NETWORK CAMERA Protocol Spec.

HTTP Setting Protocol Specifications

VB-C300 Firmware Ver. 1.0

Ver 1.0

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CANON INC.

Change Tracking List

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1 Overview

The network camera server configuration module communicates with the configuration client via the network and retrieves or changes setting values and related information in response to the client requests. The set of rules detailed by the specifications that define these communication procedures and communication data are called the Setting Protocol.

The Setting Protocol uses HTTP (CGI) as the underlying protocol, with each HTTP request from the setting client and the corresponding HTTP reply grouped together and treated as a single transaction within the settings operation (session). Although the setting client is primarily envisioned to be the web browser, dedicated client software can also be created and used.

This document describes the setting protocol specifications using dedicated client software as the target. Details of the HTTP and CGI protocols are omitted, and the parts of the setting protocol that are specialized for transactions are described.

1.1 Setting Protocol Operation

In the setting protocol, an HTTP request (input) and the corresponding reply (output) are treated as a pair that is handled as the smallest unit of configuration operation. This unit is called a transaction. A complete series of setting operations is composed of multiple transactions, and is processed exclusively from other transactions by the IP address of the setting client[1]. The series of transactions during this exclusive period is called a session.

A session is created according to setting protocol operations. Setting operations are performed through a procedure of first making changes to the setting values in a temporary work area, and then saving the settings in a batch. While the setting values in the working area are different from the saved setting values, the session is maintained with the setting client that established the setting operation.

[1] The IP address of the HTTP peer as seen by the network camera server. If there is an intermediary HTTP proxy server, the IP address of the HTTP proxy server host is used. If the IP address is not fixed due to HTTP proxy load-balancing or for other reasons, the exclusion mechanism may act on the same setting client. The VB-C300 does not support proxies.

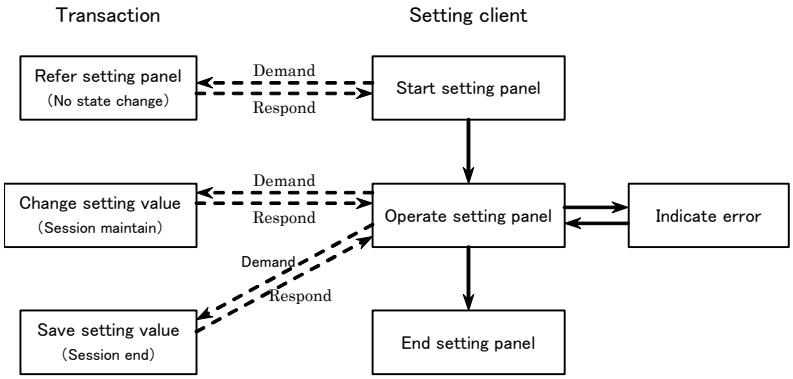

Figure 1 Session Start and End

The types of transactions are shown in Table 1. A session is started by a WRITE or OPEN transaction, and is finished by a SAVE or CLOSE transaction. The session state transitions are shown in Figure 2.

Transaction		Function
READ	Read setting value	Retrieves setting values from the working area.
WRITE	Change setting value	Changes setting values in the working area.
OPEN	Start session	Begins a session without changing a setting value.
VERIFY	Verify setting changes	Performs a check on the combination of setting values.
SAVE	Save setting values	Performs a check on the combination of setting values in the working area and saves the changes if there are not errors. The camera server is rebooted if a setting that requires a reboot is changed.
CLOSE	Force session end	Discards the setting changes in the working area and forcefully terminates the session. This can also be executed by clients that did not start the session.
REBOOT	Reboot	Reboots the camera server.
REVERT	Restore factory settings	Restores the setting values to the factory default settings and reboots.

Table 1 Types of transactions

READ transactions and WRITE transactions can be used simultaneously with other transactions except for REBOOT and REVERT. READ and WRITE processing is performed after OPEN and CLOSE, and before VERIFY and SAVE. Furthermore, WRITE processing is performed prior to READ processing.

