

A Users Guide for the X1M PRO (Platinum) Transceiver



Frederick A. Lesnick, VE3FAL
Paul W. Ross, W3FIS
Charles O. Vest, W5COV
Revision 2.0.4 – 9-4-13

This guide is for the X1M HF PRO (Platinum) model QRP transceiver, manufactured by Chongqing Xiegu Technology Co., Ltd. of China. Mr. Ed Griffin, of Import Communications, Inc, imports the radio into the United States.

Technical Specifications

The published specifications for the radio are as follows:

Receive: 0.1 - 30MHz continuous.

Transmit:

- Band 1 3.5 – 4.0 MHz (80 Meters)
- Band 2 7.0 – 7.3 MHz (40 Meters)
- Band 3 14.0 – 14.35 MHz (20 Meters)
- Band 4 21.0 – 21.45 MHz (15 Meters)
- Band 5 28.0 – 29.7 MHz (10 Meters)

(Transmission is limited to the listed amateur bands via internal programming.)

Operating modes: USB, LSB, and CW.

Receiver sensitivity: better than 0.45 μ Volts.

RF power output: 4.5 Watts.

Frequency stability: better than 0.5 parts per million.

Memory storage locations: 32 pairs of VFO settings (both VFOa and VFOb)

Operating voltage: 9.6 – 14.5 Volts DC

Receive/Standby current: 0.5A

Transmitting current: 1.8A, Max

Size: 97 x 40 x 155 mm [3-13/16 x 1-9/16 x 6-1/8 inches]

Connecting the Radio



The power jack is a standard 5.5 x 2.1 mm jack coaxial power jack. The center pin is the positive connection, and the outer shell is the negative connection. Connect the radio to a suitable power source of 9.6 to 14.5 volts, direct current.

A key or paddle is connected with a standard 3.5 mm stereo plug. The tip is the “dot,” and the ring is the “dash.” The common connection is to the sleeve. The dit/dah arrangement may be changed in a menu for left-handed operators. For “straight key” operation, use only the tip and sleeve, and leave the ring floating.

The RF antenna connection is a standard BNC female connection.

The COMM connection – this is a standard 9 pin RS-232 connector for computer interfacing. However, the signal levels however, are TTL level signals, *not* the standard RS-232 level signals. An appropriate adapter cable is available for computer connection. **Do not plug the radio directly into a computer fitted with an RS-232 connection.**

A set of headphones may be plugged into the headphone jack on the back panel. This disables the built-in speaker when the headphones are connected.

The supplied microphone plugs into the front panel. The connection is a standard 3.5 mm stereo plug. The microphone is a re-purposed speaker microphone, with the speaker circuit disconnected. Ignore the connection on the microphone for an ear bud. It has been suggested that a dab of RTV Silicon rubber be inserted into the plug for greater stability. A red LED is activated on the microphone when the PTT switch is pushed.

A set of four small rubber feet (local hardware store item) on the bottom will protect your X1M case from scratches.

Screen Icons

R/T Receive mode /Transmit mode.

USB/LSB/CW Current operating mode.

PRE Receive pre-amplifier is on when there is a solid dot on the icon.

ATT Attenuator (not implemented)

SPL Split-Frequency Mode is on when there is a solid dot on the icon.

RIT Receiver Incremental Tuning. Value show is Hertz +/- when RIT option selected. Change the value with the frequency knob.

CH00 Memory mode operating channel being used. No digits shown when in VFO mode.

14.270.000 VFO mode current operating frequency. Active VFO is top one.

V-B VFOb frequency.

V-A VFOa frequency.

KYR Keyer mode. Manual, auto left, auto right.

Lock Symbol Keyboard lock mode. All functions except on/off and volume disabled.

Loudspeaker Mute on/off for indicator “beeps.”

Operating Controls

Control of the various functions of the transceiver is through the buttons and knobs on the front on the unit. Pressing and holding the F5 key will return the build date and serial number of the unit.

Power off/on and volume – This is the red knob on left side. Rotate it clockwise to turn the radio on, and increase the volume.

There are a series of four menus, which are accessed though successively pushes of the frequency knob on the right hand side of the front panel.

Function key F1



TS+: Frequency Step up. Underline shows digit that can be changed.

MD: Mode for LSB-USB-CW.

A/B: Toggle between VFOa and VFOb.

A=B: Set VFOa and VFOb the same. Active VFO into inactive VFO

TS-: Frequency Step down. Underline shows digit that can be changed.

Function key F2



V/M: Frequency mode or Channel mode.

MC: under channel mode, clears the current selected channel.

V>M: Save the VFO frequencies and modes to the currently selected channel

Function key F3



PRE: Turn the preamplifier on or off.

ATT: Select the input attenuator. Not implemented on this model.

SPL: Run in "split" mode.

Function key F4



RIT: Receiver incremental tuning on/off. If on, set with frequency knob. Normal frequency setting is inhibited.

MUT: Mute the system beep.

KYR: Key mode (manual, automatic left hand, or right hand mode).

Changing the Frequency Setting – This is done with the right-hand knob. Rotate to set the radio to the desired frequency. Use F1 or F5 to move to the desired digit to change.

Storing Frequencies into Memory

1. Set VFO frequency and transmit mode, and preamp options as desired. The system will remember the mode and preamp setting as well as the frequency. Both VFOa and VFOb are stored to memory. When in memory mode, the **A/B** button will toggle between the two stored VFOs.
2. Press the V/M button to enter memory mode.
3. Rotate the frequency knob until the word “blank” appears above a channel number, unless you want to write over an existing stored channel value.
4. A long press of the V>M button stores the VFOs and modes into the desired channel.

Channel selection is determined in memory mode by rotating the frequency knob. There are effectively 64 memory storage locations in pairs. See the following for use of the split mode where storing VFO pairs is useful.

Doing “splits” with the two VFOs

Set desired *transmit* frequency into VFOb. Set the desired *receive* frequency into VFOa. Activate the SPL mode. Reception will be from VFOa and transmit will be from VFOb. Splits only work in the SSB modes. VFOa and VFOb can be reversed with the A/B key. Transmission is from the inactive VFO.

Systems Menu

Like all modern ham radios, the functionality and options for the radio are programmed via an extensive set of internal menus. To access the various menus, press and hold the **LK/SYS** button for two seconds to give access to the following functions. Make sure the keyboard is *not* locked!



Rotate the frequency knob to select the desired menu item. Press the knob again to allow alteration of the value. Use the frequency knob and F1/F5 keys to select the desired digit. When you are done, press LK/SYS again for a “Yes – No” to save or not save the settings. Use the frequency knob to select “Yes” or “No.” Press the frequency knob to make your selection and return to normal operation.

- 01. IF OFST:** Set the intermediate frequency offset.
- 02. LSB BFO:** Set the LSB BFO frequency.
- 03. USB BFO:** Set the USB BFO frequency.
- 04. CW BFO:** Set the CW BFO frequency.
- 05. CW TONE:** Sets the side tone value in CW mode. Default is 800 HZ.
- 06. CW TDLY:** CW transceiver delay. “QSK” delay
- 07. KYR SPD:** Speed for automatic keyer rate adjustment. Default is 20 WPM.
- 08. TXP TIM:** Transmitting time set. To avoid “frying the finals”. Works in all modes.
- 09. BRITNES:** Screen intensity setting. The display cannot be turned off.
- 10. CNTRST:** Screen contrast setting.
- 11. FBND TX:** Inhibit transmission on non-amateur frequencies. Spurious radiation will occur when transmitting outside of the five pre-filtered bands shown in the specifications. Some type of external band pass filter should be used if transmitting outside these five bands!
- 12. DDS CLK:** DDS clock setting.
- 13. DDS MLT:** RCLK Ratio DDS frequency setting.

14. RST ALL: Reset all parameters to factory values. A reset resets *only* the items in this parameter menu. Mode, VFOs, channel memories, etc., are not altered.

A caveat ---

Setting (and storing) Parameter 11 to the value to “open up” the radio is done at your own risk.

There are two considerations:

1. Out-of-band transmission is enabled. This may be illegal where you live, and may cause interference with other radio services. You do not want to do this!
2. There is indication that spurious transmissions may occur when transmitting out-of-band. One strategy to eliminate these is to install a suitable external band pass filter for the band in question (WARC bands, for example), from a company like Kits and Parts. Their web site is at: <http://kitsandparts.com/>.

Use of the Computer Interface

This transceiver can be connected to your computer to operate with the Ham Radio Deluxe software. A built-in CAT interface makes the X1M also suitable for automatic logging and control. The serial interface (9pin Sub-D) on the rear supplies TTL level signals. An optional interface provides a level converter to RS-232 levels. The interface emulates an Icom radio (IC-718).

We have used an IO-Gear GUC 232A converter with success. The major issue was getting the proper drivers installed. Ham Radio Deluxe works satisfactorily with the Icom 718 option. Other command suites should work if they can generate the IC-718 command set.

The following functions in HRD have been determined to work:

- VFOa and VFOb switching. Toggle option does not work. You must select the specific VFO.
- Frequency setting. Change digits, or move slider.
- Frequency change with “fine” indicator at end of slider – up or down by increments of 500 Hz.
- Mode switching between LSB/USB/CW.
- Split ON/OFF.
- ATT ON/OFF – The screen changes, but feature not implemented in X1M.
- Preamplifier ON/OFF.
- Memory/VFO switching.
- Memory write – We needed to select desired channel with frequency knob.
- Clear selected memory channel.
- Select memory channel (you get a drop down list). Only entries 01 through 32 work.

Audio Filter Accessory

The Xiegu Technology audio filter is also available as a useful accessory for the X1M transceiver. It is a very useful device to “sharpen up” the pass band for CW work. Alternatively, it may be set for SSB voice use. The center frequency is adjustable from 400 to 1100 Hz, with a bandwidth from 60 to 1800 Hz. It is a switched capacitor audio filter which provides for the design of a very compact audio filter without the necessity of either bulk or precision components.

The left hand knob sets the center frequency for the filter. When turned on, the unit powers up from the power applied to the rear of the unit (9 volt battery, or 12.8 volt supply), with a standard 5.5 x 2.1 mm power jack. With power off, the filter is bypassed.

The LED on the front between the two knobs indicates that the power on.

The right hand knob sets the overall bandwidth, with maximum bandwidth at full clockwise rotation of the knob. This then provides satisfactory SSB reception.

The two jacks on the back are for audio input from the X1M or other audio source, and the output jack provides a signal to headphones, a small loud speaker, or an amplified computer speaker. The jacks are standard 3.5 mm stereo jacks.

Microphone Pin Out

The microphone pin connections are as follows. The microphone connector is a standard 3.5 mm stereo plug.

Sleeve – common.

Ring – PTT button – closure to sleeve.

Tip – Microphone.

Case Removal

1. Disconnect all wiring.
2. Slip both knobs off – this may require a little persuasion from a thin item, like jack knife blade. Be careful, as the knob on the volume control has been found to be tight, and you may damage things. The knobs are standard 6mm push-on knobs, *not* ¼" knobs.
3. Remove the nuts on the volume control and frequency adjustment shafts.
4. Remove **ALL** four screws on front panel. Gently remove the front panel.
5. Remove **ONLY** two top screws on the back panel.
6. Do **NOT** remove the screw on the bottom of the case!
7. The top of the case simply slides forward and off.

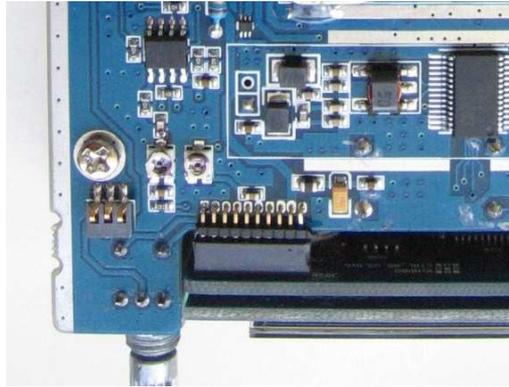
A 2.5 mm or 3/32" Allen wrench is used to remove the screws. The 2.5 mm Allen wrench is a better fit. Inexpensive sets of metric Allen wrenches can be obtained at any good hardware or auto parts store.

Re-assembly -- reverse the foregoing procedure. Do not press the frequency knob on too far, or you will not be able to access "push" functions.

As a note, we have found some of the loudspeakers have come loose in transit. A *small* dab of hot glue will take care of this. Check this if things "rattle," or examine the speaker when you have the case off.

Setting the Side Tone

1. Remove the case – see the foregoing instructions.
2. There are two multi-turn trim pots on the display end of the board.
3. Note the setting of the trim pots, in the event you need to reset them.
4. The left hand trim pot is for side tone level setting. An adjustment of appropriately 90 degrees clockwise seems to be satisfactory. Put the case back on.



Side tone adjustment trim pot is of the left, microphone level trim pot on the right.

Alignment Procedure

If you find that the radio sounds “muffled” on either USB or LSB, you likely do not have the system aligned correctly. This is a simple procedure.

1. Set the IF OFFSET first, or you'll chase your tail. With the radio hooked to an antenna receiving noise but no signal, adjust the IF OFFSET setting until you can switch back and forth between USB and LSB modes and the "wooshing"; or "timbre" sounds about the same. Looking at the audio signal with a program like Spectran is helpful. Save the setting.

Note: IF Offset is the adjustment you need to make in a dual conversion receiver's conversion process so as to center the signal up in the final IF filter.

2. Now, adjust USB by moving USB BFO until a voice USB signal received from a local accurate receiver is correct. Save the setting.
3. Adjust LSB by moving LSB BFO until a voice LSB signal received from a local accurate receiver is correct. Save the setting.
4. Adjust CW only After you do the IF, USB, and LSB. Once the IF OFFSET is close and the two sidebands sound roughly the same, you can adjust the CW BFO. While transmitting an 800 Hz CW tone on USB over a local transmitter to the X1M, set to CW mode, adjust the CW BFO setting until the received audio zero beats with the local transmitter's 800 Hz audio side tone. You may want to set it a different way.
5. Write down your settings for IF OFFSET, USB BFO, LSB BFO, and CW BFO.

If you manage to make a mess of things, you can always do a “General Reset,” and set the system parameters back to factory values. There are other alternative strategies, but moving the signal to the center of the IF pass band is the critical issue.

An alternative procedure, and one that produces better results is possible if you have a computer with a sound card, and any good digital mode program that has a “waterfall.” The waterfall can be used as an audio frequency meter. You will need a suitable digital mode program, and a stereo jumper cable to connect your radio to the Line Input jack on your computer sound card. If you want to continue to hear your radio during this, then you will also need a stereo-to-stereo 2-way splitter, and either headphones or an amplified computer speaker to monitor the radio.

The alignment procedure is as follows. Do it in the following order:

1. Set up the IF Offset for approximately equal noise spectra on USB versus LSB, or equal sounding signals for an AM station, such as CHU, WWV, or a local AM broadcasting station. Do this "by ear," or observe the waterfall image. Save the changes. This will approximately center your signal in the IF pass band of the X1M. Most of us have found that the LSB adjustment is the one that needs to be made.
2. Set the radio for LSB and *raise* the dial frequency by 1 kHz. You will get a nice 1 kHz beat. Adjust the LSB BFO to bring the 1 kHz signal to the 1 kHz mark on the waterfall. Save the changes and exit the system menu.
3. Set the radio for USB and *lower* the dial frequency by 1 kHz. You will get a nice 1 kHz beat. Adjust the USB BFO to bring the 1 kHz signal to the 1 kHz mark on the waterfall. Save the changes and exit the system menu.
4. Restore the dial to the AM signal.
5. Set the CW Side Tone to 800 Hz, or whatever you like. Save the changes and exit the system menu.
6. Finally, adjust the CW BFO so that the side tone shown in the waterfall is the same as chosen in the previous step. Save the changes and exit the system menu.

The following procedure has been suggested by Heath, VK3TWO. This procedure is for those operators who don't have any specialized test equipment. Enjoy!

Alignment Procedure – IF Offset, LSB BFO, USB BFO

Find an AM broadcast station that isn't too strong, otherwise you'll have overloading and clipping of the audio, making the alignment process very hard to do by ear. It may help to turn the Preamp off at this point.

