

**INSTRUCTION MANUAL**  
**RANDOM NOISE GENERATOR**  
**SF-06**



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<http://www.rion.co.jp/english/>



# Organization of this manual

This manual describes the features and operation of the Random Noise Generator SF-06. For information regarding the operation of other equipment in the case of incorporating the SF-06 into a measurement system with other equipment, always make sure to refer to the documentation of the other equipment. The section starting on page iii contains important information on safety. Be sure to read this part.

The manual contains the following sections.

## Outline

Gives basic information on the unit, including features, and a block diagram.

## Panel Explanation

Briefly identifies and explains all controls, indicators, connectors, and other parts of the unit.

## Preparations

Explains how to connect the AC power cord and how to connect the unit to other equipment.

## Power-Up

Describes the settings at power-on, including the factory default settings.

## Setup

Describes how to use the front-panel controls to make operation settings. Also gives information on how to use the ID switch.

## Serial Interface

Describes the serial interface that can be used to connect the unit to a computer.

## Specifications

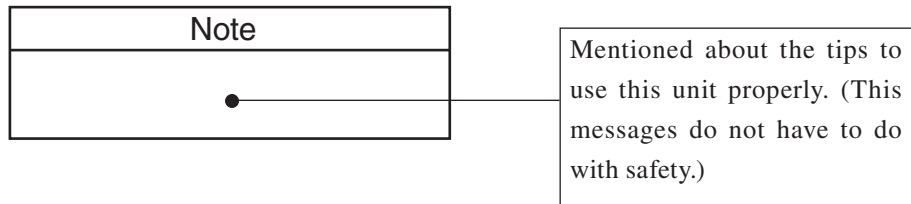
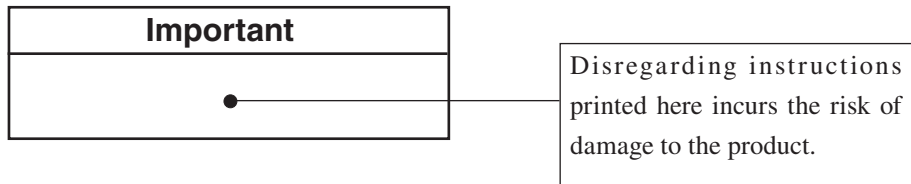
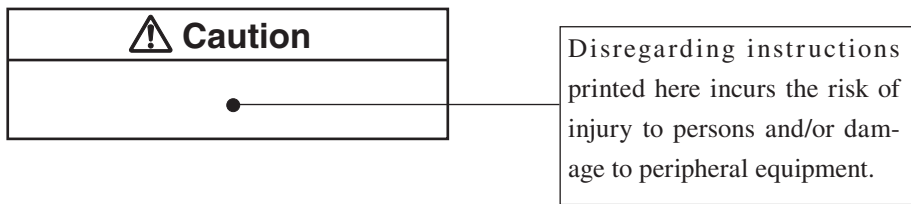
Lists the technical specifications of the unit.

- \* All company names and product names mentioned in this manual are trademarks or registered trademarks of their respective owners.



# FOR SAFETY

In this manual, important safety instructions are specially marked as shown below. To prevent the damage to the unit or peripheral equipment, make sure that all instructions are fully understood and observed.





# Precautions

- Operate the unit only as described in this manual.
- Take care not to drop the unit or subject it to shock and vibrations.
- Do not use or store the unit in locations which
  - may be subject to high levels of dust or splashes of water, or
  - may be subject to air with high salt or sulphur content, or to gases, or are in the vicinity of stored chemicals, or
  - may be subject to high temperature (over 50°C), high humidity (over 90% RH), or to direct sunlight, or
  - may be subject vibrations or shock.
- Do not forget to turn the unit off after use.
- Do not disassemble the unit or attempt internal alterations.
- Be sure to have the unit serviced regularly.
- Use only the supplied AC power cord with this unit. Using any other kind of power cord or AC cable can lead to malfunction and damage.
- In case of malfunction, do not attempt any repairs. Note the condition of the unit clearly and contact the supplier.
- When disconnecting cables, always hold the plug and do not pull the cable. Do not apply excessive force.
- Do not insert any wire or other metallic objects or conductive plastic objects into the openings on the unit, as this can lead to damage.
- When disposing of the unit, be sure to observe all applicable legal regulations and guidelines in your country and community.





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# Outline

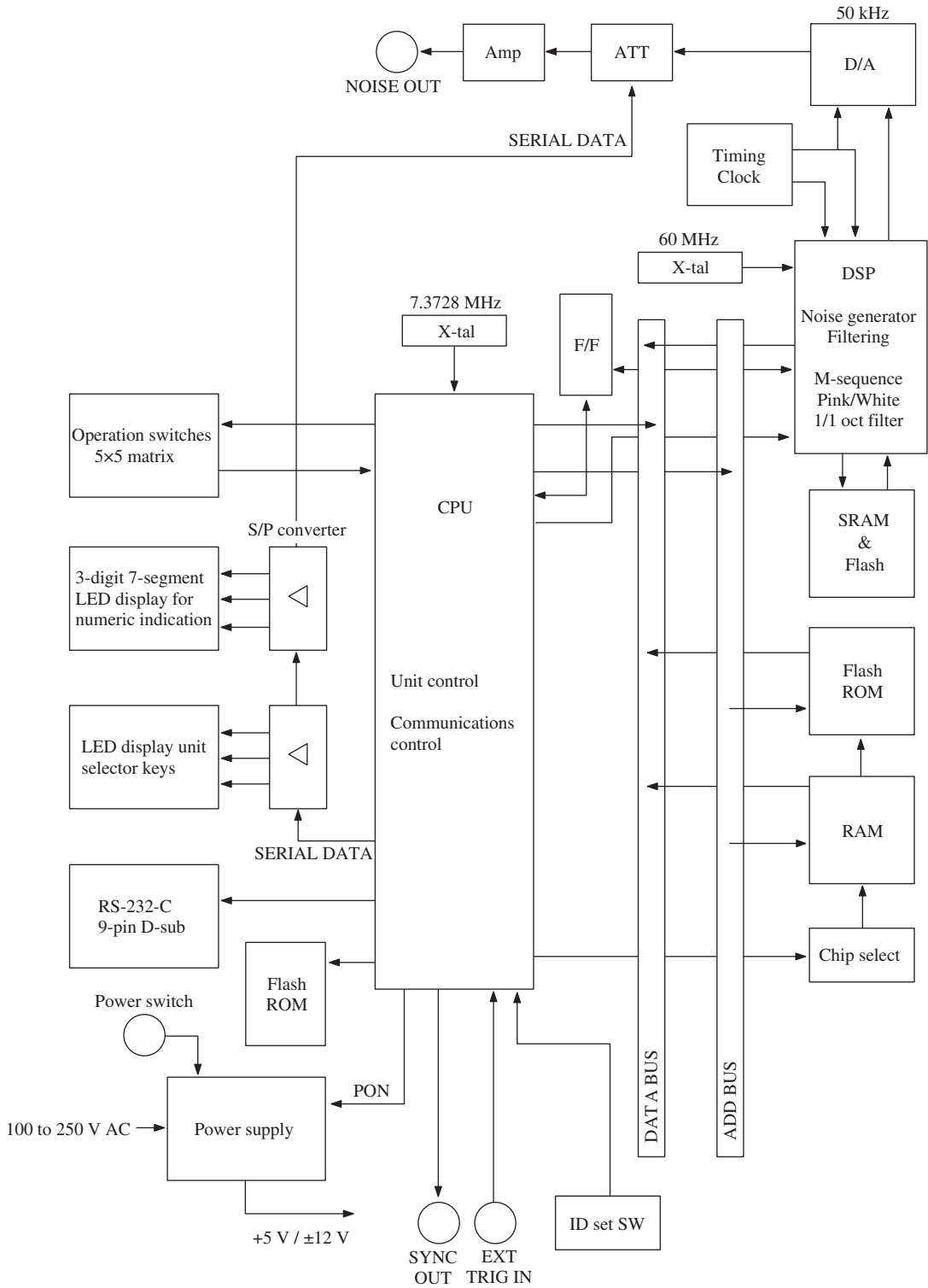
The SF-06 employs latest DSP (digital signal processor) technology to create white noise and pink noise from M-sequence pseudo random noise. Based on the white noise or pink noise, a 1/1 octave band filter produces band noise.

The white and pink noise spans the 20 Hz to 20 kHz frequency range. Octave band noise with center frequencies from 31.5 Hz to 8 kHz can be easily obtained by pushbutton selection. The SF-06 is designed for applications such as architectural acoustic measurements, sound absorption factor measurements in anechoic chambers, and sound insulation measurements.

The built-in serial interface allows control of the unit from a host computer.

## Features

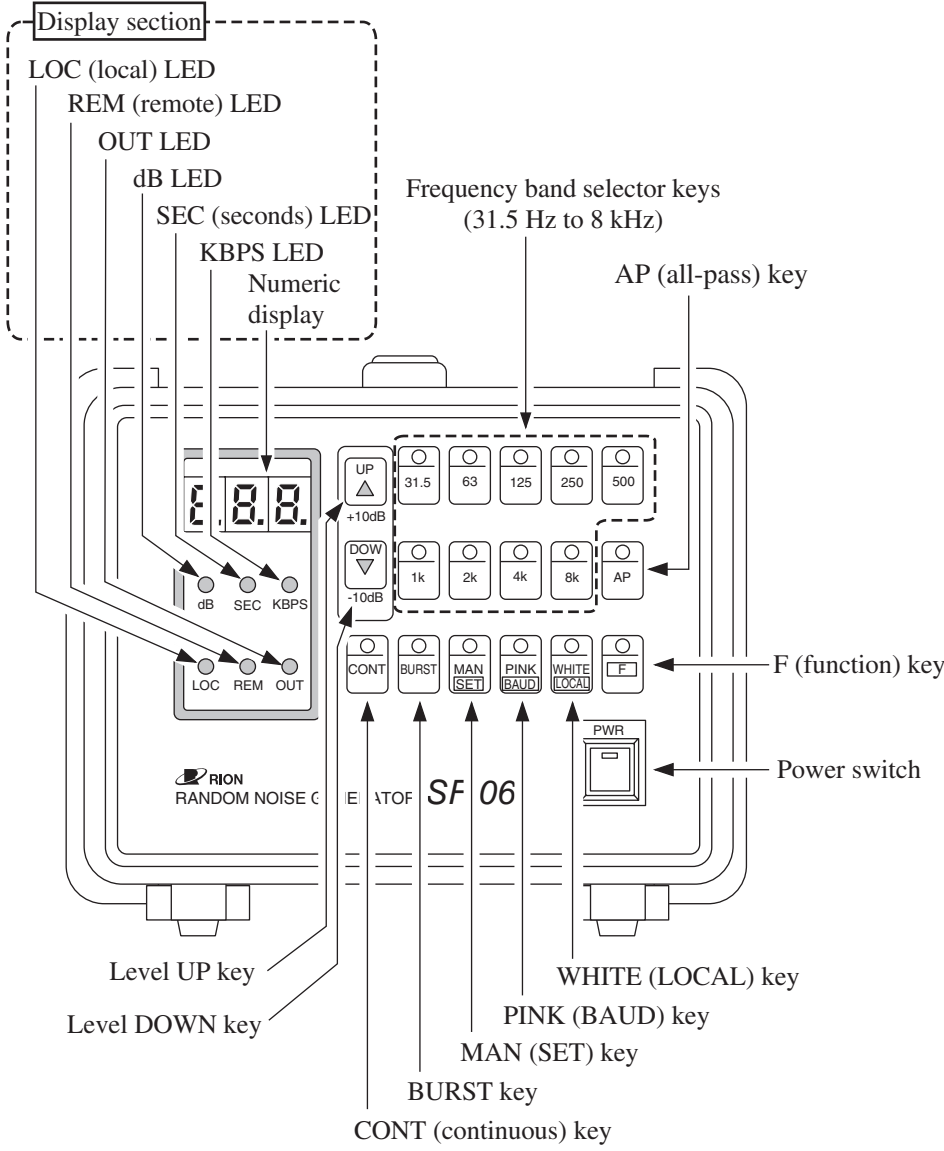
- White noise and pink noise based on M-sequence pseudo random noise
- M-sequence repeat cycle 12 hours with 50 kHz sequence clock
- Nine selectable 1/1 octave band filters with center frequencies from 31.5 Hz to 8 kHz
- Single band or multiple band output can be selected
- Choice of noise output control methods: continuous, burst, manual, external trigger



Block Diagram

# Panel Explanation

## Front Panel



## Display section

### Display

This 3-digit 7-segment LED display shows output level (attenuation), burst time, or baud rate. In normal operation, the current attenuation setting is shown.

### Unit and mode indicators

The top row of three LEDs indicates the unit for the value being shown on the display.

The bottom row of three LEDs indicates the operation mode.

### LOC (local) LED

Lights up when the unit is in local mode.

### REM (remote) LED

Lights up when the unit is in remote mode.

### OUT LED

Lights up while noise is being output and goes out while the output is inactive.

### dB LED

Lights up when the display shows the output level.

### SEC (seconds) LED

Lights up while the burst time is being set.

### KBPS LED

Lights up while the transfer (baud) rate is being set.

## Frequency band selector keys

31.5 Hz key, 63 Hz key, 125 Hz key, 250 Hz key, 500 Hz key, 1 kHz key, 2 kHz key, 4 kHz key, 8 kHz key

These keys activate the respective frequency band.

### AP (all-pass) key

Pressing this key selects full-range (20 Hz to 20 kHz) white or pink noise.

### F (function) key

This key is used in conjunction with other keys. If pressed by itself, the key has no effect.

**Power switch**

Serves to turn the unit on and off.

**WHITE (LOCAL) key**

Selects white noise.

In remote mode, pressing this key together with the F key sets the unit to local mode.

**PINK (BAUD) key**

Selects pink noise.

Pressing this key together with the F key sets the unit to the mode for setting the transfer (baud) rate.

**MAN (SET) key**

Selects manual output.

Pressing this key together with the F key sets the unit to the mode for setting the burst time.

**BURST key**

Selects burst mode (automatic output at preset intervals).

**CONT (continuous) key**

Selects continuous output.

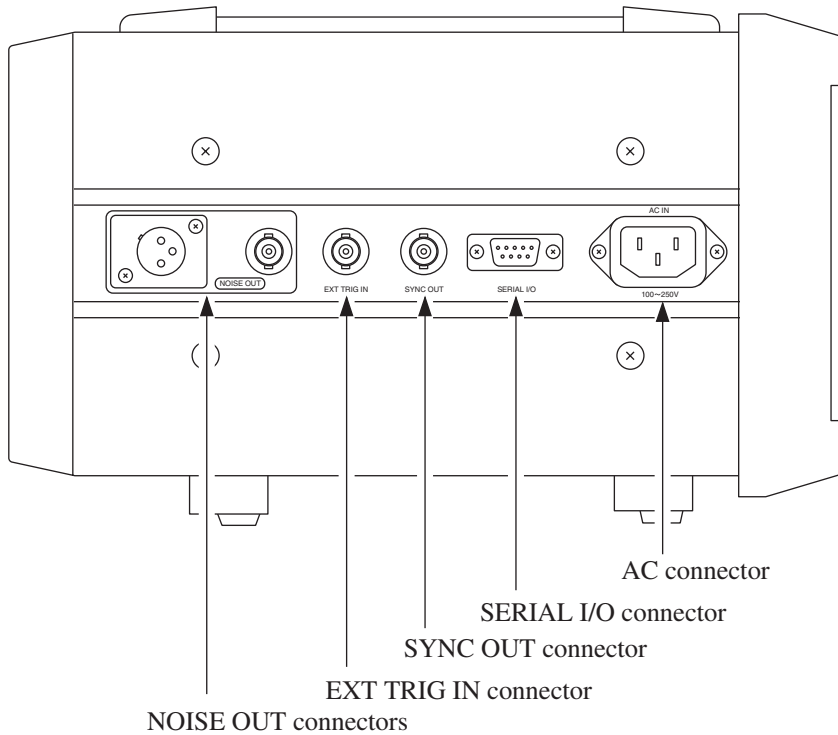
**Level UP key**

Serves to raise the output level or increase the numerical value when making a setting.

**Level DOWN key**

Serves to reduce the output level or decrease the numerical value when making a setting.

## Side Panel



### AC connector

Serves for connection to the AC power source (100 to 250 V, 50/60 Hz).

### SERIAL I/O connector

RS-232-C interface for connection to a computer.

### SYNC OUT connector

Synchronization output. While the noise output is active, this connector is at ground level. While the noise output is stopped, this connector is in the high-impedance state.

### EXT TRIG IN connector

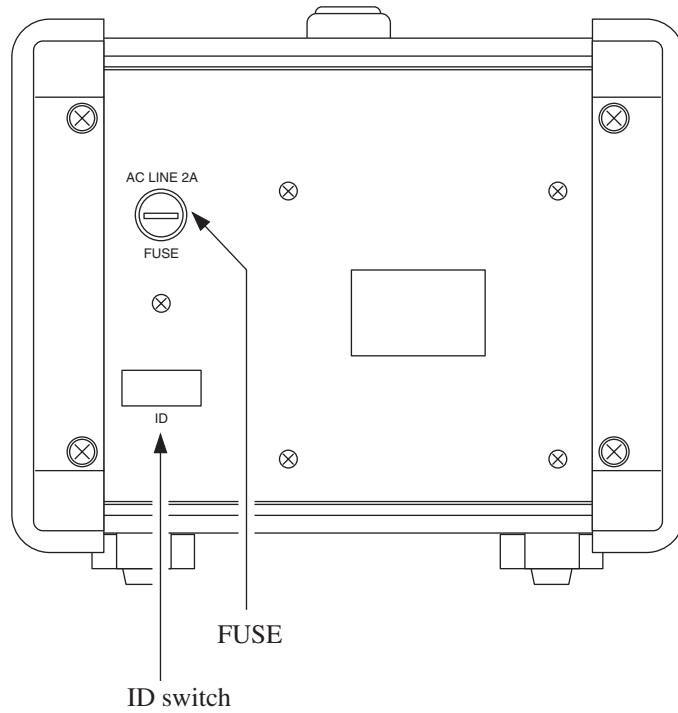
Control input. Allows external triggering through connection to an external switching circuit.

### NOISE OUT connectors

Noise output.



## Rear Panel



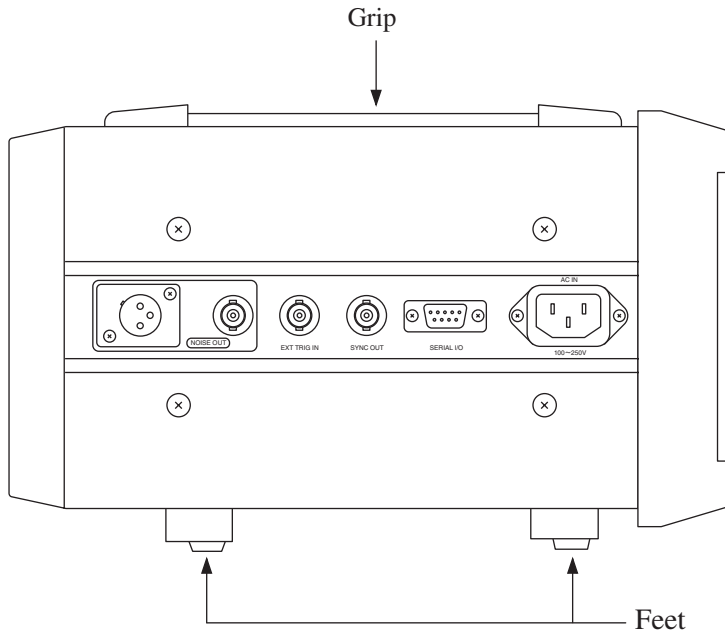
### FUSE

This fuse holder contains a 2-A fuse.

