NEC

Aspire Volp

VoIP Feature Supplement

2.00

Technical Support Web Site: http://ws1.necii.com (registration is required) This manual has been developed by NEC America. It is intended for the use of its customers and service personnel, and should be read in its entirety before attempting to install or program the system. Any comments or suggestions for improving this manual would be appreciated. Forward your remarks to:

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Aspire

Available with software 00.25 or higher.

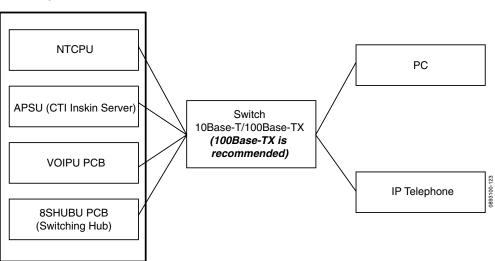
Description

VoIP (voice over Internet protocol or voice over IP) allows the delivery of voice information using the Internet protocol (sending data over the Internet using an IP address). This means that voice information, in a digital form, can be sent in packets over the Internet rather than using the traditional public switch telephone network (CO lines). A major advantage of VoIP and Internet telephony is that it avoids the tolls charged by ordinary telephone service.

Using VoIP equipment at a gateway (a network point that acts as an entrance to another network), the packetized voice transmissions from users within the company are received and routed to other parts of the company's intranet (local area or wide area network) or they can be sent over the Internet using CO lines to another gateway.¹

Using LANs

Using a LAN setup (local area network) with the Aspire system complies with the ethernet standard (10Base-T/100Base-TX).



Aspire Cabinet

To connect a telephone to a LAN connection, the system allows the use of an Aspire digital IP 34button keyset (referred to as Aspire IPhone), an Aspire digital keyset with an IP Adapter installed or an H.323 IP digital telephone. For details on installing the IP Adapter, refer to the Aspire Hardware Manual (P/N 0893100).

The voice quality of VoIP is dependent on variables such as available bandwidth, network latency and Quality of Service (QoS) initiatives, all of which are controlled by the network and internet service providers. Because these variables are not in NEC's control, it cannot guarantee the performance of the user's IP-based remote voice solution. Therefore, NEC recommends connecting VoIP equipment through a local area network using a Private IP address.

If connecting a LAN to a WAN (wide area network), follow the instructions included with the ADSL modem or gateway device.

IP Address

Equipment/devices used in the Aspire LAN setup must have an IP address assignment. An IP address assigns a unique address for each device. There are two types of IP addresses: Private and Global. A Private IP address is not accessible through the internet - a Global IP address can be accessed through the internet.

With a Private IP address, with equipment that does not access the internet directly, addresses can be assigned to the equipment within Class A, B or C by assigning a number within the class's range of numbers.

Class	Allowed IP Address	Recommended Environment
А	10.0.0.010.22.255.255	Large Scale Network
В	172.16.0.0 172.31.255.255	Mid Scale Network
С	192.168.0.0 192.168.255.255	Small Scale Network

With a Global IP Address, connected equipment can be accessed through the internet, so each address must be unique. To avoid a conflict, the addresses are controlled by ARIN (American Registry for Internet Numbers). To obtain a Global IP Address, contact ARIN or apply with your local ISP (internet service provider).

The first one to three groups of numbers (depending on the subnet mask) identify the network on which your computer is located. The remaining group(s) of numbers identify your computer on that network.

Subnet Mask

As the IP Address includes information to identify both the network and the final destination, the Subnet Mask is used to set apart the network and destination information.

Class	Default Subnet Mask
А	255.0.0.0
В	255.255.0.0
С	255.255.255.0

The default subnet masks are:

In the above table, you'll see that the Subnet Mask is made up of four groups of numbers. When a group contains the number '255', this is telling the router to ignore or mask that group of numbers in the IP address as it is defining the network location of the final destination. So, for example, if the IP Address were: 172.16.0.10 and the Subnet Mask used was Class B (255.255.0.0), the first two groups of numbers (172.16) would be ignored once they reached the proper network location. The next two groups (0.10) would be the final destination within the LAN to which the connection is to be made.

DHCP

DHCP (Dynamic Host Configuration Protocol) is a protocol which assigns a dynamic IP Address. Network control may be easier with DHCP as there is no need to assign and program individual IP Addresses for the LAN equipment. To use a dynamic IP Address, a DHCP server must be provided. The Aspire system provides the ability to use DHCP. When equipment which is connected to the LAN (the DHCP client) is requesting an IP Address, it searches the DHCP server. When the request for an address is recognized, the DHCP server assigns an IP Address, Subnet definition, and the IP Address of the router, etc., based upon the system programming. When an external DHCP server is used, the DRS Server IP address (NTCPU) and the Media Gateway Card IP address can be entered into the system programming. This allows the server to use these defined addresses, and as long as the IP telephones are set for DHCP, manually programming the IP telephones with the IP and gateway address is not required. Refer to **Programming - Using an External DHCP** (page 17) for programming.

Note that the NTCPU must always have a static IP address. This address is set in *Program 10-12-01* : *NTCPU Network Setup - IP Address* (default: 172.16.0.10).

Gatekeeper

Whenever an H.323 terminal activates, a check is made of the network to see if there are any gate-keepers available. When a gatekeeper is present, it provides users with:

- Address Translation Users typically do not know the IP addresses of other terminals. When a user makes a call, the gatekeeper translates an alias address (name or number) to the destination address.
- Admissions Control

Users will not all be able to access the network at the same time because of limited shared resources. Gatekeepers may restrict network access based on call authorization, bandwidth usage, or some other criteria. It is important to note that Admissions Control is a way to preserve the integrity of the calls (provide QoS guarantees) that are already up and operating when a user requests access.

• Bandwidth Control

Besides network access control, the gatekeeper offers network managers the ability to restrict or assign bandwidth to different applications along certain protocol conventions. This is another place network managers can enforce QoS guarantees and other enterprise-wide usage policies.

With the Aspire system, a separate external gatekeeper is not required unless connecting to an outside H.323 endpoint/gateway which requires an outer gatekeeper or if over 50 outer addresses must be registered. Otherwise, the Aspire provides tables within the system programming for address resolution.

Routers

When purchasing a router for use with the Aspire IP feature, the minimum requirements would be that it provide VPN and QoS. Current VoIP protocols for the Aspire, NGT and H.323 telephones can not communicate over NAT. Therefore, when communications is required over NAT, the router must support VPN. Note that a router which supports 'VPN Pass Through' requires a VPN server.

The priority control feature is required to prevent RTP packet loss. If a WAN is used for VoIP only and the bandwidth is wide enough for the VoIP channel, then the QoS feature might not be required.

The following are available routers which provide VPN and QoS:

- NEC IX1000 / 2000 Series
- Yamaha RT105, RTX1000 / 2000
- Cisco 800 Series
- Furukawa FITELnet F40
- Fujitsu SiR-170, SiR-150

The following routers provide VPN but no priority control (QoS):

- Linksys BEFSX41, DEFVP41
- OMRON MR104DV, MR104FH
- Allied Telesis AR410

VoIP Bandwidth Calculation

A digital telephone system converts an analog voice signal into a stream of bits expressed in K bits per second (where K is used to mean one thousand). For standard PCM digital encoding, this stream of bits is 64 K bits per second. This is 64 K bps in each direction (transmit and receive).

To improve transmission efficiency, this bit stream is compressed using a standard compression algorithm such as G.729. The result is still a bit stream, but with fewer bits per second. For example, G.729 will reduce the 64 K bits per second to a bit stream of 8 K bits per second.

This bit stream is then divided into chunks (called Voice Samples or Voice Frames) that can be placed in packets for transmission over a data network.

This reduced bit stream is examined repeatedly in fixed time intervals. This examination time is called the Voice Frame Interval. This is the time used to collect the bits for one Voice Frame. The Voice Frame Interval is expressed in milliseconds (ms). A millisecond is one thousandth of a second.

To help determine the bandwidth requirements for the system, the NEC Technical Support web site (http://ws1.necii.com) provides a bandwidth calculator. This web site requires registration with the NEC Sales Support. Contact them by phone (1-800-365-1928) or EMail (ubsdsupport@necinfron-tia.com) in order to register. It is important to remember that the bandwidth calculator is based on a single voice channel. It takes two voice channels (send and receive) for each telephone conversation.

Refer to Required Bandwidth (page 45) for additional information.

IP Hardware

PCBs:

- NTCPU Signals the gateway with VoIP communication
- **4VOIPU** VoIP PCB provides a 4-channel voice packet gateway unit and works as a media gateway for VoIP communication. This PCB is required for either VoIP trunks or when using VoIP keysets which talk to non-IP keysets. VoIP keyset-to-VoIP keyset can talk without a media gateway and without using any DSP resources using the Peer-to-Peer feature (page 47). The 4VOIPU PCB requires 4 trunk ports.
- **4VOIPDB** VoIP daughter board provides an additional 4 channels when attached to either the 4VOIPU or 16VOIPU PCB. The 4VOIPDB requires 4 trunk ports.
- **16VOIPU** VoIP PCB provides a 16-channel voice packet gateway unit and works as a media gateway for VoIP communication. This PCB is required for either VoIP trunks or when using VoIP keysets which talk to non-IP keysets. VoIP keyset-to-VoIP keyset can talk without a media gateway and without using any DSP resources using the Peer-to-Peer feature (page 47). The 16VOIPU PCB requires 16 trunk ports.
- **16VOIPDB** VoIP daughter board provides an additional 16 channels when attached to the 16VOIPU PCB. The 16VOIPDB requires 16 trunk ports.
- **8SHUBU** Provides an 8-port switching hub for use with the Aspire system. This PCB can also be used to provide PoE for Aspire IP equipment.

Terminals:

- IPhone Aspire 34-button multi-line IP phone
- **IP Adapter** IP adapter connects an Aspire keyset to the VoIP network
 - The phone with the adapter installed is also referred to as the Dterm IP phone.
- ITR-2D-1 H.323 IP phone
 - H.323 phones do not support the ability to send digits after a call has been placed and before it is answered. This means that features which use single digit service codes, such as Voice Over and Barge-In, are not available with this type of phone.

Power must be supplied to the IPhone or the Aspire keyset with IP adapter using either a local or central power supply. The ITR-2D1 phone requires local power. If there is a power outage, the VoIP phones will not work unless the phones are plugged into a UPS (uninterruptible power supply).

Switches/Hubs for PoE

Using a central power supply or the 8SHUBU PCB with the PoE jumpers set, power over category 5 network cables can be provided. This eliminates the need of installing separate power adapters for each IP phone and it allows for centralized power backup.

! CAUTION !

Only Aspire IP phones and Aspire IP Adapters must be connected to the 8SHUBU. The provided DC voltage provided through the spare pairs (4/5, 7/8) may damage any other equipment.

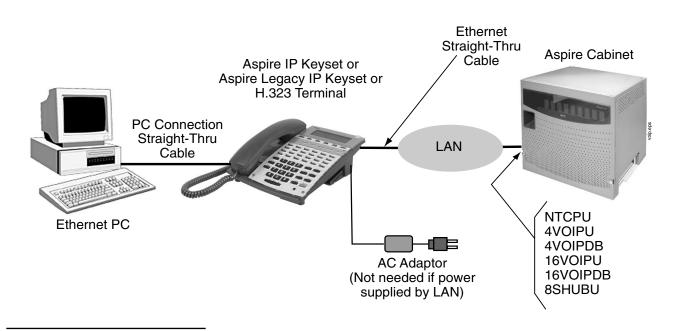
If PoE (power over ethernet) is to be used to eliminate the separate power adapters, due to the power requirements, a separate power source (power switch/power hub) is suggested.

