

# CN2x4

## IP Phone



### Key Features

- Uses SIP to operate with any standard IP phone system or network
- Supports all standard PBX functions
- Four call appearances support two simultaneous calls
- Two 10/100 Ethernet circuits connect to the LAN and an additional device
- Graphical LCD
- Displays menu and names in English and Chinese
- Buttons and keys for all commonly used functions
- Message waiting LED
- Speech quality ensured by QoS at the Ethernet and IP layers and comprehensive jitter buffer
- Half duplex speaker phone
- Receives power over Ethernet (PoE) or from an ac adapter
- Menu, browser, and HTTP support for configuration and updates
- Uses highly stable embedded Linux operating system

### Overview

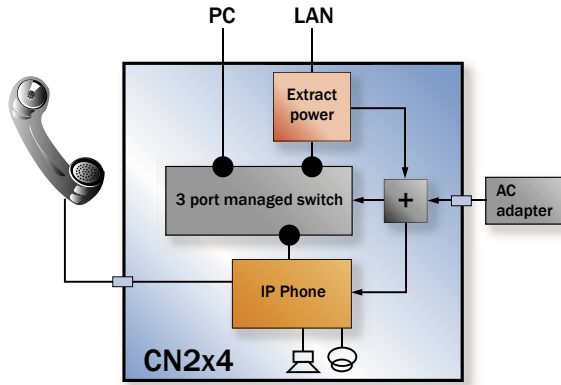
The CN2x4 is a quality phone that can be used by business and residential users. The phone is referred to as a “two by four” because it has two Ethernet circuits and four call appearances. The phone is available in charcoal.

The CN2x4 is based on open standards. It uses SIP for call control, making it compatible with any IP phone system using the SIP standards. The second Ethernet port on the phone permits a PC or other network to be connected to the phone without the need for additional switching equipment. The phone can be powered from the ac adapter that is supplied or receive power over an Ethernet connector.

In deploying a CN2x4, only a single Ethernet circuit needs to be taken to the desktop, to provide both voice and data communications. The phone is simple for an administrator to install, manage, and maintain. After initial installation the phone can be moved anywhere in the network, normally without the need to change the provisioning or wiring.

The phone is compact and takes up little space on the desktop. In day to day operation, end users can access all features quickly and unambiguously as there are buttons and keys for all functions.





## Speech Quality

The phone has speech quality that exceeds the needs for daily business or residential communication. The half duplex speaker phone provides acceptable speech for hands free operation to enable its use at home or the office. The phone has a standard headset connector to permit the use of professional headsets. Switching between handset and headset is accomplished with a single button.

The phone incorporates an adaptive jitter buffer to ensure that speech quality is optimal, even when the network has varying delays and lost packets. This technology provides a distinct advantage even within an office, but proves itself when communicating over a WAN or the Internet.

## Physical Convenience

The CN2x4 has the appearance of a modern business telephone set. There are 37 buttons and keys for convenient access to every feature, such as hold, transfer, and mute.

There are LEDs for each of the four buttons denoting the call appearances. These indicate the status of a call. There are also LEDs to indicate there is a new message and that the phone is in speaker mode.

The phone has four rubber feet that prevent pulling the phone off the desk. The phone is shipped with a stand that can tilt the phone on the desk or can make the phone vertical when wall mounted.

## Dialling

The CN2x4 provides a phone book for storing the contact information of 100 individuals. Phone book entries can be easily searched, inserted, modified, and deleted using the browser interface. Each entry contains a name and destination number.

The phone remembers the last 32 numbers dialed and the last 32 incoming numbers. This list is quickly accessed from the menu button on the phone.

## Auto Provisioning

This feature allows you to control all your Zed-3 phones from a central server. You only have to specify the IP address of the auto provisioning server on the CN2x4. The CN2x4 will retrieve the configuration it needs from the auto provisioning server. Updates and upgrades for hundreds or thousands of phones can be done easily through this feature.

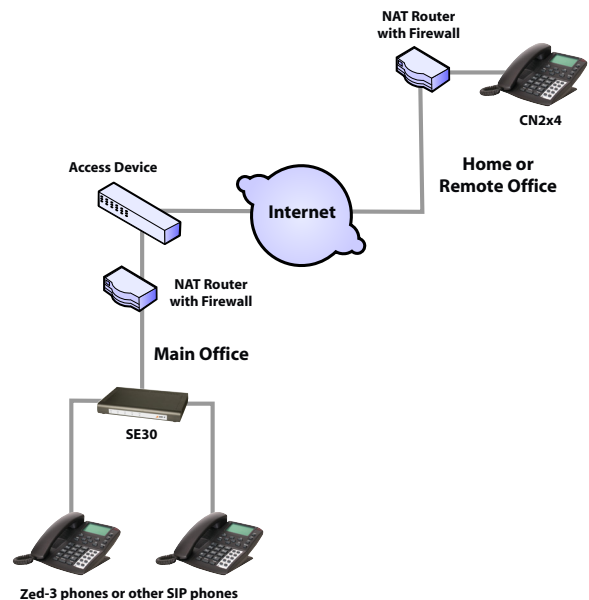
## Power over Ethernet (PoE)

The CN2x4 supports the IEEE 802.3af standard. The phone can therefore receive power over the Ethernet (PoE) connection which is sufficient to allow the phone to perform all of its functions without the need for an external ac adapter.

## Data Features

The CN2x4 has a 3 port managed switch so users can connect to an additional device such as a PC, without any additional investment in an external switch. One switch port connects internally and two ports are available for external connections. The Ethernet ports are wired so they can easily be connected to the network and the PC with straight through cables. In addition, all ports perform auto negotiation of link speed and determine whether operation will be full or half duplex.

