



SIP Trunk Compatibility Report

NEC is pleased to verify that:

BT Wholesale – WSIPT & One Voice Services

Has **successfully** met the standards for SIP Trunk compatibility with the NEC products listed below.

SL1100 (From R5.12)

NEC Enterprise Solutions has performed Interoperability Testing with the Switch(es) and Provider/Service listed above on the date specified.

Please always refer to the appropriate SIP Trunk Compatibility Report Index and the latest edition of a specific Compatibility Report on BusinessNet before considering connection.

If a Provider is no longer mentioned in the Index then the Compatibility Report has been withdrawn and connection will no longer be supported by NEC Enterprise Solutions.

Test Completion Date:	28/03/2015
Test Location:	NEC UK
Name of Provider:	BT Wholesale
Website:	www.btwholesale.com
System Tested:	SL1100
Software Version:	V5.12
SIP Connection Mode:	Networking Mode
Test Plan Version:	5.0

Please refer to the following page(s) for further Information and Configuration Notes.

SIP Configuration Notes – BT Wholesale - WSIPT & One Voice Services

Use the specific configuration guide below as an example to configure an SV9100 PBX for connection to the service described above via SIP trunks.

Recommended Software Versions

SL1100



CCPU v5.12

System Programming

The following items should be changed – all other items are considered irrelevant and as such left as default. Screenshots are for example purposes only and will have been taken from the PBX under test but will apply to the other PBXs listed on the cover of the Compatibility Report.

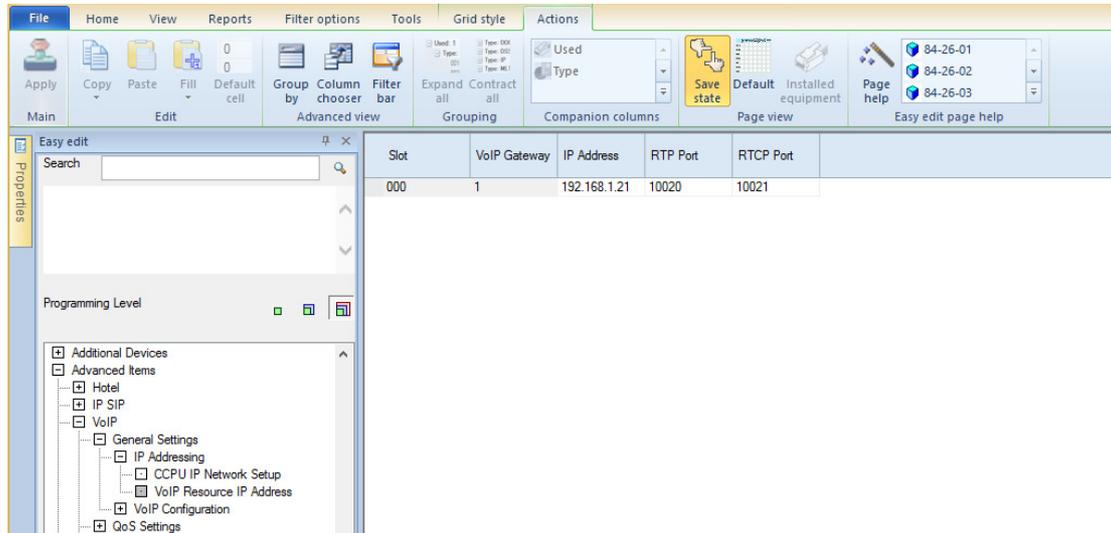
Any differences in programming will be documented where necessary.

Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP > General Settings > IP Addressing > CCPU IP Network Setup	10-12-09	IPLE/VOIPDB IP Address	Set according to customers network requirements
	10-12-10	IPLE/VOIPDB Subnet Mask	Set according to customers network requirements
	10-12-03	Default Gateway	Set according to customers network requirements
	10-12-02	Default Gateway Subnet Mask	Set according to customers network requirements
	10-12-01	IP Address	Must be in a different network range to IPLE IP Address (10-12-09) Must not be set as 0.0.0.0