Supported Switches/Hubs

- 8SHUBU PCB Provides 8-port switching hub and the ability to provide PoE for Aspire equipment.
 - 802.1p/1q Support
- 24-Port Power Supply PoE-managed switch (NEC BlueFire 200/24)
 - PoE (Power over Ethernet) to Aspire IP/H.323 Phone
 - Spare Pair (4/5, 7/8) / Signal Pair (1/2, 3/6) Selection For systems which require layer 2 switching capability and PoE, the NEC BlueFire 200/ 24 switch is recommended. This unit provides layer 2 switch capability in addition to being able to supply ethernet power to 24 NEC IP terminals.
- Cisco Data Switch CDP Supported

Note that the Aspire IP phones are not IEEE 802.3AF compliant.

<u>Note: Each IP phone consumes one port. When automatically selected, the port number</u> <u>ranges from 257-512. The port number can be manually assigned using the port range</u> <u>001-512.</u>



Aspire VoIP Specifications

Category	Feature	Note		
IP Address	DHCP Server	NTCPU		
	DHCP Client	VOIPU PCB or IP Phone		
QoS	802.1p/1q			
	L3 QoS (ToS)	Diffserv/IP Precedence		
Maintenance	HTTP Server	NTCPU		
Server	H.323 Gatekeeper	For H.323 Phone Registration and Routing		
VLAN	Tag and port-based VLAN			
VoCoder	G.711 µ-law/A-law			
	G.729a			
	G.723.1			
	Fax Relay			
Jitter Buffer Size	Set by system programming			
RTP Length	Set by system programming			
Echo Canceller Tail Size	Set by system programming			
Level Adjustment	Set by system programming			
Protocol	H.323			
	NGT (Next Generation Telephone)			
IP Phone	H.323 Phone	H.323 Phone		
	NGT Phone	Maximum 512 Phones		
IP Trunk	H.323 Trunk	Maximum 200 Trunks		

Programming

In addition to the required VoIP programming described under the **Programming - VoIP** (page 8) heading, the following features and options have additional programming which may be required. Refer to the section that applies to the applications required for your location.

- Programming Static IP Address (page 9)
- **Programming Using the Aspire DHCP** (page 13)
- Programming Using an External DHCP (page 17)
- Programming H.323 Phone, Setting H.323 Options (page 20)
- LAN Connections (page 24)
- Address Conversion Table (page 25)
- **CODEC Selection** (page 25)
- **Deleting IP Phone Registration** (page 26)
- Echo Adjustment (page 26)
- Fax Relay (page 36)
- H.323 Gatekeeper Connection (page 37)
- H.323 Terminals (page 37)
- **IP Extensions** (page 38)
- **IP Trunks** (page 45)
- Firmware Download for Aspire Keyset with IP Adapter (page 36)
- Networking Over IP (page 46)
- Peer-to-Peer Connection (page 47)
- Tandem Connection (page 47)
- VLAN/QoS (page 48)
- VOIPU DSP Resource Assignment (page 50)

Programming - VolP

These programs are always required with the VoIP feature. Refer to the following feature options for additional programming.

◆ 10-12-01 : NTCPU Network Setup - IP Address

Select the IP address for the IP connection (default: 172.16.0.10). A static IP address is required by the NTCPU. The system must be reset in order for the change to take affect.

- ✤ 10-12-02 : NTCPU Network Setup Subnet Mask Select the Subnet Mask to be used by the IP server (default: 255.255.0.0).
- 10-12-03 : NTCPU Network Setup Default Gateway If required, select the default gateway IP address to be used when using a router (default: 0.0.0.0).
- ✤ 84-16 : VOIPU Limiter Control Gain Setup

ltem No.	Item	Input Data	Default
01	RX Limiter Control Gain This option controls the limiter gain for IP to PCM direction. This option adds gain to the voice input from the LAN and removes it from the voice output to highway.	0-30 (-15 ~ +15) 0: -15 dBM 1: -14 dBm :	25 (+10 dBm)
02	TX Limiter Control Gain This option controls the limiter gain for PCM to IP direction. This option adds the gain to the voice input from highway and removes it from the voice output to the LAN.	15: 0 dBm : 29: 14 dBm 30: 15 dBm	15 (0 dBm)
03	RX Limiter Control Gain - COIU This option controls the limiter gain for a COIU call in the IP to PCM direction.		15 (0 dBm)
04	TX Limiter Control Gain - COIU This option controls the limiter gain for a COIU call in the PCM to IP direction.		15 (0 dBm)

Programming - Static IP Address

In addition to the system programming for the NTCPU or VOIPU PCB, the IP phone also has options which must be programmed from the phone itself. Be sure to set both the system and phone options.

- ✤ 10-13-01 : In-DHCP Server Setup DHCP Server Mode Disable (0) the system's ability to use the built-in DHCP server.
- ◆ 84-04-01 : VOIPU PCB DHCP Server Mode Setup Disable (0) the use of DHCP for the VOIPU PCB.
- 84-05-01 : VOIPU IP Address Setup IP Address
 For each VOIPU PCB, enter the IP address for the VOIPU PCB (default: slot 1=173.16.0.20, slot 2 = 172.16.0.21, etc.). The IP address should be increased according to the number of VOIPU PCBs. This entry becomes invalid if Program 84-04 is set to "1" (DHCP enabled).
- ◆ 84-06-01 : VOIPU Setup RTP Port Number For each VOIPU PCB, enter the RTP port number (default 10020).

Programming - Aspire IP Keyset or Aspire Keyset with IP Adapter, Static IP Address

<u>Setting the IP Address on an Aspire IP or Aspire Keyset with IP Adapter Using a Static</u> <u>IP Address</u>

1. On the Aspire IP keyset, enter the phone's program mode by pressing HOLD CONF * #. *This enters the IP User Menu program mode to select the settings for the individual*

phone.

To enter the phone's program mode, the display must show the time, error, or "Connecting" message prior to pressing HOLD CONF *#.

1.DHCP Mode
2.DRS Address Primary
3.DRS Address Secondary
4. IP Address
5.Default Gateway
6.Subnet Mask
7. DNS
8. VLAN
9.System Information
Up Down Save

2. Press 1 to enter the DHCP mode. If not flashing, press "1" to disable the DHCP mode. Press the Soft Key "OK".

The flashing item is the current selection.

3. Press 2 to enter the Primary DRS (Device Registration Server). Enter the IP address used in Program 10-12-01 (default: 172.16.0.10). The * key is used to move to the next set of 3 digits (example: 172*16*0*10). Press the Soft Key "OK".

The Soft Key "BK" backs up a character to correct an entry.

- 4. Press 4 to enter the IP address for the phone. The IP address must be unique to each phone but the range is dependent upon system programming (example: IP Keyset 1 = 172.16.0.11, IP Keyset 2 = 172.16.0.12, etc.). The * key is used to move to the next set of 3 digits (example: 172*16*0*10). Press the Soft Key "OK".
 - The Soft Key "BK" backs up a character to correct an entry.
- 5. Press 5 to enter the Default Gateway address as entered in Program 10-12-03.
- 6. Press 6 to enter the Subnet Mask. This should match the entry made in Program 10-12-02 (default: 255.255.0.0).
- 7. Press the Soft Key "SAVE" to save the entries and return the phone to an idle condition. *Pressing CANCEL instead will ignore the changes made and return the keyset to an idle condition.*

In this program entry mode, items "3. DTS Address Secondary" and "7. DNS" can be set as required by the customer but are not required for the feature to function. Item "8. VLAN" is discussed below. Item "9. System Information" displays the entries and does not allow any changes.

Programming - H.323 Phone, Static IP Address

Setting the IP Address on the ITR-2D-1 IP Phone Using a Static IP Address

- 1. Press the menu key. *The Setup Menu screen will be displayed with Call Logs as the first entry.*
- 2. Go to the Configuration sub menu using the \blacktriangle key.
- 3. Press the **Select** key. The Configuration Menu screen will be displayed showing the first entry of Configuration Menu, which is Phone Configuration. Using the ▲ key go to the "Network Menu" which is the second entry under the Configuration Menu.
- 4. Press the **Select** key. The display prompts you to enter the password. Enter the password and press the **Select** key. The default administrator's password is 654321.

If a wrong password is entered, the display indicates "Incorrect Password" and Step 4 can be repeated.

- 5. If a correct password is entered, the current DHCP setting (Enabled or Disabled) will be displayed on the LCD as the first setting of the Network Configuration. There are 6 network related settings available under Network Configuration.
- 6. Press the **Select** key (▲ and ▼ keys can be used to move within the screen or to go to any one of the 6 network related settings).
- 7. This screen allows you to either enable or disable the DHCP. Use ▲ and ▼ keys to select disabled then press the **Select** key.

To cancel instead, press the Cancel/Del key repeatedly until returning to standby mode or press the Menu key once to go to the standby mode.

8. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone. If the Line 1, Line 2 or SPK/HS key is pressed or the handset is picked up, the phone will go off and the restart will be cancelled. If the phone restart is cancelled, the changed network setting will not be used until the phone is restarted. If the **Select** key is pressed, "Initializing...\" will be displayed while the phone is resetting.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

- 9. Repeat Steps 1-6.
- 10. Use the \blacktriangle and \blacktriangledown keys to move to "IP Address."
- 11. Press the **Select** key to see the current terminal IP address. A screen will be displayed prompting user to change the value.

Press the Cancel/Del key to go the previous screen.

This menu is used to read or change the current value of the terminal IP address if DHCP assignment is disabled. The format of the IP address is: xxx.xxx.xxx (use the * key to enter the decimal between the numbers). Allowed entries for each set of three numbers are 0-255.

12. Press the Select key to change the IP address. Enter the correct IP address and press the Select key. The IP address must be unique to each phone but the range is dependent upon system programming (example: IP Phone 1 = 172.16.0.11, IP Phone 2 = 172.16.0.12, etc.). If the entered IP address is not valid, "Invalid Input" will be displayed for 1 second

before returning to the "IP Address" screen.

Press the Cancel/Del key to return to the previous screen without making any changes.
13. The phone needs be restarted for the new settings to take affect. Press Select key to restart the phone, press Del/Cancel to return to the previous menu or Menu to return to standby mode without restarting the phone.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

- 14. Repeat Steps 1-6.
- 15. Use the \blacktriangle and \blacktriangledown keys to move to Subnet Mask.

16. Press the **Select** key to read the value. The next screen displayed prompts you to change the value if needed.

If DHCP is enabled, subnet mask will be read only and user cannot change the subnet mask address.

17. Press the **Select** key to change the Subnet Mask (as entered in Program 10-12-02). Enter the correct Subnet Mask and press the **Select** key.

*The format of the Subnet Mask is: xxx.xxx.xxx (use the * key to enter the decimal between the numbers). Allowed entries for each set of three numbers are 0-255.*

If the entered subnet mask is not valid, "Invalid Input" will be displayed for 1 second. Press the **Cancel/Del** key to return to the previous screen without making any changes.

18. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

- 19. Repeat Steps 1-6.
- 20. Use the \blacktriangle and \blacktriangledown keys to move to Default Gateway.
- 21. Press the **Select** key to read the value. The next screen displayed prompts you to change the value if needed.

If DHCP is enabled, default gateway will be read only and user cannot change the address.

22. Press the **Select** key to change the Default Gateway. Enter the correct Default Gateway (as entered in Program 10-12-03) and press the **Select** key.

The format of the Default Gateway is: xxx.xxx.xxx (use the * key to enter the decimal between the numbers). Allowed entries for each set of three numbers are 0-255. If the entered subnet mask is not valid, "Invalid Input" will be displayed for 1 second.

Press the Cancel/Del key to return to the previous screen without making any changes.

23. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

- 24. Repeat Steps 1-6.
- 25. Use the \blacktriangle and \checkmark keys to move to VLAN Enable/Disable. Press the Select key.
- 26. Use the ▲ and ▼ keys to change the selection and press the **Select** key. *Press the* **Cancel/Del** *key to return to the previous screen without making any changes.*
- 27. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

- 28. Repeat Steps 1-6.
- 29. Use the \blacktriangle and \checkmark keys to move to VLAN ID.
- 30. Press the **Select** key to read the value. The next screen displayed prompts you to change the value if needed.
- 31. Press the **Select** key to change the VLAN ID. Enter the correct VLAN ID and press the **Select** key. *The valid range of entries is 0-65535.*

Press the **Cancel/Del** key to delete a digit of the existing VLAN ID. If no ID number is displayed when the **Cancel/Del** key is pressed, it will return to the previous screen.

32. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

Programming - Using the Aspire DHCP

- 10-13-01 : In-DHCP Server Setup DHCP Server Mode Enable (1) the system's ability to use the built-in DHCP server. The system must be reset in order for the change to take affect.
- ◆ 10-13-02 : In-DHCP Server Setup Lease Time Enter the lease time of the IP address to a client (default: 0 days, 0 hours, 30 minutes). The system must be reset in order for the change to take affect.
- 10-13-04 : In-DHCP Server Setup Number of Networks
 Select the number of networks in use on the system (default: 0, entries: 0=Single Network, 1=Divide Same Network). The system must be reset in order for the change to take affect.
- 10-14-01 : Managed Network Setup Scope 1 Set the range of IP addresses available to be used by the DHCP server for Scope 1 (default: Minimum = 172.16.0.100, Maximum = 172.16.5.254, Scopes 1-10).
- 10-15-01 : Client Information Setup Set the IP and MAC addresses for each client (up to 10) when the DHCP server needs to assign a fixed IP address to clients.
- ◆ 10-16-01 : Option Information Setup Router Set the router address for the DHCP server to the client.
- 10-16-02 : Option Information Setup DNS Server
 If required, set the DNS server address for the DHCP server to the client.
- 10-16-03 : Option Information Setup TFTP Server
 Set the TFTP server address for the DHCP server to the client.
- ◆ 10-16-04 : Option Information Setup DRS Set the NTCPU's IP address for the DHCP server to the client.
- ◆ **84-04-01 : VOIPU PCB DHCP Server Mode Setup** Enable (1) the use of DHCP for the VOIPU PCB.
- 84-05-01 : VOIPU IP Address Setup IP Address
 For each VOIPU PCB, enter the IP address for the VOIPU PCB (default: slot 1=173.16.0.20, slot 2 = 172.16.0.21, etc.). The IP address should be increased according to the number of VOIPU PCBs. This entry becomes invalid if Program 84-04 is set to "1" (DHCP enabled).

Programming, Aspire IP Keyset or Aspire Keyset with IP Adapter - DHCP

<u>Setting the IP Address on an Aspire IP or Aspire Keyset with IP Adapter Using a</u> <u>DHCP Server</u>

- 1. On the Aspire IP keyset, enter the phone's program mode by pressing HOLD CONF * #. *This enters the IP User Menu program mode to select the settings for the individual phone.*
- 2. Press 1 to enter the DHCP mode. If not flashing, press "2" to enable the DHCP mode. Press the Soft Key "OK".

The flashing item is the current selection.

- 3. The entries for items 2, 4, 5, and 6 are automatically set by the DCHP server.
- 4. Press the Soft Key "SAVE" to save the entries and return the phone to an idle condition.

In this program entry mode, items "3. DTS Address Secondary" and "7. DNS" can be set as required by the customer but are not required for the feature to function. Item "8. VLAN" is discussed below. Item "9. System Information" displays the entries and does not allow any changes.

- **Note 1.** If a user's LAN is already operating with a DHCP server, disable the Aspire's DHCP server. Either DHCP server can be used, but not both.
- Note 2. When a user's DHCP server is operating, make sure to define Program 10-16.

Programming - H.323 Phone, Enabling DHCP

Setting the IP Address on the ITR-2D-1 IP Phone Using a DHCP Server

- 1. Press the menu key. *The Setup Menu screen will be displayed with Call Logs as the first entry.*
- 2. Go to the Configuration sub menu using the \blacktriangle key.
- 3. Press the **Select** key. The Configuration Menu screen will be displayed showing the first entry of Configuration Menu, which is Phone Configuration. Using the ▲ key go to the "Network Menu" which is the second entry under the Configuration Menu.
- 4. Press the **Select** key. The display prompts you to enter the password. Enter the password and press the **Select** key. The default administrator's password is 654321.

If a wrong password is entered, the display indicates "Incorrect Password" and Step 4 can be repeated.

- 5. If a correct password is entered, the current DHCP setting (Enabled or Disabled) will be displayed on the LCD as the first setting of the Network Configuration. There are 6 network related settings available under Network Configuration.
- 6. Press the **Select** key (▲ and ▼ keys can be used to move within the screen or to go to any one of the 6 network related settings).
- 7. This screen allows you to either enable or disable the DHCP. Use ▲ and ▼ keys to select Enabled then press the **Select** key.

To cancel instead, press the Cancel/Del key repeatedly until returning to standby mode or press the Menu key once to go to the standby mode.

8. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone. If the Line 1, Line 2 or SPK/HS key is pressed or the handset is picked up, the phone will go off and the restart will be cancelled. If the phone restart is cancelled, the changed network setting will not be used until the phone is restarted. If the **Select** key is pressed, "Initializing...\" will be displayed while the phone is resetting.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

- 9. Repeat Steps 1-6.
- 10. Use the \blacktriangle and \blacktriangledown keys to move to "IP Address."
- 11. Press the **Select** key to see the current terminal IP address. With DHCP enabled, the IP address, subnet mask, default gateway will be read only and user cannot change the address.
- 12. Use the \blacktriangle and \checkmark keys to move to VLAN Enable/Disable. Press the **Select** key.
- Use the ▲ and ▼ keys to change the selection and press the Select key.
 Press the Cancel/Del key to return to the previous screen without making any changes.
- 14. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

- 15. Repeat Steps 1-6.
- 16. Use the \blacktriangle and \blacktriangledown keys to move to VLAN ID.
- 17. Press the **Select** key to read the value. The next screen displayed prompts you to change the value if needed.

18. Press the **Select** key to change the VLAN ID. Enter the correct VLAN ID and press the **Select** key.

The valid range of entries is 0-65535. Press the **Cancel/Del** key to delete a digit of the existing VLAN ID. If no ID number is displayed when the **Cancel/Del** key is pressed, it will return to the previous screen.

19. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone. If the Line 1, Line 2 or SPK/HS key is pressed or the handset is picked up, the phone will go off and the restart will be cancelled. If the phone restart is cancelled, the changed network setting will not be used until the phone is restarted. If the **Select** key is pressed, "Initializing...\" will be displayed while the phone is resetting.

If DHCP is enabled and after restarting the phone, if the phone cannot find the DHCP server or it fails to retrieve the network information, the phone will go to the standby mode.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

Programming - Using an External DHCP

- **Note 1.** If a user's LAN is already operating with a DHCP server, disable the Aspire's DHCP server. Either DHCP server can be used, but not both.
- **Note 2.** When an external DHCP server is operating, make sure to define Program 10-16. These settings define the required addresses, and as long as the IP telephones are set for DHCP, manually programming the IP telephones with these addresses is not required.

10-13-01 : In-DHCP Server Setup - DHCP Server Mode Enable (1) the system's ability to use the built-in DHCP server. The system must be reset in order for the change to take affect.

- 10-16-01 : Option Information Setup Router
 Set the router address for the DHCP server to the client.
- 10-16-02 : Option Information Setup DNS Server
 If required, set the DNS server address for the DHCP server to the client.
- ◆ 10-16-03 : Option Information Setup TFTP Server Set the TFTP server address for the DHCP server to the client.
- 10-16-04 : Option Information Setup DRS Set the NTCPU's IP address for the DHCP server to the client (default: 176.16.0.10).
- 10-16-05 : Option Information Setup Media Gateway Card Set the Media Gateway Card's IP address for the DHCP server to the client (default: 176.16.0.10).
- ◆ 84-04-01 : VOIPU PCB DHCP Server Mode Setup Enable (1) the use of DHCP for the VOIPU PCB.
- ★ 84-05-01 : VOIPU IP Address Setup IP Address For each VOIPU PCB, enter the IP address for the VOIPU PCB (default: slot 1=173.16.0.20, slot 2 = 172.16.0.21, etc.). The IP address should be increased according to the number of VOIPU PCBs. This entry becomes invalid if Program 84-04 is set to 1 (DHCP enabled).

Programming, Aspire IP Keyset or Aspire Keyset with IP Adapter - DHCP

Setting the IP Address on an Aspire IP or Aspire Keyset with IP Adapter Using a DHCP Server

- 1. On the Aspire IP keyset, enter the phone's program mode by pressing HOLD CONF * #. *This enters the IP User Menu program mode to select the settings for the individual phone.*
- 2. Press 1 to enter the DHCP mode. If not flashing, press "2" to enable the DHCP mode. Press the Soft Key "OK".

The flashing item is the current selection.

- 3. The entries for items 2, 4, 5, and 6 are automatically set by the DCHP server.
- 4. Press the Soft Key "SAVE" to save the entries and return the phone to an idle condition.

In this program entry mode, items "3. DTS Address Secondary" and "7. DNS" can be set as required by the customer but are not required for the feature to function. Item "8. VLAN" is discussed below. Item "9. System Information" displays the entries and does not allow any changes.

Programming - H.323 Phone, Enabling DHCP

Setting the IP Address on the ITR-2D-1 IP Phone Using a DHCP Server

- 1. Press the menu key. *The Setup Menu screen will be displayed with Call Logs as the first entry.*
- 2. Go to the Configuration sub menu using the \blacktriangle key.
- 3. Press the **Select** key. The Configuration Menu screen will be displayed showing the first entry of Configuration Menu, which is Phone Configuration. Using the ▲ key go to the "Network Menu" which is the second entry under the Configuration Menu.
- 4. Press the **Select** key. The display prompts you to enter the password. Enter the password and press the **Select** key. The default administrator's password is 654321.

If a wrong password is entered, the display indicates "Incorrect Password" and Step 4 can be repeated.

- 5. If a correct password is entered, the current DHCP setting (Enabled or Disabled) will be displayed on the LCD as the first setting of the Network Configuration. There are 6 network related settings available under Network Configuration.
- 6. Press the **Select** key (▲ and ▼ keys can be used to move within the screen or to go to any one of the 6 network related settings).
- 7. This screen allows you to either enable or disable the DHCP. Use ▲ and ▼ keys to select Enabled then press the **Select** key.

To cancel instead, press the Cancel/Del key repeatedly until returning to standby mode or press the Menu key once to go to the standby mode.

8. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone. If the Line 1, Line 2 or SPK/HS key is pressed or the handset is picked up, the phone will go off and the restart will be cancelled. If the phone restart is cancelled, the changed network setting will not be used until the phone is restarted. If the **Select** key is pressed, "Initializing...\" will be displayed while the phone is resetting.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

- 9. Repeat Steps 1-6.
- 10. Use the \blacktriangle and \checkmark keys to move to "IP Address."
- 11. Press the **Select** key to see the current terminal IP address. With DHCP enabled, the IP address, subnet mask, default gateway will be read only and user cannot change the address.
- 12. Use the \blacktriangle and \checkmark keys to move to VLAN Enable/Disable. Press the Select key.

13. Use the \blacktriangle and \checkmark keys to change the selection and press the **Select** key.

Press the Cancel/Del key to return to the previous screen without making any changes.

14. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

- 15. Repeat Steps 1-6.
- 16. Use the \blacktriangle and \checkmark keys to move to VLAN ID.
- 17. Press the **Select** key to read the value. The next screen displayed prompts you to change the value if needed.

18. Press the **Select** key to change the VLAN ID. Enter the correct VLAN ID and press the **Select** key.

The valid range of entries is 0-65535. Press the **Cancel/Del** key to delete a digit of the existing VLAN ID. If no ID number is displayed when the **Cancel/Del** key is pressed, it will return to the previous screen.

19. The phone needs be restarted for the new settings to take affect. Press **Select** key to restart the phone, press **Del/Cancel** to return to the previous menu or **Menu** to return to standby mode without restarting the phone. If the Line 1, Line 2 or SPK/HS key is pressed or the handset is picked up, the phone will go off and the restart will be cancelled. If the phone restart is cancelled, the changed network setting will not be used until the phone is restarted. If the **Select** key is pressed, "Initializing...\" will be displayed while the phone is resetting.

