

## BUXCOMM 2007 RASCAL GLX OPERATOR'S MANUAL

Before we begin, let's perform the initial setup:

### Sound Card CONFIGURATION:

Most soundcards use 3.5mm (1/8") jack for line and/or microphone input. Use the LINE IN jack. If you do not have a LINE IN jack, then use the MIC IN (microphone input) jack. When using the MICROPHONE IN jack, you may need to insert some attenuation [see [www.BUXCOMM.com/catalog](http://www.BUXCOMM.com/catalog) for cat no. 40DBPAD]. To open your "Volume Control" (soundcard drivers/software), depending on the operating system your PC uses, follow the procedure I've outlined below.

#### Operating System

#### Start Menu Location

Windows ME

Start > Programs > Accessories > Entertainment > Volume Control

Windows 98

Start > Programs > Accessories > Entertainment > Volume Control

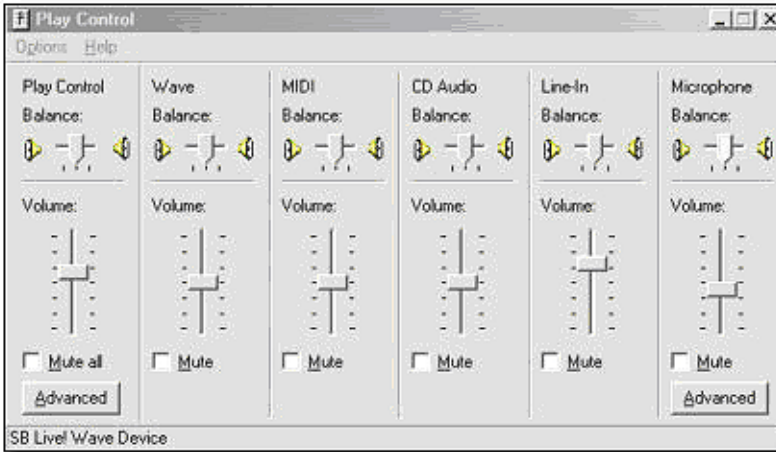
Windows XP/NT

Start > Programs > Accessories > multimedia > Volume Control

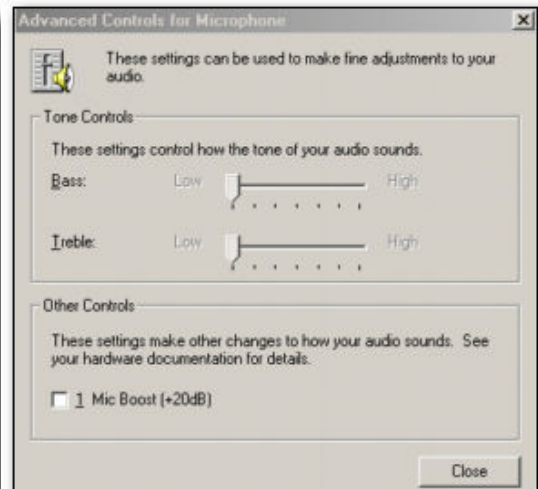
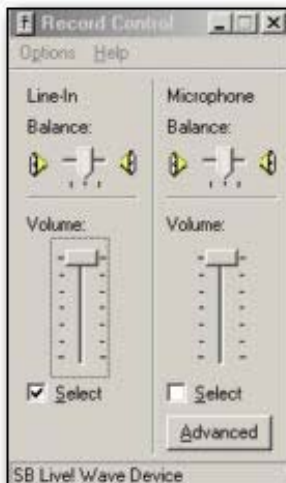
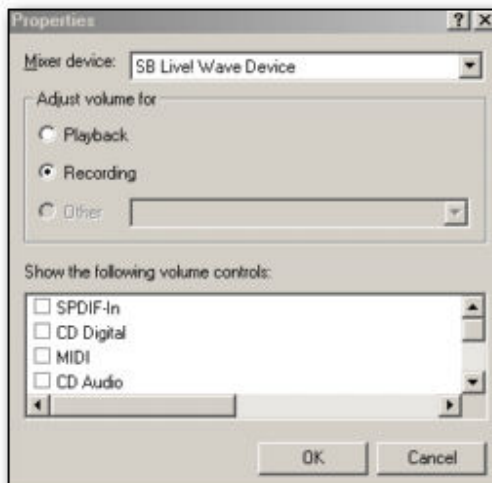
Windows 2000

Start > Programs > Accessories > multimedia > Volume Control

Be sure the input you are using is not Muted and the volume is adjusted correctly.



If your sound card does not have a LINE IN jack, then use the MIC IN jack to your soundcard. DO NOT use the "Mic Boost" option. Make sure it is NOT enabled (DISABLE IT). This is found by selecting Options on the Player Control > Properties > select Recording > OK > Advanced, UNcheck the *MicBoost* at the bottom of the soundcard display.