Ensure that your USB BFO is roughly 1100 Hz higher than the IF Offset, and that the LSB is roughly 1100 lower than the IF Offset. It's clear that the default value for LSB in the firmware is incorrect, so change this value first, and save your settings. Without doing this change, the LSB frequency is incorrect by 1100Hz.

Changing Settings/Values:

1. Press and hold the SYS button till the alignment values appear.
2. To change the value, press the right hand / VFO knob.
3. Use the F1/F5 buttons to change which digit you'd like to adjust.
4. Rotate the knob to adjust the value.
5. Press the knob again to set the value and get out of the edit mode.
6. Rotate the knob to select the next setting and repeat the above for the other settings.
7. To save all changes/settings, momentarily press the SYS button.
8. Rotate the knob to select 'YES'
9. Press the knob to commit/save (and beware the loud bleeps)

As a rough sanity check, find an AM station (Double Sideband) and check to see that LSB and USB both sound roughly the same, with no high/low 'tones' or modulating/distorted audio. You need to listen to white noise somewhere there are no other signals.

Now that you have the LSB BFO offset fixed, here comes the time consuming process. You'll now have to find the IF offset "sweet spot" value, however when you change this value, you also have

to change the USB and LSB BFOs so that they're always 1100 Hz above and below the IF Offset respectively. If you don't change the BFO values in synchronism with the IF offset, this procedure will not work.

Finding the correct IF Offset value

As a general rule, if the LSB sounds lower or wider in pitch, you have to lower the IF Offset. If the LSB sounds higher or narrower in pitch, you have to increase the IF Offset. Adjust your IF BFO in 100Hz steps. You may find that you have to increase or decrease the values some 300Hz from the default value (08999850).

1. Adjust the IF Offset in 100Hz increments.
2. Adjust the LSB/USB BFOs with the same increments (in sync).
3. Save settings.
4. Check pitch of white noise comparing, LSB to USB.

Once you're in the ballpark, then move by small increments -- 50's/10's etc. until you are happy with how it sounds. Every radio will be different.

Once you've 'gone too far' increasing or decreasing the IF Offset value, you'll notice that the pitch of LSB and USB will 'swap', i.e. if LSB started with a lower 'pitch' than USB, once you've 'gone too far', the USB will have a lower pitch than the LSB. At this point, you can spend a lot of time going higher and lower, then testing, over and over. Don't get too bogged down with getting this 'spot on' unless you have lots of time on your hands.

Notes

This will save you some headaches later on. Keep your notebook handy to make notes in for the actual operation of your X1M PRO. Also, note any problems and what you were doing when the problem showed up.

Everyone should access the SYSTEMS MENU and record the present values currently stored for each item in the list. This will allow you to restore these values in the case they get changed for some reason.

	Function	Factory	My Settings
01	IF OFST	08999850	
02	LSB BFO	08999850	
03	USB BFO	09000950	
04	CW BFO	08999850	
05	CW TONE	0800	
06	CW TDLY	0300	
07	KYR SPD	020	
08	TXP TIM	0000	
09	BRITNES	100	
10	CNTRST	100	
11	FBND	0	
12	DDS CLK	032768000	
13	DDS MLT	1	
14	RST ALL	0	

Acknowledgements

The authors would like to acknowledge the specific contributions of the following people:

Ray Motte, KD4HJT, for the photos of the rear panel of the X1M and the side tone trim pot.

Ed Griffin, W4KMA, for providing the initial manuals and answering all sorts of questions, as well as the photo of the front of the transceiver.

John Tracy, W6SB for discussion on circuit internals and SWR considerations.

Steven Johnston, WD8DAS, Ken Downs, W1KRT, Heath, VK3TWO/VK6TWO, and Mark Francis, KI0PF for the alignment procedures.

The Yahoo News Group members of the X1M transceiver group for many helpful suggestions, critiques, and comments.

Frederick A. Lesnick, VE3FAL, Thunder Bay, Ontario
Paul W. Ross, W3FIS, Fenwick Island, Delaware
Charles O. Vest, W5COV, South Coffeyville, Oklahoma