If DHCP is enabled and after restarting the phone, if the phone cannot find the DHCP server or it fails to retrieve the network information, the phone will go to the standby mode.

If there is an error in saving, "Cannot Save" will be displayed for 1 second.

Programming - H.323 Phone, Setting H.323 Options

To complete the H.323 phone programming, after connecting the phone to the LAN, you must connect to the phone using an internet browser (such as Internet Explorer or Netscape Navigator).

- 1. From a PC which is connected to the same LAN as the VoIP phone, open the internet browser. *TCP/IP must be set up on the PC in order for the connection to work correctly. In the Network Settings, under the properties of the Local Area Network setting, set the IP and subnet mask address of the TCP/IP settings.*
- 2. Enter the IP address for the phone to be programmed (assigned in the H.323 phone setup).
- 3. A screen appears requesting a user name and password. By default, the user name for the Administrator's level is "admin" and the password is "654321". Enter the information and click OK.

To enter the User level, the default user name is "user" and the password is "123456". The User level allows changes to:

Phone Settings	The Phone Settings page allows users to read and modify gen- eral call-related settings such as Call Duration Timer, Call Wait- ing, and Ringer Tone Selection.			
Function Keys	The Function Keys page allows users to read and modify the function key configurations (Speed Dial, Call Forward, Voice Mail, Do Not Disturb).			
Phone Book	The Phone Book can be viewed and edited using the web browser. However, if the Phone Book is opened by the user on the phone itself, it cannot be edited through the browser.			
Password Change	The Password Change page allows modification of the User password. If the browser's Refresh button is clicked before Sub- mit, the old password will be kept.			



4. The following screen appears:

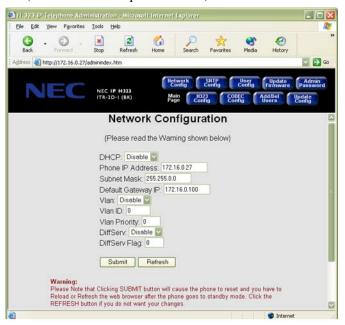
http://172.16.0.27/index.	inten - Microsoft In	terret Expla	0191				
Ele Edit Vew Favorites	Iools Help						
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Agdress () http://172.16.0.27/md	and a forestation	none	Jearch	rendrates	ritori	report y	
NEC	NEC 1 P H323 ITR-2D-1 (BK)	Main Page	1000	_		Update innware d Del iers	Password Password
	n	Main P	age				-
	Admini	strative Co	onfigura	tion			
Network Configuration	n						
H323 Configuration							
SNTP Server Config	uration						
<u>Codec Configuration</u>							
Add/Del User and Pa	assword						
Change Admin Pass	word						
Update Firmware							
Update Configuration	n File						
0						Internet	

The H.323 Configuration screen requires changes be made in order for the phone to function and display correctly. The Network Configuration also requires changes but these changes can be made either through this menu or through the phone programming described previously. The following options are available through the Administrator's Level programming.

Network Configuration	DHCPVLAN IDPhone IP AddressVLAN PrioritySubnet MaskDiffservDefault Gateway IP AddressDiffServ FlagVLANVLAN	
H.323 Configuration	Display Name LCD Display Type Number of Lines Extension 1 Extension 2 User Name Use H.323 ID Alias CID Display Type Reset Indication Type Hook Flash Code	Supplementary Service Type GK Mode Gatekeeper IP Address Gatekeeper Port Number Allow Calls Without Gatekeeper Use Gateway H.323 Gateway IP Address H.323 Gateway Port Number RTP Port Base Use Fast Start
SNTP Server	SNTP Day Light Savings	Time Zone Offset SNTP Server IP Address
Codec Configuration	Codec Name Acoustic Echo Canceller Packet Size	Nominal Jitter Depth VAD
Add/Del User and Password	Enter a 6-10 digit password	

Update Firmware	Enter the TFTP Server Address, User ID (Optional), Password (Optional) and the File Name and then click "Update" to start the firmware update.			
Update Configuration	Enter the TFTP Server Address, User ID (Optional), Password (Optional) and the File Name and then click "Update" to start the firmware update.			
User Configuration	The User Configuration allows changes to the options available when signing in at the User Level.			
	Phone Settings:	The Phone Settings page allows users to read and modify general call-related set- tings such as Call Duration Timer, Call Waiting, and Ringer Tone Selection.		
	Function Keys:	The Function Keys page allows users to read and modify the function key con- figurations (Speed Dial, Call Forward, Voice Mail, Do Not Disturb).		
	Phone Book:	The Phone Book can be viewed and edited using the web browser. However, if the Phone Book is opened by the user on the phone itself, it cannot be edited through the browser.		
	Password Change:	The Password Change page allows modi- fication of the User password. If the browser's Refresh button is clicked before Submit, the old password will be kept.		

5. Optionally, if the IP and subnet mask addresses were set up in the phone's programming using the previous programming procedure, you can use the Network Configuration window to define the network settings for the phone. *If these settings were made previously, skip to Step 6.* If any changes are made to this window, you must click SUBMIT in order for the changes to be sent to the phone (this will cause the phone to reset).



- http://172.16.0.27/index.htm Microsoft Internet Expl File Edit View Favorites Tools Help GBack 0 × 2 9 C -Search Favorites Stop Refresh http://172.16.0.27/index.htm · -) 0 Hetwork SHTP User Update Config Config Firmware Admin NEC IP H323 ITR-2D-1 (BK) Main H323 Page Config Config Add Del Update Users Config H323 Configuration Display Name: IP Phone LCD Display Type: EXTENSION_1 ~ Number of Lines(for GW only): Suppl Svc Type: H245_HOOK_FLASH 1 LINE Extension1(Line1): GK Mode: MANUAL 325 GK IP Address: 172.16.0.10 Extension2(Line2) GK Port# 1719 1001 Allow Calls without GK: YES H323 ID: 325 Use Gateway: NO Use H323-ID Alias: YES CID Display Type: GW IP Address: 169.254.1.1 GW Port# 1720 CALLING_PARTY_NAME RTP Port Base: 30000 Reset Indication Type: H323_INDICATION Use FastStart NO 🔛 Hook Flash Code Submit Refresh Warning: Please Note that Clicking SUBMIT button will cause the phone to reset and you have to Reload or Refresh the web browser after the phone goes to standby mode. Click the REFRESH button if you do not want your changes. Internet
- 6. Click on the H.323 Configuration link or button.

- 7. Make the following changes:
 - LCD Display Type = Extension_1
 - Number of Lines = 1
 - Extension Name = Enter the extension number to be used for the phone
 - H.323 ID = Enter the extension number to be used for the phone
 - CID Display Type = Select the Caller ID display mode to be used
 - Suppl. Svc. Type = Select H245_Hook_Flash in order to use the Hold and Transfer features
 - GK Mode = Manual
 - GK IP Address = Enter the NTCPU IP address assigned in Program 10-12-01 (by default 172.16.0.10)
 - Allow Calls Without GK = Yes
 - Use Gateway = No
 - Use Fast Start = No

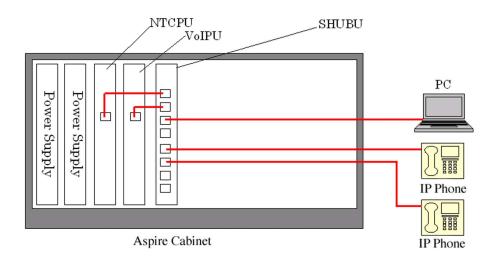
Fast Start should only be used when both terminals (gateways) are using Fast Start mode. The CODEC is then decided by the Fast Start negotiation flow. The Fast Start elements (CODEC type, VIF size, silent suppression) are compared, and based on the priority set for each system, an option is chosen for each item. In order for a voice path to be established, the CODEC, VIF size and silent suppression have to be the same value between the two gateways.

8. Click the SUBMIT button to enter the changes.

The phone will reset with the new settings. Click RELOAD or REFRESH after the phone goes to standby mode. If there are incorrect values entered in any of the fields, the update will not be performed and the screen will be displayed again allowing for changes.

9. Close the internet browser.

LAN Connections



LAN Connection Programming

- ◆ 10-12-05 : NTCPU Network Setup NIC Select the ethernet interface for the NTCPU (0=Auto, 1=100M/Full, 2=100M/Half, 3=10M/ Full, 4=10M/Half).
- 84-05-02 : VOIPU IP Address Setup Network Setup NIC Select the ethernet interface for the VOIPU PCB (0=Auto, 1=100M/Full, 2=100M/Half, 3=10M/Full, 4=10M/Half).
- \$\$5-01-01 : SHUBU LAN Setup Link Speed/Duplex
 \$\$5-01-02 : SHUBU LAN Setup Link Speed
 \$\$5-01-03 : SHUBU LAN Setup Half Duplex/Hull Duplex
 \$\$5-01-04 : SHUBU LAN Setup MDIX/MDI
 \$\$5-01-05 : SHUBU LAN Setup Back Pressure
 \$\$5-01-06 : SHUBU LAN Setup 802.3x
 Define the LAN setup for each slot in which an 8SHUBU PCB is installed.
- **Note 1.** Connect only NEC IP phones into the LAN network. Unsupported equipment may be damaged if connected to the Aspire system.
- **Note 2.** Use a 100Base/Full Duplex switch. In order to avoid network problems and to retain voice quality, do not use a Repeater Hub/10Base.

Address Conversion Table

Aspire provides an IP Conversion Table with which the system can recognize the IP address of another system without the use of an outside Gatekeeper.

Programming

- 10-23-01 : H.323 System Interconnection System Interconnection
 For each system (50 max), specify whether the system interconnection is used (0=no, 1=yes).
- 10-23-02 : H.323 System Interconnection IP Address
 If Program 10-23-01 is set to "1", for each system (50 max), specify the destination IP address. The address should not be duplicated within the system.
- 10-23-03 : H.323 System Interconnection Call Control Port If Program 10-23-01 is set to "1", for each system (50 max), specify the Call Control Port (1-65535).
- 10-23-04 : H.323 System Interconnection Alias Address
 If Program 10-23-01 is set to "1", for each system (50 max), specify the destination E.164 number as the Alias Address (12 digits max).

CODEC Selection

- For H.323 Trunk Program 84-01
 For H.323 Terminal Program 84-12
 For Aspire Keyset with IP Adapter Program 84-11
- G.711, G.729, G.723.1
- VIF Size
 - Trunk:
 - G.711 -> 20ms, 30ms
 - G.729 -> 20ms-80ms
 - G.723 -> 30ms, 60ms

When using G.711 or G.729 with the VIF set at 20ms, the maximum number of simultaneous calls is 15 when using a 16-channel VOIPU PCB (no daughter board installed). VIF 20ms is not supported with the daughter board.

Terminal:

- G.711 -> 30ms
- G.729 -> 30ms-80ms (H.323)
- G.729 -> 30ms-40ms (Aspire keyset with IP adapter)
- G.723 -> 30ms, 60ms
- Supports Silence Suppression
- Aspire provides 5 types of CODEC for the Aspire Keyset with IP Adapter (defined in Program 84-11, selected in Program 15-05-15).

Since the packet size of G711 is larger than the other compressions (G729, G723), there are some limitations to reach the maximum number of channels. With the default settings, the following limitations must be kept in mind.

32VOIPU (16VOIPU + 16VOIPDB)				
G711 - 20ms	Not supported.			
G711 - 30ms	The system uses G711 (30ms) for the first 12 channels of calls. The CODEC then changes to G729 for the last 20 channels.			
20VOIPU (16VOIPU + 4VOIPDB or 4VOIPU + 16VOIPDB)				
G711 - 20ms	The system uses G711 (20ms) for the first 13 channels of calls then changes the CODEC type to G729 for the last 7 channels.			
G711 - 30ms	There are no limitations.			
16VOIPU (16VOIPU)				
G711 - 20ms	The system uses G711 (20ms) for the first 15 channels of calls then changes the CODEC type to G729 for the last channel.			
G711 - 30ms	There are no limitations.			

Refer to Simultaneous Calls (page 39) for more information on CODEC settings.

Deleting IP Phone Registration

✤ 90-23-01 : Deleting Registration of IP Telephones

When removing an IP telephone from the system, the registration can be deleted using this program. Enter the extension number to be deleted, press 1 and then HOLD.

Echo Adjustment

Where echo (reflection of voice) is generated depends on how the network is configured. Typically, however, echo is generated at the trunk PCB (COIU) or at the telephone's microphone/speaker. The transmit/receive data is separated at the analog trunk interface. Echo from the transmit data to the receive data can be generated, and when the impedance is not set correctly, increased echo will occur. This can also occur at an ISDN/analog trunk interface. In general, the nearer the transmit, the more echo occurs as the signal level is greater.

The type of echo can also occur with non-IP phones, but the time difference between the transmit and receive is so small, the user is hardly aware of it. As the IP terminals require voice packetization, there is a longer delay. This delay causes the echo.

To reduce the echo:

- Suppress the echo from the Aspire system.
- Suppress the echo from outside the Aspire system.
- Remove the unsuppressed echo using the echo canceller in the VOIPU.

A typical example of this adjustment process is as follows:

1. CODEC Packet Size/Jitter Buffer Configuration

The Voice Packet CODEC, packet size, jitter buffer size should be configured to minimize the voice delay. This data is set in Program 84-xx-xx.

- Set the Audio Capability Priority.
- Set the packet size.
- Set jitter buffer type and adjust the size.
- 2. Gain Level

A transmit gain level with is set too high for a trunk may cause considerable echo depending on the level of the voice path route. Adjust the echo controlling this data.

- Change the Trunk Voice Transmit Level in the system to adjust the voice transmit level of the Aspire.
- Change the Trunk Voice Receive Level in the system to adjust the voice receive level of the Aspire.
- 3. CODEC Filter

When connecting an analog trunk, adjust the CODEC filter depending on the damping of the trunk side. If this is not properly adjusted, you may hear considerable echo depending on the condition of the line.

- Set the Echo Canceller Mode (Program 81-17-01) to disabled (0) and check the condition of the echo level by making an outgoing call.
- Set the CODEC Filter Setup for the analog trunk port (Program 81-07) to the configuration which results in the least amount of echo.
- 4. Echo Canceller Adjustment

The echo canceller should be adjusted after reducing the echo using the previous steps.

- Set the Echo Canceller Mode to enabled (1) [Program 84-01-24 = H.323 trunk, 84-11-20 = Aspire IP phone, 84-12-20 = H.323 extension], the Echo Canceller NLP Mode to disabled (0) [Program 84-01-26 = H.323 trunk, 84-11-22 = Aspire IP phone, 84-12-22 = H.323 extension], and check the condition of the echo level by making an outgoing call.
- Adjust the VOIPU Limiter Control Gain Setup (Program 84-16) and choose the configuration which results in the least amount of echo.
- The Echo Canceller NLP Mode should be set to the data which receives the best voice quality.

	CODEC Packet Size/Jitter Buffer Configuration					
Program	Item	Input Data	Default	How to Adjust		
84-01-33 (H.323 Trunk) 84-11-28 (Aspire IP Phone) 84-12-28 (H.323 Extension)	Audio Capability Priority	0: G.711 1: G.723.1 2: G.729	0 (G.711)	This data should not be changed. Voice Quality is the best with G.711 and lessens with G.729 and then again with G.723.1. If you need to select another band- width, it is recommended that G.729 be selected.		
84-01-02 (H.323 Trunk) 84-11-01 (Aspire IP Phone) 84-12-01 (H.323 Extension)	G.711 Audio Frame	2, 3 (20msec, 30msec)	3 (30msec)	 It is strongly recommended to use option 2 (20ms) for H.323 trunks/ stations. This data will usually come into affect when Audio Capability=0 (G.711) is selected. Aspire IP phones can only be set to use 30ms. 		
84-01-05 (H.323 Trunk) 84-11-07 (Aspire IP Phone) 84-12-07 (H.323 Extension)	G.729 Audio Frame	2 - 8 (20msec - 80msec)	3 (30msec)	 It is strongly recommended to use option 2 (20ms) for H.323 trunks/ stations. This data will usually come into affect when Audio Capability = 2 (G.729) is selected. Aspire IP phones can only be set to use 3(30ms) and 4 (40ms). 		
84-01-05 (H.323 Trunk) 84-11-12 (Aspire IP Phone) 84-12-12 (H.323 Extension)	G.723.1 Audio Frame	1 - 2 (30 msec, 60 msec)	1 (30 msec)	 This data will not need to be changed usually. This data will usually come into affect when Audio Capability = 1 (G.723) is selected. 		
84-01-15 (H.323 Trunk) 84-11-17 (Aspire IP Phone) 84-12-17 (H.323 Extension)	Jitter Buffer Mode	1: static 2: adaptive during silence 3: adaptive immediately	3 (adaptive immediately)	This data should not be changed.		
84-01-16 (H.323 Trunk) 84-11-04 (Aspire IP Phone) 84-12-04 (H.323 Extension)	G.711 Jitter Buffer (min)	0 - 145 (msec)	30	Set the same time as selected in G.711 Audio Frame.		
84-01-17 (H.323 Trunk) 84-11-05 (Aspire IP Phone) 84-12-05 (H.323 Extension)	G.711 Jitter Buffer (type)	0 - 145 (msec)	60	Set this option at two times the time selected in G.711 Audio Frame.		
84-01-18 (H.323 Trunk) 84-11-06 (Aspire IP Phone) 84-12-06 (H.323 Extension)	G.711 Jitter Buffer (max)	0 - 145 (msec)	120	Set this option at four times the time selected in G.711 Audio Frame.		

CODEC Packet Size/Jitter Buffer Configuration					
Program	Item	Input Data	Default	How to Adjust	
84-01-07 (H.323 Trunk) 84-11-09 (Aspire IP Phone) 84-12-09 (H.323 Extension)	G.729 Jitter Buffer (min)	0 - 145 (msec)	30	Set the same time as selected in G.729 Audio Frame.	
84-01-08 (H.323 Trunk) 84-11-10 (Aspire IP Phone) 84-12-10 (H.323 Extension)	G.729 Jitter Buffer (type)	0 - 145 (msec)	60	Set this option at two times the time selected in G.729 Audio Frame.	
84-01-09 (H.323 Trunk) 84-11-11 (Aspire IP Phone) 84-12-11 (H.323 Extension)	G.729 Jitter Buffer (max)	0 - 145 (msec)	120	Set this option at four times the time selected in G.711 Audio Frame.	
84-01-19 (H.323 Trunk) 84-11-14 (Aspire IP Phone) 84-12-14 (H.323 Extension)	G.723 Jitter Buffer (min)	0 - 145 (msec)	30	Set the same time as selected in G.723 Audio Frame.	
84-01-20 (H.323 Trunk) 84-11-15 (Aspire IP Phone) 84-12-15 (H.323 Extension)	G.723 Jitter Buffer (type)	0 - 145 (msec)	60	Set this option at two times the time selected in G.723 Audio Frame.	
84-01-21 (H.323 Trunk) 84-11-16 (Aspire IP Phone) 84-12-16 (H.323 Extension)	G.723 Jitter Buffer (max)	0 - 145 (msec)	120	Set this option at four times the time selected in G.723 Audio Frame.	

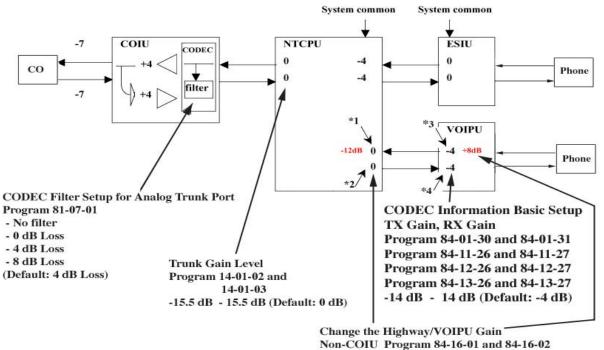
Gain Level - Transmit/Receive				
Program	Item	Input Data	Default	How to Adjust
14-01-02	Transmit Gain Level	1 - 63 (-15.5dB - +15.5dB)	26 (-3dB)	High level of transmit gain may generate a large echo depend- ing on the environment or loca- tion of the party called. Adjust to the appropriate level. Lower limits should be around 18 (-7db).
14-01-03	Receive Gain Level	1 - 63 (-15.5dB - +15.5dB)	26 (-3dB)	
14-01-04	Transmit Gain level for conference and Trans- fer Calls	1 - 63 (-15.5dB - +15.5dB)	26 (-3dB)	High level of transmit gain may generate a large echo depend- ing on the environment or loca- tion of the party called. Adjust to the appropriate level. Lower limits should be around 18 (-7db).
14-01-05	Receive Gain level for conference and Trans- fer Calls	1 - 63 (-15.5dB - +15.5dB)	26 (-3dB)	

Gain Level - Transmit/Receive					
Program	Item	Input Data	Default	How to Adjust	
84-01-30 (H.323 Trunk) 84-11-26 (Aspire IP Phone) 84-12-26 (H.323 Extension)	Transmit Gain Level of VoIPU	0 - 28 (-14dB - +14dB)	10 (-4dB)	 Aspire IP phone TX gain becomes congruent with the Aspire IP phone when this data is set to 10 (-4db). Before V3, 84-01-30 will be applied to the H.323 extension and Aspire IP phone as well. 	
84-01-31 (H.323 Trunk) 84-11-27 (Aspire IP Phone) 84-12-27 (H.323 Extension)	Receive Gain Level of VoIPU.	0 - 28 (-14dB - +14dB)	10 (-4dB)	 Aspire IP phone RX gain become congruent with Dterm when this data is set to 10 (-4db). Before V3, 84-01-30 will be applied to H.323 exten- sion and Aspire IP phone as well. 	

Internal Gain Control

Control the VOIPU PCB's internal echo canceller input by setting the VOIPU RX gain higher and the Highway Gain lower. (In the figure below set *1 to +12dB and *2 to -12dB.)

Not all the sidetone can be removed from the COIU by the VOIPU PCB. The remaining sidetone may appear as echo when heard at the IP phone. Optimizing **Program 81-07-01 : CODEC Filter Setup for Analog Trunk Ports** and suppressing sidetone as much as possible may still result in some echo being heard. This becomes more apparent when the volume of the voice level on the IP phone is louder. This may be resolved by setting the VOIPU RX Gain higher, the Highway gain lower and by limiting the volume on the phone (in the figure below, set the *3 and *4 options to +12dB [*3] and -12dB [*4]).



COIU Program 84-16-03 and 84-16-04

Internal Gain Control							
Program	Item	Input Data	Default	How to Adjust			
84-16-01	VoIPU RX Limiter Control Gain	0 - 30 (-15dB - +15dB)	25 (10dB)	This setting is applied to the call using the VOIPU and a unit other than the COIU. You may notice a small echo remaining when using ISDN trunks. If this is the case, change this data to a smaller value. Example: 15 (0db) * This option is available with software 1.11 or higher.			
84-16-02	VoIPU TX Limiter Control Gain	0 - 30 (-15dB - +15dB)	15 (0dB)	This setting is applied to the call using the VOIPU and a unit other than the COIU. You may notice a small echo remaining when using ISDN trunks. If this is the case, change this data to larger value. Example 0 (-15db) * This option is available with software 1.11 or higher			
84-16-03	VoIPU RX Limiter Control Gain (COIU)	0 - 30 (-15dB - +15dB)	15 (0dB)	This setting is applied to the call using the VOIPU and a COIU. Set this to a larger value when the echo from the COIU is too much. * This option is available with software 1.11 or higher.			
84-16-04	VoIPU TX Limiter Control Gain (COIU)	0 - 30 (-15dB - +15dB)	15 (0dB)	This setting is applied to the call using the VOIPU and COIU. * This option is available with software 1.11 or higher.			

