

# Toshiba Strata<sup>®</sup> CIX<sup>™</sup> Systems

**Technical Application Notes** 



# **Table of Contents**

About Toshiba Strata <sup>®</sup> CIX <sup>™</sup> and Broadvox SIP Trunking	1
Requirements	2
Purpose, Scope and Audience	3
What is SIP Trunking?	4
Business Advantages of SIP Trunking	4
Technical Challenges	4
Business Challenges	4
Introduction to Broadvox	6
Choosing the SIP Trunk Version	6
Sending Calls to Broadvox	6
SRV Records	7
Testing SRV Records	8
SIP Trunking Configuration	
SIP Trunking Configuration Example	
SIP Trunking Configuration Programming	11
OLG Flexible Access Code Programming	14
List of Illustrations	23



# About Toshiba Strata<sup>®</sup> CIX<sup>™</sup> and Broadvox SIP Trunking

Session Initiation Protocol (SIP) is an application layer protocol used for establishing sessions in an Internet Protocol (IP) network. Broadvox SIP Trunking allows the Toshiba Strata<sup>®</sup> CIX<sup>™</sup> system to get Primary Rate Interface (PRI)-like services from an Internet Telephony Service Provider (ITSP) using SIP. A SIP Trunk allows a Strata CIX system to connect internal voice and private data traffic to the outside public network (Public Switched Telephone Network and public data) via Internet Protocol (IP.) In the traditional world, a business would have some type of dedicated lines to route voice traffic to the outside PSTN. These lines could be analog Plain Old Telephone Systems (POTS), T1 or PRI. These circuits are considered a PSTN gateway because they make the connection between internal callers and the outside callers.

With SIP Trunks, voice and connections to the outside world use the same IP WAN. When a user dials a call to send over the PSTN, the call routing goes over the WAN to the Internet Telephony Service Provider (ITSP) that is providing the SIP trunk. This ITSP will provide a connection to the PSTN through their equipment. The call goes from the CIX system to the SIP provider, who will act as a proxy, and send the call to the dialed destination. For incoming calls, the SIP trunk acts somewhat like a DID trunk; the dialed number is sent to the SIP provider and then routed over the IP Network to the CIX system. This routing is based on the URI and associated IP address.

Toshiba's SIP Trunk capabilities allow the Strata CIX system to communicate with a service provider natively over an IP circuit, which can be used to carry voice and data simultaneously. Inside the CIX system, voice is converted to data and sent to the service provider along the same circuit as the other data packets. This allows voice and data to use one circuit; it also allows data to use all of the bandwidth when no voice is present. Quality of Service (QoS) is managed by the service provider, allowing voice to instantaneously take priority over data.

SIP trunks are set up using the MIPU/GIPU card. The MIPU/GIPU is designed as a VoIP card, able to support IP stations, Strata Net IP and SIP trunks.

SIP trunks offer ISDN-like features over a data connection (i.e. a T1 circuit). However, unlike a traditional T1 circuit, a SIP trunk enabled circuit does not have to be physically provisioned and divided to separate the voice channels from the data channels.



# Requirements

- Strata CIX Hardware: CIX40, CIX100, CIX200, CIX670 or CIX1200
- Strata CIX Software: R5.20 MT14 or higher
- MIPU/GIPU, MIPU16/MIPU24 (MIPU01.18 or higher)/GIPU8
- Network eManager<sup>®</sup>: V5.10 A18 or higher
- Service provider: Providers are listed in this document, but contact the Toshiba Sales Applications Desk for the latest list.
- License LIC-CIX-SIPT-CH
- Broadvox Provided Version N SIP Trunk

### Purpose, Scope and Audience

This technical application note describes the configuration of Toshiba for the Broadvox GO! SIP Trunking service. This document has a technical audience in mind – specifically IT professionals with some experience in PBX administration and familiarity with VoIP technologies. This document is not for business administrators or people in other non-technical careers. In order to successfully use this document to deploy Broadvox GO! SIP Trunking service, you will need to possess the following skills, or have access to professionals or consultants with the following skills:

- Familiarity with PBX systems, including:
  - ° Trunk configuration
  - ° Calling plan configuration
  - Extension configuration
  - Mailbox configuration
- Familiarity with Session Initiation Protocol (SIP)
- A complete understanding of your internal network structure, Network Address Translation (NAT) setup, and firewall setup
- A complete understanding of your public Internet connectivity

Broadvox can only provide support for Toshiba to the extent covered in this Technical Application Note and the included reference configuration, so if your level of technical expertise does not include the above skills, it is recommended that you obtain the services of a software professional.

### What is SIP Trunking?

Before you begin deploying SIP Trunking with Toshiba gateways, it is important to understand the basic definition of SIP Trunking.

Session Initiation Protocol (SIP) is the common signaling standard for real-time communications including Voice over Internet Protocol (VoIP). SIP is an open standard which allows carrier voice equipment to interoperate seamlessly with customer premise equipment (CPE). The logical voice channel established between them is referred to as a SIP Trunk; a virtual phone line that utilizes a broadband connection for access.

#### **Business Advantages of SIP Trunking**

Businesses have installed TDM phone systems (PBX or Key Systems) that work just fine and the owners and managers of the businesses see no need to replace them just yet. However, the owners and managers of these businesses would like to take advantage of some of the benefits of IP Telephony, perhaps by saving money on the monthly service via SIP Trunking, taking advantage of a Unified Communications Solution, or utilizing VoIP services like Extended Local Numbers. Until now, there has not been a cost-effective way for these businesses to phase IP telephony into their existing infrastructure.