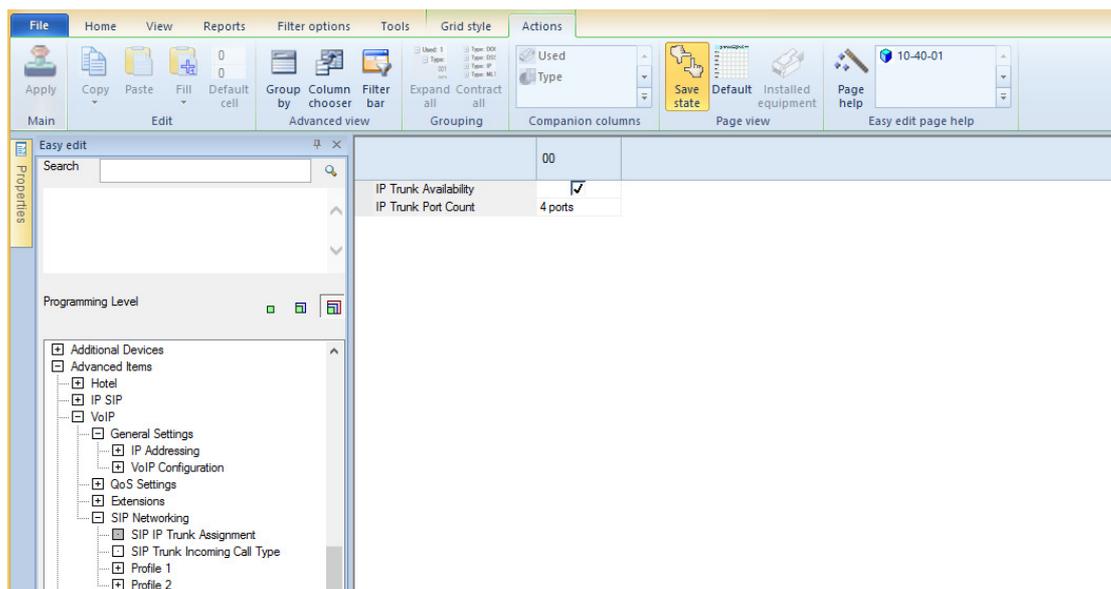
The screenshot shows the configuration interface for the PBX. The 'Easy edit' window is open, displaying the 'CCPU IP Network Setup' configuration page. The left sidebar shows the navigation tree with 'Advanced Items' expanded. The main area shows the following configuration details:

IP Address	172.1.1.10
Subnet Mask	255.255.0.0
Default Gateway	192.168.1.1
Time Zone	(GMT) Greenwich Mean Time, Dublin, Edinburgh, Lisbon, London
NIC Setting	Automatic detection
NAT Router	Used
NAPT Router IP Address	81.82.83.84
ICMP Redirect	<input type="checkbox"/>
VOIPDB IP Address	192.168.1.10
VOIPDB Subnet Mask	255.255.255.0
VOIPDB NIC Setting	Automatic detection
RTP Forwarding Mode	<input type="checkbox"/>

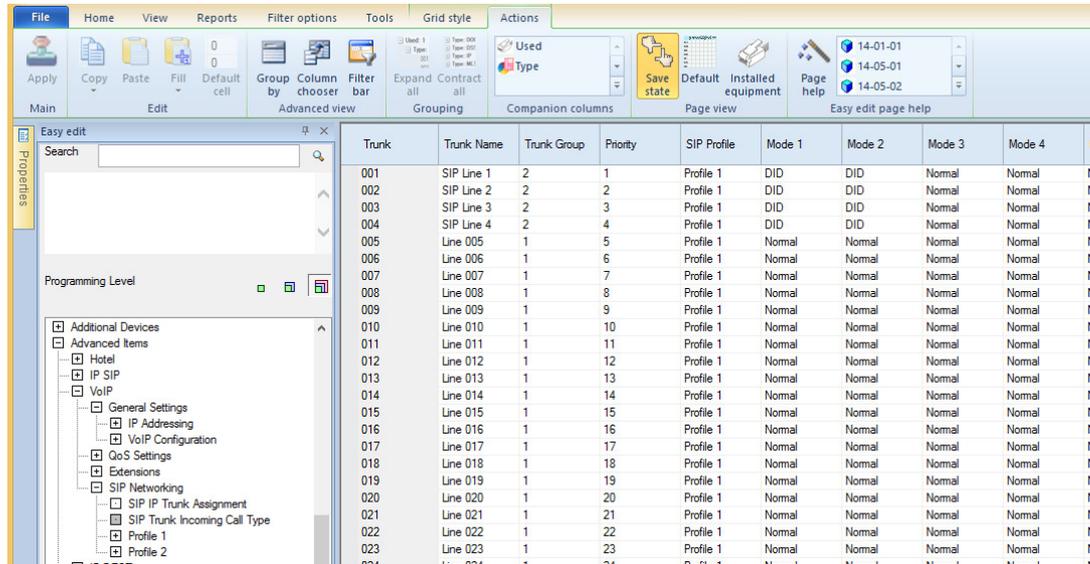
Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP > General Settings > IP Addressing > CCPU IP Network Setup > VOIP Resource IP Address	84-26-01	VoIP Gateway IP Address	Set according to customers network SL1100 requirements. VoIPDB requires 1 x static IP address for the DSP resources.



