Instruction Manual

DDS-2A

External VFO for Collins ™
KWM-2(A), 75-S ( ) and 32-S ( )

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1. GENERAL

1-1. General Description

The DDS-2A is a µ-processor controlled external VFO for the Collins KWM-2(A) and S-Line, including 75S-3B and 32S-3. The DDS-2A uses the latest DDS and PLL technology to produce accurate and clean local signals for the equipment. The unit utilizes an original BFO of 435.65 kHz (456.35 kHz) in the Collins equipment.

The DDS-2A replaces PTO and HFO in the equipment. You can expect 10 Hz frequency resolution and accuracy in the transmit and the receive.

Because of the clean local injection, you can expect performance improvement, including inter-modulation and cross-modulation characteristic.

1-2. Features

HFO

The DDS-2A provides an HFO (Heterodyne Frequency Oscillator) signal in the range of 6.550 MHz to 32.950 MHz (5 kHz off the original range) in 200 kHz increments.

The signal replaces the HFO oscillator of the equipment thereby general coverage is possible. You can operate your equipment in a new WARC bands, as well as to receive short-wave broadcast stations.

The HFO output is produced by the low-noise PLL with reference frequency of 50 kHz.

VFO & 100 Memory Channel

The DDS-2A provides VFO signal of 2.695 MHz to 2.495 MHz (5 kHz off the original range) that will replace the PTO of the equipment. The VFO output can be adjusted in 10 Hz increment.

The VFO uses an NCO (Numeric Controlled Oscillator) within a PLL loop that provides excellent C/N and accuracy over the range.

Total of 100 memory channels are provided for instant access to the important frequencies. A=B and sprit operation are also included for the VFO function.

BFO Shift compensation

The DDS-2A provides BFO shift compensation to obtain accurate frequency display. A 455 kHz of the reference frequency can be compensated up to 9.999 kHz in 1 Hz step for both the USB and the LSB. (Example ; 1.350 kHz of the Collins original frequency)

Computer control

Standard RS-232C port is provided for remote control through the PC's COM port.

Easy installation

The DDS-2A can be installed to the KWM-2(A) without any modifications to the equipment. It can also be installed to the S-Line (75S- / 32S-) with the modification to the 75S-( ) receiver. The DDS-2A uses inch-size optical encoder for the VFO dial, so you can replace the knob to an original Collins spinner knob.

2. SUPPLIED ACCESSORIES

Table 1 shows the accessories and parts that comes with the DDS-2A. Installation for the 32S-( ) requires additional parts that will be discussed in the chapter 4 of this manual.

Table 1 (Supplied Accessory List)

Parts	Quantity	Length	Description
DC Cable	1	1.5m	DC cable that comes with a 5.5mm ⌀ round type plug.
Interface Cable	1	80 cm	5 conductor cable with 8-pin DIN-plug and 9-pin vacuum tube plug.
6EA8 Coaxial cable	1	80 cm	Coaxial cable with RCA plug and 9-pin vacuum tube adapter.
BPF Coaxial cable	1	65 cm	Coaxial cable with RCA plugs. This cable includes a BPF.
Modification parts	1	N/A	Parts for the S-line modification. Resistors, wires, coaxial cable and 9-pin adapter socket are included.
Instruction Manual	1	N/A	Operating and installation manual.

3. INSTALLATION PRECAUTION

● Before installs the DDS-2A to the radio equipment, you must make sure that the radio is operating satisfactory. Adjust and repair the radio equipment before installing the DDS-2A.

● Use high quality 12-13.8 VDC power supply with minimum ripple contents. A minimum of 1A output is required for the DDS-2A.

● The DDS-2A has no power ON-OFF switch. You must use power ON-OFF switch of the DC power supply. When you turn your radio ON, the DDS-2A turns ON same time.

● Do not install the DDS-2A under high temperature and vibrating locations. If you install the unit near the power supply, the unit may pick-up power noise.

4. INSTALLATION

4-1. KWM-2(A) Installation

(1) Interface cable

Connect **8-pin DIN** connector to the **CONTROL** jack of the DDS-2A. Remove 9-pin jumper plug from the **EXT VFO** socket that is located inside center of the KWM-2(A). The jumper plug should be left there. Connect **9-pin plug** to the **EXT VFO** socket through the large whole of the rear panel of the unit.

(2) 6EA8 Cable

Connect **RCA** plug to the **HFO** jack of the DDS-2A. Remove **6EA8 (V13)** from the KWM-2(A). Connect tube adapter to the **V13** socket through the large hole of the rear panel of the unit. Re-install the 6EA8 (V13) to the **tube adapter**.

(3) BPF Cable

Connect RCA plug to the **VFO** jack of the DDS-2A. Connect **RCA** plug to the **EXT VFO jack** on the unit.

4-2. 75S-( ) Installation

(1) 32S-( ) Connection

Connect 32S-( ) to the 75S-( ) for transceiver operation. The DDS-2A connects to the 75S-( ) only.

(2) DDS-2A Modification

Remove the cover from the DDS-2A. Solder 15kΩ / 5W resistor parallel with the large power resistor that is mounted inside of the DDS-2A chassis. Close the cover.

(3) 75S-( ) Modification

Locate the **lug plate** that is used to relay the coaxial cable from the **PTO** unit. Cut the center conductor of the coaxial cable from the PTO at the lug plate. Solder new coaxial cable supplied to the lug plate. Solder both the inner conductor and the braid to the lug plate.

Solder the other end of the coaxial cable to the **SPARE** jack (vacant jack) of the rear panel of the 75S-( ). Solder both the inner conductor and the braid to the jack. Remove **6AU8 (V301)** from the **PTO** unit.

Assemble **9-pin socket** by soldering wires provided. A pin layout of the socket is same as the vacuum tube.

(3) 75S-( ) Modification

Pin No.	Color	Connect to:
2	BLUE	Connect to MUTE (-30V at transmit)
3	RED	Connect to B+140V
5	YELLOW	LSB/USB switch
9	BLACK	Ground

Insert the wires through the same hole that is used for the PTO wires. Leave the wires approximately 7 cm from the hole.

Refer to the schematic and parts location of the 75S-( ) manual. Solder the other end of the wires as indicated above. **YELLOW** wire (LSB/USB switch) should be connected to the location where the -30V is obtained at LSB and +130V for the other mode. (for PTO shift)

(4) Interface cable

Connect **8-pin DIN** connector to the **CONTROL** jack of the DDS-2A. Connect **9-pin plug** to the **9-pin socket** (mounted in the above (3)) through the large hole of the 75S-( ) rear panel.

(5) 6EA8 Cable

Connect **RCA** plug to the **HFO** jack of the DDS-2A. Remove **6EA8 (V3)** from the 75S-( ). Connect **tube adapter** to the **V3** socket through the large hole of the rear panel. Re-install the **6EA8 (V3)** to the **tube adapter**.

(6) BPF Cable

Connect RCA plug to the **VFO** jack of the DDS-2A. Connect **RCA** plug to the **SPARE jack** on the rear panel of the unit.

4-3. 32S-( ) Installation

(1) 75S-( ) Connection

Connect 75S-( ) to the 32S-( ) for independent operation. The DDS-2A connects to the 32S-( ) only. Prepare following additional parts.

Coaxial cable (approx. 80 cm) with RCA plugs.		x	1
51 Ω ¼W	Resistor	x	1
470Ω ½ W	Resistor	x	1
0.01µF 500WV	Ceramic Capacitor	x	1

4

(2) DDS-2A Modification

No modifications are needed for this application.

(3) 32S-( ) Modification - Add 9-pin socket

Assemble **9-pin socket** come with the DDS-2A by soldering wires provided. A pin layout of the socket is same as the vacuum tube.

Pin No.	Color	Connect to:
3	RED	Connect to B+275V (+275V)
4	YELLOW	Connect to T+275V (+275V at transmit)
5	BLUE	LSB/USB switch
9	BLACK	Ground

Insert the wires through the same hole that is used for the PTO wires. Leave the wires approximately 7 cm from the hole.

Refer to the schematic and parts location of the 32S-( ) manual. Solder the other end of the wires as indicated above. **YELLOW** wire (T275V) should be connected to one end of the **R-17** (5kΩ) that is connected to the OA2 regulator tube.

BLUE wire (LSB/USB switch) should be soldered to the point where the -30V is obtained at the LSB mode and +150V for the other mode. (for PTO shift)

(4) 32S-( ) Modification - 6CB6 (V12)

Replace 100kΩ that is connected to **pin 1** (Grid) of the 6CB6(V12) by 51Ω ¼W. Cut the wire that is connecting to the crystal switch. Solder coaxial cable provided between **SPARE** jack on the rear panel and the **pin 1**. Braid of the coaxial cable should be soldered to ground.

Disconnect **82PF** that is connected to **pin 6** (Screen). Cut the wire that is connecting to the crystals. Do not remove the **L23** (1mH) from the **pin 6**. Solder **0.01μF** ceramic capacitor between **pin 6** and **ground**. Replace **R135** (100W) by **470Ω** ½ W resistor. The **R135** is connecting **L18** (220μH) that connects to **pin 2**.

Remove **6AU6 (V301)** from the **PTO** unit.

(5) Interface cable

Connect **8-pin DIN** connector to the **CONTROL** jack of the DDS-2A. Connect **9-pin plug** to the **9-pin socket** (mounted in the above (3)) through the large hole of the 32S-( ) rear panel.

(6) BPF Cable

Connect RCA plug to the **VFO** jack of the DDS-2A. Connect **RCA** plug to the **J8** (VFO INPUT) of the 32S-( ).
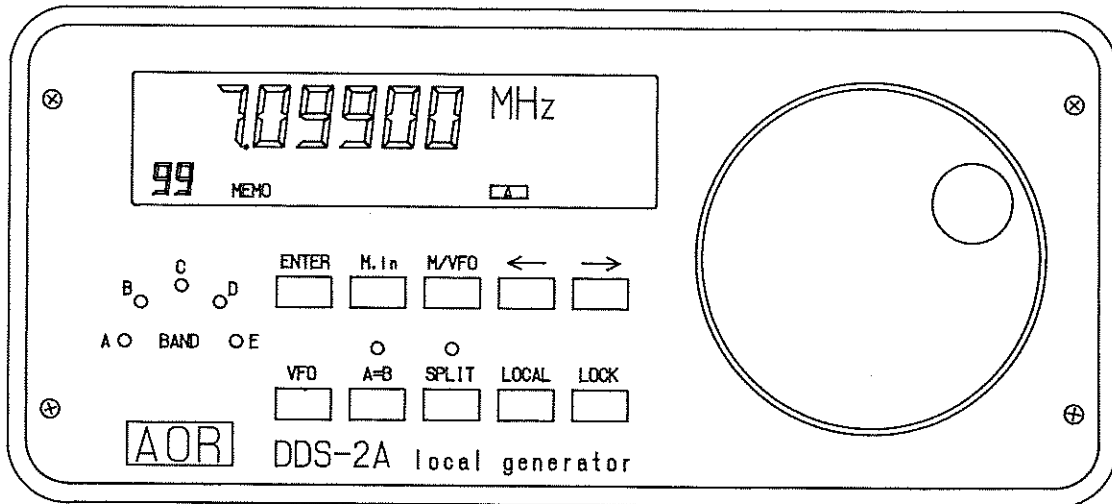
(7) HFO Cable - Use cable you provided.

Connect **RCA** plug to the **HFO** jack of the DDS-2A. Connect RCA plug to the **SPARE** jack.

5. CONTROLS & CONNECTIONS

5-1. Front Panel

The illustration shows the front panel of the DDS-2A. Table 2 shows a list of front panel controls.

5-1. Front Panel

Table 2 (DDS-2A Front Panel)

CONTROLS	FUNCTION
BAND	Display the band depending on the frequency tuned.
ENTER	Use to store the frequency into the memory channel. Toggles between the odd and the even number start frequency.
M. In	When this key is pressed, channel number start blinks indicating that the DDS-2A is ready for the memory input. Push ENTER key to store the frequency into the memory channel.
M/VFO	Switch between VFO and memory channel. In the memory mode, the channel number can be changed by the main dial.
⇦ ⇨	Change the frequency decimal point. It also used to change the memory channel.
VFO	Switch between the A VFO (1st VFO) and the B (2nd VFO) VFO.
A=B	Frequency transfer switch. Push this switch transfers the second VFO (A or B) frequency into the first VFO (A or B).
SPLIT	Push this switch for split operation. You may receive by the A VFO and transmit by the B VFO.
LOCAL	This switch override the REMOTE operation.
LOCK	Keyboard Lock(Unlock).
Main knob	Use to tune the frequency. It also selects the memory channel in the memory mode.

5-2. LCD Panel

The illustration shows the LCD panel of the DDS-2A. Table 3 shows a list of symbols of the LCD.
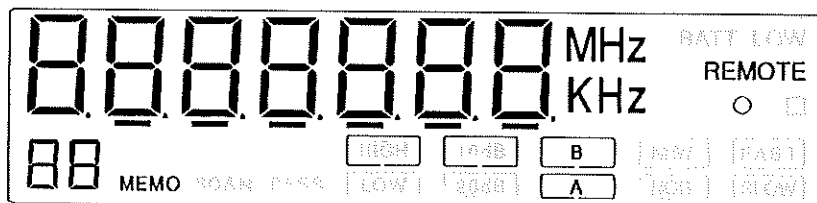
5-2. LCD Panel

Table 3 (DDS-2A LCD Panel)

DISPLAY	MEANING
Number (large)	The frequency can be displayed to 10 Hz order.
[A] [B]	Indicates the type of VFO selected.
REMOTE	Indicates that the DDS-2A is under remote control.
◯	Indicate when inputting BFO shift frequency.
Number (small)	Indicates number of the memory channel.
▭	Indicate that the DDS-2A accept the frequency for memory storage.
▭ B▭	Rectangular indicator next to B VFO indicator shows that the DDS-2A starts from an odd frequency. (Example: 3.5, 3,.7, 3.9 MHz etc.)

5-3. Rear Panel

The illustration shows the rear panel of the DDS-2A. Table 4 shows a list of symbols of the LCD.
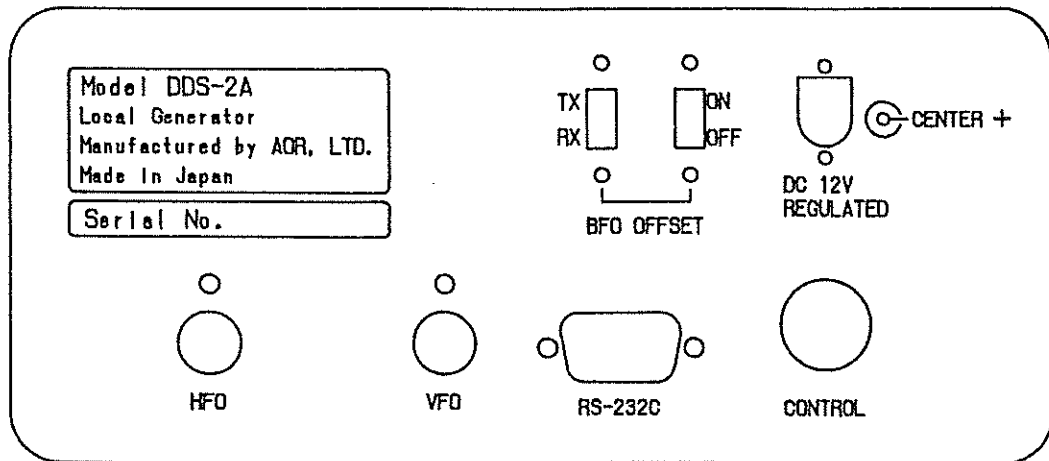
5-3. Rear Panel

Table 4 (DDS-2A Rear Panel)

LABEL	PURPOSE
DC 12V	Provided for DC power supply. Use the DC cable comes with the unit.
BFO OFFSET	Turn this switch to ON to compensate the BFO frequency. When the switch is ON, LCD shows shift frequency in kHz. Turn the switch to OFF after compensation is done. The LCD returns to normal display.
HFO	6.550 MHz - 32.950 MHz output. (Heterodyne Frequency Oscillator)
VFO	2.695 MHz - 2.495 MHz VFO output for PTO.
RS-232C	For remote control through a PC's COM port.
CONTROL	For 8-Pin DIN connector. Connect between the radio and the DDS-2A.

6. OPERATION

6-1. Basic control

(1) Power Supply

Connect high quality DC 12-13.8V power supply using the power cable supplied with the unit. The DDS-2A has no power ON-OFF switch, but it will turn ON when the power is applied to the radio equipment.

(2) MEMO / VFO Switch

This switch is used to change between the VFO and memory channel. In the VFO mode, the MEMO and Channel number will be disappeared from the LCD.

(3) Main Dial knob

This knob is used to tune the frequency in VFO mode. The tuning steps can be changed by ⇦ ⇨   key. In the memory channel mode, channel number can be changed by the knob.

(4) VFO select

Push VFO key to select the A or B VFO. When the DDS-2A is in the memory channel mode, this key resume to the VFO mode. When the VFO mode is selected, LCD shows [A] or [B] depending on the type of the VFO selected.

6-1. Basic control

(5) Key lock

Push [**LOCK**] key to lock the controls. Push [**LOCK**] key again to unlock the controls.

(6) Memory write

Tune the frequency by main knob. To store the frequency, hit [**M.in**] key. The display shows the lowest vacant channel number. Hit [**ENTER**] key to store the frequency into the memory.

To store the frequency into a particular channel number, first tune the frequency by main knob then hit [**M.in**] key. Use main dial to select the channel number and hit [**ENTER**] key to store the frequency.

If the channel is already been used, you will hear the warning beep and the frequency in the channel will be displayed for about 1 second. If you wishes to store the new frequency, hit [**ENTER**] key again.

(7) Odd or Even number start

When you move the frequency in some bands (example 3.800 MHz to 3.799 MHz), you will hear switching noise from the receiver. To prevent the switching noise, you may consider using an odd (even) number frequency start feature.

To activate this feature, hit [**ENTER**] key. Once the DDS-2A is an odd start setup, rectangular indicator next to B VFO indicator should lit. The [**ENTER**] key toggles the ODD and the EVEN start. No display will be changed when this feature is activated.

6-2. Collins equipment control

Once frequency is tuned by the DDS-2A, the BAND LED flashes showing an appropriate and for the main radio equipment. Set radio's band switch to the same position. Tune radio equipment according to the operating procedure as described in the manual.

Example: Tune EXCITOR TUNE, TUNE (KWM-2(A)), PRE-SELECTOR (75-S( )) etc.

7. ADJUSTMENT

7-1. BFO Compensation - KWM-2(A)

(1) Shift frequency offset - General

The BFO compensation is provided to display accurate operating frequency. The DDS-2A set it BFO offset frequency to 1.350 kHz when shipped from the factory. You may fine tune the BFO shift frequency according to your preference.

7-1. BFO Compensation - KWM-2(A)

(2) BFO compensation at RECEIVE mode.

The following procedure applies to the KWM-2(A). You can use the same technique for the 75S-( ) and the 32S-( ).

On the LSB mode, tune the KWM-2(A) to 15.000 MHz (or other frequency to receive standard signal.) Slide BFO offset switches to RX and ON position respectively. The LCD shows a factory default value of 1.350 kHz. ○ in the LCD blinks. Tune the main knob of the DDS-2A to obtain the "ZERO BEAT".

Once the "ZERO BEAT" is obtained, slide the BFO offset switch to OFF position.

NOTE : If the display shows other than 1.350 kHz at ZERO BEAT, (example 1.330 kHz) the frequency of the BFO crystal inside of the KMW-2(A) should be : 453.670 kHz (455.000 - 1.330 = 453.670)

On the LSB mode, tune the KWM-2(A) to 15.000 MHz (or other frequency to receive standard signal.) Slide BFO offset switches to RX and ON position respectively. The LCD shows a factory default value of 1.350 kHz. ○ in the LCD blinks. Tune the main knob of the DDS-2A to obtain the "ZERO BEAT".

Once the "ZERO BEAT" is obtained, slide the BFO offset switch to OFF position.

NOTE : If the display shows other than 1.350 kHz at ZERO BEAT, (example 1.330 kHz) the frequency of the LSB BFO crystal inside of the KMW-2(A) should be : 453.670 kHz (455.000 - 1.330 = 453.670)

Change mode switch to USB mode, tune the KWM-2(A) to 15.000 MHz (or other frequency to receive standard signal.) Slide BFO offset switches to RX and ON position respectively. The LCD shows a factory default value of 1.350 kHz. ○ in the LCD blinks. Tune the main knob of the DDS-2A to obtain the "ZERO BEAT".

Once the "ZERO BEAT" is obtained, slide the BFO offset switch to OFF position.

NOTE : If the display shows other than 1.350 kHz at ZERO BEAT, (example 1.375 kHz) the frequency of the USB BFO crystal inside of the KMW-2(A) should be : 453.375 kHz (455.000 + 1.375 = 453.375)

(3) BFO compensation at TRANSMIT mode.

