

## Notice to the user:

One or more of the following statements may be applicable to this equipment.

### FCC WARNING

This equipment generates or uses radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

### 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 into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer for technical assistance.

### WARNING

To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

## General

Digital Signal Processing is a method of signal manipulation that takes an analog signal, such as a sine wave, and converts it into a digital waveform that looks a lot like a staircase. By converting the signal into a digital waveform it is possible to remove some of the noise associated with the signal, and also to tailor the audio passband of the transceiver for the best performance.

DSP also has the advantage of providing increased suppression of the unwanted sideband during SSB operations. It increases the amount of carrier suppression, provides an improved CW waveform that may be tailored for operator preference of rise and decay times, and provides a cleaner RTTY/FSK signal that decreases errors.

Operator controls are provided on the front panel of the DSP-100 to allow the operator to select 4 different LPF response limits and 4 different HPF response limits. This is useful in pileups as it provides maximum signal intelligence with minimum bandwidth. Since the signal is also digitally processed this results in a signal that is "cleaner or more crisp" than an equivalent analog signal. This makes it easier for the DX station to pick you out of the pile-up.

During marginal band conditions the ability to digitally process the incoming receive audio signal can also result in a cleaner signal. Since the processing is done at an IF level it results in a more copyable signal. Not only are you able to tailor the audio frequency response, but because the signal has been digitally processed it also appears to be "cleaner or more crisp".

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## ■ SPECIFICATIONS

SPECIFICATION	DSP-100
Mode	J3E (LSB, USB), A1A(CW), A3E(AM), F1A(FSK)
Power requirement	K and P type: 120VAC $\pm$ 10% E and M type: 230VAC $\pm$ 10% X type: 240VAC $\pm$ 10%
Power dissipation	Less than 30W
Operating temperature	-10°C to +50°C (+14°F to +122°C)
Output frequency	455kHz
Input frequency	36.891MHz
Modulation	SSB: Balanced modulation AM: Low level modulation
Unwanted frequency deviation	More than 50dB
Dimensions W×H×D (Projections included)	270×56×281mm (10-5/8"×2-3/16"×11-1/16")
Weight	3 kg (6.6 lbs)

## ■ ACCESSORIES

Cable with connector (6-pin).....	E30-3047-05	1 ea.
Cable with connector (13-pin)....	E30-3048-05	1 ea.
Cable with connector (Yellow)...	E30-3055-05	1 ea.
Cable with connector (Black)....	E30-3056-05	1 ea.
Fuse(0.3A) (K and P type) ....	F05-3001-05	..... 1 ea.
Fuse(0.2A) (E type).....	F05-2015-05	..... 1 ea.
Fuse(0.2A) (M and X type)	F05-2012-05	..... 1 ea.
Instruction Manual.....	B62-0077-XX	... 1 copy
Warranty card (U.S.A, Canada and Europe version only) .....		1 ea.

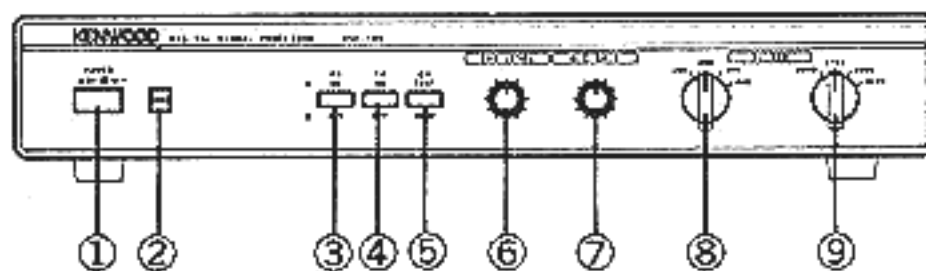
## ■ INSTALLATION

Refer to the instruction manual provided with the transceiver.

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## ■ OPERATING CONTROLS

### Front Panel



#### ①POWER switch

Press to turn the power ON or OFF.

#### ②POWER indicator

Lights when the POWER switch is ON.

#### ③RX switch

Depressing this switch will allow the DSP-100 to be used during receive.

#### ④TX switch

Depressing this switch will allow the DSP-100 to be used during transmit.

#### ⑤CW switch

Depressing this switch will allow the DSP-100 to be used during CW to control the rise and decay times of the transmitted signal.

#### ⑥CAR LEVEL control

Used to adjust the carrier level of the transceiver in the CW, FSK, AM, and FM modes of operation.

#### ⑦MIC GAIN control

Used to adjust the microphone gain level of the transceiver during SSB and AM operation.

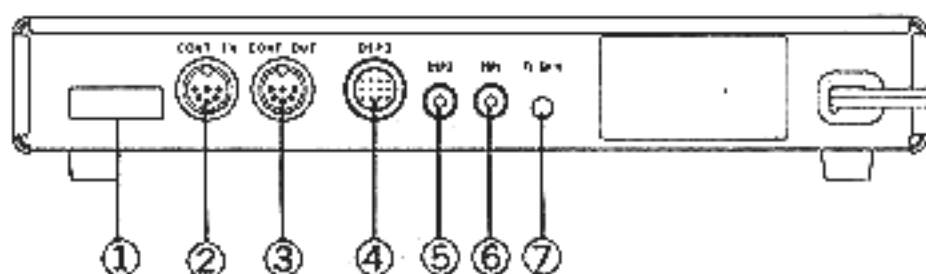
#### ⑧FILTER switch (HPF)

This 4 position control is used to select the desired low frequency cutoff point.

#### ⑨FILTER switch (LPF)

This 4 position control is used to select the desired high frequency cutoff point.

### Rear Panel



#### ①DIP switch

This switch is used to control some of the less frequently used functions of the DSP-100. Please refer to the chart on page 5 for further information on this control.

#### ②CONT IN connector

Connect the 6 pin DIN cable from this jack to the ACC1 jack on the rear of the transceiver.

#### ③CONT OUT connector

This connector is used when there are two transceivers connected together in a Master/Slave configuration and you have separate DSP-100 units for each transceiver. This connector is used to connected the interface

**④ DSP3 connector**

Connect the 13 pin DIN cable from this jack to the DSP3 connector on the rear of the transceiver.

**⑤ DSP2 connector**

Connect the black RCA cable from this jack to the DSP2 jack on the rear of the transceiver.

**⑥ DSP1 connector**

Connect the yellow RCA cable from this jack to the DSP1 jack on the rear of the transceiver.

**⑦ TX GAIN volume**

This control is used to adjust the output level during SSB transmissions.

## ■ OPERATION

### 1. SSB mode (Transmit)

- (1) Place the transceiver in the desired SSB mode. (USB or LSB)
- (2) Press the DSP-100 TX switch ④ to turn on the DSP-100 transmit function.
- (3) Depress the PTT switch on your microphone and adjust the MIC GAIN control ⑦ of the DSP-100 so that the ALC indicator on the transceiver remains within the ALC zone when you speak into the microphone.

#### Notes

1. The MIC gain control on the transceiver will be disabled when the TX function of the DSP-100 is on.
2. The DSP-100 contains a clipper circuit to reduce the microphone gain when an excessively strong signal is generated by the microphone. This might cause some distortion on your transmitted signal.
3. The SSB transmitter audio level of the DSP-100 can be adjusted with the TX GAIN control on the rear of the DSP-100. Do not adjust this control unless it is absolutely necessary. Improper adjustment can result in distortion of your transmitted audio signal.

- (4) The transmit audio passband can be adjusted with the FILTER switches on the front of the DSP-100. You can select a low cut frequency of 100, 200, 300, or 400 Hz and/or a high cut frequency of 2600, 2750, 2900, or 3100 Hz.

#### Notes

1. You can select the desired receiver audio passband with the front panel controls on the DSP-100 and select to have a transmit audio passband of from 100 to 3100 Hz. Please refer to section 7 for information on this function.
2. Do not advance the MIC GAIN control too far clockwise when the filter low cut filter switch is set to 100Hz. It is possible for the transmitter to key when you depress the TX switch on the front of the DSP-100. Keep the control adjustment so that the ALC meter reading is within the ALC range.

### 2. CW mode (Transmit)

- (1) Place the transceiver in the CW mode.
- (2) Press the DSP-100 TX switch ④ to turn on the DSP-100 transmit function.
- (3) Depress the CW key or depress the REC/SEND switch on the transceiver to select the transmit mode.
- (4) Adjust the CAR LEVEL control on the front of the DSP-100 so that the ALC indicator stays within the ALC zone during transmit.

#### Note

The CAR control on the transceiver is disabled during DSP transmit operations.

- (5) Select the desired Rise and Decay times of your CW waveform by using the CW switch on the front panel of the DSP-100. The rise/decay time is 4 mS in SLOW and 2 mS in FAST. You can change these settings to 8 mS SLOW and 6 mS FAST using the DIP switch on the rear of the DSP-100. Please refer to section 7 for additional information on this function.

#### Note

If you select a rise/decay time of 8 mS you will not be able to operate the transceiver in the full break-in mode, because the 8 mS time constant is longer than transceiver requires to switch between transmit and receive.

### 3. FSK mode (Transmit)

- (1) Place the transceiver in the FSK mode.
- (2) Press the DSP-100 TX switch ④ to turn on the DSP-100 transmit function.
- (3) Place the transceiver into the transmit mode by depressing the REC/SEND switch or by keying your terminal unit.
- (4) Adjust the CAR LEVEL control on the front of the DSP-100 so that the ALC indicator stays within the ALC meter zone.

#### Notes

1. The FSK shift width and direction of the DSP-100 are determined by programming information provided by the transceiver.
2. The CAR control on the transceiver is disabled during DSP transmit operations.

### 4. AM mode (Transmit)

- (1) Place the transceiver in the AM mode.
- (2) Press the DSP-100 TX switch ④ to turn on the DSP-100 transmit function.
- (3) Adjust the CAR LEVEL and the MIC GAIN controls on the front of the DSP-100 rather than the equivalent controls on the transceiver when adjusting the transceiver for AM operation.

#### Note

The CAR and MIC controls on the transceiver are disabled during DSP-100 transmit

## 5. FM mode (Transmit)

- (1) Place the transceiver in the FM mode.
- (2) Press the DSP-100 TX switch ④ to turn on the DSP-100 transmit function.
- (3) Place the transceiver into the transmit mode by depressing the PTT switch on your microphone.
- (4) Adjust the CAR LEVEL control on the front of the DSP-100 so that the ALC indicator stays within the ALC meter zone.

### Notes

1. The DSP-100 will only generate a carrier. No modulation is performed by the DSP-100 itself. You must speak into the microphone to modulate the carrier.
2. The CAR control on the transceiver is disabled during DSP-100 transmit operations.

## 6. SSB, CW and FSK mode (Receive)

- (1) Select the receive mode on your transceiver, i.e. unkey the set.
- (2) Press the DSP-100 RX switch ③ to turn on the DSP-100 receiver function.
- (3) The receiver audio passband can be adjusted with the FILTER switches on the front of the DSP-100. You can select a low cut frequency of 100, 200, 300, or 400 Hz and/or a high cut frequency of 2600, 2750, 2900, or 3100 Hz.

### Notes

1. You can select the desired receiver audio passband with the front panel controls on the DSP-100 and select to have a transmit audio passband of from 100 to 3100 Hz. Please refer to section 7 for information on this function.
2. The signal strength meter reading (S-Meter) may be lower than the actual signal strength, or the audio level might be lower than normal when using a 6 kHz IF filter. This is because the AGC circuits might be adversely affected by other nearby signals with such a wide IF bandwidth. This can effectively lower the gain of the receiver. This should not be a problem with the other filter selections on the transceiver.

## 7. DIP switch

Several functions of the DSP-100 can be controlled thru the programming of the DIP switch located on the rear of the DSP-100. All the switches are ON as delivered from the factory. Refer to the accompanying chart for additional information on the functions that can be controlled by this switch.

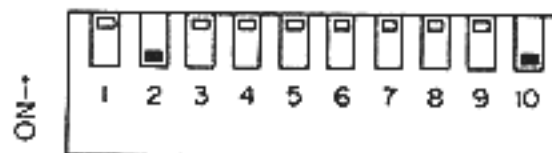
## 8. SSB transmitter output level adjustment

### Note

This equipment has been calibrated at the factory using an external frequency standard and should, therefore, not require further adjustment. Do not attempt to recalibrate this adjustment unless absolutely necessary.

The SSB transmit audio output level is adjusted with the TX GAIN control on the rear of the DSP-100. A two-tone signal produced by the DSP-100 (internally) is used for this adjustment.

- (1) Connect the DSP-100 to the transceiver. Attach a 50 ohm load to the antenna terminal of the transceiver and adjust the transceiver for a frequency of 21.200 MHz in the USB mode. Turn the PWR control fully clockwise. Turn the speech processor OFF.
- (2) Turn DIP switch positions 2 and 10 OFF as illustrated in the diagram below.



Set the LPF select switch on the front panel of the DSP-100 to the 2750 Hz position.

- (3) Place the transceiver into transmit and adjust the TX GAIN control on the back of the DSP-100 so that the ALC Indicator reads full scale on the ALC meter.

### Note

The MIC control of the transceiver and the MIC GAIN control of the DSP-100 are disabled during this adjustment.

- (4) Unkey the radio and return DIP switch positions 2 and 10 to their ON positions.

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## DIP Switch Setting

Switch No.	Position (ON/OFF)	Description	
1	LPF In/Out	Turns the LPF (Low Pass Filter) on or off. This filter determines the high-cut frequency for transmit and receive.	
2	FSK/PSK	Determines the type of waveform generated in the FSK mode.	
3	SSB/DSB	Allows a double sideband, suppressed carrier to be generated during SSB operation when turned <b>OFF</b> .	
4	Carrier Suppression notch filter In/Out	Controls the carriers suppression notch filter during transmit operations.	
5	CW waveform Rise-Decay time select FAST/SLOW	Selects the desired CW waveform characteristics. ON FAST: 2 mS, SLOW: 4 mS OFF FAST: 6 mS, SLOW: 8 mS	
6, 7	FILTER switch transmit/receive selection.		
	Switch No.6	Switch No.7	
	ON	ON	Front switches control RX and TX
	ON	OFF	Fixed during RX.
	OFF	ON	Fixed during TX.
	OFF	OFF	Controlled by transceiver.
8	Receive HPF control	Controls the receiver HPF that determines the low frequency cutoff point.	
9	Transmit HPF control	Controls the transmit HPF that determines the low frequency cutoff point.	
10	Remote Control	Usually turned on. Allows DSP-100 to control frequency response.	

## Notes

- The functions of DIP switches 1, 8, and 9 have priority over the operation of DIP switches 6 and 7.
- If there is no compatible transceiver that can control the functions of DIP switches 6 and 7 the filter passband will be fixed at 200 Hz and 2750 Hz.
- The occupied frequency band during transmit is increased when DIP switch 1 is off. Use of an external audio equalizer, etc, is recommended if DIP switch 1 is off.
- The low-frequency response of the transmitter is improved when DIP switches 4 and 9 are off. This has the disadvantage of reducing the carrier suppression ratio since the carrier suppression notch filter is off. We therefore recommend that you leave DIP switches 4 and 9 on.
- The LPF FILTER switch is not active when the speech processor of the transceiver is on.