Once a speed is negotiated, the ports are capable of switching Ethernet traffic at wire speed. The switch is based on hardware, not software running on the processor. This allows it to forward traffic at line rates without limitation, thus ensuring that devices downstream are not starved of bandwidth.



## VLAN and QoS Support

By default, the ports on the switch are untagged members of a single VLAN, so the switch can interoperate with most networks. Each port can be a member of a tagged VLAN, a member of an untagged VLAN, or excluded from a VLAN. Full support for IEEE 802.1q VLAN tagging and IEEE 802.1p QoS settings allows the CN2x4 to provide enhanced quality of service functions at the Ethernet layer and operate in a modern network.

At the IP layer the CN2x4 supports the ability to mark the lower six bits of the IP QoS byte with the various differentiated services code point (DSCP) markings. This allows for up to 64 codepoints to be defined which map to various per-hop behaviors (PHBs). The CN2x4 internally has two queues allowing for the prioritization of voice and signalling traffic over data traffic marked as “best effort.” Each queue is serviced in such a way that neither queue is starved.

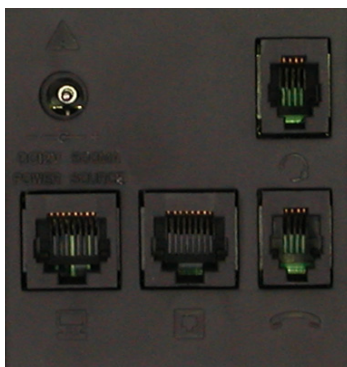
## LCD

The LCD on the phone has a high contrast that the user can adjust. The LCD intelligently shows users all relevant information without any soft keys being required. It displays all information about a call, such as the name and number of a caller and its duration.

## Preferences and Settings

All phone settings are accessible from a browser page located at the IP address assigned to the phone. In addition, all user settings are accessible from the phone.

There are many parameters on the phone that allow it to operate in the network. The phone automatically downloads these parameters at power on from a configuration file that is generated by the system administrator. These settings are protected by a password that can be restricted to the administrator to prevent the user from accidentally disrupting the network settings. With the menu on the phone, the user can customize personal preferences like volume level, contrast, and language.



## Date and Time

The phone uses NTP to automatically obtain the date and time from the network. However, the date and time can be set manually in the absence of an NTP server. The phone displays the current date and time and the start time of each call on the LCD.

## International Support

Users can select between the following languages for the menu of the phone: English and simplified Chinese. In addition, the browser interface can be selected in these languages: English, simplified Chinese.

The user can select the call progress tones for any one of 8 countries: China, Hong Kong, United States, United Kingdom, Japan, Korea, Slovenia, and Czech Republic. The ac adapter that is shipped with the phone is appropriate for the destination country. The phone and adapter are fully certified to be sold in that country.





## Technology

The CN2x4 has a powerful internal computer that runs a highly reliable real time embedded Linux operating system. The phone externally looks and behaves like a regular business phone, and not like a computer with a handset attached.

The CN2x4 uses SIP for communication. This protocol is now widely recognized as the standard for IP telephony. The CN2x4 performs all of the functions of a user agent client and a user agent server. It can be used with all standard SIP servers, making it a truly open IP phone.

The phone incorporates self tests and diagnostic capabilities. These allow for rapid isolation and resolution of problems associated with deployment.

## Physical and Environmental

**Operating temperature:** 10°C to 40°C (50°F to 104°F)

**Storage temperature:** 0°C to 50°C (32°F to 122°F)

**Weight:** 0.7 kg (1.4 lb). Shipping weight (box of 10) 8 kg (17.5 lb)

**Size:** 160 mm (W) x 215 mm (L) x 65 mm (H) (6.25" x 8.5" x 2.5")

**Power:** 12 Vdc 500 mA from included ac adapter. Classification 0 under IEEE 802.3af on CN2x4.

**Safety:** IEC60950

**Emissions:** FCC part 15A, ANSI C63.4, EN55022 class B, EN61000-3

**Immunity:** EN55024

**Warranty:** one year

## Specification

### Basic Features

- Call forward
- Call transfer
- Call hold
- Mute
- Redial
- Display caller ID
- Display call duration
- Display date and time
- Access voice mail
- Send DTMF tones
- Message waiting indication (MWI)
- 100 phone book entries
- 30 most recent call records for dialled, incoming, and missed calls
- Adjustment of LCD contrast (4 levels)
- Adjustment of handset volume (6 levels)
- Adjustment of speaker phone volume (6 levels)

### Enhanced Features

- Dynamic selection of codec
- Advanced jitter buffer
- Automatic traversal of NAT and firewall
- Echo cancellation
- Comfort noise generation (CNG)
- Voice activity detection (VAD)
- Auto provisioning (requires auto provisioning server)
- On line firmware upgrade
- Multi-language support: English and Chinese

### Supported Standards

- RFC 2327 – SDP
- RFC 2976 – SIP INFO Method
- RFC 3261 – SIP
- RFC 3264 – Offer/Answer model with SDP
- RFC 3515 – SIP REFER Method
- RFC 3842 – A Message Summary and Message Waiting Indicator
- RFC 2833 – RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals
- RFC 3489 – Simple Traversal of User Datagram Protocol (UDP) Through Network Address Translators (NATs)
- RFC 3891 – SIP “Replaces” Header
- RFC 3892 – SIP Referred-By Mechanism
- Codec: G.711 (A/μ law), GSM (21k), G.729, G.723
- DTMF: RFC 2833, In-band DTMF, SIP INFO



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