



Commercial Services Overview

**Training delivered at SCTE Greater Chicago Chapter
By Justin J. Junkus, President, KnowledgeLink, Inc.
On February 28, 2008**

Progressive Deregulation Opens Doors

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- 1968 Carter Phone
- 1969 MCI
- 1970 Computer Inquiry 1
- 1974 Second Antitrust Suit
- 1980 Computer Inquiry 2
- 1982 Modified Final Judgment
- 1987 Computer Inquiry 3
- 1996 Communications Reform Act

Who is the Phone Company?

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Commercial Services

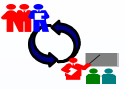
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- **Telephony**
 - Premises-based telephony
 - Centrex
 - Hosted IP
 - Trunking
- **Data Access**
- **Data Networking**
 - GigE
 - Fiber optic
 - LAN
 - WAN
 - Backbone
- **Cellular Backhaul**
- **Video**
- **Hosted Services**
- **Hospitality**
- **MTU**

Business Video

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To speak with a Business Account Executive call: 1-800-316-1619

Small & Medium Business

[Browse Products](#) [Business Tools](#) [Help](#) [Contact Us](#) [Large Business](#)

TV

Browse Products

- Internet
- Digital Voice
- TV**

Employees informed. Customers entertained. Story at 11.

Does your business need up-to-the-minute news and entertainment? Depends. Does it have a waiting area, conference room, break room, or management office?


Basic
Our Basic package offers an affordable option for businesses that want to stay up to speed with the latest breaking news and critical information from their local channels.

Information and Entertainment
With a variety of popular news and entertainment channels including CNBC, The Weather Channel, Headline News, and HGTV – this digital package provides a great value.

Standard
In addition to news and entertainment, this digital package offers classic cable networks including TNT and CNN, plus amazing sports channels like ESPN. It's the ideal package for offices with waiting areas.

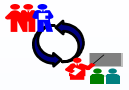
Preferred
For businesses that want the works, our Preferred package comes fully loaded with the very best office-enriching news from networks like Bloomberg TV, plus all the most exciting sports action.

Packages may include these great networks and more:



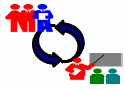
Hosted Services

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Internet Plans for Small & Medium Business			
	Lite	Standard	Enhanced
Speed	4 Mbps/384 Kbps	6 Mbps/768 Kbps	8 Mbps/1 Mbps
PowerBoost		Up to 12 Mbps/1 Mbps with PowerBoost	Up to 16 Mbps/2 Mbps with PowerBoost
McAfee Virus Scan	Included	Included	Included
Microsoft Outlook emailboxes	2 Web Access	4 Web Access	8 Full Access
Equipment	Commercial Modem	IP Gateway (Firewall/Router)	IP Gateway (Firewall/Router)
Business Class Support - 24 X 7	Included	Included	Included
Domain Name & Three Page Website	Included	Included	Included
Static IP Addresses	Not Available	Available	Available

Hospitality



COX Business Services

My Account Customer Support

SMALL BUSINESS MEDIUM BUSINESS LARGE BUSINESS SPECIFIC

Hospitality Education Government Healthcare Real Estate

Home » Specific industries » Hospitality

Solutions For Hospitality

Delivering a wide range of leading-edge communications services that benefit your guest, patrons and business.

Contact Sales: 1-800-436-0344

Products Available in Your Area: View Map

With Cox Business Services as your communications partner, you're working with a provider with longstanding experience in the hospitality industry. Through Cox's breadth of products including Hospitality Network (HN), the #1 advanced in-room video-on-demand and high-speed Internet service in use by the hotel gaming and you can provide your guests and patrons with the latest and most advanced service in addition to a full suite of in-room services. Cox also delivers advanced business solutions to your property, like dedicated access and transport services geared to you operate more efficiently. All backed by our nationwide, next-generation IP network, you are assured the most advanced solutions available for the hospitality industry today.

- Cable television with fan-faring programming
- Video on demand and video games
- High-speed Internet access
- Local and long distance telephone service
- A choice of music channels to satisfy every taste

With one communications partner providing all your services, and our unparalleled knowledge of hospitality industry needs:

- You can spend less time managing multiple vendors
- You have more time building your guest relationships
- You'll appreciate working with one local team dedicated to serving your business.

comcast

Home About Us Services Solutions Customer Care Contact Us search...

Comcast HospitalityONE

ONE Complete Solution for the Hospitality Industry

THE SIMPLE FACTS

- High-Speed Internet access for guest room and public areas
- Dedicated end user technical support
- Low/no operational impact

Comcast HospitalityONE is a single, flexible communications platform that allows a hotel to deliver video and high-speed Internet services to its guests and differentiate those services from others being offered. Comcast HospitalityONE offers ONE solution, at ONE flat rate, on ONE network, all from ONE full-service provider.

Resource Center

Username

Password

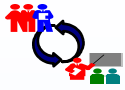
Remember me

[Lost your password?](#)

For access to additional tools and

Sound like a lot? It's what you should expect. Comcast, the country's leading cable and broadband communications provider, leverages existing in room infrastructure to provide high-speed internet access to guest rooms and meeting rooms via a wired solution with wireless access available in hotel public spaces.

Installation is fast and cost effective. In addition to fast, reliable Internet



Home > About Us > Contact Us > Commercial Building Program



Solutions For Builders, Developers and Owners

Powerful Commercial Building Programs
that put people more effectively to work

Learn More
1-800-634-4744
[View](#)

Products Available in Your Area



ZIP Code

Are you a builder, developer or property manager of residential long facilities?

If yes, our Commercial Building Program is currently only available in your area.

[View Available Areas](#)



Our GreatSM Technology helps you monitor and maintain service and increase property value.

We compete head-to-head with commercial builders, developers and property managers. You own more of our buildings as shown in the picture to the right. And you're a member of a program that lets you call us for access to critical, reliable communications for your Business Services.

Through our CommercialSM Building Program you can make your facilities more efficient and more profitable by offering one source access to our complete suite of critical infrastructure and maintenance services as well as a complete range of other services.

Your work can suffer from repetitive service from Car because the technicians at our facilities, as a communications provider to our partners and a performance-oriented network provider, thousands of miles away, can't make it to the Car when they're not at the building. Builders and owners can benefit from enhanced reliability, cost rights, business-critical and resources to our service areas.

The benefits of partnering with Car and employing the leading edge technology in your buildings include:

- a suite of high-speed, cost-effective, scalable, reliable, and available services to meet needs
- a single source connection for complete communications solutions, addressing the needs of multiple disciplines
- local customer care and 24/7 technical support for your work
- a service provider that has local and national human and industry resources to help you at all customer care and service points

Partner with Car and run your buildings the CommercialSM facilities. It's the benefits to help your entire businesses while you're helping your own.

Learning of CommercialSM facilities:

[Review United States - Service Areas, Offices](#)

CommercialSM technology enabled facilities to bring issues to the phone and view solutions in the works. [Click here](#)

[CommercialSM Facilities - Home Based Offices](#)

Our Business Services delivered to build and manage connects to CommercialSM Building Technology Center. [Click here](#)

[View Products - Available Areas](#)

Partnering with Car gives you access to a suite of communications services to meet service demands. [Click here](#)

[CommercialSM Building Services - Resources about CommercialSM](#)

[View Our Plan](#)

To learn more about the products and services in your area, contact your local technician.

[View Service - Your nearest Contact Us](#)

There are some services available in some of our facilities.

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Sampling of Cable's Offerings

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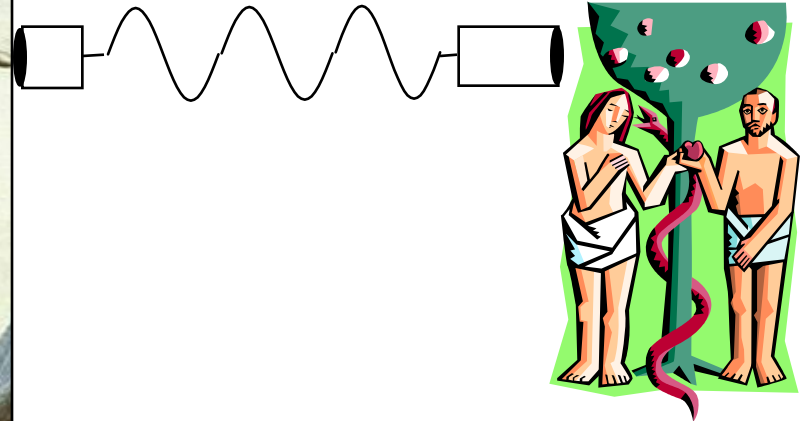


Business Telephone Systems: **Building Wiring, Network Connections, and** **Premises Telephone Systems**

In the Beginning ...



Everything was voice.



Voice Business Systems History

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5 Generations of Customer Premises Telephony Systems

- Vintage Cordboard
- Analog
- Digital
- Integrated Digital Voice/Data
- IP-based

Key Systems vs. PBX



PBX	Key
Big (Typically over 20 stations)	Small (2 – 20 stations)
Trunks to Network	Lines to Network

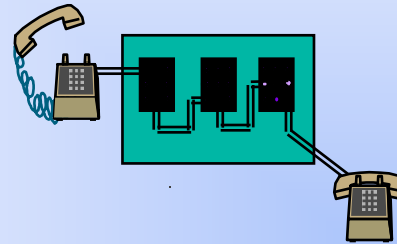
History (cont.)



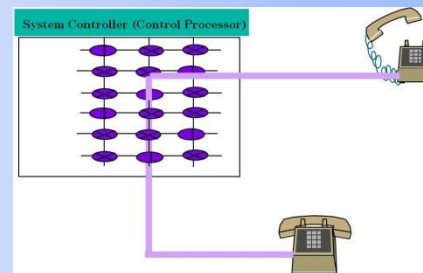
**Some (really old) Bell
System Analog PBXs:**

**Vintage Key
Systems
1A, 1A1**

**Progressive Control
701, 740**



**Common Control
756, 757, 770, 800,
805, 812, 101ESS**



History (cont.)



Digital PBX

**Dimension, Definity, SL-1,
Meridian 1, Rolm CBX**

Common Control, Electronic

**More Current Key
Systems**

AT&T Merlin

Nortel Norstar

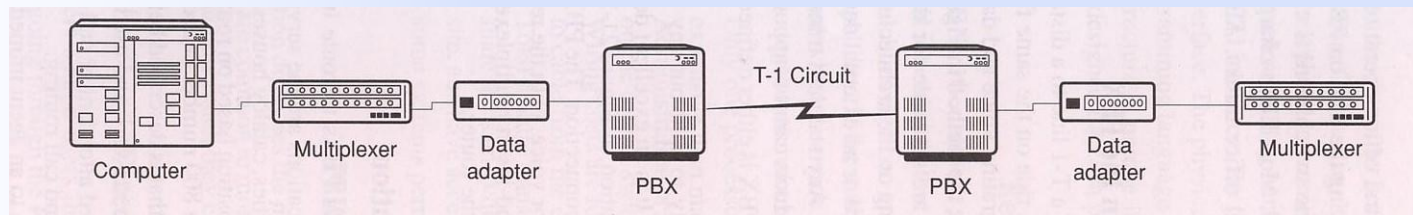
Avaya Partner

History (cont.)

