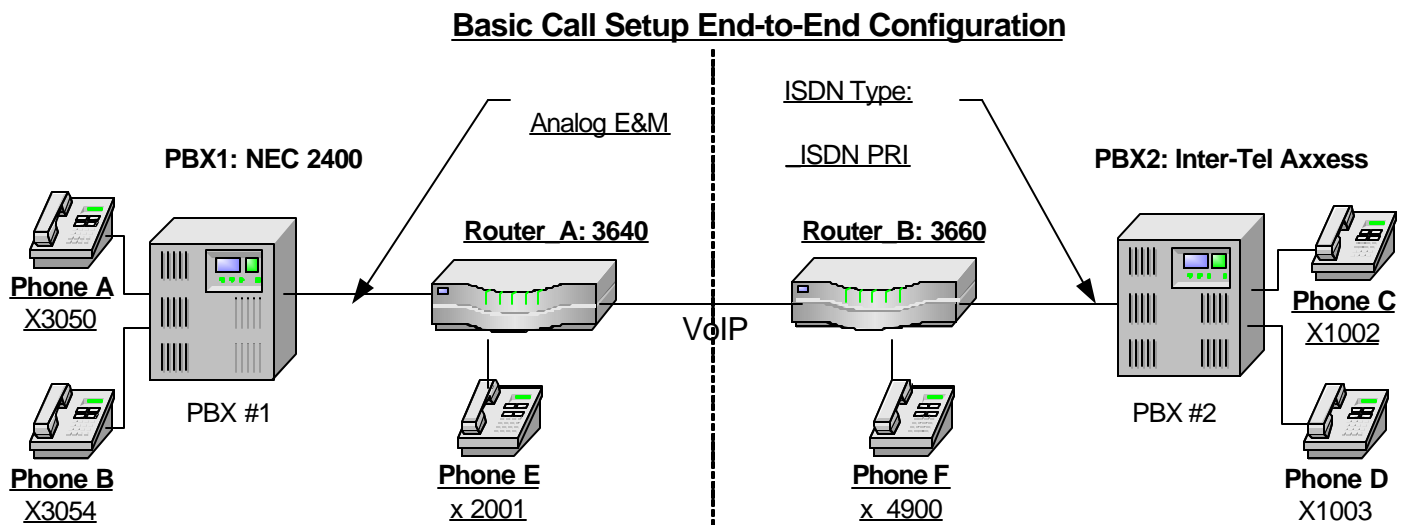


Cisco 3640 Gateway-PBX Interoperability: NEC NEAC 2400 PBX with Analog E&M Interfaces to an H.323 Gateway

Introduction

- This note describes the connectivity for the NEC 2400 ICS public branch exchange (PBX) using a Cisco 3640 gateway with dual analog E&M voice interface cards (VICs).
- The network topology diagram shows the set up for interoperability between Cisco 3640 gateway connected to the NEC NEAC 2400 PBX using analog E&M interfaces.

Network Topology



Limitations

- The NEC 2400 ICS PBX only supports Type 1 E&M.
- The NEC 2400 ICS PBX supports both 2-wire and 4-wire audio connections.
- The NEC 2400 ICS PBX supports wink, immediate and delay start signaling.

Note: Wink is preferred as timers often have to be changed to make immediate and delay start signaling to work satisfactorily.

- The NEC 2400 ICS PBX supports dual tone multifrequency (DTMF) and dial pulse (DP) signaling.
- On the PA-8LTR card, SW4 is used for ports 0 to 3 while SW5 is used for ports 4 to 7. Position 6 determines 2 or 4 wire operation for E&M: On=2 wire (2W), Off=4 wire (4W).
- When installing E&M or ground start signaling, follow proper grounding techniques.



- The NEC 2400 ICS PBX requires a substantial amount of programming and proper switch settings to properly install T1 primary rate interface (PRI).
- Calls must be completed successfully.

System Components

Hardware Requirements

- Cisco Hardware
Cisco 3640 gateway
- PBX Hardware.
NEC 2400 ICS PBX

Software Requirements

- Cisco IOS Software Release 12.2(8)T2
- PBX Software Generic Release J and Boot read only memory (ROM) Release F

Configuration

Configuring the NEC NEAC 2400 PBX

The NEC 2400 ICS PBX requires a substantial amount of programming and proper switch settings to properly install T1 primary rate interface (PRI).

PA-8TLTR E&M Switch Settings

Switch	Position	Description	Setting				
SW00		Make Busy	Down				
MB0-7	0-7	On = Make Busy Off = Cancel Make Busy	Off				
SW0	1	SW0-1	SW0-2	SW0-3	Circuits 0-3	Circuits 4-7	
	2	Off	Off	Off	DID	DID	
	3	On	Off	Off	E&M	DID	
		Off	On	Off	Not Used	Not Used	
		On	On	Off	E&M	E&M	
	4	Not Used					Off
	5	Not Used					Off
	6	Not Used					Off
	7	Not Used					Off
	8	Not Used					Off
SW1 Programmable Pad should be	1	Pad P0					Off
	2	Pad P0					Off
	3	Pad P0					Off
	4	Pad P0					Off



adjusted by user as necessary. See NEC docs.	5	Pad P0	Off
	6	Fixed	Off
	7	Not Used	Off
	8	Not Used	Off
SW2 Programmable Pad should be adjusted by user as necessary. See NEC docs.	1	Pad P1	Off
	2	Pad P1	Off
	3	Pad P1	Off
	4	Pad P1	Off
	5	Pad P1	Off
	6	Fixed	Off
	7	Not Used	Off
	8	Not Used	Off
SW3 Programmable Pad should be adjusted by user as necessary. See NEC docs.	1	Pad P2	Off
	2	Pad P2	Off
	3	Pad P2	Off
	4	Pad P2	Off
	5	Pad P3	Off
	6	Pad P3	Off
	7	Pad P3	Off
	8	Pad P3	Off
SW4 Circuits 0-3 when set for DID Terminating Impedance and Balancing Network should be adjusted by user as necessary. See NEC docs.	1	Terminating Impedance	On
	2	Terminating Impedance	Off
	3	Terminating Impedance	Off
	4	Terminating Impedance	Off
	5	Not Used.	Off
	6	Not Used.	Off
	7	Not Used.	Off
	8	Not Used.	Off
SW4 Circuits 0-3 when set for E&M Terminating Impedance and Balancing Network should be adjusted by user as necessary. See NEC docs.	1	Terminating Impedance	On
	2	Terminating Impedance	Off
	3	Terminating Impedance	Off
	4	Terminating Impedance	Off
	5	Not Used.	Off
	6	On = 2W Off = 4W	Off
	7	Fixed.	Off
	8	On = E&M Control Idle: Ground Busy: Battery Off = E&M Control Idle: Open Busy: Ground	Off



SW5 Circuits 4-7 when set for DID Terminating Impedance and Balancing Network should be adjusted by user as necessary. See NEC docs.	1	Terminating Impedance	On
	2	Terminating Impedance	Off
	3	Terminating Impedance	Off
	4	Terminating Impedance	Off
	5	Not Used.	Off
	6	Not Used.	Off
	7	Not Used.	Off
	8	Not Used.	Off
SW4 Circuits 4-7 when set for E&M Terminating Impedance and Balancing Network should be adjusted by user as necessary. See NEC docs.	1	Terminating Impedance	On
	2	Terminating Impedance	Off
	3	Terminating Impedance	Off
	4	Terminating Impedance	Off
	5	Not Used.	Off
	6	On = 2W Off = 4W	Off
	7	Fixed.	Off
	8	On = E&M Control Idle: Ground Busy: Battery Off = E&M Control Idle: Open Busy: Ground	Off



ARTD Route Settings

Route 11 is the E&M settings

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* ROUTE CLASS DATA LIST *

	-----	R O U T E	N U M B E R	-----	
CDN FUNCTION	11	12	13	14	15
1 OSGS	7	0	0	0	0
2 ONSG	3	2	0	2	2
3 ISGS	7	0	0	0	0
4 INSG	3	2	0	2	2
5 TF	3	3	3	3	3
6 TCL	4	4	4	4	4
7 L/T	1	1	1	1	1
8 RLP	2	2	0	2	0
9 TQ	0	0	0	0	0
10 SMDR	0	1	1	1	1
11 TD	0	0	0	0	0
12 DR	0	0	0	0	0
13 AC	1	1	0	1	0
14 TNT	0	0	0	0	0
15 LSG	5	12	13	12	13
16 SMDR2	0	0	0	0	0
17 H/M	0	0	0	0	0
18 MC	0	0	0	0	0
19 ANI	0	1	1	1	0
20 D	0	0	0	0	0
21 MSB	0	0	0	0	0
22 MSW	0	0	0	0	0



23	TR	0	0	0	0	0
24	OC	0	0	0	0	0
25	R/L	0	0	0	0	0
26	RVSD	0	0	0	0	0
27	TL	0	0	0	0	0
28	ANS	0	1	1	1	1
29	TELP	0	0	0	0	0
30	PAD	0	4	7	4	7
31	OGRL	0	1	1	1	1
32	ICRL	0	1	1	1	1
33	HD	0	0	0	0	0
34	GUARD	0	1	1	1	1
35	WINK	0	0	0	0	0
36	VAD	0	0	0	0	0
37	CLD	0	0	0	0	0
38	FA	0	0	0	0	0

[LRTD]

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* ROUTE CLASS DATA LIST *

	-----	R	O	U	T	E		N	U	M	B	E	R	-----
CDN FUNCTION	11	12	13	14	15									
39 BC	0	0	0	0	0									
40 TCM	0	0	0	0	0									
41 TDMQ	0	0	0	0	0									
42 TRSC	0	0	0	0	0									
43 BT	0	1	0	1	1									
44 PRV	0	0	0	0	0									
45 A/D	0	1	1	1	1									



46	CW	0	0	0	0	0
47	TPQ	0	0	0	0	0
48	BL	0	0	0	0	0
49	TRKS	0	1	1	0	0
50	DPLY	0	1	1	1	1
51	ACD	0	0	0	0	0
52	2W/4W	1	0	0	0	0
53	FAAT	0	0	0	0	0
54	GW	0	0	0	0	0
55	TCMA	0	0	0	0	0
56	SMDR3	0	0	0	0	0
57	HDT	0	0	0	0	0
58	CD	0	0	0	0	0
59	CCH	0	0	0	0	0
60	TC/EC	0	0	0	0	0
61	IRE	0	0	0	0	0
62	SCR	0	0	0	0	0
63	LYER1	0	1	1	1	1
64	NET	0	1	0	0	0
65	INT	0	4	4	4	4
66	DC	0	4	4	4	4
67	HKS	0	0	0	0	0
68	SCF	0	0	0	0	0
69	SMDR4	0	0	0	0	0

Configuring the Cisco 3640 Gateway Configuration

```
Router#sh run
Building configuration...
Current configuration : 1389 bytes
!
version 12.2
```



```
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Router
!
!
voice-card 2
!
ip subnet-zero
!
isdn switch-type primary-net5
!
--More--          !
!
fax interface-type fax-mail
mta receive maximum-recipients 0
!
controller E1 2/0
  pri-group timeslots 1-31
!
controller E1 2/1
!
interface FastEthernet0/0
  ip address 10.1.1.21 255.255.255.0
  duplex auto
  speed auto
!
interface FastEthernet0/1
  no ip address
  shutdown
  duplex auto
  speed auto
--More--          !
interface Serial2/0:15
  no ip address
  no logging event link-status
  isdn switch-type primary-net5
  isdn protocol-emulate network
  isdn incoming-voice voice
  isdn send-alerting
  no cdp enable
!
ip classless
no ip http server
ip pim bidir-enable
!
call rsvp-sync
!
voice-port 1/0/0
```




```
!  
voice-port 1/0/1  
!  
voice-port 1/1/0  
  --More--      !  
voice-port 1/1/1  
!  
voice-port 2/0:15  
!  
!  
mgcp profile default  
!  
dial-peer cor custom  
!  
dial-peer voice 4000 pots  
  destination-pattern 2001  
  port 1/0/0  
  forward-digits all  
!  
dial-peer voice 4001 pots  
  destination-pattern 4001  
  port 1/0/1  
!  
dial-peer voice 2000 voip  
  destination-pattern 10..  
  session target ipv4:10.1.1.204  
!  
dial-peer voice 2003 voip  
  destination-pattern 4900  
  session target ipv4:10.1.1.204  
!  
dial-peer voice 3 pots  
  destination-pattern 30..  
  port 1/1/0  
!  
line con 0  
line aux 0  
line vty 0 4  
  login  
!  
end
```



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