ALL SILICON TRANSISTOR 5 WATT CB TWO-WAY RADIO

PACE 100ASA

OWNERS MANUAL OF INSTALLATION AND OPERATION

MANUAL
CB.100ASA

PACE 2 YEAR FACTORY WARRANTY

ALL PACE radio transmitters and receivers are manufactured with guaranteed quality components and workmanship under the following 2-year PACE factory warranty.

PACE Communications Division, Pathcom Inc., warrants each new radio product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use and service, discloses such defect provided the unit is delivered by the owner to the factory intact for examination with transportation charges prepaid and provided that such examination discloses in our judgement that it is defective under warranty.

This warranty does not extend to any of our radio products which have been subject to misuse, neglect, accident, incorrect wiring, improper installation or to use in violation of instructions furnished by us nor extended to units which have been repaired or altered outside of our factory unless authoried.

If any defect in component or workmanship should occur within 90 days from date of user purchase, the owner may return the equipment to the place of purchase, or directly to the PACE factory for test and corrective action or exchange at no charge to the owner.

After 90 days, up to 2 years from date of user purchase, the owner may send his PACE equipment to the factory for a complete quality control inspection and service for a single charge of $14.95. This charge includes return postage and handling charges when payment is sent in with the radio. If during the service test it is determined that any part should be replaced or service work performed to bring the radio equipment up to new product operating specifications, this work will be performed at no additional charge for parts or labor. PACE Communications has the reputation for manufacturing the highest quality communications equipment. We offer this special service program so that each PACE owner may insure that his PACE Communications system is being maintained in top operating condition. To qualify for this special PACE factory service program the warranty registration card must be returned to the factory within ten days from date of purchase.

This warranty is in lieu of all warranty expressed or implied, no representative or person is authorized to assume for us any other liability in connection with the sale of our radio products.

PATHCOM Inc., Pace Division
24049 South Frampton Avenue
Harbor City, California 90710

GENERAL INFORMATION

The Pace 100-ASA Radiophone is designed to comply with requirements necessary to operate in the Class "D" Citizens Radio Service in the 27 mc Band. The user is required to be cognizant with, and comply with Part 95 of the FCC Rules which defines operation in this service.

A valid station license and call letters are necessary before operation is permissible. The station license is obtained by submitting a properly and fully completed Form 505, Station License Application. After receipt of the license, the user must attach to the transmitter a Transmitter Identification Card.

Anyone may operate a duly licensed transmitter, but the licensee is responsible for violations or infractions of the regulations, PACE Communications Division of PATHCOM Inc. can not be held responsible for improper technical adjustments where any unauthorized person has performed any adjustment or used any other than PACE crystals, components, etc.

PRE-INSTALLATION

To those readily familiar with transistorized CB radio equipment, there is a tendency to install the equipment without pursuing the details of the Instruction Manual. However, to avoid equipment damage a few precautions are necessary.

DO NOT
—Attempt to connect the power cord to a primary power source while it is plugged into the radio.

DO NOT
—Connect the antenna with the power on.

DO NOT
—Forget to check the setting of the channel selector as it must be in a position that has properly installed crystals. The radio is factory supplied with Channel 9 and 11 crystals.

DO NOT
—Key the transmitter without an antenna connected.

DO NOT
—Replace the fuse with any other type (3AG—2 ampere).

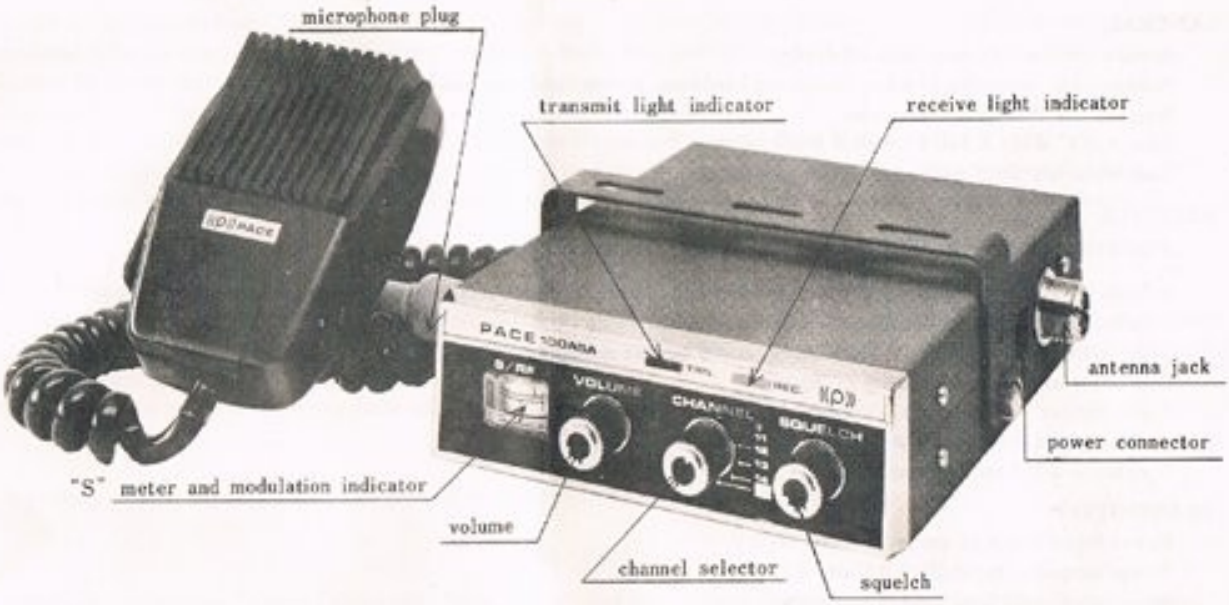
DO NOT
—Attempt alignment of the transmitter to the antenna. Loss of modulation power and inefficient operation possible resulting in transistor burnout will occur unless a factory prescribed tuning proceedure is followed. Maximum efficiency of an installation will result when the antenna has a VSWR of less than 1.5:1. The antenna should be tuned, trimmed or replaced if necessary to achieve this.

DO NOT
—Connect power cord until electrical system polarity is determined. The PACE 100-ASA is wired for 12v negative or positive ground systems. The red lead is marked (+) positive. The black lead is marked (-) negative.

GENERAL DESCRIPTION

The PACE 100-ASA embodies the latest in compact high performance transceiver design techniques. Only the most advanced solid state devices are used throughout. This circuit is unique in that any crystal error is automatically reduced by 33%. All receiver voltages are zener regulated. Maximum flexibility is obtained with an adjustable squelch action. Extreme sensitivity is provided by use of the highest frequency transistor available in the receiver RF stage.

The latest high frequency transistors provide a transmitter with maximum power output and full modulation. The PACE exclusive "Three—Pi" transmitter network provides maximum protection against spurious radiations, instability and harmonic radiation resulting in reliable transmitter performance.



The PACE 100-ASA is designed to operate from a nominal 12 volt DC source of negative or positive ground. Transient noises and voltage spikes from the power source are filtered out by an "L" filter. By means of adequate zener protection and regulation, the PACE 100-ASA will operate with stabilized performance over an input voltage excursion of 11-16 volts. In emergency situations, such as a low vehicle battery, the PACE will operate down to about 9.5 volts with only a small degradation in performance.

TECHNICAL SPECIFICATIONS

GENERAL

Semiconductor; 14 transistor 10 diodes
Accessories; mounting bracket, mounting hardware, power cord, mic holder
Weight; 2.4 lbs. with accessories
Size; 4-3/4" Wide X 1-1/4" High X 6-1/4" Deep
Case Material; Steel with scuff-proof gray coating

RECEIVER

Sensitivity – 0.5μv for 10 DB $\frac{s+n}{n}$ A40% 1000 cycles modulation
Selectivity – 6.0DB bandwidth, 5.5KC minimum, adjacent channel rejection 50DB minimum
Spurious rejection – major image – 50DB minimum
AGC characteristic – 0.5 μV 100,000μV, audio output remains within 6 DB
Squelch – minimum sensitivity – .35 μV
Noise limiter – Series gate – clipping level approximately 50%
Audio output – 0.5 watts at a minimum sensitivity
Speaker – 2-1/2 inch dynamic 8 ohms

TRANSMITTER

Power input – not to exceed 5 Watts @12 V
Power output – typically 3.0 Watts @12 V
Modulation – 85% minimum guaranteed
Harmonic suppression – (TV interference rejection)–65DB
Microphone – Dynamic type, press to talk with plug in connector
Antenna – provision for PL-259 connection 50–52 ohm impedance

POWER SUPPLY

Source – 12V DC nominal system negative or positive ground
Consumption – Receive 0.1 amp at no signal 12V
– Transmit 1.4 amp at maximum modulation 12V

INSTALLATION

The PACE 100-ASA is supplied with "mobile mount". The mount is suitable for top surface or underside mounting, as well as vertical mounting. Select a suitable mounting position keeping the following in mind.

- Controls must be convenient and visible.
- The location should not interfere with driver or operators normal functions.
- The transceiver should not be in the way of heater ducts, air conditioning outlets or direct blast air inlets.
- The transceiver should be protected from rain and spray. In some commercial vehicles and in marine applications, vertical mounting may prove more convenient. The PACE 100-ASA may be mounted in any position without performance change.

NOTE:
Most vehicles are negative ground – the following instructions are for NEGATIVE ground vehicles.

- Connect the red wire of the power cord to a well regulated (+) positive source such as an ammeter terminal, ignition accessory terminal or cigar lighter. "Tapping off" of dome or convenience light wires is NOT recommended as these circuits are usually wired very lightly and some power loss would be encountered.
- Connect the black wire to the frame or negative wire of the 12 volt system.

NOTE:
If system is positive ground connect red wire to ground and black wire to (-) negative power source.

OPERATION

1) By turning the "off-volume" control clockwise the unit is ON and the receiving light glows. Adjust the control to a comfortable listening level.

2) Adjust the "squelch" clockwise to eliminate the back ground noise when no signal is being received. The more clockwise the "squelch" control is turned the LESS sensitive the receiver becomes and the weaker signals will not be heard. The most common setting for squelch is to turn clockwise just enough to cut out the RF noise present in all AM sets, but not too far to cut down the sensitivity of the PACE 100-ASA Some operators prefer to keep the "squelch" control full counter-clockwise with "volume" low so that the maximum design sensitivity of the radio is used for weak signal pickup even though the light hissing of RF noise will be heard in the background.

3) The relative incoming signal strength is read on the "S" meter located at the left side of the PACE 100-ASA The RF noise in the air will also register low on the "S" meter. As a signal is heard with a good carrier, the "S" meter indicator will show a higher reading.

4) To transmit, press the lever on the side of the microphone. The transmit indicator light will glow red, indicating you have switched to the transmit mode. Talk into the mike in a normal voice with the mike front about 2 inches from your lips and held at an angle so that you are talking across the mike face. This will give the most intelligible speech over the air. A common fault is to talk loud right into the microphone—this causes even heavy breathing to be heard over the air and when your lips touch the microphone, this causes vibrations which tend to muffle your voice transmission. REMEMBER, you must release the microphone lever so the receive light indicats yellow before you can hear the incoming voice on your receiver.

5) The first position on your channel selector is marked with a red 9. This channel 9 is reserved for use only in times of emergency such as car trouble, being lost or needing help of some sort. There are volunteer radio monitor teams which monitor channel 9 in all parts of the country at all times. In many areas the local law enforcement agencies control this CB 9 monitor service. When driving in some areas you may have noticed highway signs marked "Monitor CB 9". For more details on how to participate in CB 9 monitor activities, write REACT Headquarters. 111 E Wacker Drive, Chicago, Illinois 60601. This REACT monitor program is sponsored by General Motors Research Laboratories as a Public Service.

The second channel is marked 11. Channel 11 is the most commonly used channel for contacting another call sign for information and general conversation. There are 4 additional channel positions, so that other channels for operating may be added at a later date. There are 23 channels to choose from. Before installing additional channels check with your local PACE dealer for the best channels to use for your purpose. For instance, some camping clubs or radio clubs have certain channels which they use to call each other. There are FCC regulations concerning calling another call sign. This regulation changes from time to time so you should keep up with your part 95 rules.

CRYSTAL INSTALLATION

CAUTION: All crystals supplied for use in PACE 100-ASA transceivers have been individually checked for activity, proper frequency and freedom from spurious and parasitic oscillations. Use of any crystals not supplied by PACE does not insure against off frequency operation, spurious radiations, sub-standard performance or temperature drift, nor will defects which in our opinion were caused by use of such crystals be corrected under warranty.

To add additional crystals, remove the four top case retaining screws at the panel sides and lift off the cover. This exposes all the crystal sockets. NOTE that the sockets are labeled to indicate transmit and receive channel sockets. Also the channel 9 and channel 11 transmit and receive crystals are marked, so that additional crystals for transmit and for receive may be installed in the position to correlate with the selector dial. All PACE crystals are stamped with a part and channel number plus a "T" for transmit and an "R" for receive. Insert the crystals in their proper sockets by aligning them directly over the pins and pushing straight in. Attempting to insert them at angle may distort the socket and cause it to lose its holding power.

After inserting the crystal it is not necessary to make any adjustments, replace the top and the four remaining screws.

ANTENNAS

No other single part of the system can be as significant a factor in complete success or total failure of performance as the antenna installation.

It is advisable not to experiment but rather to use performance proven antennas. Many new "miracle" antennas appear on the market from time to time but most of them disappear after a short period.

The most foolproof of all antennas is the 1/4 wave whip. A well designed one is nearly indestructible and will perform without deterioration for many years.

Most passenger car owners prefer a shortened antenna for better visual looks. The PACE model P5647 is recommended for passenger cars since its base loaded design is only 48" high and equals the performance of a 1/4 wave whip. The P5647 may be mounted on the front center edge of your rear trunk lid without the need for drilling any holes in the car. This location is best for all around

performance. For quick temporary installation, we recommend the PACE model P5646 which is 18" high and clips on to any metal surface such as a mobile roof rain gutter. This will give satisfactory performance though not quite as great a range as the P5647.

The length of the cable from the antenna to the radio is, contrary to popular belief, not important. What is important is that the antenna have low VSWR. If a shortened type of antenna is used, it is mandatory that the VSWR be checked. A PACE 5403 VSWR bridge or similar instrument can be used. If the VSWR is greater than 2.0:1, the antenna must be adjusted in accordance with the namufacturers instructions. If the antenna is a 1/4 wave non-adjustable type, the cable connections and the ground to the vehicle at the antenna mount should be checked.

Do not attempt VSWR checks if the vehicle is parked closer than 35 feet from a large fence, metal building, etc.

OPTIONAL ACCESSORIES

Your PACE dealer has a complete list of optional accessories and equipment to broaden the range of applications possible.

NOISE SUPPRESSION

When installed in a vehicle whose ignition system proves to be an unusually noisy one, local measures can be taken on the vehicle to reduce such noise. Consult your PACE dealer to determine the most economical method of suppressing the ignition noise. Usually simple supression of spark plugs may suffice. However, more difficult cases may require special techniques. Sometimes generator and voltage regulator "hash" may be troublesome. Special capacitors and/or complete kits are available depending upon requirements.

Little can be done to reduce noise interference from other mobile sources. Your PACE 100-ASA has noise suppression circuitry. Only special and expensive noise blankers can improve upon its noise rejection. "Outboard" noise suppressors available from $20 to $50 on the market cannot improve the PACE 100-ASA as noise is already suppressed beyond the capability of such devices. If noise is experienced in base station operation from flourescent lamps, motors, etc. suppression devices are available from radio distributors specifically designed for radio noise suppression of these appliances.

MAINTENANCE

No maintenance is required on the PACE 100-ASA other than to give it the care and treatment accorded any quality electronic equipment. If the unit is used in dusty conditions the interior can be blown out occasionally with a low pressure air hose or vacuum cleaner. To remove excessive soil on the interior, clean carefully with a soft brush and alcohol and then dry thoroughly before operating.

In the event difficulty occurs, a qualified serviceman with proper instrumentaion and service procedures should be engaged. An authorized PACE dealer or the factory should perform any service work.

TECHNICAL FACTS

The CB field is, unfortunately, overrun with much technical information of dubious origin. Many users, in an attempt to improve performance, expend much effort and money only to be disappointed. It is hoped that this brief semi-technical treatise will enlighten the user and help to avoid costly errors and achieve optimum performance with minimum effort.

Contrary to some popular opinions that a transmitter can be tuned to match the antenna, any transmitter to perform properly, must have the antenna adjusted to match its output impedance. This is necessary with tube sets as well. CB radios (tube and transistor) are designed to operate into a 50-52 ohm load. Depending on the antenna installation and type, the effective impedance of the antenna can vary a great deal from this value.

In any transistor transmitter or receiver, successive stages are interdependent on proper alignment to gain top performance. When an adjustment is made in one area, it can change the alignment in another. PACE radios are designed and built to accept an antenna impedance tolerance of 35 to 75 ohms. All stages are tuned to their optimum at the factory and should not be readjusted in the field. The following "natural tendencies" are pointed out to emphasize that a good transistor design needs no retuning in the field but does need care in making a proper installation.

1.) There is a tendency for many non-qualified technicians to want to "tweak" tuning adjustments. For instance,a slight adjustment in a receiver coil may make the output volume a "hair" louder. Actually, this slight "improvement" in volume will have no effect on ultimate sensitivity and may well have a secondary effect that is detrimental; the adjacent channel rejection or spurious response rejection may be reduced, an oscillator may fail to start or AGC overload may be reduced. The input circuit to the receiver has been designed to perform with almost any antenna impedance and tuning the input will result in virtually no improvement.

2.) An even worse tendency is to attempt retuning the transmitter. Transistor transmitters, because of their low impedance, (low voltage, high current) are much less susceptable to variations in output power caused by mismatched antenna and transmission lines. The transmitter has been factory tuned for optimum performance under all conditions. Improper adjustment may cause off-frequency operations, suprious or parasitic oscillations and generally poor modulation. Adjustment of the transmitter to deliver maximum power to the antenna without regard to input power will usually result in poor modulation and excessive dissipation in the power amplifier. As an example, suppose that a transmitter is delivering 3.0 watts output with 5.0 watts input. It may be possible to adjust the transmitter tuning to 3.7 watts output. The input power will probably increase to 6.5 watts. The efficiency is now 3.7/6.5 or 57%. The original efficiency was 3.0/5.0 or 60%.

The efficiency decreased because the transmitter is not operating at its design center. The driver stage is working harder, the oscillator is working harder and the increased load will cause it to change frequency slightly. The modulation percentage drops to 70% and it was originally 95%, almost 3DB of modulation power is sacrificed for 1DB gain in output power.

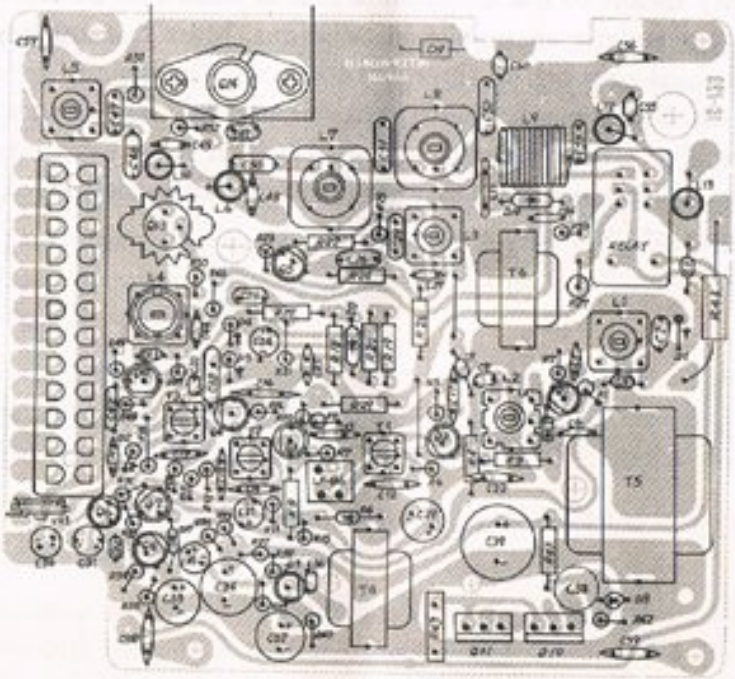
Whether tubes or transistors, the best transmitter adjustment is the one that produces the highest percentage modulation because it is the talking power that is going to get the job done at the receiver.

3.) Another common fallacy is that antenna mismatch can be corrected by transmitter tuning. This would be partly true if the antenna were mounted at the transmitter with no feed line. If an antenna with a 2:1 VSWR (50 ohm reference) is connected to a 50 ohm cable and the transmitter end of the cable has a tuning device to make it look flat, the VSWR in the cable is still 2:1 and the cable loss will be higher than normal. When the VSWR in the cable is 3.8:1 the cable loss will be twice normal and no amount of adjustment at the transmitter will reduce the loss. The correct approach is to have the matching device at the antenna end to make certain the feed cable sees 50 ohms. Now the only additional loss will be the small amount in the matching device.

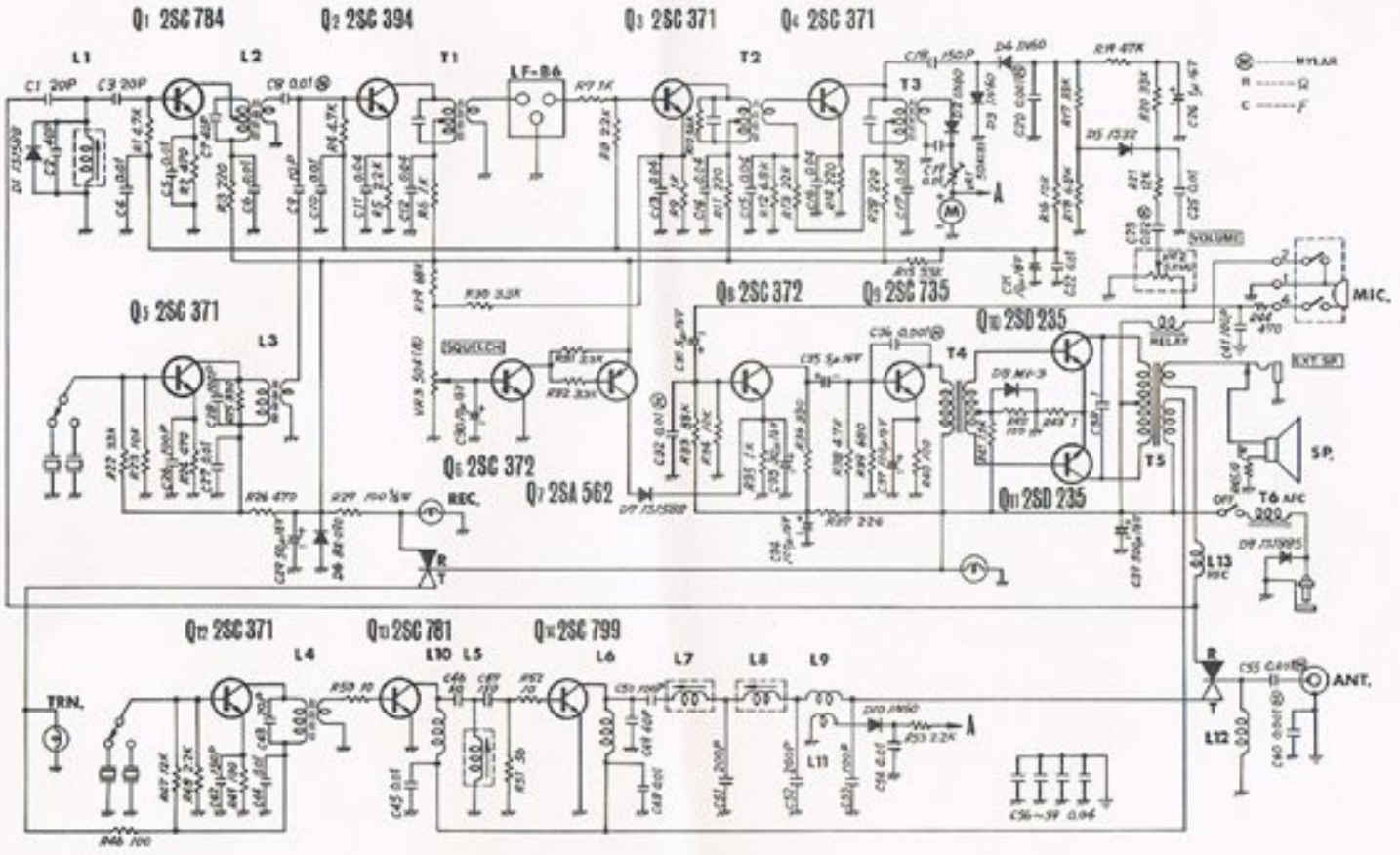
If an antenna is properly matched either by adjusting its length and/or loading coils or by an auxilliary network at its base, the coaxial feed cable will be completely non-critical, i. e., it can be any length and its losses will be extremely low. It is not necessary nor even helpful to cut the feed line in 12-foot lengths as is commonly believed. Only the poorest antenna can be helped by feed line trimming.

The answer is simplicity, and simplicity means to use an antenna that is known to be close to 50 ohms with no nonsense. Antenna location also affects the impedance, particularly in mobile installations. Most transmitters designed today to meet the full FCC requirements have some type of additional network to filter out harmonic frequencies generated by the transmitter. This includes commercial, amateur, broadcast and CB. Some use a tunable series or parallel trap, some a double pi, and most higher priced types use a multiple section m-derived filter. For effective performance, this filter must work into a load of 35-75 ohms. The same is true of all filter types and this strengthens the argument that an antenna should be made to look like the correct load for the transmitter rather than tuning the transmitter to correct for antenna deficiencies.

TOP VIEW



SCHEMATIC DIAGRAM



ELPHORA S.A.
75008 PARIS

PRINTED IN JAPAN

Citizens Two-Way Radio

- Citizens radio keeps you in touch no matter where you are.
- Citizens two-way radio can provide increased safety, convenience and pleasure for your family or business.
- Millions of Americans now own and operate citizens two-way radio.
- Any United States resident over 18 years of age is eligible to apply for a citizens radio station license. With your permission, anyone can use your citizens two-way radio.
- There are no tests to take. No technical skill is required.
- Operating a citizens two-way radio is simpler than using a telephone.
- Citizens radio equipment is highly reliable and not expensive to own or maintain. Installation in home or vehicle is simple.

FCC license application enclosed.

((ρ)) PACE
TWO-WAY RADIO PRODUCTS
by PATHCOM INC.

What
is Citizens Two-Way Radio?

The most simple way to answer this question is to say that owning a citizens two-way radio is like having a party line telephone with you wherever you go. It allows you to talk from home and business establishments to cars, trucks, boats and aircraft or between any of these vehicles by using airwaves instead of wire.

Today there are already three million citizens two-way radios in use with approximately fifteen thousand new installations added each month by people who consider two-way radio as indispensible as the telephone. One of the most frequent uses of citizens two-way radio is to have one at home and one in the family car. If there are women or teenage drivers in your family, they'll enjoy greater peace of mind knowing that they can call for assistance immediately via radio without leaving the car should an emergency arise.

In many communities, volunteer teams of public service minded citizens two-way radio owners and service stations provide a 24-hour monitoring service, just for the purpose of assisting motorists.

The uses are endless. Father can advise mother that he will be late for dinner; citizens radio can provide communications from tractor to farm house; you can bring the safety of radio to boats. Citizens two-way radio can simply bring the convenience of having communications under virtually any conditions, anywhere.

Do I Need
Training to Operate a Two-Way Radio?

No tests or special technical knowledge is required to own or operate a citizens two-way radio. The requirements for ownership and operation are very simple.

A radio station license which is valid for five years is required. You obtain one by mailing the CB station license application form with a check or money order of $4.00 to the Federal Communications Commission. Only one license application form is required regardless of the number of base stations, mobile radios or portable units you operate.

Any male or female over 18 years of age is eligible to apply for a citizens two-way radio station license. The Federal Communications Commission will assign you a CB license number and inform you of a few very logical, simple and helpful rules that are designed to help you be able to communicate when you desire. The principle restrictions are common-sense rules like these:

- *When you "call" another person, you must identify yourself by your CB license number.*
- *You may talk for five minutes only, and then you must wait five minutes before making another call.*
- *You may not use your radio for merely "passing the time of day" – you should have a definite purpose in making the call. No abusive language is permitted.*
- *Otherwise – in general – you may use your CB radio freely, anytime you wish, for normal personal or business communications.*

How
do I Operate a Citizens Two-Way Radio?

Each citizens radio is actually a complete radio broadcasting station – both transmitter and receiver all in one compact cabinet. They are extremely simple to operate – actually easier to use than a telephone.

Each radio is equipped with a built-in loudspeaker and a microphone. To talk, you pick up the mike, press a button and talk. To listen, you release the mike button and listen. It's really that simple.

There are just three basic controls. One knob turns the entire set ON or OFF, and also controls the volume of the receiver.

A second knob has a very appropriate name – the "Squelch Control". This allows you to suppress or "squelch" background noise, thus keeping your receiver silent until an actual message is broadcast.

The third control is your Channel Selector...

You
Mean I Can Use More Than One Channel?

Absolutely! Legally you are allowed to use any of the 23 available channels. Channels 10 through 15 and channel 23 may be used to communicate with any licensed citizens radio station. Channel 9 is the official emergency channel only. The remaining channels may be used only to talk to other radios in your own system. Each radio is capable of transmitting and receiving on a number of channels. The Channel Selector knob lets you choose the channel you want in much the same manner you would choose a channel on your TV set. It automatically switches both your transmitter and your receiver to the same desired frequency – no dials to read; in fact, no "tuning" at all. It's like selecting a channel on your TV set, without the need to fine tune.

Who
Can I Talk To?

Anyone in your immediate family, or connected with your business may use your equipment at any time with your permission.

Most of your communication will, of course, be with other radios under YOUR OWN license. However, it is perfectly permissible to talk on the 7 designated interlicense channels to friends or associates who have their own equipment under a different license.

Over 100,000 citizens radio operators belong to groups or clubs who regularly listen in on Channel 9 for emergency calls. One national organization, REACT, maintains such monitor service in over 1,000 communities on a twenty-four hour basis. Almost anywhere, you can receive assistance when in trouble on the highway by calling on Channel 9.

How
Far Can I Expect to Communicate?

Normally, intercommunication between base stations is possible over distances of 15 to 35 miles – between base stations and mobile units, over distances of 10 to 20 miles – and between mobile units over distances of 5 to 15 miles.

Attainable range depends a great deal upon terrain. For example, an unobstructed mountain top base station may have a range of some 100 miles. But a low level base station or mobile unit, obstructed by tall trees, hills or buildings, can only communicate over relatively short distances.

MODEL NO. 100-ASA

SERIAL NO. 08610265

ELPHORA S.A.
75008 PARIS

MADE IN JAPAN


PACE 100ASA-1
TRN.
REC.
S/RF
VOLUME
CHANNEL
SQUELCH
OFF
ABC
DEF
((ρ)) PACE


ELPHORA - PARIS
Radiotéléphone Mobile
Type PACE 100 ASA
Homologation PTT n° 1344 PP
Utilisation avec Licence PTT
Fabriqué au Japon