

## 1. Summary of Noritsu Printing Service (NPS)

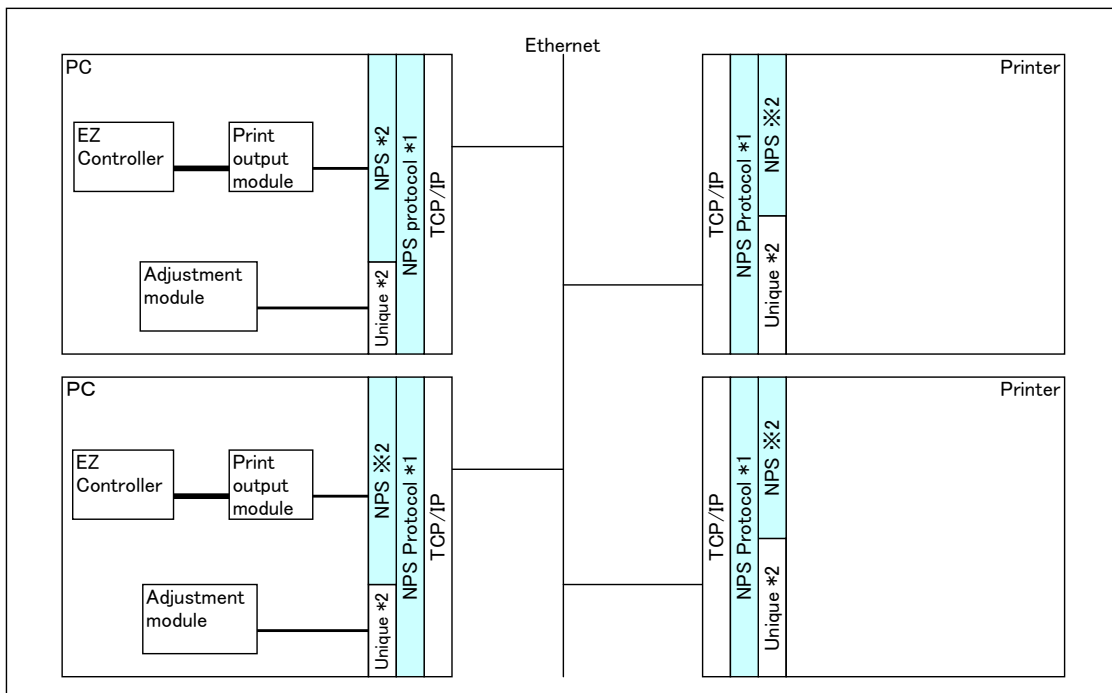
### Features

- NPS is specialized in printing via a network.
- NPS uses TCP (stream socket) as a protocol.
- NPS receives prints by frame. NPS does not manage orders.  
(Applications are responsible for managing orders.)
- NPS does not support printer maintenance functions.
- NPS does not support a network with a dynamic IP address like DHCP.

### Functions

- NPS can obtain printer basic information.
  - Printer common information
  - Printer unique information
- NPS can obtain printer status.
  - Printer states
  - Paper states
- NPS can request prints.
  - Printer occupation/release
  - Print request
  - Print cancel
  - Print status notice
- NPS can notify events occurred in printer.
  - Printer state change notification
  - Printer event notification

### Concept image



\*1 Refer to "2. Summary of communication protocol" of this document.

This shows rules for communicating over command header part and command property part.

\*2 This shows classification of command headers. For details of command headers, refer to "NPS Command List" document.

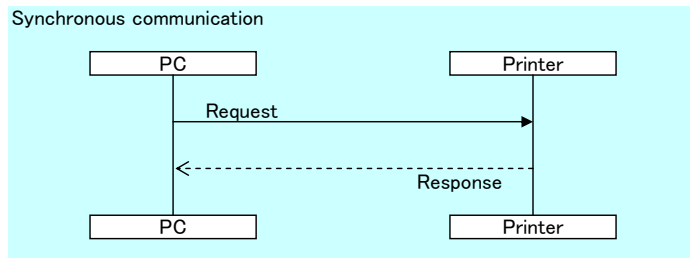
### Concern

- Embedded control
  - CPU load for establishing port connections causes overhead. (1 second on SH7619)
  - It is necessary to limit the number of connectable applications.

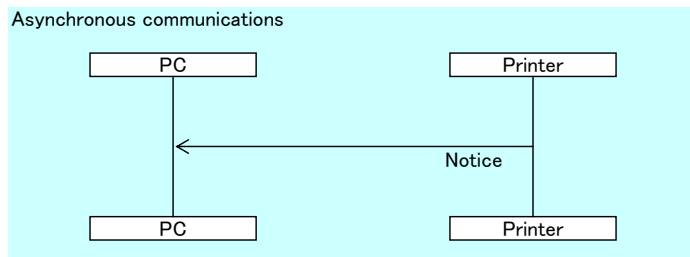
## 2. Summary of communication protocol

- NPS communication protocol is based on TCP/IP socket communication.
- There are 2 kinds of communication. One is synchronous communication that send request to printer and receive response. And the other is asynchronous communication that the printer notifies occurrence of event.

### Synchronous communication



### Asynchronous communications



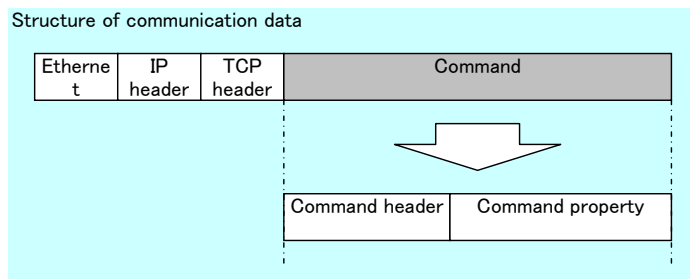
- Port number

Port numbers are divided by each function.  
For details, refer to "Appendix 1. Port Number List."

- Communication data is passed by packets.

Packets for NPS communication have the same structure as normal TCP/IP packets.  
NPS separates command that is communication data of TCP/IP packet except for headers such as IP header or TCP header into command header and command property.

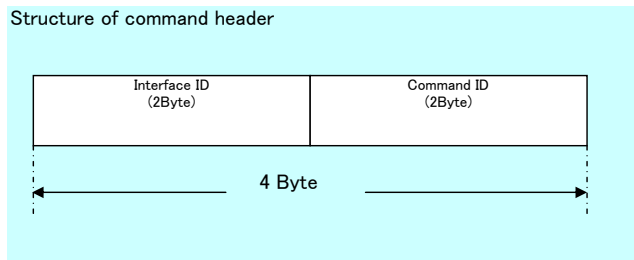
### Structure of communication data



▲ Command header

Command header is 4 bytes fixed-length data.

Structure of command header



Parameter

Offset	Type	Item	Explanation
0	US	Interface ID	Identify the interface.
2	US	Command ID	Identify the command. For details, refer to command list.

\*Byte order is big-endian of network standard.

\*For details of types, refer to "Appendix 2. Type Notation."

▲ Command property

Command property identifies commands by port number, interface ID, and command ID.  
For details of port number, refer to "Appendix 1. Port Number List."

For details of NPS command property, refer to command property list.

## Appendix 1. Port Number List

Port No./Protocol	Explanation	Server socket
30580/UDP	Port for printer detection request	Printer
(Arbitrary)/UDP	Port for printer detection response	Application
30582/TCP	Port for general commands (including event notification)	Printer
30583/TCP	Port for image transmission	Printer

### Port number

Port numbers were selected from the unassigned numbers on the Internet Assigned Numbers Authority (IANA) website at March 7, 2006.

<http://www.iana.org/assignments/port-numbers>

## Appendix 2. Type Notation

Notation	Data type in C language	Meaning
SC	char	Signed 1 byte integer
UC	unsigned char	Unsigned 1 byte integer
SS	short	Signed 2 bytes integer
US	unsigned short	Unsigned 2 bytes integer
SL	long	Signed 4 bytes integer
UL	unsigned long	Unsigned 4 bytes integer