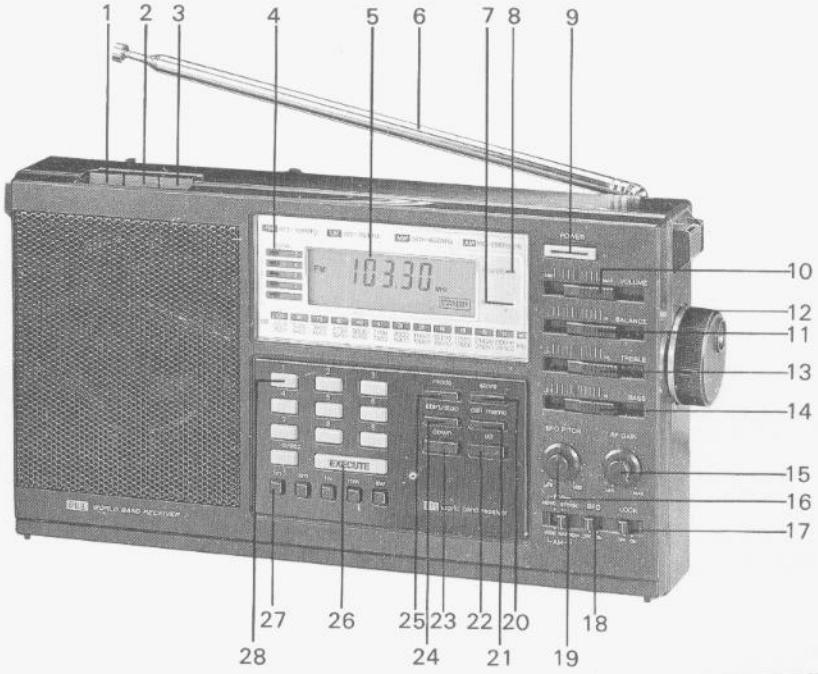
SANGEAN

## *MODEL: ATS-803A*

World Band Receiver


## OPERATING INSTRUCTIONS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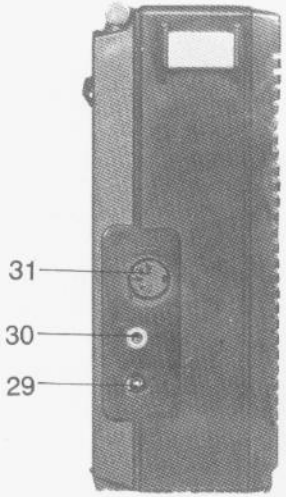
EXECUTE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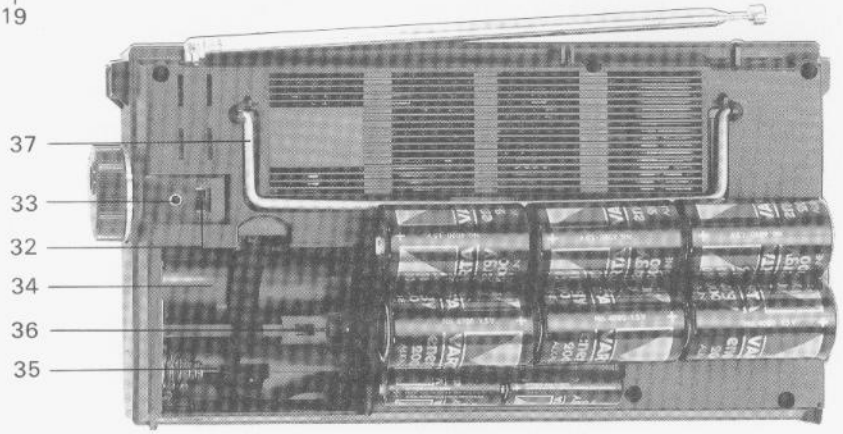
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# Controls and Indicators