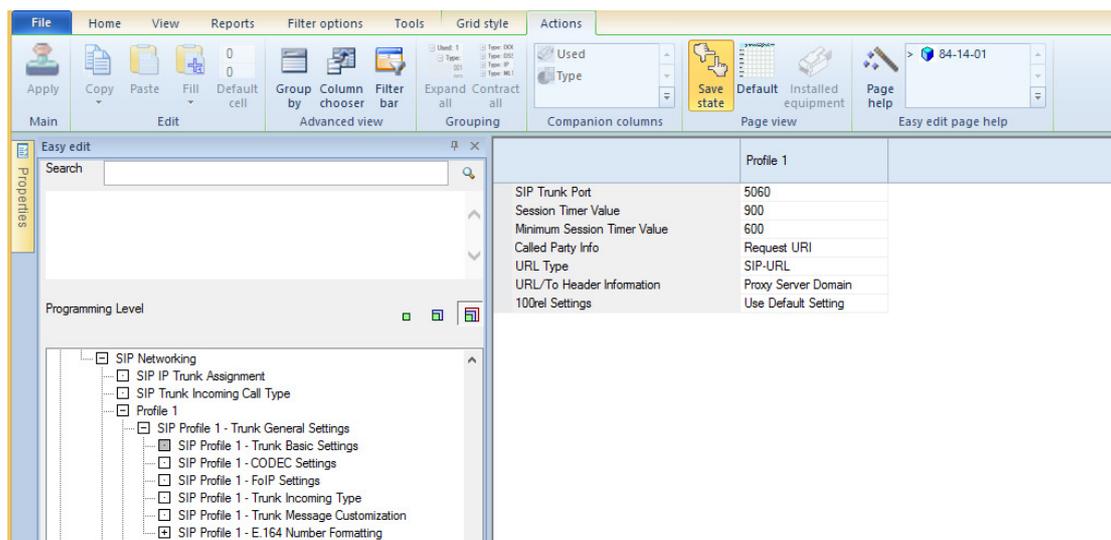
Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP > SIP Networking > SIP IP Trunk Assignment	10-68-01	Trunk Type	Set to SIP
	10-68-02	SIP Trunk Start Point	Enter the Trunk starting port. This may vary depending on other Trunk cards installed and must be from an un-allocated port.
	10-68-03	Number of ports	Enter the number of SIP Trunks required.



Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP > SIP Networking > SIP Trunk Incoming Call Type	14-18-01	Trunk Type	Should be set to SIP
	14-18-05	SIP Profile	Set to Profile 1 or alternative profile if multiple SIP Carriers are required.
	22-02-01	Incoming Call Mode	Set as DID



Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP >SIP Networking > Profile X>SIP Profile X - Trunk General Settings>Trunk Basic Settings	84-14-07	Session timer value	Set to 900
	84-14-08	Minimum session timer value	Set to 600
	84-14-15	100rel Settings	Use Default Setting

