



Morse Made Easy™



MMX MultiBand Transceiver MMX ZERO Decoder/Encoder

QUICK START GUIDE

By Eric C Anderson, PreppComm
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I. Introduction

There are two ways to use the MMX transceiver. For MMX ZERO, only the second one is available:

- 1, Sand-alone QRP Transceiver
2. Companion or assistant for decoding/encoding to your existing transceiver

In this Setup Guide, we will first cover setting up the MMX itself for operation, followed by Electrical Setup and then Operation for each of the two modes in separate sections.

II. MMX Computer Setup

The MMX start up in **External Mode**, or Companion Mode, and is discussed in detail in Section II. This is displayed in the Frequency Button. In Figure 1 below, the Frequency Button shows a 40M frequency, so this is clearly not a MMX ZERO screen, which always shows **External** in the Frequency Button space.

1. Connect the MMX to a power source, and press the red Power button. The *Splash Screen* will display for approximately 3 seconds, followed by the *Main Screen* then is displayed, as shown in Figure 1 below.

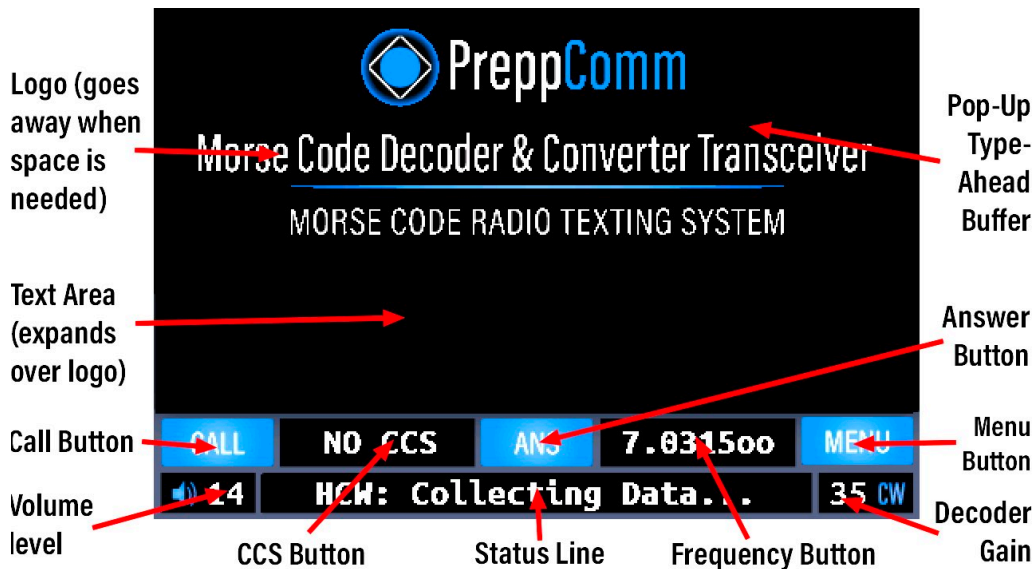


FIGURE 1: MAIN SCREEN

Spend a few moments to review the screen tags above. Take particular attention to the **CCS Button** (CCS = Captured Call Sign) and the **Frequency Button**, which at first

power on reads **External**. For the **MMX ZERO**, the Frequency Button always shows External, as there is no transceiver or VFO installed.

2. Press the Menu Button, and the *Main Menu* screen will display, as shown in Figure 2 below.

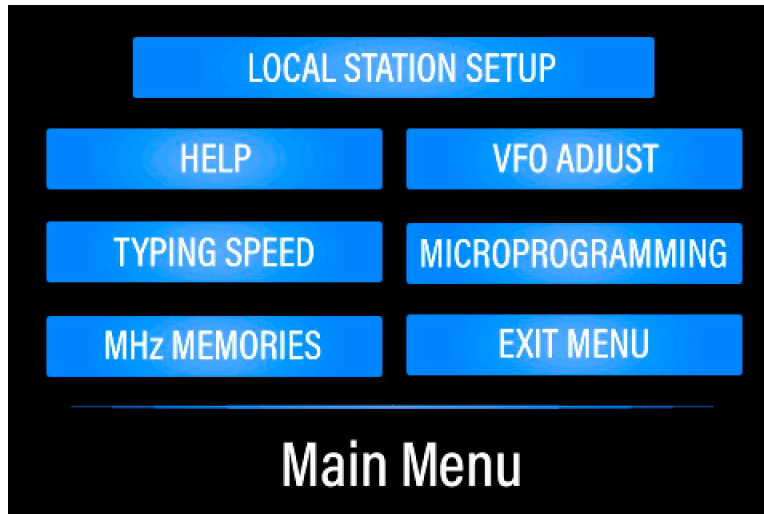


FIGURE 2: MAIN MENU

Note that Graphics and Firmware version numbers are now displayed in the lower bottom corners of the Main Menu (not shown here).

3. Press the **LOCAL STATION SETUP button** at the top of the menu. The *Call Letters* entry screen will display, as shown in Figure 3 below:

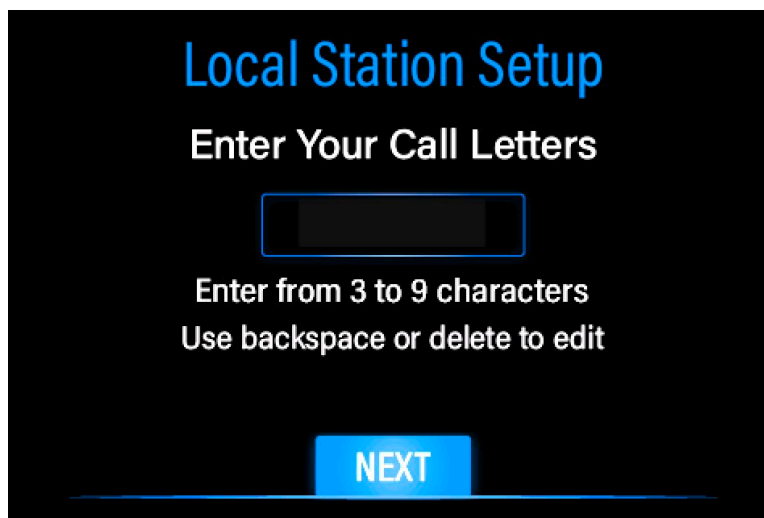


FIGURE 3: CALL LETTERS ENTRY SCREEN

4. Enter your call letters assigned to you by the FCC. Use backspace or delete to edit if you make a mistake. Note: you do not have to hold down the caps key - all caps is automatic. Press the **NEXT** button to continue.

