

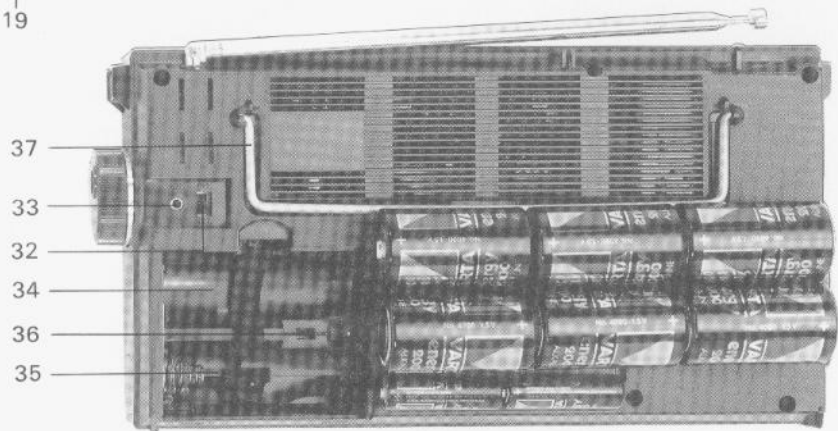
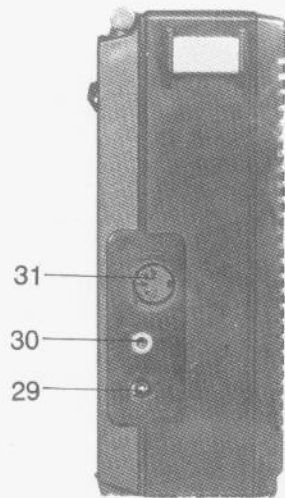
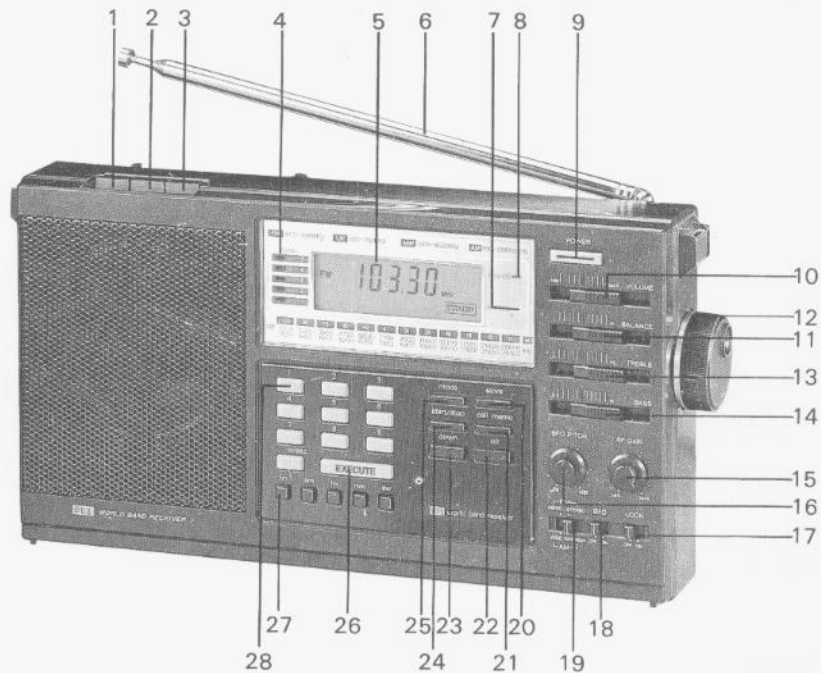
SANGEAN

MODEL: ATS-803A

World Band Receiver

OPERATING INSTRUCTIONS





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
(a) tuning in a station together with one of the waveband buttons (27)
(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)

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 compartment. 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 appears 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 generally 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 it from humidity. Proper operation is ensured between 0° and 40° 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:

- 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 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

Short-wave band
Medium wave band
Long wave band

AM Band Frequency Table

SW: Subdivided into 5 kHz channels

1.20m band: 2300kHz to 2500kHz
90m band: 3200kHz to 3400kHz
75m band: 3500kHz to 4000kHz
80m band: 4700kHz to 5000kHz
48m band: 5800kHz to 6200kHz
41m band: 7100kHz to 7500kHz
31m band: 8800kHz to 9200kHz
25m band: 11800kHz to 12000kHz
19m band: 15100kHz to 15600kHz
18m band: 17800kHz to 17900kHz
13m band: 21400kHz to 21800kHz
11m band: 25800kHz to 28100kHz

