

# Hearty Welcome



# Matrix GSM Family

- GSM FCTs (Data ,Voice and FAX Services)
- Multi-Port GSM-FXO-FXS Gateways
- Multi-Port GSM-ISDN BRI Gateways

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# Pre-eminent Features

- Reliable, Compact and Sturdy Design
- ETSI GSM Phase2/2+ Compliance
- Superior Call Routing Techniques
- Quad-band 2G and Tri-band 3G Network Support
- Compatible With any Make of PBX

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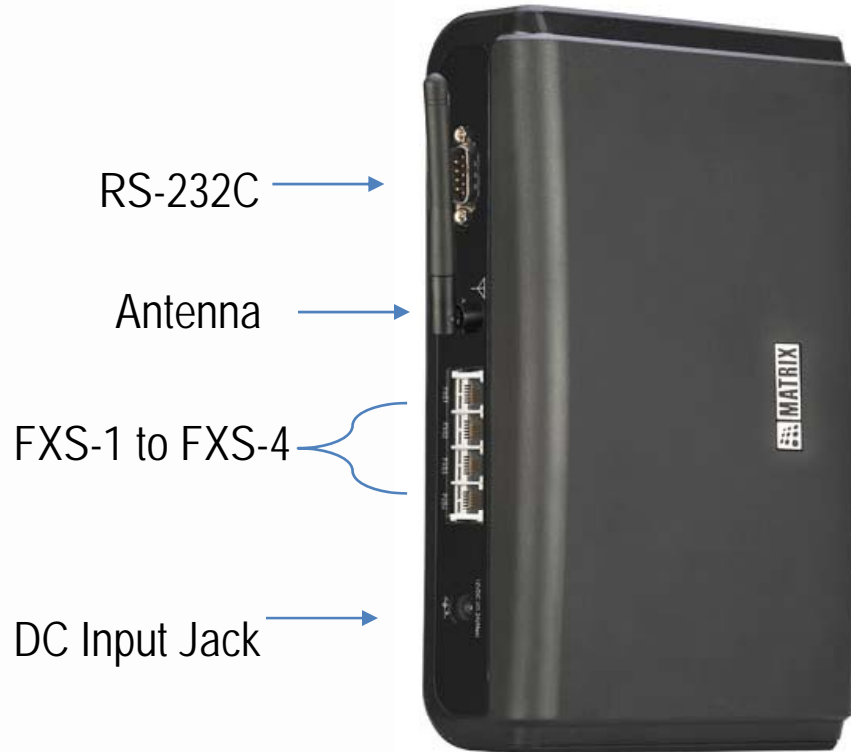
## MATRIX SIMADO GFX44 Multi-Port GSM/3G-FXS Gateway



# Introduction

- Acts as a Bridge to GSM/3G Network
- Incoming Calls on GSM/3G Network are Routed to the FXS Port
- Initiate Calls From FXS Port (Analog Terminals) to GSM/3G Network
- Powerful Least Cost Routing
- Can be Used in Stand-alone Mode
- Can be Connected With Any Existing PBX

# System Interfaces





# System Models

SIMADO GFX44	FCT for Voice Applications With 4 GSM Port and 4 FXS Port
SIMADO GFX44 3G	FCT for Voice Applications With 4 GSM Port , 4 FXS Port, With 3G Network Support

# Network Support





# 3G Network Support



- Matrix SIMADO GFX44 3G Model Supports:
  - ✓ 2G Network: Quad-band Support for GSM Network
  - ✓ 3G Network: Tri-band Support for WCDMA Network
- Call Established over 3G Network offer:
  - ✓ Noise-free, Stanch Voice Quality
  - ✓ Enhanced Security
- Fallback Compatibility
  - ✓ In Case Preferred (3G) Network is Not Available
  - ✓ Flexibility to Switchover to Alternate Network (2G)
  - ✓ Assures Network Connectivity Round-the-Clock
  - ✓ Users Can Traverse Between Regions Uninterruptedly

	2001	
	Japan Used WCDMA as a Commercial Service, Bypassing Earlier GSM Generations	
	<b>Source: Mobile Communications Systems and Security/Man Young Rhee</b>	

# RS232C Port



- RS232C (DB9 Connector) Communication Port for:
  - ✓ System Debug
  - ✓ Downloading Call Detail Reports
  - ✓ System Programming (through Jeeves)

# LED Indications



GSM	1 LED per Port for Network and Call Status
FXS	1 LED per Port for Call Status
Power	1 LED for On/Off Status

# Real Time Clock (RTC)

- Built-in RTC Circuit
- Ensures Accurate Functioning of System Features Like:
  - ✓ Time Table (Routing Calls as per Time), Setting Alarms, Call Reports and Many Others
- The System's RTC Automatically Tunes With a Country's Day Light Saving Adjustment



# System Features

- Allowed and Denied Lists
- Answer Signaling on FXS Port
- Answer-Number Based Routing
- Automatic Number Translation
- Automatic Call Distribution (ACD)
- Call Detail Recording (CDR)
- Call Duration Control (CDC)
- Call Progress Tone Generation
- Calling Line Identification Presentation (CLIP)
- Day Light Saving Time Adjustment

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# System Features

- Disconnect Signaling on FXS Port
- Emergency Number Dialing
- Fixed Number Dialing
- International Mobile Equipment Identity (IMEI)
- Jeeves
- Multi-stage Dialing
- Network Selection
- Reinstate Default Settings
- Day Light Saving Time Adjustment (DST)
- Returned Calls to Original Callers (RCOC)

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# System Features

- Routing Group
- Routing Type
- Signal Strength Indication
- SIM PIN
- Software Version/Revision Display
- Speech Gain
- System Programming
- System Restart
- System Security
- Time Table

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# Allowed and Denied Lists

- Allow/Deny Dialing of Specific Numbers
- An Allowed/Denied Number List Can be Programmed for Each System Port
  - ✓ SIMADO GFX44 Supports 16 Number Lists
  - ✓ Each List Can be Programmed to Allow/Deny 24 Numbers
- Programmed Emergency Numbers are Excluded From Such Verification
- Useful to Control Telephone Call Cost
- Limit Use of System National/International Dialing Facility as per Requirement
- Example: Restrict 0-Dialing Facility for One System Port and Allow the Same On Another System Port



# Answer Signaling on FXS Port

- When Called Party Answers a Call (i.e. on Call Maturity)
- The Signal (In form of Polarity Reversal) is Generated on FXS Port
- SIMADO GFX44, When Connected With a Payphone or FXO Port of the PBX
- It is Obligatory to Generate Call Maturity Information on the FXS Port
- This Assists the Connected (Payphone or PBX) in Accurate Billing
- Ensures, All Matured Calls are Billed
- Evades Billing Unanswered/Unsuccessful Call Attempts

# Answer-Number Based Routing

- Different Service Provider Offer Varied Call-Cost Saving Schemes

- Least Cost May be Charged Based on:

- ✓ Dialed Number
- ✓ Carrier Selection
- ✓ Time
- ✓ Location Called

	<p>Service Provider's Scheme: <i>Dial <b>079</b> + Number to be Called and Calls Within Gujarat State Will be Charged as Local Calls</i></p>	

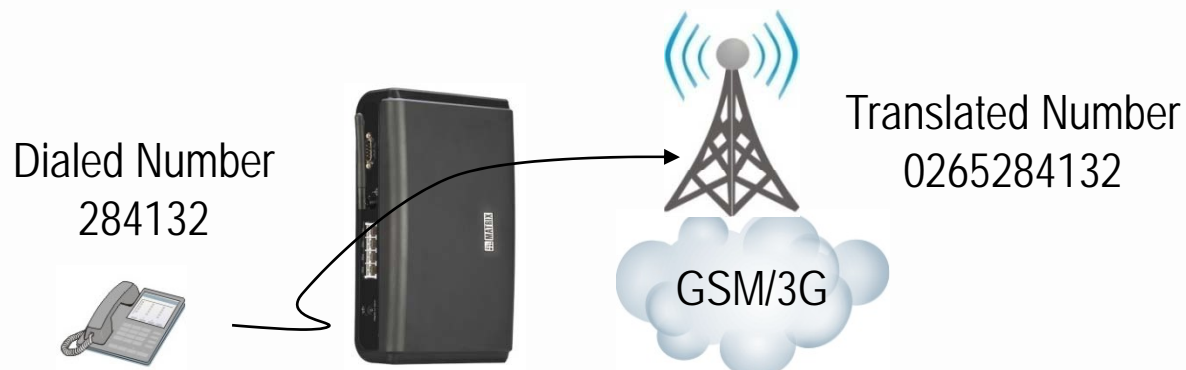
- Answer-Number Based Routing Routes Calls Based on Dialed Number
- Calls are Placed Using Routing Groups Defined for the Specific Number String
- Routing Groups in turn are Programmed for Selection the Most Cost-effective Route

# Automatic Call Distribution(ACD)

- Different Logics are Considered While Choosing a Group Member to Route a Call, Example:
  - Rotation Method:
    - ✓ Call Lands on Destination Next to One Which Received the Last Call
    - ✓ This Method Ensures Equal Call Distribution Among Group Members
    - ✓ A Technique Useful in Call Centre Setups
  - First Free:
    - ✓ Calls Always Lands on a Free Port as per Port Numbering
- Further, Routing Groups Can be Defined per Port, as per a Time Zone
- Ensures All Calls are Established using the Most Cost-effective Route
- Avoids Missed Calls Ratio, as Calls are Routed to a Programmed Destination as per Time Zone

# Automatic Number Translation

- Translates Dialed Number String to a Format Understood by the GSM/3G Network, Example:
  - ✓ While Placing Calls to Landline Numbers
  - ✓ User May Dial Only the Number
  - ✓ SIMADO GFX44 Prefixes the Area Code
  - ✓ The Number String Can then be Understood by the GSM Network
- No Need to Change Habituated Dialing Practices
- Aids in Speed Dialing and Multi-stage Dialing Set-ups



# Call Detail Recording(CDR)

- Records Details of Calls Made Through the Gateway
- 2000 Calls Can be Recorded in Memory
- Only Answered Calls are Stored in Memory
- Varied Reports Can be Generated Using Filters Like:
  - ✓ Port Number, Dialed or Received Numbers, Date, Duration of Call, etc
- Easy Transfer of CDR to PC



# Call Detail Recording(CDR)

CALL DETAIL RECORDS REPORT as on 01-Oct-2007 at 09:53:56

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Source Port	Destination Port	NUM LIST	: Called - 02	Calling - 02
FXS : 1 To 4	FXS : 1 To 4	DATE	: 01-Oct-2007 To 01-Oct-2007	
MOB : 1 To 4	MOB : 1 To 4	DUR(sec)	: 1	TIME : 00:00 To 23:59

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SR.	S-PORT	D-PORT	CALLED NUMBER	CALLING NUMBER	DATE	TIME	DUR
1	FXS 2	FXS 4			01-Oct-2007	09:27:53	6
2	FXS 4	FXS 2			01-Oct-2007	09:28:32	3
3	FXS 2	MOB 2	9898091380		01-Oct-2007	09:39:59	12
4	FXS 2	MOB 2	9824981745		01-Oct-2007	09:49:43	3
5	FXS 2	FXS 4			01-Oct-2007	09:27:53	6
6	FXS 4	FXS 2			01-Oct-2007	09:28:32	3
7	FXS 2	MOB 2	9898091380		01-Oct-2007	09:39:59	12
8	FXS 2	MOB 2	9824981745		01-Oct-2007	09:49:43	3

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# Call Duration Control(CDC)

- Control the Duration of Calls Made Through the System
- Calls Get Disconnected After a Pre-defined Duration
- Different Time Limit Can be Set On Each Ports
- Option to Alert a Caller Prior to Call Disconnection
- Controls Misuse of Calling Facilities
- Ensures Ports are Released On Call Completion



# Call Progress Tone Generation(CPTG)

- Different Tones to Indicate the Progress of Call Activity
- Example: Dial Tone, Ring Back Tone, Busy Tone, Error Tone
- CPT With Difference Cadences, to Match the Ones Used in a Region

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# Caller Line Identification Presentation(CLIP)

- CLI Can be Presented on FXS and GSM Ports
- Detection of DTMF, FSK ITU-T and FSK Bellcore
- CLIP for External and Internal Numbers
- CLIP on Transfer of Call
- Ports Can be Programmed to Send/Receive CLIP

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# Day Light Saving (DST)

	<p><b>Department of Transportation, U.S, Reports:</b> We Trim the Entire Country's Electricity Usage by About One Percent EACH DAY With Daylight Saving Time Adjustments</p>	
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- DST: Assignment of New Local Time to the Region for a Part of Year
- System's Real Time Clock Shifts (Forward/Backward), in Accordance to DST Observed in a Country
- DST Can be Set: Week-Day-Month Wise or Date-Month Wise

# Disconnect Signaling on FXS Port

- When SIMADO GFX44 is Connected With a Payphone or FXO Port of the PBX
- The Signal (In form of Polarity Reversal or Open Loop Disconnect Pulse) is Generated on FXS Port
- The Signal is an Indicator of Call Disconnection From the Called Party End
- Else Call Will be Disconnected Only When the Caller Goes On-Hook, Resulting in Inaccurate Billing
- Be Assured for Most Accurate Billing

# Emergency Number Dialing

- Program Up to 4 Emergency (Ambulance, Police, Fire Brigade and Others) Numbers
- Place Calls Even if a SIM is Not Inserted in the GSM Module
- Placing an Emergency Call is Not Subject to Verification With the Allowed-Denied Number List
- In Case, No Emergency Number is Programmed, Emergency Number Stored in the SIM Will be Dialed
- Else Default Emergency Number Stored in the Firmware Will be Dialed

# Fixed Number Dialing

- As Soon As a Call Lands on a Port
- A Pre-defined Number Can be Dialed Out
- For Number Called Frequently, Avoid Repetitive Number Dialing
- Delay After Which the Fixed Number Will be Dialed is Also Programmable
- Helpful for Establishing Point-to-Point Connectivity
- Feature Can be Activated / De-activated for Each GSM / FXS Ports

# International Mobile Equipment Identity(IMEI)

- 15/17 Digit Code Used to Identify a GSM Module on GSM Network
- When SIMADO GFX44 is Switched on, the IMEI Number is Verified With the Service Providers List of Authorized Users
- In Case of Lost/Stolen Equipment
  - ✓ Get IMEI Number Blocked
  - ✓ Prevents Misuse of Information Stored in the Gateway




# Jeeves

- Customized, Windows Based Programming Tool
- User-friendly Tool With Mouse Operated GUI



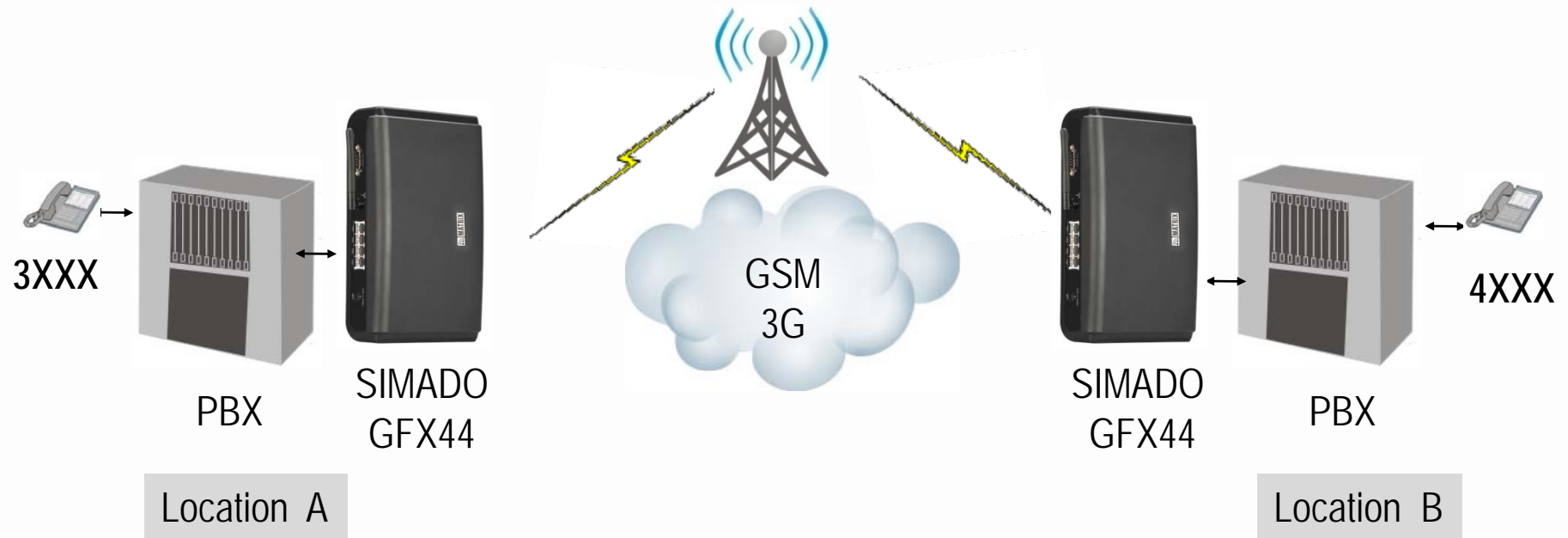
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# Multi-stage Dialing

- At Times Series of Number are to be Dialed, before Dialing the Actual Number
- Example: When Using a Virtual Calling Card (ITC Card) 
  - ✓ User is Required to Dial Long Number Strings
    - **A Toll-free Number Provided by the Service Provider+ ITC Card Number +Destination Number to be Called**
  - ✓ With Multi-stage Dialing Feature, Eliminate Dialing the Long Number Strings
  - ✓ Program the ANT Table, Calling Card Password Table and the Calling Card Service Provider Table
  - ✓ User Will then be Required to Dial Only the Destination Number



# Multi-stage Dialing: Application Scenario

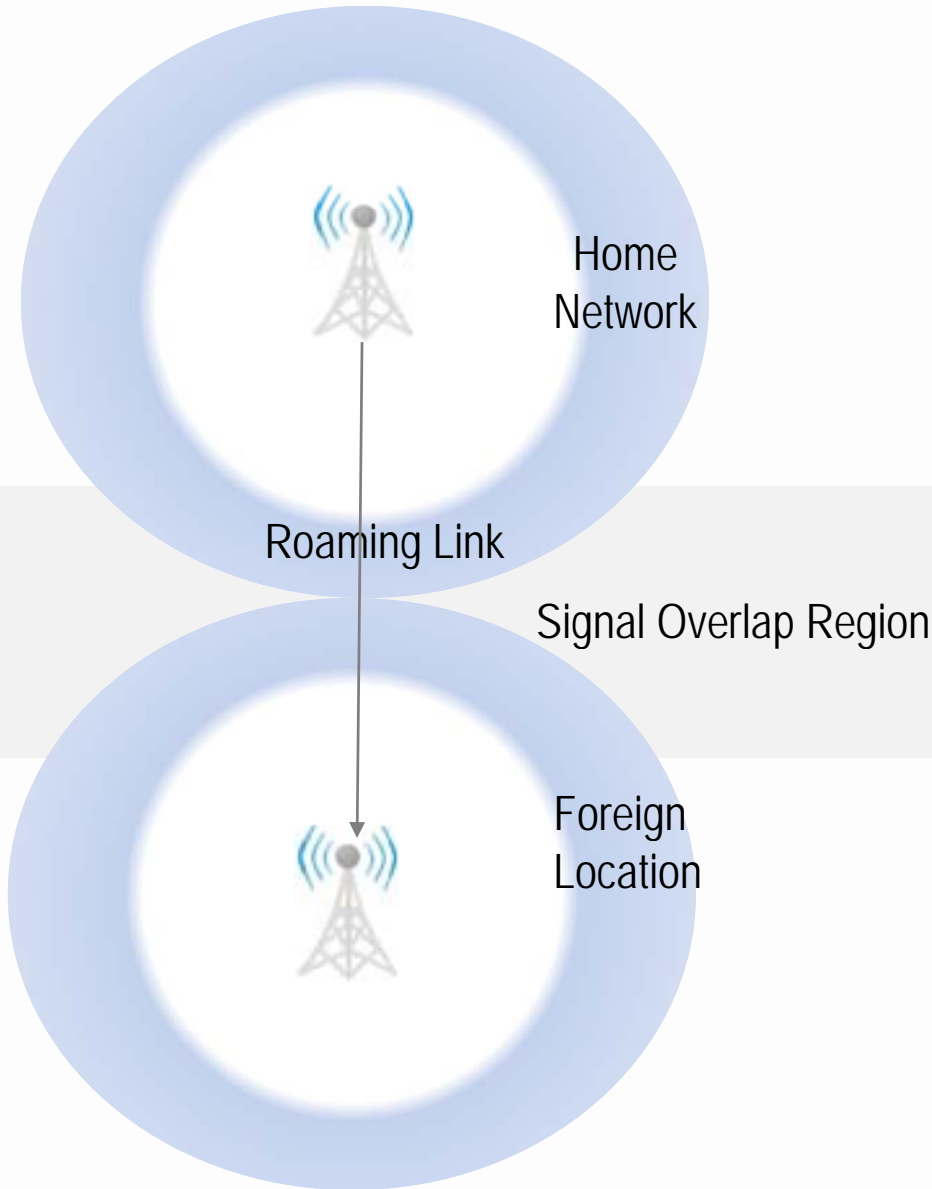


- For Organizations With Multiple Branch Offices
- Link Various Locations via GSM Network
- Connect SIMADO GFX44 in Front of the Pre-installed PBX System
- Avail CUG (Closed User Group) Services From the Service Provider for Free Dialing between the Offices
- Call Originated for 4XXX Destination, From Location A , Lands on 4XXX at Location B
- Call Originated for 3XXX Destination, From Location B , Lands on 3XXX at Location A
- System Supports Differentiated Tones to Indicate Various Dialing Stages

# Network Selection

- At Each Power-On, System Auto Searches and Registers With an Available Network (Automatic Network Selection Mode)
  - ✓ Network is Selected as per Network Signal Strength
  - ✓ Ensures Round-the-Clock Connectivity by Registering With the Available Network
- System Can be Programmed for Manual Network Selection Mode
  - ✓ Avoids Unnecessary Charges Due to Registration With Unwanted Networks
  - ✓ Network is Selected as per Assigned Priority in a Priority Table
- Each GSM Port Can be Programmed for Maximum of 9 Networks
- Multiple Attempts are Made to Register With the Available Network

# Network Selection



- Network Signals May Overlap in the Expanse of a National Border
- Set the System for Manual Network Selection Mode
- Avoid False Roaming Charges, due to Registration With a Foreign Network

# Reinstate Default Settings

- SIMADO GFX44 is Supplied With Default Settings for Various Parameters
- A Programming Error or an Operating Mistake May Necessitate Defaulting of System Parameters
  - ✓ Default the System, Entering SE Mode , From the Telephone Instrument
  - ✓ Default the System From Jeeves
- Minimizes Programming Labor

# Return Call to Original Caller(RCOC)

- If a Call Attempted From the System is Not Answered or the Called-party is Found Busy
- The System Keeps a Record of FXS/GSM Port Number and Called Party Number in its Database
- On Receiving a Call From the Called Party, System Identifies the Called Party Number
- The Call is then Routed to the Specific Caller, Who Attempted the Call

# Return Call to Original Caller(RCOC)



System Stores Called Party's no, Calling Party's no With its Extension no

When the User Calls Back, Call Gets Routed to the Same Extension

# Call Routing Scenarios

- A Call May be Attended by Any Member of the Group
  - ✓ A Call to Sales Team, May be Attended by Any Team Member
- Certain Incoming Calls are Intended for Fixed Destinations
- Routing a Call Might be Restricted to/through a Particular Port
- Screening (Denial) of Dialing Facilities May be Imposed Differently on Users

# Routing Group

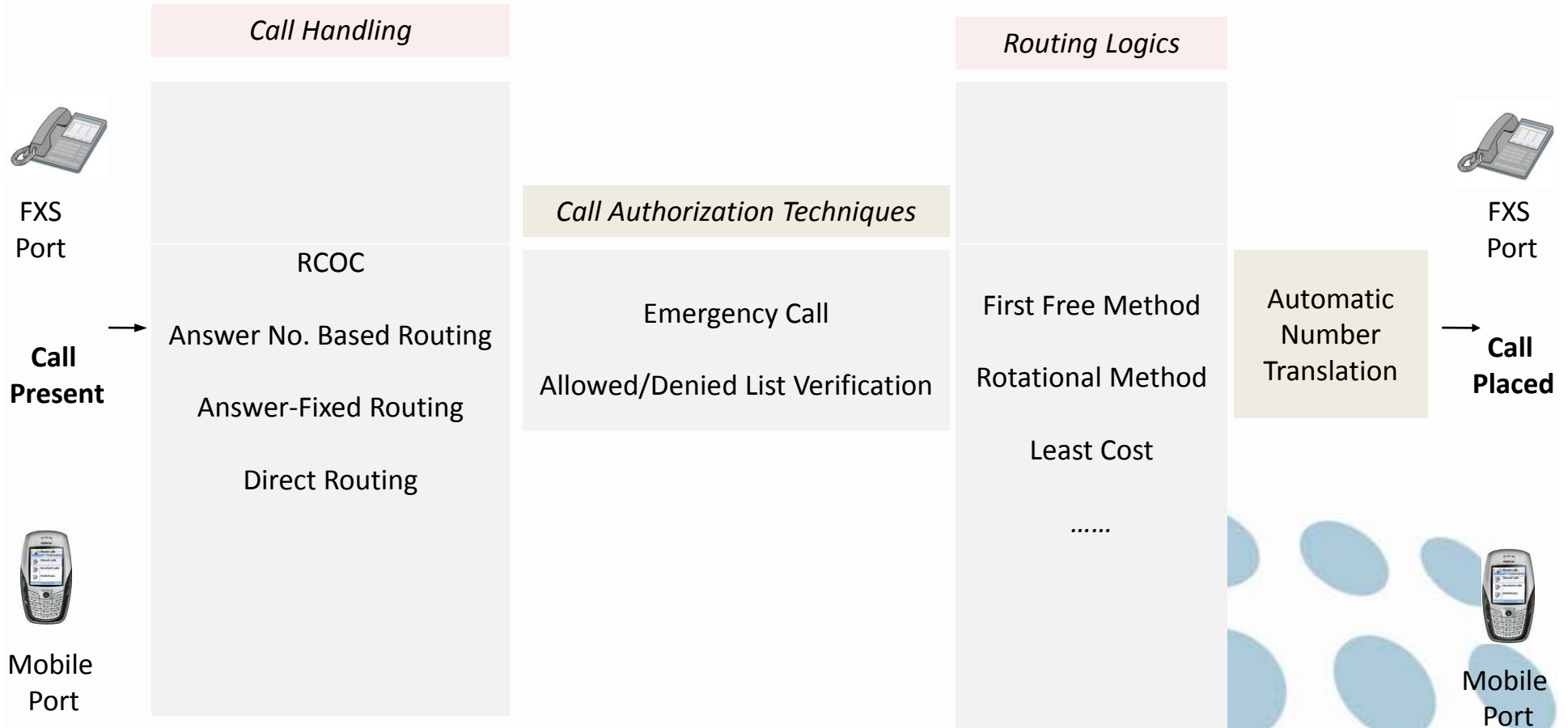
- Each Port of GFX44 is Given a Specific Group Number(Routing Group No.)
- Each Routing Group Consists of Members With Assigned Priorities
- 8 Such Groups, Each of 4 Members May be Defined



# Routing Type

- Routing Types Delineate the Way to Route Calls
- Various Routing Types Supported by the System are:
  - ✓ Rounding OFF: Disallow All Calls from/to the Port
  - ✓ Answer-Number Based Routing: Routing Groups Assigned on Basis of Dialed Number
  - ✓ Answer-Fixed Routing: Routes Calls to a Specific Port
  - ✓ Direct Routing: Applicable if User Needs to Dial a Number Directly, Bypassing Verification With Any of the Programmed System List

# Ingenious Call Management





# Signal Strength Indication

- 15 Step Indication of Signal Strength on Telephone Instrument's LCD (FXS Port)
- Telephone Instrument Should be FSK Compatible

# SIM PIN

- SIM is a Smart Card With Subscriber Specific Data Stored in it
- SIM PIN is a Security Feature Used by the GSM Network
- A PIN (Personal Identification Number) Check Can be Enabled in the SIM
- At Each Power-On, System is Authenticated for PIN
- This PIN Should Match With the One Stored in SIM as SIM PIN
- System Will Attempt Registration to a GSM Network, Once a Correct SIM PIN is Issued
- Prevents Misuse of the SIM Card

# Software Version/Revision Display

- Regular Adherence to Customer Feedbacks Directs Software Upgradation
- Current Software Version Should be Known before Upgrading to the Higher One
- No Need to Open the System
- View the Software Revision of Current System Software through Jeeves



# Speech Gain

- Set Transmit/Receive Gains of GSM Ports
- Means of Improving Speech Quality

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# System Programming

- Program the System From:
  - ✓ FXS/Mobile Port
  - ✓ Jeeves (Windows Based Programming Tool)
- Remote Programming:
  - ✓ Program Mobile Port to be Used for Remote Programming, for its Routing Type
  - ✓ Place Call on System Mobile Port
  - ✓ System Can be Programmed After Authentication for SE(System Engineer ) Password
  - ✓ Diverse Tones to Indicate Various Programming Stages



# System Restart

- When Physical Reach to System is Difficult
- Restart the System From:
  - ✓ Telephone Instrument (FXS Port)
  - ✓ Jeeves

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# System Security

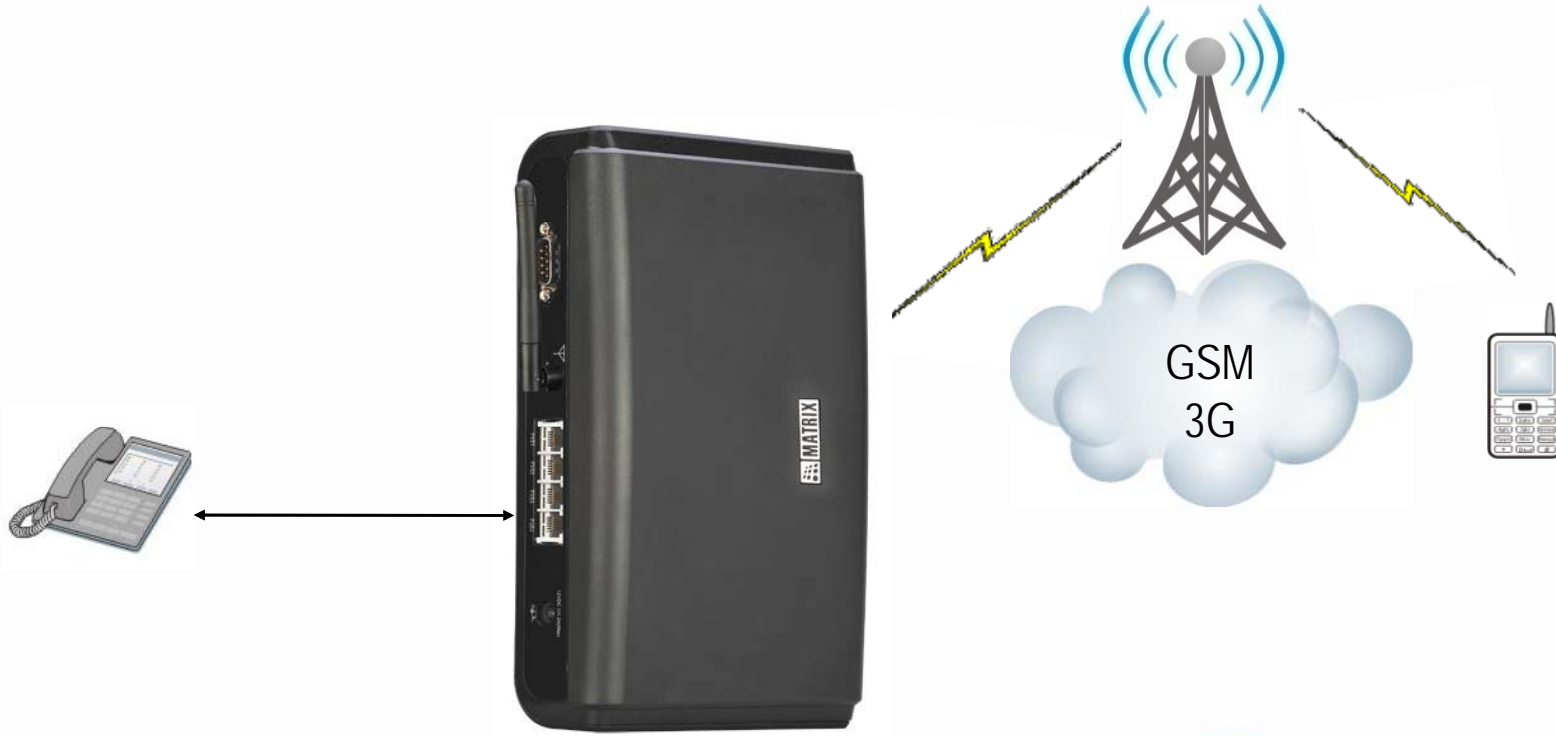
- SIMADO GFX44 is Secured With Passwords at Two Levels:
  - 1) System Engineer (SE) Level
  - 2) System Administrator (SA) Level
- System Engineer Can Alter SA Password if Required
- Technique to Default SE Password in Case of Forgotten Password
- Prevents Unauthorized Alterations and Misuse of System Features and Facilities

# Time Zones

- Route Incoming/Outgoing Calls on Each Port (GSM/FXS) as per 'Time of the Day' (Time Zone)
- Defined Schedule for a Day is Called Timetable
- A Timetable Divides Entire Day in to Four Time Zones
- Calls are Routed as per the Timetable, Following the Routing Logic (Routing Group and Routing Type) of the Port
- Benefit From the "Minimum Call Charging Schemes", Offered by Various Service Providers based on Cal Time (Off-Peak Hours)
- Notable Reduction in Call Charges
- Provides Flexibility to Receive Ones Calls on Different Terminals as per the Time

# Applications

# Stand-alone Application



SIMADO GFX44

- Works Independently
- Users Can Make Calls to GSM/3G Network From FXS Ports
- Incoming Calls on Mobile Ports are Routed to FXS Ports

# SIMADO GFX44 – With PBX Application



- A PBX System Can be Interfaced With FXS Ports
- PBX Users Can Make Calls to GSM/3G Network
- Route Calls on Mobile Ports to the PBX Extensions
- Compatible With Any Make of PBX

# SIMADO GFX44: Stand-alone + PBX Application



- PBX/FXS Terminals Can Place Calls Via GSM/3G Network
- Incoming Calls on Mobile Ports Can be Routed to Directly Connected FXS Terminals or to PBX Extensions
- Compatible With Any Make of PBX



# Target Customers

- Point-to-Point Communication Points
- Corporate Offices and Factories
- Organizations With Field Staff
- Remote Project Sites
- Hotels
- Residences
- Public Call Offices
- Call Centers
- Emergency Applications

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# Technical Specifications

Power Supply	External Adaptor 12V DC/2A (Universal input range 90-265VAC, 47- 63Hz)
Power Consumption (Typical)	8 Watt
RF Sensitivity	Better than -106dBm at GSM850/EGSM900/DCS1800/PCS1900 Better than -106dBm at WCDMA 850 Better than -108dBm at WCDMA 1900/2100
Dimensions (W X H X D)	6.10"x8.66"x1.95"
Unit Weight	1000 Grams
Mounting Options	Wall Mount and Table Top
Antenna Connector	SMA (Female)





Thank You

