

THE ICM-1024B/IC-751 INSTALLATION

Revised 6/30/96

Introduction

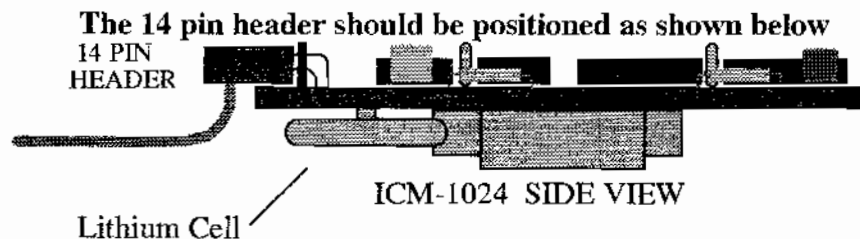
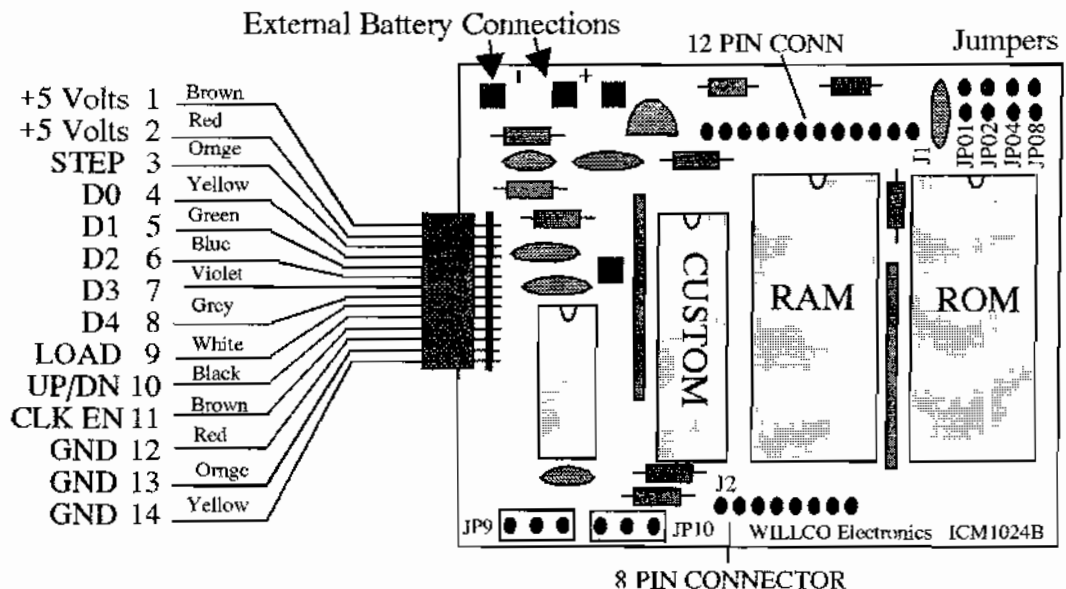
The ICM-1024B is a direct replacement for the Icom EX314 or EX-314-01 RAM unit and mates with the 8 and 12 pin connectors on the radio's logic board. It uses a 32K by 8 RAM (Random Access Memory) that provides 32 banks, 32 memories each, with a total of 1024 memories

Note: The IC-745 has only 16 memories, however, with a simple modification, the ICM-1024B can provide 1024.

The RAM is backed up with a lithium battery.

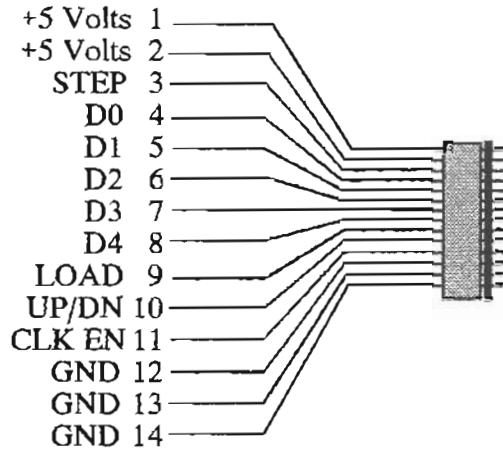
The ICM-1024B also uses a ROM (Read Only Memory) to permanently store lookup tables for the Icom R71A, IC745, IC-751/A, 271A/H and IC-471A/H. Jumpers JP01, 02, 04 and 08 are used to select the ROM banks that contain the proper lookup tables. JP09 and JP10 are for future use. The ROM also contains extended H.F. frequency coverage from .01 to 31 MHz HF and 139 MHz to 152 MHz UHF.

A 14 pin connector and ribbon cable is used to connect external push buttons and toggle switches or to interface the memory unit to a matrix board on the IC-R71 and IC-751/A.



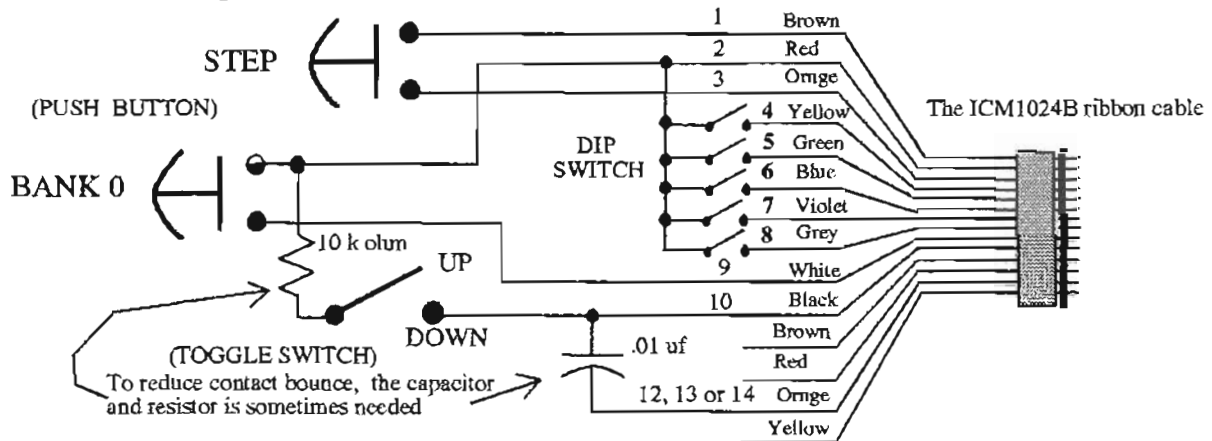
INTERFACING THE ICM1024B

The ICM-1024B can interface to Icom radios or external switches via the 14 pin header and ribbon cable. There are two +5 volt, three ground connections and control inputs. The control inputs can interface to the matrix board on the Icom R71 or to external push button and toggle switches.



Pin #3 (the STEP lead) can be connected to a push button switch. Each time the button is pressed the next bank is selected (the banks are incremented/ decremented on the falling edge).

The Up/down lead connects to a toggle switch to change the STEP direction. When bank 15 is reached, for example, you can reverse the STEP direction by toggling the UP/DN switch. When +5 volts (or a pulse) is applied to the LOAD lead bank 1 will be selected. You can also program the LOAD lead to jump to another bank by connecting the D0 to D4 leads to "DIP" switches (for programming information see page 8). The CLK EN lead can be used to lock the STEP UP or STEP DOWN operation.



ICM-1024B BASIC WIRING DIAGRAM USING EXTERNAL SWITCHES

CAUTION!

The +5 volt leads connect to the Logic board via pin12 of the 12 pin connector. To prevent accidental shorting to ground, the leads should be well insulated.

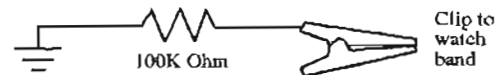
BEFORE YOU BEGIN

The following instructions may appear to be simple. They are, however, quite difficult to perform. If you are not a qualified technician or if you don't have the proper tools or soldering skills, you can damage your radio. If you don't think you can perform the task, you should contact a friend that is qualified or a nearby reputable radio/television repair shop.