### BUXCOMM, RASCAL GLX SoundCard Prep: FOLLOWS

Setup for the RASCAL GLX and Amateur Radio transceivers, using various HAMscope Radio Digital PC Sound Card Software.

#### Introduction:

This document describes the use of Sound Card Modes with most HF transceivers. The interface used is the BUXCOMM RASCAL GLX interface, and takes advantage of the unique features of the RASCAL GLX interface and level control pots built into the RASCAL GLX interface for transmit level control.

#### Concept:

The concept of sound card modes is to use the PC and associated sound card to generate a sound card audio signal. As a rule, this signal is applied to a transceiver accessory or microphone input.

The digital tones or PSK audio signal enters the radio as audio-frequency (AF) and is then super-imposed on the radio-frequency (RF) signal and transmitted over the air by the transceiver and antenna. At the target receive location, the signal is received and changes the RF into AF. The software running on the PC (WINPSK, HAMScope, etc.) and associated sound card decodes the audio (AF) signal to intelligent on-screen text

**Operation:**

The Transmitted and received AF must be clean and without distortion. That is, the distortion must be less than 3% max. In addition, the AF must be within the designated spectrum of the transceiver.

A Typical radio system is set up for voice operation, usually less than 2200 Hz. The filter characteristics of both transmit and receive are not always flat over the range of 200 to 2200 Hz, in fact they are purposely set for a band-pass that best matches human speech characteristics.

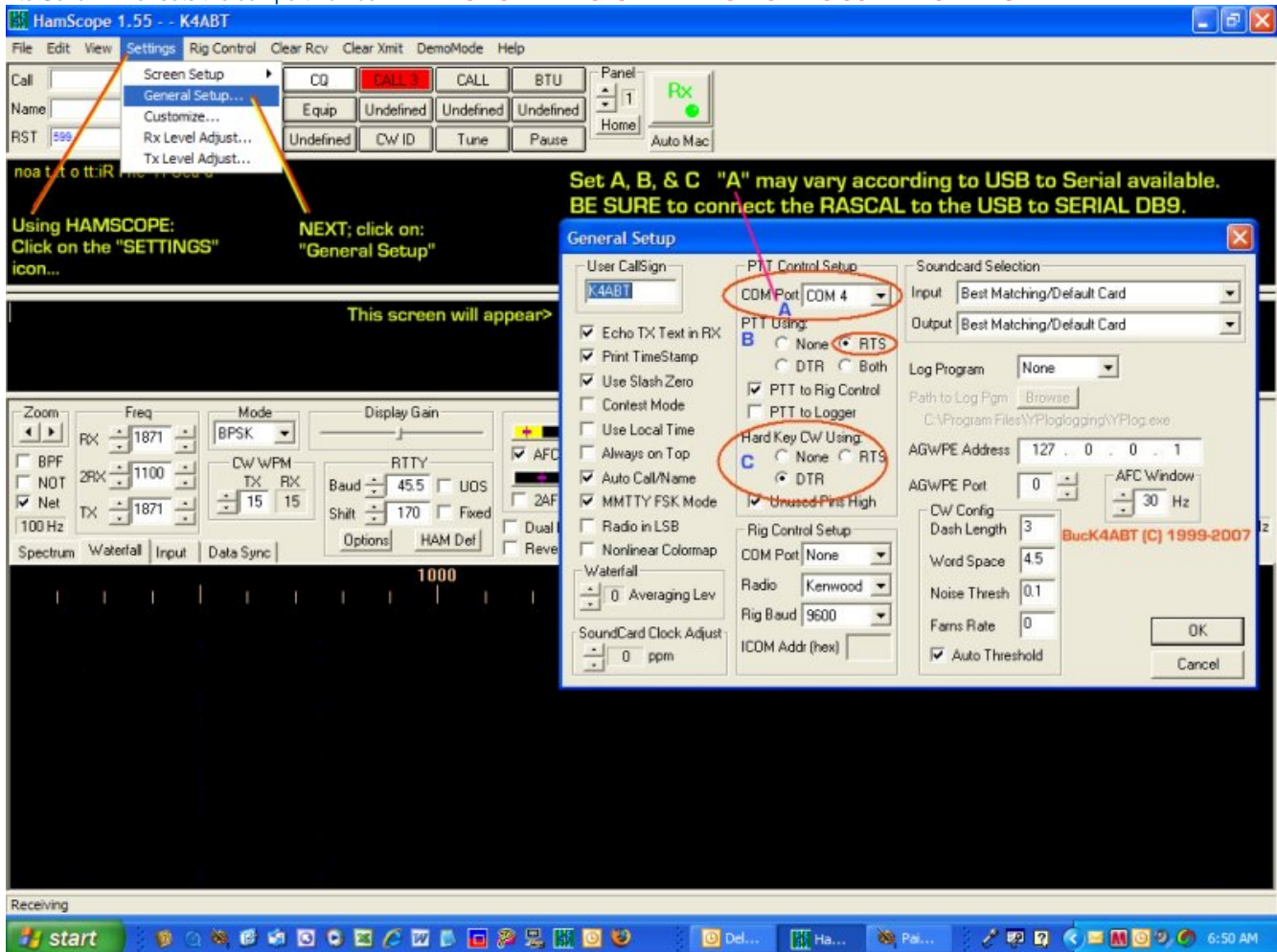
An operating range of 200 to 2000 Hz is typical for most ham transceivers. These parameters should be considered when operating in a sound card mode to allow operation of the combined software, PC, RASCAL and transceiver.

