



DATA LOGGER

UCAM-60/65B

CONTROL COMMANDS

INSTRUCTION MANUAL

Thank you for purchasing KYOWA's UCAM Data Logger.
Read this Instruction Manual carefully, in order to make full use
of the high-performance capabilities of the product.
Do not use the product in a manner other than instructed in this
manual.

Also, this Instruction Manual describes the handling method con-
cerning control commands. For the method of handling the hard-
ware, refer to the Hardware Version of the manual.

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1. CONTROL COMMANDS

This Chapter describes methods of using various commands for controlling the UCAM-60B or UCAM-65B Data Logger (hereinafter, the UCAM). This Chapter is essential for compiling your own original control software.

1-1 INTERFACE

The UCAM provides RS-232C and Ethernet ports for connection to a PC. Select either of the interface ports and set accordingly as described below. (Note that 2 interface ports cannot be used at a time.)

1-1-1 Selecting Interface

Select either RS-232C or Ethernet and set accordingly as follows.

1-1-1-1 In the Case of UCAM-60B

Select a desired interface using front panel keys.

4:Condition File
5:Check
6:File Manage
7:System Control

On the main menu, press 7 key. Or press ENTER key with the cursor on “7: System Control.”

0:Environment
1:Measurement
2:Interface
3:Printer

On the system control menu shown at the left, press 2 key. Or press ENTER key with the cursor on “2. Interface.”

0:Interface
1:Data Type
2:RS-232C
3:ETHERNET

On the interface menu shown at the left, press 0 key. Or press ENTER key with the cursor on “0: Interface.”

Interface
RS-232C
(1:RS-232C)
(0:ETHERNET)

On the display shown at the left, press 0 key to select “Ethernet” or 1 key to select “RS-232C.” Then, press ENTER key to determine the selection. The interface menu will return.

The selection is indicated on the main menu as follows.

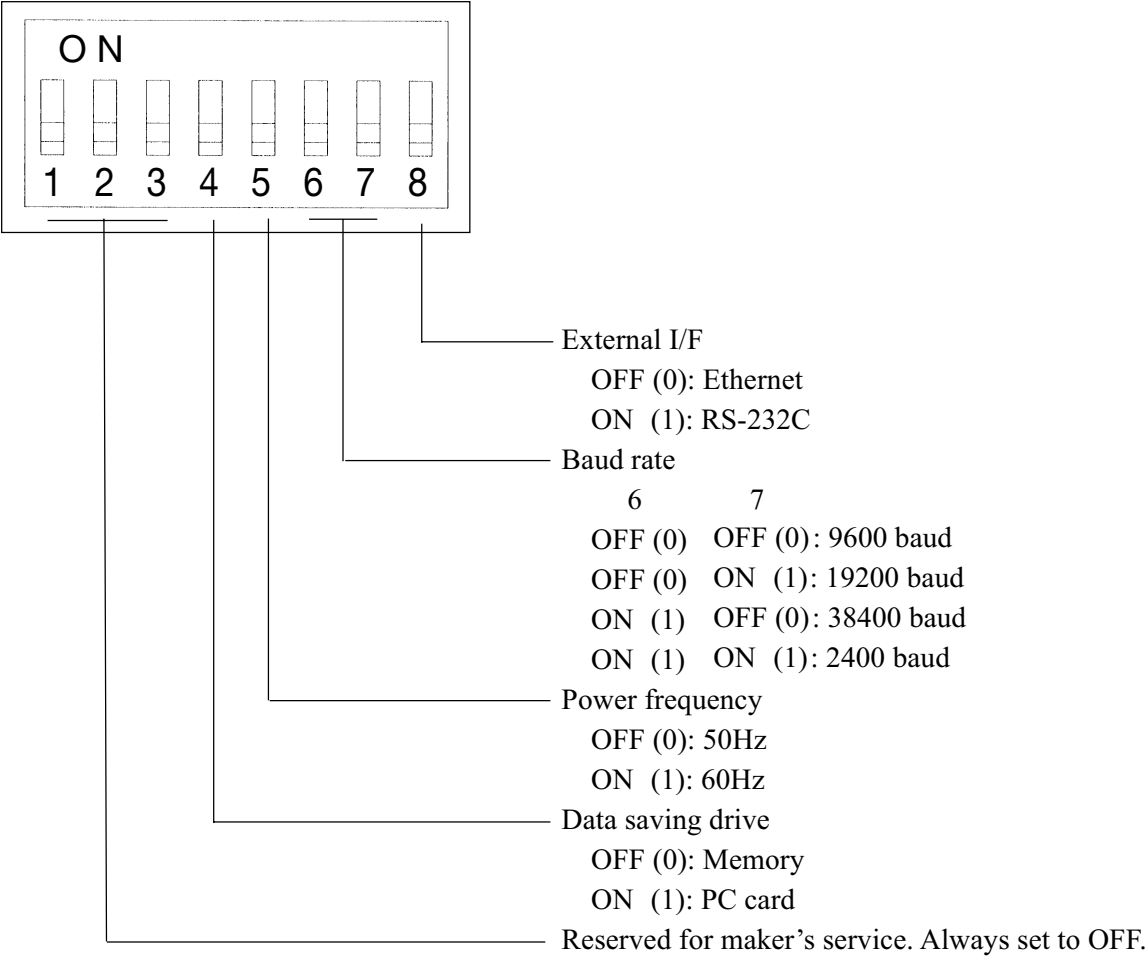
RS : When “RS-232C” is selected.

E : When “Ethernet” is selected.

1-1-1-2 In the Case of UCAM-65B

Select a desired interface by setting bit 8 of the dip switch as follows:

- OFF (0) Ethernet
- ON (1) RS-232C



MEMO

- All dip switch bits of the UCAM-65B are set to OFF prior to shipment.

1-1-2 RS-232C Interface

The UCAM provides an interface port conforming to RS-232C standard, and thus ensures easy configuration of a data processing system by connecting the UCAM to the PC.

1-1-2-1 Connecting to PC and Preparation

- (1) Using an RS-232C cable (cross/reverse), connect the UCAM to the PC.
- (2) Place the UCAM in RS-232C environment by setting the following parameters:
 - Baud rate, termination code and time-out time.In the case of the UCAM-60B, refer to “3. INTERFACE SETTING.”
In the case of the UCAM-65B,
 - 1) Set bit 8 of the dip switch to ON (1).
 - 2) Connect the UCAM-65B to the PC via RS-232C cable (cross/reverse).
 - 3) Select a desired baud rate by setting bits 6 and 7, referring to the previous page.
 - 4) Turn OFF the UCAM and restart.

1-1-2-2 Interface Standard and Connection Cable

■ **Remote Control Function:** Sending control commands from the PC to the UCAM enables settings of various parameters and measurement. For example, sending the measurement start command “STA” starts the UCAM measuring and outputting measured data to the PC.

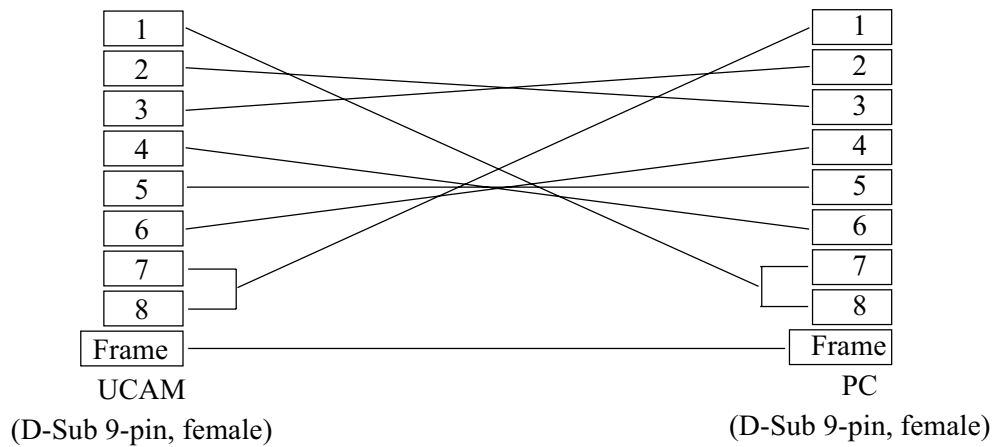
■ **Kinds of Signal:** The UCAM provides an interface port conforming to RS-232C.

Interface Standard

Pin	Name of Interconnection Line	Signal Direction	
		Data Logger	PC
1	Receiving Carrier Detect (CD)	←	
2	Received Data (RD)	←	
3	Send Data (SD)		→
4	Data Terminal Ready (ER)		→
5	Signal Ground (SG)	←	→
6	Data Set Ready (DR)	←	
7	Request to Send (RS)		→
8	Send Enable (CS)	←	
9	_____		

■ Cable

RS Cross Cable



NOTE

An interlink cable for communication between PC and PC cannot be used for connection between the UCAM and the PC, since the wiring of the interlink cable is different from that of the RS cross cable.

1-1-2-3 Control Command Format

(1) Control Command Code: ASCII code (3 uppercase characters)

Control commands are configured with the command code plus parameter according to characteristics of control commands.

Examples

a. Command with no parameter: STA (to start measurement)

b. Command with parameter: CHR00000901X (to define the first and last channels)

(2) Delimiter between Commands: , (comma)

Control commands are continuously output with a delimiter “,” in between.

(3) Command Message Length: Within 512 characters (including the termination code)

Any composite command to be output at a time should be written within 512 characters.

(4) Termination Code: CR or CRLF

The termination code should be suffixed to the character string to indicate the termination of command message output.

(5) Baud Rate: 2400, 9600, 19200 or 38400 baud

(6) Data Length: 8 bits (fixed)

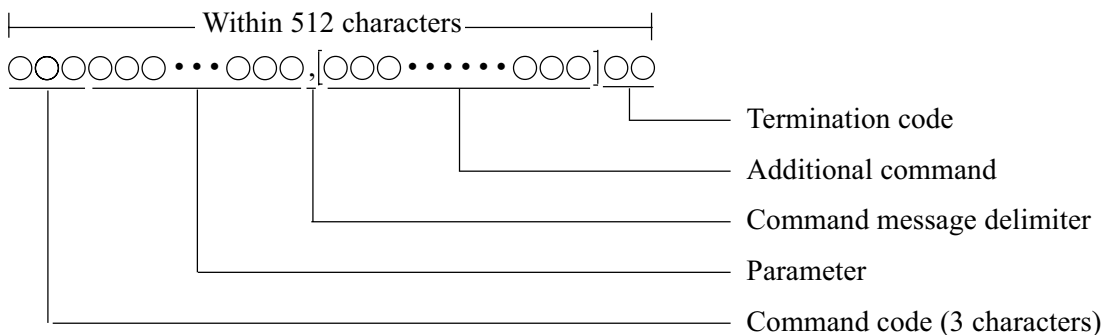
(7) Parity: None (fixed)

(8) Stop Bit: 1 bit (fixed)

(9) Time-out Time: 1 bit (fixed)

Notes:

1. Not compatible with XON/XOFF control.
2. Not compatible with send break characters.



Example of Composite Command (additional command in brackets)

1-1-3 Ethernet Interface

The UCAM is equipped with the 10BASE-T/100BASE-TX (IEEE 802) interface for connection to the PC. The communications protocol is TCP/IP (Ipv4). For sending and receiving control commands in the application program, the network communications socket library is used.

If your PC operates on Microsoft Windows 98, NT4, 2000 or XP, it provides the socket library “Microsoft Windows Socket API” which enables to create a desired remote control program for the UCAM.

MEMO

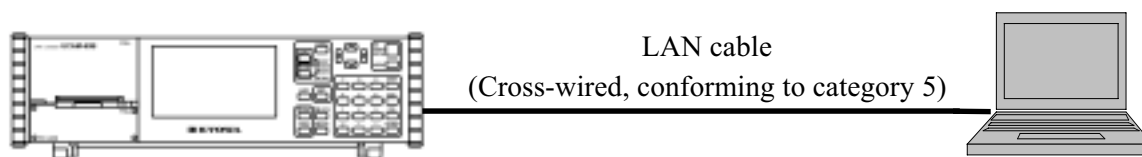
Microsoft Windows Socket API (WinSock) is a network-related application programming interface and is installed in the Windows 98, NT4, 2000 and XP as a standard provision.

1-1-3-1 Connection

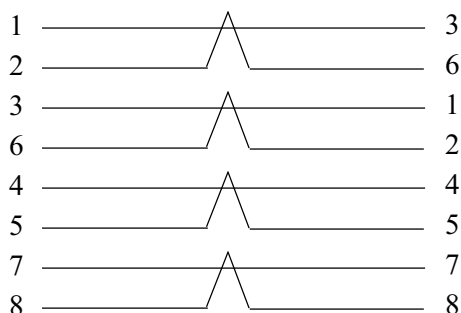
The UCAM is equipped with the 10BASE-T/100BASE-TX interface and uses the communications protocol TCP/IP (Ipv4). The mating PC should have a network interface. If the 10BASE-T/100BASE-TX is used for the network interface of the PC, the UCAM and the PC can be connected via a hub using a 10BASE-T/100BASE-TX straight cable.

Also, the PC should be placed in the network environment enabling TCP/IP communication. For the method of setting the network environment of the PC, refer to the instruction manual of the PC or the network interface.

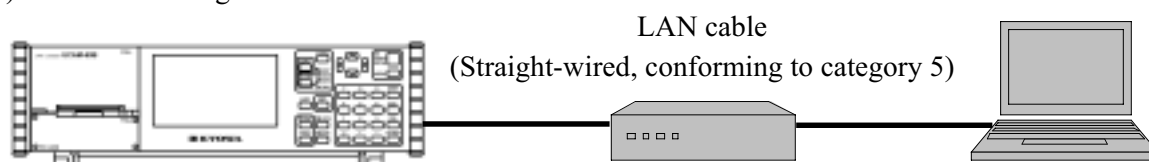
(1) When directly connecting to the PC



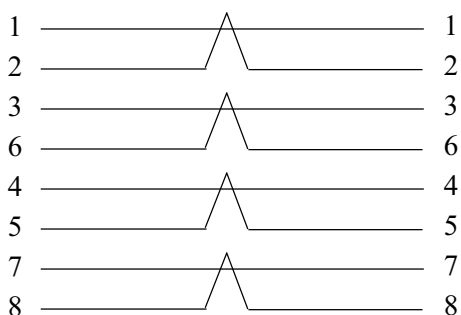
- Use a cross-wired LAN cable of category 5 or higher.
- The cross-wiring should be as follows.



(2) When connecting to the network via hub or the like



- Use a straight-wired LAN cable of category 5 or higher.
- The straight-wiring should be as follows.



MEMO

- Usually, LAN environment of offices and laboratories uses a hub. Thus, a straight-wired cable is mainly used.
- Straight and cross-wired cables have the same appearance. If the type is unclear, refer to the wiring diagram of the instruction manual.
- The UCAM does not provide a fire-wall function or the like. Thus, be careful enough when connecting the UCAM to a network.

1-1-3-2 Setting UCAM to Ethernet

Place the UCAM in Ethernet environment by setting the following parameters:

- IP address, SubNetMask, default gateway, UCAM name and work group name

The UCAM is set to the following factory default prior to shipment:

- IP address 192.168. 0. 60 (UCAM-60B)
 192.168. 0. 65 (UCAM-65B)
- SubNetmask 255.255.255. 0
- Default gateway 0. 0. 0. 0
- UCAM name UCAM60B (in the case of UCAM-60B)
 UCAM65B (in the case of UCAM-65B)
- Work group name WORKGROUP

NOTE

When using an existing Ethernet environment, consult the network manager about setting values, etc.

In the case of the UCAM-60B, set the Ethernet parameters through the front panel keys, referring to “3. INTERFACE SETTING.”

In the case of the UCAM-65B, connect it to the PC and set the Ethernet parameters on web browser as follows.

- The following description is based on the default conditions of the UCAM prior to shipment.
- Be sure to connect the UCAM-65B to the PC before setting the Ethernet parameters.
- Menu options are indicated in quotation marks (“ ”).
- The procedure below is described by supposing Windows XP and Windows Internet Explorer are used.
The same procedure may be applied to other web browsers.

