INSTALLATION MANUAL

VX-2000 series

PILOT TONE DETECTION MODULE WITH ANC VX-200SP ANC

Thank you for purchasing TOA's VX-2000 series plug-in modules.
Please carefully follow the instructions in this manual to ensure long, trouble-free use of your equipment.

TOA Corporation

TABLE OF CONTENTS

1.GENERAL DESCRIPTION

[VX-200SP ANC]

- The VX-200SP ANC is an audio signal output module of the VX-2000 system with speaker line pilot tone detection. This module is to be mounted in the VX-2000SF Surveillance Frame and detects speaker line short circuits, open circuits by monitoring for the presence of a pilot signal, and ground fault.

- The ANC Function automatically adjusts the amplifiers output volume in response to the change in ambient noise level. The output volume changes as the ambient noise level goes above the set reference level.

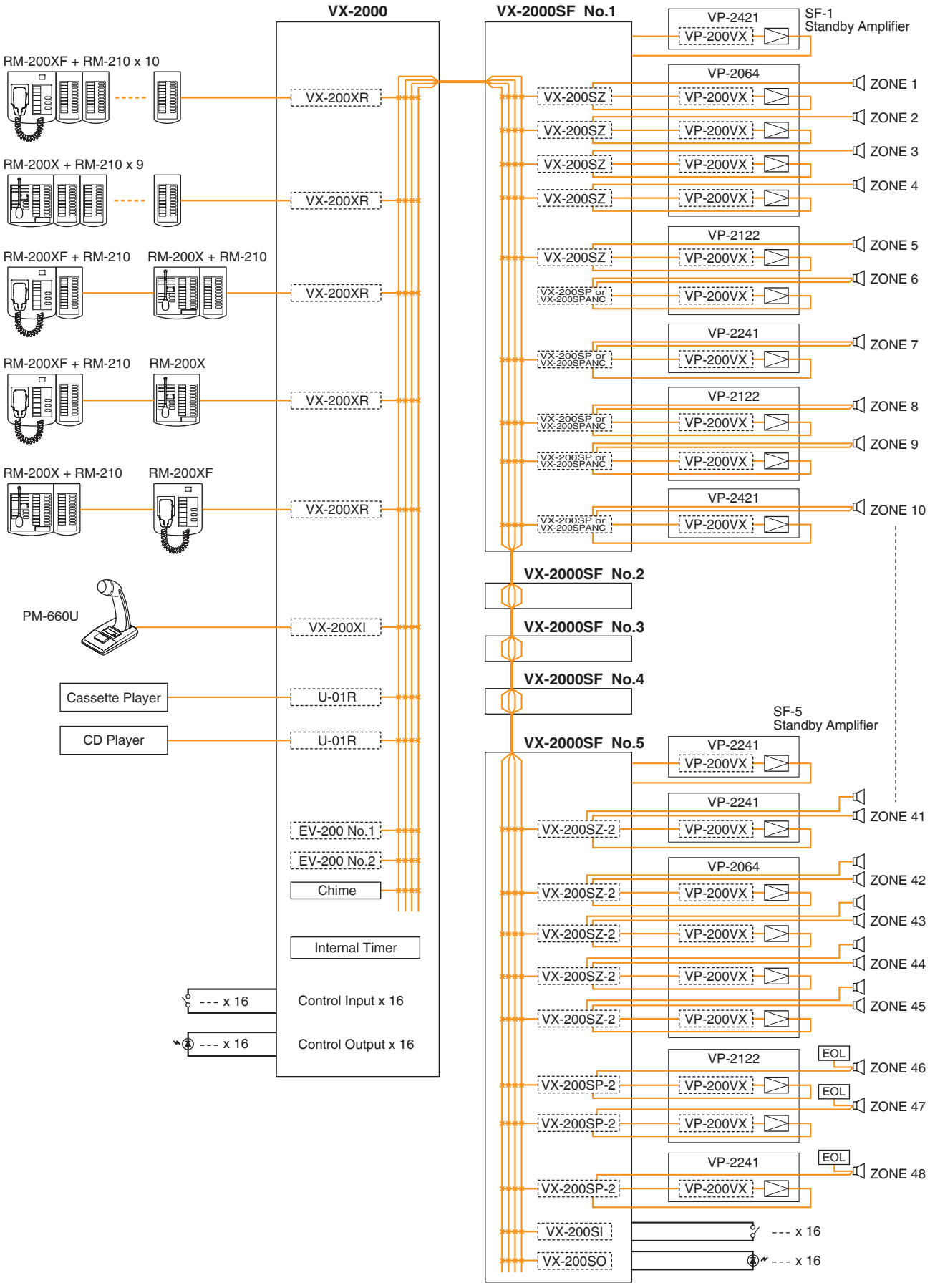
2. HANDLING PRECAUTIONS

- Do not install the unit in locations exposed to the direct sunlight or heaters, as the unit could be deformed or discolored.
- Avoid installing or storing the unit in dusty or humid locations, as doing otherwise could cause the unit's failure.
- Keep the unit as far away as possible from a fluorescent lamp, digital equipment, PC or other equipment which generate high frequency noise.
- Because each unit is not "hot-pluggable," the system needs to be shut down when it is installed or removed. For turning the system power off, refer to the VX-2000 series Instruction manual, p. 3-11.

3. MAXIMUM SYSTEM EXAMPLE

3.1. Block Diagram

The following block diagram shows the maximum sized system that can be assembled with the VX-2000 Series.



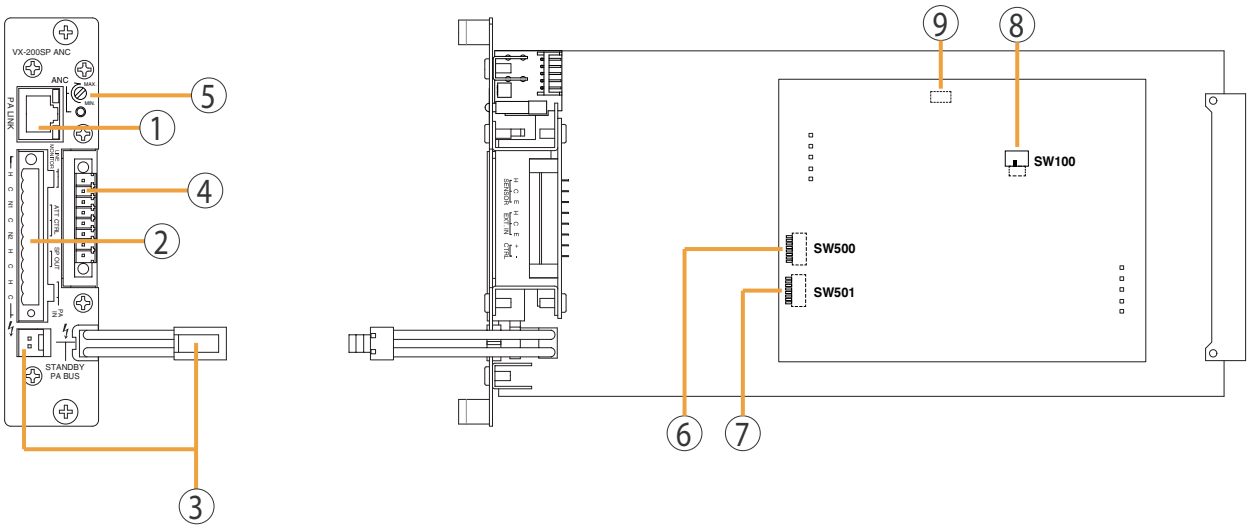
3.2. Maximum System Configuration Table

Component	Maximum No. of Units			
Input Source Equipment				
RM-200XF	4 units	4 units in total of Emergency-set models	8 units in total of both models	18 units in total of all Input Source Equipment
RM-200X	4 units ("Emergency" type)			
	8 units ("General" type)			
Paging Microphone and Music Sources (Cassette, CD, etc.)	8 units			
EV-200	2 units			
Chime (internal)	1 unit			
RM-200XF's and RM-200X's Function Key Extension				
RM-210	10 units (115 function keys) per RM-200XF	315 function keys per system		
	9 units (115 function keys) per RM-200X			
VX-2000				
VX-2000	1 unit			
Input Module (to be installed in VX-2000)				
VX-200XR VX-200XI 900 module	8 units in total of all Input Modules Usable 900 modules: M-01F, M-01M, M-01P, M-01S, M-01T, M-03P, M-51F, M-51S, M-51T, M-61F, M-61S, M-61T, U-01F, U-01P, U-01R, U-01S, U-01T, U-03R, U-03S, U-61S, and U-61T			
VX-2000SF				
VX-2000SF	8 units			
SF Module (to be installed in VX-2000SF)				
VX-200SP	80units	80 units in total of all SF Modules (10 units per VX-2000SF)		
VX-200SP-2	80units			
VX-200SP ANC	80units			
VX-200SZ	80units			
VX-200SZ-2	80units			
VX-200SI	7 units			
VX-200SO	7 units			
Optional Equalizer Card (to be installed in VX-200SP, VX-200SP-2, VX-200SZ and VX-200SZ-2)				
VX-200SE	80 units			
Control Input				
VX-2000	16 inputs (as standard equipment)	128 inputs in total		
VX-200SI	112 inputs (7 units)			
Control Output				
VX-2000	16 outputs (as standard equipment)	128 outputs in total		
VX-200SO	112 outputs (7 units)			
Power Amplifier	**Note:** The number and type of power amplifiers should be determined depending on the required speaker output for each zone.			
VP-2064 (4 ch) VP-2122 (2 ch) VP-2241 (1 ch) VP-2421 (1 ch)	80 channels (80 zones)			
Standby Amplifier	8 channels (1 channel per VX-2000SF)			
Power Amplifier Input Module				
VP-200VX	88 units in total of modules installed in Power and Standby Amplifiers			
Power Supply	**Note:** Necessary power capacity should be calculated based on total system specifications.			
VX-2000DS	16 units	2 units per VX-2000SF		
VX-200PS	48 units	3 units per VX-2000DS		
Battery	64 units	2 or 4 units per VX-2000DS		

4. NOMENCLATURE AND FUNCTIONS

Install this module in the VX-2000SF Surveillance Frame to detect speaker line short circuits, open circuits by monitoring for the presence of a pilot signal, and ground fault.
Please equate this module as the VX-200SP when setting it on the PC software.

[Front] **[Side]**



1. Power amplifier link connector [PA LINK]
This RJ45 connector connects to the PA LINK connector of the VP-200VX Power Amplifier input module
Both LEDs on this connector are not used.

2. VX-200SP ANC plug-in screw connector
Signal lines to be connected are shown below:

- **Line monitor input [LINE MONITOR]**
  Monitors connected speaker lines.
  Connect by wiring from the speaker line end.

- **External attenuator control[ATT CTRL]**
  Permits connection of a 3- or 4-wire system attenuator.
  For the attenuator connection, refer to P. 16

- **Speaker output [SP OUT]**
  Connects to the speaker.

- **Power amplifier input [PA IN]**
  Connects to the power amplifier's speaker output terminal.

3. Standby amplifier bus connector [STANDBY PA BUS]
Connects to all outputs of a single VX-2000SF unit to be switched over to the standby amplifier when the power amplifier fails. For details, refer to p.9-7 Standby Amplifier Connection.

4. Sensor/EXP input connector
Plug-in screw connector:8pins
Signal&control lines to be connected are shown below:

- **Sensor input [SENSOR]**
  Connects to ceiling mount microphone 'AN-9001' (option).
  Electronically balanced(H:hot,C:cold,E:earth)
  Sensitivity :-38,-32,-26,-20,-14,-8,-2,-38 to-10dB*(selectable/ DIP switch)
  →For details, refer to p.10
  The phantom power of +17V DC is supplied.
  Adapted model：Ceiling mount microphone : AN-9001 (Option)

- **EXT.input [EXT.IN]**
  Electronically balanced (H:hot,C:cold,E:earth)
  Sensitivity:-20dB/-10dB (when maximum gain)
  10kΩ
  Note: When CTRL terminal is open, this input is invalid.
  *0dB=1V

- **EXT.control [CTRL]**
  When this terminal (+,-) is short-circuit, EXT input is in operation and mute the signal from VX-2000SF AUDIO LINK IN.
  While the terminal is short-circuit, ANC function is not activated.
  While the terminal is open-circuit, ANC function is activated and EXT input is not in operation.

  No-voltage make contact input(+,-)
  Open voltage:DC5V or less, Short-circuits :5mA or less

5. ANC Sensor sensitivity adjustment volume&Indicator
Adjusts the input sensitivity of SENSOR input.
→For details, refer to p.10

6. ANC Sensor sensitivity adjustment switch [SW500]
Adjusts the input sensitivity of SENSOR input.
→For details, refer to p.11

7. Response time setting switch [SW501]
Adjusts the response time of ANC function
Attack time = 2sec.,10sec.,1min.
Release time＝30sec.,1min.,5min.
→For details, refer to p.9

8. Gain ratio setting switch [SW100]
Adjusts the gain ratio of ANC function.
Ambient noise vs. Output signal level
Select the ratio of ambient noise vs. output signal level with this slide switch to (3:3) or (3:6).

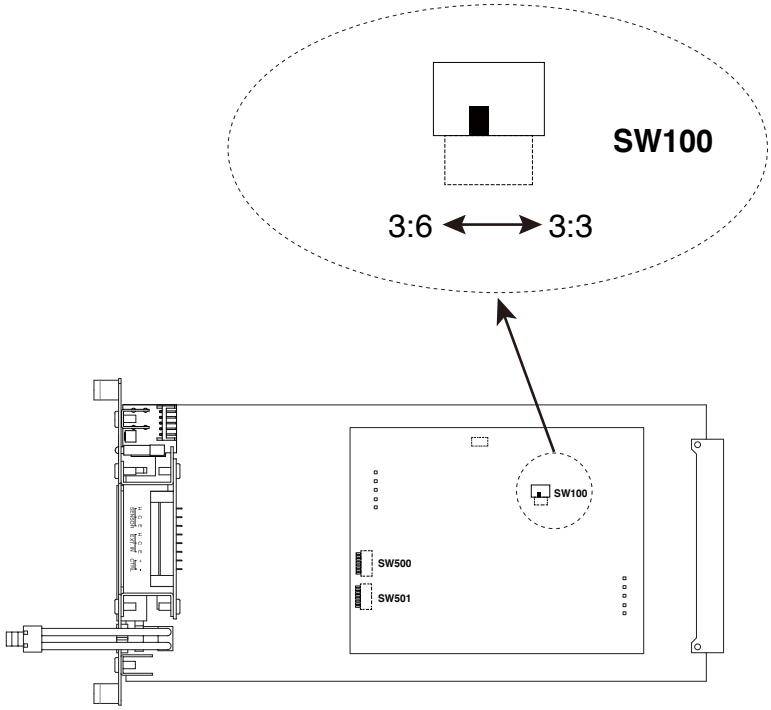
9.EXT.input sensitivity setting [CN1]
header “ON” :-20dBV (factory setting)
header “OFF” :-10dBV

5.SETTINGS

5.1.Gain ratio setting

Adjust the ratio of ambient noise level variation to output level variation.
Adjustable range= 3:3 or 3:6

Slide switch 'SW100'



For example, if the ratio between N (ambient noise) and S (output signal level) is set to 3:3, the output volume level goes up by 3dB when the ambient noise level increases by 3dB. Gain step is shown in the following tables.

SETTING N:S=3:3	
N(dB)	S(dB)
+3	-18
+6	-15
+9	-12
+12	-9
+15	-6
+18	-3
+21	0

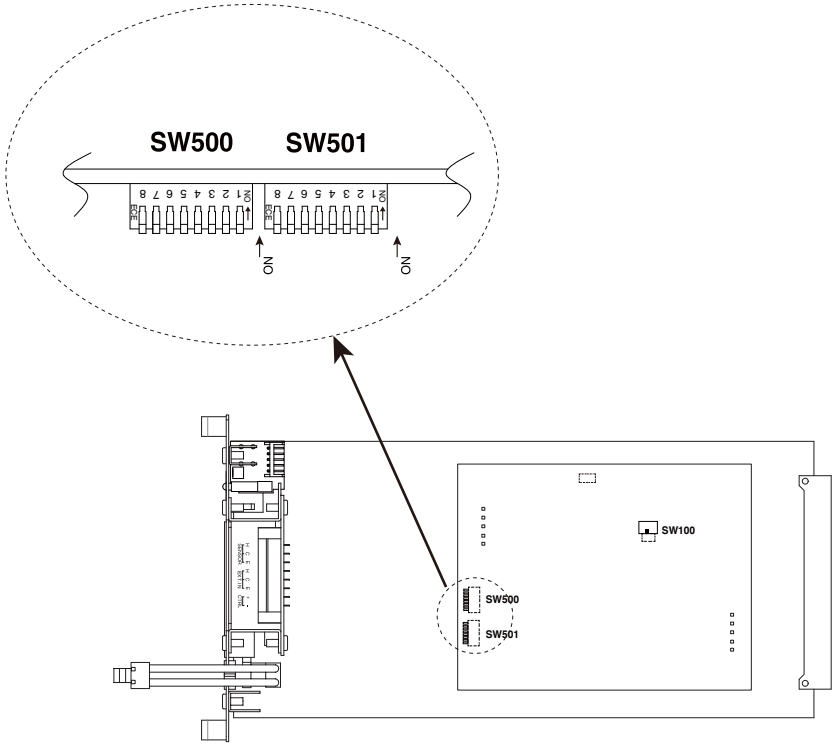
SETTING N:S=3:6	
N(dB)	S(dB)
+3	-15
+6	-9
+9	-3
+12 . . .	0

Note 1. Default (presetting) N:S=3:3
Note 2. Maximum gain : 0dB (Fixed)
Note 3. Minimum gain : -21dB (Fixed)

5.2.Response time setting

Set the average time required to detect the ambient noise levels with the sensor microphone.
Adjustable range is as follows.

Attack time＝2sec.,10sec.,1min.
Release time＝30sec.,1min.,5min.



Dip switch 'SW501'

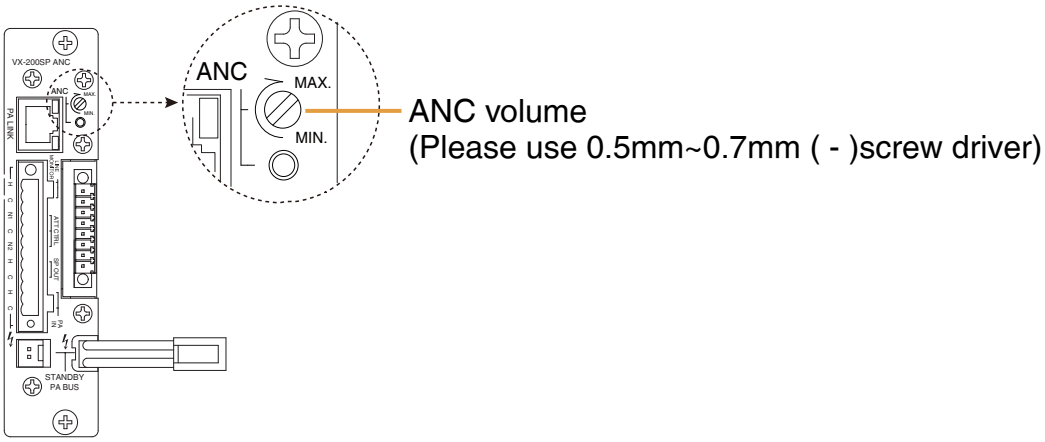
	ATTACK TIME			RELEASE TIME		
SW501 NO.	1	2	1&2	3	4	3&4
POSITION	ON(ONLY ONE)		OFF	ON(ONLY ONE)		OFF
TIME	2SEC.	10SEC.	1MIN.	30SEC.	1MIN.	5MIN.

Note . Default (factory setting)
Attack time＝2sec(SW501 NO.1:ON)
Release time＝30sec(SW501 NO.3:ON)

5.3.Sensor sensitivity setting

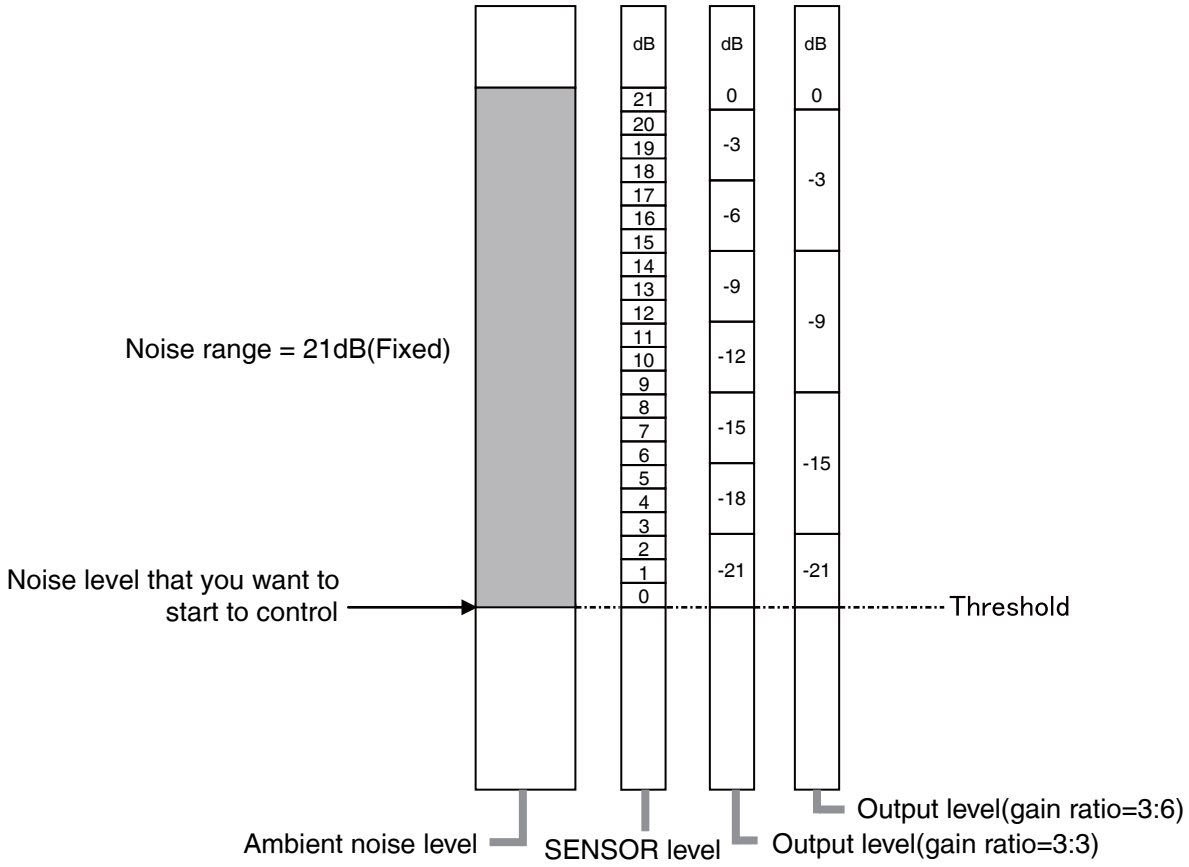
5.3.1.Setting with ANC volume

Adjust the input sensitivity for SENSOR input with ANC volume on front panel.

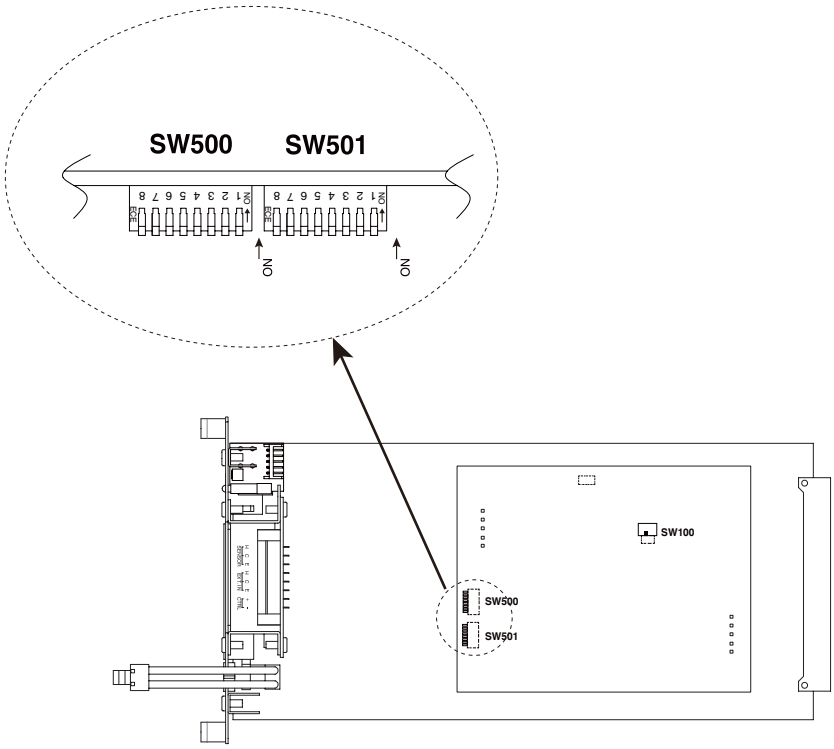


Note.
Adjustment procedure is as below.
Initial condition : EXT terminals : Open, no audio signal from VX-200SF

When the audio signal is fed from VX-2000SF AUDIO LINK IN, or the CTRL terminal is short-circuit, the noise input from SENSOR is terminated. In this condition, correct adjustment is not available.
Adjust the sensor input level through monitoring ANC indicator. When the Sensor input level over the threshold level, ANC indicator turns on.



5.3.2. ANC Sensor sensitivity adjustment switch[SW500]



SENSOR input sensitivity									
SW500 NO.	1	2	3	4	5	6	7	8	ALL
Position	ON(only one)								OFF
(dB)	−38	−32	−26	−20	−14	−8	−2 (N.C.)	−38 to −10 (ANC volume : available)	−2

5.3.3.Check output signal from EXT.IN or VX-2000SF

When the audio signal is fed from VX-2000SF, or the CTRL terminal is short-circuit, the noise input from SENSOR is terminated. At this configuration, the function of ANC indicator is changed to output indicator from sense indicator.
NOTE : It takes about 5 seconds for the change of the function from output indicator to sense indicator.

[Function of ANC indicator]

	Indicator for Adjustment	Indicator for Output gain
Condition	CTRL(+,-):open circuits AND No audio Signal from VX-2000SF AUDIO LINK IN	CTRL(+,-):short circuits OR Available audio signal from VX-2000SF AUDIO LINK IN
Operation	Under threshold level : OFF Over threshold level : Light on	gain= -21dB : OFF -18dB-Under maximum gain : Light on Maximum gain : Flashing

Confirm the output audio signal in the case of the maximum ambient noise and minimum ambient noise through monitoring the output indicator.

・Adjust the input signal level not distorted and not make foldback in the case of maximum ambient noise level. If output indicator is flashing, the gain of this unit is 0dB.

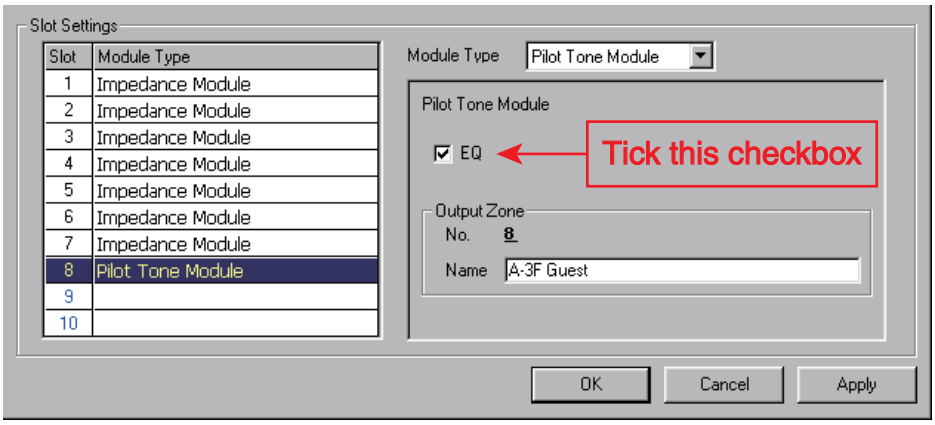
・Confirm the output audio signal is appropriate level at minimum ambient noise condition. If output indicator is off, the gain of this unit is -21dB

5.4.Software setting

For the setting instructions, refer to P.7-15 3)"Pilot tone module"(PC software offline settings).
Tick the EQ checkbox.

3) Pilot Tone Module

Refers to the VX-200SP Pilot Tone Detection module.



• EQ: When using the VX-200SE Equalizer Card, tick this checkbox.
When using the VX-200SP ANC, tick this checkbox.

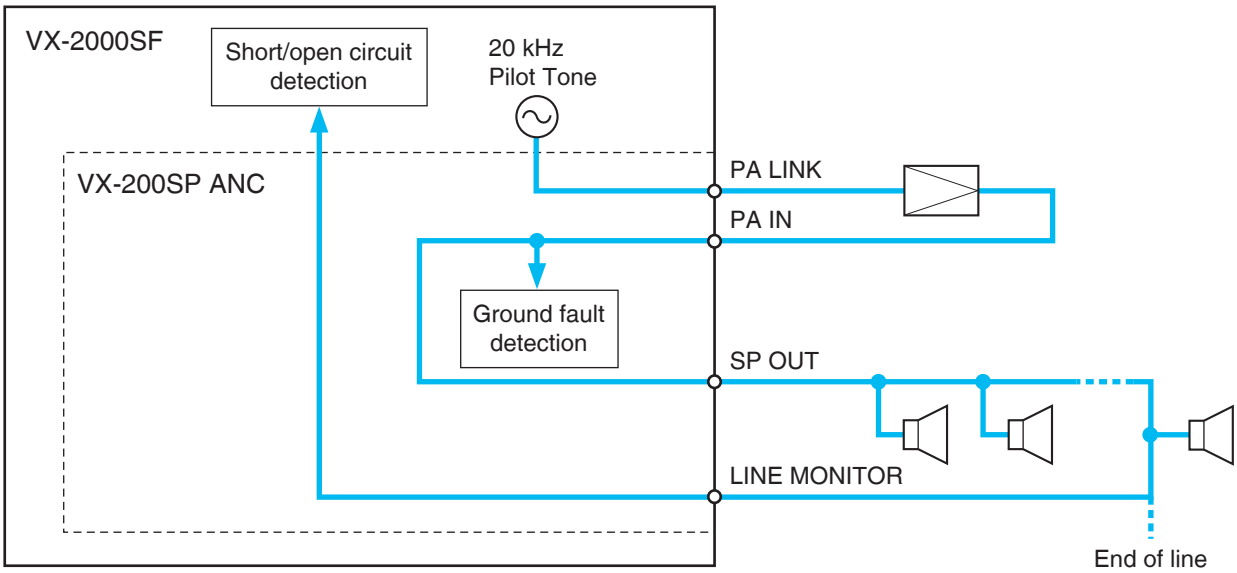
Note: Set this unit to EQ

6. SPEAKER LINE FAILURE DETECTION METHODS

Note
The failure detection functions described here are designed to perform on a 100-volt line of speaker. For the methods using a 70- or 50-volt line, please consult your TOA dealer.

The VX-200SP ANC Pilot Tone Detection module detects speaker line failures by using a pilot tone. A 20kHz failure detection pilot signal is superimposed on the signal line. To detect speaker line failures, the VX-200SP ANC checks the signal return from the speaker line end to the LINE MONITOR terminal.

[VX-200SP ANC Failure detection]



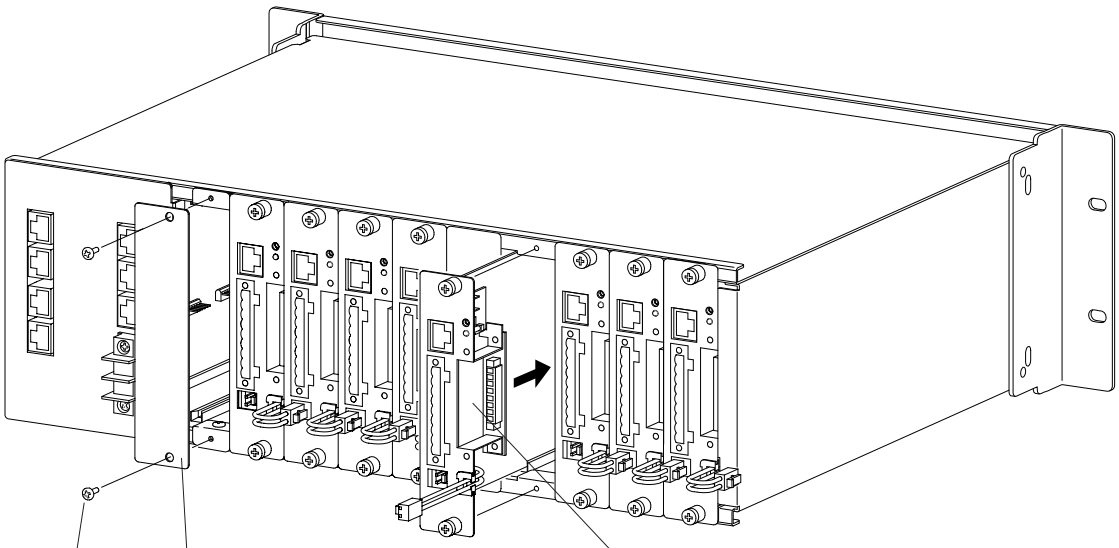
7. Installing Module (VX-200SP ANC) in the VX-2000SF Frame

Notes

- The slot number and module type to be installed must be identical to those designated by the PC software.
- Equate the VX-200SP ANC as VX-200SP when setting them on the PC software.
- Cover idle slots with the supplied blank panels to prevent dust from getting into the equipment.

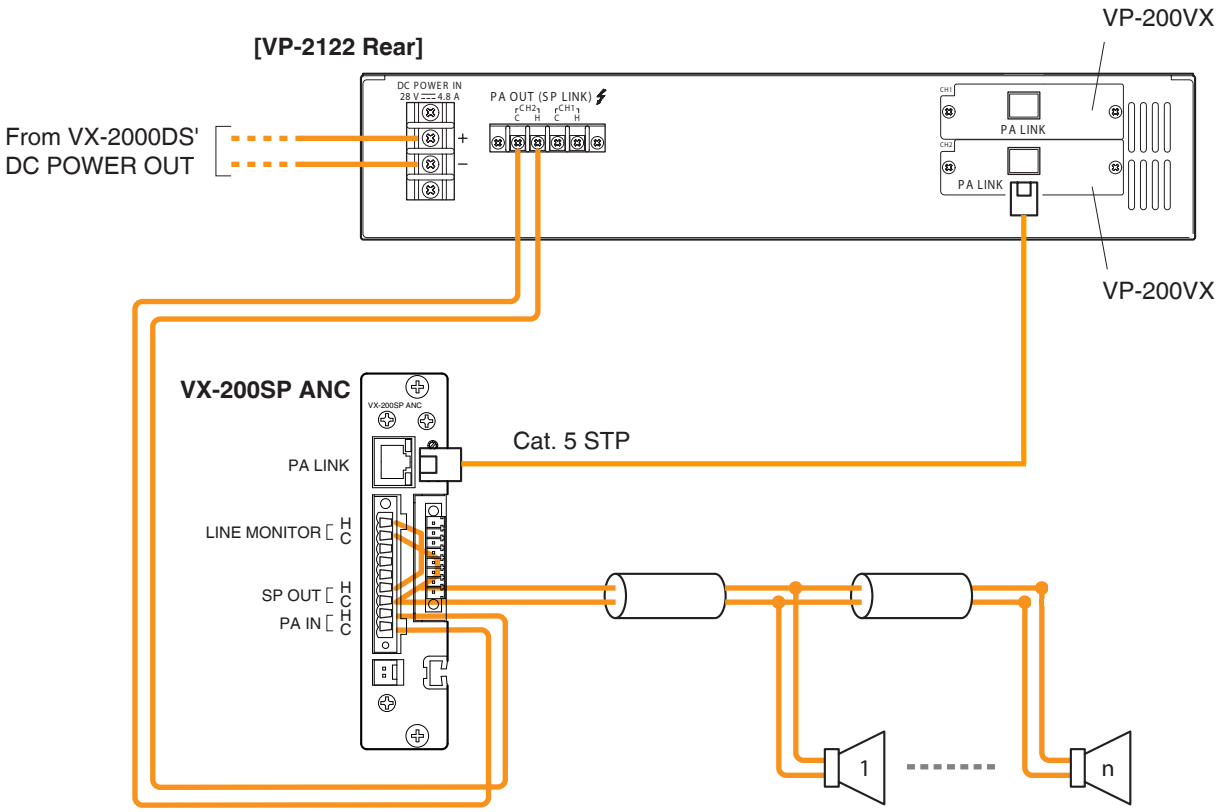
Step 1. Align the module with the rails inside the VX-2000SF Frame, then push the module in to plug its connector strip securely into the VX-2000SF's internal connector.

Step 2. Tighten both the top and bottom screws.



8. CONNECTIONS

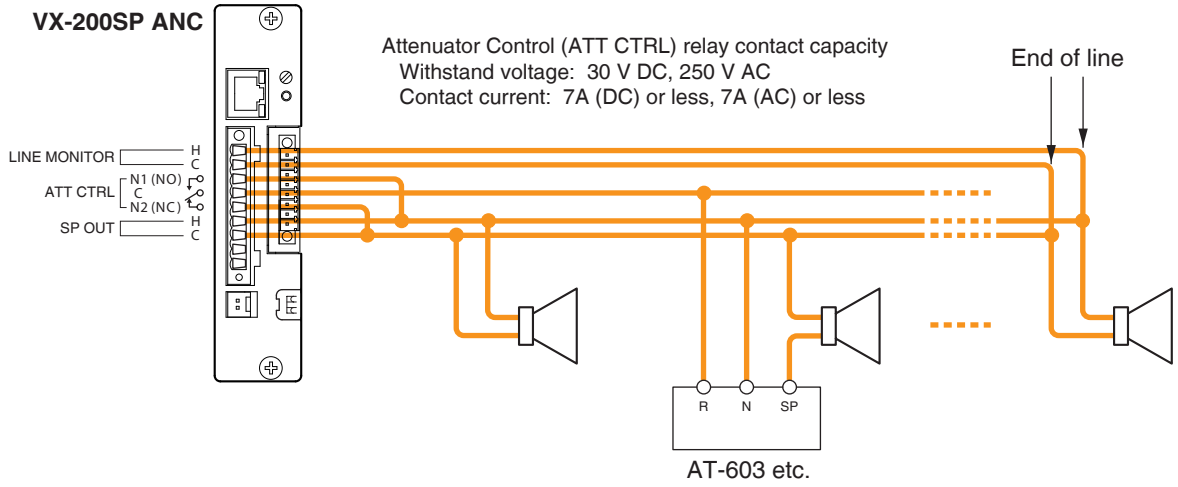
8.1. VX-200SP ANC Connection to Power Amplifier and Speakers



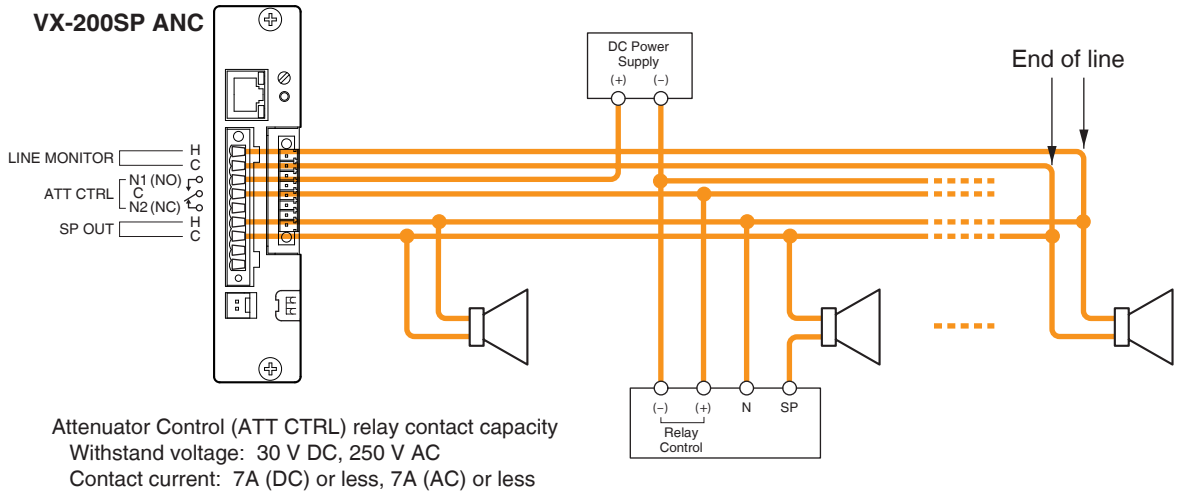
Note
After bundling all the speaker shield cables from the individual VX-200SP-2 modules into one cable at a terminal board, connect the cable to the VX-2000SF's chassis ground.

8.2. VX-200SP ANC Connection to External Attenuator

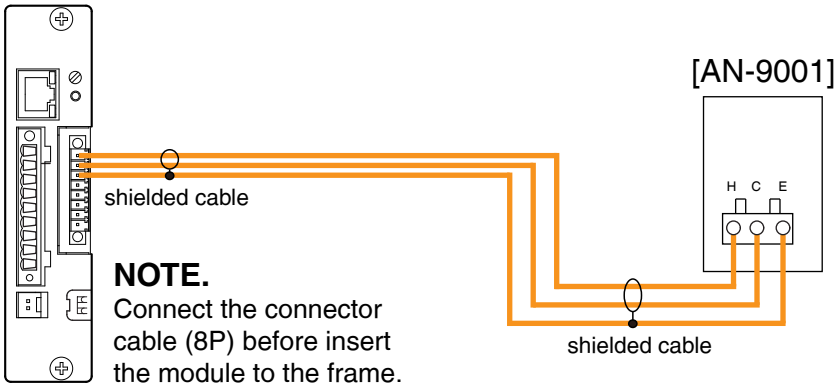
8.2.1. wire system connection



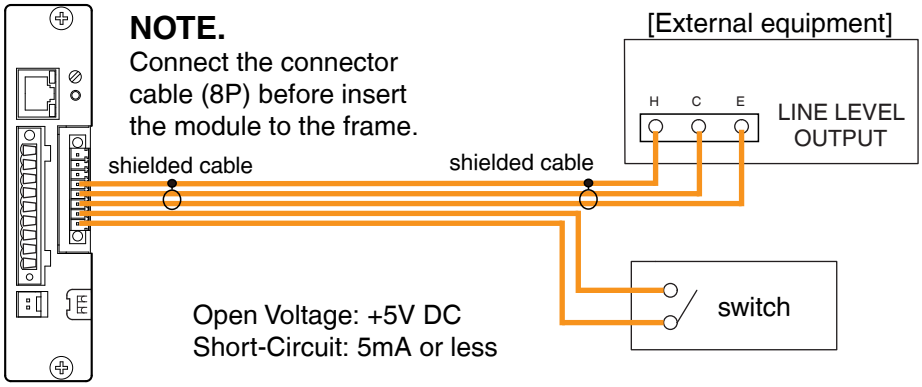
8.2.2. wire system connection



8.3. VX-200SP ANC Connection to ceiling mount microphone [AN-9001] (option)



8.4. VX-200SP ANC Connection to External Equipment



9. LIST OF CONNECTION CABLES

[VX-200SP ANC]

Terminal to Connect		Cable Type			Equipment to be Connected to		
Terminal Name	Equipment Receptacle	Plug	Cable Type	Plug	Equipment	Terminal Name	Equipment Receptacle
PA LINK	RJ45 (female)	RJ45 (male)	Cat. 5 STP	RJ45 (male)	VP-200VX	PA LINK	RJ45 (female)
LINE MONITOR	Plug-in screw connector	Unprocessed cable end	16 – 24AWG	Unprocessed cable end	VX-200SP-2	SP OUT	Plug-in screw connector
ATT CTRL	Plug-in screw connector	Unprocessed cable end	3-wire: 16 – 24AWG 4-wire: Twisted pair cable	Unprocessed cable end	External attenuator	——	——
SP OUT	Plug-in screw connector	Unprocessed cable end	Shielded pair cable 16 – 24AWG	Unprocessed cable end	Speaker	Speaker terminal	Push-in terminal block
PA IN	Plug-in screw connector	Unprocessed cable end	16 – 24AWG	Round or Y terminal	VP-2064/-2122/ -2241/-2421	PA OUT (SP LINE)	2P screw terminal
STANDBY PA BUS	2P VH connector	Round or Y terminal	18AWG	Round or Y terminal	Standby amplifier VP-2064/-2122/ -2241/-2421	PA OUT (SP LINE)	2P screw terminal
STANDBY PA BUS	2P VH connector	——	PCB Cable	——	VX-200SP VX-200SZ	STANDBY PA BUS	——
Sensor input connector	Plug-in terminal block	Unprocessed cable end	18-26AWG Shielded cable (for sensor input and EXT input)	Unprocessed cable end	AN-9001 External equipment	——	——

10. CABLE CONNECTIONS TO RJ45 CONNECTORS

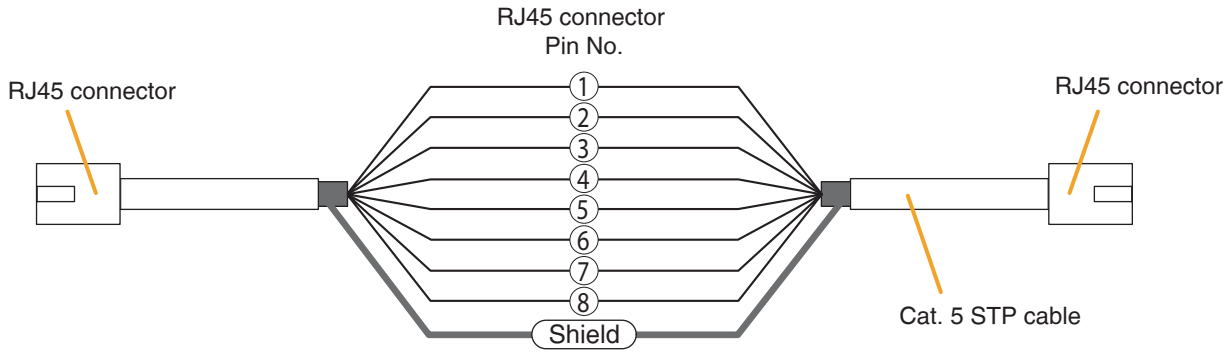
Connect a RJ45 connector to both ends of the Cat. 5 STP cable and make the following connections:

[Source to Connect]			[Source to be Connected to]	
Component	Connector Name		Component	Connector Name
VX-2000	DATA LINK	———	VX-2000SF	DATA LINK
VX-2000	AUDIO LINK OUT	———	VX-2000SF	AUDIO LINK IN
VX-2000SF	AUDIO LINK OUT	———	Next VX-2000SF	AUDIO LINK IN
VX-2000SF	DATA LINK	———	Next VX-2000SF	DATA LINK
VX-2000SF	STANDBY PA LINK	———	VP-200VX	PA LINK
VX-2000SF	DS-SF LINK 1, 2	———	VX-2000DS	DS-SF LINK
VX-200SP	PA LINK	———	VP-200VX	PA LINK
VX-200SZ	PA LINK	———	VP-200VX	PA LINK
VX-200SP-2	PA LINK	———	VP-200VX	PA LINK
VX-200SZ-2	PA LINK	———	VP-200VX	PA LINK

[RJ45 connector pin assignment]

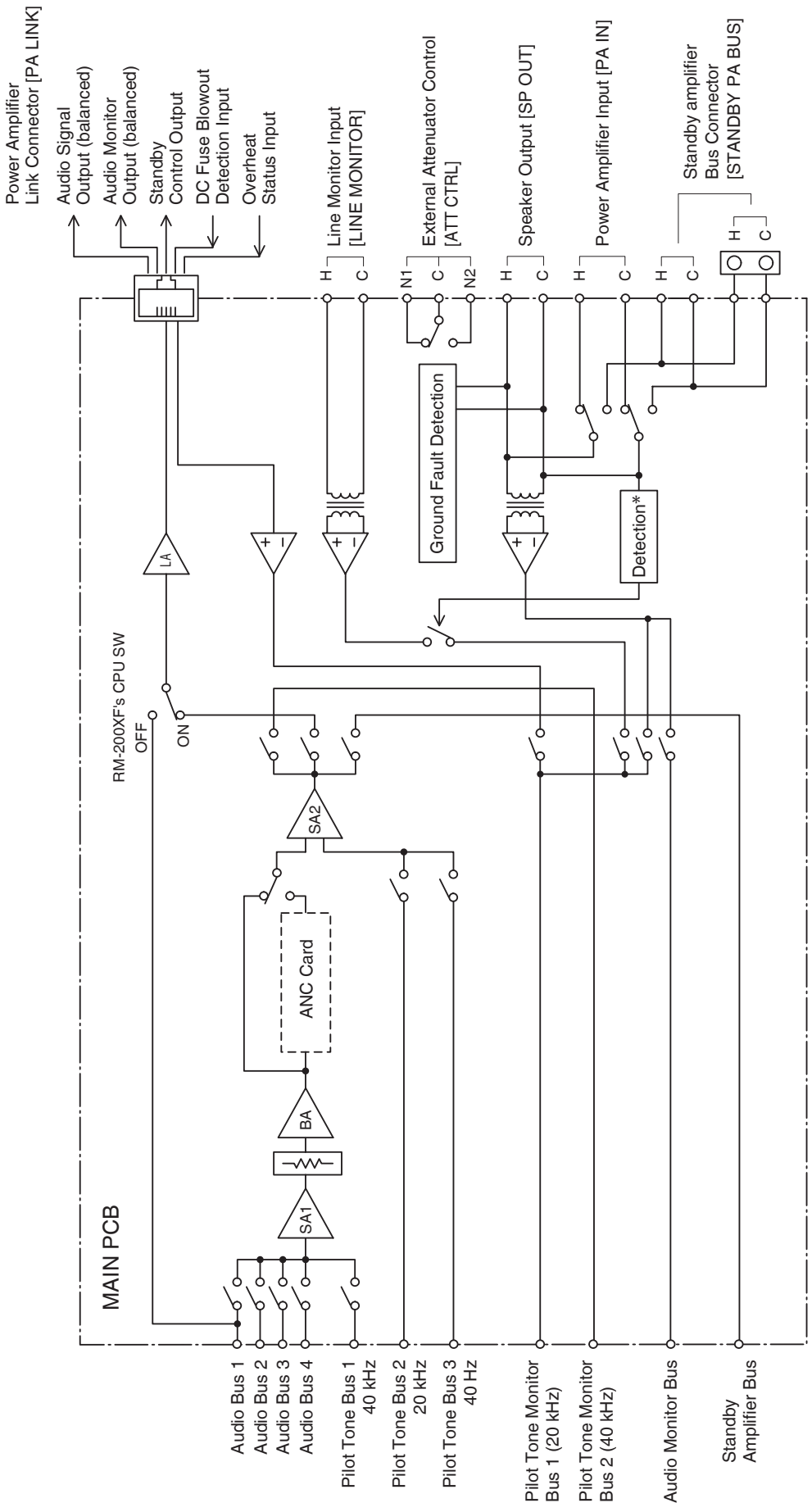
RJ45 Pin No.	Colour*	Pair
①	Orange / white	
②	Orange	
③	Green / white	
④	Blue	
⑤	Blue / white	
⑥	Green	
⑦	Brown / white	
⑧	Brown	
Shield	Shield	

*Differs from cable makers. In wiring, refer to the cable specifications for Colour

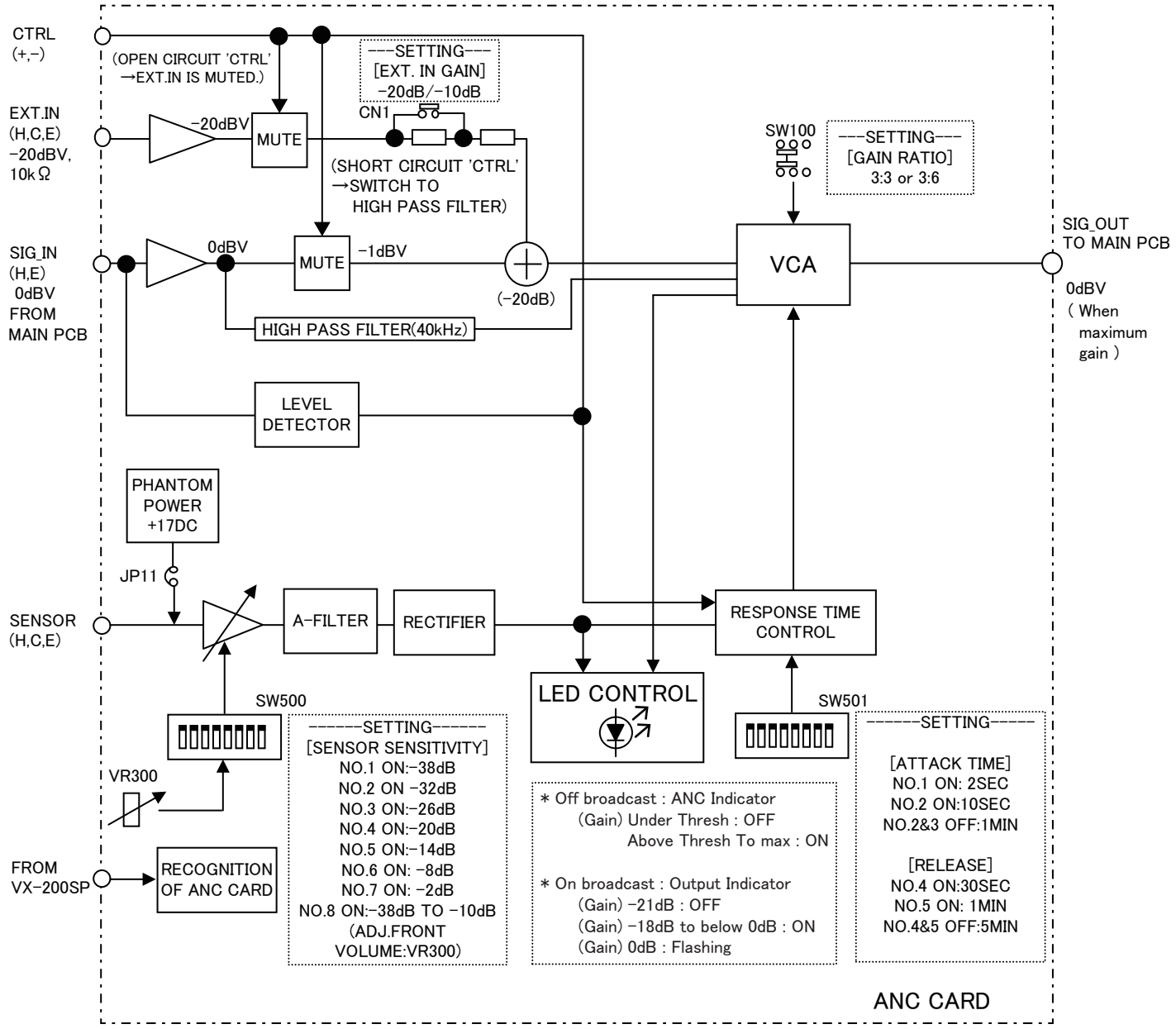


11. BLOCK DIAGRAM

11.1. Pilot Tone Detection Module With ANC



11.2. ANC card


CTRL
(+,−)
(OPEN CIRCUIT 'CTRL'
→EXT.IN IS MUTED.)
---SETTING---
[EXT. IN GAIN]
−20dB/−10dB
EXT.IN
(H,C,E)
−20dBV,
10kΩ
−20dBV
MUTE
CN1
(SHORT CIRCUIT 'CTRL'
→SWITCH TO
HIGH PASS FILTER)
SW100
---SETTING---
[GAIN RATIO]
3:3 or 3:6
SIG_IN
(H,E)
0dBV
FROM
MAIN PCB
0dBV
MUTE
−1dBV
(−20dB)
VCA
SIG_OUT
TO MAIN PCB
0dBV
(When
maximum
gain)
HIGH PASS FILTER(40kHz)
LEVEL
DETECTOR
PHANTOM
POWER
+17DC
JP11
SENSOR
(H,C,E)
A-FILTER
RECTIFIER
RESPONSE TIME
CONTROL
LED CONTROL
SW500
SW501
------SETTING------
[SENSOR SENSITIVITY]
NO.1 ON:−38dB
NO.2 ON −32dB
NO.3 ON:−26dB
NO.4 ON:−20dB
NO.5 ON:−14dB
NO.6 ON: −8dB
NO.7 ON: −2dB
NO.8 ON:−38dB TO −10dB
(ADJ.FRONT
VOLUME:VR300)
VR300
* Off broadcast : ANC Indicator
(Gain) Under Thresh : OFF
Above Thresh To max : ON
* On broadcast : Output Indicator
(Gain) −21dB : OFF
(Gain) −18dB to below 0dB : ON
(Gain) 0dB : Flashing
------SETTING-----
[ATTACK TIME]
NO.1 ON: 2SEC
NO.2 ON:10SEC
NO.2&3 OFF:1MIN
[RELEASE]
NO.4 ON:30SEC
NO.5 ON: 1MIN
NO.4&5 OFF:5MIN
FROM
VX-200SP
RECOGNITION
OF ANC CARD
ANC CARD

12. SPECIFICATIONS

＊0dB=1V

Power Source		Supplied from VX-2000SF
Current Consumption		Under 130mA
Power Amplifier Link		RJ45 female connector for connecting the VP-2064, VP-2122, VP-2241, or VP-2421 Power Amplifier Twisted-pair straight cable (TIA/EIA-568A standard)
Line Monitor		Plug-in screw connector Applicable cable diameter: AWG 16 – AWG 24
External Attenuator Control output		Plug-in screw connector, relay, no-voltage make contact output, transfer type, withstand voltage: 30 V DC, 250 V AC, contact current: Under 7 A (DC), under 7 A (AC) Applicable cable diameter: AWG 16 – AWG 24
Speaker Output		Plug-in screw connector Applicable cable diameter: AWG 16 – AWG 24
Power Amplifier Input		Plug-in screw connector for connecting the VP-2064, VP-2122, VP-2241, or VP-2421 Power Amplifier Applicable cable diameter: AWG 16 – AWG 24
EXT.input		Removable terminal block (8 pins) Electronically balanced(H,C,E) Sensitivity:-20dB*/-10dB* (When maximum gain) 10kΩ Applicable cable diameter : AWG 18 - AWG 26
EXT.input control[CTRL]		Removable terminal block (8 pins) No-voltage make contact input(+,-) Open voltage: +5V DC,Short-circuit :5mA OR less Applicable cable diameter : AWG 18 - AWG 26
ANC CARD	Sensor input	Removable terminal block (8 pins) Electronically balanced(H,C,E) Sensitivity:-38,-32,-26,-20,-14,-8,-2,-38dB to-10dB*(selectable/DIP switch) Phantom power (+17V DC） Applicable cable diameter : AWG 18 - AWG 26
	Ambient Noise Control Function	Output signal level control : -21 to 0dB Step＝3dB(When gain ratio=3:3）,6dB(When gain ratio=3:6） Response time(selectable/DIP switch) : Attack time＝2sec.,10sec.,1min. Release time＝30sec.,1min.,5min. Gain ratio setting(Ambient noise: Output signal level) : 3:3,3:6(selectable/slide switch）
	ANC's thresh level adjustment	Volume(Front Panel)
	ANC's indicator	LED indicator(green)
Fault Detection System		Short circuit, open circuit (pilot tone detection method), ground fault
Finish		Panel: Surface-treated steel plate
Dimensions		30.5 (w) x 132.6 (h) x 290.3 (d) mm
Weight		520 g
Applicable Model		VX-2000SF

Note: The design and specifications are subject to change without notice for improvement

- **Accessory** Plug-in screw terminal (9P).....1
  (8P).....1
- **Option** Ceiling mount microphone:AN-9001

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