AN IMPORTANT NOTE to remember, is: The audio level must be adjusted within the band of operation to optimize power output, and prevent distortion and over-modulation. In both theory and on-air operation, this is easily accomplished by listening to the signal output of the transceiver. Setting the Tx Audio level pot on the RASCAL GLX, or moving a slider on the PC screen (sound card software).

**Transceiver Setup:**

Transceiver setup is as follows: frequency 14.070.15 USB; Audio Processor set OFF; Receive RF level full up; Volume level set for normal listening. RF Power level should be set to less than one half transceiver rated power output. For the purpose of setting up the RASCAL GLX and the transceiver, the software we will use is either *WINPSK*, or *HAMScope*. Both programs are software we have included on the CD ROM supplied with your RASCAL GLX. The same basic setup procedures will apply to other software also found on the CD ROM supplied with the RASCAL GLX.

USING "HAMSCOPE" Sound Card Program from the CD: If you are using the RASCAL GLX with USB Adapter, "A" may vary depending where the USB to Serial Driver sets the comport number. **NOTICE: STUDY THE FOLLOWING SCREEN CAREFULLY !**



**First-time “SOFTWARE” and transmit Level Setup:**

The levels from the sound card and RASCAL GLX must be adjusted to produce a desired output power from the transceiver. **PC Volume Setting:** Start by using the standard Volume Control panels on the PC.

**“SOFTWARE” settings:**

Load WINPSK and click on the **SETTINGS** icon.

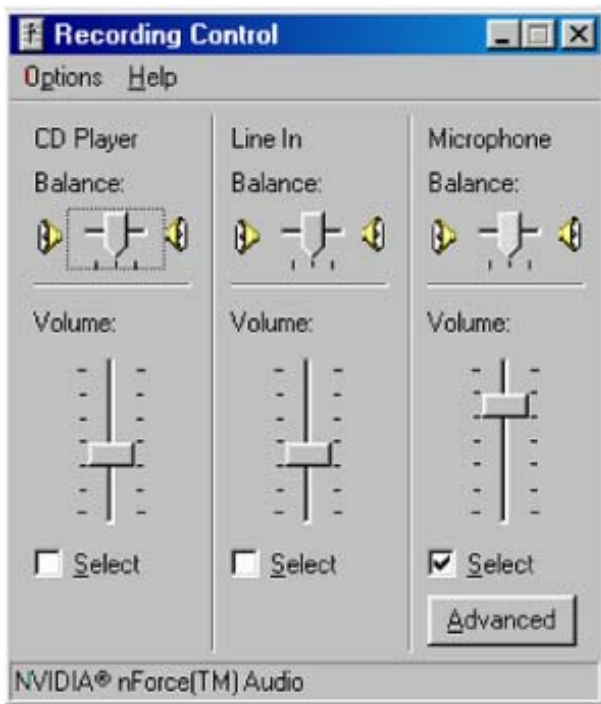
Next **CLICK “General Setup”** and enter you call sign, followed by placing a check-mark  in:

- Echo Tx Text in RX
- Use Slash Zero

Then move your cursor to the **PTT Control Setup** and check the radio knob that corresponds to the (serial) comport that you have your RASCAL GLX connected to.

In the SoundCard block, select radio knob: **“Use Any Available”** Then **CLICK OK**.

Still at the **“SETTINGS”** icon, Click on **RX Level Adjust**, The following: “Recording Control” block should appear on-screen:



(USE a dummy load for transmit signal setup)  
To begin transmit level setup and adjusting, CLICK “Tx Tune” in the top-most MENU of the WINPSK window.  
(to turn off Tx Tune, Click “TxTune” again !)