5. Using the NEXT buttons, proceed through a series of screens and enter the required information

- a) **Name**, or in ham radio lingo, your Handle, such as JOHN
- b) **Location**, or QTH in ham lingo, such as CHICAGO, IL
- c) **Rig Type** (PREPPCOMM MMX)
- c) **Antenna Type**. The antenna you are using, or DUMMY LOAD.
- d) **License Level**. Select your FCC license level

The *License Level Entry* screen is shown in Figure 4 below

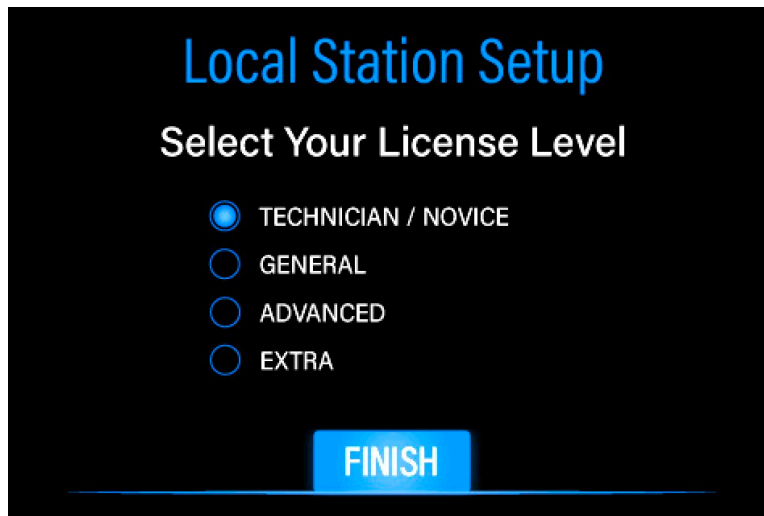


FIGURE 4: LICENSE LEVEL ENTRY SCREEN

6. Press the FINISH button on the License Level Screen

You will be returned to the *Main Screen*. You have now completed initial setup of your MMX transceiver.

7. Press the Menu button again, followed by the Typing Speed button. You will see the Typing Test screen shown in Figure 5 on the next page. Why are we taking a typing speed test now? Because you want to establish the upper limit of how fast the transmitter should be allowed to transmit Morse code, right at the start. Normally, the encoder typing speed is set by the decoder, based on the speed of the other station. However, if you can't send as fast as the other station, you need to let the computer know, so it will limit the WPM (Words Per Minute) based on your ability to type. This is important to enable well-formed Morse communications. If the transmitter is running too

fast, it will end up pressing you to type faster, making more mistakes, not to mention not having fun. So take the time now to do this important setup step, unique to PreppComm Morse transceivers. Follow the directions on the screen

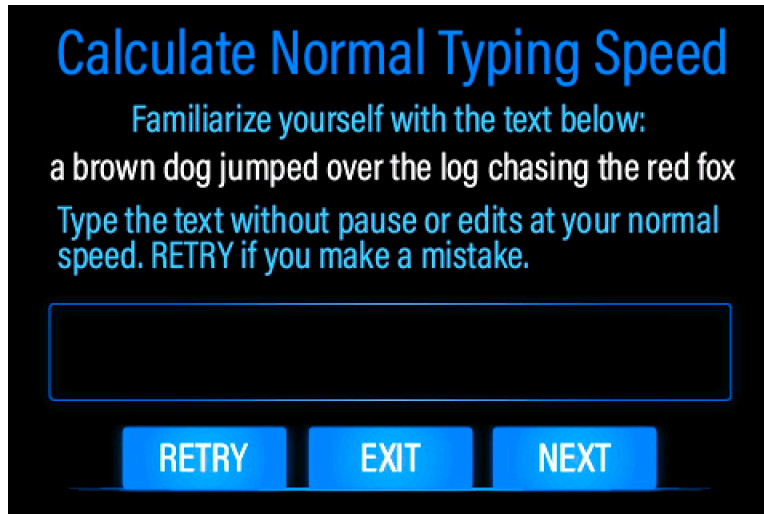


Figure 5: Typing Speed Test

The result? Your transmit speed will match the other station unless it is going too fast, at which point your speed will be set to the maximum allowed.

Once you complete the test, you will see the screen shown in Figure 6 below:

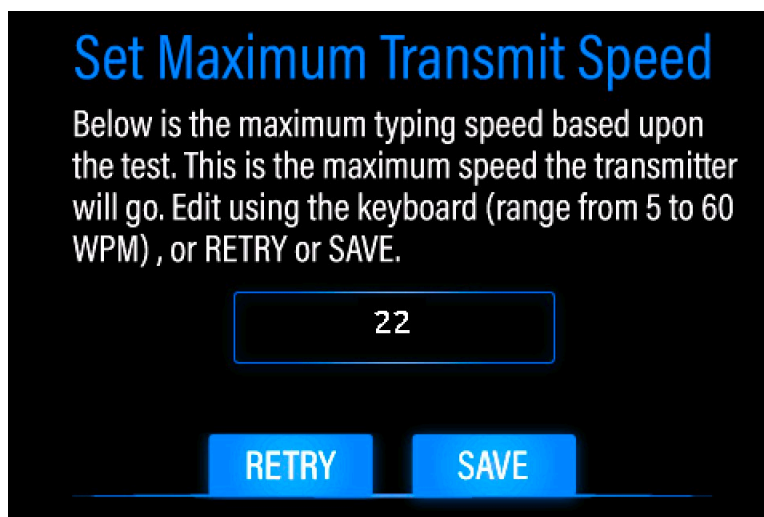


FIGURE 6: TRANSMITTER MAXIMUM WPM

The value you see on this screen is the maximum WPM the transmitter will transmit. To be clear, for MMX ZERO, this means the maximum WPM of the Morse Encoder, so the

maximum transmit speed of the external transceiver. This is a computed value, based on a number of factors. Go with it for now - you can always come back and edit it. Press **SAVE** to complete the setup.

8. Initial setup of the MMX is now complete.

III. Learning Auto-CALL and ANS

In this section we are going to familiarize you with using the four different call and answer functions built into the MMX. These work the same for both external and internal transmitters.

If not in External Mode already, press the Frequency Button until it shows External. Then, follow the following steps.

1. **Press CALL.** On the status line, you will see the question **SET CALL WPM = ?** Asking you to specify how fast to transmit, as there is no history to base that on at this first transmission, and the **CALL** button will turn **RED**.
2. **Press SPACE BAR** to set the default 20 WPM. You can change the default later if you wish. If you are not hearing tone output, adjust your volume control and check your wiring. If all else fails, exit CALL by pressing ESC and press K, and try pressing CALL again. K toggles the tone output on/off. ESC is the instant, emergency exit from transmit mode. ESC has a number of other functions not covered here.
3. **Watch** as the MMX transmits the general call or CQ, using your call sign.
4. **Press CALL** to end the call. The current repeat continues until complete, and ends with a **K** appended. The **CALL** button will turn **AMBER** during the ending of the call. **K** means "Come Back (anyone)." Note that the general call will repeat until you end it. Typically you will run it for 30 - 90 seconds when on the air.
5. **Press NO CCS button** and enter the call letters of a station you would like to call. **Press SPACE or FINISH** to complete and return to the *Main Screen*.
6. **Note** the **CCS** Button now has the new call sign you just entered loaded. Normally, the decoder will fill the CCS button from a received station ID.
7. **Press CALL again** to start a directed call. Note it will automatically use 20 WPM from recent history, your call sign, and the call sign you entered into CCS.
8. **Watch** as the MMX calls the specified station. Press **CALL** again to end the directed call. Note that **KN** is appended at the end, which means "come back,

only the station I am calling.”

9. **Press the ANS Button twice, quickly.** The first press will result in a **RED** button, the second press will result in an **AMBER** button. Ignore the Type-Ahead Buffer Pop-Up for now.
10. **Watch** as the MMX transmits the answer-validate sequence. This is a short station ID used when you are responding to another station’s CQ (general call) to attempt to establish a 2-way communication. If they answer you, then a 2-way has been established, and communication can begin. Answer Validate is not required if you make a call and someone answers you. In this case, you are using a CCS you entered. Normally, the CCS would have been set by the station calling CQ.
11. **Press ANS once.** The button turns **RED**, and a Type-Ahead Buffer pops up.
12. **Type a tilde (~) character, then press ANS again.** The button turns **AMBER**.
13. **Watch** as the MMX sends the initial station ID, followed by the **INFO text message**, which is generated when you type in a tilde character. The Type-Ahead Buffer goes away as soon as the tilde is read out. The final station ID back to the other station completes the transmission, with a KN.

The key in this step is to understand the use of ANS pressed once, and using the tilde character to send the INFO message automatically from your information previously entered. You can create your own INFO message with microprograms later.

14. **Think up a short message**, such as "HI, BOB. HOW ARE YOU TODAY?"
15. **Press ANS and IMMEDIATELY type your message.** You should be able to type at least part of the message during the initial auto station ID, and then your message will begin to transmit.
16. **Press ANS again** to indicate to the computer that your typing is complete. Your message will first appear in the Type-Ahead Buffer, until the initial auto station ID has completed, and then your message will be read out one character at a time, and reappear as transmitted text in the main text area. Finally, since you pressed ANS the second time, it completes the transmission with another station ID.

The use of ANS to go back and forth with another station is very easy and simple, but it does mean an auto ID at beginning and end of each transmission. You can change this easily with simple microprograms. You can also “press” the CALL and ANS buttons using function keys (or press YOUR call and answer function), also using microprograms.

These built-in microprograms (CALL, ANSWER, and INFO) can be customized and controlled from function keys using RPL (Rig Programming Language) in our microprogramming system. There are 12 user-defined microprograms. Watch our YouTube video on microprogramming to get the "starter set" to play with. The starter set is also described in Section 18-10 of the **MMX Reference Manual**.

17. You now have a basic idea of how to use the four main transmit functions:

1. General Call
2. Directed Call
3. Answer-Validate
4. Answer

This completes the basic training of the automated CALL-ANS functions.

IV. Choose your mode of operation

There are two more sections to the Guide:

1. **QRP Transceiver:** Getting started using your MMX as a QRP (low power) Transceiver. This is referred to as the "**Transceiver Mode.**" In this use, you need the MMX, keyboard, headphones, battery, and an antenna (or dummy load if you are learning how to use it). **Go to Section III below.**
2. **External Transceiver Decoder/Encoder:** This is for when you want to connect your MMX to your base station transceiver to use as a CW decoder/encoder. This is referred to as the "**External Mode or Companion Mode.**" This mode enables use of the internal computers for decoding and encoding, and uses the receiver and transmitter inside your base or portable station transceiver. This allows the decoder and encoder to operate on any band your base station operate on, and at a higher power level, set by your base station. This is also the MMX ZERO mode **Go to Section VII.**

V. QRP Mode Electrical Setup

1. Set up the MMX as shown in Figure 7 below. Take care plugging in connectors.



FIGURE 7: STATION SETUP AS STAND-ALONE STATION

2. Turn on the transceiver using the RED power switch.

WARNING: NEVER OPERATE THE TRANSMITTER WITHOUT A LOAD ON THE ANTENNA CONNECTOR. DOING SO VOIDS YOUR WARRANTY FOR ANY DAMAGE CAUSED BY AN UNLOADED TRANSMITTER.

If you plan to use a key to transmit, this will be covered at the end of this section.

The MMX start up in External Mode, or Companion Mode, and is discussed in detail in Section IV. Pressing External Mode on the LCD Display (Frequency Button in Figure 1) switches to your lowest band transceiver function. Pressing repeatedly will cycle through the available bands and External Mode.

The Receive Mode Keyboard for the MMX is shown below. There is a large version for printing out in Appendix VI of the MMX Reference Manual. It is a good idea to print out a copy so you can refer to it as you learn the keyboard receive mode commands.

