IP setup Interface Specifications

Network Camera

VER. 1.25

Panasonic Corporation

Revise Record

VER.	Date	Item no.	Comment	Revise trigger
1.00	04 Jul.2007		First release	-
1.01	31 Oct. 2008	1	Add supported model number	
1.11	15 Oct. 2010		Add IPv6 information	
1.12	07 Dec. 2012	3.2.1	Change explanation of 'Reserved' area in the header.	
		3.3.2	Change meaning of Code=0x00a7	
		3.3.2	Add 0x05 to Code=0x0000	
1.21	12 Dec.2014	3.2.1	Change example of 'Values and comments' in the Server IP.	
		3.2.1	Change explanation of 'Reserved' area in the header.	
		3.2.2	Add explanation of 'detail' in the Code 0x0000. Add example of 'detail' in the Code 0x0001. Change explanation of the Code 0x0041. Add example of 'detail' in the Code 0x0045. Change explanation of the Code 0x00b2. Change explanation of the Code 0x00b6.	
1.22	15 Jul 2016	3.2.1	Add 'User ID setting State' to the proprietary header. Change length of 'Reserved' area in the proprietary header.	
1.23	05 Oct 2016	3.2.1 3.2.2	Add 'PCSetup' and 'Ack-Client-PC'.	
1.24	15 Oct 2016	2.2	Add description of 'CAMERA Auto Setting Error' regarding the 'inform'.	
		3.3.2	Add information of the camera IP setting enable or disable.	
1.25b	1 Apr 2017	-	Change document version	

Index

1. Introduction

This document describes the interface specification for the IP setup protocol in network cameras.

It consists of the sequence (Chapter 2) and data format (Chapter 3).

2.   Sequence

2.1.   The notification of IP address setting from camera ("Setup-Req")

The sequence that is the notification of IP address setting from camera is described as follows.