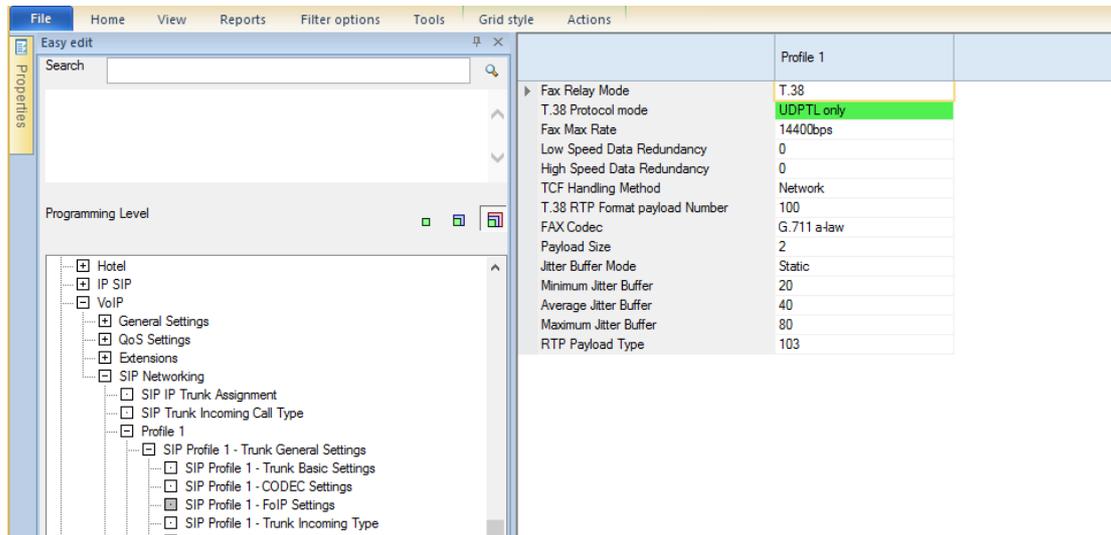


Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP >SIP Networking > Profile X>SIP Profile X - Trunk General Settings>Codec Settings	84-13-28	Audio Capability Priority	Carrier supports G.729 and G.711
	84-34-01	DTMF Relay Mode	Set to RFC2833
	84-34-02	DTMF Payload Size	Set as 101
	84-13-49	RTP Filter	Set to disabled

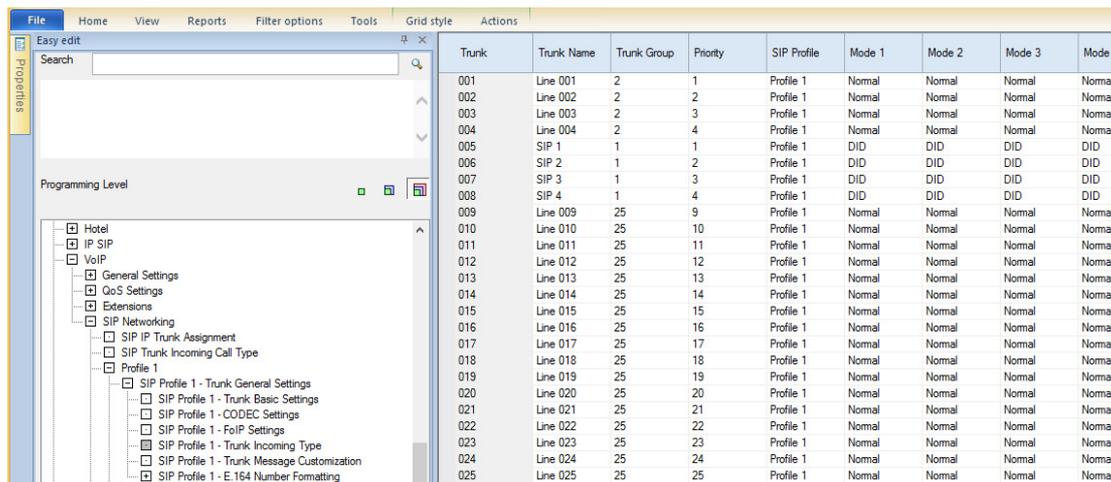
The screenshot shows a software configuration window with a tree view on the left and a settings table on the right. The tree view is expanded to 'SIP Profile 1 - CODEC Settings'. The settings table lists various audio parameters for Profile 1, such as G.711 Maximum Audio Frame Size (20ms), G.711 Voice Activity Detection (20), and G.711 Type (A-law).

Parameter	Value
G.711 Maximum Audio Frame Size	20ms
G.711 Voice Activity Detection	20
G.711 Type	A-law
G.711 Minimum Jitter Buffer Size	20
G.711 Average Jitter Buffer Size	40
G.711 Maximum Jitter Buffer Size	80
G.729 Maximum Audio Frame Size	20ms
G.729 Voice Activity Detection	20
G.729 Minimum Jitter Buffer Size	20
G.729 Average Jitter Buffer Size	40
G.729 Maximum Jitter Buffer Size	80
G.723 Maximum Audio Frame Size	30ms
G.723 Minimum Jitter Buffer Size	30
G.723 Average Jitter Buffer Size	60
G.723 Maximum Jitter Buffer Size	120
Jitter Buffer Mode	Adaptive immediately
Voice Activity Detection Threshold	20
Audio Capability Priority	G.711_PT
DTMF Payload Number	101
DTMF Relay Mode	RFC2833
G.722 Maximum Audio Frame Size	30ms
G.722 Minimum Jitter Buffer Size	30
G.722 Average Jitter Buffer Size	60
G.722 Maximum Jitter Buffer Size	120
G.726 Maximum Audio Frame Size	30ms
G.726 Voice Activity Detection	20
G.726 Minimum Jitter Buffer Size	30
G.726 Average Jitter Buffer Size	60
iLBC Minimum Jitter Buffer Size	30
iLBC Average Jitter Buffer Size	60
iLBC Maximum Jitter Buffer Size	120
iLBC Payload Number	98
RTP Filter	Disabled
VAD Negotiation on SDP	Enabled
Voice Band Data(VBD)	Enabled
VBD Payload Type	97

Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP > SIP Networking > Profile X > SIP Profile X - Trunk General Settings > SIP Profile x - FoIP Settings	84-33-01	Fax Relay Mode	Enable if required to support T.38 Fax
	84-33-02	T.38 Protocol Mode	Set to UDPTL



Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP > SIP Networking > Profile X > SIP Profile X - Trunk General Settings > SIP Profile x - Trunk Incoming Type	14-01-01	Trunk Name	Label Trunks
	14-05-01	Trunk Group/Priority	Assign to Trunk Groups and set priority. You must remove all unused Trunks from the group selected.
	22-02	Incoming Call Trunk Setup	Set to DID



e.164 Number Formatting Support

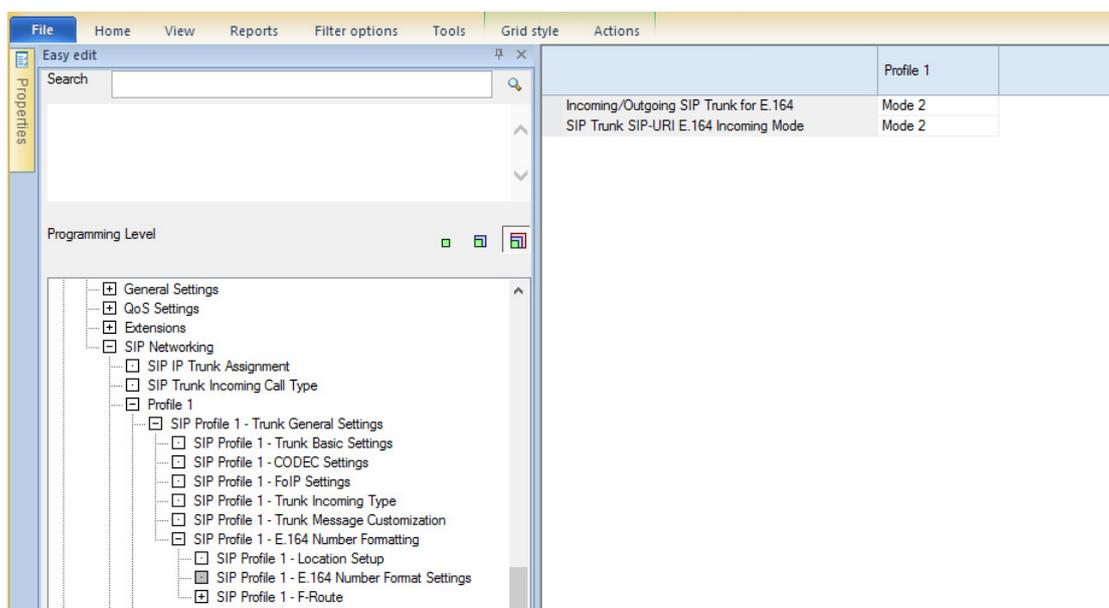
BT Wholesale require that the caller ID presentation to be converted as e.164 format +44 for example. Please configure as below to meet the requirements as addition to the settings above for commands 84-14-13 & 84-14-16 for SIP Profile 1.

Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP >SIP Networking> Profile X >SIP Profile X -Trunk General	10-02-01	Country Code	Enter the country code as 44 for UK
Settings>SIP Profile X – E.164 Number Formatting> SIP Profile x – Location Set Up	10-02-02	International Access Code	Enter as 00
	10-02-03	Caller ID Edit Mode	Enter 0 if required
	10-02-05	CID Edit TAC	Enter the digit used for Trunk Access – Normally 9 or 0

The screenshot displays a software interface with a menu bar (File, Home, View, Reports, Filter options, Tools, Grid style, Actions) and a search bar. The main area shows a tree view of settings under 'Programming Level'. The 'SIP Profile 1 - E.164 Number Formatting' item is selected. To the right, a table displays the configuration values for this setting:

Country Code	International Access Code	Caller ID Edit Code	Area Code	CID Edit Trunk Access Code
44	00	0		0

Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP > SIP Networking > Profile X > SIP Profile X - Trunk General Settings > SIP Profile X – E.164 Number Formatting > SIP Profile x E.164 Number Format Settings	84-14-13	Incoming/Outgoing SIP Trunk for E.164	Set to Mode 2
	84-14-16	SIP Trunk SIP-URI E.164 Incoming Mode	Set to Mode 2



Also configure LCR to convert the dialed digits to add 0044 in front of the number so the customer can still dial using the national format when dialing. LCR also converts numbers dialed from the Speed Dial tables & Caller History from key sets. Please set LCR as per the table below and enable Trunks required.

Advanced Edit	PRG	Item	Setting
Advanced Items > LCR > LCR Dial Data	14-01-23	Least Cost Routing	Enable each required Trunk (SIP Trunk only)
	26-02-01	Dial Data	Enter digits to be modified. See table below and add further digits as required.
	26-02-06	Carrier Table	Enter the required Carrier Table for the modification for each dialled digit.
	26-05-01	LCR Delete Digits	Enter the amount of digits required for deletion per carrier table. See table below
	26-05-02	Access Code	Use this table to add digits per carrier table. See table below.

See screen shot on next page

Trunk	Trunk Name	Least Cost Routing	Dial Data	Carrier Table Entry	Delete digits	Access Code (add digits)	Authorization Code Table Entry	Cost Centre Code
001	BRI 1	Off	00	1	0			
002	BRI 2	Off	01	2	1	0044	0	
003	BRI 3	Off	02	2	0	0044115	0	
004	BRI 4	Off	03	2	0		0	
005	BRI 5	Off	04	2	0		0	
006	BRI 6	Off	05	2	0		0	
007	BRI 7	Off	06	2	0		0	
008	BRI 8	Off	07	2	0		0	
009	SIP 1	On	08	2	0		0	
010	SIP 2	On	09	2	0		0	
011	SIP 3	On	112	1	0		0	
012	SIP 4	On	1	3	0		0	
013	Line 013	Off	2	3	0		0	
014	Line 014	Off	3	3	0		0	
015	Line 015	Off	4	3	0		0	
016	Line 016	Off	5	3	0		0	
017	Line 017	Off	6	3	0		0	
018	Line 018	Off	7	3	0		0	
019	Line 019	Off	8	3	0		0	
020	Line 020	Off	999	1	0		0	
021	Line 021	Off	90	3	0		0	
022	Line 022	Off	91	3	0		0	
023	Line 023	Off	92	3	0		0	
024	Line 024	Off	93	3	0		0	
025	Line 025	Off	94	3	0		0	
026	Line 026	Off	95	3				

Least Cost Routing 14-01-23
Dial Data 26-02-01
Carrier Table Entry 26-02-06
Delete Digits 26-05-01
Access Code (add digits) 26-05-02

Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP > SIP Networking > Profile x > SIP Profile X - Networking Mode > SIP Profile x – System Information Setup	10-28-01	Domain Name	Set according to customers network requirements or leave blank if not required
	10-28-02	Host Name	Set according to customers network requirements or leave blank if not required
	10-36-02	User ID	Enter the user ID supplied by BT Wholesale (normally the main number that must be entered in international format)

Profile	Domain Name	Host Name	User ID	Transport Protocol	Domain Assignment
Profile 1			+441923616...	UDP	IP Address

Easy edit
Search

Programming Level

- Hotel
- IP SIP
- VoIP
 - General Settings
 - QoS Settings
 - Extensions
 - SIP Networking
 - SIP IP Trunk Assignment
 - SIP Trunk Incoming Call Type
 - Profile 1
 - SIP Profile 1 - Trunk General Settings
 - SIP Profile 1 - Networking Mode
 - SIP Profile 1 - System Information Setup
 - SIP Profile 1 - Remote Destinations
 - SIP Profile 1 - Server Setup
 - SIP Profile 1 - Numbering Plan
 - SIP Profile 1 - Calling Party Number for Trunks
 - SIP Profile 1 - Calling Party Number for Extensions

Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP >SIP Networking> Profile x > SIP Profile X - Networking Mode>SIP Profile x – Remote Destinations	10-23-01	System Interconnection	Set to Enabled
	10-23-02	IP Address	Set to SIP server IP Address supplied by BT Wholesale
	10-23-04	Dial Number	The first digit(s) that will be dialled
	10-23-05	Keep Alive Mode	Set to option keep alive mode required for SIP Proxy Fall back to profile 2. See comments for further information on this requirement.
	10-23-06	SIP Profile	Set to Profile 1 or alternative profile if multiple SIP Carriers are required.