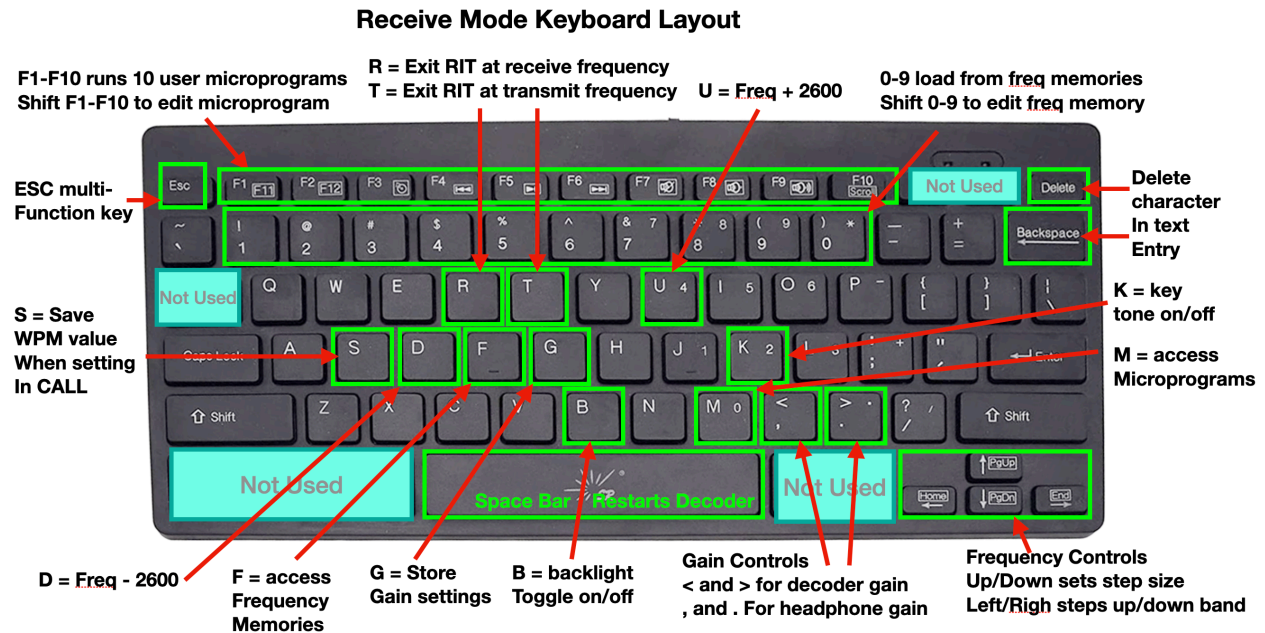


FIGURE 8: MMX RECEIVE MODE KEYBOARD COMMANDS

Here are a few things to take note of at this time:

1. The < and > keys (unshifted, so the comma/period keys) control the headphone or powered speaker volume.
2. Delete and Backspace work the same - they delete the previously entered character, if it is still available to be deleted.
3. The Space Bar restarts the decoder, and causes the Speed and Hand Algorithms to be run after collecting data. CRITICAL FUNCTION at the beginning of any new CW code stream!
4. The B backlight toggle: use this to turn on/off the backlight. The 3-minute auto-turn off is still there, and when you turn the backlight back on, a new 3-minutes timer begins (for no activity on the screen). Any activity will also restart this timer.

Next we will look at using the receiver.

VI. QRP Mode: Using the Receiver

NOTE: For this section, you will need a real antenna, and the **Frequency** button should show a frequency value, not External. Press the button to switch to an available band, which turns on the transceiver inside the MMX.

1. Background

Obviously, the first thing you need to do to tune in a station is... remove the dummy load (if you used one) and connect to a real antenna. A good antenna is a critical aspect of any radio station. Since you are running QRP (Low Power), a good antenna is truly a MUST.

One one level, tuning in a station is fairly simple: you scan up or down the band looking for a signal, and stop and adjust around the signal so that it is decoding correctly. On the other hand, it can be quite daunting.

Why can it be daunting? There are several reasons that you need to be aware of. First and foremost is the "band condition." The band can be "open" or "closed." It depends primarily on the sunspot cycle, the current sunspot activity, and time of day. If you hear nothing on the band, the band is probably closed, or, as they say, DEAD. Try later. However, a dead band does not mean you can't connect with someone nearby (local). If you have a scheduled time and frequency to meet, even if the band is dead, i.e., long distance communications is out, local can still work quite well, depending on your antenna. Typically, the 40 meter band opens in early to mid afternoon, and is open at various distances - ever growing farther and farther away - until very early morning. By that I mean oh-dark-thirty. It's all about the ionosphere and its height above the earth. It rises at night, and thus your "skip" distance increases.

2. Receiver Incremental Tuning

After transmitting, that the **Frequency** Button changes to show **RIT +0**. RIT stands for Receiver Incremental Tuning. This decouples the receiver frequency from the transmitter frequency. The transmitter frequency remains constant, but you can make minor adjustments to the receiver frequency, as needed. Specifically, when another station comes back to you the first time, their frequency may be slightly off, and you may need to adjust the receiver frequency for optimal decoder operation. More on that below.

3. Receive Mode Keyboard Commands

Figure 8 above is a diagram showing the receiver keyboard commands. You can tell that you are in Receive Mode because both the **CALL** or **ANS** Button are **BLUE**. Press **MENU / HELP / RECEIVE** for a summary of these commands. The commands are on two separate screens, which you can access via the **NEXT** and **PREVIOUS** buttons. The **EXIT** button or the keyboard ESC will return you to the *Main Screen*.

Note that on the *Help Screen*, there is also help for **TRANSMIT** and **MICROPROGRAM** commands, as well.

There is a large version of this layout in **Appendix VI** of the **MMX Reference Manual** you can use print out and as a guide. For now, just note the following keys:

- a. the 4-way Receiver Frequency Control keys (bottom right)
- b. the Gain Control keys, (to the left of the frequency controls)
- c. the Restart Decoder (space bar) key.

Note that the initial frequency display shows the QRP Calling Frequency for the selected band, and the initial frequency step size of 1 Hz. 7.03 MHz is the small signal calling frequency for 40 meters, for example.

4. Volume Controls

There are two separate volume or gain controls on the MMX. One controls the audio volume going to the headphone jack. The other controls the signal gain to the decoder. The default values are 10 and 30, and are shown at the bottom left and right of the *Main Screen* (see Figure 3).

Try adjusting both now, using the keys with or without the shift key down, watching the values change on-screen. For weak signals, increase the decoder gain to 40. For strong signals, you may need to reduce below 30. Audio setting is for your preference.