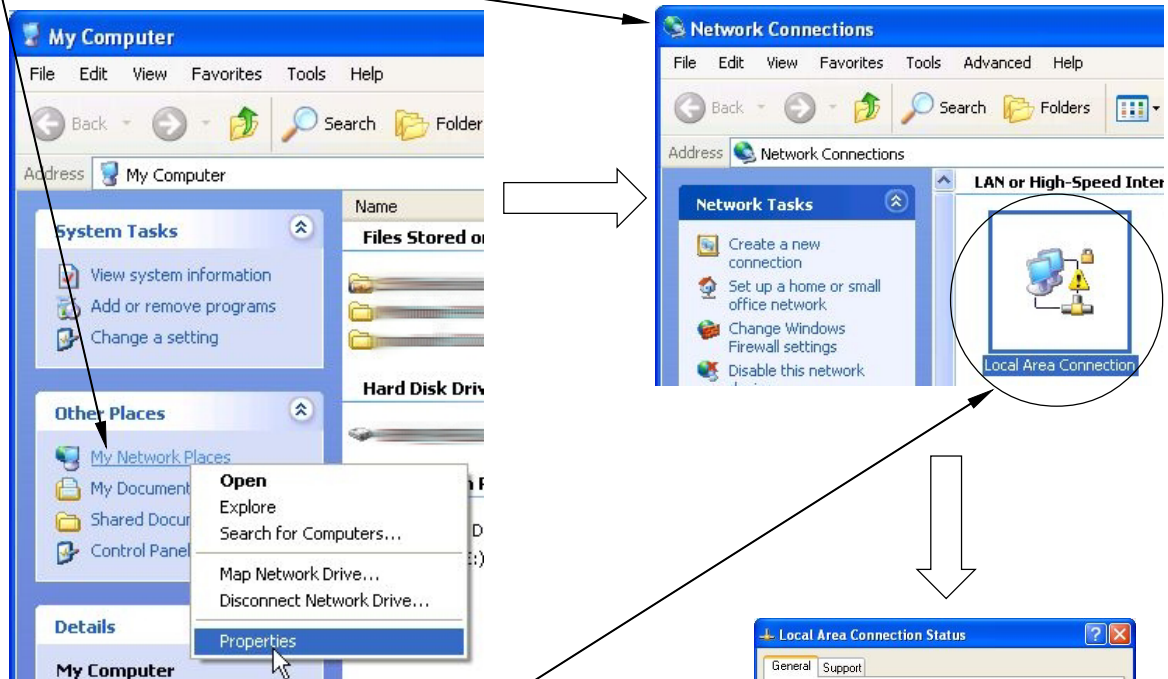
(1) Set the UCAM-65B to Ethernet by setting bit 8 of the dip switch to OFF (0).

(2) Turn OFF the UCAM and restart.

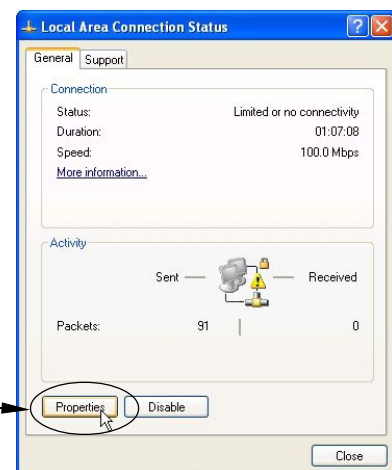
(3) Set the Internet protocol (TCP/IP) of the PC (Windows XP).

Place the PC in the network environment where it can communicate with the UCAM-65B.

1) On the “My Computer” window, select “My Network Places” ⇒ “Properties” and open “Network Connections.”

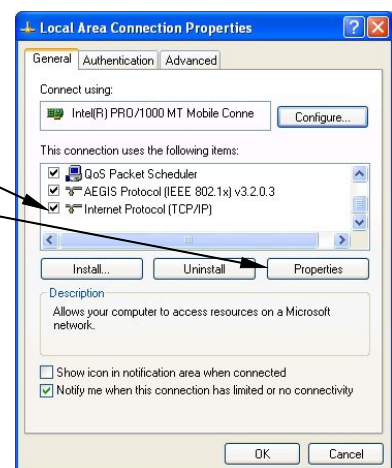


2) Select “Local Area Connection.”
The “Local Area Connection Status” window opens.

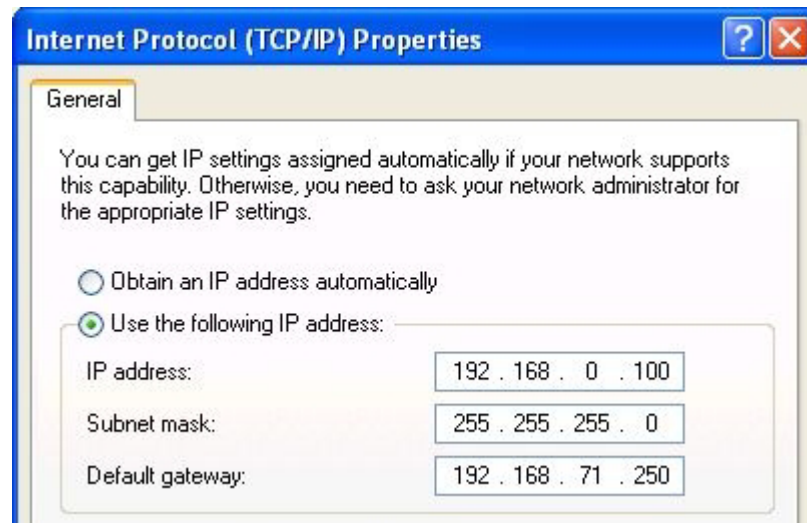


3) Select “Properties.”

4) On the “Local Area Connection Properties” window, select “Internet Protocol (TCP/IP)” and click “Properties.”



- 5) On the “Internet Protocol (TCP/IP) Properties” window, check the IP address.
(Example)



IP address of the above example is 192.168. 0 .197.

IP address of the UCAM-65B is 192.168. 0 . 65.

High-place 3 sets have the same numbers.

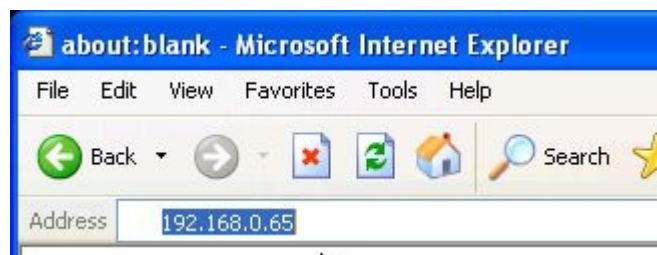
Input numbers different from that of the PC in the fourth-place. Check the IP address and take care not to duplicate IP addresses in the same Ethernet environment where other PCs and instruments are connected.

- (4) Change the Ethernet parameters of the UCAM-65B as required.

- 1) Start the web browser.

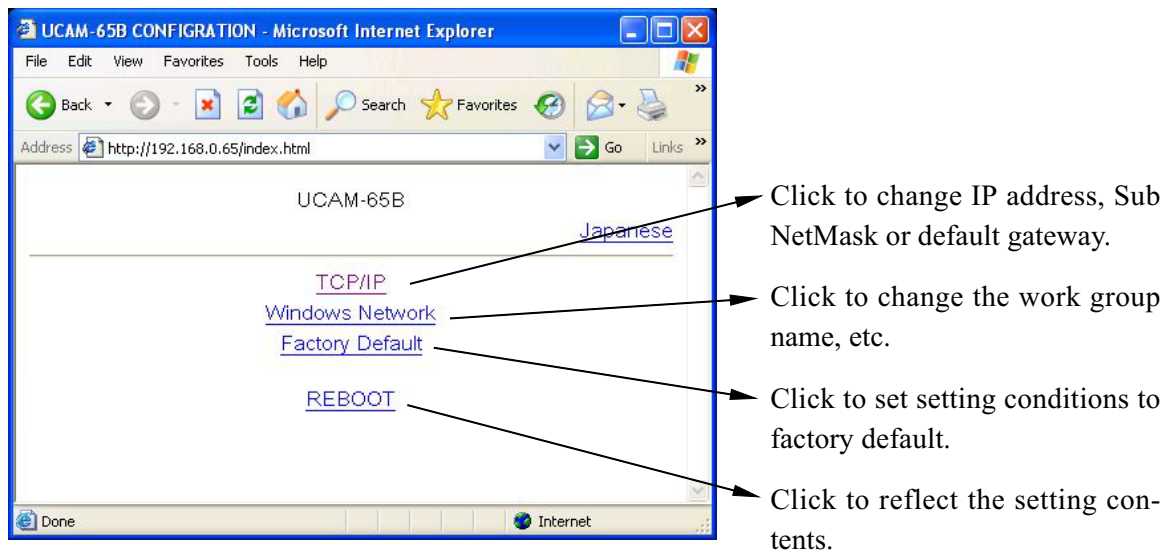


- 2) On the Explorer window, click the “Address” field.

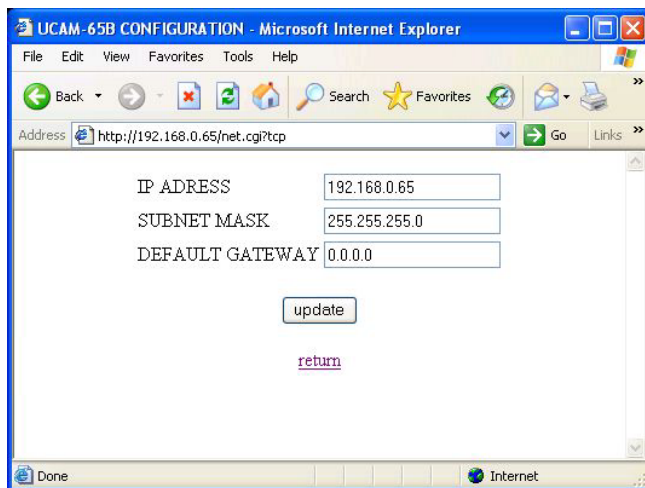


- Input “http://192.168.0.65/” in the Address field and press **Enter** key.

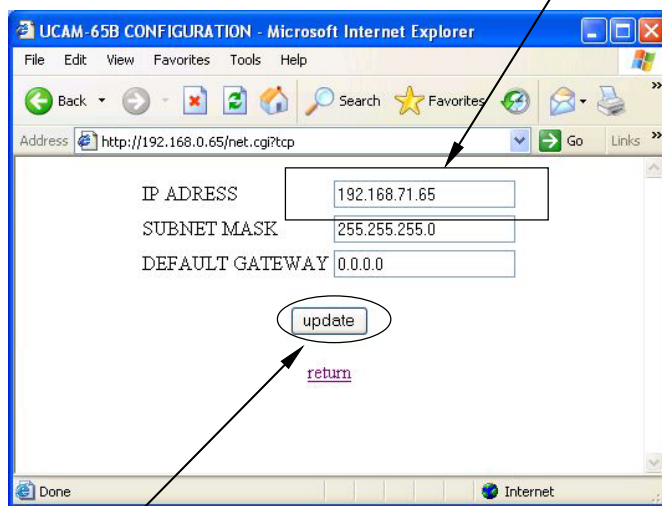
3) The UCAM-65B CONFIGURATION window opens.



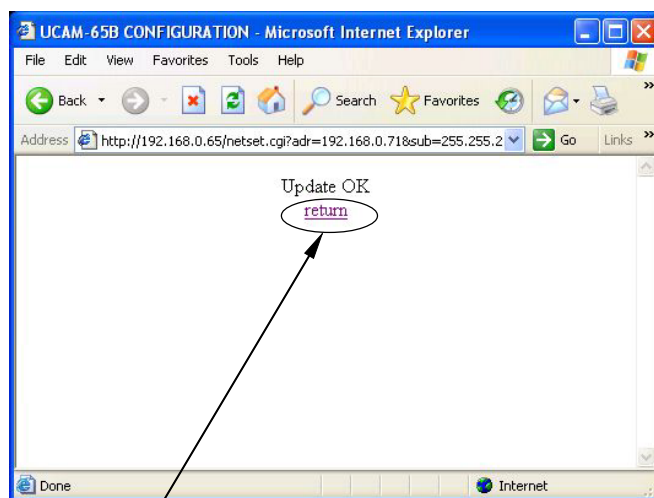
- 4) To change the IP address, click “TCP/IP.” Preset IP address, SubNetMask and default gateway are displayed as follows.



For example, change the IP address to “192.168.71.65.”

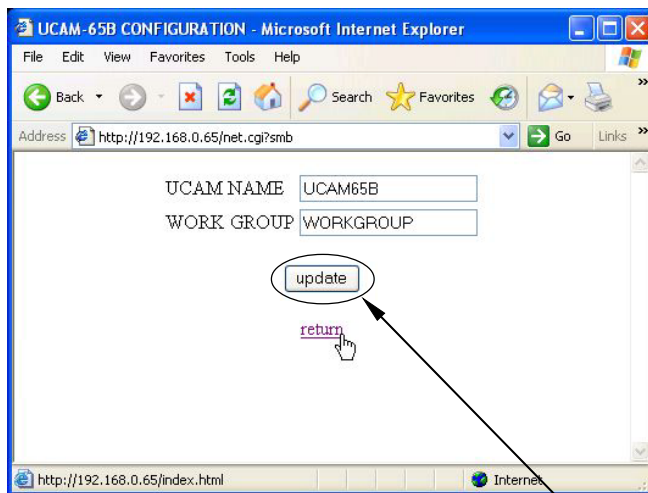


After the change, always click “update.” The following window appears.

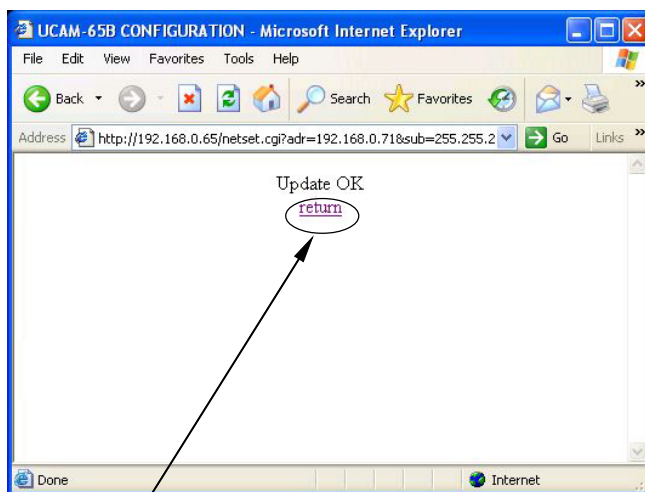


Click “return” to return to the previous window.

- 5) To change the work group name, click “Windows Network.” Preset UCAM name and work group name are displayed as follows.

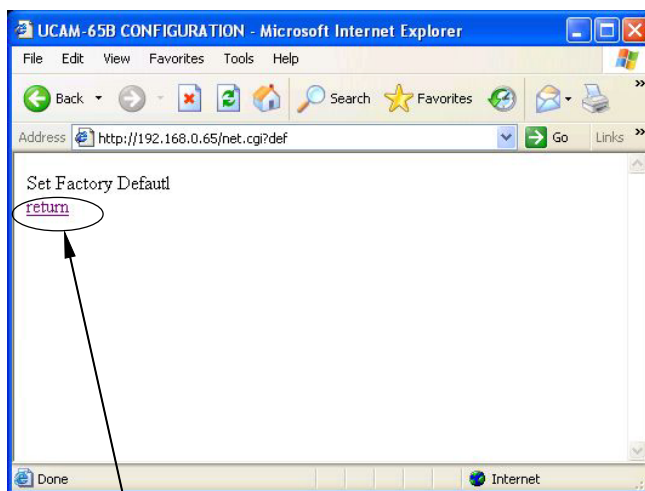


After changing the work group name, always click “update.” The following window appears.



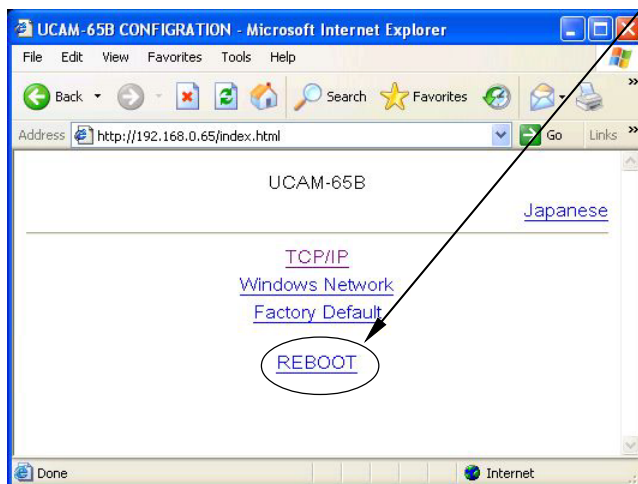
Click “return.” to return to the previous window.

- 6) To reset the setting conditions to factory default, click “Set Factory Default.” The following window appears.

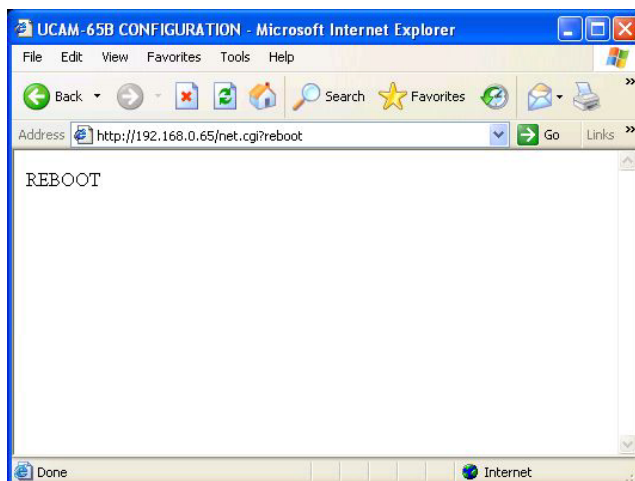


Click “return.” to return to the previous window.

7) To reflect the preset contents, be sure to click “REBOU”.



After “REBOU”



The UCAM-65B is automatically restarted with preset contents reflected.

- (5) Since the IP address of the UCAM-65B is changed to “192.168.71.65,” change the IP address of the PC to 192.168.71.***.” “***” may be any number but should not be duplicated with a number used by other PC or instrument in the network.

The above IP address is a sample one.

1-1-3-3 Confirmation of Correct Connection

A. Confirmation by Hardware

The Ethernet port of the UCAM provides 2 LED lamps, which enable confirmation of correct connection by hardware. Turn ON the UCAM. If Ethernet connection is correct, one LED lights up and the other flickers (irregularly). If not, check the LAN cable and hub.

B. Confirmation by Software (Ping Command)

Send a ping command from the PC's command prompt. If the UCAM corresponds to the command, the Ethernet connection is correct.

1) Start command prompt.

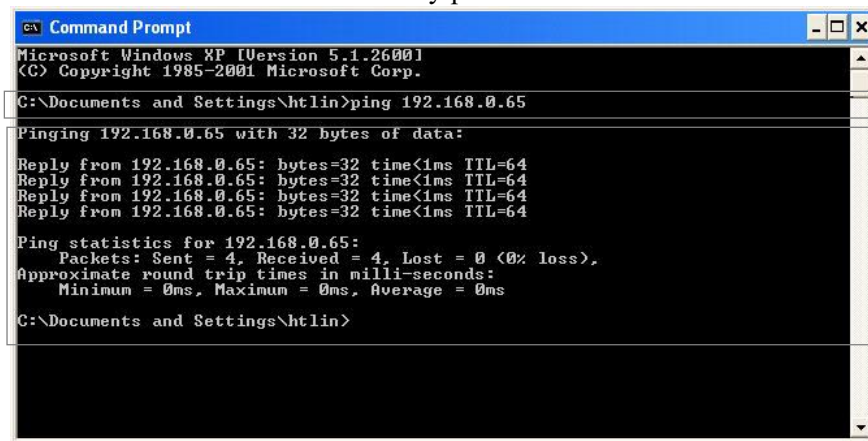
Point to "Start" and select "All Programs" ⇒ "Accessories" ⇒ "Command Prompt."

2) Input PING command.

Input "ping_IP address of UCAM" and press Enter key.

3) Communication is carried out 4 times and the results are displayed on the window.

- When communication is normally performed



```
CA Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\htlin>ping 192.168.0.65

Pinging 192.168.0.65 with 32 bytes of data:

Reply from 192.168.0.65: bytes=32 time<1ms TTL=64
Reply from 192.168.0.65: bytes=32 time<1ms TTL=64
Reply from 192.168.0.65: bytes=32 time<1ms TTL=64
Reply from 192.168.0.65: bytes=32 time<1ms TTL=64

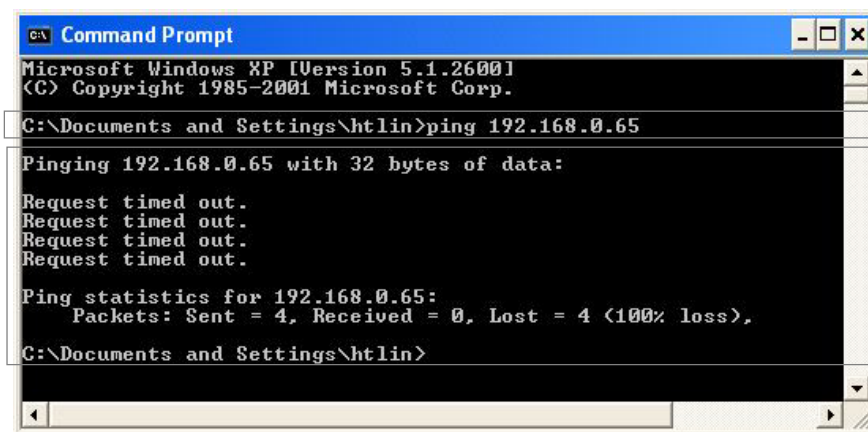
Ping statistics for 192.168.0.65:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\htlin>
```

IP address of UCAM

Results (Normal)

- When communications error occurs



```
CA Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\htlin>ping 192.168.0.65

Pinging 192.168.0.65 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.0.65:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Documents and Settings\htlin>
```

IP address of UCAM

Results (Error)

If correct connection for Ethernet communication is confirmed by both hardware and software but control on a practical application is not available,

- Check the setting conditions of the current application.
- Check with the security software Firewall removed.
- Ethernet communication is not available if the communications port (9001) is set to a state where it is always closed.

1-1-3-4 Confirmation of IP Address of PC

(1) Start command prompt.

Point to “Start” and select “All Programs” ⇒ “Accessories” ⇒ “Command Prompt.”

(2) Input IPCONFIG command.

Input “ipconfig” and press key.

(3) The present PC’s IP address is displayed as follows.

```
C:\Documents and Settings\htlin>ipconfig

Windows IP Configuration

Ethernet adapter Wireless Network Connection 2:

    Media State . . . . . : Media disconnected

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix . : 
    IP Address . . . . . : 192.168.0.100
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

C:\Documents and Settings\htlin>
```

Command input

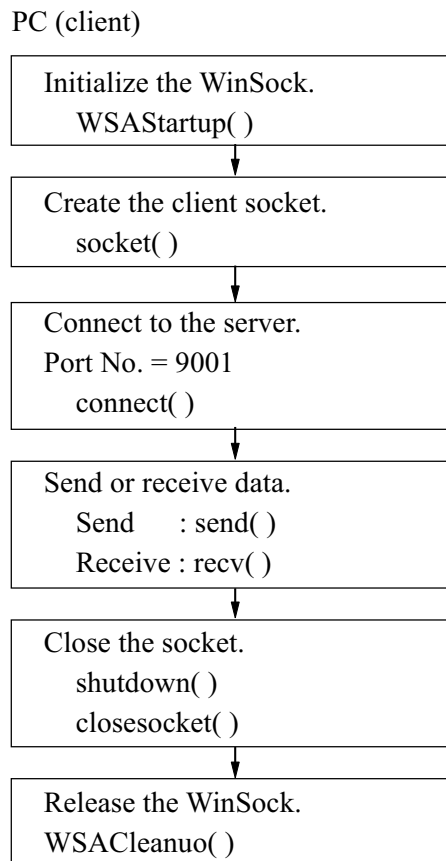
PC's IP address

1-1-3-5 Socket Programming

The application program which operates a remote control program on Microsoft Windows can be compiled using a network application socket library. Use the WinSock when compiling the application program which operates on Microsoft Windows.

The program can be compiled in any programming language for development, such as Microsoft Visual C++, which can be used by the WinSock library.

The following is the programming procedure using the WinSock.



xxxxxx(): Function of WinSock

In the remote control, the UCAM is the server and the PC is the client. That is, the UCAM is the server waiting for control commands from the client and the PC is the client sending control commands to the server. When receiving a control command from the PC, the UCAM operates according to the command and sends the results to the PC.

1-1-3-6 Communications Procedure

● Control Command Format

Control command character string (ASCII code)	
Buffer size	: 512 bytes, fixed
Termination code	: 0x00
Size	: 1 byte

- Each command is an ASCII character string consisting of the command code (3 uppercase characters) or the command code + the parameter.
- The termination code is 0x00 (null). Suffix it to the command string to indicate the termination of the control command output.

■ Packet Contents when “SYS” command is sent for example

		→ Sent command															
00000:	53 53 53 00	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	D0 FD 7F	SYS.....													
00010:	00 00 00 00	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00															
00020:	00 00 00 00	B0 FC F9 00 00 00 00 00 00 00 00 00 00 00 00															
00030:	18 EE 94 7C	00 8E 95 7C FF FF FF FF FA 8D 95 7C		...	...	...											
00040:	25 D6 94 7C	CF EA 94 7C 30 FD F9 00 01 00 00 00		%.. ... 0.....													
00050:	17 00 01 00	00 00 00 00 00 00 00 00 00 00 00 00 00 00															
00060:	00 00 00 00	00 00 00 00 00 00 00 00 00 00 00 00 00 00															
00070:	00 00 00 00	00 00 00 00 00 00 00 00 00 00 00 00 00 00															
00080:	08 40 77 89	C0 A2 5E 89 00 00 00 00 00 00 00 00 00 00		.@w...^.....													
00090:	D8 60 1E 89	B8 60 1E 89 70 1A 7B B4 CE E8 BD B5		..P.{.....													
000A0:	08 40 77 89	38 5B 26 89 C0 A2 5E 89 03 01 00 00		.@w.8[&...^.....													
000B0:	08 10 43 89	00 00 00 00 B0 FD F9 00 3E EB CF 77		..C.....>..w													
000C0:	30 CA 60 00	00 00 00 00 00 00 00 00 00 00 42 10 D0 77		0..`.....B..w													
000D0:	F4 FD F9 00	6C 0E 67 74 21 01 05 00 00 00 00 00		gt!.....													
000E0:	01 00 00 00	71 0E 67 74 00 00 00 00 00 00 D0 FD 7F		q.gt.....													
000F0:	42 10 D0 77	00 00 3C 00 21 01 05 00 C8 FD F9 00		B..w..<.!.....													
00100:	41 A3 BE 77	3C FE F9 00 48 E5 69 74 78 0E 67 74		A..w<...H.itx.gt													
00110:	FF FF FF FF	71 0E 67 74 F2 EA CF 77 00 00 00 00		q.gt...w....													
00120:	01 00 00 00	90 FE F9 00 85 CB CF 77 F8 FE F9 00		w....													
00130:	4C FE F9 00	9E EA CF 77 00 00 03 00 01 00 00 00		L.....w.....													
00140:	90 FE F9 00	AD EA CF 77 85 CB CF 77 F8 FE F9 00		w...w....													
00150:	42 10 D0 77	28 FE F9 00 88 00 00 00 74 FF F9 00		B..w{.....t...													
00160:	67 04 D2 77	B0 EA CF 77 FF FF FF FF AD EA CF 77		g..w...w...w...													
00170:	F3 EB CF 77	80 FE F9 00 90 FE F9 00 03 EC CF 77		...w.....w...													
00180:	00 00 00 00	00 00 00 00 20 00 00 00 90 FE F9 00															
00190:	D4 FE F9 00	E3 EA 94 7C 80 FE F9 00 30 00 00 00		0...													
001A0:	00 00 03 00	01 00 00 00 E9 0D 67 74 C1 EA CF 77		gt...w													
001B0:	00 00 00 00	07 04 00 00 00 00 00 00 50 56 37 00		PV7.													
001C0:	BD 4F 26 00	AF 03 00 00 D9 00 00 00 01 00 00 00		.O&.....													
001D0:	85 CB CF 77	F8 FE F9 00 D4 FE F9 00 91 10 D0 77		...w.....w													
001E0:	07 04 00 00	00 FF F9 00 42 10 D0 77 85 CB CF 77		B..w...w													
001F0:	50 30 00 10	80 FF F9 00 C1 1A 00 10 01 00 00 00		P0.....													

● Response Block Format

Response data (ASCII code)	
Buffer size	: 512 bytes, fixed
Termination code: 0x00	
Size	: 1 byte

- Response block stores response data to the control command.
- The termination code is 0x00 (null). It is suffixed to the response data.

■ Packet Contents of Response to “SYS” command for example

00000:	55 43 41 4D 2D 36 30 42 2C 20 30 2E 31 36 2C 20	UCAM 60B, 0.16,	→ Response data
00010:	30 2E 30 34 2C 31 2C 30 2C 30 2C 30 2C 30 2C 31	0.04,1,0,0,0,0,1	
00020:	2C 30 2C 30 2C 31 2C 30 2C 30 2C 30 2C 30 00 20	,0,0,1,0,0,0,0.	→ Termination code
00030:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00040:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00050:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00060:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00070:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00080:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00090:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
000A0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
000B0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
000C0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
000D0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
000E0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
000F0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00100:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00110:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00120:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00130:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00140:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00150:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00160:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00170:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00180:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
00190:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
001A0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
001B0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
001C0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
001D0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
001E0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		
001F0:	20 20 20 20 20 20 20 20 20 20 20 20 20 20 20		

2. LIST OF COMMANDS

Command Message		Command	Ref. Page	
Type	Description			
Measurement	Start measurement.	STA	28	
	Start monitor measurement.	CAL	28	
	Start trigger measurement.* ¹	TRG	28	
	Start trigger interval measurement.* ¹	TGI	28	
	Start ZERO measurement.	ZER	28	
Setting Basic Parameters	Set the first and last channels and the number of repeat times.		CHR	29
	Set the measuring function.	“Initial”	INT	29
		“Measure”	MES	29
		“Original”	ORG	29
		“Easy Measure”	ESY	29
	Set measuring channel mode.		MOD	30
	Set scanning speed.		SPD	32
	Match measursing conditions between mainframe and scanners.		SCS	32
Interrupt	Stop measurement or setting.	STP	32	
	Stop interval measurement in trigger interval measurement.* ¹	TIF	32	
ON/OFF Mode	Turn the printer ON/OFF.* ¹	PON/POF	32	
	Turn calibration coefficient calculation ON/OFF.	CON/COF	33	
	Turn interval measurement ON/OFF.	ION/IOF	33	
	Turn data saving ON/OFF.	SON/SOF	33	
	Turn the display ON/OFF.* ¹	VON/VOF	33	
Setting Various Parameters	Set the time.	TIM	34	
	Set the calibration coefficient.	CST	34	
	Set the offset value.	OFS	35	
	Set the initial value.	INI	36	
	Set the reference resistance.	ROC	36	
	Set the channel name.	NAM	36	
	Set interval measurement conditions.	INV	37	
	Set triggering conditions.* ¹	TST	37	
	Set trigger interval measurement conditions.* ¹	TIP	38	
	Set the saving file name.	FNM	38	
	System setting • Power control (Yes/No) • Rainfall input (No/1mm/0.5mm) • Internal scanner (Yes/No) • Trigger mode (Relative/Absolute) • Cold junction compensation (Internal/External) • Delta V (Yes/No) • Delta T (Yes/No) • Power frequency (50/60Hz) • Measurement timing (Synchronous/Asynchronous) • Header output (Yes/No) • Measured data output format (all items/channel numbers and measured data)		DSW	38

*1. Applicable only to the UCAM-60B.

Command Message		Command	Ref. Page
Type	Description		
Reading various parameters	Read the time.	TRD	39
	Read various parameters.		39
	• Channel mode	PRR00	
	• Initial value	PRR01	
	• Calibration coefficient	PRR02	
	• Interval measurement conditions	PRR03	
	• Triggering conditions* ¹	PRR04	
	• First and last channels, the number of repeat times and measuring function mode	PRR06	
	• ON/OFF mode	PRR07	
	• System setting	PRR08	
	• Scanning speed	PRR09	
	• Trigger interval measurement conditions* ¹	PRR10	
	• Offset value	PRR11	
	• Reference resistance	PRR12	
	• Channel conditions	PRR13	
	• Read dip switch setting conditions.* ²	PRR15	
	• Create the backup file.	PRR17	
	• Maintenance setting	PRR 18	
Checking circuit conditions	Checking conditions.		45
	• Insulation	CHK0	
	• Bridge voltage 2 V	CHK1	
	• Bridge voltage 5 V	CHK2	
	• Input resistance	CHK3	
	• Output resistance	CHK4	
	• Terminal temperature	CHK5	
	• Disconnection	CHK6	
	• Burnout	CHK7	
	• Mode detection	CHK8	
File management	Switch the drive.	DEV	50
	Read the file name.	DIR	50
	Delete the file.	DEL	50
	Copy the file.	CPY	51
	Rename.	REN	51
	Format.	FMT	51
	Set whether or not to create the backup file in PC card.	BUF	51
Data reproduction	Reproduce measured data.	REG	52
TEDS	Set TEDS reading conditions for every channel.	TCH	55
	Select automatic setting items.	TAS	55
	Start reading TEDS information.	EID	56
	Read TEDS information.	GID	57
	Read detailed TEDS information.	SID	58

*1. Applicable only to the UCAM-60B.

*2. Applicable only to the UCAM-65B.

Command Message		Command	Ref. Page
Type	Description		
Others	Test the bus line.	RS-/LAN	59
	Read the system information (model, etc.)	SYS	60
	Read the error number.	ERR	61
	Clear the error number.	ECL	61
	Duplicate the same channel parameter.	DUP	61
	Maintenance setting	MTS	61
	Automatic channel mode setting	MAS	62
	Initialize the system.	RST	62
	Exit the on-line status.	LOC	62

2-1 OUTPUT FORMAT OF MEASURED DATA

(1) Code : ASCII

(2) Delimiter of Data: , (comma)

(3) Termination Code: CR or CRLF

Selected Interface	Termination Code	
RS-232C	CR selected	CR (0x00)
	CRLF selected	CR (0x00) LF (0x0A)
Ethernet	null (0x00)	

(4) Header: The date/time is output as the header to the measured data output.

○○○○,○○,○○,○○,○○,○○
Y M D Hr Min Sec

Through system setting, it is possible not to output the header.

The number of output characters is 19 + the termination code.

(5) Measured Data

[Output format of all items]

○○,○○○,±○○○○○○○○○○,○○,○,○ +TC

End code (1 character.)
Incidental data discrimination code (1 character)
Unit No. (2 characters)
Measured data (9 characters)
Channel No. (3 characters)
Status No. (2 characters)

The number of output characters is 23 + the termination code.

[Output format of measured data with channel number only]

○○○, ○○○○○○○○○ +TC

Measured data (9 characters)
Channel No. (3 characters)

The number of output characters is 13 + the termination code.

Either of the output formats can be selected through system setting.

(6) Status No.