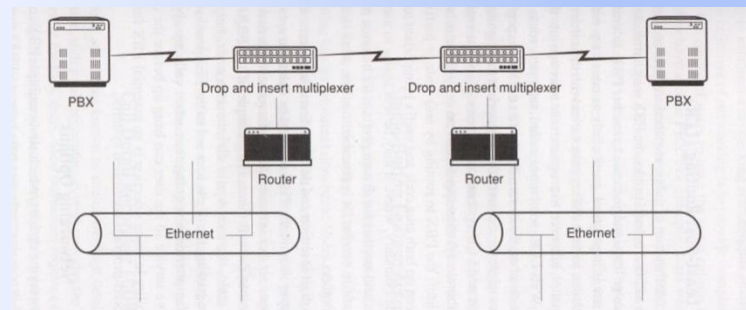


Integrated Digital Voice/Data PBX

- Time Division Multiplexed (TDM) T-1 trunks
- Shared for voice and data
 - “Nailed-up” 64 Kbps. Channels through PBX



- Shared facility between locations



- Might also simply mean integrated workstations



IP-Based Business Communications

- Full data/voice integration
- Packet-based
- Usually Ethernet connectivity to outside world
- May still have conventional analog trunk interface

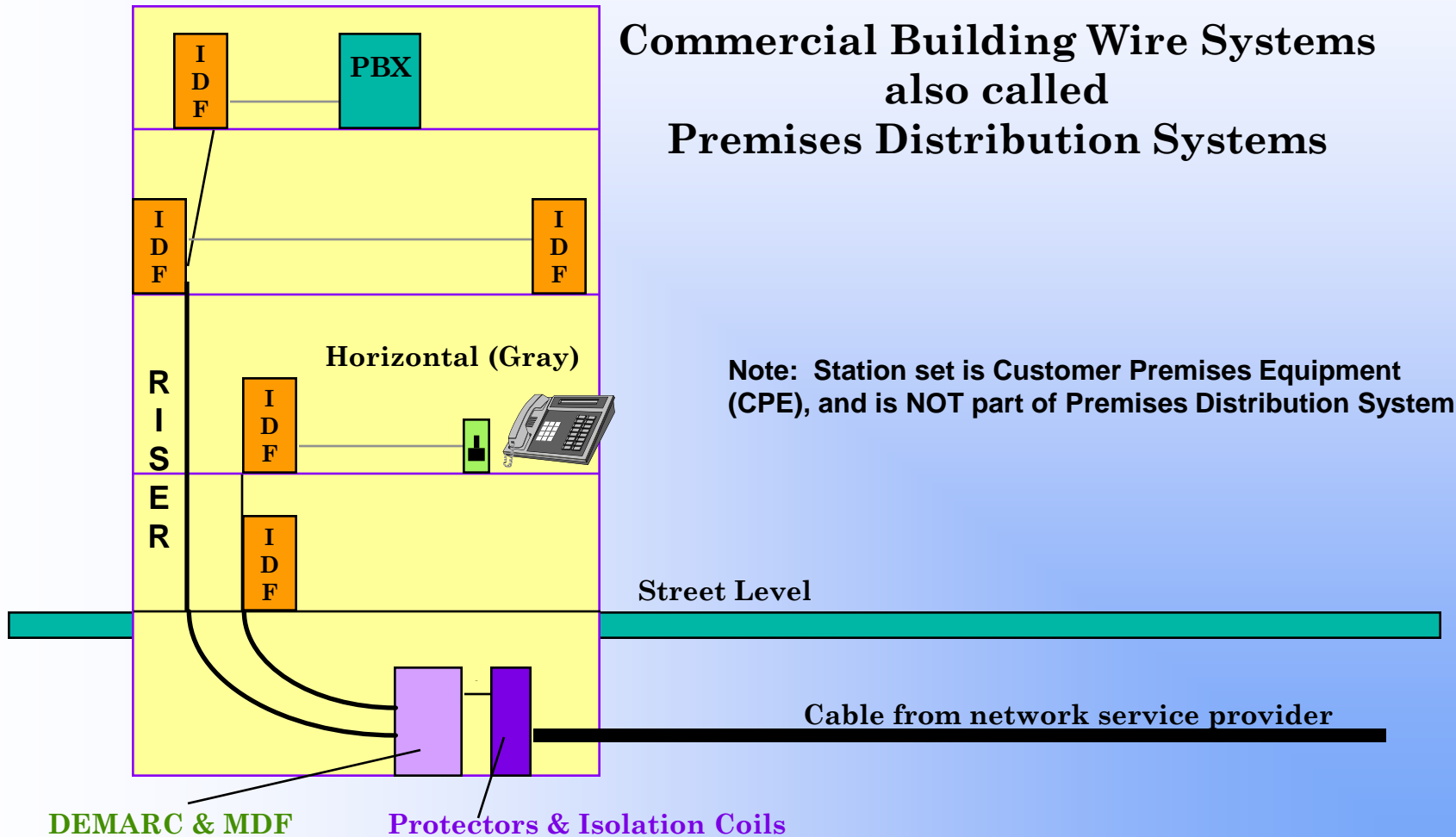
What It Helps to Know

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- **Signaling (Both sides)**
 - ☞ Idle state
 - ☞ Initiation
 - ☞ Active session
- **Telephony CPE (What are you connecting to what?)**
 - ☞ Functions
 - ☞ Features
- **Cabling and Wire**
 - ☞ Structured Wiring Systems
 - ☞ Connectors
 - ☞ Termination

Why Confusion is Easy

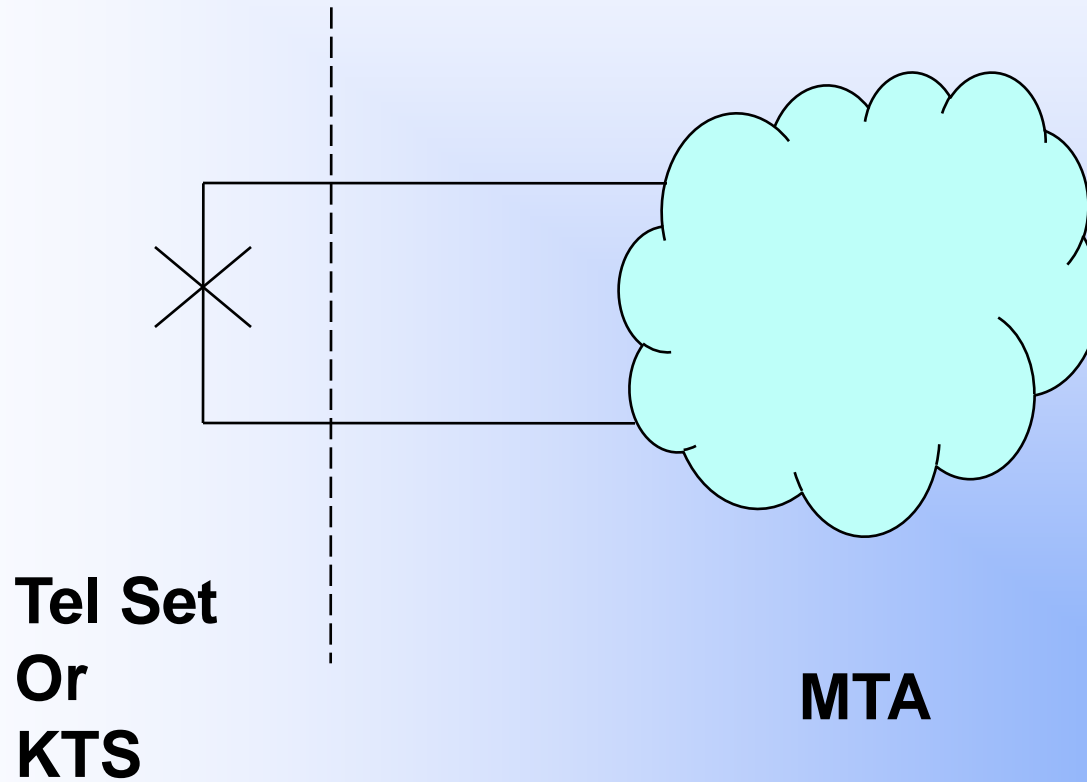


At the Demarc: Lines vs. Trunks

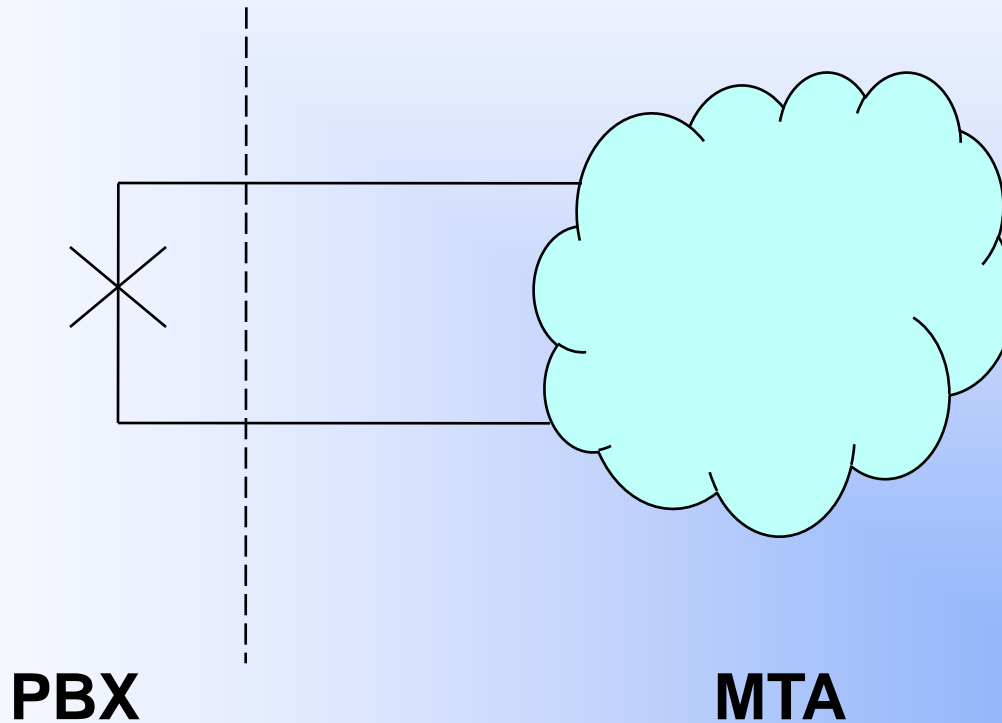


- **Blurry concept – same physical implementation**
- **Lines are associated with telephone numbers**
- **Trunks are shared on a system level**
- **Trunks have higher usage**
- **Different ways to signal request for service**

