P R O D U C T  O V E R V I E W

esi Communications Servers

# Advanced digital and IP communications servers

## Contents



## Available information

- **Color brochures**:
  Family brochure — ESI # 0450-1052.
  Mini-brochure — ESI # 0450-1139.
  System spec sheets — ESI #s 0450-1055 (ESI-1000); 0450-1054 (ESI-200); 0450-1053 (ESI-100); 0450-1148 (ESI-50); and 0450-1149 (ESI-50L).
  All available for purchase from ESI.
  All downloadable from *www.esi-estech.com*.
- **Video**: "ESI Hallmark Features."
  Available for viewing at *www.esi-estech.com*.
- ***User's Guide***: ESI # 0450-1047.
  Downloadable from *www.esi-estech.com*.



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# Introduction

**ESI Communications Servers** represent an innovative approach to digital and IP communications. The science behind the switch is sophisticated in its simplicity: Design a platform with the flexibility to support digital functionality with the ability to be configured as a purely IP-based communications system. It's ideal for any business that wants the familiarity of digital telephony, the benefits of full IP-to-the-desktop, or anything in-between.

ESI Communications Servers come in several models, to handle everything from the modest call-handling needs of a small business to the large, customized needs of the enterprise. Each ESI Communications Server is fully flexible. That means it can support traditional digital stations, IP-based, or any combination thereof that the customer requires.[1] The largest model, the ESI-1000, supports a maximum system capacity of 1,128 communications ports.

An ESI Communications Server's backplane[2], switching matrix, and main board are designed to allow for a traditional digital installation or a VoIP configuration in varying capacities. The non-blocking architecture increases station capacity to a full complement of up to 816 telephones.[3]

ESI Communications Servers share many common functions and features. Their innovative architecture integrates advanced IP functionalities, such as dedicated IP resources, the ability to support multiple Integrated VoIP Cards (IVCs), up to 96 Esi-Link channels, and remotely installed IP phones.

All ESI phone models, both IP-based and digital, provide advanced ESI features. The supported models are:

- **ESI 60IP Business Phone** and **ESI 60D** (digital) **Business Phone** — The ESI 60IP is available in both Gigabit Ethernet and 10/100 models. Each ESI 60 Business Phone model includes 48 programmable feature keys, visual voice mail, an adjustable backlit display, and a full-duplex, high-definition speakerphone.
- **48-Key IP Feature Phone II** and **48-Key Digital Feature Phone** — Each 48-Key Feature Phone model includes 30 programmable feature keys, an adjustable backlit display, and a full-duplex speakerphone.
- **ESI 40IP Business Phone** — The ESI 40IP includes 16 programmable feature keys and an adjustable backlit display.
- **ESI 30D** (digital) **Business Phone** — A smaller model intended for lower-traffic users.
- **ESI Cordless Handset II** — Available in digital, local IP, and remote IP models.
- ***VIP 7 Softphone*** — Combines the functionality of a desktop IP phone and the *VIP 7* product in one PC-based phone.

All ESI IP phone models are standards-compliant and operate with the customer's data network to provide highest-quality voice through Quality of Service (QoS) support. In addition, all ESI desktop IP phone models support Power over Ethernet (PoE).

An ESI Communications Server provides an ideal, cost-effective upgrade path for several models of ESI's IVX® systems.[4] See "Migration capability," page 17, for more details.

[1] To support certain ESI Communications Server features — most notably automatic call distribution (ACD) and any IP-related features — the entry-level ESI-50L must be upgraded to an ESI-50. As a result, a number of descriptions in this document do not apply to the ESI-50L. For a complete comparison of ESI systems' features, consult the *Technical and Features Comparison Chart* (ESI # 0450-0447), downloadable from *www.esi-estech.com/Resellers/tech* (password required).

[2] Except on the ESI-100, ESI-50, or ESI-50L.

[3] See "Capacity constraints," page 13.

[4] IVX E-Class (IVX 128e and IVX 72e) Generation II and IVX X-Class (IVX 128x and 256x).

# Advantage summary

**Note:** Maximum capacities shown.

## *Capacities*

### System

| | ESI-1000 | ESI-200 | ESI-100 | ESI-50 | ESI-50L |
|---|---|---|---|---|---|
| **System ports** | 1,128 | 300 | 108 | 87 | 56 |
| **Trunk ports** | 240 | 84 | 42 | 35 | 16 |
| **DLCs (for T1/PRI)** | 10 | 3 | 1 | 1[1] | 0 |
| **IVCs** | 34 | 8 | 3 | 1[2] | 0 |
| **SIP Trunking Cards** | 10 | 3 | 1 | 1 | 0 |
| **Applications Services Cards (ASCs)** | 20 | 7 | 1 | 1 | 0 |
| **Station ports**[3] | 816 | 192 | 84 | 52 | 40 |
| IP stations | 816 | 192 | 72 | 12 | 0 |
| Digital stations | 504 | 168 | 48 | 32 | 32 |
| Analog stations | 384 | 56 | 28 | 8 | 8 |
| **Esi-Link cards** (up to 24 Esi-Link chs./card)[4] | 4 | 1 | 1 | 1[2] | 0 |
| **Conference ports**[5] | 64 | 24 | 16 | 16 | 16 |

### Voice mail

| | ESI-1000 | ESI-200 | ESI-100 | ESI-50 | ESI-50L |
|---|---|---|---|---|---|
| **On-board integrated auto-attendant/voice mail channels** | 128 | 24 | 8 | 6 | 6 |
| **Total voice mailboxes** | 1,941 | 1,229 | 1,121 | 1,089 | 267 |
| User | 816 | 192 | 84 | 52 | 40 |
| Information/guest | 1,000 | 1,000 | 1,000 | 1,000 | 190 |
| Group/maximum members | 64/200 | 16/48 | 16/32 | 16/32 | 16/32 |
| "Special-purpose" | 61 | 21 | 21 | 21 | 21 |
| **Voice storage** (hrs.)[6] | 1,200 | 600 | 140 | 30 | 30 |

[1] The ESI-50 doesn't support T1.
[2] The ESI-50 has a built-in IVC; it accepts no additional IVCs. The built-in IVC supports 12 local IP channels, eight remote IP channels, or a combination thereof whose total can't exceed 12 IP channels.
[3] See "Capacity constraints," page 13.
[4] Esi-Link channels are allocated to "reserved" ports; *i.e.*, Esi-Link channels don't reduce CO or station capacity.
[5] Dynamic assignment allows for unlimited combinations up to the maximum of 16 parties per conference — *e.g.,* 21 three-member conferences, or four four-member conferences in combination with two eight-member conferences. Achieves best audio performance when using digital trunks.
[6] The differing quantities for the ESI-200 and ESI-50 reflect those models' Memory Module choices.

## *Standard features*

- Account codes
- Automatic call distribution (ACD)[1]
- Built-in Network Services Processor (NSP)
- Caller ID key
- Distinctive ring for trunks
- Enhanced Caller ID
- Esi-Dex integrated directories
- Fax tone detection
- Flexible numbering plans
- Recording of calls
- Shared-office tenanting[1] (maximum of eight tenants)
- Station redial and callback
- Twinning

## *Optional applications*

- ESI Presence Management
- ESI Media Management
- ESI Mobile Messaging
- Mirrored Memory Module (M3)[2]
- Esi-Link IP private networking[1]
- Power over Ethernet support for desktop IP phones[1]
- Dual-configuration desktop IP phones[1] (support local and remote installations)
- Digital, local IP[1], and remote IP[1] Cordless Handsets
- Third-party SIP[3] stations[1]
- SIP trunking
- *VIP 7* (*Visually Integrated Phone*)
- *VIP 7 ACD Supervisor*[1] and *VIP 7 ACD Agent*[1]
- *VIP 7 PC Attendant Console*
- *VIP 7 Softphone*[1]
- *ESI Personal Programmer*

[1] Not applicable to the ESI-50L.
[2] Standard on the ESI-1000; optional on the ESI-200; not available for the ESI-100, ESI-50, or ESI-50L.
[3] See "IP telecommunications capabilities," page 13.

