

Radio Distributors



NATO 2000

40-Channel Mobile FM
Citizenband Transceiver

“Built in Roger Beep”

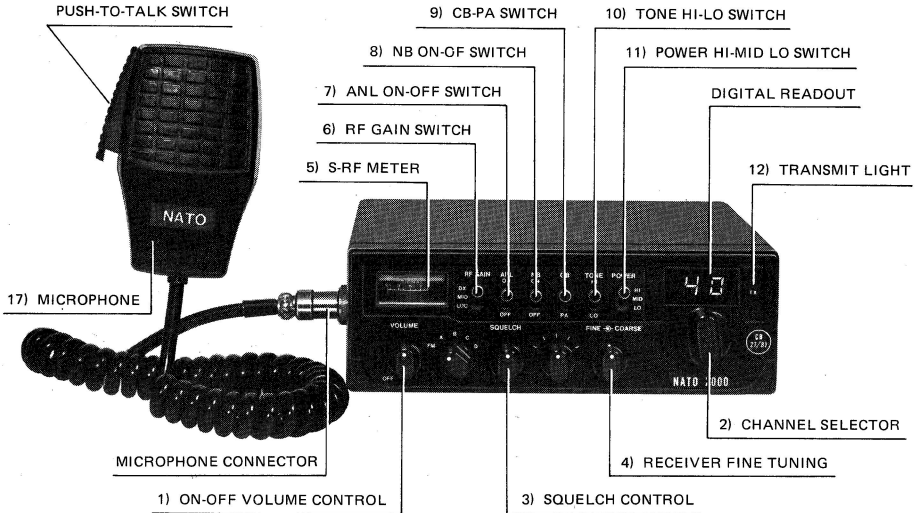


WARNING

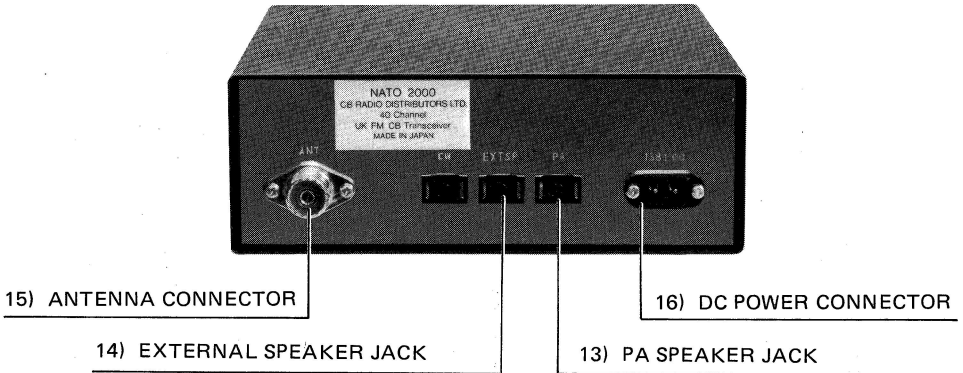
Do not attempt to operate this unit until the antenna has been connected and fully extended. Failure to do so can cause damage to this unit.

3. CONTROLS LOCATION

FRONT PANEL



REAR PANEL



4. FEATURES AND CONTROLS

4.1 Volume/Power On-Off

This combination control supplies power to the unit and adjusts the receiver volume. The switch should be turned clockwise from the "off" position. You will hear an audible "click". The L.E.D. channel display and meter will light. To increase the volume continue advancing the control in a clockwise direction.

4.2 Channel Selector

The channel selector switch is used to select the channel frequency. It automatically adjusts both the transmitter and receiver frequencies. Channels are displayed by large L.E.D. (light emitting diodes).

4.3 Squelch Control

The squelch control is used to eliminate background noise when there are no signals present strong enough to overcome the noise. To adjust the squelch control, select a channel where there is no signal. Turn the volume up to normal listening levels. Rotate the squelch control clockwise until the background noise disappears.

4.4 Variable Fine Tuning Control

The fine tuning control is an electronic tuning circuit which allows you to shift the frequency of your receiver. This allows you to compensate for an incoming signal which may be slightly off frequency. Adjust the tuning control for maximum "S" meter reading.

