NETWORK CAMERA Protocol Spec.

HTTP Setting Protocol Specifications

VB-C50i/R Firmware Ver. 1.2

VB-C50Fi/FSi Firmware Ver. 1.0

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Change Tracking List

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1 Overview

The setting modules of Network Camera Servers communicate with setting clients via network, and refer to or change setting values and related information upon request.
The communication procedures and regulations on written specifications for the contents of communication are called *Setting Protocol*. The setting module within the Network Camera Server communicates with setting clients via networks. In response to requests from setting clients, the setting module refers to and updates setting values and related information. This document refers to the conventions regarding this communication procedure and the communication content syntax specifications as the setting protocol.

The Setting Protocol recognizes HTTP requests from setting clients and their HTTP replies as a set, and handles them as a single transaction in the setting sessions, making use of HTTP (CGI) which is positioned below the Setting Protocol. Web Browser is assumed as one of the major setting clients, however it is also possible to create and use exclusive client software.
The setting protocol uses HTTP (CGI) as its low-level protocol and deals with a HTTP request and its corresponding reply as a minimum operation unit. Each unit represents one operation (transaction) for a certain setting procedure (session). Generally, the setting client is presumed to be a Web browser, however, it is also possible to create and use dedicated client software.
This document explains the specification of Setting Protocol for exclusive client software. Although detailed description about HTTP and CGI are omitted, this document provides information of Setting Protocol, which is specificialized as transaction. This document describes the specification of the setting protocol covering dedicated client software. No particular explanation is made regarding assumptions about the low-level HTTP protocol. Only the characteristics of HTTP that are specialized for transactions as part of the setting protocol are described.

1.1 The Operation of the Setting Protocol

The setting protocol recognizes the HTTP request (input) and its reply (output) as a set and handles it as a minimum unit of setting operation. This unit is called “transaction”. A complete sequence of setting operations is comprised of multiple transactions, and it is excluded from other transactions with IP address of each setting client[1].

[1] Indicates an IP address on the HTTP peer seen from the Network Camera side. If HTTP proxy is used,

A sequence of transactions during the excluded period is called “session”.

A session is generated according to the operations of the setting protocol. To complete setting procedures, first modify the setting values set in a temporary work area. Then, all of the setting values are saved collectively in the end.

The session with the setting client is kept while any setting values on the work area differ with the corresponding saved values.

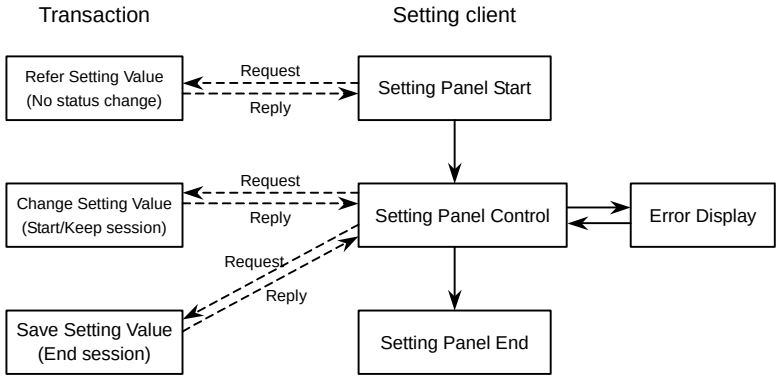

Figure 1: Start and End of a session

Types of transaction are given in the table below. All sessions are started with WRITE or OPEN and ended with SAVE or CLOSE. Chart 2 shows the status transition of sessions.

Transaction		Function
READ	Refer Setting Value	Refer to a setting value in the work area.
WRITE	Change Setting Value	Change a setting value in the work area.
OPEN	Start Session	Start session at the time when setting values are not changed.
VERIFY	Check Changes	Perform combination check of setting values.
SAVE	Save Setting Value	Perform combination check of setting values in the work area, and save changes if no error occurs. If it includes items that require restart, it reboots the camera server.
CLOSE	Session Shutdown	Discard changes in the work area and end the session forcibly. Even client who hasn’t started the session can perform this transaction.
REBOOT	Reboot	Reboot the camera server.
REVERT	Restore Factory Default Settings	Restore setting values to factory default settings and reboot the camera server.

Table 1: Types of Transaction

IP address of HTTP proxy host is used instead. If IP address is not fixed due to multiplexing of HTTP proxy or other reasons, exclusive measures may be taken toward the same setting client.

Both READ and WRITE transactions can be used with other transactions except REBOOT and REVERT transactions. The processings of READ and WRITE are made after OPEN and CLOSE transactions and before VERIFY and SAVE transactions. The processing of WRITE is done before that of READ transaction.

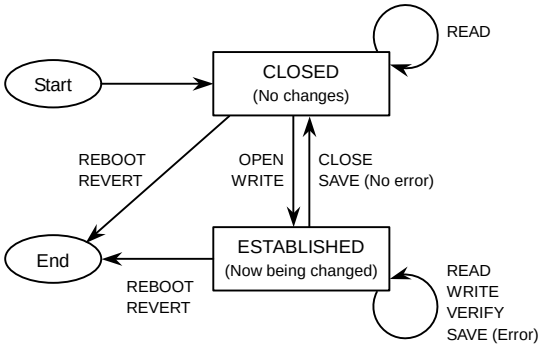

Figure 2: State transition of a session

If a setting client who has different IP address requests transactions other than READ or CLOSE while a session has been started, those transactions are not received and cause an error. This allows exclusive setting operations by a single setting client and avoids confusions in operations by mutual interferences.

The exclusive control is nonbinding because both READ and CLOSE requests are accepted anytime. This is based on an assumption that a setting client may abandon the session at a given point in time, particularly from Web browser. On the other hand, the session has no time restriction (timeout). Data in the work area will be maintained until the time when the data is saved or discarded.

1.2 HTTP Restrictions

Path names for CGI are written in '/admin/-set-' format. The following is restrictions in HTTP level.

-In conformity to HTTP/1.0+CGI/1.1.

-The request method must be GET.

-User is limited only to the system administrator[2].

-Persistent connections cannot be used.

-Some replies do not include the Content-Length header field[3].

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

1.3 Relation with VB10x Setting Protocol

The setting protocol defined in this specification is based on the existing setting protocol for VB10x series. However, there is no complete compatibility. Major differences in specifications are shown below.

-CGI parameter names are shown only in abbreviated format.

-CGI parameter names are case-insensitive.

-Handling of setting values has been changed (added record and list-type, in particular.)

-Error codes and error messages have been changed (much easier messages).

-Added session identifier specifications (See Section 2.4).

[3] Too long messages that exceed 16KB.

2 Input

The input of the setting protocol is comprised of arbitrary number of CGI parameters in text format.. With GET method, CGI parameter list is expressed in a format separated using a letter '&'.

GET /admin/-set-?<name1>=<value1>&<name2>=<value2>… HTTP/1.0

Values (the right-hand side of '=') are assumed to be URL-encoded[4].

The order of CGI parameter list is random as far as CGI parameters with different names. If there are CGI parameters with the same name, basically the latter one has priority, however setting values (See Section 2.8) are evaluated doubly. So it is not recommended to specify multiple CGI parameters.

2.1 Transaction Type (pt)

Transactions except READ and WRITE are specified using 'pt'. Table 2 below shows the value and behavior that can be specified in pt.

pt	Transaction	Behavior
0	NONE	No behavior (Possible to combine it with READ transaction)
1	OPEN	Start Session
2	CHECK	Perform partial combination check[5]
3	VERIFY	Perform entire combination check
4	SAVE	Save setting values (VERIFY is performed implicitly)
5	CLOSE	Discard changes and terminate the session
6	REBOOT	Reboot (CLOSE is performed implicitly)
7	REVERT	Restore the factory default settings (REBOOT is performed implicitly)
8	COMPEL	Forcible setting change (Perform CLOSE, WRITE and SAVE continuously)

Table 2: Transaction Types

COMPEL is a function which is a compound transaction of CLOSE, WRITE and SAVE, and which is able to change and save setting values at a single HTTP access avoiding collisions with other sessions[6].

[4] Alphanumeric (0-9, A-Z, a-z), '*', '-', '.', '@' and '_' are shown as-is, and blank space is replaced with '+', and other characters are replaced with '%' + double-digit hexadecimal values. With respect to el (See Section 2.3) and Setting Value Modification (See Section 2.8), however, random '%' + double-digit hexadecimal values and ASCII characters that are not URL-encoded (excluding '&', '=', '%') are also interpreted. Particularly, the symbol ',' used in "el" is not necessarily URL-encoded.

[5] Protocol specification for partial combination check has not yet been decided. So currently it performs entire combination check.

[6] COMPEL which does not include WRITE does not perform CLOSE nor SAVE. If errors occur with WRITE or VERIFY, and setting values are not changed accordingly, CLOSE is performed. Particu
larly, the behavior when an error occurs with VERIFY is exactly the same as the behavior of CLOSE.

2.2 Transaction Attribute (pa)

Some transactions are able to control behaviors by specifying 'pa'. Table 3 below shows the value that can be specified in pa and their meanings.

pa	Related Transaction	Meaning
h	OPEN, WRITE	Forcibly start session if the setting value in the work area has not been changed.
p	WRITE, SAVE, CLOSE	Prohibit processings when session is not started.
s	SAVE	Keep session even after the setting value has been saved.

Table 3: Transaction Attributes

Multiple attributes can be specified to pa[7]. Transaction attributes are referred to when related transactions are performed. If there are no related transactions that are to be carried out, specified attributes will be ignored.[8]

2.3 Setting Value Reference (el)

You can refer the settings values in the work area by specifying setting item name using 'el' (refer to Appendix for more details). The 'el' is processed as READ transaction. The following is the format of el.

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

Subscript can be omitted for the Array Type Items (See Section 2.8). In this case it is regarded that all of the array elements are specified. When you set el=*, it is regarded that all of the setting items are specified.

2.4 Setting Type Reference (tl)

Data types of setting values can be referenced by specifying setting item name using tl (refer to Appendix for details). The format of tl is the same as that of el (See Section 2.3).

2.5 Session Identifier (id)

Exclusive controls among clients are based on the IP address of the setting client, however it is also possible to explicitly specify IP address values using id. Values can

[7] For example, if you wish to specify p and s for SAVE transaction, specify pa=ps (random order).
[8] Undefined transaction attributes are also ignored (no error occurs).

be specified in the dotted-decimal notation. Error occurs when any of the following is specified: character strings that cannot be interpreted as IP address, '0.0.0.0' or '255.255.255.255'. In that case all transactions are cancelled[9].

2.6 Error Message (em)

Specify whether or not to display error messages corresponding to errors (See Section 3.2 – 3.3) for the setting protocol output.

0 Not display Error Message (Default)
1 Display Error Message (without setting variable name)
2 Display Error Message (with setting variable name)

2.7 Language (lg)

Specify the language in which error messages are displayed for the setting protocol output. Error messages are displayed in Japanese only when 'japanese' (case-insensitive) is specified[10].

japanese	Japanese
Others	English (default)

2.8 Setting Value Modification

If you wish to change a setting value, specify a setting item (refer Appendix for more details) as CGI parameter name, and value as parameter value. The setting value modification is processed as WRITE transaction. The format is shown below.

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

Setting items are classified into two types: Simple Type (non-array type) that is a single value, and Array Type which has multiple values. The CGI parameter name of Simple Type is the setting item, however with Array Type, it will be the setting item to which a subscript (integer 0 and above) indicating the array element number is added.

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

Subscript cannot be specified as the setting item of Simple Type, concerning the Setting Value Reference (See Section 2.3) and Setting Value Modification.

Subscript cannot be omitted as the setting item of Array type, concerning the Setting Value Modification.

[9] "id" is interpreted with WRITE, OPEN and SAVE transactions but ignored with other transactions.
[10] The HTTP Accept-Language header field is not interpreted.

3 Output

The output of the setting protocol is a list of the following items in text format in order: Status, ServerError, Parameter Error, Setting Value Reference List and Rebooting Information[11]. The following is the format of output.

```
Status=Status
[ServerError=Server Error List]
[SettingError=Parameter Error List]
[Typ Setting Item Name=Data Type]
    ...
[Val Setting Item Name=Setting Value]
    ...
[reboot=Reboot or not]
END
```

Output (particularly the right-hand side of '=') is URL-encoded (excluding ':' and (,) in the error list).

3.1 Status

Status is regularly added to the head of output as processing results of all transactions included in input. The following is the value and its meaning.

0 No error
1 Server Error
2 Parameter Error (No Server Error)

3.2 Server Error

When any of the following errors is detected, it outputs ServerError. The output contents is as follows: em=0 displays only error code, and with em=1, error code: error message is displayed. If multiple errors occur, a series of errors are listed separating each error using ','.

-4: Unknown CGI parameter

Unknown CGI parameter has been specified. This error is also output for abnormal values of Transaction Type (pt) and Session Identifier (id). The CGI parameter in parenthesis is attached to error messages.

-5: Conflict CGI access

OPEN, WRITE and SAVE transactions are excluded due to sessions by other setting client. In this case, all of the transactions including READ are cancelled.

[11] Content-Type is text/plain, and the end of line is LF (vertical spacing) without CR (return).

-6: Unknown Element

Unknown setting item has been specified in Setting Value Reference (el). In this case, the specified setting item will be ignored and other setting items and transactions are processed properly.

-7: Can't allocate memory

Failed to allocate enough memory during processing of the setting protocol. In this case, all of the transactions including READ are cancelled.

-9: Subscript is over maximum

Subscript which is over the maximum value has been specified as Array Type setting variable in the Setting Value Reference (el). In this case, the specified setting item will be ignored and other setting items and transactions are processed properly.

3.3 Parameter Error (SettingError)

When any of the following errors is detected, it outputs SettingError. The output contents is: em=0 displays error code, and with em=1, error code: error message is displayed, and em=2 displays error code: error message (setting item). If multiple errors occur, a series of errors are listed separating each error using ','.

Parameter errors are generated from unit check based on data type of individual setting item (Chapter 4), or combination check between setting items[12].

-C000: read only

Unit error. Value of constant type setting item has been modified.

-C001: not specified

Unit error. No value has been specified for a setting item which does not accept empty value.

-C002: invalid format

Unit error. Value has been specified which cannot be interpreted as data type of setting item.

[12] When unit error is detected, setting value in the work area won't be changed and other transaction processing won't be affected. On the other hand the combination check is done toward setting values in the work area which have passed unit check and which changes are accepted. Even if combination error is detected, the related series of setting value will not be restored. If error occurs while combination check,

-C003: out of range

Unit error. Unavailable value has been specified which cannot be interpreted as data type of setting item.

-C004: illegal value

Combination error. Unacceptable value has been specified to IP address or other items.

-C005: illegal combination

Combination error. Combination of IP address and subnet mask is inconsistent.

-C006: duplicate value

Combination error. The value entered cannot be specified because it has already been used by another setting item.

-C007: inconsistent value

Combination error. There are inconsistent setting values with other setting items such as View Restriction.

-C021: string too long

Unit error. Character string which exceeds the limit has been entered to the string-type setting item.

-C022: illegal characters

Unit error. Value including illegal character has been specified to the string-type setting item.

-C201: too many entries

Unit error. Too many list entries which exceed the limit has been specified to the list-type setting item.

-C601: too many user entries

Unit error: Too many users which exceed the limit has been specified to the user list (gb00).

-C602: invalid user name is found

Unit error. The user list (gb00) includes invalid user name.

SAVE transaction will be cancelled.

-C603: invalid password is found

Unit error. The user list (gb00) includes invalid password.

-C611: access from all hosts is prohibited

Unit error. The host list (gc00) which prohibits access from all hosts has been specified.

-C612: too many access control entries

Unit error. Access control entry which exceeds the limit has been specified to the host list (gc00).

-C613: incorrect address is found

Unit error. The host list (gc00) includes invalid address in the access control entry.

-C616: duplicate entries are found

Unit error: The host list (gc00) includes a duplicated access control entry.

-C617: contradictory entries are found

Unit error. The host list (gc00) includes an inconsistent access control entry.

-C618: redundant entries are found

Unit error. The host list (gc00) includes a redundant access control entry.

3.4 Reference List for Setting Type and Setting Value

When READ transaction is processed, it outputs the reference list for Setting Type as 'Typ<item>=<type>' and Setting Value as 'Val<item>=<value>' for each of setting items specified with el parameter (See Section 2.3) and tl parameter (See Section 2.4). The '<item>' indicates the setting item name including subscripts, the '<value>' means setting value expressed in text format, and the '<type>' indicates setting type expressed in text format respectively.

3.5 Reboot Information (reboot)

Reboot information is attached to the end of output (just before END) when SAVE transaction is processed. The following is the value and its meaning.

0 Setting value of a setting item which requires rebooting has not been changed.
1 Setting value of a setting item which requires rebooting has been changed.

4 Data Type

The setting protocol handles various values such as numeric values and character strings. Each of the setting items has its own value format and range, and based on the format and range, each value is checked when settings are changed.

This chapter describes general rules related to setting item values as data type.

-Numeric value: int, fixed, and boolean

It includes ‘int’ shown in decimal system, and ‘fixed’ shown in fixed point number. By adding a pair of minimum and maximum values (min, max), they are expressed like ‘int(-5,5)’ or ‘fixed(0.,10)’[13]. To indicate digit numbers of decimal point field explicitly, it is expressed like ‘1.00’. As with ‘int(0,1)’, ‘boolean’ is used particularly when indicating truth-value (0 means false and 1 means true).

-Bit string: bit

It is a bit string that expresses nibbles in hexadecimal system. It is shown like ‘bit[32]’ by adding a bit length. The bit length is always multiples of 8, and the series of bit ‘0’ which is close to the end can be omitted in terms of bytes.

-Camera control parameter: coord, scope

It includes ‘coord’ used for pan/tilt range and shooting range of view restriction, and ‘scope’ used for zoom range. The coord is the same as ‘fixed(-179.99,180.00)’, and the scope is the same as ‘(0.01,300.00)’.

-Character string: name, pass, host and mail

It is comprised of character strings including the following in each character set: name (alphanumeric, ‘-’, and ‘_’), pass (characters 20-7E expressed in hexadecimal system), host (characters of name and ‘.’), and mail (characters of host and ‘@’). They are all single-byte characters and expressed indicating the maximum character length, like ‘pass[15]’ or ‘mail[63]’ (if there are multiple character strings, it is shown as [line length x line number]).

-Name: ascii and kanji

Names used for camera name, preset name and so on. Each one is a type of character strings, and there are two types as follows: ascii (characters 20-7E expressed in hexadecimal system excluding a symbol of “) and kanji (ascii

[13] If there is no restriction, it is displayed as ‘-‘, for example an unsigned integer is int(0,-). The value range is system-dependent.

characters, 2-byte kanji) [14].

-Date: date and time

It indicates date and time. The date is expressed in “yyyymmdd” which means ‘yyyy’ year, ‘mm’ month and ‘dd’ date, and the time “hhmmss” which indicates ‘hh’ hour, ‘mm’ minute and ‘ss’ second. The range of date is from 20000101 to 20371231, and that of time is from 000000 to 235959.

-Network address: inaddr

It indicates an IP address. It is widely-used description method of IP address, and is specified in the form of “xxx.xxx.xxx.xxx”. The ‘xxx’ in each field is expressed only in decimal system in the range of 0 – 255.

-Local port: lport

It is a port number of a server. Although it is the same as ‘int(1, 65535)’, the local port has a unique value in the server. The same value cannot be allocated to multiple lport setting values.

-Host access control list entry: haccent

It is an element of host list, and expressed in the form of ‘[!] addr [- addr2]’. (Both ‘addr’ and ‘addr2’ are IP addresses.)

-User account: uaccent

It is an element of user list, and expressed in the form of ‘username’ or ‘username= password’ (username is a name type, and password is pass type). The password field is used only when setting up the account. Each character is specified as digit sequences expressed in 3-digits decimal system. Please note that configured password cannot be referenced.

-Record: record

It is a complex data type. The element of record is the basic data type as mentioned above, and each element is expressed in a form connected using ‘:’. Each element can be omitted (empty value can be specified), and it is also possible to omit the part close to end of each element line. Omitted elements are handled as follows: numeris values are 0, and character strings are empty character line.

-List: <>

[14] Japanese character set corresponds to JIS X0208-1990, and codes correspond to Japanese EUC and Shift-JIS. Although character strings of kanji are saved in EUC code, ascii characters are also handled as 2-byte characters because Unicode (UCS-2) is basically used for WebView.

It is a variable-length list of basic data type or record. It is shown like ‘date<32>’ by adding the maximum length to the type. Every element of the list is the same type and is expressed in a form connected using ‘:’. The order and duplication of elements vary depending on each list.

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Legend

Capacity, data type, default value, attribute and meaning of each setting item are shown in the table format as follows.

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
zz00	0	int	0	RWB-P	Non-array type integer	*a
zz01	99	name		RW-O-	Array type character string	

*a Precautions about zz00.

-Capacity: Number of array type elements. It will be a maximum value of subscript +1 for array type setting value, and 0 for non-array type setting value.

-Data type: Data type of setting value (Chapter 4).

-Default value: Factory default setting value.

-Attribute:It is comprised of: R (readable), W (writable), B (reboot required when setting changed), O (an empty value can be specified), and P (preserve the setting value even when the factory default setting values has been restored). Only '-' is not included.

System Administration

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
aa00	0	const	root	R----	System administrator name	
aa01	0	pass[8]	VB-C50i	-W-O-	Administrator password	*a
aa03	0	pass[8]	VB-C50i	-W-O-	Administrator password	*a
bb00	0	const	admin	R----	Setting page URL	

*a Specify 'aa01' with a character string, and 'aa03' with character code (digit sequences expressed in 3-digits decimal system). If an empty value has been specified, the value will not be changed.

Clock and Time Zone

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
bc00	0	fixed(-12,13)	9	RW---	Time zone (time difference with GMT)	*a
bc01	0	int(0,1)	0	RW---	Setting method of clock	*b
bc10	0	inaddr		RW-OP	IP address of NTP server	*c
bc20	0	date:time	(System-dependent)	RW---	Date and time	*d

*a Hourly base, the smallest unit is 0.5.
*b 0: Specify time using bc20. 1: NTP server (disabled when 'bc10' is empty).
*c Valid when 'bc01' is 1, and an empty value cannot be specified.
*d Valid when 'bc01' is 0. Otherwise ignored. The format is 'yyyymmssHHMMSS' (year in 4 digits; month, day, hour, minute, second in 2 digits).

Ethernet

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ca00	0	const	1	R----	Use Ethernet (Used)	
ca01	0	int(0,1)	0	RWB-P	IP address setting method	*a
ca02	0	inaddr	192.168.100.1	RWB-P	IP address	
ca03	0	inaddr	255.255.255.0	RWB-P	Subnet mask	
ca06	0	boolean	1	RW---	Use IP installer	
ca10	0	int(0,4)	0	RW---	LED setting	*b

*a 0: Manual setting, 1: Auto setting (DHCP)
*b 0: Blinks during Communication, 1: Turn the LED OFF, 2: Steady Green LED, 3: Steady Red LED, 4: Steady Orange LED

Route Control

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
cc00	0	const	0	R----	Default gateway network interface (Ethernet)	
cc01	0	inaddr		RWBOP	Default gateway address	

Connection Keeping

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
cd00	0	boolean	0	RWB--	Send packet regularly	
cd01	0	inaddr		RWBO-	Target IP address	*a
cd02	0	int(1,60)	1	RWB--	Interval	

*a Valid when 'cd00' is 1, and an empty value cannot be specified.

Packet Size

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
cf00	0	int(576,1500)	1500	RW---	Maximum packet size	
cf10	0	int(0,50)	0	RW---	Video transmission buffer size (0: default, or 1-: buffer size in 1460 bytes)	

Camera Common Settings

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
da00	0	const	0	R----	Main camera (built-in camera)	
da01	1	const	1	R----	Baud rate of Camera Control Port (9600bps)	
da02	0	boolean	0	RW---	Return to home position when nobody has a control privilege.	
da03	0	const	0	R----	Video input selection method (single)	
da04	0	const	1:NTSC 2:PAL	R----	Video signal format	

Camera Individual Settings

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
db00	2	boolean	(Camera-dependent)	RW---	Use this camera	*a
db01	2	ascii[15]	(Camera-dependent)	RW-O-	Camera name (English)	*b
db02	2	kanji[15]		RW-O-	Camera name (Japanese)	
db03	2	boolean	0	RW---	Use a wide-converter	
db05	2	int(0,2)	1	RW---	Video capture size	*c
db06	2	int(1,100)	50	RW---	Video quality	*d
db07	2	int(0,2)	(Camera-dependent)	RW---	Camera control port	*e
db08	2	const	0	R----	Cascade number	
db11	2	coord		RW-O-	Home position: Pan	
db12	2	coord		RW-O-	Home position: Tilt	
db13	2	scope		RW-O-	Home position: Zoom	
db14	2	int(0,1)	0	RW---	Home position: Brightness	*f
db15	2	int(0,2)	0	RW---	Shutter speed	*g
db16	2	int(0,2)	0	RW---	Focus mode	*h
db20	2	boolean	0	RW---	Appliy view restriction	
db21	2	coord		RW-O-	View restriction: Upper end	
db22	2	coord		RW-O-	View restriction: Lower end	
db23	2	coord		RW-O-	View restriction: Left end	
db24	2	coord		RW-O-	View restriction: Right end	
db25	2	scope		RW-O-	View restriction: Telephoto	
db26	2	scope		RW-O-	View restriction: Wide-angle	
db31	2	int	0	RW---	Camera option	*i

