

IVX[®] E-Class

Installation Manual

0450-0327
Rev. J



We Make It Easy To Communicate

About ESI

ESI (Estech Systems, Inc.) is a privately held corporation based in Plano, Texas. Founded in 1987, ESI designs and builds innovative telecommunications products for businesses like yours. Because of their powerful combination of value and features, ESI products are consistently recognized by industry publications and leaders.

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General description

Welcome to **IVX® E-Class**. (*IVX* stands for *Integrated Voice Exchange*.) It's the latest generation of ESI's advanced business telecommunications system, and provides much more than phone service. Other standard features include voice mail, an automated attendant, automatic call distribution (ACD), external paging interface, and extensive call coverage features such as off-premises "reach-me." Optional features include computer/telephony integration and advanced voice over IP (VoIP) communications, allowing your customers a smooth transition between traditional circuit-switched telephony to cost-efficient IP network telephony.

The system itself is housed in a surprisingly small case that is wall-mounted in the telephone equipment room. An external, wall-mounted power transformer powers the system.

You or an Administrator can program the system locally or remotely, through either a phone or one of ESI's *Windows®*-based applications — *Esi-Access* for you and *Esi-Admin* for the Administrator (the application would be running on a PC-compatible computer which is either connected to the system from another location or physically connected to the system's RS-232C serial port).

Telephone system features

Important: Some of the features this manual describes are either optional or are exclusive to IVX E-Class Generation II, and will be so noted throughout. Additionally, some product art may vary from the actual product depending whether the product is IVX E-Class or IVX E-Class Generation II.

The IVX E-Class system expands from its basic six-line, twelve-station configuration to handle as many as **66 CO lines** (see "System capacity," page B.5). For offices with higher-bandwidth needs, **T1 and PRI support** is also available through the installation of one or two DLC12 cards.

- **Impressive expansion capability** — Handles up to 66 CO lines and up to 84 stations.¹
- **T1 and PRI support** — Can connect to higher-bandwidth lines, which more and more offices use.²
- **ESI Feature Phones** — Compact and stylish, yet rugged, each ESI Feature Phone includes a high-quality speakerphone, large and informative multi-functional display and a specially designed key layout with several dedicated keys to minimize or eliminate the need to memorize codes. ESI's 48-Key Feature Phone comes in a variety of formats: digital, digital with TAPI, IP and Remote IP; each 48-Key Feature Phone model includes an integrated headset jack.³ Also available: 24-Key Feature Phone and 12-Key Feature Phone. (See also page B.3.)

Note: The 12-Key Feature Phone has the same stylish, rugged design as a Feature Phone and offers the most basic phone functions. It is intended for use in areas such as lobbies, cashier stations, warehouses and employee lunchrooms, where only minimal phone system features are needed.

- **Extensive help** — ESI's Verbal User Guide™ uses spoken and displayed help prompts to help everyone from the Installer through the Administrator down to the least experienced end user. Easily accessible with one press of either the **HELP** key on the 48-Key Feature Phone or the **PROG/HELP** combo key on the 24-Key Feature Phone. One can also visit **www.esiusers.com** for comprehensive help.
- **Enhanced Caller ID** — Allows one-touch automatic message return.^{4 5}

¹ IVX 72e expands only to 42 CO lines and 48 stations.

² IVX 128e supports up to two DLC12s; IVX 72e supports only one DLC12.

³ If shipped on or after March 1, 2004.

⁴ This and all other references to Caller ID service within this manual assume the end-user organization subscribes to Caller ID service from its telephone service provider.

⁵ IVX E-Class Generation II passes Caller ID data to both digital and analog ports; Generation I passes it only to digital ports.

- **Live call recording** — Can record any conversation or personal memo, with moving or copying of any recording to another user's voice mailbox (see "Voice mail features," *below*).
- **Call waiting** — Includes helpful display, showing both calls' Caller ID information, and easy one-key toggling between calls.
- **Conference calling** — Includes four conference bridges, and a conference may contain up to four parties, so the IVX E-Class system can support four conferences of up to four parties each. Analog phones on the system also initiate conferences.
- **Esi-Dex™ speed-dialing** — Calls any number using four separate lists (personal, station, system and — when Esi-Link is in use — location); uses Caller ID¹ information or direct keypad entries.
- **Dedicated overhead paging interface** — Allows for external paging through overhead speakers or multi-zone paging units (amplification required).
- **Intelligent call forwarding** — Lets users of compatible PRI-equipped ESI systems view the original Caller ID data of a call forwarded to an off-premises phone.
- **911 alert** — Provides immediate line access if any station with line access dials **9 1 1** to report an emergency; sends a message via the serial port indicating the start date, time, station number and end-time of the 911; also sounds a warning tone at the operator station and displays, for example:

911 CALL FROM
X102 JOHN JAMES

<p>Important: Remember to advise your customers not to make 911 calls using Remote IP Feature Phones. Because a Remote Phone isn't connected directly to its local telephone network, one must use a regular phone connected locally, not the Remote Phone, to make 911 or other emergency calls. (For more information, see the documentation included with the Remote Phone.)</p>

- **Shared-office tenanting** — (Generation II only.) Lets multiple business entities share a telephone system while maintaining separation of various facilities and features. For more details, see "Shared-office tenanting," page A.3.
- **Esi-Link support** — (Optional.) Allows an multi-site enterprise to network any combination of up to 100 compatible ESI phone systems (or ESI IP Gateways) across an IP-based network.
- **Optional NSP (Network Services Processor)** — Allows system programming via TCP/IP and can be adapted to fit a variety of phone system configurations, small to large.
- **Optional VIP™** — Provides an optional, value-added interface to an NSP-enabled IVX E-Class system. Delivers call control and unified messaging to *Microsoft® Outlook® 2000/2002/2003*.

Voice mail features

- **Built-in voice mail ports** — These are **in addition to** the up-to-128 possible call-processing ports; thus, you may build the system to its maximum for call-handling without having to balance voice mail needs versus call-handling needs. IVX 128e has 16; IVX 72e has eight.
- **Highest-grade voice quality** (64-kilobit/second sampling) for voice mail and other storage of voice messages.
- **Eight message-on-hold recordings**, including three prerecorded tracks; also supports live entry.
- **Off-premises message delivery**.
- **Urgent messages** — Can deliver higher-priority messages first.
- **Several different mailbox types**, including group, broadcast, informational, cascade paging and Q & A.
- **Message Recycle Bin** (undelete) — Remembers, and can restore, each mailbox's 10 most recently deleted messages
- **Quick Groups™** — Makes it easy to leave voice mail messages for several users.
- **Quick Move™** — Records a conversation into another user's mailbox.
- **Virtual Mailbox Key™** allows easy monitoring of a second mailbox.

Auto attendant features

- **Six levels, 100 branches** — Allow you and your customer to set up a more caller-friendly answering environment, including a company directory.
 - **Virtually unlimited call routing** — Includes off-premises transfer, pager notification, more.
-

ACD features

- **Routes calls within designated departments for quickest possible call answering.**
 - **Uses Digital Feature Phone display** to provide up-to-the-second information on queues and wait times.
-

Shared-office tenanting

(Generation II only.)

- **Supports up to two tenants.**
- **CO lines** — CO line groups and corresponding access codes will be used to separate each tenant's CO lines if required. "Pooled" or shared lines can be assigned to a line group to which all stations are allowed access. CO lines are assigned to each tenant to follow each tenant's day/night mode settings.
- **Stations and departments** — Each station and department can be assigned to one tenant.
- **Automatic day/night mode** — If this is enabled, each tenant follows day/night changes assigned in its unique table.
- **Day/night key** — A day/night key may be assigned to select day or night mode manually for each tenant.
- **Auto attendant day/night greeting** — Each tenant may use a dedicated day/night branch ID¹ to route to a destination. Day/night routing will be controlled either automatically by each tenant's day/night table or manually by use of a day/night key for that tenant.
- **Message-on-hold (MOH)** — Each tenant will have a unique customer-recorded MOH source.
- **Central answering** — Central answering makes it possible for **one** extension (or department) to answer incoming calls to different tenants.
- **Operator (dial-"0") routing** — Unique operator call routing may be assigned for each tenant.

¹ See "Function 41: Auto attendant branch programming," pp. H.1–H.6.

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Hardware overview/installation

IVX E-Class cabinet components consist¹ of:

- | | | |
|--|---|--|
| <ul style="list-style-type: none"> • Base Cabinet I <ul style="list-style-type: none"> – Main board – Memory Module – Two port card slots – External wall-mounted transformer | <ul style="list-style-type: none"> • Base Cabinet II (optional) <ul style="list-style-type: none"> – Expansion board – External wall-mounted transformer – Two port card slots – Available only for IVX 128e | <ul style="list-style-type: none"> • Expansion Cabinet (optional) <ul style="list-style-type: none"> – Two port card slots – Up to two of these can be placed in a system (one per each Base Cabinet I or II) |
|--|---|--|

The IVX 72e system consists of Base Cabinet I and can accept one Expansion Cabinet to support up to four port cards.

Warning: You can upgrade an IVX 72e system to an IVX 128e system; **however**, once ESI Technical Support has uploaded software to the site, the system **cannot** revert to an IVX 72e system.

Base Cabinet I

The wall-mounted **Base Cabinet I** measures 8½" W × 11" H × 3" D, and is designed for easy installation and easy component access. It houses the Memory Module and Main Board, one multi-purpose serial port, a USB² port, a MOH connector and two port card slots — each of which accepts a 612 Card, 684 Card, A12 Card, D12 Card, DLC12 or IVC; see page "Port card options," page B.2. Base Cabinet I can support one **Expansion Cabinet**, for a potential total of four port cards.

Base Cabinet II (IVX 128e)

To expand an IVX 128e system beyond Base Cabinet I (and its Expansion Cabinet), connect **Base Cabinet II** via ribbon cable to Base Cabinet I. Base Cabinet II houses up to two port cards; it can also support another Expansion Cabinet with one port card.

Expansion Cabinets

You can "piggy-back" an **Expansion Cabinet** to the front of each IVX E-Class Base Cabinet (see page B.10). Each Expansion Cabinet houses up to two additional port cards each, enabling the system to grow to its maximum configuration — seven port cards on IVX 128e, or four port cards on IVX 72e.

Main board

The main board combines leading-edge hardware components — including a Motorola® ColdFire® processor and DSP structure — along with proprietary operating system software. The board provides: system control of the Memory Module and port cards; a standard RS-232C DB9 serial port; a USB² port; a built-in 33.6 Kbs modem for remote access; an external paging-device interface; MOH interface; and support for the optional NSP, providing remote access via VoIP and (optionally) VIP unified messaging.

¹ Memory Modules and port cards are packaged separately and are mounted in the cabinet during installation.

² USB port will be supported by future software.

Wall-mount transformers

With four or fewer port cards, Base Cabinet I requires a 3-amp transformer (supplied). With five to seven port cards, Base Cabinet I requires a 5-amp transformer and Base Cabinet II a 3-amp transformer. Base Cabinet I is shipped with and uses a 3-amp wall mount transformer to support up to four port cards (Base Cabinet I and an Expansion Cabinet). However, when Base Cabinet II is added to an IVX 128e system, Base Cabinet I requires swapping the wall-mount transformer with the 5-amp transformer supplied with Base Cabinet II.

Memory Module

The **Memory Module** — a hard disk drive with **proprietary formatting** — contains all system programming and configuration data, and pre-loaded voice prompts. The Memory Module provides 280 hours (IVX 128e) or 70 hours (IVX 72e) of voice storage at 64 kilobits/second — the industry's highest-quality sampling rate.

Port card options

Several kinds of port cards are available for the IVX E-Class system. Although all port cards can be mounted in any slot in either of the Base Cabinets or the Expansion Cabinet, we recommend that port cards with CO lines be installed in the first slots. Each port card is equipped with a standard female Amphenol connector for easy wiring to a standard 66 or 110 block.

- **684** — Provides circuits to connect up to six analog loop-start CO lines, eight Digital Feature Phones and four analog station ports. The CO line ports support standard CO and Centrex loop-start lines; ground-start CO lines are not supported. The analog ports provide a standard 24-volt, two-wire connection to fax machines, courtesy phones, modems, *etc.* Only one analog device can be connected to each analog station port. This card uses 12 station ports and six CO ports when installed.
- **612** — Provides circuits to connect up to six analog loop-start CO lines and 12 Digital Feature Phones. Ground-start CO lines are not supported. This card uses 12 station ports and six CO ports when installed.
- **A12** — Connects up to 12 analog devices (only), such as fax machines and cordless phones. This card uses 12 station ports and no CO ports when installed. Each port provides a standard 24-volt, two-wire phone connection. Only one analog device can be connected to each port. IVX 128e can support as many as 28 analog ports, while IVX 72e can support as many as 16.
- **D12** — Connects up to 12 Digital Feature Phones (only). This card uses 12 station ports and no CO ports when installed.
- **DLC12 (Digital Line Card)**¹ — The DLC12, one of the six available port cards for the IVX E-Class system, is a plug-in design that can be installed in any of the seven available card slots on the system highway. Each card provides **either** a T1 interface supporting 24 DS0 channels and 12 digital stations **or** an ISDN PRI interface supporting 23 B (bearer) channels, one D (datalink) channel and 12 digital stations. A jumper on the DLC12 must be plugged onto pins 5 and 6 of JP6 to enable ISDN PRI functions. Any (or all) of the available channels of the T1/PRI span (24 on T1, 23 on PRI) can be assigned, and the DLC12 supports loop-start, ground-start, E&M and DNIS/DID trunk types with immediate, wink-start or dial-tone-start signaling. The DLC12 is equipped with a built-in CSU that can be connected directly to a network interface unit, SmartJack or ISDN PRI. Up to 12 Digital Feature Phones can be connected to the DLC12. All 24 CO ports are allocated (regardless of whether they are assigned or used).
- **IVC (IVX VoIP Card)**² — Provides the 10/100Base-T, RJ-45 interface that allows the system to connect to an Ethernet® network. The IVC features highly configurable DSP technology that manages the flow of traffic among the port cards and converts IP packets into *PCM* (pulse-code modulation) traffic for transmission over the PSTN. Licensing is available to support Remote IP Feature Phones and Esi-Link, enabling up to 12 remote network channels for Remote Phones and up to 24 remote network channels for Esi-Link and Remote Phones.

¹ IVX 72e supports only one DLC12. IVX 128e can support two.

² The IVC and its remote licensing are supported in only IVX X-Class and IVX E-Class Generation II. ESI continues to make available the original Local Network Card (LNC) and Remote Network Card (RNC) for IVX E-Class Generation I, IVX 128 Plus, and IVX 128. Additionally, IVX X-Class and IVX E-Class Generation II support the original LNC and RNC.

NSP

The **NSP (Network Services Processor)** serves as a bridge between an Ethernet-based network and the IVX E-Class system. The system automatically detects the NSP when it's installed. Using TCP/IP, the NSP communicates directly with specific PC applications for maintenance of, and integration with, the ESI phone system. The NSP manages features such as unified messaging and phone control via PC applications; it also provides access to not only maintenance and administration (through use of *Esi-Access* and *Esi-Admin*) but also an Installer-selectable SMDR interface. The NSP hardware interface consists of a dedicated Ethernet port. Its external RJ-45 jack provides a 10/100Base-T connection to the LAN. The NSP is field-installable and -upgradable. It includes a mounting bracket, as well as a cable assembly for power connection and input/output lines to the NSP port on the system main board. The NSP consumes no call-processing ports. It is available in two configurations:

- **NSP-0** — Supports remote connection by *Esi-Access* via IP over a LAN, WAN, or the Internet for remote maintenance.
- **NSP-2** — Same as NSP-0 except that it also includes licenses for two *VIP* users.

Additional *VIP* licenses can be enabled remotely on either of these NSP configurations.

Digital phone models

The IVX E-Class system supports three different models of **ESI digital phones**, each of which connects to the cabinet via standard two-wire twisted pair:

- **48-Key Digital Feature Phone** — Three-line, 56-character¹ display; speakerphone; headset jack²; 30 programmable feature keys; the only one of the three Digital Feature Phones that supports either TAPI (see “TAPI Phone,” *below*) or the 60-Key Expansion Console.

Note: Not all modular headsets will work on the 48-Key Feature Phone's headset jack. ESI has tested and can recommend the following headset models:

Manufacturer: Plantronics

- P51-U10P sound tube microphone
- P51N-U10P noise-cancelling microphone
- P251-U10P sound tube microphone
- P251N-U10P noise-cancelling microphone

Manufacturer: GN Netcom

- GN2120 NCD 01 “over-the-head”
- GN2127 NCD 01 “on-the-ear”

Note that GN Netcom models also are available in a “-02” configuration, which wires differently and **won't** work with ESI phones. Therefore, when ordering GN Netcom headsets for use with ESI phones, **be sure to specify the “-01” configuration.**

- **24-Key Digital Feature Phone** — Two-line, 32-character display; speakerphone; 12 programmable feature keys.
- **12-Key Digital Feature Phone** — One-line, 16-character display; nine programmable feature keys.

Note: When the phone is in the highest upright position, use the wall-mount hook located under the handset to secure the handset when you're not using the phone.

TAPI Phone

The **TAPI Phone** is an optional version of the 48-Key Digital Feature Phone. It provides a TAPI cable and adapter for connection to a PC serial port for **Basic Telephony Integration** to such standard packages as *Act!*[®], *Goldmine*[®] and *Microsoft Outlook*. A Digital Feature Phone cannot be field-upgraded to a TAPI Phone.

¹ The top two lines each have 16 characters, as on the 24-Key Digital Feature Phone; the bottom line has 24 characters.

² Headset jack only on 48-Key Feature Phones (Digital, Digital TAPI, [local] IP, or Remote IP) manufactured after March, 2004.

IP Feature Phone models

If equipped with an LNC, the IVX E-Class system supports up to 12 **ESI IP Feature Phones**. Each IP Feature Phone looks and works like a 48-Key Digital Feature Phone as described above¹, but connects to the cabinet from within the local premises via an IP network (LAN) rather than twisted-pair cabling.

Remote IP Feature Phones

If equipped with an IVC and properly licensed, the IVX E-Class system supports up to 12 **ESI Remote IP Feature Phones**. Each is the same as the IP Feature Phone described in the previous paragraph, except that it connects to the cabinet from a remote location via an IP network (either a WAN or the public Internet).

60-Key Expansion Console

The **60-Key Expansion Console** adds 60 additional programmable feature keys to a designated user's extension. The Expansion Console is connected to its host phone via a special cable (provided) and **doesn't** require a separate station port of its own.

Note: Up to 20 Expansion Consoles can be installed in a fully configured system — six with Base Cabinet I and the additional 14 with Base Cabinet II. (You can add only four Expansion Consoles to IVX 72e).

Feature Phone overlays

Each Feature Phone comes with one overlay for the programmable feature keys. To order additional overlays, visit the DESI™ Web site, **www.desi.com**. While there, you may also want to download the free *Windows*-based software, *DESI Lite*, which allows you to print on the overlays. For assistance with DESI products, contact DESI (the DESI Web site contains contact information).

Tip: Remember that ESI's *Esi-Access* software, available from **www.esiresellers.com**, also lets you print on the overlays as well as perform many other programming tasks.

¹ IP Feature Phones, local or Remote, come only in a 48-key model.

System capacity

	IVX 128e	IVX 72e
Fixed ports	Four: <ul style="list-style-type: none"> • Maintenance/SMDR serial port • MOH port • Modem port* • Overhead paging port* * Subtracts from the total number of ports (e.g.: [128 – 2 = 126]; [92 – 2 = 90]).	
Call processing ports, maximum	126	90¹
Combined digital and analog stations ² , maximum	84	48
CO lines, maximum, if using DLC12 cards	66	42
CO lines, maximum, if not using DLC12 cards	42	24

Notes: If DLC12 cards are used and the maximum CO lines exceed 42, then the IVX 128e cannot achieve the maximum of 84 stations. **The total ports cannot exceed 126.** If a DLC12 card is installed, the system sets 24 ports for COs, even if a fractional T1 is used.
If an IVC is installed, the number of remote channels enabled on the IVC reduces the maximum number of CO lines available in the system to the values shown in this table:

Remote channels enabled	CO line capacity (maximum lines)	
	IVX 128e	IVX 72e
2	64	40
5	59	37
12	54	30
24	42	18

When an IVC is installed in an IVX E-Class system in a lower-numbered card slot than those slots in which DLC12, 612, or 684 cards are installed, the CO line numbers will be re-numbered — i.e., they **won't** start with line 1. Therefore, if CO line numbers **must** start with line 1, you must install the IVC in a **higher**-numbered card slot than **any** card with CO lines.

IVX 128e example:

Five port cards are installed, including two T1-configured DLC12 cards and standard loop lines as shown below. Only 60 stations can be installed; i.e.:
 $126 \text{ minus } (24 + 24 + 6 + 12) = \mathbf{60}$
 Thus, the last 24 possible stations (all 12 on a Card #6 and all 12 on a Card #7) **cannot** be used.

Port card	Card type	Lines installed	Remote talk paths	Possible stations
1	DLC12	24	—	12
2	DLC12	24	—	12
3	612	6	—	12
4	IVC	—	12	12
5	A12	—	—	12
6	[Unused]	—	—	—
7	[Unused]	—	—	—
TOTAL:		54	12	60
		(54 + 12 = 66)		

IVX 72e example:

Four port cards are installed, including one T1-configured DLC12 card and standard loop lines as shown below. 48 stations can be installed; i.e.:
 $90 \text{ minus } (24 + 6 + 12) = \mathbf{48}$

Port card	Card type	Lines installed	Remote talk paths	Possible stations
1	DLC12	24	—	12
2	612	6	—	12
3	IVC	—	12	12
4	A12	—	—	12
TOTAL:		30	12	48
		(30 + 12 = 42)		

¹ With DLC12 in use; or 70 if no DLC12 is used.

² The number of analog station ports cannot exceed 28.

Cautions

Important: This information complies with the requirements of Underwriters' Laboratories (UL) and UL Standard 60950.

When using this telephone equipment, always exercise basic safety precautions in order to minimize the risk of fire, electric shock or injury to persons. **Before proceeding, please read the following:**

- The airflow vents on the IVX case **must** be free of obstruction for proper cooling. Similarly, **do not** install the cabinet in areas of extreme heat or improper ventilation. **Never** insert objects of any kind through the ventilation slots on the system cabinet; doing so may result in contact with dangerous voltages — or cause an electrical short capable of producing fire or shock.
- **Do not** use liquids or aerosols to clean any IVX equipment; rather, use a cloth that is only **slightly** damp.
- The IVX telephone/voice-mail system contains **no** components that are serviceable by either non-Resellers or non-manufacturer technicians. **All service must be referred to the Reseller for further handling.**
- To reduce the risk of fire, use **only** 26 AWG or better telecom wire.

Power supply

Always disconnect the power supply and telephone lines from the system cabinet **before** opening the case for service or component disassembly or replacement.

Heed all warnings and instructions in documentation or marked on the cabinet or peripheral equipment.

Note: If necessary, review "Wall-mount transformers" (page B.2) for information on the different types of power supplies for the IVX E-Class system.

Fuse

Contact the factory **before** attempting to replace the fuse. The fuse is located on the main board directly next to the power jack marked with "F1."

Battery (located on the main board)

"Caution: There is a danger of explosion if the onboard lithium battery is incorrectly replaced. Replace only with Ray-O-Vac BR1225 (or equivalent). Dispose of used batteries according to the battery manufacturer's instructions."

"Notice: This product is intended to be supplied by a Listed Direct Plug-In Power Unit marked 'Class 2' and provided with electrical ratings."

Regulatory information

United States of America

Registration

The CO line telephone numbers, FCC registration number, and ringer equivalence number (REN) of this equipment must be provided to the telephone company before installation. (See below for FCC registration number and ringer equivalence number.)

FCC Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and — if not installed and used in accordance with the instruction manual — may cause harmful interference to radio communications (in which case, the user will be required to correct the interference at his/her own expense).

FCC Part 68

This equipment complies with Part 68 of the FCC Rules. On the bottom of this equipment is a label that contains, among other information, the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. You must, upon request, provide this information to your telephone company.

The REN is helpful to determine the quantity of devices you can connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all, areas, the sum of the RENs of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area.

If your telephone equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, the telephone company will notify you in advance but, if advance notice is not practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC.

Your telephone company may make changes to its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If so, you will be notified in advance, to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this telephone equipment, the telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Installation: The device is equipped with a USOC connector.

Registration Number: 1T1MF08B33727

Ringer equivalence number (REN): 0.8

Hearing-aid compatibility

This equipment, utilizing telephone station equipment manufactured by ESI, meets all FCC requirements for hearing-aid compatibility.

Hardware installation

Site location

As with most electronic equipment, the environmental considerations for this site need to observe good common sense. Provide a dry, clean, and accessible area.

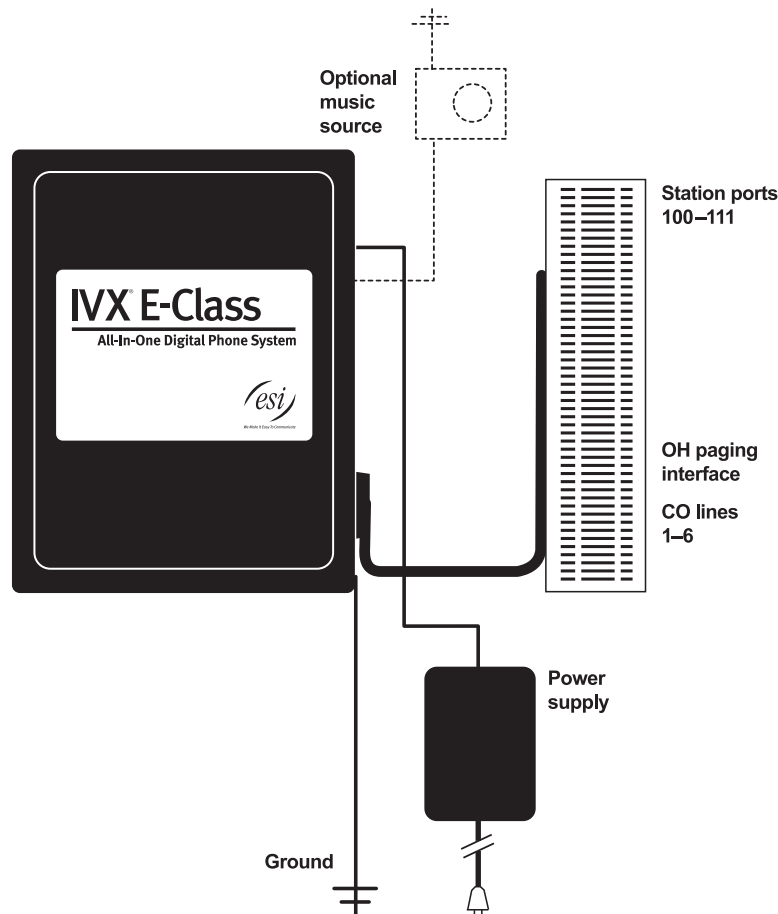
Locate space in the telephone equipment room, which will provide easy connection to the 66 blocks and 110 VAC power. **The location should be no further than 1,000 feet from the farthest station.**

Ambient room temperature must be 40⁰–80⁰ (F.), and relative humidity no higher than 90%.

Notes: Do not place the equipment or run station cabling near high voltage electrical equipment or electrical lines susceptible to high voltage surges from air conditioner compressors, etc.
Do not mount the equipment in a place that receives direct sunlight.

The system and supporting components should be mounted to a half-inch (or thicker) plywood backboard. Here is the layout of a typical Base Cabinet I installation:

IVX E-Class Base Cabinet typical installation

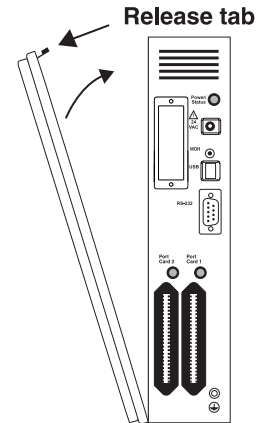


Opening the cabinet

The lid on all cabinets is held in place by two tabs that rest in slots in the bottom of the case, and a release tab that snaps into an opening in the top-center of the cabinet and is secured by a retaining screw.

To remove the lid:

1. Remove the retaining screw and depress the release tab at the top of the cabinet.
2. Rock the lid back from the top.
3. Lift and pull the lid free from the slots in the bottom of the cabinet.

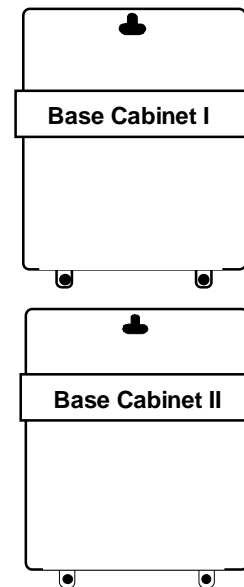


Mounting Base Cabinet(s)

Use the three provided #8 Phillips screws. Note the position of the three mounting holes in IVX. Allow room for installation of the second base cabinet either now or if required in the future. Base Cabinet II must be installed directly below Base Cabinet I. Allow about two inches of clearance between the units.

1. Screw in the top screw to the backboard (at least half-inch thick plywood) leaving about one-eighth-inch clearance between the screw head and the plywood.
2. Hang the unit using the keyhole at the top of the case.
3. Level the unit and install the bottom two screws.
4. If necessary, repeat the steps for Base Cabinet II.

Attach the power transformer to the wall, allowing sufficient length in both cords to reach the power connector on the upper right side of the cabinet and to reach a UPS or a dedicated 110 VAC outlet.



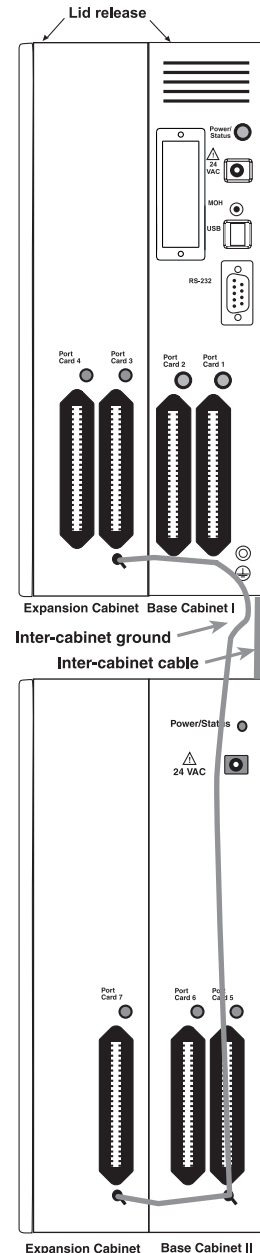
Expansion Cabinet installation

The Expansion Cabinets provide for the expansion of each Base Cabinet with two additional port cards. Each houses up to two port cards that are connected via ribbon cables through the opening in the back of the Expansion Cabinet to the Base Cabinet.

Note: You can add only one Expansion Cabinet to an IVX 72e system.