Broadvox and Toshiba have created a bundle that solves this problem with a seamless, cost-effective solution. By utilizing a Toshiba Strata CIX system along with Broadvox SIP Trunking, businesses can gain the cost savings that VoIP provides along with the features and functions of IP Telephony without introducing migration problems. There is no need to dispose of any existing equipment, no need for extensive end-user training, and access to a very nice phased implementation takes place instead of a "forklift upgrade." Best of all, the monthly savings on SIP Trunks combined with the innovative purchase arrangements make this solution extremely affordable.

#### **Technical Challenges**

The biggest technical challenge facing organizations who want to move to SIP Trunking while retaining their existing TDM PBXs is interoperability. The SIP trunks must be converted to a TDM format that is compatible with that specific PBX, allowing the TDM circuits from the PBX to be moved from the PSTN trunks to the SIP trunks with little or no adjustments to the PBX.

#### **Business Challenges**

A key business challenge for both the enterprise and reseller is separating the sale of SIP Trunking from any potential upgrades or replacement of the existing TDM PBX and avoiding the protracted evaluation process required by the customer to select a new PBX, work out a migration plan and then execute a cut over.



In addition, interoperability between the SIP Trunking and the existing TDM PBX is important, avoiding any expensive upgrades or modifications to the PBX. If the PBX needs new cards installed, if the software requires upgrades or significant administration time is required, the cost saving of the SIP trunks could be overshadowed by upgrade and installation costs.

### Introduction to Broadvox

### Choosing the SIP Trunk Version

Broadvox offers two versions of SIP Trunking to meet customer requirements. By default, Broadvox places most new customers on Version N. Version N supports dynamic IP addresses using registration, offers NAT Traversal and offers automatic fall-back forwarding to PSTN numbers, either on a per-trunk basis, or a per-number basis.

If using more than 1,000 simultaneous calls is anticipated, consider using Version S. The Version S trunks do not support registration, NAT Traversal or automatic fall-back forwarding to PSTN numbers. However, Broadvox can offer up to four separate gateways across three cities to which calls may be sent and from which calls may be received (by default, connectivity to two is offered, but for very large customer implementations, additional gateways can be added). In addition, the Version S gateways are rated for a much higher call capacity than the Version N gateways, and offer more granular control of the specific signaling and media profiles for the trunk. The more granular control allows more flexibility in accommodating any special requirements.

### Sending Calls to Broadvox

IP addresses to which calls may be sent and from which calls may be received are listed in the Welcome letter from Broadvox. The Toshiba Strata CIX System supports IP addresses and DNS records. Broadvox uses two Welcome letters depending on which version of services are deployed. Version S uses two entirely separate servers to provide high availability. Version N uses a cluster and a virtual IP address to provide high availability. In the figure below, the three main sections for Version S are listed.

Allow These Media	IPs - UDP Ports Up To 6553	5			
64.158.162.71	64.158.162.100	64.152.60.71	64.152	2.60.164	
Trunk Number	Turn-up Ticket	Trunk Type	BTN	Source IP	)
1234567	23456	GO!Anywhere	5551234567	127.0.0.1	
2345678	23456	GO!Domestic	NA	127.0.0.1	
Trunk Number	DNSA Record	DNS SRV Re	cord	IP Addr 1	IP Addr 2
2345678	east.gd.broadvox.net	psrveast.gd.b	proadvox.net	64.158.162.76	64.152.60.76
1234567	east.ga.broadvox.net	psrveast.ga.b	proadvox.net	64.158.162.75	64.152.60.75
	east1.ga.broadvox.net	t psrveast1.ga	.broadvox.net	64.158.162.101	64.152.60.165
	east2.ga.broadvox.net	t psrveast2.ga	.broadvox.net	64.158.162.102	64.152.60.166
	east3.ga.broadvox.net	t psrveast3.ga	.broadvox.net	64.158.162.103	64.152.60.167
	east4.ga.broadvox.net	t psrveast4.ga	.broadvox.net	64.158.162.104	64.152.60.168

Figure 1 - Three Main Sections from Version S Welcome Letter

The first section lists the IP addresses from which media will be received. The firewall must allow these IP addresses. Media may be received from any User Datagram Protocol (UDP) port from 1024 to 65535 from any of the listed addresses.

The second section lists each of the trunks, the service ticket number containing the turn-up information, the type of the trunk, the BTN for the trunk, if any and the

source IP address from which Broadvox expects to receive calls and to which calls are to be directed. The Source IP listed **must** match the External IP Address to be used.

The third section lists signaling addresses for each trunk group. Note that the trunk group number listed matches the trunk group number from the second section. This section tells which trunk sends to which IP address. If the incorrect IP address for the trunk is input, the charge for calls may be more than anticipated.

For example, if the IP addresses are reversed and GO!Domestic traffic is sent to the .75 address listed for the GO!Anywhere trunk while the GO!Anywhere traffic is sent to the .76 address listed for the GO!Domestic trunk, then GO!Domestic calls will be rated as long distance from the GO!Anywhere trunk LD minutes, if LD minutes have been purchased. If a bundle of LD minutes on the GO!Anywhere trunk have not been purchased, there is typically a charge of 3.5 cents per minute and GO!Anywhere calls are rated as long distance calls from the LD bundle purchased for the GO!Domestic trunk. This could result in much higher fees than anticipated. Verify that traffic is sent to the correct address. If different IP addresses are used for each trunk, then the calls will fail if sent to the incorrect location.