When the camera starts, it sends the "Setup-Req" packet.

```
                 ┌─────────────────┐                              ┌──────────┐
                 │ Network camera  │                              │    PC    │
                 └─────────────────┘                              └──────────┘
                          │                                            │
 Port number: 10669       │                                   Port number: 10669
                          │        Setup-Req                   (Receive)
                          ├───────────────────────────────────────────▶│
 ┌──────────────────────────────────┐                                  │
 │ After the camera starts, the Setup-Req is │                         │
 │ transmitted at intervals of 5 seconds.    │                         │
 └──────────────────────────────────┘                                  │
                          │        Setup-Req                            │
                          ├───────────────────────────────────────────▶│
                          │                                             │
                          │        Setup-Req                            │
                          ├───────────────────────────────────────────▶│
                          │                                             │
                          │            ⋮                                │
                          │                                             │
                          │        Setup-Req                            │
 ┌──────────────────────────────────┐                                  │
 │ The camera stops sending "Setup-Req", │      ├──────────────────────▶│
 │ when about 20 minutes have passed after │                           │
 │ turning on the power (Note 1).          │                           │
 └──────────────────────────────────┘                                  │
                          │                                             │
```
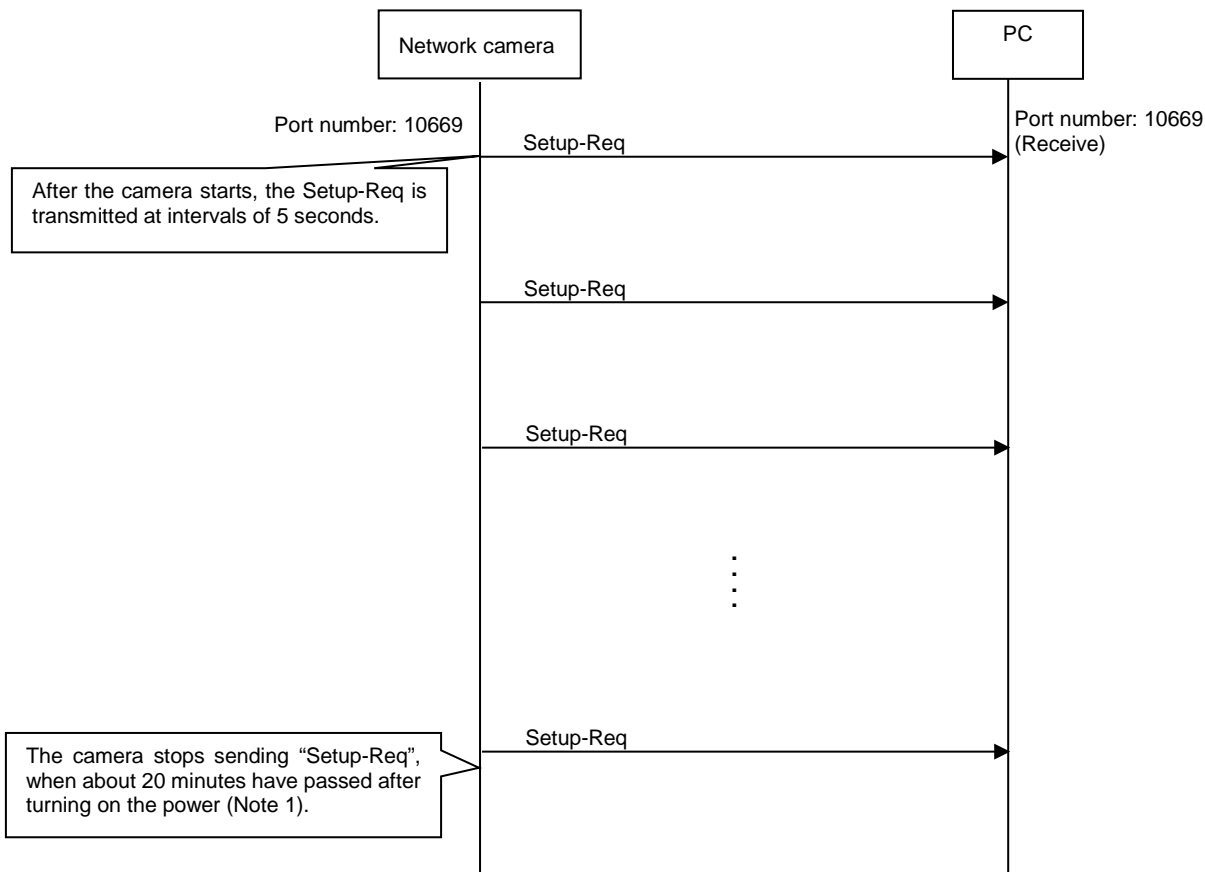
Figure 2.1.1: Setup-Req transmission

*) The data format: Refer to chapter 3.1.

(Note 1)

The camera stops sending "Setup-Req", when about 20 minutes have passed after turning on the power. However, if all of the following settings are default, the camera continues to send "Setup-Req".

"DHCP", "IP address", "Net mask", "Default gateway", "HTTP port", "The default user name and password"

2.2. To request IP address setting of the camera ("Lookup", "Inform")

The sequence that acquires IP address setting of the camera is described as follows.

```
        Network camera                                    PC

Port number: 10670                      Lookup        Port number: 10669
                    <──────────────────────────────  (Send)

Port number: 10669      Inform                        Port number: 10669
                    ──────────────────────────────>  (Receive)
```

Figure 2.2.1: "Lookup" (request) and "Inform" (response)

The camera responds (Inform) with "0x0001" for "CAMERA Auto Setting Error", when about 20 minutes have passed after turning on the power. If "unlimited" is set by CGI(/cgi-bin/easyipset?time=unlimited), the camera always responds with 0x0000.(refer to 3.3.2.)

*) The data format: Refer to chapter 3.1.

2.3. To set IP address to the camera ("Setup", "Ack-Client", "Ack-Server")

The sequence that sets IP address to the camera is described as follows.

