PACE

SIDETALK

MODEL CB-1023B

(BELCOM S-865SB)

SSB/AM TRANSCEIVER

27MHZ-15WATTS PEP

OWNERS MANUAL
NO.CB-1023B

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 Sidetalk CB-1023B is designed to comply with requirements necessary to operate in the Class "D" Citizens Radio Service in the 27 MHz 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 PA/CB switch as it must be in the CB position to receive any transmission. The radio is factory supplied with crystals for all 23 Class D citizen radio channels. The blank position between CH.22 and CH.23 is not authorized for Class D and has been internally disconnected.

DO NOT
–Key the transmitter without an antenna connected.

DO NOT
–Replace the fuse with any other type (3AC–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.

GENERAL DESCRIPTION

The PACE Sidetalk CB-1023B 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 transmitter network provides maximum protection against spurious radiations, instability and harmonic radiation resulting in reliable transmitter performance.

The PACE Sidetalk CB-1023B is designed to operate from nominal 12 volt DC source of eigher positive or negative ground and 110V AC source. 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 Sidetalk CB-1023B will operate with stabilized performance over an input voltage excursion of 11-16 volts when in mobile use.

SPECIFICATIONS:

GENERAL

Circuitry:	20 transistors, 6 F.E.T.'s, 1 I.C., 62 diodes,
Frequency Control:	±0.005% crystal
Channels:	23 – all supplied
Modes of Operation:	AM, Upper Sideband, Lower Sideband
Controls:	Power on/off, meter function selector, SWR calibration, PA/CB, noise blanker on/off, RF gain control, volume, variable squelch, AM/USB/LSB mode selector, clarifier, mike push-to-talk, 23 – channel select.
Jacks and Connections:	Jacks for mike and headset; external 8-ohm PA speaker connections for external 52-ohm antenna, AC power jack, DC 13.8V terminal.
Power Source:	117 volts AC, 12-volts DC
Speaker:	3-1/2" PM
Microphone:	Dynamic, push-talk, coiled cord
PA Audio Output:	3 watts
Size:	11 3/4" x 4" x 11"
Weight:	15 lbs
Accessories Included:	AC cord, mike with coiled cord
Receiving System:	Single conversion superheterodyne
Sensitivity:	AM: 0.5μv for 6 db (S+N)/N SSB: 0.25μv for 6 db (S+N)/N
Selectivity:	AM: 5.0 KHz at -6 db SSB: 2.4 KHz at -6 db
Clarifier/Delta Tune:	±600 Hz
Audio Output Power:	3 watts
Squelch Range:	0.5 to 1000 microvolts
Intermediate Freq.:	1st conversion: 7.8MHz

SSB TRANSMITTER (A3J)

SSB Generation:	Balanced modulator-Crystal lattice filter
Frequency Response:	350 to 2500 Hz at 6 dB
RF Input Power:	15 watts P.E.P.
Carrier Suppression:	More than 35 dB
Unwanted Sideband Suppression:	More than 40 dB
Harmonic Suppression:	More than 50 dB

AM TRANSMITTER (A3)

Modulation:	High Level Class B
RF Input Power:	5 watts
RF Output Power:	More than 3 watts
Harmonic Suppression:	More than 50 dB

INTRODUCTION

The PACE Sidetalk CB-1023B is a versatile, professional quality transceiver and we strongly suggest that you read this Instruction Manual carefully before operation so that you may receive full benefit from its many features.

SINGLE SIDEBAND

SSB (Single Sideband) is relatively new in Citizens Band Communications but has been highly effective in commercial, amateur and military usage for many years. It is a superior means of wireless communications allowing transmissions of greater distances with a minimum amount of interference and noise.