# Hardware description

## *System configurations*

### ESI-1000, ESI-200

The largest-capacity ESI Communications Servers — the ESI-1000 and ESI-200 — are compact, rack-mounted systems. The maximum configuration of each consists of one **Base Cabinet** and the following number of **Expansion Cabinets** (maximums shown):

| | ESI-1000 | ESI-200 |
|---|---|---|
| **Expansion Cabinets** | 5 | 1 |

The ESI-1000's Expansion Cabinet is unique to that model; the ESI-200's Expansion Cabinet is unique to that model. If desired, the cabinets may be wall-mounted, but rack-mounting is the preferred method of installation.

### ESI-100, ESI-50, ESI-50L

For the ESI-100, ESI-50, and ESI-50L, each consists of a compact Base Cabinet with the same form factor of ESI's long-popular IVX products. Each accepts one Expansion Cabinet through a "piggyback" method. Typically, these systems' cabinets are wall-mounted.

## *Processing*

Processing power is provided by a Motorola® ColdFire® commercial-grade microprocessor, designed specifically for 24/7 operation. This device houses SDRAM for stored program control. It also interfaces with 3 on-board DSPs that manage the HDD controller, inter-card communications, and telephony services, ensuring rapid, dependable communications among all system resources: trunks, digital stations, and IP Phones. The ColdFire processor's model, speed, and SDRAM capacity vary by ESI Communications Server model:

| | ESI-1000 | ESI-200 | ESI-100 | ESI-50 | ESI-50L |
|---|---|---|---|---|---|
| **Processor model** | MCF-5407 | MCF-5407 | MCF-5272 | MCF-5272 | MCF-5272 |
| **Speed (MHz)** | 54 | 54 | 66 | 66 | 66 |
| **SDRAM (MB)** | 128 | 64 | 32 | 32 | 32 |

## *Power provisions*

Each cabinet is powered by its own power supply. In rack-mounted installations, a power shelf is available that provides AC connection for each of the cabinet power supplies. This reduces the number of AC power outlets needed to one, instead of one per power supply. When a UPS system is installed, only one connection to the UPS must be made from the system, rather than one from each of the cabinets. The power shelf is separately fused to protect system components against erratic power fluctuations.

Each cabinet has a grounding lug and solder terminal for the connection of a ground wire. It is highly recommended that all cabinets be grounded to a common grounding point by "pig-tailing" the ground wire from one cabinet to the one below it.

## *Cabinet connection*

### ESI-1000, ESI-200

Connection between cabinets on these models is made through a SCSI (Small Computer System Interface) cable, which is shipped with each Expansion Cabinet. This SCSI cable extends the motherboard from cabinet to cabinet, creating a common backplane.

### ESI-100, ESI-50, ESI-50L

Connection between cabinets on these models is made through a ribbon cable that connects between port cards in adjoining "piggybacked" cabinets.

### *Main board*

The Main Board houses a built-in Network Services Processor (NSP) for all applications requiring direct connection of the ESI Communications Server to the customer's local area network. These applications include SMDR, system programming via TCP/IP, and ESI options such as the *VIP 7* family of software applications[1].

The M3 (Mirrored Memory Module)[2] provides a full, real-time back-up of system programming data and voice messages. The M3 is designed with RAID 1 redundancy technology. If the main hard disk drive controller senses a drive failure, it will automatically switch to the mirrored drive and continue to run. This switch of drives initiates an audible alarm with a visual LED indication on the front panel of the Base Cabinet.

### *Fully flexible platform*

Each ESI Communications Server offers impressive expansion capabilities. On each model other than the ESI-50 and ESI-50L, each available card slot accepts either digital or IP cards, to allow the customer maximum flexibility in configuration. The ESI-50 comes with one built-in IVC (which is its maximum capacity for IVCs); and the ESI-50 and ESI-50L each have the capabilities of a 482 port card (see "Port cards supported," page 21) on the main board.

For each ESI Communications Server's capacities, refer to "Advantage summary," page 3.[3]

## Features at a glance

> **Note:** For system-by-system details on quantities for features described in this section, see the "Advantage summary" on page 3.

An ESI Communications Server combines the power of a PBX with the ease of use for which every ESI system is renowned. Its feature set, capacities and scalability ensure:

- Availability of all features[4], functionalities and tools ESI offers to increase the productivity of an enterprise.
- Expansion ability to meet shifting demands of business growth.

**Integrated voice mail** — A full complement of practical, easy-to-use voice mail features is standard on every ESI Communications Server:

- In addition to its call processing ports, an ESI Communications Server is configured with **built-in voice mail channels**. There is no need to balance voice mail needs at the expense of a customer's call-handling requirements.
- Voice mail and other message storage are recorded at the **highest grade of voice quality** (64-Kbit/second sampling).
- **Substantial voice message storage** ensures ample capacity for all mailbox users, including the needs of users enabled with the optional auto-record feature.
- Support for 12 **message-on-hold recordings**:
  - Three pre-recorded tracks.
  - Nine customizable recordings.
- **New-message notification** can be delivered off-premises to a phone or pager.
- Leaving messages for up to 65 mailboxes at once is easy, using ESI's unique **Quick Groups**™ feature.
- ESI's **Quick Move**™ function enables conversations to be recorded directly into another user's mailbox. At the mailbox user's option, urgent messages can be treated with priority and delivered first, instead of on a "first in-first out" basis.
- Several **different mailbox types** — including group, broadcast, information, cascade paging, Q & A, and guest mailboxes — support a wide range of customer applications.
- Callers forwarded to user or guest voice mailboxes can reach the called individual at a designated **off-premises "reach me"** number.

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1 The ESI-50L doesn't support *VIP 7 ACD Supervisor*, *VIP 7 ACD Agent*, or *VIP 7 Softphone*.
2 Standard on the ESI-1000; optional on the ESI-200; not available for the ESI-100, ESI-50, or ESI-50L.
3 See also "Capacity constraints," page 13.
4 See the *Technical and Features Comparison Chart* (ESI # 0450-0447) for specific feature availability and capacities for all ESI Communications Servers.

- Each user mailbox is equipped with a **Message Recycle Bin** that remembers, and can restore, the 10 most recently deleted messages.
- One or more stations may have a programmable **Virtual Mailbox Key**™ on their stations to allow easy monitoring of a second mailbox.

**Auto attendant** — An ESI Communications Server provides rich, comprehensive auto attendant features:

- **100 branches (six levels deep)** to permit the design of a more natural, caller-friendly answering environment, including a company directory.
- **Virtually unlimited call routing**, including off-premises transfer.
- **Three-character dial-by-name** for callers to search through the auto attendant directory and all Esi-Dex directories to find the desired name.

**Flexible conference channels** — Each ESI Communications Server reserves channels for conferencing. These can be dynamically[1] connected in multi-party conversations up to 16 channels per conference. Any combination of conference channels may be joined together, as long as the originating party is an ESI Communications Server user. All channels reserved for conferencing are dynamically balanced for optimum audio performance.

**Shared-office tenanting**[2] — Businesses can **share a common telephone system** while maintaining a true separation of various system resources, facilities, and features:

- Private or dedicated outside lines by line groups.
- Distinctive incoming ring assignments per tenant.
- Separate auto attendant greetings and branches.
- Individual "dial **0**" operators, music-on-hold sources, and paging zones.
- Unique day/night modes of operation.