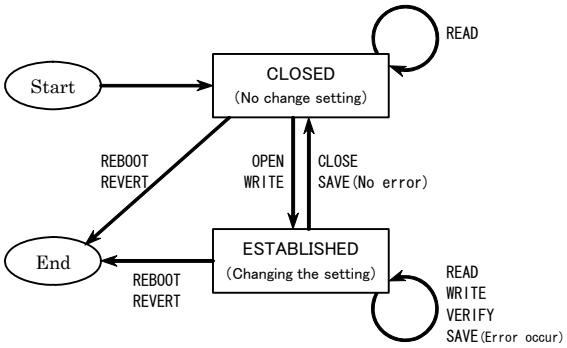

Figure 2 Session state transitions

Once a session has been started, an error occurs and the transaction is rejected if a transaction request other than READ or CLOSE is received from a setting client with a different IP address. This ensures exclusivity of setting operations between multiple setting clients, and prevents the operations from becoming mixed due to mutual interference.

READ and CLOSE requests are accepted at any time from any address, and so the exclusive access control is not totally binding. The reason for this is that a setting client could abandon a session at any arbitrary point in time (particularly if the client is a web browser). Similarly, there are no session time limits (timeouts). The data in the working area is kept indefinitely until it is saved or discarded.

1.2 HTTP Limitations

'/admin/-set-' is used as the CGI path name. Either GET or POST may be used as the HTTP method. The HTTP-level limitations are as follows.

- HTTP/1.1＋CGI/1.1 compliant.
- Use is limited to system administrators[2].
- Persistent connections cannot be used.
- The reply might not contain the Content-Length header field[3].

1.3 Relation to VB10x Setting Protocol

Although the setting protocol defined by these specifications is based on the existing setting protocol for the VB10x, compatibility is not necessarily guaranteed. The primary differences between the specifications are as follows.

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[2] Basic authentication as a system administrator is required.

[3] If the message length is long (greater than approximately 16 KB).

- Only the short versions of the CGI parameter names are used.
- The CGI parameter names are case insensitive.
- The handling of setting values has changed (in particular, record types and list types have been added).
- The error codes and error messages have changed (messages have been simplified).
- Session identifier specification has been added (Section 2.4).

2 Input

The input to the setting protocol is an ordered list of an arbitrary number of CGI parameters that are represented by text strings, where each CGI parameter represents an individual setting protocol request. In the GET method, the CGI parameter list is represented using '&' as a delimitter.

```
GET /admin/-set-?<name1>=<value1>&<name2>=<value2>… HTTP/1.1
```

The values (the right hand side of the '=') are URL encoded[4].

The order of the CGI parameter list is arbitrary for CGI parameters that have different names. For CGI parameters that have the same name, although the parameter that appears last takes precendence as a general rule, the settinng value is evaluated twice (Section 2.8). It is therefore recommended that you do not specifiy the same CGI parameter multiple times.

2.1 Transaction Type (pt)

With the exception of READ and WRITE, the transaction is specified using pt. The values that can be specified for pt and the corresponding actions are shown in Table 2.

pt	Transaction	Action
0	NONE	No action (Can be combined with READ transactions)
1	OPEN	Start a session
2	CHECK	Performs a partial combination check[5]
3	VERIFY	Performs a full combination check
4	SAVE	Saves the setting values (executed VERIFY implicitly)
5	CLOSE	Discards changed settings and forcefully terminates the session
6	REBOOT	Reboots (implicitly executes CLOSE)
7	REVERT	Restores the factory default settings (implicitly executes REBOOT)
8	COMPEL	Forces a setting change (executes a sequence of CLOSE, WRITE, and SAVE)

Table 2 Transaction types

[4] Alphanumeric characters (0 to 9, A to Z, a to z) and the '*', '-', '.', '@', and '_' characters remain unchanged, spaces are replaced by '+', and all other characters are replaced by '%' + a two digit hexadecimal representation for each byte. However, in the el (Section 2.3) and setting value change (Section 2.8) CGI parameters, arbitrary values of '%' + a two digit hexadecimal number and ASCII characters (excluding '&', '=', and '%') are also understood. In particular, commas ',' in the el parameter do not need to be URL encoded.

[5] The protocol specifications for partial combination checking have not yet been defined, and so this transaction currently executes a full combination check.

COMPEL is a compound transaction that performs a combination of CLOSE, WRITE, and SAVE that functions to change and save a setting value in a single HTTP access while avoiding conflicts with other sessions[6].

2.2 Transaction Attributes (pa)

Depending on the transaction, the behaviour can be controlled by pa. The values that pa can be set to and the corresponding meanings are shown in Table 3.

pa	Transaction	Meaning
h	OPEN, WRITE	A session is forcefully started, even if none of the setting values in the working area are changed.
p	WRITE, SAVE, CLOSE	Forbids processing if a session has not already been started.
s	SAVE	Keeps the session open after saving the setting values.

Table 3 Transacion Attributes

Multiple attributes can be specified in pa simultaneously[7]. The transaction attributes are examined when the corresponding transaction is executed. If the corresponding transaction is not executed, the specified attributes are ignored[8].

2.3 View Setting Value (el)

The values of the setting in the working area can be viewed by specifying the setting name (see Appendix) using the el parameter. The el parameter is processed as a READ transaction. The format for el is as follows.

```
el=<item1>[,<item2>[,<item3>...]]
```

For array-type settings (Section 2.8), the index may be omitted, in which case it is treated as if all of the array elements were specified. Furthermore, specifying el=* is treated as having specified all of the settings.

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[6] A COMPEL transaction that does not contain a WRITE does not execute the CLOSE or SAVE. However, CLOSE is executed if the setting value is not changed due to an error occurring in the WRITE or VERIFY. In particular, the behaviour when an error occurs during the VERIFY is exactly the same as CLOSE.

[7] For example, if p and s are specified in a SAVE transaction, you should set pa=ps (the order is unimportant).

[8] Undefined transaction attribute values are also ignored (there is no error).

2.4 View Setting Type (tl)

The data type of setting values (Section 4) can be viewed by specifying the setting name (see Appendix) using the tl parameter. The format and other details of the tl parameter are the same as the el parameter (Section 2.3).

2.5 Session Identifier (id)

Although exclusion control between clients is performed based on the IP address of the setting client, the value of the IP address can be specified explicitly using the id parameter. The value specifies the IP address in decimal notation. An error is produced and all of the transactions are cancelled if the string does not resolve to an IP address, or is the value ‘0.0.0.0’ or ‘255.255.255.255’[9].

2.6 Error Message (em)

Specifies whether error messages are displayed corresponding to any errors (Sections 3.2 to 3.3) in the setting protocol output.

0 No messages displayed (default)
1 Messages displayed (without setting variable names)
2 Messages displayed (with setting variable names)

2.7 Language (lg)

Specifies the language to display error messages in the setting protocol output. Japanese is only output if ‘japanese’ (case insensitive) is specified[10].

japanese Japanese
any other English (default)

2.8 Change Setting Value

To change the value of a setting, specify the setting name (see Appendix) as the CGI parameter name, and the value as the parameter value. Setting value changes are processed as WRITE transactions. The transaction format is as follows.

```
<item1>=<value1>[&<item2>=<value2>[&<item3>=<value3>...]]
```

[9] The id parameter is interpreted by the WRITE, OPEN, and SAVE transactions, and is ignored by other transactions.
[10] The HTTP Accept-Language header field is not understood.

The settings are broadly categorized into basic types (non-array types) that take a single value and array types that take multiple values. Although the CGI parameter name for basic type settings is simply the setting name, for array type settings an index (an integer greater than or equal to 0) that identifies the element in the array is appended to the setting name.

Basic Type	<name>=<value> (ex. ca01=192.168.100.1)
Array Type	<name>-<index>=<value> (ex. db01-0=Camera)

When viewing (Section 2.3) or changing setting values, an index cannot be specified for basic type settings. Additionally, the index cannot be omitted from array type setting names when changing the setting value.