To install an Expansion Cabinet:

1. Wear a grounding strap and avoid unnecessary movement while handling the circuit boards.
2. Unplug the power to the IVX E-Class system.
3. Remove the Base Cabinet lid by pressing the release tab at the top of the cabinet and rock back the lid from the bottom of the cabinet.
4. Install the Expansion Cabinet on the front of the Base Cabinet in place of the Base Cabinet's lid.
5. Lock the Expansion Cabinet to the Base Cabinet by snapping the top in place and reinstalling the retaining screw.
6. Connect the grounding strap from the Expansion Cabinet's grounding lug (located on the bottom of the cabinet) to the Base Cabinet's grounding lug. Follow the grounding procedures as described earlier for grounding the Base Cabinet.
7. Through the large opening in the back of the Expansion Cabinet, connect the ribbon cable(s) from the port card(s) to the card directly below.
8. Re-install the original lid from the Base Cabinet on the face of the Expansion Cabinet.



Base Cabinet II installation (IVX 128e only)

To expand the system beyond four port cards, you must add Base Cabinet II. Mount Base Cabinet II directly below Base Cabinet I, and allow about two inches between them.

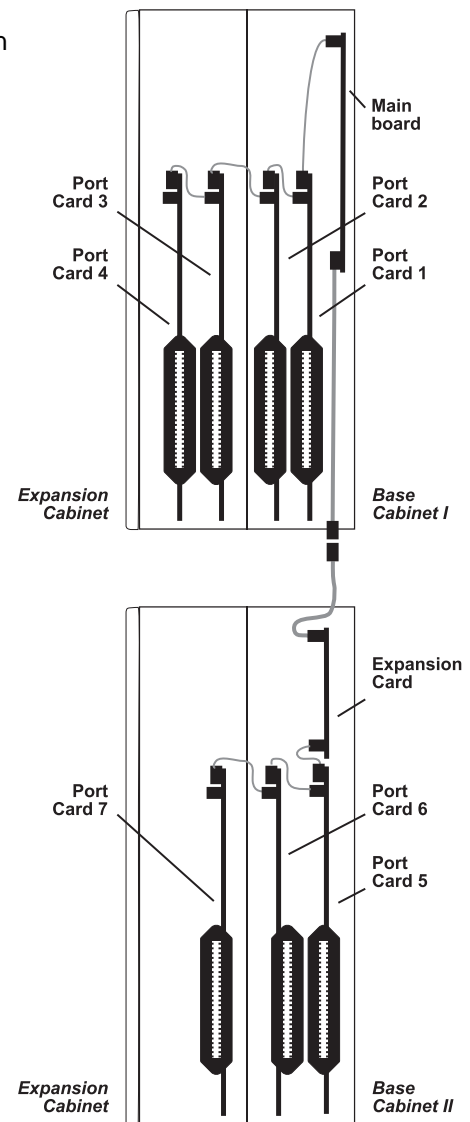
1. Connect the ribbon cable from the back of Base Cabinet II to the connector located on the bottom of Base Cabinet I.
2. Connect the ground of all units to the system ground.
3. Switch the wall mount transformers so the larger (5-amp) transformer is supplying power to Base Cabinet I and the original (3-amp) transformer is now supplying power to Base Cabinet II.
4. Connect both power transformers to the standard power strip and then connect to the UPS.

Notes: Always apply power to both cabinets simultaneously by using the power strip's switch. Do not apply power until all hardware connections have been made.

Port card installation

Adding or replacing port cards will require the system to be taken out of service. Wear a grounding strap and avoid unnecessary movement while handling the circuit boards.

1. Unplug the power supply to IVX.
2. There are two card slots on each cabinet (however, because a fully loaded system will require only seven cards, the last slot on the second Expansion Cabinet will remain empty). Each card is ribbon-cabled to the port card directly below it; the same is true for (a.) Port Card 1 to the Base Cabinet I main board, as well as (b.) Port Card 5 to the Base Cabinet II Expansion Card. (You'll need to remove the uppermost card in each cabinet to gain access to the lower card.)
3. To remove a port card, disconnect the Amphenol connector from the card. Carefully unplug the ribbon cable that runs to the port card or main board directly below it. Remove the six Phillips screws and remove the card from the cabinet.
4. To install a port card, observe the locations and relative positions of the card over the stand-offs. Install the six Phillips screws, connect the ribbon cable to the connector to the board directly below it and connect the Amphenol cable.



Memory Module installation or replacement

Note: The Memory Module has a **proprietary** formatting scheme — **do not** attempt to install a non-ESI drive. Contact ESI for a replacement Memory Module, if needed.

Adding or replacing the Memory Module will require that the system be taken out of service.

Replacing the Memory Module erases all its configuration data and customer recordings.

(Prompts stay intact, however.)

When installing a replacement Memory Module, you will have to remove Base Cabinet I from the wall, because the screws holding the Memory Module in place are on the bottom of the cabinet.

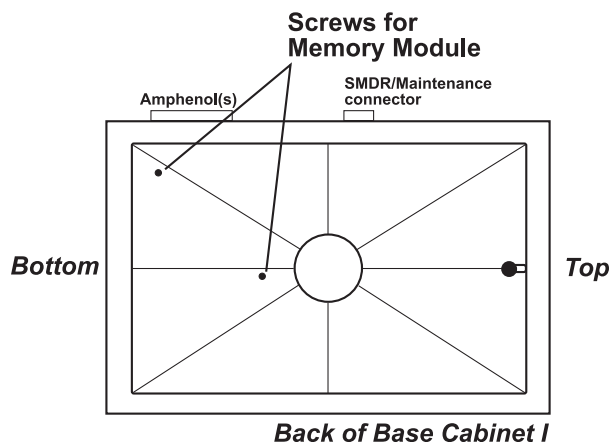
Note: Be sure to observe all proper procedures regarding the prevention of electrostatic discharge (ESD) when performing the following procedures; otherwise, circuit boards may suffer damage.

Open the lid of Base Cabinet I. The screw securing the lid must be removed from the top of Base Cabinet I.

Memory Module installation

Important: Install the Memory Module **first!** It lies directly on the bottom of Base Cabinet I, underneath the port cards.

1. Using the two screws that came with the Memory Module, secure the Memory Module to Base Cabinet I; the screws go in from the outside of Base Cabinet I.
2. Attach the ribbon cable from the Memory Module to J13 on the main board.
3. Proceed with port card installation.



Memory Module removal (when replacing an installed Memory Module)

1. Power off the E-Class system.
(Also: If there is an Expansion Cabinet installed, remove it.)
2. Remove the port cards from Base Cabinet I, by removing the five screws (and/or five standoffs) that secure each port card, and then disconnect the port cards' ribbon cables. **Be sure to note the locations of the ground wires.**
3. Disconnect the ribbon cable from connector J13 on the main board.

Note: This cable normally is very tight and may be difficult to unplug; use a scribe or similar tool to **gently** pry on the connector. **Don't** pull on the wires.

4. Remove the two screws that secure the Memory Module. **For greater ease during re-installation, be sure to note the ribbon cable routing.**

Important: To remove the screws, you must remove the cabinet from the wall. This is because the screws are located outside the plastic cabinet.

5. To install the replacement Memory Module, reverse steps 1–5.
6. Secure the lid to Base Cabinet I and place it back on the wall.

LED functions

The unit's various LEDs are designed to provide visual feedback as follows:

Power LED

The **Power** LED is located on the top-right side of the cabinet and is illuminated when power is being applied to the system. This LED blinks periodically to indicate that the main processor is operational.

Port LEDs

The **Port** LEDs are located above their respective Amphenol connectors on the right side of the cabinet. Each LED is illuminated when any port on its associated port card is in use.

Note: Disconnecting an Amphenol connector when its respective LED is lit will cause any of its ports that are in use to be disconnected.

Upon power-up, approximately five minutes are required for the system to configure. The **Power** and **Port** LEDs will blink three times to indicate that the power-up sequence has been completed.

Note: When a DLC12's LED is . . .

- . . . blinking, the T1/PRI circuit is out of service.
- . . . not lit at all, the T1/PRI circuit is in service but is idle.
- . . . lit solidly, the T1/PRI circuit and/or a station on the card are in use.

Memory Transfer LED

This LED is located inside the cabinet on the top center of the main board. It serves as a diagnostic aid by flashing as data is transferred to and from the Memory Module.

External connections

Grounding instructions

System grounding (supplemental ground) is as follows:

- The conductor wires can be no smaller than the ungrounded branch-circuit supply conductors (usually 16-gauge or higher).
- Acceptable wire: bare **or** covered with green (or green-and-yellow-striped) jacket.
- Conductors (and power receptacles) shall connect to earth ground at the service equipment (usually a cold water pipe or copper ground rod).
- The supplemental ground must: be used regardless of power cord ground, be connected to the ground lug on the bottom of the IVX cabinet, and retain ground connection when IVX power supply module is unplugged.
- Connect the grounding lugs of all units to system ground

Note: IVX E-Class system lines are protected against a 10 KV surge **only** if the earth ground procedures described above are followed.

Power

Each Base Cabinet requires a 110 VAC outlet (if possible, a dedicated outlet). Use **only** the Class-2 power supply module provided. Expansion Cabinets, as well as the 60-Key Expansion Console, require no additional AC power. A clean, isolated power source in conjunction with a UPS is **STRONGLY** recommended.

A fully loaded IVX 72e draws a maximum of 125 watts; a fully loaded IVX 128e draws a maximum of 200 watts.

If AC power is interrupted, the system will drop all connections. When power is restored, the system will resume normal operation in approximately five minutes, having retained its full programming and clock setting.

UPS

For system protection and to maintain uninterrupted operation, an uninterruptible power supply is **STRONGLY** recommended. A UPS rated for 125 VA is adequate for IVX 72e, while a UPS rated for a minimum of 200 VA is recommended for IVX 128e. Refer to the particular UPS unit's specifications to determine expected backup duration during a power outage.

Note: The remaining information under "UPS" comes from *Technical Update #216*.

Most people have heard about UPSs, but seem to think that there is just one kind of device that goes by that name. In fact, there are several different major designs in use by today's major UPS manufacturers. These makers share much of the blame for confusing UPSs' end users by, far too often, lumping different designs under the "UPS" name.

UPSs can first be broken down into **system types**:

- **Stand-by** — A very simple design that affects power only when either a lag/brownout occurs below, or a spike/surge occurs above, a certain threshold. When either occurs, the unit trips — *i.e.*, goes into battery mode. This "cleans" the voltage and helps to keep any load safe. Industry average "trip" times are 2–8 ms. No other filtration of AC power is performed.
- **Line interactive** — Constantly monitors inbound voltages, and uses special circuitry to boost low voltages and clamp high voltages without having to use the batteries. Indeed, the batteries are used only if the input voltage drops below acceptable levels (typically about 12% below normal), goes out

completely or rises to dangerous levels (typically about 14% above normal) at which components will be damaged if line voltage is not removed. Industry average transfer time is 1–3 ms. (If voltage stays within its normal window, this unit continues to pass voltage, unaltered, from the wall.)

- **On-line** (or *full on-line*) — Constantly filters the power and performs a function known as double conversion (AC to DC to AC). This assures that the load — in this case, phone equipment — will receive not only uninterrupted, true sine wave output but also the cleanest, steadiest power possible throughout any foreseeable power disruptions or voltage irregularities. According to industry specs, it is not unusual for these types of units to be able to regulate utility power, even when it drops to 27% below or rises to 33% above normal, all without using their batteries.

From this point, UPSs can be further broken down by inverter types, which determine output. These are:

- **Square wave.**
- **Modified sine wave** (or *quasi sine wave*).
- **Sine wave.**

Most devices with wall-mounted chargers, such as cordless drills or screwdrivers, can behave erratically — sometimes not allowing the charge circuit to engage at all — when operating with modified sine or square wave inverters. Small wall-based transformer-style power supplies, similar to those ESI phone systems use, can experience overheating problems with modified sine or square wave outputs, which occur while some UPSs are operating in battery mode. This overheating could eventually cause damage to the power supplies; and, in time, the damage could cause a spike through the phone system — seriously damaging some of the static-sensitive components inside the casing.

While the **true** sine wave UPS output power curve smoothly increases to its peak, then smoothly decreases (allowing connected loads and equipment to operate the same as they would from utility supplied wall power), the **modified** sine wave and square wave UPS output power curve will shoot straight up, level off at peak voltage and then drop straight down. Additionally troublesome is that the modified sine wave sits at zero voltage for a short period during the transition to or from batteries — which is the main difference between it and the square wave output of some UPS. Please note that this short interval during which the modified sine wave UPS sits at zero voltage can directly affect the transfer time of the UPS and could, theoretically, be enough to cause the phone equipment to reset or even “freeze.”

Though it is hard to predict exactly when different ESI systems will have problems with modified sine wave or square waveform UPSs (meaning during a power failure event or the recovery from one), it's fair to assume that a problem will eventually arise from the use of such UPSs. **Therefore, ESI recommends that only true sine wave output UPSs provide backup power to our phone systems and equipment.**

MOH port

The MOH (messages-, or music-, on-hold) connector on the upper right side of the cabinet is a standard $\frac{1}{8}$ " monophonic mini-jack, used for loading custom MOH recordings or for playing live music-on-hold from an external source such as a radio or CD player.

Maintenance/SMDR serial port

The **Maintenance/SMDR** port is a standard DB9 serial connector located on the side of the cabinet. Use a standard shielded serial cable, DB9-to-DB9, for printer-to-computer (this is usually male-to-female).

Note: The maximum distance from the cabinet is 100 ft.

The output from the Maintenance/SMDR port is, 8 data bits, 1 stop bit, and no parity. The pinout is:

Data Transmit	Pin 2
Receive	Pin 3
Ground	Pin 5

To program, see Function 18 (page E.10).

Range: Programmable for 300, 1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600, or 115,200 bps.

Default: 38.4K.

Maintenance

Connect a PC (such as a laptop) to the port to perform on-line programming and diagnostics. Also, the system sends reports to this port (see "SMDR," pp. L.1–L.2).

SMDR

The IVX E-Class system continuously outputs real-time SMDR call records to the port.

Note: The system will buffer up to 1,000 SMDR records (*i.e.*, 80 KB worth) in non-volatile memory when the **Maintenance/SMDR** serial port is in use for programming or uploading (such as during use of *Esi-Access*). If the buffer becomes full, the system will discard the oldest records.

External paging device connection

A dry contact overhead-paging device can be connected to the system through the first port card's 66 block.¹ The overhead paging port is fixed (located on the main board) as extension 199 for programming purposes and user access. (See "Worksheet" wiring chart, page B.29.)

Audio connection

The audio pair is connected to the 66 block at terminal 33 and 34. The pair's impedance is 600 ohms.

Note: The port doesn't support talk-back paging (which requires a CO port), nor does it support CO ring through the port.

Dry-contact control

The manner in which the dry-contact pair is punched down on the 66 block sets the pair as normally open (sending a page to the port will close the contacts) or normally closed (sending a page to the port will open the contacts).

Connect the dry-contact pair of the device to IVX as follows:

- Terminals 35 and **36** to provide normally **open** operation;
or
- Terminals 37 and **38** to provide normally **closed** operation.

The port can be used with zone paging units.

Note: ESI doesn't recommend the use of contacts for door-unlocking mechanisms.

Amphenol cable connections

Connect a standard 66 Block to each port card using a male 50-pin Amphenol cable to each port card female connector located on the bottom-right side of the cabinet. The connector closest to the wall is the first card. CO line numbering will be greatly simplified if DLC12 cards are installed as the last cards.

¹ If an IVC is installed in slot 1, the audio connection and dry-contact control connect via the second port card.

CO line connection

Local loop

The IVX E-Class system's advanced CO line circuitry provides for open loop detection and the system's built-in Caller ID interface. Loop start lines are connected via the last 6 pairs on each 66 block on the 612 and 684 cards.

Note: Observe correct order of connection to preserve proper rotary hunting of the CO lines.

T1/PRI

For T1 or PRI applications, the IVX E-Class system can use the DLC12 card.¹ The DLC12 is a plug-in design that can be installed in any of the seven available card slots on the system highway. Each card provides 12 digital stations and **either** (a.) a T1 interface supporting 24 DS0 channels **or** (b.) a PRI interface supporting 23 "B" (bearer) channels and one "D" (datalink) channel. Up to 24 CO line interfaces² (selectable as loop-start, ground-start, E&M or DNIS/DID trunks) are connected through two pairs punched down on the 66 block connector of the DLC12. (Note that the **total** line capacity is 66 for an IVX 128e system and 42 for an IVX 72e system.³)

The IVX E-Class system can have a maximum of two DLC12s⁴ per system, and can provide up to 48 DS0 channels (or 46 "B" channels) and 24 digital stations per system. Partial T1 or PRI applications are supported through line programming. Connection to the card is provided through an industry-standard 50-pin Amphenol connector.

The DLC12 has built-in CSU functionality, eliminating the need for an external unit. The integrated CSU can be enabled or disabled via system programming (see "Function 2124: CSU emulation," page F.11). The following functionality is provided: line, payload, DTE and none (normal operation) loopback modes with the ability to respond back controlled via system programming; alarm conditions, and both ANSI T1.403 and TR 54016 performance messages for ESF only.

Note: An ESI system receives clocking from the CO.

When working with a T1 line, the DLC12 card supports these trunk types:

- **Loop start**
- **Ground start**
- **E&M** (including **E&M–DID/DNIS/ANI**) — When an E&M trunk is selected, the choices for **outgoing** signaling type are immediate start, wink start and dial tone start; and the **incoming** signaling type choices are immediate start and wink start. The E&M trunk can be set for 2-way traffic, inbound traffic only or outbound traffic only.

The **DID and DNIS/ANI translation table** allows the translation of DID/DNIS digits to an IVX E-Class system's ID, mailbox, extension or department. Up to 300 entries can be programmed in the table. There is also an entry for exceptions in the table. This allows reroutes of any DID/DNIS calls that aren't programmed or detected to an ID, mailbox, extension or department and defaults to the operator.

(Continued)

¹ You may wish to review "Port card options," page B.2.

² Or 23, if using PRI.

³ If necessary, review "System capacity," page B.5.

⁴ IVX 72e supports only one DLC12.

The card supports the following framing format and line coding:

- **ESF/B8ZS** (default)
- **SF(D4)/AMI**
- **ESF/AMI**
- **SF/B8ZS**

Line compensation (or line build-out) is provided as necessary between the CSU or Smart Jack™ and the IVX E-Class system. There won't be any support for pulse dialing; all incoming dialing will default to DTMF digits.

When working with a PRI line, the DLC supports these switch protocols:

- **National-NI2** (default)
- **Nortel-DMS100**
- **AT&T/Lucent-5ESS**
- **Siemens-EWSD**

DID for the PRI is an enable/disable field. When DID is enabled, the PRI pilot table becomes active and works in combination with the DID tables.

Line Numbering Plan

Unless a DLC12 card is used, the line numbers will begin with 1 on the first port card and end with 42 on the last port card (see *right*).

Allocate 24 CO line numbers for each DLC12 and continue the numbering on the next card. The example (*below*) shows a DLC12 as the fourth card:

Port card	Card type	Line numbers
1	684	1 through 6
2	684	7 through 12
3	612	13 through 18
4	DLC12	19 through 42
5	612	43 through 48

Port card	Line numbers
1	1 through 6
2	7 through 12
3	13 through 18
4	19 through 24
5	25 through 30
6	31 through 36
7	37 through 42

Note: If fractional T1 is used, the unused circuits still will occupy a line number.

Important: If installing more than one T1 or PRI, the DLC12 in the lowest number slot will synchronize ("slave") the system with the public network. The system will synchronize to only one clock source. Therefore, ESI **strongly** recommends that the first DLC12 in the system be connected to the T1 or PRI that's connected either to the local CO or the nationwide long-distance provider, either of which typically will provide very-high-accuracy clocking (Strata 3). The DLC12 doesn't provide master or sub-master clocking for private-network T1 spans.

Station connection

The first 12 pairs on each Amphenol are station ports (12 digital stations on the 612 or DLC 12 card; eight digital stations and four analog ports on the 684 port card; 12 analog ports on the A12 card).

All stations are connected using a single pair. Each port position is pre-numbered and fixed as indicated in the 66 Block Wiring Diagram shown for each port card type.

Note: The station runs can be up to 1,000 ft.

Digital stations

The digital station wiring is not polarity-sensitive. Only one phone can be connected per digital port.

Analog ports

The analog ports do not require that tip-and-ring polarity be observed. The analog ports can be used for 2500 type sets or for devices such as fax machines, modems, etc., that can be connected via a normal tip-and-ring pair. Each analog port will support only a single analog device. IVX 128e can have as many as 28 analog ports; IVX 72e can have as many as 16 analog ports.

On IVX E-Class Generation II, all analog ports provide Caller ID Type I (call-waiting with Caller ID is not supported).

Station Numbering Plan

Each port card has 12 station interfaces. The Station Numbering Plan starts with the first pair on the first port card as 100 and ends at 183 on the 7th port card.

Port card	Station numbers
1	100 through 111
2	112 through 123
3	124 through 135
4	136 through 147
5	148 through 159
6	160 through 171
7	172 through 183

Installing the TAPI Phone

Important: To install the TAPI drivers to a PC with *Windows NT 4.0* where Service Pack 3 (or greater) hasn't been installed, please obtain the latest Service Pack — currently, Service Pack 6a, or “SP6a” — from the following link and install it before continuing:
<http://www.microsoft.com/ntserver/nts/downloads/recommended/SP6/>

Requirements

To perform this installation, you will need:

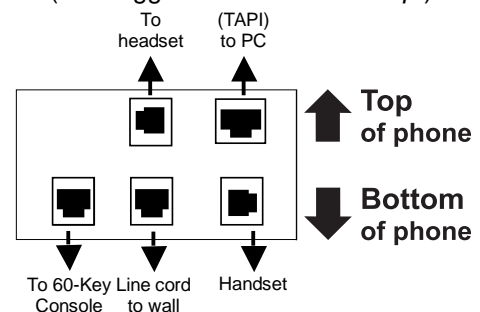
- A TAPI Phone (48-Key Digital Feature Phone with TAPI interface).
- A PC running *Windows 95, 98, ME, NT, 2000* or *XP* and with an unused COM (serial) port.
- TAPI cable and adapter (shipped with each TAPI Phone).¹

Also, if Caller ID integration is desired, you should confirm that (a) Caller ID is enabled on the IVX phone system and (b) the telephone company is providing Caller ID service.

Procedure

Note: If using the CD-ROM shipped with the TAPI Phone (first purchase only), proceed to Step 1. Otherwise, skip to Step 2.

1. Insert into the PC's CD-ROM drive the CD-ROM you received with your first purchase of one or more IVX E-Class systems; then browse to the CD-ROM drive and locate the *Esiivx.exe* file. (Depending on your settings, the file may appear as just *Esiivx*.)² **Skip to Step 5.**
2. Use your Web browser to reach <http://www.esiresellers.com/software.html>. (You'll need your ESI Resellers' site password, which is different from your Tech Support password.)
3. To download the software, scroll to and then click on the link to the *TAPI 2000* software listed under “*IVX TAPI Phones, both current and legacy.*”
4. When prompted, select a folder in which to save the software. (We suggest *C:\Windows\Temp*.)
5. The software is a self-extracting installer. To launch the installation process, browse to the *Esiivx.exe* file and double-click on it.
6. If asked whether you wish to continue, click on **Yes**. Then, follow the instructions that appear.
7. At the end of the installation, you'll be prompted whether you wish to restart the PC. Click on **Finish**.
8. As the PC restarts, a window will appear asking you to select the COM (serial) port that will be used for TAPI activity. Select the appropriate port and click on **OK**.
9. Connect one end of the provided serial cable to the PC serial port selected in Step 8. Connect the other end to the bottom of the TAPI Phone (see diagram, *right*).



*Connectors on bottom of TAPI Phone
 (Headset jack shown is **only** on 48-Key Feature
 Phones shipped after March 1, 2004)*

You have now successfully installed the *TAPI 2000 Windows* telephony driver. Continue to the next page to test the operation of the TAPI interface.

¹ If the PC has a 25-pin serial connector, you'll need to obtain a DB9-male-to-DB25-female adapter (such as Radio Shack® model # 26-287).

² We suggest that you change your *Windows Explorer* settings so that the file extension always appears in file listings. Here's how:

- a. In *Windows Explorer*, click on the **View** menu and select **Folder Options**.
- b. In the **Folder Options** window, click on the **View** tab.
- c. Locate the item entitled *Hide extensions for known file types* and make sure that this item **isn't** checked (if it is, **uncheck** it).
- d. Click on **OK** to finish.

Testing TAPI

Windows includes a simple TAPI application, *Phone Dialer*¹. It can be used to test the TAPI interface by dialing a phone number. Two versions of *Phone Dialer* are currently available. Depending on which version of Windows you have, follow the appropriate test procedure for the *Phone Dialer* software on your PC.

Testing with Phone Dialer (Windows 95/98/ME)

1. Click on the Windows **Start** button; then click on **Run**, type *Dialer* in the Run window and click on **OK**. This will start the file *Dialer.exe*.
2. In the *Phone Dialer* window, click on the **Tools** menu; then click on **Connect Using...**
3. In the **Line** field, select *ESI IVX Telephony Service Provider* and click on **OK**.
4. Once again, click on **Tools**; then click on **Dialing Properties...**
5. Enter the local area code and the appropriate access codes for an outside line; to insert a pause, use a comma (e.g., for local calls, you might use 9,).
6. Make sure the **To disable call waiting, dial:** box is **not** checked. Then, click on **OK**.
7. In the *Phone Dialer* window, enter the number to dial and click on **Dial**.
8. If the TAPI installation was successful, the phone's **SPEAKER** key will light up and you'll hear the phone number being dialed. If the call can't be completed, add one or more commas to the outside access codes; also, verify that the other dialing properties are correct for the area from which you're calling.

Testing with Phone Dialer 1.0 (Windows NT/2000/XP)

1. Click on the Windows **Start** button; then click on **Run**, then click on **Run**, type *Dialer* in the Run window and click on **OK**. This will start the file *Dialer.exe*.
2. In the *Phone Dialer* window, click on the **Edit** menu; then click on **Options**.
3. In the **Options** window, click on **Phone and Modems Option**.
4. In the **Phone and Modems** window, a location entry should be highlighted. Click on **Edit**.
5. In the **Edit Locations** window, enter the local area code and the appropriate access codes for an outside line; to insert a pause, use a comma (e.g., for local calls, you might use 9,).
6. Make sure the **To disable call waiting, dial:** box is **not** checked. Then, click on **OK**.
7. In the **Phone and Modem Options** window, click on **OK**.
8. In the **Options** window, under **Line Used For...**, select *ESI IVX Telephony Service Provider* and click on **OK**.
9. In the *Phone Dialer* window, click on **Dial** and enter the number to dial in the **Dial** window. Then, click on the **Phone Call** radio button, followed by the **Place Call** button.
10. If the TAPI installation was successful, the phone's **SPEAKER** key will light up and you'll hear the phone number being dialed. If the call can't be completed, add one or more commas to the outside access codes; also, verify that the other dialing properties are correct for the area from which you're calling.

Proceeding to use TAPI

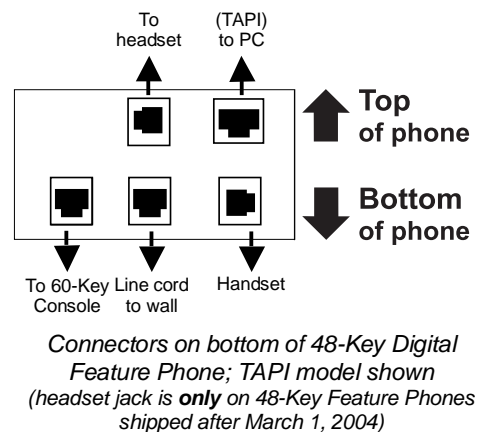
The TAPI interface is now ready to be integrated with the user's preferred TAPI-enabled application. For instructions on connecting to the TAPI driver, refer to the documentation for that application.

¹ If *Phone Dialer* isn't installed on the PC, have the customer's IT System Administrator install (or re-install) *Phone Dialer* from the original Windows installation CD-ROM.

60 Key Expansion Console connection

Note: The 60-Key Expansion Console can be connected to only a 48-Key Digital Feature Phone.

1. The 60-Key Expansion Console includes an **expansion cable**. Connect one end of the expansion cable to the appropriate connector on the bottom of the Feature Phone (see diagram, *right*). Then, connect the other end of the expansion cable to the 60-Key Expansion Console.
2. To keep cabling out of the way, thread the expansion cable into the slots on the bottom of the phone and 60-Key Expansion Console.
3. Program the keys on the 60-Key Expansion Console using the same procedure as with the Digital Feature Phone (press **PROGRAM 2**).
4. If necessary, remove the clear **plastic** overlay from the keys on the Expansion Console.
5. For the customer's convenience, label the **paper** overlay to show how the keys are programmed (we suggest you use the *Esi-Access* PC software application for this).
6. Install the labeled **paper** overlay on the 60-Key Expansion Console.
7. Install the clear **plastic** overlay **over** the paper overlay, to protect it.
8. Use the provided Velcro[®] tape to attach the left side of the 60-Key Expansion Console to the right side of the IVX Digital Feature Phone.