The ICM-1024B is guaranteed for 90 days parts and labor. If your radio is damaged during the installation, we will not guarantee or repair it. If you are having problems, reinstall the original Icom memory and have the radio repaired at your nearest authorized Icom service or dealer. If the problem appears to be associated with the ICM-1024B and replacing it with the original memory board corrects the problem, return it and we will exchange it free of charge within 90 days of your purchase date.

PREPARATION

Disconnect the antenna and the AC or DC line power to the radio. Perform the work in a static-free work space. You can also protect the radio by grounding it to a water pipe or a ground rod. If the wiring in your home or apartment is well grounded, the mounting screw on a duplex outlet is also a good ground. You should also wear a static strap. You can make one by connecting a jumper lead to ground with a 100k resistor in series and while doing the modifications, connect the other end of the jumper lead to a metal watch band.



INSTALLING THE STRAPPING JUMPERS

The ICM-1024B ROM contains lookup tables for the R71, IC-745 and IC-751. If you're installing the module in a transceiver, you will have to add jumpers (refer to the table below). Using a light gauge wire form a "U" shape jumper with a .10" spacing. Insert the jumpers on the component side and solder the pads from the bottom side of the board.

| JP01 | JP02 | JP04 | JP08 | MODEL | |
|------|------|------|------|-------------|------------------------------------|
| 0 | 0 | 0 | 0 | R71 | 1 = jumper installed 0 = no jumper |
| 1 | 0 | 0 | 0 | IC-745A | |
| 0 | 1 | 0 | 0 | IC-751/751A | |

C751/751A INSTALLATION

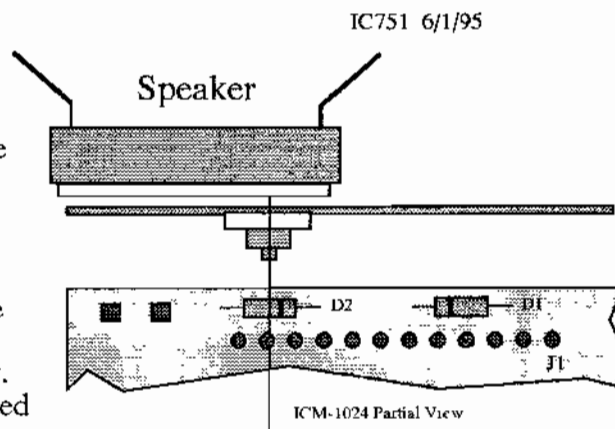
Remove the radio's bottom cover and locate the memory unit (It's a small printed circuit board with a lithium "coin" cell attached). Remove the small "Phillips" screw on the memory board and unplug it with a gentle rocking motion by pulling on the sides that are adjacent to the connectors.

Install the ICM1024B by mating the 8 and 12 pin connector with the 8 and 12 pin header on the logic board. Make sure the connectors are properly seated and that they are not offset by one pin. You can determine the proper alignment by observing it's position on the logic board.

Inspect the ICM1024B. Make sure that the transistor mounting screw, on the aluminum heat sink, is almost centered on diode D2 and J1 pin 11. Position the ribbon cable towards the front of the radio.

IF YOU DON'T WANT 1024 MEMORIES

Disregard the following paragraphs. unplug the ribbon cable, you don't have to install it. Re-assemble the radio, it should function normally. Leaving the cable off does not effect the extended frequency coverage.



THE IC-751 MATRIX BOARD CONNECTIONS

The IC751A/751 memories are selected in VFO mode by pressing the Dial Function Select switch (DFS). While in Memory mode the tuning dial selects the memories when the DFS switch is turned off. Using "firmware" the memories are actually selected by the micro processor chip. The firmware is permanently stored in the processors internal ROM memory.

The design makes it difficult to modify the radio for automatic bank selection. There are, however, several front panel buttons that can be used to manually select the 32 banks (with 32 memories in each bank). The SPEECH button, for example, can be used to STEP through the banks. The (RIT/XIT) CLEAR button can be used to jump back to bank 1 and the FUNCTION button can reverse the step direction.

Preparation

Now that the ICM-1024B is installed, place the radio up-side-down on a two inch thick book. Carefully remove the two green flat ribbon cables. They plug into the logic board and connect to the Matrix unit. Remove the bottom two flathead screws that hold the front panel. The top screws will serve as a hinge. Tilt the front panel down and rest it on a table or bench (to prevent damage or scratches, place the panel on a soft towel or cushion). With the front panel face down the Matrix board should be visible.

Interfacing

The following steps may require the green and white "Components Layout Sheet" and schematic that came with your Icom IC-751. You will be soldering wires directly to component pins, therefore, you will need a high quality temperature controlled soldering iron. Separate about 10 inches of wire on leads 3, 9 and 10 from the ribbon cable. Using the wire list on page 5, connect the 3 leads.

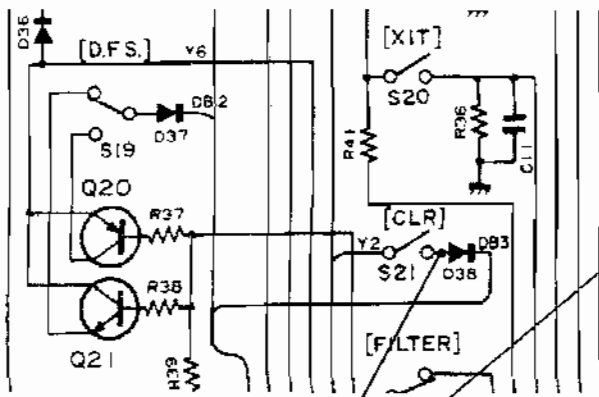
To locate the IC's, use the components layout sheet or the Service manual and schematic. Strip off about 1/8" of insulation and tin each wire. Tin the IC pin and solder the appropriate wires. Cut off about 10 " of wire on leads that are not connected and tape the bare ends.

ICM-1024B TO ICOM IC-751 MATRIX BOARD WIRE LIST

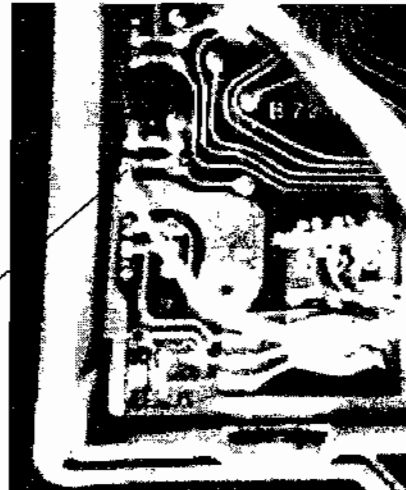
| ICM-1024B | COLOR | MATRIX |
|-----------|--------|---------------------------------------|
| PIN 3 | Orange | W2 (the SPKS line on Logic board) |
| PIN 9 | White | CLEAR button (on Switch Matrix Board) |
| PIN 10 | Black | IC 12 PIN 7 (on Logic Board) |

Note; On the Logic Board. W2 is located near pin 8 of J12 .

MATRIX SWITCH (PARTIAL SCHEMATIC)



Connect to CLEAR button here.



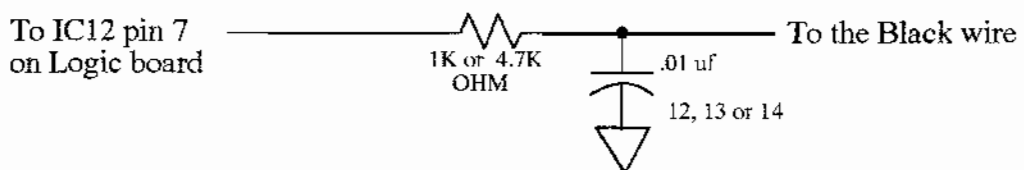
Matrix Switch PC Board
Partial view with Matrix
PC Board removed.

THE SPEECH OPTION

If the IC-EX310 voice synthesizer unit is installed, the SPEECH button will operate normally, however the button will have a dual function (frequency annunciation and BANK STEP). While changing banks, the radio will announce the displayed frequency. If the enunciator is too annoying simply rotate the tuning dial knob after you press the SPEECH button. The annunciation will cease. To disable annunciator you can also connect a rear mounted toggle switch in series with the audio lead (the shielded lead that connects to the Speech module).

Important Notice

The Black wire (on the ribbon cable) that connects to IC 12 pin 7 on the logic board can pick up noise and cause erratic operation when the SPEECH button is used to select banks. The solution is to add a filter circuit between the black lead and IC 12 pin 7.



Try a 1K ohm resistor first. If your still experiencing problems, use a 4.7 K ohm.

OPERATING INSTRUCTIONS

Reconnect the ribbon connectors on the Matrix board and any wires that were previously disconnected remount the front panel. Make sure that nothing is shorting or touching the radio's circuit boards. Ground the radio and connect the DC power supply. Apply power. The radio should operate normally. Tune the radio and check the new General Coverage frequency limits. It should tune from 10 kHz to 31 MHz.

Remember, the CLEAR button is used to jump back to bank 1. It is also used to reset the RIT and XIT controls. Therefore it's a good idea to place your favorite Ham frequencies in bank 1. If they are stored in other banks and you use the XIT control, the CLEAR button will clear the XIT and jump you back to bank one. While in GENERAL coverage mode, you don't normally use the XIT or RIT controls.

Place the radio in VFO mode and store your favorite "Ham" frequencies in bank 1. When the first bank is filled, select bank 10 by pressing the SPEECH button 9 times (banks 2 to 9 have pre programmed frequencies and they can be overwritten). While in memory mode, after you rotate the tuning knob, the frequencies that you stored should disappear and a new bank of memories should appear. You can store a new set of 32 frequencies in bank 10. You can also devote one memory in each bank as a bank indicator. Bank 15 memory 32, for example can have 1.5 MHz stored. Bank 20 memory 32 can have 2.0 MHz and bank 32, memory 32 can have 3.2 MHz etc. The FUNCTION button reverses the step direction. Re assemble the radio.

SCANNING

The radio will only scan one bank of memories at a time. To scan other banks you will have to manually select another. While the receiver is scanning simply press the speech button. The radio will scan the new bank but it will be difficult to determine the bank number.

For your convenience we included a log sheet. Use it as a master sheet to make other copies. We suggest that you arrange your frequencies in groups of 32, categorizing them by services. For example, Utilities, Short wave Broadcast, RTTY, Ham Radio, Military, Navy, Air Force or Mars. We also preloaded Larry VanHorn's Top 250 Hot! Frequencies.

REPLACING THE BATTERY AND INITIALIZING THE RAM

During "boot up" computers normally run a memory check. The memory check also initializes the RAM by writing and reading data to all memory locations. With battery backup or non-volatile RAM, memory checks aren't normally used. The same is true with radios, like the Icom IC-751 or IC-751A. Because it uses a battery backup RAM, a memory check or the memory initialization will cause you to lose previously stored frequencies. The Icom RAM unit is initialized at the factory.

The Willco ICM1024B also requires initialization. But don't worry! There's no need to ship it back to the factory. You can initialize the RAM by simply entering and saving valid frequencies and modes.

Because the ICM1024B contains 32 times more memory than the original Icom RAM unit, the battery life can be shorter. The ICM1024B is supplied with a higher capacity lithium cell and the estimated battery life is about 6 years. The important information is permanently stored in ROM (Read Only Memory) so your radio won't die when the battery fails.

MEMORY QUIRKS

After replacing the battery, the RAM will require a manual initialization. When power is first applied to the ICM-1024B (that is, when a new battery is installed) it's RAM will contain unknown data that will cause random numbers and letters to appear on the front panel display. Other times, the radio can display several modes at the same time.

For example.

| |
|----------------|
| AM CW LSB RTTY |
|----------------|

 When you select another memory or bank, the radio

may display

| |
|-------------------|
| FM AM CW LSB RTTY |
| 666.666.7 |

 other times

| |
|-----------|
| RTTY |
| 021.080.4 |

 can be displayed.

You can clear the bogus display by selecting any mode. Rotate the tuning knob and a valid frequency should appear. Check VFO A and make sure that you can tune from 10 kHz to 31 MHz. If it functions properly, copy VFO A to VFO B. Then, while in VFO A, select all 32 banks. Switch to VFO B and select all 32 banks. This procedure will initialize both VFO's for all 32 banks.

The random data (in the RAM) won't effect the radio's operation, however, it can be annoying. While in memory mode, for example, a bad frequency that was in the memory can be copied to the VFO. When you switch to VFO mode, it can lock up. Initialize all 1024B locations by writing a frequency, that corresponds to the bank, in each unused memory. All unused memories in bank 11, for example, can contain 11 mHz. Memories in bank 31 can contain 31 mHz and memories in bank 32 can contain 3.2 mHz. As you fill each bank it's also a good idea to devote one memory as the bank designator. To determine the bank number, simply switch to that memory.

BATTERY REPLACEMENT

Check the battery about every two years. If it falls below 2.5 volts remove the memory board. While changing the battery, try to maintain power to the RAM. Make up a battery holder with two AA size batteries. Solder the minus "-" lead on the temporary battery to the minus terminal on the memory board (the external battery terminals are the square pads, see page 1). Solder the plus "+" lead of the battery to the plus pad. Unsolder the Lithium cell and replace it with a Panasonic BR2330 (with solder tabs) or similar type.

If you can't find a direct replacement battery you can use the "AA" battery holder, with extra long leads, as a temporary replacement.

CAUTION: Keep the "AA" batteries outside the radio. The hot temperatures inside can cause the batteries to leak.

NNN

DIP SWITCH SETTINGS

When using dip switches refer to the the table below

| PIN | # | BANK | | | |
|-----|----|------|---|---|---|
| | | 8 | 7 | 6 | 5 |
| | 1 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 0 | 1 |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 1 |
| | 5 | 0 | 0 | 1 | 0 |
| | 6 | 0 | 0 | 1 | 1 |
| | 7 | 0 | 0 | 1 | 0 |
| | 8 | 0 | 0 | 1 | 1 |
| | 9 | 0 | 1 | 0 | 0 |
| | 10 | 0 | 1 | 0 | 1 |
| | 11 | 0 | 1 | 0 | 0 |
| | 12 | 0 | 1 | 0 | 1 |
| | 13 | 0 | 1 | 1 | 0 |
| | 14 | 0 | 1 | 1 | 1 |
| | 15 | 0 | 1 | 1 | 0 |
| | 16 | 0 | 1 | 1 | 1 |
| | 17 | 1 | 0 | 0 | 0 |
| | 18 | 1 | 0 | 0 | 1 |
| | 19 | 1 | 0 | 0 | 0 |
| | 20 | 1 | 0 | 0 | 1 |
| | 21 | 1 | 0 | 1 | 0 |
| | 22 | 1 | 0 | 1 | 1 |
| | 23 | 1 | 0 | 1 | 0 |
| | 24 | 1 | 0 | 1 | 1 |
| | 25 | 1 | 1 | 0 | 0 |
| | 26 | 1 | 1 | 0 | 1 |
| | 27 | 1 | 1 | 0 | 0 |
| | 28 | 1 | 1 | 0 | 1 |
| | 29 | 1 | 1 | 1 | 0 |
| | 30 | 1 | 1 | 1 | 1 |
| | 31 | 1 | 1 | 1 | 0 |
| | 32 | 1 | 1 | 1 | 1 |

1 = ON 0 = OFF