Sys No.	System Interconnection	IP Address	Dial Number	Keep Alive mode for SIP	SIP Profile
0001	<input checked="" type="checkbox"/>	62.239.32.253	0	Option Keep ...	Profile 1
0002	<input checked="" type="checkbox"/>	62.239.32.253	1	Option Keep ...	Profile 1
0003	<input checked="" type="checkbox"/>	62.239.32.253	2	Option Keep ...	Profile 1
0004	<input checked="" type="checkbox"/>	62.239.32.253	3	Option Keep ...	Profile 1
0005	<input checked="" type="checkbox"/>	62.239.32.253	4	Option Keep ...	Profile 1
0006	<input checked="" type="checkbox"/>	62.239.32.253	5	Option Keep ...	Profile 1
0007	<input checked="" type="checkbox"/>	62.239.32.253	6	Option Keep ...	Profile 1
0008	<input checked="" type="checkbox"/>	62.239.32.253	7	Option Keep ...	Profile 1
0009	<input checked="" type="checkbox"/>	62.239.32.253	8	Option Keep ...	Profile 1
0010	<input checked="" type="checkbox"/>	62.239.32.253	9	Option Keep ...	Profile 1
0011	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0012	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0013	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0014	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0015	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0016	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0017	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0018	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0019	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0020	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0021	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0022	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0023	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0024	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0025	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1
0026	<input type="checkbox"/>	0.0.0.0		Disabled	Profile 1

Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP >SIP Networking> Profile x > SIP Profile X - Networking Mode>SIP Profile x – Server Setup	10-28-05	Domain Assignment	Set to IP Address
	84-14-17	Call Forward Moved Temporarily Support	Not supported. Use standard forwarding methods if external divert is required
	10-29-05	SIP Carrier Choice	Set to carrier format B (See comments for more information why this format is required).
	10-29-16	Register Sub Mode	Set to disabled
	10-12-06	NAPT Router	Enable if required
	10-29-21	NAPT Router IP Address	Enable if Router if configured for port forwarding to modify the contact header from private to public IP address

The screenshot shows a software interface with a menu bar at the top: File, Home, View, Reports, Filter options, Tools, Grid style, Actions. Below the menu is a search bar and a 'Properties' sidebar. The main area is divided into a tree view on the left and a properties panel on the right.

Tree View:

- Hotel
 - IP SIP
 - VoIP
 - General Settings
 - QoS Settings
 - Extensions
 - SIP Networking
 - SIP IP Trunk Assignment
 - SIP Trunk Incoming Call Type
 - Profile 1
 - SIP Profile 1 - Trunk General Settings
 - SIP Profile 1 - Networking Mode
 - SIP Profile 1 - System Information Setup
 - SIP Profile 1 - Remote Destinations
 - SIP Profile 1 - Server Setup
 - SIP Profile 1 - Numbering Plan
 - SIP Profile 1 - Calling Party Number for Trunks
 - SIP Profile 1 - Calling Party Number for Extensions

Properties Panel (Profile 1):

Register Mode	None
SIP Carrier Choice	Carrier B
Register Sub Mode	<input type="checkbox"/>
NAPT Router	Used
NAPT Router IP Address	81.168.26.35
Call Forward Moved Temporarily Support	Disabled
Keep Alive by OPTION Interval Timer	180
Keep Alive by OPTION Fail Limit	1
Option Keep Alive User ID	ping

Advanced Edit	PRG	Item	Setting
Advanced Items > VoIP >SIP Networking> Profile x > SIP Profile X - Networking Mode>SIP Profile x – Calling Party Number for Extensions	21-19	SIP Extension CPN Number	Enter the full number including the area code

The screenshot shows a network configuration interface with a table of SIP extension settings and a tree view of the configuration hierarchy.

Station Port	Extension	Name	SIP Extension - Calling Party Number Profile 1
001	200		00441923616753
002	201		00441923616751
003	202		
004	203		
005	204		
006	205		
007	206		00441923616753
008	207		00441923616751
009	208		
010	209		
011	210		
012	211		
013	212		
014	213		
015	214		
016	215		
017	216		
018	217		
019	218		
020	219		
021	220		
022	221		
023	222		
024	223		
025	224		
026	225		

The tree view on the left shows the configuration hierarchy:

- Hotel
 - IP SIP
 - VoIP
 - General Settings
 - QoS Settings
 - Extensions
 - SIP Networking
 - SIP IP Trunk Assignment
 - SIP Trunk Incoming Call Type
 - Profile 1
 - SIP Profile 1 - Trunk General Settings
 - SIP Profile 1 - Networking Mode
 - SIP Profile 1 - System Information Setup
 - SIP Profile 1 - Remote Destinations
 - SIP Profile 1 - Server Setup
 - SIP Profile 1 - Numbering Plan
 - SIP Profile 1 - Calling Party Number for Trunks
 - SIP Profile 1 - Calling Party Number for Extensions

Network Configuration

If Public IP addresses are assigned to the SL1100 and VoIP Gateways, then there should be no network configuration required.

If there is one public IP address assigned, and NAT is used, it is necessary to configure Port Forwarding on the router and we recommend that SIP ALG is disabled:

- Port 5060 should be forwarded to the IPLE IP address as per command 10-12-09. If using multiple SIP Carriers then port 5062 should be used for the second profile in command 84-14-06. BT Wholesale has not been tested in this mode. SIP Carrier does not need to change their port as 5060 is still correct.
- Port 10020 – 10533 should be forwarded to the VoIP Gateway IP addresses as per command 84-26-01
- NAT Router should be enabled in PRG10-29-21 and the Public IP address should be entered into PRG10-12-07.

Licensing

The SL1x000 platform also includes 4 SIP Trunk licenses when a VoIP DB card has been installed but additional SIP Trunk licenses for each Trunk thereafter. The SL supports up to 32 SIP Trunks.

Comments / Known Limitations

- SIP calls are sent “en bloc”. This means that the External Call Interdigit timer (PRG21-01-03) must expire before the call is set up. This can be reduced, but will have an impact on ISDN trunks also. The user can dial # to indicate “end of dialling” instead if required.
- Command 20-25-02 to provide ring back tone for SIP to SIP calls.
- **BT SIP Accounts have a WEB portal where the SIP Settings can be amended as required. You will need to change the Caller ID presentation to use the From Header instead of the P-Asserted Identification field (default setting). This is required if the customer requires flexible CLIP using command 21-17 (Trunk Level) or 21-19 (Extension Level) to send an alternative CLI for outbound calls other than the base number. CLIP should be entered in international format 00441923610000 for example.**
- **SIP Carrier B format in 10-29-14 must be used for the BT WSIPT service as this format does not send the Privacy header that can override settings that can be applied using the BT web portal for example withheld CLIP at network level. Note comment above.**
- Fax over SIP Trunks has been tested using T.38 for both inbound and outbound. Please note that we cannot always guarantee fax over IP as this can fail due to the Fax Machines used or bandwidth / packet loss on the network. Command 15-03-03 must be set to special & 15-03-18 set to Fax for the SLT extensions used for Fax and Fax Relay Mode must be enabled in 84-13-50.
- Minimum and maximum session expiry timers need to be set as 600 for the minimum expiry timer (84-14-08) & 900 for the maximum (84-14-07) as required by BT Wholesale.
- Call Forward Moved Temporally with T302 return not supported with BT. If Call defection via SIP is required then Trunk to Trunk external forwarding will need to be configured.
- BT Wholesale provides a secondary SIP Server IP Address that can be used for back-up if their primary connection fails also referred to as SIP Proxy Fallback. This feature is not currently supported as the delay for fall-back is too long. We are looking into supporting this at a later date when the fall-back timer is more flexible but for now if required command 10-23-02 could be amended to their back up SIP Server address if the primary SIP Server not contactable.

NEC Enterprise Solutions cannot be held responsible for any regulatory non-compliance resulting from the use of this service.

Document History

Version	Date	Description
5.0	17/04/2015	Certification tests were completed using BT Wholesales SIP Certification Plan. This report is now released for the SL1100
5.1	28/04/2015	Added comment regarding SIP Proxy Fallback
5.2	06/01/2016	Updated certification regarding Carrier Format B to be used instead of E so that the privacy header is not sent in the invite for outgoing calls. Comments added that the BT SIP Account will need to be updated to use the From Header instead of the PAID header for outgoing CLIP requirements.

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