



ANTENNA TUNER
Model AT-130

INSTRUCTION MANUAL

The Model **AT-130** is designed to satisfy your antenna-tuning requirements. It has been manufactured with the quality and performance that makes Kenwood "The Pacesetter in Amateur Radio".

This unit has been carefully engineered and manufactured under rigid quality standards, and should give you satisfactory and dependable operation for many years.

Should any trouble arise with this unit, please contact the authorized **KENWOOD** dealer from whom you purchased the item.

AFTER UNPACKING

Shipping Container: Save the boxes and packing in the event your unit needs to be transported for remote operation, maintenance, or service.

The following explicit definitions apply in this manual.

NOTE: If disregarded, inconvenience only. No risk of equipment damage or personal injury.

CAUTION: Equipment damage may occur, but not personal injury.

FEATURES

1. The **AT-130** is a high performance HF antenna tuner and is a modification of the popular **AT-200** antenna tuner. The **AT-130** is small and light, and is suitable not only for operation in your HAM shack but also for mobile or field operation.
2. The **AT-130** consists of an antenna coupler, an SWR meter, and an antenna switch.
3. The **AT-130** is designed to be used on the Amateur bands between 3.5 MHz and 30 MHz.
4. Antenna **MATCHING** or **THROUGH** operation is **BAND-switch** selected.
5. The SWR meter operates in both **THROUGH** and **MATCHING** modes.
6. A mounting bracket is included for mobile operation.
7. The panel meter can be illuminated by an external power source.
8. The antenna matching circuit is also effective in reducing TVI since it acts as a band-pass

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AT-130 SPECIFICATIONS

1. Antenna Coupler

Frequency range:	8 amateur bands from 3.5 to 29.7 MHz
Input impedance:	50 Ω
Output impedance:	20 to 300 Ω , unbalanced.
Through power:	150 W max. (3.5 MHz band, 120 W)
Insertion loss:	Less than 0.5 dB at optimum match.

2. SWR Meter

Frequency range:	3.5 to 29.7 MHz
Max. power:	150 W
Measurable range:	1.0:1 to 10:1
Min. power required:	2 W

3. General

INPUT Connector:	UHF type (50 Ω)
ANT Connector:	UHF type (50 Ω)
GND:	Wing nut and stud
Dimensions:	H. 60mm (2-3/8") W. 152mm (6") D. 159 mm (6-1/4")
Weight:	1.6 kg (3.5 lbs) approx.

SECTION 1. PREPARATION FOR USE

Accessories:

Carefully unpack your AT-130 Antenna Tuner and verify the following accessories are included.

- * Operating manual 1 copy
- * Mounting bracket (J29-0402-02) . . 1 piece
- * Mounting hardware
 - Screw, 4 mm diameter 4 pieces
 - Flat washer, 4 mm diameter . . . 4 pieces
 - Lock washer, 4 mm diameter . . . 4 pieces
 - Nut, 4 mm diameter 4 pieces
 - Wing Bolt, 4 mm diameter
(N09-0007-05) 4 pieces
 - Polyethylene washer 4 pieces
- * 2P power plug (E09-0203-25) 1 piece
- * Ground lug (E23-0015-04) 1 piece

Interconnection Cable

To connect your AT-130 with the TS-130S(V) or other transceiver, an interconnection cable is required.

Refer to Figure 1-1 for details.

Meter Lamp Power (Figure 1-2)

Power for the meter lamp is supplied from an external power source. Use the supplied 2 PIN plug for power-supply connection. Observe polarity.

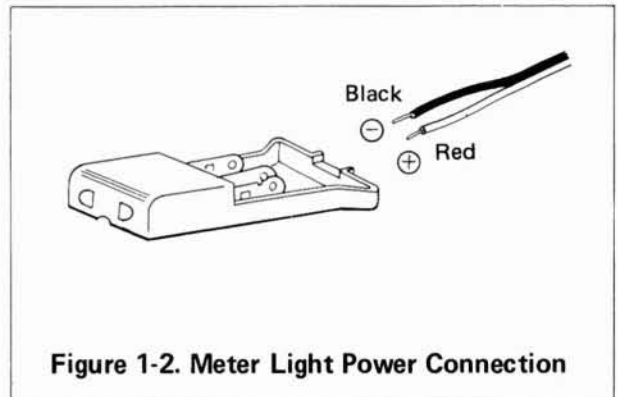
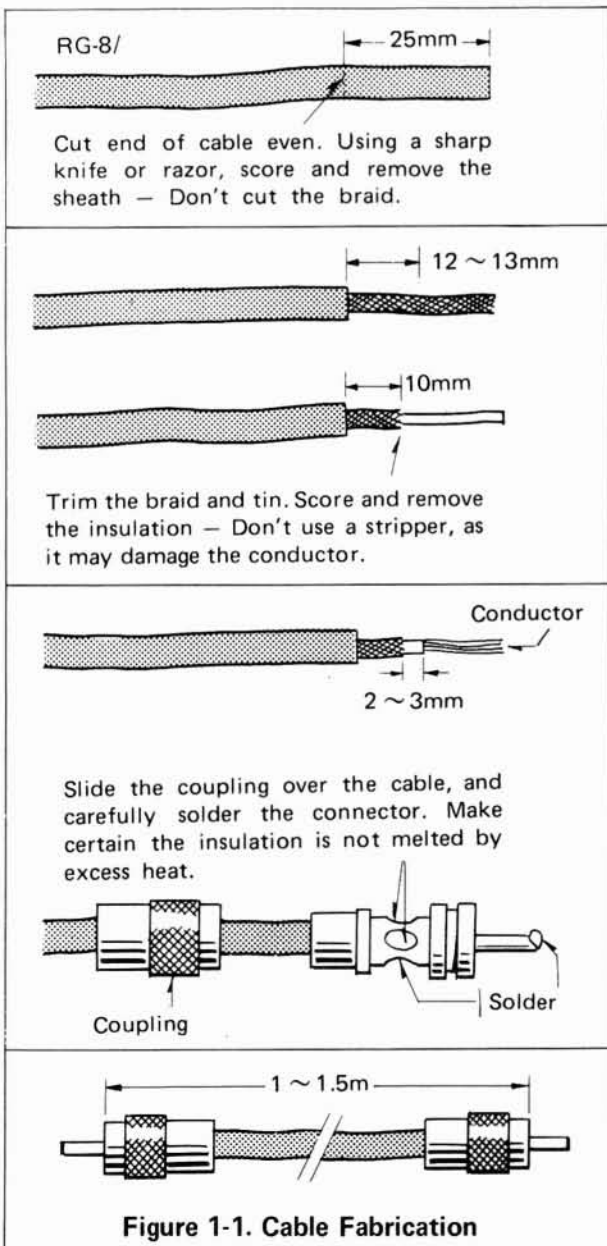


Figure 1-2. Meter Light Power Connection

SECTION 2. CONTROLS AND THEIR FUNCTIONS

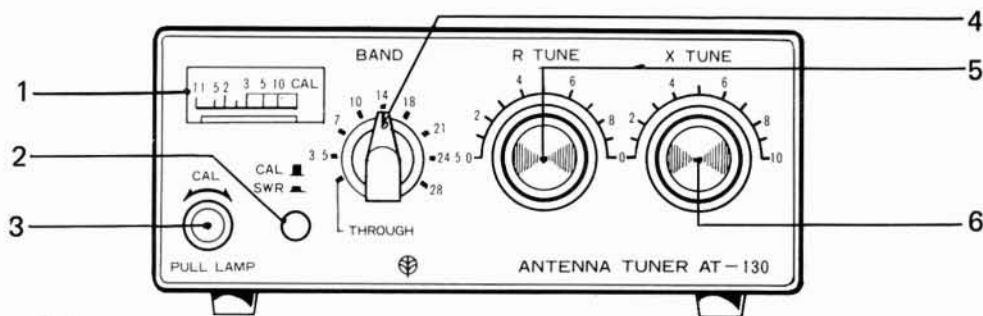


Figure 2-1 Front view

1. Meter

The meter reads SWR (standing-wave ratio) and may be illuminated by an external power source.