In the Version N Welcome letter, the media IP addresses are different and there is only one signaling IP address for each trunk instead of two, as shown in Figure 2 below. Also, note that the Version N Welcome letter contains a Password field for each trunk. This field will contain a password for the trunk if using registration. If registration is not used, the Source IP field will be filled out instead. When using registration, the IP address is obtained from the register request.

Trunk Number	Turn-up Ticket	Trunk Type	BTN	Source IP	Password	
						(
Trunk Number	DNSA Reco	ord	DNS SRV Re	cord	IP Addr 1	
	dfwnx01gd.	pa.broadvox.net	dfwnx01gd.p	osrv.broadvox.net	209.249.3.57	
	dfwnx01ga1	.pa.broadvox.net	dfwnx01ga1	.psrv.broadvox.net	209.249.3.59	
	dfwnx01ga2	.pa.broadvox.net	dfwnx01ga2	.psrv.broadvox.net	209.249.3.100	
	dfwnx01ga3	.pa.broadvox.net	dfwnx01ga3	.psrv.broadvox.net	209.249.3.101	
	dfwnx01ga4	.pa.broadvox.net	dfwnx01ga4	.psrv.broadvox.net	209.249.3.102	

Figure 2 - Version N Welcome Letter IP Addresses

### SRV Records

Service records (SRV) are a form of Domain Name System (DNS) record. They contain information about where to send requests for a particular service offered at a specific domain. In the case of Broadvox GO! SIP Trunking, they provide the IP addresses, port numbers, and preferences to use for sending SIP calls over UDP to Broadvox. The SRV location to use for sending calls to Broadvox for each trunk group is included in the Welcome letter.

Choose the correct server based on the information in the Welcome letter. There is one caveat with using DNS records. The DNS query is cached and may use only one IP address for signaling to/from a peer. To configure servers to provide proper redundancy, Broadvox recommends using IP addresses instead of DNS. If DNS records are used instead of IP addresses and one of the servers is removed from DNS to perform a scheduled maintenance, the server will continue to try to target that IP. This will either add a small amount of post dial delay to calls, or cause calls to start failing until DNS is re-checked. Post dial delay (PDD) is the period of time between dialing a number finishes and ringing starts. Typically, the added delay will be less than 3 seconds but usually will be under 1 second.

### Testing SRV Records

Most Broadvox GO! SIP Trunking customers like to ensure the DNS entries are functioning or they like to look up the actual IP addresses, however, performing a standard DNS query on the SRV records will fail. In a Windows environment, perform the query using the **nslookup** command at a command prompt, as shown in Figure 3.

🚳 Command Prompt - nslook	up	- 🗆 🗙
Microsoft Windows XP [V (C) Copyright 1985-2001	ersion 5.1.2600] Microsoft Corp.	<b>_</b>
H:\/nslookup Default Server: Address:		
> set type=srv > _sipudp.psrveast.ga Server: Address:	.broadvox.net	
_sipudp.psrveast.ga.b priority weight port svr hostname _sipudp.psrveast.ga.b	roadvox.net SRV service location: = 30 = 1 = 5060 = psrv2.ga.broadvox.net roadvox.net SRV service location: = 30	
weight port svr hostname	= 1 = 5060 = psrv1_ga.broadvox.net	
ga.broadvox.net nameser va broadvox net nameser	ver = ns03.broadvox.net uew = ns04 bwoadvox net	
msrul.ga.hroaduox.net	internet address = $64.158.162.75$	
psru2.ga.broadvox.net	internet address = $64.152.60.75$	
ns03.broadvox.net	internet address = $66.243.109.10$	
ns04.broadvox.net	internet address = 66.243.109.11	
>		· · · · · · · · · · · · · · · · · · ·

Figure 3 - SRV Lookup in Windows XP

As shown above, a SRV record consists of a service type definition (\_sip), a transport definition (\_udp), and the domain (psrveast.ga.broadvox.net). A PBX that supports SRV records will automatically add the service and transport definitions as a prefix to the domain before performing the query. The query returns a priority, weight, port and hostname for each entry. The query also returns the "A record" entries for each hostname, which provides the IP address for each host.

In a UNIX or Linux environment, a query on SRV records using the **dig** command can be performed:

\$ dig SRV sip. udp.psrveast.ga.broadvox.net ; <<>> DiG 9.3.3 <<>> SRV sip. udp.psrveast.ga.broadvox.net ;; global options: printcmd ;; Got answer: ;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 16950 ;; flags: qr aa rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 2, ADDITIONAL: 4 ;; QUESTION SECTION: ; sip. udp.psrveast.ga.broadvox.net. IN SRV ;; ANSWER SECTION: sip. udp.psrveast.ga.broadvox.net. 600 IN SRV 30 1 5060 psrv2.ga.broadvox.net. sip. udp.psrveast.ga.broadvox.net. 600 IN SRV 30 1 5060 psrv1.ga.broadvox.net. ;; AUTHORITY SECTION: ns04.broadvox.net. 600 IN NS 600 IN NS ga.broadvox.net. ga.broadvox.net. ns03.broadvox.net. ;; ADDITIONAL SECTION: 

 ;; ADDITIONAL SECTION:

 psrvl.ga.broadvox.net.
 600
 IN
 A
 64.158.162.75

 psrvl.ga.broadvox.net.
 600
 IN
 A
 64.152.60.75

 ns03.broadvox.net.
 7200
 IN
 A
 66.243.109.10

 ns04.broadvox.net.
 7200
 IN
 A
 66.243.109.11

 ;; Query time: 2 msec ;; SERVER: 66.243.109.10#53(66.243.109.10) ;; WHEN: Wed Nov 7 12:30:24 2007 ;; MSG SIZE rcvd: 236

# **SIP Trunking Configuration**

#### SIP Trunking Configuration Example

The example shown below is a general system plan. Interoperability was confirmed using BroadvoxGO! **Version N** SIP Trunking. Please note that BroadvoxGO! **Version S** SIP Trunking is not compatible.



Figure 4 - CIX with SIP Trunking

There are many ways to set up a public IP address for the MIPU or GIPU. The most common way is to simply run an Ethernet cable from one of the WAN interfaces on the router straight to the MIPU/GIPU.



#### SIP Trunking Configuration Programming

The following pages show the general programming and configuration steps to implement a SIP trunk. Specific procedures for each provider are in the linked tables in this document.

#### Programming the MIPU/GIPU card

- 1. Set the card type for the slot holding the MIPU.
- 2. Choose the type of MIPU for use in the system. The number of channels entered must match the number of channels on the card.



Figure 5 - Programming the MIPU/GIPU card



#### Programming the Incoming Line Group

- 1. For SIP trunk programming, start with an ILG and Outgoing Line Group (OLG) assignment.
- 2. For Incoming Line Group (ILG) programming, create an ILG group (in this example, group number 8).
- 3. FB01 Trunk type: Select SIP.
- 4. FB03 CO Service Type: DID.
- 5. FB11 DID Digits: Number of incoming digits to use from the dialed number to route the call. Count the number of digits from the least significant digit.

ling Innovation >>>				TOSHI	BA TE	ilecommunic Iser Name: A	arion s adminis	VETEME DI	VISION					log ou
gy ES 🕨 Gystem	• Stat	ion 🕨 Tr	unk	IT Tac	phor	iy 🕨 📮	CR/DR	DE DE	rata N	ct	<ul> <li>Mainte</li> </ul>	rerec	Alarm/Tra	fic ▶ Help
MOTE TRAINING	- 304 IN	COMING LINE	GROU	PASSIGNI	IENT	<u>2</u>							1	
STSTEN	Group N	umber		8										1 ANALOG
	01 Group	Type		SIP	v	02	Line Typ			CO	¥			5 ISDN
CIX200-TECH	03 CO \$4	ervice Type		DID	¥	84	Private S	ervice Type		Star	dard 🛩			8 SIP B SIP
	03 GCO I	Key Number		0	V	95	Pool Key	Number		0	¥			10 ISDN
	07 COS I	)ay1		1	¥	COS Day2	1	*	COS	6 Night	17	~		11 SIP
	00 DRL (	Jay1		1	~	DRL Day2	1	4	DRI	Night	1	4		
	09 FRL C	Day1		1	v	FRL Day2	1	<b>\$</b>	FRI	. Night	1	~		=
	10 OPL D	layi		1	V	QPL Day2	1	¥	QPL	. Night	1	~		
	11 DID D	lgl1s		4	v	12	Speech/3	1KHz		Aud	10 🔻			
	13 Delay	1 Ringing Time	r	12	*	14	Delay2 R	inging Time	ar -	24	*			
	15 Interd	igit 1 Timer		15	•	16	Interdigit	2 Timer		5	~			
	17 Auto	Campon		Enable	Y	12	Calling N	lumber ID		Use	r Provided	Y		
	19 Interc	ept		Disable	V	20	Send Dia	Tone		Disa	ble 😽			
	21 TGAC	Override		Disable	*	22	Network	COS		1	*			
	23 LCR (	Group		1	~	24	Change (	05 Overrid	ie Gode	Diad	ble 🛩			
	25 Regie	ter Speed Dial (	Codes	Disable	V	26	Originato	r Invoke OC	A	Diea	ble 🗸 🗸			-
r	27 Canda	rized Tone Mor	10	Diel Tope	40	22	Emernen	Call Grou	IIII	1	<b>u</b>			×

Figure 6 - Programming the Incoming Line Group

**Note:** SIP Trunking requires a license for each trunk. No channel group can successfully be programmed without a license.

SIP Trunking is supported by the MIPU/GIPU cards only. It can share connections of its ports between stations, IP telephones and other IPU devices. The IP telephones are the only devices that are flexibly

assignable. That is, SIP stations, VM ports, SIP trunks and attendant consoles are fixed resources. IP telephones do not need to be fixed assignments unless they are assigned a fixed equipment number (not 0000).

#### Assigning the Trunk DID Destination

- 1. FB01 DID number: Incoming digits used to direct the dialed number to route the call. Count from the least significant digit side and limit to the number of digits set in Prog 204, FB11.
- 2. FB05-07 Audio Day 1 Dst Type, Audio Day 1 Dst Digits, Day 2, Night: For example, Dialing Digits/Extension

**Note:** DID routing must be set up to route incoming SIP calls to their desired destination. This programming is the same as any other trunk group type. If the routing is not set up, incoming INVITES will fail instantly.

Toshiba::TAIS::TSD::Network	eManager - Microsoft In	ternet Explorer				
			Home C	lients 🕨 Connected Ed	quipments 🕨 Applicat	ion Settings 🕨 🗠
TOSHIBA Leading Innovation >>>		Strata N TOSHIBA TELECOMMU User Name	TWORK MANAGER NICATION SYSTEMS DIVISION a: administrator			log out
Stratagy ES 🔸 System 🕨	Station 🕨 Trunk	IP-Telephony	LCR/DR 🕨 Strata Net	Maintenance	▶ Alarm/Traffic	▶ Help ▶
Trunk - DID						
Default						
	LG Group Number	8				
Default	309 DIRECT INWARD DIALI	NG				
	11 DID Number	8400	List			
0	12 MOH Source	1 Processor MOH Jack 💙	]			
0	13 GCO Key Group	0 🗸	04 Pooled Key Group	0		
0	19 Audio Day1 Dst Type	Dialing Digits 🛛 👻	Audio Day1 Dst Digits	2400		
0	16 Audio Day2 Dst Type	Dialing Digits 🛛 😪	Audio Day2 Dst Digits	2400		
0	)7 Audio Night Dst Type	Dialing Digits 🛛 👻	Audio Night Dst Digits	2400		
0	18 Data Day1 Dst Type	No Data 🛛 👻	Data Day1 Dst Digits			
0	19 Data Day2 Dst Type	No Data 💉	Data Day2 Dst Digits			
1	10 Data Night Dst Type	No Data 🛛 📉	Data Night Dst Digits			
1	11 DID/DNIS No. VMID		12 DID/DNIS Name			
1	15 YM Application Digits		16 Tenant Number	1		
Su	ubmit Print Refresh	Get Default Create	Copy Delete DID/DNIS T	able View		
Ne	twork eManager: V5.10A1	13 ©2008 Toshi	ba America Information Syst	tems <u>disclaim</u>	ier ?	
						~
E Done					<b>3</b> 🧐 Lo	cal intranet

Figure 7 - Assigning the Trunk DID Destination



#### Programming the Outgoing Line Group

- 1. Create a new Outgoing Line Group (OLG) and designate it as SIP.
- 2. Set FB01 Group type: SIP
- 3. The rest of the values are left at the default value.

Note: An OLG flexible access code must be created for this group.

TOSHIBA Leading Innovation >>>	Home Clerk V ( Stroto: NSTWORK TOSHIRA TELECOMMUNICATION SYSTEMS DIVISION User Name: Administrator	ionnested Edupments 🕨 Application Settings 🕨 🌨
CIX200-TECH	Station       Trunk       IP To cphony       CR/DR       Strate Net       Mair         Hole OUTGOING LINE GROUPS       roup Number       8       CO/DD       Mair         I Group Type       SIP       42 Trunk Type       CO/DD       0       0         I Group Type       SIP       44 GCO Keyl Number       0       0       0       0         I Group Type       SIP       46 GCO Keyl Number       0 <th>Iterarce       Alam/Trafic       Itelp         I ANALOG       1 ANALOG         2 IBDN       3 ANALOG         5 ISDN       B SIP         9 SIF       10 IEDN         11 SIP       Itelp</th>	Iterarce       Alam/Trafic       Itelp         I ANALOG       1 ANALOG         2 IBDN       3 ANALOG         5 ISDN       B SIP         9 SIF       10 IEDN         11 SIP       Itelp
Dane		📑 🚭 Internet 🔍 100% 🔹

Figure 8 - Programming the Outgoing Line Group

#### OLG Flexible Access Code Programming

An access code is required for the OLG that was setup for the SIP Trunks. SIP Trunks can also be accessed using LCR.

- 1. FB00 create an access code for the SIP Trunk (in this example, 8.)
- 2. FB01 Feature name set to Line group access code; one access code for each OLG.
- 3. FB02 Enter the OLG number set in Programming OLG on the previous page (in this example, 8.)



Figure 9 - OLG Flexible Access Code Programming

#### **Creating the Channel Group**

- 1. Go to IP Telephone > SIP Trunking. The first tab is Channel Group setting (Program 326.)
- 2. FB00 SIP Trunk Channel Group: In this example SIP Trunk Channel Group 16 is created.
- 3. FB01 Equipment Number: Enter the Cabinet number and slot number (four digits.) In this example, 0201.
- 4. FB02 LAN interface number 1 (MIPU/GIPU have one IP interface.)
- 5. FB03 Strata Net Channels: Enter the TOTAL number of ports on this card that are going to be dedicated to SIP Trunking. On further tabs, each OLG or ILG can be for a different service provider and still be in the same channel group.
- 6. FB04 RBT (Ring Back Tone) on incoming call: Enable the CIX to provide RBT.



							Hom	e Clients	Connect	ed Equipme	nts 🕨 Applic	ation Settings 🕨 .	^
<b>TOSHIBA</b> Leading Innovation >>>				TOSHIBA	Car North	UNICATION ST De: Administ	STEMS DIVISIO	R				log out	
Stratagy ES 🔹 🕨 System	► Stat	tion 🕨 🕨	Trunk	IP-Telepho	ony	LCR/DR	Strata	Net 🕨 🕨	Maintenanc	e 🕨 A	larm/Traffic	🕨 Help 🕨	
IP-Telephony - SIP Trunking													
REMOTE TRAINING SYSTEM	Channe	Group S	etting	Service Defin	nition	Service A	signment		URI				
CIX200-TECH	00 SIP 326 01 Equ 03 Stra	Trunk Chai SIP TRUN uipment ata Net IP C	nnel Group K ASSIGNI hannels	16 MENT 0201 5	List	02 LAN Int 04 RBT on	erface Number Incoming Call	1 Enable	×				III
	Submit	Print	Refresh	Get Default	Create	Delete							
	Network	eManage	et V5 10A	17 0	2008 Tosl	niha America	Information	- Sveteme	die	claimer	2	[	~
								Ĩ		🤞 🌍 Interr	net	🔍 100% 🔻	

Figure 10 - Creating the Channel Group

#### **Service Definition**

The Service Definition tab is where the SIP Trunk provider is defined. There may be several SIP Trunk providers per Channel Group.

