



Siemens HiPath 4000 Release 1 and Siemens Hicom 330E Release 3.1 to Cisco IOS Voice Gateway using E1 NET5 with H.323

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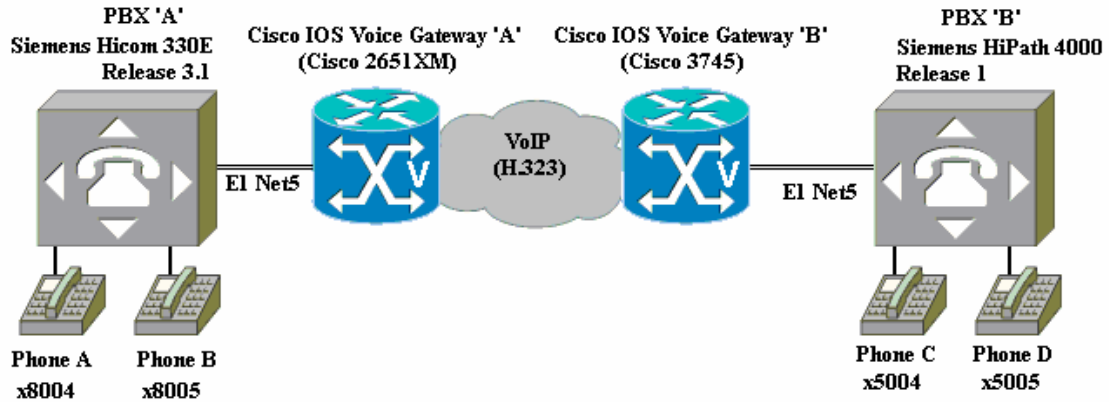
Introduction

- Although specific gateway router models were used to validate its content, this application note also applies to all Cisco 1700/2600/3600/3700/2800/3800 series Cisco IOS voice gateways.
- This application note provides configuration guidelines for a toll-bypass network using Cisco IOS voice gateways to connect Siemens HiPath 4000 Release 1 and Siemens Hicom 330E Release 3.1 PBXs. The PBXs are connected to the Cisco IOS voice gateways by E1 NET5 trunk circuits. The Cisco IOS voice gateways “extend” the E1 NET5 trunk circuits with VoIP, using the H.323 protocol.
- A Siemens HiPath 4000 Release 1 PBX and a Siemens Hicom 330E Release 3.1 PBX were each connected via E1 NET5 trunk circuits to a Cisco IOS voice gateway. The two voice gateways were connected via IP over Ethernet, and configured for VoIP using H.323. End-to-end calls were placed between the PBXs to exercise and test basic calls as well as supplementary services such as call transfer, call conference, and call forward.
- Using the Siemens PBX configurations and Cisco IOS voice gateway configurations in this application note, successful toll bypass integration was achieved. This includes basic call, call transfer, call conference, and call forward, with some limitations on Caller ID features. Also, for certain call conference scenarios, dropped calls occurred when one party left the conference.



Network Topology

Figure 1. Network Topology or Test Setup



System Components

Hardware Requirements

- (2) Cisco IOS voice gateways with E1 VWICs (voice/WAN interface cards)
- (1) Siemens HiPath 4000 PBX
- (1) Siemens Hicom 330E PBX
- (2) Siemens HiPath digital station telephones
- (2) Siemens Hicom digital station telephones

Software Requirements

- Siemens HiPath PBX: V1.0 SA12 Patch0.
- Siemens Hicom PBX: Release 3.1 SA5 Rev14
- Cisco IOS voice gateways: Cisco IOS Release Version 12.3(7)T or later.



Features

Features Supported

- Basic Call (ENBLOC and Overlap)
- Calling Number
- Connected Number
- Call Transfer: Supervised Local Transfer
- Call Transfer: Supervised Network/External Transfer
- Call Conference: Local
- Call Conference: Network/External
- Call Forward: Local
- Call Forward: Network/External

Features Not Supported

- Calling/Called/Connected Name
- Call Hold
- MWI



Limitations

- Cisco IOS ver 12.3 was used in the testing represented in this app note. For 12.4 images and later, an additional configuration command is needed in the serial interface configuration: **isdn outgoing ie connected-number**. If this command is not implemented on both gateways, connected number is not sent across the toll bypass network.
- CALLING/CALLED/CONNECTED NAME is not supported. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 NET5 trunk.
- CONNECTED NUMBER was supported in lieu of CALLED (ALERTING) NUMBER. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 NET5 trunk.
- On Supervised Transfers originating with an external call (e.g., Phone A calls Phone C), the CONNECTED NUMBER is not displayed on the originating phone after the transfer is complete. Rather, the originating phone continues to display the transferring phone's number.
- On Supervised Transfers from PBX 'A' to PBX 'B' (e.g., Phone C calls Phone A, Phone A transfers to Phone D), the original CALLING NUMBER is not displayed on the final destination phone. Rather, the transferring phone's number is displayed.
- On Supervised Transfers from PBX 'B' to PBX 'A', (e.g., Phone A calls Phone C, Phone C transfers to Phone B), the original CALLING NUMBER is not displayed at the final destination. Rather, the number for the transferring phone is displayed. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 NET5 trunk.
- On Conference Calls accomplished by an external call followed by an external conference (e.g., Phone C calls Phone A, Phone A conferences in Phone B), the CONNECTED NUMBER is not updated on the original calling phone when the conferencing phone drops out. Rather, the number for the conferencing phone is still displayed.
- On Conference Calls accomplished by an external call followed by a conference initiated by an external call from PBX 'A' to PBX 'B' (e.g., Phone C calls Phone A, Phone A conferences in Phone D), the conference completes successfully, but when the conferencing phone drops out, the entire call drops.
- On Conference calls accomplished by a local call followed by an external conference (e.g., Phone A calls Phone B, Phone B conferences in Phone C), the CALLING NUMBER is not passed to the remaining conferee when the conferencing phone drops out. Rather, the number for the conferencing phone is still displayed.
- On Conference Calls accomplished by an external call followed by a conference initiated by an external call from PBX 'B' to PBX 'A' (e.g., Phone C calls Phone A, Phone C conferences in Phone B), the CALLING NUMBER is not passed to the remaining conferee when the conferencing phone drops out. Rather, the conferencing phone's number is still displayed. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 NET5 trunk.
- On Call Forwards from PBX 'A' to PBX 'B' (e.g., Phone A calls Phone B, which forwards to Phone C), the forwarding CALLED NUMBER is not passed to the final destination.
- On Call Forwards originated by an external call from PBX 'B' to PBX 'A' and followed by a local forward on PBX 'A' (e.g., Phone C calls Phone B, which forwards to Phone A), the CONNECTED NUMBER from the final destination is not updated at the original side. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 NET5 trunk.
- Call Hold was not tested as a separate feature. The call is held automatically during Transfers or Conferences, and the call hold is facilitated in NOTIFY message from Siemens HiPath/Hicom PBX. Aside from Transfers or Conferences, it is not possible to put a call on hold from one of the Siemens HiPath/Hicom digital station phones.
- MWI was not tested, as a local voice mail system was not available on the PBXs at the time of testing, and Net5 does not support MWI.