5. Tuning Practice

1. **Press the right arrow key**. Note the frequency has increased 1 Hz. You have increased the receiver frequency by 1 Hz.
2. **Press and hold the right arrow key**, and after 1 second, auto-repeat on the keyboard kicks in. Now you see the frequency step up in 1 Hz intervals.
3. **Press the up arrow key once**. You have now increased the step size to 10 Hz. Note that the last digit has become a small zero. This is the visual indicator of the step size. Repeat steps 1 and 2 with 10 Hz steps.

4. **Press the down arrow key once.** The step size has returned to 1 Hz steps.
5. **Note:** Typically, you will scan the band for a station by using 100 Hz or 1000 Hz steps. Do that now by pressing the **up arrow** key twice (two small zeros for 100 Hz steps), or one more time for 1000 H steps, and holding the **right arrow** key down.
6. **Test:** See if you can return to the QRP calling frequency on the **Frequency** Button. Practice moving around. If you have a real antenna connected, check out 10 MHz or 5 MHz for WWV. Hint: Go to 10,000 Hz steps to get there quickly. Note that outside the ham band the status line displays **SW Listening** for Short Wave Listening. Naturally, you can't transmit there, but you can receive SSB, AM and CW.
7. **If you hear a Morse Code signal,** adjust the frequency until you see the **CW IN** LED light up and track the signal. Using 10 Hz steps, move up and down in frequency steps to find approximate center of where the LED lights up. Adjust the decoder gain down if the **CW IN** LED is staying on between Morse Code tones (very strong signal), or up if the decoder is missing some tones (weak signal) using the Decoder Gain keys.

If you don't hear any signals, try again later in the day when the band is open.

8. When you first tune into a new station, with CW IN LED blinking, **press the SPACE bar to restart the decoder.** The decoder will start collecting data, and when it has enough, it will determine the sender's speed and measure 5 different factors related to the specific style of the sender's code, or hand. The decoder will then use that information to fully decode the captured signal, and then continue in real time.

Always restart the decoder when tuning in a different station to ensure proper capture of the sender's code.

9. Any decoded Morse Code will appear on the screen in GRAY letters. If a transmitting station call sign is detected, it will be captured automatically, and it will show up in place of the NO CCS (Captured Call Sign) text in the **CCS** Button.
10. Do not be surprised by strange decodings. If you have not tried, it is hard to focus on sending with your hand and thinking about what is the next letter in the word, and thinking what is the next word... Sounds easy, but It is not, although practice makes perfect. Also, there are a lot of stations that send what appears to be gibberish. Often it is weather or other digital information. Look for conversations that sound like two or more people talking, or call CQ. Also, a lot of abbreviations are used to speed communications, so check out the abbreviations list in Appendix VII in the **MMX Reference Manual.**

6. Calling CQ

1. If you can't find anyone calling CQ, find a quiet spot on the band to transmit. Make sure the Green **ENABLED LED** is lit up. This tells you that your license allows you to transmit on this frequency. You can't transmit if that LED is not lit.
2. Use the **CALL** Button to do at least a 30 second general call.
3. Listen for at least 30 seconds to see if anyone replies. Repeat. If you get no response after 5 or 10 calls, try longer calls. Maybe the band is dead, or your antenna is not working properly?
4. If someone answers, use the **left-right arrow keys** to adjust the frequency of the receiver for best decoder operation (you will be in RIT Mode automatically).
5. When they pass back to you, use the **ANS** Button. You are one your way!
- 6.

7. The Tuning Rule: Before You Answer a CQ

Calling CQ and having someone answer you automatically means you and they are on the same frequency. You do not have to worry about the Tuning Rule. But if you are answering someone else's CQ, you need to make sure you are on the correct frequency.

There are actually TWO frequencies where you can hear another station and have the CW LED flashing and the decoder happily operating. For example, if the other station is transmitting at 7.03 MHz, you can tune them in at 1300 Hz higher or lower, or 7.031300 MHz or 7.028700 MHz. Just to keep things sane, we subtract 1300 Hz from the receiver frequency, so it shows 7.03 MHz when tuned to a 7.03 MHz station with a 1300 Hz tone, but you can also tune the station 2600 Hz higher, at 7.032600 MHz and get the same tone. Sound complicated? Well, OK. So just follow the **Tuning Rule**.

8. The Tuning Rule

1. If you made the call and someone answered, skip this - no rule required.
2. If you want to answer a call: If increasing your frequency one step makes the received tone go DOWN in frequency, skip this.
3. If the tone went up, Press the **D** key to drop down 2600 Hz, and adjust your frequency slightly to receive the other station accurately (make sure you are within the decoding frequency bounds).

NOT using the Tuning Rule is the cause of many missed QSO's (ham lingo for an on-air conversation). Do not forget to do this step!

Experiment with this process by tuning in stations, then applying the Tuning Rule.

9. Getting it Right

Learning the ropes is a slow process. The best way to become comfortable with the process is to practice. Practice practice practice! There are two major areas to practice:

1. **Operating the MMX:** This is the easy part. Use the MMX Reference Manual. There is so much more the MMX can do we have not touched on.
2. **Tuning and Doing QSO's:** This is harder, because there is much to learn: what are the best frequencies to use? What is the best time of day to operate? How to identify different styles of operation? How to establish your own style? How to use microprogramming to support your own style? This is the more time-consuming part, but especially if you are a prepper, do it NOW, and do it FREQUENTLY so if the S does HTF, you will be comfortable operating your communications safety net!

VII. External Mode Electrical Setup

Before you begin setup, you are going to need some cables and adaptors. Or better yet, you have purchased the PreppComm's **External Transceiver Cable Assembly** accessory, which makes the interconnection between your **MMX** and everything else easy and neat.

Using the cable assembly, the electrical setup is shown in Figure 9 below:

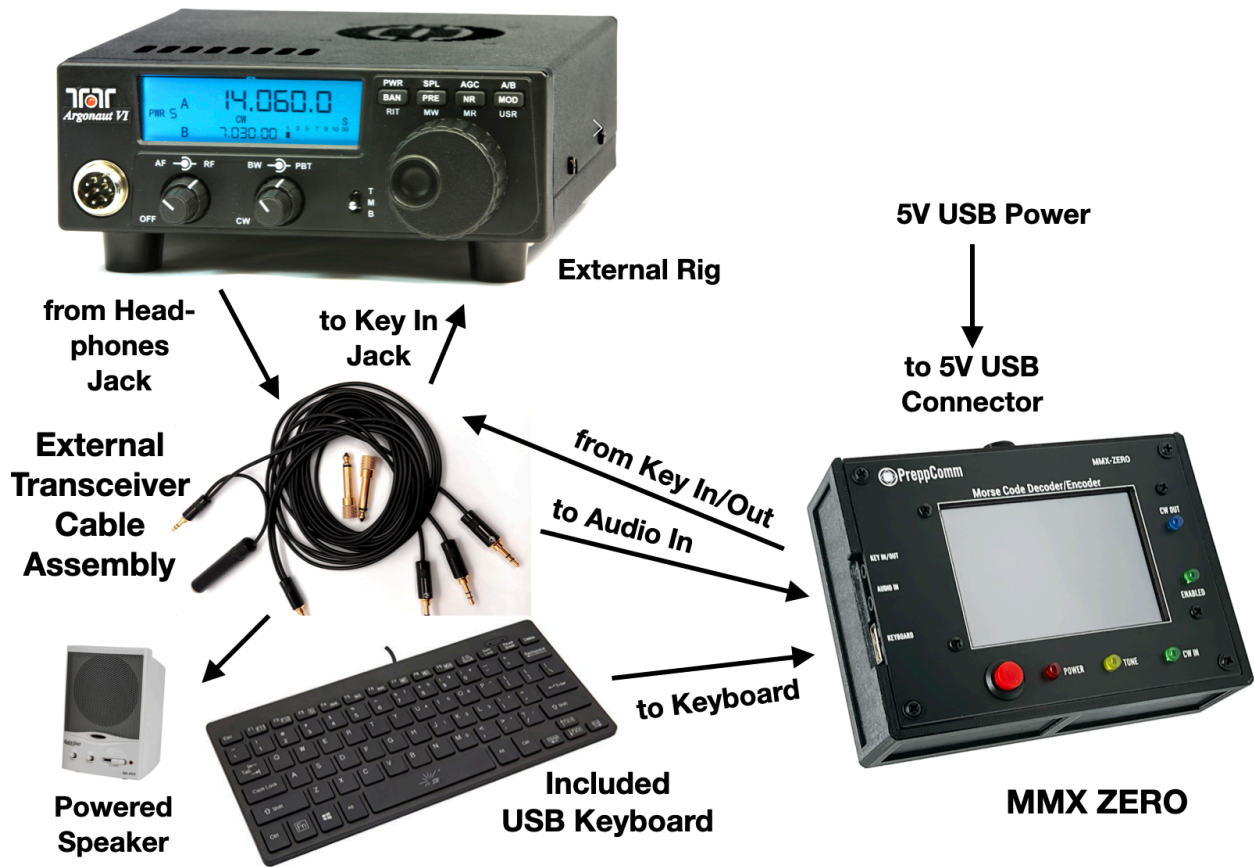


FIGURE 9: EXTERNAL (ZERO) MODE ELECTRICAL SETUP

If you plan to use a key to transmit, a 1/4" jack input is provided (straight key for pure Morse only). If you would like to use a paddle, an external circuit that converts the two-wire input from the paddle into pure Morse is required as an external add-on.

If you plan to only use the ZERO or MMX as a decoder, the keyboard is not required. You plug your key directly into your external transceiver, and use the status line as the decoder restart, rather than the space bar.

External Receive Mode Keyboard Commands

The keyboard commands for operating with an external transceiver are much fewer than when operating QRP. The reason is simple: you don't have any control over the external transceiver, other than transmit via Key-Down.

F1-F10 runs 10 user microprograms
Shift F1-F10 to edit microprogram

MMX ZERO Receive Mode Keyboard Layout

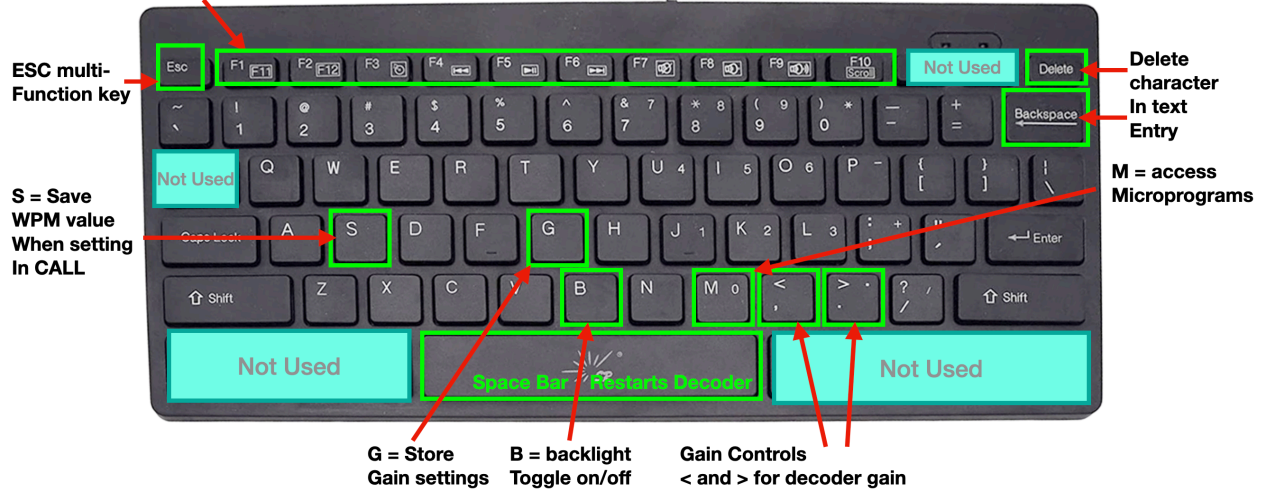


FIGURE 10: MMX ZERO OR EXTERNAL MODE RECEIVE MODE COMMANDS

Note that B key for turning on/off the backlight, which will automatically turn off after 3 minutes of inactivity. Use B to turn it on. Of course the 3-minute timer will start again, if there is no activity on the display.

