NETWORK CAMERA Protocol Spec.

HTTP Setting Protocol Specifications

VB-C60 Firmware Ver. 1.0

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CANON INC.

Change Tracking List

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Table of Contents

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. (However, it is not recommended to execute multiple sessions simultaneously.)

[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.

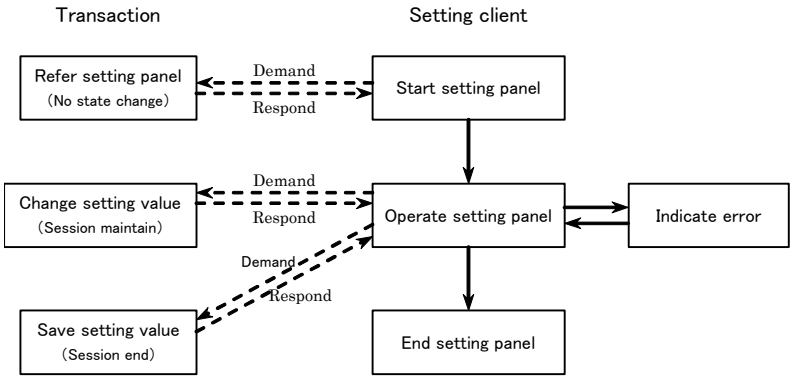

Figure 1 Session Start and End

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.

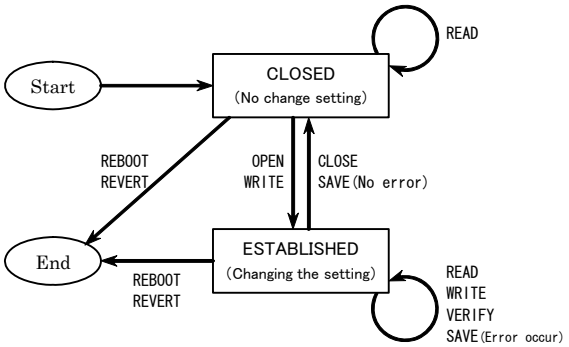

Figure 2 Session state transitions

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].
- The reply might not contain the Content-Length header field[3].

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

[3] If the message length is too long (greater than approximately 16 KB), persistent connection will be prohibited.

1.3 Relation to Setting Protocol of Existing Models

1) Changes from VB100, VB101 and VB150 setting protocols

- 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) Changes from VB-C50i series, VB-C300

- Support for HTTP persistent connection
- Support for multi-byte character string, except for Japanese (spec change of CGI parameter lg: Refer to section 2.7)

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
```

For the values (<value1>,<value2>,…, which is on the right hand side of the ‘=’), URL encoded character strings should be specified[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 setting value is evaluated twice (Section 2.8). So, the result might be an unintended one. It is thus recommended that basically you do not specify such CGI parameters with the same name, multiple times.

[4] Once URL is encoded, 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.

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)
9	WRCHECK	Performs a WRITE parameter check (Though WRITE transaction is executed, the setting value is not changed.)

Table 2: Transaction types

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].

[Ref.] Example of 'pt'

1. Change the value of 'maximum number of clients' to 20 and save

```
GET /admin/-set-?pt=4&ha03=20
```

If successful, the following reply is returned.

```
HTTP/1.1 200 OK
…
Status=0
reboot=0
END
```

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

[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 behavior when an error occurs during the VERIFY is exactly the same as CLOSE.

2.2 Transaction Attributes (pa)

Depending on the transaction, the behavior 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: Transaction 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.

[Ref.] Example of 'el'

1. Obtain the setting values of 'maximum number of clients' and 'maximum connection length'.

```
GET /admin/-set-?el=ha03,ha06
```

If successful, the following reply is returned.

```
HTTP/1.1 200 OK
  …
Status=0
Valha03=30
Valha06=0
END
```

[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. Obtain the setting value of ‘preset name (one-byte English)’

```
GET /admin/-set-?el=ea01
```

If successful, the following reply is returned.

```
HTTP/1.1 200 OK
  …
Status=0
Valea01-0=PresetNo1
Valea01-1=PresetNo2
Valea01-2=PresetNo3
Valea01-3=PresetNo4
Valea01-4=PresetNo5
Valea01-5=PresetNo6
Valea01-6=PresetNo7
Valea01-7=PresetNo8
Valea01-8=PresetNo9
Valea01-9=PresetNo10
Valea01-10=PresetNo11
Valea01-11=PresetNo12
Valea01-12=PresetNo13
Valea01-13=PresetNo14
Valea01-14=PresetNo15
Valea01-15=PresetNo16
Valea01-16=PresetNo17
Valea01-17=PresetNo18
Valea01-18=PresetNo19
Valea01-19=PresetNo20
END
```

As “Preset name (one-byte Englsih)” is a setting item of the array types (Refer to Section 4 Data Types”), all values in the array will be returned in el=ea01. If it is necessary to obtain individual value, you need to add an index (0 and greater integer), which represents the number of array element, to the end, like el=ea01-2. (Refer also to section 2.8 Change Setting Value)

3. Obtain the value of Preset 4 (index 3) of setting value ‘preset name (one-byte English)’.

```
GET /admin/-set-?el=ea01-3
```

If successful, the following reply is returned.

```
HTTP/1.1 200 OK
  …
Status=0
Valea01-3=PresetNo4
END
```

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).

[Ref.] Example of 'tl'

1. Obtain the data type of setting values "maximum number of clients" and "maximum connection time".

```
GET /admin/-set-?tl=ha03,ha06
```

If successful, the following reply is returned.

```
HTTP/1.1 200 OK
…
Status=0
Typha03=int%280%2C30%29
Typha06=int%280%2C65535%29
END
```

Please note that the above reply has been URL-encoded. "Typha03=int%280%2C30%29" is %28='(', %2C=',', %29=')', which means that maximum number of clients 'ha03' is type "int(0,30)" (integer between 0 - 30). Similarly, maximum connection time 'ha06' is type "int(0,65535)".

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].

[9] The id parameter is ignored by all transactions, except WRITE, OPEN, and SAVE.

2.6 Error Message (em)

Specifies whether error messages are displayed corresponding to any errors (Section 0~ 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)

[Mamo] Example of 'em'

1. Error message example of em=0
   (100, which is out of the range, is specified to maximum number of clients ha03.)

```
GET /admin/-set-?em=0&pt=4&ha03=100
```

   In this case, the following reply is returned.

```
HTTP/1.1 200 OK
…
Status=2
ServerError=C003
reboot=0
END
```

2. Error message example of em=1
   (100, which is out of the range, is specified to maximum number of clients ha03.)

```
GET /admin/-set-?em=1&pt=4&ha03=100
```

   In this case, the following reply is returned.

```
HTTP/1.1 200 OK
…
Status=2
SettingError=C003%3Aout+of+range
reboot=0
END
```

   [Memo] The error message is URL-encoded. If the above message is URL-decoded, it will be "SettingError=C003:out of range".
   * The older models, such as VB-C50i and VB-C300, don't encode ':' which is between the error code and the message, while VB-C60 encodes even ':'.

3. Error message example of em=2
   ((100, which is out of the range, is specified to maximum number of clients ha03.)