Antenna
Ferrite antenna for LW/MW (150 to 1650 kHz)
Telescopic antenna for
SW (1620 to 28100 kHz)
FM (87.5 to 108 MHz)
Connector for external antenna for SW/FM
Connector for
8V-DC power bank
Stereo earphones (3.5mm jack) VM 0021
Tape recording (8-point DIN connector)
(Output: 1 mV at 1 kHz) %01
External antenna (3.5mm banana plug)
Power supply
1 8 1.8 V batteries (IEC R20 or LM 14)
D or 9 V power pack (R09 type)
(Negative pole at center terminal)
2 1.8 V batteries for the micro-processor (IEC R8 or LM 3 or AA)
Subject to change without notice

USER TROUBLESHOOTING CHART

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

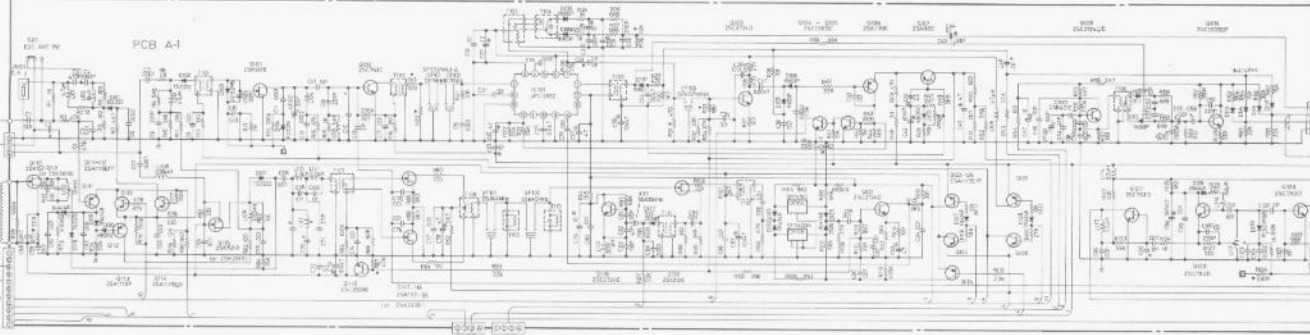
PROBLEM	REASON	REMEDY
CLOCK DOES NOT SHOW IN DISPLAY	<ul style="list-style-type: none">• UM-3 batteries installed improperly.• Weak or dead batteries.	<ul style="list-style-type: none">• Remove and re-install batteries.• Replace batteries.
DISPLAY VERY DIM	<ul style="list-style-type: none">• Weak UM-3 batteries.• High temperature or humidity.	<ul style="list-style-type: none">• Replace.• Change location.
POWER SWITCH DOES NOT FUNCTION	<ul style="list-style-type: none">• Lock switch on.• UM-1 batteries installed wrong.• Weak UM-1 batteries.• AC adapter cord not plugged in.	<ul style="list-style-type: none">• Move to off position.• Re-install correctly.• Replace.• Check and correct.
NO SOUND	<ul style="list-style-type: none">• Volume control set to minimum.• Headphone connected.	<ul style="list-style-type: none">• Turn up to desired level.• Remove headphone.
INTERMITTENT SOUND OR HIGH NOISE LEVEL	<ul style="list-style-type: none">• Frequency de-tuned.• Weak signal.	<ul style="list-style-type: none">• Use rotary tuning or up/down keys to fine tune.• Set RF gain to "max" & adjust antenna.

PROBLEM	REASON	REMEDY
"ERROR" DISPLAYED WHEN FREQUENCY IS KEYED IN	<ul style="list-style-type: none"> • Frequency outside band limits. • Wrong band setting. 	<ul style="list-style-type: none"> • Key in correct frequency. • Select correct frequency within desired band.
AUTO-SCAN DOESN'T STOP	<ul style="list-style-type: none"> • Weak signal. 	<ul style="list-style-type: none"> • Set RF gain to "max". • Adjust antenna.
MEMORY RE-CALL DOES NOT WORK	<ul style="list-style-type: none"> • Memory erased due to weak UM-3 batteries. 	<ul style="list-style-type: none"> • Replace batteries & re-enter frequencies.
PRE-SET AUTOMATIC TURN-ON INOPERATIVE	<ul style="list-style-type: none"> • Timer button not pressed when set. 	<ul style="list-style-type: none"> • Press Timer button.
INCORRECT DISPLAY FUNCTIONS	<ul style="list-style-type: none"> • Microprocessor fails to initialize. 	<ul style="list-style-type: none"> • Remove batteries & re-install after ten minutes.