4.5 S/RF Meter

This unit is equipped with a large, easy-to-read combination meter with a built-in transmit indicator light.

In the receive position, the meter reads the level of the incoming signals. In the transmit position, it indicates relative power output.

4.6 RF Gain Switch

Selects RF Gain (receiver sensitivity) of the transceiver in 3 ways:

DX. In this position, the receiver section provides maximum sensitivity so that it can pick up even weak signals.

Normally this switch should be placed in this position.

Mid. In this position, the receiver sensitivity is medium, and may be used when you desire to pick only strong or fairly strong signals.

Local. In this position, the receiver sensitivity is minimum, and the receiver will pick up only the strong signals. May be used when receiving strong (close) signals which are causing overload in receiving sound.

4.7 ANL Switch

Activates the automatic noise limiter in the audio. The ANL will be effective in reduction of atmospheric (discharge) interference.

4.8 NB Switch

Activates the noise blanker circuit which is effective in reduction of impulse type noises (ignition noise, etc.).

4.9 PA-CB Switch

The PA-CB switch converts the unit into a powerful Public Address System. The "PA" function requires use of an optional 4 – 8 Ohm paging speaker. This speaker must be connected to the "PA" jack on the back of the set. Once this speaker has been connected, simply put the PA-CB switch to the "PA" position. Depress the microphone push-to-talk switch to activate the circuit.

Note: The volume control adjusts PA output level.

4.10 CB-PA Switch

When set to PA (lever down) position, the transceiver acts as a public address amplifier. Before operating PA, you must first connect an external PA speaker (8 Ohm, more than 2 W) to the PA Speaker jack on the unit rear panel.

4.11 Power Selector

Enables you to select the RF power output of the transceiver in 3 ways:

High. In this position the transceiver produces full rated RF power of 4 watts for maximum communication range.

Middle. In this position, the RF power is 2 watts for medium communication range.

Low. In this position, the minimum RF power output is obtained. If your antenna is mounted at a height exceeding 7m, you must push this switch to the low position.

4.12 Transmit Light

Your transceiver is equipped with modern light emitting diode (LED) transmit indicator light. This light will be lighted red when the transceiver is in the transmit mode.

4.13 PA Speaker Jack

For attaching optional 4 – 8 Ohm PA speaker, use 3.5mm jack.

4.14 External Speaker Jack

You may add any 4 – 8 Ohm external speaker. Simply plug your accessory speaker into the jack. Inserting the 3.5mm plug will automatically disconnect the internal speaker.

4.15 Antenna Connector

A Standard SO-239 type connector is supplied for attaching either mobile or base antennas fitted with a PL259 plug.

4.16 DC Connector

This connector is used to supply power to your unit. The plug-in feature allows easy removal for switching vehicles.

5. POWER SUPPLY

Almost all cars and most trucks currently operating in the U.K. are negative earth. There are some large trucks and construction equipment which do operate on positive earth. Your unit will operate on either. In the negative earth systems the minus (-) pole of the battery is attached to the car body, engine block, etc.

Negative Earth Hookup:

Attach the red (fused) wire to the fuse block terminal or any convenient plus (+) lead. Devices operated by the ignition key such as the radio, light, etc. are best since when you turn the ignition off, the unit will be turned off. Attach the black lead to the car body via any convenient method.

Note: Many newer cars use plastic dash facias. Make sure the screw or contact you choose is attached to the metal framework of the car.

Positive Earth Hookup:

In the event that you do have a positive earth vehicle, the following hookup must be made. Attach the red (fused) lead to the car body via any convenient screw, bolt, etc. Attach the black lead to the terminal block or any convenient wire which goes to the minus (-) pole of the battery.

Failure to make the proper connection could result in unit damage.

6. ANTENNA REQUIREMENT

This transceiver will operate with any standard 52 ohm ground-plane, vertical, mobile whip, long wire or other CB antenna. A standard SO-239 type connector is provided on the back panel for use with popular PL-259 antenna plug. Licence conditions require that the antenna shall be a single rod or wire, not exceeding 1.5m in overall length.