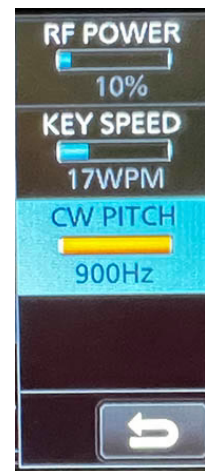
VIII.External Transceiver Setup

There has been so much confusion on how to set up an external transceiver so the **ZERO**, **DMX-40** or **MMX** multi-band in External Mode can receive the proper 1300 Hz signals, and still have the transmitter transmit on the correct frequency - the same frequency of the station that is being decoded.

I don't have a wall full of transceivers, as some folks do, I have only my trusty old IC-7300. I say old, because I bought it when it first came out at \$1500. I recognized even before it was on sale from the information made available that it was a breakthrough product, and I was right. What an amazing day in amateur radio history! Below is a step-by-step method for setting up an IC-7300. The process will need to be adjusted for your specific case, as terminology and arrangement of functions are different between transceiver companies, but the functions referred to should be available on your transceiver, unless it is a very old unit.

Step 1: Setting CW PITCH or SIDE TONE:

Let's start out by first setting the CW PITCH or sidetone as high as it will go. To do this for the IC-7300, go to CW mode, and then, using the Multi knob/button, press once for the display shown on the right. Touch CW PITCH to select. Turn the Multi knob until the value reaches 900 Hz. You should see something like the view on the right. Press Multi to save the value.



Now let's consider what this setting is doing. For many, it is a mystery. Basically, to turn a carrier wave - which has no sound in itself - into a tone, we do this using a method called creating a beat frequency. A beat frequency is the difference frequency between two signals. So, if you have your dial set at 7.030.000, or 7,030,000 Hz, or 7.03 MHz, to get a 600 Hz beat frequency audio tone, you must use another frequency at 7.030.600. Note that 7.029.400, which is 600 Hz lower, will also generate a 600 Hz beat frequency tone. So in effect, this 600 Hz higher frequency

is your VFO or receive frequency, and the displayed frequency is your transmitter frequency. Thought of in another way, a zero beat will occur 600 Hz higher on the dial, indicating that your receiver is, in effect, operating at 600 Hz higher in frequency than your transmitter, so you can hear the other station.

Thus, the CW PITCH control is an offset between your transmitter frequency and a VFO frequency generated within the transceiver. You can tune up or down, and this tone will go up and down depending on the distance between an incoming carrier and the VFO, which is offset from the displayed frequency by this setting, now 900 Hz. The displayed

frequency is both your transmitter frequency AND the station's frequency you are listening to,

The VFO frequency is the receive frequency, and it is the frequency we "insert" into the RF mixer to generate an audio signal. To receive 1300 Hz tones for a given frequency, we actually set the receiver frequency (VFO) 1300 Hz above the displayed frequency, and turn off the 1300 Hz offset when transmitting. We have only achieved 900 Hz so far, and we will add the extra 400 Hz later,

Step 2: Selecting a Filter

There are 3 built-in filters, and the one you are currently using is shown to the right of the blue CW button on the 7300 LCD screen, at the top of the screen (see Figure 11 below). Here, we see a gray button labeled FIL1, which is Filter 1. Pressing briefly switches between filters, but pressing and holding brings up the settings for the filter. In the figure, you see the effect of holding down FIL1 at the bottom of the screen, an area called FILTER (CW). Note that you can use any of the 3 filters for this purpose.



FIGURE 11: 7300 FILTER SETTING

Note in the bottom left, the filter "center" is 900 Hz, as you have set in the CW PITCH, and the bandwidth in this example happens to be set to 1.5K, shown below FIL1 between the DEF button and SOFT button. That is 1500 Hz, and the filter is from 600 to 2100 Hz as shown on the left. SOFT is a good setting - SHARP will introduce too much ringing and other artifacts into the signal, interfering with the signal processing in the **ZERO**.

Step 3. Selecting Bandwidth Edit

Press the BW button to the left of FIL1, as shown in Figure 12 below:



FIGURE 12: SELECTING BW

The BW button and the box below **FIL1** will light up, and the label FIL1 will turn darker blue. This indicates that the filter bandwidth is ready to be adjusted.

Step 4: Adjust the Bandwidth of the Selected Filter

Using the main tuning knob, adjust the bandwidth so that the upper number is at least 1500 Hz, and better yet, 1700 Hz to give plenty of unfiltered content for the **ZERO** signal processor. Having a filter too tight can cause issues and reduce quality of the decode output.

In Figure 13 on the next page, you can see we adjusted the bandwidth to 1.1K or 1100 Hz, resulting in a filter range of 600 to 1700 Hz. This should work nicely with the DMX-40 or MMX decoder.



FIGURE 13: FILTER SET

Step 5: Adding 400 Hz to 900 Hz

You may have noticed that RIT was already set to 0.40, but the photo here shows you the setting again, top right on the waterfall display. Use the Multi knob to adjust this to 0.40, which is 0.4 KHz or 400 Hz.

Now what is actually happening when you set RIT to 400 Hz? It moves the receiving frequency up an additional 400 Hz from the transmitter and displayed frequency. Since the offset is already 900 Hz (generated by whatever means is used in the 7300), the tone for a tuned in signal that was at 900 Hz will rise to 1300 Hz - without touching the tuning knob! But the transmitting frequency, and the display frequency will stay the same. So no changes are needed between transmit and receive!

For PreppComm products, more than 900 Hz is needed, so we add in 400 more with RIT.

If you could turn off CW PITCH, or make it zero, then RIT would need to be 1.3, or 1300 Hz.

You don't need to move the dial between receive and transmit. If you need to adjust for a station that is not exactly on your frequency - i.e., the tone is not quite right - adjust with your RIT control. It has steps of 10 Hz, and you can do fine adjustments.

In fact, your DMX-40 or MMX decoder is only APPROXIMATELY 1300 Hz. It should be very close, but it can be 20-30 Hz off in either direction, and can drift as the temperature changes inside the decoder. So a little experimenting over time, you may discover that the correct setting for your PreppComm decoder is actually 0.42 or 0.39, for example. However, each station you are communicating with, depending on how close they are transmitting to your frequency, may require you to make a fine adjustment for best results. This should not be more than 50-60 Hz, for a sloppy operator. Always return to the default best setting between QSO's.

SUMMARY: Hopefully, you now have the ability to tune in 1300 Hz CW code and both hear it and have the MMX or ZERO also hear and decode it.

