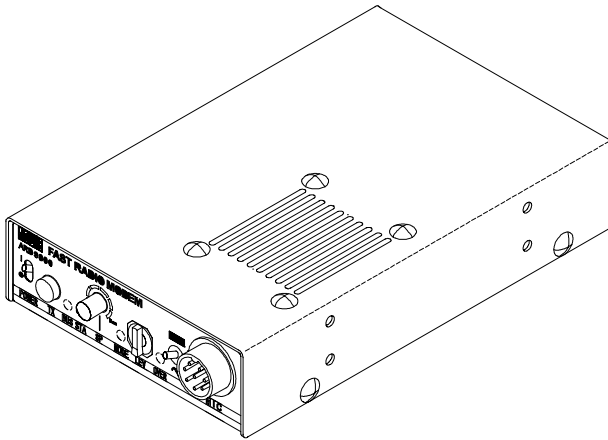**AOR**

FAST RADIO MODEM

ARD9800

Instruction Manual

Multi-Mode And Digital Voice Interface

AOR, LTD.

Authority On Radio communications

Thank you for purchasing the AOR **ARD9800** Multimode and Digital Voice Interface.

The **ARD9800** is designed to convert your HF radio equipment to a multi mode and digital voice capable radio without performing any modifications to your transceiver.

Please read through this instruction manual and familiarize yourself with the operation of the **ARD9800**. We suggest you keep this instruction manual for future reference.

We believe you will enjoy using the ARD9800 as an enhancement to your enjoyment of amateur radio.

AOR, LTD.

Features:

- Digital voice communications using existing analog 2 way radios.
    The ARD9800 uses the same audio frequencies (300 Hz ~ 2500 Hz) as microphone audio to modulate the voice signal. This allows you to use an analog radio as a digital voice transceiver.
- Digital voice communications in the Single Side Band (SSB) mode.
    The automatic frequency clarifier function adjusts frequency drift automatically in the SSB mode. (Approximately up to +/- 125 Hz). Utilizes the ODFM (Multi Carrier Modulation) circuit that is effective against Multi-path or Selective Fading.
- Automatic digital receive
    Automatic voice signal detector recognizes the received signal as analog or digital, automatically switching to the appropriate mode.
- Digital Slow Scan TV (SSTV) – Optional memory module (VM9800) required
    Built-in video capture function (NTSC). Compresses the signal into our original adaptive JPEG format. Send and receive images (similar to analog slow scan TV) in the Digital mode. Built-in video output connector (NTSC) allows viewing the picture on an external monitor.
- Built–in high grade Vocoder (AMBE)
    Utilizing high grade digital voice compression; delivers quality digital voice communications.
- Built-in FEC error correction
    A powerful error correction circuit delivers stable and reliable communications.
- Data communications on the HF band
    Data communication is possible on the HF (High frequency) bands at no extra cost. (Speed may be limited by regulations in certain jurisdictions.)
- Small and compact unit. Easy to operate.
    Simply connect the ARD9800 to the microphone jack. No complicated or risky radio modifications are necessary.
- Utilizes a uniquely designed high performance DSP (Digital Signal Processor) engine
- Battery operation for field use.

Information to the Digital Device user required by the FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can generate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer for technical assistance.

Precautions

To prevent fire, personal injury, or unit damage, please observe the following precautions:

- Do not attempt to adjust this unit unless instructed to do so by this manual.
- Do not expose the unit to direct sunlight or place the unit close to heating appliances.
- Do not place the unit in excessively dusty, humid, wet areas.
- We are not responsible for any damages to the radio equipment due to improper settings or interface.
- We are not responsible for any loss of communications due to an unexpected change of propagation or operating environment.

Table of Contents

Supplied Accessories

The following items are provided in the box:

Accessory	Quantity
Microphone	1
PC interface cable	1
Speaker Cable	1
DC Power cable	1
Microphone Connector	1
Instruction manual (this booklet)	1

Controls and functions

Front Panel
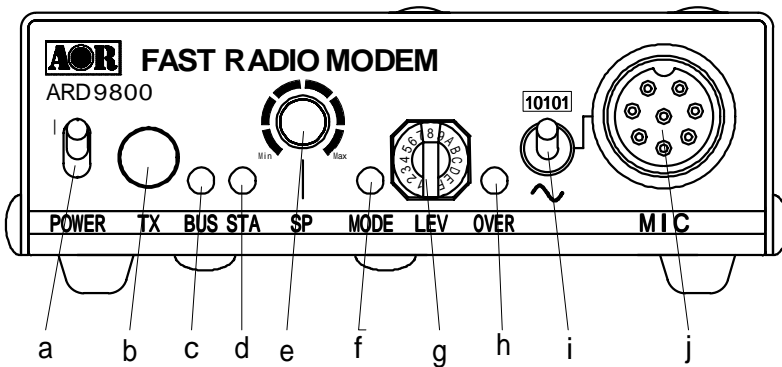
a.   Power on/off switch

b.   TX switch

   (Note: This function is available only when an optional memory module has been installed.)

   Press this switch to capture and send an image.

   When the Video Through Function is activated (AVT command is ON), pressing this

switch will enable output of the video signal connected to the Video Input to also be sent to the video output port, so that you can monitor the video image. Press this switch again to capture and send the image through the radio equipment.

When the Video Through Function is de-activated (AVT command is OFF), pressing this switch will automatically capture the video image and then transmit it through the radio equipment.

c.   2 color LED

Steady red display — The unit is in the transmit mode

Flashing red – Flashes red while the header information is being sent when in the digital communication mode. (approximately one second).

Lit in green – The unit is in the receive mode

Not lit ———— The unit is in the standby receive mode or in the analog voice receive mode.

d.   Status LED (STA LED)

In the data communication mode, lit while unsent data is in the memory. It is lit when the Video Through Function is activated (Digital Image Communication mode). When the Video Through Function is de-activated (AVT command is OFF), this LED will not be lit.

e.   Speaker volume adjustment

Adjustment for the internal speaker output level or the external speaker output level when it is connected.

f.   Operation Mode LED (3 colors)

Indicates the current operation mode:

Green display — Digital Voice mode

Red display — Analog Voice mode

Orange display – Data Communication mode

Not lit ———— Digital Image Communication mode

g.   Microphone Input Level Adjustment

Adjustment for microphone input level

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(This adjustment may be required when using a microphone other than the one that came with your AR9800.)

Refer to Microphone Level Adjustment at page 17 for details.

In case of unbalanced levels between analog voice and digital voice, perform a microphone balance adjustment as described below.

Microphone Balance

1. At first, set the proper microphone level in the digital voice mode.
2. Turn off the power to the ARD9800. Press and hold the TX switch then turn the power back on. The Mode LED should flash in orange color indicating the ARD9800 is in the microphone balance adjustment mode.
3. Holding the PTT switch, and while speaking into the microphone, adjust the microphone level.
4. After the adjustment is completed, push the TX switch to save the new setting. The STALED will light to indicate the setting process is completed.
5. To complete the operation, turn the power of the ARD9800 off, and turn back it on.

h. Overload indicator

Lit when the microphone input is overloaded (too high).

A proper microphone input level will cause the LED to flash from time to time when speaking into the microphone at a normal level.

The microphone level can be adjusted with the microphone level controller.

Refer to Microphone Level Adjustment at page 17 for details.

i. Mode switch

Select the Digital voice mode (10101) or the Analog voice mode (~)

When the Analog voice mode (~) is selected, ordinary analog voice communications will be made. In the receive mode, however, the ARD9800 will automatically detect the mode of the incoming signal and decode signals accordingly. The LED indicates the respective operation mode.

j. Microphone connector

Connect the supplied microphone to this connector.

Below are the pin assignments of the connector.

1. Speaker output – Monitor output signal is present at this pin.
2. BIAS – Power source for an electret condenser type of microphone.
   5V DC through 2.2Kohm of resistor
3. GND – Chassis ground
4. TX
   Taking this pin to the ground will enable the transmit mode.
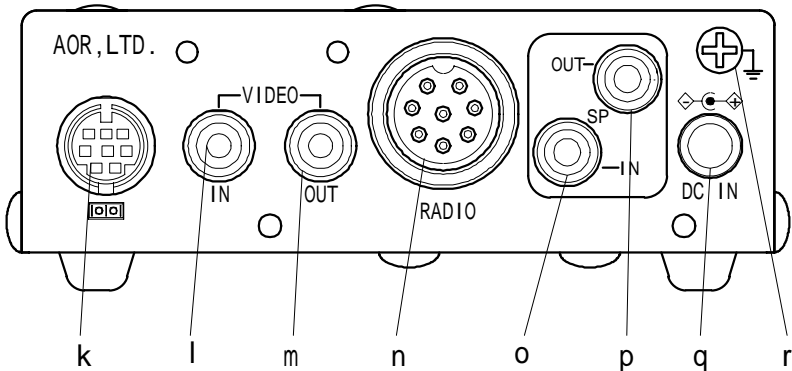   (Same operation as the TX switch on the front panel.)
5. D/A
   Taking this pin to the ground will force the unit to the digital voice communication
   mode. When this pin is left open, the operation mode will be set by the mode
   switch on the front panel.
6. MIC PTT – PTT (Push To Talk) input.
7. MIC GND – Microphone ground signal
8. MIC IN – Microphone signal input

Rear Panel

k.   Communication Connector (mini DIN 8 pin)

A communication connector for PC (RS-232C)

Pin Number	Signal	Signal Direction
1	TX	ARD9800 → PC
2	DTR	ARD9800 → PC
3	DSR	ARD9800 ← PC
4	GND	GND
5	RX	ARD9800 ← PC
6	RTS	ARD9800 → PC
7	CTS	ARD9800 ← PC
8	NC	No Connection
Shell	FG	Frame ground

Baud Rate:	9600
Start bit:	1
Stop bit :	1
Parity:	None
Synchronization:	Asynchronous
Flow control:	Hardware

l.   VIDEO - IN connector (NTSC 1V p – p, 75 ohm)

Connect a video signal source such as a video camera, VCR output, etc.

m.   VIDEO – OUT connector (NTSC 1V p – p, 75 ohm)

Connect a video monitor to this connector to monitor a received image or a picture to be sent.

n.   RADIO Connector

Using the supplied 8 pin connector, connect the ARD9800 to your radio equipment. You will
need to wire a cable according to the microphone connector specifications of your radio.
Below are the pin assignments of the connector on the ARD9800.

Pin number	Signal	Details
1	MIC GND	Microphone ground
2	MIC IN	Microphone Input
3	PTT	PTT (Push To Talk) input
4	GND	PTT ground
5	NC	No connection
6	NC	No connection
7	GND	Ground
8	NC	No connection

Note: MIC GND and GND must not be connected together in the ARD9800 connector, or RF feedback will result.

o. SP IN Connector (3.5 mm mono jack)

Connect to the radio equipment's speaker jack. (Input level: 0.5 V – 5 V p-p)

GND   SIGNAL
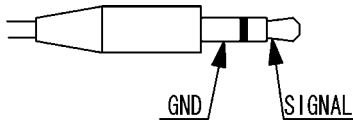
Note: The output signal from a radio's "accessory" connector may not be sufficient to use for this purpose. Use the transceiver's "speaker out" jack.

p. SP OUT Connector (3.5 mm mono jack)

Connect an external speaker to this jack to disable internal speaker.

GND   SIGNAL
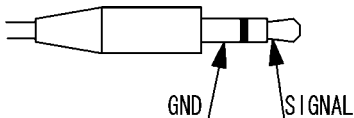
q. DC IN Connector (EIAJ Type 4)

Connect to a regulated power supply. (10.7 ~ 16.0 V DC, Center pin – positive) For lower voltage battery operation, set the internal jumper terminal for battery operation, and then connect external batteries.

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 If you have changed the internal jumper for low-voltage battery operation, battery voltage must be within the range of 5.6 ~6.5 VDC. DO NOT apply 12.0V or severe damage will result, and the warranty will be void!

Note: No low battery voltage detector is built-in the ARD9800.

r.   FG

Frame ground

Top Panel

s

s.   Internal Speaker

Internal View

v   w

x

t   u

t.   Factory setting jumper
      Must be set between 2-3.   (Do not change this setting at any time.)

u.   Optional Memory module connector

    Insert an optional Memory module to use Digital SSTV functions.

      Refer to Memory Module Installation Manual for details.

v.   Battery operation selector

    Place the jumper between 1 – 2 (NOR) for normal operation.

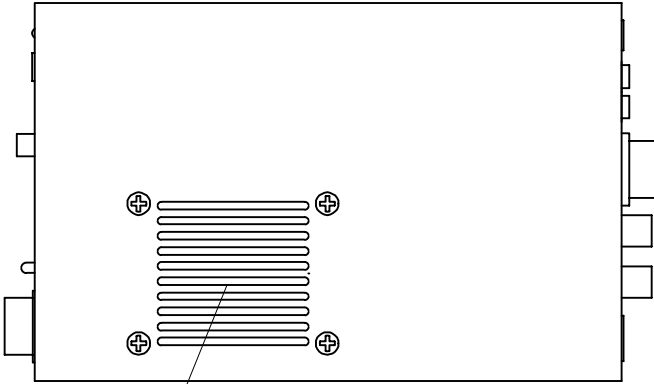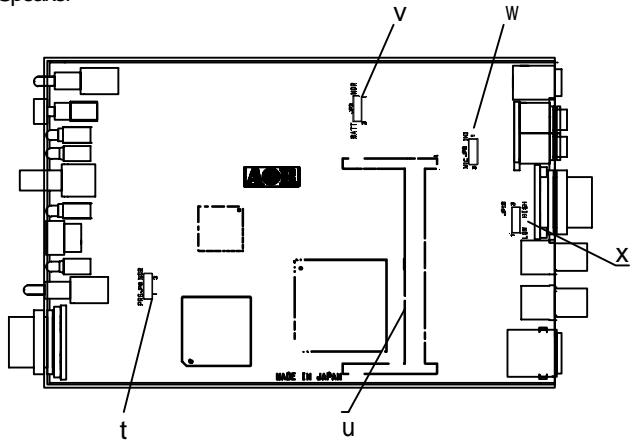   Change it between 2-3 (BATT) for battery operation.

