

**DATA LOGGER**

**UCAM-60C/65C**

**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-60C or UCAM-65C 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-60C

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.

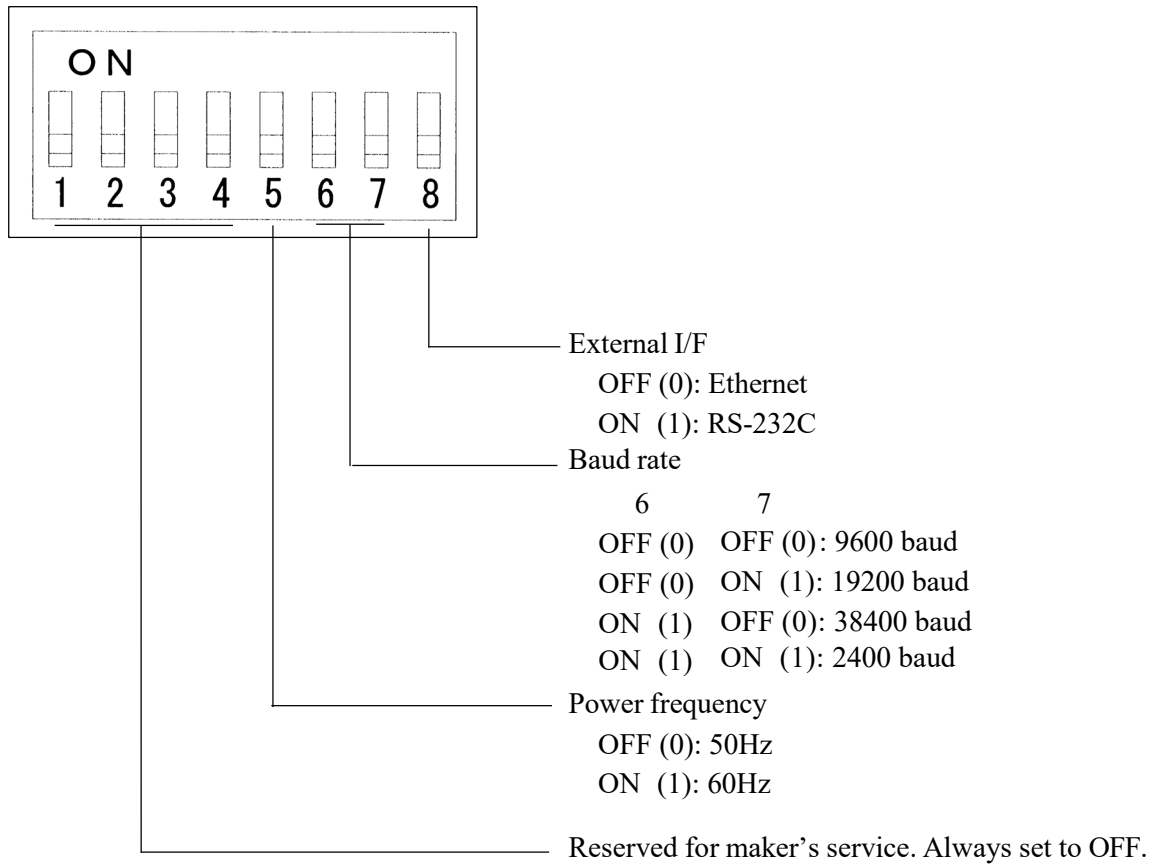
**[RS]** : When “RS-232C” is selected.

**[E]** : When “Ethernet” is selected.

### 1-1-1-2 In the Case of UCAM-65C

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-65C 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-60C, refer to “3. INTERFACE SETTING.”

In the case of the UCAM-65C,

- 1) Set bit 8 of the dip switch to ON (1).
- 2) Connect the UCAM-65C 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.

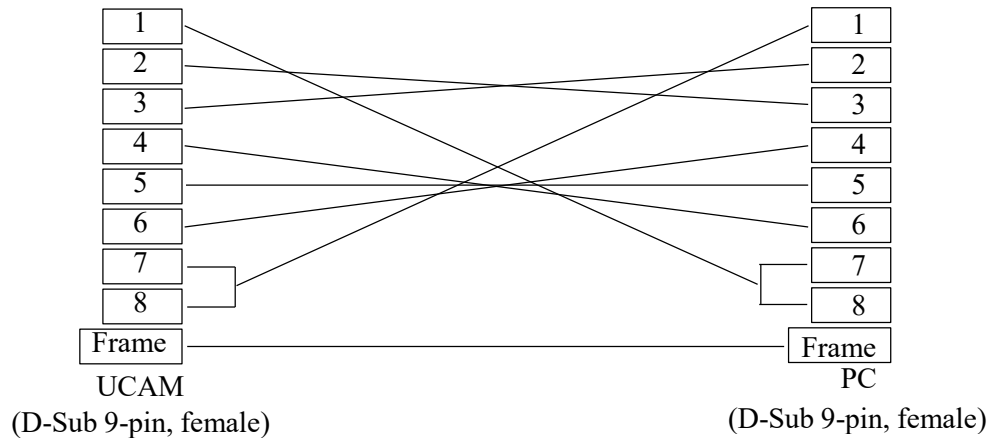
■ **Kinds of Signal:** The UCAM provides an interface port conforming to RS-232C.

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(CRLF is UCAM-60C only)

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)

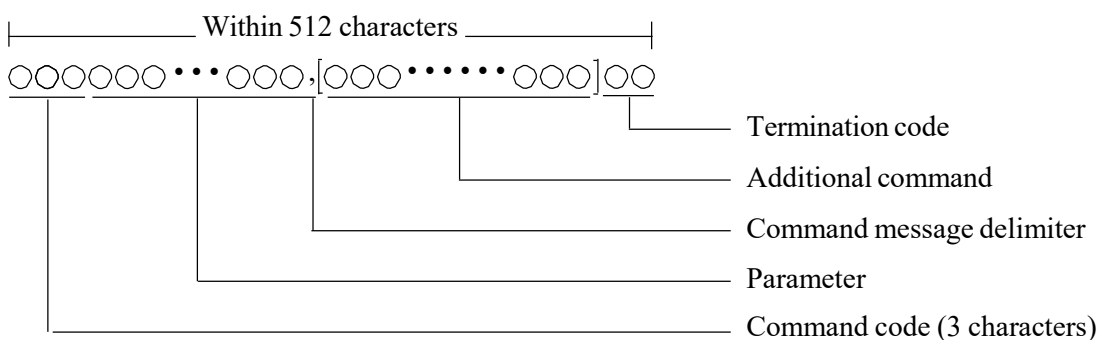
(7) Parity: None (fixed)

(8) Stop Bit: 1 bit (fixed)

(9) Time-out Time: 5 sec or 50 sec (50 sec is UCAM-60C only )

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 7, 8 or 10, it provides the socket library “Microsoft Windows Socket API” which enables to create a desired remote control program for the UCAM.

#### MEMO

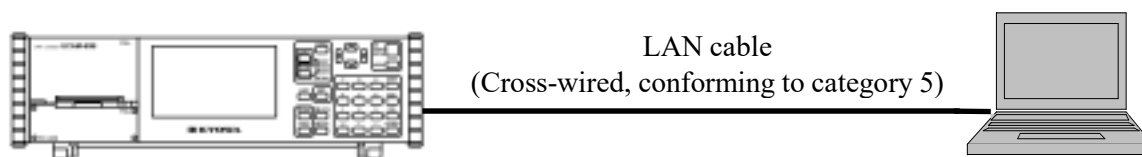
Microsoft Windows Socket API (WinSock) is a network-related application programming interface and is installed in the Windows 7, 8 and 10 as a standard provision.

#### 1-1-3-1 Connection

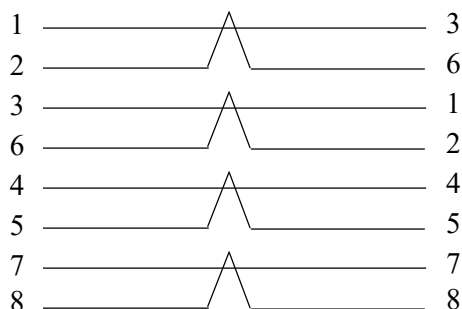
The UCAM is equipped with the 10BASE-T/100BASE-TX interface and uses the communications protocol TCP/IP (Ipv4). The mating PC should have a network interface. If the 10BASE-T/100BASE-TX is used for the network interface of the PC, the UCAM and the PC can be connected via a hub using a 10BASE-T/100BASE-TX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

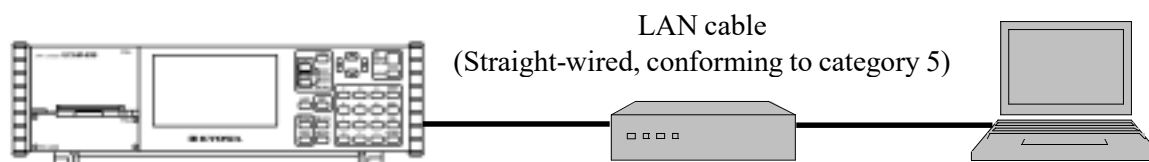
(1) When directly connecting to the PC



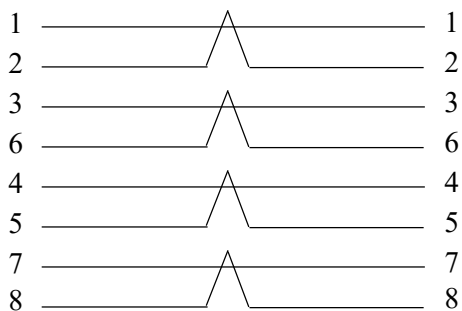
- Use a cross-wired LAN cable of category 5 or higher.
- The cross-wiring should be as follows.



(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-60C)  
                                                 192.168. 0. 65 (UCAM-65C)
- SubNetmask                            255.255.255. 0
- Default gateway                      0. 0. 0. 0

#### NOTE

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

For the UCAM-60C, set the Ethernet parameters through the front panel keys, referring to “3. INTERFACE SETTING.”

For the UCAM-65C, use a USB memory to read and change the communication setting condition file, then change the IP address by importing the file into the UCAM-65C.

(1) Change the interface setting of the UCAM-65C to “ETHERNET”.

Turn switch (8) of the external I/F of the DIP SW to OFF(0).

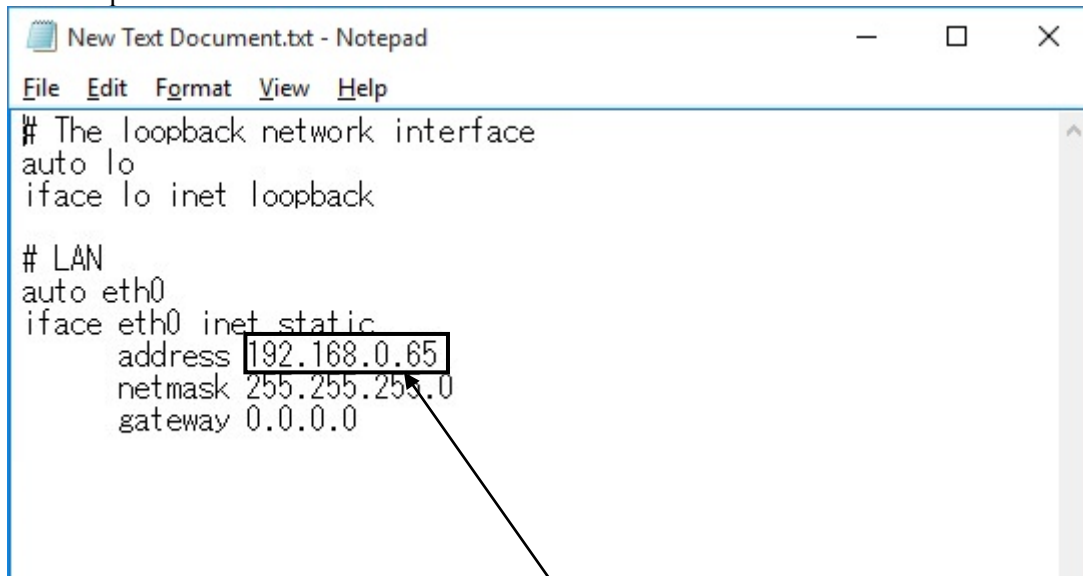
(2) Turn on the power supply of the product again.

(3) Reading the communication condition file

1. Create the folder ”\_ucam\_get\_config” in the USB memory.
2. Insert the USB memory into the UCAM-65C. At this point, turn the ENABLE/DISABLE switch to the DISABLE position.
3. Turn ON the power supply of the UCAM-65C. The REMOTE LED will flash during the startup process, so turn the ENABLE/DISABLE switch to the ENABLE position during this time. The communication condition file of the UCAM-65C will be written in the”\_ucam\_get\_config” folder of the USB memory.

(4) Editing the communication condition file

Insert the USB memory into a PC and open the “interfaces” file in the ”\_ucam\_get\_config” folder in the Notepad.



The IP address setting on the UCAM side is 192.168.0.65.  
Change this number to the IP address that you want to set in the UCAM-65C.

The upper 3 groups of the IP address to change need to be set to the same numbers as the PC side.  
For the 4th group, input any number that is different from the PC side.  
However, if other PCs or devices are connected in the LAN environment, check each IP address first before setting a number that does not duplicate the IP address of all these devices.  
In this example, the IP address on the PC side is 192.168.0.197.  
As a result, the IP address of the UCAM-65C needs to be set to 192.168.0.XXX.  
(XXX can be any number except 1)

(5) Writing the communication condition file

1. Create the folder ”\_ucam\_set\_config” in the USB memory and move the ”interfaces” file revised earlier to this folder.
- 2 Turn OFF the power supply of the UCAM-65C first before inserting the USB memory. At this point, turn the ENABLE/DISABLE switch to the DISABLE position.
- 3 Turn ON the power supply of the UCAM-65C. The REMOTE LED will flash during the startup process, so turn the ENABLE/DISABLE switch to the ENABLE position during this time.
- 4 The communication conditions listed in the ”interfaces” file in the USB memory will be written in the UCAM-65C.

### **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  key.

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

- When communication is normally performed

```
C:\WINDOWS\system32\CMD.exe
Microsoft Windows [Version 10.0.15063]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users\%P%>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
```

IP address of UCAM

Results (Normal)

- When communications error occurs

```
C:\WINDOWS\system32\CMD.exe
Microsoft Windows [Version 10.0.15063]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users\%P%>PING 192.168.0.65

Pinging 192.168.0.65 with 32 bytes of data:
PING: transmit failed. General failure.
PING: transmit failed. General failure.
PING: transmit failed. General failure.
PING: transmit failed. General failure.

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

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

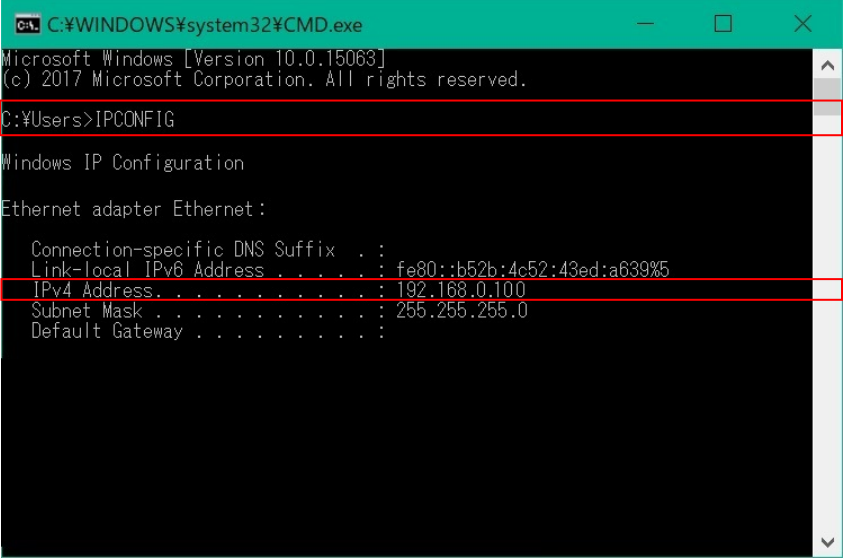
(1) Start command prompt.

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

(2) Input IPCONFIG command.

Input “ipconfig” and press Enter key.

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



The screenshot shows a Windows Command Prompt window titled "C:\WINDOWS\system32\CMD.exe". The text inside the window is as follows:

```
Microsoft Windows [Version 10.0.15063]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users>IPCONFIG

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::b52b:4c52:43ed:a639%5
    IPv4 Address. . . . . : 192.168.0.100
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :
```

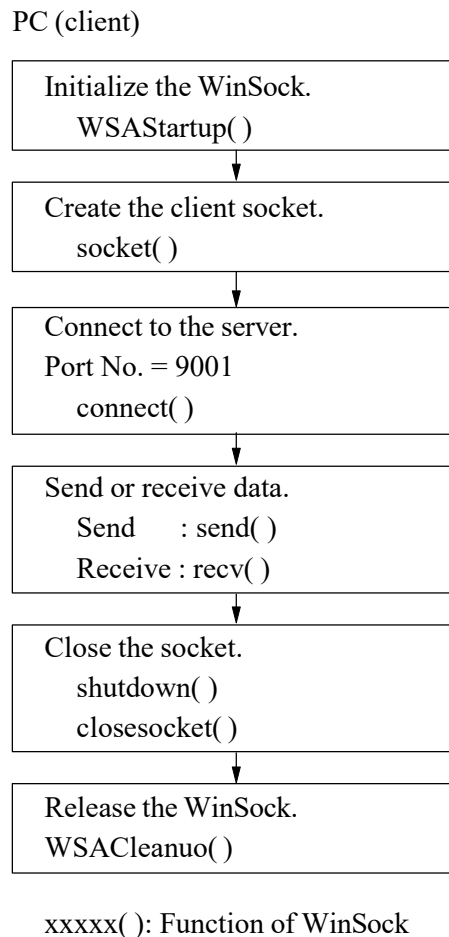
Two red rectangular boxes are drawn on the right side of the window. The first box highlights the command prompt line "C:\Users>IPCONFIG" and is labeled "Command input". The second box highlights the line "IPv4 Address. . . . . : 192.168.0.100" and is labeled "PC's IP address".

### 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.



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 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 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            | 23        |    |
|                            | Start monitor measurement                                                                                                                                                                                                                                                                                                                                                                                                                          | CAL            | 23        |    |
|                            | Start trigger measurement* <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                            | TRG            | 23        |    |
|                            | Start trigger interval measurement* <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                   | TGI            | 23        |    |
|                            | Start ZERO measurement                                                                                                                                                                                                                                                                                                                                                                                                                             | ZER            | 23        |    |
| Setting Basic Parameters   | Set the first and last channels and the number of repeat times                                                                                                                                                                                                                                                                                                                                                                                     |                | CHR       | 24 |
|                            | Set the measuring function                                                                                                                                                                                                                                                                                                                                                                                                                         | “Initial”      | INT       | 24 |
|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | “Measure”      | MES       | 24 |
|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | “Original”     | ORG       | 24 |
|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | “Easy Measure” | ESY       | 24 |
|                            | Set measuring channel mode                                                                                                                                                                                                                                                                                                                                                                                                                         |                | MOD       | 25 |
|                            | Set scanning speed                                                                                                                                                                                                                                                                                                                                                                                                                                 |                | SPD       | 27 |
|                            | Match measuring conditions between mainframe and scanners                                                                                                                                                                                                                                                                                                                                                                                          |                | SCS       | 27 |
| Interrupt                  | Stop measurement or setting                                                                                                                                                                                                                                                                                                                                                                                                                        |                | STP       | 27 |
|                            | Stop interval measurement in trigger interval measurement* <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                            |                | TIF       | 27 |
| ON/OFF Mode                | Turn the printer ON/OFF* <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                              |                | PON/POF   | 27 |
|                            | Turn calibration coefficient calculation ON/OFF                                                                                                                                                                                                                                                                                                                                                                                                    |                | CON/COF   | 28 |
|                            | Turn interval measurement ON/OFF                                                                                                                                                                                                                                                                                                                                                                                                                   |                | ION/IOF   | 28 |
|                            | Turn data saving ON/OFF                                                                                                                                                                                                                                                                                                                                                                                                                            |                | SON/SOF   | 28 |
|                            | Turn the display ON/OFF* <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                              |                | VON/VOF   | 28 |
| Setting Various Parameters | Set the time                                                                                                                                                                                                                                                                                                                                                                                                                                       |                | TIM       | 29 |
|                            | Set the calibration coefficient                                                                                                                                                                                                                                                                                                                                                                                                                    |                | CST       | 29 |
|                            | Set the offset value                                                                                                                                                                                                                                                                                                                                                                                                                               |                | OFS       | 30 |
|                            | Set the initial value                                                                                                                                                                                                                                                                                                                                                                                                                              |                | INI       | 31 |
|                            | Set the reference resistance                                                                                                                                                                                                                                                                                                                                                                                                                       |                | ROC       | 31 |
|                            | Set the channel name                                                                                                                                                                                                                                                                                                                                                                                                                               |                | NAM       | 31 |
|                            | Set interval measurement conditions                                                                                                                                                                                                                                                                                                                                                                                                                |                | INV       | 32 |
|                            | Set triggering conditions* <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                            |                | TST       | 32 |
|                            | Set trigger interval measurement conditions* <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                          |                | TIP       | 33 |
|                            | Set the saving file name                                                                                                                                                                                                                                                                                                                                                                                                                           |                | FNM       | 33 |
|                            | System setting<br>• Power control (Yes/No)<br>• Rainfall input (No/1mm/0.5mm)<br>• Internal scanner (Yes/No)<br>• Trigger mode (Relative/Absolute)<br>• Cold junction compensation (Internal/External)<br>• Delta V (Yes/No)<br>• Delta T (Yes/No)<br>• Power frequency (50/60Hz)<br>• Measurement timing (Synchronous/Asynchronous)<br>• Header output (Yes/No)<br>• Measured data output format<br>(all items/channel numbers and measured data) |                | DSW       | 33 |

\*1. Applicable only to the UCAM-60C.

| Command Message             |                                                                                   | Command | Ref. Page |
|-----------------------------|-----------------------------------------------------------------------------------|---------|-----------|
| Type                        | Description                                                                       |         |           |
| Reading various parameters  | Read the time                                                                     | TRD     | 34        |
|                             | Read various parameters                                                           |         | 34        |
|                             | • Channel mode                                                                    | PRR00   |           |
|                             | • Initial value                                                                   | PRR01   |           |
|                             | • Calibration coefficient                                                         | PRR02   |           |
|                             | • Interval measurement conditions                                                 | PRR03   |           |
|                             | • Triggering conditions* <sup>1</sup>                                             | 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* <sup>1</sup>                           | PRR10   |           |
|                             | • Offset value                                                                    | PRR11   |           |
|                             | • Reference resistance                                                            | PRR12   |           |
|                             | • Channel conditions                                                              | PRR13   |           |
|                             | • Read dip switch setting conditions* <sup>2</sup>                                | PRR15   |           |
|                             | • Create the backup file                                                          | PRR17   |           |
|                             | • Maintenance setting                                                             | PRR 18  |           |
| Checking circuit conditions | Checking conditions                                                               |         | 40        |
|                             | • 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     | 45        |
|                             | Read the file name                                                                | DIR     | 45        |
|                             | Delete the file                                                                   | DEL     | 45        |
|                             | Copy the file                                                                     | CPY     | 46        |
|                             | Rename                                                                            | REN     | 46        |
|                             | All file delete                                                                   | FMT     | 46        |
|                             |                                                                                   |         |           |
| Data reproduction           | Reproduce measured data                                                           | REG     | 47        |
| TEDS                        | Set TEDS reading conditions for every channel                                     | TCH     | 50        |
|                             | Select automatic setting items                                                    | TAS     | 50        |
|                             | Start reading TEDS information                                                    | EID     | 51        |
|                             | Read TEDS information                                                             | GID     | 52        |
|                             | Read detailed TEDS information                                                    | SID     | 53        |

\*1. Applicable only to the UCAM-60C.

\*2. Applicable only to the UCAM-65C.

| Command Message |                                                     | Command | Ref.<br>Page |
|-----------------|-----------------------------------------------------|---------|--------------|
| Type            | Description                                         |         |              |
| Others          | Test the bus line                                   | RS-/LAN | 54           |
|                 | Read the system information (model, etc.)           | SYS     | 55           |
|                 | Read the system information (model, Serial No etc.) | SNR     | 56           |
|                 | Read the error number                               | ERR     | 57           |
|                 | Clear the error number                              | ECL     | 57           |
|                 | Duplicate the same channel parameter                | DUP     | 57           |
|                 | Maintenance setting                                 | MTS     | 57           |
|                 | Automatic channel mode setting                      | MAS     | 58           |
|                 | Initialize the system                               | RST     | 58           |
|                 | Exit the on-line status                             | LOC     | 58           |

## 2-1 Wait time at command transmission

When sending a command, wait time is required between command and command.  
The command being used is used as an example.

|                                        |                         |
|----------------------------------------|-------------------------|
| Send 'RS-' command<br>Received '232 C' | ※ Sending and receiving |
| <b>Wait about 100 ms</b>               |                         |
| Send 'POF, ECL' command                | ※ Send only command     |
| <b>Wait about 100 ms</b>               |                         |
| Send 'ION' command                     | ※ Send only command     |
| <b>Wait about 100 ms</b>               |                         |
| Send 'LOC' command                     | ※ Send only command     |

## 2-2 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(UCAM-60C only) | CR (0x00) LF (0x0A) |
| Ethernet           | null (0x00)                  |                     |

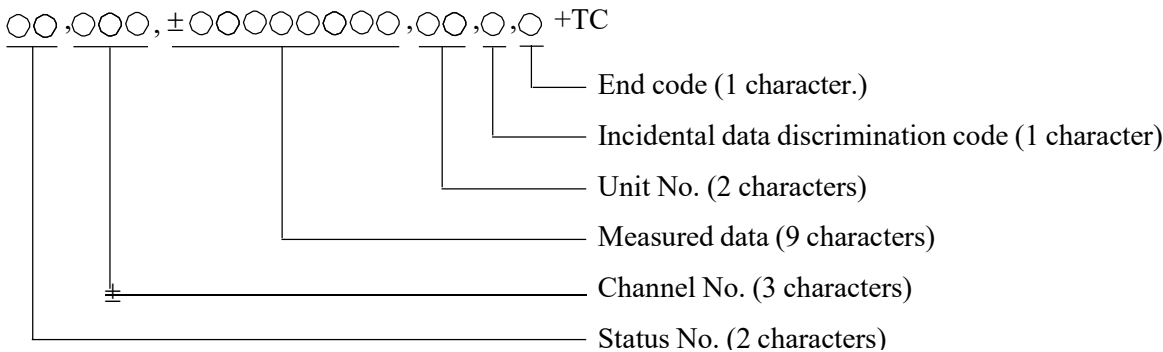
- (4) Header: The date/time is output as the header to the measured data output.

○○○○,○○,○○,○○,○○,○○  
 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.

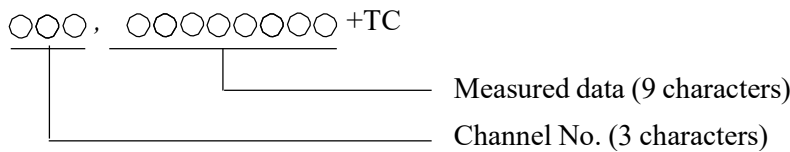
- (5) Measured Data

[Output format of all items]



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

[Output format of measured data with channel number only]



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                                                                                       | <p>Check the following to find out whether the problem lies in the sensor or the scanner:</p> <ul style="list-style-type: none"> <li>• Whether or not an overload is applied to the sensor.</li> <li>• Whether sensors are correctly connected.</li> <li>• Whether or not normal measurement is made possible by changing the channel.</li> <li>• Whether or not the measuring channel mode is matched.</li> </ul> |
| 02  | Abnormal initial value                                                                                                     | <ul style="list-style-type: none"> <li>• The initial value is exceeding the range.<br/>Conduct initial measurement once again. Or set the correct initial value.</li> </ul>                                                                                                                                                                                                                                        |
| 03  | Number of display/printout digits exceeded                                                                                 | <ul style="list-style-type: none"> <li>• The number of digits of the integer obtained through calibration coefficient calculation exceeds “6 – digits below the decimal point.”<br/>Check the calibration coefficient.</li> </ul>                                                                                                                                                                                  |
| 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  | <ul style="list-style-type: none"> <li>• No common dummy</li> <li>• Abnormal measured data in the dummy channel</li> </ul> | <ul style="list-style-type: none"> <li>• No dummy channel exists in true dummy measurement.<br/>Check the measuring channel mode.</li> <li>• Data error in the dummy channel.<br/>Check whether or not the sensor of the dummy channel is normal.<br/>Check whether or not the initial value of the dummy channel is normal.</li> </ul>                                                                            |
| 07  | Abnormal terminal temperature with thermocouple                                                                            | <ul style="list-style-type: none"> <li>• The terminal temperature is exceeding the range of <math>-20^{\circ}\text{C}</math> to <math>+60^{\circ}\text{C}</math>.<br/>Check the terminal temperature.</li> </ul>                                                                                                                                                                                                   |
| 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                                                                                                 | <p>Check that the scanner cable is correctly connected.</p> <p>Check that the scanner has the box number and the same box number is not used for another scanner.</p>                                                                                                                                                                                                                                              |
| 11  | Abnormal A-D converter                                                                                                     | <p>Remeasure and check whether the same error occurs or not.</p> <p>If the error occurs frequently, contact KYOWA for repair.</p>                                                                                                                                                                                                                                                                                  |
| 30  | Unmatched measuring channel mode between the UCAM and USB-70A, disabling measurement                                       | <p>Check the measuring channel mode.</p> <p>Check the “MODE SET” switch of the USB-70A.</p> <p>Check the scanner connection.</p>                                                                                                                                                                                                                                                                                   |
| 31  | No scanner mounted, disabling measurement                                                                                  | <p>Check that the internal scanners are installed or external scanners are connected via the scanner interface.</p> <p>If this error occurs frequently despite correct connection of scanning units or external scanners, contact KYOWA for repair.</p>                                                                                                                                                            |

(7) Channel No.: 000 to 999

(8) Unit No.

| Unit No. | Unit                     | Unit No. | Unit               | Unit No. | Unit             |
|----------|--------------------------|----------|--------------------|----------|------------------|
| 00       | $\mu\epsilon$            | 20       | $\text{cm/s}^2$    | 40       | m/s              |
| 01       | $\mu\text{m/m}$          | 21       | $\text{m/s}^2$     | 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       | $\Omega$         |
| 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       | $\text{N/mm}^2$          | 33       | A                  | 53       | dB               |
| 14       | $\text{N/m}^2$           | 34       | K                  | 54       | %                |
| 15       | mmHg                     | 35       | $^{\circ}\text{C}$ | 55       | ppm              |
| 16       | $\text{kgf/cm}^2$        | 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.

## 2-3 DESCRIPTION OF CONTROL COMMANDS

### 2-3-1 STA: Start real-time measurement

- This command lets the UCAM start the measurement under preset measuring conditions and output the header and measured data.  
(Measurement is conducted for the preset number of repeat times, from the first to last channels.)
- For the output format of measured data, refer to “2-1 OUTPUT FORMAT OF MEASURED DATA.”
- Sending the stop command “STP” during the measurement stops the measurement.
- After measuring the initial value, the UCAM is automatically switched to the “Measure” mode.

STA + TC

### 2-3-2 CAL: Start monitor measurement

- This command lets the UCAM measure the designated monitor channels and output the header and measured data.
- For the output format of measured data, refer to “2-1 OUTPUT FORMAT OF MEASURED DATA.”
- Up to 40 channels can be selected as monitor channels, with three digits for each channel.
- Monitor measurement continues until the stop command “STP” is received.
- The header is output only once at the beginning.

CAL 0 0 0 0 0 1 0 0 2 0 0 3 X + TC  
          └───┴───┴───┴───┘ Monitor channels (up to 40 channels)

### 2-3-3 TRG: Start trigger measurement

- This command lets the UCAM start the trigger measurement under preset conditions.
- Until the trigger condition is satisfied, the UCAM outputs measured data of the triggering channel.  
When the trigger condition is satisfied, the UCAM measures and outputs data of the first to last channels for the preset number of repeat times.

TRG + TC

### 2-3-4 TGI: Start trigger interval measurement

- This command lets the UCAM start the trigger interval measurement under preset conditions.
- Until the trigger condition is satisfied, the UCAM outputs measured data of the trigger channel.  
When the trigger condition is satisfied, the UCAM measures and outputs data of the first to last channels in the preset number of repeat times. After then, the UCAM is triggered at each preset time interval to measure and output data of the first to last channels for the preset number of repeat times.

TRI + TC

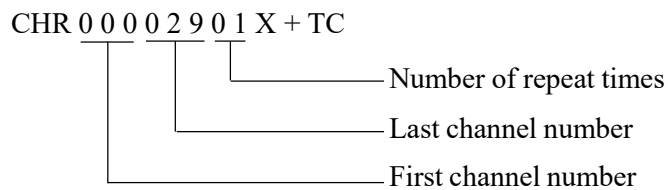
### 2-3-5 ZER: Measure the ZERO value

- This command is effective only in the “EASY MEAS” mode.
- Upon completing the ZERO measurement, the UCAM sends “ZER.” Be sure to receive it.

ZER + TC

### 2-3-6 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.



### 2-3-7 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

### 2-3-8 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

### 2-3-9 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

### 2-3-10 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

## 2-3-11 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 $\Omega$                                                     |
| 02 (1G240)       | 1-gage, 240 $\Omega$                                                     |
| 03 (1G350)       | 1-gage, 350 $\Omega$                                                     |
| 04 (1G120/D)     | 1-gage, 120 $\Omega$ , true dummy method                                 |
| 05 (1G120/A)     | 1-gage, 120 $\Omega$ , active method                                     |
| 06 (1G350/D)     | 1-gage, 350 $\Omega$ , true dummy method                                 |
| 07 (1G350/A)     | 1-gage, 350 $\Omega$ , 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 $\Omega$                        |
| 15 (4G/1(350))   | 4-gage, constant-current excitation, 350 $\Omega$                        |
| 16 (4G/1 HR)     | 4-gage, constant-current excitation, 350 $\Omega$ (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 $\Omega$ (new JIS)           |
| 27 (JPt100)      | Platinum resistance thermometer sensor, 100 $\Omega$ (old JIS)           |