**Enhanced automatic call distribution**[3] **—** Manage call overload and increase customer satisfaction with ESI's standard call center feature.[4] ACD ensures that:

- Calls are prioritized and routed within designated departments for **quickest possible call handling**.
- Managers and agents receive **up-to-the-second information** on queues and wait times via the displays on most ESI desktop phones supported by ESI Communications Servers.
- Supervisors have access to agents' ACD call activity to **more effectively evaluate** call traffic and agent performance.
- A **separate hold recall timer** is provided for ACD agents, further ensuring that customer care is enhanced.
- Agents may log into two separate ACD departments simultaneously, with departmental prioritization.

**Verbal User Guide**™ — Users have instant access to assistance in operating their ESI phones and voice mailboxes.[5] By pressing the **HELP** key, the user is presented with extensive spoken and displayed prompts to assist with phone operation, voice mail features, programming instructions, and more. System Administrators and Reseller technicians can also use the Verbal User Guide to prompt them through infrequently used programming changes.

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1 Dynamic assignment of the conference channels allows for any combination of members (up to the maximum of 16) per conference — *e.g.*, on the ESI-1000, 10 four-member conferences and three eight-member conferences can take place simultaneously.
2 Not supported by the ESI-50L.
3 Not supported by the ESI-50L.
4 The optional ***VIP ACD*** application allows even easier and more substantial management of ACD operations. See the *VIP ACD Product Overview* (ESI # 0450-0988).
5 Not available from an ESI Cordless Handset.

**Esi-Dex**™ — Locating and calling hundreds of frequently dialed phone numbers is easy when using ESI's Esi-Dex speed-dialing feature. Up to four separate lists ("Dexes") are available:

- **Station Dex** — All extensions within the system.
- **Personal Dex** — All speed-dial entries programmed by each individual user.
- **System Dex** — All speed-dial entries stored system-wide.
- **Location Dex** (available when Esi-Link is installed) — Lists all dial access codes associated with each location within an Esi-Link private network.

Saving numbers to the Personal Dex is just as easy. When Caller ID is presented with an incoming call or a voice mail message, one touch of the **ESI-DEX** key stores the provided number for future use.

**Intelligent Call Forwarding**™ — Users of an ESI Communications Server equipped with one or more PRI[1] digital trunk circuits have access to this unique feature. Users who forward their calls off-premises are able to view the *original* Caller ID data of incoming forwarded calls.[1]

**Personal Caller ID**[2] **—** For situations in which the company's leading number identification data may not be the appropriate Caller ID for individual station users, an ESI Communications Server makes it possible to define a different Caller ID number to be associated with, and sent for, each individual user. This feature provides E-911 support.[3]

# Flexible numbering

**Flexible numbering** provides the means to assign extensions, mailboxes, and department numbers based on specific customer requirements. An ESI Communications Server's flexible numbering is separated into three parts:

1. Selecting a numbering plan template;
2. Reassigning ranges of extensions, speed-dial numbers, and guest mailboxes (if needed);
3. Reassigning numbers for individual extensions, speed-dial numbers, guest mailboxes, and departments.

## *Selectable numbering plans*

The selectable numbering plan template is the basis for flexible numbering assignment. When a numbering template is selected, all extensions, mailboxes, departments, and other system features are automatically assigned with the numbering plan of that template. Choosing the template that is closest to the customer's existing configuration greatly simplifies, or even eliminates the need for, number reassignment.

The **quantity** (four or three) of digits in extension numbers determines the number of stations that can be connected to the ESI Communications Server:

| | Extension numbers available | | | | |
|---|---|---|---|---|---|
| **Plan chosen** | **ESI-1000** | **ESI-200** | **ESI-100** | **ESI-50** | **ESI-50L** |
| **Four-digit** | 816 | 192 | 84 | 52 | n/a |
| **Three-digit** | 168 | 168 | 84 | 52 | 40 |

## *Range reassignment*

Flexible number range assignment is used to change the numbers of a block, or range, of extensions, speed-dial numbers, guest mailboxes, or departments.

The flexible numbering plan is very useful in matching station extension numbers with blocks of DID numbers assigned by the telephone company. If a customer already has an extension number directory assigned and does not want to change it, the flexible dialing plan will also accommodate this request.

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1 For more details about this feature, see the *Intelligent Call Forwarding Feature Overview* (ESI # 0450-0674).
2 Requires the installation of a PRI digital trunk circuit (and thus is not available on the ESI-50L).
3 Check local regulations regarding E-911 compliance.

### *Number reassignment*

The number reassignment function will let the Installer assign new — or reassign existing — numbers for individual extensions, speed-dial numbers, departments, and mailboxes.

### *Station move*

Station move is used by the Installer or System Administrator to move, or exchange, extension numbers and other station information between extensions of the same station type.[1] Programmable feature keys, personal greetings, voice mail messages, and other station information are automatically and instantly exchanged between the two stations when station move is done.

The Installer can use a separate programming function for flexible reassignment of station and department numbers through *ESI System Programmer*.

### *Esi-Link and selectable numbering*

In an Esi-Link network, certain ESI Communications Server selectable numbering templates can be incompatible with some ESI systems. For additional details, refer to the *Esi-Link Product Overview* (ESI # 0450-0214).

### *Available numbering plan templates*

To view the available numbering plan templates, refer to the *Flexible Numbering Feature Overview* (ESI # 0450-0952).

## Optional ESI Presence Management

**ESI Presence Management** — RFID scanning technology combines with an ESI Communications Server to offer an innovation in presence status, call control, entrance security, and documented tracking of users' work hours and attendance history. Highlighted benefits of ESI Presence Management include:

- **Remote entry control** with **built-in doorphone**.
- **Access control** through the use of authorized electronic keys (key fobs or scan cards).
- **Presence indication** to show "in" and "out" status of employees on programmed DSS keys.
- **Personal Call Routing** to modify the behavior of a station when the user is scanned in or out.
- **Optional third-party software**[2] to track, sort, and prepare employees' attendance data for easy entry into common business payroll software applications.

For more complete details about ESI Presence Management, consult the *ESI Presence Management Product Overview* (ESI # 0450-0794).

[1] Such stations must be like types — *e.g.*, Digital Feature Phone to Digital Feature Phone, IP Feature Phone to IP Feature Phone, or analog extension to analog extension.

[2] *WaspTime* software is not sold by ESI but, rather, is available for direct purchase from the manufacturer, Wasp Barcode Technologies (*www.waspbarcode.com*).

# Optional ESI Media Management

**ESI Media Management** is a hardware/software combination which provides audio and video monitoring directly through an ESI Communications Server. These advanced capabilities help customers reduce many of the inherent risks in their organization. Additionally, ESI Media Management serves as an "all-in-one" solution by eliminating the need to install and manage multiple systems from various vendors.

Using an installed Applications Services Card (ASC), ESI Media Management collects and stores not only recordings of selected phone calls (call logging) but also video camera recordings, detailed call activity (SMDR), and building access events from across the customer's facility. ESI Media Management gives customers the flexibility to decide who is authorized to access the stored information, so there's no need to worry that information is getting into the wrong hands.

Here are just a few of the benefits ESI Media Management provides:

- Recording of all calls to and from employees for improved customer service and quality control.
- Capture and review of video from around customer facilities using standard video cameras.
- Use of live video to improve facility monitoring and enhance access control.
- Review of system-wide building access events and call detail records for employees.
- Quick location of a collection of related events using simple search criteria.

ESI Media Management is compatible with any properly equipped ESI Communications Server (except the ESI-50L). For more complete details about ESI Media Management, consult the *ESI Media Management Product Overview* (ESI # 0450-1238).

# Optional ESI Mobile Messaging

**ESI Mobile Messaging** combines the advanced capabilities of an ESI business communications system with the convenience of users' existing e-mail accounts. When one receives a **message** (a voice mail or a recording) at an extension or guest mailbox, the person also receives an e-mailed notification to which a .WAV of the message may be attached. The notification's header contains information about the message — the Caller ID name and number, as well as the call's date, time, and duration. ESI Mobile Messaging also allows users to quickly do these (and more):

- **Listen to a message on one's PC or "smartphone"** — Play back a message on one's PC or "smartphone" by simply double-clicking the attachment.
- **Share messages** — Forward important messages to interested individuals, even if not on the user's system.
- **Choose which messages to handle and how to manage them** — A user with numerous messages can directly access any message right away.
- **Remotely manage messages** — A user can manage messages using Web mail from: a home PC or laptop; a personal (or alternate) e-mail account; or a "smartphone."
- **Store important messages** — Save a message attachment to a hard drive or USB Flash® drive.

> **Note:** Some of these capabilities require activation in user programming, as explained in this feature's *Installation Guide* (ESI # 0450-1231).

ESI Mobile Messaging is compatible with any properly equipped ESI Communications Server (except the ESI-50L). For more complete details about ESI Mobile Messaging, consult the *ESI Mobile Messaging Feature Overview* (ESI # 0450-1243).

# Optional *ESI Personal Programmer*

Station programming is easy with ***ESI Personal Programmer***. This application can be used by individual users and System Administrators to perform station programming on ESI Communications Servers.

With *ESI System Programmer*, users can program their station's greetings, password, DSS keys, presence[1], and off-premises "reach-me" settings directly from the program. Administrators, too, can use it to modify any phone on the system.

Best of all, *ESI Personal Programmer* requires no license. It is available for download at no charge from the ESI Web site (*www.esi-estech.com*), and the Installation Wizard makes setup a snap.

> **Note:** *ESI Personal Programmer* is compatible with *Windows 7* (64- or 32-bit), *Windows Vista* (64- or 32-bit), and *Windows XP* (32-bit only). It is mutually exclusive with *VIP 7* applications.

# Optional *VIP 7* PC applications

ESI's ***VIP 7*** (*VIP* stands for *Visually Integrated Phone*) works with the advanced capabilities of your ESI communications system to enhance day-to-day communication — including the ability to control calls and organize voice mail and contacts.
*VIP 7* captures and catalogs details about every call for better management. In addition, *VIP 7* makes it easy to program the phone with just a few mouse clicks. The familiar *Windows*® graphical user interface is intuitive and easy to learn, requiring minimal training. Each *VIP 7* application is a fully standalone application.

*VIP* is offered in several configurations: the basic *VIP 7*, ***VIP 7 PC Attendant Console***, ***VIP 7 ACD Supervisor***, ***VIP 7 ACD Agent***, and ***VIP 7 Softphone***.[2]

Licenses for *VIP 7, VIP 7 ACD Agent*, and *VIP 7 Softphone* are sold in four-packs and 16-packs; *VIP 7 PC Attendant Console* and *VIP 7 ACD Supervisor* are sold in **single-seat** licenses. The maximum number of seats for *VIP 7 PC Attendant Console* and *VIP 7 ACD Supervisor* on an ESI Communications Server varies by model:

| | ESI-1000 | ESI-200 | ESI-100 | ESI-50 | ESI-50L |
|---|---|---|---|---|---|
| **Installations** | 16 | 4 | 2 | 2 | 2 |

The maximum number of *VIP 7 Softphone* licenses is dependent upon the available IP channels provided with an installed IVC.

The familiar *Windows*® graphical user interface is intuitive and easy to learn, requiring minimal training. With *VIP 7*, the user handles incoming and outgoing calls, manages contacts, and organizes voice mail, all on one's PC. Voice mail messages or personal recordings may be saved as .WAV files.

A *VIP 7* user can:

- Manage voice mail messages and call recordings.
- Organize all contacts in one convenient list.
- Control the ESI phone from a desktop PC.
- Capture all inbound and outgoing calls in historical log files.
- Program the phone with just a few mouse-clicks.
- Use instant messaging to provide a quick method of communication between users of *VIP 7* applications.

*(Continued)*

[1] Requires optional ESI Presence Management.
[2] The ESI-50L lacks support for ACD and IP-related features and, therefore, doesn't support *VIP ACD Supervisor*, *VIP ACD Agent*, or *VIP Softphone*.

*VIP 7 PC Attendant Console* provides superior call handling abilities for busy attendants:

- **Incoming Calls** and **Holding Calls** displays that show calls in the attendant queue, calls that were re-routed to the operator, and system-wide recalling held calls.
- A **400-button Virtual Button Window** for single-click access to stations, departments, speed-dial numbers, and mailboxes, as well as many of the system features which can be assigned to programmable feature keys.

*VIP 7 ACD Supervisor*'s benefits include:

- A **real-time status display** of departmental performance, including service level.
- A **view of agent status** — logged in, logged out, wrap, DND, off-hook, and off-premises.[1]
- Access to **six departmental reports**.[2]

*VIP 7 ACD Agent* gives each ACD agent:

- A **view of agent status** — DND, off-hook, and off-premises.[1]
- **Log-on, log-off, and wrap control** for up to two departments, directly from the PC.

The *VIP 7 Softphone* user[3] benefits from:

- **Combined operation** of *VIP 7* features and an **IP phone** resident within the PC.
- **Local or remote** operation.

Unlike many messaging offerings, *VIP 7* does **not** require installation of a *Microsoft Exchange*® server. This puts a powerful call and message management tool within financial reach for even smaller businesses.

For more details on the *VIP 7* family of applications, visit *www.esi-estech.com* or see the *VIP 7 Product Overview* (ESI # 0450-1340).

[1] Off-premises indication requires optional ESI Presence Management (see the *ESI Presence Management Product Overview*, ESI #0450-0794).
[2] Requires the third-party *Crystal Reports* application.
[3] *VIP Softphone* requires an available IP port and universal IP license, as well as use of a USB headset.

# IP telecommunications capabilities

> **Note:** Information concerning IP-related capabilities isn't applicable for the ESI-50L. To provide full support of IP telecommunications, the ESI-50L (which supports only a single IP phone) must be upgraded to an ESI-50.

The ESI Communications Server architecture provides a robust infrastructure for both LAN[1]-based IP telephony and remote IP applications.

## *Standards-based design*

ESI Communications Servers' IP capabilities are supported by **compliance with major industry standards**. ESI employs all applicable standards to ensure that, regardless of location, ESI Communications Server IP users experience the best audio quality.

- User Datagram Protocol (UDP).
- Layer 3 QoS support via DiffServ (Differentiated Services).
- Voice compression methods of G.711 (for locally installed IP stations), G.726 (for remotely installed IP stations and *VIP 7 Softphone)*, and G.729 (for Esi-Link connectivity).

> **Note:** The ESI-50 uses only the G.726 speech compression algorithm and, therefore, can be in an Esi-Link network with only other ESI Communications Servers set to G.726. ESI's IVX® X-Class and IVX E-Class systems, as well as the original metal-cabinet version of the legacy ESI-600 (prior to system software version 16.2.0), use only the G.729 speech compression algorithm; thus, an ESI-50 cannot be in an Esi-Link network with these systems.

- 802.3 100Base-TX Ethernet interfaces.
- Layer 2 Quality of Service (QoS) support through compliance with 802.1p for voice packet prioritization and 802.1q for VLAN (Layer 2) support.
- 802.3af Power over Ethernet.
- Dynamic Host Configuration Protocol (DHCP) for IP address conservation within a customer's LAN.
- Session Initiated Protocol (SIP) to support local SIP-compliant third-party IP telephones.