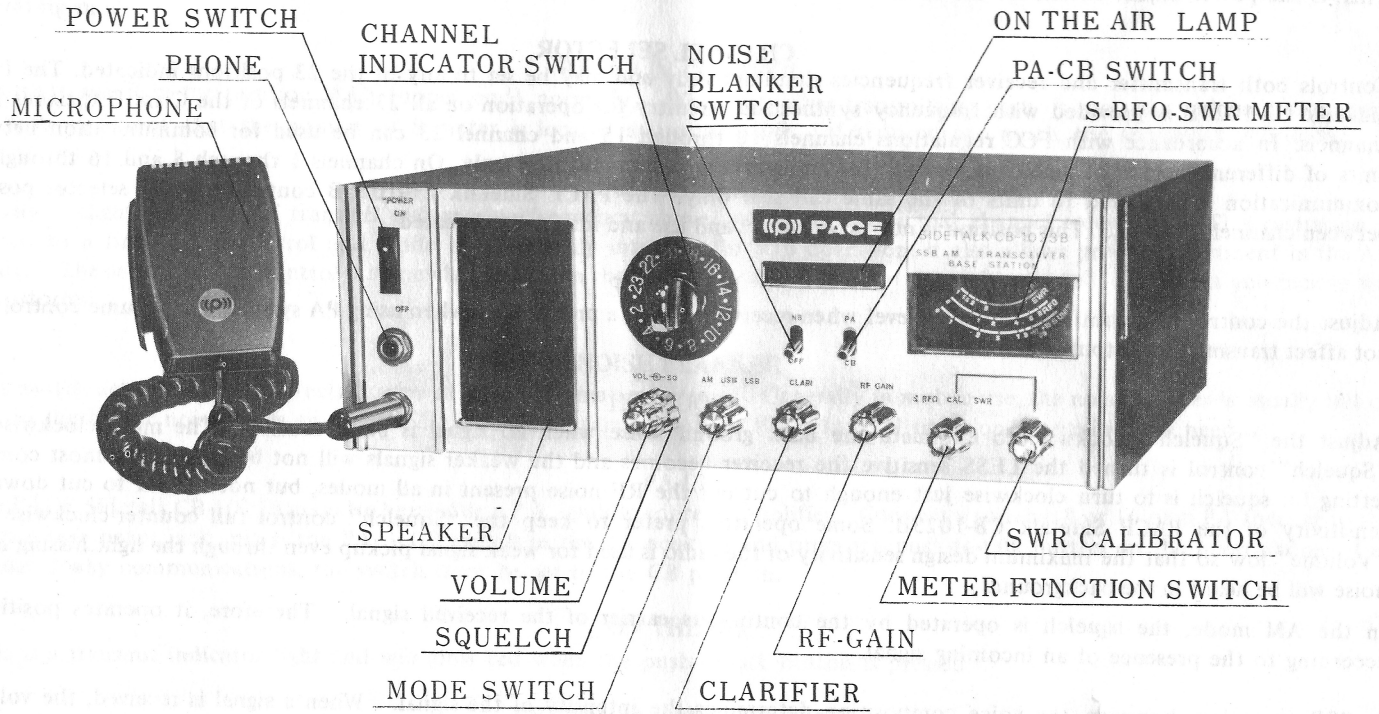
There are two types of single sideband transmissions, USB (Upper Sideband) and LSB (Lower Sideband). These might be described as half signals and due to the narrow band-width required, will travel over greater distances at lower power than ordinary AM signals.

In the actual transmission of either USB or LSB, the carrier is removed. All of the modulation for a transmission is concentrated in either the Upper or Lower sideband. In the receiver, the carrier is reconstructed and the intelligence or modulated voice is then detected, amplified and converted into an audible sound heard at the speaker.

AM (Amplitude Modulation) has been the standard method of Citizens Band reception and transmission for many years and most of the existing transceivers being used today are AM. Technically, Amplitude Modulation is Double Sideband (DSB) with full carrier. In this method of operation, a carrier modulated or interrupted by voice on both sides of the carrier frequency is transmitted.

COMPATIBILITY

The PACE Sidetalk CB-1023B is designed to be completely compatible including single sideband, (upper or lower), double sideband, or conventional AM and is equipped with separate transmitter circuitry to provide high level AM (Amplitude Modulated) transmissions and True SSB (Single Sideband) transmissions. The receiver section is also capable of receiving AM and SSB. The mode of operation for both receiver and transmitter sections is programmed by means of the mode selector switch.


POWER SWITCH
PHONE
MICROPHONE
CHANNEL INDICATOR SWITCH
NOISE BLANKER SWITCH
ON THE AIR LAMP
PA-CB SWITCH
S-RFO-SWR METER
SPEAKER
VOLUME
SQUELCH
MODE SWITCH
CLARIFIER
RF-GAIN
SWR CALIBRATOR
METER FUNCTION SWITCH
PACE
POWER ON
OFF
NB
PA
CB
VOL
SQ
AM
USB
LSB
CLARI
RF GAIN
S RFO
CAL
SWR

OPERATING CONTROLS AND FUNCTIONS (FIGURE 1)

POWER

This is the power on/off switch for the unit.