A12 port card

Term	Wire color	Signal	RJ11	Port
1	White-Blue	Tip	Green	Analog
2	Blue-White	Ring	Red	
3	White-Orange	Tip	Green	Analog
4	Orange-White	Ring	Red	
5	White-Green	Tip	Green	Analog
6	Green-White	Ring	Red	
7	White-Brown	Tip	Green	Analog
8	Brown-White	Ring	Red	
9	White-Slate	Tip	Green	Analog
10	Slate-White	Ring	Red	
11	Red-Blue	Tip	Green	Analog
12	Blue-Red	Ring	Red	
13	Red-Orange	Tip	Green	Analog
14	Orange-Red	Ring	Red	
15	Red-Green	Tip	Green	Analog
16	Green-Red	Ring	Red	
17	Red-Brown	Tip	Green	Analog
18	Brown-Red	Ring	Red	
19	Red-Slate	Tip	Green	Analog
20	Slate-Red	Ring	Red	
21	Black-Blue	Tip	Green	Analog
22	Blue-Black	Ring	Red	
23	Black-Orange	Tip	Green	Analog
24	Orange-Black	Ring	Red	
25	Black-Green			
26	Green-Black			
27	Black-Brown			
28	Brown-Black			
29	Black-Slate			
30	Slate-Black			
31	Yellow-Blue			
32	Blue-Yellow			
33	Yellow-Orange			
34	Orange-Yellow			
35	Yellow-Green			
36	Green-Yellow			
37	Yellow-Brown			
38	Brown-Yellow			
39	Yellow-Slate			
40	Slate-Yellow			
41	Violet-Blue			
42	Blue-Violet			
43	Violet-Orange			
44	Orange-Violet			
45	Violet-Green			
46	Green-Violet			
47	Violet-Brown			
48	Brown-Violet			
49	Violet-Slate			
50	Slate-Violet			

D12 port card

Term	Wire color	Signal	RJ11	Port
1	White-Blue	Data+	Green	Digital
2	Blue-White	Data-	Red	
3	White-Orange	Data+	Green	Digital
4	Orange-White	Data-	Red	
5	White-Green	Data+	Green	Digital
6	Green-White	Data-	Red	
7	White-Brown	Data+	Green	Digital
8	Brown-White	Data-	Red	
9	White-Slate	Data+	Green	Digital
10	Slate-White	Data-	Red	
11	Red-Blue	Data+	Green	Digital
12	Blue-Red	Data-	Red	
13	Red-Orange	Data+	Green	Digital
14	Orange-Red	Data-	Red	
15	Red-Green	Data+	Green	Digital
16	Green-Red	Data-	Red	
17	Red-Brown	Data+	Green	Digital
18	Brown-Red	Data-	Red	
19	Red-Slate	Data+	Green	Digital
20	Slate-Red	Data-	Red	
21	Black-Blue	Data+	Green	Digital
22	Blue-Black	Data-	Red	
23	Black-Orange	Data+	Green	Digital
24	Orange-Black	Data-	Red	
25	Black-Green			
26	Green-Black			
27	Black-Brown			
28	Brown-Black			
29	Black-Slate			
30	Slate-Black			
31	Yellow-Blue			
32	Blue-Yellow			
33	Yellow-Orange			
34	Orange-Yellow			
35	Yellow-Green			
36	Green-Yellow			
37	Yellow-Brown			
38	Brown-Yellow			
39	Yellow-Slate			
40	Slate-Yellow			
41	Violet-Blue			
42	Blue-Violet			
43	Violet-Orange			
44	Orange-Violet			
45	Violet-Green			
46	Green-Violet			
47	Violet-Brown			
48	Brown-Violet			
49	Violet-Slate			
50	Slate-Violet			

612 port card

Term	Wire color	Signal	RJ11	Port
1	White-Blue	Data+	Green	Digital
2	Blue-White	Data-	Red	
3	White-Orange	Data+	Green	Digital
4	Orange-White	Data-	Red	
5	White-Green	Data+	Green	Digital
6	Green-White	Data-	Red	
7	White-Brown	Data+	Green	Digital
8	Brown-White	Data-	Red	
9	White-Slate	Data+	Green	Digital
10	Slate-White	Data-	Red	
11	Red-Blue	Data+	Green	Digital
12	Blue-Red	Data-	Red	
13	Red-Orange	Data+	Green	Digital
14	Orange-Red	Data-	Red	
15	Red-Green	Data+	Green	Digital
16	Green-Red	Data-	Red	
17	Red-Brown	Data+	Green	Digital
18	Brown-Red	Data-	Red	
19	Red-Slate	Data+	Green	Digital
20	Slate-Red	Data-	Red	
21	Black-Blue	Data+	Green	Digital
22	Blue-Black	Data-	Red	
23	Black-Orange	Data+	Green	Digital
24	Orange-Black	Data-	Red	
25	Black-Green			
26	Green-Black			
27	Black-Brown			
28	Brown-Black			
29	Black-Slate			
30	Slate-Black			
31	Yellow-Blue			
32	Blue-Yellow			
33	Yellow-Orange			
34	Orange-Yellow			
35	Yellow-Green			
36	Green-Yellow			
37	Yellow-Brown			
38	Brown-Yellow			
39	Yellow-Slate	Tip	Green	CO
40	Slate-Yellow	Ring	Red	
41	Violet-Blue	Tip	Green	CO
42	Blue-Violet	Ring	Red	
43	Violet-Orange	Tip	Green	CO
44	Orange-Violet	Ring	Red	
45	Violet-Green	Tip	Green	CO
46	Green-Violet	Ring	Red	
47	Violet-Brown	Tip	Green	CO
48	Brown-Violet	Ring	Red	
49	Violet-Slate	Tip	Green	CO
50	Slate-Violet	Ring	Red	

684 port card

Term	Wire color	Signal	RJ11	Port
1	White-Blue	Data+	Green	Digital
2	Blue-White	Data-	Red	
3	White-Orange	Data+	Green	Digital
4	Orange-White	Data-	Red	
5	White-Green	Data+	Green	Digital
6	Green-White	Data-	Red	
7	White-Brown	Data+	Green	Digital
8	Brown-White	Data-	Red	
9	White-Slate	Data+	Green	Digital
10	Slate-White	Data-	Red	
11	Red-Blue	Data+	Green	Digital
12	Blue-Red	Data-	Red	
13	Red-Orange	Data+	Green	Digital
14	Orange-Red	Data-	Red	
15	Red-Green	Data+	Green	Digital
16	Green-Red	Data-	Red	
17	Red-Brown	Tip	Green	Analog
18	Brown-Red	Ring	Red	
19	Red-Slate	Tip	Green	Analog
20	Slate-Red	Ring	Red	
21	Black-Blue	Tip	Green	Analog
22	Blue-Black	Ring	Red	
23	Black-Orange	Tip	Green	Analog
24	Orange-Black	Ring	Red	
25	Black-Green			
26	Green-Black			
27	Black-Brown			
28	Brown-Black			
29	Black-Slate			
30	Slate-Black			
31	Yellow-Blue			
32	Blue-Yellow			
33	Yellow-Orange			
34	Orange-Yellow			
35	Yellow-Green			
36	Green-Yellow			
37	Yellow-Brown			
38	Brown-Yellow			
39	Yellow-Slate	Tip	Green	CO
40	Slate-Yellow	Ring	Red	
41	Violet-Blue	Tip	Green	CO
42	Blue-Violet	Ring	Red	
43	Violet-Orange	Tip	Green	CO
44	Orange-Violet	Ring	Red	
45	Violet-Green	Tip	Green	CO
46	Green-Violet	Ring	Red	
47	Violet-Brown	Tip	Green	CO
48	Brown-Violet	Ring	Red	
49	Violet-Slate	Tip	Green	CO
50	Slate-Violet	Ring	Red	

DLC12 port card

(to 66 Block)

Term	Wire color	Signal	RJ11	Port
1	White-Blue	Data+	Green	Digital
2	Blue-White	Data-	Red	
3	White-Orange	Data+	Green	Digital
4	Orange-White	Data-	Red	
5	White-Green	Data+	Green	Digital
6	Green-White	Data-	Red	
7	White-Brown	Data+	Green	Digital
8	Brown-White	Data-	Red	
9	White-Slate	Data+	Green	Digital
10	Slate-White	Data-	Red	
11	Red-Blue	Data+	Green	Digital
12	Blue-Red	Data-	Red	
13	Red-Orange	Data+	Green	Digital
14	Orange-Red	Data-	Red	
15	Red-Green	Data+	Green	Digital
16	Green-Red	Data-	Red	
17	Red-Brown	Data+	Green	Digital
18	Brown-Red	Data-	Red	
19	Red-Slate	Data+	Green	Digital
20	Slate-Red	Data-	Red	
21	Black-Blue	Data+	Green	Digital
22	Blue-Black	Data-	Red	
23	Black-Orange	Data+	Green	Digital
24	Orange-Black	Data-	Red	
25	Black-Green			
26	Green-Black			
27	Black-Brown			
28	Brown-Black			
29	Black-Slate			
30	Slate-Black			
31	Yellow-Blue			
32	Blue-Yellow			
33	Yellow-Orange			
34	Orange-Yellow			
35	Yellow-Green			
36	Green-Yellow			
37	Yellow-Brown			
38	Brown-Yellow			
39	Yellow-Slate			
40	Slate-Yellow			
41	Violet-Blue			
42	Blue-Violet			
43	Violet-Orange			
44	Orange-Violet			
45	Violet-Green			
46	Green-Violet	Signal	Cable pair¹	RJ48 pinout
47	Violet-Brown	Transmit T	White-Orange	1
48	Brown-Violet	Transmit R	Orange-White	2
49	Violet-Slate	Receive T	White-Blue	5
50	Slate-Violet	Receive R	Blue-White	4

¹ RJ48 labeled as EIA/TIA 568B (AT&T 258A). If RJ48 is labeled as EIA/TIA 568A, connect the violet-slate pair to the white-green pair at the jack.

Worksheet

				IVX 128e or IVX 72e				IVX 128e only		
				Base Cabinet I		Expansion Cabinet		Base Cabinet II		Exp. Cab.
Term.	Wire color	Signal	RJ11	Pt. Crd. 1	Pt. Crd. 2	Pt. Crd. 3	Pt. Crd. 4	Pt. Crd. 5	Pt. Crd. 6	Pt. Crd. 7
Card type →										
1	White-Blue	Data+	Green	Dig/Ana 100	Dig/Ana 112	Dig/Ana 124	Dig/Ana 136	Dig/Ana 148	Dig/Ana 160	Dig/Ana 172
2	Blue-White	Data-	Red							
3	White-Orange	Data+	Green	Dig/Ana 101	Dig/Ana 113	Dig/Ana 125	Dig/Ana 137	Dig/Ana 149	Dig/Ana 161	Dig/Ana 173
4	Orange-White	Data-	Red							
5	White-Green	Data+	Green	Dig/Ana 102	Dig/Ana 114	Dig/Ana 126	Dig/Ana 138	Dig/Ana 150	Dig/Ana 162	Dig/Ana 174
6	Green-White	Data-	Red							
7	White-Brown	Data+	Green	Dig/Ana 103	Dig/Ana 115	Dig/Ana 127	Dig/Ana 139	Dig/Ana 151	Dig/Ana 163	Dig/Ana 175
8	Brown-White	Data-	Red							
9	White-Slate	Data+	Green	Dig/Ana 104	Dig/Ana 116	Dig/Ana 128	Dig/Ana 140	Dig/Ana 152	Dig/Ana 164	Dig/Ana 176
10	Slate-White	Data-	Red							
11	Red-Blue	Data+	Green	Dig/Ana 105	Dig/Ana 117	Dig/Ana 129	Dig/Ana 141	Dig/Ana 153	Dig/Ana 165	Dig/Ana 177
12	Blue-Red	Data-	Red							
13	Red-Orange	Data+	Green	Dig/Ana 106	Dig/Ana 118	Dig/Ana 130	Dig/Ana 142	Dig/Ana 154	Dig/Ana 166	Dig/Ana 178
14	Orange-Red	Data-	Red							
15	Red-Green	Data+	Green	Dig/Ana 107	Dig/Ana 119	Dig/Ana 131	Dig/Ana 143	Dig/Ana 155	Dig/Ana 167	Dig/Ana 179
16	Green-Red	Data-	Red							
17	Red-Brown	Data+/Tip	Green	Dig/Ana 108	Dig/Ana 120	Dig/Ana 132	Dig/Ana 144	Dig/Ana 156	Dig/Ana 168	Dig/Ana 180
18	Brown-Red	Data-/Ring	Red							
19	Red-Slate	Data+/Tip	Green	Dig/Ana 109	Dig/Ana 121	Dig/Ana 133	Dig/Ana 145	Dig/Ana 157	Dig/Ana 169	Dig/Ana 181
20	Slate-Red	Data-/Ring	Red							
21	Black-Blue	Data+/Tip	Green	Dig/Ana 110	Dig/Ana 122	Dig/Ana 134	Dig/Ana 146	Dig/Ana 158	Dig/Ana 170	Dig/Ana 182
22	Blue-Black	Data-/Ring	Red							
23	Black-Orange	Data+/Tip	Green	Dig/Ana 111	Dig/Ana 123	Dig/Ana 135	Dig/Ana 147	Dig/Ana 159	Dig/Ana 171	Dig/Ana 183
24	Orange-Black	Data-/Ring	Red							
25	Black-Green									
26	Green-Black									
27	Black-Brown									
28	Brown-Black									
29	Black-Slate									
30	Slate-Black									
31	Yellow-Blue									
32	Blue-Yellow									
33	Yellow-Orange	OH Page Audio A			Paging controls on second port card are active only if IVC is installed in slot 1.					
34	Orange-Yellow	OH Page Audio B								
35	Yellow-Green	OH Page Relay Normally Open								
36	Green-Yellow	Relay Common								
37	Yellow-Brown									
38	Brown-Yellow	Relay Normally Closed								
39	Yellow-Slate	Tip	Green	CO*	CO*	CO*	CO*	CO*	CO*	CO*
40	Slate-Yellow	Ring	Red							
41	Violet-Blue	Tip	Green	CO*	CO*	CO*	CO*	CO*	CO*	CO*
42	Blue-Violet	Ring	Red							
43	Violet-Orange	Tip	Green	CO*	CO*	CO*	CO*	CO*	CO*	CO*
44	Orange-Violet	Ring	Red							
45	Violet-Green	Tip	Green	CO*	CO*	CO*	CO*	CO*	CO*	CO*
46	Green-Violet	Ring	Red							
47	Violet-Brown	Tip	Green	CO*/T1/PRI TX	CO*/T1/PRI TX	CO*/T1/PRI TX	CO*/T1/PRI TX	CO*/T1/PRI TX	CO*/T1/PRI TX	CO*/T1/PRI TX
48	Brown-Violet	Ring	Red	CO*/T1/PRI RX	CO*/T1/PRI RX	CO*/T1/PRI RX	CO*/T1/PRI RX	CO*/T1/PRI RX	CO*/T1/PRI RX	CO*/T1/PRI RX
49	Violet-Slate	Tip	Green							
50	Slate-Violet	Ring	Red							

* CO lines' numerical designations vary, depending on whether there is a DLC installed.

(This page included for pagination purposes only.)

Remote maintenance with *Esi-Access*

Esi-Access, one of the five modules of *Esi-Tools*, gives the **Installer** the capability to program all phone system features, including IP addresses for Remote Phones and Esi-Link. *Esi-Access* can be used from a PC or laptop connected directly to the phone system on-site; it can also connect to the system remotely via TCP/IP or dialup. *Esi-Access* can be used remotely by the Installer to make adjustments to a site's phone system. This section will cover how to use *Esi-Access* in conjunction with the phone system's NSP for remote maintenance.

Required equipment and information:

- An NSP installed in the site's ESI phone system.
- You will also need to know the site's NSP IP address _____.
- The PC or laptop must have an Ethernet interface and have a broadband connection to the LAN, WAN, or Internet (depending upon the type of remote connection involved).
- TCP/IP port number **59002** for the site's router.

Esi-Access setup

1. Contact the site to port-forward TCP/IP port 59002 from the router to the NSP's IP address. Verify that the port prefix of 59 hasn't changed (if it changed to 56, for example, the port number would be 56002 rather than 59002). If the customers are unaware how to port-forward, have them refer to the router's *User's Guide*.

Note: For an explanation of how the port forwarding works, see "Configuring the remote office NAT router" in *NSP/VIP Advanced Options Guide* (ESI part #0450-0667).

2. After port forwarding is complete, install *Esi-Access* on your PC. *Esi-Access* can be found on the *Technical Resource* CD or on the Resellers' Web site, www.esiresellers.com.
3. Follow directions in the *Esi-Tools User's Guide* (# 0450-0311) for setting up a site.

Connecting to the site

Important: ESI **strongly** recommends connecting to the phone system via the NSP, for a faster and more stable connection.

Once the site is created, connect to the site using network communications, as follows:

1. Highlight the site and click **Program**.
2. For **Access Mode**, select **Online**.
3. For **Communications Type**, select **Network**.
Two fields will now appear:
 - a. **IP Address** —
This will be the site's NSP IP address.
 - b. **Port Number** —
This typically will be 59002 unless the prefix, 59, was changed.
4. Click **OK** to connect.

Once you are connected to the site, you can program features as if you were actually there.

The screenshot shows the 'Site Connection' dialog box. It is divided into three main sections. The first section, 'Access Mode', has three radio buttons: 'Read-Only', 'Off-line', and 'On-line', with 'On-line' being selected. The second section, 'Communications Type', has three radio buttons: 'Direct Connect', 'Modem', and 'Network', with 'Network' being selected. Below this, there are two text input fields: 'IP Address' containing '10.0.0.231' and 'Port Number' containing '59002'. The third section, 'Site Information', has two text input fields: 'Site Name' containing 'Tedsport' and 'Site Password' containing '789'. At the bottom right of the dialog are 'OK' and 'Cancel' buttons.

(This page included for pagination purposes only.)

System programming: An introduction

You can program an IVX E-Class system either (a.) from a 24-Key or 48-Key Digital Feature Phone¹ in the system (while the system is operating) or (b.) with the *Windows*®-based *Esi-Access* package. Both methods follow the same programming steps. This manual focuses on programming from a Digital Feature Phone; the respective documentation for *Esi-Access* details the differences in programming from that environment.

Read the *User's Guide* first. Programming features require a clear understanding of **user** interface and application.

Once you've accessed programming mode on a 24-Key or 48-Key Digital Feature Phone, the system will prompt for — and confirm — each keystroke action via voice commands and the display. You program both configuration data and recordings in the same manner.

Important: During programming, the 24-Key Feature Phone's two-line display shares the same content as the top two lines of the 48-Key Feature Phone's three-line display. As a result, to save space, the sample displays shown herein will show only two lines.

Programming keys

During programming, the first line of the display will show the current **item** being programmed, and the second line will be the **entry** line. You can enter values as directed by the combination of the voice prompts and display. To enter multiple values, such as a list of extension numbers, separate each value by # (to exit the list, enter # #).

To...	Press ...	What this does
Enter	#	Confirms new or existing entry and advances to next programming step.
Back up (i.e., reverse direction)	*	Backs up to previous prompt without changing its value.
Delete	HOLD	Deletes data or recording.
Exit	[Hang up]	Exits programming mode and removes extension from DND.
Help	HELP	Provides more detailed instructions during programming.
Select/scroll	▼ (left-side scroll key)	<ul style="list-style-type: none"> During entry of a value, backs up. If a list is present (">" is displayed), scrolls to left.
	▲ (right-side scroll key)	<ul style="list-style-type: none"> Selects from options presented. If a list is present (">" is displayed), scrolls to right. Inserts a space during entry of a name.

Note: Either < or > in the display indicates that additional choices or values are available by pressing a corresponding scroll key (▼ or ▲).

¹ ESI doesn't recommend programming the system using a 12-Key Digital Feature Phone.

Entering alphanumeric characters

You enter names for **extensions, departments, branch IDs, CO lines, guest mailboxes and DIDs** by pressing the dial pad key that corresponds to the character to be entered. The key's possible entries will change each time the key is pressed, and the display will show this. When the desired character appears on the display, press **#** to confirm; the cursor will move to the next character position. You may move the cursor left (to correct an entry) by pressing the left scroll key (▼) or move right (to add a space) by pressing the right scroll key (▲).

Key	Options
0	0, - (hyphen), _ (underline)
1	Q, Z, 1, " " (space)
2	A, B, C, 2
3	D, E, F, 3
4	G, H, I, 4
5	J, K, L, 5
6	M, N, O, 6

Key	Options
7	P, R, S, 7
8	T, U, V, 8
9	W, X, Y, 9
▼ (left scroll key)	Backs up and erases
▲ (right scroll key)	Adds a space
#	[Enter]
# #	Ends the name

Example: To enter a *B*, press **2** twice (the possible options to scroll through are **A, B, C** and **2**). When **B** is displayed, press **#** to confirm; the cursor will move to the next character to be entered. To complete the name, press **# #**.

Note: On an incoming call, the name you assigned to the call's CO line or DID — rather than the Caller ID data — will appear until the call is answered.

System fixed numbering plan

Numbers	Function
0	Operator
1–66	CO lines
100–183	User extensions
199	Overhead paging port
290–299	Department numbers
300–489	Guest/info mailboxes
490–499	Q & A mailboxes

Numbers	Function
500	Broadcast mailbox
501–516	Group mailboxes
520–529	Cascade paging mailboxes
530–550	Recordable system prompts
560–589	Feature codes
590–598	MOH recordings
600–699	System speed dial
700–799	Esi-Link locations

Line groups

The numbers 9, 8 and 71–76 are designated as **line groups**. A line group is, as the name implies, a specific group of lines in a key system that are used for making outgoing calls. In IVX, line groups give phones access to outside lines without taking up any programmable keys on each phone.

Note: Line groups 71–76 may conflict with Esi-Link locations 710–760 (if they're needed); refer to Function 164 (see page E.5).

System programming overview

1 System parameters

- 11 Initialize
- 12 Installer password
- 13 Administrator password
- 14 System clock
 - 141 Set time/date
 - 142 Automatic time setting
- 15 System timing parameters
 - 151 Flash duration
 - 152 Transfer forward timer
 - 153 Recall timers
 - 154 ACD exit timer
 - 155 ACD wrap timer
 - 156 Cell phone delay
- 16 System feature parameters
 - 161 Recording alert tone
 - 162 Connect tone
 - 163 Station feature set activation
 - 164 Esi-Link location no./line group access selection
 - 165 Auto attendant parameters
 - 166 CO line parameters
 - 167 Voice mail parameters
 - 169 Feature set activation
- 17 System speed dial
- 18 Maintenance/SMDR serial port

2 CO line programming

- 21 Line programming
 - 211 Analog CO line programming
 - 212 T1 programming
 - 2121 CO line programming
 - 2122 T1 frame format and line coding
 - 2123 Line build-out
 - 2124 CSU emulation
 - 213 PRI programming
 - 2131 CO line programming
 - 2132 Line build-out
 - 2133 CSU emulation
 - 2134 Switch protocol
 - 2135 DID
- 22 Translation table programming
 - 221 Centrex/PBX access code
 - 222 Toll restriction exception tables
 - 223 ARS (Automatic Route Selection)
 - 224 DID and DNIS/ANI translation table
 - 225 PRI pilot number translation table
- 23 Line parameters
 - 231 Line receive volume
 - 232 Analog line disconnect
 - 233 T1 line receive volume
 - 234 PRI line receive volume
- 24 Caller ID programming

3 Extension programming

- 31 Extension definition and routing
- 32 Extension feature authorization
- 33 Department programming
- 35 Extension button mapping

4 Auto attendant programming

- 41 Auto attendant branch programming
- 42 Announce extension number
- 43 Automatic day/night mode table

5 Voice mail programming

- 51 Maximum message/recording length
- 52 Message purge control
- 53 Guest/info mailboxes
- 54 Group mailboxes
- 55 Message notification options
 - 551 Station delivery options
 - 552 Delivery/paging parameters
- 56 Cascade paging mailboxes
- 57 Q & A mailboxes
- 58 Move and delete messages

6 Recording

- 61 Record system prompts
- 62 Record directory names
- 63 MOH programming
 - 631 MOH source
 - 632 Record MOH
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7 Reports

- 71 System program report
- 73 ACD department detail report
- 74 Voice mail statistics report
- 75 System speed-dial list

8 IP programming

- 81 Display licenses
- 82 Local programming
 - 821 Local IP PBX programming
 - 822 Local phone starting address
 - 823 Remote channels
 - 824 Network Services Processor
- 83 Esi-Link programming
 - 831 Local location number
 - 832 Esi-Link location programming
 - 833 Delete Esi-Link location
 - 834 Esi-Link publish list programming

Entering programming mode

You may program from **any** 24-Key or 48-Key Digital Feature Phone¹ in the system:

1. Press **PROGRAM** at any digital station. The normal **station** programming menu prompts will begin to play.
2. Press **HOLD**. The “enter password” prompt will play.
3. Enter the **Installer password** (default is **7 8 9**).² Then, to confirm the password, either press **#** or wait two seconds. **You are now in programming mode**. The extension will be automatically placed in DND, and its display will show:

I NSTALLER
CMD:

4. The system will play the **system** programming menu. Follow it to program as you wish.
5. When finished, hang up.

Warning: Always **FINISH** programming in **ANY** function **BEFORE** exiting programming mode (as needed, press **#** to accept current entries for function parameters you’re not changing).

Note: The system will automatically exit programming mode after 10 minutes of inactivity.

Example: If your Installer password is *864*, **enter** programming mode by pressing **PROGRAM HOLD 8 6 4 #**. (To **exit** programming mode, hang up.)

¹ Although a 12-Key Feature Phone allows you to **enter** Installer and Administrator programming, we don’t recommend that you use a 12-Key Feature Phone for programming because of its one-line display and small number of programmable feature keys.

² If you prefer to enter Administrator programming mode, use the Administrator password, instead (the default is **4 5 6**).

Function 1: System parameters

Function 11: Initialize

This function will return all components and software to their initial state. Initialization will erase all data and custom recordings — but **not** the time or date (see **Important notes**, *below*).

Important notes: Always initialize the system before initial programming for a new installation. You must confirm the command to initialize, when prompted, by entering the Installer password (and then pressing # to finish confirmation). Be sure to set the time and date (Function 14) **before** initializing.

System initialization will take up to five minutes to complete. When completed, the phone's display will return to the idle state. **You must then re-access Programming Mode** by following the steps described earlier (see page D.4).

Functions 12 and 13: Installer and Administrator passwords

These functions will display the existing password and prompt for entry of a new password. The passwords can be 2–8 digits long, followed by #. **The Installer can change either the Installer or Administrator Password. Only those functions listed in the *Administrator Manual* can be programmed via the Administrator Password.** The default passwords are:

Installer Password (Function 12) = **7 8 9**

Administrator Password (Function 13) = **4 5 6**

Notes: Be sure to write down the new passwords, store them in a safe place and give the new Administrator's Password to the Administrator.

Accessing user station programming

Should a user forget his password or if an employee leaves the organization, this feature allows the Installer or Administrator to enter a user's station programming and operate within it as if he were the user. From the user's station, enter the **Installer** or **Administrator** password when the system prompts for the **user** password.

Example: From station 105, entering **7 8 9 #** or **4 5 6 #** instead of the user password (**1 0 5 #**) will enter the station's user programming. (Default passwords shown for this example).

Function 14: System clock

Function 141: Set time/date

1. Enter a new time in a **twelve**-hour format.

Example: Enter **1 2 3 3** for 12:33, or **3 1 5** for 3:15 (note that you need **no** leading zero for the time).

2. Select AM or PM by pressing a scroll key (either ▼ or ▲).
3. Enter a new date in an **eight-digit** format, **including** leading zeroes.

Example: Enter **0 7 0 4 2 0 0 3** for July 4, 2003 (note that leading zeroes **are** required here, unlike in Step 1).

4. Press # to finish the entry.

Note: A built-in battery maintains the correct time and date, even in the event of a power loss.

Function 142: Automatic time setting

1: Synchronize with Caller ID¹

This function, when enabled, synchronizes the real-time clock with Caller ID (CID) messaging: call processing compares the time of a CID message to the system real-time clock and, if the difference is more than two minutes, resets the real-time clock to match the time (hours and minutes) of the CID message. The system will analyze each such message (or — if it receives more than four calls with CID information within a one-minute period — as is needed). Select *ENABLE* or *DISABLE* by pressing a scroll key (either ▼ or ▲). Choosing *ENABLE* will allow the CID data to update the time and date.

Default: Disabled.

Esi-Link-related notes (see also “Function 83: Esi-Link programming,” pages M.5–M.7):

If “synchronize with Caller ID” is enabled, Esi-Link time synchronization (from location 700) will be disabled.

If “synchronize with Caller ID” is disabled, Esi-Link time synchronization will be allowed (minutes only).

When Esi-Link is used, all cabinets’ time will be synchronized by cabinet 700, unless “synchronize with Caller ID” is enabled in Function 142.

2: Adjust for Daylight Savings Time

This function, when enabled, causes the real-time clock to adjust itself automatically for Daylight Savings Time (DST). Select *AUTO* or *DISABLE* for DST by pressing a scroll key (either ▼ or ▲). Choosing *DISABLE* is best for those areas that don’t observe DST.

Default: Disabled.

Note: If this function is enabled and it causes an automatic time change, the system won’t update the real-time clock from either Caller ID messages (Function 1421, *above*) or Esi-Link time synchronization for 25 hours before and 25 hours after the time change is due to be effective (*i.e.*, 2:00 AM Sunday).

¹ Does not work with PRI.

Function 15: System timing parameters

Function 151: Flash hook duration

This sets the time (in seconds) that a flash hook will be sent on the current line to the Telco from a digital phone set. The default setting of **1.5** will cause disconnect and fresh dial tone from the CO.

Range: 0.2–2.0. **Default:** 1.5.

Function 152: Transfer forward timer

This sets the number of times a transferred call will ring before following the day/night routing for the extension or department.

Range: 1–9 rings. **Default:** 3.

Function 153: Recall timers

Function 1531: Exclusive hold recall timer

This is the amount of time, in seconds, that a call will remain on exclusive hold before recalling to the extension that initiated the exclusive hold.

Range: 5–960 seconds. **Default:** 60.

Function 1532: Hold recall timer

This is the amount of time, in seconds, that a call will remain on hold before recalling to the extension that initiated the hold.

Range: 5–960 seconds. **Default:** 60.

Function 154: ACD exit timer

This is the amount of time, in seconds, that a call will remain in ACD department queues before following the department reroute (see Function 33, page G.12).

Range: 5–600 seconds (or 0 for no limit). **Default:** 180.

Function 155: ACD wrap timer

This is the maximum amount of time, in seconds, that an agent can remain in wrap mode. If this function is turned off, agents cannot place their stations in Wrap Mode (see the “ACD agent operation” chapter in the *User's Guide*).

Range: 5–600 seconds (**0** for no limit). **Default:** 0 (no limit).

Function 156: Cell phone delay

When one uses a cellular phone or cordless phone to pick up messages, this usually requires the user to move the phone away from the ear frequently in order to press command keys, making the user miss some portion of the next prompt. This function adds additional delay before the playback of system prompts during remote message pickup or message pickup from an analog station (*this does not affect ESI Feature Phone message pickup*). The value is in seconds.

Range: 0.0–5.0. **Default:** 1.0.

Function 16: System feature parameters

Function 161: Recording alert tone

This sets whether the system plays a short beep tone every 15 seconds during a call recording, indicating to both parties that a recording is in progress.

Default: Disabled (the beep doesn't play).

Important: IN **MOST** JURISDICTIONS, IT IS PERMISSIBLE TO RECORD A CONVERSATION IF ONE OF THE TWO PARTIES IS AWARE THAT IT IS BEING RECORDED. HOWEVER, ESI TAKES **NO** RESPONSIBILITY AS TO ITS LEGALITY IN **ALL** JURISDICTIONS. IT IS THE RESPONSIBILITY OF THE INSTALLING COMPANY AND THE END USER TO DETERMINE AND FOLLOW THE APPLICABLE STATE AND LOCAL LAWS REGARDING RECORDING OF CONVERSATIONS.

Function 162: Connect tone

This sets whether the system plays a system connect tone (two short beeps a user hears when a station answers).

Default: Enabled (the beeps play).

Function 163: Station feature set activation

Field 1: Group listen enable/disable

With this feature **disabled**: if a station user presses **SPEAKER** while on a call, the Feature Phone immediately turns off the handset and switches to hands-free mode.

If enabled, the group listen feature is available system-wide. If disabled, it is no longer available.

Default: Enabled.

Field 2: Privacy release enable/disable

(Generation II only.) With this feature **enabled**: if a station user presses a CO line key that is in use (lit red), the user will be immediately conferenced with the call in progress on that line. With this feature **disabled**: pressing an in-use CO line key has no effect.

Default: Disabled.

Field 3: Headset microphone gain adjust

(Generation II only.) Adjusts the gain of headset microphones connected either directly to a 48-Key Feature Phone's headset jack or a headset box connected to a 24-Key Feature Phone. If the headset microphone gain is too high ("hot"), the user may perceive an annoyingly loud sidetone or hissing when on a station-to-CO call. The default level should provide a comfortable sidetone level and adequate transmit volume when used with recommended headsets.