No.	Status (Error) Name	Troubleshooting
00	Normal data	
01	Measured data is exceeding the range	Check the following to find out whether the problem lies in the sensor or the scanner: • Whether or not an overload is applied to the sensor. • Whether sensors are correctly connected. • Whether or not normal measurement is made possible by changing the channel. • Whether or not the measuring channel mode is matched.
02	Abnormal initial value	• The initial value is exceeding the range. Conduct initial measurement once again. Or set the correct initial value.
03	Number of display/printout digits exceeded	• The number of digits of the integer obtained through calibration coefficient calculation exceeds “6 – digits below the decimal point.” Check the calibration coefficient.
04	Unusable measuring channel mode selected	Check the measuring channel mode.
05	Allowable temperature range exceeded	Check that the input voltage does not exceed the range of the electromotive force of the thermocouple.
06	• No common dummy • Abnormal measured data in the dummy channel	• No dummy channel exists in true dummy measurement. Check the measuring channel mode. • Data error in the dummy channel. Check whether or not the sensor of the dummy channel is normal. Check whether or not the initial value of the dummy channel is normal.
07	Abnormal terminal temperature with thermocouple	• The terminal temperature is exceeding the range of -20°C to $+60^{\circ}\text{C}$. Check the terminal temperature.
08	Skip channel	Check the measuring channel mode.
09	Disconnection error	Check that the strain gage or strain gage transducer is not disconnected from the B.D pin of the scanner input terminal.
10	Scanner transmission error	Check that the scanner cable is correctly connected. Check that the scanner has the box number and the same box number is not used for another scanner.
11	Abnormal A-D converter	Remeasure and check whether the same error occurs or not. If the error occurs frequently, contact KYOWA for repair.
30	Unmatched measuring channel mode between the UCAM and USB-70A, disabling measurement	Check the measuring channel mode. Check the “MODE SET” switch of the USB-70A. Check the scanner connection.
31	No scanner mounted, disabling measurement	Check that the internal scanners are installed or external scanners are connected via the scanner interface. If this error occurs frequently despite correct connection of scanning units or external scanners, contact KYOWA for repair.

(7) Channel No.: 000 to 999

(8) Unit No.

Unit No.	Unit	Unit No.	Unit	Unit No.	Unit
00	$\mu\epsilon$	20	cm/s^2	40	m/s
01	$\mu\text{m/m}$	21	m/s^2	41	m/min
02	mN	22	G	42	km/h
03	N	23	g	43	Hz
04	kN	24	kg	44	kHz
05	MN	25	t	45	MHz
06	$\text{N}\cdot\text{m}$	26	ms	46	rpm
07	$\text{kN}\cdot\text{m}$	27	s	47	Ω
08	$\text{N}\cdot\text{cm}$	28	min	48	$\text{k}\Omega$
09	Pa	29	h	49	$\text{M}\Omega$
10	hPa	30	mV	50	mW
11	kPa	31	V	51	W
12	MPa	32	mA	52	kW
13	N/mm^2	33	A	53	dB
14	N/m^2	34	K	54	%
15	mmHg	35	$^{\circ}\text{C}$	55	ppm
16	kgf/cm^2	36	rad	56	pH
17	mm	37	$^{\circ}$	57	R
18	cm	38	rad/s	58	(Blank)
19	m	39	cm/s		

(9) Incidental Data Discrimination Code:

0 = No incidental data

1 = Incidental data

When 2 measured values are provided by 1 channel in the following measuring channel modes, the second measured data is regarded as the second incidental data and indicated with the incidental data discrimination code '1.'

Measured values provided by other measuring channel modes are indicated with the incidental data discrimination code '0.'

Measuring channel modes providing incidental data

4G/T (Transducer with temperature measuring function)

	Strain data (Incidental data discrimination code = 0)
	Temperature data (Incidental data discrimination code = 1)

LVDT/T (Differential transformer transducer + resistance thermometer sensor)

	Displacement data (Incidental data discrimination code = 0)
	Temperature data (Incidental data discrimination code = 1)

POT./AB (Sliding resistance transducer)

	A part data (Incidental data discrimination code = 0)
	B part data (Incidental data discrimination code = 1)

(10) End Code

[When measuring]

0: Channel other than the last channel

1: Last channel at the end of repetitive measurement

2: Last channel on the way of repetitive measurement

3: Last channel in monitor measurement

9: Interruption of measurement on the way or abnormal termination of measurement

[When reproducing data]

0: Channel other than the last channel

1: Last channel at the end

2: Last channel on the way

9: Interruption of data reproduction

In the following description,

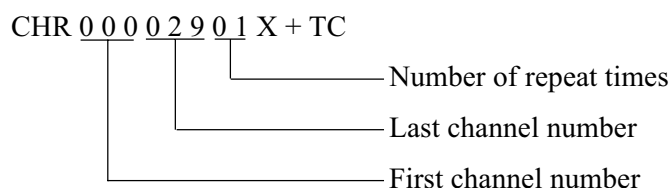
TC is the abbreviation of termination code.

“X” in parameters stands for the delimiter between parameters.

“Δ” in parameters stands for space.

2-2-6 CHR: Set the first to last channels and the number of repeat times

- This command defines a measuring channel range and the number of repeat times.
- The measuring channel range is defined by setting the first to last channels.
- The number of repeat times is set in a range of 00 to 99.



2-2-7 INT: Set the measuring function to “Initial” mode

- This command sets the measurement function to “Initial” mode.
- To start the measurement in the “Initial” mode, send the measurement start command “STA.”
- After the initial value is measured, the measurement function is switched to the “Measure” mode.

INT + TC

2-2-8 MES: Set the measuring function to “Measure” mode

- This command sets the measurement function to the “Measure” mode.
- To start the measurement in the “Measure” mode, send the measurement start command “STA.”

MES + TC

2-2-9 ORG: Set the measuring function to “Original” mode

- This command sets the measurement function to the “Original” mode.
- To start the measurement in the “Original” mode, send the measurement start command “STA.”

ORG: TC

2-2-10 ESY: Set the measuring function to “EASY MEAS” mode

- This command sets the measurement function to the “EASY MEAS” mode.
- To start the measurement in the “EASY MEAS” mode, send the measurement start command “STA.”

ESY + TC

2-2-11 MOD: Set the measuring channel mode

- This command sets the measuring channel to the mode corresponding to the sensor connected to the channel.
- Basically, the measuring channel mode is selected for every individual channel. But the same measuring channel mode can be applied to continuous multiple channels by using the command DUP of duplicate channels.
- The mode which is firstly entered is the one applied to the first channel set by the “CHR” command.

MOD12X13X, DUP009X + TC

The command exemplified above sets the measuring channel mode of the first channel to “12 (4G),” the next channel to “13 (4G_HR)” and the succeeding channels up to channel 009 to “13 (4G_HR).”

List of Measuring Channel Modes

Channel Mode No.	Channel Mode
00 (SKIP)	Skip
01 (1G120)	1-gage, 120 Ω
02 (1G240)	1-gage, 240 Ω
03 (1G350)	1-gage, 350 Ω
04 (1G120/D)	1-gage, 120 Ω , true dummy method
05 (1G120/A)	1-gage, 120 Ω , active method
06 (1G350/D)	1-gage, 350 Ω , true dummy method
07 (1G350/A)	1-gage, 350 Ω , active method
08 (2G/A-D)	2-gage, active-dummy method
09 (2G/A-A)	2-gage, active-active method
10 (2G/COM-D)	2-gage, common-dummy method
11 (4G/A-A)	4-gage, opposite side active method, BV 2 V
12 (4G)	4-gage, constant-voltage excitation, BV 2 V
13 (4G_HR)	4-gage, constant-voltage excitation, BV 5 V (high-resolution mode)
14 (4G/1(129))	4-gage, constant-current excitation, 120 Ω
15 (4G/1(350))	4-gage, constant-current excitation, 350 Ω
16 (4G/1_HR)	4-gage, constant-current excitation, 350 Ω (high-resolution mode)
17 (4G/T)	Transducer with temperature measuring function
18 (V/500mV)	Voltage, 500 mV
19 (V/50V)	Voltage, 50 V
20 (1/50mA)	Current, 50 mA
21 (TC/K)	Thermocouple, K
22 (TC/T)	Thermocouple, T
23 (TC/E)	Thermocouple, E
24 (TC/J)	Thermocouple, J
25 (TC/R)	Thermocouple, R
26 (Pt100)	Platinum resistance thermometer sensor, 100 Ω (new JIS)
27 (JPt100)	Platinum resistance thermometer sensor, 100 Ω (old JIS)
28 (POT.)	Potentiometer sensor
29 (1G120_5V)	1-gage, 120 Ω , BV 5 V
30 (1G240_5V)	1-gage, 240 Ω , BV 5 V
31 (1G350_5V)	1-gage, 350 Ω , BV 5 V
32 (1G120D_5V)	1-gage, 120 Ω , true dummy method, BV 5 V
33 (1G120A_5V)	1-gage, 120 Ω , active method, BV 5 V
34 (1G350D_5V)	1-gage, 350 Ω , true dummy method, BV 5 V
35 (1G350A_5V)	1-gage, 350 Ω , active method, BV 5 V
36 (2G/A-D_5V)	2-gage, active-dummy method, BV 5 V
37 (2G/A-A_5V)	2-gage, active-active method, BV 5 V

Channel Mode No.	Channel Mode
38 (LVDT)	Linear variable differential transformer transducer
39 (LVDT/T)	LVDT transducer with temperature measuring function
40 (POT./A)	Sliding resistance transducer (A part only)
41 (POT./A)	Sliding resistance transducer (A and B parts)
42 (USB-70A-S)	Applied scanner is USB-70A.
43 (USB-50/51)	Applied scanner is USB-50 or USB-51.
• Channel modes to which internal scanners cannot be set.	
10 (2G/COM-D0) 38 (LVDT) 39 (LVDT/T) 40 (POT./A) 41 (POT./AB) 43 (USB-50/51)	

■ Scanning Unit, Types of External Scanner and Selectable Measuring Channel Mode

- Any channel can be set to 00 irrespective of scanning unit and the types of external scanner.
- Internal scanners installed scanning unit

Measuring Channel Mode	Applicable Scanning Units
01 to 09, 11 to 37	USS-61A/62A/63A, USS-61B/62B/63B
10, 38 to 43	Cannot use

- USB-70A (with the scanner “MODE SET” switch set to “REMOTE”)
USB-70B
USB-65A

Measuring Channel Mode	Applicable Scanners
01 to 12, 15, 18 to 25, 28	USB-70A-10/20/30 USB-70B-10/20/30
17, 26, 27	USB-70A-30 USB-70B-30
13, 14, 16, 29 to 43	Cannot use
38, 39, 40, 41	USB-65A on special order only

- USB-70A (with the scanner “MODE SET” switch set to “SCANNER”)
Set the measuring channel mode to 42.
Select the operating measuring channel mode with the digital switch on the scanner.
- USB-50/51
Set the measuring channel mode to 43.
Select the operating measuring channel mode with the digital switch on the scanner.

NOTE

- Contents of Channel Mode Nos. 29 and thereafter differ from those in the previous UCAM-60/65A.

2-2-12 SPD: Set the scanning speed

- This command sets the desired scanning speed for every channel.
- Basically, the scanning speed is set for every individual channel. But the same scanning speed can be applied to continuous multiple channels by using the command DUP of duplicate channel.
- The scanning speed which is firstly entered is the one applied to the first channel set by the CHR command.

SPD0X1X, DUP009X + TC

The command exemplified above sets the first channel to the scanning speed “1” (normal), the next channel to “3” (0.5 sec) and the succeeding channels up to 009 to “3” (0.5 sec).

Scanning speeds Nos.

- 0: High speed (Enabled only for internal scanners)
- 1: Normal
- 2: 0.28 sec
- 3: 0.5 sec
- 4: 1 sec
- 5: 2 sec
- 6: 5 sec
- 7: 10 sec

2-2-13 SCS: Match measuring conditions between the UCAM and scanners

- Be sure to send this command before starting the measurement.
- After measuring conditions are matched between the UCAM and scanners, the UCAM sends “SCS.” Be sure to receive the SCS signal.

SCS + TC (Send)

SCS + TC (Receive)

2-2-14 STP: Interrupt or stop measurement

- This command stops ordinary measurement or monitor measurement in progress.

STP + TC

2-2-15 TIF: Stop interval measurement in trigger interval measurement

TIF + TC

2-2-16 PON: Turn the printer ON (UCAM-60B only)

- This command lights up the PRINT key LED on the UCAM-60B.

PON + TC

2-2-17 POF: Turn the printer OFF (UCAM-60B only)

- This command lights out the PRINT key LED on the UCAM-60B.

POF + TC

2-2-18 CON: Turn calibration coefficient calculation ON

- This command lets the UCAM calculate the CAL coefficient at the measurement. ([COEF] key lights up (ON)).

CON + TC

2-2-19 COF: Turn calibration coefficient calculation OFF

- This command makes the UCAM not to calculate the CAL coefficient at the measurement. ([COEF] key lights out (OFF)).

COF + TC

2-2-20 ION: Turn interval measurement ON

- This command lets the UCAM start the interval measurement.

ION + TC

2-2-21 IOF: Turn interval measurement OFF

- This command lets the UCAM stop the interval measurement.

IOF + TC

2-2-22 SON: Turn data saving ON

- This command lights up the [SAVE] key LED.

SON + TC

2-2-23 SOF: Turn data saving OFF

- This command lights out the [SAVE] key LED.

SOF + TC

2-2-24 VON: Turn the display ON (UCAM-60B only)

- This command lets the display ON.

VON + TC

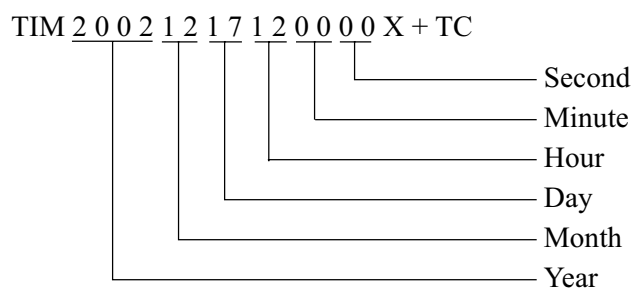
2-2-25 VOF: Turn the display OFF (UCAM-60B only)

- This command lets the display OFF.

VOF + TC

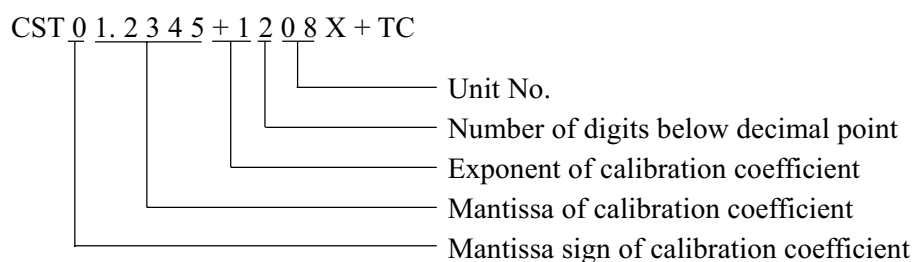
2-2-26 TIM: Set the time

- This command sets the time of the UCAM.



2-2-27 CST: Set the calibration coefficient.

- This command sets the calibration coefficient which enables output of the measured result in the engineering unit.
- Basically, the calibration coefficient is set for every individual channel. But the same calibration coefficient can be applied to continuous channels by using the command DUP of duplicate channel.
- The calibration coefficient which is firstly entered is the one applied to the first channel set by the CHR command.



- Mantissa sign of calibration coefficient: -, +, 0
- Mantissa of calibration coefficient : 0.001 to 999999
- Exponent of calibration coefficient : -9 to +9
- Number of digits below decimal point : 0 to 5

Number of digits below decimal point	Data Format
0	0xxxxxx
1	xxxxx.x
2	xxxx.xx
3	xxx.xxx
4	xx.xxxx
5	x.xxxxx

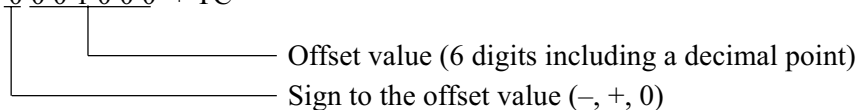
- Unit No.: 00 to 58

Unit No.	Unit	Unit No.	Unit	Unit No.	Unit
00	$\mu\epsilon$	20	cm/s^2	40	m/s
01	$\mu\text{m/m}$	21	m/s^2	41	m/min
02	mN	22	G	42	km/h
03	N	23	g	43	Hz
04	kN	24	kg	44	kHz
05	MN	25	t	45	MHz
06	$\text{N}\cdot\text{m}$	26	ms	46	rpm
07	$\text{kN}\cdot\text{m}$	27	s	47	Ω
08	$\text{N}\cdot\text{cm}$	28	min	48	$\text{k}\Omega$
09	Pa	29	h	49	$\text{M}\Omega$
10	hPa	30	mV	50	mW
11	kPa	31	V	51	W
12	MPa	32	mA	52	kW
13	N/mm^2	33	A	53	dB
14	N/m^2	34	K	54	%
15	mmHg	35	$^{\circ}\text{C}$	55	ppm
16	kgf/cm^2	36	rad	56	pH
17	mm	37	$^{\circ}$	57	R
18	cm	38	rad/s	58	(Blank)
19	m	39	cm/s		

2-2-28 OFS: Set the offset value

- This command sets the offset value (reference value) which enables output of the measured result in the engineering unit.
- Basically, the offset value is set for every individual channel. But the same offset value can be applied to continuous channels by using the command DUP of duplicate channel.
- The offset value which is firstly entered is applied to the first channel set by the CHR command.

OFS 0 0 0 1 0 0 0 + TC



- Offset value: ± 0.0000 to ± 999999

2-2-29 INI: Set the initial value

- This command sets the initial value to the UCAM.
- Bascially, the initial value is set for every individual channel. But the same initial value can be applied to continuous channels by using the command DUP of duplicate channel.
- The initial value which is firstly entered is the one applied to the first channel set by the CHR command.

INI = 0 0 0 2 0 0 0 X + TC
Initial value (8 digits including a decimal point)
Sign to the initial value (–, +, 0)

- Initial value: 0 to ±99999999

2-2-30 ROC: Set the reference resistance

- This command sets the reference resistance to the UCAM.
- Bascially, the reference resistance is set for every individual channel. But the same reference resistance can be applied to continuous channels by using the command DUP of duplicate channel.
- The reference resistance which is firstly entered is the one applied to the first channel set by the CHR command.

ROC 0 1 0 0 . 0 0 X + TC
Reference resistance (7 digits, including a decimal point)

- Reference resistance: ±0.00 to ±9999.99

2-2-31 NAM: Set the channel name

- This command sets the channel name to the UCAM.
- Bascially, the channel name is set for every individual channel. But the same channel name can be applied to continuous channels by using the command DUP of duplicate channel.
- The channel name which is firstly entered is the one applied to the first channel set by the CHR command.

NAMTEST 0 0 0 0 0 0 0 + TC
Channel name (11 alphanumerics, which may include some symbols)

2-2-32 INV: Set interval measurement conditions

- This command sets interval measurement conditions to the UCAM.

INV 2 0 0 2 1 2 1 7 1 8 0 0 0 0 X + TC (When setting the start time of interval measurement.)

Second (00 to 59)
Minute (00 to 59)
Hour (00 to 23)
Day (01 to 31)
Month (01 to 12)
Year (2002 to 2038)

INV ----- X + TC (When setting time for immediately starting the interval measurement.)

INV 0 0 0 0 0 0 0 0 3 0 0 0 1 0 E X + TC (Sets the interval table.)

Status (C, E, 00 to 14)
Number of repeat times (0000 to 9999)
Second (00 to 59)
Minute (00 to 59)
Hour (00 to 23)
Day (00 to 99)
Table No. (00 to 14)

2-2-33 TST: Set trigger measurement conditions

- This command sets trigger measurement conditions to the UCAM.

TST 0 0 0 X + TC (Sets the trigger channel.)

Trigger channel (000 to 999)

TST 0 0 0 0 0 0 0 0 0 X + TC (Sets the reference value.)

(*Required when the trigger mode is set to “Relative Value.”)
(*Not required when the trigger mode is set to “Absolute Value.”)

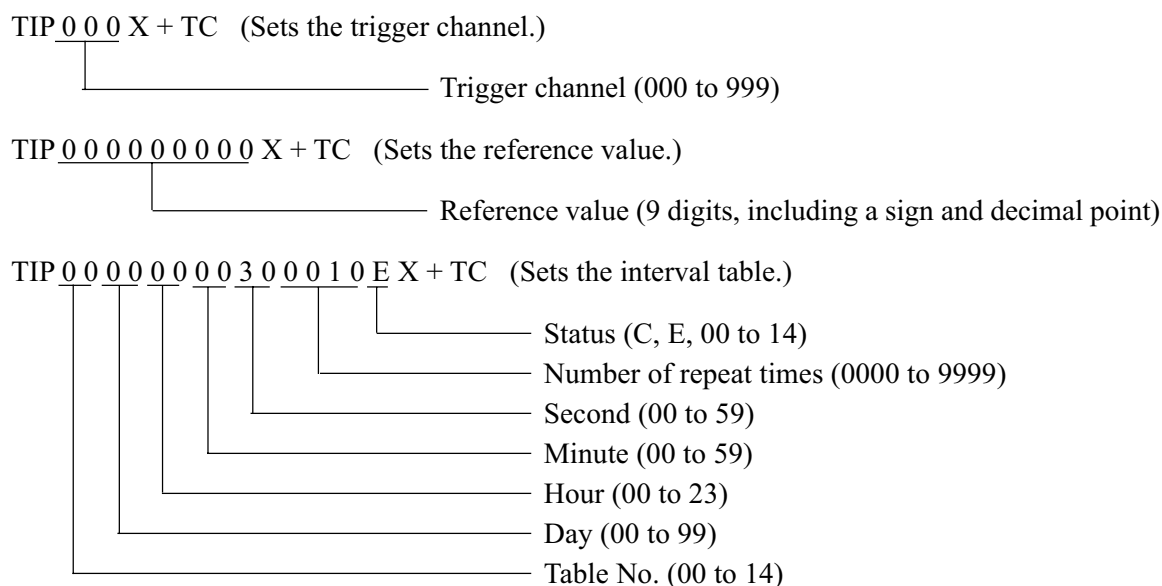
Reference value (9 digits, including a sign and decimal point)

TST 0 0 0 0 0 0 0 0 1 0 0 0 1 0 E X + TC (Sets the trigger table.)

Status (C, E, 00 to 14)
Number of repeat times (0000 to 9999)
Trigger value (9 digits, including a sign and decimal point)
Table No. (00 to 14)

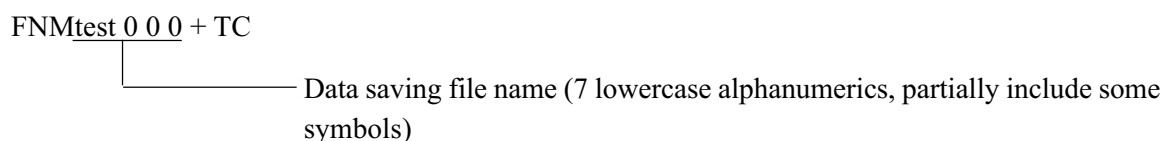
2-2-34 TIP: Set trigger interval measurement conditions

- This command sets trigger interval measurement conditions to the UCAM.



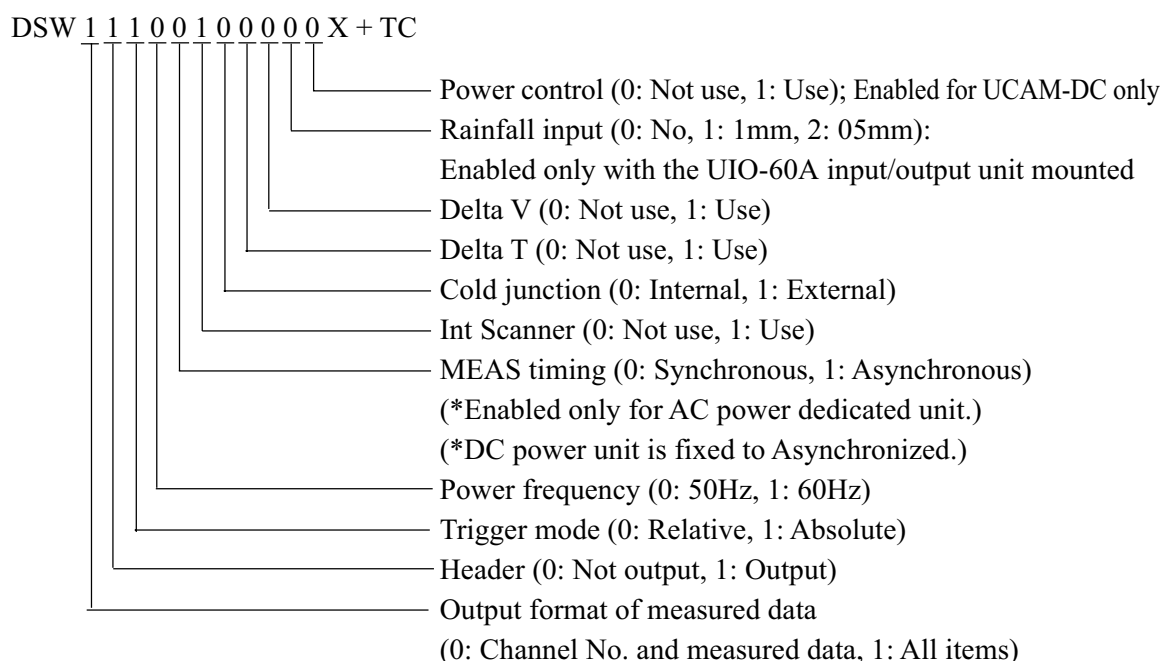
2-2-35 FNM: Set the data saving file name

- This command sets the data saving file name to the UCAM.



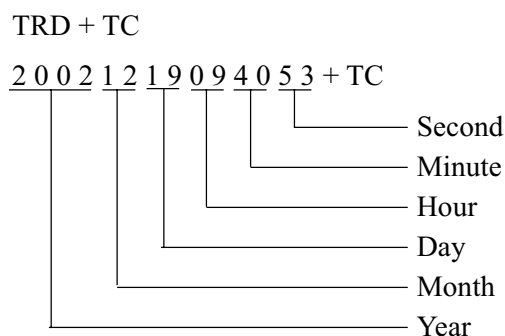
2-2-36 DSW: Set the system.

- This command enables system setting with regard to the following functions.



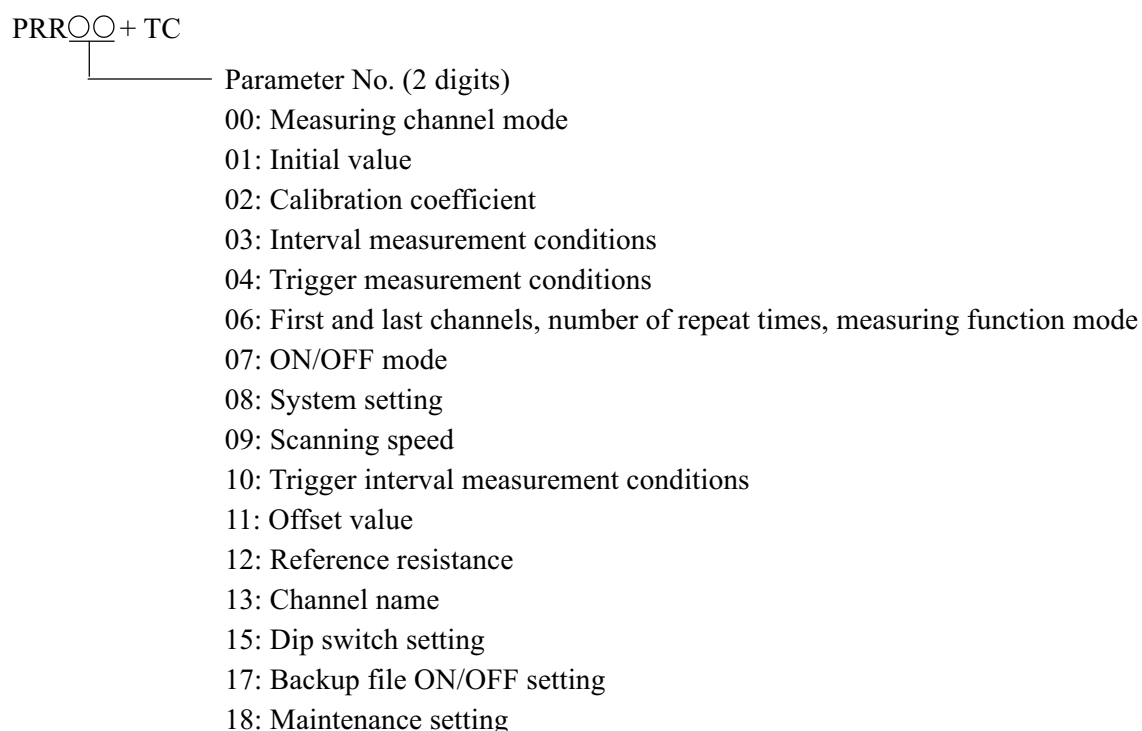
2-2-37 TRD: Read the time

- This command reads the date/time from the UCAM.



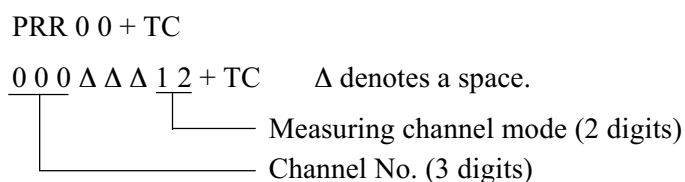
2-2-38 PRR: Read various parameters from the UCAM

- This command reads the parameters written in the UCAM.



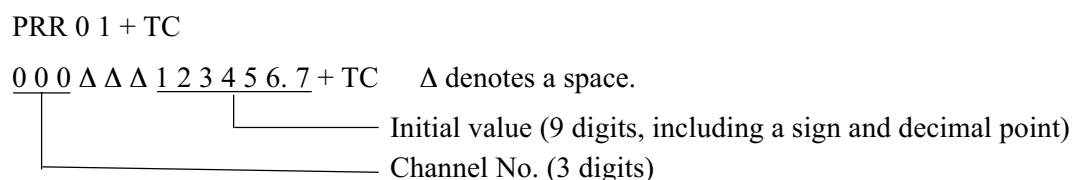
(1) PRR00: Read measuring channel modes

- This command reads measuring channel modes of the first to last channels.



(2) PRR01: Read initial values

- This command reads initial values of the first to last channels.



(3) PRR02: Read calibration coefficients

- This command reads calibration coefficients of the first to last channels.

PRR 0 2 + TC

0 0 0 Δ - 0 . 1 2 3 4 E - 0 Δ 0 Δ 1 0 + TC Δ denotes a space.

Unit No. (2 digits)
Number of digits below decimal point (0 to 5)
Exponent (-9 to +9)
Mantissa (7 digits, including a sign and decimal point)
Channel No. (3 digits)

(4) PRR03: Read interval measurement conditions

- This command reads interval measurement conditions (the starting time of interval measurement and interval tables from 00 to 14).

PRR 0 3 + TC

2 0 0 6 / 1 2 / 1 9 1 2 : 0 0 : 0 0 + TC (Start time of interval measurement)
Y M D Hr Min Sec

0 0 Δ 0 0 - 0 0 - 0 0 - 1 5 Δ 0 0 1 0 Δ C + TC (Interval table 00) Δ denotes a space.

Status
Number of repeat times
Second
Minute
Hour
Day
Table No.

0 1 Δ 0 0 - 0 0 - 0 0 - 3 0 Δ 0 0 1 0 Δ C + TC (Interval table 01)

0 2 Δ 0 0 - 0 0 - 0 1 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 02)

0 3 Δ 0 0 - 0 0 - 0 2 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 03)

0 4 Δ 0 0 - 0 0 - 0 5 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 04)

0 5 Δ 0 0 - 0 0 - 1 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 05)

0 6 Δ 0 0 - 0 0 - 3 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 06)

0 7 Δ 0 0 - 0 1 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 07)

0 8 Δ 0 0 - 0 2 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 08)

0 9 Δ 0 0 - 0 6 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 09)

1 0 Δ 0 0 - 1 2 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 10)

1 1 Δ 0 1 - 0 0 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 11)

1 2 Δ 0 2 - 0 0 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 12)

1 3 Δ 0 7 - 0 0 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 13)

1 4 Δ 3 0 - 0 0 - 0 0 - 0 0 Δ 0 0 1 0 Δ E + TC (Interval table 14)

(5) PRR04: Read trigger measurement conditions

- This command reads trigger measurement conditions (triggering channel, reference value and trigger tables from 00 to 14).

PRR 0 4 + TC

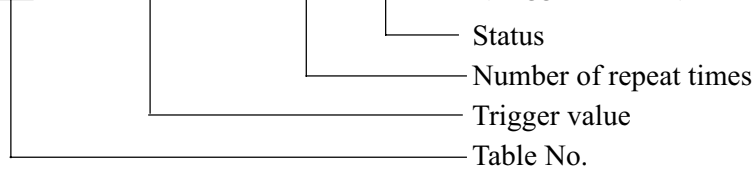
0 0 0 + TC (Trigger channel)

+ Δ Δ Δ Δ Δ Δ 0 + TC (Reference value) Δ denotes a space.

(Output with the trigger mode set to “Relative value.”)

(No output with the trigger mode set to “Absolute value.”)

0 0 Δ + Δ Δ Δ Δ 1 0 Δ 0 0 1 0 Δ C + TC (Trigger table 00)



0 1 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 01)

0 2 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 02)

0 3 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 03)

0 4 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 04)

0 5 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 05)

0 6 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 06)

0 7 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 07)

0 8 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 08)

0 9 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 09)

1 0 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 10)

1 1 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 11)

1 2 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 12)

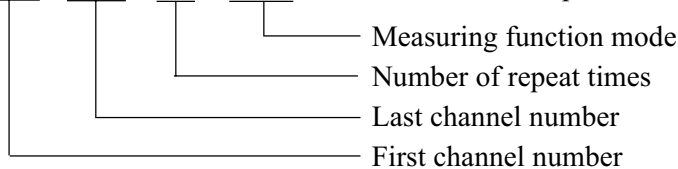
1 3 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ C + TC (Trigger table 13)

1 4 Δ + 0 0 0 0 5 0 Δ 0 0 1 0 Δ E + TC (Trigger table 14)

(6) PRR06: Read the first and last channels, the number of repeat times and measuring function mode

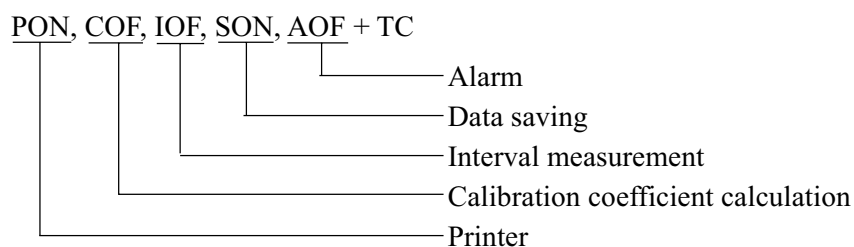
PRR 0 6 + TC

0 0 0 – 0 2 9 Δ 0 1 Δ MES + TC Δ denotes a space.



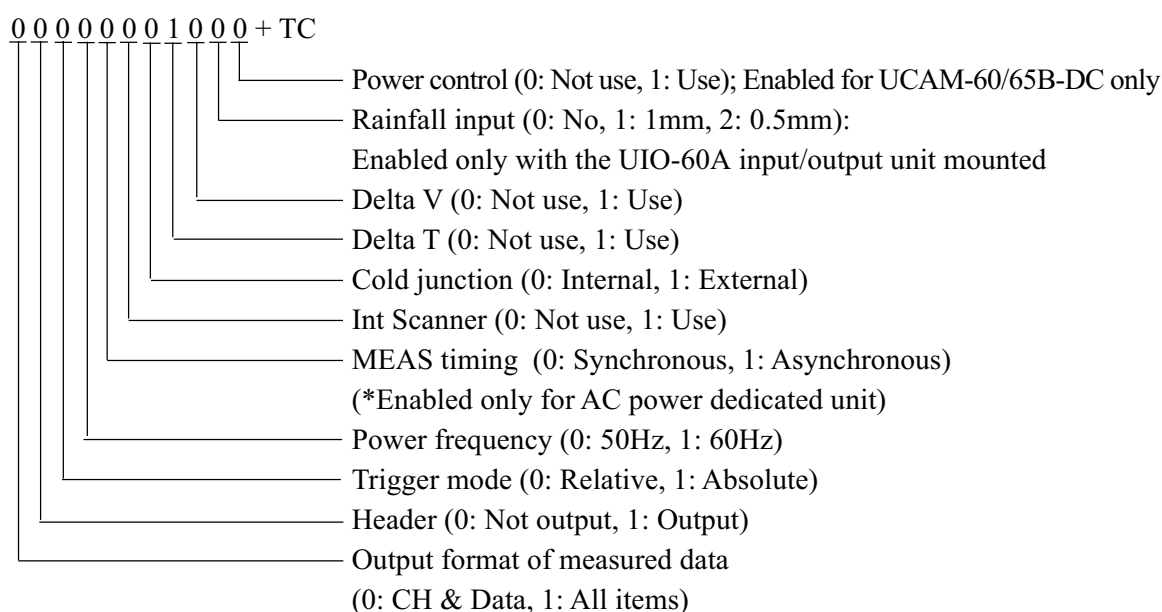
(7) PRR07: Read ON/OFF modes

PRR 0 7 + TC



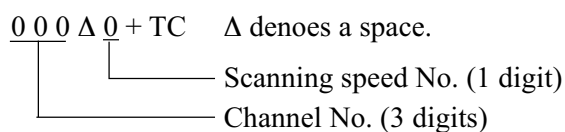
(8) PRR08: Read system setting conditions

PRR 0 8 + TC



(9) PRR09: Read scanning speeds

PRR 0 9 + TC



Scanning Speed No.

- 0: High speed
- 1: Normal
- 2: 0.28 sec
- 3: 0.5 sec
- 4: 1 sec
- 5: 2 sec
- 6: 5 sec
- 7: 10 sec

(10) PRR10: Read trigger interval measurement conditions

- This command reads trigger interval measurement conditions (trigger channel, reference value and interval tables from 00 to 14).

PRR 1 0 + TC

0 0 0 + TC (Trigger channel)

+ Δ Δ Δ Δ Δ Δ 0 + TC (Reference value) Δ denotes a space.

0 0 Δ 0 0 - 0 0 - 0 0 - 1 5 Δ 0 0 1 0 Δ C + TC (Interval table 00)

Table No.
Day
Hour
Minute
Second
Number of repeat times
Status
TC

0 1 Δ 0 0 - 0 0 - 0 0 - 3 0 Δ 0 0 1 0 Δ C + TC (Interval table 01)

0 2 Δ 0 0 - 0 0 - 0 1 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 02)

0 3 Δ 0 0 - 0 0 - 0 2 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 03)

0 4 Δ 0 0 - 0 0 - 0 5 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 04)

0 5 Δ 0 0 - 0 0 - 1 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 05)

0 6 Δ 0 0 - 0 0 - 3 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 06)

0 7 Δ 0 0 - 0 1 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 07)

0 8 Δ 0 0 - 0 2 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 08)

0 9 Δ 0 0 - 0 6 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 09)

1 0 Δ 0 0 - 1 2 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 10)

1 1 Δ 0 1 - 0 0 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 11)

1 2 Δ 0 2 - 0 0 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 12)

1 3 Δ 0 7 - 0 0 - 0 0 - 0 0 Δ 0 0 1 0 Δ C + TC (Interval table 13)

1 4 Δ 3 0 - 0 0 - 0 0 - 0 0 Δ 0 0 1 0 Δ E + TC (Interval table 14)

(11) PRR11: Read offset values

- This command reads offset values of the first to last channels.

PRR 1 1 + TC

0 0 0 Δ 0 . 0 5 1 8 3 + TC Δ denotes a space.

Channel No. (3 digits)
Offset value (7 digits, including a decimal point)
TC

(12) PRR12: Read reference resistances

- This command reads reference resistances of the first to last channels.

PRR 1 2 + TC

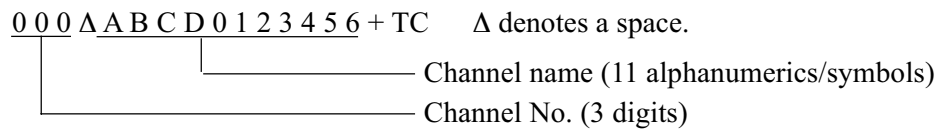
0 0 0 Δ 0 1 0 0 . 0 0 + TC Δ denotes a space.

Channel No. (3 digits)
Reference resistance (7 digits, including a decimal point)
TC

(13) PRR13: Read channel names

- This command reads names of the first to last channels.

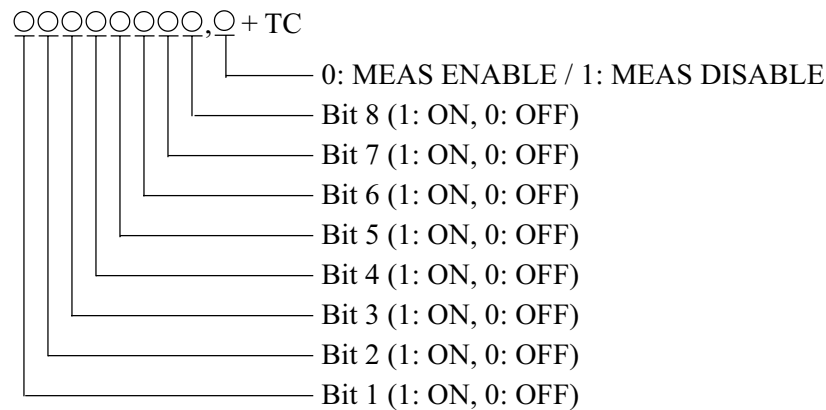
PRR 1 3 + TC



(14) PRR15: Read dip switch setting conditions

- This command reads dip switch setting conditions.

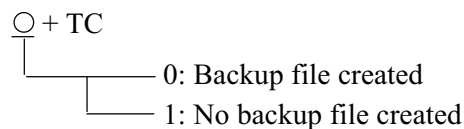
PRR 1 5 + TC



(15) PRR17: Read backup file ON/OFF setting

- This command reads backup file ON/OFF setting.

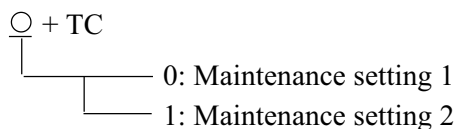
PRR 1 7 + TC



(16) PRR18: Read maintenance setting

- This command reads maintenance setting.

PRR 1 8 + TC



2-2-39 CHK: Execute checking

- This command enables checking of various items.

(1) BV2V

Measures the bridge voltage (2 V) supplied to strain gages and strain gage transducers, at the terminal board to which these sensors are connected, outputs the measured result, and checks any abnormality on the bridge power supply.

(This function is usable for internal scanners and USB-70B series.)

(2) BV5V

Measures the bridge voltage (5 V) supplied to strain gages and strain gage transducers at the terminal board to which these sensors are connected, outputs the measured result, and checks any abnormality on the bridge power supply.

(This function is usable for internal scanners.)

(3) Input/Output Resistance

Measures input/output resistance of strain gages and strain gage transducers and outputs the result. This function is useful to check for any abnormality on sensors and the measuring circuit.

(This function is not available for scanning units USS-21A and USS-22A.)

(4) Mode Detection

Detects bridge configuration for strain measurement to judge the proper channel mode to be set and outputs the result.

(This function is not available for scanning units USS-21A and USS-22A.)

(5) Terminal Temperature

Outputs the temperature of the input terminal board which is the reference junction for temperature measurement from 0°C with thermocouple. The reference temperature is measured by the built-in thermometer of scanning unit. This function is useful for checking any abnormality on the temperature measuring circuit.

(6) Disconnection

Checks for any possible disconnection of the sensor's input cable in strain measurement and outputs the result (OK or NG).

(7) Burnout

Checks any possible disconnection of the thermocouple which may be deteriorated due to oxidation through high-temperature measurement and outputs the result (OK or NG).

(8) Insulation

Measures insulation resistance of transducer and outputs the result. This function is provided since strain gage transducers such as civil engineering transducers which are used in the field for a long period of time, may have the insulation resistance lowered due to water intrusion, etc., thereby making measurement unstable.

	Internal Scanning Unit			External Scanner		External Scanner		
	General purpose	General purpose	Civil engineering	General purpose	Civil engineering	General purpose	Temperature	Civil engineering
Check function	USS-61A* ¹ USS-62A* ¹ USS-61B* ¹ USS-62B* ¹	USS-21A USS-22A	USS-63A* ¹ USS-23A* ¹ USS-63B* ¹	USB-70-10 USB-70-20	USB-70-30	USB-51A USB-20A USB-50A	USB-51-AT	USB-20D USB-50D
BV2V	Yes	Yes	Yes	Yes	Yes	No	No	No
BV5V	Yes	Yes	Yes	No	No	No	No	No
Input/Output Resistance	Yes	No	Yes	No	No	No	No	No
Mode Detection	Yes	No	Yes	No	No	No	No	No
Terminal Temperature	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Disconnection* ²	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Burnout* ³	Yes	Yes	Yes	Yes	Yes	No	No	No
Insulation* ²	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

*1. Scanning units USS-61A/62A/63A and USS-61B/62B/63B are compatible with all check functions.

*2. Enabled only for the channel mode set to strain measurement.

*3. Enabled only for the channel mode set to thermocouple.

MEMO

- The above check functions are not applicable to the USB-65A for LVDT transducer.

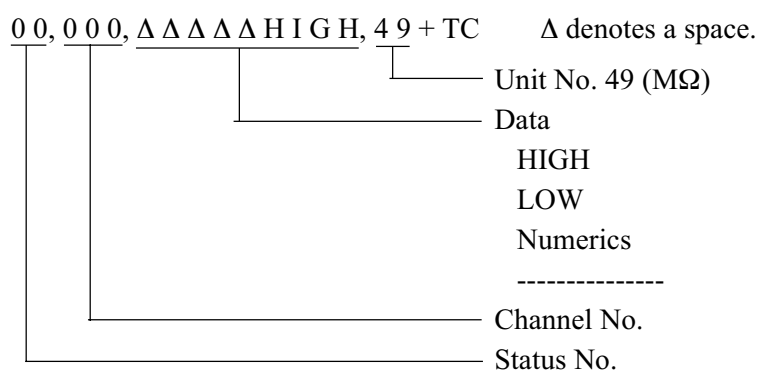
CHK_n + TC

Check No. (1 digit)

- 0: Insulation resistance
- 1: BV 2 V
- 2: BV 5 V
- 3: Input resistance
- 4: Output resistance
- 5: Terminal temperature
- 6: Disconnection
- 7: Burnout
- 8: Detecting channel mode

- Upon completing checking, the header and check results between the first and last channels are output.
- The STP command stops checking in progress.

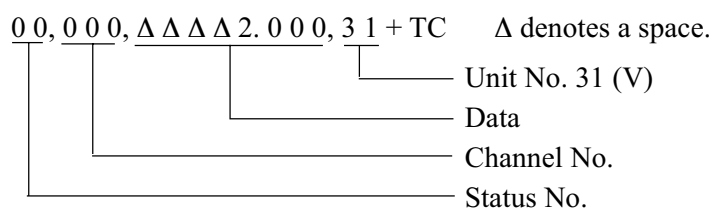
[CHK 0: Output format of insulation resistance data]



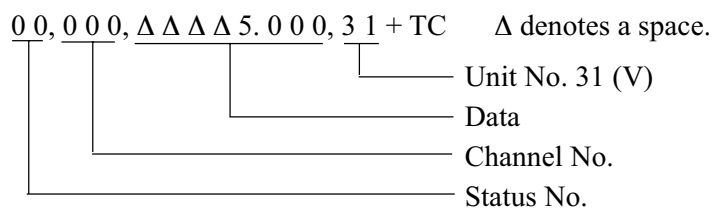
MEMO

- Insulation resistance in a range of 1 to 100 MΩ is output in numerics.
- “LOW” is output if insulation resistance is lower than 1 MΩ.
- “HIGH” is output if insulation resistance is higher than 100 MΩ.

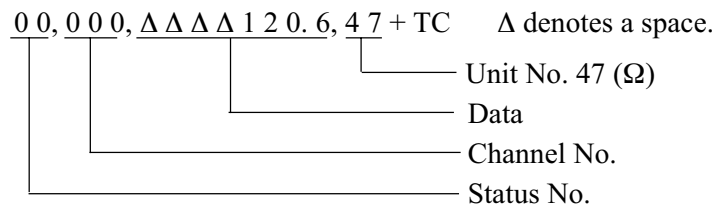
CHK1: Output format of bridge voltage 2 V data



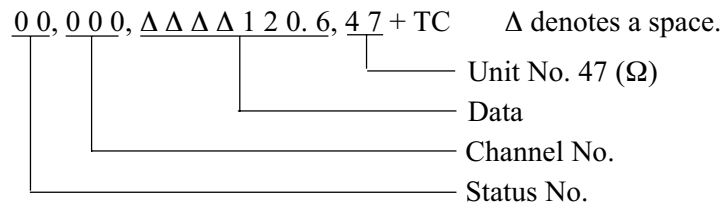
CHK2: Output format of BV 5 V data



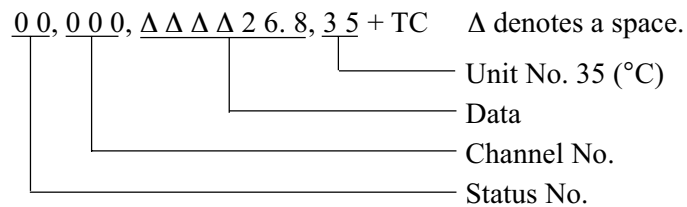
CHK3: Output format of input resistance data



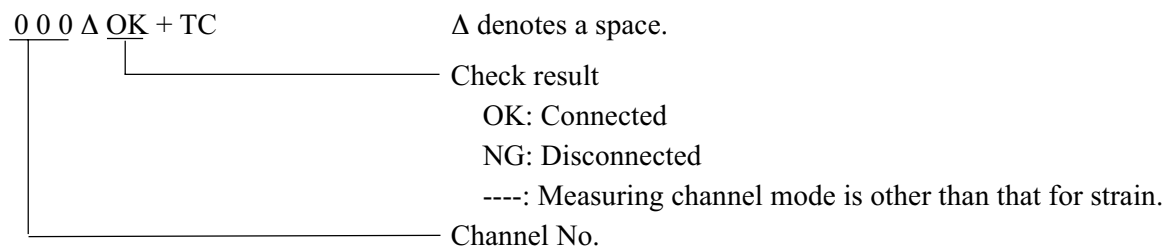
CHK4: Output format of output resistance data



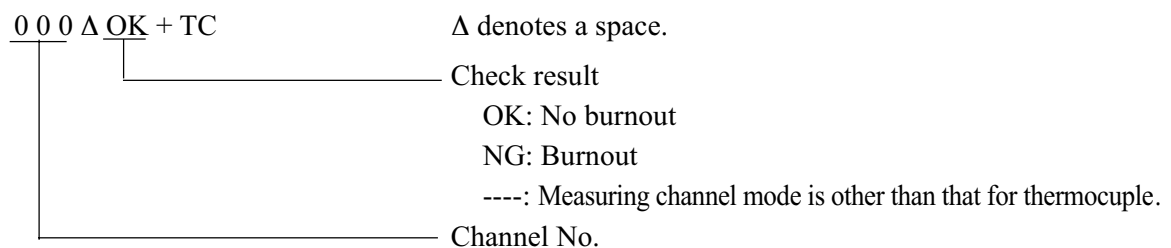
CHK5: Output format of terminal temperature data (Output for every unit)



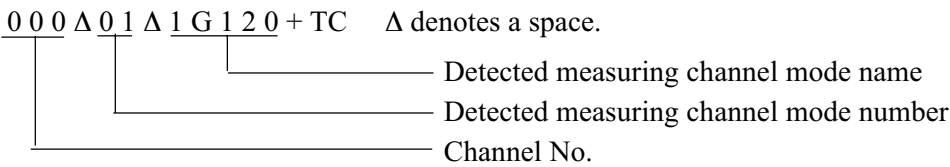
CHK6: Output format of disconnection data



CHK7: Output format of burnout data



CHK8: Output format of detected measuring channel mode data



MEMO

The modes which can be judged in mode detection are the following six:

- 1G120Ω, 1G240Ω and 1G350Ω for 1-gage connection
- 2G/A-A for 2-gage connection
- 4G for 4-gage connection
- 4G/T for civil engineering transducers with temperature measuring function

2-2-40 DEV: Switch the drive

- This command switches the drive on the UCAM.

DEV n + TC
 └── Drive No.
 0: Memory
 1: PC card

DEV 1 + TC
 └── Switch the drive to PC card.

2-2-41 DIR: Read file names

- This command reads names + extensions of the files which are saved in the designated drive.

DIR 1 : t e s t 0 ? ? ? . r t m + TC

└── Extension (lowercase characters)

└── File name (lowercase alphanumerics)

└── Drive No. (0: Memory, 1: PC card)

Note: Wildcards may be used for the file name.

test0000.rtm, 0 + TC

End code (0: Continued, 1: Last)

File name

test0001.rtm. 1

2-2-42 DEL: Delete the file

- This command deletes the file from the drive.

DEL 1 : t e s t 0 0 0 . r t m + TC

└──────────┬──────────┬──────────┘ Extension (lowercase characters)

└──────────┬──────────┘ File name (lowercase alphanumerics)

└──────────┘ Drive No.

Note: Wildcards may be used in place of a file name. They are the special characters which can be used to designate file names, which are available in two types, “*” and “?”

*: Can be used in place of any character string.

*.rtm : Designates all files having extension “rtm.”

test*.itl : Designates all files starting with “test” and having extension “itl.”

, : Designates all files.

?: Can be used in place of a character.

???.rtm : Designates all files named with 3 characters and having extension “rtm.”

test00?.rtm: Designates all files starting with “test00,” ended with any of characters and having extension “rtm.”

2-2-43 CPY: Copy the file

- This command copies the designated file to the copy destination drive.

COPY 0 : t e s t 0 0 0 . r t m Δ 1 + TC Δ denotes a space.

Copy destination drive No. (0: Memory, 1: PC card)
File name with extension (lowercase alphanumerics)
Copy source drive No. (0: Memory, 1: PC card)

Note: Wildcards may be used for the file name.

2-2-44 REN: Rename

- This command renames the designated file name.

REN 1 : t e s t 0 0 0 . r t m Δ t e s t 1 1 1 . r t m + TC Δ denotes a space.

Rename the file name with extension (lowercase alphanumerics)
New file name with extension (lowercase alphanumerics)
Drive No. (0: Memory, 1: PC card)

Note: Wildcards may be used for the file name.

2-2-45 FMT: Format

- This command formats the designated drive.

FMT 1 + TC

Drive No.

2-2-46 BUF: Set whether or not to create the backup file

- This command determines whether or not to create the backup file if the destination of measured data is PC card.

BUF 0 + TC

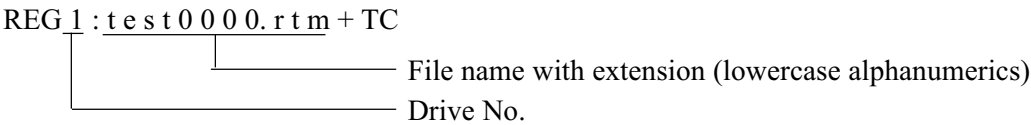
1: Create the backup file.
0: Create no backup file.

- If set to “Create,” the backup file is created with the following extension:

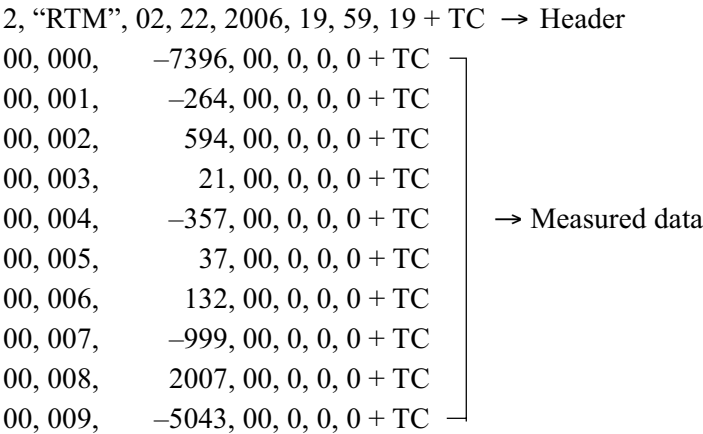
RT\$ Real-time measurement
IT\$ Interval measurement
TR\$ Trigger measurement
T_\$ Trigger interval measurement
IN\$ Initial measurement
ES\$ Easy measure

2-2-47 REG: Reproduce saved measured data

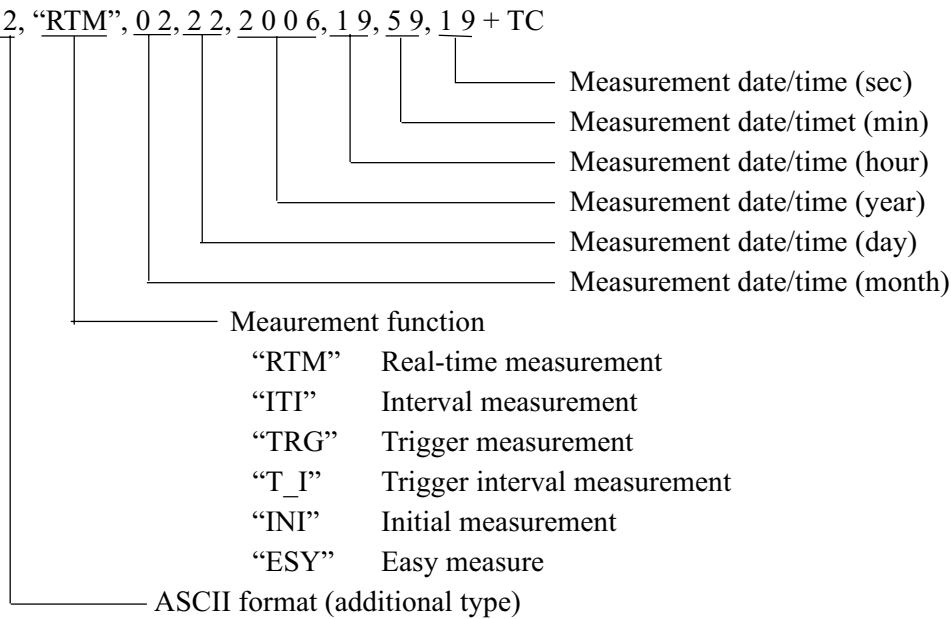
- This command enables reproduction of measured data from the drive.



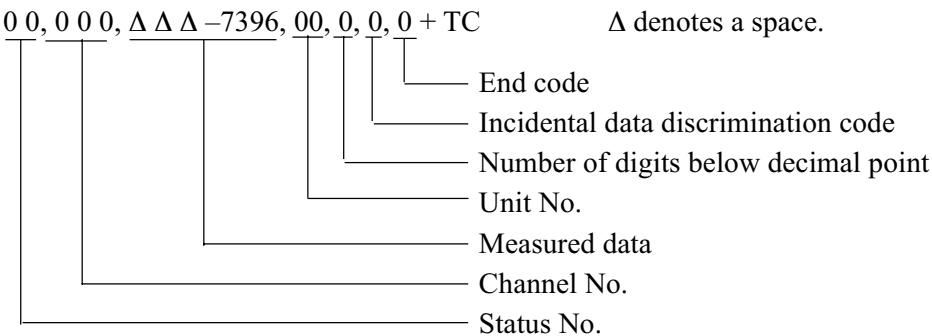
- The output format is as follows:



(1) Header



(2) Measured data



(1) Status No.

No.	Status (Error) Name	Troubleshooting
00	Normal data	
01	Measured data is exceeding the range	Check the following to find out whether the problem lies in the sensor or the scanner: • Whether or not an overload is applied to the sensor. • Whether sensors are correctly connected. • Whether or not normal measurement is made possible by changing the channel. • Whether or not the measuring channel mode is matched.
02	Abnormal initial value	• The initial value is exceeding the range. Conduct initial measurement once again. Or set the correct initial value.
03	Number of display/printout digits exceeded	• The number of digits of the integer obtained through calibration coefficient calculation exceeds “6 – digits below the decimal point.” Check the calibration coefficient.
04	Unusable measuring channel mode selected	Check the measuring channel mode.
05	Allowable temperature range exceeded	Check that the input voltage does not exceed the range of the electromotive force of the thermocouple.
06	• No common dummy • Abnormal measured data in the dummy channel	• No dummy channel exists in true dummy measurement. Check the measuring channel mode. • Data error in the dummy channel. Check whether or not the sensor of the dummy channel is normal. Check whether or not the initial value of the dummy channel is normal.
07	Abnormal terminal temperature with thermocouple	• The terminal temperature is exceeding the range of -20°C to $+60^{\circ}\text{C}$. Check the terminal temperature.
08	Skip channel	Check the measuring channel mode.
09	Disconnection error	Check that the strain gage or strain gage transducer is not disconnected from the B.D pin of the scanner input terminal.
10	Scanner transmission error	Check that the scanner cable is correctly connected. Check that the scanner has the box number and the same box number is not used for another scanner.
11	Abnormal A-D converter	Remeasure and check whether the same error occurs or not. If the error occurs frequently, contact KYOWA for repair.
30	Unmatched measuring channel mode between the UCAM and USB-70A, disabling measurement	Check the measuring channel mode. Check the “MODE SET” switch of the USB-70A. Check the scanner connection.
31	No scanner mounted, disabling measurement	Check that the internal scanners are installed or external scanners are connected via the scanner interface. If this error occurs frequently despite correct connection of scanning units or external scanners, contact KYOWA for repair.

(2) Channel No.: 000 to 999

(3) Unit No.:

Unit No.	Unit	Unit No.	Unit	Unit No.	Unit
00	$\mu\epsilon$	20	cm/s^2	40	m/s
01	$\mu\text{m/m}$	21	m/s^2	41	m/min
02	mN	22	G	42	km/h
03	N	23	g	43	Hz
04	kN	24	kg	44	kHz
05	MN	25	t	45	MHz
06	$\text{N}\cdot\text{m}$	26	ms	46	rpm
07	$\text{kN}\cdot\text{m}$	27	s	47	Ω
08	$\text{N}\cdot\text{cm}$	28	min	48	$\text{k}\Omega$
09	Pa	29	h	49	$\text{M}\Omega$
10	hPa	30	mV	50	mW
11	kPa	31	V	51	W
12	MPa	32	mA	52	kW
13	N/mm^2	33	A	53	dB
14	N/m^2	34	K	54	%
15	mmHg	35	$^{\circ}\text{C}$	55	ppm
16	kgf/cm^2	36	rad	56	pH
17	mm	37	$^{\circ}$	57	R
18	cm	38	rad/s	58	(Blank)
19	m	39	cm/s		

(9) Incidental Data Discrimination Code:

0 = No incidental data

1 = Incidental data

When 2 measured values are provided by 1 channel in the following measuring channel modes, the second measured data is regarded as the second incidental data and indicated with the incidental data discrimination code '1.'

Measured values provided by other measuring channel modes are indicated with the incidental data discrimination code '0.'

Measuring channel modes providing incidental data

4G/T (Transducer with temperature measuring function)

_____	Strain data (Incidental data discrimination code = 0)
_____	Temperature data (Incidental data discrimination code = 1)

LVDT/T (Differential transformer transducer + resistance thermometer sensor)

_____	Displacement data (Incidental data discrimination code = 0)
_____	Temperature data (Incidental data discrimination code = 1)

POT./AB (Sliding resistance transducer)

_____	A part data (Incidental data discrimination code = 0)
_____	B part data (Incidental data discrimination code = 1)

(5) End Code

- 0: Channel other than the last channel
- 1: Last channel at the end of repetitive measurement
- 2: Last channel on the way of repetitive measurement
- 9: Interruption of data reproduction

2-2-48 TCH: Read TEDS sensor information by channel

- This command selects whether or not to read TEDS (Transducer Electronic Data Sheet, hereinafter referred to as TEDS) sensor information for every channel.
- Basically, TEDS sensor information is read for every channel. However, the use of the DUP command enables duplication of the same data to the succeeding channels.
- The channel in which the TEDS sensor information is firstly read is the first channel determined by the CHR command.

TCH 1X0X,DUP009+TC

Read TEDS sensor information or not.

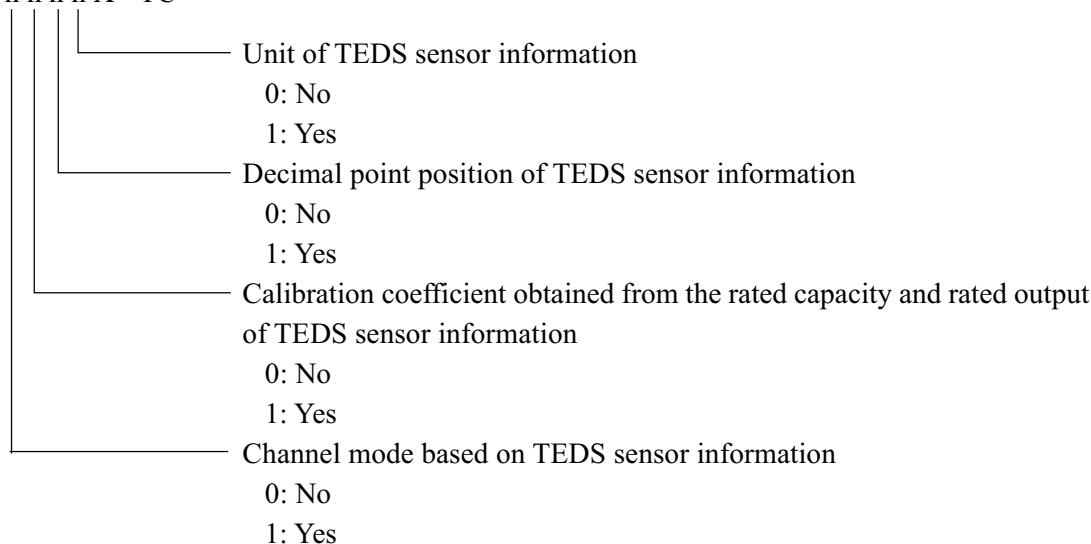
- 0: Not read
- 1: Read

With the sample above, the TEDS sensor information of the first channel is set to Read “1,” the next channel to Not Read “0,” and the succeeding channels up to 009 to Not Read “0.”

2-2-49 TAS: Set auto-setting items

- This command sets the items which are automatically set based on TEDS sensor information.
- After TEDS sensor information is read, set the items to be reflected on channel conditions.
- This command is collectively applied to all concerned channels and cannot be used for every channel.

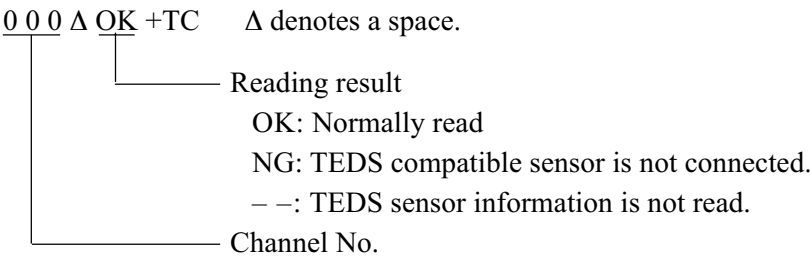
TAS n n n X+TC



2-2-50 EID: Read TEDS sensor information reading status

- This command starts reading the TEDS sensor information and automatically sets channel conditions as determined by the TAS command.
- Reading results of the first to last channels are output.

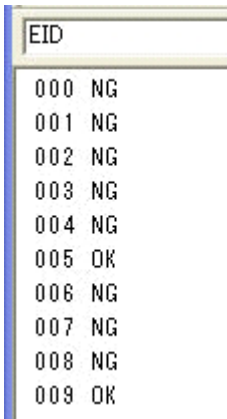
EID +TC



With the channels set to reading TEDS sensor information								
Reading Result			Auto-set Items					
	Channel Mode		Calibration Coefficient		Decimal Point Position		Unit	
	ON	OFF	ON	OFF	ON	OFF	ON	OFF
OK	○	—	○	—	○	—	○	—
NG	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—

- : The item is reflected on the channel condition.
- : The item is not reflected on the channel condition. (The original channel condition remains as it is.)