It is possible to setup the camera IP address when about 20 minutes have passed after turning on the power(Note 3).
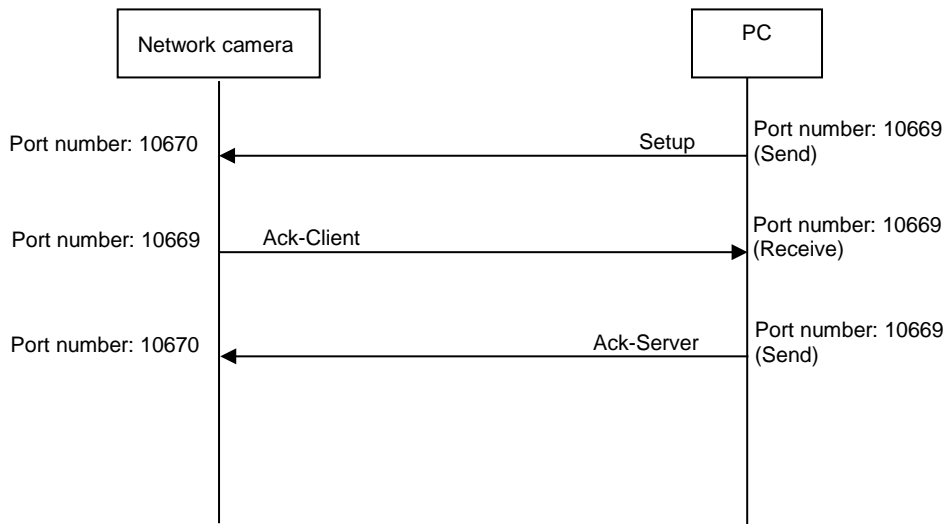

Figure 2.3.1: IP setting for the camera

Though "PCsetup" includes more Property data than "Setup", camera should refer the parameters same with "Setup".
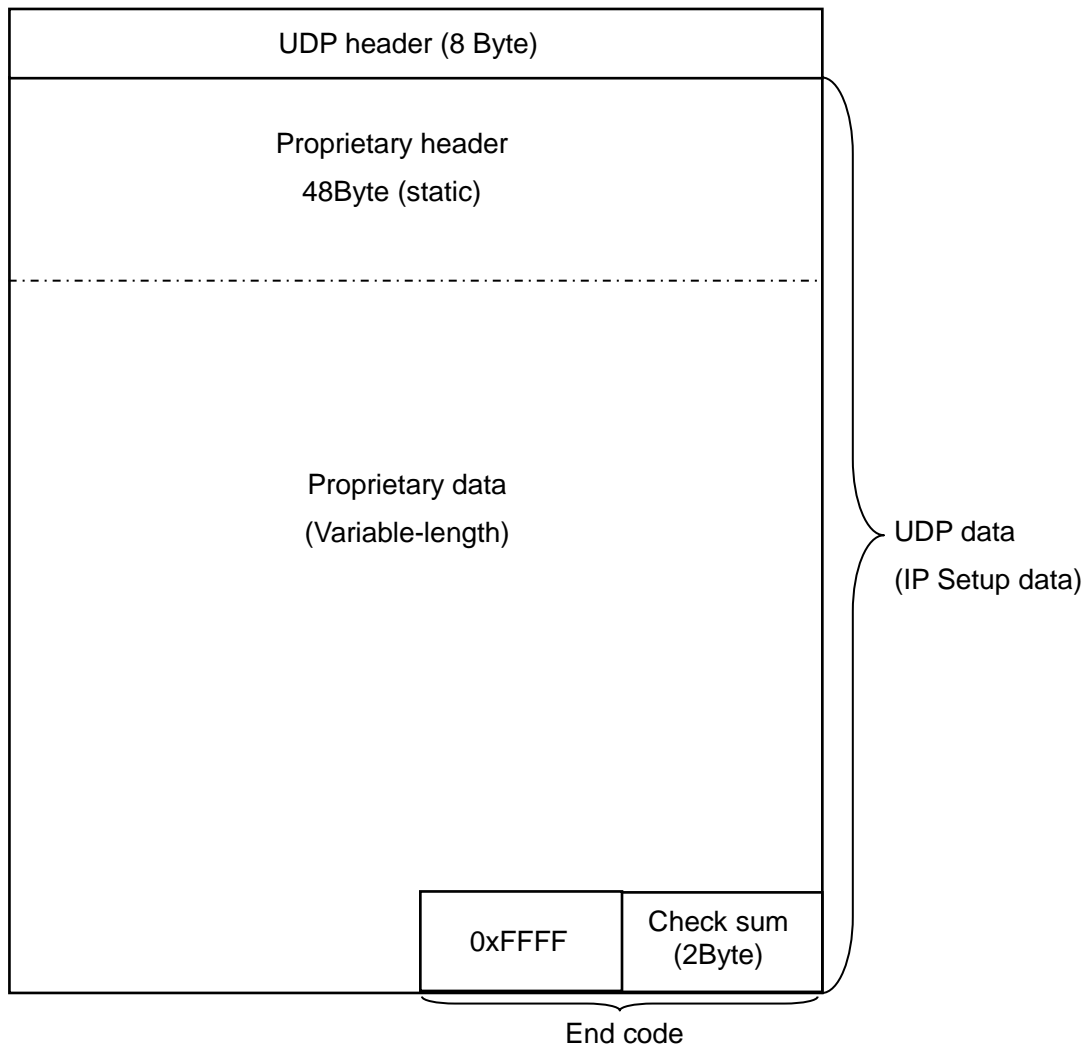
*) The data format: Refer to chapter 3.1.

