Setting Up Your Station

Amateur Radio is supposed to be fun, but an awkward ham-station setup can turn enjoyment to frustration. Good lighting, orderly layout and other housekeeping measures can make a big difference.

By Doug DeMaw, W1FB

How orderly and convenient is your station layout? Chances are you have a few annoyances when you sit down to operate — caused by too little room, cluttered equipment stacks and awkward methods for changing antennas. All of this may be complicated by poor lighting that can make your shack seem like it’s in a crypt or a wine cellar. I know a chap who runs a kilowatt almost nightly, but burns a single 60-W lamp in his shack because “it saves money to use smaller bulbs.” This old “penny-wise and pound foolish” philosophy can lead to a lot of squinting and shadowy QSOs for no good reason. I’m sure the spiders and other creatures of the night are pleased with my friend’s subdued lighting, but I’m not.

I’ve seen other ham stations that required an octopus to keep things on track. Controls are out of reach from the operator’s position, antenna changeover necessitates unscrewing and reconnecting coaxial cables to other terminals, and what have you. I marvel also at some CW operators who use a tiny desk or table, with barely enough room for the key or paddle let alone the operator’s arm. If I were to operate CW in that manner I’d fatigue and develop a “glass arm” in a matter of minutes.

I certainly don’t consider myself an oracle when it comes to laying out a radio station, but I do love convenience and an orderly setup in my station, especially for contesting and fast band changing. Furthermore, I have always been afflicted with an incurable case of lassitude, which makes me want to have things as easy as possible. I’d like to share some of my thoughts with you in the hope they will give you some ideas for your station. Those who have network-studio-quality consoles need not read further.

The Operating Desk or Table

Some amateurs are tempted to occupy the smallest space possible when setting up their ham stations. This is often inspired by a misbelief that ham gear is ugly, and that family members or visitors might be offended by a spread of radio equipment in some frequently occupied room. I have found that most non-amateur guests are fascinated by ham stations, irrespective of the size of the “shack.” I have yet to hear, “Oh my, how dreadful that looks in your home!” If the layout is neat and well-organized, it can look very impressive to outsiders. But, if you try to cram a lot of equipment on too small a desk, overall appearance will suffer. Small operating positions are difficult to endure for long hours of operating, and there can be a psychological effect on those who tend to suffer from claustrophobia.

A small table or desk can be expanded easily and inexpensively by adopting the method illustrated in Fig. 1. Drawing A shows a new and larger desk top made from ½-inch plywood. This platform can be any size you prefer, provided it is not so long that it sags at the hangover points. Too great an overhang — especially if equipment is sitting on that part of the platform — will cause warping and sagging with time. This plywood addition can be placed on an existing small table or on an office desk.

Framework A (illustrations A and C) is affixed to the bottom surface of the platform to keep it from shifting on the desk top. It should be approximately 1/8 inch larger inner opening than the desk or table top. Screws or white glue may be used to
Transmatch and keyer, should be toward the front of where you sit, within arm’s reach if possible. You should not have to leave your chair to adjust those items of equipment. The receiver or transceiver tuning knob needs to be immediately in front of your right or left hand, depending on your natural inclination. Analog or digital frequency readout displays should be in your direct line of vision to ensure easy and accurate frequency adjustment. The station accessories that require frequent attention are best arranged off to the right or left of your main focal point.

Hand keys, bug keys and paddles need special attention with regard to location. The primary consideration is to have the unit placed so that your sending arm is completely supported by the table from the key to your elbow. Your arm should rest easily and comfortably when you are sending CW. Only your fingers should be used to manipulate the key (left-footed sending, known fondly as QLF, is being ignored here).

I suggest you experiment with the placement of your key to find a spot that results in complete ease when sending. Anchor the key to that spot by means of double adhesive-backed tape pieces or pads. These are generally available at building-supply stores. How often have you heard someone try to excuse poor CW sending by saying, “Sorry my sending is so sloppy, but my paddle is sliding all over the table.” The cure is simple, if that’s the real cause of some of the bum fists we hear!

If you suffer from a “glass arm” after sending for long periods, try elevating your key or paddle on a ½- or ¾-inch platform to raise it above desktop level. An old timer suggested this trick to me some years ago. It helped me to avoid sending errors created by my arm muscles stiffening because of high-speed CW tension during long transmissions. The remedy may have been purely a psychological one, but it did work.

Brighten Your Shack

Dim lights mean hard-to-read dials and meters. Logging and note taking is often more accurate when we can plainly see what we’re putting on paper. Although a cocktail-lounge atmosphere is comforting to some operators who prefer ragchewing as a steady diet, I believe good lighting is essential to sharp operating. It’s too easy to become inattentive, or even drowsy, when the light level is very low.

I prefer a medium-intensity light source behind my left shoulder (a lamp with a 100-W bulb and a lamsheen that permits plenty of light to pass through it). A reading lamp on the desk is also aid to easy operating. I use one of those adjustable lamps on a movable arm. It clamps to the edge of my desk. A 60-W bulb furnishes ample illumination. I direct the light toward the table top, directly in front of me, which is helpful for logging, note taking and reading.

Be Sure You’re Grounded

An effective earth ground is nearly as important as the antenna system. I say this from a safety and TVI/RFI point of view. All electrical units in a ham station should be connected to a ground system to prevent accidental shock and to minimize the flow of RF energy except via the intended paths. I strip the shield braid from RG-8/U or RG-11/U coaxial cable and use it for the ground bus in my ham shack. It is stapled to the back edge of my operating desk from one end to the other. This enables me to attach short ground straps (also made from shield braid) to each piece of equipment.

From the main ground bus I use additional shield braid to a pair of 6-foot ground rods that are driven into the soil just outside my shack window. A second ground lead passes through the floor to the cold-water pipes in my basement. At those points where the sections of copper braid are joined, I ensure a good electrical bond by using solder. I cannot adequately express the importance of good grounding.

For ease of grounding, and for other reasons, you will fare much better when you can locate your radio room on the first floor or in the basement: The longer the ground lead, the greater the difficulty you will have in keeping the RF voltage off your equipment cabinets, microphones and keys.

Where to Place Your Gear

Convenience is of paramount importance in your radio station. Those units that require frequent adjustment, such as transmitters, receivers, transceivers, ...
A second- or third-floor installation is apt to cause tingling sensations when you touch the metal parts of your equipment during transmission periods! This is caused by unwanted RF energy flowing on the cabinets and leads instead of flowing to ground through the intended path. I’ve had this experience many times, and nothing short of tuning the ground lead (as you would with an antenna) for each band of operation seemed to stop the nightmare. I’ve heard my wife yelp in anguish more than once when she touched a lamp and received an unwelcome RF tingle!

RF in the shack can also cause the keyer to misfire and send gibberish, to say nothing of encouraging transmitter and frequency instability in severe cases. The moral of this story is to install as short and effective a ground system as possible. The larger the ground conductors the better.

**Getting the Feed Line into the Shack**

Bringing our feed lines into the house causes aesthetic and practical problems. At some point we must ask ourselves, “Have I the courage to make holes through the wall of my home?” Most hams say, “No.” But several years ago I took a whacky outlook and decided that convenience was more important than honoring the sanctity of the outer wall of my radio room. The saber saw was put to work, and a nice feed-through jack panel resulted.

Fig. 2 shows the method I used then, and continue to employ. An aluminum plate of identical dimensions and layout is used on the inside and outer wall. The size chosen will depend on how many lines you plan to feed into the shack. I always include a through-connection for bringing in the earth ground. A ¼-inch bolt is suitable, although smaller diameters are probably okay. Short lengths of coaxial cable are used within the wall to join the coaxial-connector jacks. The shield braid is made common to the wall plates at both ends of the cable. A short section of shield braid joins the two ground terminals, and the feedthrough bushings are joined by pieces of RG-8/U inner conductor and insulation. The braid and outer jacket are removed from these leads. All leads are soldered in position at one of the plates, then the plate is installed by using four wood screws. The outer-wall plate is allowed to hang loose until all leads are soldered to it. This requires that all leads be somewhat longer than the wall thickness in order to have access to the rear of the jacks.

A layer of caulking compound is spread along the perimeter of the outdoor plate before it is screwed into position. This will prevent dust, air and moisture from entering the space between the walls. If you decide later to sell your home, it will be a simple matter to cover the holes where the panels were. Some window screen, joint or spackling compound, and paint will do the job rather handily.

An alternative to this type of access is to make a panel that will fit snugly under the lower part of the window in the shack. Fig. 3 illustrates this method. A panel of suitable size is inserted between the window casing and the bottom of the raised lower-window section. Weatherproofing material should be placed around the insert panel. Foam rubber or plastic stripping needs to be wedged between the upper and lower window sections where the gap will be formed. If you use a storm window on your house, this method will present a problem unless you have your storm window shortened and install a second insert panel of the kind in Fig. 3. I don’t care much for this method, but I have used it a number of times.

A third technique for bringing antenna leads into the house involves routing the cables through the foundation of the house, into the cellar, and then through the floor of the radio room under the desk. A large number of hams have adopted this technique. A section of wall molding can be removed for this purpose. Later, if the house is to be sold, or the shack moved to another room, the molding strip can be replaced to cover the holes in the floor.

**Antenna Selection**

We mentioned earlier the annoyance of unscrewing cable connectors and reconnecting them in order to change antennas. It is a simple job to build an antenna switch box (or you may purchase one). A circuit example is given in Fig. 4. I use this method in my station. The switch box is within reach from my operating position. Coaxial jacks of your choice can be used as connectors. I recommend a well-insulated switch with large electrical contacts, preferably a rugged ceramic switch. Many of these can be found at flea markets and in surplus stores. My present switch is an Ohmite power-tap switch. I paid $1 for it (new) at a ham flea market. It handles 1 kW of RF power very well at 50-ohm line impedance. My switch box is mounted just below my feed-through panel.

**Some Final Touches**

A degree of “law and order” is needed to keep the cumbersome ac cords of your equipment from becoming a tangle of hissing snakes. Nothing looks worse in our stations than power cords dangling and coiled haphazardly every which way!

I have found that the best way to deal with the problem is to install a multilouet strip (or two) along the back wall or rear edge of the desk. Each equipment cord is plugged into it, then folded back on itself several times until it is just long enough to reach the plug strip. A couple wraps of tape or long garbage-bag “twisties” can be
used to keep the cord folded neatly.

The plug strip is then connected to the wall outlet through an ac line filter that has
its case attached to the earth-ground bus.
The filter will not only help to prevent your
RF signal from being radiated by the power
lines, but it will filter away some of the
QRN noise that enters the shack via the
mains. Many a case of TVI or RFI has been
cured by the simple installation of a "brute-
force line filter." No shack should be
without one.

A circuit you can duplicate is shown in
Fig. 5. You may want to build this filter
as your workshop project this month. The
coils can be wound on hot/cold type PVC
tubing. C1, C2, C3 and C4 are disc-ceramic
capacitors with a 1.5-kV dc rating. Be sure
to use heavy-gauge enamelled wire for the
coils. I suggest no. 14 wire for rigs under
150 W. No. 12 wire or larger should be used
for greater amounts of ac power.

Warning: Do not plug the line filter into
the ac outlet until the earth ground is
attached to it. Without the ground connec-
tion you can get a mild shock if you touch
ground and the filter box or equipment
or ground cables at the same time. Be sure to wire
the plug and socket as shown (neutral, hot
and ground connections). The filter should
be installed as close to the station equip-
ment as possible to prevent radiation of RF
from the ac leads to the filter box. In an
ideal situation we would have a separate
line filter for each piece of RF equipment.
These filters would be located inside the
equipment cabinets, or attached to the rear
walls of the cabinets.

If you use an amplifier to increase your
station power, it is best to operate it from
the 234-V mains in your house. High-power
amplifiers (1 kW, for example) draw a lot
of current from the line, and most homes
do not contain 117-V ac lines that are
suitable for big amplifiers. They will
operate, for certain, but the plate voltage
in the amplifiers will sag (drop) consi-
derably during key-down periods, and the
power output will decline as a result. Worse
still, the lights in your home will blink each
time you key the transmitter. That will,
without question, elicit some pointed com-
ments from others in your home! This is
not normally a problem when the amplifier
is connected to the 234-V lines.

A separate ac line of this kind should be
routed to the radio room by a licensed
electrician. It must be attached to the circuit-
breaker box so it is protected from
overloads. The outlet in your shack should
be a 234-V type to prevent accidental
connection of 117-V equipment.

In Closing

An organized and safe ham station is a
joy to use. Yours will be much better if you
adopt some of the ideas presented here, and
it matters not whether the gear is
homemade or commercial. Good luck, and
may your titivating be titillating.

NEW 2-METER BAND PLAN TO BE
DEBATED NEXT MONTH

☐ The Texas VHF-FM Society has issued
a call for comments, either in person or in
writing, on a proposal to change from a
15-kHz spacing band plan to a 20-kHz
band plan between 146 and 148 MHz. A
forum for the presentation of these papers
and comments will be held at the summer
meeting of the Texas VHF-FM Society in
Austin, August 11, 1984. Substantial time
will be allotted for both presentation and
debate of the issue. This forum will be
chaired by Joe Jarrett, K5FOQ, past presi-
dent of the Texas VHF-FM Society and
past 5th call district member of the ARRL's
VHF Repeater Advisory Committee
(VRAC).

Papers must be submitted at least 30 days
in advance of the meeting. Papers read at
the forum will be those judged to best
represent the various sides of the issue. If
the author is unable to be present, the paper
will be read by a competent speaker. All
papers submitted will be available for
review by forum attendees.

Speakers who wish to make a presenta-
tion at the forum without a written paper
must submit an outline of their talk at least
15 days in advance of the meeting. If more
speakers apply than time permits, one or
more representative speakers will be picked
from each of the various sides of the issue.
Speakers are expected to remain for the
debate.

All correspondence should be addressed
to Joe Jarrett, 8501 Spring Valley Dr.,
A: 78736.

QEX: THE ARRL EXPERIMENTERS' EXCHANGE

☐ Wonder what you've been missing by
not subscribing to QEX, the ARRL
newsletter for experimenters? Among the
features in the June issue were:
• Part 2 of the RSGB article, "The GB3US
Mk2: A Microprocessor Repeater Logic
System," by A. J. T. Whitaker, G3RLK
• Do you own a Heathkit ET-3400A
Microprocessor Trainer? Double its
memory capacity using a modification by
Donald G. Varner, WB3CEH
• Two new products are reviewed: The
Linker 100: an Industrial Portable
Terminal/Controller, and The Motorola
MC3361P: a low-power narrow-band
FM-IF circuit

QEX is edited by Paul Rinaldo, W4RJ,
and Maureen Thompson, KAIHZ, and
is published monthly. The special subscrip-
tion rate for ARRL members is $6 for 12
issues; for nonmembers, $12. There are
additional postage surcharges for mailing out-
side the U.S.; write to Headquarters for
details.

July 1984 19