

## Intercom System (N-8000 series) Network Specification

### 1. Introduction

This document summarizes important information on the network specifications and network connection of intercom system (IP emergency terminal: N-8616MS, IP multifunctional terminal: N-8500MS, IP standard terminal: N8510MS/N-8515MS, audio interface unit: N-8000AF, direct select unit: N-8000D1).

Refer to this document when initially installing the intercom system or changing the network configuration.

### 2. System overview

- The intercom system transfers various control and audio information and data between devices over IP network.
- The system can interconnect up to 192 units within the same system.
- The dedicated PC software (for Windows XP SP2 or higher) is available for setting up devices.
- Web browser (IE6.0 or higher) can be used to set the network, collect logs, etc.
- Paging from the IP multifunctional/standard terminal can be transmitted to max. 16 locations (unitcast) and 191 locations (multicast).
- Paging from the IP emergency terminal and audio interface unit can be delivered to max. 8 locations (unitcast) and 191 locations (multicast).
- Paging broadcasting is impossible with direct select unit.
- Various contact outputs can be controlled in synchronization with paging broadcasting.

### 3. Network interface

- Ethernet: DIX type
- 10BASE-T/100BASE-TX automatic switchover
- MDI fixed (IP multifunctional/standard terminal), MDI/MDIX automatic switchover (IP emergency terminal, unit)

#### 4. Network protocol

- TCP/IP, UDP, HTTP, RTP, ARP, ICMP, IGMP (v2 with IP multifunctional and standard terminal, v1 with emergency terminal, unit)
- List of ports used

##### TCP

Application	Protocol	Default port number	Remarks
Web server Setting upload/download	TCP (HTTP)	80 (variable)	
Call control	TCP	5000 (variable)	TCP start port number+0
PC monitor	TCP	5001 (variable)	TCP start port number+1
PC control	TCP	5002 (variable)	TCP start port number+2

\* Call control, PC monitor and PC control port can be changed by the setting of TCP start port number.

##### UDP

Application	Protocol	Default port number	Remarks
Call	UDP	5010–5025 (variable)	TCP start port number+4–20
Paging	UDP	6000– (variable)	4 ports assigned to each unit

\* UDP port for calling can be changed by resetting the UDP start port number.

\* UDP port for paging can be changed through resetting of port number for paging.

\* UDP port number 15000 is internally used. 14981-15000 cannot be used for setting.

- MTU value: MTU = 1280 [Bytes] (Common to all units)
- TTL value:
  - Unicast: 32
  - Multicast: 1
- Audio stream QoS: None

\* When connecting to dial-up line or xDSL, prepare a broadband router having PPPoE function, because the system does not support protocols such as PPP and PPPoE.

\* By setting WAN side address as WAN side IP address, NAT can be supported.

\* NAPT can be supported by setting WAN side port number.

→ For details of NAT/NAPT, refer to P.8-8 of N-8000 series instruction manual.

## 5. General description of communication

### Call

- Call control: TCP terminal 1 ↔ terminal 2
- Audio stream: UDP terminal 1 ↔ terminal 2

### Paging broadcast (unicast)

- Call control: TCP broadcasting terminal/audio interface unit 1 → broadcast destination terminal/audio interface unit 2
- Audio stream: UDP broadcasting terminal/audio interface unit 1 → broadcast destination terminal/audio interface unit 2

### Paging broadcast (multicast)

- Call control: TCP broadcasting terminal/audio interface unit 1 → broadcast destination terminal/audio interface unit 2 (sent to unicast address)
- Audio stream: UDP broadcasting terminal/audio interface unit 1 → broadcast destination terminal/audio interface unit 2 (sent to multicast address)

### Contact output

- Contact control: TCP terminal 1 → terminal 2/audio interface unit 1 → direct select unit TCP direct select unit 1 → direct select unit 2

## 6. IP address assignment

- DHCP cannot be used. Be sure to assign fixed IP address.
- The equipment default IP address is [192.168.1.1/24]. It can be reset to any address of class A to C (except for broadcast or network address).
- The default multicast address is [225.0.0.0]. It can be reset to any multicast address within the range of 225.0.0.0 to 238.255.255.255.

### [CAUTION]

A multicast address which results in 2nd octet of [0] or [128], and 4th octet of [1] cannot be used.

(Example) 225.0.0.1, 225.128.0.1

## 7. Multicast

Multicast is a method to send a packet to a destination having the special multicast address, when paging broadcast is made for multiple terminals having different IP address.

Multicasting communication needs narrower bandwidth. For details, refer to P.8-9, N-8000 series instruction manual.

## 8. Capacity of transmission

Specifications such as operating band and sampling frequency of the network necessary to transmit audio information are listed in the table below. Note that the capacity of transmission is constant irrespective of sound volume.

Audio specification	Operating band	Sampling frequency	Delay
High-sound quality mode	130 kbps	16 kHz	80 ms
Standard mode	98 kbps	8 kHz	80 ms
Frequency band saving mode	49.5 kbps	8 kHz	320 ms

\* Operating band is set for one call. For unicast paging, the band is multiplied by the number of destinations.

\* A packet loss results in audio interruption.

## 9. Web accessing method to device

Device having the following address can be accessed over Web (common to all models).  
http://device IP address/index-j.htm

## 10. Security

- Before a Web browser connects a device, BASIC certification is performed. The user name and password can be changed.
- Each control data has the unique format. **General call control protocol (e.g. SIP) is not used.**
- Audio data is uniquely encoded.

## 11. System configuration considerations

All devices to be used should always be ready for communication. If a device fails to communicate, it causes retries in all control communications, and slows down related operation speed.

## 12. PC in use

The PC used for setting should meet the following requirements.

- OS: Windows XP SP2 or higher
- CPU: Intel Pentium IV 2 GHz or higher
- RAM: Min. 1 GB
- Resolution: 1024 × 768 pixels or higher

The PC used for setup must have the following software installed. If not, download from the Microsoft website.

- Microsoft .NET Framework 3.5 or higher
- SQL Server 2005 Express Edition or higher

## 13. SNMP

Not supported.