- 1. Create the Service Kind Table Index Start with index 1 if desired (11 in this example.)
- FB01 Registration Mode: Broadvox Static NextPoint (Version N static) set to None: Broadvox Dynamic NextPoint (Version N Dynamic) set to Client.
- 3. FB02 ILG: Use the previously created ILG number.
- 4. FB03 OLG: Use the previously created OLG number.
- 5. FB04 Effective Channel Number: Number of SIP Trunks from the SIP provider.
- FB05 Domain Name: Use the DNS SRV Record provided by Broadvox (i.e. dfwnso1ga1.psrv.broadvox.net). This name is specific to this installation.
- 7. FB06 SIP Server: Enter the IP address (will be provided by Broadvox.)
- 8. FB12 Disabled



#### Figure 11 - Service Definition

**Note:** The Toshiba Strata CIX is not certified with Broadvox for T.38 as Toshiba listed it as "not supported" during interoperability testing and did not test its functionality.

- FB34 SIP Trunk Options Interval: For Static NextPoint (Version N static) set to 60; for Dynamic NextPoint (Version N Dynamic) set to 0.
- 10. FB35 and FB37 Set to IPU IP Address.
- 11. FB36 and FB38 SIP Server IP Address

These are the only mandatory program entries. The rest can be left at the default values.



C Toshiba::TAIS::TSD::Netw	vork eManager - Windows Internet Explorer			- 7	×
			Home Clients > Connected Equipme	ent 🕨 Application Settings 🕨	^
	User	Name: administrator	, Division	log out	
Stratagy ES	Station Frunk FIP-Telephony	► LCR/DR ►	Strata Net 🕨 Maintenance 🕨 Al	arm/Traffic 🕨 Help 🕨	
IP-Telephony - SIP Trunking					
Local Host	Channel Group Setting Service Definition	Service Assignment	ment URI		
	23 Diffserv for Media	Disable 💙	24 TOS Field Type for Media	TOS	
127.0.0.1	25 TOS Precedence Type for Media	Critical/ESP 💙	TOS Delay Type for Media	Normal 💙	
			TOS Throughput Type for Media	Normal 💙	
			TOS Reliability Type for Media	Normal 💙	
	26 DSCP for Media	0 💙			
	27 Diffserv for Signaling	Disable V	28 TOS Field Type for Signaling	TOS 💙	
	29 TOS Precedence Type for Signaling	Critical/ESP 💙	TOS Delay Type for Signaling	Normal 💙	
			TOS Throughput Type for Signaling	Normal 💙	
			TOS Reliability Type for Signaling	Normal 💙	
	30 DSCP for Signaling	0 🗸			
	31 Call Release On QoS Failure	Disable 🗸	32 QoS Failure Notification Timer	10 💌	
	33 SIP Trunk Service Recovery Time	60	34 SIP Trunk Options Interval	0	
	35 SIP Trunk Message Option	FQDN 🗸	36 SIP Trunk Message To Header Option	FQDN	
	37 SIP Trunk Register Message From Header Option	FQDN	38 SIP Trunk Register Message To Header Option	FQDN	
	39 Assert Identity	Disable 🖌			
				<b>~</b>	
	Submit Print Refresh Get Default Cre	ate Delete			
	Network eManager: VS 20006	2008 Toshiba America	a Information Systems	2	
	Wetwork emanager: V5.20A061 C	2000 Tosniba America	a mormation systems	•	
					$\mathbf{\vee}$
Done			Second Second	intranet 🔍 100% 🔻	

Figure 12 - Service Definition, continued

#### Service Assignment

This tab must be completed before entries can be made on the next tab (URI.) If not completed, entries attempted in the URI tab will not be saved.

**Important Note:** After URI entries are made in URI tab, changing this program will DELETE all the URIs programmed. Once this is set, do not change it.

- 1. FB01 Channel Group (16 in this example.)
- 2. FB02 Select the Service Number by clicking on one of the table's line entries. Use the dropdown box to select the SIP Trunk provider to which the URIs belong. This should match the Service Kind Table Index number of the desired SIP Trunk provider.



🖉 Toshiba::TAIS::TSD::Netwo	rk eManager - Windows	Internet Explorer				- 7 🛛
			Home	Clients 🕨 Connected	d Equipment 🕨 Applicat	tion Settings 🕨 🛆
TOSHIBA Leading Innovation >>>		Strata Toshiba Telecom User Na	CALL CONTRACTOR OF CONTRACTOR OF CONTRACTOR SYSTEMS DIVISION me: Administrator			log out
Stratagy ES 🔸 System	Station Trunk	▶ IP-Telephony	▶ LCR/DR ▶ Strata Ne	et 🕨 Maintenance	Alarm/Traffic	▶ Help ▶
IP-Telephony - SIP Trunking						
Local Host	Channel Group Setting	Service Definition	Service Assignment	URI		^
localhost	00 Channel Group — 328 SIP TRUNK SERVICI	16 V E ASSIGNMENT				
	02 Service Index Service No.	Service Index				
	2	11 <empty></empty>				
	3	<empty></empty>				=
	5	<empty></empty>				=
	6	<empty></empty>				
	7	<empty></empty>				
	8	<empty></empty>				
	9	<empty></empty>				
	10	<empty></empty>				
	11	<empty></empty>				
	12	<empty></empty>				
	10	<empty></empty>				
	14	<empty></empty>				
	16	<empty></empty>				
						×
	Network eManager:	V5.10A17 ©20	08 Toshiba America Informat	tion Systems	?	
I Done					🧐 Local intranet	€ 100% ×;