	COI	DEC Filter Configu	ration	
Program	Item	Input Data	Default	How to Adjust
81-07-01	CODEC Filter Setup for Analog Trunk Port	0: No Filter 1: 0dB Loss 2: 4dB Loss 3: 8dB Loss 4. Specified Data	2	 Setting this data depends on the loss of the analog line. This will reduce the echo from the analog hybrid circuit caused by the mismatch of the impedance. When the signal loss is low (ex. behind PBX connection), set to 1. When the signal loss is high (large distance from the central office), set to 3. When the echo from the analog line is too much, setting 4 (specified data) may help improve the condition. Input data 1-4 is equivalent to Types 1-4 in the Analog Port CODEC Filter Setup table below.
82-07-01	CODEC Filter Setup for Analog Station Port	0: No Filter 1: 0dB Loss 2: 4dB Loss 3: 8dB Loss 4: Specified Data	1	 Setting this data depends on the loss of the analog line. This will reduce the echo from the analog hybrid circuit caused by the mismatch of the impedance. When the signal loss is low (ex. behind PBX connection), set to 1. When the signal loss is high (large distance from the central office), set to 3. When the echo from the analog line is too much, setting 4 (specified data) may help improve the condition. Input data 1-4 is equivalent to Types 1-4 in the Analog Port CODEC Filter Setup table below.

			Anal	og Port CO	DEC Filter	Setup				
		Тур	e 1	Ту	pe 2	Тур	be 3			
Filter	Data	0dB	Loss	ø0.5 4	dB Loss	ø0.5 80	lB Loss	APEX3600 LC		
		HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	
B1	D01	AA	170	5A	90	23	35	AA	170	
	D02	73	115	СВ	203	DE	222	DB	219	
	D03	A3	163	2B	43	AA	170	3B	59	
	D04	6D	109	2A	42	A3	163	37	55	
	D05	33	51	1C	28	22	34	22	34	
	D06	A5	165	21	33	A0	160	61	97	
	D07	2A	42	22	34	FE	254	B4	180	
	D08	D4	212	22	34	1B	27	2C	44	
	D09	BD	189	A3	163	B2	178	C4	196	
	D10	2B	43	49	73	23	35	98	152	
	D11	DB	219	F3	243	4B	75	D3	211	
	D12	AD	173	2E	46	A6	166	2E	46	
	D13	E2	226	2A	42	52	82	4A	74	
	D14	E0	224	D0	208	E0	224	D0	208	
B2	D01	22	34	22	34	57	87	2A	42	
	D02	C0	192	C0	192	C0	192	B0	176	

				Туј	be 4				
Filter	Data	ø0.4 4d	lB Loss	ø0.4 80	dB Loss	ø0.65 4	dB Loss	ø0.65 8	dB Loss
		HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC
B1	D01	24	36	AB	171	22	34	5A	90
	D02	CA	202	DD	221	C2	194	C3	195
	D03	AB	171	4C	76	2A	42	2A	42
	D04	3A	58	2C	44	6A	106	AB	171
	D05	1A	26	13	19	32	50	52	82
	D06	B1	177	A0	160	31	49	21	33
	D07	A2	162	BA	186	7A	122	B3	179
	D08	3C	60	1A	26	1A	26	1C	28
	D09	9F	159	33	51	B3	179	22	34
	D10	3A	58	E2	226	A8	168	A2	162
	D11	C2	194	6B	107	7B	123	35	53
	D12	2D	45	BE	190	AD	173	C4	196
	D13	A5	165	AA	170	25	37	B9	185
	D14	D0	208	D0	208	D0	208	F0	240
B2	D01	FA	250	A2	162	AA	170	A3	163
	D02	C0	192	C0	192	C0	192	D0	208

	Echo Cancele	er Configuration		
Program	Item	Input Data	Default	How to Adjust
84-01-24 (H.323 Trunk) 84-11-20 (Aspire IP Phone) 84-12-20 (H.323 Extension)	Echo Canceler Mode	0: Disable 1: Enable	1	 Echo canceler mode Prior to Version 3, Program 84-01-24 is applied to IP phones (system common data).
84-01-25 (H.323 Trunk) 84-11-21 (Aspire IP Phone) 84-12-21 (H.323 Extension)	Echo Canceler Tail Size	1: 8 ms 2: 16 ms 3: 32mS	3	 Only valid when 84-01-24 is enabled. Prior to Version 3, Program 84-01-25 is applied to IP phones (system common data).
84-01-26 (H.323 Trunk) 84-11-22 (Aspire IP Phone) 84-12-22 (H.323 Extension)	Echo Canceler NLP Mode	0: Disable 1: Enable	1	 NLP (Non-linear process- ing) will remove the remaining noise after sup- pressing echo using the echo canceler. Prior to Version 3, Program 84-01-26 is applied to IP phones (system common data).
84-01-27 (H.323 Trunk) 84-11-23 (Aspire IP Phone) 84-12-23 (H.323 Extension)	Echo Canceler NLP Noise	40-70 (-40 dBm - -70dBm)	70	 When the NLP is enabled, and silence/non-silence boundary seems incorrect, adjust this data (ex. 50). This is only valid when Pro- gram 84-01-26 is enabled. Prior to Version 3, Program 84-01-27 is applied to IP phones (system common data).
84-01-28 (H.323 Trunk) 84-11-24 (Aspire IP Phone) 84-12-24 (H.323 Extension)	Echo Canceler Cng Cfg	0: Adaptive 1: Fixed	0	 This is only valid when Program 84-01-26 is enabled. Prior to Version 3, Program 84-01-28 is applied to IP phones (system common data).
84-01-29 (H.323 Trunk) 84-11-25 (Aspire IP Phone) 84-12-25 (H.323 Extension)	Echo Canceler 4w Det	0: Disable 1: Enable	0	• Prior to Version 3, Program 84-01-29 is applied to IP phones (system common data).

Fax Relay

Required Items

VOIPU PCB G3 Fax equipment (G4 Fax is not supported)

Basic Programming

All VOIPU programming required for the feature as well as the following:

✤ 15-03-03 : Single Line Telephone Basic Data Setup

Set the terminal type to "1" (Special Terminal) for the extension which has the fax connected.

✤ 84-01-59 : CODEC Information Basic Setup - Fax Relay Function

Enable (1) or disable (0) the Fax Relay function for the system.

When the voice CODEC to be used in a session is selected as G.711, fax signals may be sent even when this option is disabled. This occurs as G.711 sends fax signals in voice packets. Frequent packet loss on the network may cause the session to disconnect since the connection is not established as a Fax Relay (T.38). To avoid this, set Program 84-01-33 to a CODEC other than G.711 and the fax connection will then be established as T.38 (Fax Relay).

◆ 84-01-36 through 84-01-58 : CODEC Information Basic Setup

These programs are also available for the Fax Relay feature, but it is recommended that they remain at the system default.

The following fax machines require changes as noted below:

 NEFAX-490: Set the VOIPU ECM to off (Program 84-01-55 = 0) for transmission on the VOIPU. The NEFAX-490 must also have the ECM turned off and the auto-answer alerting time should be increased.

 NEFAX-500: The NEFAX-500 must have the ECM set to off.

Firmware Download for Aspire Keyset with IP Adapter

There are two types of downloads: Local (Aspire Keyset with IP Adapter) and Center (System). When you select Center download, you need to set the hardware version and firmware version. If the hardware version is the same and the firmware version is different, then the download will start. A TFTP server or FTP server is required.

Programming

- 84-07-01 : Firmware Download Setup Server Mode Select the server mode (0=TFTP, 1=FTP).
- ◆ 84-07-02 : Firmware Download Setup File Server Enter the IP address for the file server.
- 84-07-03 : Firmware Download Setup Log-In Name Enter the log-in name to be used, up to 20 characters.
- ◆ 84-07-04 : Firmware Download Setup Password Enter the password to be used, up to 20 characters.

- 84-08-01 : Firmware Name Setup Firmware Directory Enter the firmware directory to be used, up to 64 characters maximum.
- 84-08-02 : Firmware Name Setup Firmware File Name Enter the firmware file name to be used, up to 30 characters.
- ◆ 90-22-01 : NGT Terminal Version Information Hardware Version For each terminal type (1=Dterm IP/Aspire keyset with IP adapter, 2=Smart Phone, 3=Bandle IP Phone, 4=ITR-32D-1D, IP1WW IP Adapter, 6=ITR-LC-1, 7=IP1NA-24TIXH, 8=IP1WW-24TIXH), define the hardware version of the NGT terminal.
- ◆ 90-22-02 : NGT Terminal Version Information Firmware Version For each terminal type (1=Dterm IP/Aspire keyset with IP adapter, 2=Smart Phone, 3=Bandle IP Phone, 4=ITR-32D-1D, IP1WW IP Adapter, 6=ITR-LC-1, 7=IP1NA-24TIXH, 8=IP1WW-24TIXH), define the firmware version of the NGT terminal.

H.323 Gatekeeper Connection

- 10-17-01 : H.323 Gatekeeper Setup Gatekeeper Mode Set the Gatekeeper mode to be used (0=No Gatekeeper, 1=Automatic Gatekeeper, 2=Manual Gatekeeper). If Automatic Gatekeeper is selected, the system searches for the gatekeeper. If Manual Gatekeeper is selected, the IP address defined in 10-17-02 is used to locate the gatekeeper.
- 10-17-02 : H.323 Gatekeeper Setup Gatekeeper IP Address If 10-17-01 is set to "2", enter the IP address of the Gatekeeper. This should match the entry made in 10-12-01 (default: 172.16.0.10).
 - **10-17-04 : H.323 Gatekeeper Setup Preferred Gatekeeper** If 10-17-01 is set to "1", enter the Gatekeeper's ID. When registering with an external Gatekeeper using Gatekeeper search, two or more GRQ's may be assigned. In this case, if this ID is set up, it will register with a Gatekeeper using the ID set up in this program (124 characters max).
- 10-18-01 : H.323 Alias Address Setup Alias Address Enter the Alias Address of the Aspire system registered into the external Gatekeeper. At this time as restricted by Program 10-18-02, only the telephone number can be registered as an alias address (12 digits max).

✤ 10-18-02 : H.323 Alias Address Setup - Type of Alias Address

Define the type of Alias Address registered to the external Gatekeeper. At this point, only E.164 can be entered (0=E.164).

H.323 Terminals

•>

Hold and Transfer features are available when using the ITR-2D-1 H.323 terminal. The firmware in this terminal should be version 2.08 or higher.

In order to use an H.323 phone as an Aspire extension, the H.323 phone needs to be registered with the Aspire Gatekeeper. An extension number or alias should be assigned to the phone. If both are assigned, the extension number is given priority.

H.323 phones do not support the ability to send digits after a call has been placed and before it is answered. This means that features which use single digit service codes, such as Voice Over and Barge-In, are not available with this type of phone.

Programming

- ◆ 15-05-01 : IP Phone Terminal Basic Data Setup Terminal Type When using an IP/H.323 terminal, the terminal type is defined in this program. The type is set automatically and this program cannot be changed manually (0=Aspire NGT [new generation telephones], 1=H.323, 2=SIP, 3=MEGACO).
- ◆ 15-05-03 : IP Phone Terminal Basic Data Setup Default URL Address Define the default URL address for a Smart phone.
- 15-05-04 : IP Phone Terminal Basic Data Setup H.323 Fixed Port Assignment Set the alias of an H.323 terminal (up to 48 characters in length). Each alias address must be unique in the system.

IP Extensions

- When the first IP phone is plugged in, the system automatically assigns the next three consecutive station ports available as IP ports. The next three IP phones installed will use this group of ports. When the fifth IP phone is connected, the next 3 consecutive station ports available will be assigned as IP ports.
- After connecting an IP phone, there could be a delay of up to one minute until the system checks for an IP connection.
- If there is no idle DSP resource or CODEC resource available, the terminal cannot be registered.
- If the same IP address already exists in the LAN, the last one assigned to the phone is considered valid.
- If a MAC address is registered, but an intercom number is not (Program 11-02), then the DRS rejects a registration and the IP phone display reads "Illegal Len".
- If the same MAC address already exists, the lower port is assigned.
- Aspire keysets with an IP adapter/Dterm phones and Aspire IP keysets do not support silent suppression.

Assign Port/Extension Number

The extension port of an IP terminal is assigned by default starting with port 01. Use Program 84-03-09 to redefine this starting port number. The extension number for the port is set in Program 11-02.

Programming

- 11-02-01 : Extension Numbering If the default extension number is not acceptable for an IP terminal, change the extension number associated with the port number (port 1-512).
- 84-03-09 : NGT Information Basic Setup Set the starting port number to be used for IP terminals (default: 1, entries 1-512).

Simultaneous Calls

Each VoIP PCB provides resources which can be used for IP calls. The 4VOIPU provides 4 resources, the 4VOIPDB provides 4, the 16VOIPU provides 16, and the 16VOIPDB provides 16 resources. An IP phone uses 1 channel resource. At the time of an extension call (IP phone to IP phone), it is possible to create 16 telephone calls if a 16VOIPU and 16VOIPDB are used and are **not** set peer-to-peer. If peer-to-peer is on, a call between Aspire IP phones (Aspire keyset with IP adapter or Aspire IPhone) will not use a resource from the VOIP PCB.

Refer to CODEC Selection (page 25) for additional information on CODEC settings.

Because of the performance that would be experienced with the maximum number of calls, it is necessary to restrict the number of maximum number of simultaneous calls with a combination of the type and the number of CODEC frames. The table below indicates the performance level which can be achieved with the various settings.

Use the charts on the following pages to view how the different types of settings restrict the number of simultaneous calls within that range.

Group	CODEC / Frame (VIF) Number *	Comments
Group 1	G.711 / 30ms	 No compression Best voice performance Most restricted in the quantity of calls With a 32VOIPU, 12 channels are possible with this setting. The remaining 20 channels must use one of the Group 3 settings shown below.
Group 2	G.723 / 30ms G.729 / 30ms G.729 / 40ms G.729 / 50ms	 Mid-range compression Good voice performance Some restrictions for the quantity of calls The maximum number of resources for a 16 or 32 VOIPU PCB is 16 using these settings. With a 32VOIPU PCB, the remaining 16 channels must use one of the Group 3 settings shown below.
Group 3	G.723 / 60ms G.729 / 60ms G.729 / 70ms G.729 / 80ms	 Highest compression Voice performance may be a problem No restrictions for the quantity of calls
VIF 20ms is a VIF 20ms is s PCB.	pplied by the H.323 trunk only upported for G.711 and G.729. G.729 at VIF 20ms, the maxim	VOIPDB (daughter board) used. It is not, however, supported with the 32VOIPU num number of simultaneous calls is 15 with a

The following chart shows the maximum number of simultaneous calls based on the different group settings and the type of VOIPU PCB being used. So, for example, with a 16VOIPU, 7 calls can use the G.711/G.729 with 20ms VIF, which would then restrict the remaining 9 channels to use one of the Group 2 settings (which have a higher compression and lower voice quality than the Group 1 settings).

							-	16VC	DIPU	PC	В											
	CODEC	VIF							Nu	Imbe	er of	Sin	nulta	neo	us C	Calls	;					
Group 1	G.711/G.729	20ms	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14	14	14	14	15 max
Group	G.711	30ms	16	15	14	13	12	11	10	9	8	7	6	5	4	3	0	0	0	1	1	0
2	G.729/G.723	30ms															0	1	2	0	1	1
	G.729	40ms																				
	G.729	50ms																				
	G.729	60ms															2	1	0	1	0	1
	G.729	70ms																				
	G.729	80ms																				

						32VO	PU P	СВ								
	CODEC	VIF					Num	ber o	f Sim	ultane	eous	Calls				
Group 1	G.711	30ms	0	0	1	2	3	4	5	6	7	8	9	10	11	12 max
Group 2	G.729/G.723 G.729 G.729	30ms 40ms 50ms	0	16 max	14	13	12	10	9	8	6	5	4	2	1	0
Group 3	G.729/G.723 G.729 G.729	60ms 70ms 80ms	32	16	17	17	17	18	18	18	19	19	19	20	20	20

					20V	OIPI	U PC	B (1	6VC	DIPU	wit	h 4V	OIPI	DB)									
	CODEC	VIF							Ν	lum	ber o	of Si	muli	tane	ous	Cal	ls						
Group 1	G.711/G729	20ms	0	1	2	3	4			5					6				7				
Group 2	G.711	30ms	20	19	18	17	15	14	13	12		0	12	11	10		0	10	9	8	7	6	5
Group	G.729/G.723	30ms					0	0	1	3		15	0	2	4		14	0	2	3	4	6	7
3	G.729	40ms																					
	G.729	50ms																					
Group	G.729/G.723	60ms					1	1	1	0	0	0	2	1	0	0	0	3	2	2	2	1	1
4	G.729	70ms																					1
	G.729	80ms																					
	1		11	1	1	1	1	1		1	1					1		1	1			1	
Group 1	G.711/G729	20ms	7	(con	t.)					8								9	9				
Group 2	G.711	30ms	4		0	8	7	6	5	4	3	2		0	7	6	5	4	3	2	1	0	
Group	G.729/G.723	30ms	9		13	0	2	4	5	7	8	10		12	0	2	3	4	5	7	8	10	1
3	G.729	40ms																					
	G.729	50ms																					
Group	G.729/G.723	60ms	0	0	0	4	3	2	2	1	1	0	0	0	4	3	3	3	3	2	2	1	Í
4	G.729	70ms																					
	G.729	80ms																					
	•												•		•		•	_		•	•		
Group 1	G.711/G729	20ms			1	0					11				12		13						
Group 2	G.711	30ms	5	4	3	2	1	0	3	3	2	1	0	2	1	0	0						
Group	G.729/G.723	30ms	0	2	3	5	6	7	0	1	2	4	5	0	1	3	0	1					[
3	G.729	40ms	1																				[
	G.729	50ms	1																				
Group	G.729/G.723	60ms	5	4	4	3	3	3	6	5	5	4	4	6	6	5	7	1					
4	G.729	70ms	1																				
	G.729	80ms	1																				

VoIP Phones

When connecting an VoIP phone, the MAC address (ID) is automatically registered in Program 15-05-02. If the registration in Program 15-05-02 is made manually, prior to connecting the phone, when the phone is connected, it will use the extension number assigned. The MAC address is printed on the barcode label on the bottom of the phone or adapter. It is a 12-digit alphanumeric number, ranging from 0-9 and A-F.

Aspire keysets with an IP adapter do not use Program 80-01 : Service Tone Setup entries. The tones, instead, are provided by the IP adapter. When a Door Box chime rings an Aspire keyset with IP adapter, the system activates the chimes using a ring command. Because of this, if the volume is adjusted while the door chime is sounding, the ringing volume of the Aspire keyset with IP adapter will be adjusted.

In addition, Music on Hold is also provided by the IP adapter. The settings in Program 10-04 : Music on Hold Setup are ignored except to determine whether or not music should be provided. If 10-04-02 is set to "0", no music on hold will be heard. If 10-04-02 is set to "1" or "2", music will be provided by the IP adapter, but there is only one music selection.

Programming

◆ 15-05-02 : IP Phone Terminal Basic Data Setup - NGT Fixed Port Assignment

If a specific extension number is to be assigned to an Aspire keyset with an IP adapter, the MAC Address of the IP adapter must be set for the extension. For the extension number which has the IP adapter connected, enter the MAC Address of the IP adapter. This MAC Address is printed on the IP adapter label (default: 00-00-00-00-00). If this is not set, the system will automatically assign the next available extension number.

Use line keys 1-6 to enter letters A-F (key 1=A, key 2=B, etc.) Use caution when entering in the MAC Address as the system will allow duplicate entries to be made. If there are two duplicate entries, the lowest matching extension will be assigned to the MAC Address.

Aspire IP and Aspire Keyset with IP Adapter

There are two program levels available for individual phone programming - the User Menu and the Maintenance Menu. Each program mode is accessed differently.

Accessing the User Menu

1. On the Aspire IPhone or an Aspire keyset with an IP Adapter, enter the phone's program mode by pressing HOLD CONF * #. The following shows the menu items available in the phone's programming.

This enters the IP User Menu program mode to select the settings for the individual phone.

Default

	Donaun
1. DHCP Mode	Enabled
Disable	
Enable	
2. DRS Address Primary	0.0.0.0
3. DRS Address Secondary	0.0.0.0
4. IP Address	0.0.0.0
5. Default Gateway	0.0.0.0
6. Subnet Mask	0.0.0.0

7. DNS	
DNS Address	0.0.0.0
DNS Domain Name	
DRS Name	NECDRS1
8. VLAN	Disable
VLAN Mode	
VLAN ID	
VLAN Priority	
9. System Information (for viewing only)	
DRS Address (Primary)	0.0.0.0
DRS Address (Secondary)	0.0.0.0
DRS Mate Port	3456
DRS Self Port	3455
IP Address	0.0.0.0
Default Gateway	0.0.0.0
Subnet Mask	0.0.0.0
Download Address	0.0.0.0
Area ID	Automatic
Language	Automatic
DHCP Mode	Enable
DtermIP Modem	Normal
VLAN Mode	Disable
VLAN ID	7
VLAN Priority	5
DNS Address	0.0.0.0
DRS Name	NECDRS1
DNS Access Domain	
PROTIMS Self Port	3458
RTP Self Port	3462
Voice Control Self Port	4000
H245 Self Port	Any Port
ToS DRS	0xC0
ToS PROTIMS	0xC0
ToS RTP	0xA0
ToS Voice Control	0xC0
MAC Address	00 60 b9 c1 23 5d
Firmware Version	(P2PK) 00.21
Hardware Version	02.10

2. Press the Soft Key "SAVE" to save the entries and return the phone to an idle condition.

Accessing the Maintenance Menu

1.	On the Aspire keyset with an IP adapter, enter the phone's program mode by pressing HOLD
	CONF * #. This enters into the IP User Menu. Press HOLD # 0 to then enter the Maintenance
	Menu. The following shows the menu items available in the phone's programming.

This enters the IP Maintenance Menu program mode to select the settings for the individual phone.

	Default
0. Next Page (P1 >>P2) ¹	
0. Next Page $(P2 >> P1)$	
1. Ping	
1. Echo Request	
2. Destination Address	
3. Requests Count	
4. Reply Timer	
2. Music Select	
1. DtermIP Mode	Normal
2. Download Address	0.0.0.0
3. AreaID (select Area ID entry then press #)	Automatic
0. Automatic	
1. Japan	
2. America	
3. Others	
4. Port	
1. DRS Mate Port	3456
2. DRS Self Port	3455
3. PROTIMS Self Port	3458
4. RTP Self Port	3462
5. Voice Ctrl Self Port	4000
6. H245 Self Port	32826
5. Download	
1. Program	
2. Config	
3. Input File Name	
4. Boot & Program	
5. Music ¹	
6. Soft Reset	
7. Factory Value	
8. Type of Service	
1. DRS	ToS (hex) 0xC0
2. PROTIMS	ToS (hex) 0xC0
3. RTP	ToS (hex) 0xC0
4. Voice Control	ToS (hex) 0xC0
¹ IP Adapter firmware version 0.10 is not supported.	

2. Press the Soft Key "EXIT" to save the entries and return to the IP User Program menu.

IP Trunks

When installing a VOIPU PCB in the Aspire system, external line ports are automatically assigned. If there are IP trunks which are not used or if it is not necessary to use all the ports as IP trunks, use Program 10-03-01 to cancel the trunk setting for the slot in which the VOIPU PCB is installed.