KWM-2(A) uses the same filter and BFO oscillator for both transmit and receive.

On the LSB mode, slide the BFO offset switches to TX and ON position respectively. Tune the main knob of the DDS-2A to obtain the same offset value. (1.330 kHz in the above example). Slide the BFO offset switches to OFF and RX position respectively.

For the USB mode, proceed the same to compensate the TX offset.

7-2. BFO Compensation - S-LINE

(1) Preparation

To perform the BFO compensation, you must connect your 32S-( ) to a dummy load and a monitor receiver with at least 10 Hz accuracy. Set 32S-( ) to any amateur frequency. (Example 7.08700 MHz etc.) You must tune the equipment to transmit properly at the frequency in LSB mode. You must also set the monitor receiver to the same frequency to monitor the sound.

(2) BFO Compensation

Slide the BFO offset switches to ON and RX respectively. The LCD shows a factory default of 1.350 kHz. Transmit the S-Line and monitor your signal. The DDS-2A shows 1.350 kHz.

Adjust the main knob until comfortable sound is obtained form the monitor receiver. Slide the BFO offset switch to OFF position.

NOTE : If the display shows other than 1.350 kHz at ZERO BEAT, (example 1.323 kHz) the frequency of the LSB crystal should be : 453.677 kHz (455.000 - 1.323 = 453.677)

Change mode switch to the USB mode and proceed the same compensation. Slide the BFO offset switch to OFF position.

NOTE : If the display shows other than 1.350 kHz at ZERO BEAT, (example 1.385 kHz) the frequency of the USB crystal should be : 456.385 kHz (455.000 + 1.385 = 456.385)

7-3. BFO Compensation - 32S-( )

If you use the DDS-2A for the 32S-( ), no RX compensation is needed. However, you can compensate TX offset using same technique as described in this manual.

7-4. Reset and initialization

You may reset the DDS-2A by the following two methods.

RESET (No memory contents will be erased.)   -   Push reset switch firmly using a pointing object such as tooth pick through the pin hole that is located underneath of the front trim of the DDS-2A.

INITIALIZE (Memory contents will be erased.)   -   Turn   OFF   the   radio equipment while holding [**ENTER**] key. Wait approximately 5 seconds until all memory contents are erased. The DDS-2A returns to the factory default.

BFO SHIFT OFFSET :   1.350 kHz
VFO A/B   :   10.000 MHz

7-5. Output level adjustment

Factory default is sufficient for an ordinary users. When the fine adjustment is required, refer to the following diagram for the location of the tunings.

C-65, C-24, C-13 and C-6 Locations

C-65 :	VFO Output	
C-24 :	HFO Output	3.4 - 7.8 MHz band
C-6 :	HFO Output	8.0 - 15.8 MHz band
C-13 :	HFO Output	16.0 - 29.8 MHz band
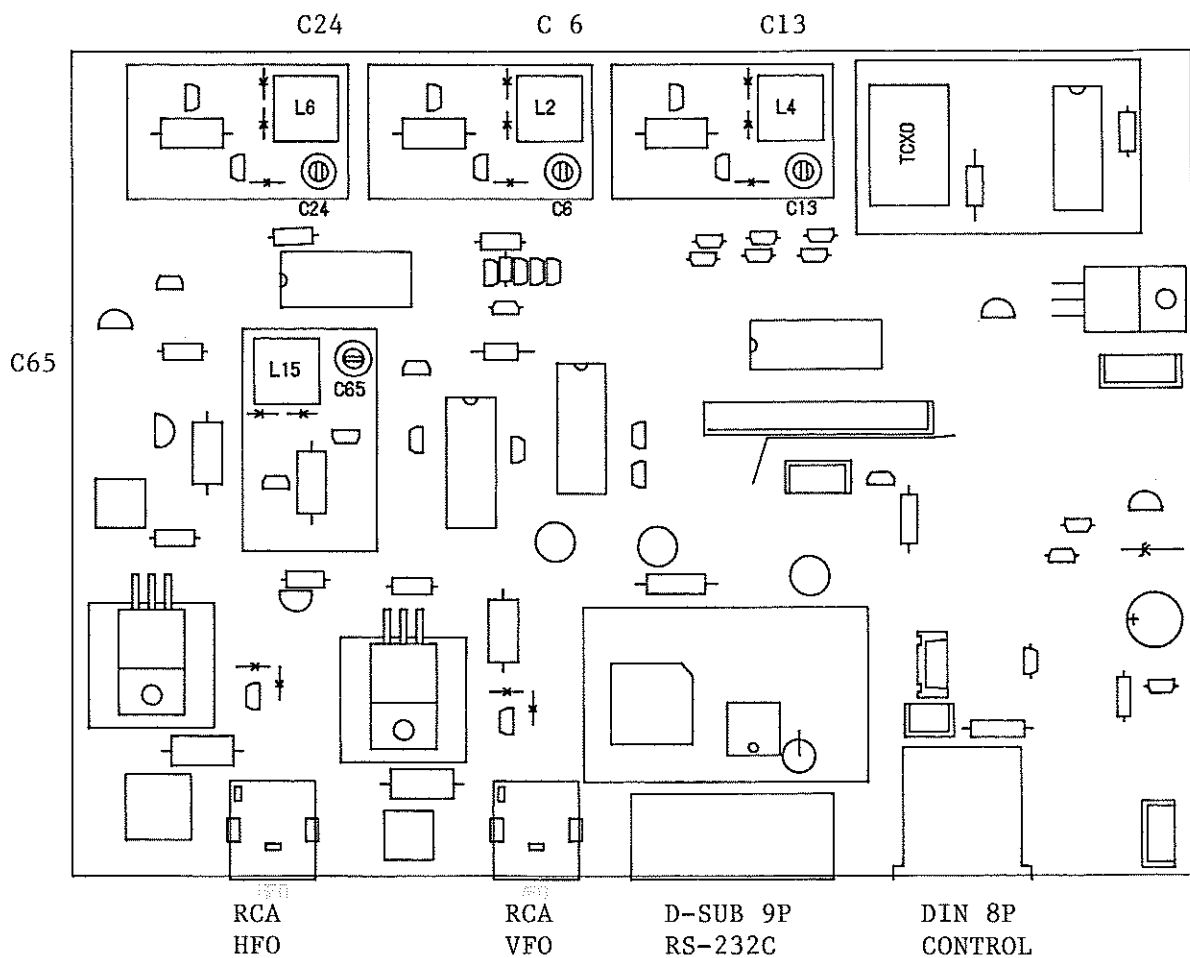
8. SPECIFICATIONS

As a part of our policy of continuous improvement, AOR reserves the right to make design and specification changes for product improvement without prior notice. The performance specification figures indicated are nominal values of production unit. There may be some deviation from these values in individual units.

Model		DDS-2A External VFO
Frequency range	HFO	6.550 MHz to 32.950 MHz
	VFO	2.695 MHz to 2.495 MHz
Stability		Less than 5 PPM. (0.005%)
Output level	HFO	2.0 to 2.3V RMS. @ 50 Ω
	VFO	2.0 to 2.3V RMS. @ 100 Ω
		1.5 to 1.7V RMS. through BPF
Spurious & Noise attenuation		
	HFO	> 70 dBc @ 1 kHz to 25 kHz from the carrier frequency.
		> 75 dBc @ 26 kHz to 1 MHz from carrier frequency.
	VFO	> 80 dBc @ 1 kHz to 25 kHz from carrier frequency.
		> 90 dBc @ 25 kHz to 250 kHz from carrier frequency.
Phase noise attenuation		>130 dBc/Hz @ 25 kHz(VFO) from the carrier frequency.
External power source		12.0 to 13.8V DC @ 0.6A. Less than 5mV ripple contents.
Dimension and weight		80 mm (H) x 180 mm (W) x 181 mm (D) / 1.9 kg (unit only)

APPENDIX A

DDS-2A PROGRAMMING GUIDE

1. GENERAL

The DDS-2A can be connected to PC's COM port for remote operation. 9-pin serial cable should be connected to the rear panel of the DDS-2A.

2. PARAMETERS

Set PC's terminal emulation parameters as follows. Majority of the communication software designed for DOS, MS.Windows, O/S2 or Mac OS should work with the DDS-2A.

Baud Rate	4,800 BPS.
Data Bits	8
Stop Bits	2
Parity	None
Flow Control	None
CR-> CR/LF	Outbound
Communication	Half-Duplex

3. DB-9 LAYOUT

The DDS-2A requires standard STRAIGHT 9-pin modem cable. However, you will need 3 wires as listed below if you make your own cable.