```
GET /admin/-set-?em=2&pt=4&ha03=100
```

   In this case, the following reply is returned.

```
HTTP/1.1 200 OK
…
Status=2
SettingError= C003%3Aout+of+range%28ha03%3D100%29
reboot=0
END
```

   [Memo] The error message is URL-encoded. If the above message is URL-decoded, it will be "SettingError=C003:read only(ha03=100)".
   * The older models, such as VB-C50i and VB-C300, don't encode ':' which is between the error code and the message, while VB-C60 encodes even ':'.

2.7 Language (lg)

Specifies the multi-byte character language. Any of the following values can be specified.[10] If noting is specified or the input value is invalid, it will be processed as English (default).

en (or English)	English (default)
ja (or Japanese)	Japanese

The character-encoding scheme of multi-byte character is UTF-8. However, character codes are not interpreted or inspected at camera side. Thus, even if a Japanese text is specified using 'lg=en', no error will be detected.

* With a combination of 'em=1,2' and 'lg=japanese', Japanese error messages can be obtained in older modesls, such as VB-C50i and VB-C300, but error messages of VB-C60 is set to English.

[Memo]
Setting items, which can specify the language using 'lg', are defined as a Unicode type (Section 4 Data Types). It applies to following items in VB-C60.

Camera name (multi-byte):	`db02`
Preset name (multi-byte):	`ea02`
External input device name (multi-byte):	`fa07`
External device output name (multi-byte):	`fa09`
Motion detection area name 1~4 (multi-byte):	`oi12, oi22, oi32, oi42`

[10] Basically it complies with Alpha-2 code of ISO 639, but only english and japanese are interpreted individually for maintaining compatibility with older versions. The HTTP Accept-Language header field is not interpreted.

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>...]]
```

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)

The index cannot be omitted from array-type setting names when viewing the setting value (Section 2.3), but the index cannot be omitted when changing.

[Memo] Example of changing setting value

1. Change of basic type settings – Change “maximum number of clients”

```
GET /admin/-set-?em=2&pt=4&ha03=10
        -- reply --
        HTTP/1.1 200 OK
        …
        Status=0
        reboot=0
        END
```

2. Change of array type settings – Change Preset 4 (index 3) of “Preset name (one-byte)”

```
GET /admin/-set-?em=2&pt=4&ea01-3=Entrance+no4

        -- reply --
        HTTP/1.1 200 OK
        …
        Status=0
        reboot=0
        END
```

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 is URL encoded.

* ‘ : ’ and ‘ , ‘ which are included in the server error list and parameter list, are not encoded in older models, such as VB-C50i and VB-C300. Meanwhile, both of them are encoded in VB-C60.

[Memo] Example of output

```
Status=2
ServerError= C003%3Aout+of+range%28ha03%3D100%29
reboot=0
END
```

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)

[11] The Content-Type is always ”text/plain; charset=utf-8", and the line is terminated by a line feed (LF) without a carriage return (CR).

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 (‘,’). (Please note that ‘ : ’ is URL-encoded to %3A, ‘ , ’ is URL-encoded to %3D.)

- 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.
- 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. However, please note that the transactions will be processed as “4:Unknown CGI parameter”, if specifying values, which exceed the maximum integer value (2147483647).

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 (‘,’). (Please note that ‘ : ’ is URL-encoded to %3A, and ‘ , ’ is URL-encoded to %3D.)

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`
  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`
  Single item error. A value was specified that could not be interpreted as the data type of setting.
- `C003: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.
- `C004:illegal value`
  Combination error. A forbidden value was specified for the IP address or another setting.
- `C005:illegal combination`
  Combination error. An inconsistency was detected in the combination of the IP address and subnet mask, or another combination of settings.
- `C006:duplicate value`
  Combination error. The same value was specified for multiple settings where duplicate values are not permitted.

[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.

- `C007:inconsistent value`
  Combination error. A setting value was detected that conflicts with another setting, such as the visible range limits.
- `C008:password unacceptable`
  Single item error. Different strings were set to administrator password (aa01, aa02). From the security view point, setting item names are not output even with em=2.
- `C021:string too long`
  Single item error. A string type setting was set to a string that exceeds the upper length limit.
- `C022:illegal characters`
  Single item error. A string type setting was set to a string that contains illegal characters.
- `C201:too many list entries`
  Single item error. A list entry that exceeds the upper limit was specified for a list type setting.
- `C601:too many user entries`
  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`
  Single item error. The user list (gb00) contains an invalid user name.
- `C603:invalid password is found`
  Single item error. The user list (gb00) contains an invalid password.
- `C611:access from all hosts is prohibited`
  Single item error. The host list (gc00) that prohibits all hosts' access was specified.
- `C612:too many access control entries`
  Single item error. The access control entry that exceeds the upper limit was specified to the host list (gc00).
- `C613:incorrect address is found`
  Single item error. The access control entry of the host list (gc00) contains an invalid address.
- `C616:duplicate entries are found`
  Single item error. The same access control entry was contained in the host list (gc00).
- `C617:contradictory entries are found`
  Single item error. The access control entry that conflicts with the host list was contained.

- `C618:redundant entries are found`
  Single item error. A redundant access control entry was contained in the host list (gc00).

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 array-type index, the ‘<value>’ is the text representation of the setting value, and the ‘<type>’ is the text representation of the setting type.

[Memo] Example of reference list
1. Example of setting value reference list (list of ha03 and ha06)

```
Status=0
Valha03=30
Valha06=0
END
```

2. Example of setting type reference list (list of ha03 and ha06)

```
Status=0
Typha03=int%280%2C30%29
Typha06=int%280%2C65535%29
END
```

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

[Memo] Example of ‘reboot’
1. When a reboot is not required. (Change of [Maximum number of clients] db03)

```
GET /admin/-set-?em=2&pt=4&ha03=10

--Reply--
Status=0
reboot=0
END
```

2. When a reboot is required. (Change of [Installation type] da05)
   [Note] After the following setting, the installation type will be changed to [ceiling-mounted], and then the camera will reboot. Please be careful when you actually try this setting.

```
GET /admin/-set-?em=2&pt=4&da05=2

--Reply--
Status=0
reboot=1
  END
```

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, unit, fixed, boolean`

  The "int" type is a decimal integer. The "fixed" type is a fixed point number. A pair (min,max) representing the minimum value min and the maximum value max are added and expressed as int(-5,5) or fixed(0.,10.), etc. When the number of decimal places is clearly specified, the numbers is 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. The maximum values of “int” and “unit” are written as ‘-‘ (ex. uint(0,-)), which represents 2147483647 for “int”, and 4294967295 for “unit”. Min of unit (min, max) should be more than 0.

- `Bit string: bit, hex`

  A bit string where each nibble is represented by a hexadecimal digit. The bit length are 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. Hex is expressed with specifying the maximum byte number, like hex[4], etc. Bit strings, which are less than the maximum number, can be specified. In case of expressing hex[3], you can specify 1byte "11"(0x11), 2byte "0022"(0x0022), 3byte "112233"(0x112233), etc.

- `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, atext`

  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, ‘@’), atext (characters from 20 to 7E in hexadecimal notation, ‘¥t’, ‘¥r’, ‘¥n’). 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]).

[Note]
For host type, you can specify IPv4 address, as well as regular host name. Please note however that any Pv6 address cannot be specified.

- `Name: ascii, char, unicode`

  A character string used for a camera name, preset name, or other names. There are three data types as follows.

  ascii (character stings, consist of characters from 20 to 7E, excluding ‘”’ in hexadecimal).

  char (character strings, consist of characters from 20 to 7E)

  unicode (multibyte characters, encoded using UTF-8)

  [Note]
  For ascii, char and unicode type data, you need to specify the maximum length of character strings, such as ascii[63]. Unicode is multibyte characters, but the maximum length is expressed with the number of characters. For example, if the data type of some setting item is expressed as unicode[15], it means maximum 15 letters, not 15 bytes. One letter of UTF-8 equals 4 bytes, so data can be 15 x 5 = 60 at a maximum.
  [Memo]
  kanji, used in VB-C50i, VB-C300 and other older models, was removed, and unicode has been added, instead.

- `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, inaddr6, inaddrx`

  inaddr is specified in the widely-used IPv4 notation, as xxx.xxx.xxx.xxx. Each field of xxx can only be specified in decimal and in the range of 0 to 255.

  inaddr6 is specified in the IPv6 notation, as xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx. Each x can only be specified in hexadecimal digit of 0~9 and a~f. It can be specified with a normally used abbreviation of IPv6. Series of 0, like 0000, can be abbreviated as single 0. another successive 0, like 0:0:0, can be abbreviated as ::. For example, fd00:0000:0000:0000:0000:0000:0000:0001 can be abbreviated as fd00::1.

  Inaddrx is specified in both the IPv4 notation, same as inaddr, and the IPv6 notation, same as inaddr6.

- `Local port: lport, hport`

  A server port number. lport is integer value of 1 ~ 65535. hport is integer value of 80 and 1024 ~ 65535. Both lport and hport are checked for duplication, so if the same value is specified for a different setting items, a combination error C006(duplicate value) will occur.

- `Host access control entry: haccent`

  Host access control entry is a element of the host list. It is expressed in a form as '[!] addr [- addr2]' (addr and addr2 are inaddr-type IPv4 addresses).

- `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.

  [Note] with VB-C300, 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. However, these have all been eliminated from VB-C60.

- `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.

A VB-C60 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 basic type settings, this is 0.
- Data type: The data type of the setting value (Refer to Chapter 4 Data Types).
- Default value: The factory setting.
- Attributes: A combination of R (readable), W (writable), B (reboot automatically when settings are saved), b (need reboot to enable settings), 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.

[Note]

Attribute B (capital B) of older models, has been changed to Attribute b (small letter b). Please note that the meaning of attribute B has also been changed.

System Administration

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
aa00	0	const	Root	R----	System administrator name	
aa01	0	pass[8]	VB-C60	-W-OP	Administrator password	*a
aa02	0	pass[8]	VB-C60	-W-OP	Administrator password (for check)	*a
bb00	0	const	admin	R----	Setting page URL	

*a You should 'WRITE' aa01 and aa02 in the same HTTP request. Also, value for aa01 and aa02 should be the same. If an empty value is specified, the value will not be changed.

[Note] Spec change of Administrator password settings

For VB-C10, VB-C50i series and VB-C300, you can change the password by setting either aa01 or aa03. On the other hand, for VB-C60, there are 2 setting items, aa01 and aa02, to which you are required to input the same value.

Clock and Time Zone

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
bc00	0	fixed(-12,13)	9	RW-	Time zone (difference from GMT)	*a
bc01	0	const	0	R----	Method for setting the clock	*b
Bc10	0	inaddr		RW-O-	NTP server (IP address)	*c
bc20	0	date:time	(System dependent)	RW---	Data and time	*d

*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), 2: NTP broadcast mode.

*c This value is enabled when bc01 is 1. An empty value is unacceptable.

*d 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. ' : ' is URL-encoded to be "%3A").

Network (LAN)

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
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---	Lighting LED	*b
ca11	0	int(1,3)	1	RWB--	LAN interface	*c
ca20	0	boolean	1	RWB--	IPv6 Setting	
ca22	0	const	(System-dependent)	R----	IPv6 Address	*d

*a 0: Manual, 1: Auto (DHCP)
*b 1: Turn off, 5: Turn on. (2, 3, 4 also light blue.)
*c 1: Auto, 2: Full Duplex, 3: Half Duplex
*d Display a IPv6 address, which is currently in operation. If any IPv6 address is not assigned, an empty value will be set.

Routing Control

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
cc01	0	inaddr		RWBOP	Default Gateway Address	

Packet Size

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
cf00	0	int(576,1500)	1500	RWB--	Maximum Packet Size	

*a The value should not be set to less than 1280, when using IPv6.

IPsec

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
cs00	5	int(0,1)	0	RWB--	IPsec Method	*a
cs01	5	int(0,1)	0	RWB--	IPsec Mode	*b
cs02	5	inaddrx		RWBO-	Destination Address	
cs03	5	int(0, 128)	0	RWB--	Destination Prefix Length	
cs04	5	inaddrx		RWBO-	Security Gateway Address	
cs05	5	int(0, 2)	0	RWB--	IPsec Protocol	*c
cs06	5	inaddrx		RWBO-	Source IP Address	
cs10	5	pass[127]		-WB--	IKE Pre-shared Key	
cs11	5	int(0, 2)	0	RWB--	IPsec SA Encryption Algorithm	*d
cs12	5	int(0, 1)	0	RWB--	IPsec SA Authentication Algorithm	*e
cs13	5	int(1, 1440)	480	RWB--	IPsec SA Valid Period (minute)	
cs14	5	int(0, 1)	0	RWB--	IKE ISAKMP SA Encryption Algorithm	*f
cs15	5	int(0, 1)	0	RWB--	IKE ISAKMP SA Authentication Algorithm	*g
cs16	5	int(0, 1)	0	RWB--	IKE DH Group	*h
cs17	5	boolean	0	RWB--	IKE PFS	*i
cs18	5	int(1, 1440)	480	RWB--	IKE ISAKMP SA Valid Period (minute)	*j
cs40	5	int(0, 3)	0	RWB--	ESP Encryption Algorithm	*k
cs41	5	int(0, 2)	0	RWB--	ESP Authentication Algorithm	*l
cs42	5	uint(256, -)		RWBO-	ESP SPI (transmission)	
cs43	5	hex[24]		RWBO-	ESP Encryption Key(transmission)	
cs44	5	hex[20]		RWBO-	ESP Authentication Key (transmission)	
cs45	5	uint(256, -)		RWBO-	ESP SPI (reception)	
cs46	5	hex[24]		RWBO-	ESP Encryption Key (reception)	
cs47	5	hex[20]		RWBO-	ESP Authentication Key (reception)	
cs48	5	int(0, 1)	0	RWB--	AH Authentication Algorithm	*l
cs49	5	uint(256, -)		RWBO-	AH SPI (transmission)	
cs50	5	hex[20]		RWBO-	AH Authentication Key (transmission)	
cs51	5	uint(256, -)		RWBO-	AH SPI (reception)	
cs52	5	hex[20]		RWBO-	AH Authentication Key (reception)	

*a 0: Disable, 1: Manual
*b 0: Tunnel Mode, 1: Transport Mode
*c 0: ESP, 1: AH, 2: ESP and AH
*d 0: AES->3DES, 1: AES->3DES->DES, 2: AES->3DES->DES->NULL
*e 0: HMAC_SHA1_96, 1: HMAC_SHA1_96->HMAC_MD5_96
*f by minutes
*g 0: SHA1, 1: SHA1->MD5
*h 0: Group 2, 1: Group 2-> Group 1
*i 0: Disable, 1: Enable
*j by minutes
*k 0:AES, 1:3DES, 2:DES, 3:NULL
*l 0:HMAC_SHA1_96, 1:HMAC_MD5_96, 2: no authentication

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---	Operation when nobody has a control privilege	*a
da05	0	int(1.2)	2	RWB--	Mount	*b

*a 0: Do not return to Home Position, 1: Return to Home Position

*b 1: Upright; 2: Inverted

Camera Individual Settings

Name	Capacity	Data Type	Default Value	Attribute	Meaning	Note
db00	1	const	1	R----	Use the camera	
db01	1	ascii[15]	(Camera)	RW-O-	Camera name (ascii numbers and letters)	
db02	1	unicode[15]		RW-O-	Camera name (multibyte letters)	
db03	1	const	0	R----	Use a wide converter	
db05	1	int(0,2)	1	RW---	Video Size (JPEG)	*a
db06	1	int(5)	3	RW---	Video Quality (JPEG)	*b
db07	1	const	1	R----	Camera control port	
db11	1	coord		RW-O-	Home Position: Pan	
db12	1	coord		RW-O-	Home Position: Tilt	
db13	1	scope		RW-O-	Home Position: Zoom	
db14	1	int(-3,3)	0	RW---	Home Position: Brightness	o
db15	1	int(0,3)	0	RWb--	AE Mode	*c
db16	1	int(0,1)	0	RWb--	Focus Mode	*d
db20	1	boolean	0	RW---	Apply view restriction	
db21	1	coord		RW-O-	View restriction: Top edge	
db22	1	coord		RW-O-	View restriction: Bottom edge	
db23	1	coord		RW-O-	View restriction: Left edge	
db24	1	coord		RW-O-	View restriction: Right edge	
db25	1	scope		RW-O-	View restriction: Telephoto	
db26	1	scope		RW-O-	View restriction: Wide-angle	
db27	1	int(0,3)	0	RW---	Home position: Focus mode	*d
db28	1	int(0,65535)	0	RW---	Home position: Manual focus value	*n
db32	1	boolean	0	RW---	Use digital zoom	
db34	1	int(0,2)	0	RW---	Use Image Stabilizer	*e
db36	1	int(0,1)	0	RW---	Day & Night mode	*f
db37	1	int(0,4)	2	RW---	Brightness level for switching auto Day&Night	*g
db38	1	int(0,4)	2	RW---	Luminance Sensitivity of auto Day & Night	*h
db41	1	int(0,2)	0	RW---	Auto slow shutter - Maximum shutter speed	*i
db42	1	int(8,8000)	100	RWb--	Shutter Speed	*j
db43	1	int(0,1)	0	RWB--	Dome Mode	*k
de05	1	int(1,2)	1	RWB--	Video Size (MPEG-4)	*l
de06	1	int(1,5)	3	RW---	Video Quality (MPEG-4)	*m
de50	1	int(4,15)	15	RWB--	MPEG-4 GOP configuration	*n

*a Specify the video size for transmitting JPEG video. 0: Small size (160x120), 1: Medium size (320x240), 2: Large size (640x480). However, it is preferable to change the size in ‘dr01’ for VB-C60.

*b 1 ~ 5: Video quality Low ~ Video quality High. This will change all settings, including ‘Video quality/JPEG Small size (dq01)’, ‘Video quality/JPEG Medium size (dq02)’ ‘Video quality/JPEG Large size (dq03)’. Thus, it is preferable to use ‘dq01’, ‘dq02’ or ‘dq03’ for the video quality setting.

*c 0: Auto, 1, 2: flicker free AE, 3: Shutter-Speed Priority AE
[Note] Value ‘1 (1/60)’, which is supported for older models, has been removed. If you specify value ‘1’ for VB-C60, it will operate as same as ‘2 (flicker free AE)’. Flicker free AE is equal to shutter speed ‘1/100’ for older models.

*d 0: Auto, 1: Fixed at infinity, 2: Auto, 3: Manual
[Note] value ‘2 Auto (for domes)’, which is supported for older models, has been removed. If you specify ‘2’ for VB-C60, it will operate as same as ‘0 (Auto)’.

*e 0: Disable, 1: On1, 2: On2

*f 0: Manual, 1: Auto (automatic switching according to the luminance)

*g 0 ~ 4: Darker ~ Brighter

*h 0: 60 sec., 1: 30 sec., 2: 20 sec., 3: 10 sec., 4: 5 sec.

*i 0: 1/30, 1: 1/15, 2: 1/8

*j The shutter speed should be specified using a reciprocal of the value. Valid values for VB-C60 include 8, 15, 30, 60, 100, 120, 250, 500, 1000, 2000, 4000, and 8000. Specified values are used only when the exposure mode (db15) is set to 'shutter speed priority AE'. If a number between two values is specified, it will be rounded off to the smaller one.

*l 1: Medium size (320x240), 2: Large size (640x480)

*m 1 ~ 5: Video quality Low ~ video quality High

*n The number of frames, included in 1GOP (Group of Pictures), should be specified. Available values include 4, 8, and 15 only. The other numbers, such as numbers between 5 and 7, are interpreted as 8, and numbers between 9 and 14 are interpreted as 15.

*o -3 ~ 3: Darker ~ Brighter

[Note] If you specify a number other than 0, and then change the setting values using Preset Setting Tool of VBAdmin Tools, the numbers between –3 and –1 will be automatically changed to 0, and the numbers between 1 and 3 will be automatically changed to 2. Thus, under normal conditions, it is recommended to use only 0 or 2, which is equivalent to backlight compensation ON.

Video Capture

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
dq01	1	int(0,100)	50	RW---	Video Quality: 160x120	*a
dq02	1	int(0,100)	50	RW---	Video Quality: 320x240	*a
dq03	1	int(0,100)	50	RW---	Video Quality: 640x480	*a
dr01	0	int(0,2)	1	RW---	Video Size: Video Transmission	*b
dr02	0	int(0,1)	0	R----	Video Size: Motion Detection	*d
dr03	0	int(0,2)	1	RW---	Video Size: Upload	*b
dw01	0	int(0,2)	0	RWB--	MPEG-4 Capture Frame Rate	*c

*a 1 ~ 5: Video quality Low ~ Video quality High

*b 0: Small Size (160 x 120), 1: Medium Size (320 x 240), 2: Large Size (640 x 480).

*c 0: 30fps, 1: 15fps, 2: 10fps

*d Fixed to Small Size (160 x 120) for Motion Detection. Fixed to monochrome stream and lowest video quality.

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-O-	Preset name (English)	*b
ea02	20	unicode[15]		RW-O-	Preset name (Multibyte)	
ea03	20	int(0,0)	0	RW---	Camera	
ea04	20	coord		RW-O-	Pan	
ea05	20	coord		RW-O-	Tilt	
ea06	20	scope		RW-O-	Zoom	
ea07	20	int(-3,3)	0	RW---	Brightness	*c
ea08	0	boolean	0	RW---	Restrict to Preset	
ea09	20	int(0,3)	0	RW---	Focus Mode	*d
ea10	20	int(0,65535)	0	RW---	Manual Focus Setting	*e

*a 0: Not use with a viewer, 1: Use with a viewer

*b Empty value cannot be specified when corresponding 'ea00' is set to 1.

*c -3 ~ 3: Darker ~ Brighter

[Note] When a value between -3 ~ 0 is specified, the camera sends notification of backlight compensation OFF to viewer. When a value between 1 ~ 3 is specified, it sends notification of backlight compensation ON to viewer. Only when the preset is specified using External Device Input 'sp01', exposure compensation is carried out as specified. If you specify a number other than 0 and then change the setting values using Preset Setting Tool of VBAdmin Tools, the numbers between –3 and –1 will be automatically changed to 0, and the numbers between 1 and 3 will be automatically changed to 2. Thus, under normal conditions, it is recommended to use only 0 or 2, which is equivalent to backlight compensation ON.

*d 0: Auto, 1: Fixed at infinity, 2: Auto, 3: Manual

[Note] '2 Auto (for domes)', which is supported for older models, has been removed. If you specify '2' for VB-C60, it will operate as same as '0 (Auto)'.

*e When ea09 is 3, this value is enabled and cannot be set to an empty value

[Note] This should not be confused with preset tour (ea10) of VB-C50i series. The preset tour has been changed to 'ec10' for VB-C60.

Auto Preset Tour

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ec10	0	int(0,2)	0	RW---	Auto preset tour	*a
ec11	0	record<20>		RW-O-	Tour schedule	*b

*a 0: Not used, 1: For viewers, 2: Always

b Preset number(int(1,20)):Speed(int(0,255)):Pause(int(0,65535)).

<Preset number> --- integer between 1 and 20. Specify present numbers.

<Speed> --- integer between 0 and 255. Specify the speed toward a preset position.

High-order 4 bits correspond to [Speed (PT)] and low-order 4 bits correspond to [Speed (Z)], in Preset Setting Tool. The bigger the value is set, the faster the camera moves.

<Pause> --- integer between 0 and 65535. Specify the number of seconds of pause.

[Example]

Preset 1, Speed (PT) (Z) 7, Pause (sec) 10 --> 1:119:10 * 0 x 77=119 in hex

Preset 2, Speed (PT) (Z) 0 (lowest speed), Pause (sec) 20 --> 2:0:20

[Note]

Values for Speed and Pause can be set from the following range only, using Preset Setting Tool of VBAdmin Tools.

Speed (PT): 0 ~ 2
Speed (Z): 3, 7
Pause (sec): 0, 5, 10, 15, …., 120

If you specify values other than the above, it could cause an adverse effect on the performance of Preset Setting Tool. Also, some setting values might make camera's mechanical sound bigger. Hence, please set the values within the above range.

External Device Name

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
fa06	2	ascii[15]		RW-O-	External Input Device Name (English)	
fa07	2	unicode[15]		RW-O-	External Input Device Name (multi-byte)	
fa08	1	ascii[15]		RW-O-	External Output Device Name (English)	
fa09	1	unicode[15]		RW-O-	External Output Device Name (multi-byte)	

E-mail Notification

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
fn00	2	int(1,2)	1	RW---	Notification Setting	*a
fn01	2	ascii[31]		RW-O-	Subject	
fn02	2	atext [255]		RW-O-	Message Body	*b

*a 1: Text Only, 2: Text with Image. Index '0' of fn00~fn02 is for external input device. Index '1' is for motion detection.

*b Following '% characters' can be used. ('%' is deleted for undefined characters.)

%n	Trigger for shooting (No.)	1(contact input 1) | 2(contact input 2) | 130(motion detection[Region 1]) | 131(motion detection[Region 2]) | 132(motion detection[Region 3]) | 133(motion detection[Region 4])
%N	Trigger for shooting (String)	[external device input name (one byte)] (Setting value of fa06-0,fa06-1) [motion detection Region name 1/2/3/4 (one byte)] (Setting values of oi11-0,oi21-0,oi31-0,oi41-0)
%X	Width of video	The number of pixels in a horizontal direction (ex. 320)
%Y	Height of video	The number of pixels in a vertical direction (ex. 240)
%Q	Video quality	1 ~ 5
%C	No. of camera	1
%D	Camera name	Setting value of [camera name (one byte)] (db01-0)
%P	Pan position	-170.99 ~ 180.00
%T	Tilt position	-170.99 ~ 180.00
%Z	Zoom position	0.1 ~ 300.00
%V	Camera server	VB-C60
%y	Year of shooting	2000 ~ 2038
%m	Month of shooting	1 ~ 12
%d	Day of shooting	1 ~ 31
%w	Day of the week of shooting	0 ~ 6 (Sun ~ Sat)
%H	Hour of shooting	00 ~ 23
%M	Minute of shooting	00 ~ 59
%S	Second of shooting	00 ~ 59
%s	Millisecond of shooting	000 ~ 999
%a	Time zone of shooting	-1200 ~ +1300
%b	Day of the week of shooting	Sun | Mon | Tue | Wed | Thu | Fri | Sat
%t	Month of shooting	Jan| Feb| Mar| Apr| May| Jun| Jul| Aug| Sep| Oct| Nov| Dec
%h	Host name	Host name or IP address

User Access Control

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
gb00	0	uaccent<50>		RW-O-	User (+ password) list	*a
gb13	0	boolean	1	RW---	Permit audio distribution to authorized users	
gb33	0	booleanconst	1	RW---	Permit audio distribution to guest users	
gb50	0	int(0,3)	3	RW---	Setting for Authorized Users' Camera Privilege	*b
gb51	0	int(0,2)	2	RW---	Setting for guest users' Camera Control Privilege	*c

*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.

[Memo] Example of user (+ password) list
gb00=user1=112097115115049,user2=112097115115050
For how to specify a password, refer to explanation of 'uaccent' in 'Chapter 4 Data Types'.
To specify using GET, it needs to be URL-encoded as follows.
GET /admin/-set-?em=2&pt=4&gb00=user1%3D112097115115049%2Cuser2%3D112097115115050

*b 0: No Access Privilege, 1: Image Distribution only, 2: Camera Control + Image Distribution, 3: Privileged Camera Control + Image Distribution

*c 0: No Access Privilege, 1: Image Distribution only, 2: Camera Control + Image Distribution

Host Access Control

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
gc00	0	haccent<30>		RW-O-	Host List	
gc11	0	boolean	0	RW---	Apply Host List to HTTP Server	*a
gc12	0	boolean	0	RW---	Apply Host List to Image Transmission	*a
gc13	0	boolean	0	RW---	Apply Host List to Audio Transmission	*a

*a When 'gc11' is set to '1', the host list is also applied to Image Transmission, Audio Transmission, and Obtaining Still Image. When 'gc12' is set to '1', the host list is also applied to Audio Transmission and Obtaining Still Image.

[Note] Any IPv6 address cannot be specified for the host access control. When gc11, 12, 13 is switched on, the function cannot be accessed from a host of IPv6 address.

Camera Server

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ha03	0	int(0,30)	30	RW---	Maximum Number of Clients	*a
ha04	0	int(0,30)	30	RW---	Control Queue Length	
ha05	0	fixed(0.1,30.0)	30	RW---	Maximum Frame Rate	
ha06	0	int(0,65535)	0	RW---	Maximum Connection Time (sec.)	
ha07	0	int(1,3600)	20	RW---	Camera Control Time (sec.)	
ha31	0	const	1	R----	Number of Stream for Recording	

*a Maximum Number of Clients is a total of JPEG and MPEG connections. However, the number of MPEG-4 connection is limited to less than 10. The setting values are also applied to audio connection.
[Note] Maximum Transmission Rate (ha15) has been removed from VB-C60.

Audio Server

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
hb00	0	boolean	0	RW---	Audio Transmission from the Camera	*a
hb01	0	int(1,100)	50	RW---	Input Volume	
hb03	0	boolean	0	RW---	Voice Activity Detection	
hb05	0	int(0,100)	0	RW---	Noise Canceller	b,c
hb06	0	boolean	0	RW---	Slope Filter	*b
hb10	0	boolean	0	RW---	Audio Reception from the Viewer	*a
hb11	0	int(1,100)	50	RW---	Output Volume	
hb20	0	boolean	0	RW---	Echo Canceller	*b
hb30	0	int(0,2)	0	RW---	Audio Input	*d

*a 0: Disable, 1: Enable
*b 0: Disable, 1: Enable
*c [Note] The spec has been changed from older models. The only option for VB-C60 is to specify On/Off only.
*d 0: Line In, 1: Microphone In (dynamic microphone), 2: Microphone In (condenser microphone)

Audio File

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
hp10	3	ascii[15]		RW-O-	Audio File Name	*a

*a To set non-empty strings to hp10-<i>, non-empty audio files should be registered beforehand. (‘i’ in hp10-<i> is called ‘Voice file number’, which is used when referring audio files in oj42 or other items.

Thus, you need to follow the steps below to use this function.
Step1. Register audio files using ‘upload_audio.cgi’
Step2. Name the audio files using ‘hp10’

Registerable audio files are wav files, which meet following conditions.
CCITT μ-Law, Attribute: 8.000kHz, 8 bit, monaural, 7KB/B, 20 sec length or less

To delete audio files, you just need to set an empty string (“”) to corresponding h10-<i>.

[Memo: spec of ‘upload_audio.cgi’]
‘upload_audio.cgi’ is VB-C60’s command for audio file registration.

Audio files can be registered using POST request in the following format.
(The basic authentication at the administrator level is required.)

```
--------------------------------
POST /cgi-bin/upload_audio.cgi HTTP/1.1¥r¥n
Host: {VB-C60’s IP address or host name}¥r¥n
Content-Type=multipart/form-data, boundary=boundary¥r¥n
Content-Length: {data length}¥r¥n
Authorization: Basic XXXXXXXXXX¥r¥n
¥r¥n
--boundary
Content-Disposition: form-data; name="{Voice file number to be registered}"; filename="dummy"¥r¥n
Content-Type: audio/wav¥r¥n
¥r¥n
{audio data to be registered}
--------------------------------
```

[Note] It is a multipart format, but it cannot send multiple files in a single request.

[Memo: Audio file play command]

Play and Stop of audio files are available using a following GET request.
(The basic authentication at the administrator level is required for both of them.)

1) Play

```
--------------------------------
GET /-wvaudio-01-/play?ft=play&l=100&no={Voice file number} HTTP/1.1¥r¥n
Host: {VB-C60’s IP address of host name}¥r¥n
Authorization: Basic XXXXXXXXXX¥r¥n
--------------------------------
```

2) Stop

```
--------------------------------
GET /-wvaudio-01-/stop?ft=play&l=100 HTTP/1.1¥r¥n
Host: { VB-C60’s IP address of host name}¥r¥n
Authorization: Basic XXXXXXXXXX¥r¥n
```

Replies of both 1) and 2) are to be as follows.

```
a. Normal operation
-------------------------------
HTTP/1.1 200 OK¥r¥n
…
¥r¥n
{play or stop} OK
-------------------------------

b. at the time of error occurrence
-------------------------------
HTTP/1.1 200 OK¥r¥n
…
¥r¥n
{play or stop} NG
{error information}
```

Followings are the ‘error information’.
“File Not Found” - The audio file does not exist.
“Canceled” - It has been canceled by another high-priority command.
“Competing” - Process is conflicting. (ex. while receiving audio from another client, etc)
“Host Restricted” - The command was rejected due to host access restriction.

HTTP Server

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ia00	0	lport	80	RWB--	HTTP port	
ia02	0	inaddr		RW-O-	IP Address (Global address for Web page)	*a
ia03	0	int(1,65535)		RW-O-	Port Number (Global address for Web page)	*a
ia04	0	int(0,1)	0	RW---	Global address for the Web page	*a

*a In case of ia04=0, the IP address and port number, used for ia02 and ia03, are used as [Global address for the Web page].
In case of ia04=1, the value of host name (ib10), set for DNS/DDNS, is used for a Global address.

[Memo] Spec change of “Web page’s global address”
Older models, except VB-C300, are equipped with function that replaces string <_I_P_A_D_D_R_>, embedded in in-camera html file, using specified IP address and port number, once setting “Global address for the Web page”.
Replace of <_I_P_A_D_D_R_> has been removed from VB-C60. Instead, setting values of ‘ia02’, ‘03’, ‘04’ are used for reply of ‘open.cgi’ command (refer to ‘Network Camera Server WebView-HTTP Protocol Tutorial’).

[Note] Keep Alive time (ja01) has been removed. The keep alive time for HTTP is fixed to 10 seconds.

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]		RWbO-	Host Name	
ib20	0	boolean	0	RWb--	Register the Host Name DDNS	

E-Mail

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ic00	1	host[63]		RW-O-	Mail Server Name (host name)	*a
ic01	1	mail[63]		RW-O-	Sender's Mail Address (From)	
ic02	1	mail[63]		RW-O-	Recipient's Mail Address (To)	
Ic04	1	int(1,65535)	25	RW---	Mail Server's Port Number	
ic10	1	int(0,2)	0	RW---	Mail Authentication Method	*b
ic11	1	name[31]		RW-O-	User Name	
ic12	1	pass[31]		RW-O-	Password	
ic13	1	host[63]		RW-O-	POP Server	

*a [Note]
For VB-C50i and older models, each setting item is the basic type. For VB-C60, it has been changed to the array type.

*b 0:None, 1:POP before SMTP, 2:SMTP-AUTH（CRAM-MD5）
[Note] SMTP-AUTH has been added to the authentication method, and the date type was changed to from Boolean to int(0,2).

SNMP

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
if00	0	boolean	0	RW---	SNMP Use	*a
if01	0	char[31]	public	RW---	Community Name	
if02	0	char[63]		RW-O-	Contact Information of Administrator	
if03	0	char[31]	VB-C60	RW-O-	Equipment Name for Administration	
ic04	0	char[31]		RW-O-	Location	

*a 0: Disable, 1: Enable

Upload

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ja03	0	int(0,2)	0	RWB--	Upload Operation	*a
ja50	0	int(1,10)	1	RW---	Frame Rate (for Image Buffer)	
ja51	0	int(0,100)	0	RW---	Pre-event Buffer (Number of still pictures)	
ja52	0	int(0,100)	0	RW---	Post-event Buffer (Number of still pictures)	

*a 0: Upload disabled, 1:FTP Upload, 1:HTTP Upload

FTP Upload

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
jb01	1	int(2,2)	2	RW---	Notification Setting	*a
jb02	1	host[63]		RW-O-	FTP Server	
jb04	1	ascii[31]		RW-O-	User Name	
jb05	1	pass[63]		-W-O-	Password	
jb06	1	boolean	1	RW---	PASV Mode	
jb07	1	char[255]		RW-O-	File Upload Path	
jb20	1	int(0,3)	0	RW---	File Naming Method	*b
jb21	1	ascii[127]		RW-O-	Subdirectory Name to Create	*c
jb22	1	ascii[127]	image	RW---	File Name to Create	*d
jb30	1	int(0,9999)	0	RW---	Maximum Number of Loops	*e

*a 2: File Transfer with FTP

*b 0: yyyymmddhhmmssms.jpg
1: yyymmdd folder/hhmmssms.jpg
2: Loop
3: User Setting

*c Following '% characters' can be used for Subdirectory Name to Create. ('%' is deleted for undefined characters.)

%n	Trigger of shooting (No.)	1(contact input 1) | 2(contact input 2) | 130(motion detection [Region 1]) | 131(motion detection [Region 2]) | 132(motion detection [Region 3]| 133(motion detection [Region 4])
%y	Year of shooting	2000 ~ 2038
%m	Month of shooting	1 ~ 12
%d	Day of shooting	1 ~ 31
%w	Day of the week of shooting	0 ~ 6 (Sun ~ Sat)
%H	Hour of shooting	00 ~ 23
%h	Host name	Host name or IPv4 address

*d Following '% characters' can be used for File Name To Create. ('%' is deleted for undefined characters.)

%n	Trigger of shooting (No.)	1(contact input 1) | 2(contact input 2) | 130(motion detection[Region 1]) | 131(motion detection[Region 2]) | 132(motion detection[Region 3]) | 133(motion detection[Region 4])
%y	Year of shooting	2000 ~ 2038
%m	Month of shooting	1 ~ 12
%d	Day of shooting	1 ~ 31
%w	Day of the week of shooting	0 ~ 6 (Sun ~ Sat)
%H	Hour of shooting	00 ~ 23
%M	Minute of shooting	00 ~ 59
%S	Second of shooting	00 ~ 59
%s	Millisecond of shooting	000 ~ 999

*e The number of loops starts with 0, and increments by one every file upload. After the number reaches (Maximum Number of Loops - 1), then it goes back to 0. Please understand that when the maximum loop number is 0,1, the number of loops is always 0.

HTTP Upload

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
jc01	1	int(1,2)	1	RW---	Notification Setting	*a
jc02	1	ascii[255]		RW-O-	URI	
jc04	1	ascii[31]		RW-O-	User name	
jc05	1	pass[31]		-W-O-	Password	
jc06	1	host[63]		RW-O-	Proxy Address	
jc07	1	int(1,65535)	80	RW---	Proxy Port	
jc08	1	ascii[31]		RW-O-	Proxy User Name	
jc09	1	pass[31]		RW-O-	Proxy Password	
jc21	1	char [127]		RW-O-	Parameter (query string)	*b

*a 1: Notification Only with HTTP, 2: Image attached Notification with HTTP

When [Notification Only with HTTP] is chosen, it sends a (HTTP) GET request, together with a parameter specified using jc21, to the URI specified using jc02.
When [Image attached Notification with HTTP] is chosen, it sends a POST request, together with a parameter specified using jc21, to the URI specified using jc02. An Image data is specified to POST's body. Refer to 'Network Camera Server WebView-HTTP Protocol Tutorial' for more details.

*b URL-encoded strings should be specified for the parameter.
(For details about URI encoding, refer to RFC2396 "Uniform Resource Identifiers (URI): Generic Syntax".)

Following '% characters' can be used for character parameters. ('%' is deleted for undefined characters.)

%n	Trigger of shooting(No.)	1(contact input 1) | 2(contact input 2) | 130(motion detection [Region 1]) | 131(motion detection [Region 2]) | 132(motion detection [Region 3]| 133(motion detection [Region 4])
%y	Year of shooting	2000 ~ 2038
%m	Month of shooting	1 ~ 12
%d	Day of shooting	1 ~ 31
%H	Hour of shooting	00 ~ 23
%M	Minute of shooting	00 ~ 59
%S	Second of shooting	00 ~ 59
%s	Millisecond of shooting	000 ~ 999
%h	Host name	Host name or IP address

Motion Detection

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
oa00	0	boolean	1	RW---	Motion Detection Event	*a
oc00	1	int(0,20)	0	RW---	Preset	*b
oc08	1	int(0,300)	0	RW---	Frame Rate	*c
oe00	1	boolean	0	RW---	Automatic Tracking at ON event	*d
oe09	1	int(1,300)	60	RW---	Maximum tracking time (sec.)	
oi10	1	record	0/1:…	RW---	Parameter of Motion detection area 1	*e
oi11	1	ascii[15]		RW-O-	Motion detection area 1 (one byte)	
oi12	1	unicode[15]		RW-O-	Motion detection area 1 (multi byte)	
oi20	1	record	0/1:…	RW---	Parameter of Motion detection area 2	*e
oi21	1	ascii[15]		RW-O-	Motion detection area 2 (one byte)	
oi22	1	unicode[15]		RW-O-	Motion detection area 2 (multi byte)	
oi30	1	record	0/1:…	RW---	Parameter of Motion detection area 3	*e
oi31	1	ascii[15]		RW-O-	Motion detection area 3 (one byte)	
oi32	1	unicode[15]		RW-O-	Motion detection area 3 (multi byte)	
oi40	1	record	0/1:…	RW---	Parameter of Motion detection area 4	*e
oi41	1	ascii[15]		RW-O-	Motion detection area 4 (one byte)	
oi42	1	unicode[15]		RW-O-	Motion detection area 4 (multi byte)	
oj30	1	boolean	0	RW---	ON Event Operation	*f

oj31	1	boolean	0	RW---	OFF Event Operation	*f
oj32	1	boolean	0	RW---	Motion Detection Operation	*f
oj40	1	boolean	0	RW---	Audio playback at ON event	*g
oj41	1	boolean	0	RW---	Audio playback at OFF event	*g
oj42	1	int(0,3)	0	RW---	Audio Paly Number	
oj43	1	int(0,100)	50	RW---	Audio Volume	
oj90	1	boolean	0	RW---	Motion Detection E-mail Notification	*h
oj91	1	int(0,1)	0	RW---	Motion Detection Upload	*i

*a 0: Disable, 1: Enabled

*b 0: None, 1 ~ 20: Present number

*c 0: Unrestricted, 1~300: the number of frames per 10 seconds

*d 0: Disable, 1: Enable

*e The data format is a combination of following 8 values:
{valid area(boolean)}:{left edge(int(0,79))}:{upper edge(int(0,59))}:{right edge(int(1,80))}:{lower edge(int(1,60))}:{Sensitivity(int(1,256))}:{Number of blocks for detection(int(0:4800))}:{Time for detection(int(0,100))}
Ex. 1:0:0:40:30:20:150:0

[left edge], [upper edge], [right edge], [lower edge] should be specified using DCT block-scale (8 pixels=1DCT block).
Since it is based on a VGA (640x480) image, each edge can be specified within the following ranges.
The left edge: between 0 and 79 (=(640/8)-1)
The right edge: between 1 and 80 (=640/8)
The upper edge: between 0 and 59 (=(480/8)-1)
The lower edge: between 1 and 60 (=480/8)
It should be [left edge] < [right edge], [upper edge] < [lower edge]. Otherwise, it will cause the C002 error.

[Sensitivity] should be specified using an integer between 1 and 256. 1 represents the lowest and 256 represents the highest sensitivity.

[Number of blocks for detection] is to specify the number of DCT blocks, which is required to detect motion for sending a motion detection event.

Since it is based on a VGA (640x480) image, the maximum number of blocks is 4800 (=(640/8) x (480/8)). For example, if 100 is specified, a motion detection event will be sent when 100 blocks detect motion.

[Time for detection] should be specified the time to judge motion by 0.1 second.
(100, the upper limit, means 10 seconds.)

The default value is as follows.

```
oi10=1:0:0:40:30:20:150:0
oi20=1:40:0:80:30:20:150:0
oi30=0:0:30:40:60:20:150:0
oi40=0:40:30:80:60:20:150:0
```

[Note] About [Size]
Please note that any motion detection events will not occur, if the number of DCT blocks included in a detection region, which is specified using [left edge], [upper edge], [right edge] and [lower edge], is smaller than the number of DCT blocks specified in [Number of blocks for detection].
[Size] used in GUIs of Motion Detection Tool of VBAdmin Tools shows the ratio of the total number of blocks in a detection region to [Number of blocks for detection]. For example, when the total number of blocks in a detection area is 2400 and [Number of blocks for detection] is 1200, the [Size] indicated in the Motion Detection Tool is 50%.

*f 0: Not buffering images 1: Buffering images
This is to set whether buffer images or not when a motion detection event starts (oj30), when a motion detection event finishes (oj31), or while a motion detection event is going on.

*g 0: Disable 1: Enable
Audio files should be specified using ‘oj42’ with either of following values.
0: Disable, 1 ~ 3: Audio file number
(For information on registering audio files, refer to the explanation about ‘hp10’.)

Audio play volume should be specified using ‘oj43’, using an integer between 1 and 100. 1 represents the minimum, and 100 represents the maximum volume.

*h 0: Disable 1: Enable

*i 0: Disable 1: Enable

Interval Timer

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
sn00	0	boolean	1	RW---	Interval Timer Event	*a
sn02	1	int(0,86400)	60	RW---	Timer Interval (sec.)	
sn90	1	boolean	0	RW---	E-mail Notification at Interval Timer	*b
sn91	1	int(0,1)	0	RW---	Upload at Interval Timer	*c

*a 0: Disable, 1: Enable
*b 0: Disable, 1: Enable
*c 0: Disable, 1: Enable

External Device Input

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
sp00	0	boolean	1	RW---	External Device Input Event	*a
sp01	2	int(0,20)	0	RW---	Preset	*b
sp30	2	boolean	0	RW---	ON Event Operation	*c
sp31	2	boolean	0	RW---	OFF Event Operation	*c
sp40	2	boolean	0	RW---	Audio playback at ON event	*d
sp41	2	boolean	0	RW---	Audio playback at OFF event	*d
sp42	2	int(0,3)	0	RW---	Audio Play Number	
sp43	2	int(1,100)	50	RW---	Volume	
sp90	2	boolean	0	RW---	Mail Notification at External Device Input	*e
sp91	2	int(0,1)	0	RW---	Upload at External Device Input	*f

*a 0: Disable, 1: Enable
*b 0: None, 1 ~ 20: Preset number
*c 0: Disable, 1: Enable
This is to set whether buffer images or not when an event starts (sp30) or when an event finishes (os31).

*d 0: Disable, 1: Enable
Audio files should be specified using ‘sp42’ with either of following values.
0: Disable, 1 ~ 3: Audio file number
(For information on registering audio files, refer to the explanation about ‘hp10’)

Audio play volume should be specified using ‘sp43’, using an integer between 1 and 100. 1 represents the minimum, and 100 represents the maximum volume.

*e 0: Disable, 1: Enable

*f 0: Disable, 1: Enable

System Attribute Information

Name	Capacity	Data Type	Default Value	Attributes	Meaning	Note
ra00	0	const	VB-C60	R----	Model name	
ra01	0	const	Ver. 1.0.0	R----	Firmware Version	*a
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	

ra09	0	const	1	R----	Number of Video Input Channels	
ra10	0	const	640x480	R----	Largest Video Size	
ra11	0	const	en,ja	R----	Supported Language	
ra13	0	const		R----	Build No.	

*a The format of version description varies by model.
VB-C60: Ver. {major version}.{minor version}.{correction number} (ex. Ver. 1.0.0)
VB-C300: {major version}.{minor version}.{correction number(2-digit)} (ex. 1.0.01, 1.1.00)
VB-C50i and others:
Ver. {major version}.{minor version} Rev.{correction number} (ex. Ver. 1.2 Rev.77)

YT1-1009-000