(Note)

It is not possible to setup the camera IP address when about 20 minutes have passed after turning on the power. However, if all of the following settings are default, it is possible to setup the camera IP address.

"DHCP", "IP address", "Net mask", "Default gateway", "HTTP port", "The default user name and password"

3. Data format

3.1. Data format of the IP Setup

The data format of the IP setup data is described as follows. It is the UDP data.

```
+---------------------------------------------------+
|            UDP header (8 Byte)                    |
+---------------------------------------------------+ ─┐
|            Proprietary header                     |  │
|            48Byte (static)                        |  │
| - - - - - - - - - - - - - - - - - - - - - - - - - |  │
|                                                   |  │
|            Proprietary data                       |  ├─ UDP data
|            (Variable-length)                      |  │   (IP Setup data)
|                                                   |  │
|                                                   |  │
|              +-----------+-----------+            |  │
|              |  0xFFFF   | Check sum |            |  │
|              |           |  (2Byte)  |            |  │
|              +-----------+-----------+            | ─┘
+---------------------------------------------------+
                      End code
```

The method of calculating "Check sum":

  (Value in that it added from "Proprietary header" to "End code" by one byte in UDP data)+1

When the operation is "Lookup" or "Ack-Client" or "Ack-Server" or "Ack-Client-PC", it is composed of only the "Proprietary header".

When the operation is "Setup-Req" or "Setup" or "Inform" or "PCSetup", it is composed of the "Proprietary data" and the "Proprietary header".

*) The operation: Refer to chapter 3.2.2.

3.2. Proprietary header

3.2.1. Data format

The data format of the proprietary header is described as follows. The size of proprietary header is 48 bytes.

Table3.2.1: Proprietary header

0.			4		8		12	
V	Length		OP		Client Mac		Server Mac	
	Server IP			Packet No		Identifier		
	Reserved							

Table3.2.2: Details of proprietary header

Parameter name	length (Byte)	Values and comments
V (Version)	2	00 01 (fixed)
Length	2	Data length
OP	2	Operation
Client Mac	6	Client(Camera) MAC address When the destination is unknown(operation is "Lookup"), set "00 00 00 00 00 00".
Server Mac	6	Server MAC address When the destination is unknown(operation is "Setup-Req"), set "00 00 00 00 00 00".
Server IP	4	Server IP address When the destination is unknown(operation is "Setup-Req"), set "00 00 00 00".
Packet No	2	Packet number When the operation is "Setup-Req" or "Inform", set 0x0000. When the operation is "Lookup" or "Setup" or "Ack-Client", set "0x0001" When the operation is "Ack-Server", set 0x0002. When the operation is "Ack-Client-PC", set the "Packet No" received from PCSetup.
Identifier	10	20 11 1E 11 23 1F 1E 19 13 00 (fixed)
Reserved	1	00 (fixed)
Minor Version	1	02 (fixed) When the operation is "Lookup", set "0x00"
Model	1	02 (fixed) When the operation is "Lookup", set "0x00"or"0x01"