EID Command Execution Sample



2-2-51 GID: Read TEDS sensor information

- This command reads the TEDS sensor information.

GID n n n X +TC

Channel No. of which TEDS sensor information is read

Contents of TEDS sensor information sent from the UCAM

Manufacture ID
Model Number
Version Letter
Version Number
Serial Number

GID Command Execution Sample

```
GID005X
Manufacture ID:58 (KYOWA)
Model Number:29
Version Letter:A
Version Number:5
Serial Number:4000004
```

MEMO

- Item names only are sent back for the channel of which the TEDS sensor information cannot be read normally.
- For the contents of TEDS, contact the manufacturer of the TEDS sensor.

- This command reads details of the TEDS sensor information.

Channel No. of which details of TEDS sensor information are read

Pattern No.
 Channel No.
 Line Number
 ROM ID
 Manufacture ID
 Model Number
 Version Letter
 Version Number
 Serial Number
 Selector
 Template ID
 Physical Measurand
 Minimum physical value
 Maximum physical value
 Transducer Electrical Signal Type
 Full-Scale Electrical Value Precision
 Minimum electrical output
 Maximum electrical output
 Mapping Method
 Bridge Type
 Bridge element Impedance
 Response Time
 Excitation level, normal
 Excitation level, min
 Excitation level, max
 Calibration Date
 Calibration initials
 Calibration period
 Measurement location
 Selector
 Extended Selector

```
SID005X
Pattern No.:58
CH No.:005
Line Num:28
ROM ID:23DA9C3A00000066
Manufacture ID:58 (KYOWA)
Model Number:29
Version Letter:A
Version Number:5
Serial Number:4000004
Selector:0
Template ID:33
Physical Measurand:m/s2
Minimum physical value:-19.610001
Maximum physical value:19.610001
Transducer Electrical Signal Type:Bridge Sensor
Full-Scale Electrical Value Precision:2
Minimum electrical output:-0.000585
Maximum electrical output:0.000585
Mapping Method:Linear
Bridge Type:Full
Bridge element Impedance:122.300003
Response Time:0.013083
Excitation level, normal:2.000000
Excitation level, min:1.000000
Excitation level, max:6.000000
Calibration Date:2005/04/25
Calibration initials:TED
Calibration period:365
Measurement location ID:0
Selector:3
Extended Selector:1
```

- Item names only are sent back for the channel of which details of the TEDS sensor information cannot be read normally.
- For the contents of TEDS, contact the manufacturer of the TEDS sensor.

2-2-53 RS-: Test the bus line

- When the UCAM receives this command (RS-+TC) normally, the following character string is output.

232C+TC

2-2-53 LAN: Test the bus line

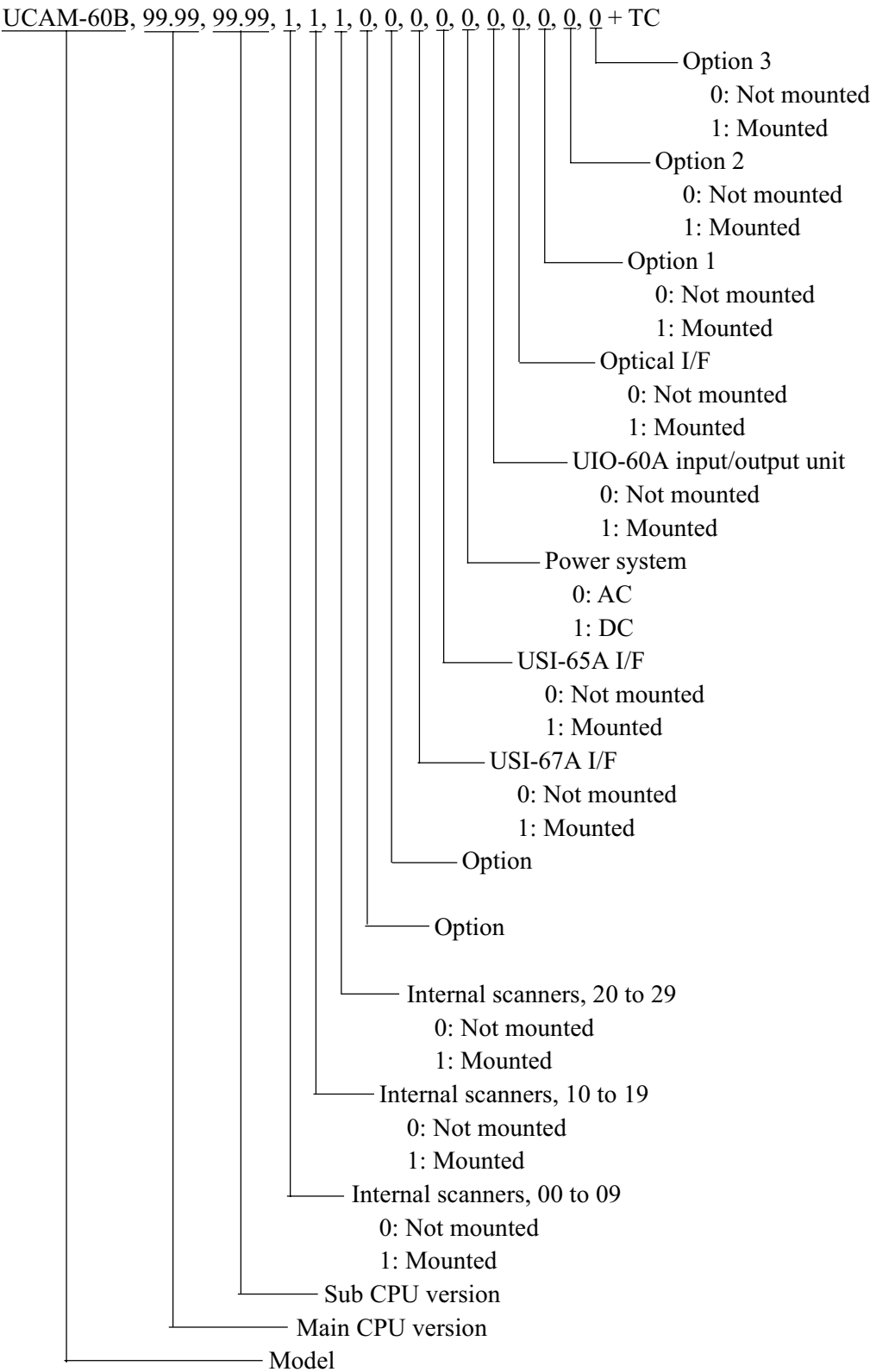
- When the UCAM receives this command (LAN+TC) normally, the following character string is output.

ETHERNET+TC

2-2-55 SYS: Read the system information

- This command reads the system information including the model number of the UCAM and versions.

SYS+TC



2-2-56 ERR: Read the error number

- This command reads the error number.

ERR + TC

00 + TC
└──────── Error No. (2 digits, 00 to nn)

For details of error numbers, refer to “3. ERROR NUMBERS.”

2-2-57 ECL: Clear the error number

- This command resets the error number to 00.

ERR + TC

2-2-58 DUP: Duplicate the parameter to the succeeding channel(s)

- This command duplicates the same parameter to the succeeding channel(s) in setting the measuring channel mode, calibration coefficient, offset, initial value, reference resistance or channel name.
- Add “DUPnnnX” to the command, the parameter of which is to be duplicated to the succeeding channels.

MOD 1 2 X 1 3 X, D U P 009 X +TC
└──────── Channel number up to which the previous parameter is duplicated.

- With the example above, the measuring mode of the first channel is set to 12 (4G) and the same of the second to ninth channels to 13 (4G_HR).

2-2-59 MTS: Set maintenance condition

- This function is for maintenance service.

MEMO

- Basically, users need not use this command.

2-2-60 MAS: Set the channel mode automatically

- This command determines whether or not to apply the channel mode detected by “Mode Detection” of check function. (The command is enabled only for internal scanners.)

MAS n X + TC

Auto-setting of channel mode based on “Mode Detection”
0: No
1: Yes

- How to use the automatic channel mode setting function

Send MAX1X+TC.

Send CHK8+TC.

Detected channel mode is sent in the data format shown below.

0 0 0 Δ 0 1 Δ 1 G 1 2 0 + TC Δ denotes a space.
Detected measuring channel mode name
Detected measuring channel mode number
Channel No.

MEMO

The modes which can be judged in mode detection are the following six:

- 1G120Ω, 1G240Ω and 1G350Ω for 1-gage connection
- 2G/A-A for 2-gage connection
- 4G for 4-gage connection
- 4G/T for civil engineering transducers with temperature measuring function

2-2-61 RST: Reset the UCAM to the initial conditions

- This command initializes measurement-related conditions of the UCAM.

RST + TC

2-2-61 LOC: Place the UCAM in the local status.

- This command places the UCAM in the local status.

LOC + TC

3. INTERFACE SETTING

This Chapter describes details for setting RS-232C or Ethernet interface.

Select and set either of the interfaces. (Cannot use two interfaces at the same time.)

3-1 SELECT THE INTERFACE

Select the interface as follows.

```
3:Condition File
4:Check
5:File Manage
6:System Control
```

On the main menu, press **[6]** key. Or press **[ENTER]** key with the cursor on “6: System Control.”

```
0:Environment
1:Measurement
2:Interface
3:Printer
```

On the system control menu shown at the left, press **[2]** key. Or press **[ENTER]** key with the cursor on “2. Interface.”

```
0:Interface
1:Data Type
2:RS-232C
3:ETHERNET
```

On the interface menu shown at the left, press **[0]** key. Or press **[ENTER]** key with the cursor on “0: Interface.”

```
Interface
RS-232C
(1:RS-232C)
(0:ETHERNET)
```

On the display shown at the left, press **[1]** key to display “RS-232C.” Press **[ENTER]** key to determine the selection and the indication returns to the interface menu.

3-2 SELECT DATA OUTPUT FORMAT

(1) Header

```
0:Interface
1:Data Type
2:RS-232C
3:ETHERNET
```

On the interface menu, press **[1]** key. Or press **[ENTER]** key with the cursor on “1: Data Type.”

```

0:Header
1>Data

```

On the display shown at the left, press **0** key. Or press **ENTER** key with the cursor on “0: Header.”

```

Output Header
Output
(1:Output)
(0:Not Output)

```

Press **1** key to display “Output.” Press **ENTER** key to determine the selection and the indication returns to the previous display.

(2) Data

```

0:Interface
1>Data Type
2:RS-232C
3:ETHERNET

```

On the interface menu, press **1** key. Or press **ENTER** key with the cursor on “1: Data Type.”

```

0:Header
1>Data

```

On the display shown at the left, press **1** key. Or press **ENTER** key with the cursor on “1: Data.”

```

Output MEAS Data
All Items
(1:All Items)
(0:CH & Data)

```

On the display shown at the left, press **1** key to display “All Items.” Press **ENTER** key to determine the selection and the indication returns to the previous display.

3-3 SET PARAMETERS OF RS-232C

Set parameters of the RS-232C interface as follows.

```

0:Interface
1>Data Type
2:RS-232C
3:ETHERNET

```

On the interface menu, press **2** key. Or press **ENTER** key with the cursor on “2: RS-232C.”

```

0:Baud Rate
1:Termination Code
2:Timeout Time

```

The RS-232C setting menu shown at the left appears.

(1) Baud Rate

Select the baud rate from 2400, 9600, 19200 and 38400 as follows.

```
0:Baud Rate
1:Termination Code
2:Timeout Time
```

On the RS-232C setting menu, press **0** key. Or press **ENTER** key with the cursor on “0: Baud Rate.”

```
Baud Rate
9600
(0:9600,1:19200)
(2:38400,3:2400)
```

On the display shown at the left, press **0** key to display “9600.” Press **ENTER** key to determine and the indication returns to the previous display. .

(2) Termination Code

Select the termination code, CR or CRLF, as follows.

```
0:Baud Rate
1:Termination Code
2:Timeout Time
```

On the RS-232C setting menu, press **1** key. Or press **ENTER** key with the cursor on “1: Termination Code.”

```
Termination Code
CR
(1:CRLF)
(0:CR)
```

On the display shown at the left, press **0** key to display “CR.” Press **ENTER** key to determine the selection and the indication returns to the previous display.

(3) Timeout Time

Select the timeout time, 5 seconds or 50 seconds, as follows.

```
0:Baud Rate
1:Termination Code
2:Timeout Time
```

On the RS-232C setting menu display shown at the left, press **2** key. Or press **ENTER** key with the cursor on “2: Timeout Time.”

```
Timeout Time
5 Sec
(1:50 Sec)
(0: 5 Sec)
```

On the display shown at the left, press **0** key to display “5 Sec.” Press **ENTER** key to determine the section and the indication returns to the previous display.

3-4 SET PARAMETERS OF ETHERNET

Set parameters of Ethernet (10BASE-T/100BASE-TX) as follows.

```
0:Interface
1:Data Type
2:RS-232C
3:ETHERNET
```

On the interface menu, press **[3]** key. Or press **[ENTER]** key with the cursor on “3. ETHERNET.”

```
0:IP Address
1:SubNetmask
2:Default Gateway
3:PC Name
```

The Ethernet setting menu appears as shown at the left.

(1) IP Address

```
0:IP Address
1:SubNetmask
2:Default Gateway
3:PC Name
```

On the Ethernet setting menu, press **[0]** key. Or press **[ENTER]** key with the cursor on “0: IP Address.”

```
IP Address
192.168. 0. 0
```

Using numeric keys, input the IP address. Press **[ENTER]** key to determine the IP address and the indication returns to the Ethernet setting menu.

(2) SubNetmask

```
0:IP Address
1:SubNetmask
2:Default Gateway
3:PC Name
```

On the Ethernet setting menu, press **[1]** key. Or press **[ENTER]** key with the cursor on “1: SubNetmask.”

```
SubNetmask
255.255.255. 0
```

Using numeric keys, input the SubNetmask. Press **[ENTER]** key. to determine the SubNetmask and the indication returns to the Ethernet setting menu.

(3) Default Gateway

```
0:IP Address
1:SubNetmask
2:Default Gateway
3:PC Name
```

On the Ethernet setting menu, press **[2]** key. Or press **[ENTER]** key with the cursor on “Deflt Gateway.”

```
Default Gateway
0. 0. 0. 0
```

Using numeric keys, input the default gateway. Press **[ENTER]** key to determine the default gateway and the indication returns to the Ethernet setting menu.

(4) UCAM Name

```
0:IP Address
1:SubNetmask
2:Default Gateway
3:UCAM Name
```

On the Ethernet setting menu, press **[3]** key. Or press **[ENTER]** key with the cursor on “3. UCAM Name.”

```
PC Name
UCAM60B
(ABCDEFGHIJ)
0123456789
```

Using numeric keys, input the UCAM name with a maximum of 16 characters. Press **[ENTER]** key to determine the UCAM name and the indication returns to the Ethernet setting menu.

(5) Work Group Name

```
1:SubNetmask
2:Default Gateway
3:PC Name
4:Work Grp Name
```

On the Ethernet setting menu shown at the left, press **[4]** key. Or press **[ENTER]** key with the cursor on “4: Work Grp Name.”

```
Work Grp Name
WORKGROUP
(ABCDEFGHIJ)
0123456789
```

Using numeric keys, input the work group name with a maximum of 16 characters. Press **[ENTER]** key to determine the work group name and the indication returns to the Ethernet setting menu.

4. ERROR NUMBERS

If the UCAM detects an error while setting measuring conditions, the ERROR LED lights up. Send the ERR command to read the error No. and take a proper measure.

Send the ECL command to clear the error No. The error No. can also be reset by turning OFF the UCAM.

No.	Description	Troubleshooting
30	Erroneous setting of the first to last channels and the number of repeat times	• Check the preset first to last channels and the number of repeat times.
31	The first channel is larger than the last channel.	• Check the preset channel numbers.
33	Erroneous setting of measuring channel mode	• Check the measuring channel mode.
34	Erroneous setting of calibration coefficient	• Check the mantissa of calibration coefficient. • Check the exponent of calibration coefficient. • Check the number of digits below decimal point. • Check that the unit No.
35	Erroneous time setting	• Check the set time.
36	Erroneous interval setting	• Check the interval measurement start time. • Check the interval steps.
37	Erroneous initial value setting	• Check the preset interval value.
38	Erroneous monitor channel setting	• Check whether or not the channel No. or the number of channels of the monitor channel is set to more than 40.
40	Erroneous alarm setting	• Check the preset alarm channel. • Check the preset alarm value.
57	Erroneous offset setting	• Check whether or not the set offset value is correct.
58	Erroneous reference resistance setting	• Check the set reference resistance.
80	Undefined command is used.	• Check whether or not undefined command is used.
81	Erroneous parameter setting	• The command code is correct but the succeeding parameter is faulty. Check the program.
91	Cannot conduct ZERO measurement.	• ZERO measurement is conducted in a measuring function other than “Easy Measure.”
92	Erroneous scanning speed setting	• Check the preset scanning speed.
93	Cannot reproduce data.	• Check whether or not the file designated for data reproduction exists.