| | | | |
|---|---|---|---|
| 1 | LIGHT | = | Display illumination button |
| 2 | TIMER | = | Daily alarm button (automatically turns on the set at a preset time) |
| 3 | SLEEP | = | Sleep button (automatically turns off set after a preset time (90 to 10 minutes) after going to sleep) |
| 4 | SIGNAL | = | Received signal strength indicator |
| 5 | | = | Display (displays the time of day (CLOCK), the turn-on time (STANDBY), the turn-off time (SLEEP) 90 ... 10), the frequency of the received station, the wave band (FM, AM, LW, MW, SW), the short-wave subband (SW 120m to SW 11m) the selected programm memory location (MEMO 1 to 9), memory input (STORE) and input errors (ERROR) |
| 6 | | = | Telescopic antenna for VHF and SW |
| 7 | STEREO | = | VHF stereo reception indicator |
| 8 | POWER | = | On indicator |
| 9 | POWER | = | On/Off button |
| 10 | VOLUME | = | Volume control |
| 11 | BALANCE | = | Balance control for VHF stereo reception with earphones |
| 12 | | = | Dual-function rotary button for<br>(a) tuning in a station together with one of the waveband buttons (27)<br>(b) setting the time of day and the turn-on time (CLOCK/TIMER) together with the STORE button (20) |
| 13 | TREBLE | = | Treble control |
| 14 | BASS | = | Bass control |
| 15 | RF GAIN | = | SW input signal control (normal position: at right-hand stop) |

16 BFO PITCH = Beat frequency oscillator control for continuous wave (CW), lower (LSB) or upper (USB) single side band (SSB) transmissions

17 LOCK = Operation mode lock switch

18 BFO = Beat frequency oscillator on/off switch

19 FM = Mono/stereo switch for VHF reception with earphones

AM = Narrow/Wide switch for two bandwidth selections during AM reception

20 STORE = Triple-function button for
(a) storing a station frequency in one of memory locations 1 to 9 (28)
(b) setting the time of day and the turn-on time (TIMER)
(c) starting the clock at zero seconds, e.g. at time signal

21 CALL MEMO = Read button. Serves to read a stored station frequency together with one of the programm buttons 1 to 9 (28)

22 UP = Dual-function button for
(a) tuning in a station in the higher-frequency direction together with one of the wave band buttons (27)
(b) setting the time of day or turn-on time (CLOCK/TIMER) in the up direction together with the STORE button (20)

23 DOWN = Dual-function button for
(a) tuning in a station in the lower-frequency direction together with one of the wave band buttons (27)
(b) setting the time of day or turn-on time (CLOCK/TIMER) in the down direction together with the STORE button (20)

24 START/STOP = Scan tuning buttons. Start and stop scan tuning together with one of the wave band buttons (27)

25 MODE = Display mode selector
(a) Set on/Timer on:
Frequency, time of day (CLOCK), turn-on time (TIMER)
(b) Set on/Timer off:
Frequency, time of day (CLOCK)
(c) Set off/Timer on:
Time of day (CLOCK), turn-on time (STANDBY)
(d) Set off/Timer off:
Time of day (CLOCK)

26 EXECUTE = Confirms direct station frequency entry with buttons 0 ... 9 (28)

27 FM,AM,LW,MW,SW = Wave band buttons
FM = VHF (87,5 to 108 MHz)
AM = Full range (150 to 29999 kHz)
LW = Long-wave band (150 to 281 kHz)
MW = Mediumwave band (520 to 1620 kHz)
SW = Short-wave band (2300 to 26100 kHz)
(subdivided in 12 subbands from 120m to 11m)

28 1 ... 9 ... 0 = Triple-function buttons for
(a) 0 ... 9 entering station frequencies together with a wave band button (27) and the EXECUTE button (26)
(b) 1 ... 9 storing station frequencies together with the STORE button (20), or reading stored station frequencies together with the CALL MEMO button (21)
(c) Zero-seconds button for switching the time display to the minutes/seconds mode or, together with the STORE button (20), resetting the seconds display to ›00‹