Range: 0–5. **Default:** 2. (See table, below.)

Entry	Value
5	+9dB
4	+6dB
3	+3dB

Entry	Value
2	0dB (default)
1	-3dB
0	-6dB

Warning: Changing the headset microphone gain will drop all calls in progress. **Before** making any changes to this parameter, make sure that all stations are idle.

Function 164: Esi-Link location number/line group access selection

Without Esi-Link installed, line group access codes 71–76 aren't reserved for a particular purpose.¹ But, with Esi-Link installed, these codes are automatically reserved for Esi-Link location access, as shown in the chart at right.

However, even if Esi-Link is installed, the Installer can manually change codes 71–76 using Function 164. Once these codes are manually changed, the Esi-Link location numbers beginning with the same two digits can no longer be used (e.g., if line access code 71 is changed for non-Esi-Link use, Esi-Link location numbers 710–719 are no longer available).

Numbering of locations or line groups

Esi-Link location number range (default)	Line group access (if selected)
710–719	71
720–729	72
730–739	73
740–749	74
750–759	75
760–769	76

Function 165: Auto attendant parameters

Field 1: Auto attendant inter-digit timer

Make this setting higher if callers complain that they don't have enough time to dial before either the system sends them to the wrong destination or they hear "Your entry was not valid"; make it lower if they say it pauses too long after they dial digits.

This sets the time after the first digits has been entered and before the entered number is accepted as being complete (time between each digit dialed). Expressed in 1/100s of seconds.

Range: 40–1000 (i.e., 400 ms to 10 seconds). **Default:** 200 (i.e., 2 seconds)

Field 2: Auto attendant no-response timer

Adjust if the time after the playing of the auto attendant greeting is too long (or too short) before the system follows the no-response (call-forward) destination of a menu or directory.

Sets auto attendant's no-response timeout time. This is how long the auto attendant waits until after the menu plays all options. Expressed in 1/100s of seconds.

Range: 50–6000 (i.e., 500 ms to 1 minute). **Default:** 300 (i.e., 3 seconds).

Field 3: ACD beep

Enables or disables the ACD beep tone (same as the "new message" beep) given to agents logged into an ACD department when they're in a busy condition and a call goes into queue.

Range: 0 (enabled) or 1 (disabled). **Default:** 0 (enabled).

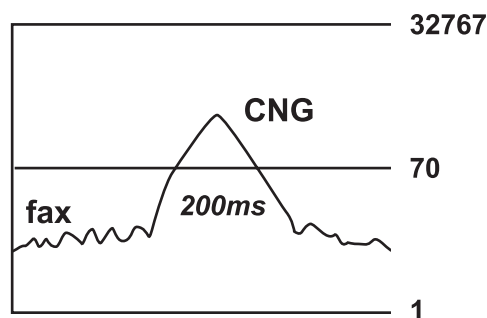
(Continued)

¹ i.e., as are line access numbers 9 and 8.

Field 4: Fax energy level (CNG tone)

Adjust this level if fax calls aren't routing properly when the auto attendant answers. Increasing (or decreasing) this field causes the system to look for more (or less) CNG tone to detect whether it's a valid tone. This is a threshold level, so setting level too low may cause the system to route **all** calls to the fax port. The energy level of a fax signal must exceed this setting for more than 200 ms.

Range: 1–32767. **Default:** 70.

**Field 5: Name key digits**

(Generation II only.) Refers to number of digits used for the auto attendant directory branch name key¹) This is the number of digits corresponding to the number of letters the system will prompt an outside caller to enter when in an auto attendant directory branch.

Range: 1–3. **Default:** 3.

Function 166: CO parameters**Field 1: CO-to-CO conference gain**

Adjusts the volume level on CO lines when in a conference call. Increasing this level to a high setting can cause excessive noise or feedback on conference calls. This is a threshold gain level. Doubling or halving the current setting is in 6dB increments.

Range: 100–32767. **Default:** 2048.

32767	= +24dB
4096	= +6dB
2048	= 0dB
1024	= -6dB
100	= -26dB

Field 2: ARS inter-digit timer

Adjust this timer if the system disconnects the call before all digits are sent or there is an excessively long delay before the number is dialed. Sets the time **after** the first digit has been entered and **before** the entered number is accepted as being complete. This is when ARS (see Function 223, page F.16) is enabled and an outgoing call is made. Expressed in 1/100s of seconds.

Range: 40–1000 (*i.e.*, 400 ms to 10 seconds). **Default:** 500 (*i.e.*, 5 seconds).

Field 3: CO playback gain

Adjusts the volume level the system uses to play back recordings, prompts or messages to a CO line. If this value is set too low, callers into the system may not be able to hear the greeting of a mailbox or the auto attendant when either answers the call. 6 = 0dB; going up or down from there is in 3dB increments.

Range: 1–12. **Default:** 6.

(Continued)

¹ See "Function 62: Record directory names," p. J.2.

Field 4: Trunk-to-trunk CO gain

Adjust this if callers in a trunk-to-trunk connection — either through the “reach-me” feature, manual connection or auto attendant — are unable to hear or have excessive noise or feed-back. 10 = 0 dB; going up or down from there is in 3dB increments.

Range: 1–12. **Default:** 11.

Field 5: Delay before connection “beep-beep”

Adjust this if connection tones are played either too soon or too late after the system answers a CO or intercom call. Sets the amount of time before the connection “beep-beep” is started. Expressed in 1/100s of seconds.

Range: 10–100 (*i.e.*, 100 ms to 1 second). **Default:** 20 (*i.e.*, 200 ms).

Field 6: Caller ID gain

Adjust this level if Caller ID information isn't being displayed. Setting this field tells the system how much CID signal it needs to determine whether the signal is valid CID. This is a value set in the DSP and is similar to the fax energy level (see Function 165, field 4, page E.5).

Range: 1–32767. **Default:** 20000.

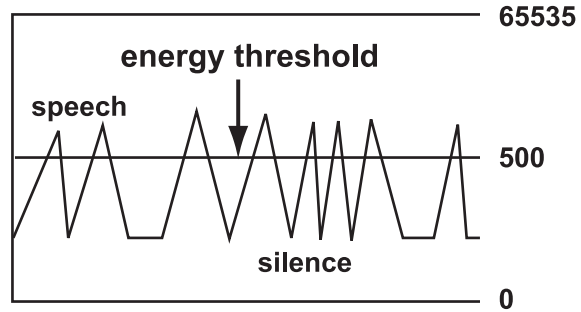
Field 7: PRI local number digit length

Tells the system whether there is seven- or 10-digit local dialing in the system's area. If the local calling area uses **only** seven-digit dialing, set this value to 7 (this tells the system not to wait for additional digits when a local seven-digit number is dialed).

Range: 7 or 10. **Default:** 10 (supports both 10- and seven-digit dialing).

Function 167: Voice mail parameters**Field 1: Energy threshold**

Adjust this downward if (a.) callers in a mailbox, on a conference call or in the auto attendant are being disconnected and/or (b.) messages in a mailbox are incomplete. Adjust this upward if mailboxes are storing messages with long periods of silence. This sets the value used to detect energy received by the system on any port. Lowering this value means less energy will be required to stay connected. Energy below this level is treated as silence.



Range: 0–65535. **Default:** 500.

Field 2: Recording silence value

This sets how much consecutive silence can be recorded in a mailbox before it stops and plays the “end of recording” prompt (537). Expressed in 1/100s of seconds.

Range: 200–3000 (2 to 30 seconds). **Default:** 350 (3.5 seconds).

Field 3: Maximum message length

Sets the maximum message length (same as in Function 51, page I.1). Expressed in minutes.

Range: 1–30. **Default:** 3.

Field 4: Page glare value

Enable this field if any extension uses pager notification and it causes line lock-up or phantom ring calls. Setting the flag to 3 in this field will cause the system **not** This field can hold up to two flags and is used to enable or disable page glare.

Range: 2 (ignore page glare **disabled**; check writes to DSP) or 3 (ignore page glare **enabled**; check writes to DSP). **Default:** 2.

Field 5: Maximum messages in Recycle Bin

Sets the maximum number of messages in the Message Recycle Bin. This is a system-wide setting.

Range: 2–40. **Default:** 10.

Field 6: Unified messaging playback timeout

Sets the maximum duration in seconds to keep the Feature Phone connected to voice mail (*i.e.*, wait for additional user entries) after a message stops playing via *VIP*

Range: 0–20 (seconds). **Default:** 4.

Feature 169: Feature set activation

Field 1: Tenant service

(Generation II only.) Enables/disables tenant service. When tenant service is enabled, stations and departments must be assigned to one of two tenants in Functions 21, 31, or 33. Tenant service affects:

- Function 21 (CO line assignment, page F.1)
- Function 225 (pilot number translation table, page F.19)
- Function 31 (extension definition and routing, page G.1)
- Function 33 (department programming, page G.12)
- Function 4 (auto attendant programming, page H.1)
- Function 63 (MOH programming, page J.3)

Default: Disabled.

Function 17: System speed-dial

Up to 100 system speed dial names and associated numbers can be stored, in location numbers 600–699, for access by any station. A user can initiate a system speed-dial by dialing the speed dial location number or by accessing the name through the Esi-Dex feature. In Function 32, access to system speed-dial can be denied to individual stations (see page G.9).

Note: System speed-dialing overrides toll restrictions (Function 32, page G.9).

1. Enter the 3-digit location number to program,
2. Enter a **ten-character** name (see “Entering alphanumeric characters,” page D.2).
3. Enter the number to be dialed (including the line group 9, 8, or 71–76). Press the left scroll key (▼) to delete any character or digit entered in error.

Important: When using PRI, **don’t** enter a pause (“P”) after the line group number. If you do, the system will send all digits after the pause as DTMF digits, and the call won’t be completed.

Here’s an example:

1.	2.	3.
Speed-dial number	Name	Number
601	AUTO RENTL	915552221212

The number dialed in Step 3 can be up to 30 digits long **including** special characters:

Code	What it produces
#	# DTMF tone
*	* DTMF tone
F	Flash hook
P	2-second pause

Use the ▲ scroll key to enter special characters; use the ▼ scroll key to backspace. Press # to confirm the inserted character and continue. Press # # to complete the entry.

Example: To create a System Speed Dial number that dials 9, then 214-555-5644, then pauses for four seconds and finally dials #104, enter the following dial string: **9 2 1 4 5 5 5 6 4 4 P # P # # # 1 0 4 #**

Deleting a speed dial number

To delete an entire speed dial number and name, delete the location number (**6 X X**) by pressing **HOLD** or the left scroll key (▼) during Step 1 in the speed-dialing procedure described above.

Function 18: Maintenance/SMDR serial port

As its name implies, the **Maintenance/SMDR** serial port on the system cabinet provides not only SMDR data but also access to system maintenance.

Note: The system will buffer up to 1,000 SMDR records (*i.e.*, 80 KB worth) in non-volatile memory when the **Maintenance/SMDR** serial port is in use for programming or uploading (such as during use of *Esi-Access*). If the buffer becomes full, the system will discard the oldest records.

SMDR

Real-time SMDR call records are continuously output to the SMDR port.

1. Select the output device by pressing the scroll keys (▼ and ▲):
 - *NONE* (Making this selection ends the process at this step.)
 - *SERIAL* (if connecting a printer or call accounting system).
 - *ETHERNET* (if connecting to a LAN through an NSP board) — Skip to Step 3.
2. The system will then prompt you for the serial port *baud rate*. You can change this rate by pressing the scroll keys (▼ and ▲).

Options: 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200 bps.
Default: 38400.
3. Select the SMDR format, *STANDARD* or *CSV*, by pressing the scroll keys (▼ and ▲).

Default: *STANDARD*.

Maintenance

A laptop PC can be connected to this port for on-line programming and diagnostics. Reports (see “SMDR,” pp. L.1–L.2) are also output to this port.

Maintenance mode begins for this port when you connect a PC to it and tap the PC's **Enter** key.

Baud rate for maintenance is the same as for SMDR (see “SMDR,” *above*).

Function 2: CO lines

The IVX E-Class system can operate on a station-by-station basis as a PBX or as a combined key/PBX using standard loop start lines. If a station has line keys programmed, the user accesses the lines by pressing one of these keys **or** by dialing **9** (or **8** or **71–76**). If a station does **not** have line keys programmed, the user **always** accesses CO lines by dialing **9** (or **8** or **71–76**). Since the system handles call transfer and auto attendant functions efficiently, operating in the PBX mode provides more programmable feature keys for other uses and the opportunity for glare is greatly reduced.

Notes: When a port card is **added to** or **removed from** the system — *i.e.*, thus changing the **number** and **configuration** of cards in the system — you must reprogram the CO lines. **However**, if a port card is replaced by the **same** type of port card (*e.g.*, when you replace a faulty 684 card with a new 684 card), you **don't** have to reprogram the CO lines.

As a visual indication of CO line usage, the phone's display will show on/off-hook line status.

All phone programmable keys default to being unprogrammed (except on extension 100, where the first key defaults as a day/night key). Use *extension button mapping* (Function 35; see page G.14) to assign line keys system-wide. An **individual** station's keys can be reassigned using either **PROGRAM 2** or "radio-key programming" at that station.

Important: Where any **gray shading** (■) appears in an example, it represents values either **unavailable** to the function or **unused** in the particular example.

Function 21: CO line programming

This function lets you program analog COs (enter **1**), T1 COs (enter **2**) or PRI COs (enter **3**).

CO PROGRAMMING
 1=ANG 2=T1 3=PRI

Important: When you modify the system configuration by changing cards, you must reprogram the CO lines.

Answer ring assignments

Each CO line can have up to four programmable **answer ring assignment** lists. The first list, "Ring 1," is used to send incoming calls on the first ring (or second ring if Caller ID is enabled) to an answer destination. The "Ring 3" list is invoked on the third ring, and so on.

Each list can be directed to be answered at up to 10 home location extensions, or a department (up to 32 extensions), a mailbox, or an auto attendant branch ID¹; these can be selected with the scroll keys. Destinations at a single remote destination (see numbered **Notes**, page F.3) can also be set as ring assignments in each list.

Ring assignments can be set to add or drop extensions, or add a department, a mailbox, or ID branch is ringing continues due to no-answer. Once a department, mailbox, or ID branch in either a home (local) location destination or remote location destination is encountered in any of the lists, no other ring assignments will be followed.

¹ For more information about ID branches, see "Function 41: Auto attendant branch programming," pp. H.1–H.6.

CO ring assignments can include the following Esi-Link¹ remote location destinations:

- Location ID (7xx) + department
- Location ID (7xx) + extension
- Location ID (7xx) + mailbox)

Default answer ring assignment for CO lines: *ID1*.

- The CO lines are numbered 1–66. An IVX 128e system connects to **either** (a.) up to **42** loop-start CO lines if it has 684 or 612 port cards installed (six lines on each port card) **or** (b.) up to **66** lines if the system has two DLC12s. An IVX 72e system connects to **either** (a.) up to **24** loop-start CO lines if it has 684 or 612 port cards installed (six lines on each port card) **or** (b.) up to **42** lines if the system has a DLC12.
- The lines installed via TI can be loop, ground, E & M, or DID.
- All CO lines are programmed to route callers during the day mode and then can be programmed to route callers differently during the night mode. The display will indicate *D* (for *day*) or *N* (for *night*) to show which mode is currently being programmed. Lines that are to be programmed alike can be *grouped* to simplify programming.

Programming examples

Here are two examples of how to implement this programming; each shows a completed programming worksheet. Example 1 is simplified, to serve as an illustration for those installations not using Esi-Link; while Example 2 depicts an Esi-Link-enabled configuration. **In each case**, the step numbers correspond to the explanation in “Function 211: Analog CO line programming,” pp. F.5–F.7.

Example 1 (Simplified; non-Esi-Link)

Incoming calls on Line 1 (default name used, here) ring live to extension 100, but are finally answered by the Main Greeting after nine rings.

1. CO	2. Name	3. Tenant	4. Out	5. Ring 1	Ring 3	Ring 5	Ring 9
1	LINE 1	1	9	X100	X100	X100	ID 1

(Continued)

¹ For more about Esi-Link, see “Function 83: Esi-Link programming,” pp. M.5–M.7.

Example 2 (with Esi-Link)**CO line 1 answer ring destination**

- First ring — Line 1 (optionally named “SALES”) rings at operator’s extension.
- Third ring — Extensions 112 and 113 at Location 702 are added.
- Fifth ring — Extension 100, and Location 702 extensions 112 and 113, stop ringing; and Location 703 extensions 101 and 102 start ringing.
- Ninth ring (*or no available Esi-Link channels for Ring 5*) — Call is answered by auto attendant.

CO line 2 answer ring destination

- First ring — Line 2 (optionally named “MFG.”) rings at extensions 118–119.
- Third ring — Line 2 rings at Department 290 in Esi-Link Location 702.
- Fifth ring — (*In this example, Ring 5 isn’t programmed. If an Esi-Link connection to Location 702 is available, the call routing will follow the call forwarding for Department 290.*)
- Failure destination (ring 9) — Line 2 rings at extension 100 if no Esi-Link channels are available to Location 702.

CO line 3 answer ring destination

- First ring — Line 3 (optionally named “TECH”) is answered by auto attendant (branch ID 4) in home location. Branch ID 4 is assigned as a GoTo: Remote branch to an ID branch at Location 703.¹

1. CO	2. Name	3. Tenant	4. Out	5. Ring 1	Ring 3	Ring 5	Ring 9
1	SALES	1	9	X100	X100 X702112 X702113	X703101 X703102	ID 1
2	MFG.	1	76	X118 X119	X702290		X100
3	TECH	1		ID 4			

Notes:

1. If a CO line ring assignment needs to go to a remote location branch ID, see “Function 41: Auto attendant branch programming” (pp. H.1–H.6).
2. Each CO line ring assignment list can have destination extensions in the home location and in only one other remote location. You may enter up to 10 extensions in either the remote location or home location.
3. If the remote location destination is a mailbox or department, no other ring assignments will be followed (see Example 2, page F.3).
4. Ring assignment list 9 will be allowed to have only home location (local) destinations entered. If all local or remote cabinet RNC channels are busy, the ring assignment to the local destination in Ring 9 will be immediately executed if there are no other local destinations in the previous ring lists.
5. If a remote location destination is assigned in a ring list **and** there are no answer ring assignments to local destinations **and** there are no Esi-Link channels available to route the call, the call will ring to the default operator assignment (factory default is X100).
6. Night mode answer ring assignments can be set to different remote locations.
7. Ring assignments will not follow the call forwarding of stations in a ring list that are call forwarded to a remote location destination.

¹ For more information about ID branches, see “Function 41: Auto attendant branch programming,” pp. H.1–H.6.

The steps for programming CO lines throughout Function 21 are:

1. Choose the CO lines to program.

Note: If performing T1 programming — Function 2121 — set trunk type emulation as explained in that function's instructions (see page F.8) **before** proceeding to the next step below.

2. Name the CO lines. **This is optional;** to retain the **default** values — “Line 1,” “Line 2” and so on — press #. (See “Optional naming of the CO lines,” *below*, for more details.)
3. Follow the remaining steps (as described herein) that are specific to the function you're programming — Function 211 (analog CO line programming), Function 2121 (T1 CO line programming) or Function 2131 (PRI CO line programming).

Optional naming of the CO lines (Step 2, above)

During this step, you **optionally** can name the CO lines you're programming. Each name can contain up to 10 alphanumeric characters. If you press # while performing this step, the default names (*e.g.*, “Line 1,” “Line 2,” etc.) will be retained.

If you select multiple CO lines to program, the name field will be left blank; at this point, you can **either** press # to keep all of the lines' default names **or**, by entering a name, assign the same name to all selected CO lines.

To change an already programmed name to the default value, press **HOLD** to delete the name and then press # while the field is blank. This restores the default values for all selected lines.

If used in conjunction with Caller ID, this feature causes the Caller ID name to appear on the first line, and the line name to appear on the second line, until the call is answered; then the phone number will appear for five seconds. After that, a call timer appears on the display. If Caller ID isn't enabled, the CO name will appear on the top line of the display. In either case, the third line of a 48-Key Feature Phone's display shows line usage.

Default: Line numbers.

Function 211: Analog CO line programming

This function allows you to program the analog COs for both day and night mode. You can select the trunk groups and ring assignments for a group of COs or individual lines. The steps are:

1. Choose CO lines to program.
2. Name the CO lines (optional).
3. Assign the CO lines' tenant.
4. Assign outbound CO line groups.
5. Assign answer rings.

1. Choose CO lines to program

During this step, you use the programmable keys to represent CO lines. Select lines to be programmed by pressing one or more of the programmable keys. Press the scroll keys (▼ or ▲) to “page” in increments appropriate for the port card configuration.¹ The display will indicate which CO lines the programmable keys currently represent.

Software will identify the port card type installed in each slot. The display will show the following information: the first line will show the port card number, the type of card, the COs available to program and a *D* or *N* for day or night mode. The second line will show the CO currently selected and the circuit that is being programmed. The appropriate programmable feature key lights will light red to indicate the lines available to program.

(Continued)

If the port card in the first slot is a 612, the display will be:

PC1	612	1-6	D
C01	CI	RCUI T	1 >

If the port card in the third slot is a 684, the display will be:

PC3	684	13-18	N
C016	CI	RCUI T	4 >

In both examples, the first six DSS LEDs glow red. Select the COs to program alike (you can scroll to select the next port card and continue to select COs to be programmed alike) and press the # key to confirm. The LEDs will now glow green.

2. Name the CO lines

This is optional; to retain the **default** values — “Line 1,” “Line 2” and so on — press #. (See “Optional naming of the CO lines,” pg. F.4, for more details.)

Note: Naming the CO lines will replace the Caller ID number (if supplied by the provider) on an incoming call. However, the number will appear after the call is answered.

¹ If all cards support only analog lines, the lines will appear in six-line increments: 1–6, 7–12, 13–18, etc. If at least one DLC is installed, the numbering plan will be different.

3. Assign each CO line's tenant

(Generation II only.) The tenant parameter¹ is used here to have each CO line follow the day/night mode of the tenant — 1 or 2 — to which it's assigned. The day/night mode can be changed **either** by the day/night programmable feature key on a station in the same tenant as the CO **or** by the day/night table assigned for that tenant in Function 43 (see page H.7).

4. Assign outbound CO line groups

CO lines can be grouped for outbound, pooled access into one of eight line groups: 9, 8, 71, 72, 73, 74, 75 or 76.

Note: A line can only be in one line group or designated as a private line.

Select the line group and press the # key to confirm. Outgoing calls will be assigned from the highest CO to the lowest available. Or, to **delete** the line group number (whereupon the line can only **receive** inbound CO line calls), press **HOLD**.

Default: 9 (i.e., all CO lines in Group 9).

Note: To assign a CO line for incoming traffic only, don't enter a CO line group here.

Private line

You can designate a line as a **private line** by entering an extension number, instead of a line group number, in this step. The line is then programmed as outlined in the following explanation, giving the private line great flexibility for handling call routing.

Notes: Private lines **don't** follow ARS.²

A private line can be assigned only to a Digital Feature Phone. A line key must be programmed on the phone to access the line for outgoing calls. If the line key is programmed on another phone, it can be used **ONLY** for incoming access (it may also serve just as a purely visual indicator).

(Continued)

¹ To view and change the tenant number, you must first have enabled tenant service in Function 169 (see page E.9).

² Automatic route selection.

5. Assign answer rings

Lines can be directed to be answered at up to 10 extensions, a department, a mailbox or an auto attendant branch ID (see “Auto attendant programming,” page H.1). The destination can be set to add or drop extensions, departments, mailboxes or ID branches if ringing continues due to no answer.

Example: First ring — Line 1 will ring at the operator's extension.
 Third ring — Extensions 112 and 113 are added.
 Fifth ring — The operator's station is dropped from ringing.
 Ninth ring — The call will be answered by the auto attendant.

CO	Name	Tenant ¹	Out	Ring 1	Ring 3	Ring 5	Ring 9
1			9	100	100 112 113	112 113	ID1

Once you have programmed all desired CO lines for day mode, repeat the programming steps for all desired CO lines for night mode.

Default: Answer on ring 1 with ID1 (main greeting) in both day and night modes.

Example: To have after hours calls directed to a general delivery mailbox, program the system as follows. During night mode, Line 1 (and other lines to be programmed alike) will be answered immediately by MB 301 (a guest mailbox set up for general delivery). The personal greeting for MB 301 might be:

“Hello, thank you for calling ABC Company. Our offices are closed. Our normal business hours are 8 to 5 Monday through Friday. Please leave a message at the tone and your call will be returned when we resume normal business hours.”

A Virtual Mailbox Key programmed at the operator's phone will allow easy pick-up of calls left during the night.

Night mode

CO	Name	Ring 1	Ring 3	Ring 5	Ring 9
1		MB301			

Note: The *CO line groups* and *Tenant* parameters aren't programmable from night mode.

¹ IVX E-Class Generation II only.

Using the DLC12 for T1 and PRI: An overview (Functions 212 through 2135)

The DLC12, one of the five available port cards for IVX E-Class, is a plug-in design that can be installed in any of the seven available card slots on the system highway. Each card provides **either** a T1 interface supporting 24 DS0 channels and 12 digital stations **or** an ISDN PRI interface supporting 23 B (bearer) channels, one D (datalink) channel and 12 digital stations. A jumper (labeled **JP6**) on the DLC12 must be plugged onto pins 5 and 6 of JP6 to enable ISDN PRI functions. For more information on the DLC12, refer to the *Digital Line Card Configuration Instructions* (ESI part #0450-0428).

Note: If jumper JP6 is removed or added to a DLC12 that's already installed, all CO line programming will return to system defaults and all of the systems' stations will revert to default settings for station options (hands-free answer, call waiting, background announce, monitor mode, outside dialtone preference, headset operation, etc.).

Function 212: DLC12 programming for T1

This function allows you to program the trunks and line parameters for the DLC12 card. The system will identify the number of DLC12 cards installed (one or two) and allow you to scroll through the 24 channels on each port card.

T1 PROGRAMMING

Function 2121: CO line programming

Note: Set **trunk type emulation**, as explained below, **before** proceeding to name any line.

Software has identified the port card type installed as a DLC12 card. The display will show the following information: the first line will show the port card number, the type of card, the COs available to program and a *D* or *N* for day or night mode. The second line will show the CO currently selected and the circuit that is being programmed. If multiple COs are selected, then the last CO selected is displayed. All DSS LEDs will glow red until selected for programming.

1. Choose CO lines to program

You can select from the first set of 24 COs on the first DLC12 card. Scrolling again will allow you to select the 24 COs on a second DLC12 card if one is installed. If there is only one DLC12 card installed, then scrolling will return you to the first 24 COs.

Note: A 24-Key Feature Phone will display only the card's first 12 COs; scroll to view the next 12 on the same card. Scroll again to see the first 12 COs on the second card (if installed).

Select the COs to program alike and press **#** to confirm. The LED will glow green and then, after a CO is programmed, the LED will glow amber. The programming of the first CO should default forward for the remaining COs selected. After the selected COs are programmed, the LED will glow amber.

For example: if the port card in the third slot is a DLC12 card, the display will be:

PC3 T112 13-36 D
CO22 CIRCUIT 10>

(Continued)

2. Select trunk type emulation

Use the scroll keys to select the **trunk type emulation**: either *E&M DNIS/DID*, *E&M*, *LOOP START* or *GROUND START*. Press # to confirm. (Default is *E&M DNIS/DID*.)

```
TRUNK EMULATION
E&M DNIS/DID >
```

If **LOOP START** or **GROUND START** is selected, continue with the outbound CO line groups and answer ring assignment.

If **E&M DNIS/DID** is selected, the lines are routed to the DNIS/DID table. After the E&M programming is complete, name the CO lines and then select the outbound CO line groups.

If **E&M** is selected, the lines are routed to the answer ring assignment. After the E&M programming is complete, name the CO lines and then select the outbound CO line groups and the answer ring assignment.

To **complete** the programming of the E&M trunks selected:

1. Use the scroll keys to select the **outgoing signal type** — *WINK START*, *IMMEDIATE START* or *DIAL TONE START*. Press # to confirm. Default is *WINK START*.

```
OUTGOING SIGNAL
DIAL TONE START>
```

2. Use the scroll keys to select the **incoming signal type** — either *WINK START* or *IMMEDIATE START*. Press # to confirm. Default is *WINK START*.

```
INCOMING SIGNAL
IMMEDIATE START>
```

3. Use the scroll keys to select the **trunk mode** — *2-WAY TRAFFIC*, *INBOUND ONLY* or *OUTBOUND ONLY*. Press # to confirm. Default is *2-WAY TRAFFIC*.

```
TRUNK MODE
2-WAY TRAFFIC >
```

4. Use the scroll keys to set **dial tone transmit** to either *OFF* or *ON*. Press # to confirm. Default is *OFF*.

```
DIAL TONE TRANS.
OFF >
```

5. Use the scroll keys to set **ringback transmission** to either *OFF* or *ON*. Press # to confirm. Default is *OFF*.

```
RINGBACK TRANS.
OFF >
```

3. Name the CO lines

This is **optional**; to retain the **default** values, press #. (See "Optional naming of the CO lines," pg. F.4, for more details.)

(Continued)

4. Assign each CO line's tenant

The tenant parameter¹ is used here to have each CO line follow the day/night mode of the tenant — 1 or 2 — to which it's assigned. The day/night mode can be changed **either** by the day/night programmable feature key on a station in the same tenant as the CO **or** by the day/night table assigned for that tenant in Function 43 (see page H.7).

5. Assign outbound CO line groups

Select the line group — 9, 8, 71, 72, 73, 74, 75 or 76 — and press # to confirm. Outgoing calls will be assigned from the highest CO to the lowest available. Default is 9. (You can designate a private line by entering an extension number instead of a line group in this step.)

6. Make answer ring assignments

Note: Ring assignments don't apply to E&M DID. See Function 224 (pages F.17–F.18) for translation table.

Lines can be programmed with four different ring assignments — Ring 1, Ring 3, Ring 5 and Ring 9. Each ring count can be programmed for up to 10 extensions, a department, a mailbox or an auto attendant branch ID. E&M lines must be answered by the auto attendant under Ring 1.

After all lines are programmed for day mode, the steps are repeated for night mode.

Function 2122: T1 frame format and line coding

Use the scroll keys to select the frame format and line coding — either *ESF/B8ZS*, *SF/AMI*, *ESF/AMI* or *SF/B8ZS*. Press # to confirm. Default is *ESF/B8ZS*.

```
P-CARD 3    DLC12
FF/LC ESF/B8ZS >
```

If a second DLC12 card is installed, the system will alternate to the next port card. Use the scroll keys to select the frame format and line coding. Press # to confirm.

Function 2123: Line build-out

Line compensation (or *line build-out*) is provided, as necessary, between the CSU and Smart-Jack and the IVX E-Class system. This function allows you to adjust the line build-out of the DLC12 card. The level programmed depends on the application (CSU or DSX-1) indicated in the following table.

Level	CSU line build-out	DSX-1 line build-out
1	0 dB	0 to 133 feet
2	N/A	133 to 266 feet
3	N/A	266 to 399 feet
4	N/A	399 to 533 feet
5	N/A	533 to 655 feet
6	-7.5 dB	N/A
7	-15 dB	N/A
8	-22.5 dB	N/A

Use the scroll keys to select the line build-out and press # to confirm. Default is 1.