> If you have changed the internal jumper for low-voltage battery operation, battery voltage must be within the range of 5.6 ~6.5 VDC. DO NOT apply 12.0V or severe damage will result, and the warranty will be void!
> Note: No low battery voltage detector is built-in the ARD9800.

w.   Internal speaker setting

    Jumper setting

      1 – 2   Activates internal speaker (default)

      2 – 3   Disable internal speaker

        Speaker output is also available from the pin #1 of the microphone connector.

    Note: The SP OUT (external speaker output) has priority regardless of the above jumper setting.

x.   Output level setting

    Jumper setting

      1 – 2   Normal level (default) (LOW)

      2 – 3   High level (HIGH)

        In case the microphone output level is too low to drive your radio equipment, place the jumper to the 2-3 position.

        Refer to Microphone Level Adjustment at page 17 for details.

Bottom View
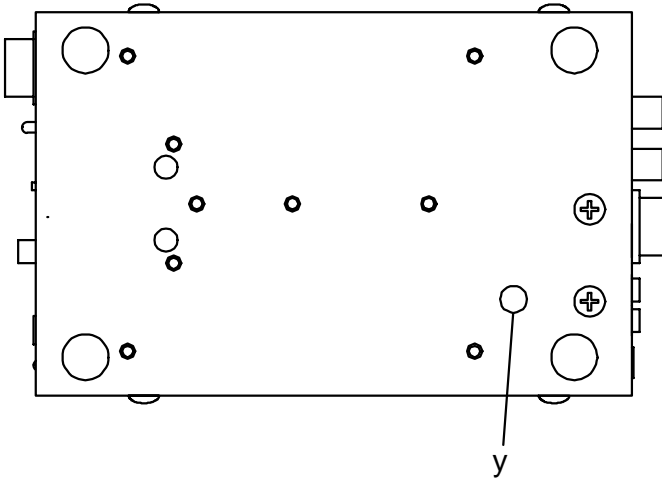
Interfacing the ARD9800

Connection to a Radio

Before using your ARD9800, you will first need to wire the cable between your radio
equipment and the ARD9800.

For your convenience, an 8-pin of a microphone connector for the ARD9800 is included.
You will need to prepare, however, your own microphone connector for your radio
equipment.

Below are the pin assignments of the 8-pin RADIO connector on the rear panel of the ARD9800.

Pin number	Signal	Details
1	MIC GND	Microphone ground
2	MIC OUT	Microphone Output
3	PTT (H)	PTT (Push To Talk) Output (H level)
4	PTT (L)	PTT (Push To Talk) Output (Low level)
5	NC	No connection
6	NC	No connection
7	GND	Ground
8	NC	No connection
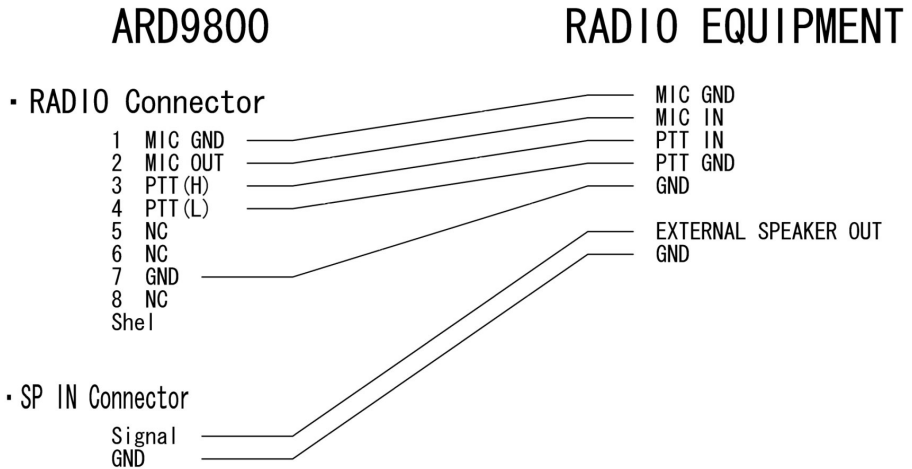
ARD9800   RADIO EQUIPMENT

```
                                              MIC GND
・RADIO Connector                             MIC IN
    1  MIC GND                                PTT IN
    2  MIC OUT                                PTT GND
    3  PTT(H)                                 GND
    4  PTT(L)
    5  NC                                     EXTERNAL SPEAKER OUT
    6  NC                                     GND
    7  GND
    8  NC
    Shel

・SP IN Connector
    Signal
    GND
```

Note: MIC GND and GND must <u>not</u> be connected together in the ARD9800 connector, or RF feedback will result.

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Connection to a Microphone

A speaker microphone is included with your ARD9800. However, if you wish to use your own microphone with the ARD9800, you may do so by wiring your microphone to correlate with the input jack of the ARD9800. Below are the pin assignments of the Microphone connector of the ARD9800.

1. Speaker output
    Monitor output signal is present at this pin.
2. BIAS
    Power source for an electlet condenser type of microphone.
    5V DC through 2.2K ohm of resistor
3. GND
    Chassis ground
4. TX
    Taking this pin to the ground will enable to transmit.
    (Same operation as the TX switch on the front panel.)
5. D/A
    Taking this pin to the ground will force the ARD9800 to the Digital voice communication mode.
    When this pin is left open, the operation mode will be set by the mode switch on the front panel.
6. MIC PTT
    PTT (Push To Talk) input.
7. MIC GND
    Microphone ground signal
8. MIC IN
    Microphone signal input

Connection to a PC

A PC interface cable is included with the ARD9800.

Parameter settings can be made by using terminal software.

Connection to a Power Supply

To operate your ARD9800, use a regulated power supply.

The operating voltage must be within the range of 10.7 ~ 16.0 V DC (approximately 200mA).

A DC power cable is also included with the ARD9800.

Color	Polarity
RED	Positive (+)
BLACK	Negative (-)

Refer to Internal View: Battery operation at page 12 for details

If you have changed the internal jumper for low-voltage battery operation, supplied voltage must be within the range of 5.6 ~ 6.5 VDC. DO NOT apply 12.0 V or severe damage will result, and the warranty will be void!

Note: There is no low battery voltage detector built-into the ARD9800.

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Connection to an External Speaker

If an external speaker is desired, connect it to the SP OUT jack. This will also disable the internal speaker.

GND   SIGNAL
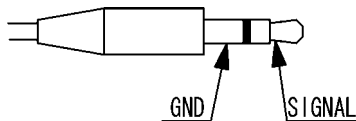
Level Adjustment

Microphone Level

The microphone level has been properly adjusted at the factory with the provided microphone. Therefore, no further adjustment is needed for normal operation.

If you wish to use your own microphone rather than the included one, you will need to wire your microphone connector to match the pins of the ARD9800, and then adjust the microphone level as described in the following steps:

1. Connect your microphone to the Microphone connector of the ARD9800.
2. Turn the [LEV] knob fully counterclockwise.
3. Press and hold the PTT switch of the microphone, and speak into microphone normally.
4. Slowly turn the [LEV] clockwise until the [OVER] LED flashes occasionally, with the peaks of your voice signal.

Radio Input Level

Perform the following steps to adjust the radio input level of your radio equipment:

1. Connect the microphone to the ARD9800, and then connect the ARD9800 to your radio equipment. Finally, Connect the ARD9800 to a power supply.
2. Turn the output level adjustment on the bottom of the ARD9800 fully counterclockwise. Turn the power on to the ARD9800. Turn the power on to your radio equipment.
3. Set the mode switch to the Digital mode [10101].
4. Press the [PTT] switch to transmit from the radio equipment.
5. Adjust the microphone gain of the radio equipment until the ALC function just activates.
6. If the microphone gain is too low, readjust the output level on the bottom of the ARD9800.

Microphone Balance

If the output level of analog voice and digital voice are not equal, an adjustment can be made. To adjust the audio balance, perform the following steps:

1. First, set the proper microphone level in the digital voice mode.
2. Turn off the power to the ARD9800. Press and hold the TX switch then turn the power back on. The MODE LED should be blinking orange, indicating the ARD9800 is in the microphone balance adjustment mode.
3. Holding the PTT switch, and while speaking into the microphone, adjust the microphone level.
4. After the adjustment is completed, push the TX switch to save the new setting. The STA LED will light to indicate the setting process is completed.
5. To complete the operation, turn the power of the ARD9800 off, and then turn back it on.

Operations

<u>Note: All adjustments must be properly performed before operation.</u>

Voice Communication

Your ARD9800 is capable of Digital Voice Communications and Analog Voice Communication.

In the receive mode, the ARD9800 will automatically recognize the type of communication, and set the appropriate operation mode.

In the transmit mode, the operation mode can be selected by using the front Mode switch.

Digital Voice Communication

Set the mode switch [10101 - ~] upward to the digital mode position. [10101]

Press and hold the PTT switch of the microphone. The STA (Status) LED will flash for about 0ne (1) second while sending a data header signal.

When the LED stops flashing, speak into the microphone normally.

Analog Voice Communication

Set the mode switch [10101 - ~] downward to the analog mode position. [~] Press and hold the PTT switch of the microphone, and speak into the microphone normally.

Data Communication

Run a terminal software program to control the ARD9800, and to enter control commands.

<u>Refer to Control Commands at page 23 for details</u>

Two different types of data, ASCII data or binary data, can be used.

Both data can be mixed as communication data.

Receive

Enter the command [ACO] to go into the converse mode.

The received valid data will be decoded and displayed on the PC screen.

If received data is missing, (which may occur during poor propagation conditions) "garbage" data may be displayed on the PC screen.

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Transmit

Enter the command [ACO] to go into the converse mode.

Type text from the keyboard, then hit the enter key at the end of the text.

NNNNNNNN [CR]

NNNNNNNN   ASCII character

[CR]   Carriage Return

Note: Maximum data length is 2046 bytes per packet.

To send binary data, add [FE] (hexadecimal) to a header and footer with the data.

FE BBBBBBBBBBBBBBBB FE

BBBBBBBBBBBBBBBB Binary data

FE   ID as a binary data

Note: If you need to insert the data [FE] in hexadecimal in the middle of the text,
       convert it into two (2) bytes of hexadecimal data.

FE → FDD8

If you need to insert the data [FD] in hexadecimal in the middle of the text,
convert it into two (2) bytes of hexadecimal data.

FD → FDDD

Note: Maximum data length is 2046 bytes per packet.

At the receive side, the data will be automatically decoded and displayed on the PC screen.
If the [ALF] command is set ON, the LF (line feed) code will be added at the end of received
data.

Digital Image Communication

Note: An optional memory module is required to use this function.

Receive

When valid digital image data is received, it will be decoded and output as a video image from the VIDEO OUT connector.

If received data is missing during a transmission, that portion will be displayed as invalid (like noise).

Transmit

When pin - 4 of the microphone connector is grounded, the ARD9800 starts sending the image.

Note: When the Video Through Function is activated (AVT command is ON), pressing the TX switch will enable output of the video signal connected to the Video Input to also be sent to the video output, so that you can monitor the video image. Press the TX switch again to capture the image and then transmit it through the radio equipment.

When the Video Through Function is de-activated (AVT command is OFF), pressing the TX switch will automatically capture the video image and then transmit it through the radio equipment.

A Progress indicator will display on the monitor during image transmission.

Specifications

Modulation Method	OFDM	Band Width: 300 Hz ~ 2.5 KHz, 36 carrier
	Symbol Rate	20 mS (50 Baud)
	Guard Interval	4 mS
	Tone Space	62.5 Hz
	Individual Tone Modulation Method	36 carrier: DQPSK(3.6K)
Auto Frequency Offset	+/- 125 Hz	
Error Correction	Data: Reed Solomon + Vitabi Decoder Voice: Golay + Hamming	
Header	1 second, 3 tone + BPSK training pattern for synchronization	
Digital Audio	AMBE ® 2020 Coder/Decoder	
Mode Selection	Receive: Automatic selection Transmit: Data communication mode: Automatic exchange according to TX request from PC Digital voice mode: Manually selected by the mode switch Digital Image mode: Manually selected by pressing the TX switch Analog voice mode: Manually selected by the mode switch	
Video Compression	AOR original JPEG format	
Video Input/output	NTSC (NTSC 1Vp-p 75ohm)	
Power Requirement	10.7 ~ 16 V DC (Approximately 200 mA @ 12 V DC) 6.0 V DC with battery operation (5.6 ~ 6.5 V DC)	
Communication	RS-232C Asynchronous, 9600 bps (setting / data) 115.2 kbps (image)	
I/O Connectors	Microphone: 8 – pin metal Radio: 8 – pin metal PC interface: Mini 8 – pin DIN Video In/Out: RCA Speaker In/Out: 3.5 mm mono jack Power: EIAJ type 4	
Dimensions	100 (w) x 32 (h) x 156 (d) (mm) 4 (w) x 1.3 (h) x 6.2 (d) (inches) Projections not included Weight: Approximately 600 g (1 lb – 5 oz)	

Control Commands

Interfacing to a PC

Using the supplied PC interface cable, connect between the COM connector at the rear panel (marked as [10101]) to the serial port of a PC.

NOTE: Be sure your PC's serial port is active. Check for correct hardware and software settings!

Below are the pin assignments of the COM connector of the ARD9800.

ARD9800 COM connector	Serial connector of a PC (D-Sub 9 – pin)
Pin #	Pin #
1 ———————	2
2 ———————	6
3 ———————	4
4 ———————	5
5 ———————	3
6 ———————	8
7 ———————	7
8 ———————	1
GND ———————	GND

Terminal Settings

Communication Speed:	9600 bps
Data Length:	8 bit
Start Bit:	1
Stop Bit:	1
Parity:	None
Flow Control:	Hardware
Local Echo:	None
Specifications:	RS-232C compatible

Command Format

Run a terminal software program, and then turn the power of the ARD9800 on.
The following message should appear on the PC screen:

cmd>

This indicates the ARD9800 is ready to accept commands from the PC.

Each command consists of three (3) alphabetical characters.

cmd>CCC_NN [CR]

CCC: Command (Must be a capital letter)
_: Space
NN: Parameter
[CR]: Carriage Return

Entering a command without a parameter will display the current parameter (value) setting.

cmd>CCC[CR]

If an invalid parameter or command is entered, the ARD9800 will respond as follows:

cmd>
?
cmd>

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Command List

Command	Function
AAQ	Send VIDEO In signal to VIDEO OUT (to a monitor screen) Capture image into memory of the ARD9800
ACO	Enter the Converse mode
ADC	List the current commands
ADS	Display current settings
AFC	Activate AFC (Automatic Frequency control) function
AHL	Set the duration of the synchronization header
ALF	Add the LF (Line Feed) code at the end of the CR code
ARA	Monitor both digital/analog voice signal or monitor digital voice only
ATT	Select output level for the radio equipment
ATX	Send digital image
AVT	Activate the Video through function when capturing image
AVR	Display the current firmware version

Command details

AAQ	
Function	Send VIDEO In signal to the VIDEO OUT (to the monitor screen) Capture image into memory of the ARD9800
Default	None
Format	AAQ {0 / 1} [CR]
Parameter	1: Send VIDEO In signal to a VIDEO OUT (to the monitor screen) 0: Capture image into memory of the ARD9800
Details	While AVT command is OFF, [AAQ 0] will be accepted. Entering AAQ[CR] will respond with the current status. AAQ ON — Video signal is passed to the VIDEO OUT port AAQ OFF — Video signal is not passed to VIDEO OUT Note: Optional memory module MUST be installed to use this function.
Example	AAQ_0 [CR]

ACO	
Function	Change from the Command mode to the Converse mode
Default	None
Format	ACO [CR]
Parameter	None
Details	Change from the Command mode (while cmd> appears on the PC screen) into the Converse mode. In the Converse mode, data from the PC keyboard can be sent. To return to the Command mode, enter [Ctrl – C] (holding the Control key while entering the C.)
Example	ACO [CR]

ADC	
Function	List the current commands
Default	None
Format	ADC [CR]
Parameter	None
Details	Lists the current commands
Example	ADC [CR]

ADS	
Function	Display current settings
Default	Headerlen : 1.00 AFC = ON Analog : ON
Format	ADS [CR]
Parameter	None
Details	Displays the current parameter settings
Example	ADS [CR]

AFC	
Function	Activate AFC (Automatic Frequency control) function
Default	On
Format	AFC {ON/OFF} [CR]
Parameter	ON: Activates the AFC function OFF: Deactivates the AFC function
Details	Must be set to ON in the SSB mode Set to OFF in the FM mode
Example	AFC_ON [CR]

AHL	
Function	Set the duration of the synchronization header
Default	100 (1 second)
Format	AHL {050 – 198} [CR]
Parameter	050 – 198 (0.02 incremental)
Details	Sets the duration of the synchronization header {100} represents 1.00 second .
Example	AFC_146 [CR]　　→ Set duration to 1.46 seconds.