### ID switch

The DIP switch bank serves for setting the ID number (page 29).

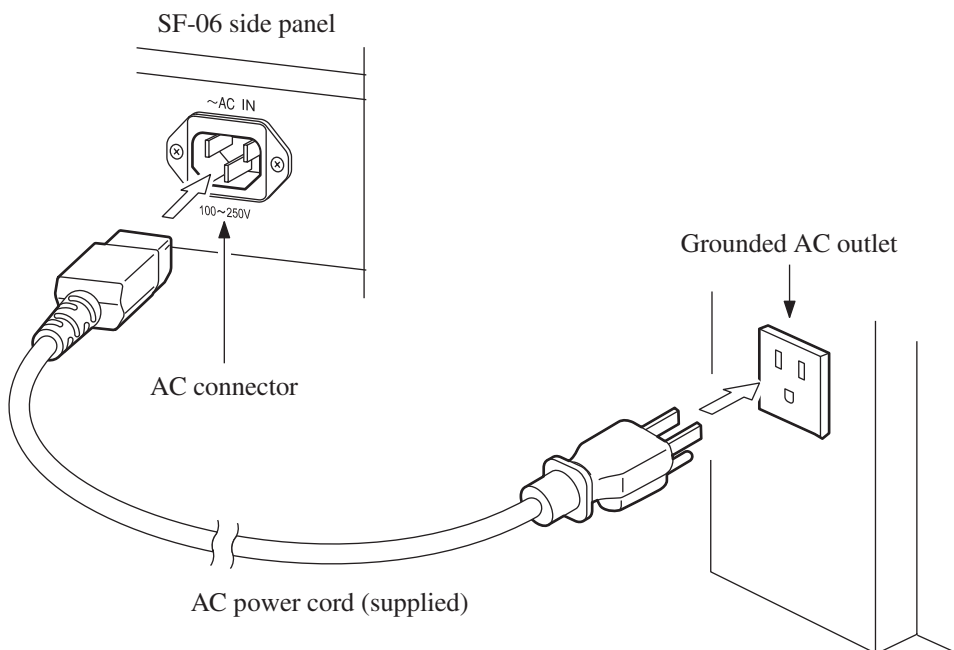
## Side View



# Preparations

## AC Power Cord Connection

1. Verify that the power switch of the SF-06 is turned off.
2. Plug the supplied AC power cord into the AC connector on the side panel.
3. Plug the other end of the AC power cord into a 100 V AC outlet.



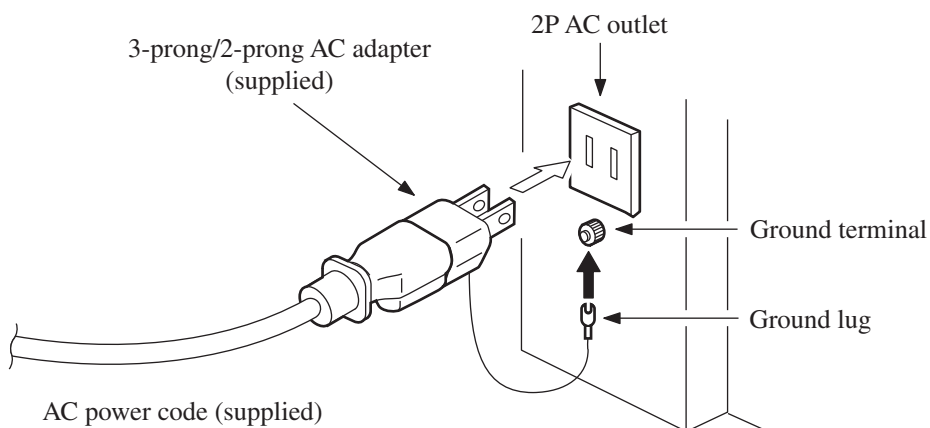
### Important

For safety, use only a grounded outlet.  
After use, be sure to disconnect the AC power cord from the AC outlet.

The supplied AC power cord is designed only for 100 V AC as used in Japan. Before using the unit in another country or with another AC voltage, contact your supplier.

If the AC outlet is a 2-pronged type with a ground terminal, use the supplied 3-prong/2-prong AC adapter for connection to the outlet.

<b>⚠ Caution</b>
Be sure to connect the ground lug of the adapter to the ground terminal on the outlet.

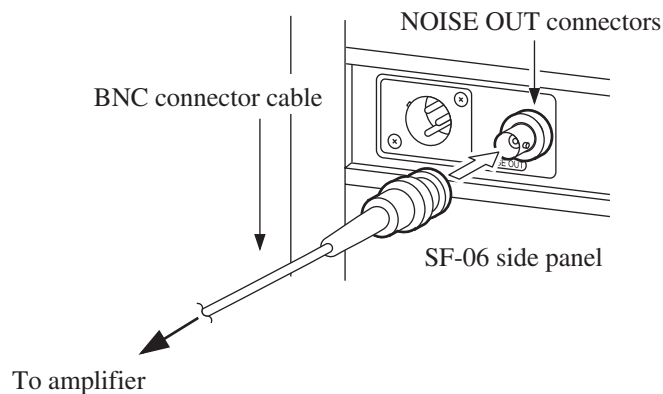
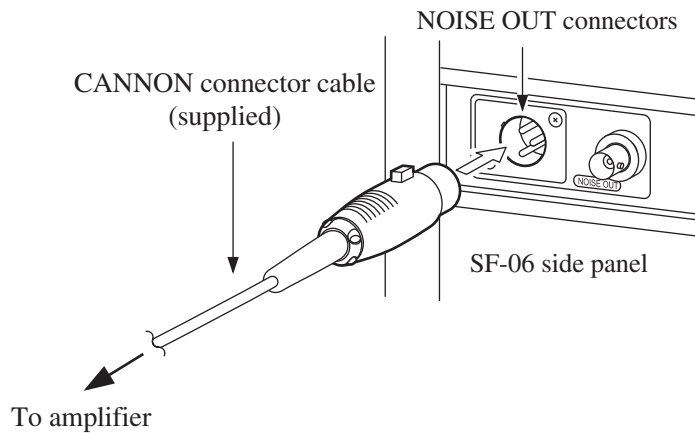


## External Equipment Connections

Before making any connections, verify that power to the SF-06 and all other equipment is turned off.

### Output amplifier connection

1. Set the power switch of the SF-06 and the amplifier to OFF.
2. Connect one of the NOISE OUT connectors on the side panel of the SF-06 to the input of the amplifier. Choose the required cable according to the input type of the amplifier, and plug the cable into the matching NOISE OUT connector on the SF-06.



## Connection to a host computer

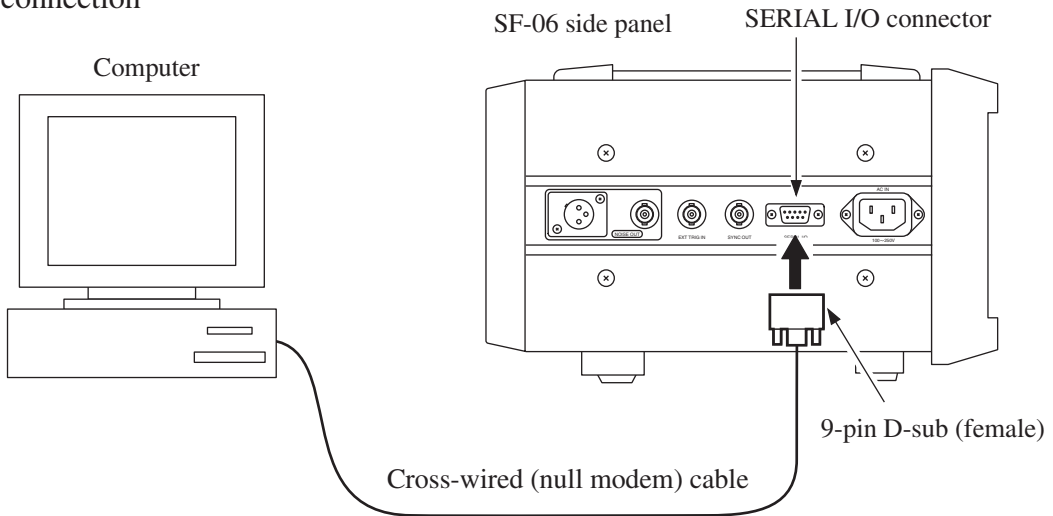
1. Set the power switch of the SF-06 and the computer to OFF.
2. Use a commercially available interface cable to connect the SERIAL I/O connector on the SF-06 to the serial interface on the computer.

Cable type: Cross-wired (null modem) cable  
 Connector at SF-06 side: 9-pin D-sub (male)

**Note**

For information on how to control the unit from a host computer, please refer to the section “Serial Interface” starting on page 30.

