer a page from an extension that's not being paged	* 76 < user number that is being paged >
Directed page	* 7 7 < user number >
Universal page	* 7 7 *
Intercom (force handsfree answer to system phone user)	#77 < user number >
Door opening code	* 7 8
Intrude (at busy tone)	* 7 9
Access voicemail	* 9 9
Connect to a user's Mailbox	# 9 9 <user number>
Connect to a user's Mailbox (without hearing welcome message)	# 9 8 <user number>
Transfer call to Mailbox (While ringing the User)	# 9 9
Direct access to a user when answered by the Auto Attendant	* + user number
Direct access to a user voicemail when answered by the Auto Attendant	# + user number
Access voicemail settings (when pressed while listening to voicemail welcome message)	#
Programming	**Code**
Program an external number in your personal address book.	* * < 8 0 0 to 8 1 9 > * < external number > #
Erase a number from your personal address book.	# < 8 0 0 to 8 1 9 > #
Implement Ringing mode (Modes 1 to 5)	* 0 7 * <Ringing Mode > #
Set user PIN	* 70 * * NEW PIN * NEW PIN #
Clear user PIN	* 70 * CURRENT PIN #
Change user PIN	* 70 * CURRENT PIN * NEW PIN * NEW PIN #
Enter System Programming	* * * * # # # #
Play system IP Address	* * 0 1 #
Set system IP Address	* * 0 1 * xxx * xxx * xxx * xxx #
Play system subnet mask	* * 0 2 #
Set system subnet mask	* * 0 2 * xxx * xxx * xxx * xxx #
Play Gateway Address	* * 0 3 #
Set Gateway Address	* * 0 3 * xxx * xxx * xxx * xxx #

2. System Mounting, Wiring and Connection on the LAN

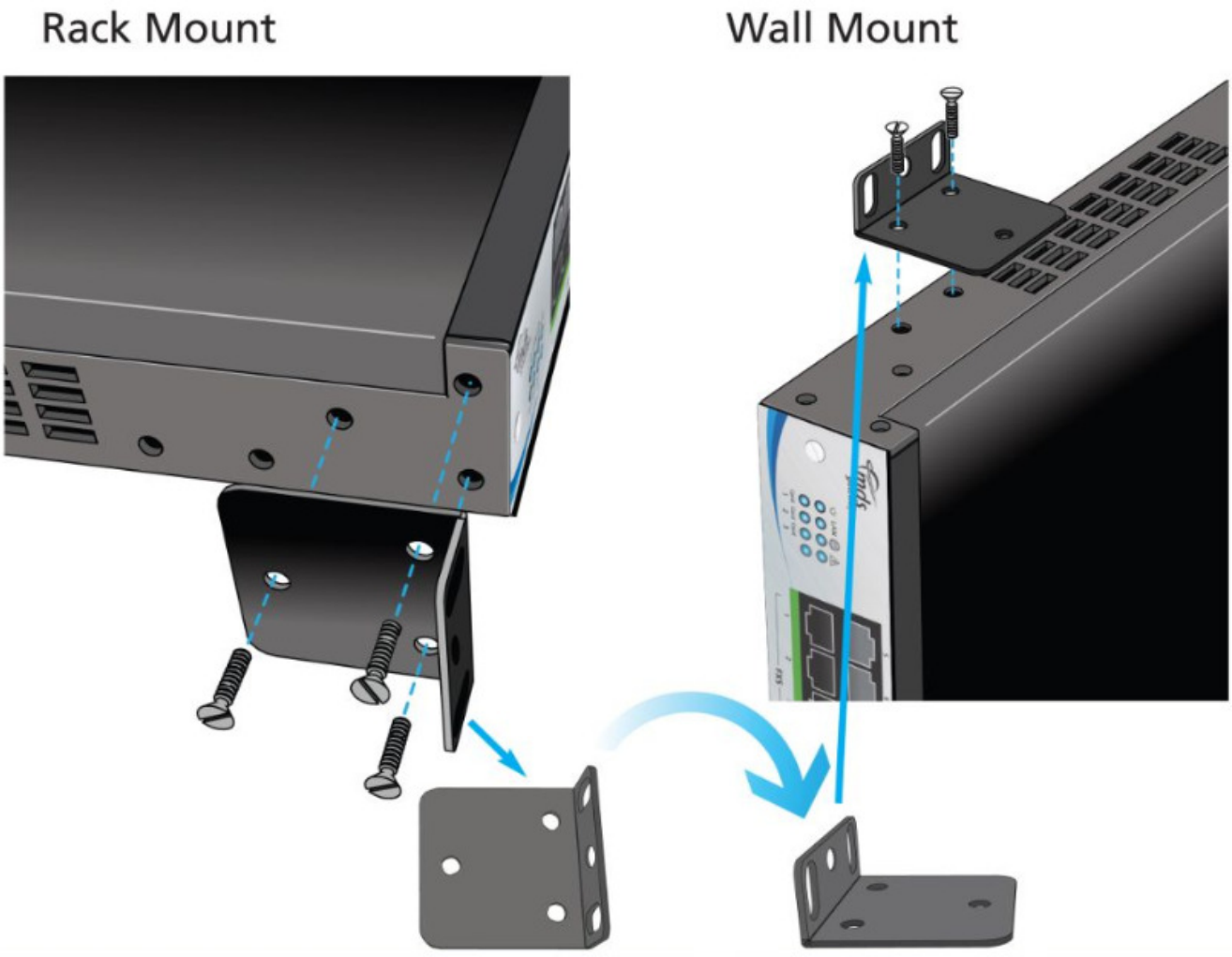
2.1. Sequence required for installation

It is important to follow the sequence in this manual of first verifying the compatibility of the system IP address with the range of the LAN and then connecting the system on the LAN, then accessing the system browser for configuration, then getting Internet access and only then connecting the IP system phones to the LAN.
See also the 3-step set-up flow chart in this manual.

2.2. Rack mounted control unit

The Opera 240 is designed for rack or wall mounting. The air-cooling slots must not be covered.

CAT-5 cable is required to connect to the router or LAN.
RJ 45 cables are required for the analogue users, relays and line connections



2.3. Wall Mounting the Opera 240

Find a location that is:

- Easily accessible and within 2 meters of the nearest available power point
- Isolated from plumbing or electrical wiring
- Not exposed to extremes of temperature, humidity, dust, chemicals or direct sunlight
- Sufficiently spacious and well-lit to allow you to wire the system

Equipment required for wall mounting the system:

- Four screws and rawl plugs suitable for the material to be drilled
- Drill and chuck-key
- Drill bit and flathead screwdriver
- CAT-5 cable to connect to the router or LAN.
- RJ 45 cables for the analogue users, relays and line connections

1. Unscrew the rack-mounting brackets at each side, rotate through 90 degrees and screw them back in that position, using two of the screws at each side.
2. Place the Opera 240 unit, with the brackets in their wall-mounting positions, parallel to the wall, with the fixed module to the top and the connectors facing to the left. Mark the positions of the fixing holes at either side.
3. Drill the holes in the positions marked, insert rawl plugs
4. Fix the unit parallel to the wall by inserting two screws in each of the brackets above and below the unit.

The system is now ready for wiring.

2.4. System Wiring

Connecting the Ethernet Port
Connect the Ethernet LAN port of the Opera 240 to the LAN connection point using a CAT-5 Ethernet cable. The Ethernet port is compatible with any 10/100BaseT Ethernet switch.

Analogue Users 1 – 8
Plug the analogue telephones directly into the RJ45 analogue user ports at the face plate of the **Opera 240**. The maximum analogue user line length is 1,000 metres.

Connecting ISDN lines
Connect the line ports 1 to 4 of any 4-BRA ISDN2 expansion cards on the Opera 240 to the ISDN termination points using RJ45 line cables. Alternatively use the RJ45 socket on one or two plug-in Primary Rate Access cards.

Connecting the relay
Connect the relay port of the Opera 240 to the door phone using RJ45 cable, if required.

Powering Up
Connect the AC mains power cable from the back of the unit to the AC power supply using the cable provided.

2.5. Three step IP Set-up flow chart

What you need to know before you start:
1. The IP address range of the LAN.
2. The IP address of the Router on the LAN.
3. Does you Router Support UPnP and is it enabled?

STEP 1. Power the Opera system up

The LEDs flash during the initiation sequence and finally just the power LED flashes.

The system has a default IP address of 192.168.1.250 and mask of 255.255.255.0 Is this ok for you?

No

Change the IP address of the system

To hear the systems current IP address or Subnet mask.
1. Plug an analogue phone into one of the analogue ports
2. Dial ****01#** for the IP address or ****02#** for the Subnet mask. 3. The system will call out the current setting.

To change the systems current IP address or Subnet mask.
*1. Dial ****01*DDD*DDD*DDD*DDD#** for the IP address or ****02*DDD*DDD*DDD*DDD#** for the Subnet mask, where DDD represents the elements of the IP address or subnet mask, i.e. dial **01*192*168*0*100# to set the IP address to 192.168.0.100 or **02*255*255*255*254# to set the subnet mask to 255.255.255.254*

Yes

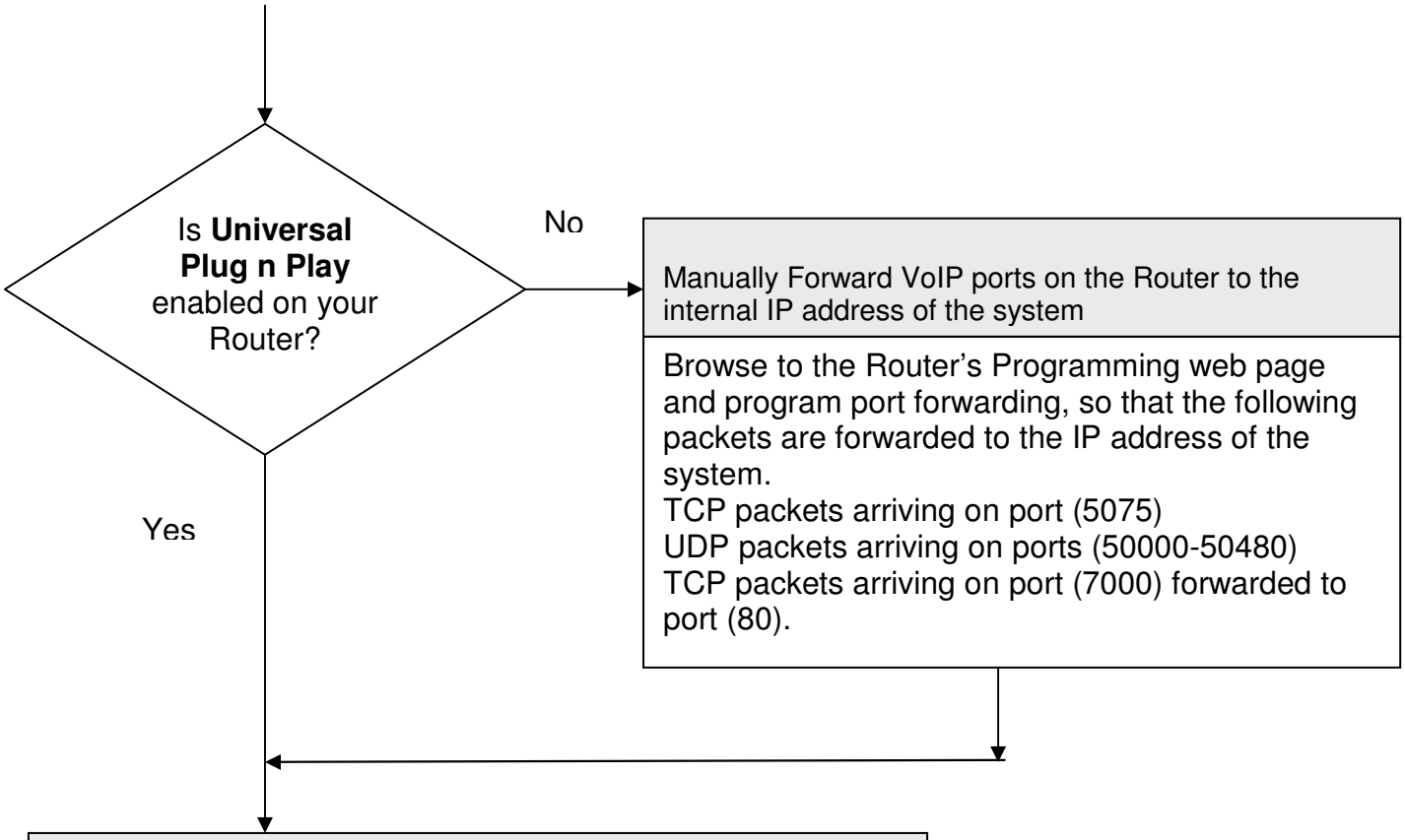
The system has default Gateway IP address **192.168.1.254**. Is this ok for you?

No

Change the Gateway IP address of the system

Plug the system into the LAN, Point a PC browser at the systems IP address. (default http://192.168.1.250)
User name: admin
Password: 1000
Click on the link **IP Addresses** in the **IP Settings** panel.
Enter your gateway IP address in the **Default Gateway** field, and click save.

Yes



STEP 2. Connect the IP system phones to the LAN

The IP system phones request an IP address from the DHCP server in the router. (**Note**: If DHCP is not enabled in the router, you need to manually set the local IP address in each Phone; see phone installation guide for this).
The phone then **Auto-discovers** the system and is assigned an IP registration name and an IP registration PIN along with the WAN (public) IP address of the router.
That's it. Your IP system phone should now be connected to the Opera system and be able to make and receive calls

STEP 3. If you wish to use your IP system phone at a remote location

Just take the IP system phone home and connect it to you home LAN. The IP system phone will request an IP address from the DHCP server in your router. (**Note**: If DHCP is not enabled in the router, you will need to manually set the local IP address in the Phone: depress Menus key for 10 seconds, then scroll to Local IP Params/Change IP Address.) Once it has a Local IP address, the phone will then connect back to the system over the Internet.

2.6. Program the IP address of the system into the range of the LAN

The default IP address of the Opera 240 is 192.168.1.250.

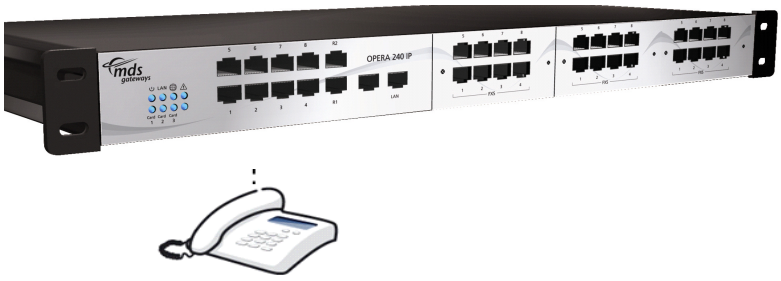
The IP address of the system must be in the range of the LAN to which it's connected. The system does not have either a DHCP client nor a DHCP server, to minimise potential for conflicts.

If for example the LAN range is VVV.XXX.YYY.ZZZ, the first three elements of the IP address of the system must be altered to VVV.XXX.YYY and the last element must be taken from the range 1-255, but excluding those numbers at which devices are already connected.

The IP address of the system can be changed in a number of ways.

2.5.1. Change the IP address of the system using an analogue phone

Connect an analogue phone to one of the analogue ports of the Opera 240.



At internal dial tone, dial **01# and the Opera 240 system will announce its internal IP address.

Enter new IP Address into the Opera 240:

Internal Dial Tone	*	*	0	1	*	D	D	D	*	D	D	D	*	D	D

D	*	D	D	D	#	☺	**System will set new IP Address**

where each 'DDD' represents one element of the IP address.
Dial '**01*192*168*000*001#' to assign the system the IP address 192.168.0.1.

☺	Smiley face indicates successful programming tone. You will get this tone after you have successfully programmed an option. At this tone, you should clear down.

Enter Subnet Mask:

Internal Dial Tone	*	*	0	2	*	D	D	D	*	D	D	D	*	D

D	D	*	D	D	D	#	☺	**System will set Subnet Mask**

where each ‘DDD’ represents one element of the subnet mask.
Dial ‘**02*255*255*255*254#’ to assign the mask 255.255.255.254.

Check Local IP Address:

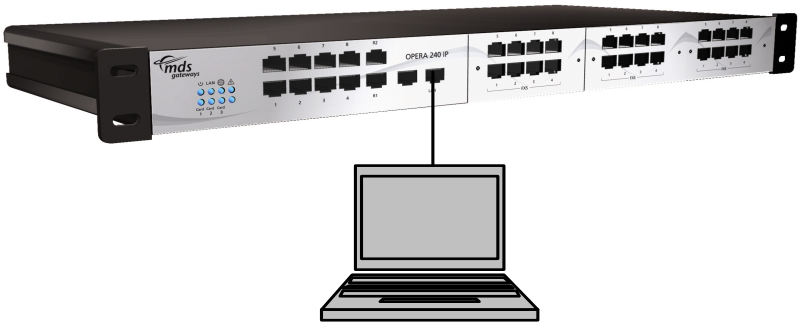
Internal Dial Tone	*	*	0	1	#	**System will read out Local IP Address**

Check Subnet Mask:

Internal Dial Tone	*	*	0	2	#	**System will read out Subnet Mask**

2.5.2. Change the IP address of the system using a PC

Connect a PC directly to the LAN port of the system using an Ethernet cable.



- Configure the IP address of the PC in the same address range as the Opera 240 system, default address 192.168.1.250. The first three elements of the IP address of the PC must be 192.168.1 and the last element must be taken from the range 1-255, but excluding 250.
- Open a browser on the PC and point it at the the Opera 240 system default address 192.168.1.250.
- Login to the system with the username ‘admin’and the password ‘1000’.
- Click on the link ‘IP Adresses’ in the section ‘IP settings’, change the IP address of the system and press ‘Save’ .

IP Connection Testing

To check that the IP configuration is correct and both the PC and the Opera 240 are on the same network -

At the PC, from Windows -

- Go to <**Start**>
- Select <**Run**>

A window prompting the user to open a program will appear -

- Type "**command**" (or "**cmd**" in some cases for Windows 2000) in the white field. The MS-DOS window opens with the following prompt - **C:_**
- Type "**ipconfig**" at the cursor.

The details of the IP configuration of the PC will appear on the window - e.g.

Windows IP Configuration -

IP Address **192.168.1.251**
Subnet Mask **255.255.255.0**
Default Gateway **192.168.1.254**

Make sure that the configuration that appears on your PC is correct.

In order to test the IP connection between the PC and the Opera 240, type "**ping**", followed by the IP address of the Opera 240. To test for the example shown above, type -

Ping 192.168.1.250

The PC will ping the system with 32 bytes of data and report the results. If the IP connection is correct, the results should state -

Packets: Sent=4, Received=4, Lost=0 (0% Lost).

If the IP connection is incorrect, check again that the system and the PC are in the same IP address range and that the cabling connections are correct.

Safety Notes

- **This unit should only to be opened by service personnel.**
- **There are no serviceable parts inside the housing**

3. Configure the system from the Browser

3.1. Browser based programming

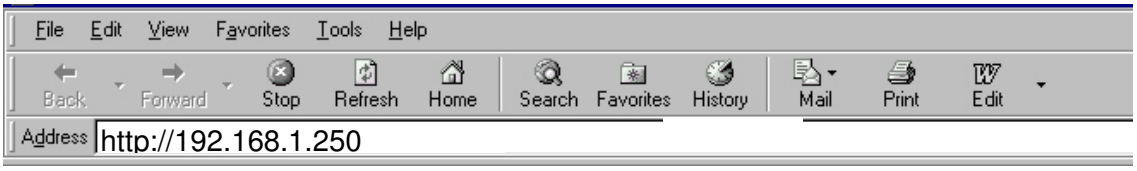
This section describes how to connect to the Browser interface on the Opera 240 and enter the basic configuration information needed for the operation of the system. Once you have successfully connected to the browser, the full range of features offered by the system can be programmed. The browser interface also allows a software upgrade either locally by uploading it from a PC or remotely by requesting it from a remote management server.

There is a **Help** Button on each feature-programming page. On clicking the Help button, the Help page appears on screen giving an explanation of the feature and indicating how to program the feature.

Programming is carried out using any standard Internet Browser on a PC connected to the system either directly on the Ethernet Port or through a Local Area Network (LAN).

3.2. Enter Browser Based System Programming

To use Browser Based Programming, the system and the PC must be on the same network with an IP connection established between them as described above.



Open the Internet Browser and type the IP address of the system.
The default address is: http://192.168.1.250

The IP address of the system can be checked as described in section 2 above.

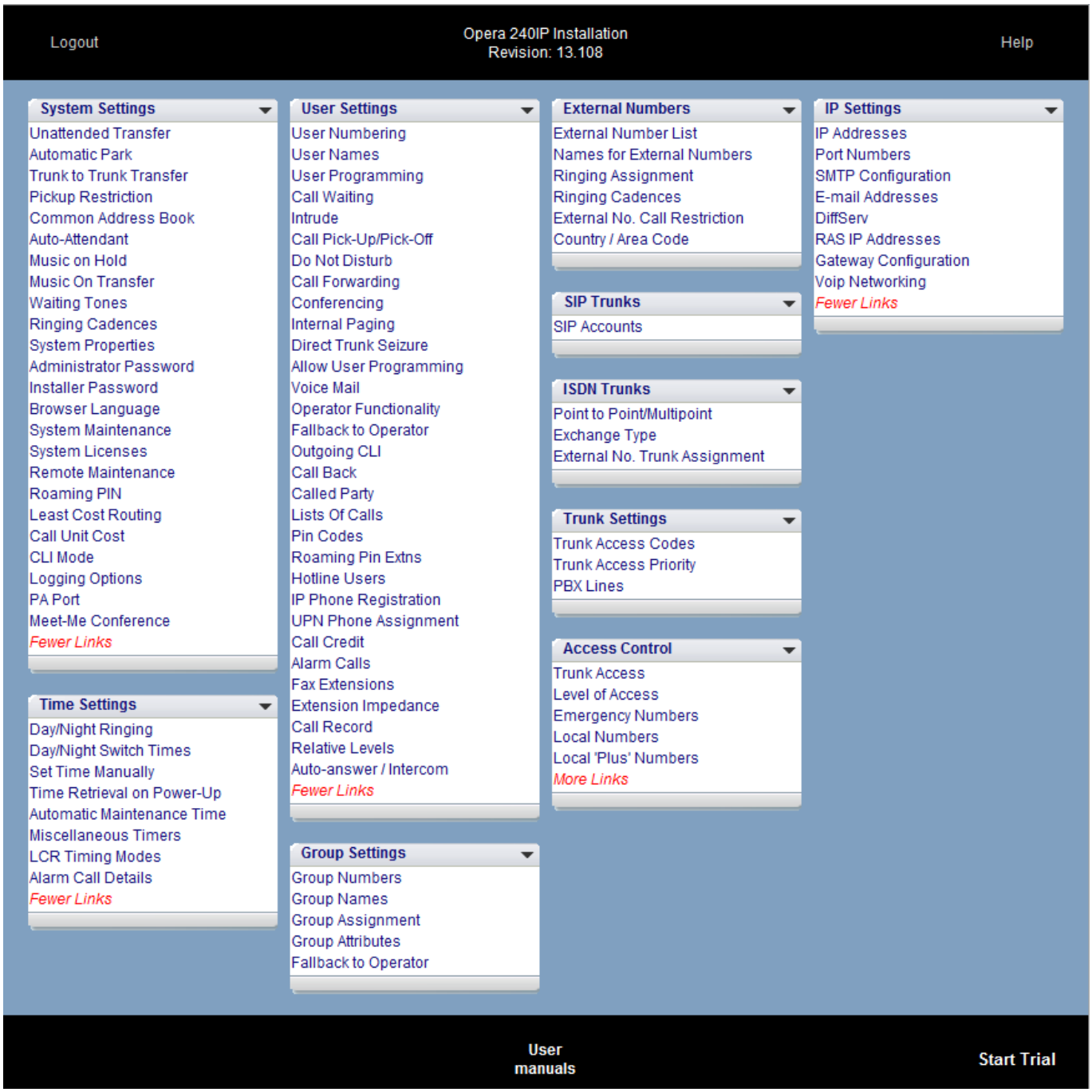
Once the IP connection is established, the following login page will be displayed:

Enter:
Username: admin
Password: 1000

The main configuration page, the system programming page, is displayed.