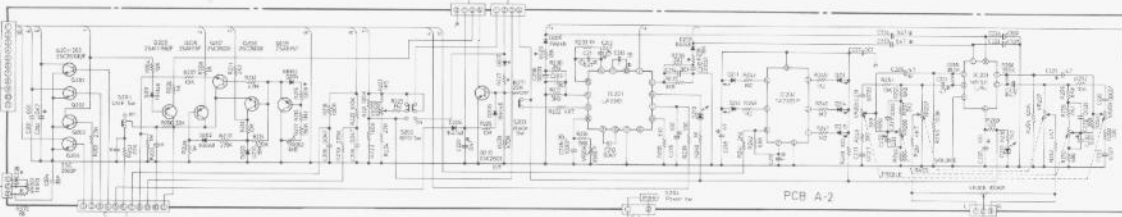
NOTE

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

PCB A-1



NOTES:
 1. Resistor values are in Ω , $\text{k}\Omega$, $\text{M}\Omega$, and $\text{G}\Omega$.
 2. Capacitor values are in pF, μF , and mF .
 3. All capacitors are electrolytic unless otherwise specified.
 4. All resistors are 1% tolerance unless otherwise specified.
 5. All components are to be used as specified unless otherwise noted.
 6. All dimensions are in inches.
 7. To insure best performance, appearance and protection must be used and may be used for accurate performance of test.