2. CAL (Calibrate)/SWR Switch

To measure SWR, first set this switch to the CAL (■) position. Adjust the CAL control until the meter pointer swings to the CAL line on the meter scale.

Then depress the switch to the SWR (▲) position, and read the SWR.

3. CAL (Calibrate) Control/Meter Lamp Switch

Before measuring SWR, this control is used to calibrate the meter. Adjust as described above in item 2. The meter lamp lights when the control is pulled ON.

4. BAND Switch

Set this switch to the band in which you are operating. The BAND switch also has a "THROUGH" position at which the antenna is connected directly to the transceiver. SWR can also be measured at the THROUGH position.

CAUTION: DO NOT operate the band switch while transmitting. Equipment damage **WILL** occur.

5. R TUNE

The R TUNE adjusts the resistive component of antenna impedance.

6. X TUNE (Transmit Tuning) Control

The X TUNE adjusts the reactive component of antenna impedance.

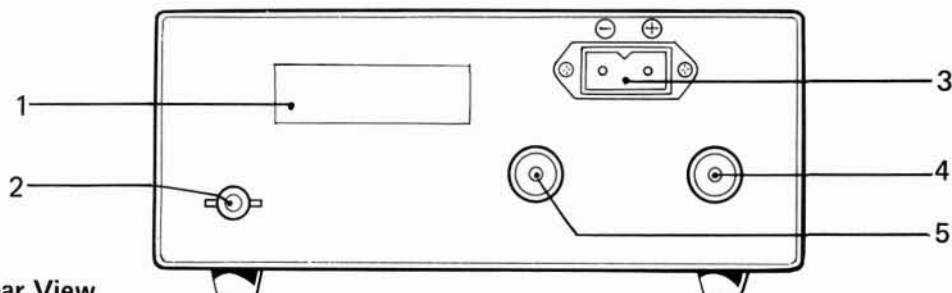


Figure 2-2. Rear View

1. Serial No. Plate

This plate is stamped with the Serial Number of your unit.

2. GND post

Connect the GND post to the transceiver GND stud. Use as short a cable as possible, using the supplied ground lug.

3. 12V DC

Accepts 12V DC for meter illumination. Use the supplied plug.

NOTE: Viewed from the rear, the right terminal is POSITIVE.

4. INPUT Connector

The INPUT UHF connector accepts the HF input signal fed from the antenna connector on the transceiver.

5. ANT Connector

The ANT UHF connector accepts the antenna coaxial cable.

SECTION 3. OPERATION

Measuring antenna system SWR

(i) Using an all solid-state transceiver (such as a TS-130S or TS-130V)

Before setting up the antenna coupler, first determine the antenna system SWR.

- a. Set the controls as shown in Figure 3-2. Set the BAND switch to the "THROUGH" position.
- b. In the transmit mode, calibrate the meter with the calibration control.
- c. Depress the CAL/SWR switch to the SWR (■) position and read SWR. If the SWR is lower than 1.5:1 the antenna system impedance is sufficiently matched for practical use. If above 1.5:1, tune the system.

NOTE: In the event of too high an SWR (over 10:1), check the antenna system for breaks or a short circuit.

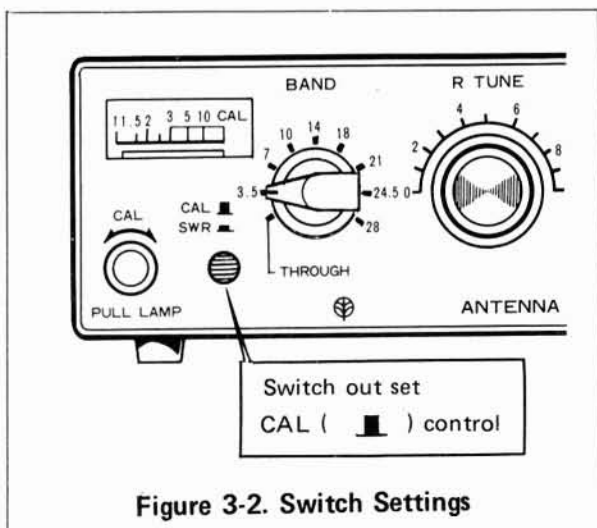
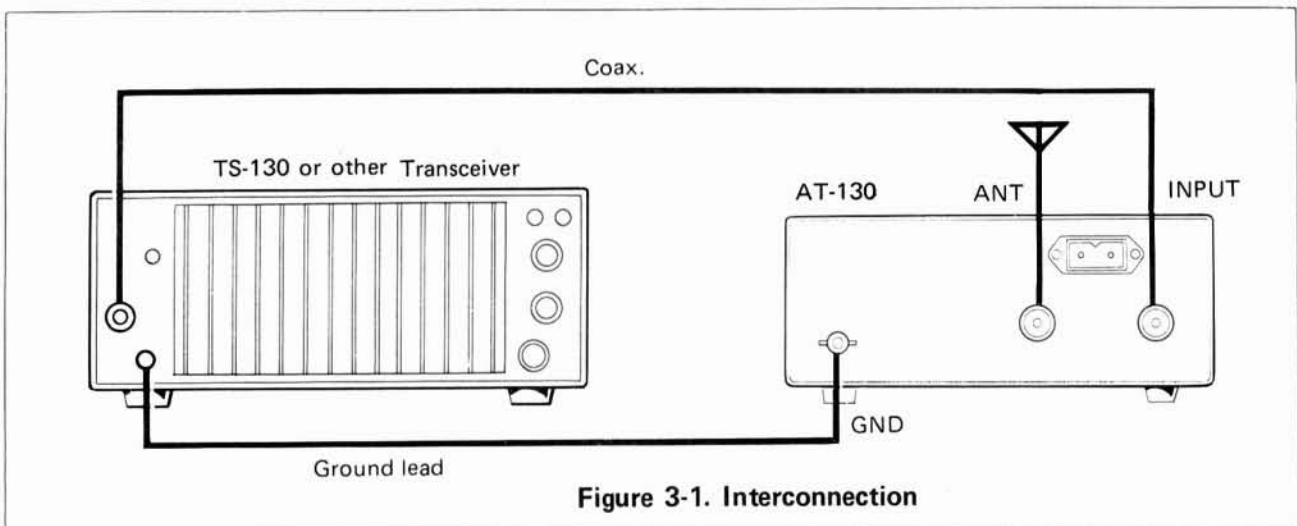
(ii) Using a tube power amplifier transceiver (such as a TS-820)

Connect the transceiver (or transmitter) and dummy load (or antenna) through the AT-130 as shown in Figure 3-3. Before adjusting the antenna coupler, you should first know the antenna system SWR.

Connect the dummy load to the ANT connector and adjust the transceiver (or transmitter) final tuning. Then, replace the dummy load with the antenna and measure the antenna-system SWR.

NOTE: During antenna measurements, your transceiver may be operating under heavy loading conditions.

Your signal may also interfere with other stations. Use the least amount of power possible, and complete measurements as quickly as possible.



Adjusting the Antenna Coupler

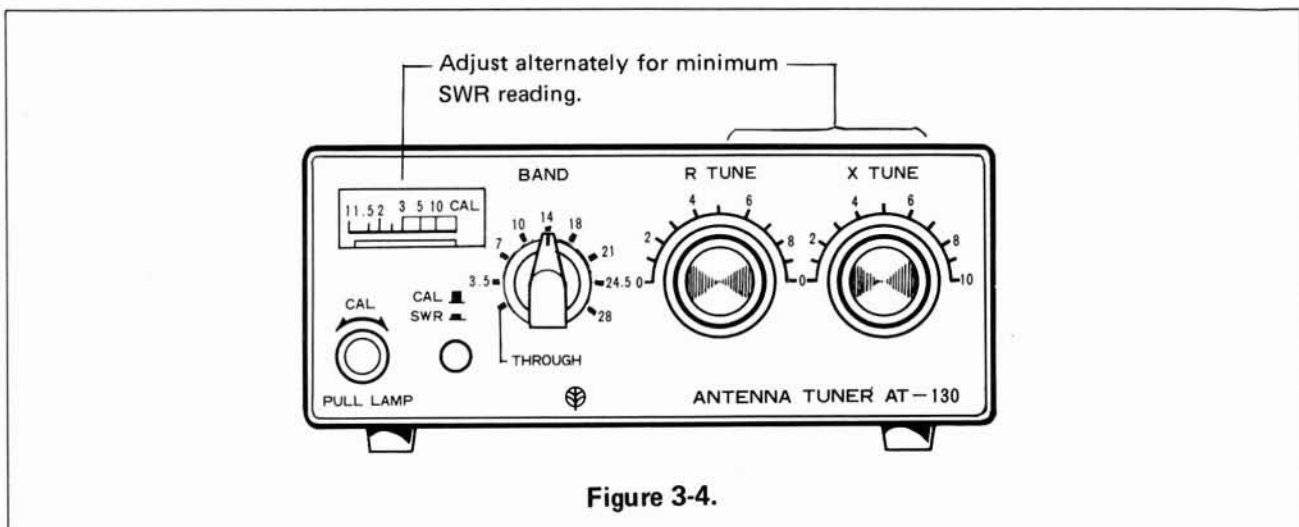
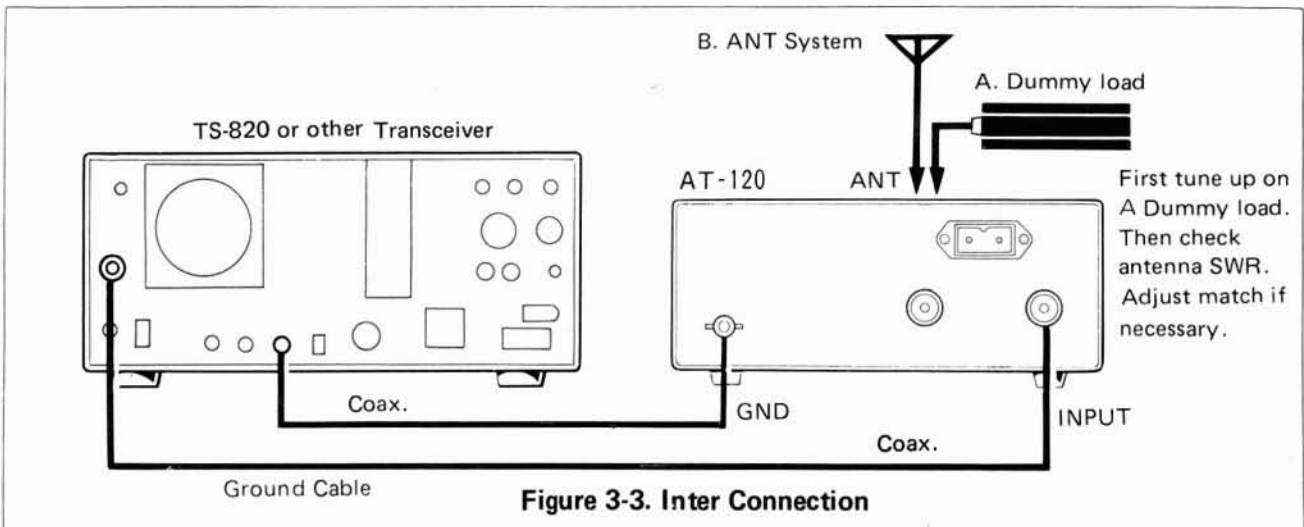
The antenna coupler is used to match a transmitter to an antenna system when its SWR is too high (i.e., greater than 1.5:1 SWR).

- Place the BAND switch to the same band setting as your transceiver (as shown in Figure 3-4).
- Set the CAL/SWR switch to the CAL (■) position.
- Transmit and adjust the CAL control so the meter indicates CAL.
- Place the CAL/SWR switch in the SWR (—) position.
- Now you will measure the reflected power. Adjust the R TUNE and X TUNE controls alternately for a good minimum meter indication. Reflected power will be close to zero as a good match is achieved.

Table 3-1 shows approximate control positions for coupler adjustment.

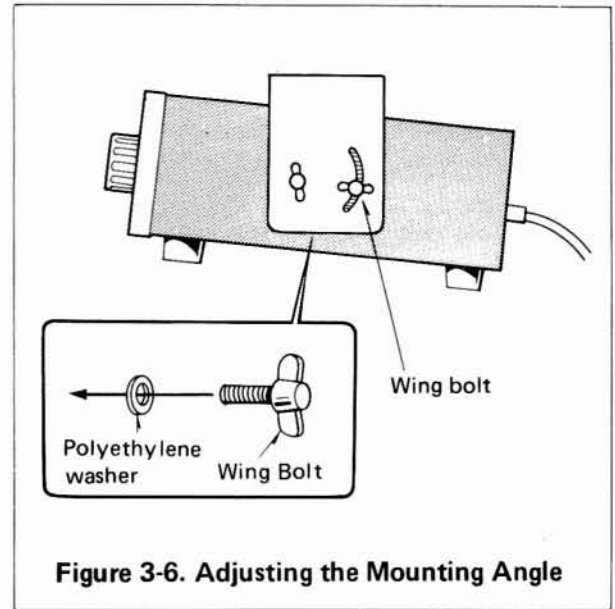
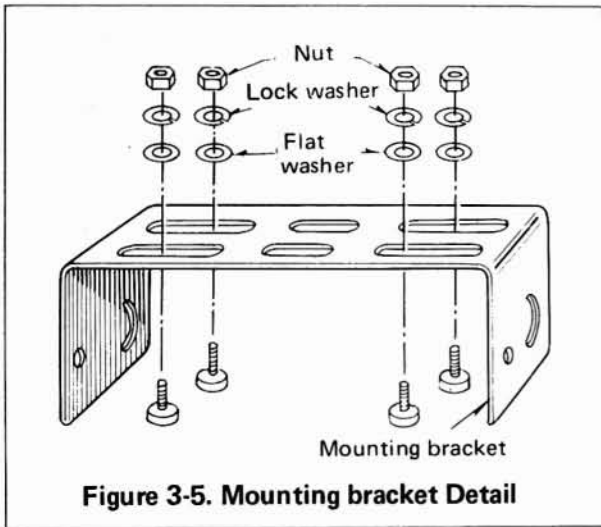
Table 3-1

BAND (MHz)	R TUNE	X TUNE
3.50	5.1	3.2
7.00	6.2	5.5
10.10	6.7	6.1
14.00	7.7	7.3
18.10	7.3	7.4
21.00	8.0	8.0
24.90	8.4	8.5
28.50	8.4	8.6



AT-130 Mobile Installation

Securely install the Mobile Mount using four lock washers, four flat washers, and four screws and nuts. Install the AT-130 in the Mobile Mount by four wing bolts and polyethylene washers. Adjust the tilt before tightening the bolts.



SECTION 4. CIRCUIT DESCRIPTION

Figure 11 shows a block diagram of the AT-130.

Directional Coupler

The directional coupler samples forward and reflected power from the transceiver to the load.

Meter Circuit

The forward and reflected power sampled by the directional coupler is used for SWR measurement. Forward power is calibrated with the CAL control so reflected power is read as SWR.

Band Selector Switch

This selects the band to which the matching circuit is tuned. In the "THROUGH" position, the antenna is connected directly to the transceiver, bypassing the coupler, while still allowing SWR measurement.

Antenna Coupler

The universal matching circuit is capable of matching 20 to 300 Ω loads to the 50 Ω input impedance.

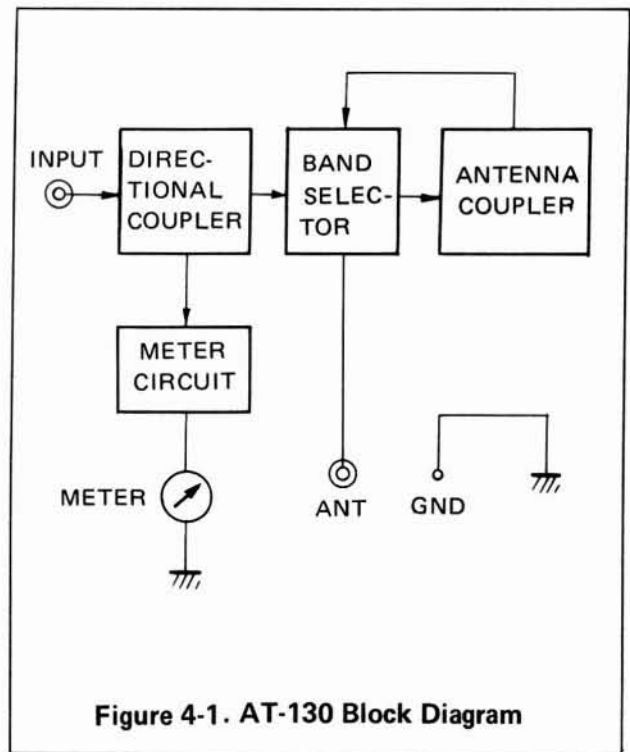


Figure 4-1. AT-130 Block Diagram

SECTION 5. ADDITIONAL INFORMATION

1. General Information

Your AT-130 has been factory aligned and tested to specification before shipment. Under normal circumstances, it will operate in accordance with these operating instructions.

If your unit fails to work, contact the authorized dealer from which you purchased it for quick, reliable repair.

Attempting service without factory authorization can void the unit's warranty.

2. Ordering Spare Parts

When ordering replacement or spare parts for your equipment, be sure to specify the following:

Model and serial number of your transceiver,
Schematic number of the part. Printed circuit

3. Service

You may return your unit for service either to the Authorized Kenwood Dealer from whom you purchased it or to Trio-Kenwood. A copy of the service report will be returned with the unit. Please do not send sub-assemblies or printed circuit boards—send the complete unit, in its original boxes and packing.

You need not return accessory items unless they are directly related to the service problem.

If you want verification of receipt, please supply a self-addressed card (or letter) and we will inform you of the date of receipt and estimated service time.

NOTE: When claiming warranty service, please

include a photocopy of the bill of sale, or other proof of purchase showing the date of sale.

Dear OM, if you desire to correspond on a technical or operational problem, please make your note short, complete, and to the point. And PLEASE make it readable.

Please list: Model and serial number.

The question or problem you are having.

Please give sufficient detail to diagnose; other equipment in the station, meter readings and anything you feel might be useful in attempting diagnosis.

4. Dial Lite Information

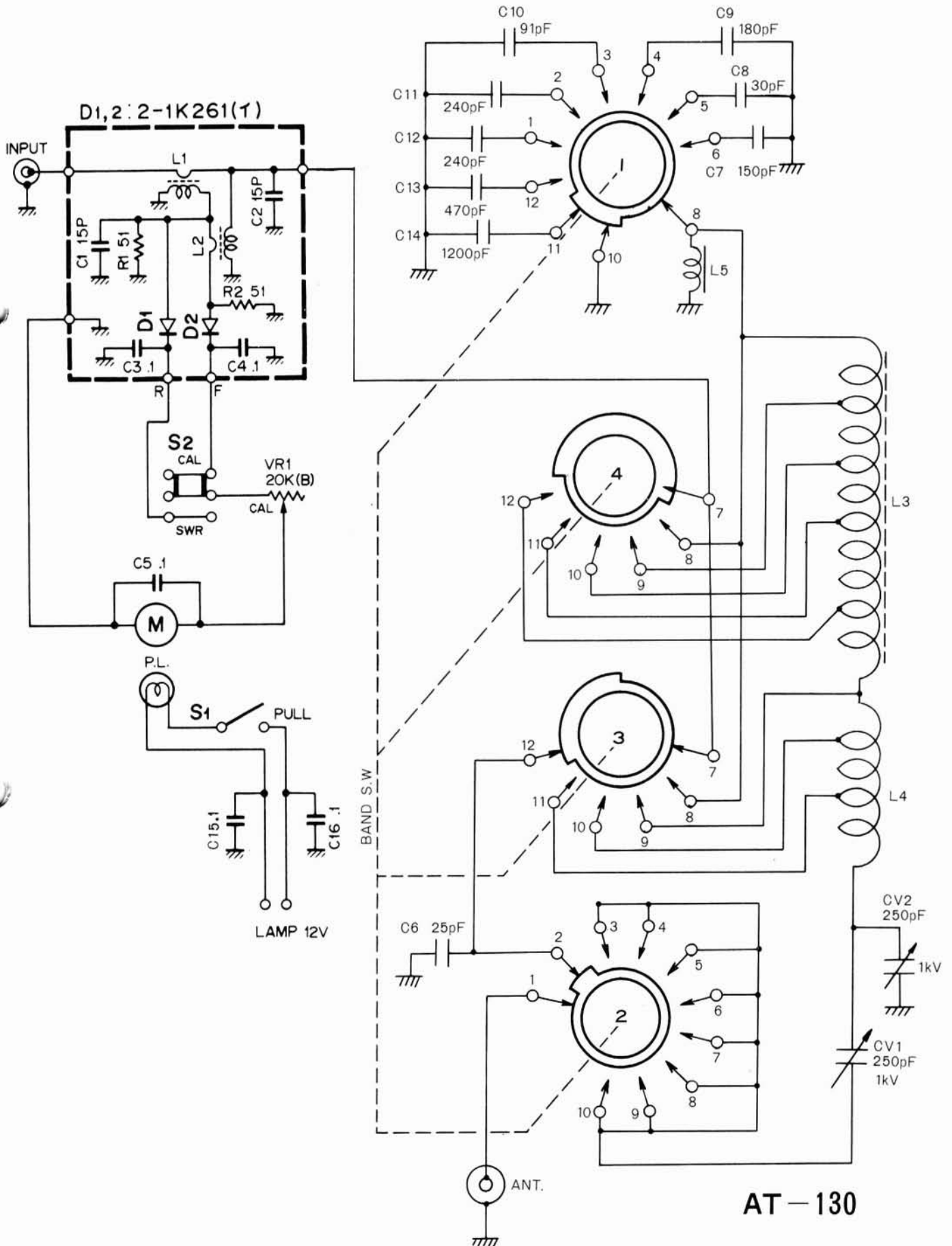
Part #	B30-9996-00
Rating	12V 40mA

To replace:

1. Remove top cover.
2. Note position of all leads on S meter and lamp P.C.B.
3. Remove all leads from meter and lamp P.C.B.
4. Remove meter bracket.
5. Remove 2 brass Philips screws holding lamp P.C.B. to meter.
6. Swing P.C.B. rear edge up and out.
8. Reverse disassembly procedure.

SCHEMATIC DIAGRAM

Circuits and specifications are subject to change for improvement.



Model: AT-130

Serial

Date Purchased...../...../.....

Dealer

.....

.....

A product of

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