CHANNEL SELECTOR

Controls both transmitter and receiver frequencies simultaneously and may be set to any of the 23 positions indicated. The PACE Sidetalk CB-1023B is provided with frequency synthesized circuitry for operation on all 23 channels of the Class D Citizens Band channels. In accordance with FCC regulations channels 10 through 15 and channel 23 can be used for communication between units of different license; channel 9 is reserved for emmergency communication only. On channels 1 through 8 and 16 through 22, communication is restricted to units of the same call sign only. The PACE Sidetalk CB-1023B contains a blank selector position between channel 22 and 23. This position is not for citizens band use and internally defeated.

VOLUME

Adjust the control to a comfortable listing level when receiving and to a proper level when using PA system. The volume control does not affect transmitting output.

SQUELCH

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 modes, but not too far to cut down the sensitivity of the PACE Sidetalk CB-1023B. 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 through the light hissing of RF noise will be heard in the background.

In the AM mode, the squelch is operated by the continuous carrier of the received signal. Therefore, it operates positively according to the presence of an incoming signal.

In SSB operation, however, the voice composition determines the intensity of the signal. When a signal is received, the voltage is held for 1 – 2 seconds in the circuit, then the squelch will open and you will hear the signal. When the signal stops, the squelch will remain open for 1 – 2 seconds before quieting the receiver. This is normal operation.

MODE SWITCH

Controls the mode of operation for the transmitter and receiver simultaneously and allows selection of conventional AM operation or SSB operation on either upper or lower sideband. In order to communicate with another transceiver, you must use the same operating mode.

RF. GAIN CONTROL

Be sure to use it in the position MAX (upper end) normally. When the other transmitting party is too near, reduce it accordingly to such an extent that the pointer of S meter is located at position 8-9. If reduced too much, the sensitivity will drop.

CLARIFIER

Allows a slight variation of transmit and receive frequency above and below the actual channel frequency. This operation is similar to a fine tuning control and while it is primarily intended for SSB operation, it also allows precise adjustment in the AM mode. The setting of this control is somewhat critical in the SSB mode and if it is not properly adjusted, the signals you receive will be distorted.

NOISE BLANKER

This switch activates a very effective type of noise elimination circuit. Generally in mobile use, the noise blanker is usually left on due to the higher noise levels encountered. In base station operation, the individual situation determines the need.

PA-CB

The PACE Sidetalk CB-1023B may also be used as a P.A. (public address) amplifier. Connect a suitable 8 or 16 ohm PA speaker to the proper rear panel jack, place the PA – CB switch in the PA position and press the push-to-talk button on the microphone. For regular 2-way communications, the switch must be set to the CB position.

ON THE AIR

This is a transmit indicator light and will glow red when the push-to-talk button is pressed.

EXTERNAL SPEAKER JACK

An external speaker may be used by connecting a suitable 8-16 ohm speaker or a standard 1/4" 2 circuit phone plug. When the plug is inserted into the external speaker jack, the built-in speaker is automatically disconnected.

PHONE JACK

A headphone or external speaker may be used by connecting a suitable 8-16 ohm headphone or speaker to a standard 1/4" 2 circuit phone plug. When the plug is inserted into the phone jack, the built-in speaker is automatically disconnected.

MICROPHONE (Push-to-talk)

The microphone is the push to talk type and controls both the transmitter and receiver. To transmit, press and hold the push-to-talk switch on the microphone. Hold the microphone 2 to 3 inches (1 or 2 centimeter) from your mouth and speak in a normal tone of voice. To receive, release the push-to-talk switch.

S-RFO-SWR METER AND FUNCTION SWITCH

This is a triple purpose meter. It measures relative incoming signal strength in S units when receiving, relative power output for SSB or AM when transmitting and VSWR (voltage standing wave ratio) for monitoring antenna match, condition and performance. To monitor incoming signal strength and relative power output during normal operation the control switch is set to the left position marked S-RFO.

SWR FUNCTION AND CALIBRATOR CONTROL

Whatever the type of antenna selected, it is important that is be properly adjusted and matched and the connecting transmission line be in good condition so as to avoid a high VSWR. An SWR over 2 results in reduced radiated power and may cause instability and damage to the final output stage of the transceiver. The built-in SWR bridge in this model should be used initially after antenna installation and periodically thereafter in order to insure that the antenna is in proper working order. SWR should always be checked after a storm with high winds or icing conditions or whenever there is any reason to suspect the possibility of damage to the antenna or transmission line.

Refer to general operating instruction for specific instructions on how to measure SWR.

POWER CABLES

AC power cable is supplied with this transceiver. The 110–120V AC cord terminates in a standard AC plug. When you want to use this model for mobile, connect proper DC cord to DC 13.8V terminals located on the rear and be sure to disconnect AC cord since AC cord disconnects DC operation when plugged into AC jack located on the rear.

BASE STATION OPERATION

When the PACE Sidetalk CB-1023B is used as a base station, any Citizens Band beam, dipole, ground plane or vertical antenna may be used. A ground plane type antenna will provide good coverage, and since it is essentially non-directiona, it is ideal in base station to mobile operation. From base station to base station or a point-to-point operation a directional beam will give greater distance even under adverse conditions. The range of the transceiver also depends on the height of the antenna so whenever possible, select the highest location within applicable regulation's limits.

MOBILE INSTALLATION

Safety and operating convenience are the primary factors to consider when mounting any piece of equipment in an automobile. Be sure that the transceiver controls may be easily reached by the operator. Also be sure that connecting cables do not interfere with the operation of the brake, accelerator, etc.

POWER CONNECTION

When used in mobile operation, the vehicle's battery supplies the power.

CAUTION: The PACE Sidetalk CB-1023B can be used in a 12 volt DC either positive or negative ground system. If you are unsure of your vehicle's polarity, ask your dealer or local service station.

The suitable DC cord should be used for the power when mobile operation. If your vehicle is negative ground system, +DC 13.8V terminal should be connected directly to the positive or + battery terminal or to a fuse block or ignition switch or other convenient point. –DC 13.8V terminal should be connected to a metal part of the vehicle body or frame or – battery terminal.
If your vehicle is positive ground system, +DC 13.8V terminal should be connected to a metal part of the vehicle body or frame or + battery terminal. –DC 13.8V terminal should be connected to – battery terminal or to a fuse block or ignition switch or other convenient point.

MOBILE ANTENNAS

A vertical whip antenna is best suited for mobile operation. A nondirectional antenna should be used for best results in any case. The base-loaded whip antenna will normally provide effective communication or for greater range and more reliable operation a full quarterwave ship may be used. Either of these antennas use the metal car body as a ground plane and the shield of the base lead as well as the metal case of the transceiver should be grounded. A standard antenna connector (type SO-239) is provided on the transceiver for easy connection to a standard PL-259 coax plug. Following the antenna manufacturer's instructions carefully will insure proper operation. Of course the VSWR should be checked after installation and periodically thereafter.

GENERAL OPERATING INSTRUCTIONS

The explanations of operating controls and functions should be read and understood before actual operation of this transceiver.

1. Plug in the microphone and check to be sure that the antenna and power cables are properly connected.
   CAUTION: Do not transmit until an antenna or suitable dummy load has been connected to the coax antenna output jack.
2. Set the RF gain control to maximum.
3. Set the channel selector to the desired channel.
4. Set the squelch control fully counterclockwise.
5. Set the PA-CB switch to the CB position.
6. Set the mode switch to the desired mode.
7. Set the meter switch to the RFO/S position.
8. Turn the set on and adjust the volume control to the desired level.
9. Adjust the clarifier control for the clearest reception of the desired signal.
10. To transmit, press and hold the push-to-talk switch on the microphone. Hold the microphone 2 to 3 inches (1 or 2 centimeter) from your mouth and speak in a normal tone of voice. To receive, release the push-to-talk switch.

SWR MEASUREMENTS

1. Adjust all controls as outlined in general operating instructions except set the meter switch to CAL and the mode switch to AM.
   CAUTION: Make sure the antenna is connected.
2. Press the microphone switch and adjust the CAL (calibrate) control for a full scale reading on the bottom meter scale. Release the microphone switch.
3. Set the meter switch to SWR, press the microphone switch and the VSWR can be read on the bottom meter scale. A reading of 2 would indicate a VSWR of 2 to 1. Remember, a VSWR of more than 2 to 1 may be harmful to the transmitterand the antenna should be adjusted. Any normal CB antenna properly installed and in good condition should have a VSWR of less than 1.5 to 1 and VSWR's of 1.2 to 1 are commonly attained.

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 Sidetalk CB-1023B has noise blanker 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-S 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 Sidetalk CB-1023B other than to give it the care 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 instrumentation 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, spurious 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.

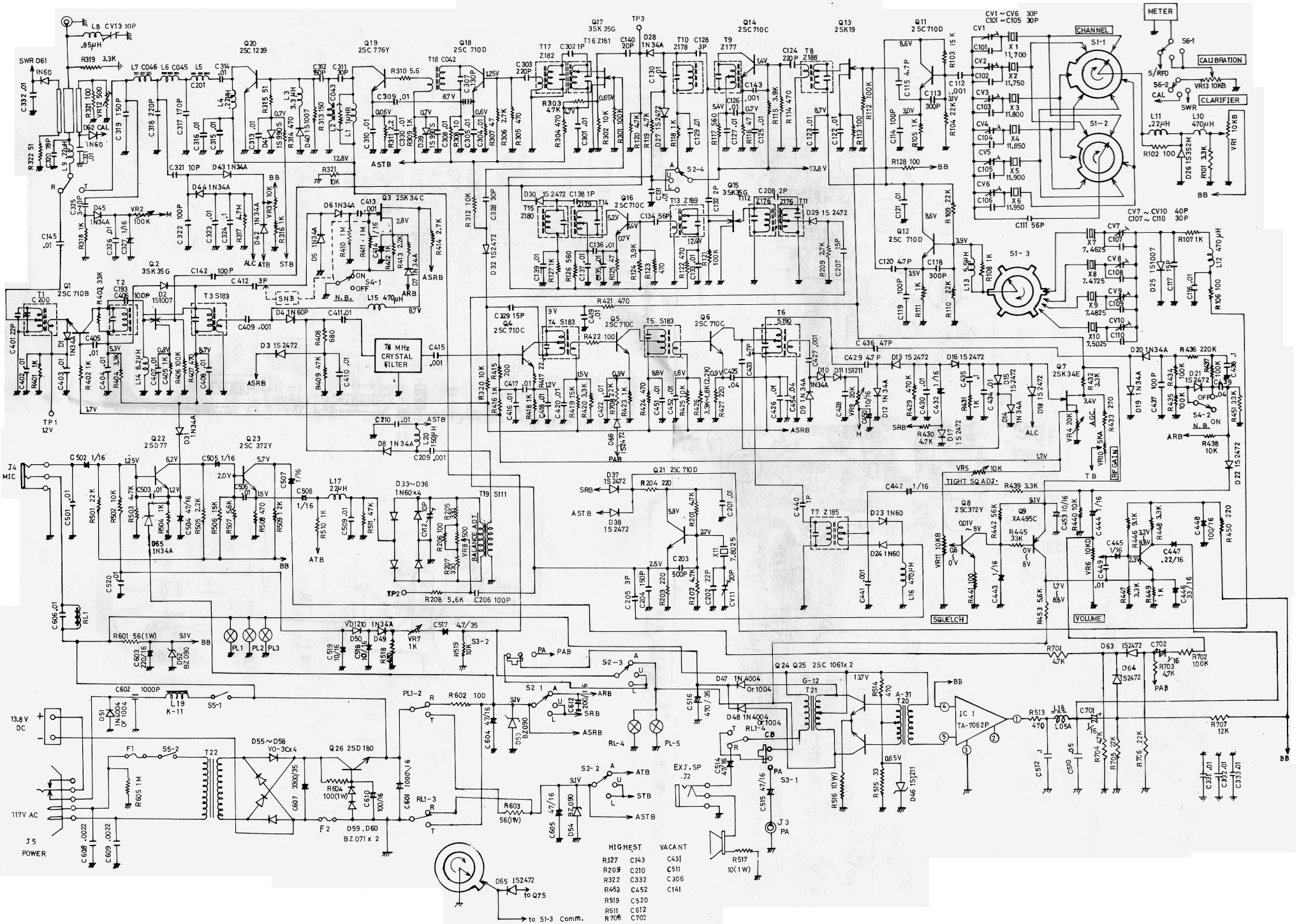
Whether tubes or transistors, the best transmitter adjustment is the one that produces the highest percentage modulation because it is the talking power that is going to get the job done at the receiver.

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 auxiliary 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.

SCHEMATIC DIAGRAM



Radio Serial No.

Model No.

Customer Name

Purchase Date

Address

Pace Dealer

City

Address

state-zip

Phone

City

state-zip

Registration for warranty on PACE BRAND RADIOS, 90 day no charge repair or replacement guarantee on all PACE equipment IF registered at the PACE factory. PLUS two year extended service warranty for a single handling charge of $14.95 per service request.

To help us give you better service we would appreciate answers to the following:

Accessories used

Primary use of PACE equipment is:

Please check appropriate:

( ) Personal (describe)

( ) First purchase of communications equipment

( ) Business (describe)

( ) Have used purchased previous PACE products. Type or previous model

Address

( ) Two-Way Radio User for years.

City

state-zip

License No.

Owner's Age

Friend is owner of PACE Model

Other communications equipment needs are:

What PACE features are most important to you:

Printed in Japan

PLACE
STAMP
HERE

PACE DIVISION, Pathcom Inc.
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