3.3. System Programming Page

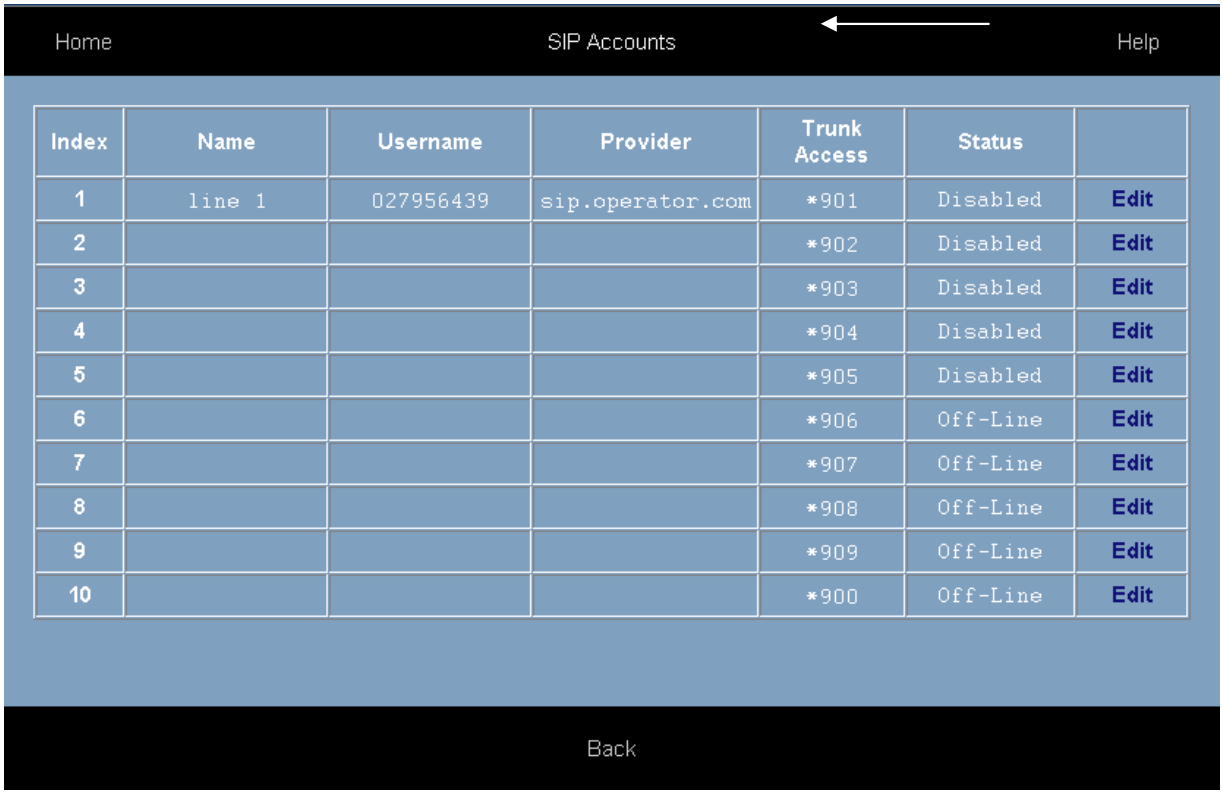
Following login, the main configuration screen, similar to that shown below, is displayed. This shows a list of links for all the programmable settings for the system, divided into related groups for ease of programming.



Clicking on any one of these links will open the configuration page for that parameter.

3.4. Manual Programming of the SIP trunk lines

The VoIP trunk lines of the Opera 240 may be configured automatically by the network operator. However, should you need to programme the trunks manually, you can do so by clicking the link 'SIP Accounts' under the heading SIP Trunks. The following page will be displayed:



Index	Name	Username	Provider	Trunk Access	Status	
1	line 1	027956439	sip.operator.com	*901	Disabled	Edit
2				*902	Disabled	Edit
3				*903	Disabled	Edit
4				*904	Disabled	Edit
5				*905	Disabled	Edit
6				*906	Off-Line	Edit
7				*907	Off-Line	Edit
8				*908	Off-Line	Edit
9				*909	Off-Line	Edit
10				*900	Off-Line	Edit

This page is used to display the status and parameters of the SIP external lines, which connect to the Voice over IP public network. Each telephone number corresponds to an account on the public VoIP network. Each account has a user name and password. These details are provided by the operator of the network.

The parameters of the SIP accounts are displayed here. Press the 'edit' button to configure. The following parameters are displayed.

NAME: The Opera 240 may allocate a name to each SIP account.

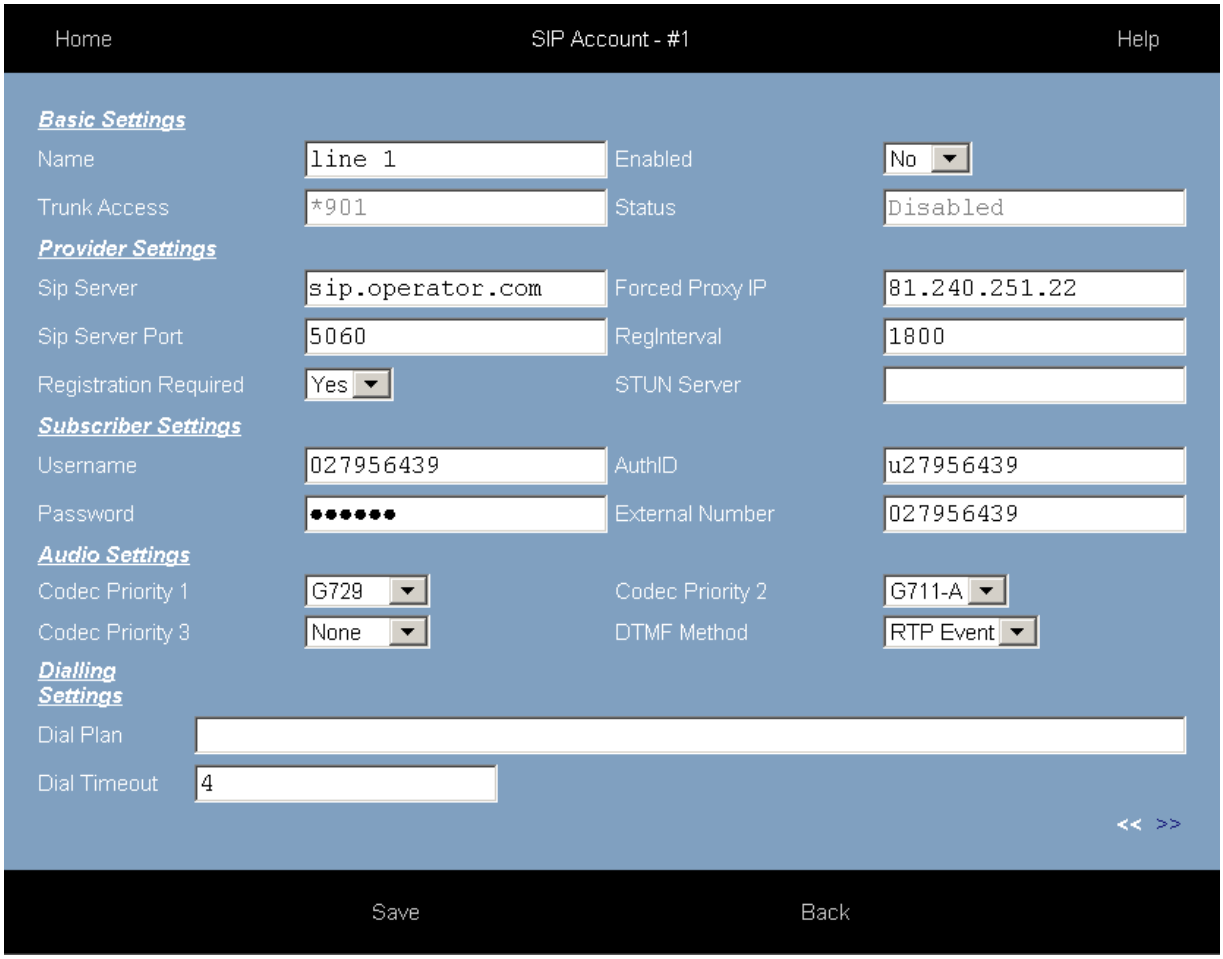
USERNAME: This is the username defined by the network operator for this SIP account.

PROVIDER: This is location of the SIP server as defined by the network operator. Typically it is in the format sip.operator.com.

TRUNK ACCESS: This is the line access code for this trunk. The user on an outgoing call may select this particular trunk by dialling the line access code prior to dialling the external number.

STATUS: Indicates whether the SIP account is operational or not.

Click on the ‘Edit’ button on the first line of this table. The following page will be displayed:



This page is used to configure the SIP external lines that connect to the Voice over IP Operator network. Each SIP trunk requires an account on the Operator network. The network operator provides the details of this account.

The parameters of the SIP trunk are altered or edited on this page. The following parameters may be configured:

Basic Settings

NAME: The Opera 240 system can allocate a name to each SIP trunk line.

TRUNK ACCESS: This is the line access code for the trunk. The user, on an outgoing call, may select a particular trunk by dialling the trunk access code prior to dialling the external number.

ENABLED: The line may be enabled or disabled here.

STATUS: Indicates whether the SIP trunk is operational or not.

Provider Settings

SIP SERVER: The location of the SIP server in the Operator's network. The Operator provides this information. Typically it will be in the format sip.operator.com.

SIP SERVER PORT: This is the PORT number for the SIP protocol. By default it is 5060. If the operator uses a different port number it should be entered here.

REGISTRATION REQUIRED: Is registration required by the network operator or not?

FORCED PROXY IP: The actual SIP server IP address must be entered here if it's different from the IP address associated with the SIP server URL. The SIP operator may insist that all SIP messages are relayed to the forced proxy IP address entered here; the SIP server URL is included in the SIP messages from the system.

REGINTERVAL: The SIP protocol allows for periodic registration messages to be sent to the SIP server in order to keep it updated it on the status of the SIP client. The parameter RegInterval allows the system administrator to program the length of the registration interval in seconds.

STUN SERVER: Some operators require the use of a STUN server (Simple Traversal of UDP through NATS). If the operator provides the address of a STUN server with the account details, it should be entered here.

Subscriber Settings

USERNAME: This is the username provided by the network operator for the SIP account.

PASSWORD: This is the password provided by the network operator for the SIP account.

AuthID: Authorisation ID, if required, is provided by the network operator.

EXTERNAL NUMBER: This is the public telephone number associated with this SIP account. It is provided by the network operator and should be entered here. It is then added automatically to the list of external telephone numbers of the system.

Audio Settings

Codec priority 1,2,3: These fields are used to set the preferred audio codecs.

DTMF Method: This parameter allows the system administrator to select the method of transmitting DTMF digits across the VoIP network.

Dialling Settings

DIAL PLAN: During dialling on outgoing calls, the digits are stored until the complete number has been dialled and then the complete number is transmitted en bloc to the VoIP network. A period of three seconds without dialling is interpreted by the system as the end of dialling. This means that the system must delay transmitting the number for a period of 3 seconds after the end of the last digit. The Dial Plan allows the system administrator to define number types that can be dialled immediately without waiting for the 3-second period to elapse.

For example, the entry

[2-8]XXXXXX=,08[567]XXXXXXX=,999=,911=

will be interpreted by the system as follows:

Any number with first digit 2,3,4,5,6,7 or 8 followed by six digits may be dialled immediately and

Any number beginning with 08 and whose third digit is 5,6 or 7 followed by seven digits may be dialled immediately and

The number 999 may be dialled immediately and

The number 911 may be dialled immediately.

DIAL TIMEOUT: This is a pre-defined period without dialling which is interpreted as the end of dialling. The default is 3 seconds and this may be changed here by specifying an alternative value.

Click [SAVE] to accept new settings.

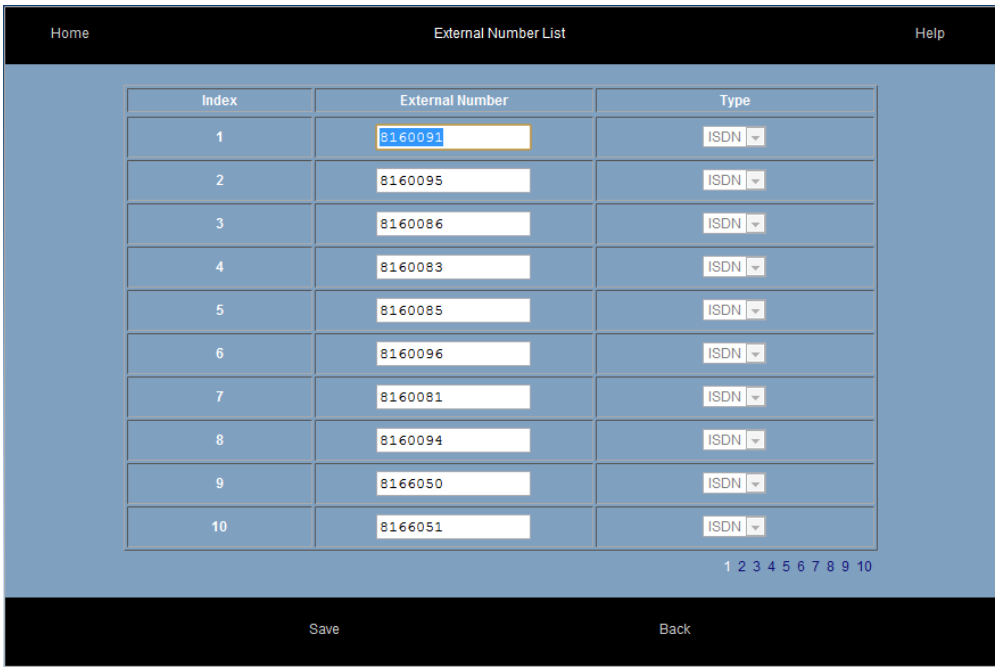
The double arrows << and >> at the bottom of the page may be used to jump forward or back to the next SIP account.

Click [BACK] to return to the SIP Accounts menu.

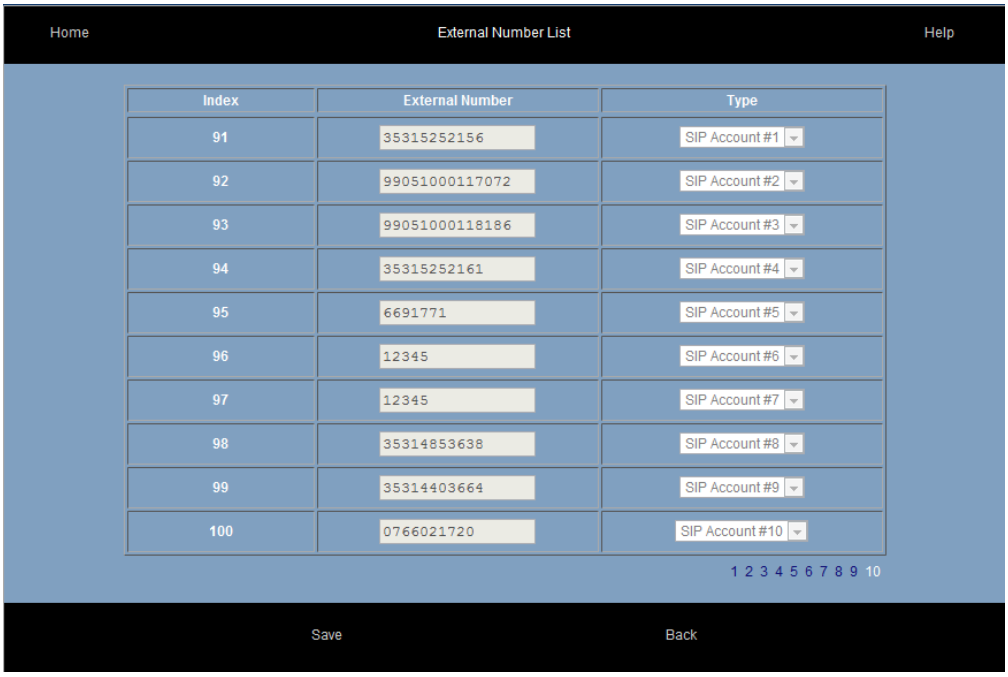
3.5. Programming the External Lines

The Opera 240 may have up to 2 ISDN Primary Rate Accesses, up to 12 ISDN2 Basic Rate Accesses or up to 60 SIP trunks, or combinations of the above, with an upper limit of 60 outside channels. The ISDN lines connect to the ISDN interface modules described earlier, while SIP trunks are configured using the registration information from the provider, as described earlier.

When ISDN2 basic access trunks are connected, you must program the ISDN telephone numbers associated with each T0 interface into the Opera system. These numbers are entered on the 'External Number List' as shown below.

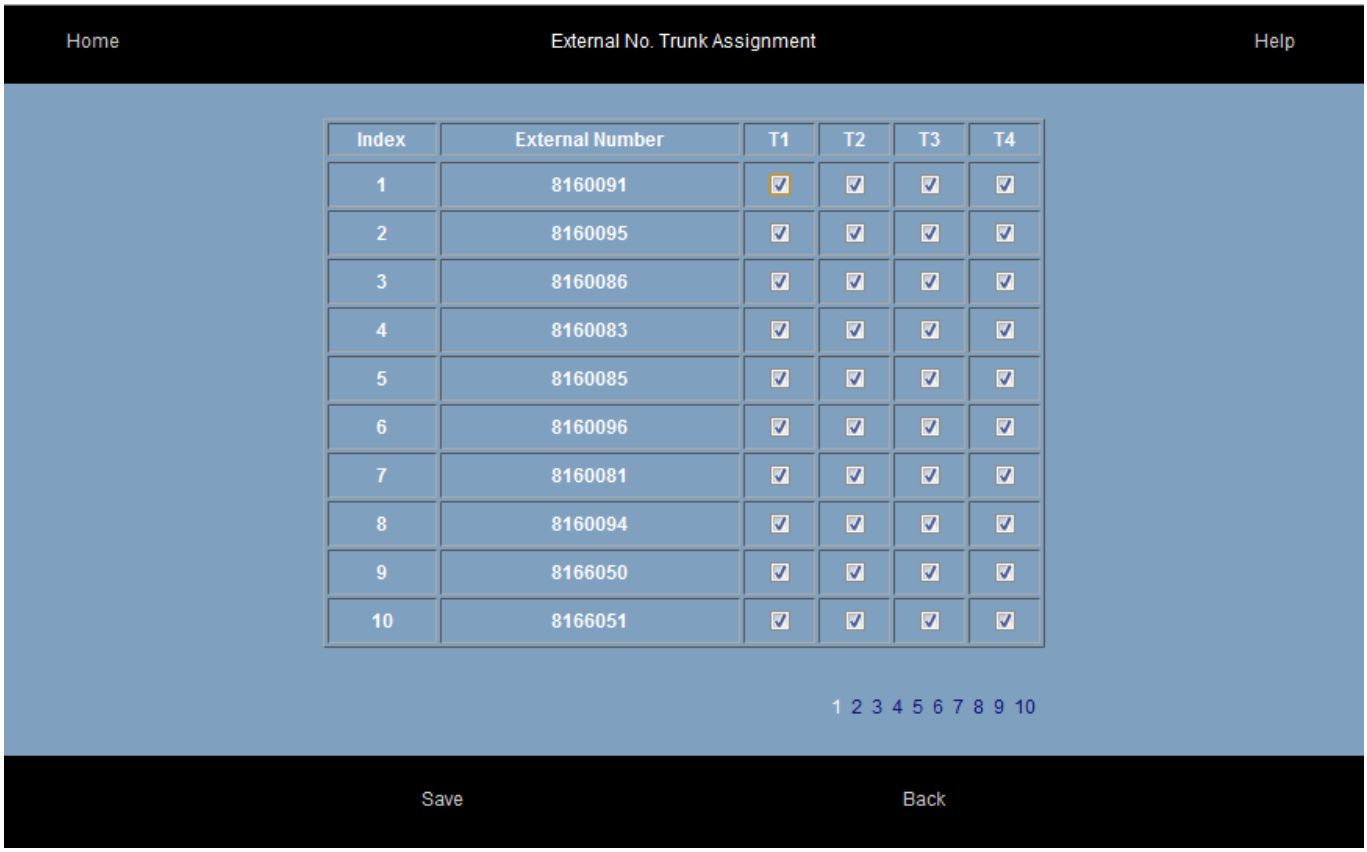


Similarly for the SIP trunk numbers associated with each of the SIP accounts:



When the external numbers have been entered in the white boxes, press 'Save' and 'Back'.

ISDN2 BRA external numbers must be associated with one of the T0 trunk line interfaces on the ‘External No. Trunk assignment’ page, under ‘ISDN Trunks’ as shown below. This enables outgoing ISDN calls present a CLI that is recognised as a valid number for the Trunk interface at the ISDN network.



For each external number, tick the ISDN T interface associated with this number and press ‘Save’.

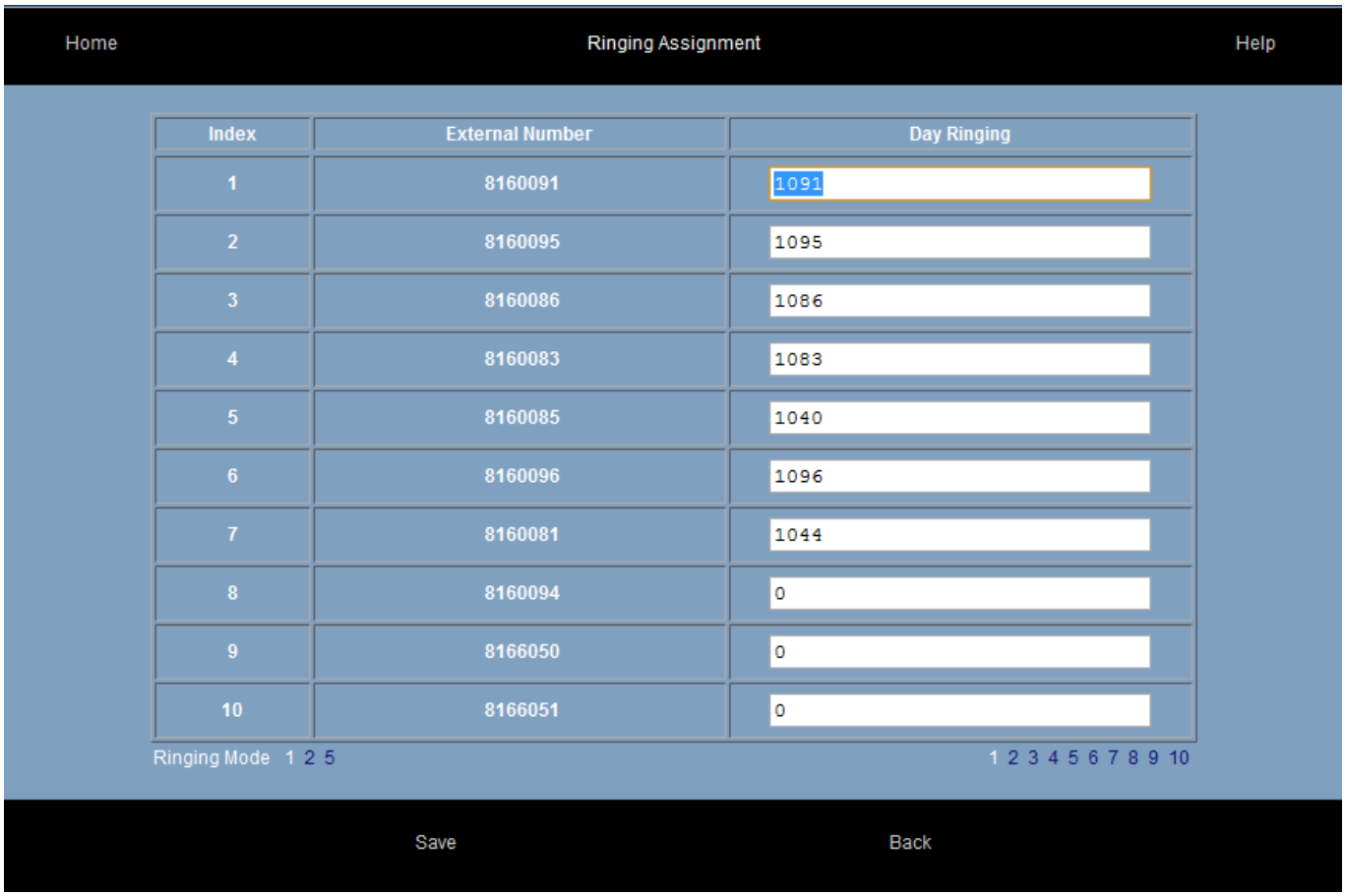
3.6. Programming the Ringing Assignment

Each external telephone number connected to the Opera 240 may be programmed to ring a different user or set of users on incoming calls. The SIP trunk assignment is done on the 'Ringing assignment' page in the section 'External Numbers'. The ISDN ringing assignment is done on the 'Ringing Assignment' page under 'External Numbers'. The ringing assignment may be changed for different times of the day. By default, three ringing modes are defined, 'Day ringing' and 'Night ringing' and Operator Mode and there are two additional modes that can be defined by the user.