*a The main camera is always 1 which cannot be changed. The default value of external camera is 0 and it is changeable.
*b The default value of main camera is 'Camera', and that of external camera is 'Camera2'.
*c Change 'dr01' to a specified value. If the corresponding video image is 0, it is changed to 50. The only valid value is 'db05-0', and 'db05-1' is a dummy.
*d Change all of the dq01 – dq03 to a specified value. The initial value of db06 is corresponded to the video quality (dq01 – dq03) against dr01.
*e 0: Not used, 1: Port1, 2: Port2. The main camera is 1 (default) or 0. For the external camera, 2 or 0 (default) can be specified.
*f 0: Standard, 1: Brighter
*g With NTSC model; 0: Auto, 1: 1/60, 2: 1/100. With PAL model; 0: Auto, 1: 1/50, 2: 1/120
*h 0: Auto, 1: Fixed at infinity, 2: Auto (for domes)
*i Integer value which expresses OR of the following bit field (bit 0 from the LSB side).
- Bit 0: Clock display (0: OFF, 1: ON)
- Bit 4-6 Maximum tilt angle (0: Standard <90 degrees max.> - 7: Minimum <20 degrees min.>, smallest unit is 10 degrees, available only for upright mount type)
- Bit 9-12 IR light ON time: 0: 30 minutes, - 15: 8 hours. The smallest unit is 30 minutes.
- Bit 13-20 Aperture adjustment (0: Default, 1-255: Aperture adjustment value)

Video Capture

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
dq01	2	int(0,100)	50	RW---	Video quality (Q-factor)/Small size	*b
dq02	2	int(0,100)	50	RW---	Video quality (Q-factor)/Medium size	*b
dq03	2	int(0,100)	50	RW---	Video quality (Q-factor)/Large size	*b
dr01	0	int(0,2)	1	RW---	Video size/Video Transmission	*c
dr02	0	int(0,1)	0	RW---	Video size/Motion Detection	*c
dr03	0	int(0,2)	1	RW---	Video size/Picture Recording	*c
ds01	0	record(*a)	0:0:255:255	RWB--	Capture range/Small Size	
ds02	0	record(*a)	0:0:255:255	RWB--	Capture range/Medium Size	
ds03	0	record(*a)	0:0:255:255	RWB--	Capture range/Large Size	
dt00	0	int(0,1)	0	RWB--	Interlace mode	*d

dv00	0	int(0,1)	0	RW---	Add authentication information to picture	

*a Indicate Left end: Upper end: Width: Height (int:int:int:int). Shown in 8x8 block unit (the effective value range varies depending on NTSC or PAN model.)
*b 0: Not used, 1-100: JPEG Q-factor
*c 0: Small size, 1: Medium size, 2: Large size
*d 0: Weave (interlace), 1: Bob (non-interlace)

Preset

Name	Capacity	Data type	Default value	Attribute	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	kanji[15]		RW-O-	Preset name (Japanese)	
ea03	20	int(0,0)	0	RW---	Camera	*c
ea04	20	coord		RW-O-	Pan	
ea05	20	coord		RW-O-	Tilt	
ea06	20	scope		RW-O-	Zoom	
ea07	20	int(0,1)	0	RW---	Brightness	
ea08	0	boolean	0	RW---	Restrict camera control to preset	

*a 0: Picture recording only, 1: Picture recording and video transmission
*b Empty value cannot be specified when corresponding 'ea00' is set to 1.
*c 0: Main camera, 1: External camera

Auto Preset Tour

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ea10	0	int(0,2)	0	RW---	Auto preset tour	*c
ea11	0	record(*a)<20>		RW-O-	Preset schedule	
ea20	0	record(*b)	0:0:0:0:0	RW---	Restrict preset tour time	

*a Preset (int(1,20)): Speed (int(0,255)): Pause(int(0,65535)). The camera speed is shown as follows: upper 4 bits are PT speed, and lower 4 bits are Z speed
*b Time Restriction ON/OFF (boolean): Start Time Hour (int(0,23)): Start Time Minute (int(0,59)): End Time Hour (int(0,23)): End Time Minute (int(0,59)). When the Time Restriction is true and the following combinations are the same: Start Time Hour and Start Time Minute, End Time Hour and End Time Minutes, it causes C002 error.
*c 0: Not used, 1: For Viewers, 2: Always

External Device Name

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
fa06	2	ascii[15]		RW-O-	External input device name (English)	
fa07	2	kanji[15]		RW-O-	External input device name (Japanese)	
fa08	3	ascii[15]		RW-O-	External output device name (English)	
fa09	3	kanji[15]		RW-O-	External output device name (Japanese)	

E-mail Notification

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
fn00	2	int(1,2)	1	RW---	Type of notification	*a
fn01	2	ascii[31]		RW-O-	Subject	
fn02	2	ascii[255]		RW-O-	Text	*b

*a 1: Text only, 2: Text and recorded picture. Subscript 0 attached to fn00 - fn02 is intended for External Input Device, and subscript 1 is for Motion Detection.
*b Available to specify '% character' as follows ('%' is deleted for undefined characters).

%n	Reason for shot (number)	1(external device input 1) | 2(external device input 2) | 129(Motion detection)
%N	Reason for shot (text)	"External Input Device Name"
%X	Image width	Number of horizontal pixels
%Y	Image height	Number of vertical pixels
%Q	Video quality	10-100
%C	Camera number	1-2
%D	Camera name	"Camera Name" setting value
%P	Pan position	-179.99 to 180.00
%T	Tilt position	-179.99 to 180.00
%Z	Zoom position	0.1 to 300.00
%V	Camera server	VB-C50i
%y	Year of shot	2000 - 2038
%m	Month of shot	1-12
%d	Date of shot	1-31
%w	Day of shot	0-6 (correspond to Sunday to Saturday)
%H	Hour of shot	00-23
%M	Minute of shot	00-59
%S	Second of shot	00-59
%z	Time zone of shot	-1200 to +1200
%a	Weekday of shot	Sun | Mon | Tue | Wed | Thu | Fri | Sat
%b	Name of month of shot	Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec
%t	Tab	
%q	" (double-quotation)	
%%	%	

Low Server CapacityNotification

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
fr00	0	boolean	0	RW---	Perform low server capacitynotification	
fr01	0	int(0,100)	0	RW---	Free space (the smallest unit: 0.1MB)	
fr10	0	host[63]		RW-O-	Host	*a
fr11	0	int(1,65535)	1906	RW---	Port	
fr12	0	ascii[255]		RW-O-	Warning message	

*a Empty value cannot be specified when 'fr00' is set to 1.

User Access Control

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
gb00	0	uaccent<50>		RW-O-	User (+ password) list	*a
gb11	0	boolean	0	RW---	Access permitted to listed users only	
gb13	0	boolean	0	RW---	Audio Transmission permitted to listed users only	
gb14	0	boolean	0	RW---	Still Image Capture 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 registerd user, you don't have to enter the password. You cannot register a user without entering a password.

Host Access Control

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
gc00	0	haccent<30>		RW-O-	Host list	
gc11	0	boolean	0	RW---	Apply this list to HTTP Server	*a
gc12	0	boolean	0	RW---	Apply this list to Video Transmission	*a
gc13	0	boolean	0	RW---	Apply this list to Audio Transmission	*a
gc14	0	boolean	0	RW---	Apply this list to Still Image Capture	*a

*a When gc11 is 1, a host list is applied to Video Transmission, Audio Transmission and Still Image Capture. And if the gc12 is 1, a host list is applied to Autio Transmission and Still Image Capture.

Camera Server

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ha00	0	lport	65310	RWB--	Video Transmission Port	
ha01	0	lport	65311	RWB--	Camera Control Port	
ha03	0	int(1,50)	50	RW---	Maximum Number of Clients	
ha04	0	int(0,50)	50	RW---	Control Queue Length	
ha05	0	fixed(0.1,30.0)	30	RW---	Maximum Frame Rate	*b
ha06	0	int(0,65535)	0	RW---	Maximum Connection Time	
ha07	0	int(1,3600)	20	RW---	Camera Control Time	
ha08	0	int(0,10000)	1500	RW---	Camera Stabilization Time	
ha15	0	int(0,10)	0	RW---	Max. Transmission Rate	
ha20	0	record(*a)	0:0:0:0:0	RW---	Restrict Service Time	

*a Service Time Restriction ON/OFF (boolean): Start Time Hour (int(0,23)): Start Time Minute (int(0,59)): End Time Hour (int(0,23)): End Time Minute (int(0,59)). When the Time Restriction is true and the following combinations are the same: Start Time Hour and Start Time Minute, End Time Hour and End Time Minutes, it causes C002 error.

*b With PAL model, data type is fixed(0.1,25.0) and the default value is 25.0.

Audio Server

Name	Capacity	Data type	Default value	Attribute	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	int(0,100)	0	RW---	Noise Cancellor (doubled dB value)	*c
hb06	0	boolean	0	RW---	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

Audio Recording and Playback

Name	Capacity	Data type	Default value	Attribute	Meaning	Note

hp10	8	ascii[15]		RW-O-	Sound Clip Name	*a
hr00	0	int(0,255)	10	RW---	Recording Capacity Restriction (the smallest unit: 0.1MB)	*b

*a If you wish to set a non-blank character string to hp10-<i>, there must be non-blank file/etc/audio/<i>.raw.
*b Not used.

HTTP Server

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ia00	0	lport	80	RWB--	HTTP Port	
ia01	0	const	10	R----	Keep Alive Time	
ia02	0	inaddr		RW-O-	Global Address for Web Pages: IP Address	
ia03	0	name[15]		RW-O-	Global Address for Web Pages: Port Name	
ia04	0	int(0,1)	0	RW---	Global Address for Web Pages: Format	*a

*a 0: IP Address, 1: Host Name

DNS/DDNS

Name	Capacity	Data type	Default value	Attribute	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	

Mail

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ic00	0	host[63]		RW-O-	Mail Server Host	
ic01	0	mail[63]		RW-O-	Sender's (From) Mail Address	
ic02	0	mail[63]		RW-O-	Recipient (To) Mail Address	
ic10	0	boolean	0	RW---	POP before SMTP	
ic11	0	name[31]		RW-O-	User Name	
ic12	0	pass[31]		RW-O-	Password	
ic13	0	host[63]		RW-O-	POP Server	

Motion Detection

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
oa00	0	boolean	1	RW---	Enable Motion Detection	
oc00	8	int(0,20)	0	RW---	Preset	*e
oc08	8	int(0,300)	0	RW---	Frame Rate	*f
oe00	8	boolean	0	RW---	Start Auto Tracking when Motion Detection is Started.	*g
oe09	8	int(1,300)	60	RW---	Maximum Tracking Time (sec.)	
oi10	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area1 Parameter	
oi20	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area2 Parameter	
oi30	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area3 Parameter	
oi40	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area4 Parameter	
oj10	8	record(*b)	0:0:0:0:1:0:1:1:0	RW---	Picture Recording Parameter	*h
oj11	8	record(*c)	0:50:0:0:0:0:0	RW---	Audio Recording & Playback Parameter	*h
oj20	8	record(*d)<3>	0:0,0:0,0:0	RW-O-	External Output Device Control Parameter	*h

*a Effective Area (boolean): Left end (int(0,W-1)): Upper end(int(0,H-1)): Right end (int(1,W)): Lower end (int(1,H)): Sensitivity (int(1,256)): Area Ratio (int(0:S)): Duration (int(0,100)). The left-end, upper-end, right-end and lower-end are the motion detection area (based on DCT block). If the values are not left-end<right-end, and/or upper-end<lower-end, it causes C002 error. Default values are as follows: oi10; 1:0:0:W/2:H/2:20:S/32:0, oi20; 0:W/2:0:W:H/2:20:S/32:0, oi30; 0:0:H/2:W/2:H:20:S/32:0, and oi40; 0:W/2:H/2:W:H:20:S/32:0. The values of W, H and S are as follows: NTSC model; (W,H,S) = (80,60,4800), and PAL model; (W,H,S) = (96,72,6912).
*b Enable Prior Edge Recording (boolean): Enable Level Recording (boolean): Enable Posterior Edge Recording (boolean): Pre-edge Recording Time (int(0,10)): Pre-edge Recording Interval (fixed(0.1,1)): Post-edge Recording Time (int(0,10)): Post-edge Recording Interval (fixed(0.1,1)): Level Recording Interval (int(1:900)): E-Mail Transmission (boolean). All of these items are set in seconds.
*c Behavior Specification (int(0,15)): Audio Playback Volume (int(1,100)): Sound Clip Number (int(0,7)): Specification when playback is overlapped (int(0,1)): Audio Playback Time (int(-1,-)): Pre-event Recording Time (int(0,10)): Post-event Recording Time (int(0,60)). The order of Behavior Specifications is as follows starting from the LSB, and the values are shown in combined items of the following: Playback at ON event, Playback at OFF event, Recording at ON event, Recording at OFF event. The details of specification when playback is overlapped are as follows: 0: Prior event has a priority, 1: Posterior event has a priority. Playback Time and Recording Time are both set in seconds (-1 means unlimited).
*d Output Control (boolean): Delay Time (int(0,30)). The delay time is set in seconds. The order of list is External Device 1, External Device 2, and External Device 3 from the left side.
*e 0: Not specified, 1-20: Presets
*f 0: No limit, 1-300: Frame per 10 sec. (1-250 with PAL model)
*g 0: Disable Auto Track, 1: Enable Auto Track
*h The oc00-oi40 and oj10-oj20 are handled as independent parameter sets (with the element of service No. 3 included in Schedule Behavior sc04, the following parameters are referenced: parameters of oc00-oi40 from Parameter Number, and parameters of oj10-oj20 from Action Number).

System Attribute Information

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ra00	0	const	VB-C50i	R----	Model Name	
ra01	0	const	Ver. 1.0 Rev. xx	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	36,…(*a)	R----	Schedule Parameter Specification	
ra06	0	const	0:0(*b)	R----	Night Mode Control Specification	
ra09	0	const	2	R----	Number of Video Input Channelsm	
ra10	0	const	640x480	R----	Maximum Image Size (768x576 with PAL model)	

*a A list of: Total number of schedules (36), Number of Interval Timer System (4), Number of Interval Timer Action (4), Number of Motion Detection System (8), Number of Motion Detection Action (8), Number of External Device Input System (2), Number of External Device Input Action (4), Number of External Device Output System (3), Number of External Device Output Action (6), Number of Night Mode System (1), and Number of Night Mode Action (2).

*b Unavailable to remove IR Cut Filter: Unavailable to turn the IR light ON (Note: With Firmware Ver. 1.0, ra06 cannot be referenced, therefore it is handled as '0:0'.)

Schedule

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sc00	36	record(*a)	128:0 (Invalid value)	RW---	Type and Level	
sc01	36	ascii[15]		RW-O-	Schedule Name (English)	
sc02	36	kanji[15]		RW-O-	Schedule Name (Japanese)	
sc03	36	record(*b)	0:0:0:0:0:0:00	RW---	Specify Timetable	
sc04	36	record(*c)<8>		RW-O-	Behavior	*d
sd00	4	date<32>		RW-O-	Specify year, month and day	*e
sd01	4	bit[384]	00 ... 00	RW-O-	Specify month and day	*f

*a Type (int(0,3)): Level (int(0,255)). Details of the type are as follows: 0: Scheduled/Disabled, 1: Scheduled/Enabled, 2: Always/Disabled, 3: Always/Enabled.

*b Start (int(0,1440)): End(int(0,1440)): Cycle (int(-1,32)): Attribute (Int(0,255)): Period (int(0,255)): Year, month and day (int(0,3)): Specify Date (bit[32]). The bit string of Specify Date corresponds as follows: the first date to the first bit, and following n' dates to (n-1) bits.

*c Service Number (int(1,5)): Parameter Number (int): Action Number (int). The details of Service Number are as follows: 0: None, 1: Interval Timer, 2: External Device Input, 3: Motion Detection, 4: External Device Output, and 5: Night Mode. Both of the Parameter Numbers and Actions Numbers are integers 0 or greater that indicate corresponsing relation with after-mentioned parameter sets. The maximum value is as follows: Service 0: 0/0, Service 1: 3/3, Service 2: 1/3, Service 3: 7/7, Service 4: 2/5, and Srvice 5: 0/1 (m/n: Max. value of Parameter Number/Max. value of Action Number).

*d The following duplication is not acceptable: For Service Number 1, 3 and 5, duplication of Service Numbers: For Service Number 2 and 4, duplication of Service Number and Parameter Number.

*e Elements are sorted in ascending order, and duplicated ones are implicitly discarded (the order of specification is random).

*f Bit strings are devided into 32-bit word, and 'm' month 'n' day corresponds to the (n-1)th bit of the (m-1)th word.

Interval Timer

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
so00	4	int(0,-)	0	RW---	Picture Recording Interval	*d
so01	4	record(*a)	0:0	RW---	Audio Recording Playback Interval	*d
so10	4	record(*b)	0:0:0:0	RW---	Picture Recording Parameter	*d
so11	4	record(*c)	0:50:0:0:0:0:0	RW---	Audio Recording Playback Parameter	*d

*a Playback Interval (int(0,-)): Audio Recording Interval (int(0,-)). The Playback and Audio Recording Intervals are set in seconds.

*b Picture Recording (boolean): Camera Position (int(0:20)): Camera Stabilization Time (int(0:10)): Preset Tour, Return to Home Position (boolean). Camera Position will be 0: Not Specified or 1-20: Preset. Camera Stabilization Time is set in seconds. With the Preset Tour and Return to Home Position, it specifies whether or not performing auto preset tour or return the camera to a home position after picture recording has finished.

*c Behavior Specification (int(0,15)): Audio Playback Volume (int(1,100)): Sound Clip Number (int(0,7)): Specification when playback is overlapped (int(0,1)): Audio Playback Time (int(-1,-)): Pre-event Recording Time (int(0,10)): Post-event Recording Time (int(0,60)). The order of Behavior Specifications is as follows starting from the LSB, and the values are shown in combined items of the following: Playback at specified interval, Audio Recording at specified interval, Playback when pictures are recorded, and Audio Recording when pictures are recorded. The details of specification when playback is overlapped are as follows: 0: Prior event has a priority, 1: Posterior event has a priority. Time is set in seconds (-1 means unlimited).

*d With the element of service No. 1 included in Schedule Behavior sc04, the following parameters are referenced: parameters of so00-so01 from Parameter Number, and parameters of so10-so11 from Action Number.

External Device Input

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sp10	4	record(*a)	0:0:0:0:1:0:1:1 :0:0	RW---	Picture Recording Parameter	*d
sp11	4	record(*b)	0:50:0:0:0:0:0	RW---	Audio Recording Playback Parameter	*d
sp20	4	record(*c)<3>	0:0,0:0,0:0	RW-O-	External Output Device Control Parameter	*d

*a Enable Prior Edge Recording (boolean): Enable Level Recording (int(0,0)): Enable Posterior Edge Recording (boolean): Pre-edge Recording Time (int(0,10)): Pre-edge Recording Interval (fixed(0.1,1)): Post-edge Recording Time (int(0,10)): Post-edge Recording Interval (fixed(0.1,1)): Level Recording Interval (int(1:900)): E-Mail Transmission (boolean): Camera Position (int(0,20)). All of these items are set in seconds. Camera Position will be 0: Not Specified or 1-20: Preset.

*b Behavior Specification (int(0,15)): Audio Playback Volume (int(1,100)): Sound Clip Number (int(0,7)): Specification when playback is overlapped (int(0,1)): Audio Playback Time (int(-1,-)): Pre-event Recording Time (int(0,10)): Post-event Recording Time (int(0,60)). The order of Behavior Specifications is as follows starting from the LSB, and the values are shown in combined items of the following: Playback at ON event, Playback at OFF event, Recording at ON event, Recording at OFF event. The details of specification when playback is overlapped are as follows: 0: Prior event has a priority, 1: Posterior event has a priority. Playback Time and Recording Time are both set in seconds (-1 means unlimited).

*c Output Control (boolean): Delay Time (int(0,30)). The delay time is set in seconds. The order of list is External Device 1, External Device 2, and External Device 3 from the left side.

*d With the element of service No. 2 included in Schedule Behavior sc04, the External Input Device Terminal is specified from Parameter Number, and parameters of sp10-sp20 are referred from Action Number.

External Device Output

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sq10	6	record(*a)	0:0:0	RW---	External Output Device Control Parameter	*b

*a Output Control (boolean): Output Interval (int(0,-)): Output Time (int(0,-)). The Output Interval and Output Time are both set in seconds.

*b With the element of service No. 4 included in Schedule Behavior sc04, the External Output Device Terminal is specified from System Number, and parameter of sq10 is referred from Action Number.

Night Mode

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sr10	2	record(*a)	0:0	RW---	Night Mode Setting Parameter	*b

*a Night Mode Setting (int(0,7)): Shutter Speed (int(0,255). The Night Mode Setting specifies ON or OFF of Slow Shutter, Infrared Light, and Removal of Infrared Cut Filter in decimal system of bit strings, starting in order from LSB. Shutter Speed is 0: Slowest Shutter Speed or 1~: inverse number of Shutter Speed.

*b With the element of classified No. 5 included in Schedule Behavior sc04, the parameter of sr10 is referenced from Action Number (Number is 0).

B Setting Parameter of VB-C50Fi

Legend

Capacity, data type, default value, attribute and meaning of each setting item are shown in the table format as follows.

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
zz00	0	int	0	RWB-P	Non-array type integer	*a
zz01	99	name		RW-O-	Array type character string	

*a Precautions about zz00.

-Capacity: Number of array type elements. It will be a maximum value +1 of subscript for array type setting value, and 0 for non-array type setting value.

-Data type: Data type of setting value (Chapter 4).

-Default value: Factory default setting value.

-Attribute:It is comprised of: R (readable), W (writable), B (reboot required when setting changed), O (an empty value can be specified), and P (preserve the setting value even when the factory default setting values are restored). Only '-' is not included.

System Administration

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
aa00	0	const	root	R----	System administrator name	
aa01	0	pass[8]	VB-C50i	-W-O-	Administrator password	*a
aa03	0	pass[8]	VB-C50i	-W-O-	Administrator password	*a
bb00	0	const	admin	R----	Setting page URL	

*a Specify 'aa01' with a character string, and 'aa03' with character code (digit sequences expressed in 3-digits decimal system). If an empty value has been specified, the value will not be changed.

Clock and Time Zone

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
bc00	0	fixed(-12,13)	9	RW---	Time zone (time difference with GMT)	*a
bc01	0	int(0,1)	0	RW---	Setting method of clock	*b
bc10	0	inaddr		RW-OP	IP address of NTP server	*c
bc20	0	date:time	(System-dependent)	RW---	Date and time	*d

*a Hourly base, the smallest unit is 0.5.
*b 0: Specify time using bc20. 1: NTP server (disabled when 'bc10' is empty).
*c Valid when 'bc01' is 1, and an empty value cannot be specified.
*d Valid when 'bc01' is 0. Otherwise ignored. The format is 'yyyymmssHHMMSS' (year in 4 digits; month, day, hour, minute, second in 2 digits).

Ethernet

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ca00	0	const	1	R----	Use Ethernet (Used)	
ca01	0	int(0,1)	0	RWB-P	IP address setting method	*a
ca02	0	inaddr	192.168.100.1	RWB-P	IP address	
ca03	0	inaddr	255.255.255.0	RWB-P	Subnet mask	
ca06	0	boolean	1	RW---	Use IP installer	
ca10	0	int(0,4)	0	RW---	LED setting	*b

*a 0: Manual setting, 1: Auto setting (DHCP)
*b 0: Blinks during Communication, 1: Turn the LED OFF, 2: Steady Green LED, 3: Steady Red LED, 4: Steady Orange LED

Route Control

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
cc00	0	const	0	R----	Default gateway network interface (Ethernet)	
cc01	0	inaddr		RWBOP	Default gateway address	

Connection Keeping

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
cd00	0	boolean	0	RWB--	Send packet regularly	
cd01	0	inaddr		RWBO-	Target IP address	*a
cd02	0	int(1,60)	1	RWB--	Interval	

*a Valid when 'cd00' is 1, and an empty value cannot be specified.

Packet Size

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
cf00	0	int(576,1500)	1500	RW---	Maximum packet size	
cf10	0	int(0,50)	0	RW---	Video transmission buffer size (0: default, or 1-: buffer size in 1460 bytes)	

Camera Common Settings

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
da00	0	const	0	R----	Main camera (built-in camera)	
da01	1	const	1	R----	Baud rate of Camera Control Port (9600bps)	
da02	0	boolean	0	RW---	Return to home position when nobody has a control privilege.	
da03	0	const	0	R----	Video input selection method (single)	
da04	0	const	1:NTSC 2:PAL	R----	Video signal format	

Camera Individual Settings

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
db00	2	boolean	(Camera-dependent)	RW---	Use this camera	*a
db01	2	ascii[15]	(Camera-dependent)	RW-O-	Camera name (English)	*b
db02	2	kanji[15]		RW-O-	Camera name (Japanese)	
db03	2	boolean	0	RW---	Use a wide-converter	
db05	2	int(0,2)	1	RW---	Video capture size	*c
db06	2	int(1,100)	50	RW---	Video quality	*d
db07	2	int(0,2)	(Camera-dependent)	RW---	Camera control port	*e
db08	2	const	0	R----	Cascade number	
db11	2	int(0,0)		RW-O-	Home position: Pan	
db12	2	int(0,0)		RW-O-	Home position: Tilt	
db13	2	scope		RW-O-	Home position: Zoom	
db14	2	int(0,1)	0	RW---	Home position: Brightness	*f
db15	2	int(0,2)	0	RW---	Shutter speed	*g
db16	2	int(0,2)	0	RW---	Focus mode	*h
db20	2	boolean	0	RW---	Appliy view restriction	
db21	2	coord		RW-O-	View restriction: Upper end	
db22	2	coord		RW-O-	View restriction: Lower end	
db23	2	coord		RW-O-	View restriction: Left end	
db24	2	coord		RW-O-	View restriction: Right end	
db25	2	scope		RW-O-	View restriction: Telephoto	
db26	2	scope		RW-O-	View restriction: Wide-angle	
db31	2	int	0	RW---	Camera option	*i

*a The main camera is always 1 which cannot be changed. The default value of external camera is 0 and it is changeable.
*b The default value of main camera is 'Camera', and that of external camera is 'Camera2'.
*c Change 'dr01' to a specified value. If the corresponding video image is 0, it is changed to 50. The only valid value is 'db05-0', and 'db05-1' is a dummy.
*d Change all of the dq01 – dq03 to a specified value. The initial value of db06 is corresponded to the video quality (dq01 – dq03) against dr01.
*e 0: Not used, 1: Port1, 2: Port2. The main camera is 1 (default) or 0. For the external camera, 2 or 0 (default) can be specified.
*f 0: Standard, 1: Brighter
*g With NTSC model; 0: Auto, 1: 1/60, 2: 1/100. With PAL model; 0: Auto, 1: 1/50, 2: 1/120
*h 0: Auto, 1: Fixed at infinity, 2: Auto (for domes)
*i Integer value which expresses OR of the following bit field (bit 0 from the LSB side).
Bit 0: Clock display (0: OFF, 1: ON)
Bit 13-20 Aperture adjustment (0: Default, 1-255: Aperture adjustment value)

Video Capture

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
dq01	2	int(0,100)	50	RW---	Video quality (Q-factor)/Small size	*b
dq02	2	int(0,100)	50	RW---	Video quality (Q-factor)/Medium size	*b
dq03	2	int(0,100)	50	RW---	Video quality (Q-factor)/Large size	*b
dr01	0	int(0,2)	1	RW---	Video size/Video Transmission	*c
dr02	0	int(0,1)	0	RW---	Video size/Motion Detection	*c
dr03	0	int(0,2)	1	RW---	Video size/Picture Recording	*c
ds01	0	record(*a)	0:0:255:255	RWB--	Capture range/Small Size	
ds02	0	record(*a)	0:0:255:255	RWB--	Capture range/Medium Size	
ds03	0	record(*a)	0:0:255:255	RWB--	Capture range/Large Size	
dt00	0	int(0,1)	0	RWB--	Interlace mode	*d
dv00	0	int(0,1)	0	RW---	Add authentication information to picture	

*a Indicate Left end: Upper end: Width: Height (int:int:int:int). Shown in 8x8 block unit (the effective value range varies depending on NTSC or PAN model.)

*b 0: Not used, 1-100: JPEG Q-factor
*c 0: Small size, 1: Medium size, 2: Large size
*d 0: Weave (interlace), 1: Bob (non-interlace)

Preset

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ea00	10	int(0,1)	0	RW---	Preset applicable range	*a
ea01	10	ascii[15]		RW-O-	Preset name (English)	*b
ea02	10	kanji[15]		RW-O-	Preset name (Japanese)	
ea03	10	int(0,0)	0	RW---	Camera	*c
ea04	10	Int(0,0)		RW-O-	Pan	
ea05	10	Int(0,0)		RW-O-	Tilt	
ea06	10	scope		RW-O-	Zoom	
ea07	10	int(0,1)	0	RW---	Brightness	
ea08	0	boolean	0	RW---	Restrict camera control to preset	

*a 0: Picture recording only, 1: Picture recording and video transmission
*b Empty value cannot be specified when corresponding 'ea00' is set to 1.
*c 0: Main camera, 1: External camera

Auto Preset Tour

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ea10	0	int(0,2)	0	RW---	Auto preset tour	*c
ea11	0	record(*a)<10>		RW-O-	Preset schedule	
ea20	0	record(*b)	0:0:0:0:0	RW---	Restrict preset tour time	

*a Preset (int(1,10)): Speed (int(0,15)): Pause(int(0,65535)). The camera speed is equal to the zoom speed (0: Slow, and it becomes faster with the number increases up to 15).
*b Time Restriction ON/OFF (boolean): Start Time Hour (int(0,23)): Start Time Minute (int(0,59)): End Time Hour (int(0,23)): End Time Minute (int(0,59)). When the Time Restriction is true and the following combinations are the same: Start Time Hour and Start Time Minute, End Time Hour and End Time Minutes, it causes C002 error.
*c 0: Not used, 1: For Viewers, 2: Always

External Device Name

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
fa06	2	ascii[15]		RW-O-	External input device name (English)	
fa07	2	kanji[15]		RW-O-	External input device name (Japanese)	
fa08	3	ascii[15]		RW-O-	External output device name (English)	
fa09	3	kanji[15]		RW-O-	External output device name (Japanese)	

E-mail Notification

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
fn00	2	int(1,2)	1	RW---	Type of notification	*a
fn01	2	ascii[31]		RW-O-	Subject	
fn02	2	ascii[255]		RW-O-	Text	*b

*a 1: Text only, 2: Text and recorded picture. Subscript 0 attached to fn00 - fn02 is intended for External Input Device, and subscript 1 is for Motion Detection.
*b Available to specify '% character' as follows ('%' is deleted for undefined characters).

%n	Reason for shot (number)	1(external device input 1) | 2(external device input 2) | 129(Motion detection)
%N	Reason for shot (text)	"External Input Device Name" (External Input Device 1-3 when omitted) | Motion Detection)
%X	Image width	Number of horizontal pixels
%Y	Image height	Number of vertical pixels
%Q	Video quality	10-100
%C	Camera number	1-2
%D	Camera name	"Camera Name" setting value
%P	Pan position	0
%T	Tilt position	0
%Z	Zoom position	0.1 to 300.00
%V	Camera server	VB-C50Fi
%y	Year of shot	2000 - 2038
%m	Month of shot	1-12
%d	Date of shot	1-31
%w	Day of shot	0-6 (correspond to Sunday to Saturday)
%H	Hour of shot	00-23
%M	Minute of shot	00-59
%S	Second of shot	00-59
%z	Time zone of shot	-1200 to +1200
%a	Weekday of shot	Sun | Mon | Tue | Wed | Thu | Fri | Sat
%b	Name of month of shot	Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec
%t	Tab	
%q	" (double-quotation)	
%%	%	

Low Server CapacityNotification

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
fr00	0	boolean	0	RW---	Perform low server capacitynotification	
fr01	0	int(0,100)	0	RW---	Free space (the smallest unit: 0.1MB)	
fr10	0	host[63]		RW-O-	Host	*a
fr11	0	int(1,65535)	1906	RW---	Port	
fr12	0	ascii[255]		RW-O-	Warning message	

*a Empty value cannot be specified when 'fr00' is set to 1.

User Access Control

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
gb00	0	uaccent<50>		RW-O-	User (+ password) list	*a
gb11	0	boolean	0	RW---	Access permitted to listed users only	
gb13	0	int(0,0)	0	RW---	Audio Transmission permitted to listed users only	
gb14	0	boolean	0	RW---	Still Image Capture 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 registerd user, you don't have to enter the password. You cannot register a user without entering a password.

Host Access Control

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
gc00	0	haccent<30>		RW-O-	Host list	
gc11	0	boolean	0	RW---	Apply this list to HTTP Server	*a
gc12	0	boolean	0	RW---	Apply this list to Video Transmission	*a
gc13	0	int(0,0)	0	RW---	Apply this list to Audio Transmission	*a
gc14	0	boolean	0	RW---	Apply this list to Still Image Capture	*a

*a When gc11 is 1, a host list is applied to Video Transmission, Audio Transmission and Still Image Capture. And if the gc12 is 1, a host list is applied to Autio Transmission and Still Image Capture.

Camera Server

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ha00	0	lport	65310	RWB--	Video Transmission Port	
ha01	0	lport	65311	RWB--	Camera Control Port	
ha03	0	int(1,50)	50	RW---	Maximum Number of Clients	
ha04	0	int(0,50)	50	RW---	Control Queue Length	
ha05	0	fixed(0.1,30.0)	30	RW---	Maximum Frame Rate	*b
ha06	0	int(0,65535)	0	RW---	Maximum Connection Time	
ha07	0	int(1,3600)	20	RW---	Camera Control Time	
ha08	0	int(0,10000)	1500	RW---	Camera Stabilization Time	
ha15	0	int(0,10)	0	RW---	Max. Transmission Rate	
ha20	0	record(*a)	0:0:0:0:0	RW---	Restrict Service Time	

*a Service Time Restriction ON/OFF (boolean): Start Time Hour (int(0,23)): Start Time Minute (int(0,59)): End Time Hour (int(0,23)): End Time Minute (int(0,59)). When the Time Restriction is true and the following combinations are the same: Start Time Hour and Start Time Minute, End Time Hour and End Time Minutes, it causes C002 error.

*b With PAL model, data type is fixed(0.1,25.0) and the default value is 25.0.

Audio Server

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
hb00	0	int(0,0)	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	int(0,100)	0	RW---	Noise Cancellor (doubled dB value)	*c
hb06	0	boolean	0	RW---	Slope Filter	
hb07	0	int(1,20)	4	RW---	Audio Transmission Unit (in 10 msec.)	
hb10	0	int(0,0)	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

Audio Recording and Playback

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
hp10	8	ascii[15]		RW-O-	Sound Clip Name	*a
hr00	0	int(0,255)	10	RW---	Recording Capacity Restriction (the smallest unit: 0.1MB)	*b

*a If you wish to set a non-blank character string to hp10-<i>, there must be non-blank file/etc/audio/<i>.raw.
*b Not used.

HTTP Server

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ia00	0	lport	80	RWB--	HTTP Port	
ia01	0	const	10	R----	Keep Alive Time	
ia02	0	inaddr		RW-O-	Global Address for Web Pages: IP Address	
ia03	0	name[15]		RW-O-	Global Address for Web Pages: Port Name	
ia04	0	int(0,1)	0	RW---	Global Address for Web Pages: Format	*a

*a 0: IP Address, 1: Host Name

DNS/DDNS

Name	Capacity	Data type	Default value	Attribute	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	

Mail

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ic00	0	host[63]		RW-O-	Mail Server Host	
ic01	0	mail[63]		RW-O-	Sender's (From) Mail Address	
ic02	0	mail[63]		RW-O-	Recipient (To) Mail Address	
ic10	0	boolean	0	RW---	POP before SMTP	
ic11	0	name[31]		RW-O-	User Name	
ic12	0	pass[31]		RW-O-	Password	
ic13	0	host[63]		RW-O-	POP Server	

Motion Detection

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
oa00	0	boolean	1	RW---	Enable Motion Detection	
oc00	8	int(0,10)	0	RW---	Preset	*e
oc08	8	int(0,300)	0	RW---	Frame Rate	*f
oe00	8	int(0,0)	0	RW---	Start Auto Tracking when Motion Detection is Started.	*g
oe09	8	int(1,300)	60	RW---	Maximum Tracking Time (sec.)	
oi10	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area1 Parameter	
oi20	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area2 Parameter	
oi30	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area3 Parameter	
oi40	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area4 Parameter	
oj10	8	record(*b)	0:0:0:0:1:0:1:1:0	RW---	Picture Recording Parameter	*h
oj11	8	record(*c)	0:50:0:0:0:0:0	RW---	Audio Recording & Playback Parameter	*h
oj20	8	record(*d)<3>	0:0,0:0,0:0	RW-O-	External Output Device Control Parameter	*h

*a Effective Area (boolean): Left end (int(0,W-1)): Upper end(int(0,H-1)): Right end (int(1,W)): Lower end (int(1,H)): Sensitivity (int(1,256)): Area Ratio (int(0:S)): Duration (int(0,100)). The left-end, upper-end, right-end and lower-end are the motion detection area (based on DCT block). If the values are not left-end<right-end, and/or upper-end<lower-end, it causes C002 error. Default values are as follows: oi10; 1:0:0:W/2:H/2:20:S/32:0, oi20; 0:W/2:0:W:H/2:20:S/32:0, oi30; 0:0:H/2:W/2:H:20:S/32:0, and oi40; 0:W/2:H/2:W:H:20:S/32:0. The values of W, H and S are as follows: NTSC model; (W,H,S) = (80,60,4800), and PAL model; (W,H,S) = (96,72,6912).

*b Enable Prior Edge Recording (boolean): Enable Level Recording (boolean): Enable Posterior Edge Recording (boolean): Pre-edge Recording Time (int(0,10)): Pre-edge Recording Interval (fixed(0.1,1)): Post-edge Recording Time (int(0,10)): Post-edge Recording Interval (fixed(0.1,1)): Level Recording Interval (int(1:900)): E-Mail Transmission (boolean). All of these items are set in seconds.

*c Behavior Specification (int(0,15)): Audio Playback Volume (int(1,100)): Sound Clip Number (int(0,7)): Specification when playback is overlapped (int(0,1)): Audio Playback Time (int(-1,-)): Pre-event Recording Time (int(0,10)): Post-event Recording Time (int(0,60)). The order of Behavior Specifications is as follows starting from the LSB, and the values are shown in combined items of the following: Playback at ON event, Playback at OFF event, Recording at ON event, Recording at OFF event. The details of specification when playback is overlapped are as follows: 0: Prior event has a priority, 1: Posterior event has a priority. Playback Time and Recording Time are both set in seconds (-1 means unlimited).

*d Output Control (boolean): Delay Time (int(0,30)). The delay time is set in seconds. The order of list is External Device 1, External Device 2, and External Device 3 from the left side.

*e 0: Not specified, 1-10: Presets

*f 0: No limit, 1-300: Frame per 10 sec. (1-250 with PAL model)

*g 0: Disable Auto Track, 1: Enable Auto Track

*h The oc00-oi40 and oj10-oj20 are handled as independent parameter sets (with the element of service No. 3 included in Schedule Behavior sc04, the following parameters are referenced: parameters of oc00-oi40 from Parameter Number, and parameters of oj10-oj20 from Action Number).

System Attribute Information

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ra00	0	const	VB-C50Fi	R----	Model Name	
ra01	0	const	Ver. 1.0 Rev. xx	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	10	R----	Number of Preset	
ra05	0	const	36,…(*a)	R----	Schedule Parameter Specification	
ra06	0	const	0:1(*b)	R----	Night Mode Control Specification	*b
ra09	0	const	2	R----	Number of Video Input Channels	
ra10	0	const	640x480	R----	Maximum Image Size (768x576 with PAL model)	

*a A list of: Total number of schedules (36), Number of Interval Timer System (4), Number of Interval Timer Action (4), Number of Motion Detection System (8), Number of Motion Detection Action (8), Number of External Device Input System (2), Number of External Device Input Action (4), Number of External Device Output System (3), Number of External Device Output Action (6), Number of Night Mode System (1), and Number of Night Mode Action (2).

*b Unavailable to remove IR Cut Filter: Unavailable to turn the IR light ON.

Schedule

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sc00	36	record(*a)	128:0 (Invalid value)	RW---	Type and Level	
sc01	36	ascii[15]		RW-O-	Schedule Name (English)	
sc02	36	kanji[15]		RW-O-	Schedule Name (Japanese)	
sc03	36	record(*b)	0:0:0:0:0:0:00	RW---	Specify Timetable	
sc04	36	record(*c)<8>		RW-O-	Behavior	*d
sd00	4	date<32>		RW-O-	Specify year, month and day	*e
sd01	4	bit[384]	00 ... 00	RW-O-	Specify month and day	*f

*a Type (int(0,3)): Level (int(0,255)). Details of the type are as follows: 0: Scheduled/Disabled, 1: Scheduled/Enabled, 2: Always/Disabled, 3: Always/Enabled.

*b Start (int(0,1440)): End(int(0,1440)): Cycle (int(-1,32)): Attribute (Int(0,255)): Period (int(0,255)): Year, month and day (int(0,3)): Specify Date (bit[32]). The bit string of Specify Date corresponds as follows: the first date to the first bit, and following n' dates to (n-1) bits.

*c Service Number (int(1,5)): Parameter Number (int): Action Number (int). The details of Service Number are as follows: 0: None, 1: Interval Timer, 2: External Device Input, 3: Motion Detection, 4: External Device Output, and 5: Night Mode. Both of the Parameter Numbers and Actions Numbers are integers 0 or greater that indicate corresponsing relation with after-mentioned parameter sets. The maximum value is as follows: Service 0: 0/0, Service 1: 3/3, Service 2: 1/3, Service 3: 7/7, Service 4: 2/5, and Service 5: 0/1 (m/n: Max. value of Parameter Number/Max. value of Action Number).

*d The following duplication is not acceptable: For Service Number 1, 3 and 5, duplication of Service Numbers: For Service Number 2 and 4, duplication of Service Number and Parameter Number.

*e Elements are sorted in ascending order, and duplicated ones are implicitly discarded (the order of specification is random).

*f Bit strings are devided into 32-bit word, and 'm' month 'n' day corresponds to the (n-1)th bit of the (m-1)th word.

Interval Timer

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
so00	4	int(0,-)	0	RW---	Picture Recording Interval	*d
so01	4	record(*a)	0:0	RW---	Audio Recording Playback Interval	*d
so10	4	record(*b)	0:0:0:0	RW---	Picture Recording Parameter	*d
so11	4	record(*c)	0:50:0:0:0:0:0	RW---	Audio Recording Playback Parameter	*d

*a Playback Interval (int(0,-)): Audio Recording Interval (int(0,-)). The Playback and Audio Recording Intervals are set in seconds.

*b Picture Recording (boolean): Camera Position (int(0:10)): Camera Stabilization Time (int(0:10)): Preset Tour, Return to Home Position (boolean). Camera Position will be 0: Not Specified or 1-10: Preset. Camera Stabilization Time is set in seconds. With the Preset Tour and Return to Home Position, it specifies whether or not performing auto preset tour or return the camera to a home position after picture recording has finished.

*c Behavior Specification (int(0,15)): Audio Playback Volume (int(1,100)): Sound Clip Number (int(0,7)): Specification when playback is overlapped (int(0,1)): Audio Playback Time (int(-1,-)): Pre-event Recording Time (int(0,10)): Post-event Recording Time (int(0,60)). The order of Behavior Specifications is as follows starting from the LSB, and the values are shown in combined items of the following: Playback at specified interval, Audio Recording at specified interval, Playback when pictures are recorded, and Audio Recording when pictures are recorded. The details of specification when playback is overlapped are as follows: 0: Prior event has a priority, 1: Posterior event has a priority. Time is set in seconds (-1 means unlimited).

*d With the element of service No. 1 included in Schedule Behavior sc04, the following parameters are referenced: parameters of so00-so01 from Parameter Number, and parameters of so10-so11 from Action Number.

External Device Input

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sp10	4	record(*a)	0:0:0:0:1:0:1:1:0:0	RW---	Picture Recording Parameter	*d
sp11	4	record(*b)	0:50:0:0:0:0:0	RW---	Audio Recording Playback Parameter	*d
sp20	4	record(*c)<3>	0:0,0:0,0:0	RW-O-	External Output Device Control Parameter	*d

*a Enable Prior Edge Recording (boolean): Enable Level Recording (int(0,0)): Enable Posterior Edge Recording (boolean): Pre-edge Recording Time (int(0,10)): Pre-edge Recording Interval (fixed(0.1,1)): Post-edge Recording Time (int(0,10)): Post-edge Recording Interval (fixed(0.1,1)): Level Recording Interval (int(1:900)): E-Mail Transmission (boolean): Camera Position (int(0,10)). All of these items are set in seconds. Camera Position will be 0: Not Specified or 1-10: Preset.

*b Behavior Specification (int(0,15)): Audio Playback Volume (int(1,100)): Sound Clip Number (int(0,7)): Specification when playback is overlapped (int(0,1)): Audio Playback Time (int(-1,-)): Pre-event Recording Time (int(0,10)): Post-event Recording Time (int(0,60)). The order of Behavior Specifications is as follows starting from the LSB, and the values are shown in combined items of the following: Playback at ON event, Playback at OFF event, Recording at ON event, Recording at OFF event. The details of specification when playback is overlapped are as follows: 0: Prior event has a priority, 1: Posterior event has a priority. Playback Time and Recording Time are both set in seconds (-1 means unlimited).

*c Output Control (boolean): Delay Time (int(0,30)). The delay time is set in seconds. The order of list is External Device 1, External Device 2, and External Device 3 from the left side.

*d With the element of service No. 2 included in Schedule Behavior sc04, the External Input Device Terminal is specified from Parameter Number, and parameters of sp10-sp20 are referred from Action Number.

External Device Output

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sq10	6	record(*a)	0:0:0	RW---	External Output Device Control Parameter	*b

*a Output Control (boolean): Output Interval (int(0,-)): Output Time (int(0,-)). The Output Interval and Output Time are both set in seconds.

*b With the element of service No. 4 included in Schedule Behavior sc04, the External Output Device Terminal is specified from System Number, and parameter of sq10 is referred from Action Number.

Night Mode

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sr10	2	record(*a)	0:0	RW---	Night Mode Setting Parameter	*b

*a Night Mode Setting (int(0,7)): Shutter Speed (int(0,255). The Night Mode Setting specifies ON or OFF of Slow Shutter, Infrared Light, and Removal of Infrared Cut Filter in decimal system of bit strings, starting in order from LSB. Shutter Speed is 0: Slowest Shutter Speed or 1~: inverse number of Shutter Speed.

*b With the element of service No. 5 included in Schedule Behavior sc04, the parameter of sr10 is referenced from Action Number (Parameter Number is 0).

C Setting Parameter of VB-C50FSi

Legend

Capacity, data type, default value, attribute and meaning of each setting item are shown in the table format as follows.

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
zz00	0	int	0	RWB-P	Non-array type integer	*a
zz01	99	name		RW-O-	Array type character string	

*a Precautions about zz00.

-Capacity: Number of array type elements. It will be a maximum value +1 of subscript for array type setting value, and 0 for non-array type setting value.

-Data type: Data type of setting value (Chapter 4).

-Default value: Factory default setting value.

-Attribute:It is comprised of: R (readable), W (writable), B (reboot required when setting changed), O (an empty value can be specified), and P (preserve the setting value even when the factory default setting values are restored). Only '-' is not included.

System Administration

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
aa00	0	const	root	R----	System administrator name	
aa01	0	pass[8]	VB-C50i	-W-O-	Administrator password	*a
aa03	0	pass[8]	VB-C50i	-W-O-	Administrator password	*a
bb00	0	const	admin	R----	Setting page URL	

*a Specify 'aa01' with a character string, and 'aa03' with character code (digit sequences expressed in 3-digits decimal system). If an empty value has been specified, the value will not be changed.

Clock and Time Zone

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
bc00	0	fixed(-12,13)	9	RW---	Time zone (time difference with GMT)	*a
bc01	0	int(0,1)	0	RW---	Setting method of clock	*b
bc10	0	inaddr		RW-OP	IP address of NTP server	*c
bc20	0	date:time	(System-dependent)	RW---	Date and time	*d

*a Hourly base, the smallest unit is 0.5.
*b 0: Specify time using bc20. 1: NTP server (disabled when 'bc10' is empty).
*c Valid when 'bc01' is 1, and an empty value cannot be specified.
*d Valid when 'bc01' is 0. Otherwise ignored. The format is 'yyyymmssHHMMSS' (year in 4 digits; month, day, hour, minute, second in 2 digits).

Ethernet

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ca00	0	const	1	R----	Use Ethernet (Used)	
ca01	0	int(0,1)	0	RWB-P	IP address setting method	*a
ca02	0	inaddr	192.168.100.1	RWB-P	IP address	
ca03	0	inaddr	255.255.255.0	RWB-P	Subnet mask	
ca06	0	boolean	1	RW---	Use IP installer	
ca10	0	int(0,4)	0	RW---	LED setting	*b

*a 0: Manual setting, 1: Auto setting (DHCP)
*b 0: Blinks during Communication, 1: Turn the LED OFF, 2: Steady Green LED, 3: Steady Red LED, 4: Steady Orange LED

Route Control

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
cc00	0	const	0	R----	Default gateway network interface (Ethernet)	
cc01	0	inaddr		RWBOP	Default gateway address	

Connection Keeping

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
cd00	0	boolean	0	RWB--	Send packet regularly	
cd01	0	inaddr		RWBO-	Target IP address	*a
cd02	0	int(1,60)	1	RWB--	Interval	

*a Valid when 'cd00' is 1, and an empty value cannot be specified.

Packet Size

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
cf00	0	int(576,1500)	1500	RW---	Maximum packet size	
cf10	0	int(0,50)	0	RW---	Video transmission buffer size (0: default, or 1-: buffer size in 1460 bytes)	

Camera Common Settings

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
da00	0	const	0	R----	Main camera (built-in camera)	
da01	1	const	1	R----	Baud rate of Camera Control Port (9600bps)	
da02	0	boolean	0	RW---	Return to home position when nobody has a control privilege.	
da03	0	const	0	R----	Video input selection method (single)	
da04	0	const	1:NTSC 2:PAL	R----	Video signal format	

Camera Individual Settings

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
db00	2	boolean	(Camera-dependent)	RW---	Use this camera	*a
db01	2	ascii[15]	(Camera-dependent)	RW-O-	Camera name (English)	*b
db02	2	kanji[15]		RW-O-	Camera name (Japanese)	
db03	2	boolean	0	RW---	Use a wide-converter	
db05	2	int(0,2)	1	RW---	Video capture size	*c
db06	2	int(1,100)	50	RW---	Video quality	*d
db07	2	int(0,2)	(Camera-dependent)	RW---	Camera control port	*e
db08	2	const	0	R----	Cascade number	
db11	2	int(0,0)		RW-O-	Home position: Pan	
db12	2	int(0,0)		RW-O-	Home position: Tilt	
db13	2	scope		RW-O-	Home position: Zoom	
db14	2	int(0,1)	0	RW---	Home position: Brightness	*f
db15	2	int(0,2)	0	RW---	Shutter speed	*g
db16	2	int(0,2)	0	RW---	Focus mode	*h
db20	2	boolean	0	RW---	Appliy view restriction	
db21	2	coord		RW-O-	View restriction: Upper end	
db22	2	coord		RW-O-	View restriction: Lower end	
db23	2	coord		RW-O-	View restriction: Left end	
db24	2	coord		RW-O-	View restriction: Right end	
db25	2	scope		RW-O-	View restriction: Telephoto	
db26	2	scope		RW-O-	View restriction: Wide-angle	
db31	2	int	0	RW---	Camera option	*i

*a The main camera is always 1 which cannot be changed. The default value of external camera is 0 and it is changeable.
*b The default value of main camera is 'Camera', and that of external camera is 'Camera2'.
*c Change 'dr01' to a specified value. If the corresponding video image is 0, it is changed to 50. The only valid value is 'db05-0', and 'db05-1' is a dummy.
*d Change all of the dq01 – dq03 to a specified value. The initial value of db06 is corresponded to the video quality (dq01 – dq03) against dr01.
*e 0: Not used, 1: Port1, 2: Port2. The main camera is 1 (default) or 0. For the external camera, 2 or 0 (default) can be specified.
*f 0: Standard, 1: Brighter
*g With NTSC model; 0: Auto, 1: 1/60, 2: 1/100. With PAL model; 0: Auto, 1: 1/50, 2: 1/120
*h 0: Auto, 1: Fixed at infinity, 2: Auto (for domes)
*i Integer value which expresses OR of the following bit field (bit 0 from the LSB side).
Bit 0: Clock display (0: OFF, 1: ON)
Bit 13-20 Aperture adjustment (0: Default, 1-255: Aperture adjustment value)

Video Capture

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
dq01	2	int(0,100)	50	RW---	Video quality (Q-factor)/Small size	*b
dq02	2	int(0,100)	50	RW---	Video quality (Q-factor)/Medium size	*b
dq03	2	int(0,100)	50	RW---	Video quality (Q-factor)/Large size	*b
dr01	0	int(0,2)	1	RW---	Video size/Video Transmission	*c
dr02	0	int(0,1)	0	RW---	Video size/Motion Detection	*c
dr03	0	int(0,2)	1	RW---	Video size/Picture Recording	*c
ds01	0	record(*a)	0:0:255:255	RWB--	Capture range/Small Size	
ds02	0	record(*a)	0:0:255:255	RWB--	Capture range/Medium Size	
ds03	0	record(*a)	0:0:255:255	RWB--	Capture range/Large Size	
dt00	0	int(0,1)	0	RWB--	Interlace mode	*d
dv00	0	int(0,1)	0	RW---	Add authentication information to picture	

*a Indicate Left end: Upper end: Width: Height (int:int:int:int). Shown in 8x8 block unit (the effective value range varies depending on NTSC or PAN model.)

*b 0: Not used, 1-100: JPEG Q-factor
*c 0: Small size, 1: Medium size, 2: Large size
*d 0: Weave (interlace), 1: Bob (non-interlace)

Preset

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ea00	10	int(0,1)	0	RW---	Preset applicable range	*a
ea01	10	ascii[15]		RW-O-	Preset name (English)	*b
ea02	10	kanji[15]		RW-O-	Preset name (Japanese)	
ea03	10	int(0,0)	0	RW---	Camera	*c
ea04	10	Int(0,0)		RW-O-	Pan	
ea05	10	Int(0,0)		RW-O-	Tilt	
ea06	10	scope		RW-O-	Zoom	
ea07	10	int(0,1)	0	RW---	Brightness	
ea08	0	boolean	0	RW---	Restrict camera control to preset	

*a 0: Picture recording only, 1: Picture recording and video transmission
*b Empty value cannot be specified when corresponding 'ea00' is set to 1.
*c 0: Main camera, 1: External camera

Auto Preset Tour

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ea10	0	int(0,2)	0	RW---	Auto preset tour	*c
ea11	0	record(*a)<10>		RW-O-	Preset schedule	
ea20	0	record(*b)	0:0:0:0:0	RW---	Restrict preset tour time	

*a Preset (int(1,10)): Speed (int(0,15)): Pause(int(0,65535)). The camera speed is equal to the zoom speed (0: Slow, and it becomes faster with the number increases up to 15).
*b Time Restriction ON/OFF (boolean): Start Time Hour (int(0,23)): Start Time Minute (int(0,59)): End Time Hour (int(0,23)): End Time Minute (int(0,59)). When the Time Restriction is true and the following combinations are the same: Start Time Hour and Start Time Minute, End Time Hour and End Time Minutes, it causes C002 error.
*c 0: Not used, 1: For Viewers, 2: Always

External Device Name

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
fa06	2	ascii[15]		RW-O-	External input device name (English)	
fa07	2	kanji[15]		RW-O-	External input device name (Japanese)	
fa08	3	ascii[15]		RW-O-	External output device name (English)	
fa09	3	kanji[15]		RW-O-	External output device name (Japanese)	

E-mail Notification

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
fn00	2	int(1,2)	1	RW---	Type of notification	*a
fn01	2	ascii[31]		RW-O-	Subject	
fn02	2	ascii[255]		RW-O-	Text	*b

*a 1: Text only, 2: Text and recorded picture. Subscript 0 attached to fn00 - fn02 is intended for External Input Device, and subscript 1 is for Motion Detection.
*b Available to specify '% character' as follows ('%' is deleted for undefined characters).

%n	Reason for shot (number)	1(external device input 1) | 2(external device input 2) | 129(Motion detection)
%N	Reason for shot (text)	"External Input Device Name" (External Input Device 1-3 when omitted) | Motion Detection)
%X	Image width	Number of horizontal pixels
%Y	Image height	Number of vertical pixels
%Q	Video quality	10-100
%C	Camera number	1-2
%D	Camera name	"Camera Name" setting value
%P	Pan position	0
%T	Tilt position	0
%Z	Zoom position	0.1 to 300.00
%V	Camera server	VB-C50Fi
%y	Year of shot	2000 - 2038
%m	Month of shot	1-12
%d	Date of shot	1-31
%w	Day of shot	0-6 (correspond to Sunday to Saturday)
%H	Hour of shot	00-23
%M	Minute of shot	00-59
%S	Second of shot	00-59
%z	Time zone of shot	-1200 to +1200
%a	Weekday of shot	Sun | Mon | Tue | Wed | Thu | Fri | Sat
%b	Name of month of shot	Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec
%t	Tab	
%q	" (double-quotation)	
%%	%	

Low Server CapacityNotification

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
fr00	0	boolean	0	RW---	Perform low server capacitynotification	
fr01	0	int(0,100)	0	RW---	Free space (the smallest unit: 0.1MB)	
fr10	0	host[63]		RW-O-	Host	*a
fr11	0	int(1,65535)	1906	RW---	Port	
fr12	0	ascii[255]		RW-O-	Warning message	

*a Empty value cannot be specified when 'fr00' is set to 1.

User Access Control

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
gb00	0	uaccent<50>		RW-O-	User (+ password) list	*a
gb11	0	boolean	0	RW---	Access permitted to listed users only	
gb13	0	boolean	0	RW---	Audio Transmission permitted to listed users only	
gb14	0	boolean	0	RW---	Still Image Capture 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 registerd user, you don't have to enter the password. You cannot register a user without entering a password.

Host Access Control

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
gc00	0	haccent<30>		RW-O-	Host list	
gc11	0	boolean	0	RW---	Apply this list to HTTP Server	*a
gc12	0	boolean	0	RW---	Apply this list to Video Transmission	*a
gc13	0	boolean	0	RW---	Apply this list to Audio Transmission	*a
gc14	0	boolean	0	RW---	Apply this list to Still Image Capture	*a

*a When gc11 is 1, a host list is applied to Video Transmission, Audio Transmission and Still Image Capture. And if the gc12 is 1, a host list is applied to Autio Transmission and Still Image Capture.

Camera Server

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ha00	0	lport	65310	RWB--	Video Transmission Port	
ha01	0	lport	65311	RWB--	Camera Control Port	
ha03	0	int(1,50)	50	RW---	Maximum Number of Clients	
ha04	0	int(0,50)	50	RW---	Control Queue Length	
ha05	0	fixed(0.1,30.0)	30	RW---	Maximum Frame Rate	*b
ha06	0	int(0,65535)	0	RW---	Maximum Connection Time	
ha07	0	int(1,3600)	20	RW---	Camera Control Time	
ha08	0	int(0,10000)	1500	RW---	Camera Stabilization Time	
ha15	0	int(0,10)	0	RW---	Max. Transmission Rate	
ha20	0	record(*a)	0:0:0:0:0	RW---	Restrict Service Time	

*a Service Time Restriction ON/OFF (boolean): Start Time Hour (int(0,23)): Start Time Minute (int(0,59)): End Time Hour (int(0,23)): End Time Minute (int(0,59)). When the Time Restriction is true and the following combinations are the same: Start Time Hour and Start Time Minute, End Time Hour and End Time Minutes, it causes C002 error.

*b With PAL model, data type is fixed(0.1,25.0) and the default value is 25.0.

Audio Server

Name	Capacity	Data type	Default value	Attribute	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	int(0,100)	0	RW---	Noise Cancellor (doubled dB value)	*c
hb06	0	boolean	0	RW---	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

Audio Recording and Playback

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
hp10	8	ascii[15]		RW-O-	Sound Clip Name	*a
hr00	0	int(0,255)	10	RW---	Recording Capacity Restriction (the smallest unit: 0.1MB)	*b

*a If you wish to set a non-blank character string to hp10-<i>, there must be non-blank file/etc/audio/<i>.raw.
*b Not used.

HTTP Server

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ia00	0	lport	80	RWB--	HTTP Port	
ia01	0	const	10	R----	Keep Alive Time	
ia02	0	inaddr		RW-O-	Global Address for Web Pages: IP Address	
ia03	0	name[15]		RW-O-	Global Address for Web Pages: Port Name	
ia04	0	int(0,1)	0	RW---	Global Address for Web Pages: Format	*a

*a 0: IP Address, 1: Host Name

DNS/DDNS

Name	Capacity	Data type	Default value	Attribute	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	

Mail

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ic00	0	host[63]		RW-O-	Mail Server Host	
ic01	0	mail[63]		RW-O-	Sender's (From) Mail Address	
ic02	0	mail[63]		RW-O-	Recipient (To) Mail Address	
ic10	0	boolean	0	RW---	POP before SMTP	
ic11	0	name[31]		RW-O-	User Name	
ic12	0	pass[31]		RW-O-	Password	
ic13	0	host[63]		RW-O-	POP Server	

Motion Detection

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
oa00	0	boolean	1	RW---	Enable Motion Detection	
oc00	8	int(0,10)	0	RW---	Preset	*e
oc08	8	int(0,300)	0	RW---	Frame Rate	*f
oe00	8	int(0,0)	0	RW---	Start Auto Tracking when Motion Detection is Started.	*g
oe09	8	int(1,300)	60	RW---	Maximum Tracking Time (sec.)	
oi10	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area1 Parameter	
oi20	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area2 Parameter	
oi30	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area3 Parameter	
oi40	8	record(*a)	0/1:…(*a)	RW---	Motion Detection Area4 Parameter	
oj10	8	record(*b)	0:0:0:0:1:0:1:1:0	RW---	Picture Recording Parameter	*h
oj11	8	record(*c)	0:50:0:0:0:0:0	RW---	Audio Recording & Playback Parameter	*h
oj20	8	record(*d)<3>	0:0,0:0,0:0	RW-O-	External Output Device Control Parameter	*h

*a Effective Area (boolean): Left end (int(0,W-1)): Upper end(int(0,H-1)): Right end (int(1,W)): Lower end (int(1,H)): Sensitivity (int(1,256)): Area Ratio (int(0:S)): Duration (int(0,100)). The left-end, upper-end, right-end and lower-end are the motion detection area (based on DCT block). If the values are not left-end<right-end, and/or upper-end<lower-end, it causes C002 error. Default values are as follows: oi10; 1:0:0:W/2:H/2:20:S/32:0, oi20; 0:W/2:0:W:H/2:20:S/32:0, oi30; 0:0:H/2:W/2:H:20:S/32:0, and oi40; 0:W/2:H/2:W:H:20:S/32:0. The values of W, H and S are as follows: NTSC model; (W,H,S) = (80,60,4800), and PAL model; (W,H,S) = (96,72,6912).

*b Enable Prior Edge Recording (boolean): Enable Level Recording (boolean): Enable Posterior Edge Recording (boolean): Pre-edge Recording Time (int(0,10)): Pre-edge Recording Interval (fixed(0.1,1)): Post-edge Recording Time (int(0,10)): Post-edge Recording Interval (fixed(0.1,1)): Level Recording Interval (int(1:900)): E-Mail Transmission (boolean). All of these items are set in seconds.

*c Behavior Specification (int(0,15)): Audio Playback Volume (int(1,100)): Sound Clip Number (int(0,7)): Specification when playback is overlapped (int(0,1)): Audio Playback Time (int(-1,-)): Pre-event Recording Time (int(0,10)): Post-event Recording Time (int(0,60)). The order of Behavior Specifications is as follows starting from the LSB, and the values are shown in combined items of the following: Playback at ON event, Playback at OFF event, Recording at ON event, Recording at OFF event. The details of specification when playback is overlapped are as follows: 0: Prior event has a priority, 1: Posterior event has a priority. Playback Time and Recording Time are both set in seconds (-1 means unlimited).

*d Output Control (boolean): Delay Time (int(0,30)). The delay time is set in seconds. The order of list is External Device 1, External Device 2, and External Device 3 from the left side.

*e 0: Not specified, 1-10: Presets

*f 0: No limit, 1-300: Frame per 10 sec. (1-250 with PAL model)

*g 0: Disable Auto Track, 1: Enable Auto Track

*h The oc00-oi40 and oj10-oj20 are handled as independent parameter sets (with the element of service No. 3 included in Schedule Behavior sc04, the following parameters are referenced: parameters of oc00-oi40 from Parameter Number, and parameters of oj10-oj20 from Action Number).

System Attribute Information

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
ra00	0	const	VB-C50FSi	R----	Model Name	
ra01	0	const	Ver. 1.0 Rev. xx	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	10	R----	Number of Preset	
ra05	0	const	36,…(*a)	R----	Schedule Parameter Specification	
ra06	0	const	0:1(*b)	R----	Night Mode Control Specification	*b
ra09	0	const	2	R----	Number of Video Input Channels	
ra10	0	const	640x480	R----	Maximum Image Size (768x576 with PAL model)	

*a A list of: Total number of schedules (36), Number of Interval Timer System (4), Number of Interval Timer Action (4), Number of Motion Detection System (8), Number of Motion Detection Action (8), Number of External Device Input System (2), Number of External Device Input Action (4), Number of External Device Output System (3), Number of External Device Output Action (6), Number of Night Mode System (1), and Number of Night Mode Action (2).

*b Unavailable to remove IR Cut Filter: Unavailable to turn the IR light ON.

Schedule

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sc00	36	record(*a)	128:0 (Invalid value)	RW---	Type and Level	
sc01	36	ascii[15]		RW-O-	Schedule Name (English)	
sc02	36	kanji[15]		RW-O-	Schedule Name (Japanese)	
sc03	36	record(*b)	0:0:0:0:0:0:00	RW---	Specify Timetable	
sc04	36	record(*c)<8>		RW-O-	Behavior	*d
sd00	4	date<32>		RW-O-	Specify year, month and day	*e
sd01	4	bit[384]	00 ... 00	RW-O-	Specify month and day	*f

*a Type (int(0,3)): Level (int(0,255)). Details of the type are as follows: 0: Scheduled/Disabled, 1: Scheduled/Enabled, 2: Always/Disabled, 3: Always/Enabled.

*b Start (int(0,1440)): End(int(0,1440)): Cycle (int(-1,32)): Attribute (Int(0,255)): Period (int(0,255)): Year, month and day (int(0,3)): Specify Date (bit[32]). The bit string of Specify Date corresponds as follows: the first date to the first bit, and following n' dates to (n-1) bits.

*c Service Number (int(1,5)): Parameter Number (int): Action Number (int). The details of Service Number are as follows: 0: None, 1: Interval Timer, 2: External Device Input, 3: Motion Detection, 4: External Device Output, and 5: Night Mode. Both of the Parameter Numbers and Actions Numbers are integers 0 or greater that indicate corresponsing relation with after-mentioned parameter sets. The maximum value is as follows: Service 0: 0/0, Service 1: 3/3, Service 2: 1/3, Service 3: 7/7, Service 4: 2/5, and Service 5: 0/1 (m/n: Max. value of Parameter Number/Max. value of Action Number).

*d The following duplication is not acceptable: For Service Number 1, 3 and 5, duplication of Service Numbers: For Service Number 2 and 4, duplication of Service Number and Parameter Number.

*e Elements are sorted in ascending order, and duplicated ones are implicitly discarded (the order of specification is random).

*f Bit strings are devided into 32-bit word, and 'm' month 'n' day corresponds to the (n-1)th bit of the (m-1)th word.

Interval Timer

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
so00	4	int(0,-)	0	RW---	Picture Recording Interval	*d
so01	4	record(*a)	0:0	RW---	Audio Recording Playback Interval	*d
so10	4	record(*b)	0:0:0:0	RW---	Picture Recording Parameter	*d
so11	4	record(*c)	0:50:0:0:0:0:0	RW---	Audio Recording Playback Parameter	*d

*a Playback Interval (int(0,-)): Audio Recording Interval (int(0,-)). The Playback and Audio Recording Intervals are set in seconds.

*b Picture Recording (boolean): Camera Position (int(0:10)): Camera Stabilization Time (int(0:10)): Preset Tour, Return to Home Position (boolean). Camera Position will be 0: Not Specified or 1-10: Preset. Camera Stabilization Time is set in seconds. With the Preset Tour and Return to Home Position, it specifies whether or not performing auto preset tour or return the camera to a home position after picture recording has finished.

*c Behavior Specification (int(0,15)): Audio Playback Volume (int(1,100)): Sound Clip Number (int(0,7)): Specification when playback is overlapped (int(0,1)): Audio Playback Time (int(-1,-)): Pre-event Recording Time (int(0,10)): Post-event Recording Time (int(0,60)). The order of Behavior Specifications is as follows starting from the LSB, and the values are shown in combined items of the following: Playback at specified interval, Audio Recording at specified interval, Playback when pictures are recorded, and Audio Recording when pictures are recorded. The details of specification when playback is overlapped are as follows: 0: Prior event has a priority, 1: Posterior event has a priority. Time is set in seconds (-1 means unlimited).

*d With the element of service No. 1 included in Schedule Behavior sc04, the following parameters are referenced: parameters of so00-so01 from Parameter Number, and parameters of so10-so11 from Action Number.

External Device Input

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sp10	4	record(*a)	0:0:0:0:1:0:1:1 :0:0	RW---	Picture Recording Parameter	*d
sp11	4	record(*b)	0:50:0:0:0:0:0	RW---	Audio Recording Playback Parameter	*d
sp20	4	record(*c)<3>	0:0,0:0,0:0	RW-O-	External Output Device Control Parameter	*d

*a Enable Prior Edge Recording (boolean): Enable Level Recording (int(0,0)): Enable Posterior Edge Recording (boolean): Pre-edge Recording Time (int(0,10)): Pre-edge Recording Interval (fixed(0.1,1)): Post-edge Recording Time (int(0,10)): Post-edge Recording Interval (fixed(0.1,1)): Level Recording Interval (int(1:900)): E-Mail Transmission (boolean): Camera Position (int(0,10)). All of these items are set in seconds. Camera Position will be 0: Not Specified or 1-10: Preset.

*b Behavior Specification (int(0,15)): Audio Playback Volume (int(1,100)): Sound Clip Number (int(0,7)): Specification when playback is overlapped (int(0,1)): Audio Playback Time (int(-1,-)): Pre-event Recording Time (int(0,10)): Post-event Recording Time (int(0,60)). The order of Behavior Specifications is as follows starting from the LSB, and the values are shown in combined items of the following: Playback at ON event, Playback at OFF event, Recording at ON event, Recording at OFF event. The details of specification when playback is overlapped are as follows: 0: Prior event has a priority, 1: Posterior event has a priority. Playback Time and Recording Time are both set in seconds (-1 means unlimited).

*c Output Control (boolean): Delay Time (int(0,30)). The delay time is set in seconds. The order of list is External Device 1, External Device 2, and External Device 3 from the left side.

*d With the element of service No. 2 included in Schedule Behavior sc04, the External Input Device Terminal is specified from Parameter Number, and parameters of sp10-sp20 are referred from Action Number.

External Device Output

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sq10	6	record(*a)	0:0:0	RW---	External Output Device Control Parameter	*b

*a Output Control (boolean): Output Interval (int(0,-)): Output Time (int(0,-)). The Output Interval and Output Time are both set in seconds.

*b With the element of service No. 4 included in Schedule Behavior sc04, the External Output Device Terminal is specified from System Number, and parameter of sq10 is referred from Action Number.

Night Mode

Name	Capacity	Data type	Default value	Attribute	Meaning	Note
sr10	2	record(*a)	0:0	RW---	Night Mode Setting Parameter	*b

*a Night Mode Setting (int(0,7)): Shutter Speed (int(0,255). The Night Mode Setting specifies ON or OFF of Slow Shutter, Infrared Light, and Removal of Infrared Cut Filter in decimal system of bit strings, starting in order from LSB. Shutter Speed is 0: Slowest Shutter Speed or 1~: inverse number of Shutter Speed.

*b With the element of service No. 5 included in Schedule Behavior sc04, the parameter of sr10 is referenced from Action Number (Parameter Number is 0).

D Guideline for multiple-systems support

There are slight differences of the setting protocol specification among product types, i.e. camera with built-in server (VB-C50i series) or server box (VB101/VB150). Therefore, you need to handle the setting protocol carefully if you use many types of products with Setting Tool[15]. This section describes how to deal with such differences, whether or not a certain functional element exists, or different setting methods of a feature, reflecting our future products and firmware upgrades.

D.1 Availability of Functional Element

You can judge whether a certain product supports a setting item by referring to the value of the setting item. If the requested setting item is included in a reply, it indicates that it's available, but if the reply does not contain the setting item, the product does not support the item[16]. You can handle a setting item that is not supported by Setting Tool, for example you can disable (or hide) a User Interface portion which is corresponded to the setting item. It is not necessary to perform judgement of all setting items because settings items are categorized by the functional elements. The following setting items can be used to judge the availability for major functional elements[17].

Functional Elements	Setting Item	Supported Products
PPP	cb00	+ + - - -
PPPoE	cg00	- + - - -
Wireless LAN	ce00	- + - - -
Audio Input	hb00	- - + - +
Audio Output	hb10	- - + - +
Auto Preset Tour	ea10	- - + + +
External Device Input (VB101/VB150 spec.)	fb00	+ + - - -
Motion Detection[18]	oa00	- + + + +
Schedule (VB101/VB150 spec.)	fc00	+ + - - -
Schedule (VB-C50i spec.)	ra05	- - + + +

Some setting items do not allow modification of values, though reference is available. To check whether a value can be changed or not, you need to refer the Data Type (Chapter 4). You cannot modify values which Data Types are 'const' or fixed value

[15] This Specification is not intended for VB-C10/VB-C10R Setting Protocol because it is limited to Camera Setting and Preset Setting (Supported setting items are as follows: Camera: db01-db03, db05-db08, db10-db16, db20-db26, and db31/Preset: ea00-ea07/External Device Name: fa06-fa09/Camera Server: ha00, ha01, ha03-ha13/System Configuration: ra02-ra04).

[16] ServerError=6 is output if it is unsupported (See Section 3.2). However you do not have to refer the ServerError field.

[17] Supported products are VB101, VB150, VB-C50i/R, VB-C50Fi and VB-C50FSi from the left side. The '+' mark indicates that the model supports the feature, and '-' indicates unsupported feature. For example, a sample of "- + - -" means that VB150 supports the element, though other models do not support it.

[18] Details of setting are different between VB150 and VB-C50i specifications.

such as ‘int(0,0)[19]. It’s not available to judge whether a value can be changed or not by merely referring to the value.

Data Type of setting items also provides the maximum element number of list-type setting item. The maximum element number cannot be obtained from a value because it is expressed in variable length according to the element number[20].

D.2 Differences of Setting Method

There are some setting items that have different setting methods between VB101/VB150 and VB-C50i series, although both are based on the same functional specification. The differences of setting methods for major functional elements are described as follows.

Administrator password

There are two setting items of ‘aa01’ and ‘aa02’ with VB101/VB150. To change the administrator password, you need to enter the same value to ‘aa01’ first, and then ‘aa02’.

The VB-C50i series products have two settings items, ‘aa01’ and ‘aa03’. One of the items is used to change the administrator password[21]. These two items have different form of expression, however the contents are the same.

Clock

VB101/VB150 has 7 setting items, bc01-bc07. You can change the setting by specifying bc02 (year), bc03 (month), bc04 (day), bc05 (hour), bc06 (minute), and bc07 (second), and then set to bc01=1.

With VB-C50i series, there are two setting items, bc01 and bc20. To change the setting, specify bc01=0 and bc20 (year, month, day: hour, minute, second).

User Access Control

There are five setting items, ga00-ga04 with the VB101/VB150 products. Specifying combined value of ga01 (user name), ga02 (password) and ga03 (user list operation) allows setting modifications.

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[19] Type information can be obtained with tl parameter (See Section 2.4). Although the VB101/VB150 Setting Protocol does not support the tl parameter, all of the VB101/VB150 setting items can be changed (except ra**), so there are practically no problems. Among settings items that cannot be changed and comparatively important, there are pan and tilt range values. You can recognize that pan and tilt values with VB-C50Fi are fixed because the data type of db11 and db12 is ‘int(0,0)’.

[20] The list-type setting item has been newly added from Setting Protocol for VB-C50i-series products. The following is major list-type items: Tour schedule of Auto Preset Tour (ea11), User list of Access Control (gb00), and Host list of Access Control (gc00).

[21] If both items are specified, the posterior one has a priority (no error occurs even if different value are specified).

On the other hand the VB-C50i-series products have 4 settings items of gb00-gb14, and the User list is changed in block using gb00.

Although the applicable range of User list varies depending on product model, the ‘ga00’ and ‘ga04’ of VB101/VB150 correspond to ‘gb11’ and ‘gb14’ of VB-C50i series respectively.

Host Access Control

VB101/VB150 models have 5 setting items of ga10-ga15, and VB-C50i series also has 5 items, gc00-gc14. Both setting specifications are basically the same, and they corresponds each other as follows respectively: ga10, ga12, ga14, and ga15 of VB101/VB150; gc12, gc11, gc00, and gc14 of VB-C50i series. The ‘ga13’ of VB101/VB150 and ‘gc13’ of VB-C50i are setting items that are specific to each model.

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