

**INSTRUCTION MANUAL  
OF  
VHF AUTOMATIC DIGITAL  
DIRECTION FINDER  
TD-L1620A**

**- OPERATION, INSTALLATION AND MAINTENANCE -**

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**Warning:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FOR SERVICE REQUIREMENT

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### 3.2 SPOT Mode

- (1) Basic procedure for spot reception

Confirm that SPOT is ON. If not, press **[SPOT]**. Call up a channel and receive. **[M]** → **[±]** → **[Last digit]** → **[E]**

- (2) Change to another channel in the same group while receiving in **[SPOT]** mode. Press **[S]** as many times as necessary.

### 3.3 SRCH Mode

- (1) Basic procedure for search reception

Confirm that SRCH is ON. If not, press **[SRCH]**. Set a center frequency,  $F_c$ , and start searching in step of 5 kHz in the range of  $F_c \pm 500$  kHz.

**[F]** → **[Center frequency, 6 digits]** → **[E]**

- (2) Change the direction of frequency sweep, press **[±]**.

- (3) When a signal is received and frequency search stops, press **[S]** several times to find a frequency at which the level indicator shows its maximum.

- (4) When an interesting frequency is found in SRCH reception, store it in a memory channel by following procedure.

**[HOLD]** → **[M]** → **[±]** → **[Last digit]** → **[E]**

- (5) When HOLD is on, incoming signal locks frequency search. To restart search, press **[S]**.

### 3.4 SCAN Mode

- (1) Set SCAN mode

Confirm that SCAN is ON. If not, press **[SCAN]**.

When SCAN mode was selected at the last power off, SCAN restarts when the power switch is turned on.

- (2) Check the group number. To change the group number, operate key as following. **[±]** may be pressed a few times:

**[M]** → **[±]** → **[E]**.

- (3) When HOLD is on, incoming signal locks frequency scan. To restart scan, press **[S]**.

- (4) SCAN pass

When a frequency is not necessary to be scanned while it is being received, following procedure restart scanning and that frequency is skipped from the next scan:

**[M]** → **[E]** → **[S]**

- (5) A frequency returns to be scanned from scan pass, enter the last digit of its channel number by following procedure.

**[M]** → **[Last digit]** → **[E]**.

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- (1) Basic procedure for spot reception

Confirm that SPOT is ON. If not, press **[SPOT]**. Call up a channel and receive. **[M]** → **[±]** → **[Last digit]** → **[E]**

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When a frequency is not necessary to be scanned while it is being received, following procedure restart scanning and that frequency is skipped from the next scan:

**[M]** → **[E]** → **[S]**

- (5) A frequency returns to be scanned from scan pass, enter the last digit of its channel number by following procedure.

**[M]** → **[Last digit]** → **[E]**.

## PRECAUTIONS



WARNING Personal injury or death may occur when handled improperly.



CAUTION Personal injury or damage to property may occur when handled improperly.



To indicate the possibility of electric shock when handled improperly.



To avoid an electric shock, its GND terminal should be grounded with a grounding cable.



To indicate the possibility of overheat, smoke or fire when handled improperly.

## NOTE ON SAFETY



WARNING



● Grounding

Though attention has been paid in design to prevent electric shock due to high voltage, connect grounding cable to the GND terminal on its rear panel.



● Note to avoid electric shock

- (1) When a specialist has to touch part(s) inside the equipment, turn off its power supply together with its switch on the switch board.
- (2) Do not touch part(s) inside the equipment when operator's body is wet.



CAUTION



- Never feed power other than designated voltage or frequency. If not, electric shock, smoke or fire may occur.

- Never let water or other liquid enter inside. If not, electric shock may occur.



- Never let metallic piece enter inside. If not, short-circuit may occur and cause fire.

## CAUTION IN INSTALLATION

### CAUTION

- Never install the equipment to a place where rain or water splash makes it wet. Avoid to install it to a place with high moisture since water may cause troubles.
- Avoid installing the equipment to a place exposed to direct sunshine or vibration or shock which may cause trouble.
- Separate the equipment from a magnetic compass when a safe separation distance is shown on the equipment.

## CAUTION IN OPERATION AND MAINTENANCE

### WARNING

- Note to the maintenance of the loop antenna  
Paint the loop antenna with oil paint to avoid its erosion. If it is not painted for a long period, it may drop because of erosion.

### CAUTION

- Confirm the buoy function before operation  
When it is used for radio buoy operation, confirm that the direction can be measured on board after the switch of the buoy is turned on.
- Gyro repeater confirmation  
When a gyro repeater is built in the equipment, confirm that it follows the movement of the master compass from time to time.
- No organic solvent  
Never apply organic solvent such as thinner or alcohol to wipe it. Use soft cloth wet with neutral detergent solution.

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# Chapter 1 GENERAL DESCRIPTION

## 1.1 INTRODUCTION

TD-L1620A is a high grade VHF AUTOMATIC DIGITAL DIRECTION FINDER (VHF ADDF) covering a frequency range from 110MHz to 170MHz. Goniometers with rotation mechanism which has been widely employed in direction finders is replaced with a computer-controlled device which results in a high reliability.

The model is designed for H type Adcock antenna with a balanced modulation circuit. A computer-controlled synthesizer with a triple super-heterodyne circuit provides high sensitivity, accuracy and stability and consequently, the unit is very suitable for stand-by reception.

A new tracking technique is adopted for its display which gives a high stability in the display even for a weak signal with low S/N ratio. Both digital and direct bearing displays give the bearing when a signal is received. Holding function is also provided which maintain the last bearing data while receiving no signal. Bearing data is updated when the signal arrives irrelevant to whether the holding function is on or off.

There are 4 modes in selecting the frequency which are explained below:

1. MANU mode : Reception by manual frequency setting.
2. SPOT mode : Quick reception by channel selection. Max 30 frequencies can be stored in the memory.
3. SRCH mode : Search reception covers a frequency range,  $F_c \pm 500\text{kHz}$ , in 5kHz step, where  $F_c$  is the center frequency.
4. SCAN mode : Automatic scanning reception of SPOT frequencies in group. Max. 10 channels with the same group number can be scanned. Scan stops when a signal is received.

## 1.2 FEATURES

Features of the model are shown below.

- a) A wide range from 110 MHz to 170 MHz is covered.
- b) Computer-controlled circuits without mechanical movement give high reliability.
- c) The relative bearing is indicated on LCD with 36 LEDs in  $10^\circ$  step.
- d) LCD shows relative bearing in  $1^\circ$  step.
- e) Scanning reception over a frequency group is possible. Max 3 groups, and max.10 channels in a group.
- f) Clear voice is received both in DF and RCV mode.
- g) An LED level indicator shows the signal level.
- h) A light Adcock antenna has a high sensitivity.
- i) The unit is compact, easy to operate, and with a low power consumption.

- j) Various modes of reception are selectable, MANU, SPOT, SCAN and SRCH.
- k) The frequency and the bearing are maintained until next signal comes.
- l) A squelch circuit is built-in to suppress noise when no signal comes.

## 1.3 SPECIFICATIONS

### ● Antenna (EA-351A)

- Type : H type Adcock Antenna
- Antenna Cable : Twin coaxial cable with armor
  - 16m or shorter : RG-58A/U, 17 - 29m : 5D-2V
  - 30m or longer : 8D-2V

### ● Receiving system

- Amplification : Triple-superheterodyne with synthesized local frequency oscillator.
- Mode of reception : Manual, spot, search and scan.
  - SPOT : max. 30 channels in the memory
  - SRCH : center frequency  $\pm 500$  kHz, in 5 kHz step
  - SCAN : max. 10 SPOT frequencies in the same group.
- Frequency : 110 - 170 MHz, in 5 kHz step
- Mode of modulation : AM or FM (waveform : A3 or F3)
- Sensitivity : For DF mode, minimum field strength  $0.5 \mu\text{V/m}$ .  
For RCV mode, 12dB SINAD  $0.25 \mu\text{V}$ .
- Selectivity :  $\pm 6$  kHz at -6dB or wider.  
 $\pm 12$  kHz at -60dB or narrower.
- Squelch Sensitivity :  $0.25 \mu\text{V}$

### ● Output

- Displays : Digital bearing display in  $1^\circ$  increment  
Analog bearing display with LED in  $10^\circ$  step
- Voice Output : 1.8W (impedance  $4 \Omega$ )

### ● Power Supply : DC 11~35V, 0.6~1.5A

AC Power Supply is available as option.

### ● Back-up Battery : Built-in, Ni-Cd battery, rechargeable GB-5011-3

### ● Size and Weight

- Main Unit : 175(H)x320(W)x350(D)mm, 8kg
- Adcock Antenna : 930(H)x410(W)x410(D)mm, 3kg

# Chapter 2 OPERATION

## 2.1 KEYS AND CONTROLS

### 2.1.1 Front Panel

Fig.1 shows layout of keys and controls on the Front Panel of TD-L1620A.

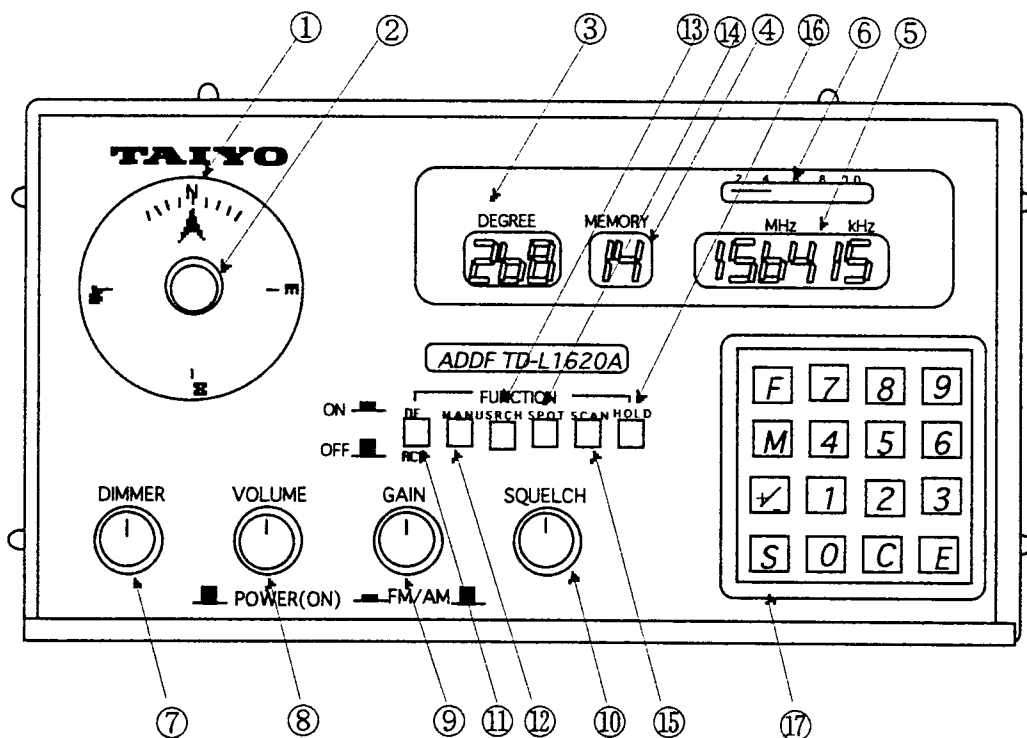


Fig. 1 Layout of keys and controls on front panel

Table 1. Names and functions of keys and controls on front panel  
(to be continued)

No	Name	Functions
①	Ring display	To show the relative bearing with 36 LEDs in 10° step.
②	Azimuth	To read the true bearing. on the azimuth card.
③	DEGREE	To give relative bearing in 1° step. It also shows entry condition with keyboard.
④	MEMORY	To indicate the channel number in the memory.
⑤	Frequency	A selected frequency is displayed in 5kHz step.
⑥	Level	To indicate the level of a signal on LED, with 10 LED indicators.
⑦	DIMMER	Rotate clockwise to increase the brightness of LEDs and LCDs. Also, pull the knob to illuminate the azimuth card.