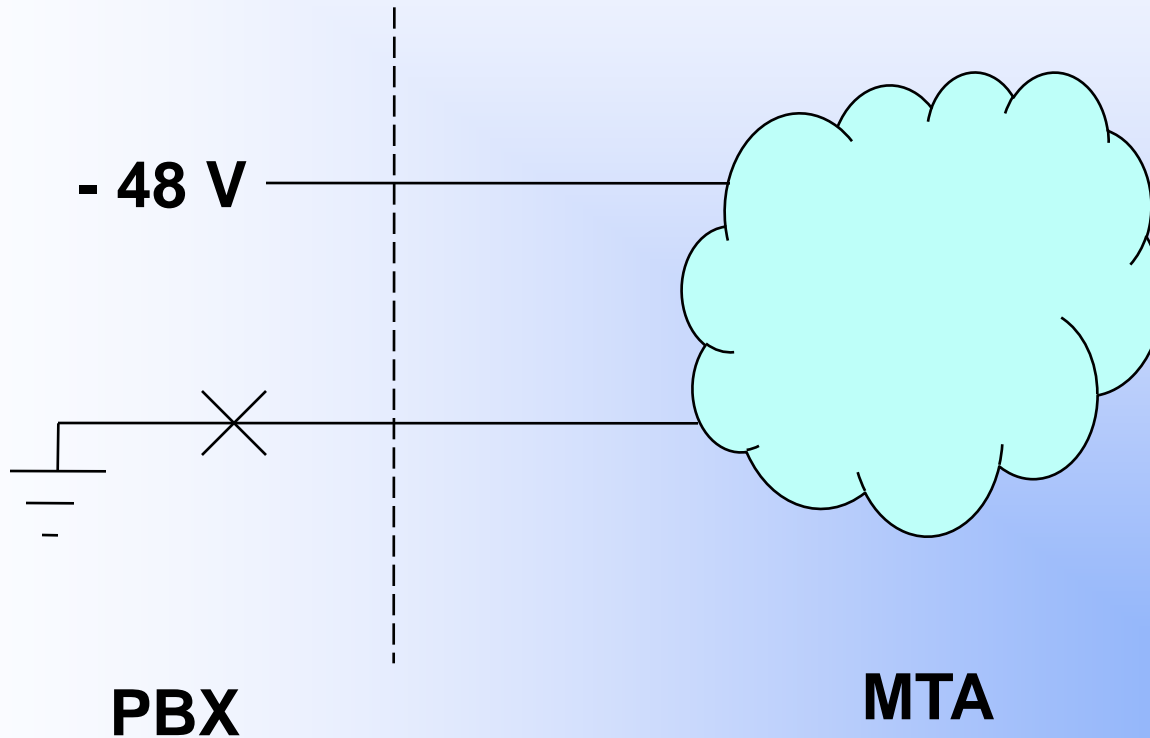
Line Off-Hook



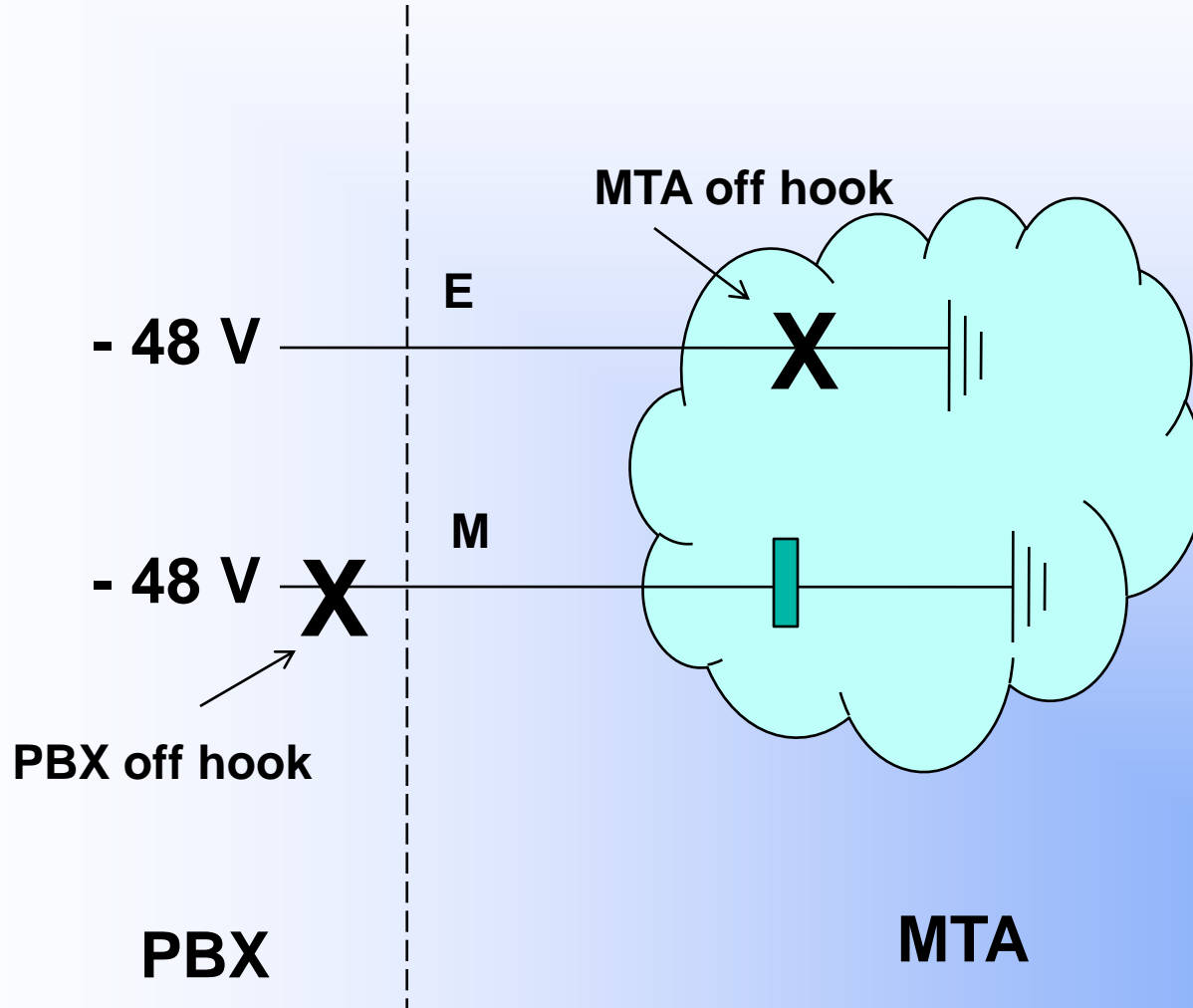
Loop Start Trunk



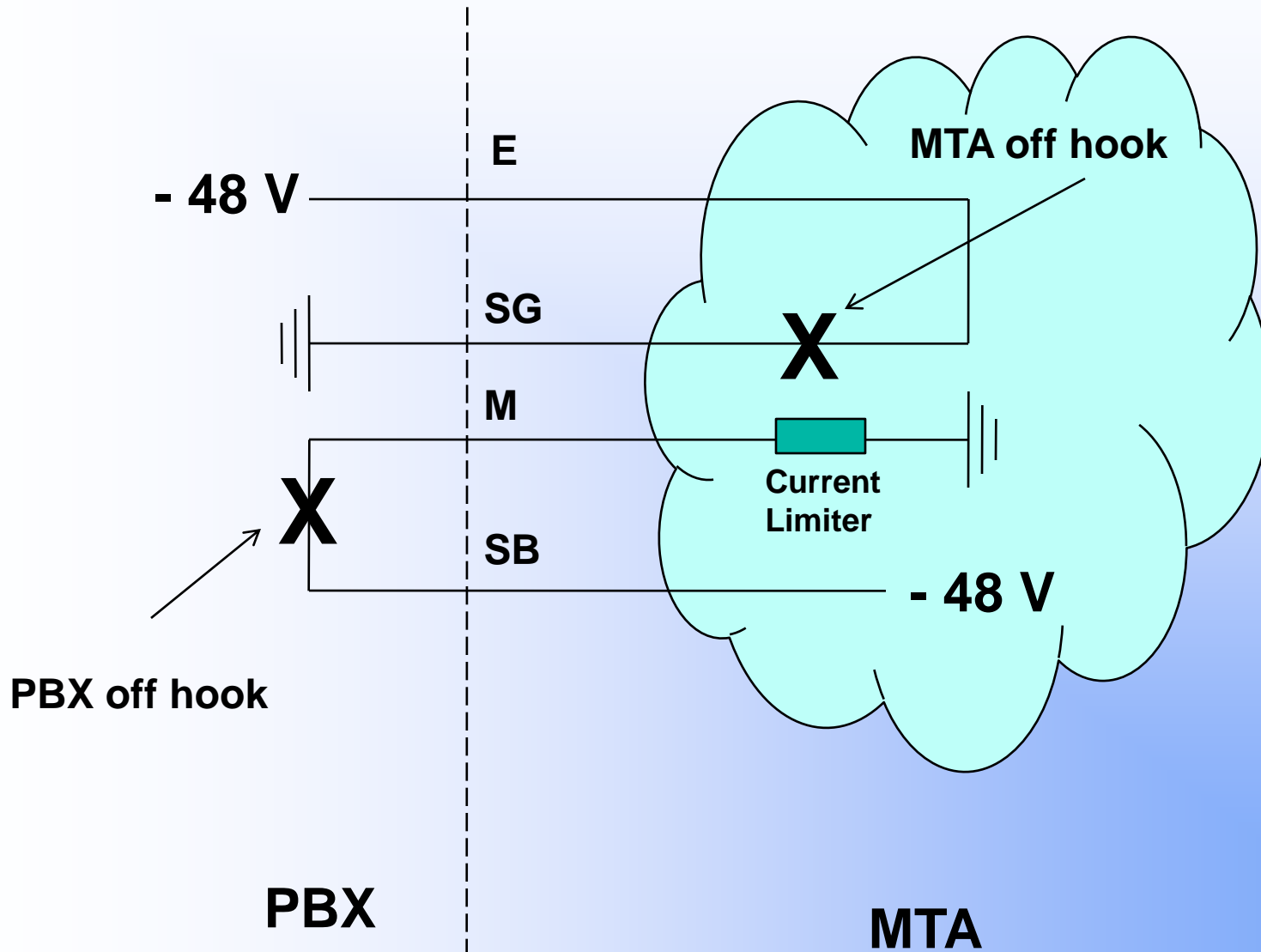
Ground Start Trunk



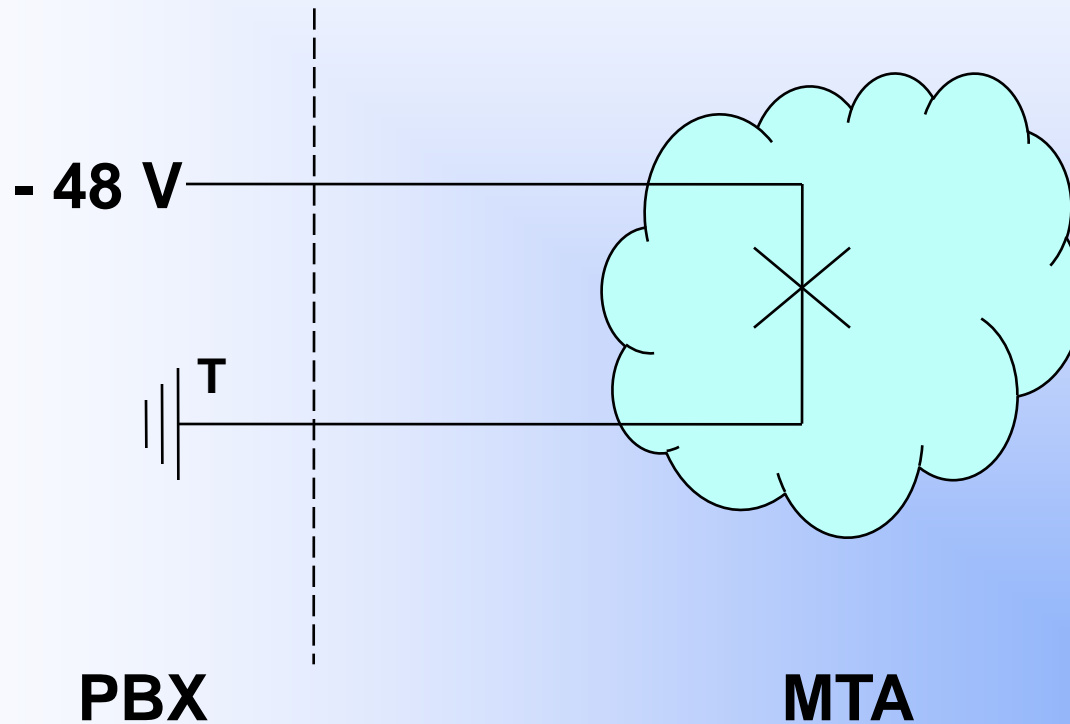
E & M Two Wire Trunk



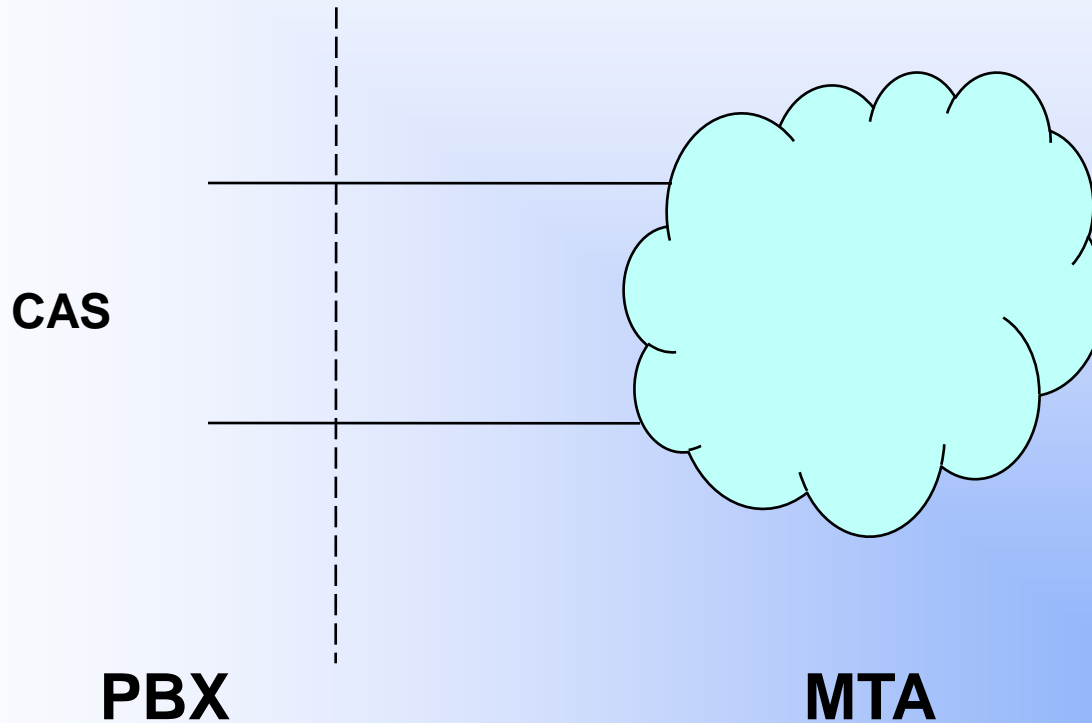
E & M Four Wire Trunk



DID PBX Trunk



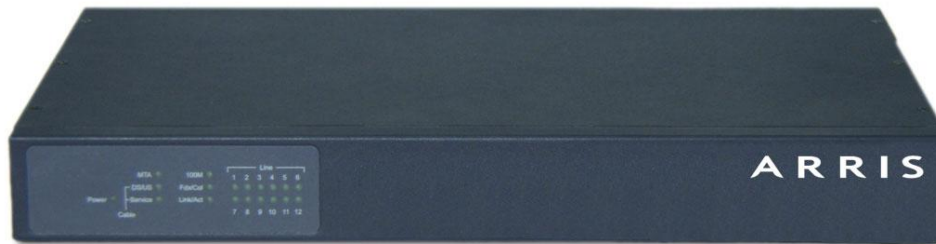
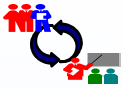
T-1 Trunk



Multi-Line E-MTAs

ARRIS TM508

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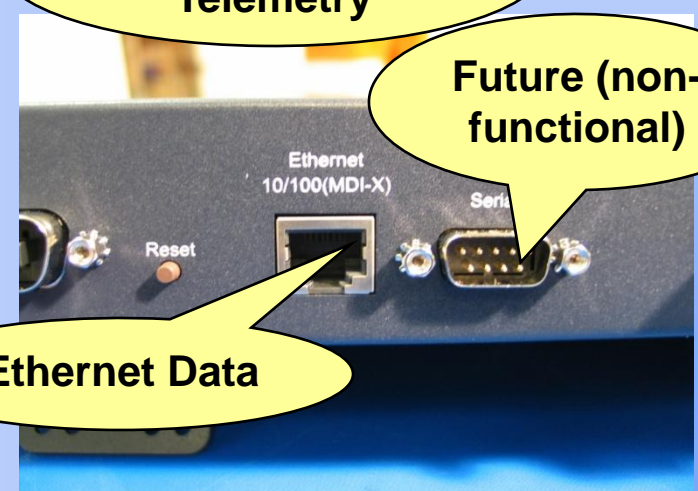
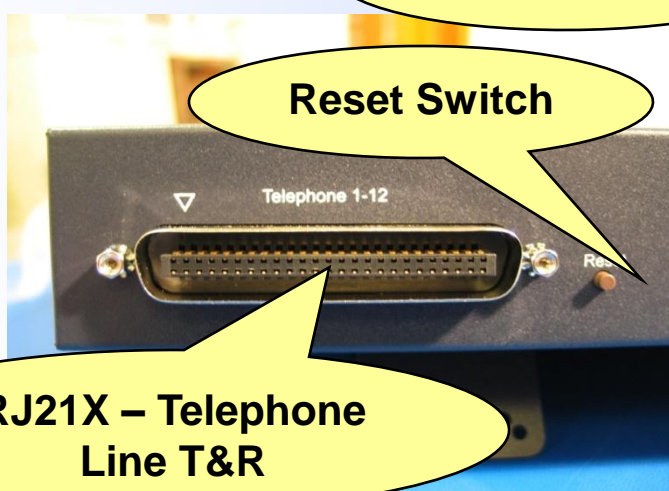
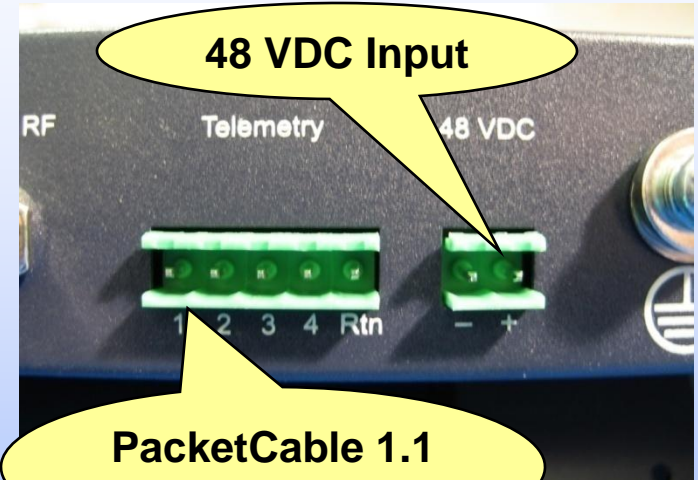


■ Product features:

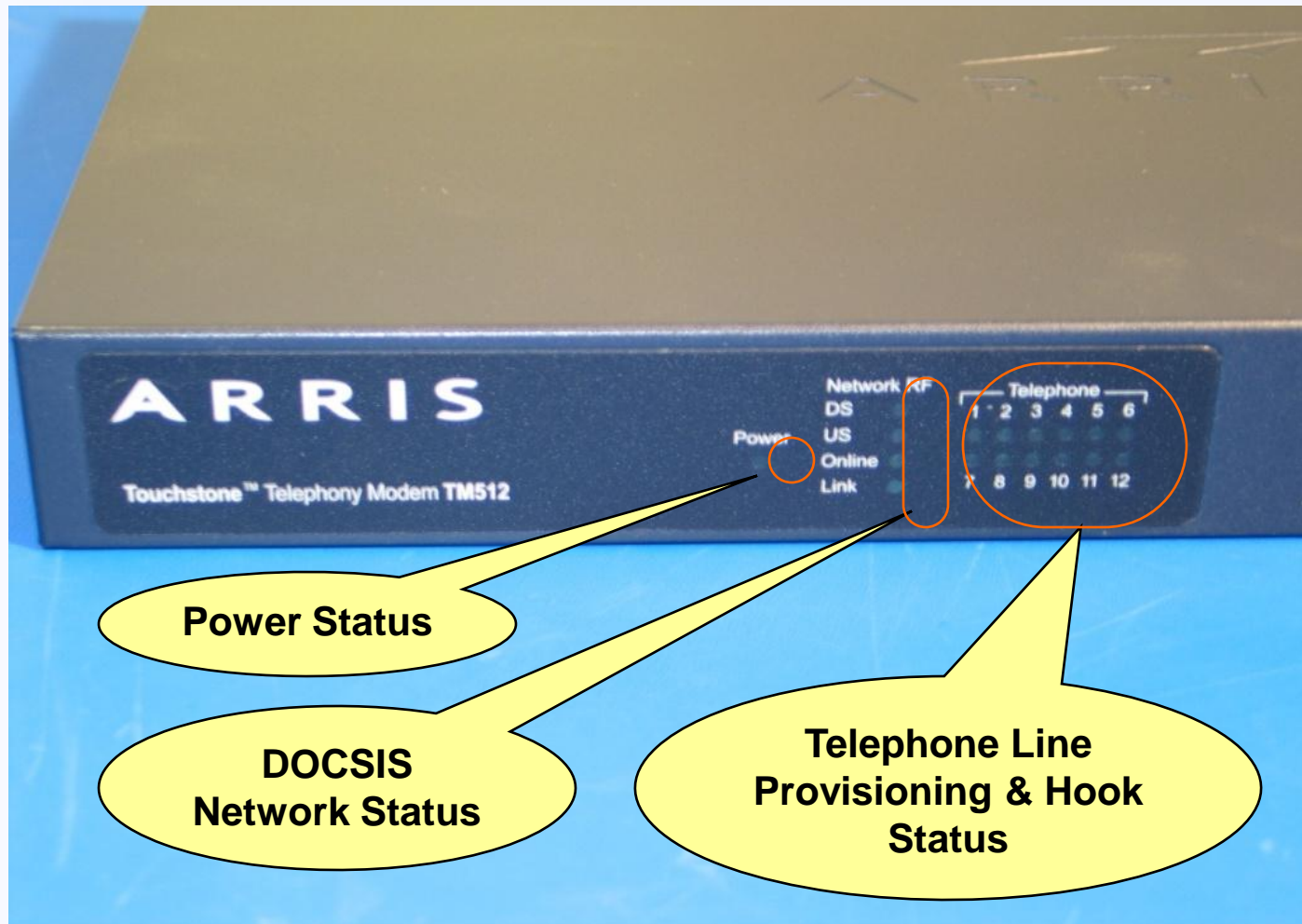
- Integrated DOCSIS 2.0 Cable Modem
- Multiple Protocol Support: PacketCable NCS and SIP (future)
- Either 8 or 12 Lines of Telephony (RJ-21)
- Software compatibility and feature parity with existing Touchstone Software Carrier class telephony interface implementation
 - 48V loop voltage, current boost mode
- Wall mount and rack mount options
- Enhanced telephony features include dynamic jitter buffers and G.168 compliant echo cancellation
- RJ45 10/100BaseT high speed data interface
- Support for external battery backup power with 48V DC power input and telemetry support
- Supports up to 14 non-blocking simultaneous call events
 - Example: 8 active lines off hook, 6 lines with call features (i.e., 3WC, CW)

TM508

Rear Panel Connectors



TM512 Front Panel LED



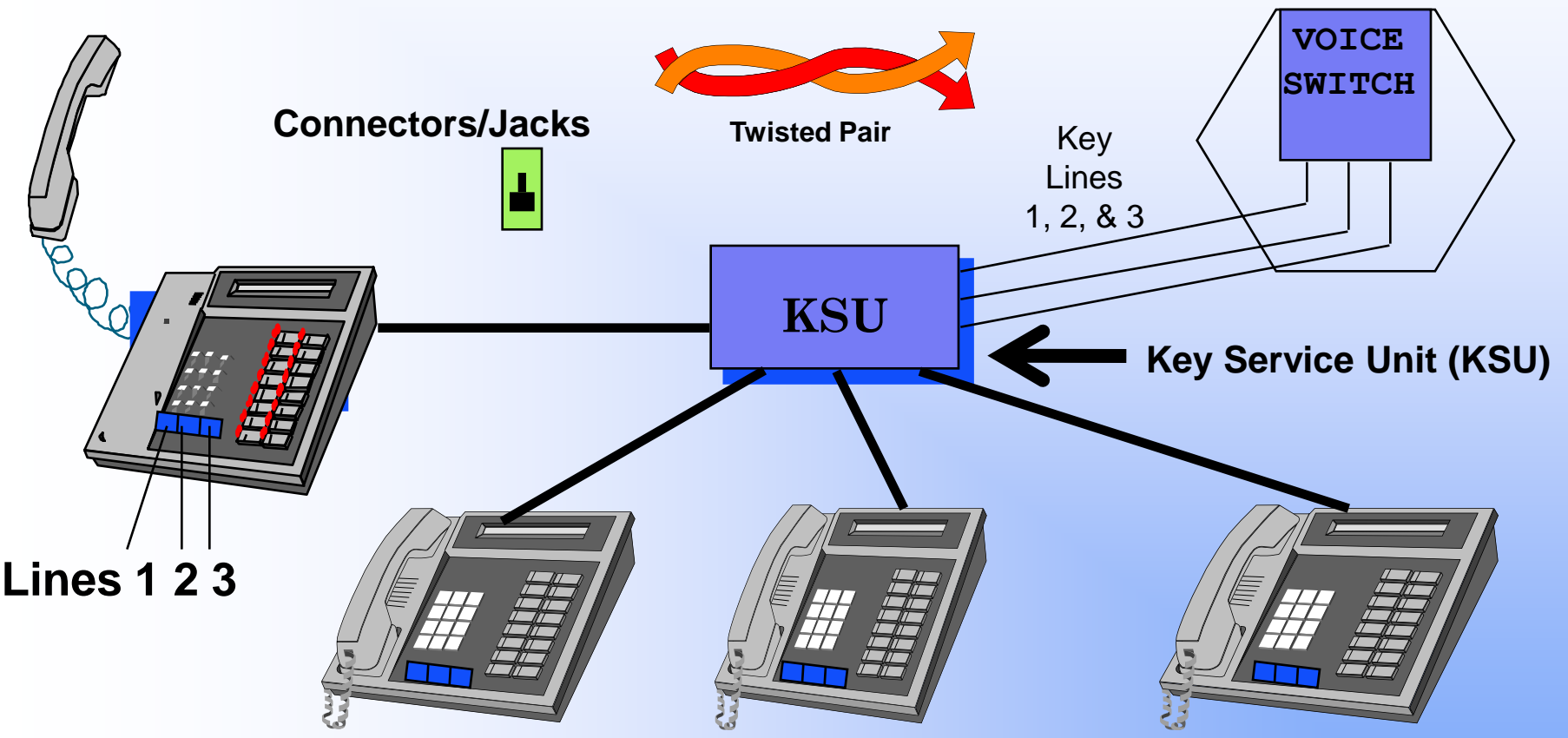
Key Telephone System Attributes



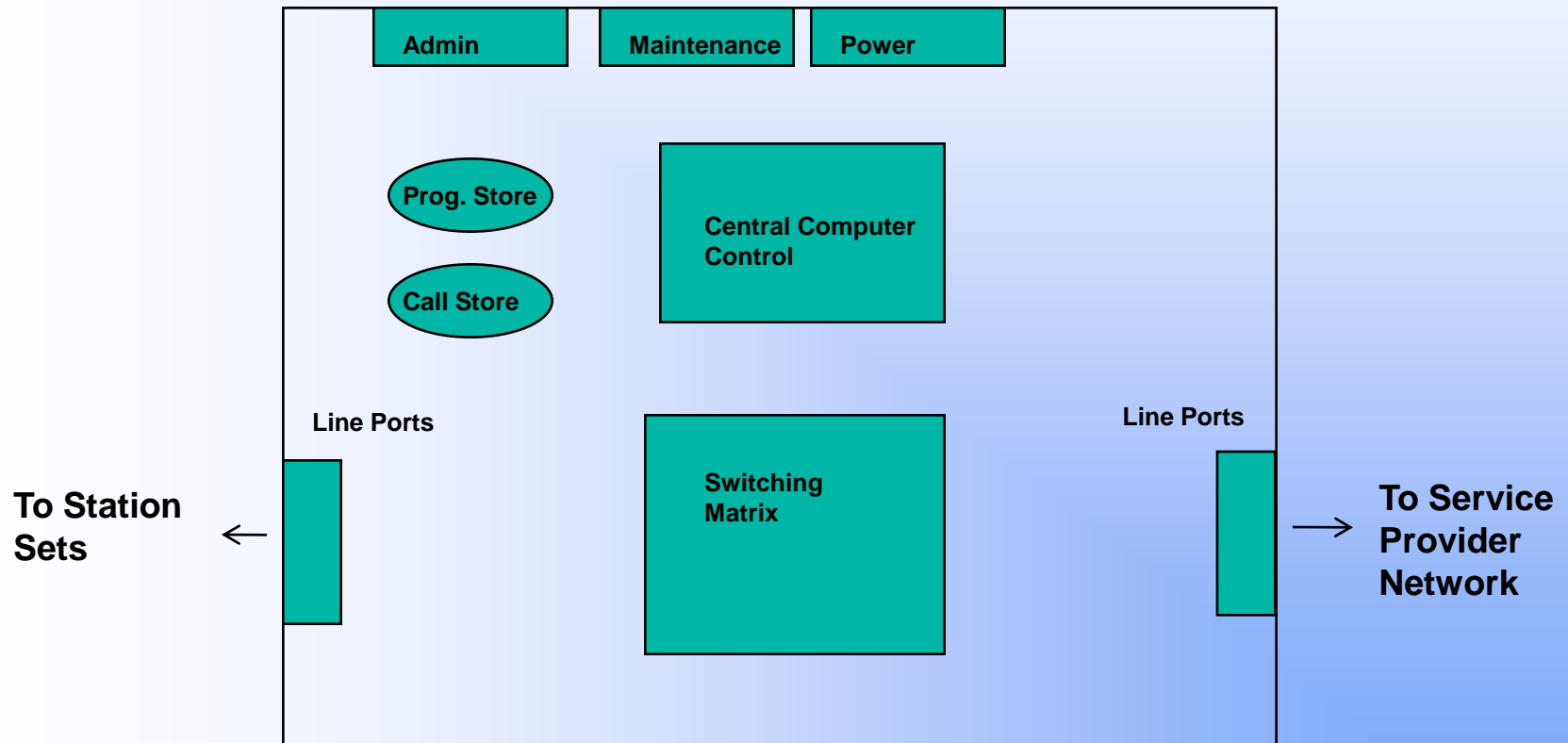
Key Telephone Systems (KTS)

- Usually have Key Service Unit (KSU)
- Lines only
- Intercom

Key Telephone System



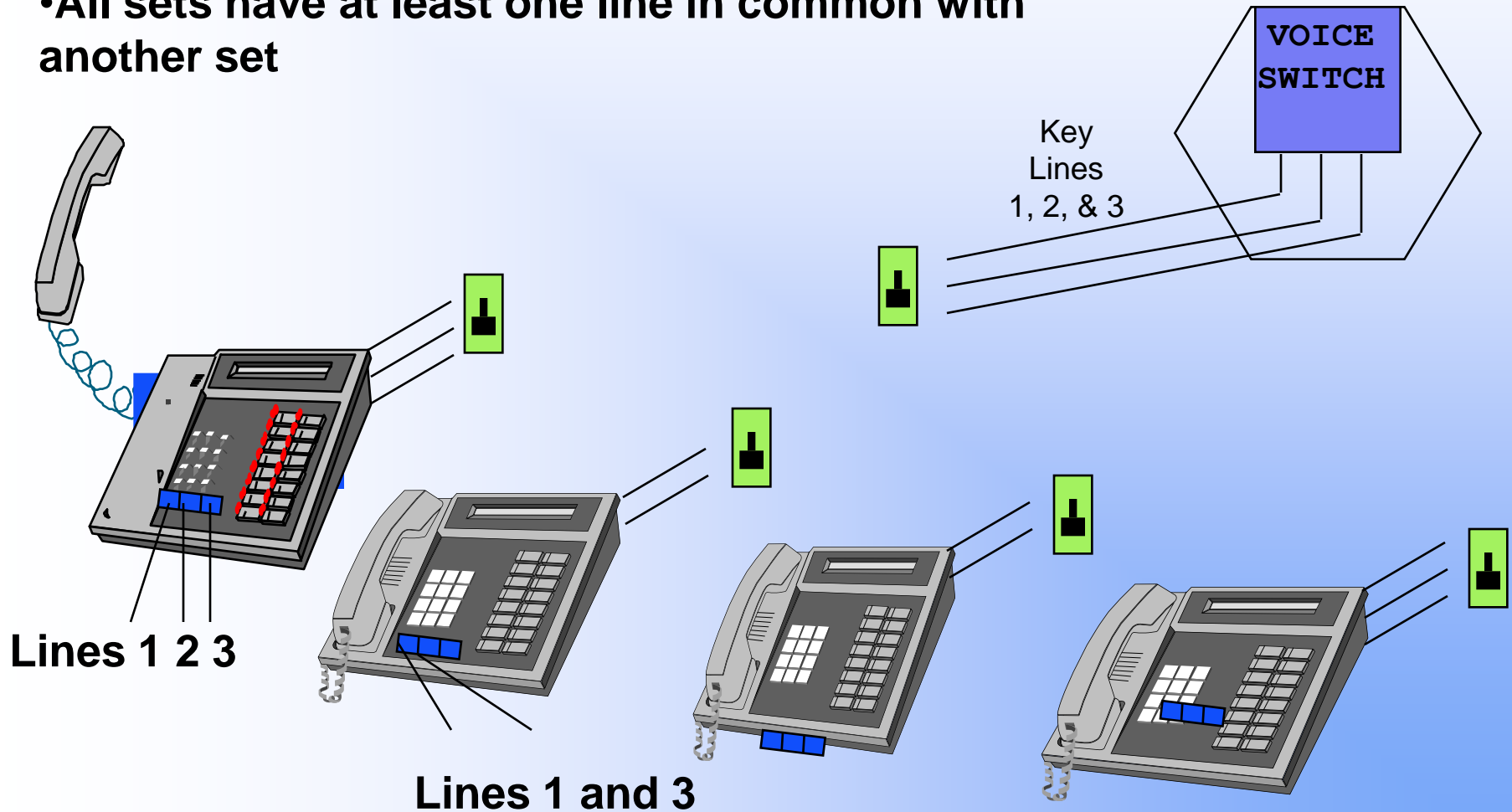
Key Telephone System Block Diagram



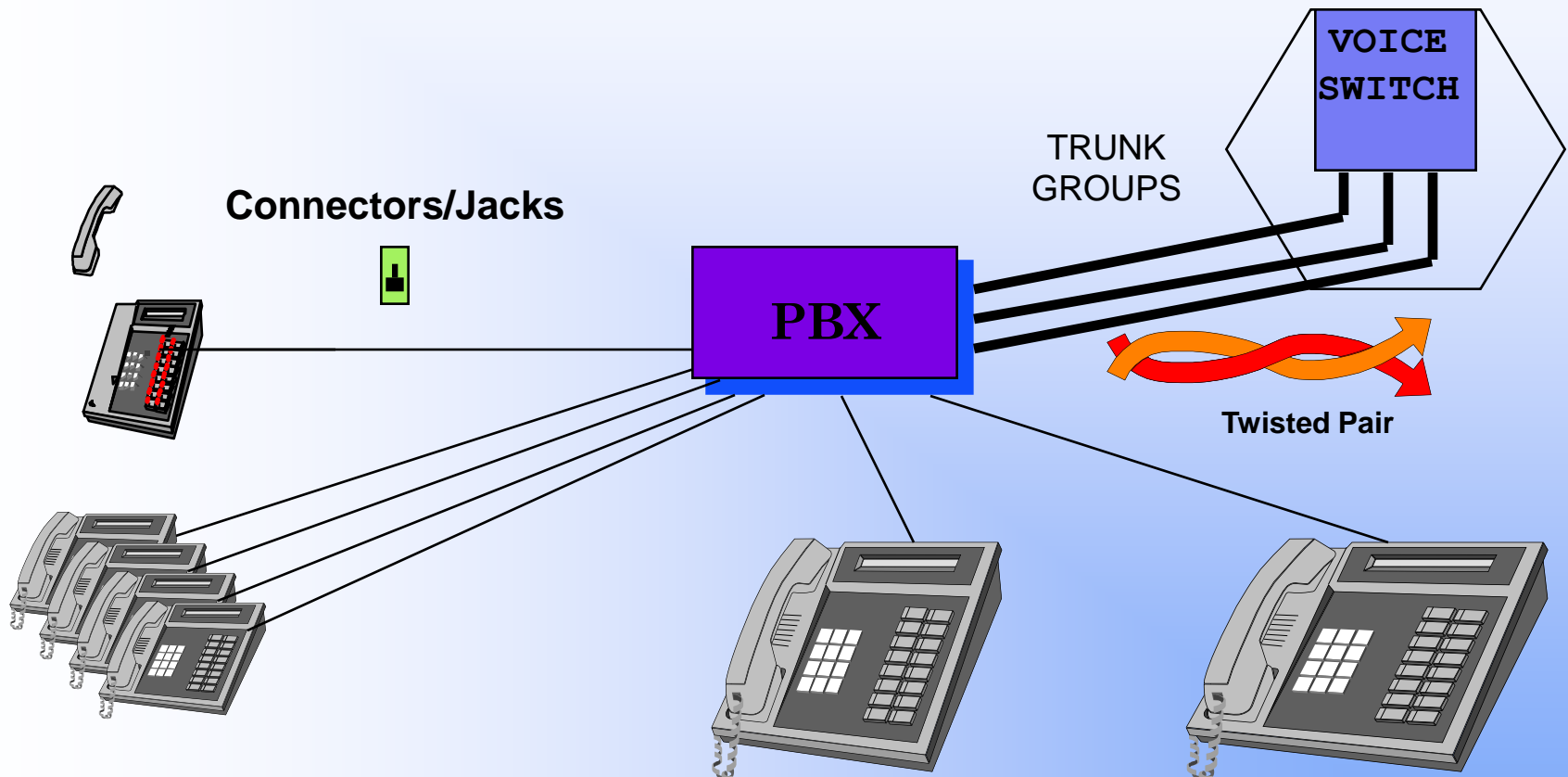
KSU-less Key System



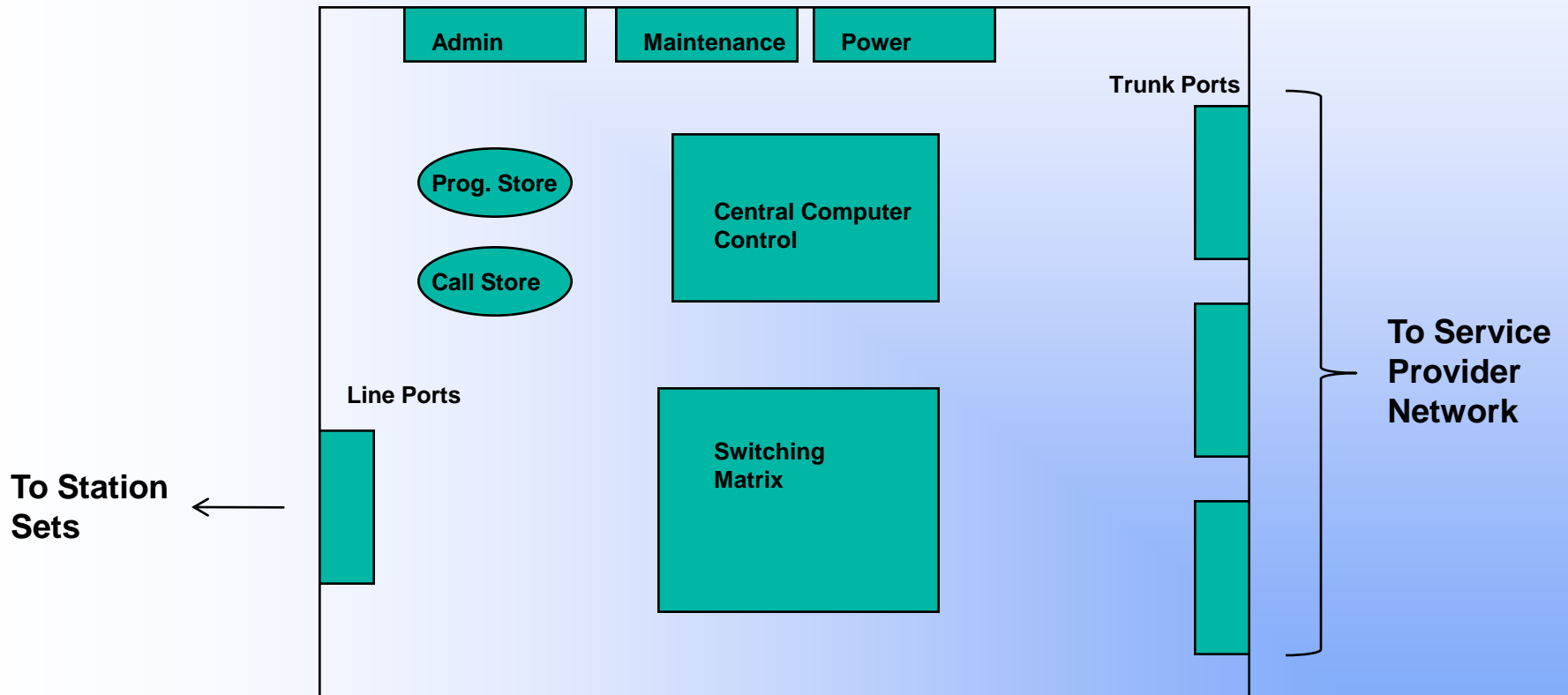
- Each station set has full processing ability
- Accessible lines wired directly to each set
- All sets have at least one line in common with another set



Private Branch Exchange (PBX)



PBX Block Diagram



Circuit Switched PBX Typical Cabinet Hardware

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- Power
- Carriers, Shelves
- Common Control and Memory
- Port Cards
- Special Shared Cards
 - Touch Tone Receivers
 - TT Dialing Senders
 - Ring Generators
 - Data Call Setup Cards
 - Tone Generators

PBX Design Capacity Issues

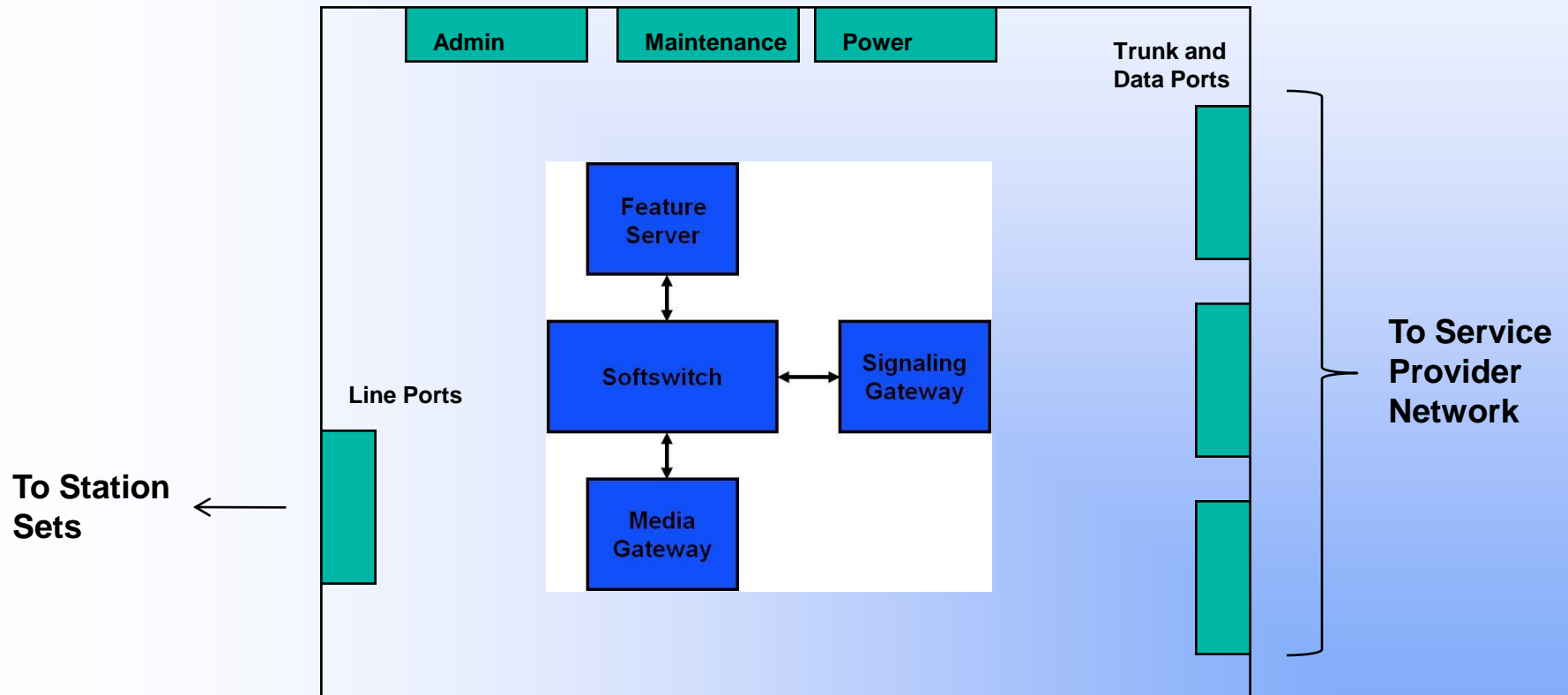
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CCS Capability
Mix of Lines/Trunks
Universal Ports
Feature Mix and Usage
Call Duration
Processor Size (MIPS)
Timeslots

Current Technology: IP PBX

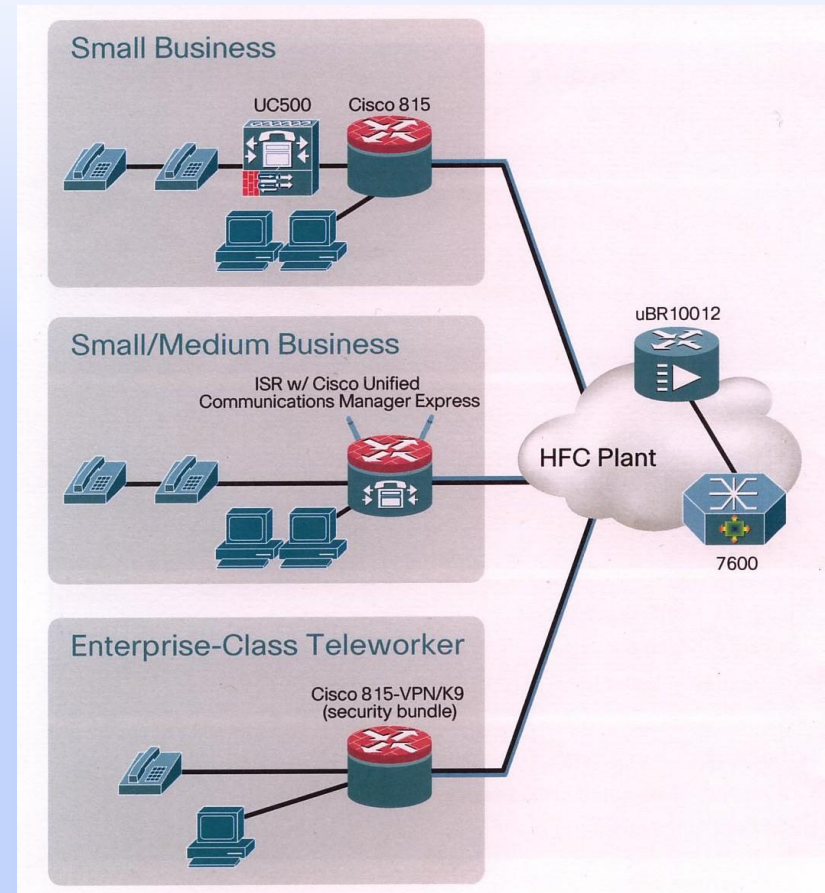
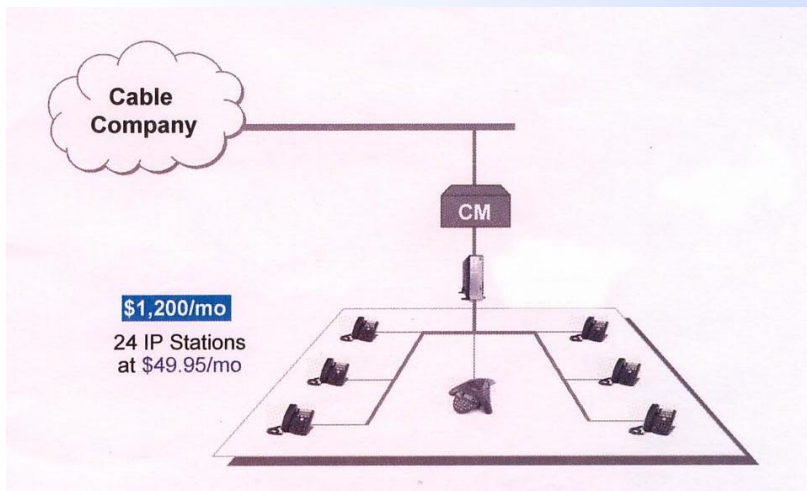
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Why You Need to Know Datacom as Well as Voice



These are Key Systems and PBXs!



PBX vs. Key System

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	PBX	KEY
Tel Sets	Simple	Complex
Network Access	Dial 9	Direct Selection
Size	Large	Less than 20 Stations
Predominant Calling	Between Office Users	Outside Calls
Intercom	Many Paths	Few Paths

Centrex and Hosted PBX

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- **Share part of a network-based switch**
- **Centrex is typically circuit switched, TDM technology**
- **Hosted PBX is typically an IP-based service**
- **All features come from the network-based switch**
- **Subscriber buys on a “per line” basis**

CPE Features



Why you need to know CPE features



That light wasn't blinking before!

Feature Classes



- **System**
- **Attendant**
- **Management**

} **PBX**

- **Station**

- **PBX and Key**

System Features - Standard

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- •Automated Attendant
- Automatic Program Reloading
- Automatic Route Selection
- Automatic Station Release with Howler
- Call Forwarding Busy Line
- Call Forwarding No Answer
- Call Forwarding - Remote
- Call Forwarding - Private Facilities

System Features - Optional



- •Automatic Call Distribution
- Autovon Access
- Call Number Buffering
- DC Power
- Direct Inward Dialing
- •Direct Inward System Access (DISA)
- Direct Outward Dialing
- Distinctive Ringing
- End to End DTMF Signalling
- •Flexible Hunting Arrangements
- Flexible Intercept
- Flexible Release

System Features – Optional Continued

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- Flexible Station Restrictions
- Hot Standby
- Off-Premises Stations
- Power Failure Cut-Through
- Reserve Power
- Special Circuit Interface
- Speed Calling: System
- Ten Digit Telephone Number Restriction
- Tenant Service
- Time of Day Routing
- Uniform Call Distribution

Attendant Features

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- **Alphanumeric Display**
- **Attendant Abbreviated Dialing**
- **Attendant Assisted Dialing**
- **Attendant Controlled Conference**
- **Automatic Recall**
- **Busy Override**
- **Calling Number Identification**
- **Call Processing Indications**
- **Call Waiting Indications**
- **Camp-On Busy**

Attendant Features - Continued

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- **Centralized Attendant Service**
- **Console Headsets**
- **Console Signal Volume Control**
- **Dial 0 Access to Attendant**
- **Direct Trunk Group Selection**
- **Flexible Night Service**
- **Individual Trunk Access**
- **Locked Loop Operation**
- **Loop Transfer**
- **Message Center Service**
- **Multiple Console Operation**

Attendant Features Continued Some More

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- **Position Busy**
- **Station Busy Verification**
- **Switched Loop Operation**
- **Trunk Group Busy Lamps**
- **Two Way Splitting**

Management Features



- •Account Code
- •Authorization Code
- Automatic Circuit Assurance
- Call Accounting
- Diagnostic and Maintenance Programs
- •Feature Usage Monitoring
- Line Load Control
- Line, Trunk, and Network Testing
- Maintenance Busy
- Malicious Call Trace
- System Administration and Control
- System Alarm Indication
- Remote Diagnostics and Maintenance
- •Traffic Measurement



Station Features

(Also Pertain to Key Systems)

- Add-On Conference
- Automatic Callback
- Automatic Re-Ring on Held Call
- Call Forwarding, Variable
- Call Hold
- Call Park
- Call Transfer
- Call Transfer via Camp-On
- Call Waiting
- Cancel Call Waiting
- Classes of Service
- Consultation Hold
- Data Privacy

Station Features - Continued

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- Data Terminal Connection
- Dial Call Pickup
- Dial Trunk Transfer
- •Dial Intercom
- Directed Call Pickup
- DTMF Dialing
- Executive Override
- Flexible Station Controlled Conference
- Individual Speed Calling
- Last Number Redial
- Malicious Call Trace From Station

Station Features

Continued Some More

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- **Music on Hold**
- **Saved Number Redial**
- **Station Call Waiting**
- **Station Forced Busy**
- **Station To Station Calling**

Cabling and Connectors

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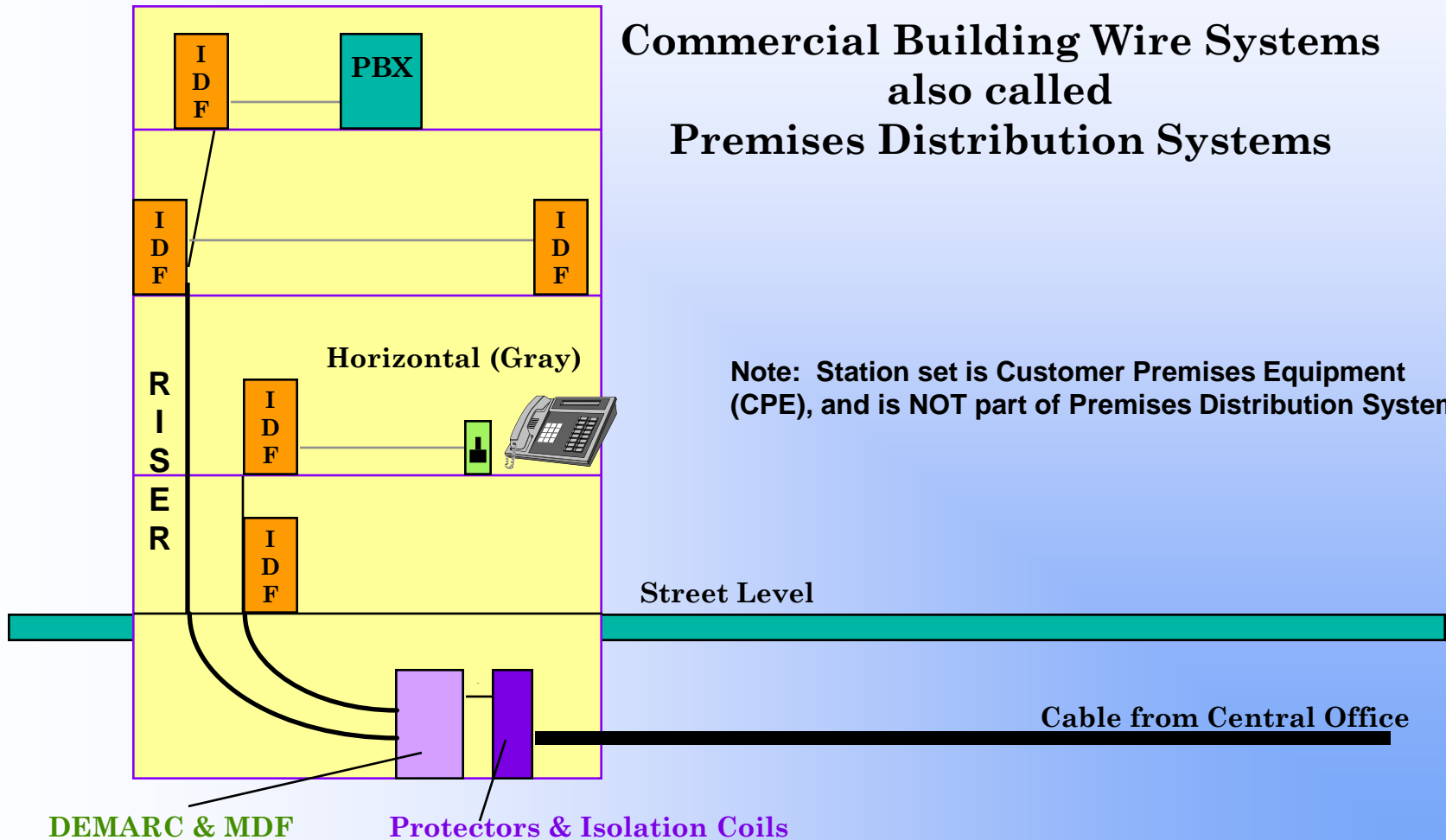
- Premises Distribution System
- Connectors and Jacks

Building Wiring



Commercial Building Wire Systems also called Premises Distribution Systems

Note: Station set is Customer Premises Equipment (CPE), and is NOT part of Premises Distribution System



Horizontal Wiring



Two Outlets per Work Area

**One outlet: Four pair unshielded twisted pair (UTP)
(Meets IEEE 802.3 Standard for 10 Base T)**

**One outlet: Four pair UTP, or
Two pair shielded twisted pair (STP), or
Coax**

Last two meet IEEE 802.5 and 802.3 for 10Base2

Some Popular Jacks



RJ-45



RJ-11



RJ-21



Jack Bauer

Their Real Names



8P8C



6P2C



RJ-21

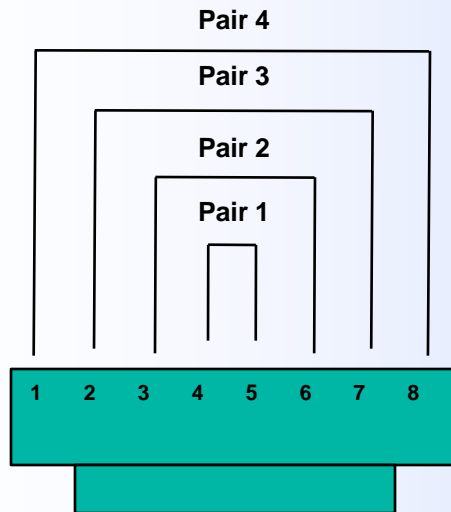


Kiefer Sutherland

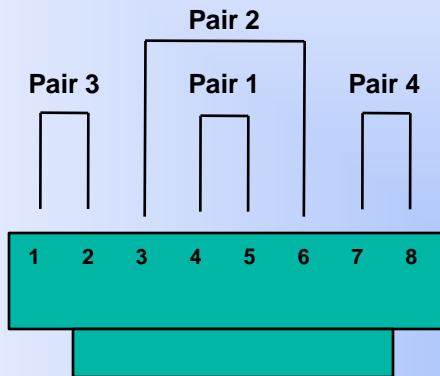
Inconsistent Pin Assignment



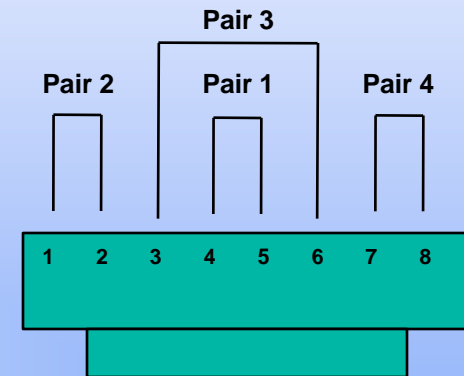
An 8P8C jack can be wired as:



USOC RJ

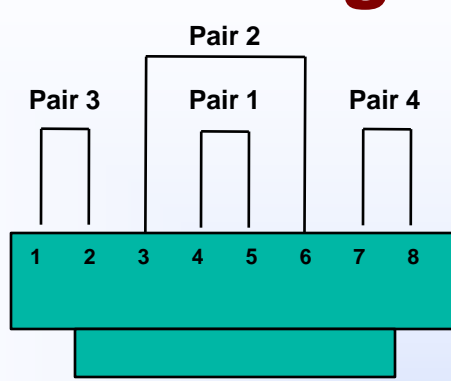


TIA/EIA T568A

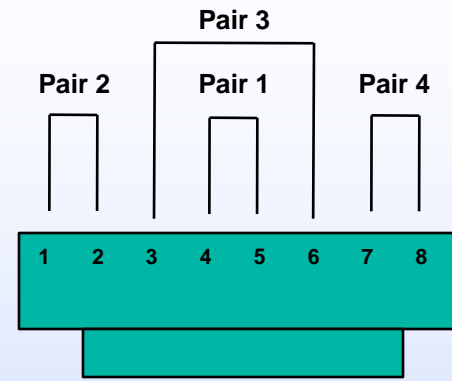


TIA/EIA T568B

Common Usage RJ-45



TIA/EIA T568A



TIA/EIA T568B

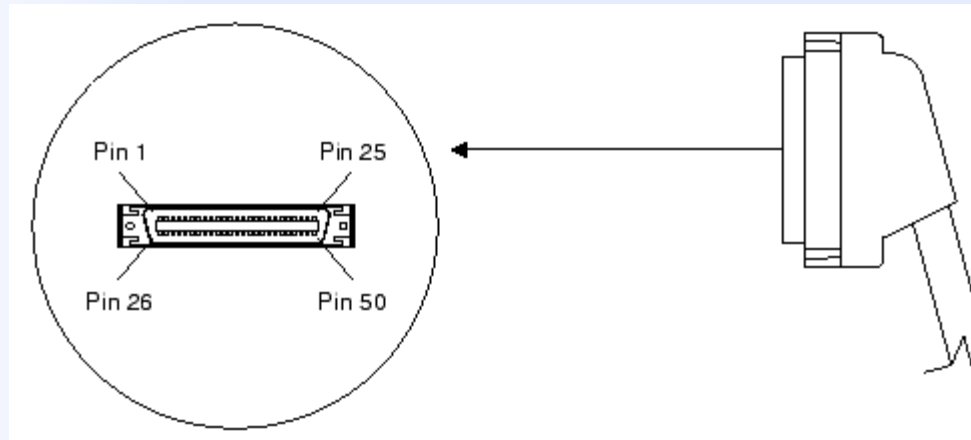
Pin	Ethernet	EIA/TIA 568A	EIA/TIA 568B
1	Transmit+	White with green stripe	White with orange stripe
2	Transmit-	Green with white stripe or solid green	Orange with white stripe or solid orange
3	Receive+	White with orange stripe	White with green stripe
4	Not used	Blue with white stripe or solid blue	Blue with white stripe or solid blue
5	Not used	White with blue stripe	White with blue stripe
6	Receive-	Orange with white stripe or solid orange	Green with white stripe or solid green
7	Not used	White with brown stripe or solid brown	White with brown stripe or solid brown
8	Not used	Brown with white stripe or solid brown	Brown with white stripe or solid brown