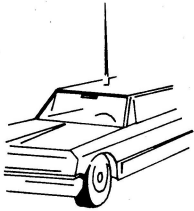
Mobile Antennas:

A vertical whip antenna is best suited for mobile use. A non-directional antenna must be used for best results in any case. The base loaded whip antenna will normally provide effective communication. The antenna uses 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 earthed. A standard antenna connector (type SO-239) is provided on the transceiver for easy connection to a standard PL-259 cable termination.

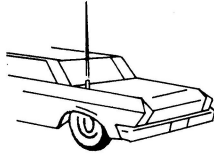
The antenna's mounted location on the vehicle affects the operation of the transceiver. Transmission and reception characteristics vary for different antenna locations. Four most popular antenna mounting shown below:

4.17 Microphone

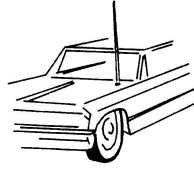
The receiver and transmitter are controlled by the press-to-talk switch on the microphone. To transmit, simply press in this switch. Release the switch to receive. When transmitting, hold the microphone three to four inches from your mouth and speak clearly at normal voice levels.



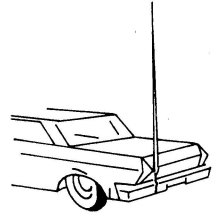
ROOF MOUNT



REAR DECK



FRONT COWL MOUNT



BUMPER MOUNT

Front Cowl Mounting

Front cowl mounting offers a number of advantages. The CB antenna can be mounted in place of the regular auto radio antenna and will thus provide the minimum of installation problems. The antenna can then be used for both the CB and standard auto radio by employing any of the commercially made two-way couplers available. In this location you can install a short loaded whip, with only a small loss of efficiency.

The horizontal radiation pattern in such a location is slightly irregular, radiation being slightly greater in the direction of the rear fender opposite to the side on which the front cowl antenna is mounted.

Roof Mounting

Roof mounting is usually the best location because it provides an almost perfect omnidirectional radiation pattern. However, the use of a 1.5m base loaded antenna on the roof of a vehicle is fairly impractical and a shorter, loaded whip is usually installed in this location, even though this type offers lower efficiency.

Rear Deck Mounting

Rear deck mounting permits the use of a 1.5m, or a base loaded, shorter antenna. The radiation pattern in such a location is somewhat irregular, radiation being slightly greater in the direction of the front fender opposite to the side on which the rear deck antenna is mounted.

Bumper Mounting

This arrangement uses the rear bumper of the car and is by far the most practical for use with full 1.5m base loaded whips. Another advantage is that removal of the antenna is simple and leaves no holes in the car body. The radiation pattern produced by an antenna mounted on the left rear bumper is fairly irregular, with greatest radiation being in two directions — one to the right and forward slightly, the other to the rear and left slightly.

Base Station:

When this unit is used as a base station, any Citizens Band, ground-plane or vertical antenna may be used. A ground-plane type will provide greater coverage, and since it is essentially non-directional, it is ideal in base station to mobile operation. From base station to base station, the range of the transceiver depends basically on the height of the antenna, and whenever possible, select the highest location within the licence conditions.

Important Notice

If your antenna is mounted at a height exceeding 7m, the licence condition requires a reduction in transmitter power of 10 dB. When above is applicable to you you must switch "Power Switch" at Lo position.

Ensure that the switch is returned to the original Hi position when operating from your vehicle.

7. MOBILE INSTALLATION

A location in the car or truck should be chosen carefully for convenience of operation and non-interference with normal driving functions. Mounting may be under the dash or instrument panel or any place a secure installation can be made. The carrying handle again serves as the mounting bracket or additional perforated straps or brackets may be used as desired. The 12 Volt cable may be connected to any convenient terminal but preferably to the ignition switch to prevent unauthorized persons from operation of your unit. With this method the unit will only operate when your key is turned on. Engine ignition interference should not be a problem and vehicles equipped with standard broadcast radios will have enough suppression to eliminate ignition interference. If interference is present, any skilled auto radio repairman should be able to eliminate it for you.

8. BASE STATION INSTALLATION

To operate your CB radio in the home, a suitable 12V DC stabilised power supply must be used as the source of power. The 12V DC power supply is plugged into the mains and the CB radio's red and black leads are connected to the terminals on the power supply. Be sure to connect them correctly following the instructions supplied with the transformer. NEVER CONNECT A CB RADIO DIRECT TO 240V AC MAINS. Consult your dealer to ascertain which 12V DC power supplies are suitable.

9. GENERAL OPERATING PROCEDURE

Check to see if the proper connections have been made on the power cable, antenna system, and microphone.

Receiver

- a. Put PA-CB switch to the CB position.
- b. Plug in microphone.
- c. Set Channel Selector to the desired channel
- d. Turn the volume and squelch controls fully counter-clockwise.
- e. Rotate the volume control clockwise. You will hear an audible "click" and the meter and channel LED lights will come on. Continue rotating clockwise to desired listening level.
- f. With no signal present, rotate the squelch control clockwise until the rushing noise disappears.

Transmitter

Caution: Never operate this unit without an adequate antenna system or load. Antenna SWR should not exceed 3:1. Failure to follow these recommendations could result in damage to the RF output transistor.

To transmit, depress the Push-To-Talk switch on the microphone. Hold the microphone 3 to 5 inches from your mouth and talk at a normal level.

10. PUBLIC ADDRESS

Attach an optional paging speaker to the P.A. jack on the back of the unit.

Put the PA-CB switch to the "PA" position. To activate circuit, simply depress the Push-To-Talk switch on the microphone.

In some cases, feedback may occur if there is not enough separation between the microphone and paging speaker. Rotate microphone so it is 180 degrees from speaker. If this does not solve the problem, you may have to move the speaker further away.

11. ROGER BEEP FACILITY

Your transceiver has the built in Roger Beep Facility. Each time the PTT lever is released, a tone is transmitted to the receiver though it will not be audible at your transmitter. This is for those receiving your signal who will know when your transmission has ended.

12. USING CB IN AN EMERGENCY

Channel 9 is the officially recognised emergency channel in your local area. This channel will very likely be monitored by REACT (Radio Emergency Associated Citizens Teams), other voluntary organizations or independent CB users.

Before you have an emergency of your own to report, it is useful to listen to Channel 9 to get an idea of the way in which an emergency message is exchanged.

13. UNDERSTANDING SWR (Standing Wave Ratio)

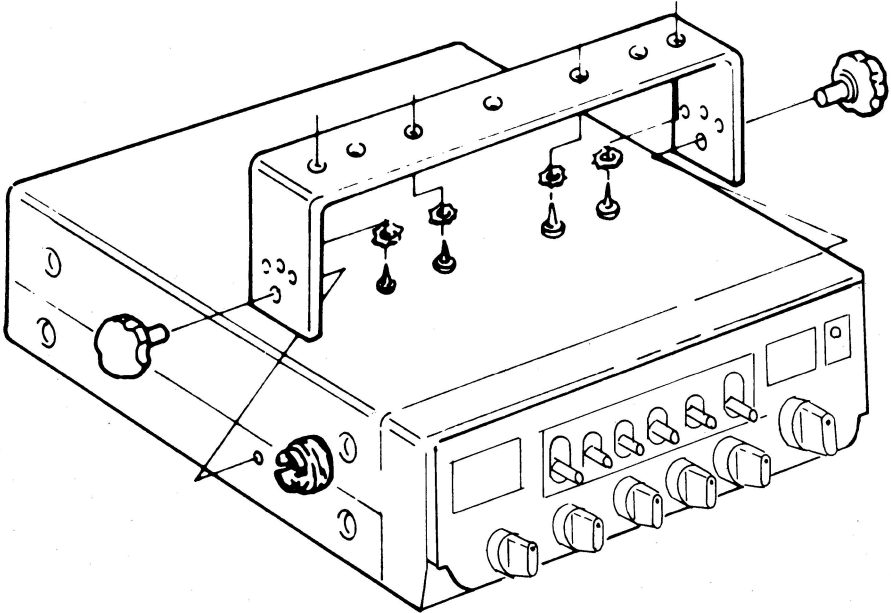
In theory, your transceiver has a 50 ohm output and your antenna is 50 ohms. If a 50 ohm cable (such as RG58/U or RG8/U) is used, all the power from your transceiver will be transmitted via the coaxial cable and radiated by the antenna. Under these conditions, the SWR (standing wave ratio) of your antenna system would be 1:1. In practice, the antenna must be 50 ohms and tuned to the exact channel. This condition seldom exists and standing waves are set up on the cable. This SWR robs you of power and likewise range. While 1:1 is not always possible to attain, you should tune your antenna system so the SWR does not exceed 1.5 to 1 or at maximum 2 to 1. Here are some examples of the power losses for various SWR ratios:

SWR	=	Power Losses
1:1	=	0
1.3:1	=	2%
1.5:1	=	3%
1.7:1	=	6%
2:1	=	11%
3:1	=	25%
4:1	=	38%
5:1	=	48%
6:1	=	55%
10:1	=	70%

14. MOUNTING INSTRUCTIONS

Mobil Installation

Before installing the transceiver in a car, truck, boat, etc., be sure to choose a location which is convenient to the operating controls, and will not interfere with the normal functions of the driver. The transceiver may be mounted to the underside of the instrument panel or dashboard of a car, truck, etc., by means of the special bracket that is supplied with the transceiver.



15. TECHNICAL SPECIFICATIONS

General

Operating Frequencies:

Channel	1	27.60125 MHz	Channel	21	27.80125 MHz
"	2	27.61125 "	"	22	27.81125 "
"	3	27.62125 "	"	23	27.82125 "
"	4	27.63125 "	"	24	27.83125 "
"	5	27.64125 "	"	25	27.84125 "
"	6	27.65125 "	"	26	27.85125 "
"	7	27.66125 "	"	27	27.86125 "
"	8	27.67125 "	"	28	27.87125 "
"	9	27.68125 "	"	29	27.88125 "
"	10	27.69125 "	"	30	27.89125 "
"	11	27.70125 "	"	31	27.90125 "
"	12	27.71125 "	"	32	27.91125 "
"	13	27.72125 "	"	33	27.92125 "
"	14	27.73125 "	"	34	27.93125 "
"	15	27.74125 "	"	35	27.94125 "
"	16	27.75125 "	"	36	27.95125 "
"	17	27.76125 "	"	37	27.96125 "
"	18	27.77125 "	"	38	27.97125 "
"	19	27.78125 "	"	39	27.98125 "
"	20	27.79125 "	"	40	27.99125 "

Type of Emission: F3

Channel Spacing: 10 KHz

Frequency Composition: PLL Synthesizer

Power Source: 12V DC Negative or Positive Earth

Operating Temperature Range: $-5^{\circ}\text{C} - +45^{\circ}\text{C}$

Electric Specifications

Receiver Section

- a. Receiver System : Dual Conversion Superheterodyne
- b. Intermediate Freq. : 1st IF: 10.695 MHz
2nd IF: 455 KHz
- c. Sensitivity : $0.5\mu\text{V}$ (20dB S/N) nominal
- d. Adjacent Channel Selectivity : 45dB nominal
(@+10 KHz)
- e. Squelch Threshold Sensitivity : less than -10 dB NQ level nominal
(approx 0.15 to $0.2\mu\text{V}$)

- f. Squelch Tight Sensitivity : $50\mu\text{V}$ maximum nominal
- g. Spurious Response Attenuation : 60dB nominal
- h. Image Rejection : 45dB nominal
- i. Receiver Spurious Emissions : less than 20nw
- j. Audio Output Power : 4 watts at 4 ohm
 (@10% THD at 1 KHz) 2 watts at 8 ohm
- k. Audio Freq. Response : $+2$
 -8 dB per 6dB/OCT at 0.3 – 3 KHz
- i. Current Drain : Stand-by 0.25A nominal
 Receiving max. 0.8A nominal

Transmitter Section

- a. RF Output Power : 4 watts (MPT-1320)
- b. Freq. Deviation (@ 1 KHz) : ± 2.5 KHz max.
- c. Audio Freq. Response : $+2$
 -5 dB per 6dB/OCT
 at 0.3 – 3.0 KHz pre-emphasise
- d. Spurious Emission : less than 50uw
 - 80 – 85 MHz
 - 87.5 – 118 MHz
 - 135 – 136 MHz
 - 174 – 230 MHz
 - 470 – 862 MHz
- Other Freq. : less than $0.25\mu\text{W}$
- e. Adjacent Channel Power : less than $10\mu\text{W}$
- f. Current Drain @12.0V : 2A nominal

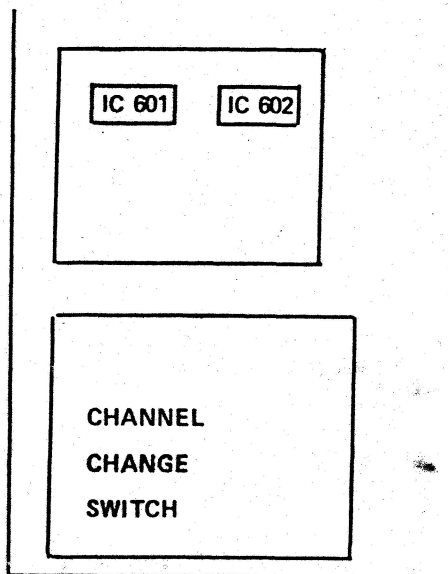
MEMO

NATO 2000

**This set has been converted to operate
on 40 CH FM UK Frequency ONLY**

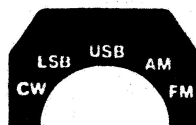
For operation OUTSIDE the U.K. only. The following alterations will permit FULL function of transceiver in all modes. On removal of lower half of casing (i.e. speaker housing) access can be gained to the circuit board which is situated to the rear of the channel change switch. The sketch diagram below shows the relative locations of the two I.C. components that are to be used. Simple inter-changing of these components (i.e. IC 601 & IC 602) will permit full mode, all band operation. To obtain full power output as per manual on full mode operation it is necessary for your dealer or service agents abroad to adjust RV11 to maximum output and RV12 to obtain correct modulation depth.

NB Only adjustments made by a qualified service dealer with the necessary equipment is recommended as damage caused to this transceiver would not be covered by any warranty as may be applied to your unit.



IC 601 = 57032A)
IC 602 = 57042B) U.K. FM

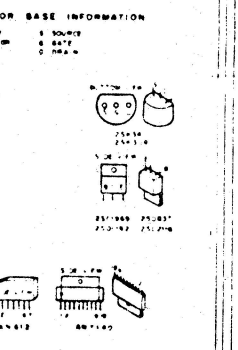
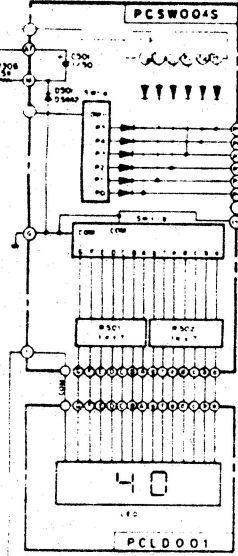
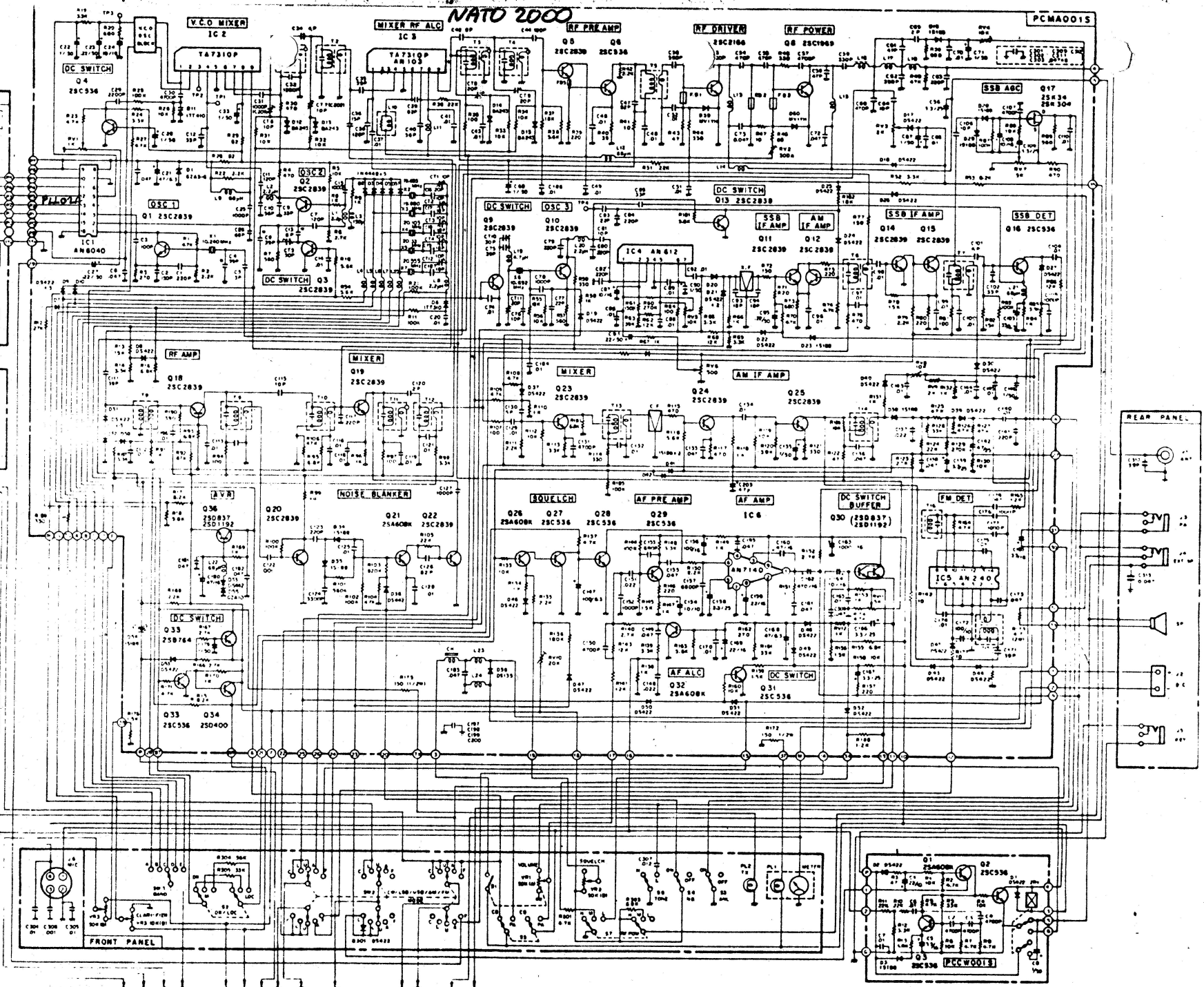
IC 601 = 57042B) All mode
IC 602 = 57032A) All band



FASCIA OF SET

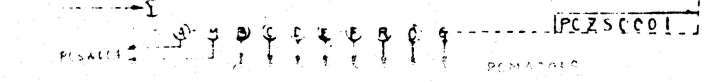
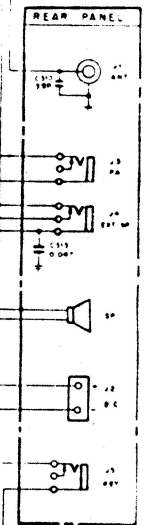
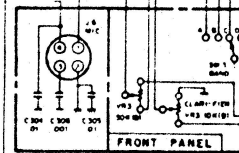
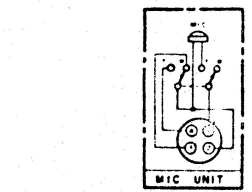
ALL VOLTAGES MEASURED FROM PC BOARD GROUND WITH D.C. VTMV AT NO SIGNAL (AT 13.5V SUPPLY) IF MEASUREMENT VALUES ARE IN EXCESS OF 20% OF THE REASON FOR DIFFERENCE SHOULD BE CORRECTED. A.T.E. IS 1.1 AM Y.E. CHASSIS GND PC BOARD GND ADJUSTED (TYPICAL VALUE SHOWN)

NATO 2000



TRANSISTOR BASE INFORMATION

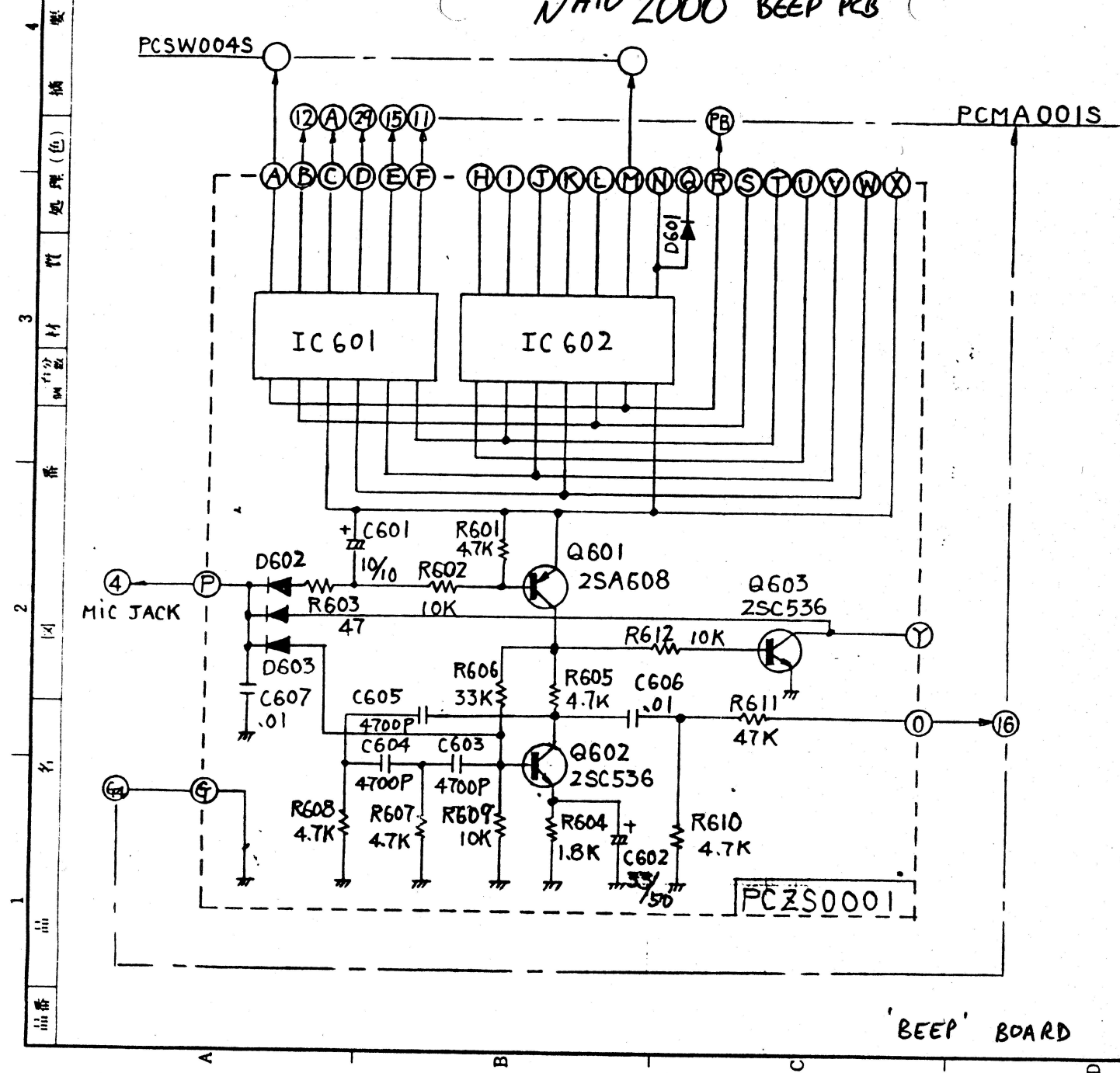
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NATO-2000

NATO 2000 BEEP PCB

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4 裝
3 實 質 材 料
2 圖 號
1 名 稱
品 名

材 質	處 理
版 年 · 月 · 日	著 名
版 號	通 知 號 號
	變 更 記 事

Sole UK Importer

CB Radio Distributors Ltd.
Isle of Man.

Printed in Japan