If a second DLC12 card is installed, the system will alternate to the next port card. Select the line build out with the scroll key. Press # to confirm.

¹ To view and change the tenant number, you must first have enabled tenant service in Function 169 (see page E.9).

Function 2124: CSU emulation

Use the scroll keys to toggle between enabled and disabled. **Default:** Off. If there is no external CSU, the CSU emulation setting should be set to *On* but the remaining options should be left at the default setting of *Off*. When CSU emulation is enabled, the following test options will be available and **should be used only at the request of the carrier**.

Test option*	Description	Options	Default
ATT PRF	Loopback test per AT&T spec 62411 for performance assessments, sent to the carrier on ESF trunks only.	On/Off	Off
ANSI PRM	Loopback test per ANSI spec T1.403 for performance assessments, sent to the carrier on ESF trunks only.	On/Off	Off
PLB	(Payload loopback.) Accepts signal from the carrier at the chip level, puts it through the framer (de-frames and re-frames signal with data staying the same) and sends it back to the carrier. Used to determine whether the chip itself is functioning correctly.	On/Off	Off
LLB	(Line loopback.) Sends the signal back right at the point it enters the chip before it enters the framer. Helps determine whether the line itself is good.	On/Off	Off
NET LLB	(Network loopback.) Lets the carrier put the DLC's CSU into any of the loopback modes.	On/Off	Off

* Test options available only when CSU emulation is set to On.

Warning: The default setting is **Off** for those systems using an external CSU. If there is no external CSU, the CSU Emulation setting should be set to *On* **but** the remaining options should be left at the default of *Off*. **Use these other settings ONLY at the request of your carrier or the phone system manufacturer for testing purposes.**

Function 213: DLC12 (PRI) programming

The options under Function 213 are used to configure the DLC12 card for an ISDN PRI line with 23 B channels and one data channel (24). The first line of the display will indicate the card number and the type of card. The frame format and line coding will default to the ISDN standard of ESF/B8ZS.

One of the main features of PRI is *dynamic channel allocation*, meaning all telephone numbers on the PRI span can come in over any of the 23 channels. This eliminates the need to forecast call volume for the main published number, because as few as one channel or as many as 23 channels can be occupied at any time by callers to the main published number. For example, channels 1–20 can be occupied by callers to the main published number while channels 21–23 are open or occupied with DID callers; later, channels 1–15 can be occupied by DID callers while channels 16–23 are open or occupied by callers to the main number.

The components required for programming are CO line programming (Function 2131) and Switch protocol (Function 2134). In addition to the required fields, there are also fields for line build-out (Function 2132), CSU emulation (Function 2133) and DID enable/disable (Function 2135) that typically are left off at default.

Function 2131: PRI CO line programming

The 23 voice channels support both inbound and outbound traffic. Answer ring assignments must be assigned for daytime and night routing. This routing will be followed only if DID is disabled. Because of the dynamic channel allocation on PRI, there is no control over the channel any given number rings in on. For this reason it is recommended that all channels be routed the same. For maximum flexibility, we allow each channel to be selected individually. For example: in some cases, the outbound line group needs to be different or possibly have the first five channels be live-answer, then send the overflow to ID 1.

When performing the CO line programming, remember that there are only 23 channels; the 24th channel is used for signaling, so it does not take up a port and it needs no programming. If the PRI card is in the first slot, the COs will be 1–23 and the next card will start with CO 24.

1. Choose CO lines to program

Using the programmable feature keys, select the line keys to be programmed.¹ Press # to confirm.

2. Select Dialtone transmit on or off. Default: Off.

3. Select Ringback transmit on or off. Default: Off.

4. Name the CO lines

This is optional; to retain the **default** values, press #. (See “Optional naming of the CO lines,” pg. F.4, for more details.)

5. Assign each CO line's tenant

The tenant parameter² is used here to have each CO line follow the day/night mode of the tenant — 1 or 2 — to which it's assigned. The day/night mode can be changed **either** by the day/night programmable feature key on a station in the same tenant as the CO **or** by the day/night table assigned for that tenant in Function 43 (see page H.7).

6. Assign outbound CO line groups

Enter the CO line group (9, 8 or 71–76).

(Continued)

¹ If using a 24-Key Feature Phone to program, use the scroll keys to select lines 13–23.

² To view and change the tenant number, you must first have enabled tenant service in Function 169 (see page E.9).

7. Make answer ring assignments

Lines can be programmed with four different ring assignments — Ring 1, Ring 3, Ring 5 and Ring 9. Each ring count can be programmed for up to 10 extensions, a department, a mailbox or an auto attendant branch ID.

Notes: Ring assignments don't apply if DID is enabled in Function 2135.

After you program a ring assignment for a department, mailbox or ID branch, no remaining ring assignments will be required because, upon reaching any of these, the call is considered answered.

Example:	Ring 1	Ring 3	Ring 5	Ring 9
	X100	X100, X101, X102	ID1	Not used (system won't prompt you to program)

8. Repeat if needed for night programming

Repeat steps 1–7 for night programming.

Function 2132: Line build-out

Use the arrow keys to select a value of 1–8 (you can make one selection per installed DLC12). Press the # key to confirm. The level programmed depends on the application (CSU or DSX-1) indicated in the following table:

Level	CSU line build-out	DSX-1 line build-out
1	0 dB	0 to 133 feet
2	N/A	133 to 266 feet
3	N/A	266 to 399 feet
4	N/A	399 to 533 feet
5	N/A	533 to 655 feet
6	-7.5 dB	N/A
7	-15 dB	N/A
8	-22.5 dB	N/A

Default: 1.

Function 2133: CSU Emulation

Use the arrow key to toggle between On and Off.

Default: Off.

If there is no external CSU, the CSU Emulation setting should be set to On but the remaining options should be left at the default setting of Off. When CSU emulation is enabled, the following test options will be available and **should be used only at the request of the carrier**:

- ATT PRF — Loopback test per AT&T spec 62411 for performance assessments, sent to the carrier on ESF trunks only.
- ANSI PRM — Loopback test per ANSI spec T1.403 for performance assessments, sent to the carrier on ESF trunks only.
- PLB (payload loopback) — Accepts signal from the carrier at the chip level, puts it through the framer (de-frames and re-frames signal with data staying the same) and sends it back to the carrier. Used to determine if the chip itself is functioning correctly.
- LLB (line loopback) — Sends the signal back right at the point it enters the chip before it hits the framer. This helps determine if the line itself is good.
- NET LLB (network loopback) lets the carrier put the DLC12 card's CSU into any of the loopback modes.

Function 2134: Switch protocol selection

Use the scroll keys to select from the four switch options for your carrier.

- Nortel – DMS100
- AT&T/Lucent – 5ESS
- National – NI2 - Default
- Siemens - EWSD

Note: Most switches can emulate the various protocols. Please be sure to base your selection on the protocol being used rather than the actual switch manufacturer. For example, your central office could have a Nortel DMS 100 switch but have the span configured as NI2; in this instance, you would select the option for National/NI2.

Warning: After changing the switch protocol, be sure to **finish** programming all other remaining options **before** exiting programming mode (as needed, press # to accept current entries for function parameters you're not changing). Then, **wait at least four (4) full minutes** and power-cycle the system.

Function 2135: DID

With DID enabled, call processing will check first the pilot number table and then the DID table, and route the call accordingly. Any number not found in the pilot number or DID tables (programmed in Functions 224 and 225) will be routed to the DID exception routing. With DID disabled, all calls will follow the routing as programmed in PRI CO line programming (Function 2131).

Default: Disabled.

Function 22: Translation table programming

Function 221: Centrex/PBX access code

If the system is to be used behind Centrex or another PBX, you must list the **dial access code** used to gain access to a CO line from Centrex or the PBX, so that toll restriction can ignore the access code digit(s). Users must dial the access code after accessing a line by **either**:

(a.) Dialing **9, 8, 71, 72, 73, 74, 75** or **76**.

or

(b.) Pressing a line key (if programmed)

The access code can be one or two digits — e. g., 9, 81, etc. — and must be programmed for each line group.

Default: 0.

Note: You must set the flash duration in Function 151 (page E.3) for the requirements of the host switch.

Function 222: Toll restriction exception tables

The system's toll restriction is based on outbound calls being defined as either *toll calls* (i.e., calls in the *deny table*) or *non-toll calls* (calls in the *allow table*). Four tables exist for this purpose:

1. Allow exception table (programmable). Up to 100 entries; no entry can exceed 26 digits.

Default: No entries.

2. Deny exception table (programmable). Up to 100 entries; no entry can exceed 26 digits.

Default: No entries.

A number listed in the **allow** exception table — e.g., a branch office or vendor's location — will be *allowed* to all stations, regardless of how they're set in Function 32 (see page G.9). Conversely, a number listed in the **deny** exception table (e.g., a "1-900" number) will be *denied* to all stations.

3. Fixed allow table (not programmable).

Default: 1800, 1888, 1877, 1866, 1855, 1844, 1833 and 1822.

4. Fixed deny table (not programmable).

Default: 976, 1976, 1xxx976, 900, 1900, 1xxx900, 555, 1555, 1xxx555, 0, 10, 411, 1411 and 11+-digit restriction.

As part of extension feature authorization (Function 32; see page G.9), each station is programmed to be allowed or denied toll calls by following the fixed tables when they are programmed with an "N," as well as following the allow and deny exception tables (i.e., overriding the fixed tables). All stations that have been assigned access to a line group can make non-toll calls.

To program the allow and deny exception tables:

1. Enter the numbers for either table, separating each number by #.

Example: For "1-900," enter **1 9 0 0 #**.

Note: Press **MUTE/DND** to insert a "wild card" digit. A "wild card" digit is needed only when followed by more numbers; e.g., to allow/deny 1-555, enter just **1 5 5 5 #** — however, to allow/deny all "1+" area codes and 555, enter **1 X X X 5 5 5 #** (where **X** indicates a pressing of **MUTE/DND**).

Warning: Do **not** include IVX line access codes (9, 8 or 71–76) in **any** of the toll restriction entries.

(Continued)

2. After the last number, enter **# #** to end the list. The IVX E-Class system will apply the numbers you enter to their most significant digit.

Example: Entering **1 5 0 5** into the deny exception table tells IVX to deny **all** “1+” calls to area code 505. **But** entering **1 5 0 5 5 5 8 7 8 7** into the table tells IVX to deny “1+” calls **specifically** to (505) 555-8787 while **allowing** *other* “1+505” calls.

To allow information calls, enter into the allow table: 411, 1411, 5551212, 1XXX5551212 (where X is a wild card digit, entered by using **MUTE/DND**).

Default: None.

Function 223: Automatic route selection (ARS)¹

Within the IVX E-Class system, route selection is normally accomplished by assigning lines to line groups (9, 8, or 71-76). The user then manually selects the line group for the type of call to be made. Typically, the same carrier handles both local and long distance calls so the user will only have to select an alternate group (8 or 71-76) for rare occasions.

If DLC12 cards are used, different line groups may be required to allow the user to access the local loops (via regular loop lines or T1) and long distance trunks (via T1). ARS is designed to eliminate the need for the user to manually select a line group when calling in this situation (such as 9 for local and 8 for LD).

If ARS has been enabled in Function 223, the system will not connect to a line immediately when the user dials 9 (or goes off-hook with outside dial tone preference enable). Instead, the system will “play” outside dial tone to the user, store the digits dialed, and check the toll restriction tables and if allowed, then determine the ARS call type: Local (9), LD (8), or other (9).

If the call is determined to be “Local,” it will then be dialed on a line in line group 9. If the call is determined to be an “LD” call, it will be placed on a line programmed in line group 8. Therefore, if ARS is to be used, local lines must have been programmed in line group 9 and lines for long distance calls must have been programmed in line group 8 in CO line programming (Function 21).

In addition, a list of area codes or numbers can be created that will be dialed on the programmed line group and Other Common Carrier code².

Example:

	Table	Line group(s)	OCC	Definition
Fixed	1	9		7 or 10 digits, information
	2	8		1+, 0+, 01+, 011+, or 101XXXX
	[3-10]	9, 8, 71-76	101XXX	1+XXX, 1+YYY, etc.

(Continued)

¹ A DLC card is not necessary for ARS.

² A code (e.g., 1010) to be dialed before the actual number, often to connect with a specific long-distance provider.

Function 223 ARS is programmed as follows:

1. Enable/disable ARS (default is *DISABLED*).
2. Select the ARS table to program (3–10).
3. Use the scroll key to select the line group.
4. Enter Other Common Carrier numbers.
5. Enter numbers for the table, separating each number by #.

Example: For “1-976,” enter **1 9 7 6 #**.

Note: Press **MUTE/DND** to insert a “wild card” digit. The **Hold** key will delete an entry.

Warning: Do **not** include IVX’s line access codes (9, 8, 71, 72, 73, 74, 75 or 76) in **this table**.

IVX will apply the numbers you enter to their most significant digit.

Examples: Entering **1 5 0 5** into the table tells IVX to place **all** “1+” calls to area code 505 to the line group and Other Common Carrier listed.
 Entering **1 5 0 5 5 5 8 7 8 7** into the table tells IVX to place “1+” calls **specifically** to (505) 555-8787 to the line group and Other Common Carrier listed while *other* “1+505” calls will follow regular LD routing to line group 8.

After the last number, enter **# #** to end the list. Enter another list or press **#** to exit.

Note: Toll restriction, as set in Functions 222 and 32, will be applied to calls before released.

Function 224: DID and DNIS translation table

A translation table is programmed to translate DID or DNIS routing numbers to the corresponding ID (**ID**), mailbox (**MB**) extension (**EXT**) or department with both day and night destinations. IVX E-Class supports up to 4-digit DID and DNIS/ANI. Up to 300 numbers can be programmed into the table (multiple numbers programmed to the same destinations). An entry for exceptions is provided and can be programmed for an ID (**ID**), mailbox (**MB**) extension (**EXT**) or department.

Default: Operator.

DI D/DNI S TABLE
DI D/DNI S #: 3352>

DI D/DNI S TABLE
EXCEPTI ON: >

(Continued)

To program the translation table:

1. **Either** enter the DNIS or DID number **or** use the scroll keys to select a previously programmed number or exception.

Notes: Pressing the right scroll key will start with a blank number field for entry and continue through all previously programmed numbers, ending with the exception entry (continuing to scroll will start over the blank entry). Pressing the left scroll key will start with the exception entry, continue in reverse order with previously programmed numbers and end with the blank number entry (continuing to scroll will start over with the exception entry). Pressing **HOLD** will delete an entry.

2. Press the **#** key. The system will prompt you to enter a name for this DID line; the name will appear on the bottom line of the display of a station using the line.
3. Enter the desired name (see “Entering alphanumeric characters,” page D.2).
4. Press the **#** key. The system will prompt you for the day mode call routing.
5. Use the scroll keys to select whether you’re routing to a branch (ID), mailbox (MB), or extension or department (EXT); then enter the number. Here are two examples, based on the example table below:

DI D/DNI S #: 3352
DAY ID: 12 >

EXCEPTI ON:
DAY EXT: 100 >

6. Press the **#** key. The system will prompt you for the night mode call routing.
7. Use the scroll keys to select whether you’re routing to a branch (ID), mailbox (MB), or extension or department (EXT); then enter the number. Here are two examples, based on the example table below:

DI D/DNI S #: 3352
NI GHT MB: 400 >

EXCEPTI ON:
NI GHT EXT: 100 >

8. Press the **#** key to finish.

Note: The **HOLD** key will delete an entry.

Example:

DID or DNIS	Name	Day translation	Night translation
3578		X105	X105
3624		X290	MB410
3352		ID12	MB400
<i>Exceptions</i>		Operator (X100)	Operator (X100)

Function 225: Pilot number translation table

Note: This feature is accessible only if Function 2135 (page F.14) is enabled.

Every call on a PRI span is sent with the called number in the setup message. This means you can determine whether to use a number as a pilot number or as a DID number. Pilot numbers are a means of routing a company's primary published phone number differently from a DID. The system supports up to five pilot numbers, each with its own answer ring assignment. This is important, because the dynamic channel allocation prevents you from routing based on channel.

Pilot numbers can be routed to an ID branch, department, extension or mailbox. This varies from DIDs in that, when a DID number is routed to an extension, it is considered answered and follows the busy/no-answer routing of the extension; but, with pilot numbers, the call will be routed to the extensions for live answer for the designated number of rings, then can be routed to an ID branch in the event of busy/no-answer. If the PRI span is used for outgoing calls, pilot table entry 1 is used for outgoing Caller ID, as well. Because of this, pilot number entry 1 should always be programmed with 10 digits.

Max Channels value

Max Channels is the maximum number of channels that can be used simultaneously for incoming calls to a particular pilot number. Incoming calls to that pilot number are rejected (CO plays busy signal) when the Max Channels value is exceeded for the pilot number. Max Channels is applicable only to incoming calls.

Note: The sum of maximum channels of all PRI pilot numbers must not exceed 23.

1. Use the scroll keys to select the entry number.
2. Enter the pilot number, two to 10 digits in length.¹
3. Enter the name for the pilot number.
4. Enter the maximum channels allowed for this pilot number.

Range: 1–23. **Default:** 23.

5. Set answer ring assignments for both day and night modes.

Note: For programming information, see step 4 in Function 2131 (page F.13).

6. Repeat steps 1–5 for the remaining pilot numbers.

Example:

Entry no.	Pilot no.	Name	Max Chs.	Day				Night			
				Ring 1	Ring 3	Ring 5	Ring 9	Ring 1	Ring 3	Ring 5	Ring 9
1	2145551452	ABC Co.	16	X100	X100, X101	X101	ID1	MB100	MB100	MB100	MB100
2	2145551245	Private line	1	X106	X106	MB106		MB106	MB106	MB106	
3											
4											
5											

Tenant service and pilot numbers

If tenant service is enabled, the first pilot number — *i.e.*, entry 1 — is used for tenant 1's outgoing Caller ID and entry 2 is used for tenant 2's outgoing Caller ID. When a station (or the station's voice mailbox) originates an outgoing call via a PRI channel, the pilot number of the station's tenant will be used for that call's outgoing Caller ID. Also: any auto attendant outdial branches that originate from branch ID 1 will use Caller ID for tenant 1, and branch ID 2 will use Caller ID for tenant 2.

¹ If the pilot number has fewer than 10 digits, the system will use only the rightmost digits of the called number.

If two PRI circuits (port cards) are installed

Example A: Pilot number to either PRI port card

Where there are two PRI port cards installed, a pilot number can have calls directed to it from one or both of the cards. The Max Channels value entered sets the maximum number of channels the pilot number will use for each PRI port card. Therefore, the Max Channels value can't exceed 23 for each pilot number, even if there are two PRI port cards installed.

A customer has two PRI port cards (46 channels). Both PRI port cards handle calls to the main pilot number (972 555-3200) and Customer Service department (972 555-3300). Up to 32 channels can be used for calls to the main number, and up to 10 channels can be used for Customer Service calls. Since there are two PRIs, the Max Channels value to assign is half of the actual number of channels for each pilot number.

In Function 225, pilot number 972 555-3200 will be assigned a Max Channels value of 16, and pilot number 972 555-3300 will be assigned a Max Channels value of 5. This is because $16 \text{ Max Channels} \times 2 \text{ PRIs} = 32 \text{ actual maximum channels}$ for pilot number 972 555-3200. Similarly, pilot number 972 555-3300 will have 10 actual maximum channels.

Entry number	Pilot number	Max Channels
1	9725553200	16
2	9725553300	5

Example B: Pilot number to one PRI

There can be instances wherein one pilot number takes incoming calls from one PRI and another pilot number is used to take calls from the second PRI. In this case, don't divide the maximum channels by the number of PRIs installed.

A customer has two PRI port cards (46 channels). The first PRI has a toll-free pilot number (800 555-4141) that directs incoming calls to the Customer Service department, and can use all 23 channels of that PRI. The second PRI uses a pilot number to direct calls to the main business number (214 555-5678); up to 12 channels can be used for that pilot number.

Each of the pilot numbers are assigned to individual PRIs; so, in Function 225, pilot number 800 555-4141 will be assigned a Max Channels value of 23, and pilot number 214 555-5678 will be assigned a Max Channels value of 12.

Entry number	Pilot number	Max Channels
1	8005554141	23
2	2145555678	12

Function 23: CO line parameters

Function 231: System CO line receive volume

Many variables can affect the volume of the CO lines. Weak lines can reduce the IVX E-Class system's ability to properly detect DTMF dialed by an outside caller. Conversely, "hot" lines can cause DTMF distortion and/or increase the opportunity for message talk-off (*i. e.*, messages being cut off before completion). Ideally, a message recorded from an outside call has the same playback volume as the system prompts.

This function can be used to adjust the gain of the receive volume of the CO lines system-wide.

Range: 0–12 (lowest to highest gain, respectively). **Default:** 10.

Function 232: Line disconnect

You can set the lines to detect the open loop interval (if available from the CO) and disconnect more quickly. This will also allow the system to:

- Drop abandoned calls from hold.

- Reduce the opportunity for abandoned calls to be transferred by the auto attendant

- Reduce the possibility that abandoned calls could create messages that are either silent or contain CO-generated tones.

Since open loop intervals generated by the CO may vary in duration, use this function to program IVX to less than or equal to the CO open loop interval.

If this programmed value is set unnecessarily low, the IVX E-Class system may falsely interpret static or a momentary loop break as an open loop and disconnect a caller on hold or in the process of leaving a message. If this value is set too high, the IVX E-Class system may not detect a valid open loop signal for fastest call processing.

Range: 1–255 (10–2,550 ms) (or **0** to turn off open loop detect). **Default:** 6 (60ms).

Function 233: DLC12 line receive volume

Many variables can affect the volume of the T1 lines. Different volume levels may be required when connecting a DLC12, depending on the signal level of the T1. The volume level can be adjusted by increasing or decreasing the digital pad setting. By default, the digital pad setting is –2 db. Changes to the setting are in 2-db increments.

Example: If calls received at the extension have low volume levels, the pad level for that T1 circuit can be adjusted to increase the volume. Select the circuit to adjust by pressing the appropriate programmable feature key and press **#** to confirm. Use the scroll keys to select the appropriate db level and press **#** to confirm.

Programming a circuit

To program a circuit, select the appropriate programmable feature key and press **#** to confirm. You can select from the first set of 16 COs, and then press the scroll keys to select from the remaining eight CO lines on the first DLC12. Scrolling again will allow you to select the 16 COs on a second DLC12 if one is installed, and scrolling again will allow you to select from the 8 remaining COs. If there is only one DLC12 installed, then scrolling will return you to the first 16 COs.

PC3 DLC12 13-36
C022 CIRCUIT 10>

After selecting the COs to program, use the scroll keys to select the new level of gain or loss in db. Press **#** to confirm. Select additional circuits to adjust and program as above.

RECEIVE VOLUME
LINE COMP -28DB>

Range: -28 db to 6 db (lowest to highest gain, respectively). **Default:** -6 db.

Function 234: PRI receive volume

Many variables can affect the volume of PRI lines. Different volume levels may be required when connecting a DLC12, depending on the signal level of the PRI line. The volume level can be adjusted by increasing or decreasing the setting in this function. By default, the setting is –6 dB; changes to the setting are in 2-dB increments.

Example: If calls received at the extension have low volume levels, the pad level for that PRI circuit can be adjusted to increase the volume. Select the circuit to adjust by pressing the appropriate programmable feature key and press **#** to confirm. Use the scroll keys to select the appropriate dB level and press **#** to confirm.

Programming a circuit

To program a circuit, select the appropriate programmable feature key and press the # key to confirm. You can select the 23 CO lines on the first DLC12. Scrolling again will allow you to select the 23 COs on a second DLC12 if it's installed.

```
PC3 PRI 13-36
C022 CIRCUIT 10>
```

After selecting the COs to program, use the scroll keys to select the new level of gain or loss in dB. Press # to confirm. Select additional circuits to adjust and program as above.

```
RECEIVE VOLUME
LINE COMP -28DB>
```

Range: -28 dB to 6 dB (lowest to highest gain, respectively). **Default:** -6 dB.

Function 24: Caller ID

This function activates the Caller ID capability in the IVX E-Class system — **if** the customer has ordered Caller ID service from the Telco. The IVX E-Class system will display the caller's name (or "out-of-area," etc.) for incoming calls or messages (or show the Caller ID number if the CO only provides a number). **Default:** Disabled.

Esi-Dex and auto callback — This is accomplished by pressing **REDIAL** or **ESI-DEX** either during message playback or after an Esi-Dex search. Caller ID numbers received from the CO are 10 digits long (and include the area codes for local calls). **In auto callback, the IVX E-Class system assumes all calls are to be long distance and will automatically add a "1" prefix to the 10 digits to be dialed.**

A table of local area codes can be programmed to indicate that calls to those area codes are to be dialed as local calls. Select one of the following two types of **local** dialing for each area code entered:

- **Local 7** — Local calls that can be dialed only as seven-digit numbers (the IVX E-Class system strips the area code before dialing and will **not** add a "1" prefix).
- **Local 10** — Local calls that can be dialed only as 10-digit numbers (the IVX E-Class system will **not** add a "1" prefix).

For an area code that can be called as a long distance number (with a "1" prefix) **and** as a local number (10 digits without a prefix), decide which case is the more prevalent and then add to or exclude from the area codes exception list accordingly. Thus, some of these calls must be made manually.

Notes: Since the Caller ID information is transmitted from the CO during the silence between the first and second rings, enabling this feature will delay the answer of inbound calls until the second ring.

ESI Caller ID works with the standard ring cycle — two seconds on, four seconds off.

Analog stations cannot use the auto-callback feature.

Function 3: Extension programming

This section provides programming for extensions and department groups.

Important: Where any **gray shading** (■) appears in an example, it represents values either **unavailable** to the function or **unused** in the particular example.

Function 31: Extension definition and routing

Extensions can be either:

- **Digital Feature Phone** extensions (*DIGITAL* in the chart below and succeeding charts)
- **Analog** ports (*EXT*, *FAX*, *MODEM*, *RINGER* or *DOOR* in the same charts)
- Local **IP Feature Phone** extensions (*IP PHONE* in the charts)
- **Remote IP Feature Phone** extensions (*REMOTE IP* in the charts)

Digital, analog, and IP Phone¹ extensions may be 100–183, inclusive.

Digital Feature Phones

Below is an example of the portion of a completed programming worksheet (Appendix II) for Digital Feature Phones.

1. Ext.	2. Type	3. Name	4. Tenant	5. CO	6. CF day	7. CF night	8. Pg zone	9. Ext.
0		Operator	1		X100	X100		X100
100	DIGITAL	Jane	1	9	MB100	X105	0,1,2	
101	DIGITAL	Roger	1	9	MB101	MB101	0	
102	DIGITAL	Sally	1	9,8	MB102	MB102	0,1	
109	EXT	Roger 2	1	9	MB110	MB106		
110	FAX	FAX	1					

Note: 100 defaults as OPR (when a user dials 0); 101 is an example of system default.

Each programming step for Digital Feature Phone extensions is defined as follows:

1. **Extension number** — Extension numbers range from 100 to the highest number of ports installed and must match the port numbers as connected to the system. If you enter 0 (zero), skip to step 6.
2. **Type** — Based on the port card installed, IVX E-Class assigns the port as *digital*.²
3. **Extension name** — Used for the display, reports, and as a programming aid. The name's length can be no longer than 10 characters (See "Entering alphanumeric characters," page D.2).

Default: The extension number.

(Continued)

¹ IP Phone extensions will be assigned depending on what slot in which the IVC is installed.

² For programming of analog ports, see pages G.2–G.7.

- 4. Tenant** — (*Generation II only.*) Assign the extension to a tenant (either 1 or 2). This is used to direct-dial operator (**0**) calls to the tenant's operator destination; it's also used to play the tenant's MOH source when calls are placed on hold.

Note: To view and assign tenant, tenant service must be enabled in Function 169.

Default: 1.

- 5. CO line group** — Assigns the extension's ability to access one **or more** CO line groups (9, 8, and 71–76).

Default: 9.

- 6. Call forward busy/no answer for day mode** — The extension can be set to call forward busy/no answer to another extension (or department), a mailbox or a branch ID for day mode.

Default: The extension's mailbox.

- 7. Call forward busy/no answer for night mode** — Same as previous item, except night mode.

Default: The extension's mailbox.

- 8. Extension page zone assignment** — List the page zones (1–6, 8–9) that are to include this extension. (All stations are in all-page, and this cannot be edited.)

Default: 0 (all-page).

The overhead paging port (extension 199) can be paged along with other extensions in a zone by including the desired page zone(s) for extension 199.

All digital phone extensions are included in (and cannot be removed from) the all-page zone.

Analog extensions cannot be included in page zones.

- 9. Operator translation** — Extension **0** (Operator) programming requires:

- Programming call forwarding for day and night mode (steps 5 and 6).
- Entering the extension number to which calls are to be directed when someone dials **0**.

Default: 100.

Notes: If you want more than one extension to ring when someone dials **0**, you must build a department in Function 33 (see page G.12) and enter the department in column 9 on page G.1. If operator translation is directed to a department or branch ID, and a call to the operator is not answered, operator call forwarding takes precedence.

Analog ports

The last four station ports on a 684 port card, and all 12 ports on an A12 port card, are analog ports¹ and can be programmed only as follows:

1. Ext.	2. Type	3. Name	4. Tenant	5. CO	6. CF day	7. CF night
0		Operator	1		X100	X100
100	DIGITAL	Jane	1	9	MB100	X105
101	DIGITAL	Roger	1	9	MB101	MB101
102	DIGITAL	Sally	1	9,8	MB102	MB102
109	EXT	Roger 2	1	9	MB106	MB106
110	FAX/MODEM/RINGER/DOOR	FAX/MODEM/RINGER/DOOR	1	9	ID9999	ID9999

Note: All analog ports will send Caller ID of station calls and (where CID service is available) of CO line calls.

¹ IVX 128e can have as many as 28 analog ports and as many as three A12 cards; IVX 72e can have as many as 16 analog ports and as many as two A12 cards. However, the last eight stations on the last installed card won't work.

Here are the steps for programming analog ports:

1. **Extension number** — Analog port extension numbers must be as shown, corresponding to the 684 or A12 port card installed in the indicated position:

684 card					A12 card	
1st	108	109	110	111	1st	100–111
2nd	120	121	122	123	2nd	112–123
3rd	132	133	134	135	3rd	124–135
4th	144	145	146	147	4th	136–147
5th	156	157	158	159	5th	148–159
6th	168	169	170	171	6th	160–171
7th	180	181	182	183	7th	172–183

2. **Type** — If *ANALOG PORT* is selected, then the ports can further be defined as follows; the words in parentheses (**EXAMPLE**) indicate what the display will show in each case.

Note: If DTMF digits are to be received by a device connected to an analog station port (*i.e.*, IVR, zone paging, *etc.*), the analog port type **must** be assigned as either **EXT** or **DOOR** (*below*).

- **Phone (EXT)** — Designed to provide for standard 2500 type phones. See the *User's Guide* for complete description of the capabilities.
 - **Common ringer (RINGER)** — Connected via a tip and ring pair; will apply ring voltage whenever a line rings in night mode or when a call is directed to it (transfer, call forwarding, CO ring, *etc.*). **No other programming follows when you select this type.**
 - **Fax (FAX)** — If the Auto Attendant detects a fax tone, it will automatically forward the tone to the analog port programmed as FAX.
 - **Modem (MODEM)** — Incoming calls for a modem can be manually transferred to the modem extension; also, the modem can automatically generate outbound calls. Maximum connect speed through the PBX is 9600 bps.
 - **Door phone (DOOR)** — A telephone connected to this port will automatically dial the programmed ring-down extension number whenever the set is taken off-hook.
3. **Extension name** — This is used for the display, reports, and as a programming aid. The maximum length is 10 characters (See “Entering alphanumeric characters,” page D.2).

Default: The type selected.

Note: The name for the ringer and door can be changed in Function 32.

4. **Tenant** — Assign the extension to a tenant (either 1 or 2). This is used to direct-dial operator (0) calls to the tenant's operator destination; it's also used to play the tenant's MOH source when calls are placed on hold.

Note: To view and assign tenant, tenant service must be enabled in Function 169.

Default: 1.

5. **CO line/ring down** — For fax, modem, or phone, select the desired line group — 9, 8, or 71–76.

Default: 9.

If *door phone* is selected, an extension number is entered as a ring down destination.

Default: Extension 100.

No dial tone is presented for *common ringer*.

(Continued)

6. and 7. Call forward busy/no answer for day and night modes — The ports can be set to call forward busy/no answer to an extension, department, mailbox or a branch ID for day mode and differently for night mode.

Default: ID9999 (automatic disconnect).

The default settings for each analog port type are shown below:

1. Ext.	2. Type	3. Name	4. Tenant	5. CO	6. CF day	7. CF night
111	EXT	Phone	1	9	MB106	MB106
	RINGER	Ringer*				
	FAX	Fax	1	9	ID9999	ID9999
	DOOR	Door*		X100	ID9999	ID9999
	MODEM	Modem	1	9	ID9999	ID9999

* Name can be changed in Function 32 (see page G.9).

IP Phones

With the installation of an IVX VoIP Card (IVC), IVX E-Class supports up to 12 local IP Feature Phones. With an IVC and remote network channels enabled, IVX E-Class can support a combination of up to 12 local IP Feature Phones and Remote IP Feature Phones. Complete Function 8 programming (pages M.1–M.7) before programming local or Remote IP Feature Phones.

Programming for IP Feature Phones is similar to that for Digital Feature Phones, except that additional information is required. If the extension entered during step 1 is for a Digital or Analog extension, Function 31 programming is the same; however, if the extension entered is one of the 12 extension numbers assigned to the IVC, IVX E-Class will prompt for additional information as shown in the following procedures.

Local IP Feature Phones

Here is a completed sample programming worksheet (Appendix II) for local IP Feature Phones:

1. Ext	2. Type	3. MAC	4. Name	5. Ten- ant	6. CO	7. CF day	8. CF night	9. Pg zone	10. Ext
112	Local IP	00304D13579A	Jane	1	9	MB112	MB112	0,1,2	
113	Local IP	00304D135664	Roger	1	9	MB113	MB113	0, 2	
114	Local IP	00304D1357FF	Sally	1	9,8	MB114	MB114	0, 2	
115	Local IP	00304D144F5B	Dean	1	9,8	MB115	MB115	0, 2	
116	Local IP	00304D144F5C	Sam	1	9,8	MB116	MB116	0,1,2	
117	Local IP	00304D144F5E	George	1	9,8	MB117	MB117	0,2	

Before you program extension definition for a Local IP Phone, install the phone on the IVX E-Class system's network and power-up the Local Phone.

- 1. Extension number** — Extension numbers for IP phones, whether remote or local, will in be in a contiguous range of 12 extension numbers with a starting point dependent on the position of the IVC within the system.

STATION PROG
EXT: _

Example: If the IVC is the second port card in the system, the extensions reserved for the IP feature Phones will be 112 through 123.

(Continued)

2. **Type** — If the extension entered is for an IP extension, use the scroll keys to choose whether it is to be a remote station or a local station.

X123 TYPE
LOCAL

Note: To remove a phone and its MAC address, when prompted for type press **HOLD**.

3. **MAC address** — Enter the MAC address for the IP Feature Phone to be used at this extension. If the phone is powered on and connected to the IVX E-Class system's network, the phone LCD will display the MAC address. The MAC address is a 12-character alphanumeric address, of which the first six digits will always match (00 30 4D). Enter the complete 12-character alphanumeric address. Use the first six programmable feature keys to enter the letters A, B, C, D, E or F, respectively.

4. **Extension name** — This is used for the display, reports, and as a programming aid. The name's length can be no longer than 10 characters (see "Entering alphanumeric characters," page D.2).

Default: The extension number.

5. **Tenant** — Assign the extension to a tenant (either 1 or 2). This is used to direct-dial operator (0) calls to the tenant's operator destination; it's also used to play the tenant's MOH source when calls are placed on hold.

Note: To view and assign tenant, tenant service must be enabled in Function 169.

Default: 1.

6. **CO line group** — Assigns the extension's ability to access one or more CO line groups (9, 8, and 71–76).

Default: 9.

7. and 8. **Call forward busy/no answer** — The extension can be set to call forward busy/no answer to another extension (or department), a mailbox, or a branch ID for day mode, and differently for night mode.

Default: The extension's mailbox.

9. **Extension page zone assignment** — List the page zones (0–6; 8–9) that are to include this extension. All stations are in All Page and cannot be edited.

Default: 0 (All page).

The overhead paging port (extension 199) can be paged along with other extensions in a zone by including the desired page zone(s) for extension 199.

All digital phone extensions are included in the all-page zone. *Analog extensions cannot be included in page zones.*

10. **Operator translation** — Extension 0 (Operator) programming requires:

- Programming call forwarding for day and night mode (steps 5 and 6).
- Entering the extension number to which calls are to be directed when someone dials 0.

Default: 100.

The Local IP Phone will become active when the extension definition programming is completed for the assigned extension.

Remote IP Feature Phones

Below is an example of the portion of a completed programming worksheet for Remote IP Feature Phones.

1.	2.	3.	4.	6.	5.	7.	8.	9.	10.	11.	12.	13.
Ext	Type	IP address	MAC	Gateway IP	UDP port	Remote-access IP address	Name	Tenant	CO	CF day	CF night	Pg zone
118	Remote IP	192.168.1.3	00304D135661	192.168.1.1	59118	221.46.197.104	Roger	1	9	MB118	MB118	
119	Remote IP	192.168.210.5	00304D135F2F	192.168.210.1	59119	221.46.197.104	Sally	1	9.8	MB119	MB119	

Before entering programming extension definition for a Remote IP Phone, connect the phone to the network on which the IVX E-Class system resides and power-up the Remote IP Phone.

- 1. Extension number** — Extension numbers for IP phones, whether remote or local, come from the range of 12 extensions for the IVC.
- 2. Type** — Use the scroll keys to select and press #.

Note: To remove a phone and its MAC address, when prompted for type press **HOLD**.

- 3. IP address** — Enter the IP address that the Remote Phone will be using at its remote site.

Note: This information will have to be obtained in advance of programming the Remote Phone.

Enter this address in dotted-quad notation (for example, *192.168.1.3*) using the # key as the period between octets. The Remote Phone must be on the same subnet as the LAN interface of the gateway device (cable modem, router, etc). For instance, if the LAN interface's IP address is 192.168.210.1, and its subnet mask is 255.255.255.128, the first three octets of the phone's address must be 192.168.210, and its last octet between 2 and 127.

- 4. MAC address** — Enter the MAC address of the Remote Phone. The MAC address of the phone appears on the second line of the display when the phone is powered up. The MAC address is a 12-character alphanumeric address, of which the first six digits will always match (*00 30 4D*). Use the first six programmable feature keys to enter the letters *A, B, C, D, E* or *F*, respectively.
- 5. Gateway address** — Enter the IP address of the Remote Phone's default gateway – that is, the LAN interface of the gateway device at the remote site. The phone must be on the same subnet as the LAN interface of the remote gateway.
- 6. UDP port** — Enter the first two digits of the Remote Phone's UDP port. This number is the base UDP port. The default UDP base is 59. The last three digits will be the station's extension number, and will be populated by default. Extension 112, for example would have a UDP port of 59112 by default.

The UDP port for the Remote Phone does not have to be the same as for the IP PBX (as programmed in Function 81). The UDP port for the Remote Phone must be one that the remote WAN gateway can program as "open" and must not be already assigned to another device at the remote site. The remote gateway will then have to be programmed to recognize that traffic destined for that UDP port should be allowed to pass through its security system.

If the remote gateway cannot open UDP port 59xxx (where xxx is the phone's extension), or if that port is already open but designated for another device, the installer can choose any other base UDP number between 10 and 65, inclusive. After entering the first two digits, the phone's extension will populate the last three digits.

(Continued)

7. Remote-access IP address — Enter the IP address that will be used for remote access to the IVX E-Class system. The display will default to the IP address entered in Function 82 (see page M.1). If a Remote IP Feature Phone will use this address to connect to the IVX E-Class system, press **#** to confirm; if a Remote IP Feature Phone will use an alternate IP address to connect to the IVX E-Class system, enter that address and press **#** to confirm. “*SAVE PARAMETERS?*” will appear on the display. If you have correctly entered the IP addressing parameters (items 1–7), press **#** to program the parameters for any Remote IP Feature Phone; to abort programming, press ***** to restore the system parameters to their previously set values.

8. Extension name — This is used for the LCD display, reports, and as a programming aid. The name’s length can be no longer than 10 characters (See “Entering alphanumeric characters,” page D.2).

Default: The extension number.

9. Tenant — Assign the extension to a tenant (either 1 or 2). This is used to direct-dial operator (**0**) calls to the tenant’s operator destination; it’s also used to play the tenant’s MOH source when calls are placed on hold.

Note: To view and assign tenant, tenant service must be enabled in Function 169.

Default: 1.

10. CO line group — Assigns the extension’s ability to access one **or more** CO line groups (9, 8, and 71–76).

Default: 9.

11. and 12. Call forward busy/no answer — The extension can be set to call forward busy/no answer to another extension (or department), a mailbox or a branch ID for day mode and differently for night mode.

Default: The extension’s mailbox.

13. Extension page zone assignment — *Remote Phones cannot participate in any page zones.*

The Remote Phone will become active, in a local mode, when extension definition programming is complete for the assigned extension. The Remote Phone is ready for installation at the remote site.

Important: If the Remote IP Feature Phone is not connected to the IVX E-Class system’s network at the time of extension definition programming, critical addressing parameters will not have been programmed into the Remote Phone. Connect the Remote Phone to the network and repeat Function 31 extension programming for this extension, pressing **#** at the appropriate times to confirm previously entered values. (Performing this step again causes the IVX E-Class system to send the programming information to the Remote IP Feature Phone.)

Note: If the Remote IP Feature Phone isn’t plugged into the local network, use *Esi-Address* to program address parameters into the phone.

Paired ESI Feature Phone/analog phone operation

For someone wishing to have an ESI Feature Phone (Digital or IP) in his office and a cordless phone for roaming the building, program as follows:

1. Create a call-forward key on the ESI Feature Phone to forward to the cordless phone.
2. Assign the cordless phone’s call forward busy/no answer to the ESI Feature Phone’s mailbox.

The user will then have all of his messages in one location (but can retrieve them from either phone).

Overhead paging interface

You can connect a dry-contact overhead paging device to the system through the first port card's 66 block.¹ The overhead paging port's access is fixed as extension 199 for programming purposes. The user can access it by:

(a.) Dialing **1 9 9**

or

(b.) Programming 199 as a programmable key and/or including 199 in one or more page zones.

Note: DTMF can be transmitted to the overhead paging port after access, allowing for zone overhead paging, if the paging unit supports zone paging.

1.				2.		
Ext.	Type	Name	CO	CF day	Cf night	Pg zn
0		Operator		X100	X100	
100	FP	Jane	9	MB100	X105	1,2
199						0

Each programming step for overhead paging is defined as follows:

- 1. Extension number** — Enter **1 9 9** during extension programming.
- 2. Extension page zone assignment** — List the page zones (1–9) that are to include the overhead paging port. (All-page.) Like extensions, the overhead paging port is in the all-page zone and cannot be removed.

Example: Here is a portion of a completed Programming Worksheet for extensions. The paging port, extension 199, has been added to page zone 1. The user then can access only the overhead pager by dialing the extension number 199 or can page through both the overhead pager and all phones listed in page zone 1 by pressing **PAGE (#)** and **1** on his/her phone.

1.				2.
Ext.	Type	Name	CO	Pg zn
100	DIGITAL	JANE	9	1,2
199				1

Dry-contact control

The manner in which the dry-contact pair is punched down on the 66 block sets the pair as either **normally open** (sending a page to the port will close the contacts) or **normally closed** (sending a page to the port will open the contacts). See the "Hardware installation" section (beginning on page B.8).

Note: The port doesn't support talk-back paging (which requires a CO port), nor does it support CO ring through the port.

¹ If the IVC is installed in slot 1, the audio connection and dry-contact control connect via the second port card.

Function 32: Extension feature authorization

The Installer or Administrator can allow or deny many extension features on an extension-by-extension basis. A User, however, can only program and use allowed features (by using a combination of voice and display prompts) from his/her phone.

Below is an example of a completed Programming Worksheet. The programming sequence is:

1. Ext.	2. Name	3. Call wait	4. DND	5. AA block	6. Rec.	7. Svc. obs.	8. Toll allow	9. Sys. spd. dial	10. Auto- Page	11. Ext. fwdg.	12. Fwdg. to toll nos.	13. Trk-to- trk xfer	14. Unified msging.
XXX	Default	Y	Y	N	Y	N	Y	Y	Y	Y	N	Y	N
100	Jane	Y	Y	N	Y	N	Y	Y	Y	N	N	N	N
101	Roger	Y	Y	N	Y	N	Y	Y	N	N	N	N	N
102	Sally	Y	Y	N	N	N	Y	Y	Y	N	N	N	N
110*	Bill	Y		N			Y	Y	N	N	N	N	

The programming steps are:

1. Extension number — Enter the extension number to program.

2. Extension name — Name the extension (if not previously named in Function 31 [see page G.1]).

For each of the following features, press a scroll key (▼ or ▲) to select YES or NO.

3. Call waiting — Allows the user to turn call waiting on or off for his station.¹

4. Do not disturb — Allows the user to activate DND from his station.

5. Auto attendant block — Blocks calls from being transferred to the station from the auto attendant; follows the extension's call forward day/night as programmed in Function 31 (see page G.1).

6. Live recording feature — If enabled, will allow the user to record conversations. **Default:** NO.

7. Service observing — Allows the user to monitor the conversations of those stations listed in the **service observing list** for his/her station. If this is enabled, you must enter a list of allowed extensions.

Note: A Department number can be entered as an extension in the Service Observing list and will then automatically include all members of the Department even if the members of the Department are later changed.

8. Toll restriction — "YES" allows the user to place toll calls. If you select "NO," the user can make only either non-toll calls² or calls to numbers listed in the allow exception table.

9. System speed dial — "YES" allows the user to access and place system speed dial calls.

(Continued)

* An example of an analog phone.

¹ Analog stations programmed as FAX or MODEM can't have call waiting.

² See the fixed allow table (Function 222, pages F.15–F.16).

10. AutoPage — Lets the user turn AutoPage (*defined below*) on or off at his/her station.

Note: This feature is used in conjunction with the directory names recorded in Function 62 and is not active until a directory name is recorded for the extension.

If the station user has his/her mailbox set to answer with personal greeting 3 and a caller presses **3** to page that user, this feature automatically pages the station user in the page zones entered in Function 31. If no page zone is entered, all IVX Digital Feature Phones on the system are paged.

Default: Enabled.

Note: When AutoPage is enabled, the IVX E-Class system will use the last installed idle digital port to perform the page. Therefore, if a phone is on the last installed port (e.g., X111 on a system with only a 612 Card), the phone's user may experience a brief delay in telephone operation if he/she picks up the handset (or presses **SPEAKER**) **during** the AutoPage.

11. External forwarding — Allows the station user to use the call forwarding/off-premises and off-premises "reach-me" features. See the *User's Guide* for more information about these features.

Default: Enabled.

Note: After the system dials the external forwarding number, it will play a prompt saying, "You are receiving a forwarded call. Press any key to accept." This prompt will play continuously for 30 seconds. If the forwarded call is answered and the called person dials a digit, the forwarded call will be connected to that person. If no digit is dialed, the caller is automatically forwarded to voice mail. While the two lines (trunks) are connected, the system constantly monitors the line for open loop conditions (hang-up). If an open loop is detected on either line, the call is disconnected. The system also monitors for voice activity on the connected lines; if voice is no longer detected, the call is disconnected. Finally, if both lines are connected for more than 60 minutes¹, the call will be disconnected.

12. Forwarding to toll numbers — This feature is used in conjunction with external forwarding (see previous item). When enabled, this feature lets the user program a long-distance number for external forwarding.

Default: Disabled.

(Continued)

¹ Default timer setting. To adjust this, contact ESI Technical Support.

- 13. Trunk-to-trunk transfer** — When enabled, this lets the station user initiate a **trunk-to-trunk transfer**. The user, while connected to a CO line, can press **TRANSFER**, dial an off-site number and then complete the trunk-to-trunk transfer by simply hanging up. Both outside parties are then connected. A station user also can set up a conference call and then drop out of the conference, leaving the other members conferenced.

This feature **must** be enabled for external call forwarding to succeed.

Default: Enabled.

Important: USE OF FEATURES, SUCH AS TRUNK-TO-TRUNK TRANSFER, THAT REQUIRE TRUNK-TO-TRUNK CONNECTIONS WILL INCREASE THE RISK OF TOLL FRAUD. IN NO EVENT SHALL ESI (ESTECH SYSTEMS, INC.) BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER INCLUDING, BUT NOT LIMITED TO, FRAUDULENT TOLL CHARGES, LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTIONS OR ANY OTHER COSTS OR DAMAGES RELATED THERETO ARISING FROM THE USE OF THESE FEATURES.

- 14. Unified messaging** — [See “VIP programming” in the *Network Services Processor Installation Manual* (ESI document 0450-0439).]

Example: Here is a portion of a completed Programming Worksheet (Appendix II) for extension feature authorization. Note that:

- Extension 100 cannot record calls but **can** make toll calls (except those listed in the deny table) and can access the system speed dial numbers.
- In comparison, Extension 102 cannot make general toll calls but also can call any system speed dial number, **even if it's a toll call**.
- (Extension 112 doesn't have DND, AA block, record or service observing capability because it's an analog port.)

1. Ext.	2. Name	3. Call wait	4. DND	5. AA blk.	6. Rec.	7. Svc. obsv.	8. Toll allow	9. Sys. spd. dial	10. Auto- Page	11. Ext. fwdg.	12. Fwdg. to toll nos.	13. Trunk- to-trunk xfer	14. Unified msg.
100	Jane	Y	Y	N	N	N	Y	Y	N	N	N	N	N
102	Sally	Y	Y	N	Y	N	N	Y	Y	N	N	N	N
112*	Bill	Y		N			Y	Y	N	N	N	N	

* An example of an analog phone.

Function 33: Department programming

You can create up to 10 **departments** (or “hunt groups”), each with a maximum of 32 extensions. You also can assign an extension to more than one department. Department numbers range 290–299.

Department hunting methods

You can designate a department to be rung in one of the following methods:

- **In order** — Calls will ring each phone in the order listed. If all are busy or none answer, the call will call forward as programmed here.
- **All** — Calls will ring all listed phones at the same time. If no extension answers or all are busy, the call will call forward as programmed as part of this function.
- **UCD** — Calls will be rotated evenly throughout the listed extensions. If none answer or all are busy, the call will call forward as programmed here. Counters are cleared at midnight.
- **ACD** — Calls will be presented to the longest idle logged-on agent. If all agents are busy, the caller will be played the **ACD queue prompt** (Prompt 538; see page J.1) and placed in queue. When an agent becomes available, the longest holding caller will be connected. If no agents answer before the exit time (Function 154; see page E.3) is reached, the call will call forward as programmed in this function.

A caller holding in an ACD department queue will be connected to music/message-on-hold, during which time he/she can dial options presented, such as **0** for the operator. While on hold, the caller is periodically played prompts to continue to hold for an available agent.

The ACD queue prompt is played when all extensions are busy and the first time the caller has been put on hold (“*All extensions are busy, please hold and your call will be answered in the order received*”); and **ACD hold prompt** (Prompt 539; see page J.1) is played at a 60-second interval (“*All extensions are still busy, please continue to hold*”). These prompts can be re-recorded in Function 61 (“Re-record system prompts”; see page J.1).

All ACD agents must have Digital Feature Phones. Agent log-on keys will be automatically assigned to the lower left programmable feature keys for the stations listed in ACD departments. Stations can later be added to or deleted from ACD Departments by creating or deleting log-on keys as part of their station programming (See the *Feature Phone User’s Guide for E-Class*).

- **Pick-up-only** — Additionally, you can designate a department as a **pick-up group**. Calls cannot be directed to a pick-up-only department. Instead, one must use a programmable feature key on phones that are to use this feature. An extension can be in only one pick-up group.

Example: A call is transferred to the Sales Department (290), in order, and each sales extension has been placed into Department 291, which is set as pick-up-only. If one of those extensions rings, the user at a non-ringing phone can pick up the call by pressing * and a programmable feature key programmed for Department 291.

Note: Usually a caller will be forwarded to a department by the auto attendant. However, a user, too, can transfer a caller to the department number. The transferred call will be processed according to the above description, as if transferred by the auto attendant. If no agents are logged-on to an ACD department, incoming calls will immediately follow the department’s call-forwarding setting.

(Continued)

Procedure

Here's an example of a completed programming worksheet:

1. Dept. no.	2. Name	3. Type	4. Tenant	5. CF day	6. CF night	7. List:
290	Sales	In order	1	MB300	MB300	104, 112, 115
291	Service	ACD	1	X0	MB301	101, 102

Here are the programming steps.

- 1. Department number** — Range is 290–299.
- 2. Name** — Used for the display, reports, and as a programming aid. Length can be up to 10 characters (See “Entering alphanumeric characters,” page D.2).
Default: The department number.
- 3. Type** — Selected from one of the five possible types (*all*, *in order*, *UCD*, *ACD* or *pick-up*).
Can be changed later without affecting its other programmed values.
Default: In order.
- 4. Tenant** — Assign the department to a tenant (either 1 or 2). This is used to direct-dial operator (0) calls to the tenant's operator destination; it's also used to play the tenant's MOH source when the department is using the ACD method.

Note: To view and assign tenant, tenant service must be enabled in Function 169.

Default: 1.

- 5. and 6. Call forward busy/no answer** — The department can be set to call forward busy/no answer (for all extensions in the department) to an extension, another department, a mailbox or a branch ID for day mode and differently for night mode. The department can have its own mailbox for pickup by members knowing the password or forwarded to any mailbox type including guest, cascade, etc. Calls routed to an extension via a department will follow the **department's** call forwarding. While calls transferred to the extension will follow the **extension's** call forwarding as programmed in Function 31 (see page G.1).

Important: Don't call-forward a department to itself. This can cause line lock-up problems.

Default: X100.

- 7. Department list** — Enter the extension numbers that are assigned to this department. To delete an extension number from a list, press **HOLD**. Please note that **the order that the extension numbers are entered will dictate the order called when the department selected is “in order.”**

Example: Here is a portion of a completed Programming Worksheet for Department programming. Department 290 was created to have calls directed to it to first ring 104, then, if busy/no answer, 111, and then 112. If all are busy or do not answer, the call will forward to the operator if in day mode — or, if in night mode, to guest mailbox 300 for retrieval in the morning. Department 291 rotates calls between the two extensions listed; if both are busy/no answer, calls go to the service manager (X105) — or, if in night mode, to Guest Mailbox 301, which has been set to page the tech on-call.

1. Ext.	2. Name	3. Type	4. Tenant	5. CF day	6. CF night	7. List:
290	SALES	IN ORDER	1	X0	MB300	104, 111, 112
291	SERVICE	UCD	1	X105	MB301	101, 102

Function 35: Extension button mapping

By default, the programmable feature keys' initial state is "not programmed" (except in the case of station 100, on which the upper left key is a day/night key). Use this function to change the programmable feature keys **system-wide**. Users can later change the programmable feature key positions for **their** stations as part of station programming.

Important: Future, system-wide changes made later here by the Installer will overwrite **any** station user programming.

When prompted, press the desired programmable feature key location, then enter the appropriate digits on the dialpad and confirm by again pressing the same programmable feature key.

To determine how a programmable feature key is currently programmed, press the key, note how it is programmed, and press the key again.

The keys can be programmed as follows:

CO line key

If the dialed digits are 1–66, the key will serve as a CO line key.

Note: Removing the line key appearances will set the station(s) to operate as a PBX with line access by dialing **9** (or **8** or **71–76**).

Station key

If the digits entered constitute a three-digit extension number (or department, guest mailbox, etc.), the key will become a station key providing the appropriate lamp information (See "System fixed numbering plan," page D.2).

Department numbers (290–299) programmed here will appear on all phones; however, agent log-on keys (5290–5299) will appear only at the phones of assigned agents in the corresponding ACD department.

Guest/info mailboxes (300–489) and group mailboxes (500–516) can be assigned here to appear on all phones.¹ However, messages being left in these will not cause lamp appearances. (For more on the different kinds of mailboxes, see "Voice mail programming," beginning on page I.1.)

Speed-dial key

If one enters **9** (or **8** or **71–76**) plus a phone number, the key will become a speed-dial key for outside calls. Alternatively, the user may enter the system speed-dial bin (600–699).

Location Key

To facilitate dialing into a remote Esi-Link location, you may assign (700–799) a programmable feature key as a **Location Key**. When you press a Location Key, you'll hear dial tone; you can then dial any extension, department, mailbox, or outside line group access code² in the remote location.

(Continued)

¹ However, it isn't possible to assign mailboxes 490–499 or 520–529 to station keys.

² Depending on the assignment of Function 164.

Feature keys

Feature keys, as listed here, cannot be programmed system-wide but must be programmed for each individual station. Grayed-out codes are the **only** ones that can be programmed on a **12-Key Feature Phone**; on the other hand, there are two codes which can be programmed on **only** the 12-Key Feature Phone.

- **Manual day/night mode (Code 560)** — Allows manual setting of the system's mode — day, night, day2, night2, holiday or auto (in auto mode, the system follows the day/night mode tables you have programmed).¹

Note: You or the Administrator can also change the mode and/or re-record the holiday greeting remotely to handle unexpected closings, such as for inclement weather.

- **Service observing (Code 561)** — Allows authorized users to monitor others' calls silently (e.g., in order to aid in quality assurance of call activity).

Note: You or the Administrator must authorize service observing for a station, and you must program the list of allowed extensions in Function 32 (page G.9).

- **ACD agent log-on/off key (Code 5DDD)** — Logs an agent on or off the ACD. The *DDD* represents the department number (for example, a key programmed with the code **5 2 9 0** would log an agent on/off Department 290).
- **ACD agent wrap key (Code 562)** — Toggles “wrap mode”; i.e., keeps a logged-in ACD agent from receiving the next assigned call. For use in performing “wrap-up” activities, such as completing paperwork, following the agent's most recent call.
- **ACD administrator key (Code 563)** — Allows a user to view the call activity of an ACD group. Set a programmable feature key with **5 6 3** and the ACD department number (for example, **5 6 3 2 9 0**), and then press the key. It will glow green and the bottom line of an ACD group's display will appear until you press the key again. Only two ACD administrator keys can be programmed per department.
- **Headset key (Code 564)** — Provides for easy connecting to/disconnecting from calls when the user is operating in headset mode. The user presses the key to receive dial tone or to answer a ringing call; he/she then presses the key again (or **RELEASE**) to disconnect from the call.
- **Call forward key (Code 565 or 565XXX)** — Toggles call forwarding on and off. If the user always forwards to the same extension, you (or the user) can program a key with both **5 6 5** and the extension number.
- **Redial key² (Code 566)** — Redials the most recently dialed number, as would pressing the **REDIAL** fixed-feature key.
- **Call forward/no-answer key (Code 567)** — Sets or cancels call forwarding/no-answer. This overrides the call forward busy/no-answer assignment in Function 31.

Code	Feature key
560	Manual day/night mode key
561	Service observing key
5DDD	ACD agent log on/off key
562	ACD agent wrap key
563DDD	ACD Administrator key
564	Headset key
565	Call forward key
565XXX	Forward to a destination
566	Redial
567	Call forward/no-answer key
568	Message monitor key
569	Background announce key
570*	Conference
571	Personal Greeting 1
572	Personal Greeting 2
573	Personal Greeting 3
574	Missed call key
575 and 576	Virtual answer keys
577	QuickPage
578*	Mute/DND
579*	Voice mail
580	Override ring key

DDD = ACD department number.

XXX = Forwarded-to extension.

Only grayed-out codes can be programmed on a 12-Key Feature Phone.

* Programmable on **only** a 12-Key Feature Phone.

¹ If tenant service (Function 169) is enabled, using this key will set the mode of **only** the tenant to which the station is assigned.

² Programmable on only the 12-Key Feature Phone.

- **Message monitor key (Code 568)** — Toggles message monitor mode. (Functionally is same as pressing **PROGRAM 3 6** and following the prompts.)
- **Background announce key (Code 569)** — During call waiting, pressing (and holding down) this key lets the user make a brief, private **background announcement** to the station's earpiece (if the user has enabled the background announce feature).
- **Conference (Code 570)**¹ — Serves the same function as the **CONF** fixed-feature key.
- **Personal greeting keys (Codes 571–573)** — These provide for easy activation of one or more of the user's personal greetings. Each key's LED will be green for the associated personal greeting that is active. These keys can be used in place of, or in conjunction with, manual activation of the greetings in programming mode.
- **Missed call key (Code 574)** — A programmable feature key with this code will flash whenever the user has a missed call — *i.e.*, **both** (a.) the user doesn't answer a call to his/her station; **and** (b.) the caller doesn't leave a message in the user's voice mailbox. When the key is flashing, the user presses it to see the stored Caller ID record for the most recent missed call. (For more details on this feature, see the *IVX E-Class User's Guide*.)
- **Virtual Answer Keys (Codes 575 and 576)** — Pressing a virtual answer key when the extension is busy causes the system to play a greeting to a caller and then route the caller to a desired destination. (For more details on this feature, see the *IVX E-Class User's Guide*.)
- **QuickPage (Code 577)** — Normally used by an operator, this key lets the user quickly put on hold, and page, a station user. While on a CO line call, the user can press a QuickPage key and then enter a station number (or press a programmable feature key programmed for an extension), and the system will automatically page the person², then forward the call to the person's voice mailbox if he/she doesn't answer.
- **Mute/DND (Code 578)**¹ — Serves the same function as the **MUTE/DND** fixed-feature key.
- **Voice mail (Code 579)**¹ — Serves the same function on a 12-Key Feature Phone as pressing **VOICE MAIL** on a 24-Key or 48-Key Feature Phone.
- **Override ring key (Code 580)** — Allows a user to place an outside call (CO, extension, Esi-Link or Remote Phone) while another call is ringing in on the same station.