29 DC IN 9V = 9V DC power pack connector

30 PHONES = (Stereo) earphones connector

31 REC OUT = Tape deck connector (recording)

**Rear**

32 EXT/INT = External (EXT) or built-in (INT) antenna switch selector
33 ANT EXT = External antenna connector
34 = Battery compartement (6 batteries)
35 = Battery compartement (2 buffer batteries)
36 10 k/9 k = MW 9 kHz/10 kHz frequency step selector (9 kHz for Europe)
37 = Support bail for set tilting

Your portable superhet is designed for home and in transit use, incorporates state-of-the-art technology and performs many functions as a:

1. **World Band Receiver**

– with a no-gap full frequency range from 150 kHz to 29999 kHz
– with separate FM, MW and LW wave bands
– with 12 expanded short-wave bands (120m, 90m, 75m, 60m, 49m, 41m, 31m, 25m, 19m, 16m, 13m and 11m)
– with built-in beat frequency oscillator for continuous wave (CW) signals
– with lower (LSB) and upper (USB) side band selector for receiving single side band (SSB) transmissions
– with stereo decoder for receiving FM broadcasts in stereo quality with earphones
– with 9 memory locations for storing the frequencies of stations operating in any wave band
– with a high-stability, microprocessor-controlled PLL synthesizer for station selection by
  1. direct frequency entry with buttons
  2. automatic scan tuning
  3. manual scan tuning
  4. rotary button tuning
  5. reading stored frequencies
– with digital frequency and wave band LCD display that can be illuminated

2. **LCD Quartz Clock** with 24-hour display

3. **Alarm Clock** with presettable turn-on time (TIMER) and automatic turn-off after one hour

4. **Lullaby radio** with sleep turn-off time presettable to between 90 and 10 minutes

Please read the following operating instructions carefully to enable you to make full use the many features of your world band receiver.

## Power Supply

### Battery Operation

The battery compartement (34) is located at the rear. To open it, push the cover lock in the direction of the arrow and lift off the cover. Insert 6 IEC R 20 batteries in the compartement as shown on the sketch.

We recommend to insert 2 IEC R 6 buffer batteries in battery compartement (35) as shown on the sketch. They serve to buffer the microprocessor and to retain the timer settings and memory content during battery replacement.

Please ensure proper polarity when inserting batteries. Placing the batteries in the black tape will facilitate later removal. Apply the cover.

We recommend the use of high-power batteries, e.g. alkali-manganese batteries. These batteries are more expensive than normal batteries, but they do have a considerably longer service life.

Remove spent batteries from the set immediately to avoid damage by leaking batteries.

The batteries are spent when the receiver performance falls off and the overall volume becomes lower. Sound distortions may also occur. Never replace individual batteries but always the complete set.

Remove the batteries if the set is not to be used for an extended period of time or when operating it with a power pack.

Do not burn or throw away spent batteries but return them to your dealer.

### Mains Operation

At home you may operate your set with an extra 9V DC power pack in order to save batteries. Apply the negative pole to the center pin of the connector. The batteries are disconnected automatically when the power pack is connected to the DC IN 9V connector (29).

## Connectors

### Earphones

Stereo earphones with any impedance and a 3.5mm stereo jack can be connected to the PHONES connector (30). The speaker is disconnected automatically when earphones are connected.

With stereo earphones you can receive FM stereo programs in normal stereo quality.

### Tape Deck

A tape deck or a cassette recorder can be connected to the REC OUT connector (31) with a 5-point DIN plug to make tape recordings.

### External Antenna

An external antenna can be connected to the ANT EXT connector (33) with a 9mm plug (RCA jack) to improve long-distance reception. Even a length of normal wire may improve reception noticeably, especially in the short-wave band. When connecting an external antenna, set the antenna switch (32) to EXT.

## Antennas

A ferrite rod antenna for long and medium-wave reception and AM reception between 150 kHz and 1600 kHz is built in. It has a good directional effect so that you can increase the volume and suppress interference by turning the set.

For FM reception, set up the telescopic antenna (6) and pull it out about 70 to 90 cm. Tilt and turn the antenna until you have found the position that ensures best reception of the selected station.