Common Usage RJ-11



"real" RJ	RJ25	RJ14	RJ11					
Pin				Pair	T/R	+/-	New color	Old color
1	X			3	T	+	White/ Green	Orange
2	X	X		2	T	+	White/ orange	Black
3	X	X	X	1	R	-	Blue	Red
4	X	X	x	1	T	+	White/ blue	Green
5	X	x		2	R	-	Orange	Yellow
6	x			3	R	-	Green	Blue

RJ-21 Connector



RJ-21 Pin Layout

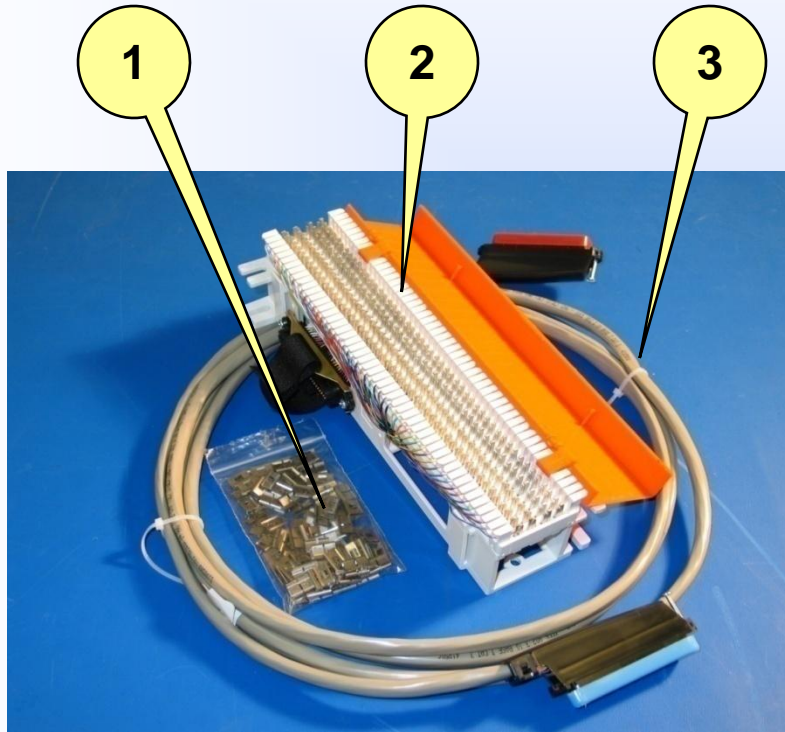


RJ21X Standard Telco Cable Pinout



Telephony Punch Block Kit

KnowledgeLink, Inc.
(630) 820-8205



- (1) Bridging clips (Qty 24)
- (2) Pre-wired Network 66-block with cover
- (3) RJ21X cable

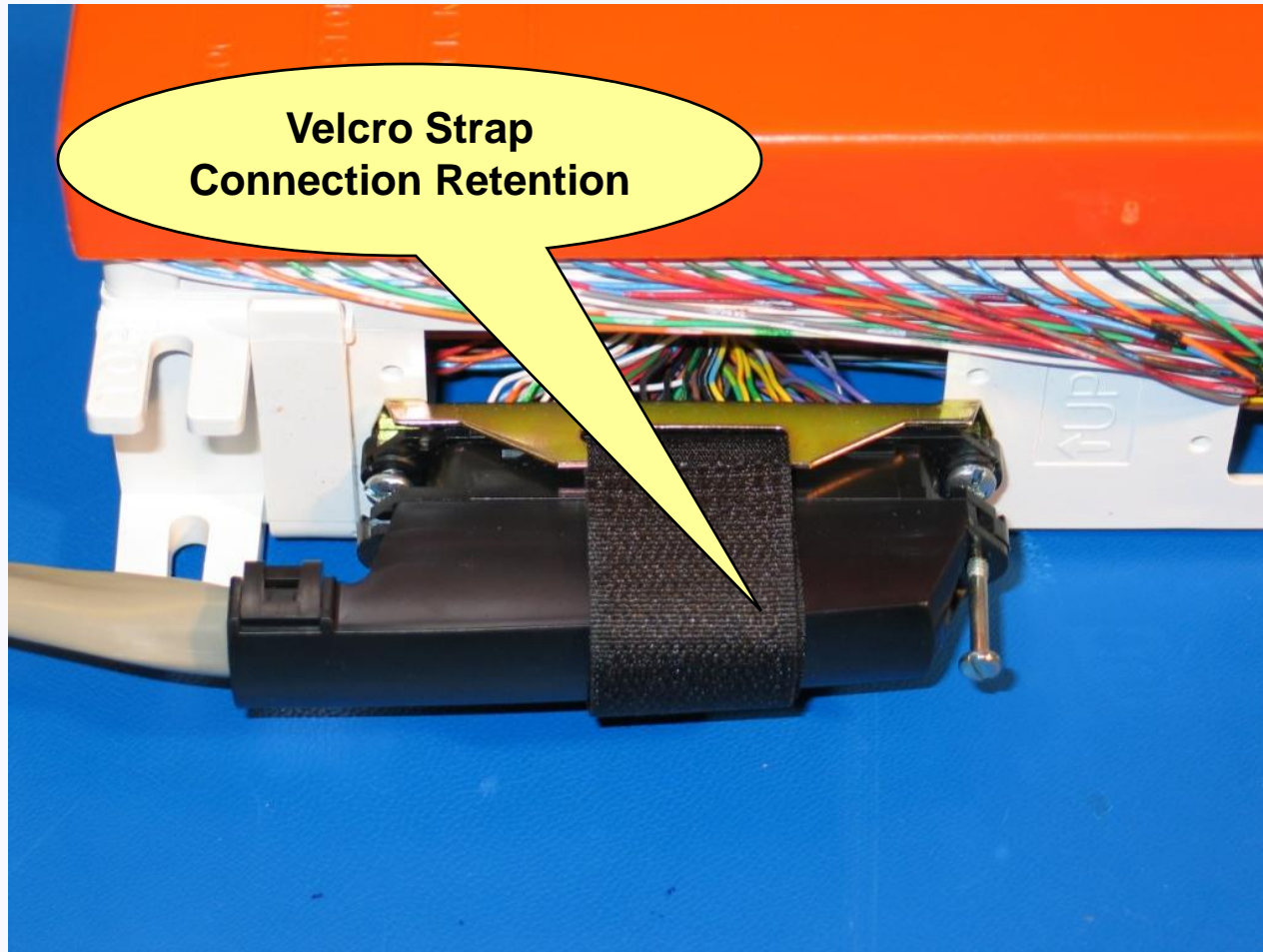
66 Connector Block



With RJ-21 Connector

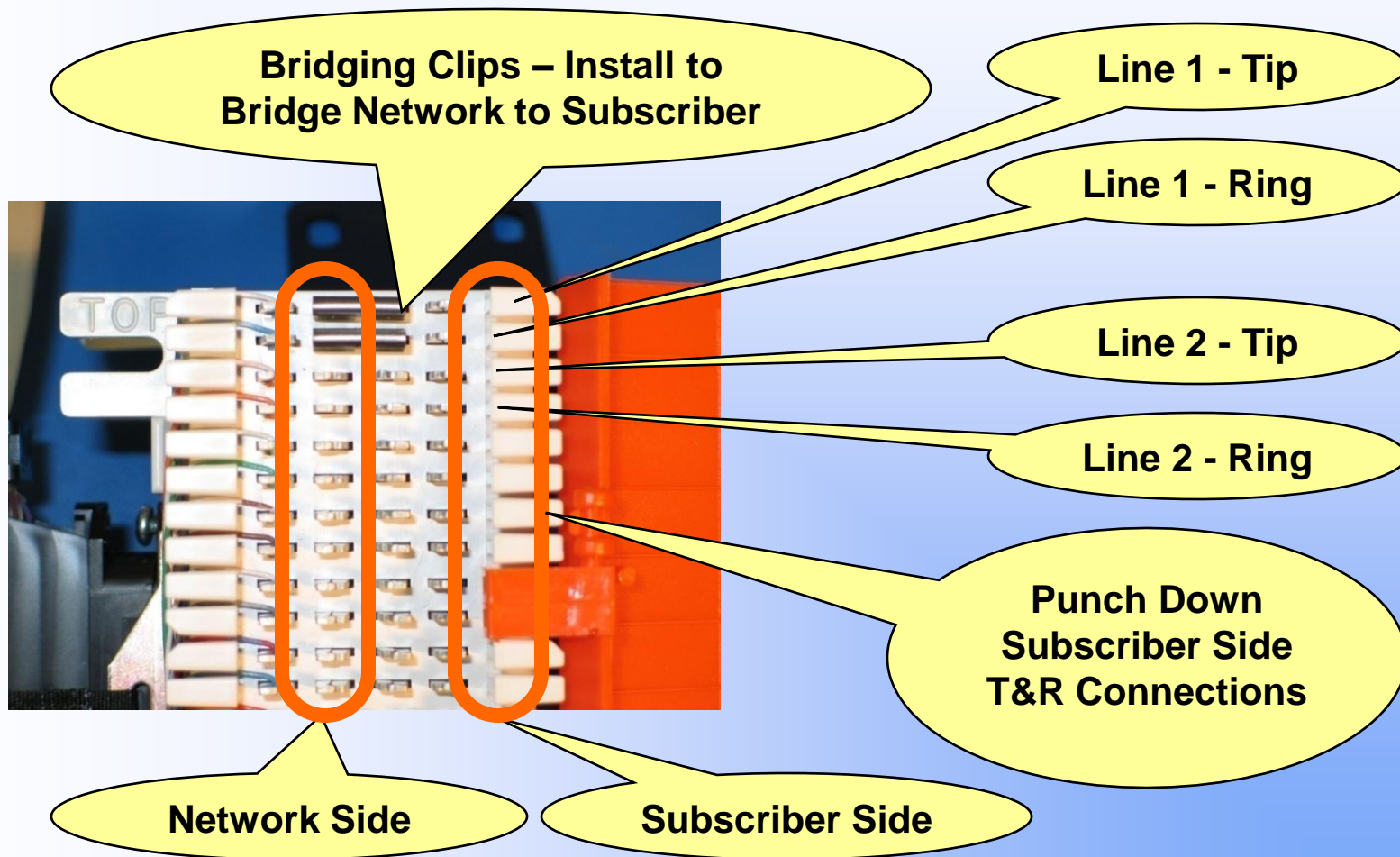
Connection to 66 Block

KnowledgeLink, Inc.
(630) 820-8205



**Velcro Strap
Connection Retention**

Telephony Subscriber Connections



110 Connector Block

KnowledgeLink, Inc.
(630) 820-8205



Questions and More Info

KnowledgeLink, Inc.
(630) 820-8205



**For further information
on Business Communications Systems
and Commercial Services, please contact:**

Justin J. Junkus

President, KnowledgeLink, Inc.

jjunkus@knowledgelinkinc.com

630-820-8205

www.knowledgelinkinc.com