Figure 13 - Service Assignment

#### **URI Programming**

The SIP URI is the Telephone Number (TN) from the SIP Trunk provider. The MIPU/GIPU registers each TN using the same authentication credentials (FB03 and FB04.) When the URI TN is dialed from outside, the SIP Trunk provider sends a SIP INVITE just as if it were a call to a SIP station. However, an outbound call using one of the UAs does not "busy out" the UA against an incoming call. That is a key difference of SIP Trunks.

- 1. FB00 URI Service Index: The service index that defines the SIP provider.
- 2. FB01 Index: Click the Index line in the table to select one of the indices (1-160.)
- 3. FB02 SIP URI: This is the TN of the URI.
- FB03 SIP URI User Name: Version N Static: Leave this field blank. Version N Dynamic: "PBX Username" is the BTN listed in the technical welcome letter provided by Broadvox.

- FB04 SIP URI password: Version N Static: Leave this field blank. Version N Dynamic: "PBX Password" can be found in the technical welcome letter provided by Broadvox.
  - 6. FB05 Channel Group Number this will be filled in automatically when the **Add** button is clicked.
  - 7. FB06 Default value is MAIN. If set to SUB, as called out in the URI Programming Table, the URI number cannot be used as the Calling Number in Prog 321.

**Important Note:** URIs will register as soon as they are Added, Modified, or when the MIPU/GIPU is reset.

🟉 Toshiba::TAIS::TSD::Netw	ork eManager - Windows Int	ernet Explorer				
🙋 http://12.195.92.62/eManager/i	main/eManager/classic.aspx					~
			Home Cl	ients 🕨 Connected E	iquipment 🕨 Applicati	on Settings 🕨 🗠
		Strata' NETW	ORK			
TOSHIBA			VAGER			
Leading Innovation >>>		TOSHIBA TELECOMMUNICATION S	YSTEMS DIVISION			log out
Stratagy ES System	Station Trunk	IP-Telephony	Strata Net	Maintenance	Alarm/Traffic	N Help
ID Talashaav SID Trusking			V Strata Net	Maintenance	Alarniy frame	
ELECOM DEMO SYSTEM						
	Channel Group Setting	Service Definition Service A	ssignment	URI		
	- 329 SIP URI ASSIGNMENT					=
CIX200-TECH	00 SIP URI Trunk Service Index	11 💌 Add	Modify Remove			
CIA200-TECH	01 SIP URI Index	1				
	02 SIP URI	9495833000 03 SIP UF	I User Name 949	95833000		
	04 SIP URI Password	id5v80 05 SIP UF	Channel Group 16		06 SIP URI Attribution	
	<u></u>					
	Index URI	User Name	Password	Reg. Chanr	nel Group	
	Index URI 1 9495833000	User Name 9495833000	Password id5v80	Reg. Chanr 16	nel Group	
	Index URI 1 9495833000 2 3	User Name 9495833000	Password id5∨80	Reg. Chanr 16	nel Group	
	Index URI 1 9495833000 2 3 4	User Name 9495833000	Password id5v80	Reg. Chanr 16	nel Group	
	Index         URI           1         9495833000           2         3           4         5	User Name 9495833000	Password id5v80	Reg. Chanr 16	nel Group	
	Index         URI           1         9495833000           2         3           4         5           6         7	User Name 9495833000	Password id5v80	Reg. Chanr 16	nel Group	
	Index URI 1 9495833000 2 3 4 5 6 7 8	User Name 9495833000	Password id5v80	Reg. Chanr 18	nel Group	
	Index         URI           1         9495833000           2         3           3         4           5         6           7         8           9         9	User Name 9495833000	Password id5v80	Reg. Chanr 16	nel Group	
	Index         URI           1         9495833000           2         3           4         5           6         7           8         9           10         10	User Name 9495833000	Password id5v80	Reg. Chanr 16	nel Group	
	Index         URI           1         9495833000           2         3           4         5           6         7           8         9           10         11	User Name 9495833000	Password id5v80	Reg. Chanr 16	nel Group	
	Index         URI           1         9495833000           2         3           4         5           6         7           8         9           10         11           12         13	User Name 9495833000	Password id5v80	Reg. Chanr 18	nel Group	
	Index         URI           1         9495833000           2         3           4         5           6         7           8         9           10         11           12         13           14         5	User Name 9495833000	Password id5v80	Reg. Chanr 10	nel Group	
	Index         URI           1         9495833000           2         3           4         5           6         7           8         9           10         11           12         13           14         15	User Name 9495833000	Password id5v80	Reg. Chanr	nel Group	
	Index         URI           1         9495833000           2         3           4         5           6         7           7         8           9         10           11         12           13         14           15	User Name 9495833000	Password id5v80	Reg. Chant	nel Group	
	Index         URI           1         9495833000           2         3           4         5           6         7           7         8           9         10           11         12           13         14           15                Network         eManager: V5.	User Name 9495833000 20401 ©2008 Toshiba A	Password id5v80	Reg. Chant 16	nel Group	

Figure 14 - URI Programming

#### **Configuring the MIPU/GIPU**

1. Determine if a static IP address or DHCP (Dynamic IP Address) will be used. This information is available from the IT department at the installation site or from the ISP.



- Go to IP Telephone > IPU Config. If a static IP address will be used, go to Step 3. If this site is using DHCP, go to DHCP configuration on Page 22.
- 3. Ensure that FB21 is set to Disable.
- FB01 MIPU/GIPU IP address. This value must be a public IP address.
- 5. FB02 Subnet Mask.
- 6. FB03 Default Gateway Address.
- 7. There is only one interface on an MIPU/GIPU. Leave the second interface (FB04 FB06) blank. The DNS server address is critical to resolving the SIP provider's domain name and SIP server. This information was entered in the Service Group Definition. The installation site IT department or the ISP will provide this information.

TOSHIBA Leading Innovation >>>	Home Clients Connected Equipments Application Settings
Stratagy ES → System → Station → Trunk →	IP-Telephony → LCR/DR → Strata Net → Maintenance → Alarm/Traffic → Help →
IP-Telephony - L/M IPU Configuration	
REMOTE TRAINING	ION 0101
00 Cabinet & Slot Number	0201 0102
01 IPU IP Address	68 232 52 50 0201
CIX200-TECH 02 IPU Subnet Address	255 255 255 224 0203
03 IPU Default Gateway Address	68 232 52 1
07 Version of IPU/IPH	 MIPU01_14DA100
09 Available IPU/IPH IP Ports	3
04 LIPS IP Address	
05 LIPS Subnet Address	
06 LIPS Default Gateway Address	
08 Version of LIPS	
10 Available LIPS IP Ports	
11 IPU/IPH Packet Prioritization	Enable     Disable
12 IPU/IPH Packet Prioritization Tyr	Best Effort Ovice
13 IPU/IPH VI AN	C Enable Disable
14 IPU/IPH VI AN ID	
15 LIPS Packet Prioritization	Enable     Disable
16 LIDE Dacket Prioritization Tupo	Rest Effort     Voice
Submit Print Refresh	Set Default
Network eManager: VS 10412	@2008 Toshiha America Information Systems disclaimer ?
Done	📑 🚱 Internet 🔍 🔍 100% 👻

Figure 15 - Configuring the MIPU/GIPU

- 8. FB22 Primary DNS IP address
- 9. FB23 Secondary DNS IP address
- 10. Click on the Submit button. Wait for the programming to complete and then go to the next step.
- 11. Press the **Restart** button on the MIPU/GIPU.

The configuration is complete.

TOSHIBA			Home Clients V Co	nnected Equipments 🕨 Appl	ication Settings 🕨	
		User Name: Administrator			log out	
Stratagy ES 🕨 System	▶ Station ▶ Trunk ▶ IP-Tele	phony 🕨 LCR/DR 🕨	Strata Net 🕨 Mainte	enance 🕨 Alarm/Traffic	🕨 Help 🕨	
IP-Telephony - L/M IPU Configuration						
REMOTE TRAINING SYSTEM	12 IPU/IPH Packet Prioritization Type	O Best Effort 💿 Voice		<u>^</u>	0101	
	13 IPU/IPH VLAN	Enable     S Disable			0102	
					0201	
CIX200-TECH	15 LIDC Dasket Prioritization	Fnable     Disable			0202	
		Rest Effert     Voice				
	16 LIPS Packet Prioritization Type					
	17 LIPS VLAN	O Enable O Disable				
	18 LIPS VLAN ID	1				
	19 IP Strata Net RTP Base Port (IPU/IPH)	20992				
	20 IP Strata Net RTP Base Port (LIPS)	20992				
	21 MIPU DHCP Server	<ul> <li>Enable</li> <li>Disable</li> </ul>				
	22 MIPU Primary DNS	198, 168, 211, 20				
	23 MIPU Secondary DNS Server	204, 210, 220, 57		≡		
	24 MIPU Hostname					
	25 MIDII Drimany DNS Suffix					
	23 MPO Primary DNS Sunix					
				×		
6	Submit Print Refresh Get Defai	ut				
l l						
	Network eManager: )/5 10012	@2008 Toshiba America Info	ormation Systems	disclaimer 2		
ne				🐻 😂 Internet	100%	

Figure 16 - DHCP Configuration

#### **DHCP Configuration**

- 1. FB21 MIPU DHCP Server: Click to select Enable.
- 2. Click on the Submit button. Wait for the programming to complete and then go to the next step.
- 3. Press the Restart button on the MIPU/GIPU.

The configuration is complete.

# List of Illustrations

Figure 1 - Three Main Sections from Version S Welcome Letter	6
Figure 2 - Version N Welcome Letter IP Addresses	7
Figure 3 - SRV Lookup in Windows XP	8
Figure 4 - CIX with SIP Trunking	10
Figure 5 - Programming the MIPU/GIPU card	11
Figure 6 - Programming the Incoming Line Group	12
Figure 7 - Assigning the Trunk DID Destination	13
Figure 8 - Programming the Outgoing Line Group	14
Figure 9 - OLG Flexible Access Code Programming	15
Figure 10 - Creating the Channel Group	16
Figure 11 - Service Definition	17
Figure 12 - Service Definition, continued	18
Figure 13 - Service Assignment	19
Figure 14 - URI Programming	20
Figure 15 - Configuring the MIPU/GIPU	21
Figure 16 - DHCP Configuration	22