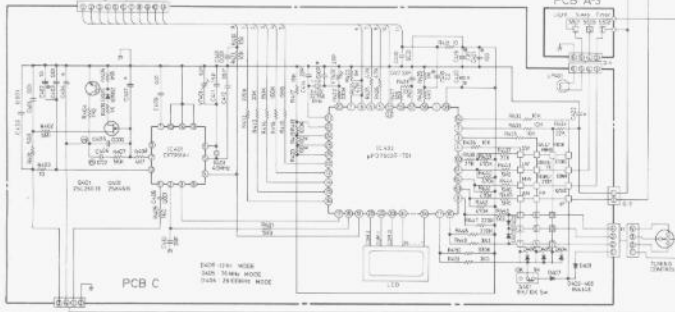


PCB A-2

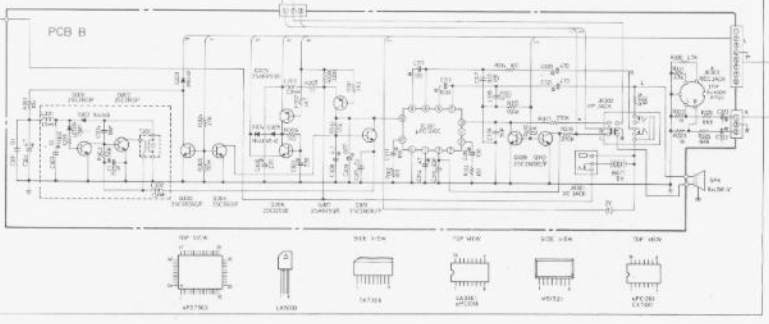
PCB A-1	PCB A-2	PCB A-3
Q1-Q4, Q10-Q12	Q5-Q9, Q13-Q15	Q16-Q18
Q19-Q21	Q22-Q24	Q25-Q27
Q28-Q30	Q31-Q33	Q34-Q36
Q37-Q39	Q40-Q42	Q43-Q45
Q46-Q48	Q49-Q51	Q52-Q54
Q55-Q57	Q58-Q60	Q61-Q63
Q64-Q66	Q67-Q69	Q70-Q72
Q73-Q75	Q76-Q78	Q79-Q81
Q82-Q84	Q85-Q87	Q88-Q90
Q91-Q93	Q94-Q96	Q97-Q99
Q100-Q102	Q103-Q105	Q106-Q108
Q109-Q111	Q112-Q114	Q115-Q117
Q118-Q120	Q121-Q123	Q124-Q126
Q127-Q129	Q130-Q132	Q133-Q135
Q136-Q138	Q139-Q141	Q142-Q144
Q145-Q147	Q148-Q150	Q151-Q153
Q154-Q156	Q157-Q159	Q160-Q162
Q163-Q165	Q166-Q168	Q169-Q171
Q172-Q174	Q175-Q177	Q178-Q180
Q181-Q183	Q184-Q186	Q187-Q189
Q190-Q192	Q193-Q195	Q196-Q198
Q199-Q201	Q202-Q204	Q205-Q207
Q208-Q210	Q211-Q213	Q214-Q216
Q217-Q219	Q220-Q222	Q223-Q225
Q226-Q228	Q229-Q231	Q232-Q234
Q235-Q237	Q238-Q240	Q241-Q243
Q244-Q246	Q247-Q249	Q250-Q252
Q253-Q255	Q256-Q258	Q259-Q261
Q262-Q264	Q265-Q267	Q268-Q270
Q271-Q273	Q274-Q276	Q277-Q279
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Q289-Q291	Q292-Q294	Q295-Q297
Q298-Q300	Q301-Q303	Q304-Q306
Q307-Q309	Q310-Q312	Q313-Q315
Q316-Q318	Q319-Q321	Q322-Q324
Q325-Q327	Q328-Q330	Q331-Q333
Q334-Q336	Q337-Q339	Q340-Q342
Q343-Q345	Q346-Q348	Q349-Q351
Q352-Q354	Q355-Q357	Q358-Q360
Q361-Q363	Q364-Q366	Q367-Q369
Q370-Q372	Q373-Q375	Q376-Q378
Q379-Q381	Q382-Q384	Q385-Q387
Q388-Q390	Q391-Q393	Q394-Q396
Q397-Q399	Q400-Q402	Q403-Q405
Q406-Q408	Q409-Q411	Q412-Q414
Q415-Q417	Q418-Q420	Q421-Q423
Q424-Q426	Q427-Q429	Q430-Q432
Q433-Q435	Q436-Q438	Q439-Q441
Q442-Q444	Q445-Q447	Q448-Q450
Q451-Q453	Q454-Q456	Q457-Q459
Q460-Q462	Q463-Q465	Q466-Q468
Q469-Q471	Q472-Q474	Q475-Q477
Q478-Q480	Q481-Q483	Q484-Q486
Q487-Q489	Q490-Q492	Q493-Q495
Q496-Q498	Q499-Q501	Q502-Q504
Q505-Q507	Q508-Q510	Q511-Q513
Q514-Q516	Q517-Q519	Q520-Q522
Q523-Q525	Q526-Q528	Q529-Q531
Q532-Q534	Q535-Q537	Q538-Q540
Q541-Q543	Q544-Q546	Q547-Q549
Q550-Q552	Q553-Q555	Q556-Q558
Q559-Q561	Q562-Q564	Q565-Q567
Q568-Q570	Q571-Q573	Q574-Q576
Q577-Q579	Q580-Q582	Q583-Q585
Q586-Q588	Q589-Q591	Q592-Q594
Q595-Q597	Q598-Q600	Q601-Q603
Q604-Q606	Q607-Q609	Q610-Q612
Q613-Q615	Q616-Q618	Q619-Q621
Q622-Q624	Q625-Q627	Q628-Q630
Q631-Q633	Q634-Q636	Q637-Q639
Q640-Q642	Q643-Q645	Q646-Q648
Q649-Q651	Q652-Q654	Q655-Q657
Q658-Q660	Q661-Q663	Q664-Q666
Q667-Q669	Q670-Q672	Q673-Q675
Q676-Q678	Q679-Q681	Q682-Q684
Q685-Q687	Q688-Q690	Q691-Q693
Q694-Q696	Q697-Q699	Q700-Q702
Q703-Q705	Q706-Q708	Q709-Q711
Q712-Q714	Q715-Q717	Q718-Q720
Q721-Q723	Q724-Q726	Q727-Q729
Q730-Q732	Q733-Q735	Q736-Q738
Q739-Q741	Q742-Q744	Q745-Q747
Q748-Q750	Q751-Q753	Q754-Q756
Q757-Q759	Q760-Q762	Q763-Q765
Q766-Q768	Q769-Q771	Q772-Q774
Q775-Q777	Q778-Q780	Q781-Q783
Q784-Q786	Q787-Q789	Q790-Q792
Q793-Q795	Q796-Q798	Q799-Q801
Q802-Q804	Q805-Q807	Q808-Q810
Q811-Q813	Q814-Q816	Q817-Q819
Q820-Q822	Q823-Q825	Q826-Q828
Q829-Q831	Q832-Q834	Q835-Q837
Q838-Q840	Q841-Q843	Q844-Q846
Q847-Q849	Q850-Q852	Q853-Q855
Q856-Q858	Q859-Q861	Q862-Q864
Q865-Q867	Q868-Q870	Q871-Q873
Q874-Q876	Q877-Q879	Q880-Q882
Q883-Q885	Q886-Q888	Q889-Q891
Q892-Q894	Q895-Q897	Q898-Q899

REVISIONS

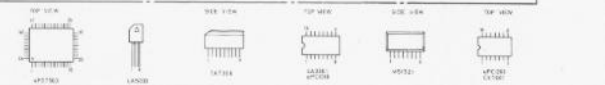
REV.	DATE	BY	APP.	DESCRIPTION
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2	10/1/78
3	10/1/78



PCB C



PCB B



NOTE: 1. ALL DIMENSIONS ARE IN INCHES.
 2. ALL DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED.
 3. DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED.