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The SL2100
Quick Install Guide:
Virtual Loopbacks

Out of the box installations for resellers

www.nec-enterprise.com

This guide explains the configuration and operation of Virtual Loopbacks on the SL2100 Telephone System. Further information is available on BusinessNet.
Please keep all information supplied for future reference.

Regulatory Notice.
Refer to the Declaration of Conformity shown in the SL2100 Hardware Manual
Warning: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Contents

1 – What are Virtual Loopbacks?

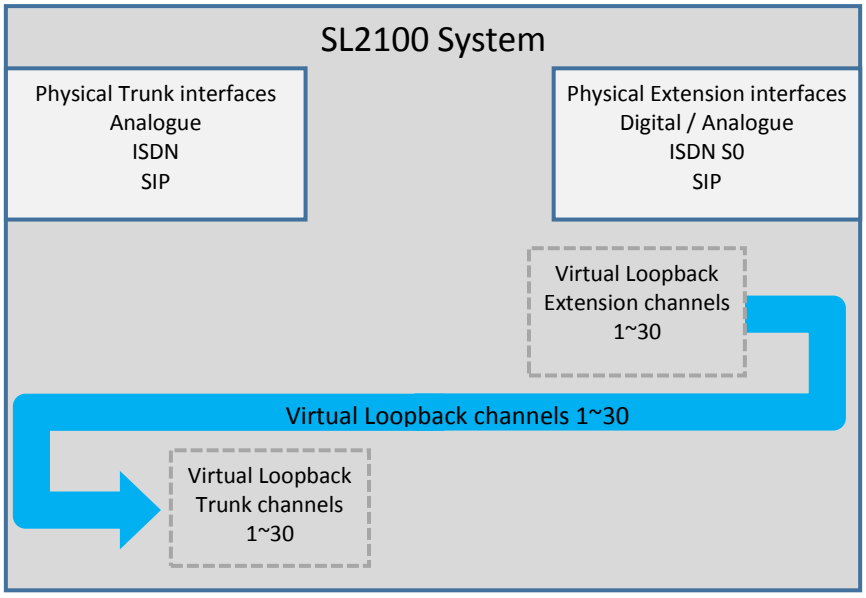
The SL2100 has a built in loopback feature, that can be used to increase the flexibility of call routing.

Virtual loopback ports are presented as trunk and extension ports and can be configured in a similar way to an ISDN trunk and ISDN S-Point extension.

Common uses of Virtual Loopbacks

- Giving DDI routing options to an incoming analogue trunk call
- Giving extensions the ability to make an internal call that routes as if it were an incoming DDI call
- Increasing routing options and flexibility of the Auto Attendant feature

Representation of Virtual Loopback channels



Calls routed to a virtual extension port will automatically be presented to the corresponding virtual trunk port.

Virtual Loopback Channels

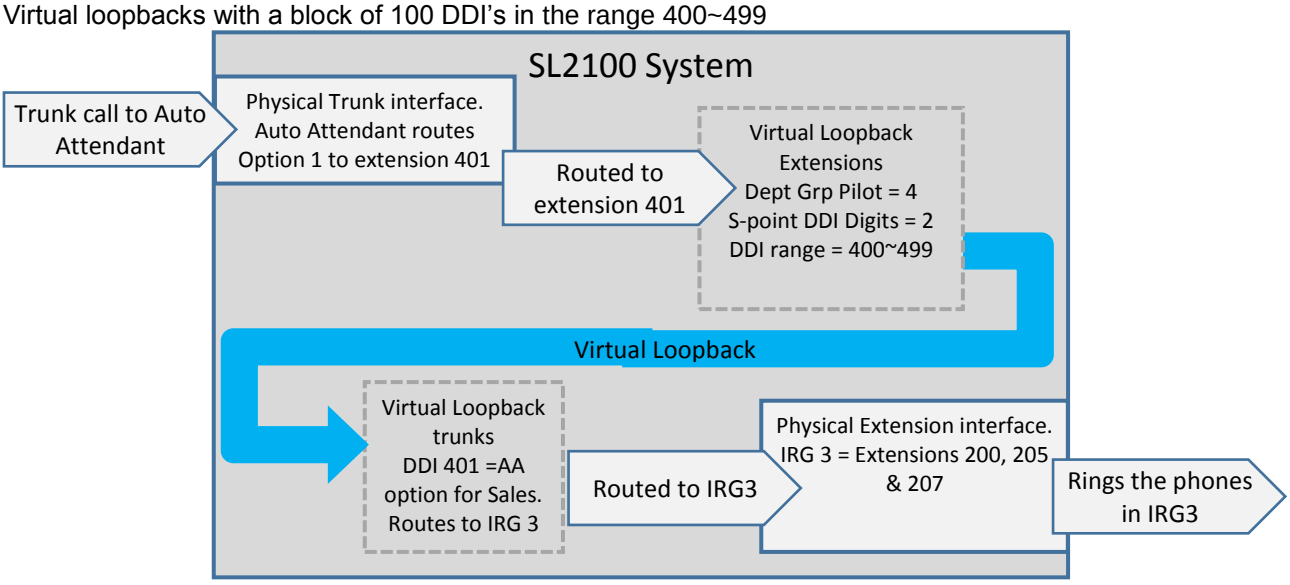
- You can select up to 30 Virtual Loopback channels.
- Each channel will reserve 1 x trunk and 1 x extension interface within the system, you must have spare trunk and extension ports available to be able to setup Virtual loopbacks.
- The SL2100 supports up to 128 trunks and 128 extensions (Physical + Virtual) within the system configuration.
- Channels are automatically assigned, you can not select the ports used.

2 – Overview of Virtual Loopback Operation

The virtual trunks are configured as DDI trunks, this gives maximum flexibility.
In order to provide the range of DDI numbers required it is necessary to assign one or more DDI digits to the virtual extension ports. As shown earlier, calls to any of the virtual loopback extensions will be presented to the corresponding virtual loopback trunk as an incoming trunk DDI call.

To simplify numbering the virtual extensions are placed into a Department Group and a pilot number assigned. Calls to the Department Group Pilot number will then be presented to any of the virtual loopback extension ports. Additional DDI digits are defined for the virtual loopback extensions, these are wildcard digits and appended to the Department group pilot number.
This can be visualised as creating an ISDN PRI interface with a block of incoming DDI digits of your choice.

Example
Virtual loopbacks with a block of 100 DDI's in the range 400~499



Calls made to 400~499 will be presented as an incoming DDI call at the virtual loopback trunk port.
The DDI's 400~499 can be routed as you would for a DDI received on an ISDN trunk interface – ***the configuration of a virtual loopback trunk is exactly the same as a physical ISDN trunk***.

Tips

- Install all physical interfaces (cards and InMail) before creating your virtual loopback channels
- Configure your virtual loopbacks into their own areas, this makes your configuration easier to setup
    - Give the virtual loopback extension ports extension numbers away from those of your physical extensions
    - Give the Department group a pilot number away from those of your physical extension/groups
    - Assign the virtual loopback trunks to a unique trunk group and DDI table area
- Plan your configuration before configuring your virtual loopbacks, use the work sheet at the end of this guide
- Only configure the quantity of loopback channels required to support the quantity of simultaneous calls the customer wants to route
- Only allow outgoing trunk access for the virtual loopback trunks if you specifically want to support calls made out via the trunks

3 – Virtual Loopback Configuration

Refer to the SL2100 Hardware Manual for full installation instructions.

1. Using Telephone Programming to select the quantity of virtual loopback channels required
2. Using PCPro configure the channels for call routing

4 – Use KeyTel Pro to Select the Quantity of Channels

The number of virtual loopback channels can only be setup using a system telephone or web interface

Setup the Virtual Loopbacks by the Telephone Handset

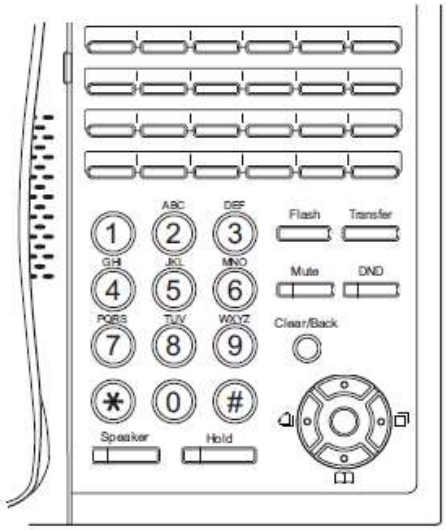
How to enter programming mode

At an idle system telephone

- Speaker
- #*#*
- Installer level password [default=12345678]
- Hold

How to exit programming mode

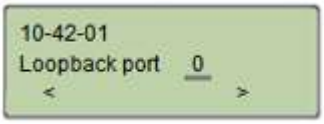
- Mute x 3 presses
- Speaker



Other keys used within programming mode

Hold = store and next
Mute = back
DND = scroll
Flash = clear

Create your virtual loopback channels:
Dial **Speaker # * # *** [**pwd**] **Hold**
Dial **10 42 01**
To access program command 10-42-01



Use the **keypad** to enter the quantity of virtual loopback channels required (10 channels in this example)
Press **Hold**

The start port of the virtual trunks will be displayed
Note – If 0 is displayed then assignment as been rejected – try the process again.

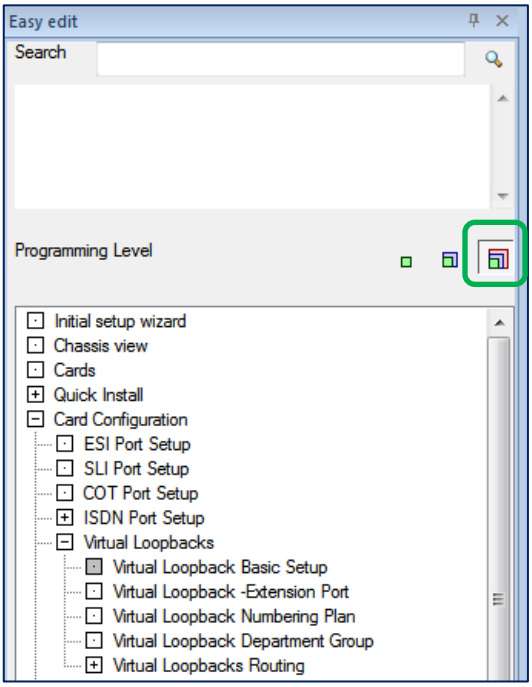
Press **Mute** key 3 times and then press **Speaker** to save and exit

5 – Configure Virtual Loopback with PCPro

Connect PCPro to the SL2100 and download the configuration.

Select Programming Level 3 within Easy Edit

Virtual loopback configuration can be found in Easy Edit – Card Configuration – Virtual Loopbacks



(A) Virtual Loopback Basic Setup

Confirm the channels used and the start port of the virtual trunks and extension ports.
Define the quantity of S-Point DDI digits to be appended to the Department Group pilot number.

Loopback Port Count	Logical Trunk Port	Logical Telephone Port	S-point DDI Digits
10	5	13	2

(B) Virtual Loopback Extension Port

Name the loopback extension ports and assign them to a unique department group

Station Port	Extension	Name	Department Group	Logical Telephone Port	Loopback Port Count
001	200	Extn 200	1	13	10
002	201	Extn 201	1		
003	202	Extn 202	1		
004	203	Extn 203	1		
005	204	Extn 204	1		
006	205	Extn 205	1		
007	206	Extn 206	1		
008	207	Extn 207	1		
009	208	Extn 208	1		
010	209	Extn 209	1		
011	210	Extn 210	1		
012	211	Extn 211	1		
013	212	LB1	10		
014	213	LB2	10		
015	214	LB3	10		
016	215	LB4	10		
017	216	LB5	10		
018	217	LB6	10		
019	218	LB7	10		
020	219	LB8	10		
021	220	LB9	10		
022	221	LB10	10		

The loopback extension start port and channel quantity

Virtual loopback extensions (A)

(C) Virtual Loopback Numbering Plan

Define the system numbering plan to provide the DDI range for the virtual loopback Department Group pilot number (D) + appended DDI digits (A)

1st Dial Digit	1st and 2nd Dial Digits	Dial Digit Length	Type
3	3#	0	Not used
4	4x	2	Extension
4	41	0	Not used
4	42	0	Not used

Type = Extension for virtual loopbacks

The S-Point DDI digit range created = Department Group Pilot Number + Quantity of S-Point DDI Digits

Examples:

1st & 2nd Dial Digits	Dial Digit length (C)	Department Group Pilot number (D)	Quantity of S-Point DDI digits (A)	DDI range created	Total quantity of DDI's
4x	1	4	1 (0~9)	40~49	10
4x	2	41	2 (00~99)	4100~4199	100
4x	3	420	1 (0~9)	4200~4209	10
4x	2	44	3 (000~999)	44000~44999	1000

(D) Virtual Loopback Department Group

Assign the pilot number and name. You can use any spare Department group and extension number range.
Name is only for your information, use a name that is easy to identify.
Enable Call Recall Restriction for the group used.

Department Group	Pilot	Name	Call Recall Restriction
01			Disabled (Recall)
02			Disabled (Recall)
03			Disabled (Recall)
04			Disabled (Recall)
05			Disabled (Recall)
06			Disabled (Recall)
07			Disabled (Recall)
08			Disabled (Recall)
09			Disabled (Recall)
10	41	VLoop	Enabled (Non-recall)
11			Disabled (Recall)
12			Disabled (Recall)

Virtual loopback Department Group pilot number

(E) Virtual Loopback Trunk Group

Assign a name and use a unique trunk group to the virtual loopback trunks. You can use any spare trunk group.
Do not mix physical trunks and virtual loopback trunks within this trunk group.
Trunk Name is only for your information, use a name that is easy to identify.
Priority is not important, leave at default.
Enable Trunk to Trunk Caller ID Through Mode for all loopback trunks.

Trunk	Trunk Name	Trunk Group	Priority	Trunk to Trunk Outgoing Caller ID Through Mode	Logical Trunk Port	Loopback Port Count
001	Line 001	1	1	☐	5	10
002	Line 002	1	2	☐		
003	Line 003	1	3	☐		
004	Line 004	1	4	☐		
005	LB1	25	5	☑		
006	LB2	25	6	☑		
007	LB3	25	7	☑		
008	LB4	25	8	☑		
009	LB5	25	9	☑		
010	LB6	25	10	☑		
011	LB7	25	11	☑		
012	LB8	25	12			
013	LB9	25	13			
014	LB10	25	14			
015	Line 015	1	15	☐		
016	Line 016	1	16	☐		

The loopback trunk start port (5) and channel quantity (10)

Virtual loopback trunks 5~14

(F) Virtual Loopback DDI Table Area

Create a unique DDI translation table area to be used for the virtual loopback incoming DDI calls.
Use a different table area to those you are using for your physical DDI trunks.
Assign sufficient table size to support the DDI range you created (eg 10, 100, 1000 etc) for the virtual loopback department group.

DDI Translation Table Area	1st Area Starting Address	1st Area Ending Address	2nd Area Starting Address	2nd Area Ending Address
01	1	50	0	0
02	51	100	1	50
03	101	150	1	50
04	151	200	1	50
05	201	250	1	50
06	251	300	1	50
07	301	350	1	50
08	351	400	1	50
09	0	0	0	
10	701	800		
11	0	0	0	
12	0	0	0	

Used by the physical DDI trunks

Used by the virtual loopback DDI trunks

(G) Virtual Loopback DDI Table Area Target

Define the Dial-in Receive DDI digits for the trunk group used for the virtual loopback trunks.
Set the quantity of Dial-in Receive Digits to equal the quantity of DDI digits you created in (C) Virtual Loopback Numbering Plan
Route the trunk group to the DDI Table Area you've defined in (F) Virtual Loopback DDI Table Area.

Trunk Group	Dial-in Receive Digits	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5	Mode 6	Mode 7	Mode 8
25	4	10	10	10	10	10	10	10	10

The quantity of DDI digits received

DDI Table area for each Day/Night mode 1~8

(H) Virtual Loopback Trunk Type

Set all virtual loopback trunks to DDI type for all Day/Night modes 1~8

Trunk	Trunk Name	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5	Mode 6	Mode 7	Mode 8
001	Line 001	DID	DID	DID	DID	DID	DID	DID	DID
002	Line 002	DID	DID	DID	DID	DID	DID	DID	DID
003	Line 003	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
004	Line 004	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
005	LB1	DID	DID	DID	DID	DID	DID	DID	DID
006	LB2	DID	DID	DID	DID	DID	DID	DID	DID
007	LB3	DID	DID	DID	DID	DID	DID	DID	DID
008	LB4	DID	DID	DID	DID	DID	DID	DID	DID
009	LB5	DID	DID	DID	DID	DID	DID	DID	DID
010	LB6	DID	DID	DID	DID	DID	DID	DID	DID
011	LB7	DID	DID	DID	DID	DID	DID	DID	DID
012	LB8	DID	DID	DID	DID	DID	DID	DID	DID
013	LB9	DID	DID	DID	DID	DID	DID	DID	DID
014	LB10	DID	DID	DID	DID	DID	DID	DID	DID

(I) Virtual Loopback DDI Routing Table

Define your incoming DDI routing, this is exactly the same setup you would use for a physical ISDN trunk and DDI.
The DDI Translation Table Entry range is defined in (F) Virtual Loopback DDI Table Area.
You may have different DDI Tables areas per night mode if you set this in (G) Virtual Loopback DDI Table Area Target

DDI Translation Table Entry	Received Number	DDI Name	Target 1	Transfer Operation Mode	Target 2	Target 3
694				No Transfer	0	0
695				No Transfer	0	0
696				No Transfer	0	0
697				No Transfer	0	0
698				No Transfer	0	0
699				No Transfer	0	0
700				No Transfer	0	0
701	4100	AA Opt1	200	Busy/No Ans...	1	0
702	4101	AA Opt2		No Transfer	2	0
703	4102	AA Op3		No Transfer	5	0
704	4103	LB test	200	No Transfer	0	0
705	4104	LB Sales		No Transfer	5	0
706				No Transfer	0	0
707				No Transfer	0	0
708				No Transfer	0	0
709				No Transfer	0	0

Tip – set one of the virtual loopback DDI's to route to an known working extension number, you can use this to confirm that the virtual loopbacks are configured and working correctly by making a test call.
In the example above a test call can be made to virtual extension 4103 which will ring at extension 200 and display 'LB test'.

6 – Additional Information

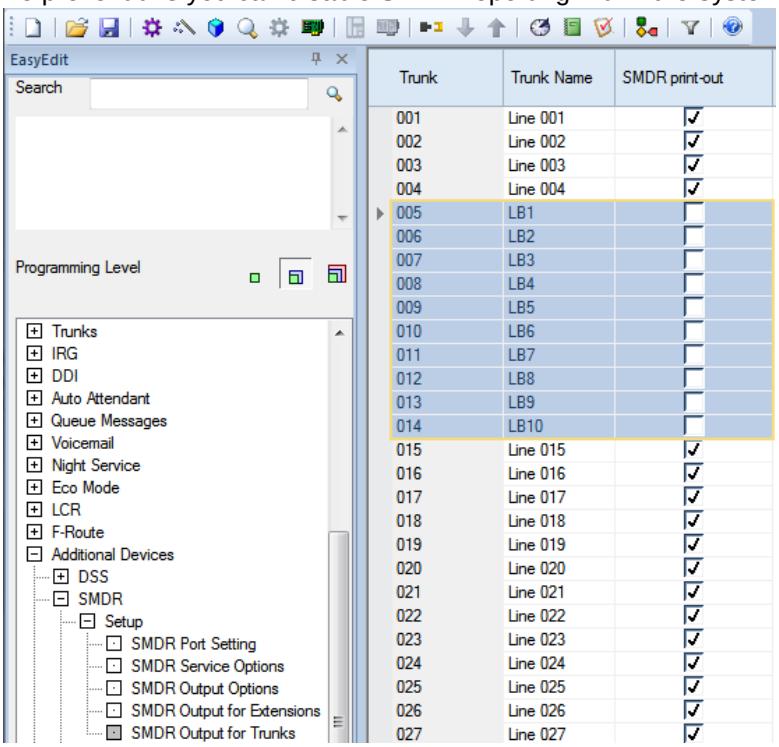
InGuard – Toll Fraud Guard

InGuard can include/exclude calls made via the virtual loopback channels.

Refer to the InGuard User Manual for instructions to report on virtual loopback calls.

InReports – Call Management

InReports can include/exclude calls made via the virtual loopback channels.
Trunk calls made via a loopback trunk and extension channel will cause two call records to be reported.
To prevent this you can disable SMDR reporting within the system configuration.

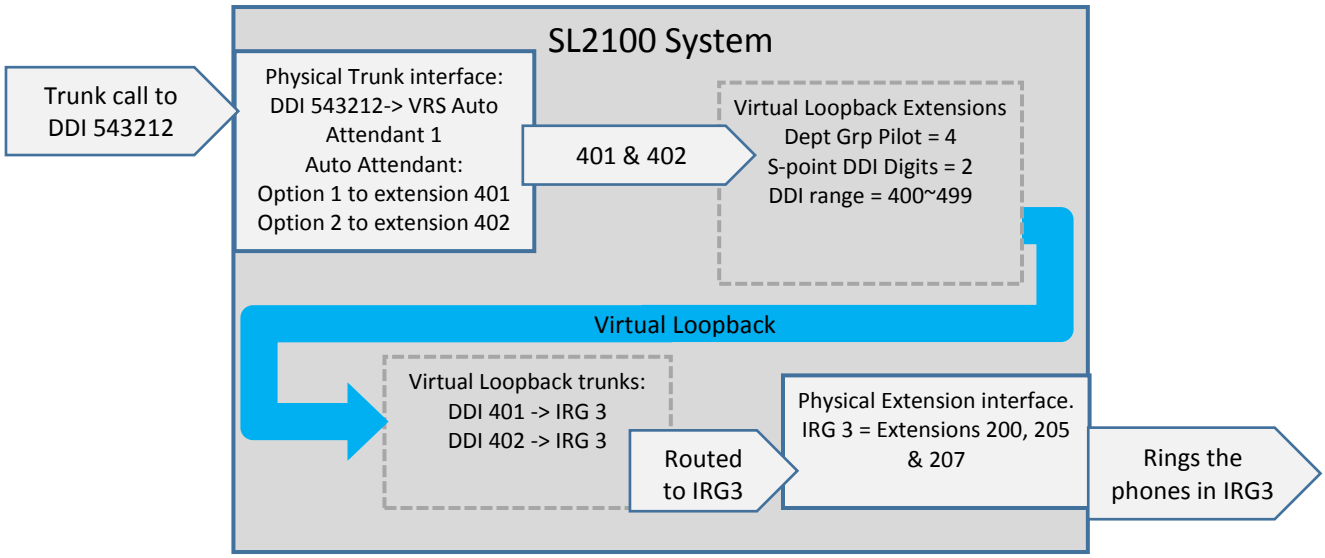


Alternatively, the loopback trunks and extension channels can be grouped within InReports to display the desired output.
Refer to the InReports Installation Manual for instructions to report on virtual loopback calls.

7 – Example

Auto Attendant showing the option dialled by the incoming caller when the call is presented to the extension.

- Customer wants the Auto Attendant callers to press 1 for Sales or 2 for Support and to route the calls to a common Ring Group.
- When the call is presented at the extensions within the ring group it should display the Sales or Support option selected by the Auto Attendant Caller, this will allow the user to answer the call with the appropriate greeting.



Example

The system has a Main Auto Attendant DDI for external callers. This DDI 543212 is routed to VRS Message 001 in the DDI routing table.

DDI Translation Table Entry	Received Number	DDI Name	Target 1	Transfer Operation Mode	Target 2
<all>	<all>	<all>	<all>	<all>	<all>
0001	543212	Main AA		No Transfer	501

5XX routes to VRS Message 0XX
501 = VRS 001

Auto Attendant Message 001 has options configured for dialling 1 and 2. These route to our 'Loopback' numbers.

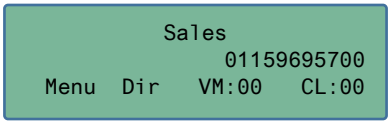
Attendant Message	Received Digit	Next Attendant Message	Destination Number
Attendant Message: 001			
001	1	0	401
001	2	0	402
001	3	1	
001	4	1	
001	5	1	
001	6	1	
001	7	1	
001	8	1	
001	9	1	
001	0	1	
001	*	1	
001	#	1	

Example

The DDI Routing table for the Virtual Loopback DDIs is configured so that Virtual DDIs 401 and 402 transfer to Ring Group 3. As target 1 is not defined, it is skipped and the call progresses to Group 3.

DDI Translation Table Entry	Received Number	DDI Name	Target 1	Transfer Operation Mode	Target 2
0698		Loopback DDI		No Transfer	0
0699				No Transfer	0
0700				No Transfer	0
0701	401	Sales		No Transfer	3
0702	402	Support		No Transfer	3

When the call rings on the telephone extension, it will display the DDI name on the display. The user is then aware that this call is for the Sales department.



8 – Worksheet

What are the Virtual Loopbacks used for?

List the virtual extension numbers you will use, and what each is used for.
This will then give you the total quantity of virtual loopback extension numbers required, you can then define sufficient S-Point DDI digits.

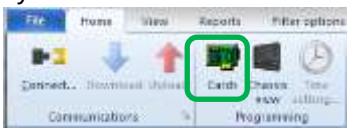
List quantity	Virtual loopback extension number	Function/Name	Description
example	*4100*	*Auto Att option 1*	*Used in InMail mb501 to route to extn200 and display 'AA Opt 1'*
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			

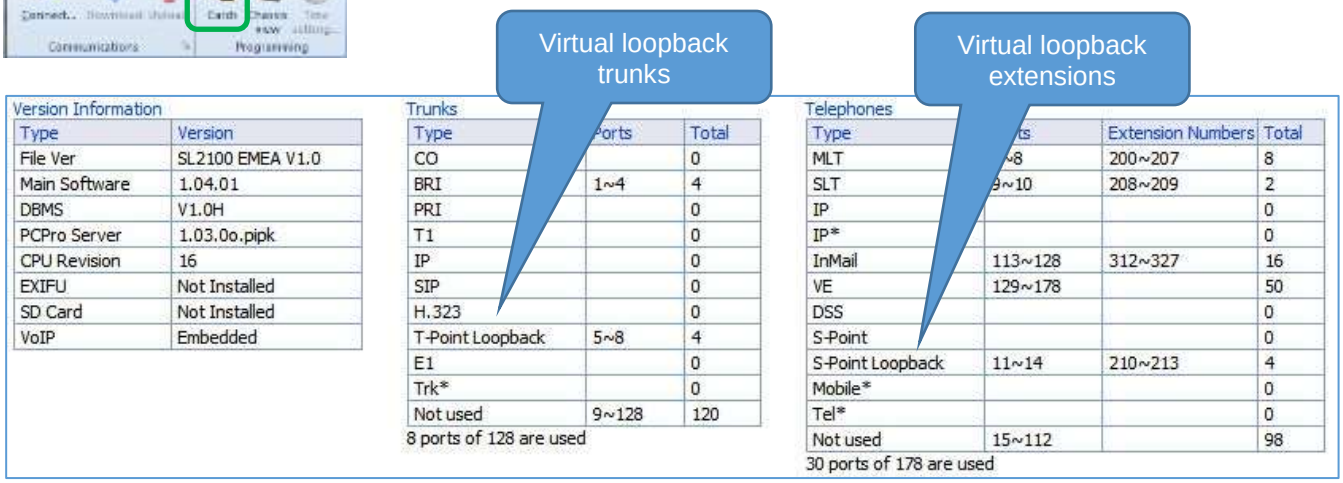
Setup the Virtual Loopback Channels using KeyTel Pro

The quantity of virtual loopback channels should be sufficient to handle the maximum call traffic the customer needs.
Example, if the system has 4 Physical trunks routing incoming calls via virtual loopbacks then you will need at least 4 virtual loopback channels.
If they have 12 extensions that also want to place calls via the virtual loopbacks then you will need more channels, 8 should be sufficient.

10-42-01 loopback port quantity	

Use the Cards screen within PCPro to confirm the ports assigned for all physical and virtual devices on the system





Trunks

Include all trunks installed on the system so you know which are physical and which are loopback.
Set the loopback trunks to DDI.
Put all loopback trunks into their own trunk group and enable Trunk to Trunk Caller ID through mode.

Analogue (CO) ISDN (BRI/PRI) IP T-Point Loopback	**Port range**	**Type (DDI, Normal)**	**Trunk Group (1~25)**	**Trunk to Trunk Caller ID through mode**
Example - Loopbacks	*5~14 (10 channels)*	*DDI*	*25*	*enabled*

Extensions

Show the Department group assignment for the virtual loopback S-Point extensions.
Include all Department Groups in use to give you an overview.

S-Point Loopback ports	**Department Group (1~32)**	**Name**
Example - 13~22	*10*	*VLoop*

System Numbering Plan

Show the numbering plan and which extension number you will use for the virtual loopback Department Group pilot number

1st Dial Digit	Dial length (1~8 digits)	Type (Extn, Trunk, Operator, Service Code etc)
4	*2*	*Extension (41 used for virtual loopbacks)*
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		
*****		
#		

Department Groups

Select the Department group used for virtual loopbacks, define the pilot number and the quantity of S-Point DDI digits, this will then give you the DDI range available.

Enable Call Restriction Recall.

You can also include all other Department groups to show an overview of all groups used.

Group	Pilot number	Name	Call Recall Restriction	S-Point DDI digits appended to pilot number	DDI range created
10	*41*	*VLoop*	*Enabled (non-recall)*	*2*	*4100~4199*

Virtual Loopback DDI Routing

DDI Table Area – create a unique area for the virtual loopbacks to make your configuration easier to setup. Assign the same quantity as the DDI digit range you created for the Department group DDI range.

DDI Translation table areas (1~20)	1st Area start	1st Area end	2nd Area start	2nd Area end
Example 10	*701*	*800*	*0*	*0*

DDI Table Area Target

For the trunk group number you have assigned to the virtual loopback trunks define the quantity of received DDI digits (i.e. the Department group pilot number + appended DDI digits) and the DDI Table Area to be used for each Day/Night mode 1~8.

Use a different table area if you want different routing in any Night modes.

Trunk Group	Dial-in Receive digits	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5	Mode 6	Mode 7	Mode 8
25	*4*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*

DDI Routing Table

For the DDI table area used for the virtual loopback trunks enter the routing for each DDI within the virtual loopback range (Department group pilot number + appended DDI digits).

Day (Mode 1)

DDI Translation table entry	Received number	DDI name	Target 1	Transfer operation mode	Target 2	Target 3
701	*4100*	*AA Opt 1*	*200*	*B/No-Ans*	*1*	

Night (Mode __)

DDI Translation table entry	Received number	DDI name	Target 1	Transfer operation mode	Target 2	Target 3
701	*4100*	*AA Opt 1*	*@200*		*102*	

Night (Mode __)

DDI Translation table entry	Received number	DDI name	Target 1	Transfer operation mode	Target 2	Target 3