W8UM
Station Operations Guide

W8UM

THE UNIVERSITY OF MICHIGAN
AMATEUR RADIO CLUB

Last Update: 06 June 2008 (fm)

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The Amateur's Code

The Radio Amateur is

CONSIDERATE...never knowingly operates in such a way as to lessen the pleasure of others.

LOYAL...offers loyalty, encouragement and support to other amateurs, local clubs, and the American Radio Relay League, through which Amateur Radio in the United States is represented nationally and internationally.

PROGRESSIVE...with knowledge abreast of science, a well-built and efficient station and operation above reproach.

FRIENDLY...slow and patient operating when requested; friendly advice and counsel to the beginner; kindly assistance, cooperation and consideration for the interests of others. These are the hallmarks of the amateur spirit.

BALANCED...radio is an avocation, never interfering with duties owed to family, job, school or community.

PATRIOTIC...station and skill always ready for service to country and community.

--The original Amateur's Code was written by Paul M. Segal, W9EEA, in 1928.

(Source: http://www.arrl.org/acode.html)

Station Overview

W8UM

Amateur Radio Station W8UM operates from the fourth floor of the Electrical Engineering and Computer Science Building, (4436 EECS) located on the University's North Campus in Ann Arbor, MI. W8UM is available for the use by club members 24 hours-a-day, year-round. In addition, the club frequently hosts contests, other operating events, as well as educational activities for local school and scouting groups.

Station Equipment

The station is currently active on the HF bands on SSB, CW, RTTY, and PSK31, 2m FM, with satellite capabilities on 2m and 70cm. The station is well-equipped with a Ten-Tec Omni VI HF transceiver, a Heathkit SB-220 2 kW HF amplifier, an Icom IC-910H satellite VHF/UHF transceiver, and several other pieces of modern equipment. The W8UM "shack" also has a complete bench of electronic test equipment and assembly tools to support the club's many ongoing technical projects.

Antennas

W8UM features a full suite of high performance antennas covering 3.5 MHz to 1.2 GHz. The shortwave bands from 7 MHz to 30 MHz, as well as the 50 MHz band are covered by our 4-element tunable Yagi-Uda at 105 ft above ground level. Wire dipole antennas cover 3.5 MHz to 7 MHz, long-boom Yagis for 144 MHz and 430 MHz top the main W8UM tower, while a Discone at 90 ft covers 30 MHz to 1.2 GHz. The club strives to constantly improve our antenna system and lots of room exists for club members to implement their own antenna designs on our tower and rooftop "antenna farm". A dedicated satellite antenna tower supports circularly polarized Yagis for 144 MHz and 430 MHz mounted on an elevation-azimuth positioner.

A Few Simple Rules

1. Operation of the W8UM station is a privilege, not a right. Many people have donated countless volunteer hours (and yes….money) to make the station what it is today. Please show your respect to these individuals, and the amateur radio service in general, by the way in which you operate this station.

2. To insure safe and proper operation of the station equipment, we ask that you first obtain a "Safe Operations Orientation" from Mr. Steve Culp (K8QKY), the W8UM Station Manager. He may be reached via email: **total@umich.edu**.

3. The information presented in this document will be covered during your "Safe Operations Orientation". While this document should be considered a reference/reminder of the information you have received, it should not be viewed as a replacement for the orientation itself.

4. Remember: You are only allowed to operate on those bands for which you have licensed privileges. If a control operator with advanced privileges is present and consenting, you may operate on bands for which the advanced control operator has privileges.

5. Have fun!!!!

Getting ready to operate

When you first enter the station, all of the equipment should be in an “offline” state. The station is placed in an “offline” state at the end of each operation day in order to insure that the station equipment (towers, amplifiers, radios, etc.) is protected from lightning and other natural acts which could damage equipment while not in use. Before you can operate, your first task is to get the station back “online”. While the steps take will vary somewhat depending on which radio you plan to operate, there are a few general steps that must be taken:

1. Most of the equipment for HF operation is plugged into power strips that are attached to the back of the tables along the far wall. So, the first think that you will likely need to do is plug in both the grey extension cords: one for the HF rig/power supply and the other for the amplifier (if you plan to use it). There is also a chance that the power strips themselves have been turned off, so check that as well.
2. You are also likely to find that the large coax cables running from the roof top “antenna farm” have been disconnected from the radios. This is to protect the radios from lightning strikes or other potential stray charges. In the case of the HF rig, the coax is usually disconnected from needled display of forward and reflected power (SWR Meter).
3. You may also want to locate the Station Logbook. It is always important to keep good records in case we need to verify contacts for contests, etc. It is also fun to look back and see all of the many contacts our station has made.

Antennas

The antenna system that you use will depend upon which radio you are planning to operate. A brief discussion of each is provided here.

SteppIR 4-Element Tunable Yagi-Uda (HF Operation)

UMARC SteppIR 4-element tunable Yagi-Uda

SteppIR Microprocessor Based Controller

The UMARC SteppIR antenna is controlled by a microprocessor base console located within the station. This controller will allow you to select your operating band and azimuthal position of the antenna.

1. Turn on SteppIR microprocessor.
2. Push MODE until you get to Amateur setting (green light will light up next to AMATEUR).
3. Select Band you want to use. This will cause the SteppIR to adjust its element lengths to the proper lengths for the band of choice.
    a. You may need to push the UP or DOWN buttons to move closer to frequency you desire to use.
4. Turn on Rotor control to point the antenna into the direction you would most like to communicate with. Use CW or CCW controls. YOU MUST MOVE THROUGH NORTH.

Whenever you finish operating and are putting the station back into the “offline” state, you will want to retract the elements within the antenna housing to make the antenna a smaller target for lightning flashes. In the winter, this practice also protects the system during strong winds and ice storms. To retract the elements, first change the MODE to SETUP. When you first enter setup

mode, you will see “mode key to exit, up / dn to scroll” on the LCD screen. Press the up button five times, and it will take you to “Retract Elements, up / dn to scroll”. To enter, press the select button. A new screen will appear saying “Home Now? YES NO, with NO flashing. The controller is asking you if you want to send the elements “home”, which means retracting the elements inside the antenna housing. To retract the antenna, press the up or down button once, and YES will start flashing. Press the select button, the display will say “Home Now? / Homing Elements”. The asterisk will be flashing, this means that the antenna is retracting, when the asterisk disappears, the new message will read “Element Retracted”. Your antenna is now safely inside the antenna housings. When you want to put the antenna back on the air, simply press the antenna segment you desire, and the controller will adjust to that segment.

HF Station

The station's HF rig is the TEN-TEC Omni VI Transceiver. The operation of the rig is pretty straight forward. A detailed discussion follows.

www.rigpix.com

Ten-Tec Omni VI Transceiver

1. Turn on Omni VI.
2. Press button for band you want to operate on.
3. Select frequency of operation. This can be done in one of three ways:
    a. If you know the exact frequency that you would like to use, you may key in that frequency using the keypad.
        i. <enter>frequency<enter>
    b. You may also use the up/down arrows to move in 100 kHz steps (coarse adjust)
    c. You may further adjust the frequency by using the dial for fine adjustment.
4. Next, select mode. USB (20m – 10m), LSB (40 and 80m), or CW (for CW operation)
    a. Then select band pass filter (2.4 option or 1.8 if band is crowded) for USB or LSB, and 0.5 for CW.

b. For USB, set pass band tuning to 2 O'Clock; For LSB, set to 10 O'Clock, for CW near 12 O'Clock

5. Advance RF dial full clockwise.

6. Place AF at full low. Slowly advance AF Gain to acceptable audio level.

    a. Comment 1: We highly recommend using headsets for two reasons:

        i. You hear stations much better.

        ii. Also, this room is next to faculty and student offices. Please respect them and do not make loud noises.

7. Tune radio until signal is heard.

8. If you are having trouble tuning in stations, adjust RF Gain back (counterclockwise) and ajust AF Gain up (clockwise). You might also check to insure that you are in the proper mode.

    a. Also…you may want to adjust PBT a bit for the best setting (10 and 2 O'Clock are just approximate settings).

9. For tuning up the radio, move off to a frequency not in use by others.

    a. Turn the MIC down to lowest level.

    b. Turn PWR to lowest end and then advance upward slightly and push TUNE button near bands push buttons and then advance power.

    c. On stepper, adjust up or down and tune for minimum swr.

    d. Push TUNE to turn off on OMNI.

    e. Set OMNI PWR to 80% or to last dot clockwise.

    f. Put Mic level to 9 O'Clock.

    g. First check to see if frequency is in use: "Hello. Is this frequency in use".

        i. If not, go ahead and call CQ in the following manner:

            1. "CQ CQ CQ, This is W8UM, Whiskey Eight Uniform Mike, Calling CQ and standing by."

            It might help to draw this out to 15 seconds worth to allow someone tuning along to dial to hear you and stop to respond.

h. Radio at 100% is 100Watts.

10. If you want to transmit at a power greater than 100Watts, you must use the amplifier.

USING THE AMPLIFIER

11. Turn OMNI VI PWR (transmit power) down full CCW.
12. First, plug in power cable (thick grey) and then turn on power to amplifier.
13. Turn power on and wait for 30 seconds to allow filaments time to warm up.
14. Flip CW/TUNE-SSB rocker switch to CW/TUNE position.
15. Turn REL PWR (far right) knob to <u>grid</u> position.
    a. NOTE: You want to make sure that your grid current stays below 150 mA.
16. Turn BAND switch to band of desired operation.
17. Place LOAD dial fully CCW.
18. Place the TUNE knob to the band that you are operating on.
19. Place Omni power to 10 O'Clock.
20. Press TUNE button on Omni which will apply power to amplifier.
21. Adjust TUNE knob on amplifer for plate current minimum. (this will cause then needles to dip on the PLATE AMPERES dial)
22. Adjust LOAD dial until current increases to its max deflection.
23. Adjust TUNE dial again for minimum current (cause dip).
24. Turn off TUNE on Omni.
25. Turn PWR to 1 oclock position.
26. Leave in CW/TUNE position for CW. Flip CW/TUNE-SSB rocker switch back to SSB if that is where you will be operating.
27. You should now be transmitting at approximately 700W.
28. ADVANCED INFO…..To avoid splatter.
    a. Go to OMNI and press the TUNE button.

b. Adjust PWR to find maximum and then back off to 80% of that level, which should put PWR dial at 1 O'Clock position.

SB-220 HF power amplifier

UHF/VHF Station

To be added.

Satellite station

ICOM – IC910

Contact Information

The club appreciates its officers who work hard to plan and inspire many events and projects, and keep the club station in top operating condition. The club officers for the 2007-08 academic year are:

- Lora Schulwitz KC8UDG, President
- Vice President needed!
- Bruce Graham KD8APB, Treasurer
- Secretary needed!
- Steve Culp K8QKY, Station Manager (total@umich.edu)

Our faculty advisor is **Prof. Amir Mortazawi** of the **EECS Department**.

You can reach the club by email at **w8um.info@umich.edu** or by U.S. mail at the following address: