

INSTRUCTION MANUAL

INTERFACE

MODEL IF01-DSS

KIKUSUI ELECTRONICS CORPORATION

824058

Power Requirements of this Product

Power requirements of this product have been changed and the relevant sections of the Operation Manual should be revised accordingly.

(Revision should be applied to items indicated by a check mark)

Input voltage

The input voltage of this product is _____ VAC,
and the voltage range is _____ to _____ VAC. Use the product within this range only.

Input fuse

The rating of this product's input fuse is _____ A, _____ VAC, and _____.

WARNING

- To avoid electrical shock, always disconnect the AC power cable or turn off the switch on the switchboard before attempting to check or replace the fuse.
- Use a fuse element having a shape, rating, and characteristics suitable for this product. The use of a fuse with a different rating or one that short circuits the fuse holder may result in fire, electric shock, or irreparable damage.

AC power cable

The product is provided with AC power cables described below. If the cable has no power plug, attach a power plug or crimp-style terminals to the cable in accordance with the wire colors specified in the drawing.

WARNING

- The attachment of a power plug or crimp-style terminals must be carried out by qualified personnel.

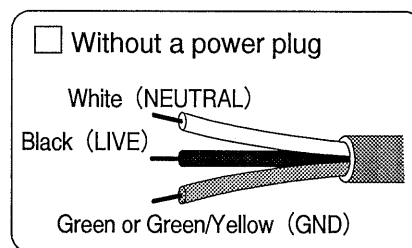


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1. GENERAL

This interface device is used with Kikusui's Digital Storage Oscilloscope via GP-IB.

The device has a talker function and a listener function. When it operates in the talker mode, data which has been acquired by the digital oscilloscope and stored in the memory is transferred from the address specified in the listener mode to the address requested by the controller.

Transfer of data of continuous addresses can be automatically and incrementally made simply by specifying the start address. It also is possible to transfer each data by specifying its address each time.

The device also provides a signal for the controller to judge whether data has been acquired by the digital storage oscilloscope or not.

When the device is operated in the listener mode, it receives data, address, and characters for control. Data is received being address-specified. When in continuous writing in consecutive addresses, writing of data commences when the start address is specified and the subsequent addresses advance incrementally each time an item of data is received.

The device can operate in the REMOTE/LOCAL mode or in the SINGLE mode as selected.

Data and addresses can be controlled up to 12 bits. They are transferred in a low-order 4-bit binary structure of ASCII codes.

The device can be especially advantageous used as an interface for a computer in conjunction with a digital storage oscilloscope to analyze waveforms stored in the oscilloscope.

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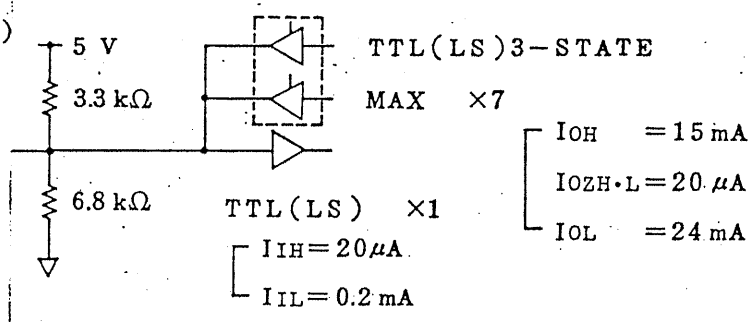
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2. SPECIFICATIONS

Device name: INTERFACE
 Model No.: IF 01-DSS
 Control codes: GP-IB (IEEE 488-1978)
 Data codes: ASCII
 Binary codes with low-order 4 bits

Input circuit:

(fan in, fan out)



Output signals:

DATA	12 bits	output
ADDRESS	12 bits	output
WRITE ENABLE	1 bit (pulse)	output
REMOTE/LOCAL	1 bit	output
DATA INPUT (LISTEN)	1 bit	output
SINGLE	1 bit	output
WRITE END (U OUT)	1 bit (pulse)	output
STORED	1 bit	input
BUSY	1 bit	input

Operating ambient temperature: 5°C to 35°C (41°F to 95°F)

Power requirements: 100 V, 50/60 Hz AC, approx. 9 VA

Weight: Approx. 2.5kg

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Dimensions: 210 W × 70 H × 310 D mm
(8.27 W × 2.76 H × 12.20 D in.)

(Maximum dimensions) 215 W × 75 H × 330 D mm
(8.46 W × 2.95 H × 12.99 D in.)

Accessories: Instruction manual 1
Flat cable 1

3. OPERATION METHOD

3.1 Descriptions of Front Panel Items

- ① POWER: Main power on/off switch of the device.
When thrown to the upper position, the device is energized and the lamp turns on.
- ② LISTEN: This lamp turns on when the device is in the LISTENER mode.
- ③ TALK: This lamp turns on when the device is in the TALKER mode.

3.2 Descriptions of Rear Panel Items

- ④ GP-IB: Connector for GP-IB cable.
- ⑤ DI/O: I/O connector for connection with digital storage oscilloscope.
- ⑥ FUSE: Fuse of the AC input power line.
- ⑦ AC input power: AC input power connector.
- ⑧ AC LINE VOLTAGE SET: To select an AC line voltage on which the device is to be used, by aligning the arrowhead mark.

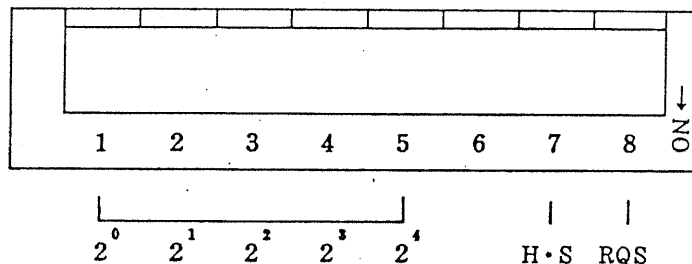
A: 90 - 110 V

B: 104 - 126 V

C: 194 - 236 V

D: 207 - 235 V

- ⑨ DIP SW



- 1 - 5: These switches are for setting of device select code. The bottom positions are for ON or "1".
- 6: When this switch is set in the ON state, REMOTE/LOCAL switching can be made with a remote enable signal. As this switch is connected making up an OR circuit with the "R" and "Q" signals in the data mode, the "Q" signal should be sent once to maintain the local state when in the data mode.
- 7: HS. When this switch is set in the ON state, handshaking is enabled up to the digital storage oscilloscope and, if the oscilloscope is in the data acquire operation, signal transfer with respect to the controller is inhibited. This switch should normally be set in the OFF state in order to prevent undesirable state which could be caused by an peripheral device or controller.
- 8: RQS. If this switch is set in the ON state, the device indicates that the digital storage oscilloscope has acquired data in the service request (SRQ) mode. This switch should normally be set in the OFF state.

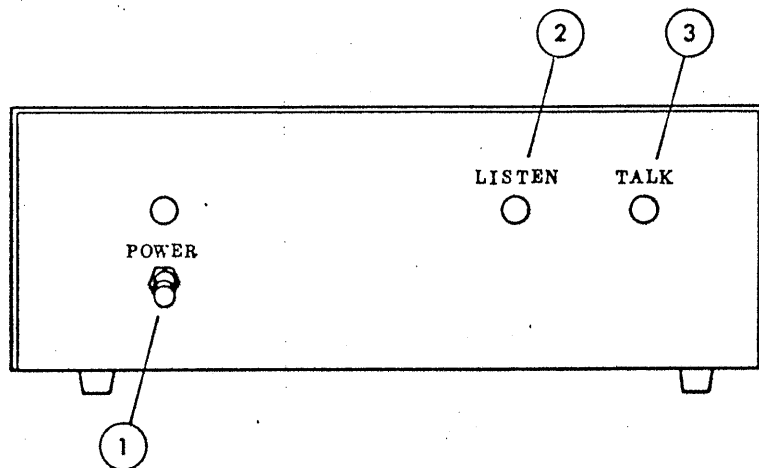


Figure 3-1. Front panel

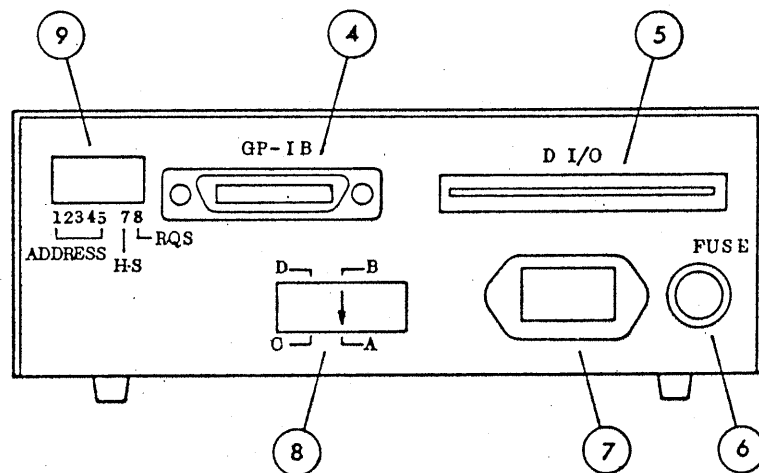


Figure 3-2. Rear panel

3.3 Layout of Connector Pins

GP-IB

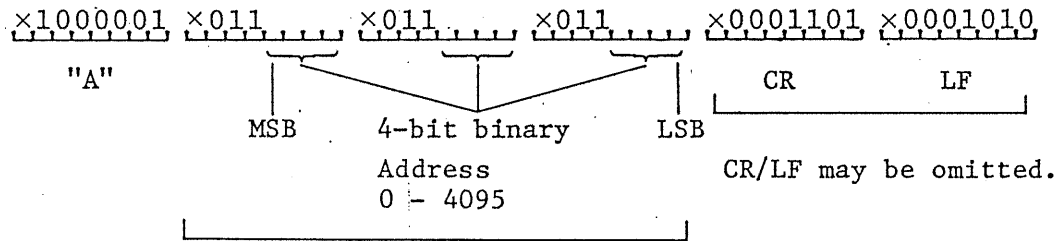
DIO 1	1	13	DIO 5
DIO 2	2	14	DIO 6
DIO 3	3	15	DIO 7
DIO 4	4	16	DIO 8
EOI	5	17	REN
DAV	6	18	GND (6)
NRFD	7	19	GND (7)
NDAC	8	20	GND (8)
IFC	9	21	GND (9)
SRQ	10	22	GND (10)
ATN	11	23	GND (11)
SHIELD	12	24	LOGIC GND

DI/O

GND	1	2	D0
GND	3	4	D1
GND	5	6	D2
GND	7	8	D3
GND	9	10	D4
GND	11	12	D5
GND	13	14	D6
GND	15	16	D7
GND	17	18	D8
GND	19	20	D9
GND	21	22	D10
GND	23	24	D11
A0	25	26	A1
A2	27	28	A3
A4	29	30	A5
A6	31	32	A7
A8	33	34	A9
A10	35	36	A11
GND	37	38	STORED
GND	39	40	W.E
GND	41	42	DI
GND	43	44	SINGLE
GND	45	46	BUSY
GND	47	48	REMOTE
GND	49	50	WRITE END

3.4 Signal Formats (CPU → IF)

o Address

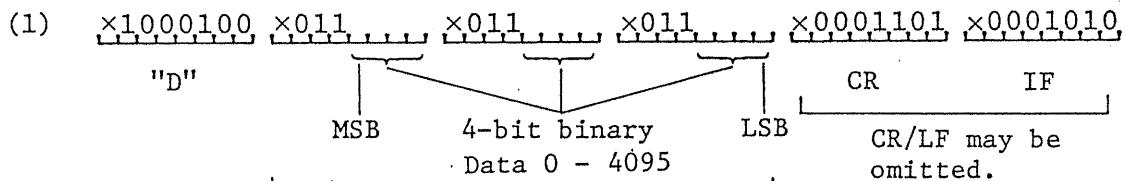


If more than 3 characters are entered, the high-order characters are ignored and the 3 low-order characters become effective.

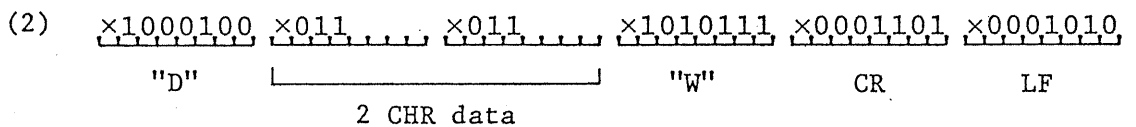
* To designate other address than 0 address, send "B" following the address designation.

- Examples:
1. "A"xxx"B" CR LF
 2. "A"xxx CR LF
 - "B" CR LF

o Data



If more than 3 characters are entered, at the instant 3 characters are received, the WRITE ENABLE state is caused and data is stored in the memory of digital storage oscilloscope.



3.7 Instruction Words and Actions

"R" REMOTE This instruction sets the digital storage oscilloscope to the REMOTE state so that read/write of oscilloscope memory is externally controlled. Once the oscilloscope is set in this state, read/write of its memory depends on an external control signal so far as this state is not released.

This state can be effected independently from the case that the REN (remote enable) instruction is used. Remote control state can be effected also by using the REN instruction (when DIP SW 6 is ON).

"Q" REMOTE RESET (LOCAL): This instruction is to reset the remote control state caused by the "R" instruction. When the oscilloscope is in the remote state caused by the REN instruction, the state cannot be reset by the "Q" instruction. (To reset from the state caused by the REN instruction, use the LOCAL instruction.)

"S" SINGLE: To set the digital storage oscilloscope to the single-sweep mode. The oscilloscope set in the stored state can be reset by applying the "T" signal and it can be turned to the standby state again by applying the "S" signal.

"T" SINGLE RESET: To reset the oscilloscope from the single-sweep state. This instruction, in conjunction with the "S" instruction, can be used to operate the digital storage oscilloscope in the single-sweep mode by controlling from the computer.

"U" WRITE END: This pulse signal is used to indicate the end of data sent from the controller to the digital storage oscilloscope. When this signal is applied, the STORED lamp of the oscilloscope turns on.

"D" DATA: To identify the data mode,

"F" FLAG: To identify the flag mode, The flag signal is returned to the controller which has been specified in the "F" mode when the digital storage oscilloscope is in the STORED state. In this case, "1" is set in the lowest-order bit.

- o Receives "F" in the LISTEN mode and
- o Sends "0" or "1" in the TALK mode.

"A" ADDRESS: To identify the address mode. An address number should be specified following "A". If no address number is specified, address 0 is used for the default. If an address number is specified only once and no subsequent address numbers are specified when in the DATA mode, address number is incremented each time an item of data is received or sent regardless of whether in the LISTEN mode or TALK mode.

"B" If other address number than 0 is specified following "A", this signal is used to store the address number. This signal must always be given following an address number.

"W" When in the 3-character transfer of data write mode, 2-character or 1-character data item character can be made by sending "W" following the data item.

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Reference

	ASCII	Binary	Decimal
0	0	0011 0000	48
1	1	0011 0001	49
2	2	0011 0010	50
3	3	0011 0011	51
4	4	0011 0100	52
5	5	0011 0101	53
6	6	0011 0110	54
7	7	0011 0111	55
8	8	0011 1000	56
9	9	0011 1001	57
10	:	0011 1010	58
11	;	0011 1011	59
12	<	0011 1100	60
13	=	0011 1101	61
14	>	0011 1110	62
15	?	0011 1111	63

3.8 Precautions

- (1) Be sure to connect the GP-IB cable and the flat cable which connects the interface to the digital storage oscilloscope before turning on the equipment power.
- (2) Pay attention to the connecting directions of the flat cable which connects the interface to the digital storage oscilloscope.
- (3) Make sure that the AC line voltage setting of the device conforms with the voltage of the AC power line on which the device is to be operated. AC line voltage setting of the device can be changed with the connector on the rear panel of the device.
- (4) This device is for serial poll only. It is not available for parallel poll.

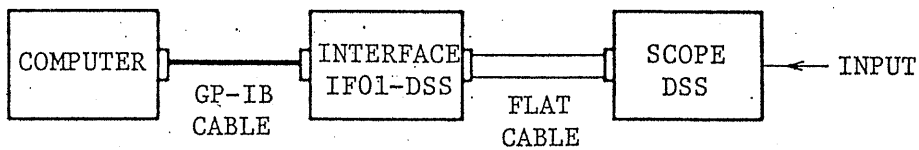
- (5) Data transfer is in the ASCII codes.
- (6) DIP SW 6 - 8 on the rear panel should normally be set in the OFF state. They should be turned to the ON state only when their functions are needed.
- (7) Data can be easily sent and received, provided that they are in the valid formats. For the data formats, refer to the examples of programming.
- (8) Exercise care when connecting or disconnecting the flat cable, lest unreasonably large force should be applied between the cable and the connector resulting in open-circuiting.
- (9) Note that the signal ground lines are not isolated, including the circuits up to the digital storage oscilloscope.

4. EXAMPLES OF OPERATIONS

- 1) Acquire data with the digital storage oscilloscope and transfer data to a computer. In this case the oscilloscope should be set and adjusted to the correct ranges and conditions.

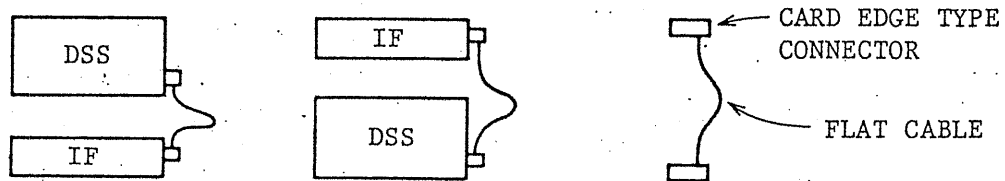
Preparation

1. Make sure that the powers of the devices are off. Make connections between the devices.



For connection between the interface and the oscilloscope, use the flat cable which has a 50-pin card-edge connector at each end. Pay attention to the polarity of the connectors.

When the two devices are stacked up, connections between them should be as one of the following two cases:



(As illustrated in the above, the flat cable should run upward from one device and downward from the other device. It should not run in the same directions from both devices.)

2. Set the select device code of the interface with the DIP SW 1 - 5 on the rear panel. If the device code is 1, throw SW1 to the ON position (bottom position).
3. Turn on the powers of the devices.

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4. Program the computer.

Example 1.

- 1. Specify a device: "R T S Q F"
(LISTEN)
-
- Remote
Reset and TRIG-READY
Local
Flag mode

Note that disparity may result between the TRIG point and the contents of memory if triggering is done within this period.

- 2. Specify a device and acquire the status of the flag.
(TALK)

- 3. IF F = 1 THEN 5.
↑
In the case of 1, indicates that the STORED state has been attained.

- 4. GOTO 2
(Monitor until the STORED state is attained)

- 5. Specify a device: "R A D"
-
- Remote
Data mode to read next data
When character A alone is specified, address 0 is used for the default.

- 6. FOR I = 0 TO 1023
↑ ↑
Address 0 Address 1023

- 7. Specify a device and acquire data.
(TALK)

- 8. Perform processing.

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-9. NEXT I.

-10. END

```
HP      10      IMAGE 3(B)
9826A   20      OUTPUT 702; "RTSQF"
9845    30      ENTER 702; F
        40      IF F=1 THEN 60
        50      GOTO 30
        60      OUTPUT 702; "RAD"
        70      FOR I=0 TO 1023
        80      ENTER 702 USING 10; D1, D2, D3
        90      D=(D2-48)*16+(D3-48)-128
       100      PRINT D
       110      NEXT I
       120      OUTPUT 702; "Q"
       130      END
```

Example 2.

To send data to a computer each time the digital storage oscilloscope is triggered, using SRQ.

- o Set the digital storage oscilloscope in the SINGLE-SWEEP mode.
- o Set the DIP SW 8 (RQS) on the rear panel of the interface to the ON state.

```
10      Z=0
20      N=0
30      ABORT 7
40      ASSIGN @ DEVICE TO 702
50      LOCAL @ DEVICE
60      OUTPUT 702; "RSTQ"
70      ON INTR 7. 5 GOSUB SRQ
80      MASK=2
90      ENABLE INTR 7; MASK
```

← IFC
Not required if DIP SW 6 is OFF.

Set program of interrupt

```

100  N=N+1
110  DISP N
120  IF Z=1 THEN 140
130  GOTO 100
140  Z=0
150  IMAGE 3(B)
160  OUTPUT 702; "SRAD"
170  FOR A=0 TO 1023
180  ENTER 702 USING 150: D1, D2, D3
190  D=(D2-48)*16+(D3-48)-128
200  PRINT D; ← To display data on
           screen
210  NEXT A
220  OUTPUT 702; "TQ"
230  GOTO 100
240  SRQ
250  SEND 7; UNL CMD 24
260  S=SPOLL (@ DEVICE)
270  IF BIT (S, 6)=1 THEN 290
280  GOTO 300
290  Z=1
300  ENABLE INTR 7; MASK
310  RETURN
320  END

```

This loop is to operate the computer separately until SRQ request is received. In this example, it makes up an addition loop of $N=N+1$.

Program for data acquisition

Subroutine for interrupt

- 2) To write data in memory of digital storage oscilloscope from computer (Hewlett-Packard 9826A, 9845, etc.)

Example 1

To send address and data for each data item.

```

10  IMAGE 4 (B)
20  IMAGE 5 (B)
30  OUTPUT 701; "RS"
40  INPUT "ADDRESS IN", A
50  A0 = INT (A/16)

```

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```

60   A1 = INT (A0/16)
70   A2 = INT (A0-A1*16)
80   A3 = INT (A-A0*16)
90   OUTPUT 701 USING 20; 65, A1+48, A2+48, A3+48, 66
100  INPUT "DATA IN", D      { If the center of scale is set to
110  D1 = INT (D/16)        { be zero, 105 D=D+128
120  D2 = INT (D-D1*16)
130  OUTPUT 701 USING 10; 68, D1+48, D2+48, 87
140  INPUT "NEXT DATA ? YES(=1), NO(=0)", J
150  IF J=1 THEN 40
160  IF J=0 THEN 180
170  GOTO 140
180  OUTPUT 701; "TQ"
190  END

```

Example 2.

To send data for each of addresses 0 to 1023.

```

10   IMAGE 4(B)
20   OUTPUT 701; "RSA"
30   FOR A=0 TO 1023
40   INPUT "DATA IN", D      { If the center of scale is set
50   D1 = INT (D/16)        { to be zero, 45 D=D+128
60   D2 = INT (D-D1*16)
70   OUTPUT 701 USING 10; 68, D1+48, D2+48, 87
80   NEXT A
90   OUTPUT 701; "TQ"
100  END

```

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