Short-wave reception in the 1600 kHz to 26100 kHz range is best with the telescopic antenna fully extended and upright.

If reception is generally poor, select another site in the room, e.g. near a window, or connect an external antenna.

## Time Setting

The clock comes on as soon as batteries are inserted in the battery compartement. The CLOCK display and the time display 0:00 appear in display (5). To set the time of day:

- Press the MODE button (25)
- Press the STORE button (20). The CLOCK display flashes for 5 seconds. During this time, press the UP button (22) or the DOWN button (23) until the desired time appears. (You can also turn the rotary button (12) to set the time.) If you press the buttons intermittently, the time display changes in minutes increments.
- To set the time precisely, press the 0/sec button (28). The display then shows the minutes and seconds. Press the STORE button (20) when the time signal sounds. The clock is set to 00 seconds and the normal hour/minutes display reappears.

## Radio Reception

### Turning On and Off

To turn the set on, press the POWER button (9). POWER indicator (8) lights. The time display disappears and the frequency of the station tuned in last appears for some minutes (but you can select any other display with the MODE button (25)). To turn the set off, press the POWER button again.

### Selecting a Wave Band

Press one of the wave band buttons (27), i.e. the
FM button for VHF (87.5 to 108 MHz)
AM button for the full range (150 to 29999 kHz)
LW button for the long-wave band (150 to 281 kHz)
MW button for the medium-wave band (520 to 1620 kHz)
SW button for the short-wave band (2300 to 26100 kHz)

The short-wave band is subdivided in 12 subbands. Each time you press the SW button, the next lower subband is selected beginning with the 120 meter band and going down to the 90m/75m/60m/49m/41m/31m/25m/19m/16m/13m/11m subbands. The precise subband ranges are given in the Technical Data section.

The selected subband and the SW band appear in the display for your information.

### Tuning in a Station

The frequencies on which the various stations are transmitting are given in radio journals. The PLL synthesizer installed in your unit enables you to set the frequency in different ways:

1. Direct frequency entry
   - Turn the set on
   - Select the wave band
   - Enter the desired frequency with buttons 0...9 (28), for FM stations in MHz and for other stations in kHz. Check your entry in the display. Then press the EXECUTE button (26) within 5 seconds.
   - Should reception be poor, press the UP button (22) or the DOWN button (23) briefly or carefully turn rotary button (12) for precision tuning.
   - In the FM band, your entry is corrected automatically to 50 kHz. In the medium-wave band the hash total of the entered frequency should be 9 or a multiple thereof, e.g. Munich 801 kHz = 8+0+1=9; Stuttgart 576 kHz = 5+7+6=18.
   - Wrong frequencies are rejected. The ERROR display then flashes 5 times.

2. Automatic Scan Tuning
   - Turn the set on
   - Select a wave band

- Press the START/STOP button (24) to initiate scan tuning. Scan tuning ends when a strong signal is found. (This may also be an interference signal.) To continue scan tuning, press the START/STOP button again. You can terminate scan tuning at any time by pressing the START/STOP button again.
- To fine-tune, briefly press the UP or DOWN button (22/23) or turn the rotary button (12).

3. Manual Scan Tuning
   - Turn the set on
   - Select a wave band
   - Press the UP or DOWN button (22/23). Briefly pressing these buttons causes the display to change in 50 kHz increments in the FM band and in 1 kHz increments in the other bands. Pressing the buttons continuously speeds up scan tuning.

4. Conventional Rotary Tuning
   - Turn the set on
   - Select a wave band
   - Tune in the desired station with rotary button (12). The tuning speed depends on the turning speed.

Rotary tuning is recommended for station hunting in the full AM band.

5. Preset Tuning of Stored Stations

## Storing Stations

Your world band receiver provides 9 memory locations for storing programs or stations. In these 9 memory locations you can store frequencies selected from any wave band.

To store a frequency:
- Turn the set on
- Select a wave band
- Enter the frequency of the desired station
- Press the STORE button (20). The STORE display flashes for about 5 seconds. During this time, press one of the 1...9 buttons to select the memory location. The selected digit appears behind the STORE display.

To read a frequency:
- Turn the set on
- Press the CALL MEMO button (21). The MEMO display flashes for about 5 seconds. During this time, press the 1...9 button for the frequency you want to read. The selected digit appears behind the MEMO display. The frequency of the selected station then apears in the display.

Apart from the 9 station frequencies stored in the program memory, the frequency of the station tuned in last in each wave band is also stored.

When you enter a new frequency in a memory location, the frequency stored there earlier is deleted automatically.

### FM Reception

If you use earphones (connected to PHONES connector (30)) for FM reception, set the FM switch (19) to the STEREO position. A special-purpose circuit automatically sets the stereo mode when a stereo broadcast comes in; the STEREO indicator (7) then lights and you can listen to the broadcast in stereo. Adjust the balance with the BALANCE control (11).

Stereo reception with the speaker is not possible.

### Volume

Adjust the volume with the VOLUME control (10).

### Tone

Adjust the tone to your liking with the TREBLE control (13) and the BASS control (14). The normal positions of these controls are the center positions marked 0.

### Signal Strength

The stronger the signal received from a station, the more SIGNAL indicators light in the display (4), but these indicators do not indicate the device sensitivity.

## Short-Wave Reception (CW/SSB)

1. Many stations transmit unmodulated telegraph transmissions in the short-wave band. To receive these Morse code characters, a beat frequency oscillator is required in the receiver. This type of telegraph transmission is called continuous wave (CW) transmission.
2. Many stations transmit radio-telephony broadcasts with suppressed carrier in the single side band (SSB). Above 10 MHz the upper side band (USB) is generaly used, and below 10 MHz the lower side band (LSB). A carrier has to be added in the receiver to make these transmissions audible.

Modes 1 and 2 require excellent frequency stability in the receiver and additional circuit elements which also affect the controls.

### CW Signal Reception

- Turn the set on
- Extend the antenna full length and position it upright or use an external antenna
- Set the BFO switch (18) to the ON position
- Set the BFO PITCH control (16) to the center position
- Set the RF GAIN control (15) to MAX (full right)
- Select the AM band with the AM button (27)
- Tune in the CW station precisely with rotary button (12) or enter the frequency with buttons (28)
- Adjust the tone with BFO PITCH control (16)
- Dampen strong signals with the RF GAIN control (15). This reduces interference and noise.

### SSB Telephony Reception

- Turn the set on
- Extend the antenna full length and position it upright or use an external antenna
- Set the BFO switch (18) to the ON position
- Set the BFO PITCH control (16) to the LSB position for stations below 10 MHz or to the USB position for stations above 10 MHz
- Set the RF GAIN control (15) to MAX (full right)
- Select the AM band with the AM button (27)
- Tune in the SSB station with rotary button (12) or enter the frequency with buttons (28)
- Adjust the signal by turning the BFO PITCH control (16) carefully
- Dampen strong signals with the RF GAIN control (15). This often improves the clarity.

Note:
Before returning to another wave band, set the RF GAIN control (15) to MAX and the BFO switch (18) to OFF.

## Automatic Turn-On (TIMER)

(e.g. for daily alarm)

### Setting the Turn-On Time

- Press the TIMER button (2). The time of day display is suppressed for about 5 seconds. The STAND BY display and the turn-on time 0:00 appear. Set the turn-on time within 5 seconds (if required, suppress the time of day display again with the MODE button (25)).
- Press the STORE button (20). The STAND BY display flashes for 5 seconds. Press the UP button (22) or the DOWN button (23) during this time until the desired turn-on time appears in the display. (You can also turn rotary button (12) for setting the time.)
- The time of day reappears after the turn-on time has been set.
- Check the turn-on time by pressing the MODE button (25) or by pressing the TIMER button (2) again.

The set will be turned on automatically each day at the preset time as long as the TIMER button (2) remains depressed, and will play the program tuned in last at the preselected volume. The set is turned off automatically after one hour. If you want to turn it off before that time, press the TIMER button.

Note:
The set can be turned on and off with the POWER button (9) at times other than the preset time also while the TIMER button is depressed.

## Automatic Turn-Off (Sleep Mode)

(e.g. after you have gone asleep)

Pressing the SLEEP button (3) activates the sleep mode for 90 minutes and then turns off the set. The remaining play time is displayed behind the SLEEP display.

You can set a time shorter than 90 minutes. To do so, press the SLEEP button again. Each time you press this button, the play time is reduced by 10 minutes.

Note:
The TIMER and SLEEP modes can be combined so that you can go to sleep with music (the sleep timer will turn off the set at the preset time), and wake up with music (the timer will turn on the set at the preset time and turn it off again one hour later).

## Precautions

Do not expose the set to direct sun radiation. Especially in cars it may suffer from excessive heat during the hot summer months. Do not position the set in the direct vicinity of radiators and protect if from humidity. Proper operation is ensured between $0^{o}$ and $40^{o}$ C.

Only use a piece of soft cloth and a mild detergent solution for cleaning, but never any chemicals, benzene etc.

Please ensure that

- the RF GAIN control (15) at the right-hand stop during normal operation
- the BFO switch (18) is off; otherwise whistling noises will occur.
- the LOCK switch (17) in ON only as long as the unit is to be protected against inadvertent alteration of the operating conditions.

## Technical Data

Dual conversion superheterodyne receiver for the AM bands (LW, MW and SW)

Intermediate frequencies:
AM 1: 55845 kHz
AM 2: 450 kHz
FM: 10,7 MHz

Bandwidth:
AM 6,5 kHz
FM:

IF suppression:
AM: 50 dB
FM: 60 dB

Stereo channel separation:
FM: 25 dB

AM suppression:
FM: 30 dB

Tone control:
FM: ± 8 dB at 10 kHz
FM: ± 8 dB at 100 Hz

Output power:
1200 mW according to DIN

Distortion factor:
10%

Wave bands:
FM: 87,5 MHz to 108 MHz
AM: 150 kHz to 29999 kHz
LW: 150 kHz to 281 kHz
MW: 520 kHz to 1620 kHz

SW: Subdivided into 12 bands
- 120m band: 2300kHz to 2500kHz
- 90m band: 3200kHz to 3400kHz
- 75m band: 3900kHz to 4000 kHz
- 60m band: 4750kHz to 5060kHz
- 49m band: 5800kHz to 6200kHz
- 41m band: 7100kHz to 7500kHz
- 31m band: 9500kHz to 9900kHz
- 25m band: 11650kHz to 12050kHz
- 19m band: 15100kHz to 15600kHz
- 16m band: 17550kHz to 17900kHz
- 13m band: 21450kHz to 21850kHz
- 11m band: 25600kHz to 26100kHz

Antennas:
Ferrite antenna for LW/MW (150 to 1620 kHz)
Telescopic antenna for
SW (1620 to 26100 kHz)
FM (87.5 to 108 MHz)
Connector for external antenna for SW/FM

Connectors for:
9V DC power pack
Stereo earphones (3.5mm jack)
Tape recording (5-point DIN connector)
(Output: 1 mV at 1 kOhm)
External antenna (3.5mm banana plug)

Power supply:
1. 6 1.5 V batteries (IEC R20 or UM 1 or D or 9 V power pack (400 mA)) (Negative pole at center terminal)
2. 2 1.5 V batteries for the micro-processor (IEC R6 or UM 3 or AA)

Subject to change without notice.