Note: To **delete** a programmable feature key, press **HOLD** instead of programming a value.

Virtual Mailbox Key

If the entered digits are a three-digit extension number for a guest, department mailbox, cascade mailbox, etc., the key will provide for direct transfer to that mailbox, as described above. However if you program **VOICE MAIL** and a three-digit extension or mailbox number, it will become a **Virtual Mailbox Key**, which will indicate message status for the mailbox (the LED will blink red if new messages exist) and provide direct pick-up of the messages.

To create a Virtual Mailbox Key at a user extension, press **VOICE MAIL *** and then enter the applicable extension or mailbox number.

Private line key

If a private line has been established in CO line programming (see "Private line," page F.6), that CO line key must appear on that station's phone to allow outbound access to the line.

¹ Programmable on only the 12-Key Feature Phone.

² The system will access the paging zone for the extension and play the user's name as recorded in the directory (if no name is recorded, it will page by extension number) followed by the phrase "you have a call on hold" and the line on which the caller is held — e.g., "John Doe, you have a call on line 21."

Function 4: Auto attendant programming

You can program the auto attendant, in line programming (Function 2; see page F.1), to answer calls immediately, on a delayed-answer basis or not at all (*i.e.*, for live answer at all times). If required, you also can program different main greetings and routing schemes for different combinations of lines. Day/night mode will change the main greeting announcement and affect rerouting of calls during call processing.

Function 41: Auto attendant branch programming

The IVX E-Class system's auto attendant follows a **branch concept**: the caller is routed through a series of branches, ultimately to the extension he wishes to reach. The caller moves from branch to branch by selecting a number or name presented in a branch prompt.

Each system supports four types of branches — *menu*, *GoTo*, *directory*, and *remote* — and up to 100 branches, total. Use them to create virtually limitless routing possibilities. Each branch has one greeting — with the exception of branches ID 1 through ID 8, each of which has four greetings (day1, day2, night1, and night2; see also “Function 43: Automatic day/night mode table,” pp. H.7–H.8).

Note: If tenant service is enabled in Function 169 (see page E.9), branch ID 1 will be associated with tenant 1 and branch ID 2 with tenant 2. Day/night routing for each tenant will be controlled either automatically by the day/night table for each tenant or manually with a day/night key on a station assigned to that tenant. Dialing **0** from a call to each of these ID branches will route the call to that tenant's respective “dial-0” destination.

Tenant	Branch ID
1	ID 1
2	ID 2

Menu branch

A **menu branch** includes a prompt that instructs the caller to make a selection from the choices presented such as “*For Sales, press 1; for Service, press 2; or, for Administration, press 3.*” Whenever you create a menu branch, you must also create a corresponding number of sub-branches to match the number of choices given the caller in the prompt.

When a caller makes a single-digit selection in the menu branch, he/she will then advance to one of its sub-branches — which could be another menu branch (if there are more choices to make), or a GoTo branch (routes the caller to a destination; see below) or directory branch (for choosing from a list of names; see page H.3).

Notes: ID 1 is always a menu branch and can't be changed.

If a caller makes no selection during the prompt in a menu branch, he will be transferred according to the no-response programming for that branch (see page H.6).

GoTo branch

A **GoTo branch** transfers the caller to an extension, department, mailbox, branch ID, or an outside number:

- **GoTo dial** — The GoTo: dial branch automatically blind-transfers the caller to the extension or department number programmed as its destination. If the number listed is a department, the system will follow the programming for the Department as set in Function 33 (see page G.12).
If the destination extension or department dialed is busy or does not answer, the call will follow call forwarding for the extension as programmed in Function 31 (see page G.1) or the department as programmed in Function 33 (see page G.12).
- **GoTo mailbox** — Routes a caller to that mailbox's personal greeting. The mailbox can be a user, a guest/information mailbox, a group mailbox, cascade paging mailbox, or Q & A mailbox.
- **GoTo branch** — Can also be used to jump to any other branch in the auto attendant. It is a good idea to provide a jump as a sub-branch of each menu branch, giving the caller the option either to repeat the menu or exit without making a selection.

Example: *"For widget sales, press 1. For gadget sales, press 2. Or, to return to the main menu, press 3."*
In this case, the third sub-branch would be a GoTo branch with ID1 (the main greeting) as its programmed destination.

- **GoTo outdial** — The GoTo branch can be used to transfer to an off-premises location, either in conjunction with Centrex lines or trunk-to-trunk. When you select GoTo, the system will prompt you for one of those two options.
The branch's dial string can be programmed to include pauses, flash hooks, etc. Use the ▲ scroll key to enter special characters; use the ▼ scroll key to backspace. Press # to confirm the inserted character and continue. Press ## to complete the entry. The codes are:

Code	Produces . . .
#	# DTMF tone
*	* DTMF tone
F	Flash hook
P	Two-second delay
E	The most recently attempted extension number

Example: To create an outdial string for Centrex that...

- Sends a flash hook
- Dials a two-second delay
- Dials 9 (Centrex access code)
- Dials another two-second delay
- Dials 555-999-5644 (a local 10-digit call, in this example)
- Goes on-hook

... enter **F P 9 P 5 5 5 9 9 9 5 6 4 4 # #** [the system will display *F 9 5 5 5 9 9 9 5 6 4 4*]

If you selected Centrex:

IVX will dial the string as programmed and then release the call to Centrex to complete the connection.

If you selected trunk-to-trunk:

The system will access another CO line to call the outdial number.

Note: Two CO lines will be utilized, one for the inbound call and one to call the outdial number.

(Continued)

1. Enter the outdial number (including the access code and any special characters¹). The system will prompt you to indicate whether DTMF detection at the remote end is required before completing the connection.

If DTMF detection is **not** required, the system will complete the trunk-to-trunk connection after dialing the final digit of the outdial number (blind transfer); skip to step 3.

However, if DTMF detection is required, proceed to step 2.

Example: To create an outdial string for trunk-to-trunk transfer that...

- Dials 9 (line group number)
- Dials a two-second delay
- Dials 555-999-5644 (a local 10-digit call, in this example)
- Goes on-hook

... enter **9 P 5 5 5 9 9 5 6 4 4**

2. For the outdial number, set the day call-forwarding and then the night call forwarding.

After the final digit of the outdial number, the system will begin to play to the called person the following prompt: *"You are receiving a forwarded call. Press any key to accept."* This prompt will play continuously for 30 seconds.

What happens now depends upon whether the system detects DTMF from the called party:

- If it does, the system completes the trunk-to-trunk connection.
- If it doesn't, the system forwards the call to the programmed call forwarding for this outdial branch (the next step for which you're prompted if DTMF detection is required).

Notes: You'll be prompted to enter a call forwarding destination for an outdial branch only if (a.) the branch uses trunk-to-trunk and (b.) DTMF detection is required. Enter an extension, branch ID or mailbox number for the day/night call forwarding of this GoTo Outdial branch.

While both COs are connected, the system constantly monitors the lines for open loops. If it detects an open loop on either line, it terminates both CO connections. Additionally, the system periodically will monitor for voice on the connected COs. If it detects no voice traffic, it terminates both CO connections. Finally, if both COs are connected for a period (programmable; default is 60 minutes), the system will terminate the connection, regardless of the presence or absence of activity.

Directory branch

A **directory branch** allows the caller to be connected to an employee by selecting his or her name from a list played. Two types of directories are available:

- **All-names** — The caller selects the person he wishes to reach from the playback of all recorded names (use this if there are about 10 or fewer names in the directory).
- **By-alpha**
 - The system prompts the caller to enter the first three letters of the individual's first or last name.
 - The system then plays the matched names to the caller **in the order recorded**.
 - A second prompt then instructs the caller to press **#** when he/she hears the name of the individual.

Note: The actual recording of the names and alpha "key" entry (if the directory type is by-alpha) will come later in Function 62 (see page J.2). **The directory branch(es) will not be enabled until at least one name has been recorded.** To re-record the directory prompt, "Enter the first three letters of the person's first name that you wish to reach," you must enter Function 61 and then record the prompt for the ID number of the directory branch.

¹ Special characters — such as *P* for *pause* or *F* for *flash* — can also be entered in the dial string.

Remote branch (Esi-Link systems only)

The **remote** branch type¹ can route calls to remote location destinations. For example:

- **Location + branch ID** — Routes caller to a menu branch at a remote location.

Note: Only branch IDs 8700 through 8798 at the remote location are supported.

- **Location + department** — Routes caller directly to a department at a remote location.
- **Location + extension** — Routes caller directly to an extension at a remote site.
- **Location + mailbox** — Routes caller directly to a voice or information mailbox at a remote site.

When you assign a remote branch to send a call to a branch ID at a remote Esi-Link location, that branch ID (*i.e.*, the destination branch ID) must be within the range of ID 8700 through ID 8798. This is to insure the correct setup of an Esi-Link auto attendant for incoming calls from remote locations.

Each remote branch can have a **forward/no-response (NR) destination** programmed to which the branch will send a caller if any of the following should occur:

- All Esi-Link channels are busy;
- The Esi-Link connection to the remote location is either off-line or unavailable;
- The caller is returned to the original location via branch ID 8799.

The forward/no-response destination can be one of the following destinations:

- Local branch ID
- Local station or department number
- Local voice mailbox (user, guest, or information)

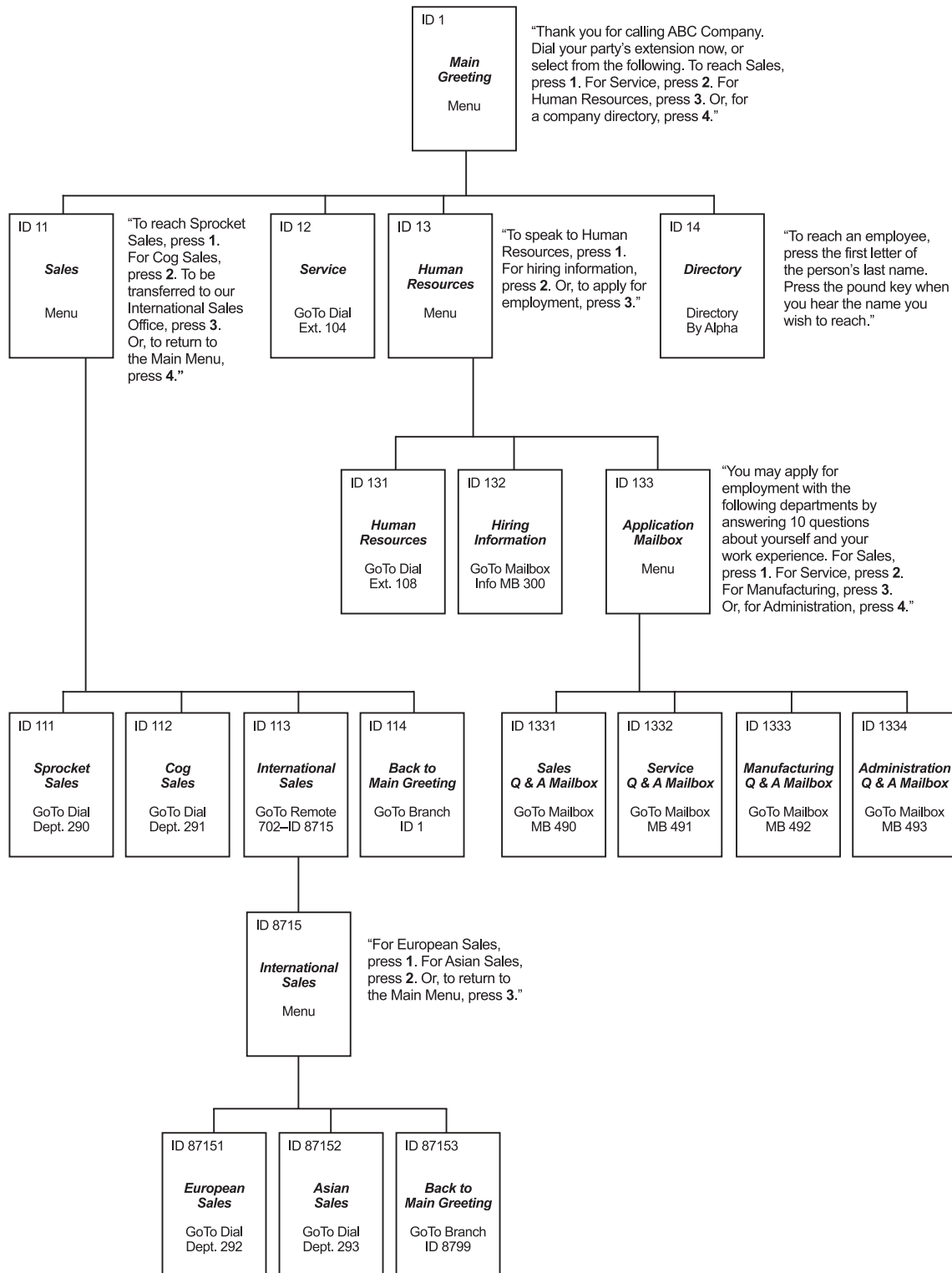
In the event all Esi-Link channels are busy or unavailable, the caller will be directed to the forward/no-response destination after hearing the prompt, *"Destination unreachable."* If a forward/no-response destination isn't assigned, the caller will be sent to the Operator at the originating location. Typically, the forward/no-response destination would be a GoTo branch to the menu branch to which the caller was last connected, such as branch ID 1.

At the remote location, when branch IDs 8700 through 8798 are assigned as GoTo branches, the branch destination will be limited to the return branch (ID 8799; see "Return branch," *below*) and internal destinations at that location (*i.e.*, local ID branches, departments, extensions, mailboxes, and COs only).

Return branch

Branch **ID 8799** is a special, pre-programmed branch that's used to send a caller back over the Esi-Link network to the no-response forward of the originating location ID branch that routed the call. To use this branch, assign (at the remote location) a GoTo branch to ID 8799. When the caller is sent to this GoTo branch, he/she automatically will be sent back to the no-response destination of the originating location branch ID.

¹ For more information about Esi-Link, see "Function 83: Esi-Link programming," pages M.5–M.7.

Auto attendant programming example

(The branch IDs and branch titles shown are for programming purposes only. The caller needs only to press 1, 2, etc., to move through the choices.)

Programming sequence

1. **Branch ID** — A numerical designator which indicates its location and relationship to the other branches. There can be up to six levels of branches — the first level being a single digit, the second level being two digits, and so on. The Main Greeting is *ID 1* (or, additionally, 2 through 8 if a different greeting for each different line is desired); each of its sub-branches will have that number, plus an additional digit of its own (corresponding to choices given to the caller, shown here in bold): **11**, **12**, **13**, etc. Menu Branch 123 would have sub-branches **1231**, **1232**, etc.
2. **Type** — Use a scroll key to select a menu, GoTo, directory, or (if Esi-Link is in use) remote branch. Press # to continue.
3. **Name** — Enter the name to help identify the branch for later programming changes; this also is the source for reports and display information at users' phones. Press # to continue.
4. **Destination** — Each branch type has different possible destinations as indicated:

Branch type	Destination(s)
Menu	Sub-branches (created later)
GoTo	Extension/department, mailbox, branch ID, or outside number
Directory	List of names (entered in Function 62)
Remote	(Esi-Link only) Extension, mailbox, branch ID, or department

Use a scroll key to select the desired branch type and press #. Then, enter the destination — either an **extension** or **department** (*EXT*), **mailbox** (*MB*), or **branch ID** (*ID*) — and its number. Press #.

Additional programming notes

- **Automatic disconnect** — If ID 9999 is programmed as a destination, the call will be automatically disconnected.
- **Call-forward busy/no answer** — Can be programmed (and will be prompted for) only if a trunk-to-trunk outdial number is the destination of a GoTo branch.
- **Call-forward no-response** — Programmed (and will be prompted for) only for a menu, directory, or remote branch.

Deleting a branch

To delete a previously created branch, enter the branch ID, press **HOLD**, and confirm by pressing a scroll key (either ▼ or ▲) and then #.

Function 42: Announce extension number

If a caller selects a name from a Directory Branch, the system can be set to announce the extension number prior to transferring the call. This provides the caller with the extension number for future direct dialing from a Menu Branch such as the Main Greeting. This feature should not be used where individual privacy is desired.

Default: Enabled.

Function 43: Automatic day/night mode table

You program the day/night mode table by selecting the day of the week, then entering the start time, and then selecting the mode — day, night, day2 or night2.¹ At the time you've programmed, the appropriate greeting for that mode will play and the system will follow the appropriate day or night forwarding. Day forwarding is the same for both day mode and day2 mode; night forwarding is the same for both night mode and night2 mode. Enter the times in military time (0000–2359). Each day can have up to six different times.

1. Enter the tenant number — 1 or 2 (Generation II only).
2. Select the day of the week by pressing a scroll key (either ▼ or ▲).
3. Press # to confirm.
4. Enter the day's start time in 24-hour format.
5. Press # to confirm.
6. Select the mode — DAY, NIGHT, DAY2 or NIGHT2 — by pressing a scroll key (either ▼ or ▲).
7. Press # to confirm.
8. Repeat steps 4–7 for the day's next setting or press # again to program another day.
9. When finished, press # again to exit.

Note: To delete an entry, press **HOLD**.

Day/night mode worksheet example

In the example below, the company or tenant² has:

- Day mode programmed for: 8 AM to 12 noon Monday, Tuesday, Thursday, and Friday; 8 AM to 2 PM Wednesday and Saturday; and 1 PM to 5 PM Monday, Tuesday, Thursday, and Friday.
- Night mode programmed for after 5 PM Monday, Tuesday, Thursday, and Friday.
- Night2 mode for Wednesday and Saturday after 2 PM and all day Sunday.
- Day2 mode for lunchtime Monday, Tuesday, Thursday and Friday.

Tenant 1

	MON		TUE		WED		THU		FRI		SAT		SUN	
	Start time	Mode	Start time	Mode	Start time	Mode	Start time	Mode	Start time	Mode	Start time	Mode	Start time	Mode
1	0800	D	0800	D	0800	D	0800	D	0800	D	0800	D		
2	1200	D2	1200	D2	1400	N2	1200	D2	1200	D2	1400	N2		
3	1300	D	1300	D			1300	D	1300	D				
4	1700	N	1700	N			1700	N	1700	N				
5														
6														

Note: For the schedule to take effect, the system must be placed in the "auto" mode.

¹ Available only on branches ID1–ID8.

² IVX E-Class Generation II only.

Remote setting of day, night, holiday and auto modes

Normally, the system's day/night mode operation will be manually controlled at an ESI Feature Phone and/or set to follow the day/night mode tables (programmed by the Installer) automatically. In addition, the Administrator can remotely change the mode and/or re-record the holiday greeting to handle unexpected closings such as for inclement weather.

Remotely logging into the system with either the Installer password or the Administrator password lets the caller re-record the ID 1 greetings (day, night, day2 and night2) and the holiday greeting, as well as change the mode to day/night/holiday/day2/night2 (or auto).

1. At the main greeting, enter * * 7 8 9 # or 4 5 6 # — or the new password — to enter remote programming mode.
2. You'll hear prompts that will allow you to change the answer mode (day, night, day2, night2, holiday or auto) and/or to re-record the holiday greeting and the main greeting (ID 1). Follow the prompts to perform the desired operation.
3. Exit by pressing * and hanging up.

Prompts for remote settings: an outline

1 Set answer mode

- 1 Day mode
- 2 Night mode
- 3 Holiday mode
- 4 Use day/night table*
- 5 Day2 mode
- 6 Night2 mode

2 Record holiday main greeting

3 Record daytime main greeting

4 Record nighttime main greeting

5 Record day2 main greeting

6 Record night2 main greeting

<p>Note: If the system is answered live and call is then routed to a mailbox., the Administrator can press 8 to return to the main greeting and then follow the steps for making remote settings.</p>

* This is used if the Installer has programmed an automatic calendar.

Function 5: Voice mail programming

To simplify initial installation, all programmed extensions will automatically have the generic personal greeting, “*You have reached the mailbox for extension [xxx].*” The mailbox user should replace this with a personalized greeting. Each guest/info, group, cascade paging or Q & A mailbox must have a greeting recorded for the IVX system to consider the mailbox active.

Important: A mailbox will not receive broadcast messages until a greeting has been recorded for it. Additionally: if the greeting is deleted, the mailbox will be considered inactive. On the 12-Key Feature Phone, it is necessary to assign the code **5 7 9** (voice mail) to a programmable feature key for the mailbox to become active.

If a programmable feature key is programmed as a Virtual Mailbox Key with any mailbox number, the key's LED will blink, to indicate that new messages exist.¹ To retrieve messages from a station, press **VOICE MAIL *** and then either press the Virtual Mailbox Key or enter the mailbox number. To record a greeting, press **PROGRAM *** and the mailbox number; then press **#** to confirm, and follow the prompts. The default password is the mailbox number. To retrieve messages from the outside, press ***** and the mailbox number **during the Main Greeting**.

Function 51: Maximum message/recording length

Although the system will store only the actual message as left by the caller, the time set here is the maximum time to allow for a message. The range is 1–30 minutes for messages and recorded conversations, and 1–120 minutes for recordings and greetings. (The maximum number of new messages and recordings in a mailbox, regardless of length, is 128.)

Default: 3 (minutes) for messages, 10 (minutes) for recordings.

Function 52: Message purge control

To avoid having unneeded messages filling up the system's memory, values entered here will establish how messages are to be automatically erased by the system if its Memory Module's free space gets too low. The system's purge routine will begin only when the system's Memory Module is 95% full and will remove messages, down to 90% full, according to the following programmed values:

Value	Meaning
New	New messages older than the number of days programmed.
Old	Old messages older than the number of days programmed.
Group	Group mailbox messages older than the number of days programmed.
Rec	Recordings that are older than the days indicated.
Del	Message Recycle Bin messages older than the number of days programmed.

The range for each item is 0–365 days. A “0” indicates that a type of message is not to be removed unless deleted by the user.

Example: To set the system to erase old messages more than 3 days old and group messages more than 5 days older and **not** to erase any newly deleted messages or recordings (if the system's Memory Module becomes full), enter **0, 3, 5, 0** and **0** as prompted.

Note: If the Memory Module becomes full but no message or recording can be purged according to the settings, callers will hear a “voice-mail-full” prompt until free space becomes available on the Memory Module.

Default: 0, 0, 0, 0, 0.

¹ Otherwise, the key is a station key that allows for single-key transfer of a call with no message indication.

Function 53: Guest/info mailboxes

Mailboxes numbered 300–489 can be programmed as either a guest or info mailbox. Enter the mailbox number and select *Guest* or *Info* by pressing a scroll (▼ or ▲) key.

Guest mailboxes

Guest mailboxes are designed to be used by personnel, such as in outside sales or manufacturing, who don't have an extension assigned to them. A guest mailbox requires no programming other than the assigning of a name. The maximum recording length is controlled by Function 51; the default is 10 minutes.

Notes: A guest mailbox can be handled like a regular extension (*i.e.*, listed in the directory, assigned a station key, etc.), and is password-protected by default.

Guest mailboxes do not support either AutoPage or off-premises “reach-me.”

Default: 300–489 as guest mailboxes.

Info mailboxes

Info mailboxes can be used to give callers information on a variety of different subjects by “publishing” these mailbox numbers. Info Mailboxes are identical to Guest Mailboxes except that the caller will not be given a record tone after the personal greeting (the information to be played). Instead, the caller will be forwarded as programmed in this function (default is the caller will be disconnected after the information is played).

Guest/info mailboxes are created or deleted here, but are turned “on” only when a personal greeting (the information to be played) has been recorded. Deleting the personal greetings will turn “off” the mailbox.

To record a greeting, press **PROGRAM *** and the mailbox number; then press **#** to confirm, and follow the prompts. The default password is the mailbox number. The maximum length of the recording time is 14 minutes.

Below is an example of a completed Programming Worksheet, showing the sequence of programming:

1.	2.	3.	4.	5.
MB	Name	Type	CF day	CF night
400	Dana	Guest		
402	Literature	Info	MB 302	MB 302

Each programming step is defined as follows:

- 1. Mailbox number** — Enter a mailbox number, 300–489.
- 2. Name** — The mailbox name is used for the display, reports, and as a programming aid. The name length can be no longer than 10 characters (see “Entering alphanumeric characters,” page D.2).
Default: The Mailbox number.
- 3. Type** — Select a mailbox type: Guest or Info.
Default: Guest.
- 4. and 5. Call forward (info mailbox only)** — An info mailbox can be set to call forward after the personal greeting has played to an extension, department, a mailbox or a branch ID for day mode and differently for night mode.
Default: ID9999 (automatic disconnect).

Function 54: Group mailboxes and the broadcast mailbox

Broadcast mailbox

Mailbox 500, the **broadcast mailbox**, is a special group mailbox which can be used to leave messages for all of the system's station users (extensions 100–183) who have recorded a personal greeting. The broadcast mailbox's user list cannot be edited. Guest mailboxes are not included in the broadcast group.

Group mailboxes

You can assign up to 16 group mailboxes (501–516) to the IVX E-Class system; each group mailbox can have up to 32 members. Anyone who knows the password can leave messages for all users listed as members of that group and who have recorded a personal greeting. The Installer, Administrator or group mailbox "owner(s)" may set or change the list of Group Mailbox members. To record a greeting, press **PROGRAM *** and the mailbox number; then press **#** to confirm, and follow the prompts. The default password is the mailbox number. The maximum recording length is controlled by Function 51; the default is 10 minutes.

Important: A group mailbox is turned "on" (able to record and playback messages) **only** when its "owner" has recorded a greeting for it, such as *"This is the group mailbox for East Coast Regional Sales."* Similarly, deleting the group mailbox greeting will turn "off" the group mailbox; any outstanding messages will remain in its members' mailboxes until erased by each member.

Notes: If 0 (zero) is programmed as the password, **anyone** can leave group messages or program the Group Mailbox.
If a user saves a group message, it will be saved as a new message.
Broadcast and group mailboxes can have a maximum of 32 messages per mailbox.

1. MB	2. Group member mailboxes' numbers
501	102 104 106 107 122 303 314

Here is the programming sequence:

1. **Enter the group mailbox number** — Range: 501–516.
2. **Enter group member mailboxes' numbers** — Separate each by #; enter ## to end the list.
Range: User mailboxes (100–183) and guest mailboxes (300–489).

Function 55: Message notification

On a mailbox-by-mailbox basis for user or guest mailboxes, the system can be programmed to call an off-premises number or another extension to deliver messages and/or dial to an external commercial paging network to activate a user's pager. The IVX E-Class system will call and/or page when the first new message has been left in a mailbox and will repeat (at the interval of minutes programmed in this function) until the new message(s) have been deleted, saved or moved.

The user can program the numbers and delay and can also select to have only messages marked as urgent delivered.

The Installer and Administrator can set, on an individual-station basis:

- The number to be called
- A delay period
- The number of attempts (maximum of 99)
- The interval between attempts
- A "quiet period" to suspend phone delivery — e.g., late at night (the quiet period is an on-and-off time that applies to all days of the week)

Function 551: Station delivery options

Programming of the station options, as shown below, can be performed by the Installer or Administrator. In addition, the user can change his phone number and pager number (but not phone or pager delay time). The phone number's maximum length is 24 digits.

	1. Number	2. Delay	3. Attempts	4. Interval	5. Quiet on	6. Quiet off
1. Phone	2145556789	30	6	60	10:30PM	7:15AM
2. Pager	2145551234	0	10	30		

To program, enter the extension number to program and select phone or pager to program. Then, enter:

1. **Phone/pager number** — The number to be dialed (**without** the CO line Group [9, 8 or 71–76]).

Note: Use the ▲ scroll key to enter special characters; use the ▼ scroll key to backspace. Press # to confirm the inserted character and continue. Press ## to complete the entry. To change the number, delete and then re-enter it.

2. **Delay** — How many minutes the system is to wait before dialing the phone or pager number. This allows the user to pick up a message if he is in the office.
Range: 0–500. **Default:** 0.
3. **Attempts** — How many times that the system will call/page.
Range: 0–99. (0 turns off delivery.) **Default:** 3.
4. **Interval** — How many minutes should elapse between attempts.
Range: 10–1440. **Default:** 30.
5. **Quiet period on** — When the quiet period should begin.
Default: (None.)
6. **Quiet period off** — When the quiet period should end.
Default: (None.)

Function 552: Delivery/paging parameters

The sequence of programming is as follows:

1. **CO line access** — Enter the CO line group (9, 8, or 71–76) that is to be accessed for delivery.
Default: 9.
2. **Maximum lines** — Enter the maximum number of lines (in the selected CO line group) that the system can access simultaneously. Make enough lines available to accommodate high notification traffic (but be careful: if you make available **all** lines in the selected line group **and** high notification traffic occurs, the system could tie up all lines).
Range: 1–19. **Default:** 1.
3. **Pager dialing pause** — When paging, the IVX E-Class system will send the mailbox number to be shown in the pager's display. To allow time for the paging service to answer, enter the pause, in seconds, to occur between when the IVX E-Class system dials the pager number and when it then dials the mailbox number.
Range: 0–20. **Default:** 6.

Function 56: Cascade paging mailboxes

In addition to individual mailbox paging, the IVX E-Class system can support up to 10 cascade paging mailboxes (520–529). These can be assigned to anyone who requires escalating levels of paging beyond the single level available in all user mailboxes. In this function, you program the paging numbers and number of times each is to be paged before the next paging number is added; additionally, the mailbox owner can program these settings. To record a greeting, press **PROGRAM *** and the mailbox number; then press **#** to confirm, and follow the prompts. The default password is the mailbox number. The maximum recording length is controlled by Function 51; the default is 10 minutes.

Cascade mailbox options

The user can program up to three paging numbers, of up to 24 digits each, to be paged whenever the mailbox takes a new or urgent message. The system will page the first paging number (for the number of times listed), then add the second paging number (for the number of times listed), then add the third paging number and will continue to page all three pagers until the message has been retrieved.

1.	2.	3.	4.	5.	6.
MB	1st Number	Attempts	2nd Number	Attempts	3rd Number
520	2145553232	2	2145554254	3	2145555452

To program this, enter:

1. **The mailbox number** — **Range:** 520–529. [Then press **1** to enter number programming, and proceed to Step 2.]
2. **First pager number** — The number to be dialed (**without** the CO line Group [9, 8 or 71–76]).
3. **Attempts** — How many times the system will page (up to 20) before adding the second pager number. **Range:** 0–99 (0 immediately pages all numbers). **Default:** 1.
4. **Second pager number** — The number to be dialed (**without** the CO line Group [9, 8 or 71–76]).
5. **Attempts** — How many times the system will page (up to 20) before adding the third pager number. **Range:** 0–99. **Default:** 1.
6. **Third pager number** — The number to be dialed (**without** the CO line Group [9, 8 or 71–76]).

Note: Use the ▲ scroll key to enter special characters; use the ▼ scroll key to backspace. Press **#** to confirm the inserted character and continue. Press **# #** to complete the entry. To change the number, delete and then re-enter it.

Cascade paging parameters

The cascade paging mailboxes will use the same CO line group and pager dialing pause as programmed in Function 552 (see page I.4).

Paging interval

To program the paging interval parameter for a cascade paging mailbox:

1. Enter the mailbox number (520–529).
2. Press **2** to set parameters for the mailbox.
3. Enter the number of minutes for the interval between attempts.
Range: 1–1440. **Default:** 30.

Function 57: Q & A mailboxes

You can create up to 10 **question and answer (Q & A) mailboxes** (490–499). Each Q & A mailbox owner can record up to 10 questions. The questions are recorded in the same manner as recording users' multiple personal greetings (see *User's Guide*). The individual answer segments recorded by the caller are stored as a single message, with the answer segments separated by short beep tones. Each answer segment's maximum length will be as programmed in Function 51 (see page I.1). Normal message handling capability — delete, save, etc. — applies to the entire message (all segments).

The caller, when recording each answer, can be instructed to conclude by pressing **1** or to pause for the next question (the system advances when it detects either a 3-second period of silence or the pressing of **1**) — e.g., "Record your name at the tone and press 1 when finished"... "Record your address at the tone and press 1 when finished." If the caller fails to respond to two questions in a row, the system disconnects the call.

Important: This programming creates or deletes Q & A mailboxes, but these mailboxes are turned "on" **only** when the mailbox owner has recorded questions. Similarly, deleting all questions turns "off" the mailbox.

To record questions, press **PROGRAM *** and the mailbox number; then press **#** to confirm, and follow the prompts. The default password is the mailbox number. The maximum recording length is controlled by Function 51; the default is 10 minutes.

Here is an example of a completed programming worksheet (numbers correspond to steps on next page):

1. MB	2. Name	3. CF day	4. CF night
490	Employment	ID 9999	ID 9999
491	Survey	ID 9999	ID 9999

Each programming step is defined as follows:

- 1. Mailbox number** — Enter a mailbox number 490 to 499.
- 2. Name** — The mailbox name is used for the display, reports, and as a programming aid. The name length can be no longer than 10 characters (see "Entering alphanumeric characters," page D.2).
Default: The mailbox number.
- 3. & 4. Call forward** — A Q & A mailbox can be set to call forward, after the last question has been answered, to an extension, department, a mailbox or a branch ID for day mode and differently for night mode.
Default: ID9999 (automatic disconnect).

Tip: If you need a Q & A mailbox with more than 10 questions, set the call-forwarding to **another** Q & A mailbox.

Function 58: Message move and delete

When enabled, this prompts the mailbox user, when moving a message, to do one of the following:

- Move the message and save a copy in his/her mailbox.
- Move the message and delete it from his/her mailbox.

Default: Disabled.

Function 6: Recording

Function 61: Re-record system and auto attendant branch prompts

The IVX E-Class system plays the **system prompts** to an outside caller at different points in the call routing or mailbox functions. These system prompts have been pre-recorded at the factory but you may re-record them, if preferred — e.g., in a different voice or with different instructions.

The **auto attendant branch prompts** (such as the main greeting or sub-menus) are also recorded here — enter the branch ID number as the prompt number.

For both system prompts and branch prompts, the maximum record length is five minutes per prompt.

Recording a prompt

1. Practice the prompt by recording and re-recording (start and stop by pressing 1).
2. When satisfied with its quality, press # to confirm.

Note: Deleting a system prompt by pressing **HOLD** (instead of #) restores to the default recording.

System prompts

- **Busy Prompt: 530** — Plays to the outside caller if an extension is busy.
Default: *"That extension is busy."*
- **No Answer Prompt: 531** — Plays to the caller if an extension does not answer.
Default: *"That extension does not answer."*
- **Hold Prompt: 532** — Plays to the caller who makes a menu selection or enters an extension number.
Default: *"One moment, please."*
- **Q/Z Prompt: 534** — Plays to a caller who has selected an alphabetic directory; instructs the caller to press 1 for the letters Q or Z since these two letters do not appear on the phone keypad; plays at the end of the first directory prompt (but only if a name in the directory starts with a Q or Z).
Default: *"For the letters Q or Z, use key number 1."*
- **No Names Matched Prompt: 535** — Played to the caller if, in a directory branch, the first letter he/she selected does not have any names associated with it, or if he/she has listened to all of the names played and has not made a selection. After playing the prompt, the IVX E-Class system forwards the call to the extension, branch or mailbox as programmed in call forward no response.
Default: *"No names matched; one moment please."*
- **End of Message Prompt: 537** — Plays after a caller leaving a message presses 1 to stop recording; the prompt then tells the caller his/her options.
Default: *"To continue this recording, press 1; to return to the main menu, press 8; or, if finished, press * and hang up."*
- **ACD Queue Prompt: 538** — The first prompt played to a caller when all extensions are busy in an ACD department.
Default: *"All agents are currently assisting other customers. Please hold; your call will be answered in the order received."*
- **ACD Hold Prompt: 539** — Is periodically played to callers on hold in an ACD department when all extensions are busy.
Default: *"All agents are still busy assisting other customers. Please hold; your call will be answered in the order received."*

(Continued)

- **Holiday Main Greeting Prompt: 540** — Plays to callers when the system has been manually placed in holiday mode.

Default: "Thank you for calling. Our office is closed in observance of the holiday. You may dial your party's extension, at any time, or please call back during regular business hours."

Note: While in holiday mode, IVX E-Class follows night mode programming for call routing. The day/night mode setting and holiday greeting can be activated remotely (see "Remote setting of day, night and holiday modes," page H.8).

Function 62: Record directory names

This function is accessible only if a directory branch has been created as part of auto attendant programming. Enter the extension number and record the name. If this is a by-alpha branch, the system will automatically set the name key using the name assigned in Functions 31, 33, or 53; if necessary, enter a different name key.

Important: Make photocopies of the blank worksheet for preparing directories and making future changes. As names change, the Administrator can enter this function and change any field via the Administrator password.

1. Ext.	2. Recorded name	3. Key
102	George Straite	4 3 6
113	Janet Smith	5 2 6

Each programming step is defined as follows:

1. **Extension number** — Enter the extension number for the directory name.
2. **Record name** — Press 1 to begin recording and press 1 again when finished.
3. **Name key**— (Necessary if the directory type is by-alpha [see "Directory branch," page H.3].)
Enter the numeric equivalent to the letters appearing on a phone keypad (for Q or Z, use 1). Up to three¹ numbers may be entered. See Function 165 (page E.5) for more information.

A by-alpha directory branch allows the caller to be connected to a system user by selecting his/her name from a directory. The by-alpha directory has two prompts: the first instructs the caller to enter the first **three letters** of the individual's first or last name; the second instructs the caller to press # when he/she hears the desired individual's name. The system then plays the matched names to the caller, in alphabetical order.

With the name key set to three digits, when a caller selects a directory branch and dials only one or two digits to select a name, the system will wait three seconds for the entry of another digit. If the system receives no other digit within that time, the auto attendant will begin to play, in alphabetical² order, the subset of directory names bounded by the digits dialed.

Examples: Caller dials 5 and waits three seconds. The system plays names beginning with J, K, and L.
Caller dials 3 2 and waits three seconds. The system plays names beginning with DA through FC.
Caller dials 7 7 2. The system plays names beginning with PPA through SSC.

If a user dials **more** than three digits, the system ignores the additional digits (except for the # key, which signals the directory to connect the caller to the extension or department associated with the directory entry that's playing).

Note: To re-record the prompt that says, "Enter the first three letters of the person's last name," you must enter Function 61 and then enter the ID number of the directory branch.

¹ Generation II only (in earlier IVX E-Class "Generation I" model, name key allowed one digit).

² Previously, names played in the order in which they'd been recorded; now, they play automatically in alphabetical order.

Function 63: Message-on-hold (MOH) programming

MOH can be:

- A live feed from an external music source connected to the MOH connector located on the side of the cabinet (see “MOH port,” page B.16, and diagram on page B.8).
- One of three default, generic MOHs pre-recorded by the factory.
- One of up to five custom MOHs loaded into the system by using a cassette recorder connected to the MOH connector.

Note: If ACD is used, we recommend that you use Prompt 590, Prompt 591 or a custom prompt without periodic “voice-overs,” since the ACD Hold Prompt **also** will be played while a caller is on hold.

Function 631: MOH source

This selects the source for the system (or only tenant 1, if tenant service is enabled) that will be played to callers on hold.

Code	Source
590	Live external source*
591	Pre-recorded music
592	Pre-recorded with “ <i>please continue to hold</i> ”
593	Pre-recorded with “ <i>dial 0 or extension from hold</i> ”
594–598	Customer-recorded message on hold

* Dialing off-hold doesn't work (can still dial off greetings and announcements).

Default: 592 (generic message-on-hold).

Note: MOH source isn't selectable for tenant 2. If tenant service is enabled, source 596 is the only available customer-recorded source for CO calls placed in hold by stations assigned to tenant 2. However, if source 596 hasn't been recorded, the default, generic MOH source (592) will be played, instead.

Function 632: MOH recording

1. Connect the message/music source to the MOH port on the side of the cabinet.

Note: The connector is monophonic-only — if you use a stereo source, you must either set it to output mono, if possible, **or** use a stereo-to-mono conversion cable (or adapter).

2. Enter the prompt number to be recorded.
3. Press **1** to begin recording. To aid you in queuing, the source will be played through the phone's speaker.

Note: The recorded material should not have a “beginning” or “end” — so that playback can loop continuously. The maximum record length is controlled by the amount of space available on the Memory Module.

4. Press **1** when finished. The recording will play back so you can review it.
5. Press **#** to accept the recording. (To delete it, press **HOLD**.)

Function 633: MOH volume

If a custom MOH is recorded, the output volume can be adjusted in this function.

Range: 1 (faint)–12 (loudest).

Default: 6.

Notes: If an external audio source such as a radio is used for MOH, adjust the volume at the source.

To turn **live** MOH volume completely off, turn off volume at the source.

To turn **recorded** MOH volume completely off, select (in Function 631, *above*) one of the prompts in the range of 594–598, but make sure it's blank. These prompts are blank by default; if you have recorded some audio on all of them, just select one and record a few seconds of silence.

Function 7: Reports

Important: You may wish to read “SMDR” (pp. L.1–L.2) before using this function.

Report printing

The system’s built-in reports can be output to a printer or a PC via the **Maintenance/SMDR** port.

When printing captured reports from the PC to a laser printer, use a fixed monoproportional font (such as Andale Mono, Courier New or Letter Gothic), 9 points or smaller.

From either the Installer or Administrator programming menu, select the desired report as shown in Functions 71, 74 and 75 (*below*). The reports can be printed with either: (1) the data saved for inclusion in future reports, or (2) the data and totals cleared. (You **can’t** clear data in either the system program report or the system speed-dial report.)

Note: Outbound calls shorter than one minute are not counted in system totals.

Reporting functions

- **Function 71: System program report** — Provides a hard copy of the system’s current programming. Compare this vs. the programmer’s worksheet to verify the accuracy of the programmed data.
- **Function 73: ACD department detail report** — (See below.)
- **Function 74: Voice mail statistics report** — Provides statistics indicating the message activity in each mailbox since the data was last cleared.
- **Function 75: System speed-dial list** — Lists the current system speed-dial numbers. Distribute a copy to those who are authorized to use them.

Function 73: ACD department detail report

The ACD department detail report provides extension usage by ACD department. This report includes the following “fixed” information:

- All ACD departments will be included.
- The current report’s **start** date and time will be the previous report’s **end** date and time.
- The current report’s **end** date and time will be the current date and time.

Function 73 offers two choices:

1. **Current report** (“Press 1 to print the current ACD report”) — Outputs the current ACD department report. All information is automatically copied to the previous report (see next choice) and cleared from the current report.
2. **Previous report** (“Press 2 to repeat the previous ACD report”) — Re-sends the last report printed.

Note: After the current report is requested, it will be stored indefinitely (as the “previous” report) until the next “current” report is selected.

Sample Function 73 report

ACD Report by Department, Current							Page 1
Department Detail			Dept: 291, TRAINED (A)				
Start: 12/15/2004 17:07			End: 12/17/2004 16:07				
Incoming ACD			PBX Calls				
(B)			(C)				
Ext Name	Answer	Duration	Recovered	Answer	Duration	Out	Duration
114 MATT	44	5:48:42	1	14	1:15:44	13	0:41:10
115 RICK	0	0:00:00	0	6	0:14:32	2	0:03:55
102 CRAIG	33	5:15:00	3	9	1:03:35	15	0:27:30
103 TOMMY	19	2:47:39	1	9	0:20:10	15	0:27:15
104 JOHN D	1	0:10:21	0	11	0:25:30	11	0:57:35
106 SCOTT	36	3:59:38	1	24	1:57:02	20	0:36:12
112 CHRIS	51	5:00:19	1	19	2:04:02	17	0:20:54
116 PHIL	31	3:14:50	0	23	1:35:41	34	0:36:33
105 BOBBY	40	4:42:32	5	15	0:43:31	18	1:20:01
119 EDWARD	41	4:25:11	2	24	0:59:53	8	0:26:17
117 MARK D	0	0:00:00	0	2	0:00:28	4	0:06:40
113 DAVID	0	0:00:00	0	7	0:52:38	13	0:42:46
120 JENNY A	4	0:09:07	1	4	0:16:10	0	0:00:00
Totals	300	35:33:19	15	167	11:48:56	170	6:46:48
Abandoned Calls: 3							
Rerouted Calls: 2							
Average CO queue time: 0:21			Max CO queue time: 0:50				

Function 73 report description

The ACD department detail report is divided into four major sections: the report header, the incoming ACD call statistics, the PBX call statistics, and the report footer.

Report header

The **report header** **(A)** includes the report name ("ACD Report by Department, Current" or "ACD Report by Department, Previous"), ACD department name and number, report start date and time, and ending date and time:

- **Start** — Beginning date and time of the reporting period. This will match the ending date and time of the previous report.
- **End** — Ending date and time of the reporting period.

(Continued)

Incoming ACD call statistics

The **incoming ACD call statistics** section ② shows ACD calls offered to each ACD agent position. These are calls that are transferred to, or ring into, the department number and then are distributed to the agent positions (extensions).

Column name	Description
Ext	ACD extension
Name	Extension name
Answer	Number of ACD incoming calls answered at that extension (includes Esi-Link calls to the ACD department)
Duration	Total time connected to ACD calls
Recovered¹	Number of ACD calls unanswered at that extension and returned to the ACD queue.

PBX call statistics

The **PBX call statistics** section ③ shows non-ACD calls for each extension — *i.e.*, all calls that weren't delivered directly through the ACD department number.

Column name	Description
Answer	Number
Duration	Total time connected to incoming PBX calls
Out	Number of PBX calls originated at that extension
Duration	Total time connected to outgoing PBX calls

Report footer

The **report footer** ④ includes totals of the incoming ACD call statistics and PBX call statistics; it also includes the average and maximum **queue times**, as well as total **abandoned calls** and **rerouted calls**, for each ACD department:

- **Average CO queue time** — The average length of time callers were holding ('queued') for an available agent over the reporting period.
- **Max CO queue time** — The maximum length of time one or more callers had been queued for an available agent over the reporting period.
- **Abandoned calls** — Total ACD calls that disconnected (hanged up) while held in queue or listening to the ACD queue or hold prompt (announcement).
- **Rerouted calls** — Total ACD calls that followed the ACD department call forwarding assigned in Function 33 after expiration of the ACD exit timer (assigned in Function 154).

¹ Each time a call is recovered, that ACD extension will be automatically logged-out of the ACD department. For more information, see the *User's Guide*.

Notes:

1. A CO call transferred to an ACD department or ACD extension will be counted as a new call each time it's successfully transferred.
2. An ACD call transferred to the same, or another, ACD department will be counted as a new ACD call for that department.
3. An ACD call transferred to an ACD extension will be counted as a PBX incoming call for that extension.
4. A PBX call (outgoing or incoming) transferred to an ACD department will be counted as an ACD call.
5. A call retrieved from hold will be counted as an incoming PBX call.
6. PBX calls that forward to voice mail or other forwarding destinations are not included in the ACD department report.
7. An incoming ACD call that disconnects (hangs up) while ringing at an ACD extension won't be counted as an abandoned call.

Feature description: SMDR

SMDR (station message detail reporting) call records are output in real time via an ESI phone system's **Maintenance/SMDR** serial port. Connect a standard serial printer or call accounting system to the serial port. SMDR data will be stored temporarily if a laptop is connected for programming (five minutes after you exit programming mode, the buffered SMDR will resume output to the serial port).

The output from the serial port is: 8 data bits, 1 stop bit, and no parity, 1200 baud.

SMDR may be output in one of two formats, selected in system programming: **tabular** or **CSV**. The tabular format is the default.

Tabular SMDR format

ESI's tabular SMDR output format, which is compatible with the standard Panasonic® DBS® format except for the last two (ESI-exclusive) items, is as shown below:

1	2	3	4	5	6	7
123456789012345678901234567890123456789012345678901234567890123456789012345678						
T	MM/DD	HH:MM:SS	HH:MM:SS	NNN	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	EEE RRR LL

The columns are:

- **Call type** — Outbound ("O"), inbound ("I") or transferred ("T") at column 1.
- **Date** ("MM/DD") — Begins at column 3.
- **Start time** ("HH:MM:SS") — Begins at column 9.
- **Duration** ("HH:MM:SS") — Begins at column 18.
- **Extension number** ("NNN") — Begins at column 27.
- **Digits dialed** (right-justified)/**Caller ID** (left-justified) — Begins at column 31 (28 characters).
- **Esi-Link home location number** ("EEE")¹ — Begins at column 69.
- **Esi-Link remote location number** ("RRR")¹ — Begins at column 73.
- **CO line number** ("LL") — Begins at column 77.

Each record is terminated with a line feed and carriage return character.

CSV SMDR format

The **comma-separated value (CSV)** format is compatible with *Microsoft® Excel®* and other spreadsheet applications. A CSV record will be output for each completed call, and will be represented as follows (word-wrapped):

Format:

"T", "MMDDYYYY", "HHMMSS", "HHMMSS", "NNN", "XXXXXXXXXX. . .XXX", "CCCCCCCCC. . .CCC", "LL"

Example A:

"I", "07042002", "000852", "000059", "101", "2144229700", "ESTECH SYS INC. ", "54"

Example B:

"O", "10312003", "221502", "020512", "190", "12125551212", "", "11"

¹ Used only when Esi-Link is enabled and programmed.

(Continued)

The fields are:

- **Call type** ("T") — Outbound ("O"), inbound ("I") or transferred ("T").
- **Start date** ("MMDDYYYY") — Six characters, zero-filled.
- **Start time** ("HHMMSS") — Six characters, zero-filled; 24 hour clock.
- **Duration** ("HHMMSS") — Six characters, zero-filled.
- **Extension number** ("NNN") — Three characters, space-filled, right-justified.
- **Digits dialed/Caller ID** ("XXXXXXXX . . . XXX") — Up to 28 characters, null-filled.
- **Caller ID name** ("CCCCCCCC . . . CCC") — Up to 24 characters, null-filled.
- **Esi-Link home location number** ("EEE")¹ — Three characters.
- **Esi-Link remote location number** ("RRR")¹ — Three characters, null-filled.
- **Line number** ("LL") — Two characters, null-filled, right-justified.

Each field is delimited with double quote marks and separated with a single comma. Null fields are still included as place holders (see Example B, p. L.1). Each record is terminated with a line feed and carriage return character.

Reporting conventions and rules

- Inbound and outbound call records are generated only for calls between a station and a CO line.
- The duration of each call record represents the period of time that that station controlled its portion of a call. A record is generated each time a station does any of the following:
 - Disconnects.
 - Places a call on hold.
 - Transfers a call.

A single CO call could be included in multiple records if it is transferred from station to station.

- Periods when calls are placed on hold or attempts at supervised transfers are unsuccessful are included in the station's record.
- Periods when calls are on hold, in the auto attendant, leaving/retrieving voice mail or in an ACD queue are not included in call records.
- A new record begins when a station answers a call or a hold recall.
- Records will be generated independently for all stations in a conference. If more than one CO line is involved in a conference, each call record generated by that conference will be associated with only the last line disconnected.
- Dialed digits don't include the line group or location number.
- Outbound calls begin a call record 10 seconds after the call has cleared toll restriction.

PC interface

Use an RS-232C cable to connect a PC's serial port to the IVX system's **Maintenance/SMDR** port.

Note: SMDR data will be stored temporarily if a laptop is connected for programming (five minutes after you exit programming mode, the buffered SMDR data will resume output to the serial port).

¹ Used only when Esi-Link is enabled and programmed.

Function 8: IP PBX programming

This function lets the Installer perform the programming steps that allow the hardware components — IP PBXs and IP Feature Phones — to communicate with each other.

Notes: After making any IP PBX configuration changes, wait at least five minutes before you power down the system.

Neither the IP PBX nor the IP phones use any subnet masking; that is, their subnet mask is *0.0.0.0*. This means the IP PBX and the phones won't communicate with any other device on their Ethernet segment.

When entering F8, the first screen will appear as follows. Press **1** to view licensing, **2** to program the local IP PBX, or **3** to program Esi-Link (multi-site) capabilities.

```
I P  P R O G R A M M I  N G
C M D :  _
```

Function 81: Display licenses

Function 81 is used to view the **license information** for *VIP*, as well as remote network channels for Remote IP Feature Phones and Esi-Link. This function **cannot** *change* license information (if you need any such changes, contact an ESI representative).

Parameters include:

- **Max** — The total number of licenses (users) that can have the feature enabled.
- **Used** — The total number of licenses in use. For *VIP*, this is the total number of extensions that have unified messaging enabled.

```
L I C E N S E  V I P
M A X : 0  U S E D : 0
```

Function 82: Local IP PBX programming

Function 82 is an Installer-level function used to program the local IP PBX so that it can communicate with the phones on its own network segment ("local phones"), with Remote IP Feature Phones, and with other IP PBXs. The Installer will be able to:

- Assign IP addresses and UDP ports to the IP PBX and the local IP phones
- Set limits to the number of available remote talk paths

(Continued)

Function 821: Program IP PBX addresses

Important: Any calls that are in progress on IP Feature Phones or Esi-Link when changes are made in Function 821 will be immediately disconnected. Therefore, ESI recommends that Function 821 programming be performed on **idle** systems **only**.

Assign IP address to the IP PBX

The administrator assigns an IP address to the IP PBX, using four-octet (dotted-quad) notation. The default is 192.168.248.1. Press # for the periods between the octets. Press # again when finished.

PBX PRIVATE IP
192.168.248.1

Normally, the IP PBXs will use private IP subnetworks (as defined in RFC 1597¹) rather than public subnetworks.

ESI recommends keeping all the ESI IP components within the same address range. To do so, assign to the IP PBX the first available address in the range. For example, if the user plans to use the IP addresses 192.168.210.1 through 192.168.210.97 as the range of IP addresses, the .1 address would usually be assigned to the IP PBX, with the remainder of that block being made available to the phones.

Important: The IP PBX's MAC address will appear in the display. **Write down this address.** It is **needed** for programming Esi-Link access to this IP PBX from other locations.

Enter gateway's IP address

Although it can use a public IP address, the IP PBX will normally use private addressing and sit behind some sort of address-translation device, such as a NAT²-enabled router. Whatever device provides a public IP address to the network on which the IP PBX resides is the gateway. This device's address is often called the *default gateway address*.

For instance: a company's Dallas office uses DSL as its broadband connection, and the DSL line is terminated at a DSL router that sits on the LAN. That router will have two interfaces: the WAN side, which must have a public (globally-addressable) IP address, and the LAN side, which normally has a private (non-routable) IP address. The private IP address on the LAN interface is the address that is used in this programming step.

Note: The IP addresses of the IP PBX and the LAN interface do not necessarily have to be on the same subnet.

Enter the IP address of the gateway's LAN interface in dotted-quad notation, using the # key as the dot between the octets. Press # again when finished.

PBX GATEWAY IP
0.0.0.0

(Continued)

¹ <http://www.rfc-editor.org/rfc/rfc1597.txt>.

² Network address translation.

Enter remote-access IP address

The remote-access IP address is the address the Remote IP Feature Phone and other IP PBXs connected via Esi-Link will use to access the local IP PBX. (If remote access to the IP PBX is not planned, this parameter can be left at default.) If a gateway device is used to connect an IP PBX on a private network to a public or WAN connection, the remote access IP address is the public or WAN address of the gateway. If a public IP address is assigned as the PBX Private IP Address, the same IP address will be entered here.

Enter the remote-access IP address in dotted-quad notation, using the # key as the dot between the octets. Press # again when finished.

RMT ACCESS I P
0. 0. 0. 0

Assign UDP port

UDP ports are used to provide security to the system; only traffic destined for a specific UDP port will be allowed to pass through the gateway device. Choose a UDP port range 10000–65000, inclusive, but enter only the first two digits of that range. For example, the range of 10000–10999 would be entered as **10**; the range of 56000–56999 would be entered as **56**. The default is 59.

BASE UDP PORT
??000: 59

The IP PBX will automatically be assigned the first port in that range (in this example, 59001) and the IP phones will automatically have their extension number appended to the first two digits (e.g., extension 123 will be assigned a UDP port of 59123). In fact, upon entering the second digit of the base number (in this case, the 9), the display will automatically populate the remaining three places in the number with the digits 001.

Press # when finished.

Note that only the first 195 ports within that range are actually used. The gateway router will need to be programmed to open UDP ports xx001–xx195, inclusive, where xx represents the two-digit number that designates the UDP port range.

Example: The network administrator for IP PBX 705 in Chicago realizes that he is already using UDP port 59123, which falls in the default range, so he decides instead to use 56000 as the base UDP port. He will use F82 to assign that range by pressing **5 6 #**. The IP PBX will automatically be assigned a UDP port of 56001. Extension 100 will automatically be assigned a UDP port 56100, x121 will have a UDP port of 56121, and so on. (In an Esi-Link network, the base UDP port must be programmed in Function 832 at the remote locations.)

Function 822: Assign IP address pool for local IP phones

Note: If you are supporting **both** IP E-Class **and** IP-compatible IVX products, be aware that this feature is used only by IP E-Class, **not** by IVX products. On an IVX product, press **#** until you're back to the F82 display.

Function 823: Remote channels

This function sets the number of **remote channels** available for use by Remote IP Feature Phones. This is allowed so that such phones don't use up all network bandwidth. A conversation over a Remote IP Feature Phone uses approximately 44K of bandwidth; so, depending on the amount of available bandwidth on the network, you may want to restrict the amount of bandwidth used by Remote IP Feature Phones and Esi-Link.

Example: If total available network bandwidth between sites is 256K and five remote channels are in use simultaneously (thus consuming approximately 86% of the 256K), the network will become congested, having an adverse impact on other data transmissions (e.g., file movement, printing, etc.) on the site-to-site network.

You must have an IVX VoIP Card (IVC) installed, with appropriating licensing, to set this parameter. If the IVC is licensed for three channels, you can set one, two or three remote channels; if the IVC is licensed for 12 channels, you can set one to 12 remote channels.

Enter the number of remote channels and press **#** to confirm.

REMOTE
CHANNELS: 12

Function 824: Network Services Processor

The optional **Network Services Processor (NSP)** is a component that provides an IP network connection for maintenance and other features, such as *VIP* unified messaging. You enter each of the following parameters in one operation.

NSP private IP address — View or enter the IP address for the NSP.

Range: 1.0.0.1 through 254.254.254.254.

NSP subnet mask — Enter the IP subnet mask of the network to which the NSP is connected.

Range: 0.0.0.0 through 255.255.255.252.

NSP gateway — Enter the default gateway IP address of the NSP if it differs from that for the IP PBX. Default value is the PBX gateway IP address assigned in Function 821.

Range: 1.0.0.1 through 254.254.254.254.

NSP public address — Enter the public WAN address that routes to the NSP if it differs from that for the IP PBX. Default value is the PBX remote-access IP address assigned in Function 821.

Range: 1.0.0.1 through 254.254.254.254.

The following parameters will display only if *VIP* unified messaging has been installed on the system:

NSP remote messaging e-mail server — Enter the IP address of the customer's e-mail server.

Range: 1.0.0.1 through 254.254.254.254.

VIP remote messaging e-mail address — Enter the e-mail address assigned by the e-mail System Administrator. To enter a period ("dot"), press 1. To enter the @ symbol, press # #.

Function 83: Esi-Link programming

Function 83 is used to program the information required for Esi-Link operation between multiple IP PBXs at different locations. **It is critical that programming is consistent and correct at all locations to be connected with Esi-Link.** Location numbers, names, abbreviations, and addressing parameters should be planned out in detail prior to performing Function 83 programming.

ESI - LINK MENU

Function 831: Local location number

Before programming Esi-Link parameters for other locations in Function 832, you must program the location number of the local IP PBX. Each IP PBX in an Esi-Link network must have a unique location number. Valid location numbers are in the range of 700–799. This location number will be used for dialing between sites. Press # to confirm.

LOCAL LOC NUMBER
7_

Note: When Esi-Link is used, all cabinets' time will be synchronized by cabinet 700, unless "synchronize with Caller ID" is enabled in Function 142 (see page E.2).

Function 832: Adding an Esi-Link location

This function is used to add, modify or view the programming for an Esi-Link location. Add the location for the site to be added or modified. The valid range is 700–799. **This number must be unique for each site.** Press # to confirm.

ESI -LINK LOC
NUMBER? _

Enter the location name, which can be up to 10 characters in length. Press # to confirm.

701 LOC NAME
_

Enter the three-character location abbreviation. Press # to confirm.

701 LOC ABBRV
_

Enter the MAC address of the location's IP PBX. (This can be displayed in Function 821 programming on the IP PBX at that location.) This MAC address is different than the one displayed in Function 821 on the local IP PBX. Use the first six programmable feature keys to enter the letters A, B, C, D, E or F, respectively, in the MAC address. Press # to confirm.

701 HOU MAC
00304DFFF123

Note: All ESI MAC addresses begin with 00304D followed by six alphanumeric characters.

Enter the remote-access IP address for the location's IP PBX. This is the public IP address or private WAN address used for remote access to the location's IP PBX. Enter the address in dotted-quad notation, using the # key as the dot between the octets. Press # again when finished.

701 HOU RMT IP
_

Enter the UDP port number assigned to the location's IP PBX. Press # to confirm (and complete the Function 832 entries).

701 HOU PBX UDP
__001

Function 833: Deleting an Esi-Link location

This function is used to delete previously entered information about Esi-Link sites. Enter the location number to be deleted and press # to confirm.

ESI -LINK LOC
NUMBER? _

When prompted to confirm deletion, press **1**. (To **cancel** deletion, press any other key.)

1 TO DEL LOC
701 HOUSTON

Function 834: Programming Esi-Link publish

Each Esi-Link-enabled IP PBX can “publish” (or transmit) lamp appearance updates to the other Esi-Link locations. A combination of up to 30 local extensions, departments, and/or virtual mailboxes can be programmed to be published. When programmed on a programmable feature key at another Esi-Link location, lamp appearance for numbers on the Esi-Link publish list will automatically update.

Use the up and down arrow keys to scroll through the list. An entry can be programmed by entering an extension number or department group number. A mail box can be entered by pressing the voice mail key followed by the mailbox number. Press **#** to confirm the entry.

To remove an entry from the list, use the up and down arrow keys to scroll to that entry and press **HOLD** to delete, or enter a new number or mailbox.

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NOTES



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