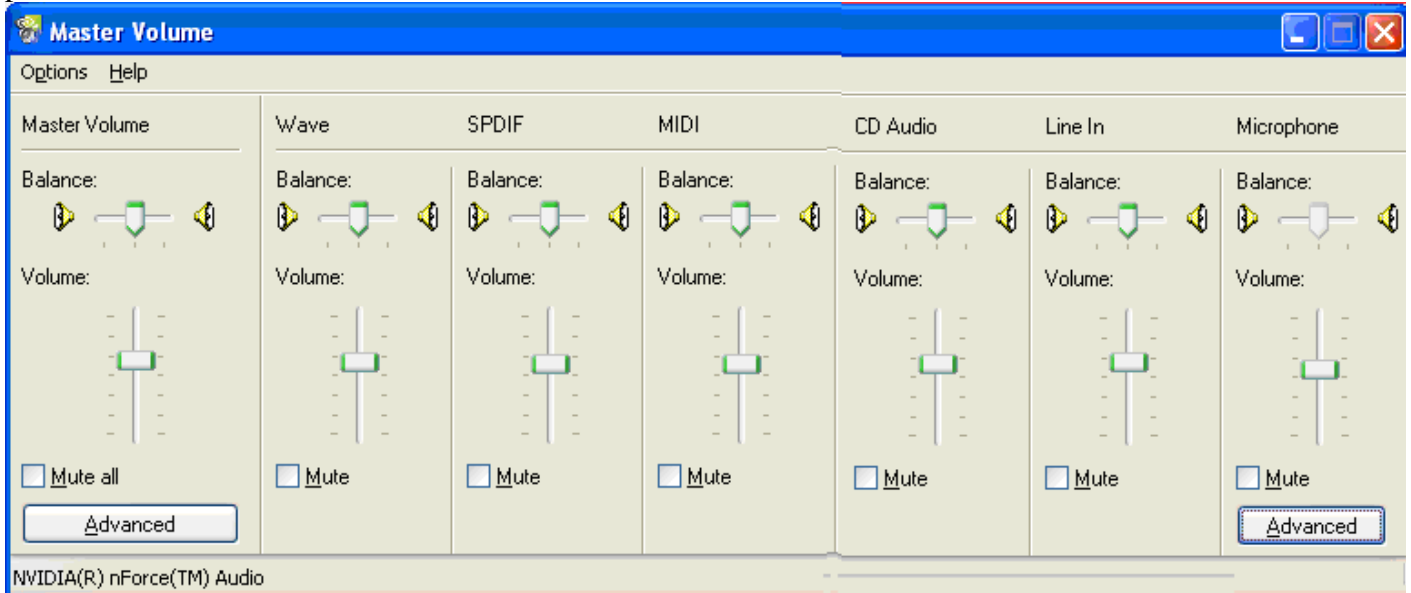
**NOTICE:** When using the RASCAL with *both serial and USB to serial adapter:*

First install the USB to Serial port adapter driver (On the CD between the folded cardboard back of the USB to serial converter package), then go to the Windows Device Manager (Start: Settings; Control Panel: System) and click on the + next to Ports to expand the list and see which COM port the adapter is using change your Sound Card software Port setting to use the adapter's COM port. Plug the RASCAL serial serial cable into the port. This is your auto PTT FSK, and CW control serial port.

For the latest USB to Serial converter driver software, check the site at: <http://www.manhattan-support.com/driver-usb-rs232.shtml>  
Your model is 205146 USB to RS232 converter SELECT : [Windows 98Se/Me/2000/XP Install Shield](#)  
PL-2303H/X/HX Installshield Driver Setup Program v2.0.0.14 for Win98SE/ME v2.0.0.26 for Win2K/XP (XP Logo Certified) (V20026, 08/2004) **This driver also supports Windows Vista.**

Still in the “SETTINGS” icon, Click on: **Tx Level Adjust** and Set check-mark  in “SELECT” box as shown below;

The Transmitter Drive Control (**Tx Level Adjust**) Panel appears similar to the following Master Volume panel:



In the Master Volume screen, you may “MUTE” some of the “Mute” boxes, **but do NOT mute the “WAVE” check box.** As a rule, the slider controls of the Wave and the Master Volume controls are set midway of their range. Set the Tx Level pot on the RASCAL GLX to mid-point.

Be sure you have HAMscope or WINPSK running. Next Click the waterfall about midway 1200 to 1800 Hz. This sets the audio frequency midrange of the waterfall screen, select *Tx Tune*.

**Still using the DUMMY load for tune and setup: Begin transmit level setup and adjusting. CLICK “Tx Tune” in the top-most MENU of the WINPSK window.** (to turn off Tx Tune, Click “TxTune” again !)

This will generate a single frequency tone to modulate your transceiver. Monitor the power output level on the transceiver front panel RF output meter or a watt meter, for a continuous output signal. The power output should NOT show more than half the transceivers rated “output” power.

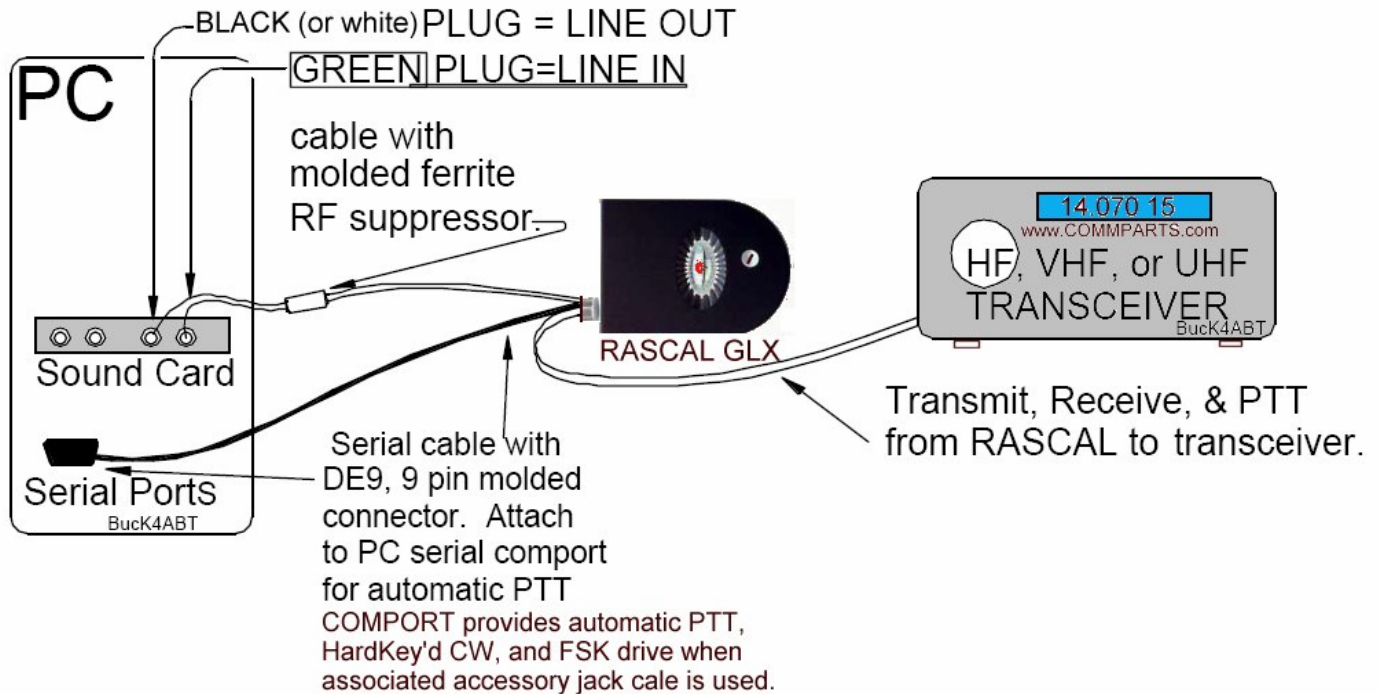
You can adjust the Tx Level Control on the RASCAL GLX: to produce the desired RF level. When the pot is in the upper two-thirds of its travel, and you have not achieved enough audio to drive the radio to half power, it may be necessary to adjust the PC Master Volume Control slider up or down to bring the power level to one third or half rated power.

Once you have the level set, no additional adjustments to the RASCAL GLX level should be necessary. The PC Master Volume control panel can be closed. **Turn Off The Tune Signal** by clicking the Tx Tune button again.

The Receive Level is controlled by the sliders in the PC sound card software. The waterfall of WINPSK display is blue, and the signals are usually yellow. If a red “Audio level too High” appears in the WINPSK display, it indicates the receive audio level needs to be turned down in the sound card software, or an (40 dB pad) attenuator should be inserted in the MIC IN, or Line In to the sound card input.

If your radio has the FSK feature, the RASCAL GLX can be used to do true RTTY/FSK, instead of "A"FSK. The RASCAL GLX also does Hard-Key'd CW by using the special "CBL CW." To use FSK or CW, be sure your sound card software is set to FSK, or CW. These two modes will not work without the correct cable or when the sound card software is set for PSK or SSTV modes. A Free Cable (customer's choice), detailed set of documentation, a CD-ROM with many sound-card and RASCAL programs are included with each RASCAL GLX.

Signals will appear throughout the waterfall spectrum of 1000 to 3000 Hz. To begin a QSO with one of them, be sure the signal at or near the point where you have set your cursor and yellow line. Another method of setting the frequency, is to set the "NET" feature in WINPSK "ON." Switch to the antenna.. and HAVE FUN.



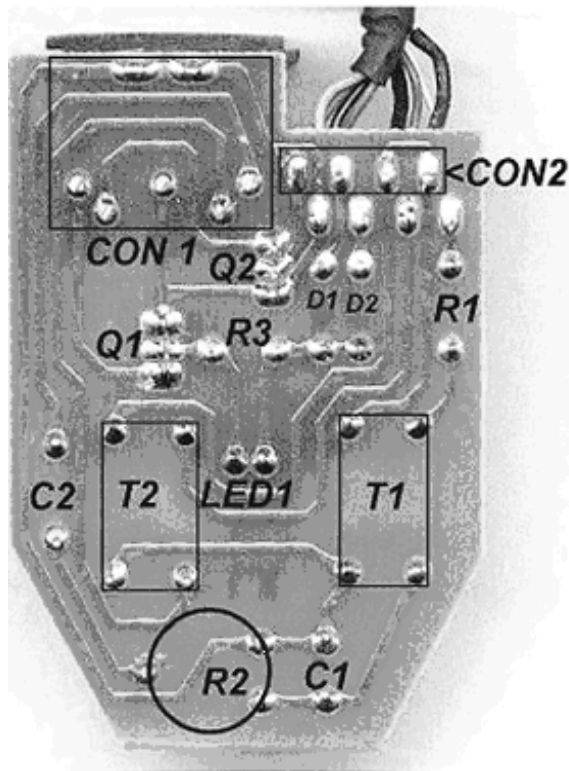
Some PCees may have MIC IN and SPKR OUT, instead of LINE IN and LINE OUT.

*For RASCAL GLX with USB to Serial adapter/converter, Install USB Driver software, then in the soundcard PSK program set comport under the "settings" icon.*

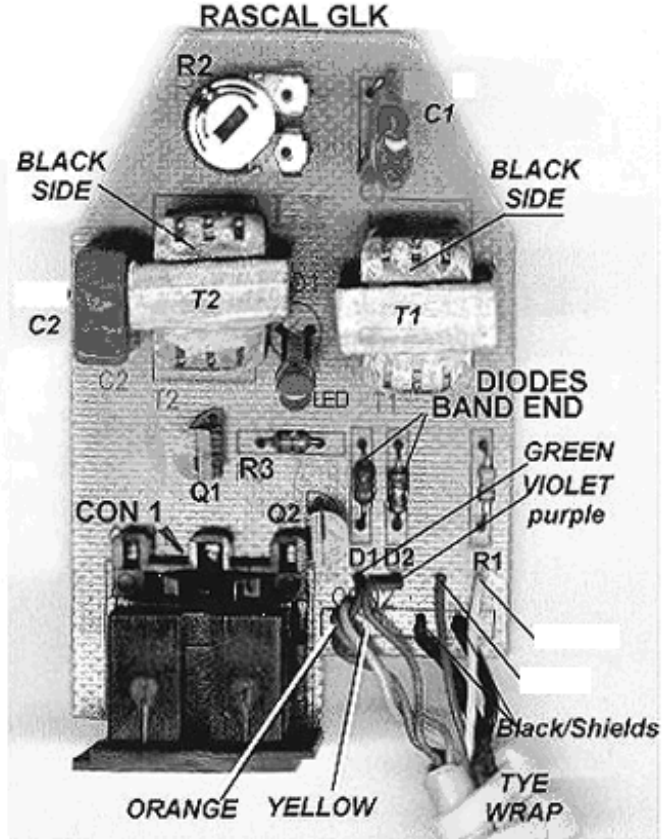
Having Fun with the Digital Modes.

73 de BucK4ABT  
[www.BUXCOMM.com](http://www.BUXCOMM.com)

ASSEMBLY INSTRUCTIONS FOR THE BUXCOMM 2007 RASCAL GLKit

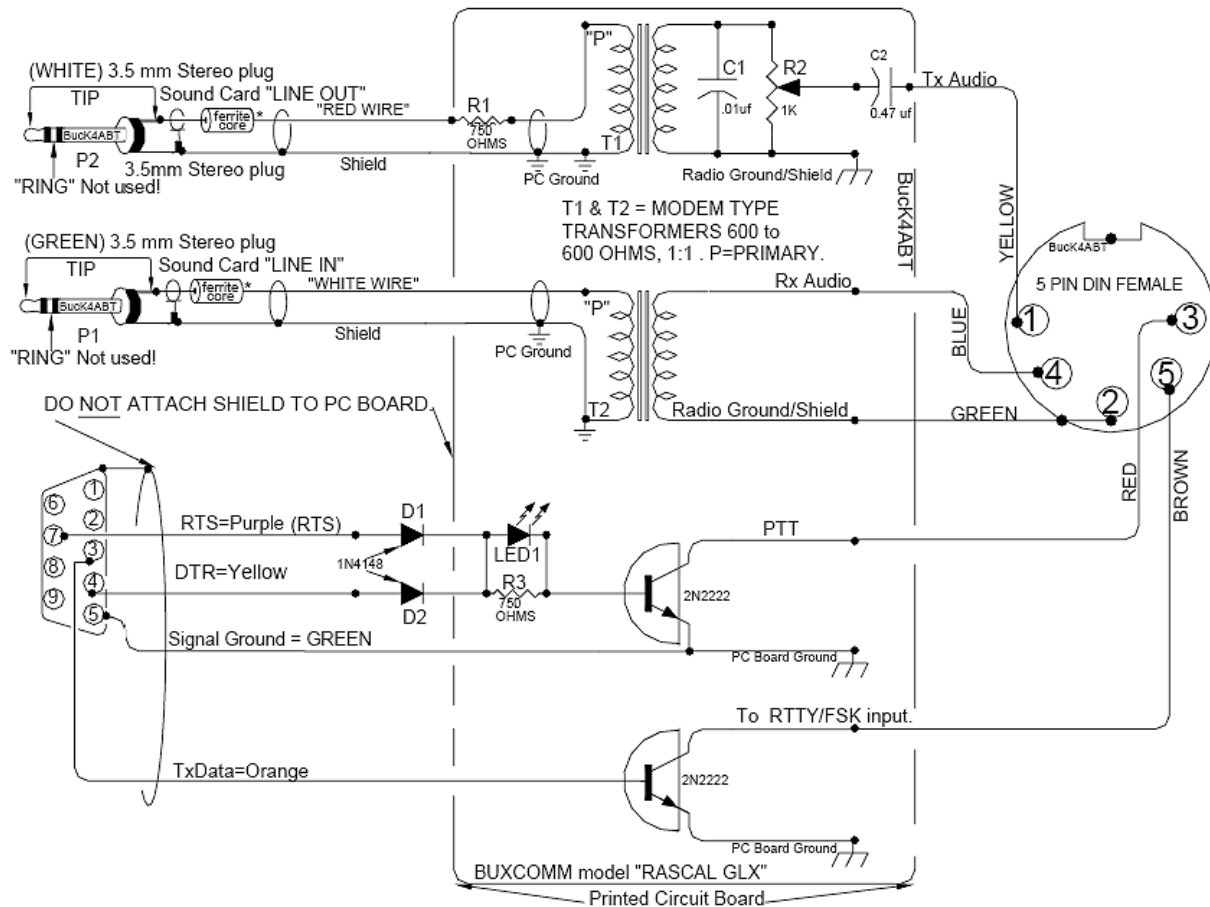


**SOLDER SIDE OF PC BOARD**



**COMPONENT LAYOUT**

Qty	Description	LOCATION ON PC BOARD
2,	2N2222 Transistor (MPS2222A)	Q1 & Q2
2,	1N4148 Diode (switching)	D1 & D2
1,	LED Light Diode T1-3/4 RED	LED 1
1,	DB9 Female w/6ft CBL	COMPORT CABLE
2,	600 to 600 ohm (1:1) MODEM transformer(s)	T1 & T2
2,	3.5mm Shielded, Stereo 5 ft cables with molded Ferrite Cables "plugs" are stereo, but "RING" not used.	Sound Card CABLE
1,	5 pin DIN female connector/socket 180 degree, standard 5 pin DIN female w/2 mtg holes.	CON 1
1,	001 uF @ 50 vdc	C1 (BLUE)
1,	0.47 uF @ 50 vdc	C2 (RED )
2,	Resistors = 750 ohms @ 1/8 <sup>th</sup> watt	R1 & R3 (Violet, Green,Brown)
1,	1k pot (1000 ohm variable resistor)	R2 Variable Resistor
1,	Printed Circuit board	
1,	Black Plastic case	
Misc;	Solder, VelCro, Plastic Tye-Wrap etc.	



**INITIAL ASSEMBLY PREPARATION AND NOTES:**

The RASCAL GLK contains fourteen components including the printed-circuit board. Most experienced Amateur Radio Operator's complete the assembly in less than an hour. Some first-time kit builders may take longer. In any case, the RASCAL GLK can be a fun project for an evening or Saturday morning.

**NOTICE TO THE KIT BUILDER;** When soldering any printed circuit board, be sure you have the know-how to make good solder connections without overheating the traces. Most important, make sure you have the skill to accomplish the RASCAL GLK assembly.

No refunds will be made for any kit that has been opened or soldered. Repairs will be made on kits that are returned for service, in accordance with the Service and Repair paragraph below.

The most common mistakes we find in kits returned for service are:

- Cold solder joints (solder connections that appear "frosted").
- Parts installed, but not soldered.
- Parts in the wrong location.
- Shorts across traces, or frayed wires touching another trace or wire.
- Diodes or transistors in backwards.

**Service and Repair:**

We do maintain a service center for the repair of our products. If a **RASCAL GLKit** is returned for repair, a service fee of \$17.50 is applied. This fee includes return shipping only to the customers within the United State of America. Repair/return shipping to foreign customers is an added \$9.90

**Tools used in the assembly of the RASCAL GLK are:**

- Small, 35 to 50 watt soldering iron, with small tip for working printed circuit board traces and lans.
- Technicians needle-nose pliers.
- Technicians diagonal cutter
- Small screw-driver, straight blade.

If you are near my “vintage” a “third-hand” stand and a magnifier will help when working in close spaces, and with small components. Be sure you have a clean surface to work at. Clear away all items that will not be used during construction of the RASCAL GLK. The work area should be smooth, level, and well lit.

One of the most important steps in kit building is to read over the assembly instructions one time, before beginning the actual construction of the project. Prepare the PC board and components that are to be placed on the PC Board. Compare the components to the parts list. Separate and become familiar with each component, and the location where it is to be used on the PC board. Use caution when working with hot soldering irons and sharp tools. Keep all parts and tools within your reach.

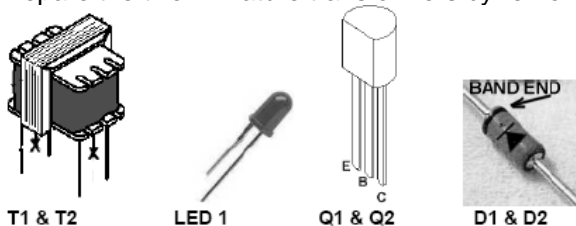
## POPULATING THE PRINTED CIRCUIT BOARD:

When we reference left and right side of the PC board, the board is oriented with the pointed end up, or away from us, and the text on the board in the correct reading plane.

There is no set rule as to when to solder a component in place. Most kit builders will install 4 or 5 components then solder and prune the wires. Others will populate the entire PC board, then carefully solder and prune the excess wires. I opt for the first procedure, as it allows me space by removing (pruning) wires as I go along. Each time I prune excess wires, I use my magnifying glass to check for bridged or shorted traces.

## ASSEMBLY STEPS:

- (1) Install the fixed resistor at location R1 (750 ohm Violet, Green, Brown)
- (2) Install the fixed resistor at location R3 (750 ohm Violet, Green, Brown)
- (3) Install (2) Diodes at locations D1 and D2, *making sure the banded ends are toward T1 location.*
- (4) Install (2) transistors 2N2222 at locations Q1 and Q2. Be sure to orient each transistor as shown by outline on the PC board. Q1 has flat side facing the right side of the PCB, and Q2 has the flat side facing the left side of the PC Board, See the photo.
- (5) Install LED1. DO NOT CUT OR SHORTEN THE LED WIRES ! The longer of the two LED wires is inserted into the hole nearest T1. Install so the tip (top) of the LED is 5/8 of an inch above the PC board surface. Prepare the two miniature transformers by removing *only the center wire (X)* from each side of the transformer, Fig 1.



**Figure 1.** DO NOT REMOVE the 2 outside wires. The two *outside* wires on each side of the transformer are the primary and secondary windings.

- (6) Install the audio coupling transformers at locations T1 and T2. Black/Top side of transformers are toward the top or pointed end of the PC board.
- (7) Install capacitors C1 (.01) Above T1, and C2 (.1 or .47), Left of T2.
- (8) Install variable resistor at R2 location, near top of PC board, near C1. Single pin of R2 is toward left side.
- (9) Install 5 pin DIN female connector at location “CON 1.” *When soldering this connector in place, try to maintain 1/32 to 1/16 inch overhang beyond the edge of the PC board. This overhang allows easy installation into the black ABS cover when the PC board assembly is complete, See photo “GAP”.*
- (10) Prepare the DE9 (serial Comport) cable by removing approximately  $\frac{3}{4}$  inch insulation, exposing the 9 insulated wires, and 1 shield/drain wire. Separate the wires into two groups. In one group, select the *VIOLET, YELLOW, GREEN, and ORANGE* wires. DO NOT cut or REMOVE the *VIOLET, YELLOW, GREEN, and ORANGE* wires. Remove (cut off) all other wires.



**(11)** Remove 1/8 inch insulation from each of the 4 wires (*VIOLET, YELLOW, GREEN, & ORANGE*), and pre-tin (coat with thin layer of solder) each wire. Use photos as location guide.

- Insert and solder the *GREEN* wire into the hole, below D1.
- Insert and solder the *VIOLET* wire into the hole, below D2.
- Insert and solder the *ORANGE* wire into the CON 2 hole nearest CON 1.
- Insert and solder the *YELLOW* wire into the remaining hole of CON2, between the sound card I/O shield and the *ORANGE* wire.

**(12)** Install the Sound Card I/O cable, RED wire to hole below R1, and WHITE wire in adjacent hole to the left. The shields (black) of the sound card I/O cable are inserted and soldered into the *two* holes at the right side of the rectangle identified as CON 2.

At this point, closely inspect all solder connections and insure that all wires are soldered and that no circuit traces have been (bridged) accidentally shorted. Double check all wiring and connections, making sure that all components are installed in the correct location, and position. If all is correct, your RASCAL GLK is ready to be tested. Use the Tyewrap to secure the two RASCAL GLK to PC cables as shown. The tyewrap should be attached so it may later be enclosed inside the ABS case, and used as the “keeper.”

## **INSTALLATION AND SETUP:**

***Connect the interface (CBL) cable between your RASCAL GLK and your transceiver.***

Use the **Installation and setup OPERATOR’S MANUAL** (at the beginning of this documentation) to continue with the testing, installation and setup. When you are satisfied that your RASCAL GLK is operating properly, install the Printed Circuit Board (PCB) into the case. A Velcro product may be used to hold the PCB inside the case or Hot Glue or similar (RTV) adhesive may be used to “fix” the PCB to the case bottom. A fast set, or super-glue may be used to hold the case together. When installing the RASCAL GLK into the case, be sure the adjustment hole is directly above the Tx Level control, R2.