ADVANTEST

ADVANTEST CORPORATION

R3261/3361

OPTION 80
RS-232 INTERFACE
HANDBOOK

MANUAL NUMBER HEA00 9406

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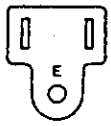
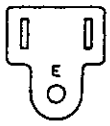
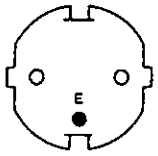
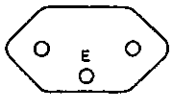
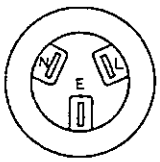
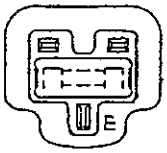
	Plugs	Standards/Countries	Ratings/Color/ Length	Accessory Codes
1		JIS : JAPAN	Rating :125V 7A Color :Black Length :2m	A01402 A01412
2		UL : USA CSA : CANADA	Rating :125V 7A Color :Black Length :2m	A01403 (Opt.95) A01413
3		CEE : EUROPE VDE : FRG OVE : AUSTRIA SEMKO : SWEDEN DEMKO : DENMARK KEMA : NETHERLANDS FIMKO : FINLAND NEMKO : NORWAY CEBEC : BELGIUM	Rating :250V 6A Color :Gray Length :2m	A01404 (Opt.96) A01414
4		SEV : SWITZERLAND	Rating :250V 6A Color :Gray Length :2m	A01405 (Opt.97) A01415
5		SAA : AUSTRALIA NEWZELAND	Rating :250V 6A Color :Gray Length :2m	A01406 (Opt.98)
6		BS : UK	Rating :250V 6A Color :Black Length :2m	A01407 (Opt.99) A01417

Note : "E" shows earth (ground).

PREFACE

1. This manual is description on the option 80 RS-232 Interface.

2. Related manuals
   For the main body (R3261/3361), refer to "R3261/3361 SERIES Instruction Manual".

3. Key expression

   Panel key: Expressed by a solid line. e.g. : 

   Soft key: Expressed by a dotted line. e.g. : 

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1. GENERAL

Remote control can be carried out through GPIB interface bus. However, if GPIB interface is not mounted in a controller (e.g.: a personal computer and etc.), use the option 80 (RS-232 interface) for the remote control.

(1) Compatibility with the GPIB remote control codes:
The control codes which can be used by the option 80 are identical to the GPIB codes of the R3261/3361, excluding some of the codes/functions inherent to the GPIB.

Note1: See the R3261/3361 SERIES Instruction Manual (Section 7.3 GPIB Code List).
- Talker/Listner codes can be used as they are.
- Header information related to the Talker request is compatible.
- The output format is also compatible.

Note2: See Chapter 6 of this manual "Difference from the GPIB Remote Programming".
- Different from the R3261/3361 GPIB codes in some points.

(2) Functions which can externally be controlled
The following functions can be controlled with the option 80:

①	Measurement condition setting:	Conditions entry through panel key operation
②	Set states output:	Set states and data call
③	I/O of measurement data:	Screen trace data write-in and read-out
④	Status output:	Data on the current instrument status can be read output in the same way as the GPIB status byte.

MEMO

2. SPECIFICATIONS

(1) Transfer speed (baud rate): The following six speed modes can be selected.

① 19200 bps
② **9600** ←**Default**
③ 4800
④ 2400
⑤ 1200
⑥ 600

(2) Data length: The following two modes can be selected.

① **7-bit** ←**Default**
② 8-bit

(3) Stop bit : The following three modes can be selected.

① **1 bit** ←**Default**
② 1.5 bit
③ 2 bit

(4) Parity bit: The following three modes can be selected.

① **None** ←**Default**
② Odd parity
③ Even parity

(5) Communication: Semi-double type

(6) Data flow control: The handshake type of the communication with the controller is specified. The following two modes can be selected according to the controller communication port function.

① **Hard Y-art handshake** ←**Default**
The RS-232 transmits no data while the transmitter DSR line is kept low. While the R3261/3361 DTR line is kept low, no transmission data is accepted.

② Xon/Xoff handshake
Once the Xoff character is received through the data line, the transmitter transmits no data until the Xon character is received. In case the R3261/3361 cannot receive a data, the Xoff character is transmitted to indicate that no data can be accepted. When the R3261/3361 has become capable of receiving data, the Xon character is promptly transmitted.

(7) Characters between transmiting interval:

When transmitting data from the R3261/3361, a time interval can be set between characters so as to reduce the load at the controller. The following five modes can be selected.

① **0** **←Default**
② 1.0 milli sec.
③ 2.5 milli sec.
④ 4.0 milli sec.
⑤ 5.5 milli sec.

(8) Communication procedure:

The communication is of non-protocol type, using carriage return (CR) and line feed (LF) as the message delimiters.

Note: A special method is used for binary output of waveform data. (See Chapter 5 "Extended Format".

(9) Transfer error control:

No transfer error control is executed in the R3261/3361. If necessary, carry out the control with the controller.

(10) Communication port opening:

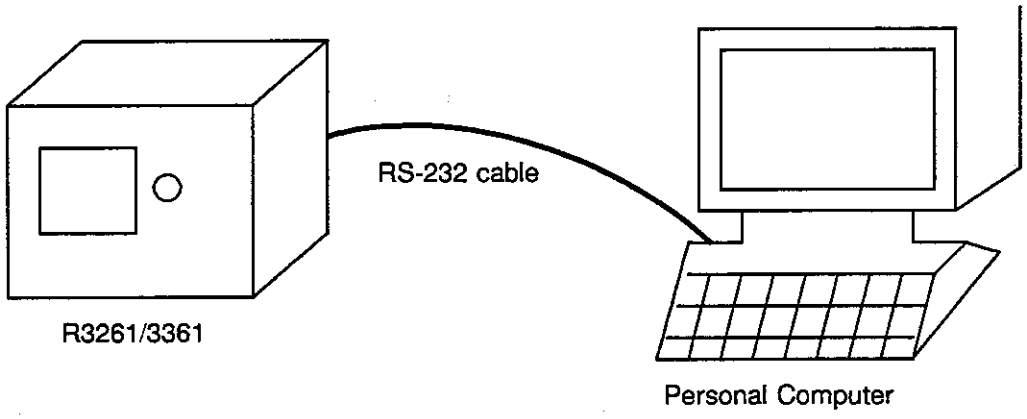
The R3261/3361 RS-232 port are opened when power is turned ON. The parameters required for communication are held in memory. The port is opened with the values which have been set through the panel/soft key operation. When shipped from the factory, the values are set to the default.

The communication port can forcibly be closed through the panel/soft key operation.

3. CONNECTION

3.1 Connection with the Controller

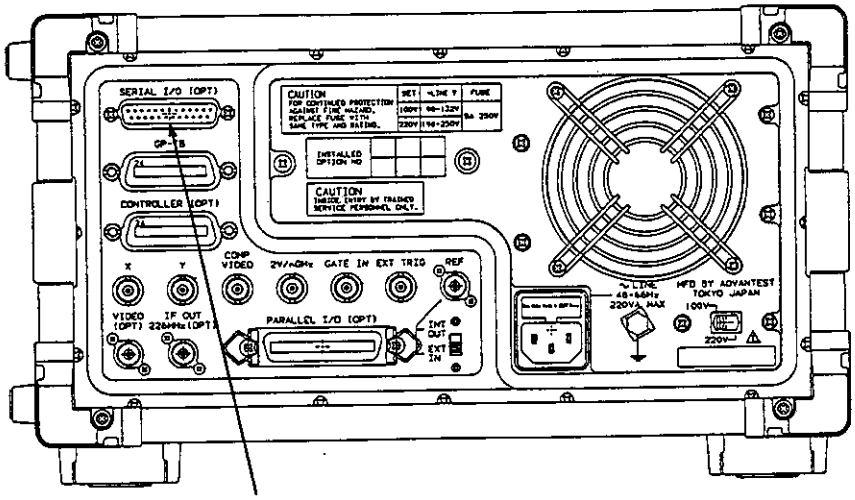
Use the RS-232 cable for connecting the R3261/3361 with the controller.



	Connector
R3261	(Rear panel) Serial I/O connector
R3361	

Devices connected	Connector
HP200/300 series	Different connectors are required depending which device is used. See the corresponding operations manual.
IBM AT PS 2	
PC 9801	
⟨	

Figure 3-1 Personal Computer Connection



SERIAL I/O (R3261C Rear Panel)

Figure 3-2 R3261/3361 RS-232 Communication Port

This section describes the connection with the controller (such as a personal computer) for using the option 80. The signal lines here are named according to the EIA (Electric Industries Association).

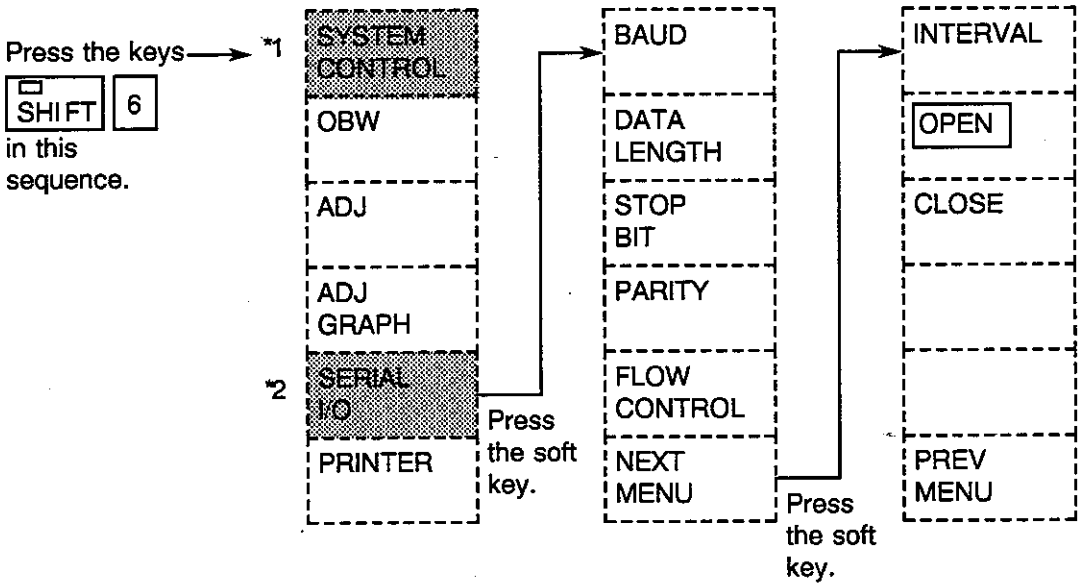
R3261/3361 (25-pin D-SUB)			Host (25-pin D-SUB)	
Pin No.	Signal name		Signal name	Pin No.
2	BA (TXD)	→	(RXD) BB	3
3	BB (RXD)	←	(TXD) BA	2
4	CA (RTS)	→	(DCD) CF	8
8	CF (DCD)	←	(RTS) CA	4
5	CB (CTS)	←	(DTR) CD	20
6	CC (DSR)	←	(CTS) CB	5
20	CD (DTR)	→	(DSR) CC	6
7	AB (GND)	—	(GND) AB	7

Figure 3-3 Cable Connection

4. COMMUNICATION PORT SETTING

4.1 Communication Port Setting Menu

Set the communication parameters required for the option 80 as follows.



For the above menu, see the explanation given in Section 4.2.

*1: Indicated if option 81 is mounted.
*2: Indicated if option 80 is mounted.

4.2 Explanation on the Communication Port Setting Menu

Specify the RS-232 communication parameters through the window screen.

Press the [SHIFT] [6] [SERIAL I/O] in this sequence.

Menu 1 appears for communication port setting with various parameters.

Menu 1

BAUD	Specifies the transfer speed (baud rate). See Figure 4-2
DATA LENGTH	Specifies the data length. See Figure 4-3 .
STOP BIT	Specifies the stop bit length. See Figure 4-4 .
PARITY	Specifies the parity bit type. See Figure 4-5 .
FLOW CONTROL	Specifies the data flow control. See Figure 4-6 .
NEXT MENU	Menu 2 appears. See Figure 4-7

Menu 2

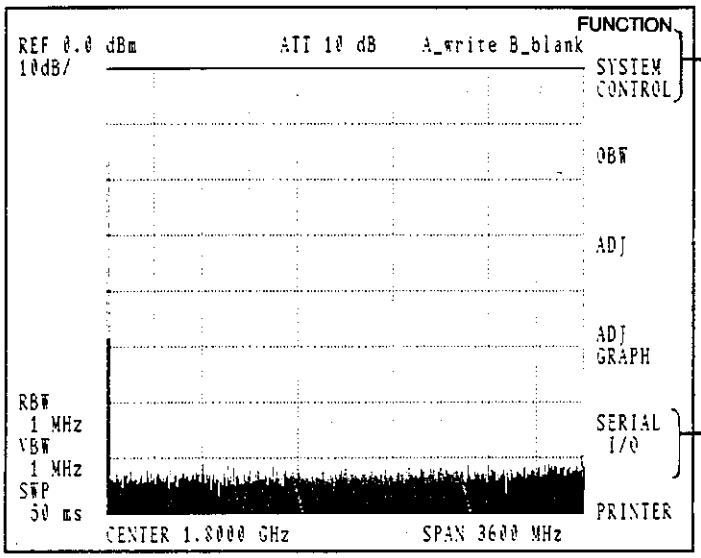
INTERVAL	Specifies the transmission time interval between characters transmitted from the R3261/3361. See Figure 4-7
OPEN	Indicates that the communication port is Open when the frame is on the screen. The Closed stage can be switched to the Open state. See Figure 4-8 .
CLOSE	Indicates that the communication port is in the Closed state when the frame is on the screen. The Open state can be switched to the Closed state. See Figure 4-9 .

4.3 Screen Display Examples

(1) Function select menu

Press the [SHIFT] [6] are pressed in this sequence.

Then the option select menu illustrated in Figure 4-1 will appear



This appears if option 81 is mounted.

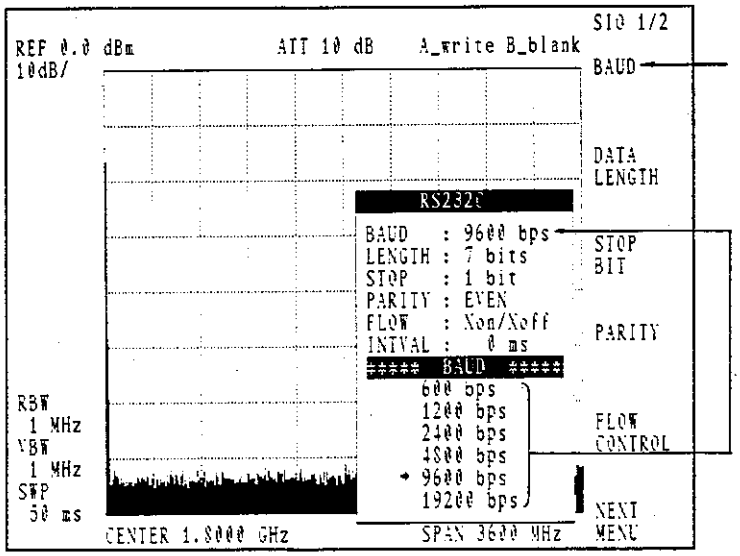
This appears if option 80 is mounted.

Figure 4-1 Function Select Menu

(2) Baud rate setting screen

Press the [SHIFT] [6] [SERIAL I/O] [BAUD] in this sequence.

Then the menu illustrated in Figure 4-2 will appear.



Ⓐ

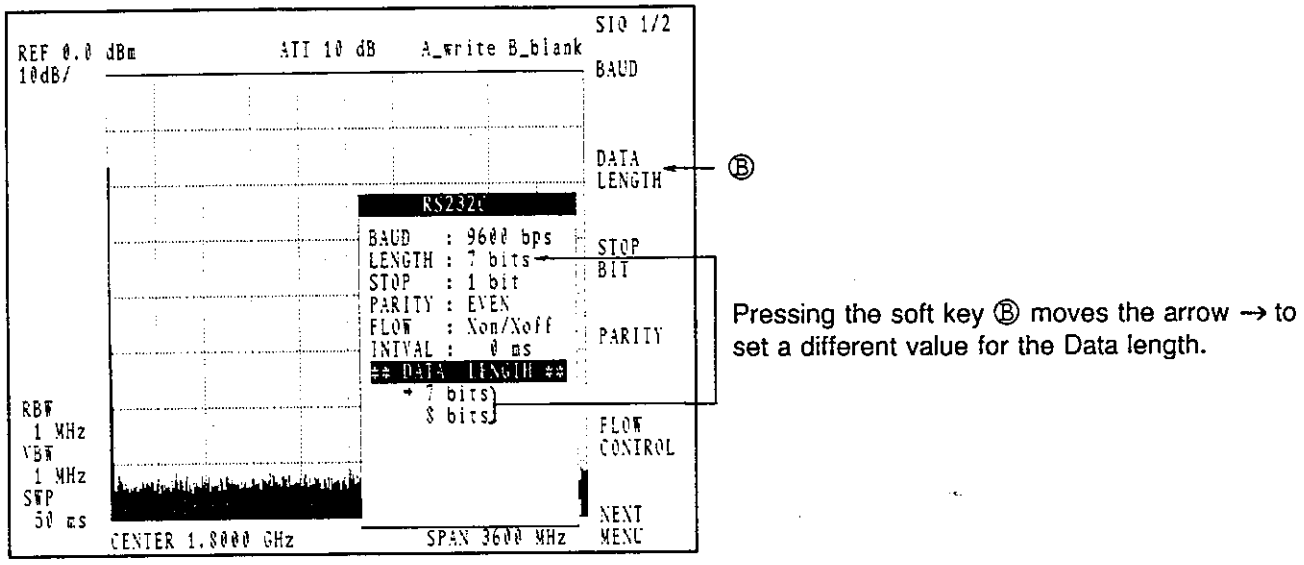
Pressing the soft key Ⓐ moves the arrow → to set a different value for the Baud rate.

Figure 4-2 Baud Rate Setting Menu

(3) Data Length Setting Screen

Press the SHIFT 6 SERIAL I/O DATA LENGTH in this sequence.

Then the menu illustrated in Figure 4-3 will appear.



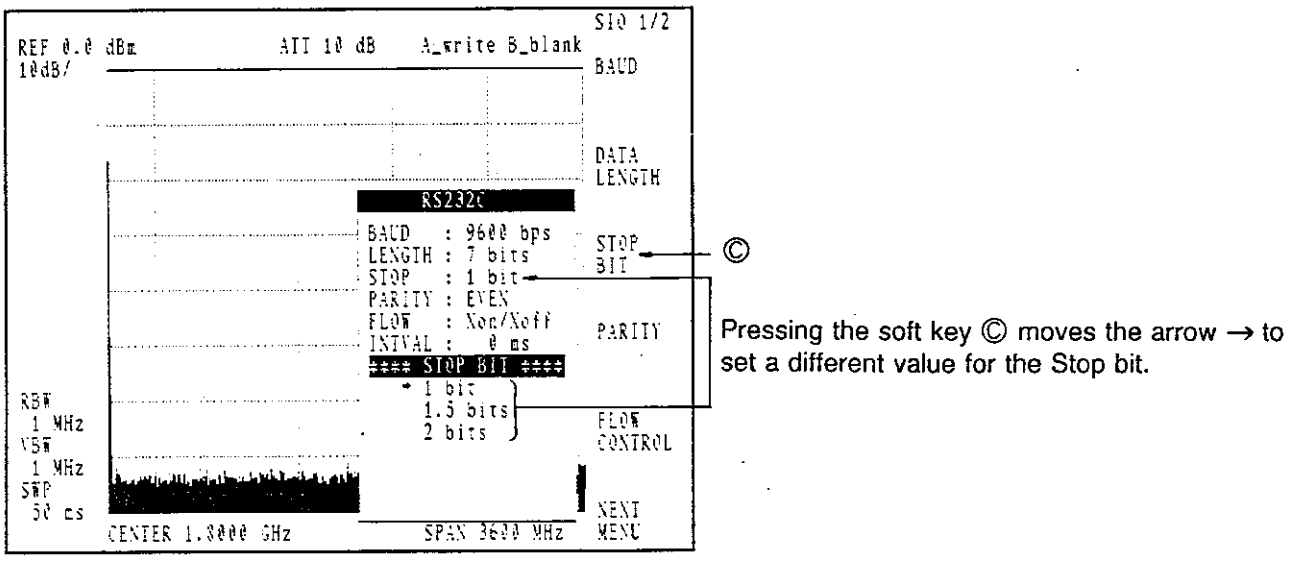
Pressing the soft key Ⓑ moves the arrow → to set a different value for the Data length.

Figure 4-3 Data Length Setting Menu

(4) Stop Bit Setting Screen

Press the SHIFT 6 SERIAL I/O STOP BIT in this sequence.

Then the menu illustrated in Figure 4-4 will appear.



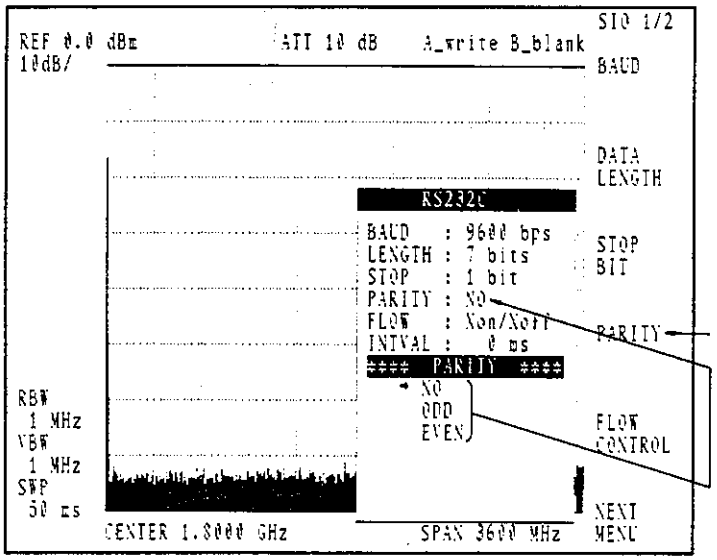
Pressing the soft key © moves the arrow → to set a different value for the Stop bit.

Figure 4-4 Stop Bit Setting Screen

(5) Parity Setting Screen

Press the SHIFT 6 SERIAL I/O PARITY in this sequence.

Then the menu illustrated in Figure 4-5 will appear.



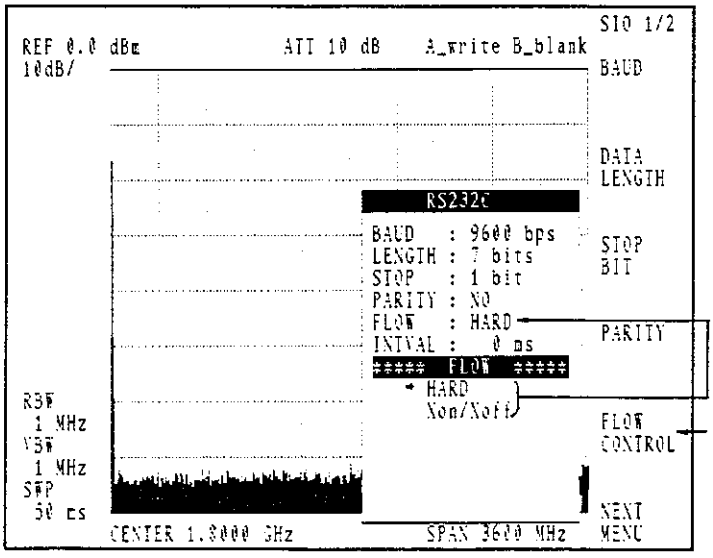
Pressing the soft key Ⓓ moves the arrow → to set a different value for the Parity.

Figure 4-5 Parity Setting Menu

(6) Flow Control Setting Screen

Press the SHIFT 6 SERIAL I/O FLOW CONTROL in this sequence.

Then the menu illustrated in Figure 4-6 will appear.



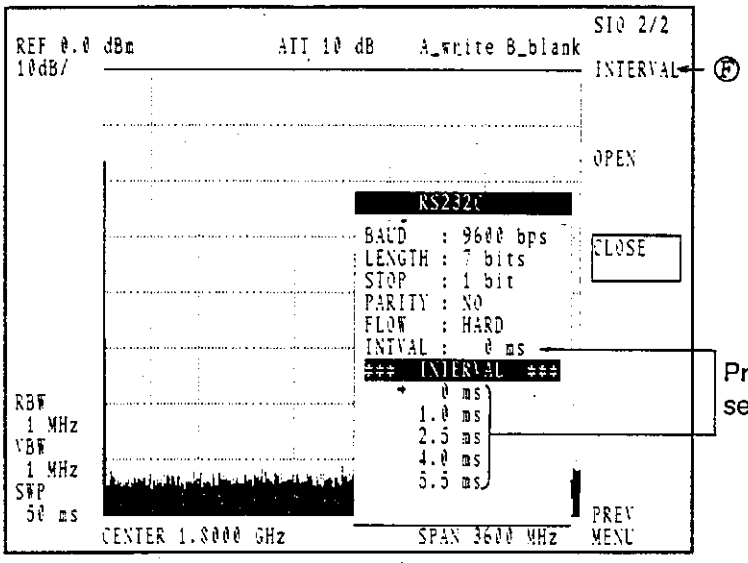
Pressing the soft key Ⓔ moves the arrow → to set a different value for the Flow control.

Figure 4-6 Flow Control Setting Menu

(7) Interval Setting Screen

Press the SHIFT 6 | SERIAL I/O | NEXT MENU | INTERVAL in this sequence.

Then the menu illustrated in Figure 4-7 will appear.



Pressing the soft key Ⓕ moves the arrow → to set a different value for the Interval.

Figure 4-7 Interval Setting Menu

(8) Communication Port Open/Close Setting Screen

Press the SHIFT 6 | SERIAL I/O | NEXT MENU in this sequence.

Then press the OPEN to open or press the CLOSE to close the communication port. When the setting is ready, the frame will appear.

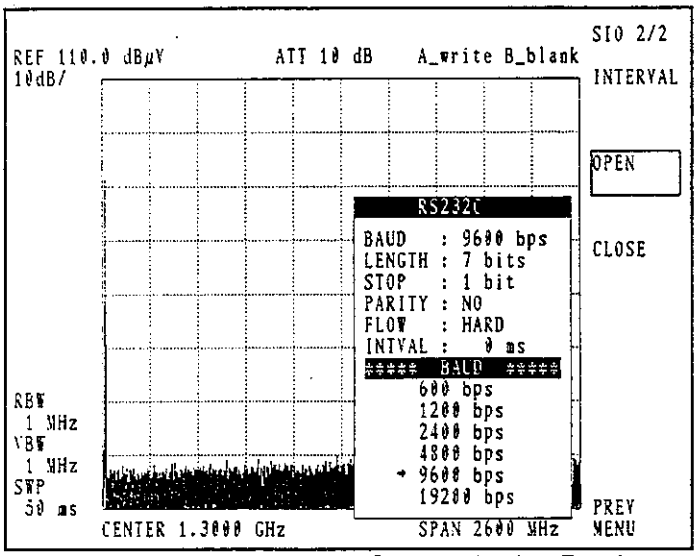


Figure 4-8 Screen of the Communication Port in Open state

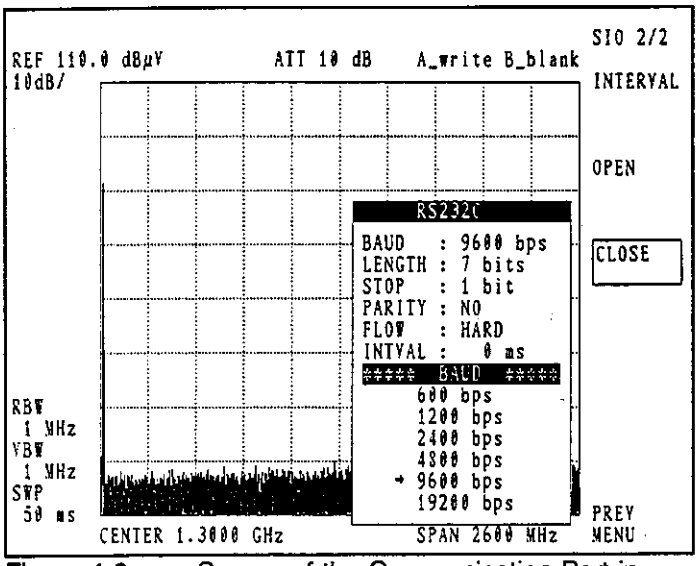


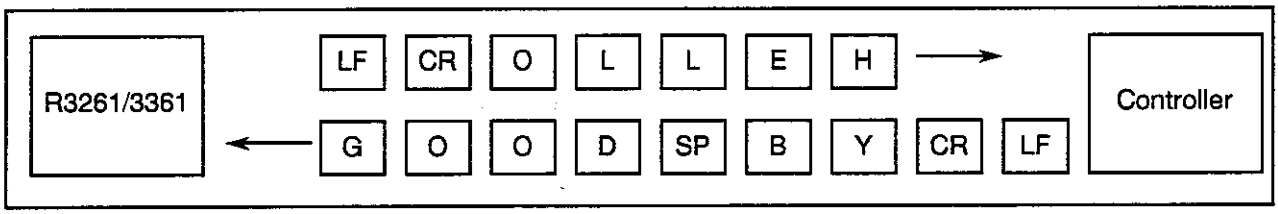
Figure 4-9 Screen of the Communication Port in Closed state

MEMO

5. MESSAGE FORMAT

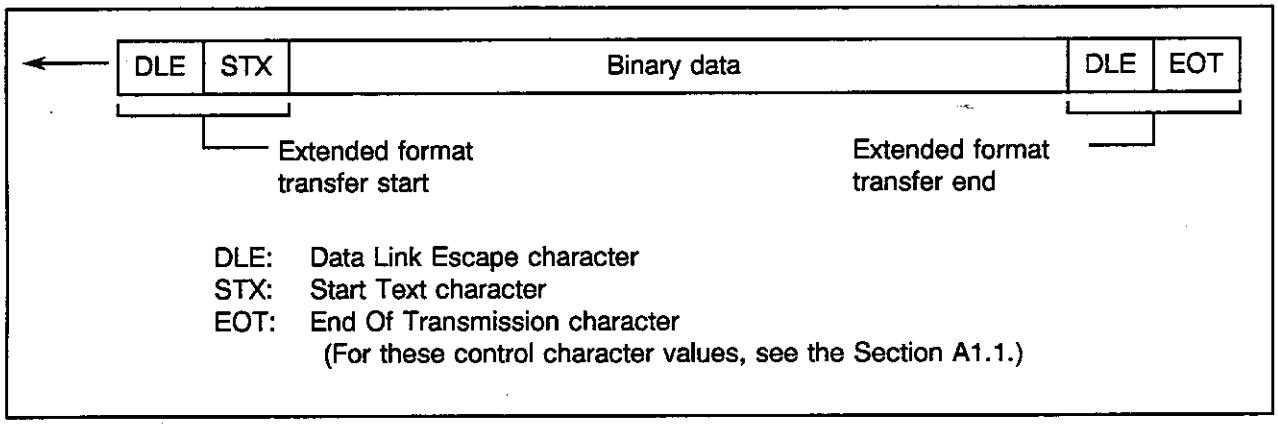
A message transferred between the controller and the R3261/3361 is basically an ASCII code characters string terminated by the carriage return (CR) and the line feed (LF) codes.

Basic Format

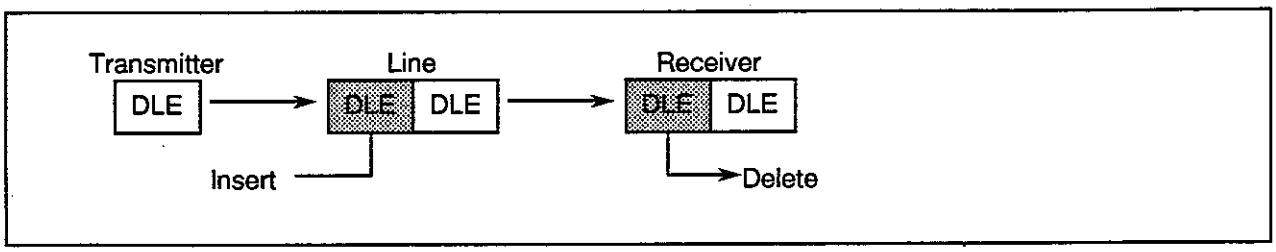


The waveform data binary format is transferred in the extended transfer format which can transparently transfer the 8-bit data.

Extended Format



If the binary data exist a data with an identical code as the DLE character, a message end may be detected. To cope with this, an additional DLE character is inserted when transmitting the data and the additional DLE character is ignored when the data is received. With this operation, the data transparency is kept.
(Source data handling is explained in the example 14 given in the Section 7.2 .)



MEMO

6. DIFFERENCE FROM THE GPIB REMOTE PROGRAMMING

Note that the Option 80 is in some points different from the GPIB remote programming.

(1) Command code

① GPIB commands which are not supported
- ① Delimiter control: DL0, DL1, DL2, DL3, DL4
- ② SRQ interrupt: S0, S1

② Additional commands for the RS-232 remote programming
- ① Panel key lock control: KLK, KUK
- ② Status byte read out: PLL?

(2) Panel control

When executing the RS-232 remote programming, the following specifications are set. (When executing the GPIB remote programming, the remote lamp on the panel is kept ON and the local operation is automatically inhibited.)

① The remote lamp will not light.

② The local operation will not be inhibited unless the KLK command is transmitted.

③ When the local operation is inhibited with the KLK command, it will not automatically released unless the KLK command is issued.

④ In case the KLK command has been issued to inhibit local operation and the processing is completed without releasing, the release can be executed with the LCL key or the IP key.

MEMO

7. SAMPLE PROGRAMS

This chapter explains how to use the the option 80 through several examples. The programs shown below all use the "Microsoft Quick BASIC" produced by the Micro Soft Co., Ltd.
Some sample programs using the "HP-BASIC" of Heulette Packard are given in the Section A1.2. The programs explained in the R3261/3361 SERIES Instruction Manual Section 7.4 have been rewritten for this function in this chapter. For the program functions, see the R3261/3361 SERIES Instruction Manual.

7.1 Option 80 Usage

- Sample Program 1

Example 1: Execute R3261/3361 master reset and turn CAL signal (30MHz) ON.

The RS-232 port is opened with specifications of 9600 baud; No parity; Data length 8-bit; Stop bit 1; Binary mode (Xon/Xoff control excluded); Line feed character insert mode; and DSR line monitor time out in 6 seconds.

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "IP"
PRINT #1,  "CLN"
END
```

Example 2: Set the start frequency to 300kHz and the stop frequency to 800kHz, and add 50kHz of the frequency offset.

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "FA300KZ"
PRINT #1,  "FB800KZ"
PRINT #1,  "FON50KZ"
END
```

Example 3: Set the reference level to -20dBm (5dB/div), the resolution bandwidth to 100kHz, and the detector mode to posi.

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "RE-20DB"                    'Reference level -20dBm
PRINT #1,  "DD5DB"                      '5dB/div
PRINT #1,  "RR100KZ"                    'Resolution bandwidth  100kHz
PRINT #1,  "DTP"                        'Detector mode is set to posi.
END
```

Example 4: Set the trigger mode to Single and the sweep time to 2 seconds; and set the marker at the maximum level at each sweep.

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "SI"
PRINT #1,  "SW2SC"

SWLOOP:
    PRINT #1,  "S2"                          'Status byte clear
    PRINT #1,  "SR"                          'Sweep start
    DO                                       'Waiting for the Sweep end
        PRINT #1,  "PLL?"
        INPUT #1,  A$
        SB = VAL(A$)
    LOOP UNTIL SB AND &H4
    PRINT #1,  "PS"                          'The marker peak search
GOTO  SWLOOP
END
```

Example 5: Set MAX HOLD (A).

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "AM"                              'Direct setting
'  Or
'PRINT #1,  "TA SF4"                        'Set through soft key operation
END
```

Example 6: Recall. (for channel 5)

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "RN"                              'Switch to the Normal mode.
PRINT #1,  "RC  5 SF1"                       'Recall channel 5.
'  Or
'PRINT #1,  "RF"                            'Switch to Fast mode
'PRINT #1,  "RC 5"                          'Recall channel 5.
END
```

Example 7: Output the marker frequency (integer).

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "HDO"                             'Header output suppress
PRINT #1,  "MF?"
INPUT #1,  A$
B = VAL(A$)                                  'Result example  B=1700000
END
```

Example 8: Output the center frequency (character string).

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "HD1"                          'Header output start
PRINT #1,  "CF?"
INPUT #1,  A$                             'Result example  A$=CF 0000001.8000E+9

END
```

Example 9: Output the unit status.

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "UN?"
INPUT #1,  A                              'Result example  A=2 (dBuv)
END
```

Example 10: Output the marker frequency and the level at once.

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "HDO"                          'Header output suppress
PRINT #1,  "MFL?"
INPUT #1,  Mf$, M1$
Mff = VAL(Mf$)                            'Result example  Mff=1.8E+0.9 M11=-73.02
M11 = VAL(M1$)
END
```

Example 11: Output the frequency offset.

```
OPEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

PRINT #1,  "HDO"                          'Header output suppress
PRINT #1,  "FO?"
INPUT #1,  On$, Frq$
Frqq = VAL(frq$)                          'Result example  On$=1  Frqq=1200000
END
```

Example 12: Using the NEXT PEAK, read 10 peak levels from the signal second peak level.

```
DIM M1$(9), M11(9)
 PEN  "COM1:9600,N,8,1,DS6000,LF"  FOR RANDOM  AS  #1

    PRINT #1,  "PS"
    FOR I = 0 TO 9
        PRINT #1,  "NXP"
        PRINT #1,  "ML?"
        INPUT #1,  M1$(I)
        M11(I) = VAL(M1$(I))
NEXT I
      'Result example  M11(1) = -55.01 M11(2) = -58.22...M11(9) = -70.26
END
```

7.2 Trace Data I/O

The trace data I/O is basically identical in the GPIB. The ASCII formats including the data value contents, message format, delimiter (fixed), and transfer count are all of equivalent specifications.

The binary formats for the data value, data transfer priority, and the data byte count are all the same, excluding that a control character is inserted at the beginning and the end of each data. (See Chapter 5 Extended Format .) If a data item identical to the DLE character is found among the data items, it should be noted that an additional DLE character has been inserted.

Note: The data length should be set to 8 bits. If a 7-bit data is transferred, the uppermost bit of the waveform data will be missing and a correct waveform may not be created.

<table>
<tr><th>I/O</th><th>Description</th></tr>
<tr><td>ASCII format</td><td>DDDD CR LF

1-point data

4-byte data without a header

<table>
<tr><th></th><th>Input code</th><th>Output code</th></tr>
<tr><td>Memory A</td><td>TAA</td><td>TAA?</td></tr>
<tr><td>Memory B</td><td>TAB</td><td>TAB?</td></tr>
</table>
</td></tr>
<tr><td>Binary format</td><td>DLE STX DD DD ..... DD DD DLE EOT

701-st point lower byte
701-st point upper byte
1st point lower byte
1st point upper byte

A 1-point data is divided into two bytes: the upper and lower of a binary value when transferred.

<table>
<tr><th></th><th>Input code</th><th>Output code</th></tr>
<tr><td>Memory A</td><td>TBA</td><td>TBA?</td></tr>
<tr><td>Memory B</td><td>TBB</td><td>TBB?</td></tr>
</table>
</td></tr>
</table>

- Sample Program 2

Example 13: Output data from Memory A in ASCII.

```
OPEN "COM1:9600,n,8,1,DS2000,LF" FOR RANDOM AS #1
DIM TR$(700)                                    '701 variables are fetched.

PRINT #1, "TAA?"                                'Memory A is set to ASCII.
FOR I = 0 TO 700                                'Data fetch is repeated 701 times.
    INPUT #1, TR$(I)
NEXT I
END
'Result example  TR$(0)=0208 TR$(1)=0210 .... TR$(699)=0311 TR$(700)=0298
```

Example 14: Output data from Memory B in Binary.

The RS-232 port is opened in Binary mode; and in mode without Line feed character insert.

```
OPEN "COM1:9600,n,8,1,DS6000" FOR RANDOM AS #1

DIM TR$(1500)
CONST DLE = 16, STX = 2, EOT = 4
CONST CR = 13, LF = 10                          'Control character definition

DLEflag = 0                                     'Flag for DLE character delete control
i = 3
PRINT #1, "TBB?; CHR$(CR); CHR$(LF);
TR$(1) = INPUT$(1, #1)                          'DLE character received
TR$(2) = INPUT$(1, #1)                          'STX character received
TR$(3) = INPUT$(1, #1)                          '1st byte of Waveform data received
DO
    IF (DLEflag = 0) THEN                                'DLE character inserted in the waveform
        IF (TR$(i) = CHR$(DLE)) THEN DLEflag = 1         'data is detected.
    ELSE
        IF (TR$(i) = CHR$(DLE)) THEN
            DLEflag = 0                         'The additional DLE character is deleted.
            i = i - 1
        ELSE
            IF (TR$(i)<> CHR$(EOT)) THEN DLEflag = 0
        END IF
    END IF
    i = i + 1
    TR$(i) = INPUT$(1, #1)                      'Waveform data fetch
LOOP WHILE (NOT ((DLEflag = 1) AND (TR$(i) = CHR$(EOT))))    'Data end detected
                                                'DLE character + EOT character
STOP
END
```

Example 15: Input data from Memory A in ASCII.

```
DIM TR$(700)
OPEN "COM1:9600,n,8,1,DS6000,LF" FOR RANDOM AS #1

PRINT #1, "TAB"                          'It is assumed that a waveform data is set in TR$().
FOR I = 0 TO 700
    PRINT #1, TR$(I)
    FOR J = 0 TO 10                      'Processing time is required in SPA.
    NEXT J
NEXT I

STOP
END
```

Note: Set the VIEW mode before executing the program. After execution press the VIEW key again to check the results of entry

Example 16: Input data from memory B in Binary.

The RS-232 port is opened in Binary mode and in mode without Line feed character insert.

```
OPEN "COM1:9600,n,8,1,DS6000,LF" FOR RANDOM AS #1

DIM TR$(1500)
CONST DLE = 16, STX = 2, EOT = 4         'Control character definition
CONST CR = 13, LF = 10

PRINT #1, "TBB; CHR$(CR); CHR$(LF);      'It is assumed that a data has been set in the TR$()
PRINT #1, CHR$(DLE); CHR$(STX);          'by "TBA?" or "TBB?".
FOR J = 0 TO 1401
    IF (TR$(J) = CHR$(DLE)) THEN
        PRINT #1, CHR$(DLE);
        FOR K = 0 TO 1                   'Wait time is required to assure the processing time in
        NEXT K                           'SPA.
        END IF
    PRINT #1, TR$(J);
    FOR K = 0 TO 1                       'Wait time is required to assure the processing time in
    NEXT K                               'SPA.
NEXT J
PRINT #1, CHR(DLE); CHR$(EOT);

STOP
END
```

Note: Set the VIEW mode before executing the program. After execution, press the VIEW key again to check the results of entry.

7.3 Status Byte Read-out Function

The remote programming functions "Service Request (SRQ)" and "Status Byte" are inherent to the GPIB and not supported by any options. However, for normal message exchange, the status byte data read-out function has been added.
The status byte data is transmitted form the R3261/3361 as a 2-byte ASCII data with the Status byte read-out code (PLL?).

Table 7-1 Status Byte Control Codes

Message code	Description
PLL?	Request for read the status byte information from the R3261/3361.
S2	The R3261/3361 status byte is cleared. (Same as the GPIB code)

Table 7-2 Status Byte Information

Bit	Decimal	Description
0	1	Turns ON when UNCAL has occurred.
1	2	Turns ON when a calibration is complete.
2	4	Turns ON when a sweep is complete.
3	8	Turns ON when the average count is reached.
4	16	Undefined
5	32	Turns ON when an error is detected in the message code of this function.
6	64	Undefined
7	128	Undefined

An example of Status byte
Sweep complete and the Average count reached. (4 + 8 = 12)

31	32	CR	LF

- Sample Program 3

Example 17: Read-out the average count end.

```
OPEN "COM1:9600,N,8,1,DS6000,LF" FOR RANDOM AS #1

PRINT #1, "S2"                          'The status byte is cleared.
PRINT #1, "AG 30GZ"                     'Average A start (30 times)
SW:
    PRINT #1, "PLL?"                    'The Status byte is read out.
    INPUT #1, StatusByte$
    SB = VAL(StatusByte$)
    IF (SB AND &H8) = 0 THEN GOTO SW    'The loop completion is indicated until bit 3 turns ON.
PRINT "AVG. END"
END
```

Example 18: Read out the single sweep end with an interval.

```
OPEN "COM1:9600,N,8,1,DS6000,LF" FOR RANDOM AS #1

PRINT #1, "SI"                          'Set to Single
PRINT #1, "S2"                          'The status byte is cleared.
PRINT #1, "SR"                          'Sweep start
SW:
    PRINT #1, "PLL?"                    'The status byte is read out.
    INPUT #1, StatusByte$
    SB = VAL(StatusByte$)
    IF (SB AND &H4) = 0 THEN GOTO SW    'The loop completion is indicated until bit 2 turns ON.
PRINT "SWEEP END"
END
```

Example 19 shows data flow control set to "Xon/Xoff" control.
This is a modification of Example 10.

Example 19: Output the marker frequency and the level at once. (Xon/Xoff CONTROL)

The RS-232 port is opened with specifications of 9600 baud; No parity; Data length 8-bit; Stop bit 1; ASCII mode (Xon/Xoff control); Line feed character insert mode; and DSR line monitor time out in 6 seconds.

```
OPEN "COM1:9600,N,8,1,ASC,DS6000,LF" FOR RANDOM AS #1

PRINT #1, "HDO"                         'Header output suppress
PRINT #1, "MFL?"
INPUT #1, Mf$, M1$
Mff = VAL(Mf$)                          'Result example Mff = 1.8E+09 M11 = -73.02
M11 = VAL(M1$)
END
```

7.4 Panel Key Lock Function

The GPIB remote control is equipped with the Remote/Local Enable as a function to inhibit local operation. The option 80 can also execute the equivalent function through message transmission.

This function is called Panel Lock. Once Panel Lock of the R3261/3361 is requested from the controller, the panel key operation or knob operation are ignored until a Panel Unlock message or a Local message (LC) is transmitted. Note that the panel lock state can also be released by one of the following operations:

- Press the LCL key.
- Press the IP key.
- Turn OFF the R3261/3361 power.

In the Panel Lock state, soft menu on the screen cannot be modified with commands from the controller.

Table 7-3 Panel Lock Code

Message code	Description
KLK	The R32612/3361 panel key operation is inhibited. (Panel Lock)
KUK	The R32612/3361 panel key operation is enabled. (Panel Unlock)

8. DATA COMMUNICATION ERROR

While executing the RS-232 remote programming, a communication error such as Time Out may be caused in the controller due to some reason. In such a case, the remote operation can be issued by re-transmitting the last message (command) which has been transmitted from the controller.
This chapter describes a simple recovery program using the "Quick BASIC" of Micro Soft Co., Ltd.

- Sample program 4

Example 20: Using the NEXT PEAK, read 10 peak levels from the signal second peak level. (This is a combination of Example 12 and a communication error processing.)

```
CONST CommTimeOut = 24                    'Time Out error No.
CONST CommBuffOver = 69                   'Buffer over flow error No.

DIM M1$(9), M11(9)
OPEN "COM1:9600,N,8,1,DS6000,LF" FOR RANDOM AS #1
ON ERROR GOTO Commerror

PRINT #1, "PS"
FOR I = 0 TO 9
    PRINT #1, "NXP"
    PRINT #1, "ML?"
    INPUT #1, M1$(I))
NEXT I                                    'Result example M11 (1)=-55.01M11(2)=-58.22...
STOP                                      'Communication error processing routine

Commerror:
    IF ERR = CommTimeOut THEN
        IF RetryCount = 5 THEN
            ON ERROR GOTO 0
        END IF
        RetryCount = RetryCount + 1
        PRINT "Communication TIME OUT !!!"
        FOR J = 0 TO 5000
        NEXT J
        PRINT "Retry communication !?"
        RESUME
    ELSE
        IF ERR = CommBuffOver THEN
            PRINT "Communication buff. overflow !!!"
            RESUME
        END IF
        PRINT "Something Error has been occured."
        PRINT "Error no. :"; ERR
        ON ERROR GOTO 0
    END IF
END
```

MEMO

APPENDIX

A1.1 Control Character Code List

Symbol	Hex. code	Description
STX	02h	Used as a header in Binary data transfer.
EOT	04h	Used as a delimiter in Binary data transfer.
LF	0Ah	Used as a delimiter in ASCII data transfer.
CR	0Dh	Used as a delimiter in ASCII data transfer.
DLE	10h	Used as a control character in Binary data transfer.
Xon	11h	X parameter transfer start character
Xoff	13h	X parameter transfer suppress character

A1.2 HP-BASIC Sample Programs

Some of the sample programs given in Chapter 7 are described in HP-BASIC (Example 17).

HP-BASIC

```
20    !
30    !*****************************************
40    !     DO AVERAGING OPERATION THRU. SIO
50    !*****************************************
60    !
70    DIM Message(1)[130]
80    Sc=20
90    ON ERROR GOTO Error       ! Set up error trap routine
100   GOSUB Sio_init
110       OUTPUT Sc;"S2"
120       OUTPUT Sc;"AG 30GZ"
130 L1: !
140       OUTPUT Sc;"PLL?"
150       ENTER Sc;S
160       IF BIT (S,3)<>1 THEN L1
170       PRINT "AVG. END"
180       STOP
190 !*************************************
200 !    ERROR HANDLING ROUTINE
210 !*************************************
220 Error:                          ! Error trap
230       IF ERRN<>167 THEN Otner_error
240       STATUS Sc,10;Uart_error   ! Get UART error information
250       IF BIT (Uart_error,2) THEN Overrun  ! Overrun error
260       IF BIT (Uart_error,2) THEN Parity   ! Parity error
270       IF BIT (Uart_error,2) THEN Framing  ! Framing error
280       IF BIT (Uart_error,7) THEN Break    ! Break detected
290 Other:                                    ! Other error
300           PRINT "Other error !"
310           STOP
320 Overrun:                                  ! Overrun error
330           PRINT "Overrun error !"
340           STOP
350 Framing:                                  ! Framing error
360           PRINT "Framing error !"
370           STOP
380 Break:                                    ! Break
390           PRINT "Break detected !"
400           STOP
410 Other_error:                              ! NO ERROR
420           PRINT "Error trapped ?"
430           STOP
440 !*********************************************
450 !     SERIAL COMMUNICATION I/F INITIALIZE
460 !*********************************************
470 Sio_init:                                 ! Initialize SIO Control reg.
480           CONTROL Sc,0;1                  ! Reset I/F board
490           CONTROL Sc,3;1                  ! Set PROTOCOL TO Async.
```

(cont'd)

```
500 Wait:       STATUS Sc,38;All_sent
510             IF NOT All_sent THEN Wait
520             CONTROL Sc,0;1                  ! Reset I/F Card
530             CONTROL Sc,14;1+2+4             ! Set Control Block Mask
540       !     CONTROL Sc,39;4                 ! Set Break singnal time
550       !     CONTROL Sc,6;1                  ! Break signal send
560             CONTROL Sc,8;3                  ! Set DTR/RTS line
570             CONTROL Sc,13;128+1             ! Set INT mask
580             CONTROL Sc,15;0                 ! No modem lime-change notifi-
                                                                        cation
590             CONTROL Sc,16;0                 ! Disable connection time out
600             CONTROL Sc,17;0                 ! Disable nonactivity time out
610             CONTROL Sc,18;40                ! Lost Carrier 400 ms
620             CONTROL Sc,19;10                ! Transmit time out 10S
630             CONTROL Sc,20;15                ! Set Transmit speed : 19200
640             CONTROL Sc,21;15                ! Set Receive Speed : 19200
650             CONTROL Sc,22;0                 ! Set protocol handshake to non
660             CONTROL Sc,23;3                 ! Set H/W handshake type
670             CONTROL Sc,24;2
680             CONTROL Sc,28;2                 ! Set EOL chra. NO.
690             CONTROL Sc,29;13                ! Set CR code
700             CONTROL Sc,30;10                ! Set LF code
710             CONTROL Sc,34;3                 ! Set DATA LENGTH 8 BIT
720             CONTROL Sc,35;0                 ! Set STOP BIT TO 1 BIT
730             CONTROL Sc,36;0                 ! Set PARITY TO NON
740             CONTROL Sc,37;0                 ! Set CHAR. INTERVAL
750             RETURN
760   !!!!!
770   END
```

A1.3 Exception Processing

The R3261/3361 interrupts the current communication processing and executes the corresponding exception processing when the following states are caused.

① State: In receiving a message from the controller (before the delimiter character string is received), more than 5 seconds have passed without receiving the next character.

Processing: Them message is canceled and the break signal is generated. The next character received is handled as a start of another message.

② State: In transmitting a message to the controller, the transmit suppress from the controller has not been released in 5 seconds after the last character was transmitted.

Processing: The message transmission is interrupted and preparation is made for the next transmission/reception.

③ State: During a trace data input, no transmission can be detected from the controller for more than 25 seconds under the condition that the specified number of times (ASCII format) or the specified number of bytes (Binary format) has not been reached.

Processing: The trace data input mode is released and preparation is made for the next transmission/reception.

④ State: In receiving a message, a framing error, parity error or overrun error occurs.

Processing: Them message is canceled and the break signal is generated. The next character received is handled as a start of another message.

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