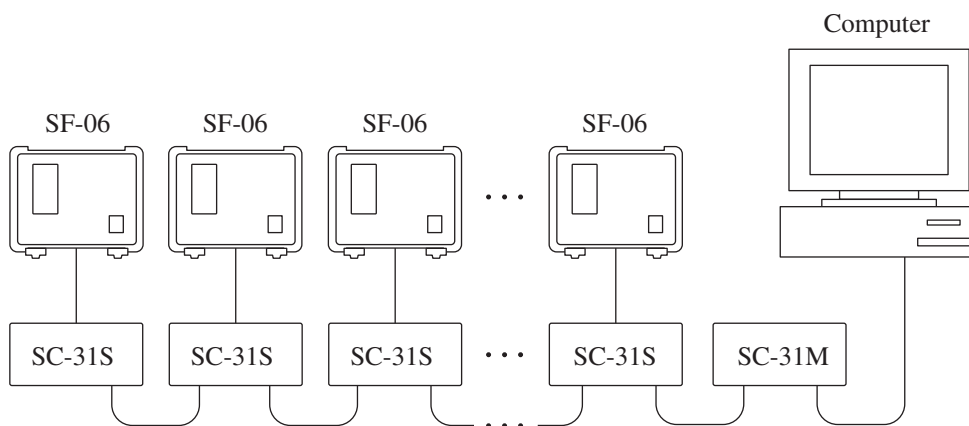
### 1:1 connection



### 1:N connection

You can connect multiple SF-06 units (up to 128) to a single host computer. In this case, the optional SC-31M/SC-31S adapters and LAN cables (generic 10BaseT cable) are required.

Note
LAN cable (generic 10BaseT cable) is not included in SC-31M/SC-31S.



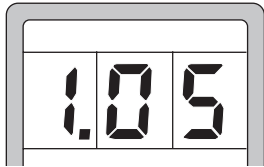
Maximum allowable wiring distance: 400 m

Note
Also when multiple SF-06 units are connected, communication with the computer occurs only on a 1:1 basis.

# Power-Up

Set the power switch to ON.

For 2 seconds, all LEDs light up, and the display shows the firmware version.



Display example

\*The indication shown here is only an example.  
Actual indication may differ.

When the unit is turned on for the first time, the default settings listed on the next page are established. In later use, the settings that were active before the unit was turned off will be established again.

The following settings are memorized by the unit.

- Selected frequency band
- Noise type (WHITE/PINK)
- Noise output control mode and burst time
- Transfer (baud) rate
- Attenuation (output) level setting

Note
If the level was higher than -30 dB at power-off, attenuation will be set to -30 dB the next time the unit is turned on. The remote mode/local mode setting becomes LOC (local), and the BURST key setting becomes ON.

Power to the unit can be turned OFF at any time.



## Initial Settings

The factory default settings are as listed below.

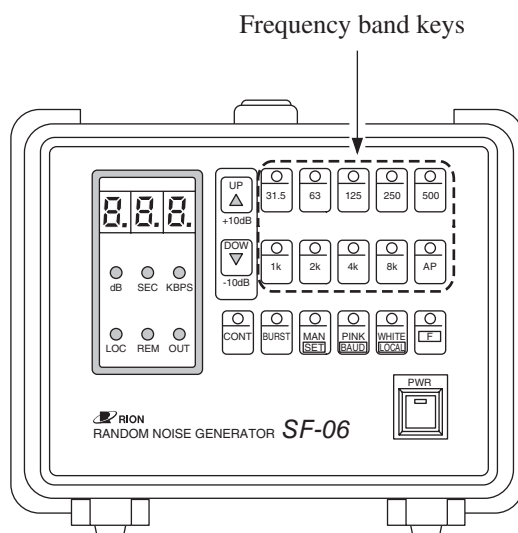
Output level:	-30 dB
Output band:	AP
Noise output control mode:	CONT (continuous)
Burst time setting:	2 seconds for ON and OFF
Noise type:	PINK
Transfer (baud) rate:	9.6 kbps
Remote/local mode:	LOC (local)

# Setup

This section explains how to use the various front-panel keys. When a key is to be pressed together with the F (function) key, this is expressed as “F + ×× key”.

A beep is heard every time a key is pressed.

## Selecting the Frequency Band



The keys indicated above select the frequency band for noise output.

There are 10 available settings: 31.5, 63, 125, 250, 500, 1 k, 2 k, 4 k, 8 k (Hz), AP (all-pass).

The 31.5 Hz to 8 kHz keys select the band, with a center frequency of 31.5 Hz to 8 kHz respectively.

The AP key cancels the 1/1 octave 9-band filter operation. When this key is pressed, the LEDs of all frequency band keys except the AP key go out, and white noise or pink noise is output over the entire frequency range.

## Selecting a single frequency

Press one of the frequency band keys. The LED of the key lights up.

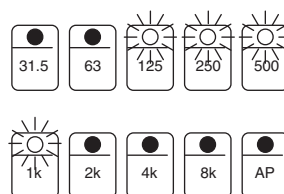
Pressing another frequency band key cancels the earlier selection, and the LED of the new key lights up.

## Selecting multiple frequencies

Press two frequency band keys simultaneously. The two frequency bands and all bands in between are activated, and the LEDs of the keys light up.

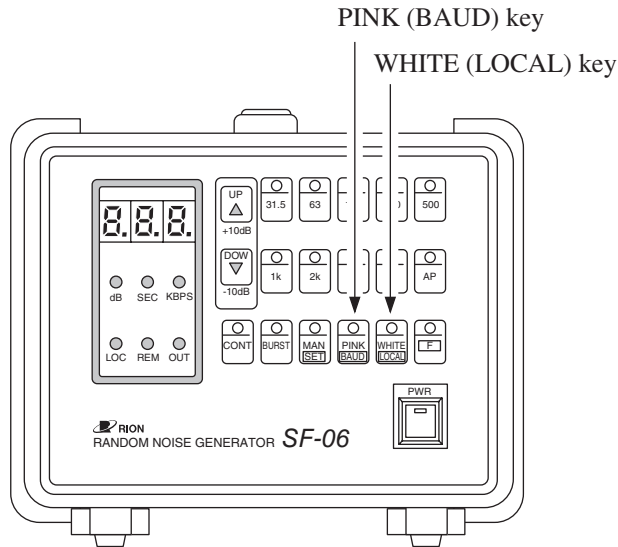
### Example

When 125 Hz key and 1 kHz key are pressed simultaneously, octave band noise from 125 Hz to 1 kHz is output.



LED indication example

## Selecting the Noise Type



The keys indicated above let you select the noise type.

To select white noise, press the WHITE (LOCAL) key. To select pink noise, press the PINK (BAUD) key. The respective LED lights up.

### Note

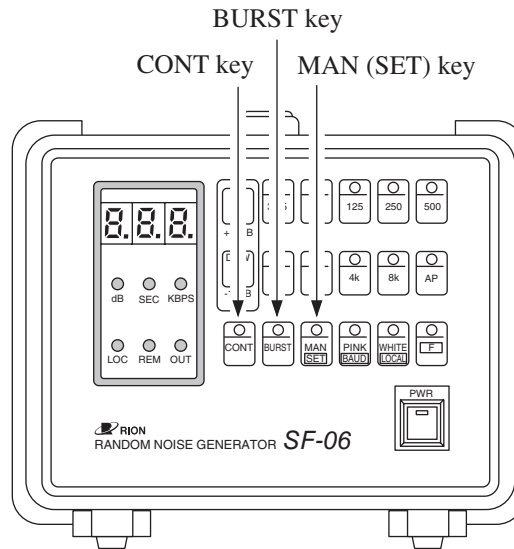
To prevent excessive signal output, the noise level setting is automatically reduced by 16 dB or set to -Lo (see page 22) when switching from pink noise to white noise. When switching from white noise to pink noise, the noise level setting is not altered.

## Noise type and other settings

The SF-06 can basically produce four types of noise, depending on the combination of noise type and frequency band settings.

- White noise
  - Frequency band: AP key
  - Noise type: WHITE (LOCAL) key
- Pink noise
  - Frequency band: AP key
  - Noise type: PINK (BAUD) key
- Band noise based on white noise
  - Frequency band: 31.5 Hz to 8 kHz key
  - Noise type: WHITE (LOCAL) key
- Band noise based on pink noise
  - Frequency band: 31.5 Hz to 8 kHz key
  - Noise type: PINK (BAUD) key

## Selecting the Noise Output Control Method



Noise output from the SF-06 can be either controlled on the unit itself (continuous, burst, manual) or switched via external equipment.

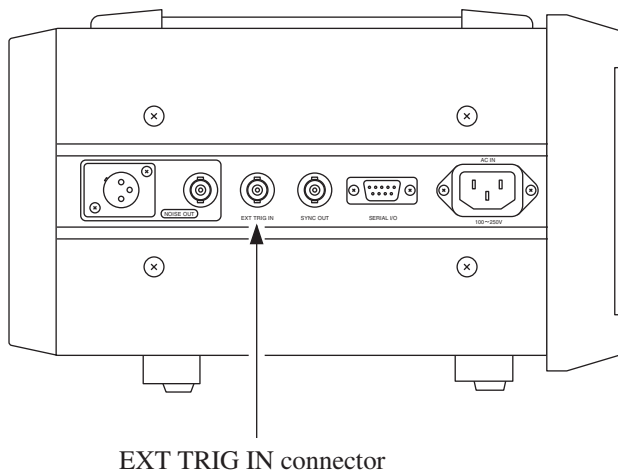
When continuous output is selected, noise is provided continually. In burst mode, noise output is automatically activated and turned off using preset ON and OFF intervals (burst time).

In manual mode, noise is output for as long as a certain key is depressed.

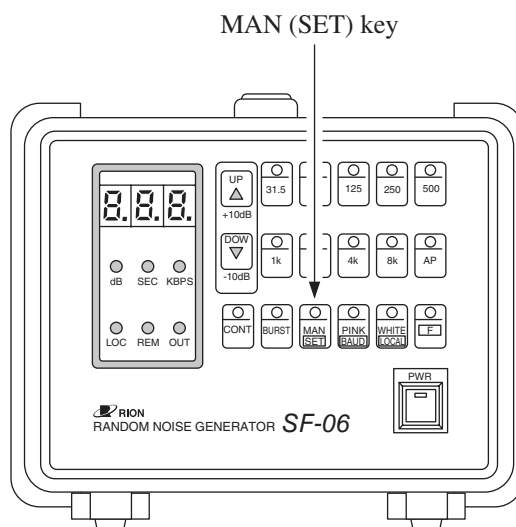
Select the mode by pressing one of the following three keys.

- **Continuous output**  
Press the CONT key. (The LED lights up.)
- **Burst mode**  
Press the BURST key. (The LED lights up.)  
The noise signal is output using the preset burst ON and OFF times.  
Before selecting this mode, you should make the burst time settings as described on page 24.
- **Manual mode**  
Press the MAN (SET) key. (The LED lights up.)  
The noise signal is output for as long as the key is held down. When the key is released, the noise output stops.

## Output Control With External Trigger



EXT TRIG IN connector



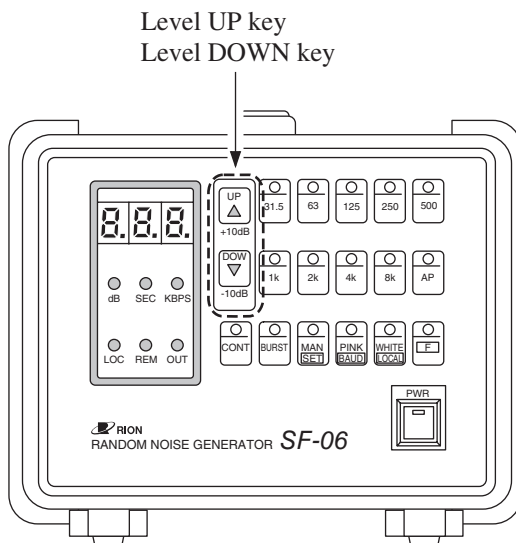
MAN (SET) key

The EXT TRIG IN connector on the side panel can be connected to an external circuit for control of noise output.

To use this function, first select the manual mode by pressing the MAN (SET) key on the SF-06.

Short-circuiting the EXT TRIG IN connector then causes the noise signal to be output, also when you release the MAN (SET) key. If you use the MAN (SET) key together with the EXT TRIG IN connector, the logical OR principle applies to external trigger and SF-06 key operation.

## Setting the Noise Level



You can set the output level (degree of attenuation) as follows.

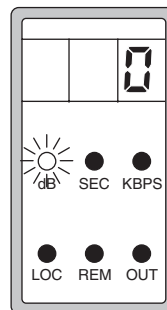
In the normal operation state, the display shows the current attenuation setting (the dB LED is lit).

By pressing the level UP ▲ or DOWN ▼ key, you can adjust the setting from 0 to -60 dB in 2-dB steps. The -Lo (lower limit) setting can also be selected. Press the level UP ▲ key to raise the attenuation level. Keeping the key depressed for more than 1 second causes a change in 5-dB steps per second. Pressing F + level UP ▲ key raises the attenuation level by 10 dB.

Press the level DOWN ▼ key to reduce the attenuation level. Keeping the key depressed for more than 1 second causes a change in 5-dB steps per second. Pressing F + level DOWN ▼ key decreases the attenuation level by 10 dB.

The display indication is shown on the right.

The numeric display reads 0, -2, -4, -6, ... -56, -58, -60, -Lo.



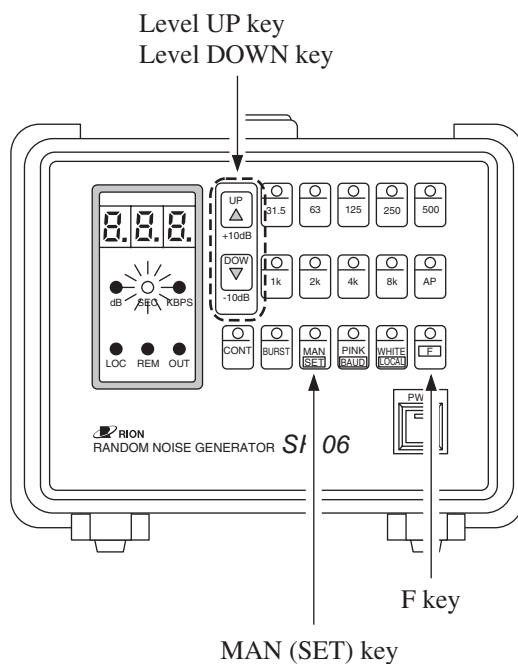
Display example



**Note**

To prevent excessive signal output, the noise level setting is automatically reduced by 16 dB or set to -Lo when switching from pink noise to white noise. When switching from white noise to pink noise, the noise level setting is not altered.

## Setting the Burst Time



To use the burst mode for automatic noise output at certain intervals, you can set the burst time (ON time and OFF time) as follows.

Press F + MAN (SET) key to activate the burst time setting mode.

The dB LED on the display section goes out and the SEC LED lights up.

The current ON time setting is shown on the display.

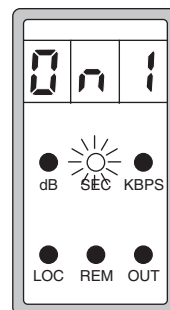
The ON time can be set in the range from 1 to 9 seconds. Press the level UP ▲ or DOWN ▼ key to adjust the setting. When the desired value is shown, press F + MAN (SET) key to accept the ON time and switch to the OFF time setting mode.

In the same way as for the ON time, use the level UP ▲ or DOWN ▼ key to adjust the setting for the OFF time in the range from 1 to 9 seconds. When the desired value is shown, press F + MAN (SET) key to accept the OFF time and switch back to normal operation. (The SEC LED goes out and the dB LED lights up again.)

The display indication is shown on the right.

#### ON time display example

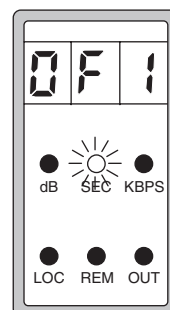
The display reads On1, On2, On3, On4, ... On8, On9.



Display example

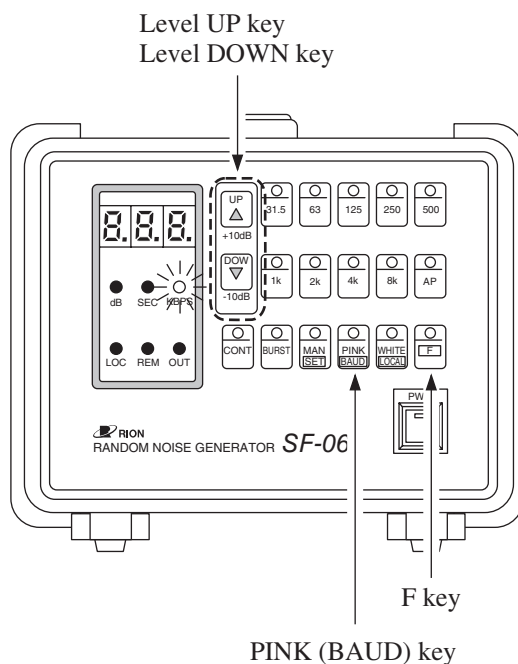
#### OFF time display example

The display reads OF1, OF2, OF3, OF4, ... OF8, OF9.



Display example

## Setting the Transfer Rate



To set the transfer (baud) rate for communication via the serial interface, proceed as follows.

Press F + PINK (BAUD) key to activate the transfer rate setting mode.

The dB LED on the display section goes out and the KBPS LED lights up.

The current transfer (baud) rate setting is shown on the display.

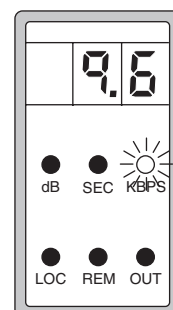
You can select from three settings: 9.6 kbps, 19.2 kbps, 38.4 kbps. (The unit used for the display is kbps.)

Press the level UP ▲ or DOWN ▼ key to adjust the setting. The indication changes in the order “9.6 → 19.2 → 38.4 → 9.6 ...”. When the desired value is shown, press F + PINK (BAUD) key to accept the setting and switch back to normal operation. (The KBPS LED goes out and the dB LED lights up again.)

The display indication is shown on the right.

Display example

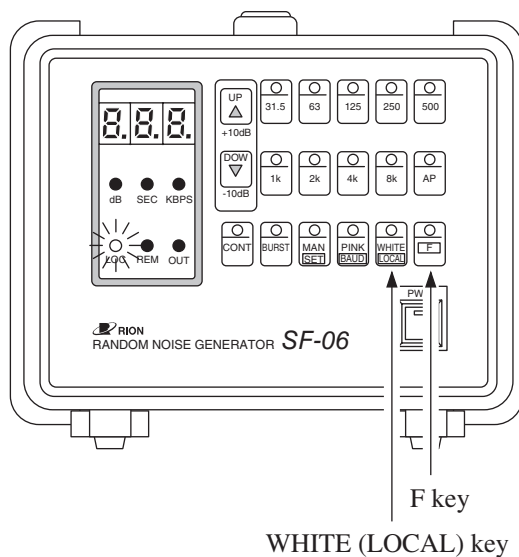
The display reads 9.6, 19.2, 38.4.



Display example

## Selecting Remote Mode/Local Mode

### Switching from remote mode to local mode



To switch from the remote mode (REM LED lit) to the local mode, press F + WHITE (LOCAL) key. The unit switches to local mode and the controls on the SF-06 are active again.

The REM LED goes out and the LOC LED lights up.

#### Note

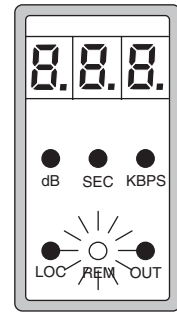
After switching from remote mode to local mode, the attenuation level setting will become -30 dB. However, if the previous attenuation setting was higher (meaning stronger attenuation), the level does not change.

## Switching from local mode to remote mode

The switchover from local mode to remote mode is performed under control of the host computer.

For details, please refer to the section “Serial Interface” starting on page 30.

In remote mode, the LOC LED is off and the REM LED is lit. The other LED indicators are on or off depending on the commands issued from the host computer.

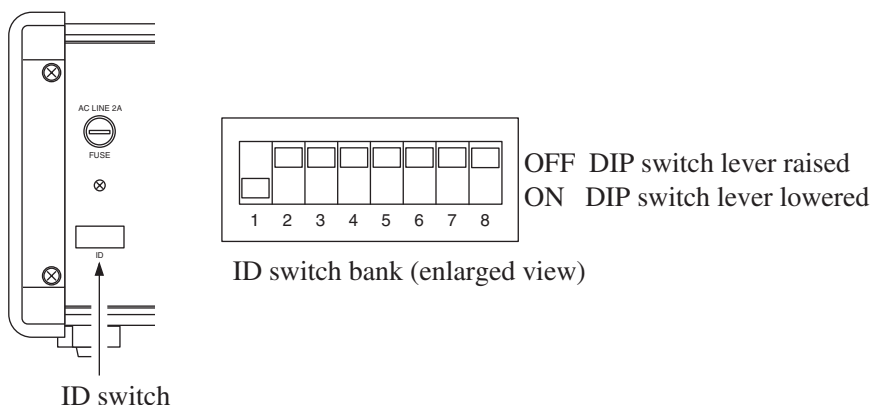


### Note

- In remote mode, only the F + WHITE (LOCAL) key combination is active. All other control keys on the SF-06 are inactive.
- EXT TRIG IN is active.
- Power ON/OFF switching can be performed.

## ID Setting

The ID switch (DIP switch bank) on the rear panel can be used to assign a unique ID number to the SF-06, for identifying the unit during communication with a host computer.



ID switch

In the above example, DIP switch 1 is set to ON (lever lowered) and DIP switches 2 to 8 are set to OFF (lever raised). This setting results in the ID number “1”. The ID number setting range is 00 to 7F in hexadecimal notation, which corresponds to 0 to 127 in decimal notation. The cumulative weighting of each DIP switch is indicated in the table below. Set the DIP switches to ON (lever lowered) to add up to the desired ID number.

DIP switch	Weighting	DIP switch	Weighting
1	1 ( $2^0$ )	5	16 ( $2^4$ )
2	2 ( $2^1$ )	6	32 ( $2^5$ )
3	4 ( $2^2$ )	7	64 ( $2^6$ )
4	8 ( $2^3$ )	8	*

\* DIP switch 8 serves for CTS control.

OFF (DIP switch lever raised): CTS control is enabled. (This setting should be selected in normal operation.)

ON (DIP switch lever lowered): CTS control is disabled. (This setting should be selected when the SF-06 is used together with the Rion SC-31S adapter.)

### Note

ID “00” (all DIP switch levers raised) is a prohibited setting (reserved code). If the “00” setting is chosen, this is read as “7F”.

# Serial Interface

The SF-06 incorporates a serial interface that can be used to control the settings of the SF-06 with commands sent from a host computer.

## Communication Parameters

The communication parameters of the SF-06 are listed below. Set up the host computer so that it matches these parameters.

Transfer principle and standard:	Half-duplex, RS-232-C, 9-pin D-sub connector
Transfer (baud) rate:	9.6 k, 19.2 k, 38.4 kbps
Data word length:	8 bit
Stop bits:	1
Parity:	None
Flow control:	None
Communication principle:	1 on 1 (identification of up to 255 stations via ID number possible)
Error correction:	Proprietary packet principle (up to 3 resends)
Transfer protocol:	Packet principle with proprietary sequence
Packet size:	1024 bytes



## Local Mode/Remote Mode

Switching between local mode and remote mode can be done from the remote station (computer). Communication via the RS-232-C interface is possible in either mode.

### Local mode

In this mode, the controls on the panel of the SF-06 or communication via the RS-232-C interface can be used to operate the unit.

### Remote mode

In this mode, the SF-06 operates in response to commands sent from a host computer. The controls on the panel of the SF-06 are inactive.

The RMT command is used to switch between local mode and remote mode.

Also while the SF-06 is in remote mode, the F + WHITE (LOCAL) key combination can be used to switch to local mode.

## When switching between local mode and remote mode

During mode switching, burst control is affected as follows.

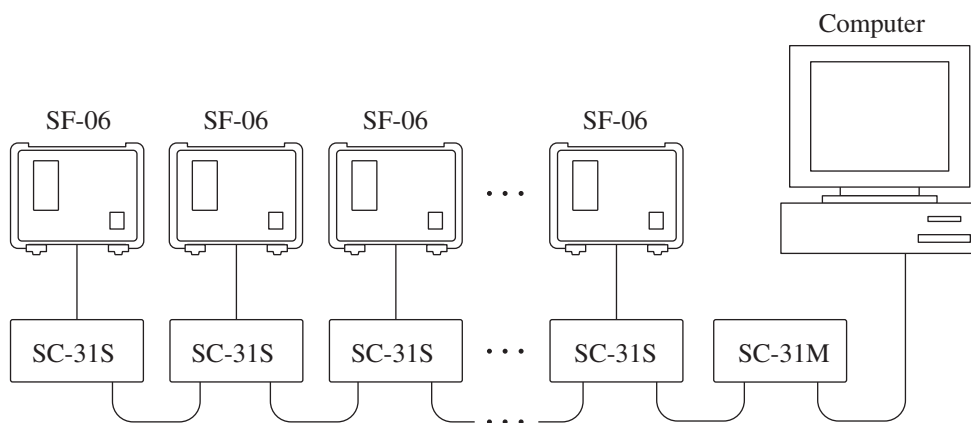
- (1) In local mode, the BSW command is inactive, and the setting is always BURST ON.
- (2) In remote mode, the BSW command is active, and control from the host computer is possible.
- (3) When switching from remote mode to local mode, the attenuation level setting will become -30 dB. However, if the previous attenuation setting was higher (meaning stronger attenuation), the level does not change. The BSW command is forced to ON.

## Communication With Multiple Units Using SC-31

Using the optional SC-31M/SC-31S adapters, it is possible to connect up to 128 SF-06 units to a single host computer.

### Connecting multiple (max. 128) SF-06 units to 1 computer

Use SC-31M/SC-31S adapters (option) and LAN cables (generic 10BaseT cable).



Maximum allowable wiring distance: 400 m

Note
LAN cable (generic 10BaseT cable) is not included in SC-31M/SC-31S.
Also when multiple SF-06 units are connected, communication with the host computer occurs only on a 1:1 basis.
<b>ID number setting</b> The ID number serves to identify a SF-06 unit when multiple units (max. 128) are connected to a single host computer. Therefore each SF-06 unit must be set to a unique ID number. The ID number setting is required also when only one SF-06 unit is connected to the host computer.

**Specifying one out of multiple connected units for communication**

1. Specify the ID number of the desired SF-06 unit and then issue the desired setting change or data request commands.
2. To switch to another SF-06 unit, specify the ID number of the new unit and then issue the desired setting change or data request commands.

Repeat this process for other units.

## Transfer Data Format

Communication between the SF-06 and the host computer uses the following codes and messages.

- Data link message
- Information message
- Acknowledge code
- Not acknowledge code
- Link cut code

### Data link message

This message packet specifies the ID number of the unit to be addressed. It has a fixed length (6 bytes).

DLE (10H)	EOT (04H)	ID	DLE (10H)	ENQ (05H)
1 byte	1 byte	2 byte	1 byte	1 byte

ID: ID number of SF-06 unit in 2-digit hex notation. 00H is prohibited. FFH stands for all ID numbers (broadcast mode).

### Information message

This is a message packet of variable length (max. 1030 bytes). (The size of the DATA part is variable.) When multiple packets are sent, the ETB segment indicates that there is a following packet. The last packet has ETX instead of ETB.

#### Following packet exists

DLE (10H)	ETX (02H)	DATA	DLE (10H)	ETB (17H)	BCC
1 byte	1 byte	Max.1024 bytes	1 byte	1 byte	2 byte

#### Last packet

DLE (10H)	ETX (02H)	DATA	DLE (10H)	ETX (03H)	BCC
1 byte	1 byte	Max.1024 bytes	1 byte	1 byte	2 byte

**DATA:** The body of the information message. Length is variable, with a maximum of 1024 bytes. The packet can contain either ASCII or binary codes. DLE in binary data is converted to DLE+DLE.

**BCC:** Block check code used for checksum processing. The checksum code contains the lower 16 bit of adding an ASCII code to each byte. The data from the start of the DATA part to ETB or ETX are included in the checksum. 16-bit checksum code is sent in the order lower byte, upper byte. For messages sent from the host computer to the SF-06, BCC can be any 2-byte character (because the SF-06 does not perform checksum processing).

### Acknowledge code

When a data link has been successfully established and when a received information message is correct, the receiver returns this 2-byte code to the sender.

DLE (10H)	ACK (06H)
1 byte	1 byte

### Not acknowledge code

When a received information message is incorrect (BCC error, data size exceeded), the receiver returns this 2-byte code to the sender.

DLE (10H)	NAK (15H)
1 byte	1 byte

### Link cut code

When the host computer terminates communication with this ID number, or when the SF-06 abandons communication due to timeout or exceeding the maximum retry count, this 2-byte code is sent.

DLE (10H)	EOT (04H)
1 byte	1 byte

## Transfer Procedure

This section describes the operation sequence that is used to transfer the data described in the “Transfer Data Format” section on page 34.

### Establish link

This is the stage where the host specifies the SF-06 unit with which to communicate. The step is necessary also for 1:1 communication with a single SF-06 unit. The ID number of the SF-06 (set with the ID switch on the unit) is specified. After establishing the link, any communication with other SF-06 units that were not specified is disregarded until the link is terminated. Once a link with a SF-06 unit has been established, the steps for cutting and reestablishing the link can be omitted, allowing consecutive command transmission and data reception (section framed by a dotted line in the illustration on page 38).

### Command send and acknowledge

The host sends one or several command messages. If the command is a command that requests data, the SF-06 returns an acknowledge message and waits for a response from the host. If this response is not received within 5 seconds, the SF-06 times out and cuts the link.

### Cut link

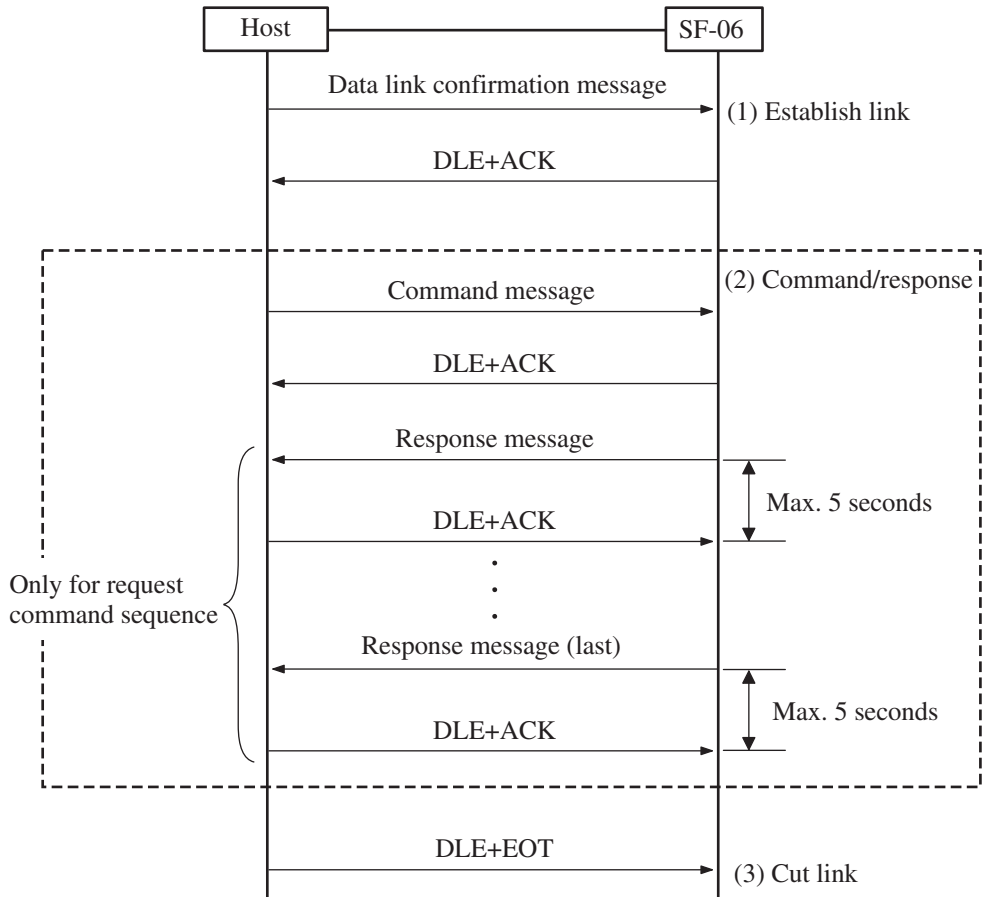
The cut link command (DLE+EOT) terminates the communication link with a SF-06 unit. It is used by the host after data transfer is completed, and it can be used by either side in case of a block error or timeout.

**Note**

A correct BCC (block check code) is appended to all messages sent from a SF-06 unit. The host can use these to test the validity of received messages. The SF-06 disregards the BCC contents of any message it receives. The BCC from the host therefore need not be correct. It should contain an arbitrary 2-byte code (for example "00"). However, the BCC may not be omitted.

The DLE code in the DATA section of response messages from the SF-06 is converted to DLE+DLE for sending. Therefore the length of the DATA section may reach 1025 bytes. At the host side, any occurrence of DLE+DLE in the received DATA section should be decoded to a 1-byte DLE.

## Normal sequence

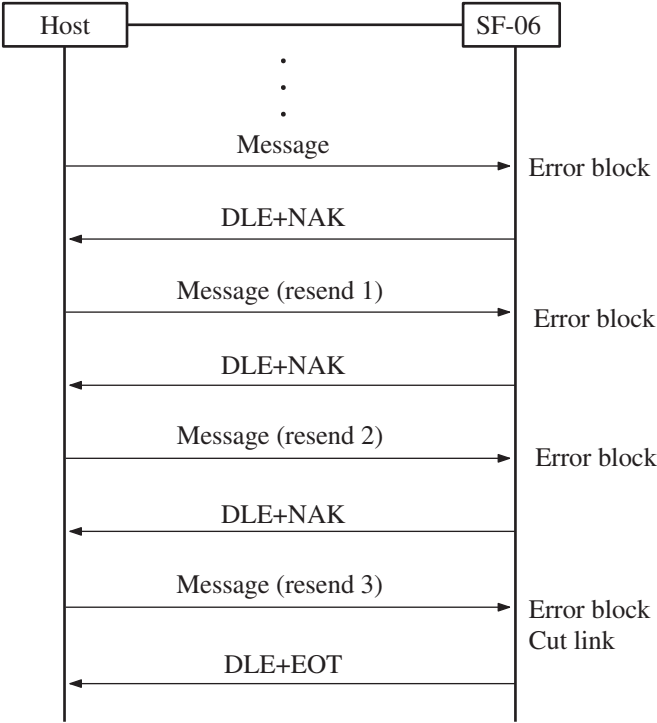


The area within the dotted line allows for consecutive simplified communication between SF-06 and host while the link is maintained.



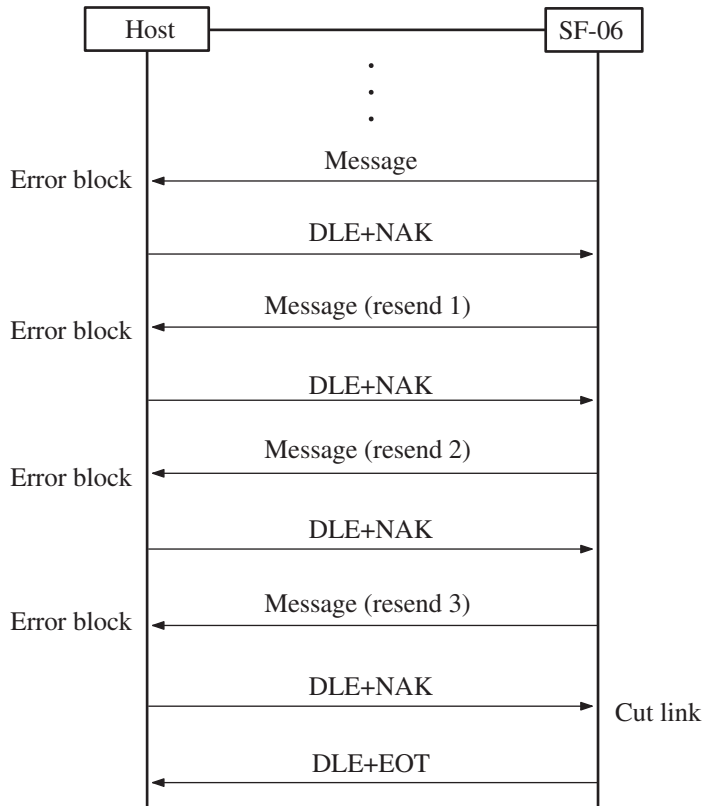
### Error sequence (block receive error)

When a message received by the SF-06 from the host is incorrect (block check code error, block length exceeded), a negative acknowledge message is returned up to 3 times. At the 4th time, the link is cut.



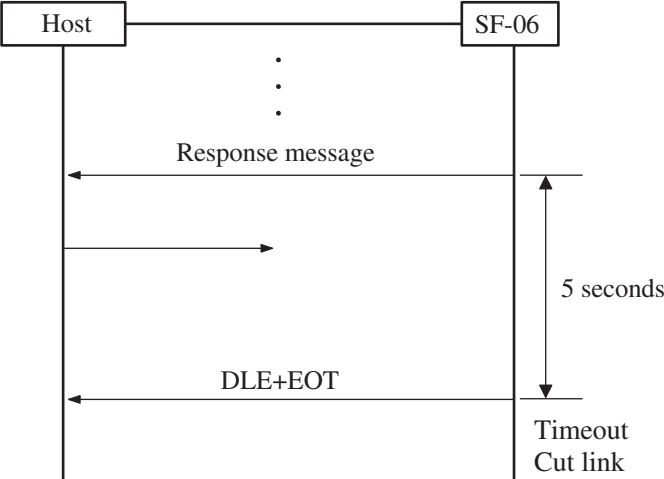
## Error sequence (resend request exceeded)

When the SF-06 receives a negative acknowledge response from the host, it resends the same data up to 3 times. At the 4th time, the link is cut.



### Error sequence (timeout)

When the SF-06 has sent a response message and receives nothing from the host for 5 seconds, it times out and cuts the link.



## Commands and Response Data

This section lists the actual contents of the DATA section of information messages mentioned in the “Transfer Data Format” section on page 34.

Command:	Information message sent from host to SF-06
Response data:	Information message sent from SF-06 to host in response to a command

### Command Types

#### Setting command

This type of command is used by the host to change settings and to control operation of the SF-06.

#### Request command

This type of command is sent to the SF-06 to obtain setting and status information. The command is terminated by a “?”.

## Command Format

Commands used by the SF-06 consist of the 3-byte command name (using letters A through Z) followed by one or several parameters. A parameter can consist of numerals “0” to “9”, “?”, “#”, or “.” (decimal point).

The command name and the parameter should be separated by a space (20H).

- Correct: LEV 10
- Correct: LEV ?
- Wrong: LEV10 (no space)
- Wrong: LEV? (no space)

When there are several parameters, a space (20H) should be used as separator.

- Correct: NOP 1 2
- Wrong: NOP 12 (no space)
- Wrong: NOP 1,2 (comma used as separator)

Multiple commands cannot be sent in one string.

- Wrong: LEV 10 NOP 1 2

Using a “#” as parameter specifies that the current value of the parameter should be maintained.

Example

NOB 1 # # #

(Noise type band setting is unchanged, but PINK noise is selected.)

## Response Data and Format

Response data are setup information data sent from the SF-06 in response to a command. The first item in the response data is the command error code. When this is other than “0” (normal), no further response data are sent. When there are multiple response data, a comma is used as separator.

Example

Command: “NOB ?” (noise type request)

Response: 0,1,1,1,3

Initial “0” indicates that command was processed normally. “1,1,1,3” indicates the current setting (PINK, BAND, LO=31.5 Hz, UP=125 Hz).

## Command Error Handling

When the SF-06 receives a command from the host, it sets the command error code. The host can check the command error code as follows.

### Result of a setting command

Use the “EST ?” command. This command will return the command error code of the immediately preceding command.

### Result of a request command

The SF-06 appends the command error code to the beginning of the response data. When this is other than “0” (normal), no further response data are sent.

### Command error codes

- 0: Command was executed normally.
- 2 to 4: Invalid command name
- 5: Setting command parameter is out of range.
- 6: Command cannot be executed. Parameter is out of range, or current operation status does not allow execution.
- 7: Request command parameter is out of range.

When the error code in the response from the SF-06 is 2 to 7, no response data are appended to the message.

## Command Description Conventions

Command parameters are denoted as “p1”, “p2” etc., with the numeral indicating the number of the parameter. The parameter of request commands (“?”) is shown as is.

Response data from the SF-06 are denoted as “d1”, “d2”, “d3” etc. When there are several parameters or data, character strings are delimited by commas. The error code is appended to the beginning of response data.

### Note

Indications such as “May not be used if ...” or “May not be used if p1 value is ...” should be followed (do not send the command in such cases). The same applies to instructions such as “Specify ... for p1 when using SF-06” (do not make other settings in such cases). Otherwise a command error will occur, or an unexpected setting will be established without warning. Specified parameters may not be omitted. Always add the specified number of parameters.

## List of Commands

### System commands

Command	Function	Page
VER	Get CPU software version	46
RMT	Get/Set local mode/remote mode	46
IDN	Get ID number	46
PDN	Get product number	46

### Operation control commands

Command	Function	Page
NOB	Get/Set noise type	47
LEV	Get/Set output level	48
NOP	Get/Set burst interval time	48
BSM	Get/Set burst mode	49
BSW	Get/Set burst switch setting	49

## Commands

### System commands

VER ?	Get CPU software version
Response data:	ERR, d1
d1:	n.n (version n.n)
RMT ?	Get local mode/remote mode setting
Response data:	ERR, d1
d1:	n (0: local mode      1: remote mode)
RMT p1	Set local mode/remote mode
p1:	n (0: local mode      1: remote mode)
IDN ?	Get ID number
Response data:	ERR, d1
d1:	nn (ID number nn: 00 to FF)
PDN ?	Get product number
Response data:	ERR, d1
d1:	06 (product number 06)



## Operation control commands

NOB ?	Get noise type		
Response data:	ERR, d1, d2, d3, d4		
d1:	n	(0: WHITE NOISE	1: PINK NOISE)
d2:	n	(0: AP 1: BAND	2: MULTI BAND)
d3:	n	(LOWER BAND	
		0: Reserved	1: 31.5 Hz
		2: 63 Hz	3: 125 Hz
		4: 250 Hz	5: 500 Hz
		6: 1 kHz	7: 2 kHz
		8: 4 kHz	9: 8 kHz
		10: A)	
d4:	n	(UPPER BAND	
		0: Reserved	1: 31.5 Hz
		2: 63 Hz	3: 125 Hz
		4: 250 Hz	5: 500 Hz
		6: 1 kHz	7: 2 kHz
		8: 4 kHz	9: 8 kHz
		10: A)	

NOB p1, p2, p3, p4	Set noise type
p1:	n (0: WHITE NOISE 1: PINK NOISE)
p2:	n (0: AP 1: BAND 2: MULTI BAND)
p3:	n (LOWER BAND 0: Reserved 1: 31.5 Hz 2: 63 Hz 3: 125 Hz 4: 250 Hz 5: 500 Hz 6: 1 kHz 7: 2 kHz 8: 4 kHz 9: 8 kHz)
p4:	n (UPPER BAND 0: Reserved 1: 31.5 Hz 2: 63 Hz 3: 125 Hz 4: 250 Hz 5: 500 Hz 6: 1 kHz 7: 2 kHz 8: 4 kHz 9: 8 kHz)
LEV ?	Get output level
Response data:	ERR, d1
d1:	nn (ATT level 00 to 60 and 99 for -∞)
LEV p1	Set output level
p1:	nn (ATT level 00 to 60 [even numbers only] and 99 for -∞)
NOP ?	Get burst interval time
Response data:	ERR, d1, d2
d1:	n (ON time 1 to 9)
d2:	n (OFF time 1 to 9)
NOP p1, p2	Set burst interval time
p1:	n (ON time 1 to 9)
p2:	n (OFF time 1 to 9)

BSM ?	Get burst mode
Response data:	ERR, d1
d1:	n (0: CONTINUOUS 1: BURST 2: MANUAL)
BSM p1	Set burst mode
p1:	n (0: CONTINUOUS 1: BURST 2: MANUAL)
BSW ?	Get burst switch setting
Response data:	ERR, d1
d1:	n (0: BURST OFF 1: BURST ON)
BSW p1	Set burst switch setting
p1:	n (0: BURST OFF 1: BURST ON)

## ID method

The ID number is an address that serves to identify the unit for communication purposes. It can be set from 00 to 7F (127) with the ID switch on the unit. The 00 setting is read by the CPU as 7F.

# Specifications

## Output frequency range

White noise, pink noise; bandwidth 20 Hz to 20 kHz

Octave bands 31.5, 63, 125, 250, 500, 1 k, 2 k, 4 k, 8 k (Hz)

Filter section: Octave band filters, compliant with IEC 61260 1995 Class 1

Output signal level Approx. 5.6 V<sub>rms</sub> (in WHITE AP position, with 0 dB attenuation)

Output level range 0 to -60 dB (variable in 2-dB steps)

Output connectors Noise output: BNC-P / XLR-3-32 (1 each)  
Output impedance: approx. 50 W

Noise generator DSP creates M-sequence pseudo random noise for pink or white noise  
Filter: 1/1 octave bandpass filter

All-pass White noise or pink noise from 20 Hz to 20 kHz

Octave band noise 31.5 Hz to 8 kHz, any single band or combination of multiple neighboring bands

Burst function CONT: Continuous output  
BURST: Automatic signal interruption  
MAN: Manual signal output control  
Individually selectable ON and OFF time; range 1 to 9 seconds  
External input: ON/OFF switching possible

## Display

7-segment LED display

3-digit 7-segment LED display shows attenuation, burst time, transfer rate (selectable)

Unit and control switch status LEDs

Individual LEDs show band and unit selection

## Communications

RS-232-C interface	9-pin D-sub connector
Transfer (baud) rate	9.6 k, 19.2 k, 38.4 k (bps), selectable
Data bits	8
Stop bit	1
Parity	None
Flow control	None
Principle	Block transfer according to protocol specifications
Memory functions	Internal nonvolatile memory stores the following settings
	Band selection
	Noise type (PINK/WHITE)
	Burst time and burst mode
	Transfer (baud) rate

## External I/O

EXT TRIG IN (control input)	Allows noise on/off control via external circuit
SYNC OUT (synchronization output)	At ground level during noise output, high impedance (open collector) in stop condition
ID setting	Rear-panel ID switch (DIP switch bank) for communications ID number setting Setting range 00 to 7F (00 to 127)

## Power requirements

Input voltage	100 to 250 V AC	50 to 60 Hz
Power consumption	approx. 20 VA	

## Ambient conditions for use

-10°C to +50°C, 30% to 90%RH (no condensation)

Dimensions	168 (H) × 198 (W) × 270 (D) mm
Weight	approx. 3 kg

## Supplied accessories

Storage box	SF-06-014	1
AC power cord	AA-38-222	1
3-prong/2-prong AC adapter	KPR-25	1
CANNON connector cable	SF-06-105	1
Instruction manual (including interface manual)		1
Inspection Certificate		1

## Optional accessory

Communications adapter	SC-31M/SC-31S
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Note
Commercially available LAN cable (generic 10BaseT cable) is necessary for SC-31M/SC-31S. Because LAN cable is not included in SC-31M/SC-31S.