By default, all external lines are programmed to ring the first IP user, e.g. 101, of the Opera 240. This user, in the default configuration, is defined as sole member of the operator group, group 9.

This ringing assignment can be changed by typing the users or groups or Auto-Attendant message to be called when an incoming call arrives on a particular line, as shown below and pressing the SAVE button.

You may proceed to program another ringing mode by clicking on the numbered link below the table on the left.



3.7. Programming the Trunk Access digits

The trunk line access digits are dialled by a user to make a call on an external trunk. In addition to the default trunk line access code, nineteen other codes may be allocated to the various external lines using the table below.

Trunk Access Codes

In the example shown below, T1 to0 T4 are ISDN2 Basic Rate Accesses and IP13 to IP22 are SIP trunks.

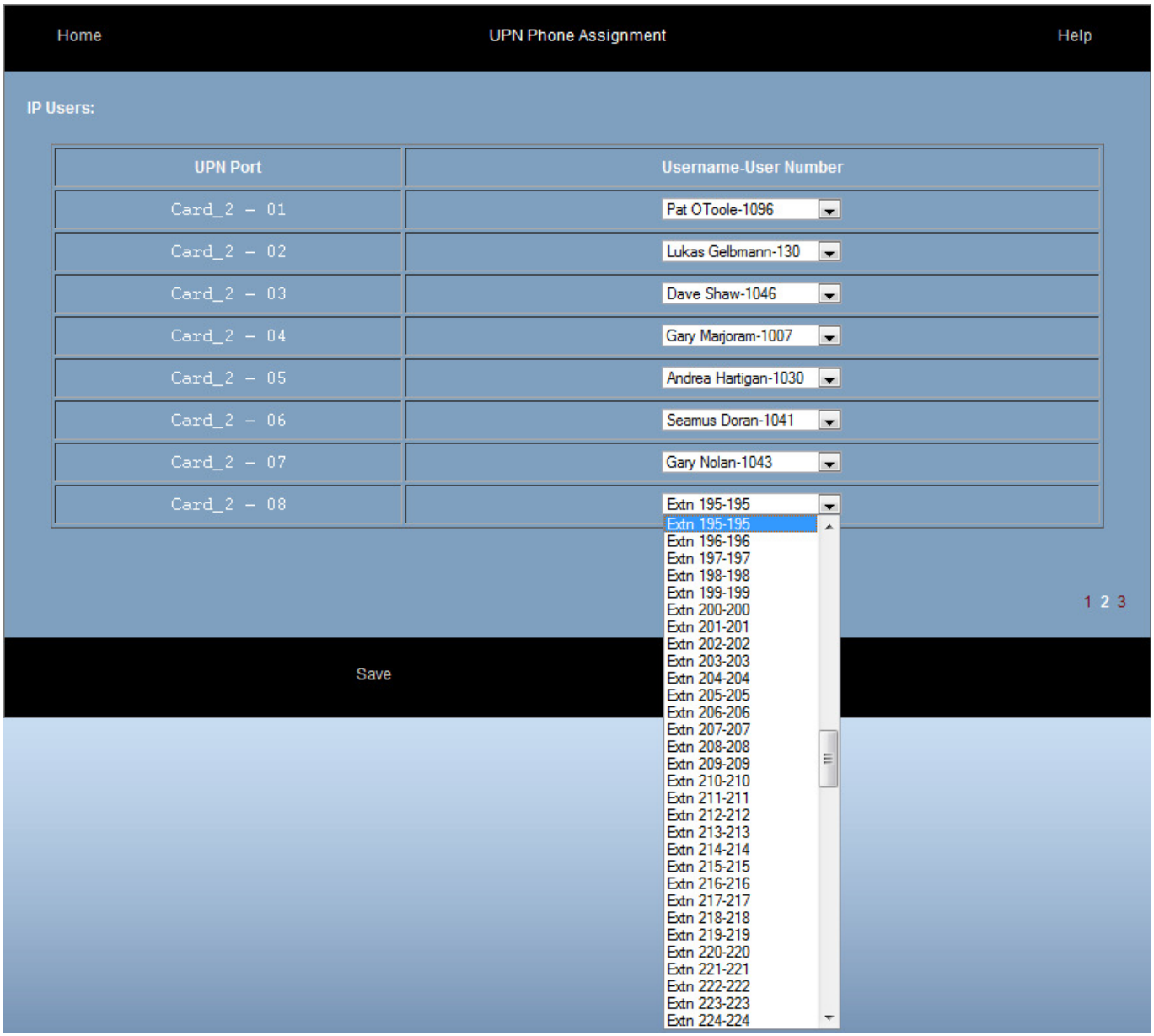
Dialling the digit 0 will select any trunk line.

Dialling *91 will select the ISDN2 basic access T1.
Dialling *92 will select the ISDN2 basic access T2.
Dialling *93 will select the ISDN2 basic access T3.
Dialling *94 will select the ISDN2 basic access T4.
Dialling *95 will select the SIP trunk IP13.
Dialling *96 will select the SIP trunk IP14.
Dialling *97 will select the SIP trunk IP15.
Dialling *98 will select any of the ISDN2 basic accesses, T1 to T4.

Click on the digit 2 at the bottom right hand side of the blue area for the second sheet, with 11 further codes boxes.

3.8. Renumbering the UPN digital extensions

An 8 Upn digital system phone card in the left of the 3 plug-in slots is, by default, assigned the extension numbers 101 to 108, in the centre 109 to 116 and on the right 117 to 124.



The 3 available slots for UPN cards are selectable on the lower right hand corner of the UPN Phone Assignment page. Each of the 8 available UPN ports on the card inserted in slot 2, in the example above, offers a drop-down menu of extension user numbers, as entered in the User Numbering page.

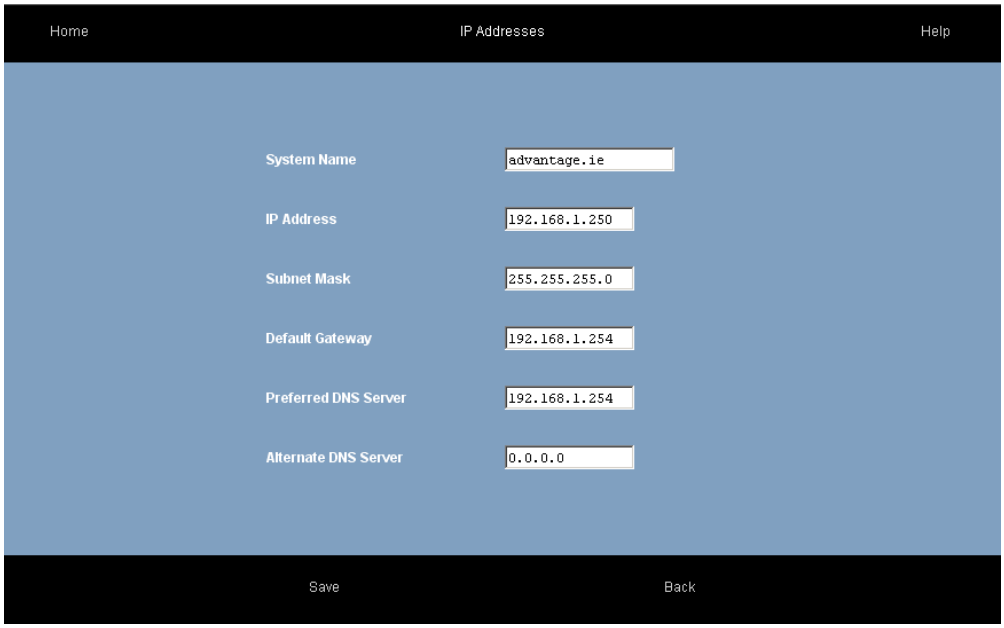
3.9. Program other features using on-line Help

Program all other features of the Opera 240 by clicking on the feature on the System Programming page and following the instructions in the comprehensive online Help available on every page.

4. Get Internet Access

4.1. Universal Plug and Play (UPnP) available on site

When the Opera system is powered up it broadcasts a Universal Plug and Play (UPnP) request to the Default Gateway address programmed in its IP Addresses table.



If the Opera system gets a positive response at the programmed Default Gateway address (default 192.168.1.254), it sets port forwarding at the Gateway, based on the settings in the Gateway Configuration page (see below). It also queries the Gateway for its WAN IP address (public IP address).

By default the Opera system implements port forwarding of UDP packets on ports 50000 to 50479 from the Gateway to the local IP address of the Opera system. Similarly, it implements port forwarding from the Gateway for TCP packets on port 5075. It also forwards port 7000 to port 80 on the Opera system to allow remote browser access.

Note: For security, remote access to the Opera system browser is restricted to only those public IP address listed in the RAS IP addresses table.

4.2. If the modem router is not at the default Gateway IP address

If the default local IP address of the modem router has been altered from 192.168.1.254, the Opera system must be manually programmed with the IP address of the Default Gateway (i.e. the router) for Internet access. The local Default Gateway IP address is entered on the IP Settings browser page. This allows the Opera system to direct outgoing traffic to the correct Internet gateway. The Gateway Configuration page is updated automatically to display the Local IP Address entered (192.0.0.229 in the screen example shown above).

4.3. Manual port forwarding, if the modem router does not support UPnP

If the SIP ports of the modem router are not open by default and it does not support UPnP, the appropriate WAN ports on the modem router Gateway must be forwarded manually by accessing the modem router Gateway browser programming as per the example in the Appendices.

UDP packets, typically on WAN ports 50000 to 50479 of the Gateway, should be forwarded to the local IP address of the Opera system and also TCP packets on port 5075 and packets on browser port 7000 on the Gateway should be forwarded to the Opera system port 80.

It may well be necessary to lower the level of Firewall protection, as described in Step 2 of the example in the Appendices.

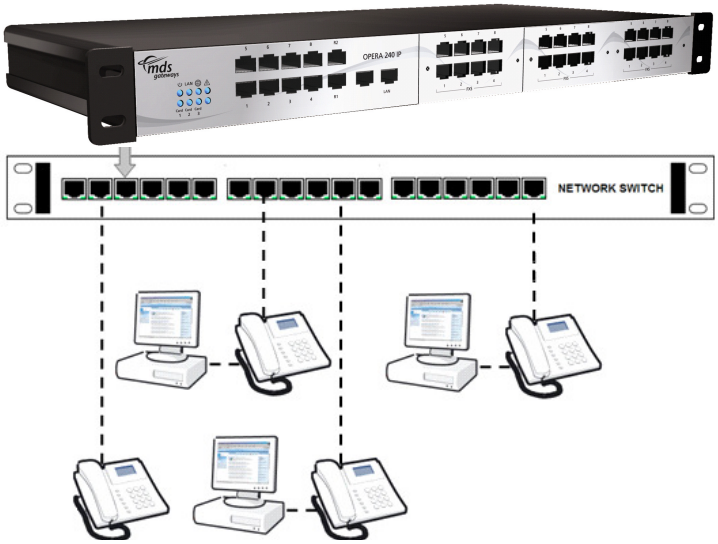
5. Connect IP system phones

5.1. Connecting IP system phones

Connect the IP system phone LAN ports to the network as shown. The PC port on the IP telephone may be used to connect a PC, thus allowing a single cable from the desk to carry the PC traffic and the telephone traffic.

Note: Do not connect any IP system phone to the LAN until the system has access to Internet; otherwise the WAN address of the system (relayed by router UPnP) will not be captured by the IP system phone at power-up.

Note: Do not power up the IP system phones until the system's IP address is in the correct range for the LAN, as described previously; otherwise the IP system phones may be assigned IP addresses that are not within the same range as the system and auto discovery cannot work properly.



Connect the LAN port of the Operafone IP system phone (Executive or Professional) to the LAN using the Ethernet cable supplied with the phone.

5.2. Auto discovery of IP system phones on the LAN

When the IP system phone is plugged into a LAN and powered up by Power-over-Ethernet (PoE standard 802.3af) or from the mains via its plug-top adaptor, it auto-discovers the Opera 240 system on the LAN and is automatically allocated an IP registration name and an IP registration PIN. The system phone also stores the internal and the public IP addresses of the Opera system.

The phone is now ready for use.

Note: The Opera 240 system must be equipped with the appropriate software licenses if more than eight IP system phones are connected.

5.3. Connecting an IP system phone remotely across the public Internet

Once an IP system phone has learned its IP registration details by auto-discovery on a LAN, it may be connected to its Opera 240 system, securely, remotely over the public Internet by simply plugging it into a broadband router. It automatically registers with its remote Opera system, from anywhere in the world, over the public Internet.

If the phone had not been connected with its system on a LAN, the public IP address or url of the system must be entered at installation in the remote location; also the system phone's IP registration name and IP registration PIN (as they appear on the IP Phone Registration page in browser based system programming).

5.4. Entering the system phone IP registration parameters manually

If the system phone had not been connected with its Opera 240 system on a LAN before delivery to the end user location, the phone will prompt the user to enter the following parameters at power up at the remote location:

1. Public IP address of the server (remote Opera system).
2. User IP registration name
3. User IP registration PIN

These parameters may be altered at any time by depressing the Menus key on the IP system phone display for 10 seconds and scrolling and selecting the options required. For connection to the system, these three parameters entered on the IP system phone must correspond to those stored on the system, on the IP Phone Registration page.

5.5. Hotdesking

A user of the Opera 240 may register from any IP system phone connected to the system. Once you have entered your IP registration name and IP registration PIN at any IP system phone, all your calls will automatically ring at that phone. Each user's IP phone registration name and IP registration PIN are listed on the IP Phone Registration page in Browser based Programming.

If you arrive at a hot desk and the phone is registered to another user, you can re-register it to your own user account as follows. Press the menus key and hold it down for 5 seconds, scroll down to Registration Info and enter your IP registration name and IP registration PIN. This can be done by repeatedly pressing the dial keys to enter the characters. Press SET and then back and exit.

If the screen displays your extension number and a softkey called 'Activate', press the softkey to activate the phone.

6. Expanding the system by connecting slave racks

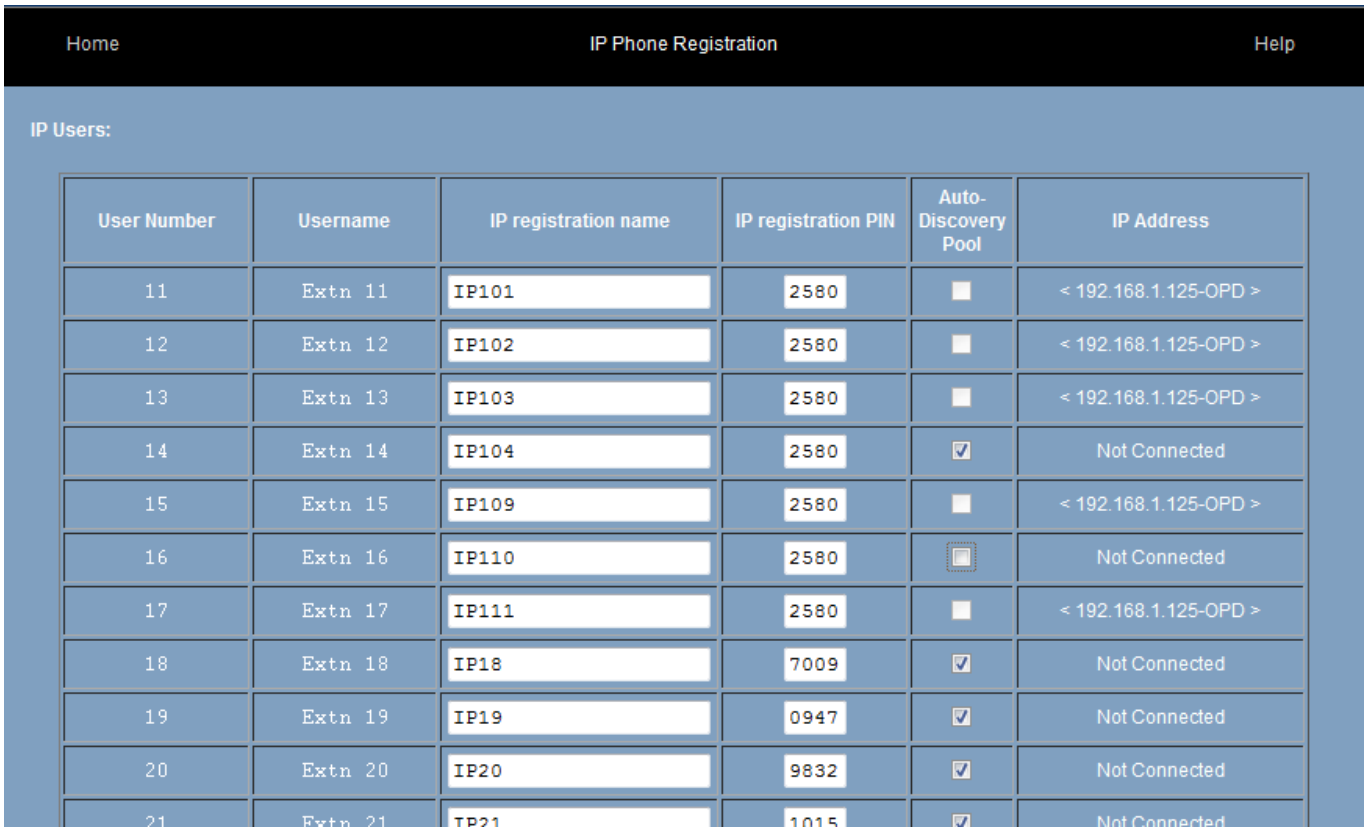
The Opera System may be expanded by connecting one or more “slave” racks, locally on the LAN or remotely and using VoIP networking. The additional racks act as Slaves to the original Master rack. All interfaces to the public network must be on the Master system; the Slaves can only break out to the public network via the Master.

The maximum capacity of the Master and Slave racks combined is 60 channels (ISDN or SIP trunks) to the public network and 240 users.

Each Slave has eight analogue a/b fixed extensions and three expansion slots. The three expansion slots may be fitted with any combination of 8-UPN and 8-a/b FXS cards. All devices connected at the expansion Slave racks must register as IP users on the Master system.

6.1. Assign IP Registration names and PINs on the Master system for all Slave extension users

Log in to the Master system and go to the IP Phone Registration page and assign IP Registration Names and IP Registration PINs for all users on the Slave systems.



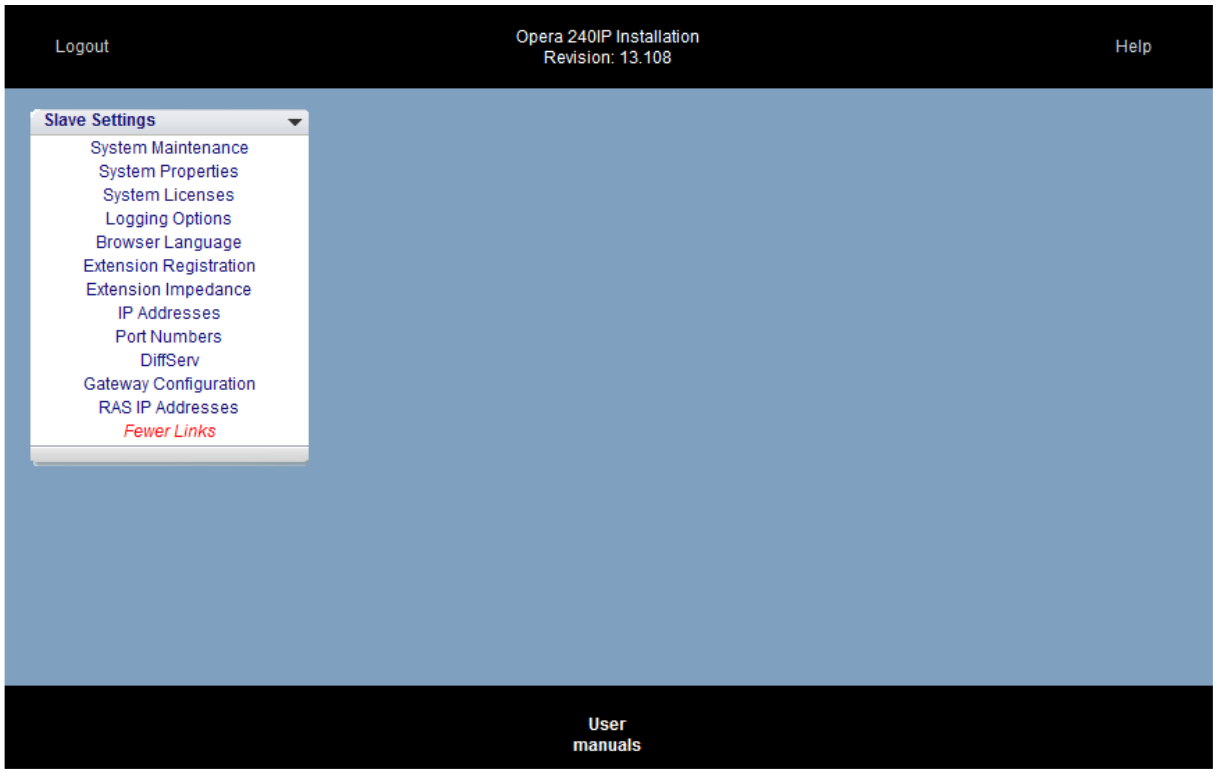
In this example User Numbers 11, 12, 13, 15, 16 and 17 are assigned IP registration names IP101, IP102, IP103, IP109, IP110 and IP111 respectively and removed from the Auto Discovery Pool on the Master system, as indicated in the above screen shot from the IP Phone Registration page of the Master. These IP registration names and PINs are then assigned to Users on Extension Registration page of an associated Slave system.

6.2. Enter the IP address of the Master at each Slave

Select the IP address of the Slave system on your Browser and log into the Browser programming, using the Slave's User Name and PIN, default admin, 1000.

By default, the slave rack IP address is 192.168.1.251. if you install more than one slave rack, you must reprogramme the IP addresses so tat each rack has a different address.

When you connect the Opera system to an existing LAN, please ensure that you use addresses that are free and compatible with the LAN IP address scheme. Contact the administrator of the LAN for this information.

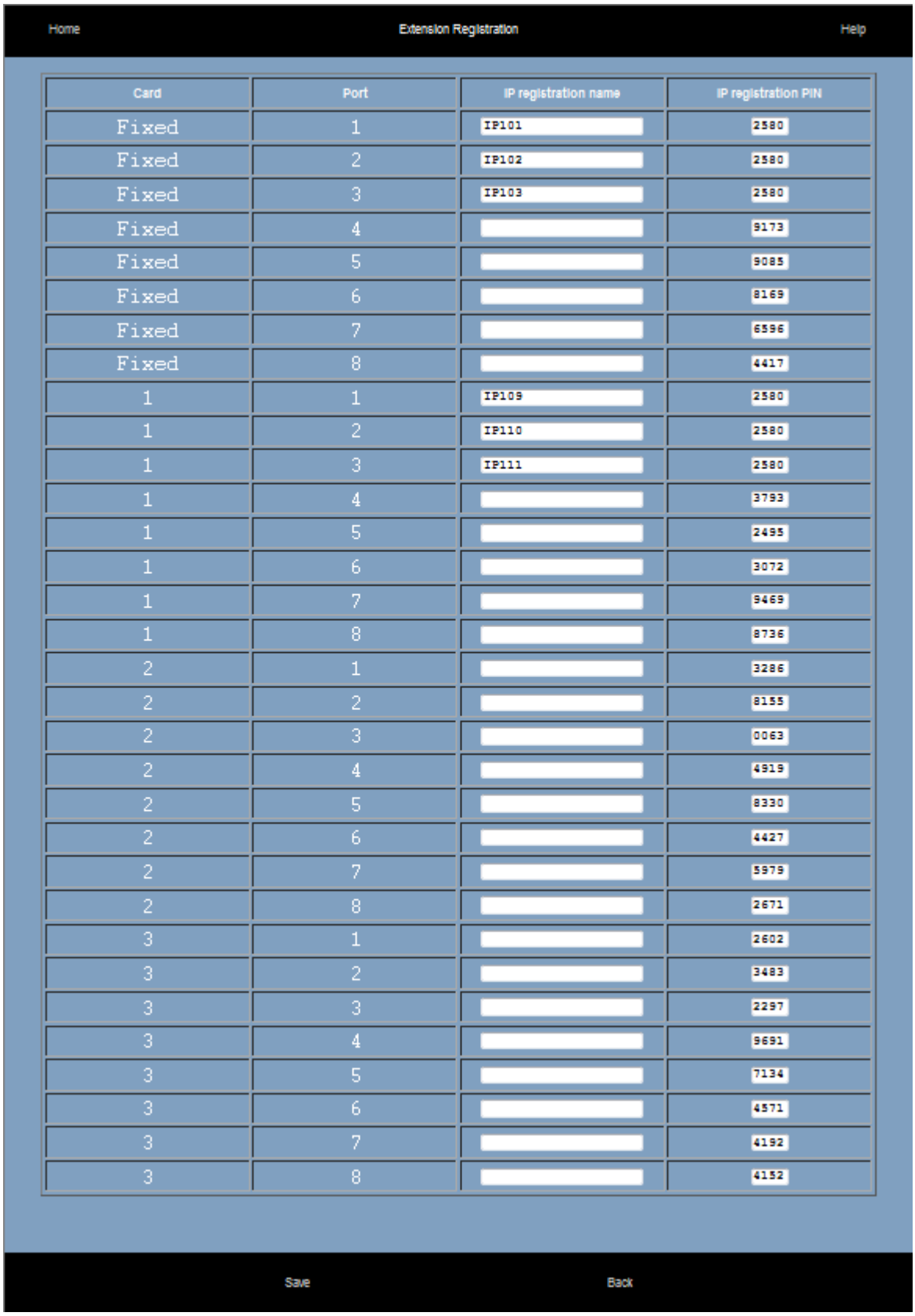


Click on the IP Addresses link and a screen similar to the following appears.

Enter the IP address of the Master system, as indicated above. Press Save and then Back, to return to the Slave Settings Browser programming front page.

6.3. Register Slave extensions with the Master system

Click on the Extension Registration link on the Slave Browser programming front page, to arrive at a page in the following format.



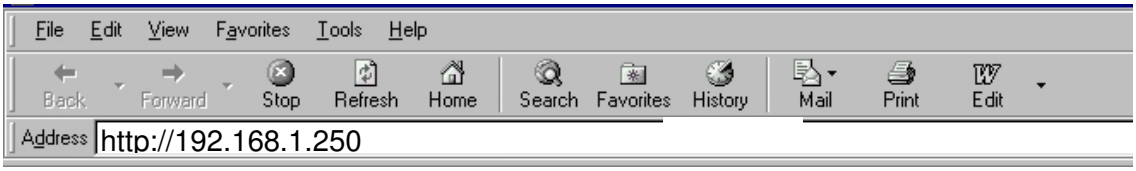
Each TDM extension port on the Slave system is assigned a row on this screen. The top eight rows correspond to the fixed a/b ports on the basic rack. Each of the eight ports at each of the expansion slots 1, 2 and 3 is also assigned a row. An IP Registration Name and IP Registration PIN assigned on the Master system, as described above, must be entered for each port at which a TDM device is to be connected.

In the example shown, IP101, IP102 and IP103 at the Master system are assigned to a/b ports 1, 2 and 3 on the Slave, while IP109, IP110 and IP111 are assigned to ports 1, 2 and 3 on the TDM card inserted in slot 1.

7. Browser-based User Portal

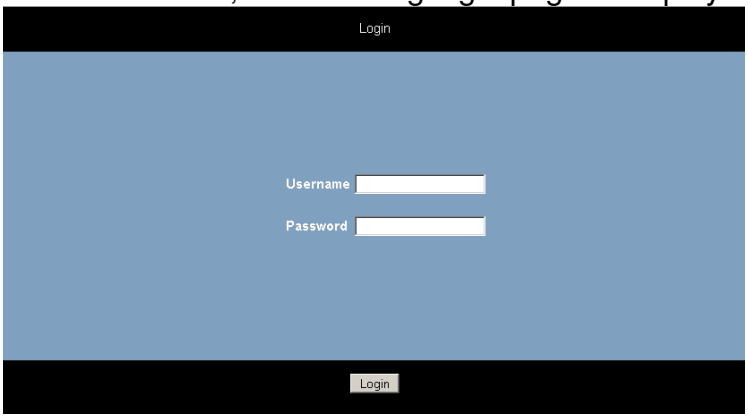
Each user can easily manage their phone settings, personal phonebook, call forwarding and voicemails by logging into the Opera 240 from any standard Browser running on their PC.

To use Browser Based Programming, the PC must have access to the system via a http IP connection. For remote users, this may require port forwarding of to the http port, default port 80, on the system location.



Open the Internet Browser and type the IP address or URL of the system.
The default local address is: http://192.168.1.250.
The IP address of the system can be checked as described above.

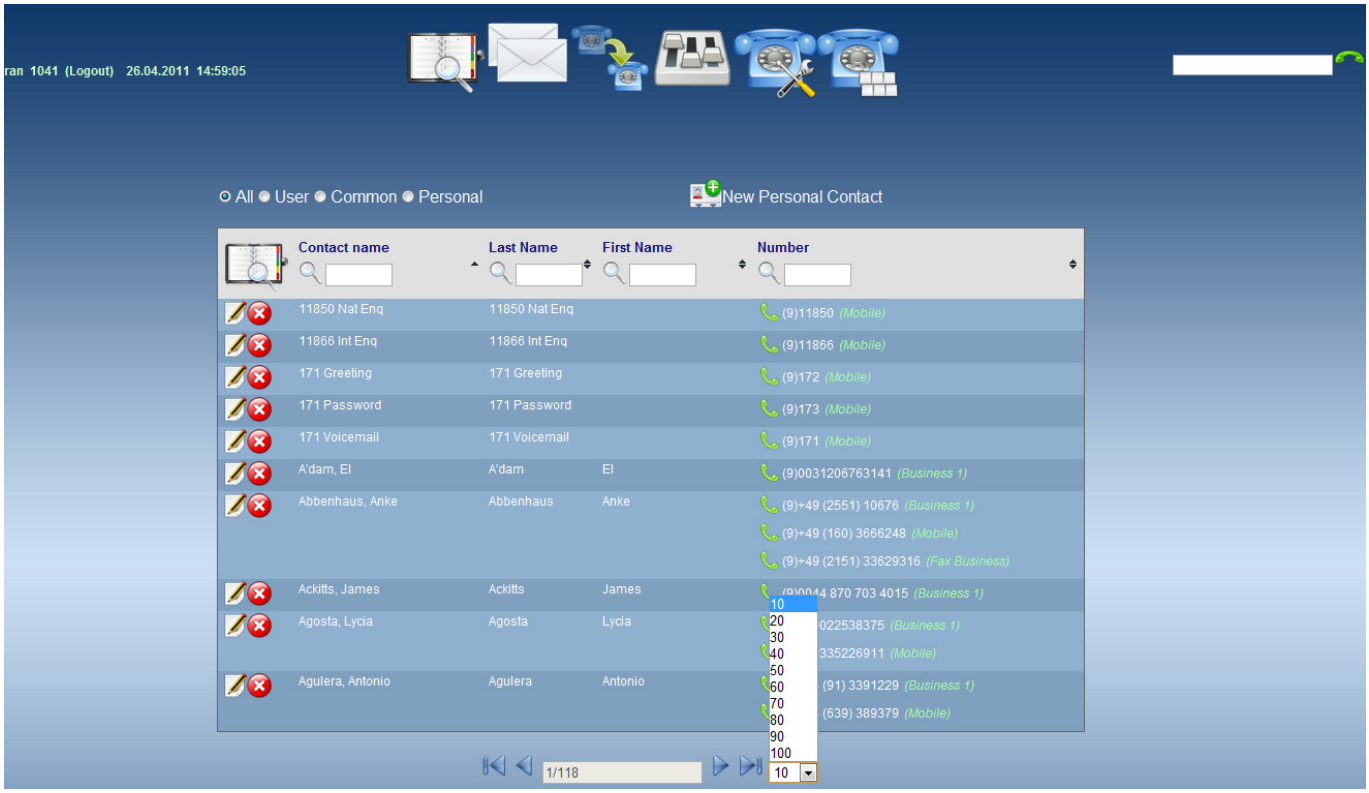
Once the IP connection is established, the following login page is displayed:



Enter the Username and Password.
Username, as listed on the User Names page in User Settings, System programming, e.g. Extension 103
Password, as listed on the PIN codes page in User Settings.

7.1. User Portal overview

On logging on to the user portal, a page similar to the following is displayed.

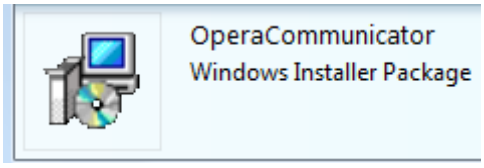


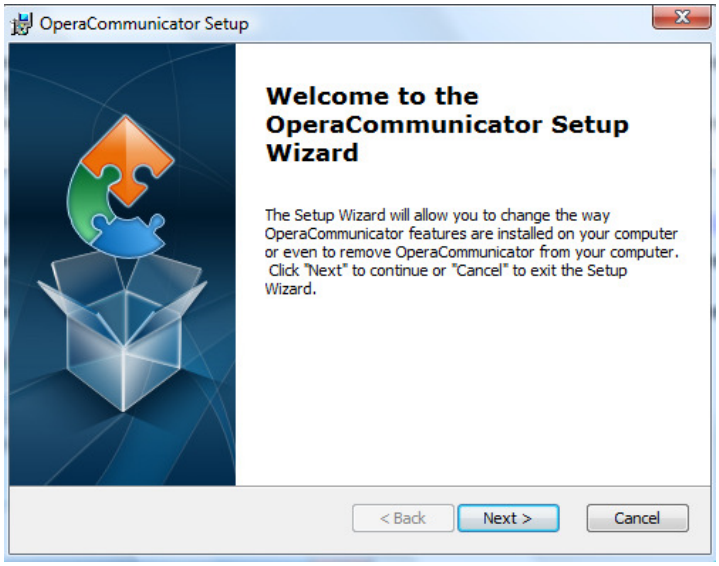
Scrolling across the icons at the top of the portal page gives the user access to Contacts, Voice mail messages and Call Forward options and, for system phone users, phone volume and settings and function key assignments.

7.2. Install the Communicator synchronisation program on the User PC

The Communicator program allows loading of Contacts and synchronisation with Gmail or Outlook. It also stores the User Name and PIN and the PBX IP address information, for single click default browser access to the User Portal.
The Communicator program is available at:
http://www.mdsgateways.com/manuals/UN/IP4/english.html

Download the program to the PC. Click on the icon and click Run.

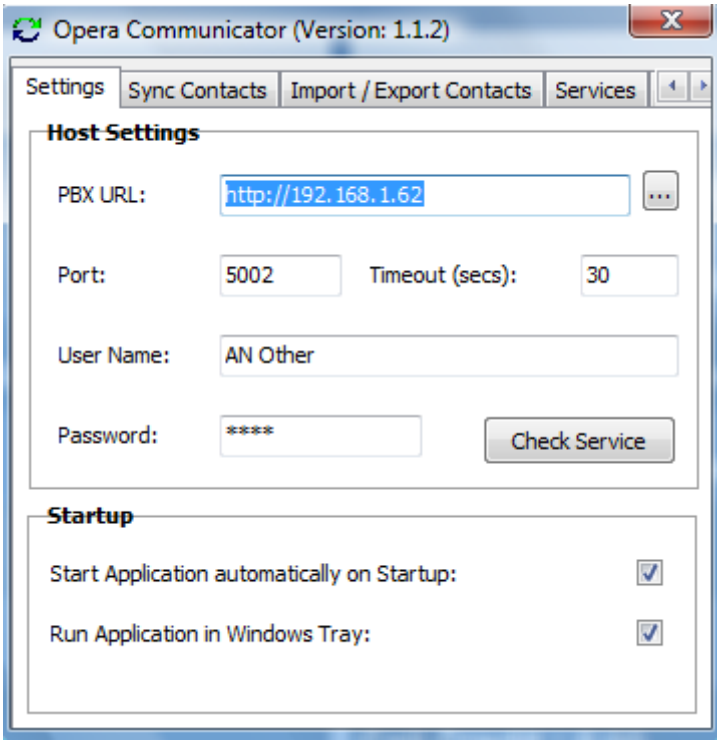




Click Next on the Setup Wizard, followed by Install, then Finish.

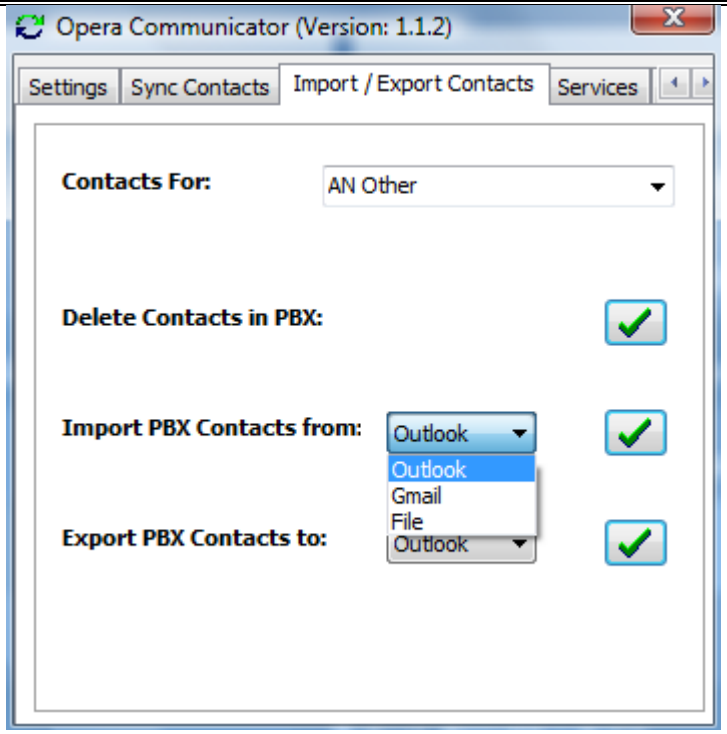
7.3. Associate the Communicator with an Extension on the PBX

Click the Communicator shortcut icon on your desktop, or run from the Windows Start menu.



On the Settings page, enter the IP/URL address of the PBX, together with the User Name and the associated Password, the User PIN code. Select the desired Startup mode.
Note that the User Name and PIN codes are normally different from the IP Registration Name and IP Registration PIN.

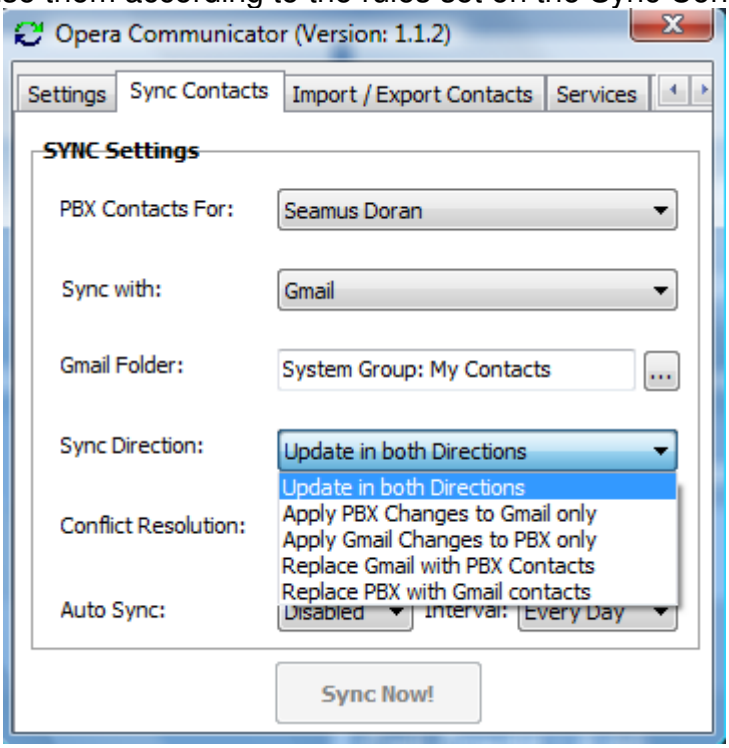
7.4. Download User Gmail or Outlook contacts to the PBX



At the Export/Import Contacts page, select either Gmail or Outlook contacts for download and click on the tick.
By logging in as the Administrator, e.g. with User name “admin”, PIN “1000”, the common address book may be loaded.

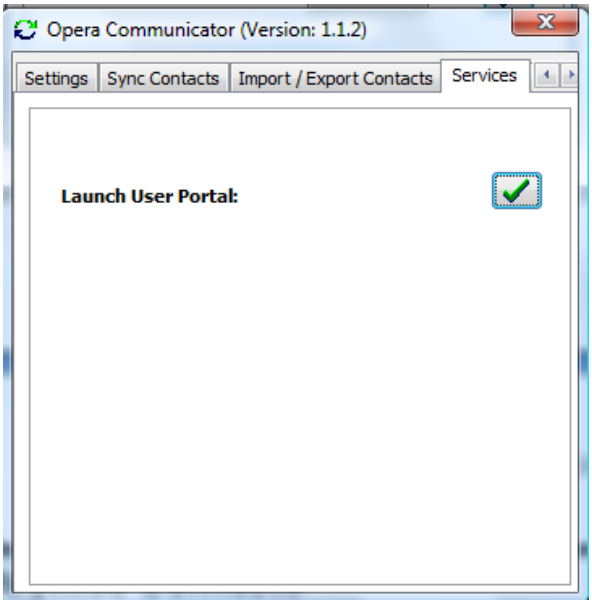
7.5. Synchronise Contacts

The Communicator program can compare the contacts on the PBX with those on Gmail or Outlook and synchronise them according to the rules set on the Sync Contacts page.



At the Sync Contacts page, select the synchronisation Direction from the drop-down menu.

7.6. Use the Communicator program to launch the User Portal



Click on the tick on the Services page

8. Software licences for additional functionality

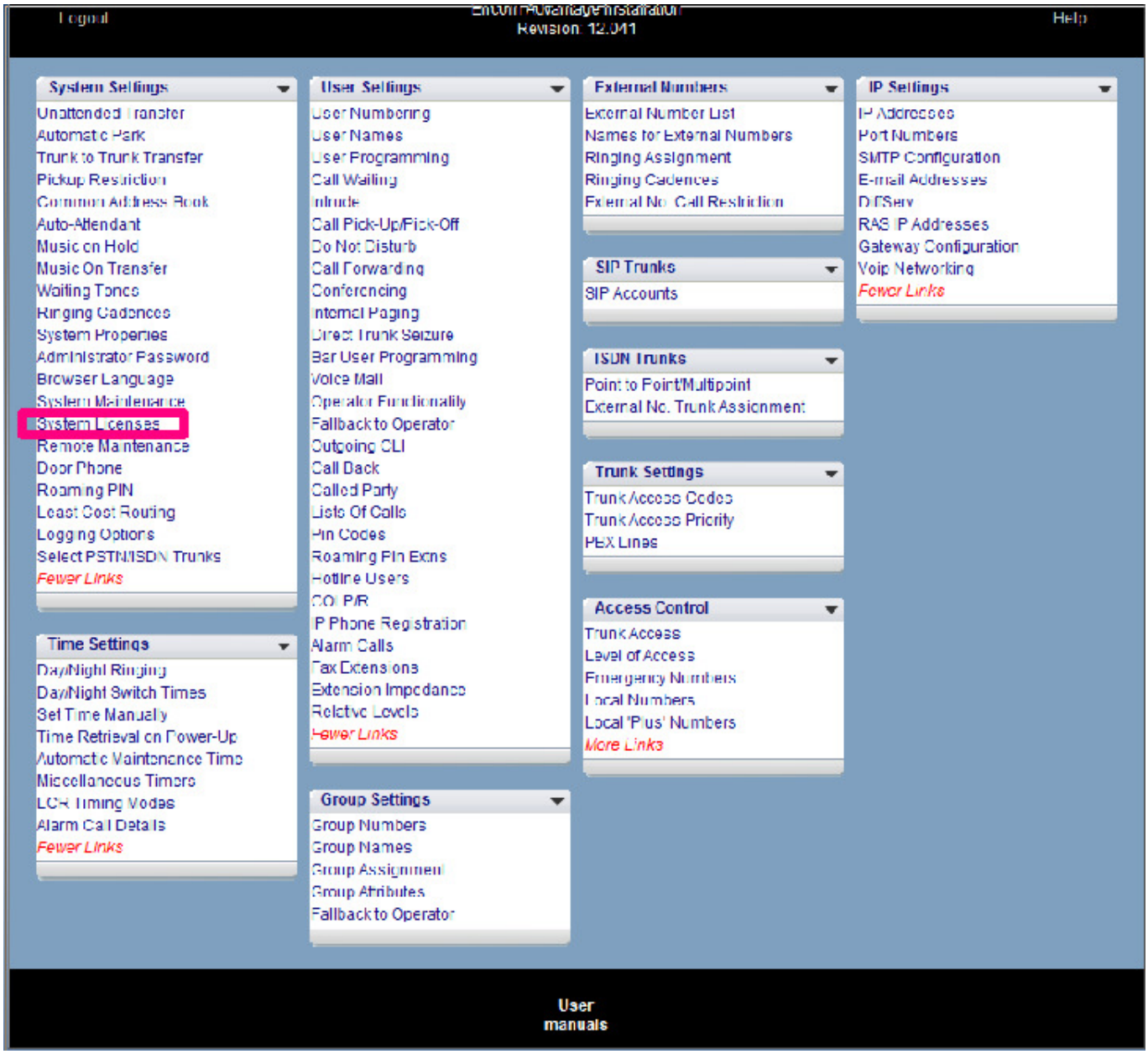
The Opera System may be expanded and enhanced by the installation of licences for extra capacity or new features such as:

- Additional SIP trunks to increase the number of VoIP connections to the public network
- Additional IP system phone users locally on the LAN or remotely on the WAN; up to 240 users in total
- Voicemail boxes; up to 240 for users and to 10 group mail boxes.
- Auto Attendant answers and routes your calls automatically to the appropriate internal destinations efficiently and professionally; up to 100 recordable messages
- Downloadable Music on Hold allows you to install several music files, in WAV or MP3 format, to be played to callers on hold
- Computer Telephony Integration
- SIP extension users on the LAN allow WLAN FMC, Fixed Mobile Convergence with single number reachability within range of the local wireless LAN, where the system is connected. A wireless handset that runs SIP protocol must be configured as a user device on the system.
- IP Softphone registration, for operation of a PC-based system phone.
- Call Record, for all external calls for a particular user, or selectable by the user on a per-call basis; up to 20 channels may be licensed.
- Telephone conference Meeting Rooms, two rooms, each for up to seven participants, with controlled access.
- VoIP peer-to-peer Networking of multiple sites, across the Internet, into a single network; up to 12 VoIP networking channels may be licensed per system and up to 100 systems can participate in a network.

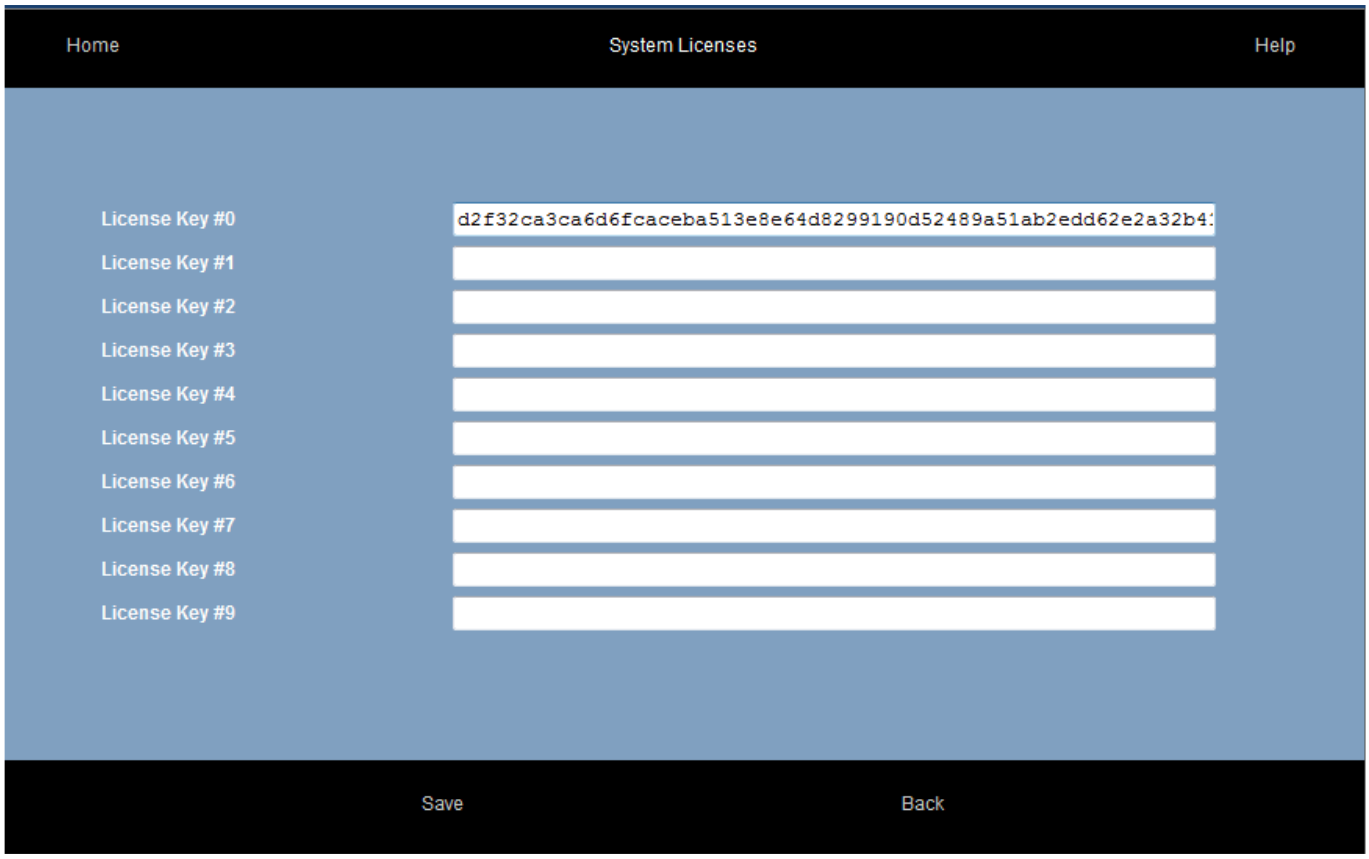
Check with your system supplier to purchase these licences.

8.1. Installing software licences

Browse to the IP address of the system and enter the user name and password, e.g. admin, 1000 to get to the main programming page and then select the System Licences link.



Paste the purchased licence keys into the box. Click “Save”.

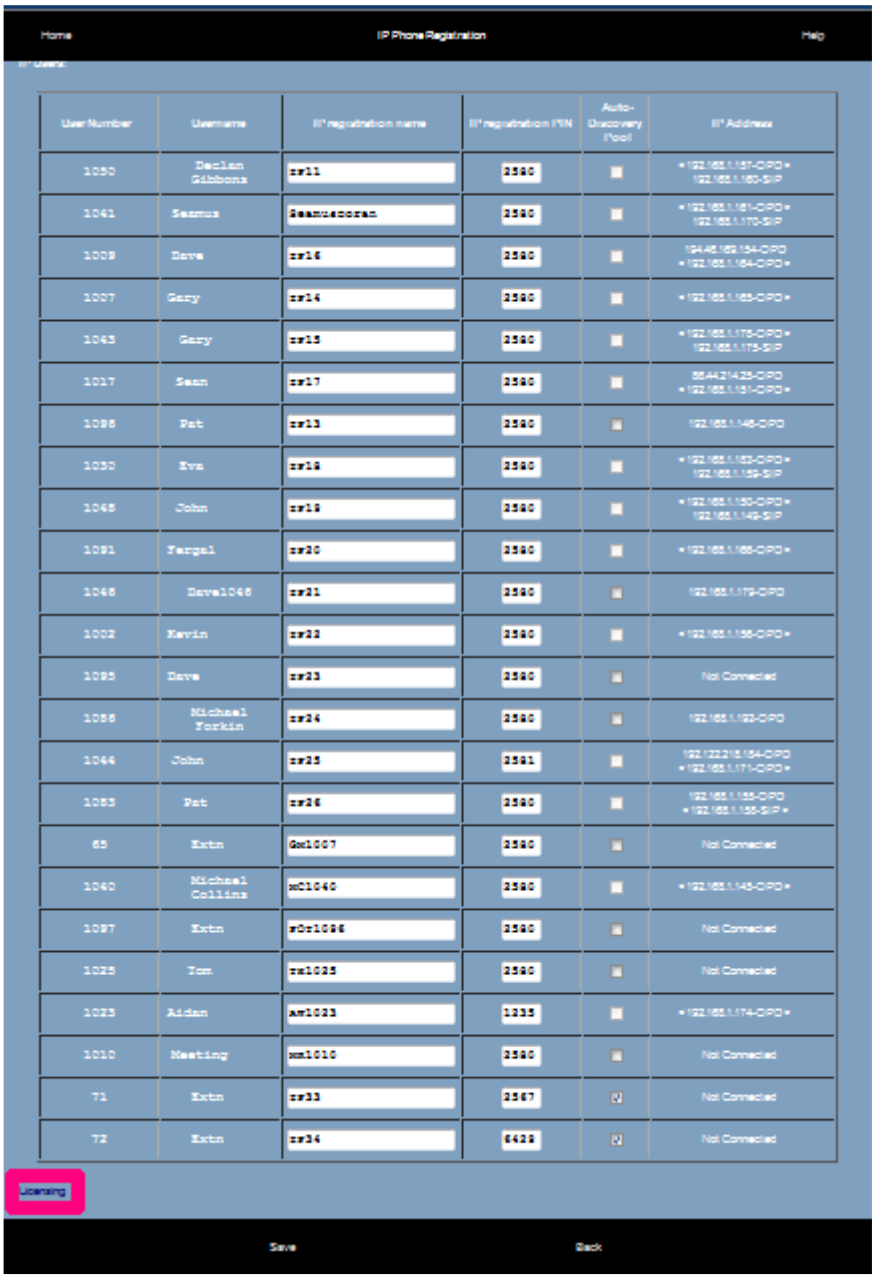


Please note that the system must be restarted for new licences to take effect.

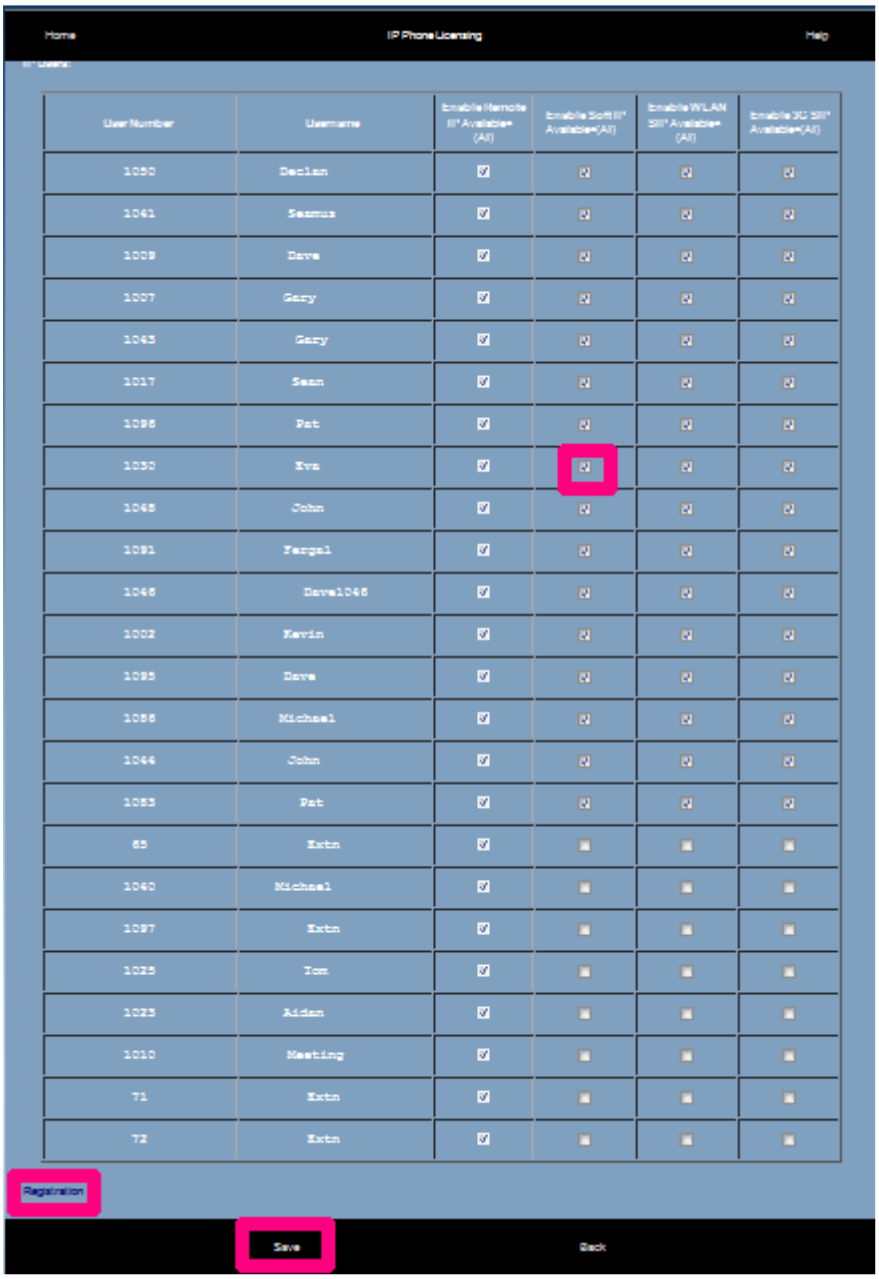
8.2. Licence activation

Once the licences have been loaded and the system restarted, go to the appropriate programming page, e.g. SIP Accounts, Automated Attendant or VoIP Networking, and activate the feature.

To activate IP user licences, go to the IP Phone Registration page.



Click on the “Licensing” link to display the following page.



Tick the box corresponding to the extension user for whom the relevant feature licence should be activated. Then click “Save”.

Click on the Registration link to return to the previous page where the IP Registration Name and PIN may be altered.

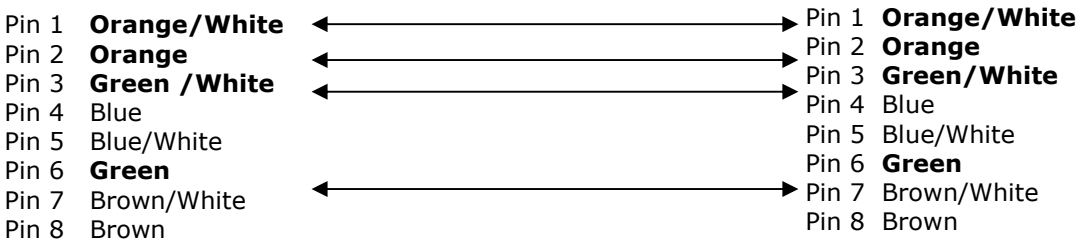
Appendix I Power over Ethernet and Ethernet cable specifications

Power over Ethernet

802.3 af, class 1 device.
5 Watts required per phone.

Standard Ethernet Cable

Ethernet cable is used to connect a hub to the system.



Appendix II System Tones

The following is a list of tones that are used on the system -

Internal Dial Tone	Continuous
Busy Tone	500mS On - 500msS Off - 500mS On - 500mS Off.....
Ringing Tone	1 Sec On - 4 Sec Off - 1 Sec On - 4 Sec Off.....
Hold Tone	30mS On - 100mS Off - 30mS On - 2 Sec Off - 30mS On - 100mS Off.....
Congestion Tone & Call Proceeding Tone	250mS On - 250mS Off -250mS On - 250mS Off.....
Success Cadence	500mS On - 55mS Off - 500mS On - 55mS Off.....
Failure Cadence	87mS On - 87mS Off - 87mS On - 87mS Off.....
Alert Tone	5 Sec Off: 120mS On - 9 Sec Off - 120mS On - 9 Sec Off.....
DND/Diversion Tone	500mS On - 55mS Off - 500mS On - 55mS Off.....

Note: Sec = Seconds
mS = milli-Seconds

Appendix III Compatibility with third party headsets and analogue phones

Headsets

The full range of Plantronics 'H' Top Headsets works on the Operafone Executive system phone. The headset plugs directly into the headset port using a Vista to QD (Quick Disconnect) Cable.

Product Range	Part Code	Description
Advantage Cable	26716-01	Vista Headset to QD (Quick Disconnect)
Supra	32184-04	H51 Headset (One Ear + Headband)
	32186-04	H51N Noise Cancelling Headset (One Ear + Headband)
Tristar	33647-01	H81 Tristar Headset (Over One Ear)
	33693-01	H81N Noise Cancelling Tristar Headset (One Over Ear)
Encore	33645-41	H91 Headset (One Ear + Headband + Treble / Bass Control)
	33699-41	H91N Noise Cancelling Headset (1 Ear + Headband + Treble/Bass Control
	33646-11	H101 Headset (Two Ear + Headband + Treble / Bass Control)
	33705-11	H101N Noise Cancelling Headset (Two Ear + Headband + Treble / Bass Control)
DuoPro	36363-01	DuoPro H171 Combo Headset (One Ear+Headband & Over Ear)
	36366-01	DuoPro H171N Noise Cancelling Combo Headset (One Ear+Headband & Over Ear)
	36568-01	DuoPro H181 Headset (Behind the Head)

Analogue phones

Compatibility of some analogue phones with MDS Opera systems:

	ULYTEL II PHONE WITH MESSAGE WAITING	SIEMENS EUROSET 2010	SIEMENS EUROSET 2015	SIEMENS GIGASET 4010 CLASSIC	SIEMENS EIRCOM 4012	SIEMENS EIRCOM 5012 COLOUR	SIEMENS GIGASET C 150	SIEMENS EIRCOM 4012 MICRO
Last Number Redial	Yes	Yes	Yes	Yes	Yes			
Time Break Recall (transfer, etc)	Yes	Yes	Yes	Yes	Yes			
Rings with a different Internal and External Ring Cadence	Yes	No *	Yes	No*	Yes			
Message Waiting audible indication	Yes	Yes	Yes	Yes	Yes			
Message Waiting visual indication	No	Not applicable	Not applicable	Not applicable	Yes			
Caller Display (CLI)	No	No	No	Yes	Yes			
Programmable keys can be Programmed as MDS PABX function keys	Yes**	Yes	Yes	N/A	N/A	N/A	N/A	N/A

* Does not differentiate between Internal and External ring cadence. Rings with one cadence only.

**It is necessary to insert a Pause after Recall when programming function keys.

Appendix IV Miscellaneous timer settings

No	TIMER	Default	New Setting	Maximum	Minimum
1	Transfer Timeout	30 secs		3 mins	5 secs
2	Parked Call Timeout	3 mins		15 mins	10 secs
3	Forward No Answer Timeout	20 secs		3 mins	5 secs
4	Normal Disconnect Timer	20 secs		1 min	0 secs
5	Handsfree Disconnect Timer	3 secs		1 min	0 secs
6	Pause Timer	2 secs		1 min	0 secs
7	Maximum Voice Message Length	90 secs		180 secs	0 secs
8	Browser Timeout	15 mins		15 mins	30 secs
9	Phone Menu Timeout	60 secs		3 mins	15 secs
10	Call Back Timer 1	10 secs		15 mins	0 secs
11	Call Back Timer 2	20 secs		15 mins	0 secs
12	Call Back Timer 3	60 mins		4 hours	1 min
13	Roaming PIN Timer	30 secs		15 mins	0 secs
14	Hotline Timer	10 secs		60 secs	0 secs
15	Internet Disconnect Timer	3 mins		999 secs	1 secs
16	Trunk To Trunk Timer	2 mins		999 secs	10 secs
17	Trunk Line Supervision	90 msecs		999 msecs	60 msecs

Appendix V Environmental Specifications

Operating temperature	-5C to + 45C
Humidity	10% to 90% non-condensing
Mains voltage	110 & 230 ± 10%
Max power consumption	10W
Maximum AC V/A:	120VA
Maximum input watts:	11W
Maximum input current at 230Vac:	0.242A
Power Factor:	0.55
Extreme working conditions	-15C to + 55C
Storage temperature	-20C to + 70C
Storage humidity	10% to 90% non-condensing

Appendix VI User settings, trunk accesses, ringing assignments and CLIs

USER SETTINGS TABLE 1 (IP Users)

User	New User Number	New User Name	Trunk Line Access								Level of Access							Users with Operator Functionality Enabled
			T/L1	T/L2	T/L3	T/L4	T/L5	T/L6	T/L7	T/L8	1	2	3	4	5	6	7	
11																		
12																		
13																		
14																		
15																		
16																		
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32																		
33																		
34																		

The default settings are - all users have access to all trunk lines
- all users have unrestricted access Level 5

USER SETTINGS TABLE 1 (Analogue Extensions)

User	New User Number	New User Name	Trunk Line Access								Level of Access							Users with Operator Functionality Enabled
			T/L1	T/L2	T/L3	T/L4	T/L5	T/L6	T/L7	T/L8	1	2	3	4	5	6	7	
41																		
42																		
43																		
44																		
45																		
46																		
47																		
48																		
49																		
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63																		
64																		

The default settings are - all users have access to all lines
- all users have unrestricted access Level 5

USER SETTINGS TABLE 2 (IP Users)

User	External Call Waiting		Internal Call Waiting		Intrude		Intrude Protection		Call Pick-Off		Call Pick-Up		Do Not Disturb (DND)		DND Override		Call Diversion		Conference		Internal Paging		Direct Line Seizure (DLS)		User Programming		Voice Mail		Voice Mail Password		Call Back		Called Party		Missed Call List		Roaming PIN Extensions	
	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N
11	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
12	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
13	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
14	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
15	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
16	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
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18	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
19	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
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21	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
22	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
23	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
24	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
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32	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
33	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	
34	√		-		-		-		-		√		√		-		√		√		√		-		√		√		√		√		-		√		-	

D: Default Setting N: New Setting

USER SETTINGS TABLE 2 (Analogue Users)

User	External Call Waiting		Internal Call Waiting		Intrude		Intrude Protection		Call Pick-Off		Call Pick-Up		Do Not Disturb (DND)		DND Override		Call Diversion		Conference		Internal Paging		Direct Line Seizure (DLS)		User Programming		Voice Mail		Voice Mail Password		Call Back		Called Party		Missed Call List		Roaming PIN Exrensions	
	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N
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42	√		-		√		-		-		√		√		-		√		√		√		-		√		√		-		√		-		√		-	
43	√		-		√		-		-		√		√		-		√		√		√		-		√		√		-		√		-		√		-	
44	√		-		√		-		-		√		√		-		√		√		√		-		√		√		-		√		-		√		-	
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63	√		-		√		-		-		√		√		-		√		√		√		-		√		√		-		√		-		√		-	
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D: Default Setting N: New Setting

Index	MSN/ LINE NUMBER	RINGING ASSIGNMENT (Enter the extensions to ring for the MSN/Line for each ringing mode)				
		DAY RINGING	NIGHT RINGING	MODE 3	MODE 4	MODE 5
1						
2						
3						
4						
5						
6						
7						
8						
9						
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50						

RINGING ASSIGNMENT TABLE

USER CLI TABLE

USER	CLI NUMBER	CLI RESTRICTION SET	USER	CLI NUMBER	CLI RESTRICTION SET
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
21			21		
22			22		
23			23		
24			24		
25			25		
26			26		
27			27		
28			28		
29			29		
30			30		
31			31		
32			32		
33			33		
34			34		

Appendi x VII Common Address Book Table

	NUMBER	NAME	Barred	Prefix		NUMBER	NAME	Barred	Prefix		NUMBER	NAME	Barred	Prefix		NUMBER	NAME	Barred	Prefix
1					51					101					151				
2					52					102					152				
3					53					103					153				
4					54					104					154				
5					55					105					155				
6					56					106					156				
7					57					107					157				
8					58					108					158				
9					59					109					159				
10					60					110					160				
11					61					111					161				
12					62					112					162				
13					63					113					163				
14					64					114					164				
15					65					115					165				
16					66					116					166				
17					67					117					167				
18					68					118					168				
19					69					119					169				
20					70					120					170				
21					71					121					171				
22					72					122					172				
23					73					123					173				
24					74					124					174				
25					75					125					175				
26					76					126					176				
27					77					127					177				
28					78					128					178				
29					79					129					179				
30					80					130					180				
31					81					131					181				
32					82					132					182				
33					83					133					183				
34					84					134					184				
35					85					135					185				
36					86					136					186				
37					87					137					187				
38					88					138					188				
39					89					139					189				
40					90					140					190				
41					91					141					191				
42					92					142					192				
43					93					143					193				
44					94					144					194				
45					95					145					195				
46					96					146					196				
47					97					147					197				
48					98					148					198				
49					99					149					199				
50					100					150					200				

Appendix VIII IP Addresses and RAS Tables

System Details	DEFAULT SETTING	NEW SETTING
IP Address	192.168.1.250	___ . ___ . ___ . ___
Subnet Mask	255.255.255.0	___ . ___ . ___ . ___
HTTP Port	80	

ISP DETAILS	
ISP Telephone Number	
Account Name	
Password	

DATA CALL MANAGEMENT		
Maximum Number of Data Calls	4	
Maximum Number of ISP Calls	6	
Maximum Number of RAS Calls	2	
Number of Users per ISP Call	4	

RAS ACCOUNTS		
INDEX	USERNAME	PASSWORD
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

REMOTE ACCESS SERVER RAS IP ADRESSES	
Index	IP Address
1	
2	
3	
4	
5	
6	
7	
8	

REMOTE ACCESS NUMBERS	
	MSN
1	
	CLI LIST
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

INTERNET BARRING			
INDEX	**PC NAME (to identify IP Address with a user)**	IP NUMBER	**BARRED (tick if barred)**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
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20			

Appendix IX Call Logging outputs and formats

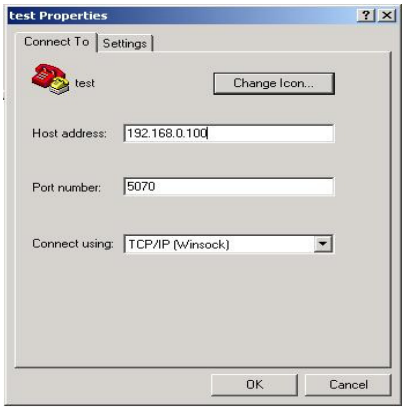
The system outputs Call Logging Records for all external calls, both incoming and outgoing, over the Ethernet port. The Call Logging Report can be generated using HyperTerminal over the Ethernet Connection using a TCP/IP port.

In order to make it easier to read the output, each field is right justified (i.e. padded with spaces) and separated from the next field by a comma. This output may be extracted and used by external applications (for example, Microsoft Excel) to generate reports and accumulate statistics. (It is beyond the scope of this guide to describe how to use this output with external applications).

Connect a PC (Windows operating system) to the system LAN Port:

- Open the <**Start**> menu
- Click On <**Programs**>
- Click On <**Accessories**>
- Click On <**Communications**>
- Click on <**HyperTerminal**>

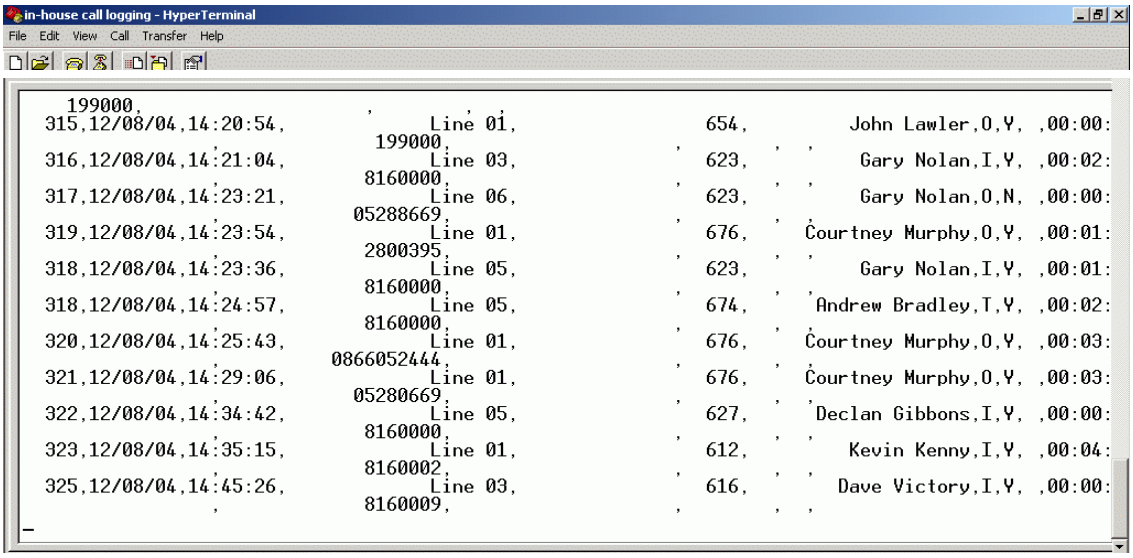
The window alongside will be shown



- In the **Connect Using** field, select the TCP/IP (Winsock) setting
- Enter the IP address of the system in the **Host Address** field (by default, **192.168.0.100**)
- Enter the **Port number**. This is always **5070**

The HyperTerminal window appears. When an incoming/outgoing call is detected on the system, a Call Logging Record will be generated at the end of the call.

Example of the call logging output to hyperterminal



Call Logging format table

The format of the call logging data that is sent to the PC consists of 17 distinct fields of variable length that provide a comprehensive list of attributes for each call as listed below.

Field ID	Description	Size (Bytes)	Details
01.	Call ID	5	Numeric index to reference the call record.
02.	Date	8	Date of call in the format DD/MM/YY.
03.	Time	8	Time of call in the format HH:MM:SS.
04.	Line Number	20	Alphanumeric representation of Line number (e.g. Line 01)
05.	Extension number	20	Numeric representation of extension number (e.g. 623)
6.	Extension Name	20	Alphanumeric representation of extension name (e.g. Joe Bloggs)
07.	Call Type	1	I= Incoming (Voice) O= Outgoing (Voice) T= Transferred N= Internet (Data) R= Remote Access C= Time Retrieval D= Software Download
08.	Connection	1	Y = Yes N = No
09.	Voice Card	1	V = Voice Mail A = Auto-Attendant
10.	Call Duration	8	Duration of call in the format HH:MM:SS (connected time)
11.	Ring Time	5	Duration of ringing in the format MM:SS
12.	Calling Number	20	Alphanumeric (CLI or “Unknown” if CLI not provided)

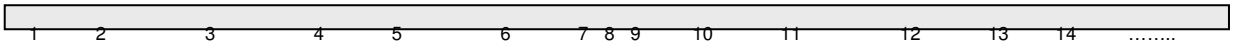
13.	Calling Name	20	Alphanumeric (if there is a match found in the Common Address Book)
14.	Called Number	20	Alphanumeric (Called Number/MSN of Called Party)
15.	Called Name	20	Alphanumeric
16.	Roaming PIN	2	Numeric representation of a roaming PIN User No. (e.g 02) for Roaming PIN user 02
17.	Call Cost	8	Numeric representation of the cost of the call in Euros

Logging Incoming Calls

When an incoming call is answered by an extension, the "Call Type" (field 7) and "Connection" (field 8) fields are updated to "**I**" and "**Y**" respectively in the HyperTerminal window at the end of the call:

Example of a call record for an incoming call that is answered

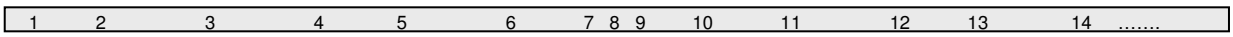
1, 12/08/04, 17:30:02, Line 03, 654, John Lawler, **I**, **Y**, , 00:00:44, 00:05, 0872979676, , 8160058, ……



Logging Outgoing Calls

When an outgoing call is made by an extension, the "Call Type" (field 7) and "Connection" (field 8) fields are updated to "**O**" and "**Y**" respectively in the HyperTerminal window at the end of the call:

2 , 12/08/04, 17:12:01, Line 01, 676, Joe Bloggs, **O, Y**, , 00:00:03, 00:24, 8160016, , 05280669, …….



Logging Voice Mail Calls

An incoming call that is directed to a user's Voice Mail will generate a call record as described for incoming calls. The "Voice Mail" field, 9, is updated to '**V**' when the line is connected to a voice mail channel. The "Connection" field (field 8) will be "Y" or "N" depending on whether the calling party left a message on the extension's mailbox. Connection = 'Y' ("message left")

Example of a call record for an incoming call that was answered by the voicemail and then left a message:

3 , 12/08/04, 17:16:02, Line 02, 8160058 , , **I**, **Y**, **V**, 00:00:39, 00:00, 8160058, …….

Logging Transfer Calls

Two call logging records are generated when an incoming call is answered by an extension and then transferred to another extension on the system. The "Call Type" (field 7) is updated to 'T' on the transferred call to indicate that it is a 'Transfer' type of call. The "Call ID" (field 1) remains the same for both records.

Example of a call record for an incoming call that was answered by Joe Bloggs and transferred to Jane Doe.

4 , 12/08/04, 17:16:02, Line 02, 627 , Joe Bloggs, **I**, **Y**, , 00:00:20, 00:03, 8160058, ……..

4 , 12/08/04, 17:16:22, Line 02, 628 , Jane Doe , **T**, **Y**, , 00:00:39, 00:05, 8160058, ……..

1 2 3 4 5 6 7 8 9 10 11 12

Logging Externally Forwarded Calls

If a user has externally forwarded his/her extension, there will be **2 separate** Call records (i.e. there are 2 separate Call IDs) for an incoming call that is externally forwarded. In both of these records the Extension Number, Extension Name & the Calling Number of the forwarding extension are stored.

Logging Auto-attendant Calls

If an incoming call is answered by the Auto-attendant then field 9 is updated to "**A**". If the call is then answered by an extension, there is a separate Call Logging record (with the same Call ID) created for the answering extension as if the call had been transferred to the user

Example of a call record for an incoming call that is answered by the Auto-attendant and subsequently answered by an extension.

5 , 12/08/04, 18:26:02, Line 04, 600 , Reception , **I**, **Y**, **A** , 00:00:10, 00:05, 0871738729, ……..

5 , 12/08/04, 18:26:12, Line 04, 627 , Joe Bloggs , **I**, **Y** , , 00:00:25, 00:03, 0871738729, ……..

1 2 3 4 5 6 7 8 9 10 11 12 ……

Logging Time From Network Calls

The Opera system can be programmed to automatically make a call on power-up in order to extract the time provided by the ISDN network. This call will immediately be cleared down as soon as the connection is established and the time information has

been extracted from the connect message. When a “retrieve time from network” call is made the “Call Type” (field 7) is updated to “**C**”

Example of a call record for an automatically generated call on power-up to extract the time from the ISDN network.

7 , 12/08/04, 18:12:01, Line 01, , , **C , Y**, , 00:00:01, 00:02, , , 1191, Network Time , …….

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 ……..

Logging Remote Access Calls

The Opera provides users with the ability to ring into the system to access the System Browser Programming or the LAN to which the system is connected. When a remote access call is made the “Call Type” (field 7) is updated to “**R**”

Example of a call record for a Remote Access call.

8 , 12/08/04, 18:12:01, Line 01, , , **R , Y**, , 00:35:17, 00:02, 8160433 , Home Office, , , …….

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 ……..

Logging Software Download Calls

The Opera system can receive software upgrades by connecting to a download server over an ISDN line. These calls are initiated by a user on the system. When a software download call is made the “Call Type” (field 7) is updated to “**D**”

Example of a call record for a software download call.

9 , 12/08/04, 18:52:01, Line 01, , , **D , Y**, , 00:03:47, 00:02, 8160410 , Administrator , , , …….

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Logging 3-Party Conference Calls

A 3-Party conference consists of 2 calls being on the same line at the same time, therefore there will be 2 active Call Logging Records with the same line number. There is no separate field on the Call logging record to indicate that a 3Pty conference has occurred.

Roaming PIN

If the Call is made from a **roaming pin enabled** extension using a roaming pin profile defined in browser based programming then the roaming pin field is filled in with the user number that enabled it at that extension.

Example of a call record for a call made from Joe Blogg's extension using the roaming PIN profile defined for User 03. .

10 , 13/08/04, 16:12:01, Line 01, 676, Joe Bloggs, **O, Y**, , 00:01:03, 00:24, , , 05281169, , **03**,

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

Advice Of Charge (AOC)

This feature if enabled by the Network will present to the Opera system the cost of the call. The system will then provide this information at the end of the call (In euros) in the "Call Cost" field
(Field 17) of the call logging output.

Example of a call record for an AOC enabled line showing the cost of the Call.

11 , 15/08/04, 18:07:05, Line 04, 676, Joe Bloggs, **O, Y**, , 00:25:03, 00:04, , , 05281169, , , **1.20**

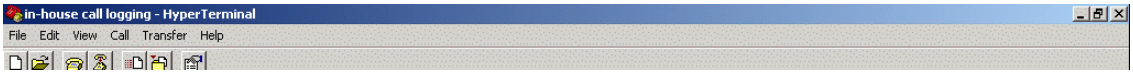
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

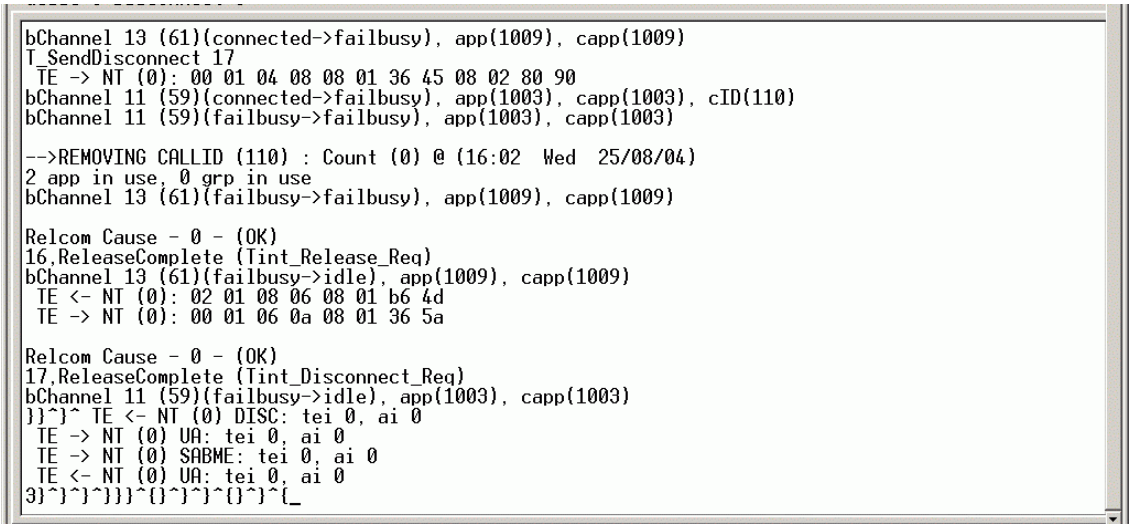
Diagnostic Logging

In addition to providing the call logging information for voice calls on the system, the Opera also has the ability to record details on data type calls (calls made to the internet) and provide system diagnostic logs for debug purposes on the ethernet port of the system.

Streaming Diagnostic Logging

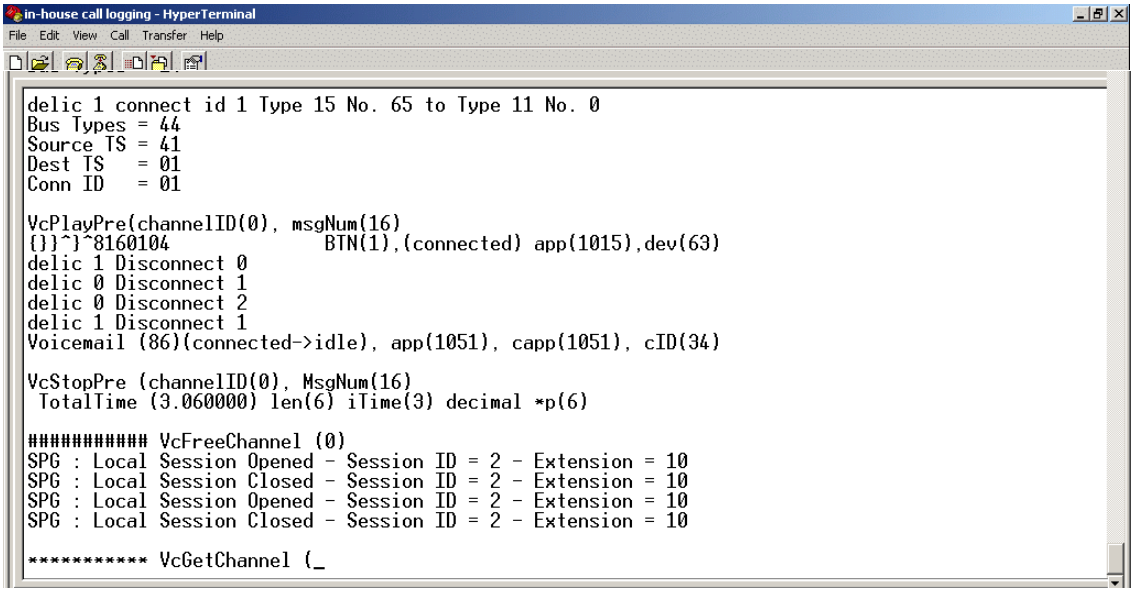
The Opera system provides diagnostic information which may be used to aid an installer to debug any potential technical problems that might arise at a particular site. This information is a detailed technical synopsis of the state of the system. The streaming diagnostic information is a real-time debug facility that shows the state of the system as actions are being performed.
This data output is sent on port **5041**





Buffered Diagnostic Logging

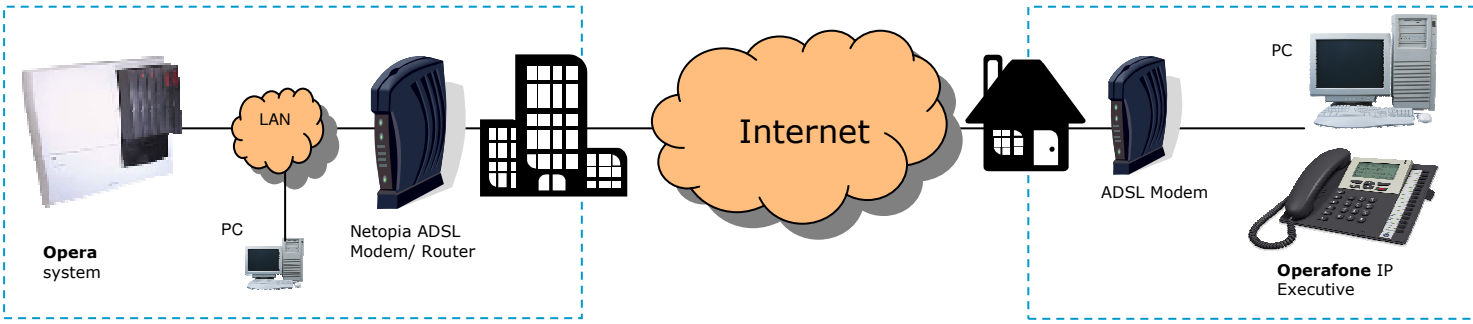
The Opera system contains a buffered record of the most recent actions performed on the system. This buffered information is dumped out en-bloc to provide a history of the most recent actions of the system. This data output is sent on port **5040**



Appendix X Example: how to configure port forwarding on the Netopia modem router Cayman 3346

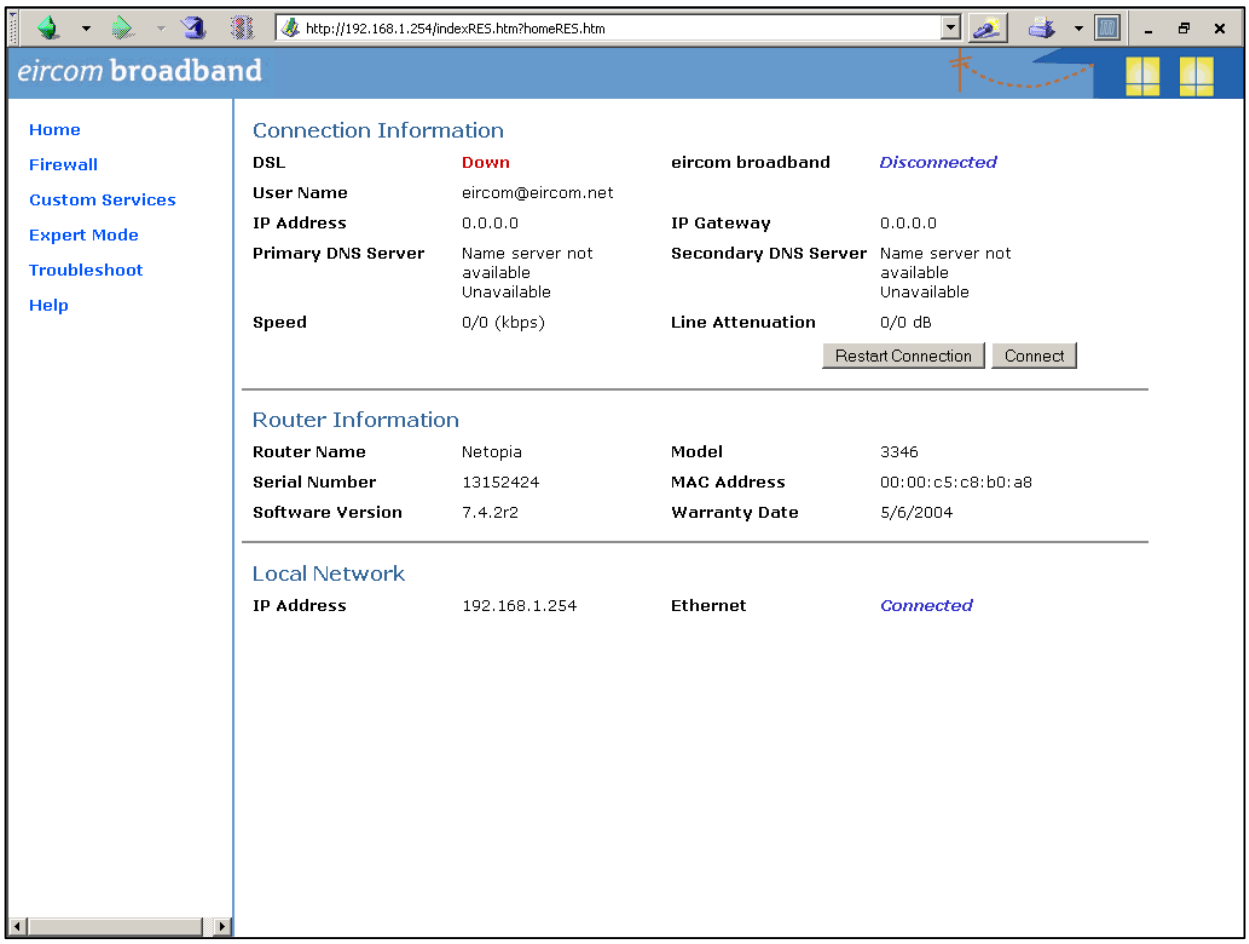
This section describes how to configure port forwarding for Voice over IP traffic on the Netopia Modem Router Cayman 3346.

In this example voice traffic coming from the Internet to the Opera system (called Advantage here) in the Office location is routed through the Netopia ADSL Modem router as shown in the diagram below. This modem router device implements a firewall to protect the internal LAN from intrusion from the Internet. The firewall must be opened up to allow voice traffic from the Internet to pass through and it must be configured to forward this voice traffic to the internal IP address of the Opera system.



Step 1 Connect to the home page.

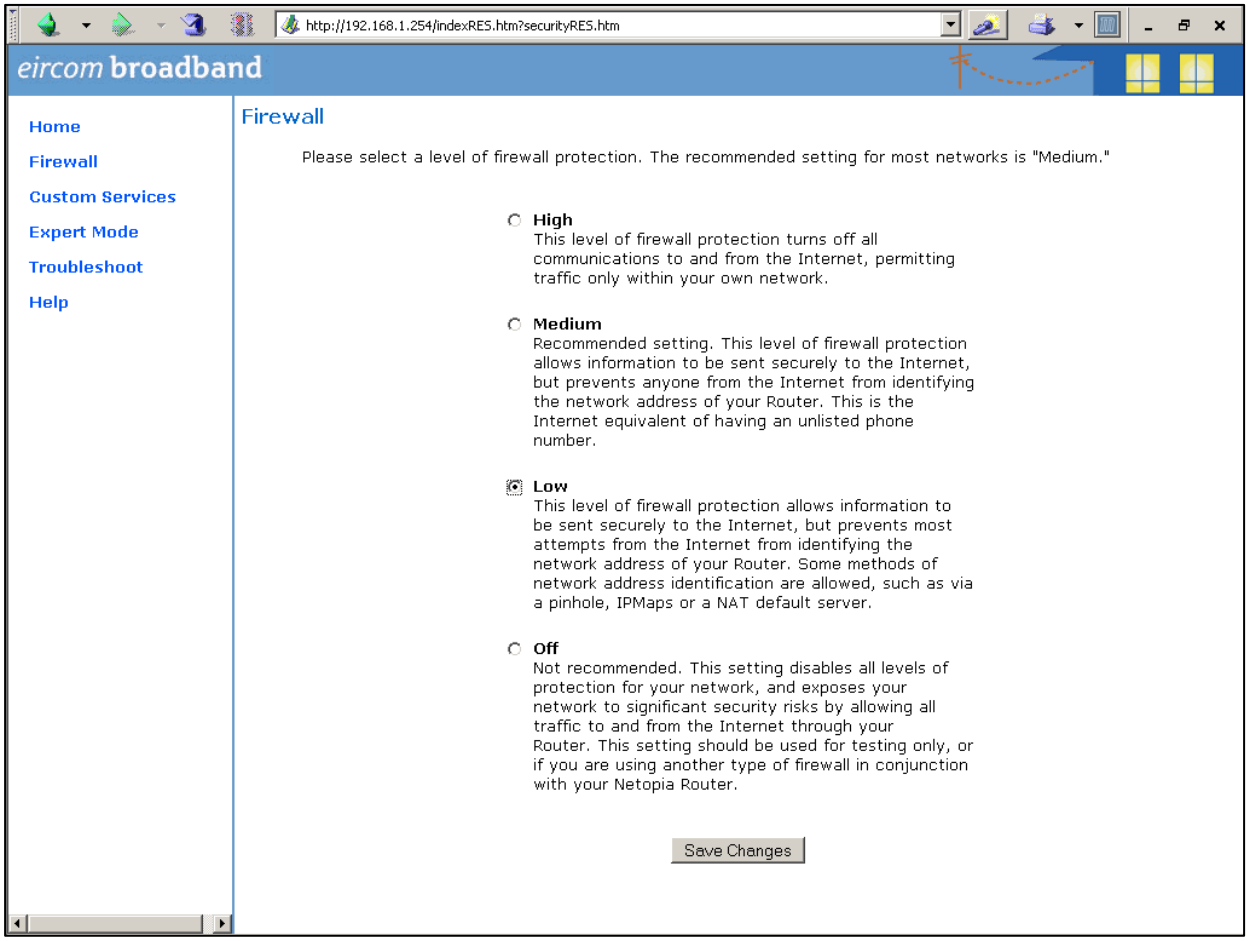
Using a PC connected on the LAN as shown in the diagram, open a browser and type in the LAN IP address of the Netopia Modem Router. The default IP address is 192.168.1.254. This may have been changed however by the LAN administrator at installation. In this case check with the LAN administrator and enter the current address. When this is done the home page of the modem/router is displayed as shown below.



If you have difficulty connecting to this home page, please check that the PC you are using has an IP address in the same subnetwork range as the Netopia modem router.

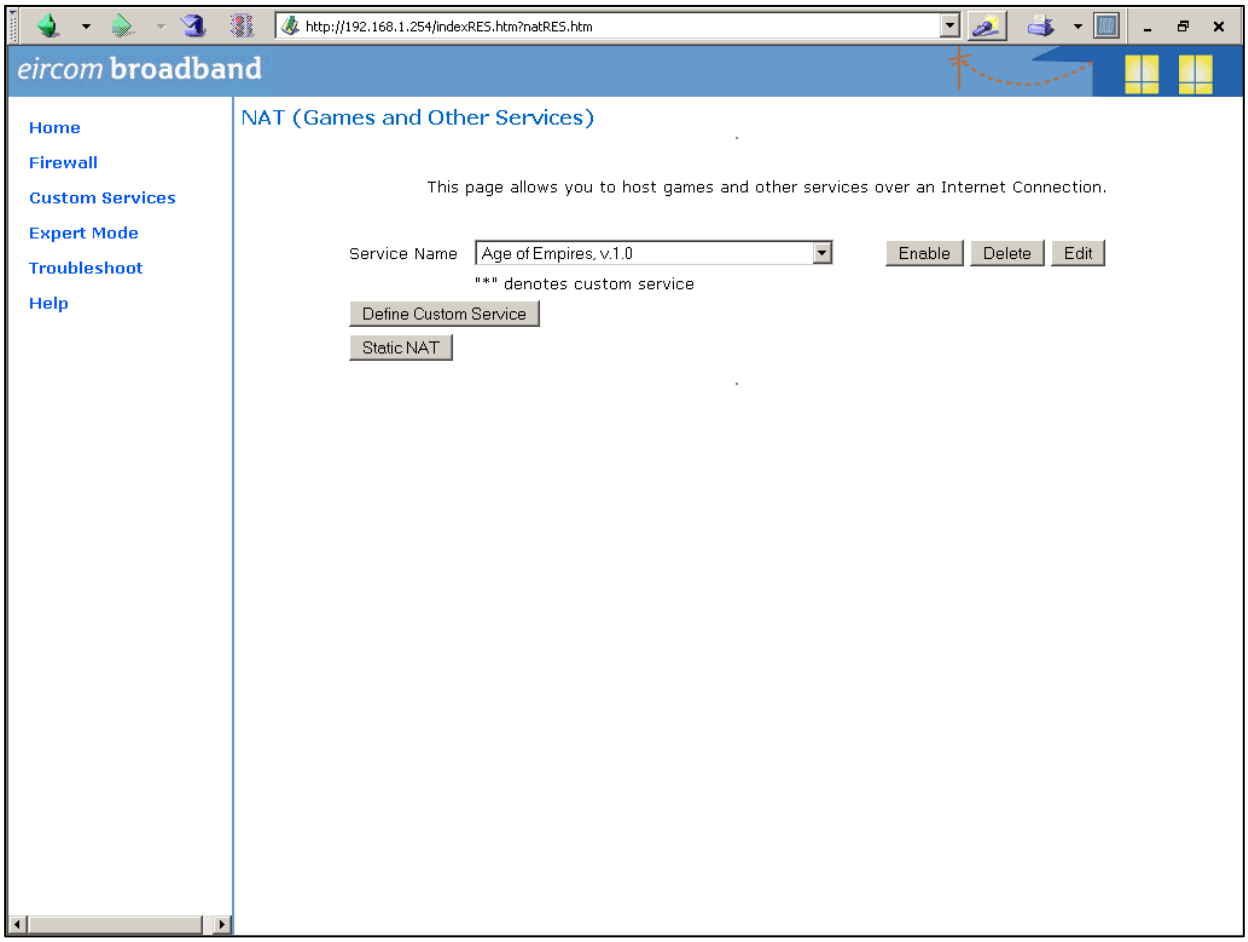
Step 2 Lower the level of Firewall protection

Click on the link Firewall in the top left corner of this page and the following screen will be displayed
Set the level of firewall protection to LOW and press the button ‘Save Changes’.

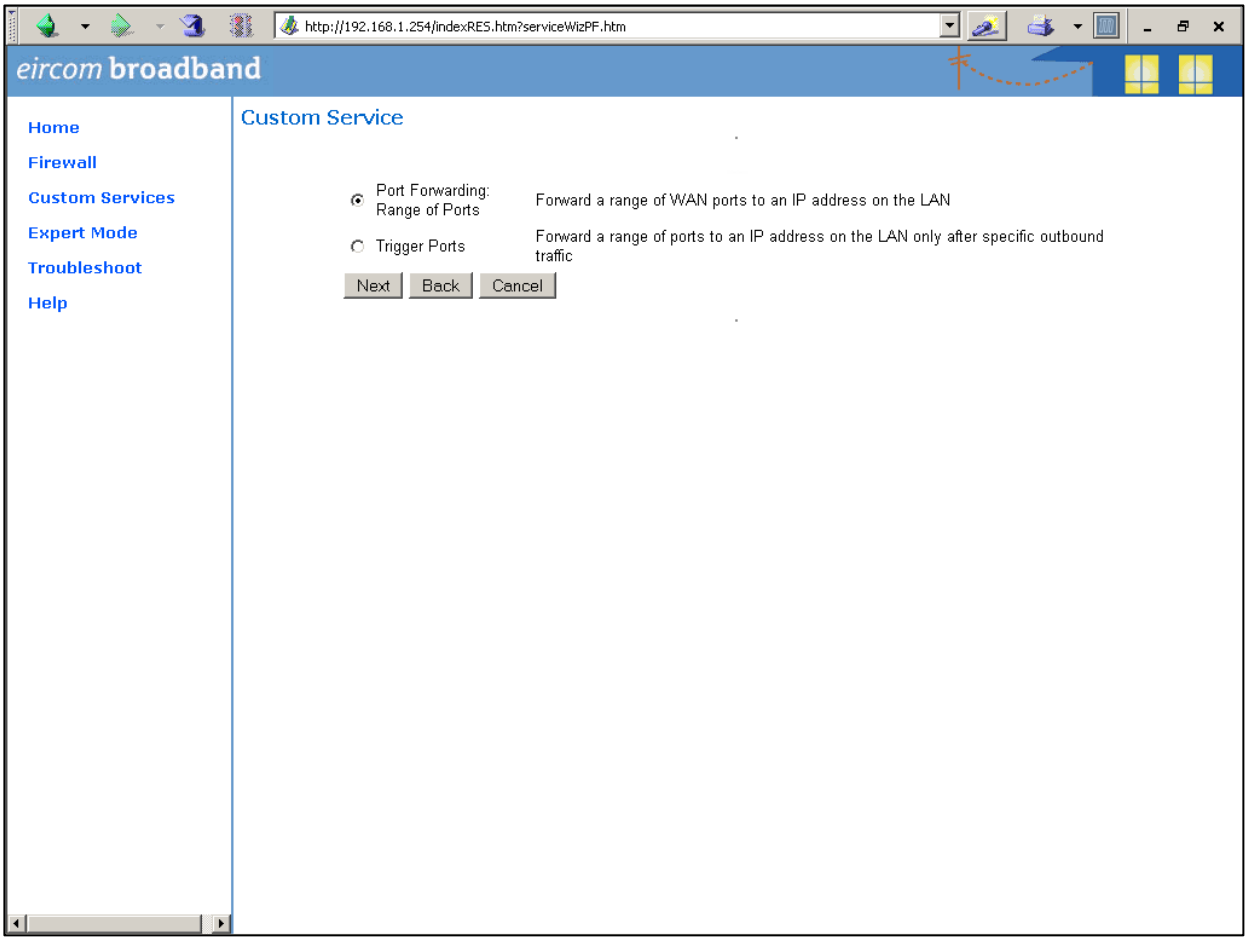


Step 3 Define the port forwarding for TCP

Click on the link ‘Custom Services’ on the top left corner of the screen and the following screen is displayed



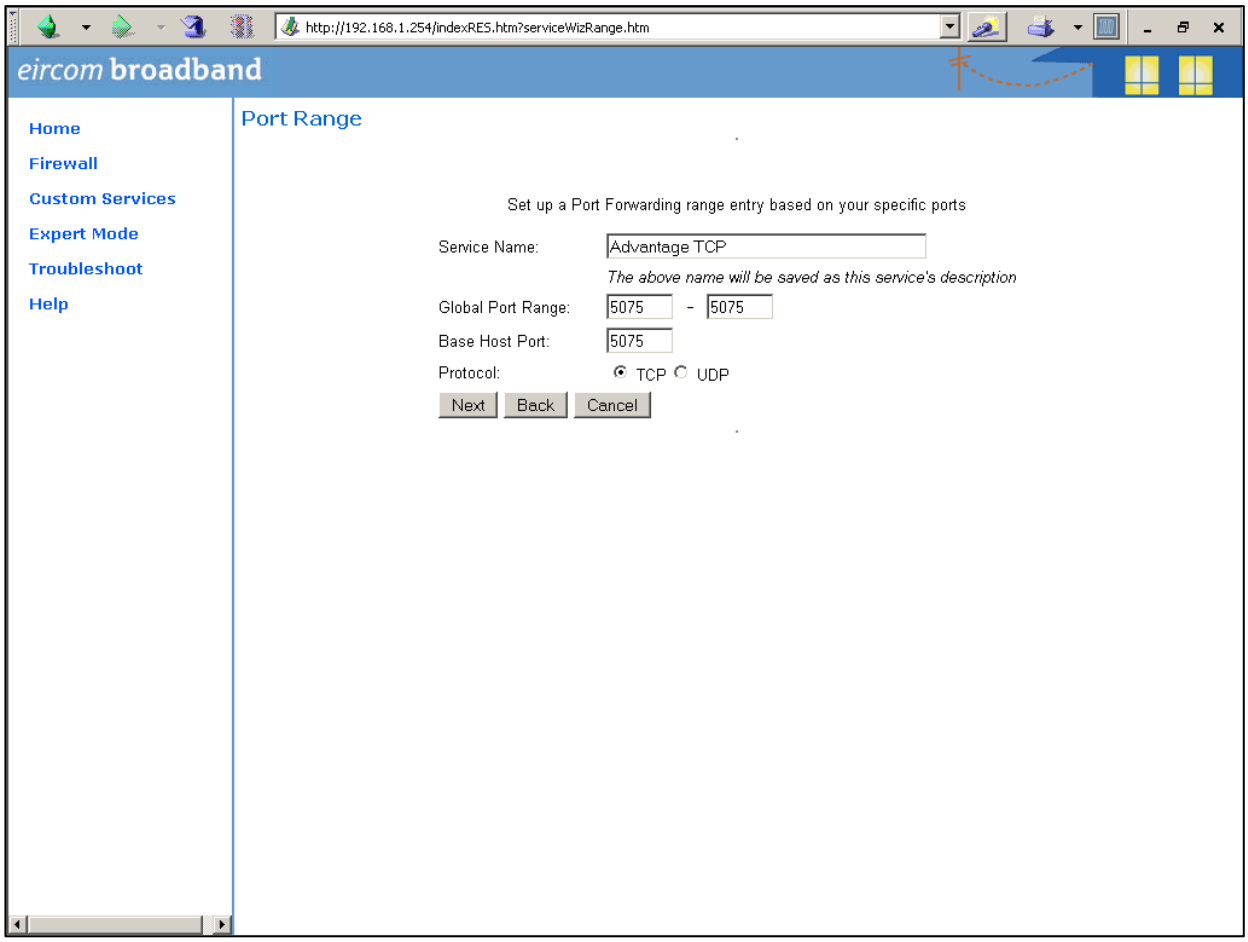
Click on the button ‘Define Custom Service’ to display the next screen:
Select the button ‘Port Forwarding: Range of Ports’ as shown and press ‘Next’.



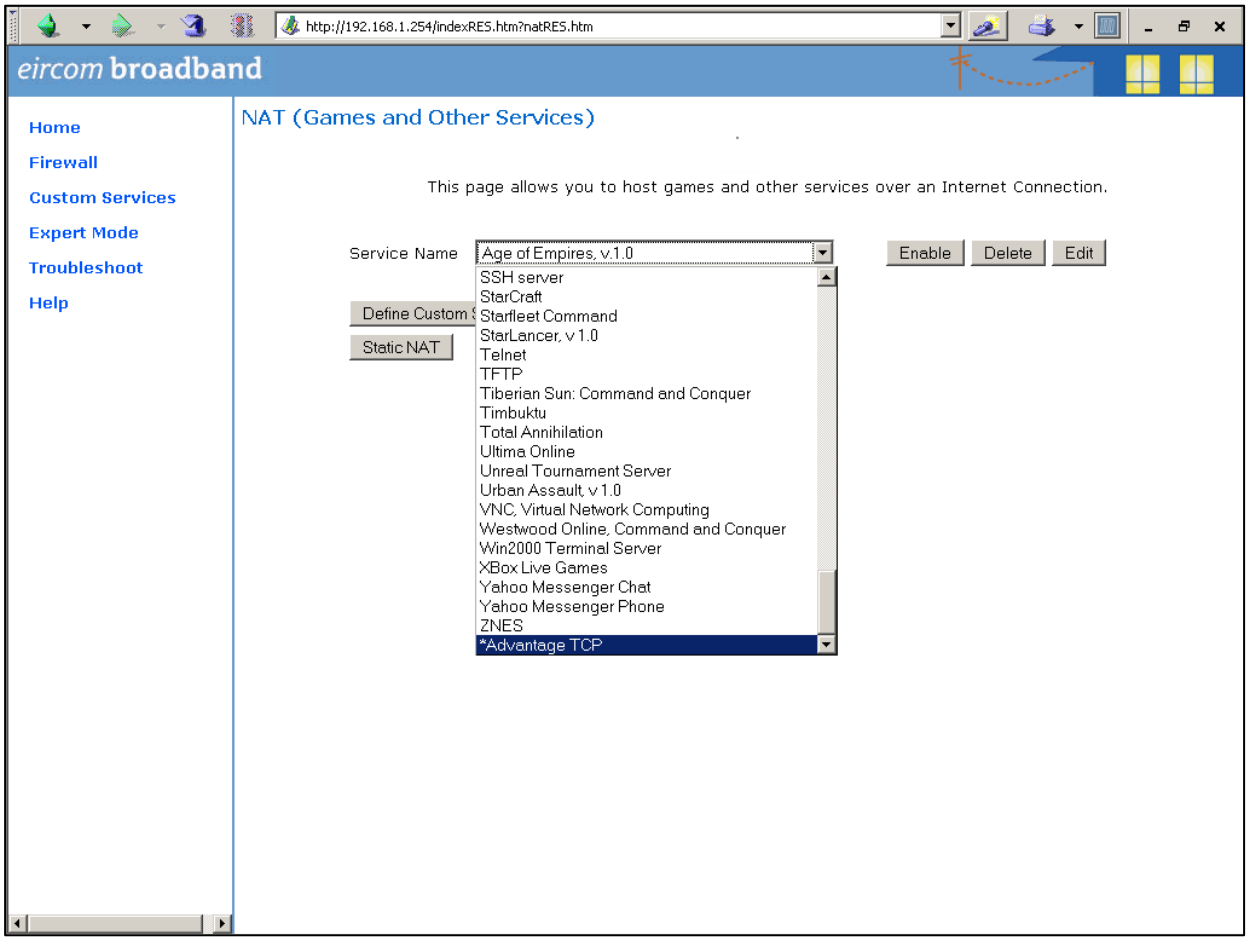
At the next screen type in the following information as shown:

Service Name: Advantage TCP
Global Port Range: 5075 - 5075
Base Host Port: 5075
Protocol: TCP

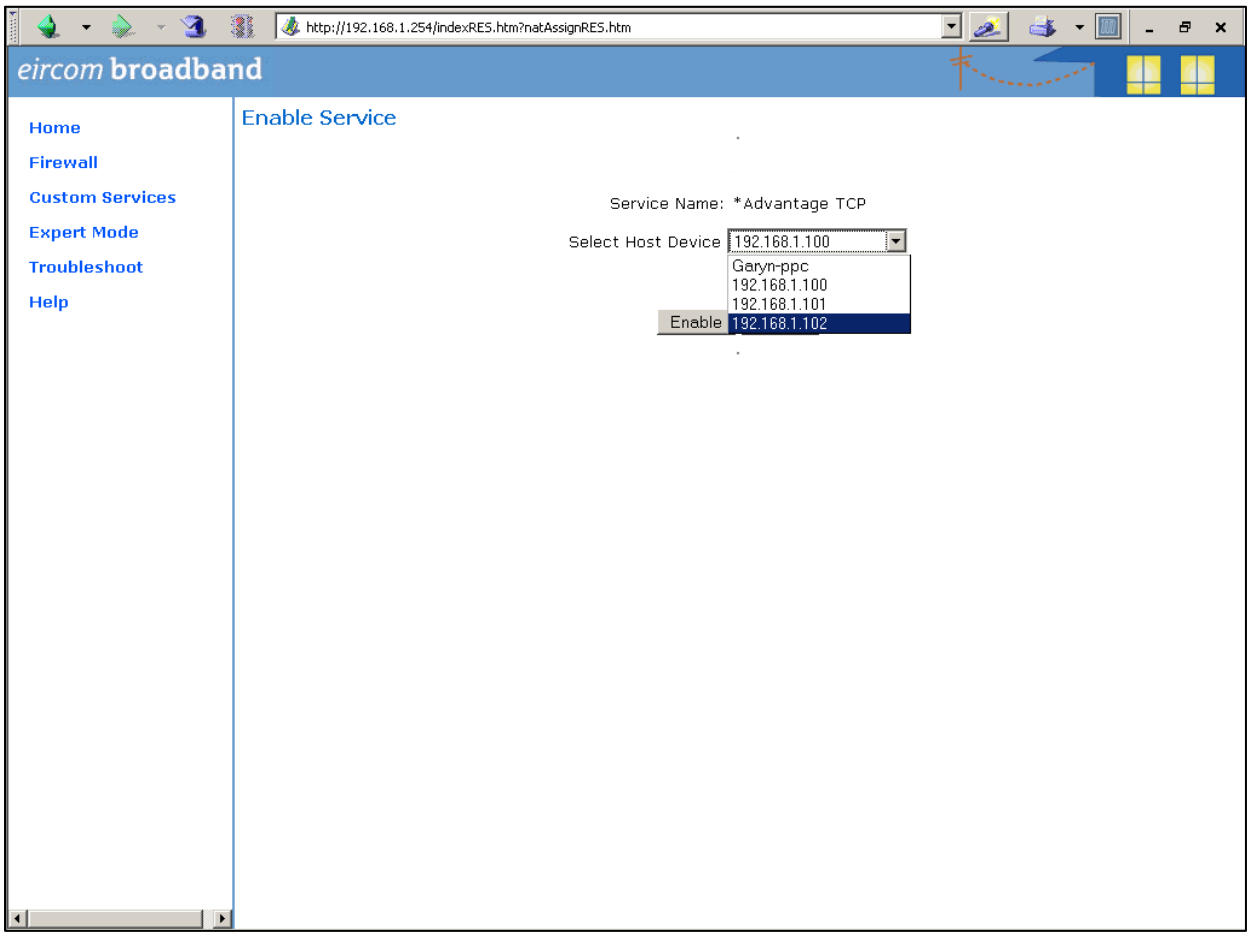
Press ‘Next’ and on the following screen press ‘Done’.



On the next screen, open the dropdown list and select the service ‘Advantage TCP’ which you have defined and press the button ‘Enable’.

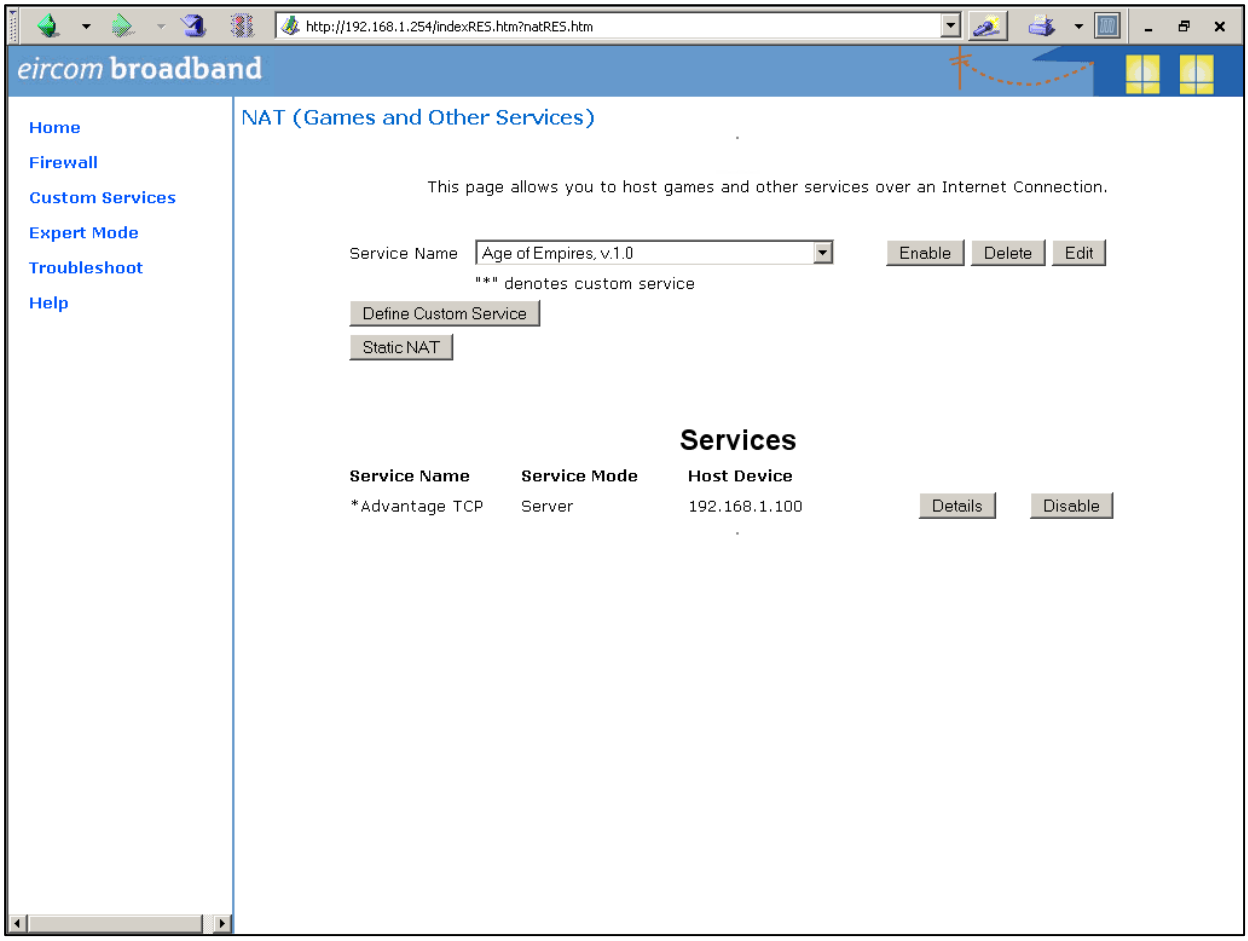


The following screen is displayed:



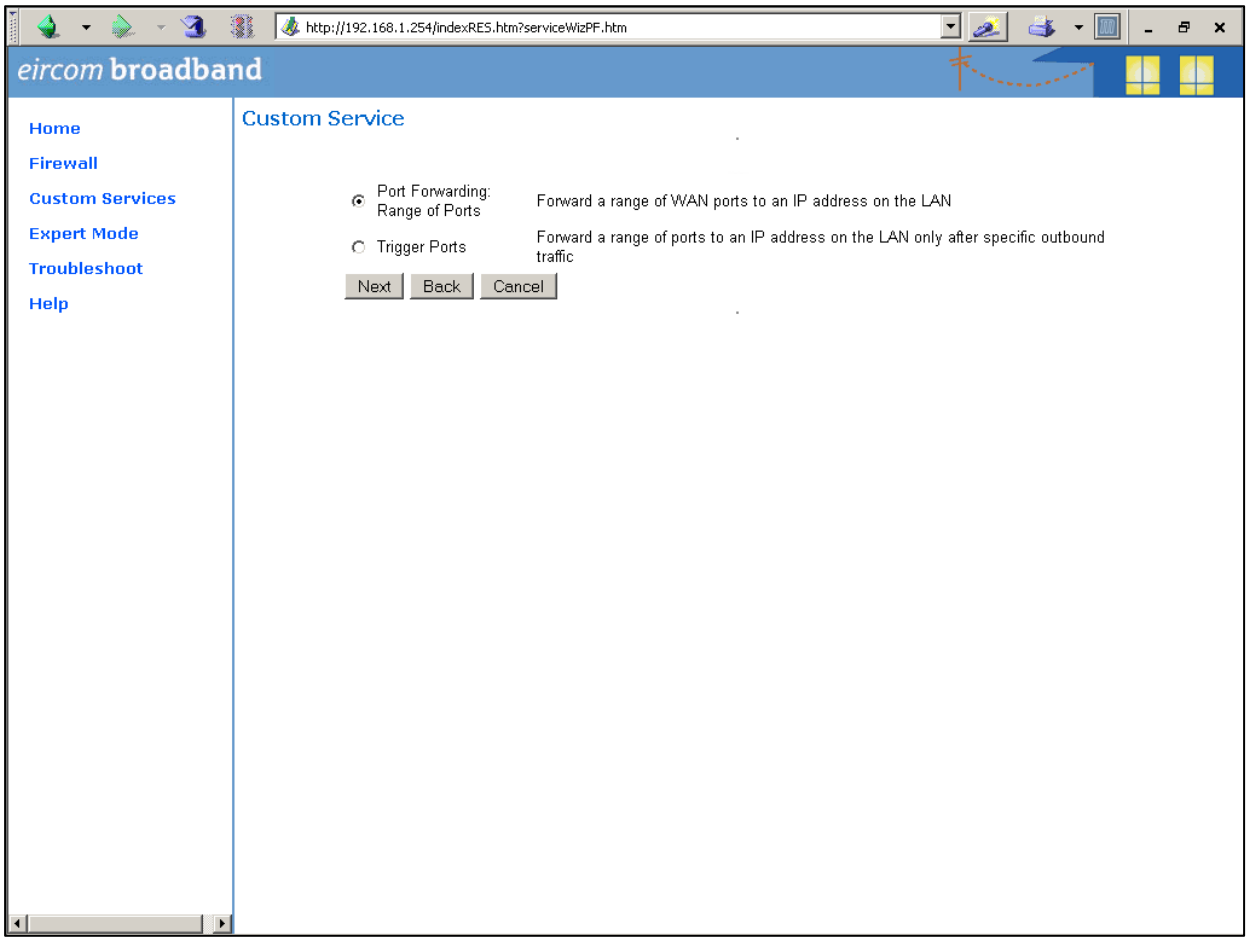
In the dropdown box ‘Select Host Service’ choose the local LAN IP address of the Opera (here called Advantage) system.
Press ‘Enable’.

All TCP traffic on port 5075 will now be forwarded to the Opera system (called Advantage in this example) and this is recorded as shown on the following screen.



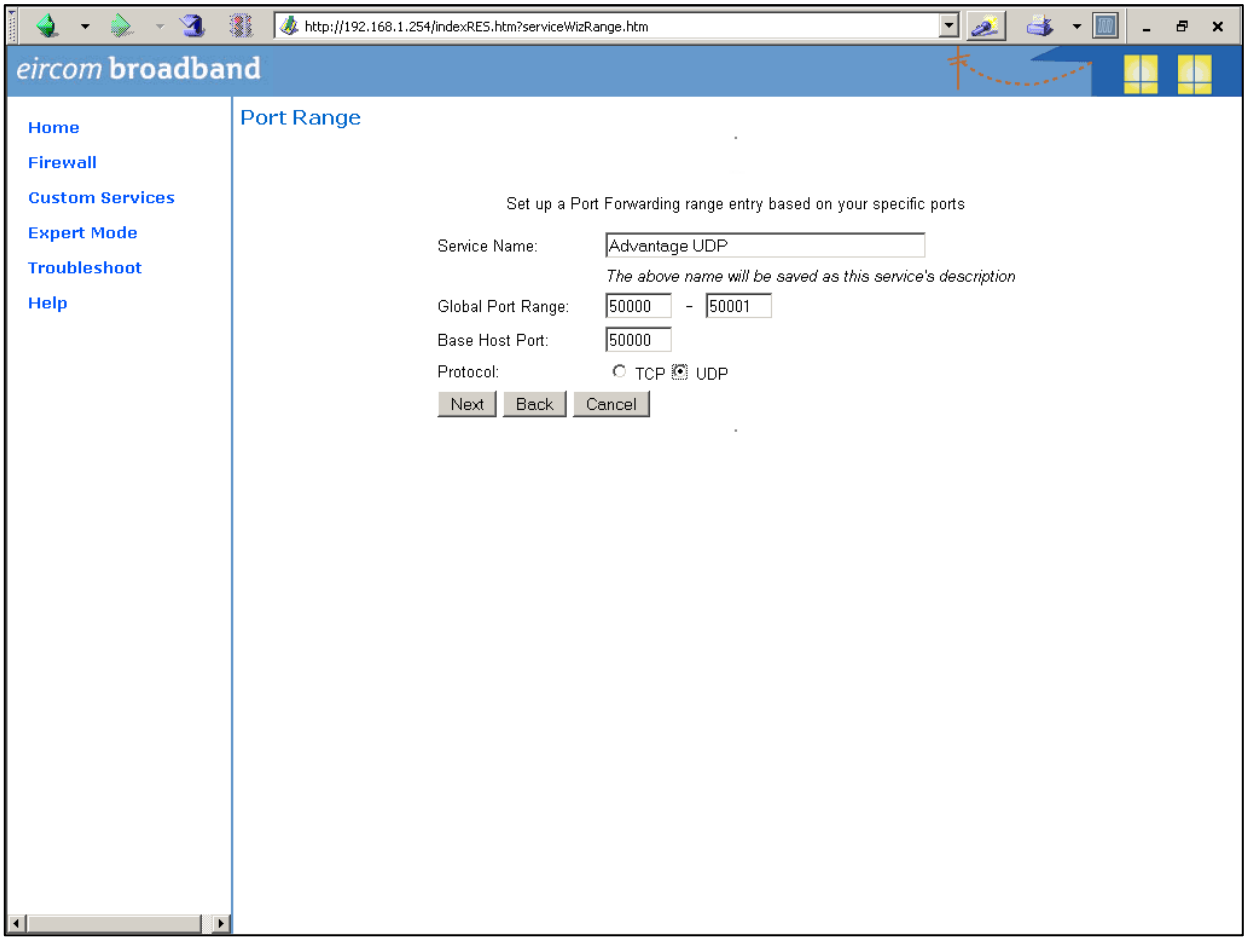
Step 4 Define port Forwarding for UDP

Press the button ‘Define Custom Service’ to display the following screen.
Select ‘Port Forwarding: Range of Ports’ and press ‘Next’.



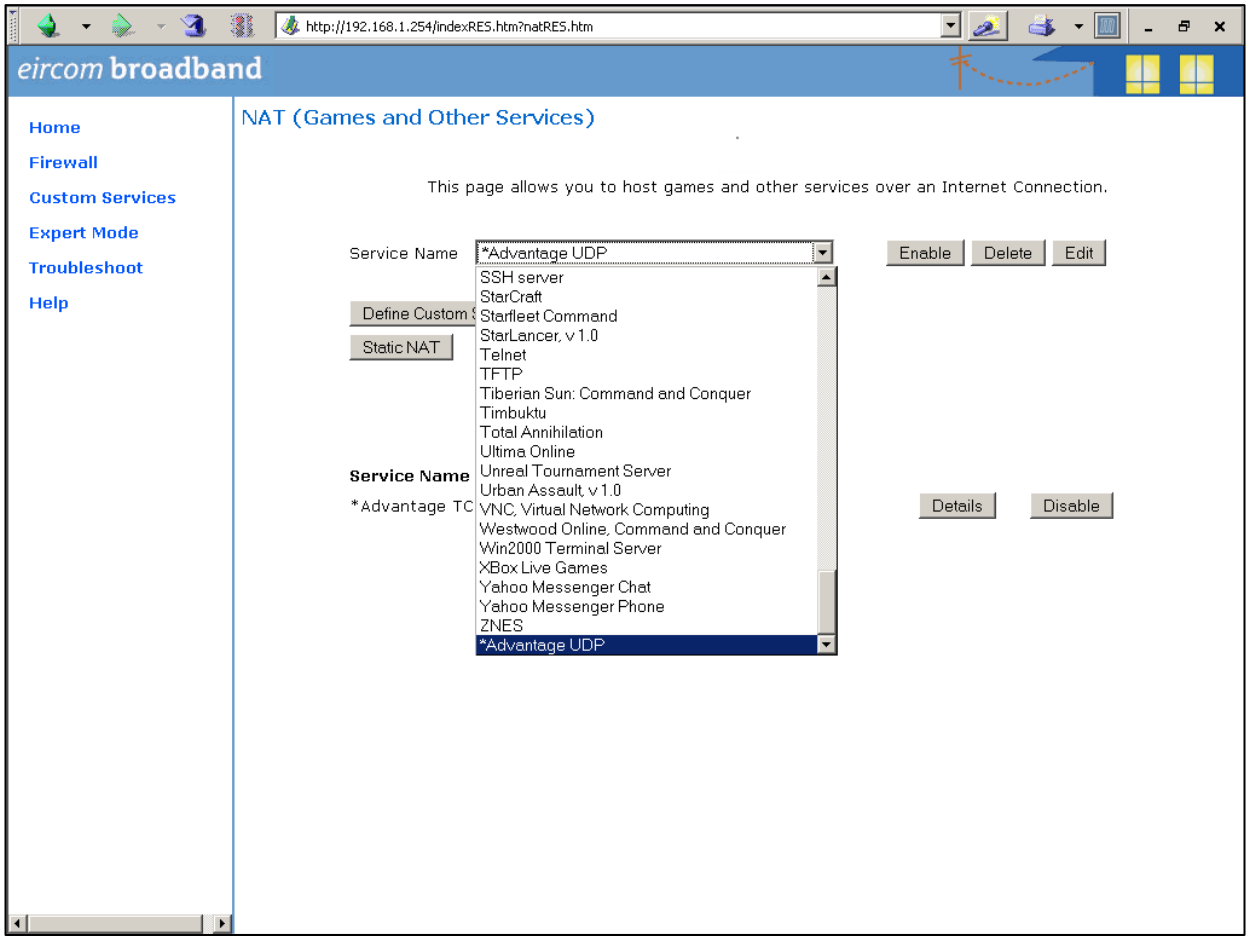
Type in the following information on the next screen as shown:

Service Name: Advantage UDP
Global Port range: 50000 – 50031
Base Host Port: 50031
Protocol: UDP

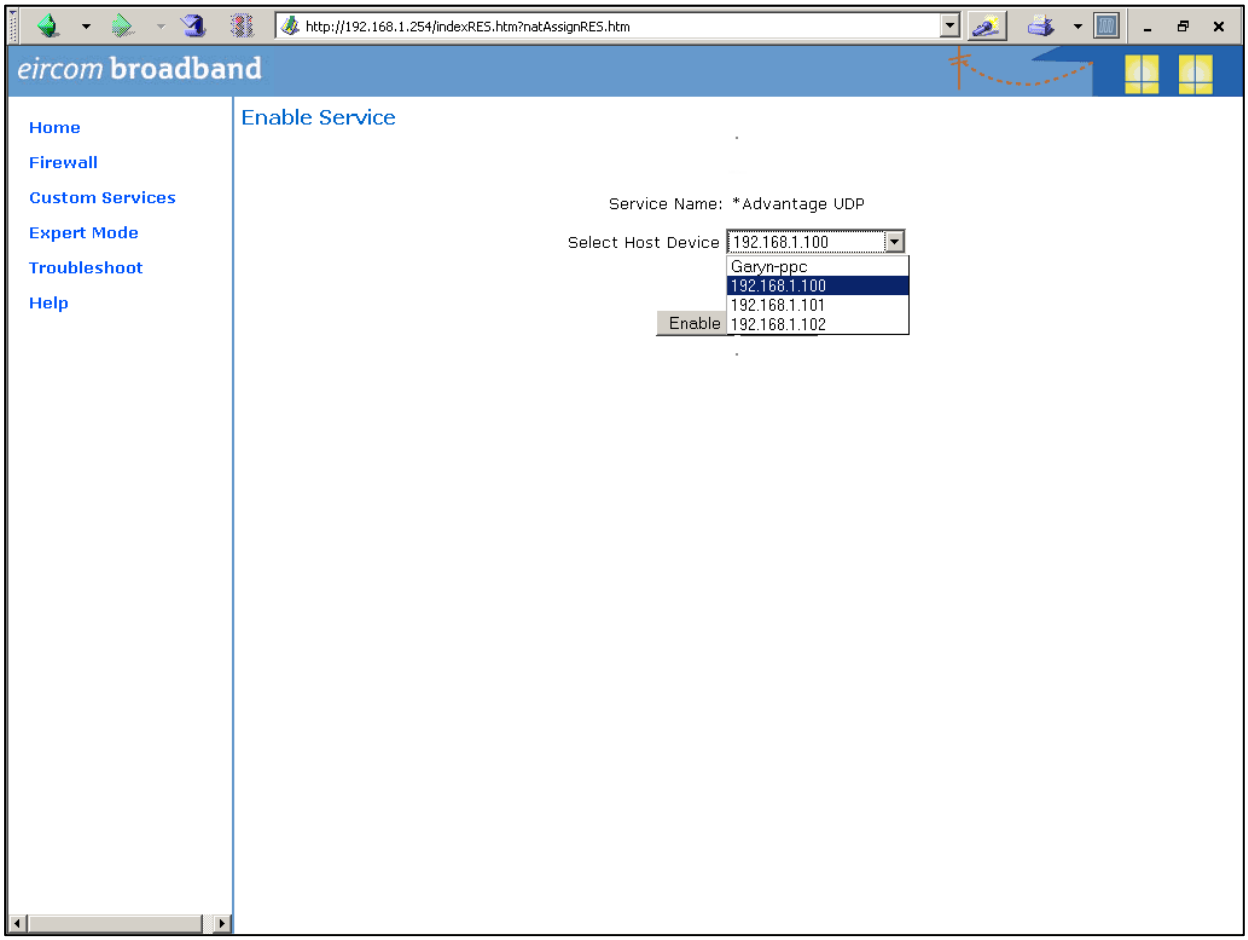


Press ‘Next’ and on the following screen, press ‘Done’. The next screen is displayed.

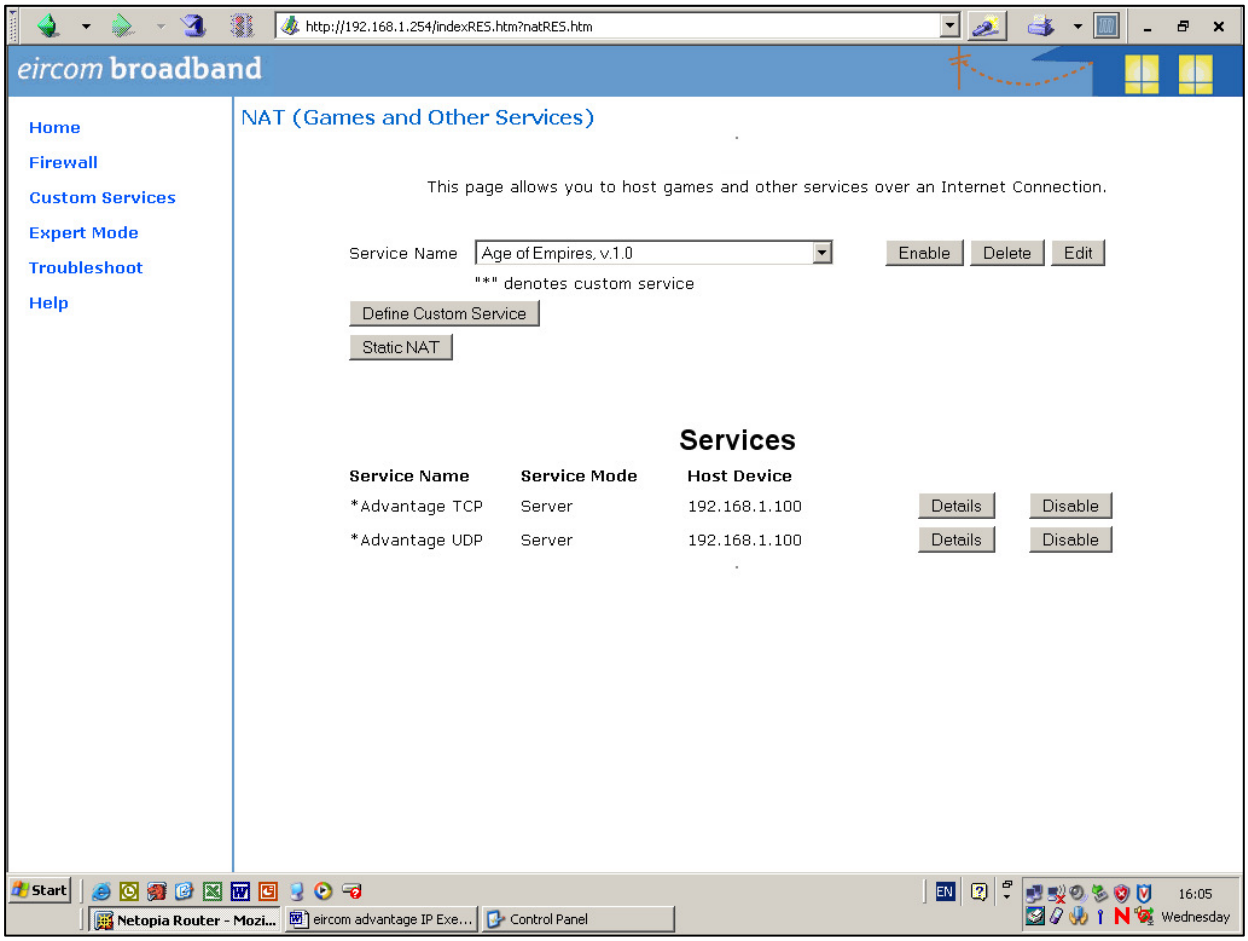
Select ‘Advantage UDP’ from the drop down menu and press Enable.



In the following screen select the local LAN IP address of the Opera (Advantage) system in the box ‘Select Host Device’ and press ‘Enable’.



All UDP traffic on ports 50000 to 50031 will now be forwarded to the Opera (Advantage) system and this is recorded as shown on the next screen.



This completes the configuration of the Port Forwarding.

Appendixl XI System Connection Capacity

Opera 240 System Capacity

This Matrix shows the system connection resources used for each type of call.
The total number of system connection resources available is 120.

System Connection Resources per call	IP System Phone* local LAN	IP System Phone* Remote	Symbian SIP extension WLAN	Analogue a/b and UPN digital	SIP Trunk	VoIP Networking channel	ISDN Trunk Channel	Automated Attendant	Voice Mail
IP System Phone* local LAN	0	1	1	2	1	1	2	6	6
IP System Phone* Remote WAN	1	1	1	2	1	1	2	6	6
Symbian SIP extension WLAN	1	1	1	2	1	1	2	6	6
Analogue a/b and UPN digital extension	2	2	2	2	2	2	2	6	6
SIP Trunk	1	1	1	2	1	1	2	6	6
VoIP Networking channel	1	1	1	2	1	1	2	6	6
ISDN Trunk Channel	2	2	2	2	2	2	2	6	6
Automated Attendant	6	6	6	6	6	6	6	6	6
Voice Mail	6	6	6	6	6	6	6	6	6

*Note
IP System phone includes IP desk phone or a softphone client for Windows PC, Apple iPhone or Android Smartphone