Programming

✤ 10-03-01 : PCB Setup - Trunk Logical Port Number

For the slot assigned as a VOIPU slot, undefine (0) the assigned VoIP trunks, if they are not needed. The unassigned port(s) will not be available for any other use as it is still reserved for the VOIPU PCB.

- ◆ 84-01-34 : CODEC Information Basic Setup Bandwidth Control Enable (1) or disable (0) voice bandwidth control on H.323 trunks.
- 84-01-35 : CODEC Information Basic Setup Maximum Bandwidth Set the maximum total bandwidth limitation for voice packets (0-65535 kbps). Calls are restricted which are above the maximum bandwidth. Only RTP packets are considered.

Required Bandwidth

Packet	Required Voice Bandwidth (Kbps) Per Call (TX+RX RTP)					
Len. (msec)	G711 No VLAN	G711 VLAN	G729 No VLAN	G729 VLAN	G723 No VLAN	G723 VLAN
10	-	-	-	-	-	-
20	160	161.6	48	49.6	-	-
30	149.4	150.4	37.4	38.4	32	33
40	-	-	32	32.8	-	-
50	-	-	28.8	29.6	-	-
60	-	-	26.8	27.2	21.4	21.8
70	-	-	25.2	25.6	-	-
80	-	-	24	24.4	-	-

To help determine the bandwidth requirements for the system, the NEC Technical Support web site (http://ws1.necii.com) provides a bandwidth calculator. This web site requires registration with the NEC Sales Support. Contact them by phone (1-800-365-1928) or EMail (ubsdsupport@necinfron-tia.com) in order to register. It is important to remember that the bandwidth calculator is based on a single voice channel. It takes two voice channels (send and receive) for each telephone conversation.

Networking Over IP

The Aspire system allows Networking connection between several different Aspire systems. Aspire supports Networking using ISDN or VoIP (H.323).

Programming

◆ 10-12-01 : NTCPU Network Setup - IP Address

Select the IP address of the master system (for example: 172.16.0.10). Set the IP address for the slave system (for example: 172.16.0.11). The system must be reset in order for the change to take affect.

✤ 10-12-02 : NTCPU Network Setup - Subnet Mask

Select the Subnet Mask to be used by the IP server (default: 255.255.0.0) for both the master and slave systems.

◆ 10-27-01 : IP System ID

For each of the networked IP systems, define the IP addresses. (Using the examples shown in Program 10-12-01 above, in the master system enter 172.16.0.11 - in the slave system enter 172.16.0.10.)

◆ 84-05-01 : VOIPU IP Address Setup - IP Address

For each VOIPU PCB, enter the IP address for the VOIPU PCB (for example: master system set to 172.16.0.20 and the slave set to 172.16.0.21).

Exampl	le:
LAamp	····

Example:		
Program	Master System	Slave System
10-12	IP Address: 172.16.0.10 Sub Address: 255.255.0.0	IP Address: 172.16.0.11 Sub Address: 255.255.0.0
84-05	IP Address: 172.16.0.20 Sub Address: 255.255.0.0	IP Address: 172.16.0.21 Sub Address: 255.255.0.0
10-27-01	System ID 1 IP Address: 172.16.0.11 Port: 1730	System ID 1 IP Address: 172.16.0.10 Port: 1730
11-01	Dial 3x Digit 3 Type 2 (Intercom)	Dial 3x Digit 3 Type 8 (Networking) System ID 1
	Dial 4x Digit 3 Type 8 (Networking) System ID 1	Dial 4x Digit 3 Type 2 (Intercom)
11-02-01		

Peer-to-Peer Connection

An Aspire keyset with an IP adapter and Aspire IP keyset can send and receive RTP packets to/from another IP keyset without using DSP resources on a VOIPU PCB. This operation only allows Intercom calls between the phones. If a non-IP Aspire keyset, H.323 phone or outside CO line is required, a DSP resource is needed and a VOIPU PCB must be installed. If, while on a peer-to-peer call, a Conference call is formed, the peer-to-peer connection is released and a new non peer-to-peer connection is created using the VOIPU PCB. If the third party drops out of the conversation, the call reverts to a peer-to-peer call (silence may be heard while this conversion is made by the system).

- With Barge-In, a short silence may be heard if the following occurs:
 - A peer-to-peer call receives a Barge-In without a Barge-In tone.
 - A peer-to-peer call receives a Barge-In with Monitor mode.
 - When the established Barge-In is disconnected.

Programming

✤ 10-26-01 : IP System Operation Setup Enable (1) or disable (0) peer-to-peer operation.

Tandem Connection

To call from one Aspire system to another, set the following programs.

Programming

- 15-05-12 : IP Phone Terminal Basic Data Setup System Type Define whether or not the Aspire system is interconnected (0=no system, 1=Second Aspire system).
- ◆ 15-05-13 : IP Phone Terminal Basic Data Setup IP Address for Other System Define the IP address for the connected system.
- ◆ 15-05-14 : IP Phone Terminal Basic Data Setup Call Control Port for Other System The Call Control Port for the other system is defined in this program. This item is fixed at 1720 and it cannot be changed.

VLAN/QoS

The Aspire system supports:

- IEEE802.1q (VLAN Tagging)
- IEEE802.1p (Priority)

With the VLAN tagging mode, the Aspire can handle packets with or without a VLAN tag. If the VLAN ID of a packet is different from the registered one, that packet will be dropped.

With the use of a switch which supports VLAN tagging, Layer 2 priority control is enabled. When available, the 8SHUBU PCB can be used to provide this option.

Using a switch which supports 802.1p allows:

- priority control
- reduction of unnecessary packets (ex: broadcast packets) and provides circuitry by restricting a broadcast domain

Layer 2

Programming - System, VLAN/QoS - Layer 2

```
    84-09-01 : VLAN Setup - VLAN Mode
        Enable the VLAN mode for the system (0=disable, 1=enable). The system must be reset in order for the change to take affect. If the VLAN mode is enabled, the Aspire sends all packets with a VLAN tag - if disabled, no VLAN tag is sent in the packets.

    84-09-02 : VLAN Setup - VLAN ID
```

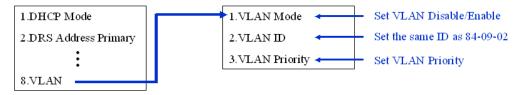
Enter the ID to be used for the VLAN (1-4094). The system must be reset in order for the change to take affect.

84-09-03 : VLAN Setup - Priority Enter the priority of the VLAN (0-7). The system must be reset in order for the change to take affect.

Programming - Aspire Keyset with IP Adapter, VLAN/QoS - Layer 2

1. On the Aspire keyset connected as an IP telephone, enter the phone's program mode by pressing HOLD CONF * #.

> *This enters the IP program mode to select the settings for the individual phone. The flashing item is the current selection.*



2. Press the Soft Key "SAVE" to save the entries and return the phone to an idle condition.

Layer 3 (ToS)

The router-supported ToS controls routing priority of packets by following the ToS field. It is possible to give priority to the voice packet using the ToS field.

- There are two types of ToS formats: DiffServ and IP Precedence. Before programming your router, make sure to check which type is supported by your router.
- Aspire can set the ToS value for each protocol, DTS, NGT, H.323 and Voice Control (H.245 for NGT). This setting allows flexible prioritization.

Protocol Type	Remarks
Default	Not needed
DRS (Device Registration Server)	Protocol when an IP telephone or IP adapter is registered
PROTIMS	Protocol to control the Aspire keyset with IP adapter
Voice Control	H.245 protocol for the Aspire keyset with IP adapter
H.323	H.245 protocol for H.323 IP phones
RTP / RTCP	Protocol for voice packet

Programming - VLAN/QoS - Layer 3

✤ 84-03-07 : NGT Information Basic Setup - Type of Service Mode

For the terminal type (1=Dterm IP/Aspire keyset with IP adapter, 2=Smart Phone, 3=Bandle IP Phone), set the service mode to be used (1=disable, 2=IP Precedence, 3=Diffserv).

◆ 84-03-08 : NGT Information Basic Setup - Type of Service

For the terminal type (1=Dterm IP/Aspire keyset with IP adapter, 2=Smart Phone, 3=Bandle IP Phone), set the type of service to be used (0x00 to 0xff). This data will be sent to the NGT terminal when it is registered. If Program 84-03-07 is "2", then enter "A0". If Program 84-03-07 is "3", then enter 74.

Use line keys 1-6 to enter letters A-F (key 1=A, key 2=B, etc.)

- 84-10-01 : ToS Setup ToS Mode
 For the Protocol type (1=default, 2=DRS, 3=Protims, 4=Voice Control, 5=H.323, 6=RTP/ RTCP), select the ToS mode (0=disable, 1=IP Precedence, 2=Diffserv).
- 84-10-02 : ToS Setup Precedence
 For the Protocol type (1=default, 2=DRS, 3=Protims, 4=Voice Control, 5=H.323, 6=RTP/ RTCP), if Program 84-10-01 is set to "1", select the precedence (0=low, 7=high).
- 84-10-03 : ToS Setup Low Delay For the Protocol type (1=default, 2=DRS, 3=Protims, 4=Voice Control, 5=H.323, 6=RTP/ RTCP), if Program 84-10-01 is set to "1", select the delay (0=normal delay, 1=low delay).
- 84-10-04 : ToS Setup Throughput For the Protocol type (1=default, 2=DRS, 3=Protims, 4=Voice Control, 5=H.323, 6=RTP/RTCP), if Program 84-10-01 is set to "1", select the throughput (0=normal throughput, 1=high throughput).
- 84-10-05 : ToS Setup Reliability For the Protocol type (1=default, 2=DRS, 3=Protims, 4=Voice Control, 5=H.323, 6=RTP/RTCP), if Program 84-10-01 is set to "1", select the reliability (0=normal reliability, 1=high reliability).
- 84-10-06 : ToS Setup Low Cost For the Protocol type (1=default, 2=DRS, 3=Protims, 4=Voice Control, 5=H.323, 6=RTP/RTCP), if Program 84-10-01 is set to "1", select the low cost mode (0=normal cost, 1=low cost).
- 84-10-07 : ToS Setup Priority
 For the Protocol type (1=default, 2=DRS, 3=Protims, 4=Voice Control, 5=H.323, 6=RTP/ RTCP), if Program 84-10-01 is set to "2", select the Diffserv priority (0-63).

VOIPU DSP Resource Assignment

✤ 10-19-01 : VOIPU DSP Resource Selection

Specify the operating mode of the DSP voice resource on the VOIPU PCB (DSP Resource: 01-32, 0=IP extensions and trunks, 1=IP extension only, 2=IP trunk only). If a user wants to keep DSP voice channels only for trunks or extensions, then set this program to IP Extension Only (1) or IP Trunk Only (2). Each VoIP call, unless it is a peer-to-peer call, requires a DSP resource be available.

Conditions

Changes to the following programs require the system be reset before the changes can take affect.

- Program 10-12
- Program 10-13
- Program 84-10

Changes to the following programs require that a programmer log out of the system programming (phone programming, WebPro) before the changes can take affect.

- Program 84-01 Items: 39-41, 49-58
- Program 84-06
- Program 84-09

When changes are made to the following programs and there is an active call on the VOIPU PCB, the system will not update until the VOIPU PCB is idle.

- Program 10-10
- Program 10-18
- Program 84-01-01
- Program 84-02-33
- Program 84-04
- Program 84-05

Default Setting

Disabled.

Related Features

Networking

Aspire systems can be connected together through a LAN using VoIP.

Operation

Refer to the individual features in the Aspire Software Manual (P/N 0893200) for operation.



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Other Important Telephone Numbers

Sales:	.203-926-5450
Customer Service:	.203-926-5444
Customer Service FAX:	.203-926-5454
Technical Service:	.203-925-8801
Discontinued Product Service:	.900-990-2541
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Emergency Technical Service (After Hours)	.203-929-7920
(Excludes discontinued products)	



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