## *Capacity constraints*

An ESI Communications Server's full station capacity can be reached **either** (a.) with **all** extensions installed as IP stations **or** (b.) when a **minimum** number of the installed stations are IP instruments (as shown in the following table).

| Configuration for full capacity | ESI-1000 | ESI-200 | ESI-100 | ESI-50 |
|---|---|---|---|---|
| **Card slots used** | 42 of 42 | 13 of 14 | 4 of 4 | 5 of 5[2] |
| **IVCs** | 29 | 6 | 3 | 1[2] |
| **Digital/analog cards** | 13 | 7 | 1 | 3 plus 1 built-in |
| **Minimum IP stations** | 696 | 144 | 72 | 12 |
| **Other stations** | 120 | 48 | 12 | 40 |

The IVC supports ESI's Power Over Ethernet (PoE) IP Phones installed locally or remotely, in any combination.

If any IVC fails, only the IP stations assigned to that card will go off-line.

[1] Local area network.
[2] One 482 card and one IVC are built into the ESI-50.

## *Esi-Link private IP networking capabilities*

The Esi-Link IVC is reserved for the support of either eight or 24 Esi-Link channels. With the Esi-Link IP networking option, up to 100 individual sites may be connected together via a customer's WAN[1] or the Internet.

The following table shows how many Esi-Link IVCs may be installed in each ESI Communications Server, and the resulting number of possible, simultaneous VoIP connections between systems:

| Maximums | ESI-1000 | ESI-200 | ESI-100 | ESI-50 |
|---|---|---|---|---|
| **Esi-Link IVCs** | 4 | 1 | 1 | 1[2] |
| **Inter-system VoIP connections** | 96 | 24 | 24 | 8 |

For further details, see the *Esi-Link Product Overview* (ESI document #0450-0214).

## *IP station sets*

An ESI Communications Server supports several types of IP telephones:

- **Desktop IP phones** — The **ESI 60IP**, **48-Key IP Feature Phone II**, and **ESI 40IP** come with a speakerphone (full-duplex on the ESI 60IP and 48-Key IP Feature Phone II) and adjustable backlit display. Each can be installed in-house on the customer's network, or remotely wherever a broadband connection to the Internet is available. There is a two-port Ethernet switch built into each of these desktop IP phones. This provides a single Ethernet connection to the network for both the customer's IP phone and his office computer. Support for **Quality of Service** (see "Quality of Service (QoS) support," page 15) is critical in this type of installation, to ensure that there is no loss of audio or dropped voice packets during large data downloads.
  The phone includes built-in Power over Ethernet (PoE) capabilities for those customers whose LAN employs powered switches. In cases where the customer does **not** have PoE switches installed, an optional 48VDC adapter is used to provide operating power to the phone.
  When connected to an ESI Communications Server, an ESI desktop IP phone can optionally utilize DHCP to obtain an IP address from the customer's LAN. If the customer's LAN does *not* support DHCP, a static IP address will automatically be assigned by the system.
  An ESI desktop IP phone may also be installed outside the confines of the customer's LAN. When installed remotely, the phone uses the higher compression rate of G.726 to maximize voice quality. A remote location might include a remote facility, home office, or any other location where broadband Internet access is available. Remote IP users are connected directly to the system, and operate as if they were on-premises.
- The **ESI Local IP Cordless Handset**[3] provides connection of the customer's LAN to the phone's base station. Users of Local IP Cordless Handsets are free to move throughout their facility while staying in touch with customers and co-workers.
- For remote teleworkers, ESI also offers the **Remote IP Cordless Handset**.[3] This phone connects like a "wired" Remote IP Phone, and can be installed anywhere broadband Internet access is available. The teleworker's home phone line can be connected into the Remote IP Cordless Handset's base station.
- The optional ***VIP 7 Softphone*** combines the functionality of an ESI desktop IP phone and the *VIP 7* product in one PC-based phone. For more information about this product, see also "Optional *VIP 7* PC applications," beginning on page 11, as well as the *VIP 7 Product Overview* (ESI # 0450-1340).
- ESI additionally supports **SIP-compliant hardware endpoints** — *i.e.*, SIP "phones." However, due to limitations with SIP itself, not all of the ESI feature set is available via a SIP phone. The following SIP hardware endpoints have been tested with ESI Communications Servers:
  - Aastra 9133i
  - Grandstream BudgeTone 101
  - Grandstream HandyTone 286

> **Note:** Each compatible ESI IP phone (including *VIP 7 Softphone*) or SIP endpoint requires an available IVC port and the activation in the system of a universal IP license before the IVC will connect to the IP phone. When an IP phone is programmed in the system, a license is consumed.

[1] Wide area network.
[2] This single built-in IVC supports both local and remote IP channels. With the maximum of eight Esi-Link channels in use, only four local channels are available for use.
[3] See the *ESI Cordless Handsets Product Overview* (ESI # 0450-0840).

## *Quality of Service (QoS) support*

Quality of Service is an important component in any converged or pure IP telephone system. It increases the likelihood for IP voice communications to be clear, and free of dropped calls and delayed audio.

QoS is defined as providing the means for specific data streams in a network to be prioritized over other types of traffic. In the case of a voice over IP application, the IP packets carrying the voice conversation are given priority over data packets. When using the built-in two-port data switch to connect the IP Phone and customer's computer to the same Ethernet port, it is highly advisable for the customer's network to support QoS so that large downloads do not affect the quality of voice communications to the IP phone.

## *Benefits of QoS*

Networks that are designed to support QoS are best suited for IP deployment since quality of voice is judged by the end-to-end experience of the user. It is not sufficient for ESI's IP applications to support QoS if all network components used in the transport of voice over the customer's LAN are not properly configured for QoS support.

The benefits of end-to-end QoS in any IP telephony application are many, and when absent, quite noticeable to the user:

- Available bandwidth is optimized by ensuring that voice packets are sent and delivered at a higher priority than "regular" data traffic on the LAN. This may allow the customer to delay upgrading the speed of transmission of his network. He may be able to defer this expense until other applications are added or IT changes in the business dictate it is necessary.
- The quality of the IP conversation is improved by ensuring that voice packets are delivered and "reassembled" at the other end of the conversation in order. This eliminates garbled conversation, hollowness, and noticeable gaps in speech.
- Unlike data packets, voice packets cannot be resent if they are dropped. Jitter[1] is reduced for voice packets by QoS. This improves the likelihood that all voice packets will not be dropped before being delivered at the other end of the IP conversation, as happens when the amount of jitter of a packet exceeds an acceptable level.
- The latency with which voice packets are delivered is minimized in a network employing QoS. This results in more natural-sounding speech patterns for both sides of an IP conversation.

## *802.1p and 802.1q standards for VLANs*

Virtual LANs (VLANs) provide a method of separating data streams to make a local area network appear to be two or more networks. A VLAN is likely to be implemented in a business where IP telephony is heavily used. The VLAN segregates the voice packets onto their own network to prevent the degradation of voice quality, loss of packets, and late delivery of voice packets (latency).

Two standards are concerned with VLAN. Both are required to be supported in order to adequately support VLAN operation. These are:

- **802.1p** — Provides for the prioritization of voice packets. This standard establishes eight levels of priority, *0* through *7*, with *7* being the highest priority. Level 7 is reserved for those applications and packets that are considered network-critical. Levels 5 and 6 identify packets that are delay-sensitive. Priority levels below 5 are used for "loss-eligible" data, meaning that if a packet is lost and must be retransmitted, nothing is affected. This is not the case with voice, where if a packet is lost, portions of words will be missing or unintelligible. ESI defines its prioritization field at 5.
- **802.1q** — Dictates how the prioritization level (or "tag") is attached to each packet. Without this tagging of voice packets, prioritization would not be possible because there would be no differentiation between types of packets.

By compliance to the 802.1p and 802.1q standards, ESI's local IP phones have built-in prioritization to simplify managing traffic and QoS over a LAN.

[1] The variation from packet-to-packet in transit time, expressed in milliseconds. For a more detailed explanation, see the *Esi-Link Product Overview* (ESI # 0450-0214).

## *Differentiated Services (DiffServ)*

This standard is primarily used with remote IP phones and Esi-Link installations in a WAN environment. This protocol allows IP voice packets to be prioritized over data transmission in LAN/WAN environments whose routers provide prioritization. As with all QoS provisioning within a LAN or WAN, the network components, such as routers and switches, must be able to support, and be configured for Quality of Service.

Some Internet connections may not support DiffServ. Contact the customer's ISP to determine whether it supports DiffServ.

## *Dedicated voice over IP resources*

A **codec** is used to take the analog spoken voice, en**co**de it as an IP packet so it can be compressed and transmitted as a "data" packet. When received by another IP device (IP phone, SIP phone, or another system connected via Esi-Link), the IP packet is **dec**oded so that it is converted back into analog voice. Communication via IP is not possible without codecs.

Three types of industry-standard codecs are used by the ESI 60IP, 48-Key IP Feature Phone II, ESI 40IP, and ESI's IVCs: G.711, G.726, and G.729. This refers to the amount of compression that a voice packet will undergo when being converted into an IP packet.

**G.711** is the non-compressed standard from which all other compression standards are established. IP phones that are locally installed use G.711.[1] Each ESI desktop phone has built-in G.711 and **G.726** codecs. Additionally, each channel of the IVC has dedicated G.711 and G.726 codecs for conversion between unlike compression standards. This conversion ability of the IVC allows intelligible audio between remotely-installed and locally-installed IP phones.

Calls to or from a remotely-installed IP phone use standard compression rates of G.726 (calls to/from the IVC) and **G.729** (calls to/from Esi-Link channels). This reduces latency in the IP conversation and minimizes dropped or lost packets. Each of the 24 channels on the IVC has a dedicated G.726 codec to support the connection of remotely installed IP phones. The **Esi-Link IVC** is equipped with 24 dedicated G.729 codecs. By dedicating codecs on each available IVC and Esi-Link IVC channel, an IP phone or Esi-Link user will never be denied the ability to place or receive a call due to the lack of a codec.

> **Note:** The ESI-50 uses only the G.726 speech compression algorithm and, therefore, can be in an Esi-Link network with only other ESI Communications Servers set to G.726. ESI's IVX® X-Class and IVX E-Class systems, as well as the original metal-cabinet version of the legacy ESI-600 (prior to system software version 16.2.0), use only the G.729 speech compression algorithm; thus, an ESI-50 cannot be in an Esi-Link network with these systems.

## *Power over Ethernet (PoE)*

Each ESI desktop IP phone complies with the IEEE 802.3af standard for powering devices over a customer's existing local area network. This enhancement requires the customer to install the appropriate PoE network components, such as switches and routers. An ESI desktop IP phone can also be powered by using its optional 48VDC adapter. There are many benefits to designing an IP telephony application with PoE capabilities:

- By using the local area network to power the IP phones, a consistent voltage is provided to all phones without the fluctuations that frequently occur in commercial office buildings.
- Since all power is provided from one location, a single UPS system can be used to protect the IP phones from power surges, brown-outs, and other electrical anomalies.
- Powering the IP phones via the customer's LAN saves the cost and inconvenience of providing a fused power strip at each IP phone placement.

ESI has tested several Power over Ethernet devices for compatibility with its PoE IP phones:

- Cisco Catalyst 3560 24-port 10/100T PoE
- Adtran Netvanta 1224 PoE
- 3Com Superstack 3 4400 switch power
- 3Com PW130

In addition, the following mid-span Power over Ethernet devices have been tested:

- 3Com 3CNJPSE24 24-port Midspan Solution
- D-link DWL-P1012 12-port PoE Midspan

[1] Local and remote installations of *VIP Softphone* use G.726.

### *Network assessment services*

Due to the impact that network performance has on the quality of VoIP communications, **ESI VoIP Network Assessment** is highly recommended, particularly prior to any installation of VoIP equipment. This assessment involves placing an *appliance* on each node of a network which is to be used for carrying VoIP traffic. (Depending upon an installation's number of planned sites, as well as its particular VoIP applications, the use of more appliances may be required. This will be determined prior to the assessment.) For a specific time period, these appliances will send communications simulating the amount of VoIP traffic that is expected for the network. The result will be a detailed report that indicates the network either is ready for the traffic or has performance issues, such as unacceptable levels of latency or jitter, which should be addressed prior to the installation.

Also available is a **Network Bandwidth Analysis** — a VoIP bandwidth analysis and utilization report of an end user's network, using a Test Access Point (TAP) device which is inserted into the network to assess data usage. This enhanced service helps identify bandwidth bottlenecks in the network based on IP address; for example, it makes it easier to determine whether an employee is conducting large and frequent downloads from the Internet, thus limiting bandwidth available to others on the network. This analysis not only is recommended as a companion to any assessment, but also is **highly recommended if the customer's network fails the standard ESI VoIP Network Assessment**.

For more information about ESI's network assessment services, please contact your ESI sales representative.

## Migration capability

For customers who outgrow their existing ESI systems, an ESI Communications Server provides the perfect **upgrade** path.[1] Most ESI station equipment[2] currently installed on a legacy IVX E-Class or X-Class system may be reinstalled on an ESI Communications Server (as noted, some items are not supported on the ESI-50L; items shown in gray are legacy products):

| ESI station equipment | Supported? |
|---|---|
| ESI 60IP | Yes, except 50L |
| ESI 60D | Yes |
| 48-Key IP Feature Phone II | Yes, except 50L |
| 48-Key Digital Feature Phone | Yes |
| ESI 40IP | Yes, except 50L |
| ESI 40D | Yes |
| ESI 30D | Yes |
| ESI Digital Cordless Handset II | Yes |
| ESI Local IP Cordless Handset II | Yes, except 50L |
| ESI Remote IP Cordless Handset II | Yes, except 50L |
| 60-Key Expansion Console | Yes |
| 60-Key Second Expansion Console | Yes |

| ESI station equipment | Supported? |
|---|---|
| *VIP 7 Softphone* (software installation) | Yes, except 50L |
| *VIP Softphone* (software installation) | Yes, except 50L |
| 48-Key [local] IP Feature Phone | No |
| 48-Key Remote IP Feature Phone | No |
| ESI Digital Cordless Handset I | Yes |
| ESI Local IP Cordless Handset I | Yes, except 50L |
| ESI Remote IP Cordless Handset I | Yes, except 50L |
| 24-Key Digital Feature Phone | Yes |
| 12-Key Digital Feature Phone | Yes |
| 16-Key Digital Feature Phone | No |
| 16-Key [local] IP Feature Phone | No |
| 16-Key Remote IP Feature Phone | No |

Each ESI Communications Server supports a wide range of port cards; **however**, pre-"Generation II" legacy cards (see the table *below*) cannot be used on this platform, because they lack the processing power and memory storage required for proper operation in a large system with a heavier traffic load:

### *Cards NOT supported by ESI Communications Servers*

| Port card | Part no. |
|---|---|
| 612 | 5000-0104 |
| 684 | 5000-0160 |
| D12 | 5000-0135 |

| Port card | Part no. |
|---|---|
| LNC | 5000-0149 |
| A12 | 5000-0160 |

| Port card | Part no. |
|---|---|
| DLC12 | 5000-0157 |
| IVC | 5000-0318 |

Generally, all "Generation II" ("E2") port cards **are** fully supported by the ESI-1000, ESI-200, and ESI-100.

No migration path is available for customers of the legacy IVX Series (IVX 128, IVX 20, and their "Plus" versions), the original IVX, IP E-Class (IP 200e and IP 40e), and IP Series (IP 200 and IP 40) systems.

[1] Note that the ESI-50 and ESI-50L support the 482 port card, and the ESI-50 supports the DLC82. These cards are compatible with no other ESI Communications Server.

[2] IP equipment on an ESI Communications Server (not including the ESI-50L, which supports only a single IP phone and otherwise doesn't fully support IP communications) requires installation of IVC — except on the ESI-50, which has a built-in IVC.

# System programming

Programming the ESI Communications Server family is greatly simplified through use of ***ESI System Programmer***. Designed from the ground up, using the latest in object-oriented programming technology, this tool provides Installers and System Administrators the ability to easily review and modify the programming on any ESI Communications Server.

*ESI System Programmer* is built on highly reliable industry protocols to enhance communication between the phone system and the programming application. Installers and System Administrators can navigate through an easy-to-use “tree” menu to access programming functions. The intuitive graphical user interface (GUI) makes learning the tool as simple as it is to use, resulting in a shortened training time for new technicians and System Administrators.

This application’s dependable backup-and-restore functionality retains programming, recorded custom prompts, and Caller ID information — giving you peace-of-mind when unforeseen circumstances occur.

The following are built into *ESI System Programmer*:

- Programming of all phone system functions
- Send/Receive of programming
- Rapid programming using templates
- Robust error-checking to prevent common mistakes
- Instant feedback informs whether data was successfully sent, and provides warnings and alerts about potential problems
- Built-in help to guide the Installer or System Administrator as required
- Import of system software

Included with *ESI System Programmer* are three additional applications — *Esi-Address*, *Esi-Check*, and *Esi-Networx* — to assist with programming and debugging.

# Specifications and requirements

## *Capacities*

> **Note:** Refer also to "Capacities" in the "Advantage Summary" (page 3).

Because they accept both digital and IP stations, and due to the more flexible configurations this capability allows, ESI Communications Servers possess station capacities far beyond those of most legacy ESI platforms. At the top of the list is the ESI-1000, which supports up to **816 stations** when configured appropriately.[1]

Each IVC supports 24 channels, to which local IP Phones or remotely installed IP Phones may be connected. This is **double** the station capacity of any port card that supports digital phones. Therefore, the maximum station capacity can be achieved with maximum use of IVCs and IP stations.[1]

The next table depicts maximum trunk capacities among the ESI Communications Servers. A certain quantity of trunks in each model may be digital (T1 and/or PRI[2]), connected to the system via one or more ESI digital line cards (DLCs).[3]

| Maximums | ESI-1000 | ESI-200 | ESI-100 | ESI-50 | ESI-50L |
|---|---|---|---|---|---|
| **Trunks** | 240 | 84 | 42 | 35 | 16 |
| Digital (T1/PRI) | 240 | 72 | 24 | 23 | — |
| **DLCs** | 10 | 3 | 1 | 1 | — |
| **SIP trunking cards** | 10 | 3 | 1 | 1 | — |

The table below shows how many Esi-Link channels may be configured in each ESI Communications Server. This maximum is achieved by installing up to the limit of Esi-Link IVCs in the system. Esi-Link channels do not detract from the number of available station or trunk ports.[4]

| Maximums | ESI-1000 | ESI-200 | ESI-100 |
|---|---|---|---|
| **Esi-Link channels** | 96 | 24 | 24 |
| **Esi-Link IVCs** | 4 | 1 | 1 |

[1] See "Capacity constraints," page 13.
[2] PRI only on the ESI-50. The ESI-50L doesn't support T1 or PRI.
[3] See "Port cards supported," page 21.
[4] Except on the ESI-50 and its built-in IVC — on which, the more Esi-Link channels (up to eight) are in use, the fewer local IP channels are available. No more than 12 total IP channels may be in use.

## *System components*

Each ESI Communications Server is comprised of one Base Cabinet, with the capability of adding one to five Expansion Cabinets, depending on model (for details, see "Hardware description," page 5).

- **On the ESI-1000 and ESI-200** — Each cabinet has its own power supply unit to support the inserted port cards. Cabinets are connected together through front-mounted cables.
- **On the ESI-100, ESI-50, and ESI-50L** — Each system uses one power supply to support both the Base Cabinet and the single available Expansion Cabinet. Each requires a "piggyback" method to mount the Expansion Cabinet onto the Base Cabinet.

The Base Cabinet holds the main board, which controls all call control and switching within the ESI Communications Server. The main board also contains these integrated connectors and components:

- **Memory Module** — A hard drive or CompactFlash with improved performance that contains all system programming and configuration data, and pre-loaded voice prompts. Each Memory Module provides voice storage at 64 kilobits/second — the industry's highest-quality sampling rate.
- **Network Services Processor (NSP)** — The NSP consists of a dedicated Motorola® ColdFire® processor and Ethernet port. The front-panel RJ-45 jack provides a 10/100Base-T connection to a site's LAN.[1] In its basic configuration, the NSP provides remote access via Ethernet and the Internet for system programming and maintenance. The NSP is required for all LAN-based options, such as the various *VIP 7* applications. On the ESI-50, the NSP further allows programming of the built-in IVC.
- **M3 memory back-up** — Using RAID[2]-1 hard drive technology, the Mirrored Memory Module (M3) maintains system operation on a separate disk drive in the event of a hard drive failure. M3 is required when redundancy of system programming, speed-dial entries, and voice mail messages and prompts is desired. The M3 drive and interface constitute a standard feature on the ESI-1000, and are optional on the ESI-200.
- **On-board MOH and overhead paging inputs** — Connection of ancillary equipment is easy using the system's built-in jacks.
- **Serial port** — SMDR call detail data is output from this port. Technicians connect their laptop computers to this port to perform on-site programming.

Also built-in on the main board for an ESI-50 or ESI-50L are a 482 card and an IVC (the ESI-50L supports only a single IP phone; for more complete IP communications support, an ESI-50L must be upgraded to an ESI-50).

[1] Local area network.
[2] *RAID* means *Redundant Array of Independent Drives*.

## *Port cards supported*

ESI Communications Servers support a wide range of port cards. Any **E2** port card can be used on the ESI-1000 and ESI-200 with the use of an additional E2 Port Card "Hot Swap" Adapter (as for the ESI-100, see "Hot-swap operations," below the following table). The **CS** port cards (not for use with the ESI-100, ESI-50, or ESI-50L) are full-size cards with built-in "hot-swap" capability, along with a special "ejector-handle" mechanism that makes them literally a snap to install or uninstall. The following port cards **are** supported:

| | Ports | | | | System maximums (port cards) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Port card** | **COs** | **Stations[1]** | **Analog stations** | **Esi-Link channels** | **ESI-1000** | **ESI-200** | **ESI-100** | **ESI-50** | **ESI-50L** |
| **CS-684** | 6 | 8 digital | 4 | | **42** | **14** | | | |
| **CS-612** | 6 | 12 digital | | | **42** | **14** | | | |
| **CS-6ALC** | 6 | | | | **42** | **14** | | | |
| **CS-A12** | | | 12 | | **32** | **4** | | | |
| **CS-D12** | | 12 digital | | | **42** | **14** | | | |
| **CS-DLC12** | 24 (T1) or 23B +1D (PRI) | 12 digital | | | **10** | **3** | | | |
| **CS-DLC** | 24 (T1) or 23B +1D (PRI) | | | | **10** | **3** | | | |
| **CS-IVC 24R** | | 24 IP (local or rem. chs.) | | | **34** | **8** | | | |
| **CS-IVC 24EL** | | | | 24 | **4** | **1** | | | |
| **CS-IVC 12R12EL** | | 12 IP (local or rem. chs.) | | 12 | **4** | **1** | | | |
| **E2-684** | 6 | 8 digital | 4 | | **42** | **14** | **4** | | |
| **E2-612** | 6 | 12 digital | | | **42** | **14** | **4** | | |
| **ESI-6ALC** | 6 | | | | **42** | **14** | **4** | | |
| **E2-A4** | | | 4 | | **32** | **4** | **2** | | |
| **E2-A12** | | | 12 | | **32** | **4** | **2** | | |
| **E2-D12** | | 12 digital | | | **42** | **14** | **4** | | |
| **E2-DLC12** | 24 (T1) or 23B +1D (PRI) | 12 digital | | | **10** | **3** | **1** | | |
| **ESI-DLC** | 24 (T1) or 23B +1D (PRI) | | | | **10** | **3** | **1** | | |
| **IVC 24R**[2] | | 24 IP (local or rem. chs.) | | | **34** | **8** | **3** | | |
| **IVC 24EL** | | | | 24 | **4** | **1** | **1** | | |
| **IVC 12R12EL** | | 12 IP (local or rem. chs.) | | 12 | **4** | **1** | **1** | | |
| **DLC82** | 23B +1D (PRI) | 8 digital | 2 | | | | | **1** | |
| **482** | 4 | 8 digital | 2 | | | | | **4**[3] | **4**[3] |
| **IVC 12** | | 12 IP (local or rem. chs.) | | 12 | | | | **1**[4] | **1**[4] |
| **CS-SIP24** | 24 | | | | **10** | **3** | **1** | **1** | |
| **CS-SIP8** | 8 | | | | **10** | **3** | **1** | **1** | |
| **CS-ASC** | | | | | **20** | **7** | **1** | **1** | |

**Note:** The ESI-50's built-in IVC 12 can support up to 12 local IP stations or up to 8 remote IP channels. It can use local IP, remote IP, and Es-Link channels in various combinations, which are activated in blocks of four for local IP, singles for remote IP, and blocks of four for Esi-Link. However, the combinations cannot exceed a **total** of 12 stations/channels.

### Hot-swap operations

"CS" port cards — full-sized cards for use on only the ESI-1000 and ESI-200 — have built-in **hot-swap** capability, allowing you to replace them while the system is powered-up. To achieve hot-swap capability with an "E2" port card requires mounting it onto a **"Hot-Swap" Port Card Adapter** prior to installation on the ESI-1000 or ESI-200. **However**, installing a **new** port card requires power-cycling the system to allow it to recognize the new card.

**Note:** For a more complete description of the port cards, and additional details concerning hot-swap operations on compatible ESI Communications Servers, consult the *ESI Communications Servers Hardware Installation Manual* (ESI # 0450-1049).

[1] For each IVC, the quantity of IP stations is a combination of locally and remotely installed IP phones.
[2] Previously called *IVCR24*.
[3] One of the four 482 cards is built-in (ESI-50 and ESI-50L only).
[4] Built into the main board (ESI-50 and ESI-50L only). In the ESI-50L, the IVC 12 supports only one IP phone and no Esi-Link channels.

## *Power consumption*

The following table shows the power consumption of each ESI Communications Server when fully loaded:

| System | Cabinets (Base and Expansion) | Power consumption (watts) |
|---|---|---|
| **ESI-1000** | 6 | 1,080 |
| **ESI-200** | 2 | 360 |
| **ESI-100** | 2 | 125 |
| **ESI-50** | 2 | 72 |
| **ESI-50L** | 2 | 72 |

### ESI-1000 and ESI-200

For the ESI-1000 or ESI-200, each Base Cabinet or Expansion Cabinet is powered by its own separately fused power transformer. For rack-mounted systems, a power shelf is available onto which all power transformers may be mounted so only one power cable is required for connection to a commercial AC power outlet or UPS system.

Since each cabinet has its own distributed power, the heat dissipation of each power "brick" is well within the environmental range for proper operation of all system components. In an installation environment with insufficient space surrounding the system and mounting rack, the power shelf may be mounted at the top of the rack (above the Base Cabinet) so that the power bricks can utilize convection cooling as a means of dissipating any potential build-up of heat.

### ESI-100, ESI-50, and ESI-50L

For the ESI-100, ESI-50, and ESI-50L, each Base Cabinet shares a 24-VAC power supply "brick" (five-amp on the ESI-100, and three-amp on the ESI-50 and ESI-50L) with an Expansion Cabinet which is installed upon the Base Cabinet.

Typically, the connected cabinets will be wall-mounted, which should provide sufficient space to allow venting of heat from the power supply.

## *Environmental considerations*

When planning the installation of an ESI Communications Server, observe good common sense by providing a dry, clean and accessible area.

If the equipment is to be rack-mounted, ensure that there is adequate room for a standard 19˝ rack. If wall-mounting is planned, ensure that all power cords have ready availability to a 110 VAC power outlet. For optimum performance, ensure that the system is located no further than 1,000 feet from the farthest station location.

An ESI Communications Server is tolerant of broad ranges in environmental characteristics:

- Ambient room temperature should fall within the range of 40°–80° F.
- Relative humidity in the room should not exceed 90%.

## *FCC regulatory information*

Each ESI Communications Server model has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 and Part 68 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the system is operated in a commercial environment.

ESI Communications Servers and all associated ESI telephone station equipment meet all FCC requirements for hearing-aid compatibility.

NTS Test Report B5317 includes all testing procedures and satisfactory results data. The FCC number for all ESI Communications Servers is *1T1MF08B33727*, with a ringer equivalency of *0.8*.

# Glossary

**Codec** — The device required to *encode* analog spoken voice into IP packets for transmission through a VoIP network. The encoded voice is *decoded* at the receiving end, converting voice into an analog component.

**HDD** — Hard Disk Drive; the device on which the system's operating software program, and voice mail prompts and messages are stored.

**IEEE** — Institute of Electrical Engineers; the professional organization that establishes standards for, among others, the telecommunications industry.

**ICC** — Inter-card communication; describes the method by which cards within a cabinet, as well as multiple card cabinets, communicate with each other.

**NSP** — Network Services Processor; the ESI device, mounted on the Main Board, that provides for an Ethernet connection between the ESI Communications Server and the customer's local area network (LAN). Multiple applications may run concurrently over the NSP connection, such as *VIP 7* and remote Internet programming.

**PoE** — Power over Ethernet; this IEEE standard (802.3af) defines the method of injecting power over a customer's local area network cabling infrastructure to operate TCP/IP devices at the Ethernet port. ESI uses this method, in conjunction with a customer-provided power switch, to operate its PoE local IP Phones.

**RAID** — Redundant array of independent drives.

**RF** — Radio frequency.

**RFID** — Radio frequency identification.

**VoIP** — Voice over Internet Protocol.

***About ESI***

*ESI (Estech Systems, Inc.) designs and manufactures high-performance phone systems for businesses and organizations. ESI uses advanced technology to design IP and digital communications systems that integrate built-in capabilities, advanced features, and highly differentiated applications into flexible products that are easy to use and keep employees productive. ESI has sold over 250,000 business communications systems through hundreds of factory-trained Certified Resellers. Founded in 1987, ESI is a privately held corporation with headquarters in Plano, Texas.*