## AM Band Frequency Table

| | | |
|---|---|---|
| Long-wave band | 150 kHz to 285 kHz: | Long-wave radio stations |
| | 33 kHz: | Radio beacons |
| | 410 kHz: | Nautical navigation services (radio direction finding) |
| | 512/500 kHz: | International radiotelephony and distress frequencies |
| Medium-wave band | 525 kHz to 1605 kHz: | Medium-wave radio stations |
| Intermediate-wave band | 1715 kHz to 2000 kHz: | Amateur radio and long-distance radio navigation, Loran navigation |
| | 2091 kHz: | JA, floating buoys |
| | 2182 kHz: | Nautical radiotelephony and distress frequency (radiotelephony) |
| | 2500 kHz: | Frequency standard |
| | 2638 kHz: | Nautical radiotelephony frequency (Amerika and Asia) |
| | 2738 kHz: | Nautical radiotelephony frequency (Amerika) |
| | 2804/2802/2812 kHz: | Police radiotelegraphy (Amerika) |
| | 3.5 MHz to 4 MHz: | 80m amateur radio band |
| | 3805 kHz: | Air traffic distress frequency (Asia) |

Short-wave band

| | |
|---|---|
| 5 MHz: | Frequency standard |
| 5.95 MHz to 6.2 MHz: | 49m radio band |
| 7 MHz to 7.3 MHz: | 41m radio band and 40m amateur radio band |
| 9.5 MHz to 9.775 MHz: | 31m radio band |
| 10 MHz: | Frequency standard |
| 10.003 to 10.005 MHz: | Space communications |
| 11.7 MHz to 11.975 MHz: | 25m radio band |
| 13.56 MHz: | Exception band (industrial, medial, remote control frequencies) |
| 14 MHz to 14.350 MHz: | 20m amateur radio band |
| 15 MHz to 15.45 MHz: | 19m radio band |
| 17.7 MHz to 17.9 MHz: | 16m radio band |
| 19.9 MHz to 20 MHz: | Space communications |
| 20 MHz: | Frequency standard |
| 21.00 to 21.45 MHz: | 15m amateur radio band |
| 21.45 to 21.75 MHz: | 13m radio band |
| 25 MHz: | Frequency standard |
| 25.07 MHz to 25.11 MHz: | A1 or F1 modulation nautical radio stations |
| 25.61 MHz to 26.1 MHz: | 11m radio band |

## USER TROUBLESHOOTING CHART

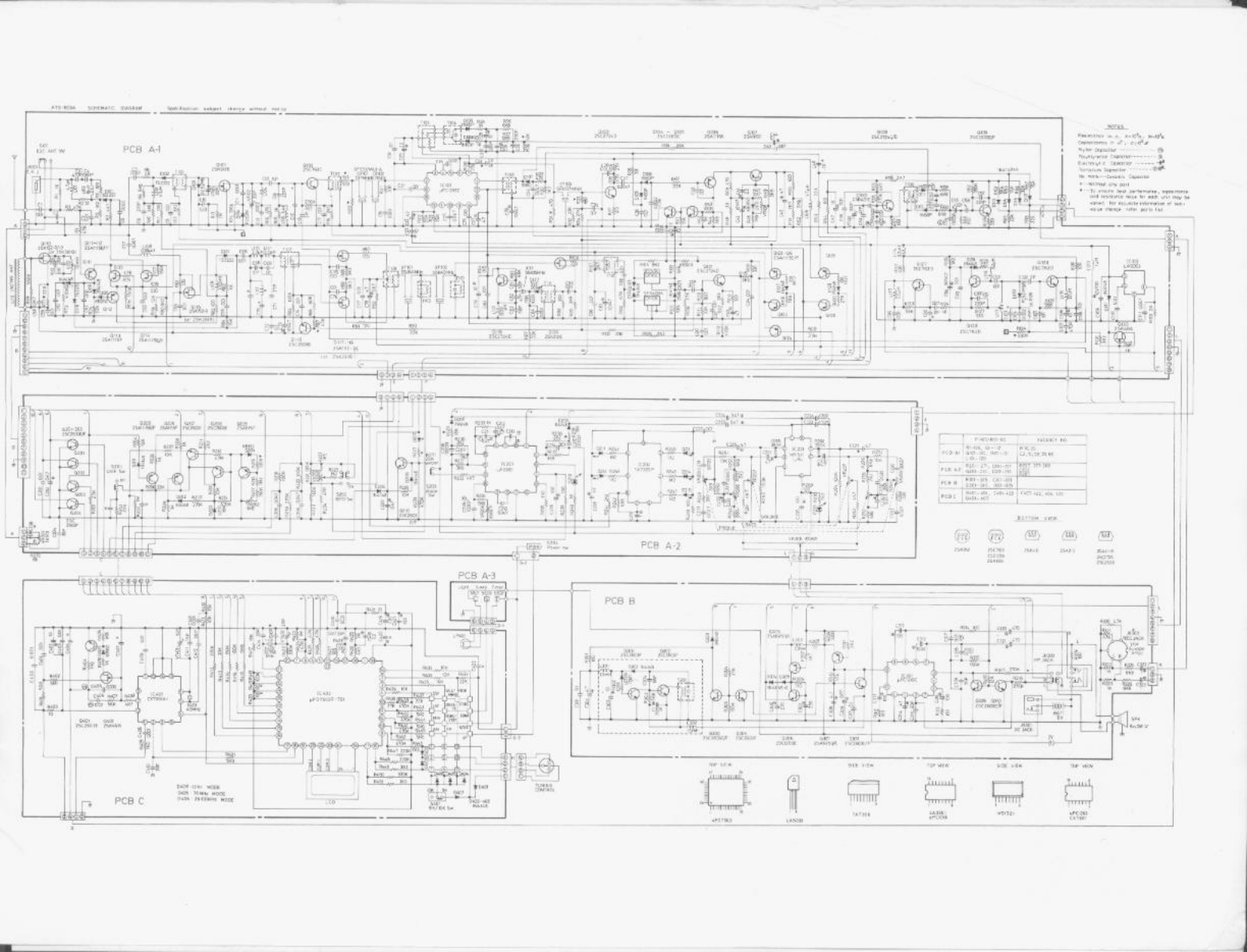
Should a malfunction occur during operation of your ATS-803A, please consult the list below, before returning the radio for service.

| PROBLEM | REASON | REMEDY |
|---|---|---|
| CLOCK DOES NOT SHOW IN DISPLAY | • UM-3 batteries installed improperly.<br>• Weak or dead batteries. | • Remove and re-install batteries.<br>• Replace batteries. |
| DISFLAY VERY DIM | • Weak UM-3 batteries..<br>• High temperature or humidity. | • Replace.<br>• Change location. |
| POWER SWITCH DOES NOT FUNCTION | • Lock switch on.<br>• UM-1 batteries installed wrong.<br>• Weak UM-1 batteries.<br>• AC adapter cord not plugged in. | • Move to off position.<br>• Re-install correctly.<br>• Replace.<br>• Check and correct. |
| NO SOUND | • Volume control set to minimum.<br>• Headphone connected. | • Turn up to desired level.<br>• Remove headphone. |
| INTERMITTENT SOUND OR HIGH NOISE LEVEL | • Frequency de-tuned.<br>• Weak signal. | • Use rotary tuning or up/down keys to fine tune.<br>• Set RF gain to "max" & adjust antenna. |

| PROBLEM | REASON | REMEDY |
|---|---|---|
| "ERROR" DISPLAYED WHEN FREQUENCY IS KEYED IN | • Frequency outside band limits.<br>• Wrong band setting. | • Key in correct frequency.<br>• Select correct frequency within desired band. |
| AUTO-SCAN DOESN'T STOP | • Weak signal. | • Set RF gain to "max".<br>• Adjust antenna. |
| MEMORY RE-CALL DOES NOT WORK | • Memory erased due to weak UM-3 batteries. | • Replace batteries & re-enter frequencies. |
| PRE-SET AUTOMATIC TURN-ON INOPERATIVE | • Timer button not pressed when set. | • Press Timer button. |
| INCORRECT DISPLAY FUNCTIONS | • Microprocessor fails to initialize. | • Remove batteries & re-install after ten minutes. |

## NOTE

DUE TO AN INTERNAL OSCILLATOR, SOME INTERFERENCE WILL RESULT AROUND 450 KHz.


PCB A-1
PCB A-2
PCB A-3
PCB B
PCB C