Configuration

Configuring the Siemens HiPath 4000

DPLN

```
<dis-wabe:gen;
DIS-WABE:GEN;
H500: AMO WABE STARTED
```

DIGIT INTERPRETATION		VALID FOR ALL DIAL PLANS						
CODE		CALL PROGRESS STATE				DIGIT ANALYSIS RESULT	RESERVED/CONVERT DNI/ADD-INFO	
		1	11111	11112	22			
		0	12345	67890	12345	67890	12	*=OWN NODE
0		.	****	..***	**..	.....	*	CO R
001	- 009	*	.....	.....	.....	.....	..	NETRTE
111		.	****	*****	**..	.....	*	TIE
12	- 14	.	****	*****	**..	.....	*	TIE
21		.	.....	.....	.....	.....	*..	KNOVRKY
22		.	.....	.....	.....	.....	*..	DNDKY
222		.	****	*****	**..	.....	*	TIE
23		.	.....	.....	.....	.....	*..	FWDKY
24		.	.....	.....	.....	.....	*..	MBKY
25		.	.....	.....	.....	.....	*..	MSGRKY
26		.	.....	.....	.....	.....	*..	DAKY
27		.	.....	.....	.....	.....	*..	DSSKY
28		.	.....	.....	.....	.....	*..	VCRKY
29		.	.....	.....	.....	.....	*..	VCKY
30		.	.....	.....	.....	.....	*..	CONFKY

DIGIT INTERPRETATION		VALID FOR ALL DIAL PLANS						
CODE		CALL PROGRESS STATE				DIGIT ANALYSIS RESULT	RESERVED/CONVERT DNI/ADD-INFO	
		1	11111	11112	22			
		0	12345	67890	12345	67890	12	*=OWN NODE
3000	- 3010	.	****	*****	**..	.....	*	STN DESTNO 30 DNNO 0- 0-222
3011	- 3020	.	****	*****	**..	.....	*	STN DESTNO 31 DNNO 0- 0- 31
3021	- 3030	.	****	*****	**..	.....	*	STN DESTNO 32 DNNO 0- 0- 32
3031	- 3040	.	****	*****	**..	.....	*	STN DESTNO 33 DNNO 0- 0- 33
3041	- 3050	.	****	*****	**..	.....	*	STN DESTNO 35 DNNO 0- 0- 35
31		.	.....	.....	.....	.....	*..	NAMEKY
32		.	.....	.....	.....	.....	*..	PARKKY

DIGIT INTERPRETATION		VALID FOR ALL DIAL PLANS						
CODE		CALL PROGRESS STATE				DIGIT ANALYSIS RESULT	RESERVED/CONVERT DNI/ADD-INFO	
		1	11111	11112	22			
		0	12345	67890	12345	67890	12	*=OWN NODE
33		*..	CCKY
34		*..	HTKY
35		*..	STKY



36 - 37	. **** ..*** **..	*	CO	
38	. .... .....	*	TIMEKY	
39	. **** ..*** **..	*	TIE	
4000 - 4050	. **** ..*** **..	*	STN	DESTNO 111 DNNO 0- 0-111
4051 - 4566	. **** ..*** **..	*	STN	DESTNO 222 DNNO 0- 0-222
4567	. **** ..*** **..	*	STN	DESTNO 34 DNNO 0- 0-200

DIGIT INTERPRETATION VALID FOR ALL DIAL PLANS

CODE	CALL PROGRESS STATE		DIGIT ANALYSIS RESULT	RESERVED/CONVERT DNI/ADD-INFO *=OWN NODE
	1 1111 1112 22	0 12345 67890 12345 67890 12		

4568 - 4999	. **** ..*** **..	*	STN	DESTNO 222 DNNO 0- 0-222
5000 - 5040	. **** ..*** **..	*	STN	DESTNO 0 DNNO 0- 0-555*
5500 - 5501	. **** ..*** **..	*	STN	DESTNO 56 DNNO 0- 0-560
555	. **** ..*** **..	*	OWNNODE	
560	. **** ..*** **..	*	TIE	
59	. **** ..*** **..	*	TIE	
6000 - 6009	. **** ..*** **..	*	STN	R DESTNO 0 DNNO 0- 0-555*

DIGIT INTERPRETATION VALID FOR ALL DIAL PLANS

CODE	CALL PROGRESS STATE		DIGIT ANALYSIS RESULT	RESERVED/CONVERT DNI/ADD-INFO *=OWN NODE
	1 1111 1112 22	0 12345 67890 12345 67890 12		

7000 - 7002	. **** ..*** **..	*	STN	DESTNO 56 DNNO 0- 0-560
8000 - 8050	. **** ..*** **..	*	STN	DESTNO 222 DNNO 0- 0-222
8060	. **** ..*** **..	*	TIE	
8070	. **** ..*** **..	*	TIE	
83	. **** ..*** **..	*	SPDC1	
84	. **** ..*** **..	*	SPDC2	
88	. .... ..*	*	SCONSI	R
89	. .... ..*	*	SCONSCO	R
9	. **** ..*** **..	*	TIE	
*13	. .... *	*	AHTVCE	
*15	. .... **	*	SPLIT	
*16	. .... *	*	AREM	
*17	. .... **	*	TRACE	

DIGIT INTERPRETATION VALID FOR ALL DIAL PLANS

CODE	CALL PROGRESS STATE		DIGIT ANALYSIS RESULT	RESERVED/CONVERT DNI/ADD-INFO *=OWN NODE
	1 1111 1112 22	0 12345 67890 12345 67890 12		

*18	. .... *	*	ACOSX	
*19	. .... *	*	KNOVR	



*20	. . . . *	. . . . .	. . . . .	. . . . .	. . . . .	ADND
*25	. . . . *	. . . . .	. . . . .	. . . . .	. . . . .	FWDTERM
*29	. . . . *	. . . . .	. . . . *	. . . . .	. . . . .	AFFWDVCE
*91	. . . . *	. . . . *	. . . . .	. . . . .	. . . . .	MBOFF
#91	. . . . *	. . . . *	. . . . .	. . . . .	. . . . .	MBON
##27	. . . . *	. . . . *	. . . . *	. . . . *	. . . . *	MWACT
##28	. . . . *	. . . . *	. . . . *	. . . . *	. . . . *	MWANS
##29	. . . . *	. . . . *	. . . . *	. . . . *	. . . . *	MWCAN
##30	. . . . *	. . . . *	. . . . *	. . . . *	. . . . *	MWCANORI

AMO-WABE -111 DIALLING PLANS, FEATURE ACCESS CODES
DISPLAY COMPLETED;



Overlap Sending Dial Plan

```
<DISPLAY-LDPLN:TYPE=LDP,LDP="8060"- "X" ;  
DISPLAY-LDPLN:TYPE=LDP,LDP="8060"- "X" ;  
H500: AMO LDPLN STARTED
```

LDPNO : 16	LDP : 8060-X	
	SPC : 22	
	FDSFIELD : 0	SDSFIELD : 0 PINDP : N
DPLN	LROUTE	LAUTH
0	806	1
1	806	1
2	806	1
3	806	1
4	806	1
5	806	1
6	806	1
7	806	1
8	806	1
9	806	1
10	806	1
11	806	1
12	806	1
13	806	1
14	806	1
15	806	1

```
AMO-LDPLN-111 ADMINISTRATION LCR DIALPLAN  
DISPLAY COMPLETED;
```

ENBLOC Sending Dial Plan

```
<DISPLAY-LDPLN:TYPE=LDP,LDP="8060"- "XXXX" ;  
DISPLAY-LDPLN:TYPE=LDP,LDP="8060"- "XXXX" ;  
H500: AMO LDPLN STARTED
```

LDPNO : 16	LDP : 8060-XXXX	
	SPC : 22	
	FDSFIELD : 0	SDSFIELD : 0 PINDP : N
DPLN	LROUTE	LAUTH
0	806	1
1	806	1
2	806	1
3	806	1
4	806	1
5	806	1
6	806	1
7	806	1
8	806	1
9	806	1
10	806	1
11	806	1
12	806	1
13	806	1
14	806	1
15	806	1



AMO-LDPLN-111 ADMINISTRATION LCR DIALPLAN
 DISPLAY COMPLETED;

BCSU

<DISPLAY-BCSU:TYPE=TBL,LTG=1,LTU=2,SLOT=49;
 DISPLAY-BCSU:TYPE=TBL,LTG=1,LTU=2,SLOT=49;
 H500: AMO BCSU STARTED

ADDRESS : LTG 1 LTU 2 SOURCE GROUP 1

PEN	ASSIGNED MODULE	MODULE TYPE	FCT ID	HWY BDL	INSERTED MODULE	STATE	HW-INFO	MODULE STATUS
49	Q2196-X	DIU-N2	1	A	Q2196-X	1	-06 -	READY

AMO-BCSU -111 BOARD CONFIGURATION, SWITCHING UNIT
 DISPLAY COMPLETED;

Class of Trunk, COT

<dis-cot:21
 FORMAT = ;
 DIS-COT:21,;
 H500: AMO COT STARTED

COT: 21 INFO:
 DEVICE: INDEP SOURCE: DB
 PARAMETER:
 PRIORITY FOR AC WILL BE DETERMINED FROM MESSAGE PRI
 RECALL IF USER HANGS UP IN CONSULTATION CALL RCL
 TRUNK CALL TRANSFER XFER
 TRUNK SIGNALING ANSWER ANS
 CHANGEOVER FROM HOLD TO RING TONE CHRT
 KNOCKING OVERRIDE POSSIBLE KNOR
 CALL EXTEND FOR BUSY, RING OR CALL STATE CEBC
 NETWORKWIDE AUTOMATIC CALLBACK ON BUSY CBBN
 NETWORKWIDE AUTOMATIC CALLBACK ON FREE CBFN
 DON'T RELEASE CALL TO BUSY HUNT GROUP BSHT
 CONNECTION TO ROUTE OPTIMIZATION NODE ROPT
 TSC-SIGNALING FOR NETWORKWIDE FEATURES (MANDATORY) TSCS
 INCOMING CDR BY ZONE OR FROM LINE ICZL
 AOC PER CALL (AUTOMATICAL OR ON REQUEST), MAND. CORNET-NQ AOCC
 LINE WITH IMPLICIT NUMBERS LINO
 NO TONE NTON

AMO-COT -111 CLASS OF TRUNK FOR CALL PROCESSING
 DISPLAY COMPLETED;

Class of Parameters for Device Handlers, COP

<DISPLAY-COP:COPNO=21;
 DISPLAY-COP:COPNO=21;
 H500: AMO COP STARTED

COP: 21 INFO:
 DEVICE: INDEP SOURCE: DB
 PARAMETER:
 LINE WITH END-OF-DIAL EOD
 SPECIAL MODE SFRM
 CODE CALLING RELEASE AFTER EVERY TASK CCR
 REGISTRATION OF LAYER 3 ADVISORIES L3AR

 CO TRUNK ACCESS:
 TRUNK ACCESS TA



TOLL ACCESS:
TRUNK ACCESS

TA

AMO-COP -111 CLASS OF PARAMETER FOR DEVICE HANDLER
DISPLAY COMPLETED;



Class of Services, COSSU

```
<DISPLAY-COSSU:TYPE=COS,COS=10;
DISPLAY-COSSU:TYPE=COS,COS=10;
H500: AMO COSSU STARTED
```

COS	VOICE	FAX	DTE
10	> TA TSUID TNOTCR RKOABS CDRINT CDRS CDRC COSXCD VCE FWDNWK MSN FWDECA CFB CFNR FWDEXT	NOCO NOTIE	NOCO NOTIE

```
AMO-COSSU-111 CLASSES OF SERVICE
DISPLAY COMPLETED;
<DISPLAY-COSSU:TYPE=LCOSV,LCOSV=1;
DISPLAY-COSSU:TYPE=LCOSV,LCOSV=1;
H500: AMO COSSU STARTED
```

LCOS	LAUTH																								COPIN										
V	1				2				3				4				5				6				NUM										
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	
	>SERVICE INFORMATION																																		
1	X.....																																		
	>LCR ATTENDANT FOR VOICE																																		

```
AMO-COSSU-111 CLASSES OF SERVICE
DISPLAY COMPLETED;
```



Trunk Group, BUEND

```
<DISPLAY-BUEND:TGRP=20;
DISPLAY-BUEND:TGRP=20;
H500: AMO BUEND STARTED
```

```
----- FORMAT = L -----
+-----+
| TGRP NUMBER :    20  TGRP NAME   : PRI PSSV1      MAXIMUM NO.   :    70 |
|                   CHARCON    : NEUTRAL          |
| SUBGROUP NO. :    3  DEVICE TYPE : S2CONN        TRACENO       :    0 |
| RESERVED    :    N  SEARCH MODE : ASCENDING     ACD THRESHOLD :    * |
| NUMBER OF ASSOCIATED ROUTES : 2                PRIORITY      :    2 |
| TDDRFLAG    :    ON  TDDRTHRESHOLD: 3          SOURCEGROUPIDX :    1 |
| GDTRRULE    :    0   ACDPMGRP   : 0                |
| THE FOLLOWING TRUNKS (LTG-LTU-SLOT-CCT) HAVE BEEN ALLOCATED: |
+-----+
| 1- 2- 49-0      1 | 1- 2- 49-0      2 | 1- 2- 49-0      3 |
| 1- 2- 49-0      4 | 1- 2- 49-0      5 | 1- 2- 49-0      6 |
| 1- 2- 49-0      7 | 1- 2- 49-0      8 | 1- 2- 49-0      9 |
| 1- 2- 49-0     10 | 1- 2- 49-0     11 | 1- 2- 49-0     12 |
| 1- 2- 49-0     13 | 1- 2- 49-0     14 | 1- 2- 49-0     15 |
| 1- 2- 49-0     16 | 1- 2- 49-0     17 | 1- 2- 49-0     18 |
| 1- 2- 49-0     19 | 1- 2- 49-0     20 | 1- 2- 49-0     21 |
| 1- 2- 49-0     22 | 1- 2- 49-0     23 | 1- 2- 49-0     24 |
| 1- 2- 49-0     25 | 1- 2- 49-0     26 | 1- 2- 49-0     27 |
| 1- 2- 49-0     28 | 1- 2- 49-0     29 | 1- 2- 49-0     30 |
+-----+
```

```
AMO-BUEND-111      TRUNK GROUP
DISPLAY COMPLETED;
```

Trunk Configuration, TDCSU

```
<DISPLAY-TDCSU:PEN1=1-2-49-0;
DISPLAY-TDCSU:PEN1=1-2-49-0;
H500: AMO TDCSU STARTED
```

```
----- DIGITAL TRUNK (FORMAT=L) -----
+-----+
| DEV   = S2CONN      PEN   = 1-02-049-0  TGRP   = 20 |
+-----+
| PROTVAR = ETSI      INS   = N           SRCHMODE = ASC |
| COTNO   = 21        COPNO = 21         DPLN   = 0 |
| ITR     = 1         COS   = 10         LCOSV  = 1 |
| LCOSD   = 1         CCT   = HICOM S2   DESTNO = 1 |
| SEGMENT = 1        DEDSCC =           DEDSVC = NONE |
| FACILITY =         DITIDX =           SRTIDX = |
| TRTBLE  = GDTR     SIDANI = N         ATNTYP = TIE |
| CBMATTR = NONE     NWMUXTIM = 10      TCHARG = N |
| SUPPRESS = 0       DGTPR  =           CHIMAP = N |
| ISDNIP  =         ISDNPN = |
| PNPL2P  =         PNPL1P =           PNPAC  = |
| TRACOUNT = 31      SATCOUNT = MANY    NNO    = 1 -1 -300 |
| ALARMNO = 0        FIDX   = 1         CARRIER = 1 |
| ZONE    = EMPTY    COTX   = 21       FWDX   = 5 |
| DOMTYPE =         DOMAINNO =         TPROFNO = |
| INIGHT  = |
| UUSCCX  = 16       UUSCCY = 8         FNIDX  = 1 |
| CLASSMRK = EC      & G711      & G729OPT SRCGRP = |
| TCCID   = |
+-----+
| BCNEG   = N        BCGR   = 1         LWPARR = 1 |
| LWPP    = 0        LWLT   = 0         LWPS   = 0 |
| LWR1    = 0        LWR2   = 0 |
| SVCDOM  = |
| BCHAN   = 1 && 30 |
+-----+
```



AMOUNT OF B-CHANNELS IN THIS DISPLAY-OUTPUT: 30

AMO-TDCSU-111 DIGITAL TRUNKS
DISPLAY COMPLETED;
<DISPLAY-LWPAR:DEV=INDEP,TYPE=DIUS2,BLNO=0;
DISPLAY-LWPAR:DEV=INDEP,TYPE=DIUS2,BLNO=0;
H500: AMO LWPAR STARTED

LOADWARE PARAMETERS	CIRCUIT TYPE: DIUS2	SOURCE:DB	BLOCK:	1
LNTYPE = COPPER	VERSION = S2	QUAL = ON		
MASTER = Y	DCHAN1 = 16	DCHAN2 = 0		
PATTERN = D5H	QUAL1 = 10 SEC.	QUAL2 = 10 MIN.		
SMD = Y	PERMACT = Y	FCBAB = DFH		
CDG = N	FIXEDTEI = 0	CNTRNR = 255		
TEIVERIF = N	CRC4REP = N			
DEV = INDEP				
INFO =				

AMO-LWPAR-111 LOADWARE PARAMETERS FOR NETWORKING MODULES
DISPLAY COMPLETED;

For Slave Side Configuration

<DISPLAY-TDCSU:PEN1=1-2-49-0;
DISPLAY-TDCSU:PEN1=1-2-49-0;
H500: AMO TDCSU STARTED

DIGITAL TRUNK (FORMAT=L)			
DEV = S2CONN	PEN = 1-02-049-0	TGRP = 20	
PROTVAR = ETSI	INS = N	SRCHMODE = ASC	
COTNO = 21	COPNO = 21	DPLN = 0	
ITR = 1	COS = 10	LCOSV = 1	
LCOSD = 1	CCT = HICOM S2	DESTNO = 1	
SEGMENT = 1	DEDSKC =	DEDSVC = NONE	
FACILITY =	DITIDX =	SRTIDX =	
TRTBL = GDTR	SIDANI = N	ATNTYP = TIE	
CBMATR = NONE	NWMUXTIM = 10	TCHARG = N	
SUPPRESS = 0	DGTPR =	CHIMAP = N	
ISDNIP =	ISDNIP =		
PNPL2P =	PNPL1P =	PNPAC =	
TRACOUNT = 31	SATCOUNT = MANY	NNO = 1 -1 -300	
ALARMNO = 0	FIDX = 1	CARRIER = 1	
ZONE = EMPTY	COTX = 21	FWDX = 5	
DOMTYPE =	DOMAINNO =	TPROFNO =	
INIGHT =		CCHDL =	
UUSCCX = 16	UUSCCY = 8	FNIDX = 1	
CLASSMRK = EC & G711	& G729OPT	SRCGRP =	
TCCID =			
BCNEG = N	BCGR = 1	LWPAR = 0	
LWPP = 0	LWLT = 0	LWPS = 0	
LWR1 = 0	LWR2 = 0		
SVCDOM =			
BCHAN = 1 && 30			

AMOUNT OF B-CHANNELS IN THIS DISPLAY-OUTPUT: 30

AMO-TDCSU-111 DIGITAL TRUNKS
DISPLAY COMPLETED;
<DISPLAY-LWPAR:DEV=INDEP,TYPE=DIUS2,BLNO=0;
DISPLAY-LWPAR:DEV=INDEP,TYPE=DIUS2,BLNO=0;
H500: AMO LWPAR STARTED



```

+-----+
| LOADWARE PARAMETERS          CIRCUIT TYPE: DIUS2  SOURCE:DB  BLOCK: 0 |
+-----+
| LNTYPE = COPPER              VERSION = S2              QUAL = ON          |
| MASTER = N                   DCHAN1 = 16             DCHAN2 = 0         |
| PATTERN = D5H                QUAL1 = 10 SEC.        QUAL2 = 10 MIN.   |
| SMD = N                      PERMACT = Y             FCBAB = DFH       |
| CDG = N                      FIXEDTEI = 0           CNTRNR = 255      |
| TEIVERIF = N                 CRC4REP = N           |
| DEV = INDEP                  |
| INFO =                       |
+-----+

```

AMO-LWPAR-111 LOADWARE PARAMETERS FOR NETWORKING MODULES
 DISPLAY COMPLETED;

Reference Clock Configuration, REFTA

For Master-side configuration

```

<DISPLAY-REFTA:TYPE=CIRCUIT,PEN=1-2-49-0;
DISPLAY-REFTA:TYPE=CIRCUIT,PEN=1-2-49-0;
H500: AMO REFTA STARTED

```

```

+-----+
| REFERENCE CLOCK CIRCUITS |
+-----+
| PEN      MODULE  DEVICE  PRI  ERROR  BLOCK  SUPP.  READY  SRCGRP |
|          |          |          |     |      |      |      | BUT  |
|          |          |          |     |      |      |      | ASYN. |
+-----+
| 1- 2- 49- 0 | DIU-N2 | S2CONN | 1 | 0 | N |      | N | 1 |
+-----+

```

AMO-REFTA-111 REFERENCE CLOCK TABLE
 DISPLAY COMPLETED;

For Slave-side configuration

```

<DISPLAY-REFTA:TYPE=CIRCUIT,PEN=1-2-49-0;
DISPLAY-REFTA:TYPE=CIRCUIT,PEN=1-2-49-0;
H500: AMO REFTA STARTED

```

```

+-----+
| REFERENCE CLOCK CIRCUITS |
+-----+
| PEN      MODULE  DEVICE  PRI  ERROR  BLOCK  SUPP.  READY  SRCGRP |
|          |          |          |     |      |      |      | BUT  |
|          |          |          |     |      |      |      | ASYN. |
+-----+
| 1- 2- 49- 0 | DIU-N2 | S2CONN | 0 | 0 | N |      | N | 1 |
+-----+

```

AMO-REFTA-111 REFERENCE CLOCK TABLE
 DISPLAY COMPLETED;

Trunk Least Cost Routing Configuration

```

<DISPLAY-LDAT:TYPE=LCR;
DISPLAY-LDAT:TYPE=LCR;
H500: AMO LDAT STARTED

```

```

+-----+
| LROUTE = 806  LDPLN          NAME = OPEN NUMBER          SERVICE = ALL |
| TYPE = LCR                                DNNO OF ROUTE = 99 |
| SERVICE INFO = |
+-----+
| LRTEL | LVAL | TGRP | ODR | LAUTH | SCHEDULE | CARRIER | LATR | LDSRT |
|        |      |      |     |      | ABCDEFGH |         |     |      |
+-----+

```



1	1	20	15	1	*****	1	EMPTY	NONE
	DNNO =		99					



RICHT

<DISPLAY-RICHT:MODE=LRTE;

DISPLAY-RICHT:MODE=LRTE;

H500: AMO RICHT STARTED

```

+-----+
| LRTE = 806   NAME = OPEN NUMBER   (NEUTRAL)  LSVC = ALL
| DNNO =      99 PDNNO =      0   DESTNO = 99
| ROUTOPT = YES  REROUT = YES  PLB = NO   FWDBL = NO
| DTMFCNV = WITHOUT DTMFDSP = WITHOUT DTMFTEXT =
| DTMFPULS =      BUGS = LIN  ROUTATT = NO   MAINGRP = 32
| EMCYRRT = NO   CONFONE = NO  RERINGRP = NO  RTENO = 32
| INFO =
| NOPRCFWD = NO
+-----+
| TGRP = 20  LDAT  PRI PSSV1           (NEUTRAL)  SUBGROUP = 3
+-----+

```

AMO-RICHT-111 TRUNK ROUTING

DISPLAY COMPLETED;

Out-going Dialing Rule, LODR

<dis-lodr

ODR = ;

DIS-LODR;

H500: AMO LODR STARTED

```

+-----+
| ODR      POSITION  CMD      PARAMETER
+-----+
| 15      |      1  ECHO      2
|          |      2  END
+-----+

```

AMO-LODR -111 ADMINISTRATION OF LCR OUTDIAL RULES

DISPLAY COMPLETED;

Digital Station Configuration

<DISPLAY-SBCSU:STNO=5004;

DISPLAY-SBCSU:STNO=5004;

H500: AMO SBCSU STARTED

```

----- USER DATA -----
STNO   =5004   OPT   =OPTI   COS1   =2       DPLN   =1
MAINO  =5004   CONN  =DIR    COS2   =2       ITR    =1
PEN    = 1- 3- 31- 4   LCOSV1 =6      COSX   =0
INS    =Y      ASYNCT =500   LCOSV2 =6
                PERMACT =      LCOSD1 =6
SSTNO  =N      EXTBUS =      LCOSD2 =6      CBKBMAX =5
TRACE  =N
ALARMNO =0     DFSVCANA=     SPDI   =0      RCBKB  =N
HMUSIC =0     FLASH  =     SPDC1  =      RCBKNA =N
PMIDX  =1     SPDC2  =     CBKNAMB =Y
                COMGRP =0
SECR   =N     DIGNODIS=N   DSSTNA =N
STD    =55    CALLOG =NONE  DSSTNB =Y     TEXTSEL =ENGLISH
REP    =0     OPTICOM =N   OPTIUSB :     VPI    =
IDCR   =N     OPTICA  =1   OPTIS0A :0    VCI    =
                OPTIDA  =1   OPTISPA :0    PATTERN =
                OPTIABA :0
DCFWBUSY=N   HEADSET =N   APICLASS=
DNIDSP =N   HSKEY  =NORMAL ACFAPPL =
DTMFBLK =N   IPPASSW =
DTMFCTRDR=Y BASICSVL=

```



DVCFIG =OPTISET TSI =1 SPROT = SOPTIDX =
DPROT = DOPTIDX =
FPROT = FOPTIDX =

----- ACTIVATION IDENTIFIERS FOR FEATURES -----

FWDS :N HTOS :N DND :N
FWDD :N HTOD :N VCP :Y TWLOGIN :N
FWDF :N HTOF :N CWT :N

----- FEATURES AND GROUP MEMBERSHIPS -----

PUGR : ESSTN :
KEYSYS :N NOPTNO :
HUNT CD :N

----- SUBSCRIBER ATTRIBUTES (AMO SDAT) -----

NONE

AMO-SBCSU-111 STATION AND S0-BUS CONFIGURATION OF SWITCHING UNIT
DISPLAY COMPLETED;
<



Configuring the Siemens Hicom 330E

DPLN

```
<dis-wabe;
TYPE = gen;
DIS-WABE:GEN;
H500: AMO WABE STARTED
```

DIGIT INTERPRETATION		VALID FOR ALL DIAL PLANS			
CODE	CALL PROGRESS STATE	DIGIT ANALYSIS RESULT	RESERVED/CONVERT DNI/ADD-INFO		
	1 11111 11112 22		*=OWN NODE		
	0 12345 67890 12345 67890 12				
001 - 010	*	NETRTE	DESTNO 25		
1000	. ***** **	STN	DNNO 0- 0- 25		
11	. . . . . * . . . . .	MBKY			
111	. ***** **	TIE			
222	. ***** **	OWNNODE			
3000 - 3010	. ***** **	STN	DESTNO 33		
			DNNO 0- 0-333		
3011 - 3020	. ***** **	STN	DESTNO 43		
			DNNO 0- 0-444		
3021 - 3030	. ***** **	STN	DESTNO 53		
			DNNO 0- 0-445		
DIGIT INTERPRETATION		VALID FOR ALL DIAL PLANS			
CODE	CALL PROGRESS STATE	DIGIT ANALYSIS RESULT	RESERVED/CONVERT DNI/ADD-INFO		
	1 11111 11112 22		*=OWN NODE		
	0 12345 67890 12345 67890 12				
3031 - 3040	. ***** **	STN	DESTNO 63		
			DNNO 0- 0-446		
3041 - 3050	. ***** **	STN	DESTNO 73		
			DNNO 0- 0-447		
3051 - 3060	. ***** **	STN	DESTNO 83		
			DNNO 0- 0-448		
32	. ***** **	TIE			
34 - 36	. ***** **	TIE			
39	. ***** **	TIE			
4000 - 4050	. ***** **	STN	DESTNO 111		
			DNNO 0- 0-111		
DIGIT INTERPRETATION		VALID FOR ALL DIAL PLANS			
CODE	CALL PROGRESS STATE	DIGIT ANALYSIS RESULT	RESERVED/CONVERT DNI/ADD-INFO		
	1 11111 11112 22		*=OWN NODE		
	0 12345 67890 12345 67890 12				
4051 - 4599	. ***** **	STN	R		
			DESTNO 0		



4700 - 4999	. ***** **	STN	DNNO 0- 0-222*
			R
			DESTNO 0
5000 - 5009	. ***** **	STN	DNNO 0- 0-222*
			DESTNO 55
5010	. ***** * . ***** **	ATNDIND	DNNO 0- 0- 55
5011 - 5020	. ***** **	STN	R
			DESTNO 55
5021 - 5050	. ***** **	STN	DNNO 0- 0- 55
			DESTNO 111
5051	. ***** * . ***** **	ATNDIND	DNNO 0- 0-111

DIGIT INTERPRETATION VALID FOR ALL DIAL PLANS

CODE	CALL PROGRESS STATE 1 1111 11112 22 0 12345 67890 12345 67890 12	DIGIT ANALYSIS RESULT	RESERVED/CONVERT
			DNI/ADD-INFO *=OWN NODE
5500 - 5501	. ***** **	STN	DESTNO 56 DNNO 0- 0-560
555	. ***** **	TIE	
560	. ***** **	TIE	
6000	. ***** **	STN	DESTNO 33 DNNO 0- 0-333
7000 - 7002	. ***** **	STN	DESTNO 56 DNNO 0- 0-560
79	. ***** **	TIE	
8000 - 8019	. ***** **	STN	DESTNO 0 DNNO 0- 0-222*

DIGIT INTERPRETATION VALID FOR ALL DIAL PLANS

CODE	CALL PROGRESS STATE 1 1111 11112 22 0 12345 67890 12345 67890 12	DIGIT ANALYSIS RESULT	RESERVED/CONVERT
			DNI/ADD-INFO *=OWN NODE
8020	. ***** **	STN	R DESTNO 0 DNNO 0- 0-222*
854	. ***** **	NETW	R DESTNO 2 DNNO 0- 0- 0
9	. ***** **	TIE	
*66	. . . . * . . . . .	SIGNON	
*91	. . . . * . . . . .	MBOFF	
#66	. . . . * . . . . .	SIGNOFF	
#91	. . . . * . . . . .	MBON	
##22	. . . . . . . . . . *	DAKY	
##24	. . . . . . . . . . *	DSSKY	
##25	. . . . . . . . . . *	FWDKY	
##26	. . . . . . . . . . *	HTKY	
##27	. . . . . . . . . . *	KNOVRKY	
##28	. . . . . . . . . . *	MBKY	

DIGIT INTERPRETATION VALID FOR ALL DIAL PLANS

CODE	CALL PROGRESS STATE 1 1111 11112 22 0 12345 67890 12345 67890 12	DIGIT ANALYSIS RESULT	RESERVED/CONVERT
			DNI/ADD-INFO *=OWN NODE



```

---
##29      | . . . . . * .. | MSGRKY
##35      | . . . . . * .. | TIMEKY
##36      | . . . . . * .. | VCKY
##37      | . . . . . * .. | VCRKY
##38      | . . . . . * .. | CCKY
##39      | . . . . . * .. | CONFKY
##41      | . . . . . * .. | NAMEKY
##42      | . . . . . * .. | PARKKY
##43      | . . . . . * .. | REMKY
##44      | . . . . . * .. | STKY
##45      | . . . . . * .. | CBKKY
##46      | . . . . . * .. | CONSKY
##47      | . . . . . * .. | DNDKY
##48      | . . . . . * .. | EXHOLDKY
##49      | . . . . . * .. | HOLDKY
##50      | . . . . . * .. | IUSEKY
##51      | . . . . . * .. | LNRKY

```

| DIGIT INTERPRETATION VALID FOR ALL DIAL PLANS |

CODE	CALL PROGRESS STATE				DIGIT ANALYSIS RESULT	RESERVED/CONVERT DNI/ADD-INFO *=OWN NODE
	1	11111	11112	22		
0	12345	67890	12345	67890	12	

```

---
##52      | . . . . . * .. | PRIVKY
##53      | . . . . . * .. | RLSKY
##54      | . . . . . * .. | SNRKY
##55      | . . . . . * .. | TRNSKY
##56      | . . . . . * .. | RCTOFFKY
##57      | . . . . . * .. | TOGGLEKY

```

AMO-WABE -111 DIALLING PLANS, FEATURE ACCESS CODES
 DISPLAY COMPLETED;

Overlap Sending Dial Plan

<DISPLAY-LDPLN:TYPE=LDP,LDPNO=35;
 DISPLAY-LDPLN:TYPE=LDP,LDPNO=35;
 H500: AMO LDPLN STARTED

```

+-----+
| LDPNO : 35 | LDP : 79-X |
|             | SPC : 22   |
+-----+
|           | DPLN | LRTE | LAUTH | DPLN | LRTE | LAUTH |
+-----+
|           | 0    | 79  | 1     | 8    | 79  | 1     |
|           | 1    | 79  | 1     | 9    | 79  | 1     |
|           | 2    | 79  | 1     | 10   | 79  | 1     |
|           | 3    | 79  | 1     | 11   | 79  | 1     |
|           | 4    | 79  | 1     | 12   | 79  | 1     |
|           | 5    | 79  | 1     | 13   | 79  | 1     |
|           | 6    | 79  | 1     | 14   | 79  | 1     |
|           | 7    | 79  | 1     | 15   | 79  | 1     |
+-----+

```

AMO-LDPLN-111 ADMINISTRATION LCR DIALPLAN
 DISPLAY COMPLETED;

Enbloc Sending Dial Plan

<DISPLAY-LDPLN:TYPE=LDP,LDPNO=35;
 DISPLAY-LDPLN:TYPE=LDP,LDPNO=35;



H500: AMO LDPLN STARTED

LDPNO : 35	LDP : 79-XXXX						
	SPC : 22						
DPLN	LRTE	LAUTH	DPLN	LRTE	LAUTH		
0	79	1	8	79	1		
1	79	1	9	79	1		
2	79	1	10	79	1		
3	79	1	11	79	1		
4	79	1	12	79	1		
5	79	1	13	79	1		
6	79	1	14	79	1		
7	79	1	15	79	1		

AMO-LDPLN-111 ADMINISTRATION LCR DIALPLAN

BCSU

DISPLAY COMPLETED;

<DISPLAY-BCSU:TYPE=TBL,LTG=1,LTU=1,SLOT=79;

DISPLAY-BCSU:TYPE=TBL,LTG=1,LTU=1,SLOT=79;

H500: AMO BCSU STARTED

ADDRESS : LTG 1 LTU 1

PEN	ASSIGNED MODULE	MODULE TYPE	FCT ID	HWY BDL	INSERTED MODULE	STATE	HW-INFO	MODULE STATUS
79	Q2196-X	DIU-N2	1	A	Q2196-X	1	-06 -	READY

AMO-BCSU -111 BOARD CONFIGURATION, SWITCHING UNIT

DISPLAY COMPLETED;

Class of Trunk, COT

<DISPLAY-COT:COTNO=5;

DISPLAY-COT:COTNO=5;

H500: AMO COT STARTED

COT: 5 INFO: 5:ECMA1 V2.0

DEVICE: INDEP SOURCE: DB

PARAMETER:

PRIORITY FOR AC WILL BE DETERMINED FROM MESSAGE	PRI
RECALL IF USER HANGS UP IN CONSULTATION CALL	RCL
TRUNK CALL TRANSFER	XFER
TRUNK SIGNALING ANSWER	ANS
CHANGEOVER FROM HOLD TO RING TONE	CHRT
KNOCKING OVERRIDE POSSIBLE	KNOR
CALL EXTEND FOR BUSY, RING OR CALL STATE	CEBC
NETWORKWIDE AUTOMATIC CALLBACK ON BUSY	CBBN
NETWORKWIDE AUTOMATIC CALLBACK ON FREE	CBFN
DON'T RELEASE CALL TO BUSY HUNT GROUP	BSHT
CONNECTION TO ROUTE OPTIMIZATION NODE	ROPT
TSC-SIGNALING FOR NETWORKWIDE FEATURES (MANDATORY)	TSCS
INCOMING CDR BY ZONE OR FROM LINE	ICZL
AOC PER CALL (AUTOMATICAL OR ON REQUEST), MAND. CORNET-NQ	AOCC
LINE WITH IMPLICIT NUMBERS	LINO
NO TONE	NTON

AMO-COT -111 CLASS OF TRUNK FOR CALL PROCESSING

DISPLAY COMPLETED;



Class of Parameters for Device Handlers, COP

```
<DISPLAY-COP:COPNO=4;
DISPLAY-COP:COPNO=4;
H500: AMO COP   STARTED

COP:   4   INFO: 4:Q931
DEVICE: INDEP           SOURCE: DB
PARAMETER:
    LINE WITH END-OF-DIAL           EOD
    SPECIAL MODE                   SFRM
    CODE CALLING RELEASE AFTER EVERY TASK  CCR
    REGISTRATION OF LAYER 3 ADVISORIES    L3AR

AMO-COP  -111           CLASS OF PARAMETER FOR DEVICE HANDLER
DISPLAY COMPLETED;
```



Class of Services, COSSU

```
<DISPLAY-COSSU:TYPE=COS,COS=32;
DISPLAY-COSSU:TYPE=COS,COS=32;
H500: AMO COSSU STARTED
```

COS	VOICE	FAX	TTX	VTX	DTE
32	>32:TRUNKS				
	TA TNOTCR	NOCO NOTIE	NOCO NOTIE	NOCO NOTIE	TA TNOTCR BASIC MSN CDRINT MULTRA

```
AMO-COSSU-111 CLASSES OF SERVICE, SWITCHING UNIT
DISPLAY COMPLETED;
```

```
<DISPLAY-COSSU:TYPE=LCOSV,LCOSV=32;
DISPLAY-COSSU:TYPE=LCOSV,LCOSV=32;
H500: AMO COSSU STARTED
```

LCOS	LAUTH						LCR
V	1	2	3	4	5	6	OPTS=
	1234567890123456789012345678901234567890123456789012345678901234						LCRET
	>SERVICE INFORMATION						LCR
32	XX						.
	>32:TRUNKS						

```
AMO-COSSU-111 CLASSES OF SERVICE, SWITCHING UNIT
DISPLAY COMPLETED;
```

Trunk Group, BUEND

```
<DISPLAY-BUEND:TGRP=70;
DISPLAY-BUEND:TGRP=70;
H500: AMO BUEND STARTED
```

```
----- FORMAT = L -----
```

TGRP NUMBER :	70	TGRP NAME :	OPEN NUMBER E1	MAXIMUM NO. :	30
SUBGROUP NO.:	18	CHARCON :	NEUTRAL	TRACENO :	0
RESERVED :	N	DEVICE TYPE :	S2CONN	ACD THRESHOLD :	*
NUMBER OF ASSOCIATED ROUTES :	2	SEARCH MODE :	ASCENDING	PRIORITY :	2
THE FOLLOWING TRUNKS (LTG-LTU-SLOT-CCT) HAVE BEEN ALLOCATED:					
1- 1- 79-0	B-CHL: 1	1- 1- 79-0	B-CHL: 2	1- 1- 79-0	B-CHL: 3
1- 1- 79-0	B-CHL: 4	1- 1- 79-0	B-CHL: 5	1- 1- 79-0	B-CHL: 6
1- 1- 79-0	B-CHL: 7	1- 1- 79-0	B-CHL: 8	1- 1- 79-0	B-CHL: 9
1- 1- 79-0	B-CHL: 10	1- 1- 79-0	B-CHL: 11	1- 1- 79-0	B-CHL: 12
1- 1- 79-0	B-CHL: 13	1- 1- 79-0	B-CHL: 14	1- 1- 79-0	B-CHL: 15
1- 1- 79-0	B-CHL: 16	1- 1- 79-0	B-CHL: 17	1- 1- 79-0	B-CHL: 18
1- 1- 79-0	B-CHL: 19	1- 1- 79-0	B-CHL: 20	1- 1- 79-0	B-CHL: 21
1- 1- 79-0	B-CHL: 22	1- 1- 79-0	B-CHL: 23	1- 1- 79-0	B-CHL: 24
1- 1- 79-0	B-CHL: 25	1- 1- 79-0	B-CHL: 26	1- 1- 79-0	B-CHL: 27
1- 1- 79-0	B-CHL: 28	1- 1- 79-0	B-CHL: 29	1- 1- 79-0	B-CHL: 30

```
AMO-BUEND-111 TRUNK GROUP
DISPLAY COMPLETED;
```



Trunk Configuration, TDCSU

```
<DISPLAY-TDCSU:PEN1=1-1-79-0;
DISPLAY-TDCSU:PEN1=1-1-79-0;
H500: AMO TDCSU STARTED
```

```

+----- DIGITAL TRUNK (FORMAT=L) -----+
|          DEV = S2CONN          PEN = 1-01-079-0          |
+-----+-----+-----+
| COTNO   = 5          COPNO   = 4          DPLN      = 0          |
| ITR     = 0          COS     = 32         LCOSV     = 32         |
| LCOSD   = 32         CCT     =           DESTNO    = 55         |
| PROTVAR = ETSI      SEGMENT = 1          TCHARG    = N          |
| SUPPRESS = 0        DGTPR   =           CHIMAP    = N          |
| ISDNCC  =           ISDNAC  =           ISDNLCL  =           |
| ISDNIP  =           ISDNNP  =           |
| PNPL2C  =           PNPL1C  =           PNPLC     =           |
| PNPL2P  =           PNPL1P  =           PNPAC     =           |
| TRACOUNT = 31       SATCOUNT = MANY     NNO       = 55         |
| ALARMNO = 0         FIDX    = 1          CARRIER  = 1          |
| ZONE    = EMPTY     COTX    = 4         FWDX      = 10         |
| DOMTYPE =           DOMAINNO =         TPROFNO  =           |
| INIGHT  =           |
| CCHDL   =           UUSCCX  = 16        UUSCCY   = 8          |
+-----+-----+-----+
| TGRP    = 70        SRCHMODE = ASC       BCNEG     = N          |
| BCGR    = 1         INS      = N         LWPAR    = 2          |
| LWPP    = 0         LWLT    = 0         LWPS     = 0          |
| LWR1    = 0         LWR2    = 0          |
| BCHAN   1 && 30     |
+-----+-----+-----+

```

AMOUNT OF B-CHANNELS IN THIS DISPLAY-OUTPUT: 30

```
AMO-TDCSU-111          DIGITAL TRUNKS
DISPLAY COMPLETED;
<DISPLAY-LWPAR:INFOPAT="2";
DISPLAY-LWPAR:INFOPAT="2";
H500: AMO LWPAR STARTED
```

```

+-----+-----+-----+-----+
| LOADWARE PARAMETERS          CIRCUIT TYPE: DIUS2  SOURCE:DB  BLOCK: 2 |
+-----+-----+-----+-----+
| LNTYPE = COPPER              VERSION = S2          QUAL      = ON          |
| MASTER = Y                   DCHAN1  = 16         DCHAN2   = 0          |
| PATTERN = D5H                QUAL1   = 10 SEC.    QUAL2    = 10 MIN.    |
| SMD    = Y                   PERMACT = Y          FCBAB    = DFH        |
| CDG    = N                   FIXEDTEI = 0         CNTRNR   = 255        |
| TEIVERIF = N                CRC4REP = N          |
| DEV    = INDEP              |
| INFO   = 2:COPPER-MASTER CLOCK.(CORNET) |
+-----+-----+-----+-----+

```

```
AMO-LWPAR-111          LOADWARE PARAMETERS FOR NETWORKING MODULES
DISPLAY COMPLETED;
```



For Slave Side Configuration

```
<DISPLAY-TDCSU:PEN1=1-1-79-0;
DISPLAY-TDCSU:PEN1=1-1-79-0;
H500: AMO TDCSU STARTED
```

```
+----- DIGITAL TRUNK (FORMAT=L) -----+
|          DEV = S2CONN          PEN = 1-01-079-0          |
+-----+-----+-----+
| COTNO   = 5          COPNO   = 4          DPLN     = 0          |
| ITR     = 0          COS     = 32         LCOSV    = 32         |
| LCOSD   = 32         CCT     =           DESTNO   = 55         |
| PROTVAR = ETSI      SEGMENT = 1          TCHARG   = N          |
| SUPPRESS = 0        DGTPR   =           CHIMAP   = N          |
| ISDNCC  =           ISDNAC  =           ISDNLC   =           |
| ISDNIP  =           ISDNNP  =           |
| PNPL2C  =           PNPL1C  =           PNPLC    =           |
| PNPL2P  =           PNPL1P  =           PNPAC    =           |
| TRACOUNT = 31       SATCOUNT = MANY     NNO      = 55         |
| ALARMNO = 0         FIDX    = 1          CARRIER = 1          |
| ZONE    = EMPTY    COTX    = 4          FWDX     = 10         |
| DOMTYPE =           DOMAINNO =         TPROFNO  =           |
| INIGHT  =           |
| CCHDL   =           UUSCCX  = 16        UUSCCY   = 8          |
+-----+-----+-----+
| TGRP    = 70        SRCHMODE = ASC       BCNEG    = N          |
| BCGR    = 1         INS      = N         LWPAR    = 3          |
| LWPP    = 0         LWLT    = 0         LWPS     = 0          |
| LWR1    = 0         LWR2    = 0          |
| BCHAN   1 && 30     |
+-----+-----+-----+
```

AMOUNT OF B-CHANNELS IN THIS DISPLAY-OUTPUT: 30

```
AMO-TDCSU-111          DIGITAL TRUNKS
DISPLAY COMPLETED;
<DISPLAY-LWPAR:TYPE=DIUS2,BLNO=3;
DISPLAY-LWPAR:TYPE=DIUS2,BLNO=3;
H500: AMO LWPAR STARTED
```

```
+-----+-----+-----+-----+
| LOADWARE PARAMETERS      CIRCUIT TYPE: DIUS2  SOURCE:DB  BLOCK: 3 |
+-----+-----+-----+-----+
| LNTYPE = COPPER          VERSION = S2          QUAL      = ON          |
| MASTER = N              DCHAN1  = 16          DCHAN2    = 0          |
| PATTERN = D5H           QUAL1   = 10 SEC.     QUAL2     = 10 MIN.    |
| SMD     = N              PERMACT = Y           FCBAB    = DFH          |
| CDG     = N              FIXEDTEI = 0          CNTRNR   = 255         |
| TEIVERIF = N            CRC4REP = N          |
| DEV     = INDEP          |
| INFO    = 3:COPPER-DERIVE CLOCK(CORNET) |
+-----+-----+-----+-----+
```

```
AMO-LWPAR-111          LOADWARE PARAMETERS FOR NETWORKING MODULES
DISPLAY COMPLETED;
```



Reference Clock Configuration, REFTA

For Master-side configuration

```
<DISPLAY-REFTA:TYPE=CIRCUIT,PEN=1-1-79-0;
DISPLAY-REFTA:TYPE=CIRCUIT,PEN=1-1-79-0;
H500: AMO REFTA STARTED
```

```

+-----+
|           R E F E R E N C E   C L O C K   C I R C U I T S           |
+-----+-----+-----+-----+-----+-----+-----+-----+
| PEN          | MODULE    | DEVICE    | PRI  | ERROR  | BLOCK  | SUPP.  | READY |
|              |           |           |      |        |        |        | BUT   |
|              |           |           |      |        |        |        | ASYN. |
+-----+-----+-----+-----+-----+-----+-----+
| 1- 1- 79- 0 | DIU-N2   | S2CONN   | 0    | 35    | N     |        | N     |
+-----+-----+-----+-----+-----+-----+-----+

```

```
AMO-REFTA-111      REFERENCE CLOCK TABLE
DISPLAY COMPLETED;
For Slave-side configuration
```

```
<DISPLAY-REFTA:TYPE=CIRCUIT,PEN=1-1-79-0;
DISPLAY-REFTA:TYPE=CIRCUIT,PEN=1-1-79-0;
H500: AMO REFTA STARTED
```

```

+-----+
|           R E F E R E N C E   C L O C K   C I R C U I T S           |
+-----+-----+-----+-----+-----+-----+-----+
| PEN          | MODULE    | DEVICE    | PRI  | ERROR  | BLOCK  | SUPP.  | READY |
|              |           |           |      |        |        |        | BUT   |
|              |           |           |      |        |        |        | ASYN. |
+-----+-----+-----+-----+-----+-----+-----+
| 1- 1- 79- 0 | DIU-N2   | S2CONN   | 11   | 535   | N     |        | N     |
+-----+-----+-----+-----+-----+-----+-----+

```

```
AMO-REFTA-111      REFERENCE CLOCK TABLE
DISPLAY COMPLETED;
<
```

Trunk Least Cost Routing Configuration

```
<DISPLAY-LDAT:TYPE=LCR,LROUTE=79;
DISPLAY-LDAT:TYPE=LCR,LROUTE=79;
H500: AMO LDAT STARTED
```

```

+-----+
| LROUTE = 79   LDPLN      NAME = OPEN NUMBER E1           SERVICE = ALL |
| TYPE = LCR                                DNNO OF ROUTE = 999 |
| SERVICE INFO = |
+-----+-----+-----+-----+-----+-----+-----+
| LRTEL | LVAL | TGRP | ODR | LAUTH | SCHEDULE | CARRIER | BAND |
|        |      |      |     |       | ABCDEFGH |         | ZONE | WPTH | LATTR |
+-----+-----+-----+-----+-----+-----+-----+
| 1     | 1    | 70  | 1  | 1    | ***** | 1     | EMPTY | 1    | NONE |
|        | DNNO = 999 |
+-----+-----+-----+-----+-----+-----+-----+

```

```
AMO-LDAT -111      LCR-DIRECTIONS
DISPLAY COMPLETED;
```




```
HTOS      :N      HTOT      :N      HTOV      :N      HTOF      :N      HTOD      :N
DND       :N      VCP       :Y      CWT       :N      TCLOGIN   :N
-----
ESSTN     :
PUGR      :      HUNTING GROUP : N
KEYSYS    :N      NIGHT OPTION  : N      ASSOCIATED STN : N
-----
SUBSCRIBER ATTRIBUTES (AMO SDAT) -----
NONE
-----
```

```
AMO-SBCSU-111      STATION AND S0-BUS CONFIGURATION OF SWITCHING UNIT
DISPLAY COMPLETED;
<
<
```



Configuring the Cisco IOS Voice Gateway 'A' (Cisco 2651XM)

2651XM_West#sho ver

Cisco IOS Software, C2600 Software (C2600-ADVENTERPRISEK9-M), Version 12.3(7)T,

RELEASE SOFTWARE (fc1)

Technical Support: <http://www.cisco.com/techsupport>

Copyright (c) 1986-2004 by Cisco Systems, Inc.

Compiled Sat 21-Feb-04 14:41 by eaarmas

ROM: System Bootstrap, Version 12.2(8r) [cmong 8r], RELEASE SOFTWARE (fc1)

2651XM_West uptime is 16 hours, 27 minutes

System returned to ROM by reload

System image file is "flash:c2600-adventerprisek9-mz.123-7.T.bin"

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<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.



Cisco 2651XM (MPC860P) processor (revision 0x300) with 124928K/6144K bytes of memory.

Processor board ID JAE0817EK5Z (1672255744)

M860 processor: part number 5, mask 2

2 FastEthernet interfaces

31 Serial interfaces

2 Channelized E1/PRI ports

32K bytes of NVRAM.

49152K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

2651XM_West#sho run

Building configuration...

Current configuration : 1825 bytes

!

version 12.3

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname 2651XM_West

!

boot-start-marker

boot system flash

boot-end-marker

!



```
!  
no network-clock-participate slot 1  
no network-clock-participate wic 0  
voice-card 1  
!  
ip subnet-zero  
!  
!  
ip cef  
no ip domain lookup  
ip audit po max-events 100  
no aaa new-model  
no ftp-server write-enable  
isdn switch-type primary-net5  
!  
!  
!  
voice service voip  
h323  
!  
!  
voice class codec 1  
codec preference 1 g729r8  
codec preference 2 g711ulaw  
codec preference 3 g711alaw  
!  
!  
!  
!
```



```
!  
!  
controller E1 1/0  
  pri-group timeslots 1-31  
  description ECN-4  
!  
controller E1 1/1  
!  
no crypto isakmp enable  
!  
!  
interface FastEthernet0/0  
  ip address 172.20.4.7 255.255.255.0  
  duplex auto  
  speed auto  
!  
interface FastEthernet0/1  
  no ip address  
  shutdown  
  duplex auto  
  speed auto  
!  
interface Serial1/0:15  
  description D-channel for ECN-4  
  no ip address  
  no logging event link-status  
  isdn switch-type primary-net5  
  isdn overlap-receiving  
  isdn incoming-voice voice
```



```
isdn send-alerting
isdn bchan-number-order ascending
isdn sending-complete
<isdn outgoing ie connected-number>1
no cdp enable
!
ip classless
ip route 0.0.0.0 0.0.0.0 FastEthernet0/0
!
ip http server
no ip http secure-server
!
!
!
control-plane
!
!
!
voice-port 1/0:15
description voice port for ECN-4
!
!
!
dial-peer voice 323 voip
destination-pattern 5...
session target ipv4:172.20.4.9
```

¹ IOS ver 12.3 was used in the testing represented in this app note, and this configuration command was not included. For 12.4 images and later, this command is needed in the serial interface configuration. If this command is not implemented on both gateways, connected number is not sent across the toll bypass network.



```
!  
dial-peer voice 1015 pots  
destination-pattern 8...  
direct-inward-dial  
port 1/0:15  
forward-digits all  
!  
dial-peer voice 519 voip  
shutdown  
destination-pattern 6...  
session protocol sipv2  
session target ipv4:172.20.4.9  
supplementary-service pass-through  
!  
!  
!  
line con 0  
line aux 0  
line vty 0 4  
exec-timeout 0 0  
password cisco  
login  
transport input telnet  
!  
!  
!  
end
```

2651XM_West#



Configuring the Cisco IOS Voice Gateway 'B' (Cisco 3745)

3745_West#sho ver

Cisco IOS Software, 3700 Software (C3745-ADVENTERPRISEK9-M), Version 12.3(7)T, R

RELEASE SOFTWARE (fc1)

Technical Support: <http://www.cisco.com/techsupport>

Copyright (c) 1986-2004 by Cisco Systems, Inc.

Compiled Sat 21-Feb-04 05:53 by eaarmas

ROM: System Bootstrap, Version 12.2(8r)T2, RELEASE SOFTWARE (fc1)

3745_West uptime is 16 hours, 34 minutes

System returned to ROM by reload

System image file is "flash:c3745-adventerprisek9-mz.123-7.T.bin"

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A summary of U.S. laws governing Cisco cryptographic products may be found at:

<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>



If you require further assistance please contact us by sending email to export@cisco.com.

Cisco 3745 (R7000) processor (revision 2.0) with 116736K/14336K bytes of memory.

Processor board ID JMX0813L0Z3

R7000 CPU at 350MHz, Implementation 39, Rev 3.3, 256KB L2, 2048KB L3 Cache

2 FastEthernet interfaces

31 Serial interfaces

4 Channelized E1/PRI ports

2 Voice FXS interfaces

DRAM configuration is 64 bits wide with parity disabled.

151K bytes of NVRAM.

31168K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x2102

3745_West#sho run

Building configuration...

Current configuration : 2347 bytes

!

version 12.3

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname 3745_West

!

boot-start-marker

boot system flash



```
boot-end-marker
!
card type e1 1 1
logging buffered 5000000 debugging
!
no network-clock-participate slot 1
no network-clock-participate slot 2
no network-clock-participate slot 3
no network-clock-participate slot 4
no network-clock-participate wic 0
no network-clock-participate wic 1
no network-clock-participate wic 2
no network-clock-participate aim 0
no network-clock-participate aim 1
no aaa new-model
ip subnet-zero
ip cef
!
!
!
!
no ip domain lookup
ip audit po max-events 100
no ftp-server write-enable
isdn switch-type primary-net5
voice-card 1
dspfarm
!
!
```



```
!  
voice call carrier capacity active  
!  
voice service voip  
h323  
!  
!  
voice class codec 1  
codec preference 2 g711ulaw  
codec preference 3 g711alaw  
!  
!  
!  
!  
controller E1 1/0  
pri-group timeslots 1-31  
description ECN10  
!  
controller E1 1/1  
!  
controller E1 1/2  
!  
controller E1 1/3  
!  
no crypto isakmp enable  
!  
!  
!  
!
```



```
interface FastEthernet0/0
ip address 172.20.4.9 255.255.255.0

duplex auto

speed auto

!

interface FastEthernet0/1

no ip address

shutdown

duplex auto

speed auto

!

interface Serial1/0:15

description D-channel for ECN10

no ip address

no logging event link-status

isdn switch-type primary-net5

isdn overlap-receiving

isdn protocol-emulate network

isdn incoming-voice voice

isdn T310 120000

isdn send-alerting

isdn sending-complete

<isdn outgoing ie connected-number>2

no cdp enable

!
```

router eigrp 10

² IOS ver 12.3 was used in the testing represented in this app note, and this configuration command was not included. For 12.4 images and later, this command is needed in the serial interface configuration. If this command is not implemented on both gateways, connected number is not sent across the toll bypass network.



```
network 172.20.0.0
no auto-summary
!
ip classless
ip route 0.0.0.0 0.0.0.0 FastEthernet0/0
!
ip http server
no ip http secure-server
!
!
control-plane
!
!
voice-port 1/0:15
description voice port for ECN10
!
voice-port 3/0/0
!
voice-port 3/0/1
!
!
dial-peer cor custom
!
!
dial-peer voice 323 voip
destination-pattern 8...
session target ipv4:172.20.4.7
!
dial-peer voice 1015 pots
```



```
destination-pattern 5...
direct-inward-dial
port 1/0:15
forward-digits all
!
dial-peer voice 519 voip
shutdown
destination-pattern 3...
session protocol sipv2
session target ipv4:172.20.4.7
supplementary-service pass-through
!
!
!
line con 0
line aux 0
line vty 0 4
exec-timeout 0 0
password cisco
login
transport input telnet
!
!
end
```




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