3 Output

The output of the setting protocol is a text-formatted sequence that contains the status, server errors, parameter errors, a list of setting values, and reboot information in that order[11]. The format is as follows.

```
Status={Status}
[ServerError={List of Server Errors}]
[SettingError={List of Parameter Errors}]
[Typ{Setting Name}={Data Type}]
   …
[Val{Setting Name}={Setting Value}]
   …
[reboot={Whether or Not to Reboot}]
END
```

The output (and particularly the right side of the '=' sign) is URL encoded (excluding the ':' and ',' signs contained in the error lists).

3.1 Status (Status)

The results of processing all of the transactions contained in the input are always attached to the header of the output. The values and meanings are as follows.

0 No errors
1 Server errors occurred
2 Parameter errors occurred (no server errors)

3.2 Server Errors (ServerError)

If any one of the following errors is detected, a ServerError is output. The output only contains the error code if em=0, and contains error code:error message if em=1. If multiple errors occur, the series of errors is listed separated by commas (',').

- 4:Unknown CGI parameter

  An unknown CGI parameter was specified. The invalid transaction type (pt) and session identifier (id) values are also output in this error. The error message contains the CGI parameter in parentheses.
- 5:Conflict CGI access

  The OPEN, WRITE, and SAVE transactions were rejected due to a conflict with another setting client session. In this case, all of the transactions including the READ transactions are cancelled.

[11] The Content-Type is "text/plain", and the line is terminated by a line feed (LF) without a carriage return (CR).

- 6:Unknown Element

  An unknown setting was specified with the view setting value (el) command. The corresponding setting is simply ignored, and the other settings and transactions are processed normally.
- 7:Can't allocate memory

  Could not allocate memory to use for setting protocol processing. In this case, all of the transactions including READ transactions are cancelled.
- 9:Subscript is over maximum

  An index that exceeds the maximum value was specified for an array type setting variable in the view setting value (el) command. The corresponding setting is simply ignored, and the other settings and transactions are processed normally.

3.3 Parameter Errors (SettingError)

If any one of the following errors is detected, a SettingError is output. The output is "error code" if em=0, "error code:error message" if em=1, and "error code:error message(setting)" if em=2. If multiple errors occur, the series of errors is listed separated by commas (‘,’).

Parameter errors are generated by single item checks based on the data types (Section 4) of the individual settings, or by a check of the combination of settings by a VERIFY transaction[12].

- C000:read only (Writing the value is not permitted)

  Single item error. An attempt was made to change the value of a constant setting.
- C001:not specified (No value was specified)

  Single item error. An empty value was specified for a setting that does not permit an empty value.
- C002:invalid format (The format of the value is invalid)

  Single item error. A value was specified that could not be interpreted as the data type of setting.
- C003:out of range (The value is out of range)

  Single item error. A value outside of the allowable range was specified for a numeric setting or another setting with a limited range.

[12] When a single item error is detected, the setting value in the working area is not changed, but there is no effect on the processing of other transactions. Conversely, the combination check is performed on setting values in the working area where the changes were accepted after passing the single item check, and so even if a combination error is detected, the set of related setting values are not restored to their original values. In particular, a SAVE transaction is cancelled if an error is detected during a combination check.

- C004:illegal value (The values are illegal)
  Combination error. A forbidden value was specified for the IP address or another setting.
- C005:illegal combination (The combination of values is invalid)
  Combination error. An inconsistency was detected in the combination of the IP address and subnet mask, or another combination of settings.
- C006:duplicate value (A value was duplicated)
  Combination error. The same value was specified for multiple settings where duplicate values are not permitted.
- C007:inconsistent value (The combination of values is inconsistent)
  Combination error. A setting value was detected that conflicts with another setting, such as the visible range limits.
- C021:string too long (The length of the string exceeds the upper limit)
  Single item error. A string type setting was set to a string that exceeds the upper length limit.
- C022:illegal characters (The string contains invalid characters)
  Single item error. A string type setting was set to a string that contains illegal characters.
- C201:too many list entries (The number of entries exceeds the upper limit)
  Single item error. A list entry that exceeds the upper limit was specified for a list type setting.
- C601:too many user entries (The upper limit on the number of user registrations was exceeded)
  Single item error. A user with a number that exceeds the upper limit was specified in the user list (gb00).
- C602:invalid user name is found (An invalid user name was specified)
  Single item error. The user list (gb00) contains an invalid user name.
- C603:invalid password is found (An invalid password was specified)
  Single item error. The user list (gb00) contains an invalid password.