| 28 (POT.)        | Potentiometer sensor                                                     |
| 29 (1G120_5V)    | 1-gage, 120 $\Omega$ , BV 5 V                                            |
| 30 (1G240_5V)    | 1-gage, 240 $\Omega$ , BV 5 V                                            |
| 31 (1G350_5V)    | 1-gage, 350 $\Omega$ , BV 5 V                                            |
| 32 (1G120D_5V)   | 1-gage, 120 $\Omega$ , true dummy method, BV 5 V                         |
| 33 (1G120A_5V)   | 1-gage, 120 $\Omega$ , active method, BV 5 V                             |
| 34 (1G350D_5V)   | 1-gage, 350 $\Omega$ , true dummy method, BV 5 V                         |
| 35 (1G350A_5V)   | 1-gage, 350 $\Omega$ , 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)                                                                                                                                                                                                                                                                         | Generally not use (Applied scanner is USB-50 or USB-51) |
| <ul style="list-style-type: none"> <li>Channel modes to which internal scanners cannot be set. <ul style="list-style-type: none"> <li>10 (2G/COM-D0)</li> <li>38 (LVDT)</li> <li>39 (LVDT/T)</li> <li>40 (POT./A)</li> <li>41 (POT./AB)</li> <li>43 (USB-50/51)</li> </ul> </li> </ul> |                                                         |

### ■ 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<br>USB-70B-10/20/30 |
| 17, 26, 27                 | USB-70A-30<br>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.

### **2-3-12 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-60C only)**

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

PON + TC

### **2-2-17 POF: Turn the printer OFF (UCAM-60C only)**

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

POF + TC

### **2-3-18 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

### **2-3-19 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

### **2-3-20 ION: Turn interval measurement ON**

- This command lets the UCAM start the interval measurement.

ION + TC

### **2-3-21 IOF: Turn interval measurement OFF**

- This command lets the UCAM stop the interval measurement.

IOF + TC

### **2-3-22 SON: Turn data saving ON**

- This command lights up the SAVE key LED.

SON + TC

### **2-3-23 SOF: Turn data saving OFF**

- This command lights out the SAVE key LED.

SOF + TC

### **2-3-24 VON: Turn the display ON (UCAM-60C only)**

- This command lets the display ON.

VON + TC

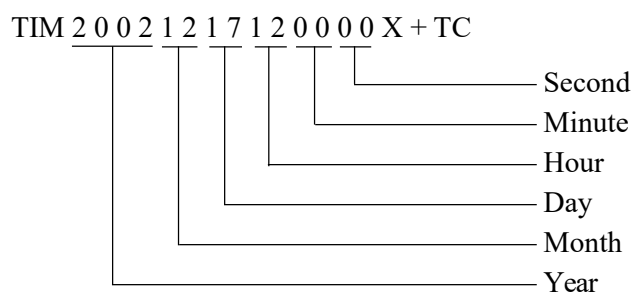
### **2-3-25 VOF: Turn the display OFF (UCAM-60C only)**

- This command lets the display OFF.

VOF + TC

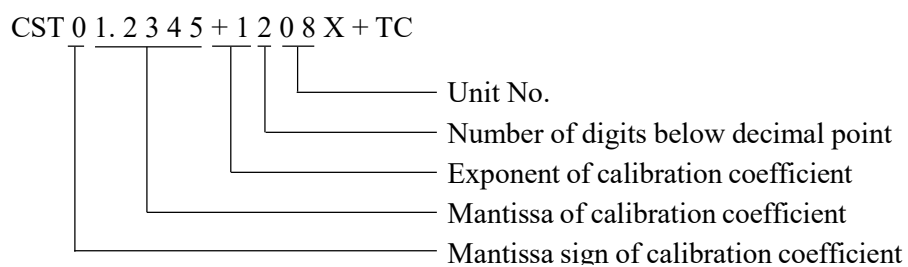
## 2-3-26 TIM: Set the time

- This command sets the time of the UCAM.



## 2-3-27 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     |

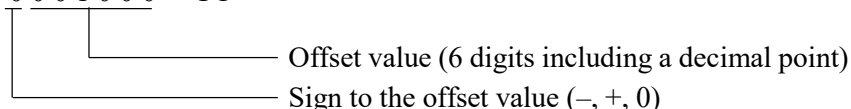
- Unit No.: 00 to 58

| Unit No. | Unit                     | Unit No. | Unit               | Unit No. | Unit             |
|----------|--------------------------|----------|--------------------|----------|------------------|
| 00       | $\mu\epsilon$            | 20       | $\text{cm/s}^2$    | 40       | m/s              |
| 01       | $\mu\text{m/m}$          | 21       | $\text{m/s}^2$     | 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       | $\Omega$         |
| 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       | $\text{N/mm}^2$          | 33       | A                  | 53       | dB               |
| 14       | $\text{N/m}^2$           | 34       | K                  | 54       | %                |
| 15       | mmHg                     | 35       | $^{\circ}\text{C}$ | 55       | ppm              |
| 16       | $\text{kgf/cm}^2$        | 36       | rad                | 56       | pH               |
| 17       | mm                       | 37       | $^{\circ}$         | 57       | R                |
| 18       | cm                       | 38       | rad/s              | 58       | (Blank)          |
| 19       | m                        | 39       | $\text{cm/s}$      |          |                  |

### 2-3-28 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:  $\pm 0.0000$  to  $\pm 999999$

### 2-3-29 INI: Set the initial value

- This command sets the initial value to the UCAM.
- Basically, 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  $\pm 99999999$

### 2-3-30 ROC: Set the reference resistance

- This command sets the reference resistance to the UCAM.
- Basically, 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:  $\pm 0.00$  to  $\pm 9999.99$

### 2-3-31 NAM: Set the channel name

- This command sets the channel name to the UCAM.
- Basically, 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 alphanumeric, which may include some symbols)

## 2-3-32 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)

## 2-3-33 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.”)

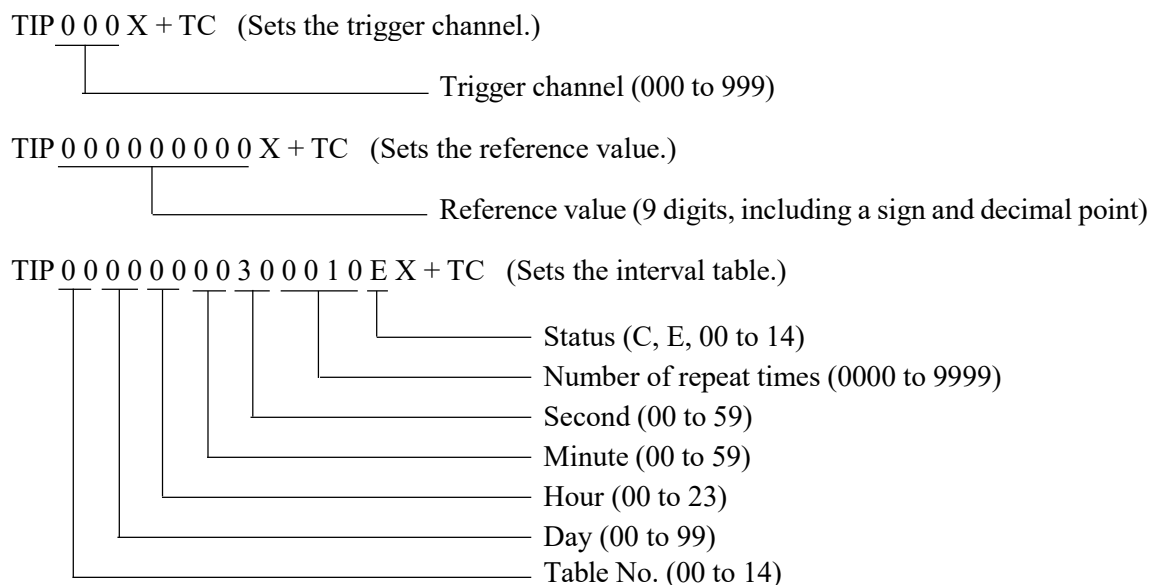
Reference value (9 digits, including a sign and decimal point)

TST 0 0 0 0 0 0 0 0 1 0 0 0 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)

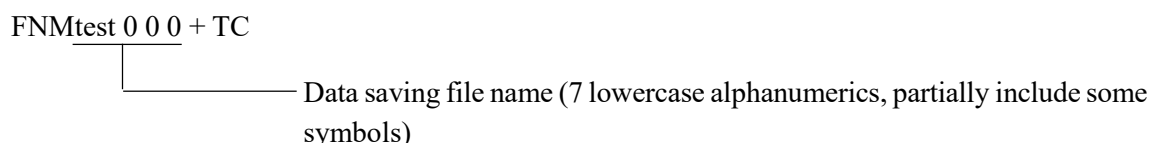
### 2-3-34 TIP: Set trigger interval measurement conditions

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



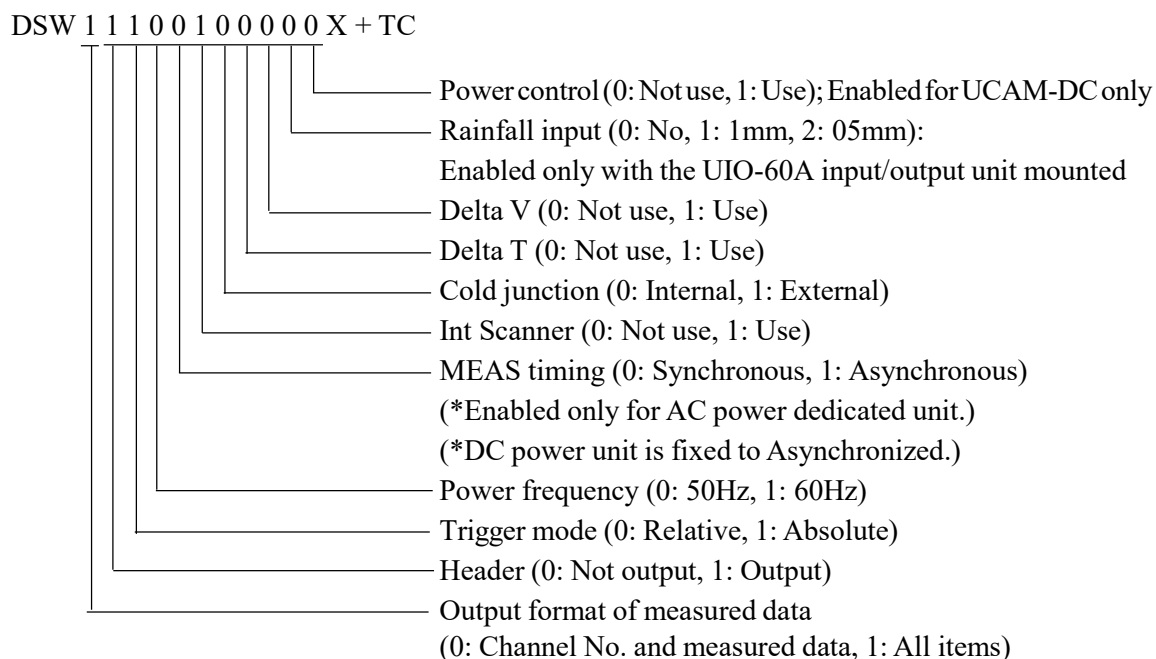
### 2-3-35 FNM: Set the data saving file name

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



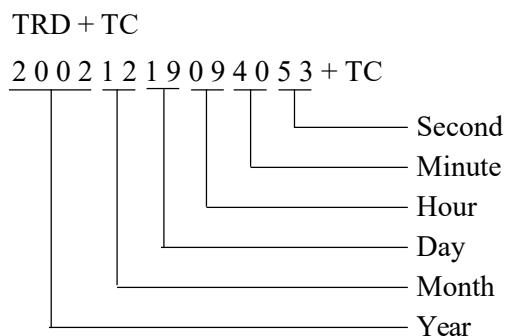
### 2-3-36 DSW: Set the system.

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



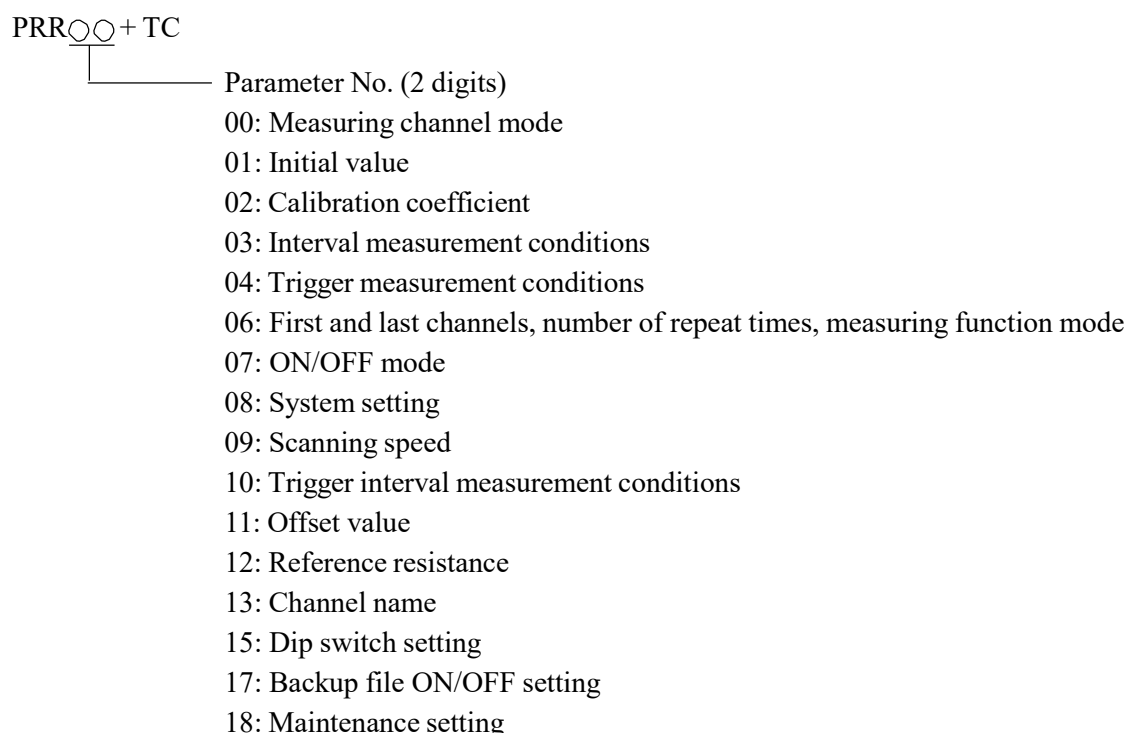
### 2-3-37 TRD: Read the time

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



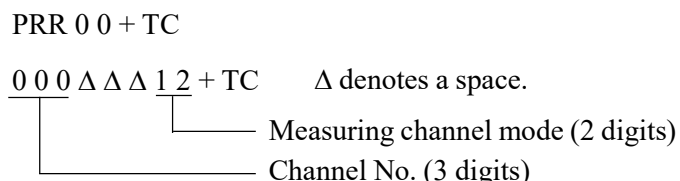
### 2-3-38 PRR: Read various parameters from the UCAM

- This command reads the parameters written in the UCAM.



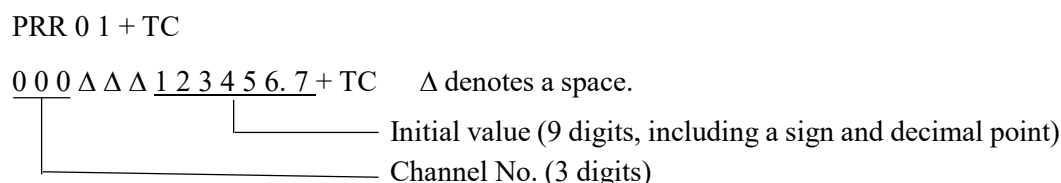
#### (1) PRR00: Read measuring channel modes

- 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.

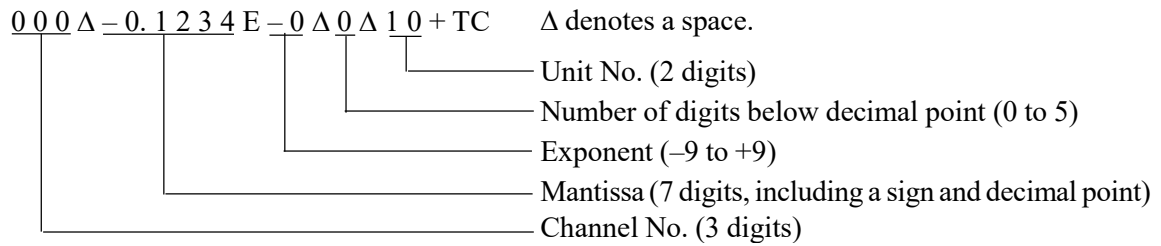


(3) PRR02: Read calibration coefficients

- 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

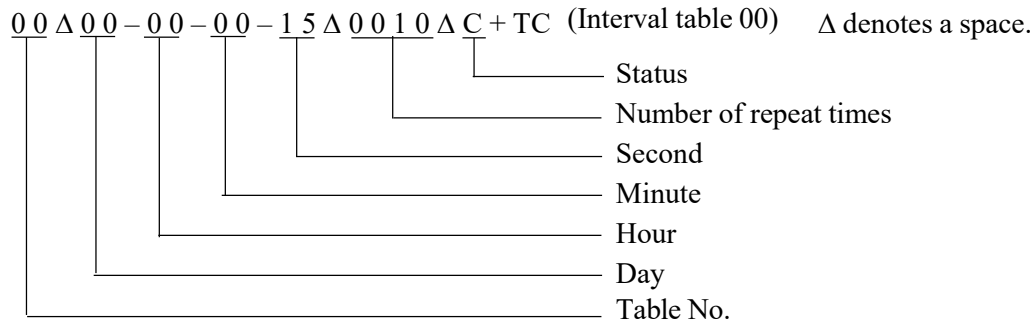
- This command reads interval measurement conditions (the starting time of interval measurement and interval tables from 00 to 14).

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)

Diagram illustrating the components of the command:

- Table No. (00)
- Trigger value (ΔΔΔΔ)
- Number of repeat times (10)
- Status (Δ)
- TC (C)

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

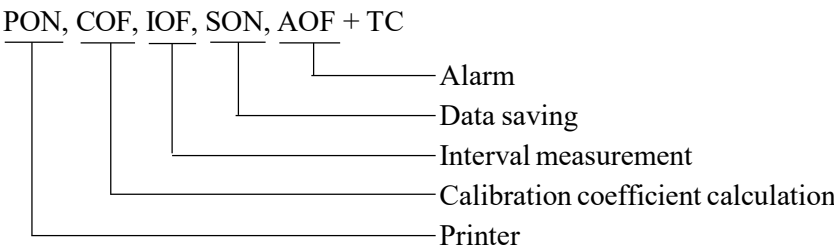
0 0 0 – 0 2 9 Δ 0 1 Δ MES + TC Δ denotes a space.

Diagram illustrating the components of the command:

- First channel number (000)
- Last channel number (029)
- Number of repeat times (Δ01)
- Measuring function mode (MES)
- TC (C)

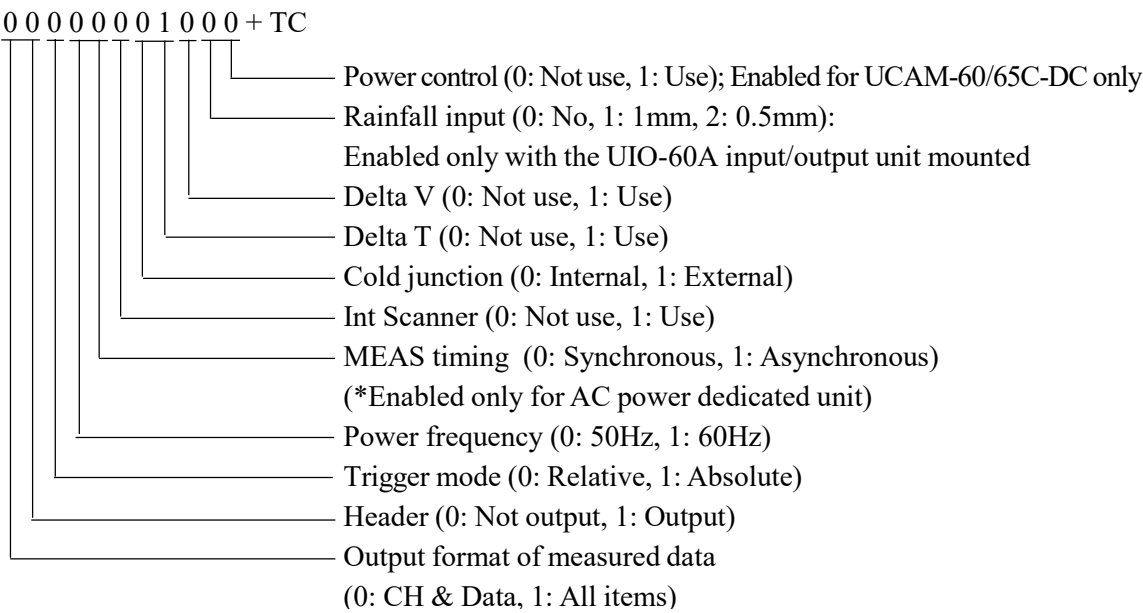
(7) PRR07: Read ON/OFF modes

PRR 0 7 + TC



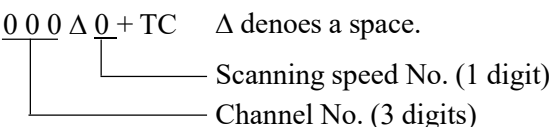
(8) PRR08: Read system setting conditions

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

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)

(12) PRR12: Read reference resistances

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

PRR 1 2 + TC

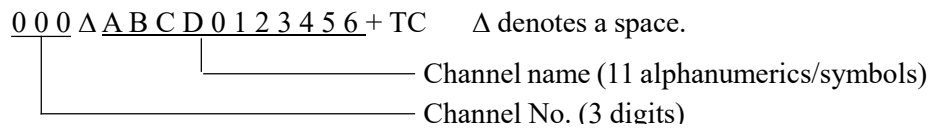
0 0 0 Δ 0.1 0 0.0 0 + TC Δ denotes a space.

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

(13) PRR13: Read channel names

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

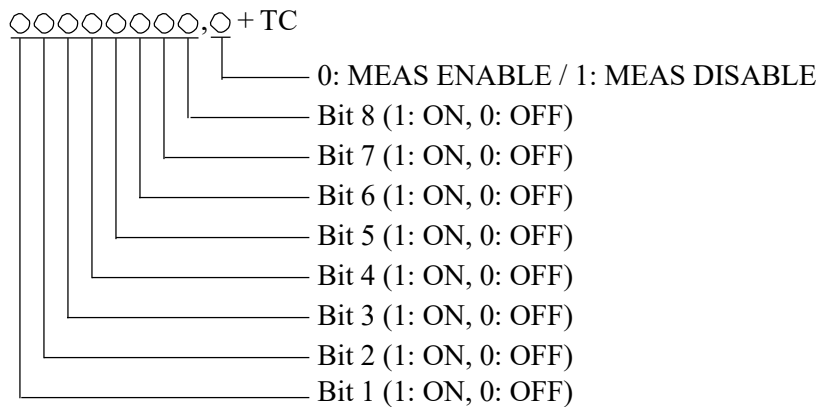
PRR 1 3 + TC



(14) PRR15: Read dip switch setting conditions

- This command reads dip switch setting conditions.

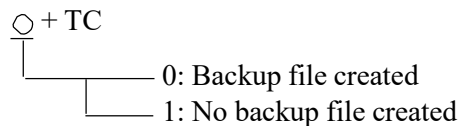
PRR 1 5 + TC



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

- This command reads backup file ON/OFF setting.

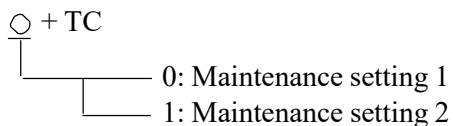
PRR 1 7 + TC



(16) PRR18: Read maintenance setting

- This command reads maintenance setting.

PRR 1 8 + TC



## **2-3-39 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* <sup>1</sup><br>USS-62A* <sup>1</sup><br>USS-61B* <sup>1</sup><br>USS-62B* <sup>1</sup> | USS-21A<br>USS-22A | USS-63A* <sup>1</sup><br>USS-23A* <sup>1</sup><br>USS-63B* <sup>1</sup> | USB-70-10<br>USB-70-20 | USB-70-30         | USB-51A<br>USB-20A<br>USB-50A | USB-51-AT   | USB-20D<br>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* <sup>2</sup> | Yes                                                                                              | Yes                | Yes                                                                     | Yes                    | Yes               | Yes                           | No          | Yes                |
| Burnout* <sup>3</sup>       | Yes                                                                                              | Yes                | Yes                                                                     | Yes                    | Yes               | No                            | No          | No                 |
| Insulation* <sup>2</sup>    | 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.

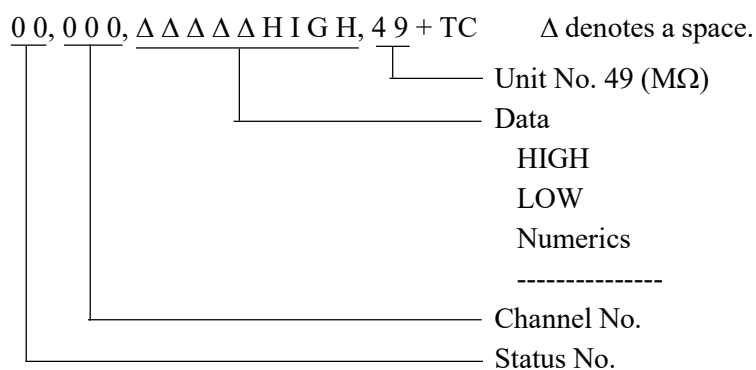
CHK<sub>n</sub> + TC

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.

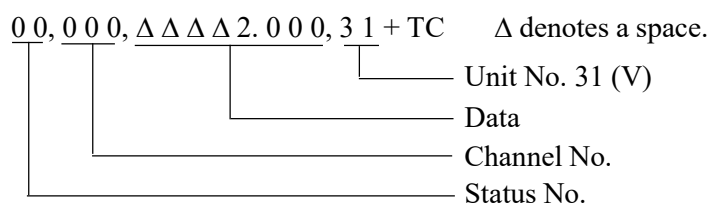
[CHK 0: Output format of insulation resistance data]



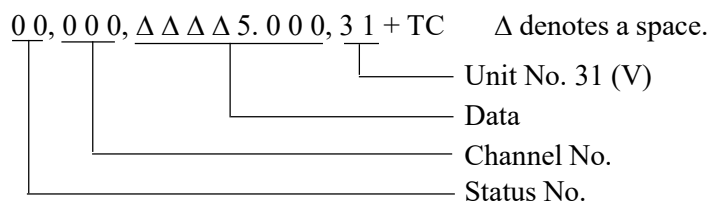
#### MEMO

- 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.

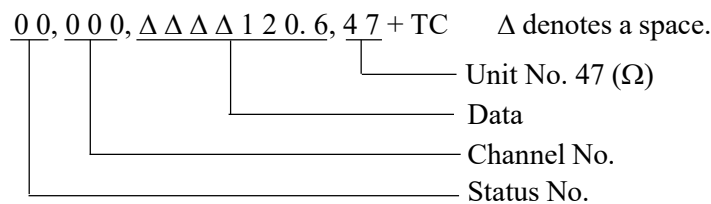
CHK1: Output format of bridge voltage 2 V data



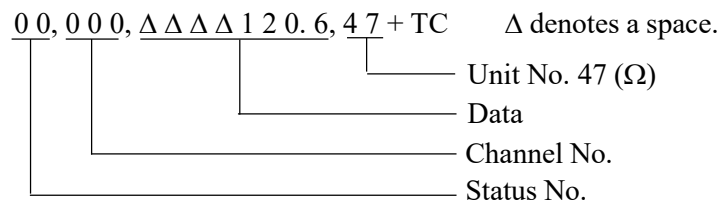
CHK2: Output format of BV 5 V data



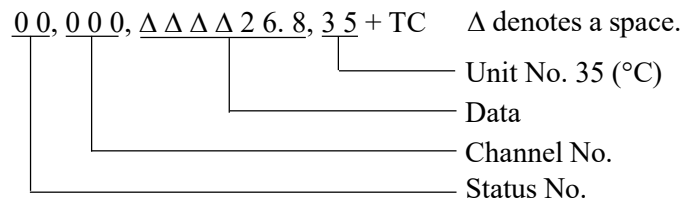
CHK3: Output format of input resistance data



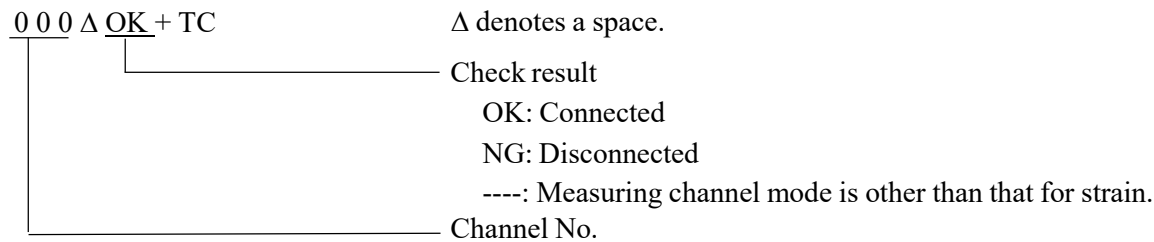
CHK4: Output format of output resistance data



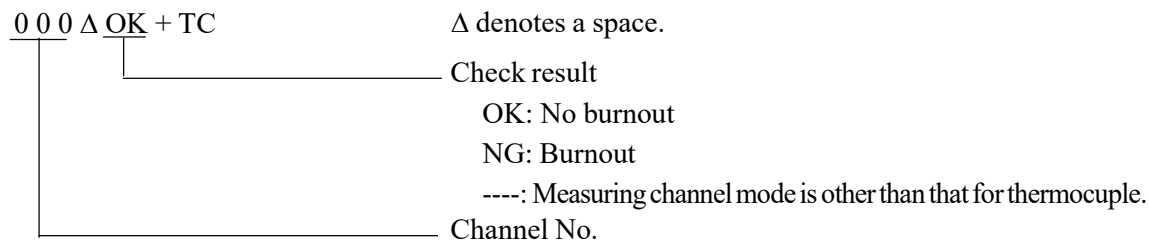
CHK5: Output format of terminal temperature data (Output for every unit)



CHK6: Output format of disconnection data



CHK7: Output format of burnout data



CHK8: Output format of detected measuring channel mode data

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

### 2-3-40 DEV: Switch the drive

- This command switches the drive on the UCAM.

DEV  $n + TC$   
└── Drive No.  
    0: Memory  
    1: USB memory

DEV 1 + TC  
└── Switch the drive to USB Memory.

### 2-3-41 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: USB memory)

Note: Wildcards may be used for the file name.

t e s t 0 0 0 0 . r t m , 0 + TC  
└── End code (0: Continued, 1: Last)  
    File name

t e s t 0 0 0 1 . r t m , 1

### 2-3-42 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.

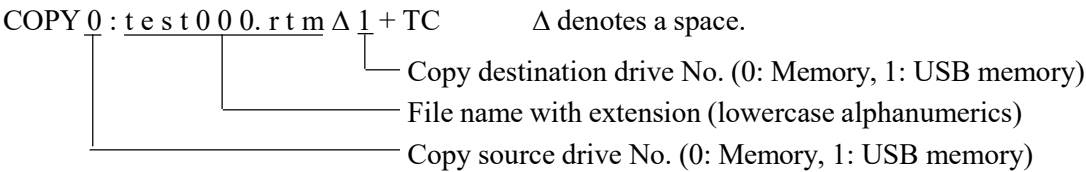
?: Can be used in place of a character.

???.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.”

**2-3-43 CPY: Copy the file**

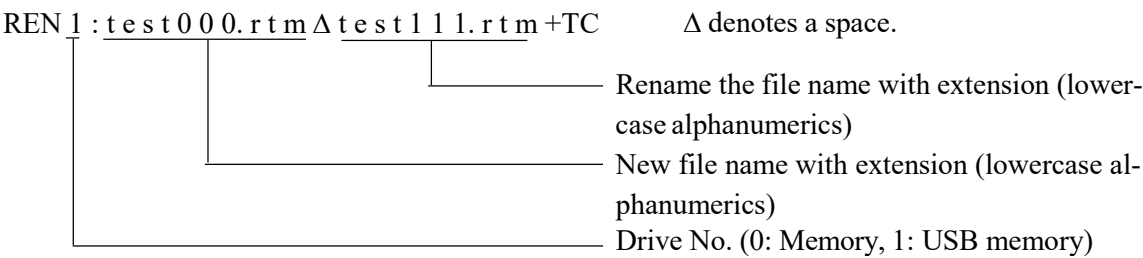
- This command copies the designated file to the copy destination drive.



Note: Wildcards may be used for the file name.

**2-3-44 REN: Rename**

- This command renames the designated file name.



Note: Wildcards may be used for the file name.

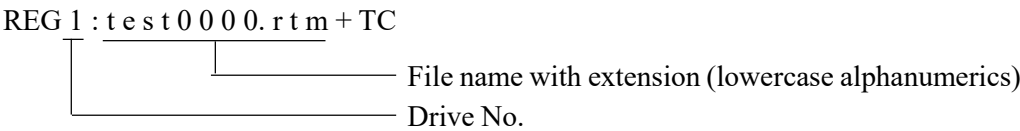
**2-3-45 FMT: All file delete**

- This command delete all file at the designated drive.

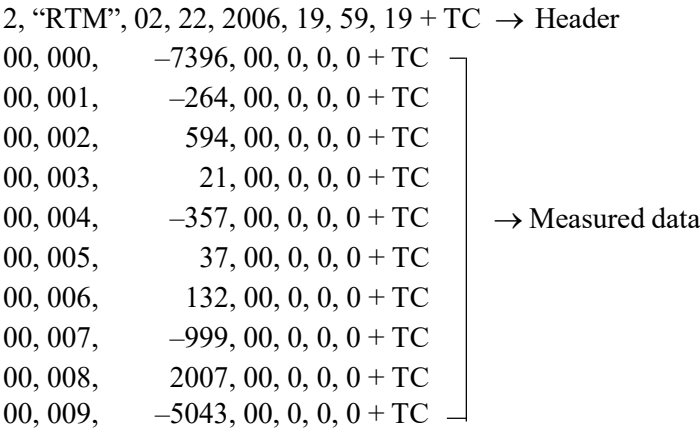


**2-3-46 REG: Reproduce saved measured data**

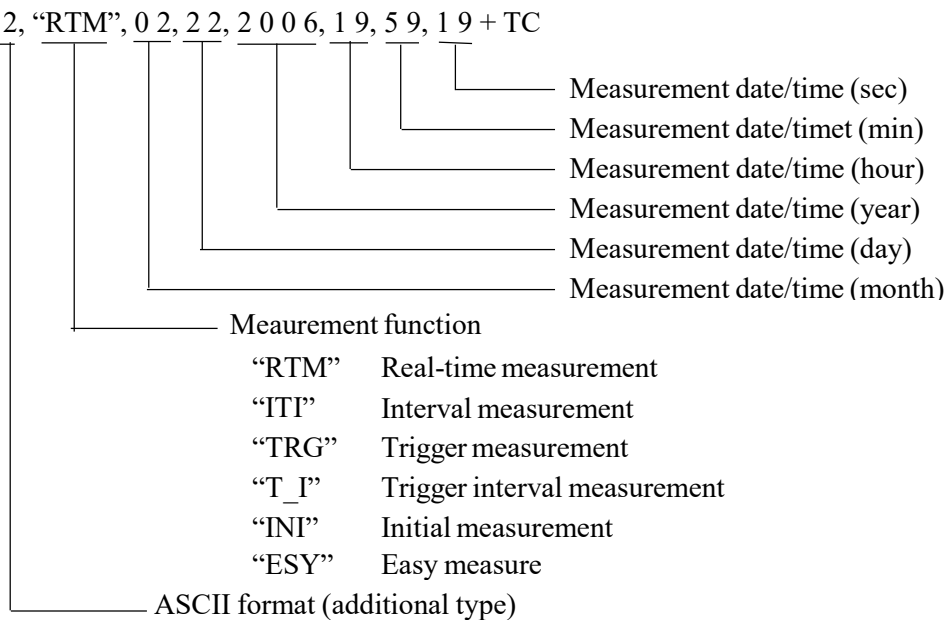
- This command enables reproduction of measured data from the drive.



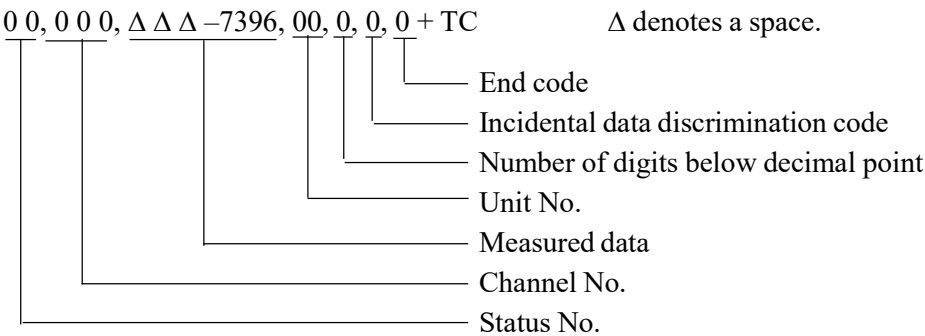
- The output format is as follows:



- Header



- Measured data



(1) Status No.

| No. | Status (Error) Name                                                                                                        | Troubleshooting                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00  | Normal data                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 01  | Measured data is exceeding the range                                                                                       | <p>Check the following to find out whether the problem lies in the sensor or the scanner:</p> <ul style="list-style-type: none"> <li>• Whether or not an overload is applied to the sensor.</li> <li>• Whether sensors are correctly connected.</li> <li>• Whether or not normal measurement is made possible by changing the channel.</li> <li>• Whether or not the measuring channel mode is matched.</li> </ul> |
| 02  | Abnormal initial value                                                                                                     | <ul style="list-style-type: none"> <li>• The initial value is exceeding the range.<br/>Conduct initial measurement once again. Or set the correct initial value.</li> </ul>                                                                                                                                                                                                                                        |
| 03  | Number of display/printout digits exceeded                                                                                 | <ul style="list-style-type: none"> <li>• The number of digits of the integer obtained through calibration coefficient calculation exceeds “6 – digits below the decimal point.”<br/>Check the calibration coefficient.</li> </ul>                                                                                                                                                                                  |
| 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  | <ul style="list-style-type: none"> <li>• No common dummy</li> <li>• Abnormal measured data in the dummy channel</li> </ul> | <ul style="list-style-type: none"> <li>• No dummy channel exists in true dummy measurement.<br/>Check the measuring channel mode.</li> <li>• Data error in the dummy channel.<br/>Check whether or not the sensor of the dummy channel is normal.<br/>Check whether or not the initial value of the dummy channel is normal.</li> </ul>                                                                            |
| 07  | Abnormal terminal temperature with thermocouple                                                                            | <ul style="list-style-type: none"> <li>• The terminal temperature is exceeding the range of <math>-20^{\circ}\text{C}</math> to <math>+60^{\circ}\text{C}</math>.<br/>Check the terminal temperature.</li> </ul>                                                                                                                                                                                                   |
| 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                                                                                                 | <p>Check that the scanner cable is correctly connected.</p> <p>Check that the scanner has the box number and the same box number is not used for another scanner.</p>                                                                                                                                                                                                                                              |
| 11  | Abnormal A-D converter                                                                                                     | <p>Remeasure and check whether the same error occurs or not.</p> <p>If the error occurs frequently, contact KYOWA for repair.</p>                                                                                                                                                                                                                                                                                  |
| 30  | Unmatched measuring channel mode between the UCAM and USB-70A, disabling measurement                                       | <p>Check the measuring channel mode.</p> <p>Check the “MODE SET” switch of the USB-70A.</p> <p>Check the scanner connection.</p>                                                                                                                                                                                                                                                                                   |
| 31  | No scanner mounted, disabling measurement                                                                                  | <p>Check that the internal scanners are installed or external scanners are connected via the scanner interface.</p> <p>If this error occurs frequently despite correct connection of scanning units or external scanners, contact KYOWA for repair.</p>                                                                                                                                                            |

(2) Channel No.: 000 to 999

(3) Unit No.:

| Unit No. | Unit                     | Unit No. | Unit               | Unit No. | Unit             |
|----------|--------------------------|----------|--------------------|----------|------------------|
| 00       | $\mu\epsilon$            | 20       | $\text{cm/s}^2$    | 40       | m/s              |
| 01       | $\mu\text{m/m}$          | 21       | $\text{m/s}^2$     | 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       | $\Omega$         |
| 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       | $\text{N/mm}^2$          | 33       | A                  | 53       | dB               |
| 14       | $\text{N/m}^2$           | 34       | K                  | 54       | %                |
| 15       | mmHg                     | 35       | $^{\circ}\text{C}$ | 55       | ppm              |
| 16       | $\text{kgf/cm}^2$        | 36       | rad                | 56       | pH               |
| 17       | mm                       | 37       | $^{\circ}$         | 57       | R                |
| 18       | cm                       | 38       | $\text{rad/s}$     | 58       | (Blank)          |
| 19       | m                        | 39       | $\text{cm/s}$      |          |                  |

(4) 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

### 2-3-47 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 1 X 0 X, DUP 0 0 9 +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.”

### 2-3-48 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 n X +TC

Unit of TEDS sensor information  
0: No  
1: Yes

Decimal point position of TEDS sensor information  
0: No  
1: Yes

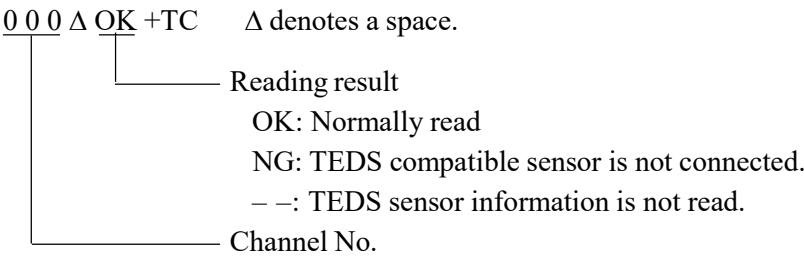
Calibration coefficient obtained from the rated capacity and rated output of TEDS sensor information  
0: No  
1: Yes

Channel mode based on TEDS sensor information  
0: No  
1: Yes

2-3-49 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.

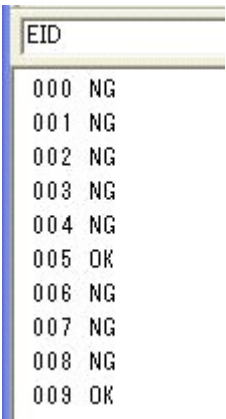
EID +TC



| 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



## 2-3-50 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.

### 2-3-51 SID: Read TEDS sensor details

- This command reads details of the TEDS sensor information.

SID n n n X +TC

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

Details of TEDS sensor information sent from the UCAM

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

#### SID Command Execution Sample

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
```

#### MEMO

- 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.

### **2-3-52 RS-: Test the bus line**

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

232C+TC

### **2-3-53 LAN: Test the bus line**

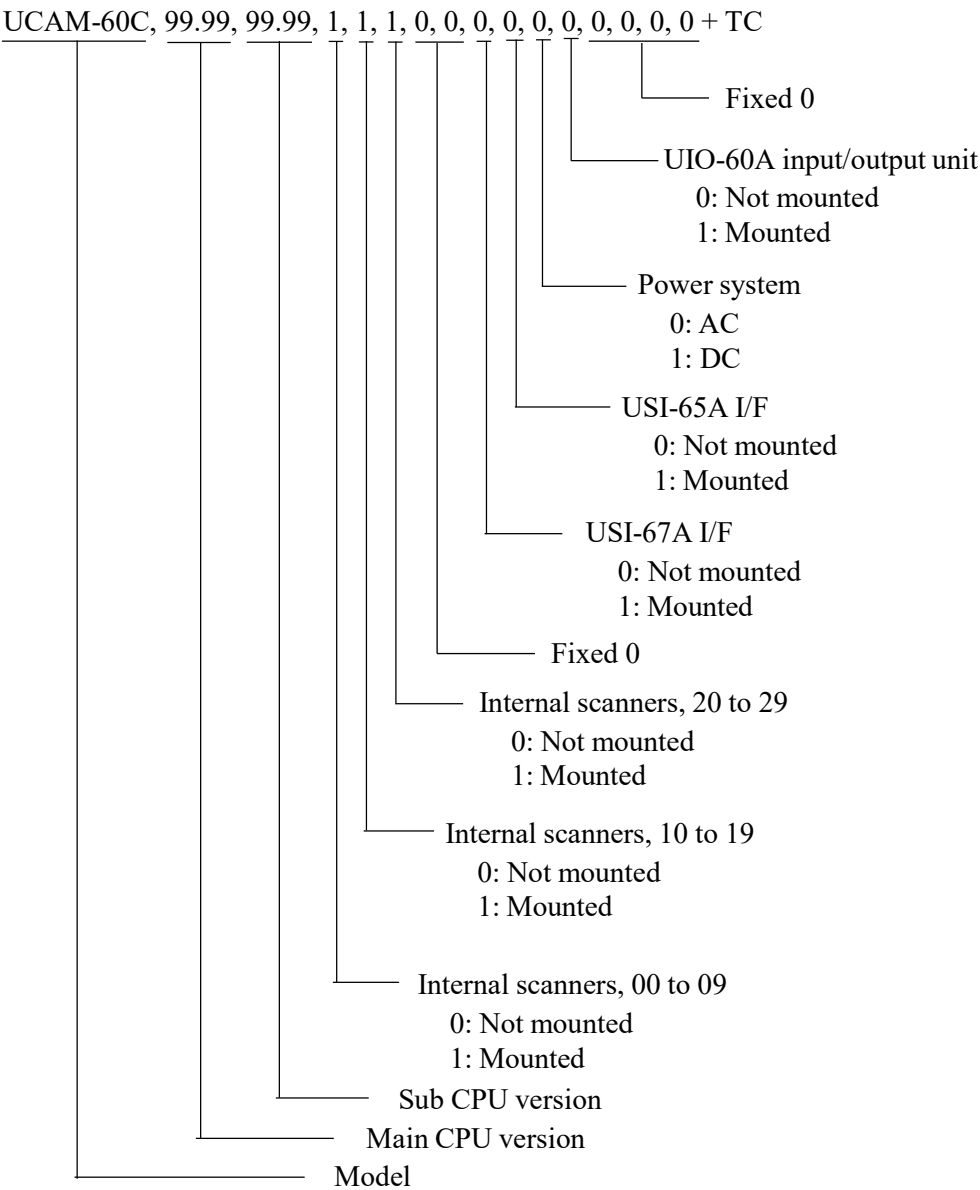
- When the UCAM receives this command (LAN+TC) normally, the following character string is output.

ETHERNET+TC

**2-3-54 SYS: Read the system information**

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

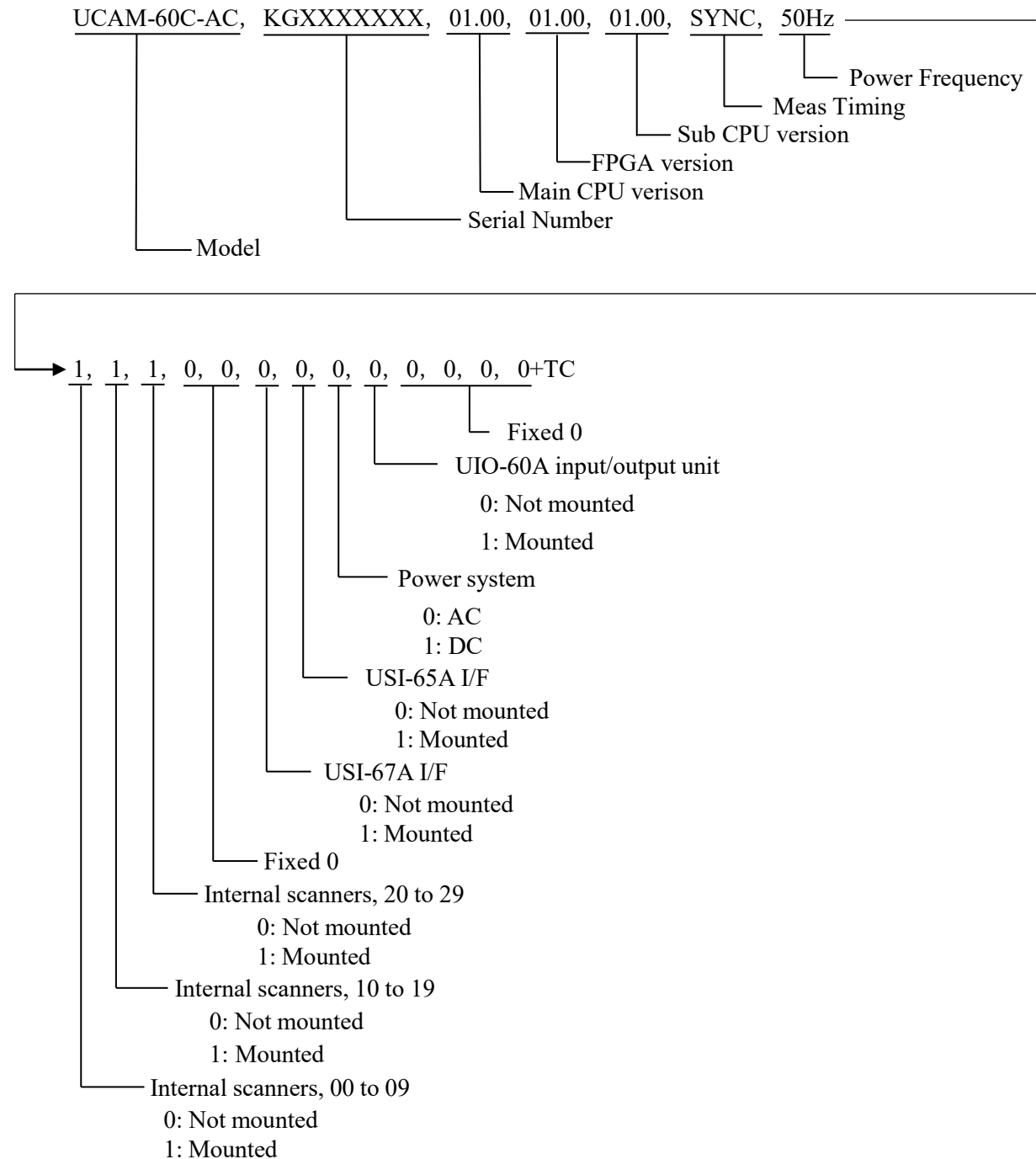
SYS+TC



### 2-3-55 SNR: Read the system information

- This command reads the system information including the model number of the UCAM, versions and Serial No

SNR+TC



### 2-3-56 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.”

### 2-3-57 ECL: Clear the error number

- This command resets the error number to 00.

ERR + TC

### 2-3-58 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 0 0 9 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).

### 2-3-59 MTS: Set maintenance condition

- This function is for maintenance service.

#### MEMO

- Basically, users need not use this command.

### 2-3-60 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  $\overset{\text{Auto-setting of channel mode based on “Mode Detection”}}{\underset{\substack{0: \text{ No} \\ 1: \text{ Yes}}}{n}} X + TC$

- 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.

$\overset{\text{Channel No.}}{\underset{\text{Detected measuring channel mode number}}{\underset{\text{Detected measuring channel mode name}}{0\ 0\ 0\ \Delta\ 0\ 1\ \Delta\ 1\ G\ 1\ 2\ 0}}} + TC$      $\Delta$  denotes a space.

#### 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

### 2-3-61 RST: Reset the UCAM to the initial conditions

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

RST + TC

### 2-3-62 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
```

The Ethernet setting menu appears as shown at the left.

#### (1) IP Address

```
0:IP Address
1:SubNetmask
2:Default Gateway
```

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
```

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
```

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

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

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. 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 | <ul style="list-style-type: none"> <li>• Check the preset first to last channels and the number of repeat times.</li> </ul>                                                                                                                                |
| 31  | The first channel is larger than the last channel.                             | <ul style="list-style-type: none"> <li>• Check the preset channel numbers.</li> </ul>                                                                                                                                                                      |
| 33  | Erroneous setting of measuring channel mode                                    | <ul style="list-style-type: none"> <li>• Check the measuring channel mode.</li> </ul>                                                                                                                                                                      |
| 34  | Erroneous setting of calibration coefficient                                   | <ul style="list-style-type: none"> <li>• Check the mantissa of calibration coefficient.</li> <li>• Check the exponent of calibration coefficient.</li> <li>• Check the number of digits below decimal point.</li> <li>• Check that the unit No.</li> </ul> |
| 35  | Erroneous time setting                                                         | <ul style="list-style-type: none"> <li>• Check the set time.</li> </ul>                                                                                                                                                                                    |
| 36  | Erroneous interval setting                                                     | <ul style="list-style-type: none"> <li>• Check the interval measurement start time.</li> <li>• Check the interval steps.</li> </ul>                                                                                                                        |
| 37  | Erroneous initial value setting                                                | <ul style="list-style-type: none"> <li>• Check the preset interval value.</li> </ul>                                                                                                                                                                       |
| 38  | Erroneous monitor channel setting                                              | <ul style="list-style-type: none"> <li>• Check whether or not the channel No. or the number of channels of the monitor channel is set to more than 40.</li> </ul>                                                                                          |
| 40  | Erroneous alarm setting                                                        | <ul style="list-style-type: none"> <li>• Check the preset alarm channel.</li> <li>• Check the preset alarm value.</li> </ul>                                                                                                                               |
| 57  | Erroneous offset setting                                                       | <ul style="list-style-type: none"> <li>• Check whether or not the set offset value is correct.</li> </ul>                                                                                                                                                  |
| 58  | Erroneous reference resistance setting                                         | <ul style="list-style-type: none"> <li>• Check the set reference resistance.</li> </ul>                                                                                                                                                                    |
| 80  | Undefined command is used.                                                     | <ul style="list-style-type: none"> <li>• Check whether or not undefined command is used.</li> </ul>                                                                                                                                                        |
| 81  | Erroneous parameter setting                                                    | <ul style="list-style-type: none"> <li>• The command code is correct but the succeeding parameter is faulty. Check the program.</li> </ul>                                                                                                                 |
| 91  | Cannot conduct ZERO measurement.                                               | <ul style="list-style-type: none"> <li>• ZERO measurement is conducted in a measuring function other than “Easy Measure.”</li> </ul>                                                                                                                       |
| 92  | Erronous scanning speed setting                                                | <ul style="list-style-type: none"> <li>• Check the preset scanning speed.</li> </ul>                                                                                                                                                                       |
| 93  | Cannot reproduce data.                                                         | <ul style="list-style-type: none"> <li>• Check whether or not the file designated for data reproduction exists.</li> </ul>                                                                                                                                 |