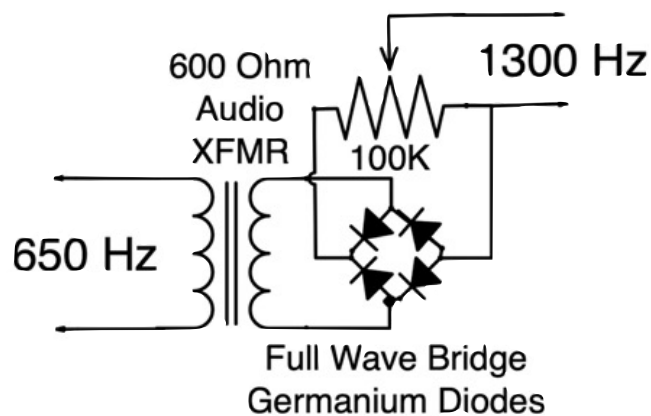
Alternative for 650 Hz decoding

One of our customers has offered a solution that he believes solves the 1300 Hz "problem" by doubling the frequency of the signal. What is the "problem" here? It is the fact that many people don't like listening to code at 1300 Hz, and in some cases it actually hurts their ears or they can't even hear it! So **Guy Iomega VA7GI** came up with

a very simple solution. **This is not a factory-tested solution**, so contact Guy for any questions at guy.immega@kinetic.ca (used by permission). This same effect can be done with a few op-amps as well, but that is more complicated, and who knows? Maybe PreppComm will build, test, and incorporate such a circuit in the future.

And here it is! The input comes from the headphone output of your transceiver, and the output goes to the AUDIO IN of the MMX or MMX ZERO.

Frequency Doubler for MMX-ZERO MORSE DECODER



Guy Immega VA7GI
March 2023

FIGURE 14: ALTERNATIVE TO 1300 HZ

IX. Operation in External Mode

1. Basics

As you can see, the tone that the MMX is looking for is NOT 600 or 650 Hz, tones normally used for listening to CW. Rather, it is 1300 Hz. Why did we mess your ears over by choosing 1300 Hz? Because we can lock onto a weak signal buried in noise twice as fast? Because we can send and receive code twice as fast? We thought that was good reason enough but there are more reasons... Naturally, we would have loved to go even higher, but we had mercy on your ears.

Essentially, if you are not tuning so the decoder is hearing 1300 Hz, the CW IN LED will not light up, and nothing will decode. This can be quite a shock if you are not expecting it, as you are used to decoding by hearing at just about any tone. The CW IN LED is the decoding indicator - use it to tell when you are in the narrow band the decoder hears, and learn to center it within that band. It is only about 150 Hz or so wide.

If you do a lot of CW, you are used to trying to isolate a single CW station so you can "hear" only it, and thus decode it in your head. Here, it is quite different. You are feeding a fairly wide audio signal to the MMX, and so it is doing the isolating via its very narrow hearing ability around 1300 Hz. You can experiment with your filter settings if you want to try to also isolate it for your hearing, but be careful not to tighten it up so much that you cause ringing and decoder failure, as described above with setting up the transceiver.

You also need to set up your transceiver so that it goes into transmit mode when the KEY IN is activated (break-in). Otherwise, you will have to switch manually between transmit and receive mode on your transceiver as well as on the MMX. Full or partial breaking is fine.

2. Decoder Only Use

If you only plan to use the internal decoder, and not use the encoder, including the CALL and ANSWER functions, automatic call sign capture, keyboard texting and type-ahead buffer, and microprogramming for customization of operating methods, then all you need to remember is to press the SPACE bar after tuning in the station of interest, making sure first that you are roughly in the center of the 1300 Hz bandpass of approximately 100-150 Hz. The SPACE bar restarts the decoder by clearing the cache of any information from previous signals, and runs the hand/speed algorithm after collecting data. Also, while in decode mode, remember that the ESC key switches between HCW (human CW) and CTX (computer texting) modes. You will want the

HCW mode. **For keyboard free operation, press the Status Line to restart the decoder.**

To operate:

1. turn on the MMX
2. Press the frequency button so it says External. This step is not required with the MMX ZERO
3. Make sure you are in HCW Mode (HCW: Collecting Data...). The ESC switches between HCW and CTX.
4. Start tuning around looking for stations to decode on your transceiver.
5. If you are using the encoder, use CALL or ANS as described earlier, or any microprograms you have replaced them with. When the encoder sends a KEY DOWN to your transceiver, it will go into transmit mode.
6. If you are only using the MMX decoder function, you will use your normal routine to transmit, and your key will be plugged into your transceiver, not the MMX.
7. Don't forget to press SPACE or the Status Line at the beginning of a NEW CODE STREAM.

3. Decode and Encode

If you do the complete setup as shown in Figure 9 above, you will be able to use both your key and the automatic keying functions of your MMX, as well as the microprogramming functions for customizing your operation mode.

Once you have these bases covered and understood, you can "break in" with manual keying at any time, and you can also train yourself for better timing by keying to the decoder while in receive mode on the MMX.

Note that transmit mode on the MMX while in External Mode simply means it is focused on transmitting CW to your rig, and receive mode means it is listening to your rig's receiver output. This means that you will be using function keys or the CALL and ANS buttons to transmit, just as if you were operating in QRP mode. But instead, you are transmitting at a much higher power via your external rig, and (one hopes) you have a much better receiver feeding the decoder, and any band your transceiver can work on!

To operate,

1. Turn on the MMX.
2. Press the frequency button until it says External.
3. Make sure you are in HCW mode (HCW: Collecting Data...). ESC switches between HCW and CTX.
4. Tune around the band looking for a spot to call CQ or for someone calling CQ, etc.

5. Operate the MMX transceiver as if it is the controller, and operate your external transceiver as if it is merely a receiver and transmitter. In other words, you should be operating the external receiver controls, but not the transmitter controls, which should automatically engage when a key-down event occurs, and return to receive mode either immediately when a key-up event occurs (full break-in) or after a brief time (partial break-in).

That is a brief overview of setting up and operating your MMX. A more detailed description of features and functions is provided in the **MMX Reference Manual**, which uses many internal links and an accessible from every page linked table of contents to help you find what you need to know. Also, make use of the PreppComm Community. There are a lot of Q&A's already there, and plenty of other MMX users out there who have asked the same question you have, or have answered someone's question. It is also a place to get answers from the factory.