3.4 List of Setting Types and Setting Values

When a READ transaction is processed, strings of the form 'Val<item>=<value>' and 'Typ<item>=<type>' are output for each of the settings specified by the el (Section 2.3) and tl (Section 2.4) parameters respectively. The '<item>' part is the setting name including the index, the '<value>' is the text representation of the setting value, and the '<type>' is the text representation of the setting type.

3.5 Reboot Information (reboot)

This is added to the end of the output (directly before END) when a SAVE transaction is processed. The possible values and meanings are as follows.

0 The setting values of settings that require a reboot were not changed
1 The setting values of settings that require a reboot were changed

4 Data Types

Although the setting protocol can handle numbers, strings, and other kinds of values, the formats and ranges of the values are decided separately for each setting. When a setting is changed, the values are checked based on these formats and ranges. This chapter describes the general rules related to setting values based on the data types.

- Numeric: int, fixed, boolean

  The "int" type is a decimal integer and the "fixed" type is a fixed point number. A pair (min,max) representing the minimum value min and the maximum value max may be added to the type in the form int(-5,5) or fixed(0.,10.)[13]. If the number of decimal places is also represented, the numbers may be written as 1.00, etc. The "boolean" type is the same as int(0,1), and is used to represent true or false values (0 is false, 1 is true) in particular.

- Bit string: bit

  A bit string where each nibble is represented by a hexadecimal digit. The bit length may also be added and expressed as bit[32], etc. The bit length is always a multiple of 8, and strings of '0' bits at the end of the string can be omitted unit units of bytes.

- Camera control parameters: coord, scope

  The "coord" type is used in the range of shooting parameters of the pan and tilt ranges, and the visible range. The "scope" type is used in the zoom range. The "coord" type is the same as "fixed(-179.99,180.00)", and the "scope" type is the same as "fixed(0.01,300.00)".

- Character strings: name, pass, host, mail

  These are character strings. The sets of characters allowed are: name (alphanumerics, '-', '_'), pass (characters from 20 to 7E in hexadecimal notation), host (the characters for name, '.'), mail (the characters for host, '@'). All characters are single-byte characters, and the maximum lengths are represented by: pass[15], mail[63] (Strings consisting of multiple lines are represented by [line length × line count]).

- Name: ascii, kanji

  A name used in a camera name, preset name, or other name. These are types of character strings with ascii (characters from 20 to 7E excluding '"' in hexadecimal)

[13] The notation '−' is used if there is no limit (Example: unsigned integers are int(0,−)). The range of values depends on the system.

and kanji (the characters for ascii plus double-byte kanji)[14].

- Date and times: date, time

  Dates and times. These are the date (yyyymmdd: Day: dd; Month: mm; Year: yyyy) and time (hhmmss: Hour: hh; Minute: mm; Second: ss). The range of date is 20000101 to 20371231, and the range of time is 000000 to 235959.

- Network address: inaddr

  IP address. Specified in the widely used IP address notation as xxx.xxx.xxx.xxx. Each field of xxx can only be specifed in decimal and in the range of 0 to 255.

- Local port: lport

  A server port number. Although this is the same as "80 or int(1024,65535)", these value are used exclusively within the server, and so multiple lport types cannot have the same setting value.

- User account: uaccent

  A user list entry, which is expressed using the format ‘username’ or ‘username=password’ (username is of "name" type, and password is of "pass" type). The password part is only used when setting the password, and is specified as a string of numbers where each character is represented by 3 decimal digits. A password that has already been set cannot be viewed.

- Record: record

  This is a compound data type. The components of the "record" type are the basic data types described above, with each component concatenated together using ":" characters. Individual components can be omitted (specifies an empty value), and components can also be omitted from the end of the sequence of components. The components that are omitted are treated as 0 for numeric values, and as an empty string for character strings.

- List: <>

  A variable length list of basic data types or records. The maximum length can be added to the type and represented such as date<32>. All of the elements in the list are the same type, and are represented concatenated by ‘,’ characters. Duplication and ordering of elements varies depending on the list.

[14] The Japanese character set is JIS X0208-1990, and the set of codes supports Japanese EUC. Although kanji strings are stored in EUC encoding, WebView and other applications use Unicode (UCS-2) as the base encoding, and so ascii characters are handled as double-byte characters.

A VB-C300 Setting Parameters

Legend

The capacity, data type, default value, attributes, and meaning of each setting name are summarized and displayed in a table using the following format.

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
zz00	0	int	0	RWB-P	Non-array integer	*a
zz01	99	name		RW-O-	Array of strings	

*a Note regarding zz00.

- Capacity: The number of array elements. For array type setting values, this is the maximum index value + 1, and for non-array type settings, this is 0.
- Data type: The data type of the setting value (Chapter 4).
- Default value: The factory setting.
- Attributes: A combination of R (readable), W (writable), B (requires reboot if setting changed), O (can specify empty values), P (the setting value is maintained when the factory settings are restored). An '-' is used for attributes that are not applicable.

System Administration

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
aa00	0	const	root	R----	System administrator name	
aa01	0	pass[8]	Network	-W-OP	Administrator password	*a
aa03	0	pass[8]	Network	-W-OP	Administrator password	*a
bb00	0	const	admin	R----	URL of the settings page	

*a aa01 is specified as a string of characters, and aa03 is specified as a string of character codes (a string of numbers where each character is represented by 3 decimal digits). The value is not changed if an empty string is specified.

Clock and Time Zone

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
bc00	0	fixed(-12,13)	9	RW- P	Time zone (difference from GMT)	*a
bc01	0	const	0	R----	Method for setting the clock	*b
bc20	0	date:time	(System dependent)	RW--P	Data and time	*c

*a In units of hours with a fractional step of 0.5.
*b 0: Time specified by bc20; 1: NTP server (Cannot be selected if bc10 is empty).
*c This value is enabled when bc01 is 0 and is ignored otherwise. The format is yyyymmssHHMMSS (The year is 4 digits, and the month, day, hour, minute, and second are 2 digits).

Network

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ca00	0	const	1	R----	Use Network (used)	
ca01	0	int(0,1)	0	RWB-P	Method used to set the IP address	*a
ca02	0	inaddr	192.168.100.1	RWB-P	IP address	
ca03	0	inaddr	255.255.255.0	RWB-P	Subnet mask	
ca10	0	int(1,5)	5	RW---	LED setting	*b

*a 0: Manual setting; 1: Automatic setting (DHCP)
*b 1: Off; 5: Steady blue. 2 to 4 are also blue light.

Routing Control

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
cc00	0	const	0	R----	The network interface of the default route	
cc01	0	inaddr		RWBOP	The address of the default gateway	

Connection Keep-Alive Function

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
cd00	0	boolean	0	RW---	Send a packet periodically	
cd01	0	inaddr		RW-0-	Destination IP address	*a
cd02	0	int(1,60)	1	RW---	Transmission interval	

*a When cd00 is 1, this value is enabled and cannot be empty.

Packet Size

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
cf00	0	int(576,1500)	1500	RW---	Maximum packet size	
cf10	0	const	2	R----	Video transmission buffer size (0: default; 1 or greater: in units of 1460)	

Camera Common Settings

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
da00	0	const	0	R----	Main camera (built-in camera)	
da02	0	boolean	0	RW---	Return to home position when nobody has control privileges	
da04	0	int(1.2)	1: NTSC; 2: PAL	R-B--	Video signal format	
da05	0	int(1.2)	2: Inverted	RWB--	Camera position	*a

*a 1: Upright; 2: Inverted

Camera Individual Settings

Name	Capacity	Data Type	Default Value	Attribute	Meaning	Note
db00	1	const	1	R----	Use the camera	*a
db01	1	ascii[15]	(Camera-dependent)	RW---	Camera name (ascii numbers and letters)	*b
db02	1	kanji[15]		RW-0-	Camera name (Japanese)	
db03	1	const	0	R----	Use a wide converter	
db05	1	int(0,2)	1	RW---	Video size	*c
db06	1	int(0,4)	2	RW---	Video quality	*d
db07	1	const	1	R----	Camera control port	*e
db11	1	coord	0	RW-0-	Home position: Pan	
db12	1	coord	0	RW-0-	Home position: Tilt	
db13	1	scope	70.76	RW-0-	Home position: Zoom	
db14	1	int(0,1)	0	RW---	Home position: Brightness	*f
db15	1	int(0,2)	0	RW---	Shutter speed	*g
db16	1	int(0,2)	0	RW---	Focus mode	*h
db20	1	const	0	R----	Apply view restriction	
db21	1	const		R--0-	View restriction: Top edge	
db22	1	const		R--0-	View restriction: Bottom edge	
db23	1	const		R--0-	View restriction: Left edge	
db24	1	const		R--0-	View restriction: Right edge	
db25	1	const		R--0-	View restriction: Telephoto	
db26	1	const		R--0-	View restriction: Wide-angle	
db27	1	int(0,3)	0	RW---	Home position: Focus mode	*h
db28	1	int(0,65535)	0	RW---	Home position: Manual focus value	*n
db32	1	boolean	0	RW---	Use digitial zoom	
db36	1	int(0,1)	0	RW---	Day&Night	*k
db37	1	int(0,1)	0	RW---	Day&Night switching luminance level	*l
db38	1	int(0,1)	0	RW---	Day&Night switching stability	*m
db41	1	int(1,3)	1	RW---	Auto slow shutter - Maximum shutter speed	*q

*a This is always 1 and cannot be changed for the main camera. The default value is 0 and can be changed for external cameras.
*b The default value for the main camera is "Camera". The default value for external cameras is "Camera2".
*c 0:Small size 1:Medium size 2:Large size
*d 0 to 4: JPEG Q value.
*e 0: Not used; 1: Port 1; 2: Port 2. For the main camera, this is 1 (default) or 0. For an external camera, this is 2 or 0 (default).
*f 0: Standard; 1: Bright.
*g On NTSC models, 0: Automatic; 1: 1/60; 2: 1/100. On PAL models, 0: Automatic; 1: 1/50; 2: 1/120.
*h 0: Automatic; 1: Fixed at infinity; 2: Automatic (dome mode); 3: Manual
*k 0: Manual; 1: AUTO (Automatic switching based on color and luminosity)
*l 0: Darker; 1: Brighter
*m 0: Slow; 1: Fast

*n When db27 is 3, this value is enabled and cannot be empty
*q For the NTSC model: 1: 1/30 2: 1/15 3: 1/8
For the PAL model: 1: 1/25 2: 1/12 3: 1/6

Video Capture

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
dt00	0	const	1	R----	Non-interlace	*a
dv00	0	const	0	R----	Add authentication information to picture	

*a 0: Interlace, 1: Non-interlace

Preset

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ea00	20	int(0,1)	0	RW---	Preset applicable range	*a
ea01	20	ascii[15]		RW-0-	Preset name (English)	*b
ea02	20	kanji[15]		RW-0-	Preset name (Japanese)	
ea03	20	int(0,0)	0	RW---	Camera	*c
ea04	20	coord		RW-0-	Pan	
ea05	20	coord		RW-0-	Tilt	
ea06	20	scope		RW-0-	Zoom	
ea07	20	int(0,1)	0	RW---	Brightness	
ea09	20	int(0,3)	0	RW---	Focus mode	*d
ea10	20	int(0,65535)	0	RW---	Manual focus setting	*e

*a 0: Not specified; 1:Picture transmission.
*b Empty value cannot be specified when corresponding 'ea00' is set to 1.
*c 0: Main camera, 1: External camera
*d 0: Automatic, 1: Fixed at infinity, 2: Automatic (Dome mode), 3: Manual
*e When ea09 is 3, this value is enabled and cannot be set to an empty value

External Device Name

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
fa06	2	ascii[15]		RW-0-	External input device name (English)	
fa07	2	kanji[15]		RW-0-	External input device name (Japanese)	
fa08	1	ascii[15]		RW-0-	External output device name (English)	
fa09	1	kanji[15]		RW-0-	External output device name (Japanese)	

User Access Control

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
gb00	0	uaccent<14>		RW-0-	User (+ password) list	*a
gb11	0	const	1	R----	Access permitted to listed users only	
gb13	0	const	1	R----	Audio Transmission permitted to listed users only	

*a Registration, deletion of user and password change is all performed in block, and items written in the list is finally registered. Duplicated user names cannot be registered. Password is required when registering a new user and when changing a password of registered user. If you do not change a password of registered user, you don't have to enter the password. You cannot register a user without entering a password.

Camera Server

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ha03	0	const	14	R----	Maximum Number of Clients	
ha04	0	const	0	R----	Control Queue Length	
ha05	0	fixed(0.1,30.0)	30	RW---	Maximum Frame Rate	*a
ha15	0	int(0,10)	0	RW---	Max. Transmission Rate	

*a PAL model: data type is fixed(0.1,25.0) and default value is 25.0.

Audio Server

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
hb00	0	boolean	0	RW---	Enable Audio Transmission	*b
hb01	0	int(1,100)	50	RW---	Input Volume	
hb03	0	boolean	0	RW---	Voice Activity Detection for Input	
hb04	0	record(*a)	50:1:150	RW---	Voice Activity Detection Parameter for Input	
hb05	0	const	0	R----	Noise Cancellor (doubled dB value)	*c

hb06	0	const	0	R----	Slope Filter	
hb07	0	int(1,20)	4	RW---	Audio Transmission Unit (in 10 msec.)	
hb10	0	boolean	0	RW---	Enable Audio Reception	*b
hb11	0	int(1,100)	50	RW---	Output Volume	
hb13	0	boolean	1	RW---	Voice Activity Detection for Output	
hb14	0	record(*a)	50:1:150	RW---	Voice Activity Detection Parameter for Output	
hb15	0	boolean	1	RW---	Comfort Noise Generation (CNG)	
hb20	0	boolean	0	RW---	Echo Cancellor	*d

*a Power (int(1,65535)): Start(int(1,255)): End(int(1:255)).
*b 0: Disabled, 1: Enabled.
*c Effective values are, 0: OFF, 16: 8dB, 27: 13.5dB, and 34: 17dB.
*d 0: OFF, 1: ON

HTTP Server

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ia00	0	lport	80	RWB--	HTTP Port	

DNS/DDNS

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ib00	0	inaddr		RW-O-	Name Server Address1	
ib01	0	inaddr		RW-O-	Name Server Address2	
ib10	0	host[63]		RW-O-	Host Name	
ib20	0	boolean	0	RW---	Register a host name to DDNS	

System Attribute Information

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ra00	0	const	Network XX	R----	Model Name	*c
ra01	0	const	1.0.00	R----	Firmware Version	
ra02	0	const	(System-dependent)	R----	MAC Address	
ra03	0	const	1	R----	Number of cameras used for Preset	
ra04	0	const	20	R----	Number of Preset	
ra05	0	const	0:0:0:0:0:2:0:1:0:1:0(*a)	R----	Schedule Parameter Specification	
ra06	0	const	0:1(*b)	R----	Night Mode Control Specification	
ra09	0	const	1	R----	Number of Video Input Channels	
ra10	0	const	640x480	R----	Maximum Image Size	

*a A list of: Total number of schedules (0), Number of Interval Timer System (0), Number of Interval Timer Action (0), Number of Motion Detection System (0), Number of Motion Detection Action (0), Number of External Device Input System (2), Number of External Device Input Action (0), Number of External Device Output System (1), Number of External Device Output Action (0), Number of Night Mode System (1), and Number of Night Mode Action (0).
*b Unavailable to remove IR Cut Filter: Unavailable to turn the IR light ON.
*c The NTSC model is the VB-C300NA, and the PAL models is the VB-C300PA.