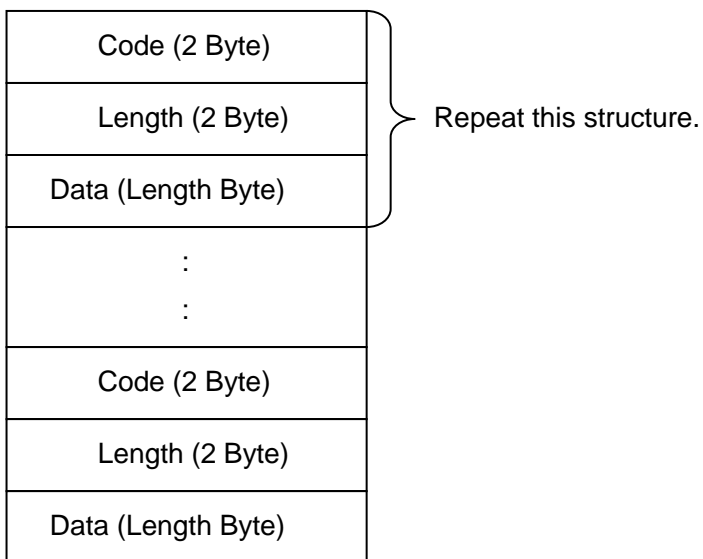| User ID Setting State | 1 | When Administrator's ID is not set, set "0x01". |
		When Administrator's ID is set, set "0x02".
		When the operation is not "Setup-Req" or "Inform", set "0x00"
Reserved	10	00 00 00 00 00 00 00 00 00 00 (fixed)

3.2.2. Operation code

OP(operation) of proprietary header is described as follows.

Table: 3.2.3: OP code

operation name	OP code	Direction	details
Setup-Req	0x0001	From the camera	Notification of IP setup
Setup	0x0002	To the camera	IP setup offer from EasyIpSetup.
Ack-Client	0x0003	From the camera	ACK response for "Setup"
Ack-Server	0x0004	To the camera	ACK response for "Ack-Client"
Lookup	0x000D	To the camera	Request the camera setting
Inform	0x000E	From the camera	Notification of IP setup(Response for "Lookup")
PCSetup	0x000F	To the camera	IP setup offer from PSSCT.
Ack-Client-PC	0x0010	From the camera	ACK response for "PCSetup"

IP setup Interface Specifications Network camera

3.3. Proprietary data

3.3.1. Format

```
┌─────────────────────────┐
│   Code (2 Byte)         │
├─────────────────────────┤
│   Length (2 Byte)       │ ── Repeat this structure.
├─────────────────────────┤
│   Data (Length Byte)    │
├─────────────────────────┤
│           :             │
│           :             │
├─────────────────────────┤
│   Code (2 Byte)         │
├─────────────────────────┤
│   Length (2 Byte)       │
├─────────────────────────┤
│   Data (Length Byte)    │
└─────────────────────────┘
```

3.3.2. Code

Code	Length (Byte)	Data Name	detail
0x0000	1	IPv4 DHCP	DHCP/Auto IP setting DHCP ON: 0x00 Static (Fixed IP address): 　When the operation is "Inform", set "0x02". 　When the operation is "Setup-Req" or "Setup", 　set "0x03". Auto IP : 0x04 Auto (Advanced) : 0x05
0x0001	1	Internal data	00 (Internal data)
0x0020	4	IPv4 Address	IP address 　When the operation is "Inform" or "Setup-Req", the camera notifies its IP address setting. 　When the operation is "Setup", set new IP address setting.
0x0021	4	IPv4 Subnet Mask	Subnet mask 　When the operation is "Inform" or "Setup-Req", the

			camera notifies its subnet mask setting. When the operation is "Setup", set new subnet mask setting.

0x0022	4	IPv4 Gateway	Default gateway
			
			  When the operation is "Inform" or "Setup-Req", the camera notifies its default gateway setting.
			  When the operation is "Setup", set new default gateway setting.

0x0023	4 x N	IPv4 DNS Servers	DNS server address
			
			  When the operation is "Inform" or "Setup-Req", the camera notifies its primary DNS and secondary DNS.
			  When the operation is "Setup", set new primary DNS setting and new secondary DNS setting.

0x0025	2	IPv4 Port Number for HTTP	HTTP port number
			
			  When the operation is "Inform" or "Setup-Req", the camera notifies its HTTP port number setting.
			  When the operation is "Setup", set the new HTTP port number setting.

0x0040	16	IPv6 Address	IPv6 Address
			
			  When the operation is "Inform" or "Setup-Req", the camera notifies its IPv6 address setting.
			  When the operation is "Setup", set new IPv6 address setting.
			
			[Note] This Code is supported by IPv6 supported models.

0x0041	16	IPv6 Gateway	IPv6 Default gateway
			
			  When the operation is "Inform" or "Setup-Req", the camera notifies its IPv6 default gateway setting.
			  When the operation is "Setup", set new IPv6 default gateway setting.

			[Note] This Code is supported by IPv6 supported models.
0x0042	16 x N	IPv6 DNS Servers	IPv6 DNS server address When the operation is "Inform" or "Setup-Req", the camera notifies its IPv6 DNS server address setting. When the operation is "Setup", set new IPv6 DNS server address setting. [Note] This Code is supported by IPv6 supported models.
0x0044	2	IPv6 Port Number for HTTP	IPv6 HTTP port number When the operation is "Inform" or "Setup-Req", the camera notifies its IPv6 HTTP port number setting. When the operation is "Setup", set the new IPv6 HTTP port number setting. [Note] This Code is supported by IPv6 supported models.
0x0045	2	Internal data	00 40 (Internal data)
0x00a0	4	Camera IPv4 Address	IP address When the operation is "Inform" or "Setup-Req", the camera notifies its IP address setting. When the operation is "Setup", set new IP address setting.
0x00a1	4	Camera IPv4 Subnet Mask	Subnet mask When the operation is "Inform" or "Setup-Req", the camera notifies its subnet mask setting. When the operation is "Setup", set new subnet mask setting.
0x00a2	4	Camera IPv4 Gateway	Default gateway When the operation is "Inform" or "Setup-Req", the camera notifies its default gateway setting. When the operation is "Setup", set new default gateway setting.

0x00a3	8	Camera IPv4 DNS Servers	DNS server address
			
			  When the operation is "Inform" or "Setup-Req", the camera notifies its primary DNS and secondary DNS.
			  When the operation is "Setup", set new primary DNS setting and new secondary DNS setting.

0x00a4	4	Camera Bandwidth	Total bit rate
			  Unlimited: 0x7fffffff
			  4096 kbps: 0x00080000
			  2096 kbps: 0x00040000
			  1024 kbps: 0x00020000
			  512 kbps: 0x00010000
			  256 kbps: 0x00008000
			  128 kbps: 0x00004000
			  64 kbps: 0x00002000
			
			  When the operation is "Inform" or "Setup-Req", the camera notifies its total bit rate setting.
			  When the operation is "Setup", set same value that the camera notified in "Inform" or "Setup-Req".
			   * It should be this value.

0x00a6	1	IPv4 DNS	DNS setting
			- Auto: 0x90
			- MANUAL: 0x92
			
			  When the operation is "Inform" or "Setup-Req", the camera notifies its DNS setting.
			  When the operation is "Setup", set new DNS setting.

0x00a7	16	Camera title on the screen	Camera title on the screen
			  When the operation is "Inform" or "Setup-Req", the camera notifies current setting of the camera title on the screen (ASCII code).
			  When the camera doesn't support function of "Camera title on the screen", all values are set to Zero.

0x00a8	16	Camera Model name	Camera model number When the operation is "Inform" or "Setup-Req", the

			camera notifies its model number (ASCII code). When the operation is "Setup", set same value that the camera notified in "Inform" or "Setup-Req".
0x00a9	16	Internal data	Internal data When the operation is "Inform" or "Setup-Req", the camera notifies internal data. When the operation is "Setup", set same value that the camera notified in "Inform" or "Setup-Req".
0x00aa	16	Internal data	Internal data When the operation is "Inform" or "Setup-Req", the camera notifies internal data. When the operation is "Setup", set same value that the camera notified in "Inform" or "Setup-Req".
0x00b1	Max 40	IPv6 Address	IPv6 Address (ASCII code) [Note] This Code is supported by IPv6 supported models.
0x00b2	Max 40	IPv6 Gateway	IPv6 Default gateway (ASCII code) [Note] This Code is supported by IPv6 supported models.
0x00b4	2	~~Internal data~~ CAMERA Auto Setting Error	Information of the camera IP setting enable or disable. 0x0001: When the operation is "Inform" and 20 minutes have passed. 0x0000: Normal.
0x00b5	1	Internal data	00 (Internal data)
0x00b6	1	IPv6 DNS	DNS setting - Auto: 0x90 - MANUAL: 0x92 When the operation is "Inform" or "Setup-Req", the camera notifies its DNS setting. When the operation is "Setup", set new DNS setting.

Appendix

<u>Example for data format</u>

Follow is the Setup-Req

-Proprietary header

00 01	// V (fix)
00 b0	// Length:176byte
00 01	// OP: Setup-Req
00 80 45 aa 00 01	// Client (Camera) Mac: 00-80-45-aa-00-01
00 00 00 00 00 00	// Server Mac
00 00 00 00	// Server IP
00 00	// Packet No
20 11 1e 11 23 1f 1e 19 13 00	// Number (fix)
00 02 00 00 00 00 00 00 00 00 00 00 00 00	// Reserved (fix)

-Proprietary Data

00 00	// IPv4 DHCP
00 01	// Length
03	// DHCP OFF
00 20	// IPv4 Address
00 04	// Length
c0 a8 00 0a	// Camera IP address: 192.168.0.10
00 21	// IPv4 Subnet Mask
00 04	// Length
ff ff ff 00	// Camera subnet mask: 255.255.255.0
00 22	// Ipv4 Gateway
00 04	// Length
c0 a8 00 01	// Camera default gateway: 192.168.0.1
00 23	// Ipv4 DNS Servers
00 08	// Length
00 00 00 00 00 00 00 00	// Primary: 0.0.0.0 , Secondary: 0.0.0.0

00 25	// Ipv4 Port Number for HTTP
00 02	// Length
00 50	// Camera HTTP port: 80
00 a0	// IPv4 Address
00 04	// Length
c0 a8 00 0a	// Camera IP address: 192.168.0.10
00 a1	// IPv4 Subnet Mask
00 04	// Length
ff ff ff 00	// Camera subnet mask: 255.255.255.0
00 a2	// IPv4 Gateway
00 04	// Length
c0 a8 00 01	// Camera default gateway: 192.168.0.1
00 a3	// IPv4 DNS Servers
00 08	// Length
00 00 00 00 00 00 00 00	// Primary: 0.0.0.0 , Secondary: 0.0.0.0
00 a4	// Camera Bandwidth
00 04	// Length
7f ff ff ff	// Unlimited
00 a6	// Ipv4 DNS
00 01	// Length
92	// Manual
00 a7	// Reserved
00 10	// Length
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	// Fix
00 a8	// Camera model number
00 10	// Length
4e 57 34 38 34 00 00 00 00 00 00 00 00 00 00 00	// Model name: NW484

00 a9   18   // Numerical value
00 10   // Length
01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

00 aa   // Numerical value
00 10   // Length
01 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00