2	RXD	
3	TXD	
5	GND	
4	DTR	INTERNALLY PULLED-UP
6	DSR	"
8	CTS	"

4. OPERATION

Once in the REMOTE mode, no specific controls are needed for the DDS-2A. To resume the local operation, hit [**LOCAL**] key.   Once command is sent to the DDS-2A, the unit respond with your screen.

5. COMMAND SUMMARY

Table A shows the command available for the DDS-2A

Table A (DDS-2A COMMAND LIST)

COMMAND	FUNCTION
A	Select A VFO
B	Select B VFO
C	VFO A=B Switch
D	Dial Mode
S	BFO Shift compensation
L	"
U	"
X	"
Y	"
M	Memory Read
W	Memory Write
%	Memory Erase
E	Odd / Even start
Q	Exit Remote mode

6. COMMAND DESCRIPTION

In the remote mode, all front panel controls are disabled except the [**LOCAL**] key. The DDS-2A I
ignores the character other than those as listed below. The DDS-2A will respond with the
command terminated by the [CR] + [LF], except the "**E**" command.

COMMAND TO DDS-2A	RESPONSE FROM DDS-2A	STATUS
A ↵	A_ Fnnnnnnnnn (Frequency in Hz)	A VFO selected. Return frequency.
B ↵	B_Fnnnnnnnnn	B VFO selected. Return frequency.
C ↵	x_Fnnnnnnnnn x= A or B	Toggles A and B VFO.
D ↵	Fnnnnnnnn	Dial mode selected. Return frequency.
nn.nnnnnn ↵	↵	Dial mode selected.

	Example :	2 ↵	2 MHz
		05 ↵	5 MHz
		7.5 ↵	7.05 MHz
		9624 ↵	24 MHz
			(Accepts last two digits.)
		412.45872401↵	12.45872 Hz (Ignore 1 Hz)
	NOTE:	0 or 5 is accepted for 1 Hz entry.	

6. COMMAND DESCRIPTION (Cont'd)

COMMAND TO DDS-2A	RESPONSE FROM DDS-2A	STATUS
S ↵ n.nnnS ↵	S_F0000nnn	Display shift frequency. Sends shift condition based on the present status. (TX, RX, LSB, USB etc.)
	Example:	n.nnnS ↵ (KHz) 1.358S ↵ 1.358 KHz
L ↵ n.nnnL ↵	L_F0000nnn	LSB mode shift frequency at receive.
U ↵ n.nnnU ↵	U_F0000nnn	USB mode shift frequency at receive.
X ↵ n.nnn X ↵	X_F0000nnnn	LSB mode shift frequency at transmit.
Y ↵ n.nnn X ↵	Y_F0000nnnn	LSB mode shift frequency at transmit.
M ↵	Mnn_Fnnnnnnn or M -- (no memory)	Memory read mode. Memory channel number and frequency.
nn M ↵ nn = Memory #	Mnn_Fnnnnnnn or M -- (no memory)	Memory channel number and frequency.
W ↵	↵	Write display frequency into a vacant memory channel.
nnW ↵	↵	Write display frequency into a selected memory channel.
% ↵	↵	Clear all memory channel contents.

6. COMMAND DESCRIPTION (Cont'd)

COMMAND TO DDS-2A	RESPONSE FROM DDS-2A	STATUS
nn% ⏎	⏎	Clear selected channel memory contents.
E		Toggles between the odd and the even number start.
Q ⏎		End remote mode.

NOTE: _   (under line) shows SPACE (20h)
           ⏎   (enter key) shows delimiter. CR (0Dh) + LF (0Ch)

7. EXAMPLE

Command	Response	Comments
A ⏎	A_F21014740	VFO A selected.
7.080 ⏎	⏎	Enter frequency. (7.080 MHz)
10W ⏎	⏎	Write frequency into CH 10.
01M ⏎	M01_F03400000 ⏎	Read CH 01.
B ⏎	B_F0705274	VFO B selected.
11W ⏎	⏎	Write 7.05274 MHz into CH 11.
10M ⏎	M10_F07080000 ⏎	Read CH 10
50M ⏎	M-- ⏎	No memory contents.
11% ⏎	⏎	Clear CH 11.