ALF	
Function	Add the LF (Line Feed) code at the end of the CR code
Default	ON
Format	ALF {ON/OFF} [CR]
Parameter	ON : Add the LF code at the end of the CR code OFF : The LF will not be added to the end of the CR code
Details	When this command is set to ON, it facilitates the entry of new data from the transmit terminal, as a new line is automatically started (and the previous line is automatically sent).
Example	ALF_ON [CR]

ARA	
Function	Monitor both digital/analog voice signals or monitor digital voice only
Default	ON
Format	ARA_{ON/OFF} [CR]
Parameter	ON : Monitor digital voice and Analog voice OFF : Monitor Digital voice only
Details	Monitor both digital/analog voice signal or monitor digital voice only
Example	ARA_ON [CR]

ATT	
Function	Selects the output level to the radio equipment
Default	ON
Format	ATT_{ON/OFF} [CR]
Parameter	ON : Lower level OFF : Higher level
Details	Selects the output level to the radio equipment Refer to Level Adjustment at page XX for details
Example	ATT_ON [CR]

ATX	
Function	Send digital image
Default	None
Format	ATX [CR]
Parameter	None
Details	An image must be captured and stored into memory before it can be sent. Note: Optional memory module MUST be installed to use this function.
Example	ATX [CR]

AVT	
Function	Activate the Video through function when capturing an image
Default	ON
Format	AVT_{ON/OFF} [CR]
Parameter	ON : Activate the Video through function OFF : Deactivate the Video through function
Details	When the AVT command is ON, pressing the TX switch will enable output of the video signal connected to the Video Input to be passed to the video output so that you can monitor the video image. Press the TX switch again to capture the image and then transmit it through the radio equipment. When the AVT command is OFF, pressing the TX switch will automatically capture the video image and then transmit it through the radio equipment.
Example	AVT_ON [CR]

AVR	
Function	Display the current firmware version
Default	None
Format	AVR [CR]
Parameter	None
Details	Displays the current firmware version
Example	AVR [CR]

LIMITED WARRANTY

AOR USA, Inc. (AOR) warrants its products as described below:

AOR will repair or exchange equipment as a result of defects in parts or workmanship for a period of one year from the date of original retail purchase from an authorized AOR dealer.

Exclusions

The following items are not covered by the AOR limited warranty:
1. Products that are damaged through accident, abuse, misuse, neglect, or user modifications.
2. Problems that arise through failure to follow directions in the owner's manual.
3. Exposure of the product to adverse or severe weather conditions, including temperature extremes or water, including rainfall or immersion.
4. Exposure to toxic materials, biohazards, radioactive materials or other contamination.
5. Repairs attempted by parties other than AOR or its authorized personnel.
6. Damage that results from improper installation, including improper voltage and/or reversed polarity, or exposure of a receiver to signal levels exceeding specifications.
7. Damage resulting through the use of accessories from manufacturers other than AOR.
8. Equipment that has had serial numbers removed or altered in any way.
9. Damage that occurred as a result of shipment. Claims must be presented to the carrier.
10. AOR is not responsible for any costs arising from installation or reinstallation of the equipment, nor for any consequential (such as loss of use) damage claims.

Obtaining Warranty Service
1. You are responsible for shipping the product to AOR and any related costs.
2. Warranty claim must be accompanied by a legible copy of the original product purchase receipt.
3. You must include a description of the problem(s) encountered with the product.
4. You must include your name, a valid ground shipping address (including zip code) and telephone contact information.
5. AOR will ship the repaired (or replaced) product by ground transport.

Limitations

Any and all implied warranties, including those pertaining to merchantability and utility for a specific purpose are limited to the duration of this limited warranty.

AOR's limits on warranty pertain only to the repair or, at its option, replacement of defective products. AOR shall not be liable for any other damages, including consequential, incidental or otherwise, arising from any defect.

Some states do not allow limitations on how long an implied warranty lasts and may not allow the exclusion of incidental or consequential damages. As such, the above limitations may not apply in every case. This warranty gives you specific legal rights and you may have other rights that apply in your state.

If you have questions about this limited warranty, or the operation of your AOR product, contact AOR at (310) 787-8615 during normal business hours (9 am ~ 5 pm Pacific Time Zone), or write to AOR, 20655 S. Western Ave., Suite 112, Torrance, CA 90501. You may also send a fax to AOR at (310) 787-8619. Additional information is available at the AOR web site: www.aorusa.com

We suggest attaching your purchase receipt to this half of the warranty information sheet and that you keep this information in a secure location.

AOR Model Number _____

Serial Number _____

Dealer Name _____

Purchase Date _____

AOR, LTD.

2-6-4, Misuji, Taitok-Ku

Tokyo, 111-0055, Japan

http://www.aorja.com

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