

Specifications

Power to Speakers

Model 20 120 watts peak
Model 20X 360 watts peak

Speakers

Model 20 1 ea. 4"x6" oval
Model 20X 2 ea. 4"x6" oval

Tempo Range

30 to 220 beats per minute

Tempo Resolution

30 to 100 1 beat per minute
102 to 180 2 beats per minute
184 to 220 4 beats per minute

Accuracy

Tempo better than 0.1 %
Tuning Notes better than 0.25 cents

Audio Output

1/4" mono phone jack - line level.

Remote Mute

1/8" miniature mono phone jack.
(Short its terminals to mute.)

Pitch Reference

Model 20 and 20X A = 440 cycles per second.
Model 20V and 20XV A = 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446.

Tuning Notes

Tempered 12 notes from F below A 440 to E above A 440.
Strings G, A, C, D, and E in perfect intervals.

Size & Weight

Model 20 8.5" H 6.5" W 9.5" L
Model 20X 5.5 lb.
6.5 lb.

Power Required

110V 60 Hz, under 50 watts



Model 20 Series Metronomes

McAdams Instruments

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Tel & Fax: (281) 356-7567
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Features

The Model 20 series metronomes are designed for use by school bands, orchestras, choirs, and other similar groups. They provide a wide variety of basic rhythms and a full range of tuning notes at the high volume necessary for the classroom.

The series includes the Model 20 and the Model 20X. The Model 20X is functionally identical to the Model 20 but is significantly louder. Both models can be supplied with an optional variable pitch reference option (Model 20V and Model 20XV) which allows the pitch of the tuning notes to be adjusted up or down from A 440.

This manual describes all of the optional features available and, therefore, may make reference to features not included in the model you have. If, after reviewing this manual, you have questions about the operation of your metronome, feel free to consult your dealer or call McAdams Instruments directly (see next page).

Basic Metronome - The Model 20 series provides loud, stable, metronome functions over the range of 30 to 220 beats per minute. Though set by a knob, the tempo is displayed digitally on the front panel for very high accuracy.

Subdivision of the Beat - The Model 20 series can play 1, 2, 3, or 4, notes per beat or any combination including 2 against 3.

Subdivision of the measure - The Model 20 series metronomes can accent various notes in the measure for time signatures from 2/4 to 7/4.

Synchronization - With the metronome on, but silent, the beat occurs instantly when a selector switch is turned on. This makes the Model 20 easy to synchronize with your directing.

Tuning Notes - The Model 20 series metronomes can generate accurate tuning pitches in even tempered half steps from the F below A 440 to the E above. The sound is rich in harmonics making the pitch easy to match.

String Tuning - Special pitches are provided for the open string notes. Though also based on A 440, these pitches are related to each other by the perfect intervals normally used when tuning strings.

Variable Pitch Reference (optional) - The pitch reference can be varied from A 435 to A 446 in 1 cycle per second steps. (This feature is optional, and not included unless requested).

Audio Output - A jack is provided on the rear panel for connecting a jumper cable to the "line in" or auxiliary input of an external amplifier or stereo system.

Remote Mute - An optional cable assembly can be connected to allow the Model 20 to be silenced remotely without altering the front panel switches. The synchronization feature also works with the remote mute.

Repair or Technical Help - You may refer to the following pages for instructions on how to use the features mentioned here. Most of the questions you may have about the operation of your new Model 20 series metronome are answered in this manual. If you have troubles, refer to the **Troubleshooting** section before giving up. If you still need help or want to send your metronome in for repair, contact us at:

McAdams Instruments Tel & Fax: (281) 356-7567
40219 Otero Road Alternate Fax: (713) 663-6361
Magnolia, TX 77354 E-mail: see www.mcadamsinstruments.com
for the latest contact information.

If you send a Model 20 back for repair, please include a note describing the problem as fully as possible and include at least your name, address, and phone number so we can contact you with questions. If your instructions just say "broken" or "fix it" but it works when we receive it, we are stuck.

CAUTION: *To reduce the risk of electric shock or fire, do not remove the front panel or expose the metronome to rain or moisture. If operated near water, it must be plugged into a properly ground fault protected outlet. Do not operate the metronome with a damaged power cord or without the grounding pin on the power plug. If you have safety related questions please contact McAdams Instruments (see the address and phone numbers above).*

Metronome Operation

This section is a short, guided tour of the basic functions of the Model 20 series metronomes. By following these steps you will gain knowledge of the basic functions and avoid the most common operational problems. See *pages 7 and 8 for illustrations of the numbered controls like "(2)"*.

Preparation - Turn the metronome ON by rotating the on-off/volume control (7) until its black marker line points straight up. The red light (1) in the upper right will come on. Then turn the time signature selector (8) all the way counterclockwise (to the position marked with F and no time signature). Finally, put all of the silver toggle switches (5 and 6) into their mid position.

At this point, you will see a two or three digit tempo indicated in the digital display (3) but there will be no sound. Use the metronome tempo knob to adjust the tempo indication from 30 to 220. If you see anything other than a number in the digital display, check the right hand silver toggle switch and make sure it is in the mid position.

Beat Subdivisions - Put any of the four beat select toggle switches (5) into the up position. If you put the switch labeled 3 into the up position, you will hear three notes per beat. If you then also put the switch labeled 1 into the up position, you will hear three notes per beat with an accent on the beat. Similarly, the other switches will sound 2 and 4 notes per beat. Any of the four beat select toggle switches may be up at one time to produce combination rhythms such as 2 against 3. Any time the beat is sounding, the green light (2) will flash with the beat.

Now return the beat select switches (5) all to the mid position except the switch labeled 4 that you should put in the down position. You will hear the pattern of a dotted eighth followed by a sixteenth. Return switch 4 to the mid position and put switch 3 down. You will then hear the pattern characteristic of a quarter followed by an eighth in 6/8 time.

The two special rhythms (switch 3 or 4 down) are only available when no time signature is selected (time signature select knob all the way counterclockwise). The basic beat subdivisions resulting from putting the beat select toggle switches up are available for any time signature. However, when the beat select switches (5) are down, you may, or may not hear sounds. See the next section for an explanation.

Measure Subdivisions - Put beat select toggle switches 2, 3, and 4 in the mid position and put switch 1 up. Move the time signature selector to the 2/4 position and then the 3/4 position and listen to the result. You will hear a 2/4 or 3/4 measure with an accent on the first beat. Move switch 1 down, and you will hear only the first note of the measure, though the light still blinks on each beat. For 2/4 and 3/4 time, this is as complex as it gets. The switches marked 2, 3, and 4 have no function in the down position for 2/4 or 3/4 time.

Note: In all time signatures, switch 1 up will cause each beat in the measure to sound with an accent on the first note of the measure. Putting switch 1 down results in only the first note of the measure sounding. Try all of the following examples with switch 1 down as well as up to see the difference.

Move the time signature selector to the 4/4 position and put switch 1 up. You will hear 4 beats per measure with an accent on the first note. Put switch 2 down and you will hear an additional accent on the third note of the measure. Switches 3 and 4 have no function in the down position for 4/4 time.

Put switch 2 back in the mid position and move the time signature selector to the 5/4 position with switch 1 up. You will hear 5 notes per measure with an accent on beat one. Put switch 2 down and things start to get interesting. You hear an additional accent on beat 3 for a rhythm like **I 2 3 4 5**. Put switch 2 back to the mid position and put switch 3 down. You now hear the additional accent on beat 4 for a rhythm like **I 2 3 4 5**. Switch 4 has no function in the down position for 5/4 time.

In a similar manner, 6/4 and 7/4 times have certain accents available depending on which beat select switches are put in the down position. For 6/4 time, switch 4 has no function in the down position. Try these yourself to get familiar with what they do. The difference between 7/4x and 7/4y is that 7/4y is like a 3/4 measure followed by a 4/4 measure, while 7/4x is a 4/4 measure followed by a 3/4 measure (put switch 2 or 4 down to see this).

At the bottom of the time signature selector are additional 5/4, 6/4, and 7/4 positions that are marked by a white arc. These function like the other 5/4, 6/4, and 7/4 positions except that the tempo is effectively doubled. This position is particularly useful for fast pieces in 5/4 that you want to direct in 2 instead of 5. It is similarly useful for fast 6/4 and 7/4 pieces.

Tuning Note Operation

See pages 7 and 8 for illustrations of the numbered controls like "(6)".

Tempered Tuning - To put the metronome in tuning note mode move the mode select toggle switch (6) to the up position (TUNING). You will see the digital display change from a tempo indication to a note indication. You will also hear a tuning note sounding in the speaker.

Turn the tuning note selector (8) to each of its 12 positions and note the effect. You will gear a chromatic scale going from the F below A 440 up to the E above. As you do this, notice the digital display as it shows the selected note. The display is intended for displaying numbers so some of the note indications may look a little strange. In particular, the # sign, which looks like a small, elevated box. Also, B looks like 8, D looks like 0, and the G looks a little like a mangled 6. This is normal for the Model 20 series, not a malfunction.

The notes sounded in the tuning mode are separated by mathematically precise, even-tempered half steps. This is typical of the tuning intervals used by bands and pianos. It will match the tuning of the chromatic tuners often found in band halls.

The beat select toggle switches (5) marked 1, 2, 3, and 4 have no effect when in tuning mode.

The green light (1) in the upper left has no function in tuning mode and may be on or off. Ignore it.

String Tuning - To select string tuning mode, put the mode select toggle switch (6) to the down (STRING) position. As in the tuning mode, the desired note is selected by turning the tuning note selector knob. However, only the G, A, C, D, and E positions cause any sound. If you put the tuning note selector in any other position (F, F#, Ab, Bb, B, C#, or Eb) the digital display will go dark and the Model 20 will go silent. This is normal behavior for the Model 20.

In the string mode, the sounds available are those of the open strings on the violin, viola, cello, and bass. The intervals between the notes are perfect, beat free intervals corresponding to the way strings are normally tuned. If you check any of the notes except the A against a tempered tuner, the tuner will indicate a bit sharp or flat because the perfect fourth and fifth intervals are not the same as a tempered fourth and fifth.

The notes are chosen to be the same octave as the open string or an octave higher in some cases. The E is special, though. In order to be easy to use with the violin and the bass, there are 2 E's, separated by 2 octaves. Turn the tuning note selector to the E. You will get either the high or the low E. If you then turn away from the E and then come back to it, you will get the other octave. If you got the high E the first time, you will get the low E the next time. The high and low E alternate. This is normal behavior for the Model 20.

The beat select toggle switches (5) marked 1, 2, 3, and 4 have no effect when in string tuning mode.

The green light in the upper left (1) has no function in tuning mode and may be on or off. Ignore it.

Variable Pitch Reference (Optional) - Look on the back panel of the metronome. If you have this option, there will be a black knob surrounded by frequency markings from 435 to 446 cycles per second. (If you see the markings but no knob, then you do not have this option.) Select one of the positions by turning the knob so that the black indicator line points toward the frequency that you want to use as the A reference pitch. All other tuning notes will be scaled in pitch accordingly.

There is a secondary way of confirming which pitch reference is selected for A. Turn the metronome off, wait a few seconds, and then turn it back on. Notice the digital display. For about 1/2 second, the pitch reference frequency is displayed while the computer in the metronome does its initial setup. Similarly, any time the pitch reference knob is rotated, the new pitch reference frequency is displayed for about 1/2 second, after which the metronome returns to normal operation.

Most tuners let you adjust the pitch reference in terms of a deviation in cents from 440 cycles per second. "Cents" is a measure of the ratio of two frequencies and is defined so that a tempered half step is always 100 cents, no matter what the actual frequencies of the notes are. Each "click" on the pitch reference knob moves the pitch of all tuning notes by about 3.9 cents (roughly 1/25th of a half step). The total amount of adjustment possible using the variable pitch reference option is 23.4 cents up and 19.8 cents down from A 440 (roughly 1/5th of a half step).

Front Panel Controls

Refer to the front panel of your metronome. This section describes the controls and displays on the front panel, in order, from the upper left to the lower right (as you face it). The number refers to the pictures on the next page.

- 1) Beat Indicator** - A green light emitting diode in the upper left that flashes with each beat when in metronome mode.
- 2) Power Indicator** - A red light emitting diode in the upper right that shines whenever the metronome is turned on and has power applied.
- 3) Digital Display** - A red three-digit display that shines out through a rectangular window in the upper part of the panel. It displays the metronome tempo (in beats per minute) or the selected tuning note, depending on the mode of operation.
- 4) Metronome Tempo Knob** - In the center of the front panel is the knob that controls the tempo of the metronome. It is surrounded by a rough scale indicating the *approximate* tempo in beats per minute. (see the digital display for an accurate tempo indication).
- 5) Beat Select Toggle Switches** - Across the front panel, underneath the metronome tempo knob are five switches with silver handles. The four switches on the left (labeled 1, 2, 3, and 4) are used to select how the beat or measure is subdivided. Each switch has three positions. Beats can only be produced when a beat select toggle switch is up or down. The mid position is always silent. In metronome mode, "up" always makes sounds. "Down" may, or may not, make sounds.
- 6) Mode Select Toggle Switch** - At the right end of the row of five silver handled toggle switches is the toggle switch (marked TUNING and STRINGS) which selects the metronome or tuning note modes. Like the beat select toggle switches, the mode select toggle switch has three positions. Up and down select tuning note functions. The mid position selects the metronome.

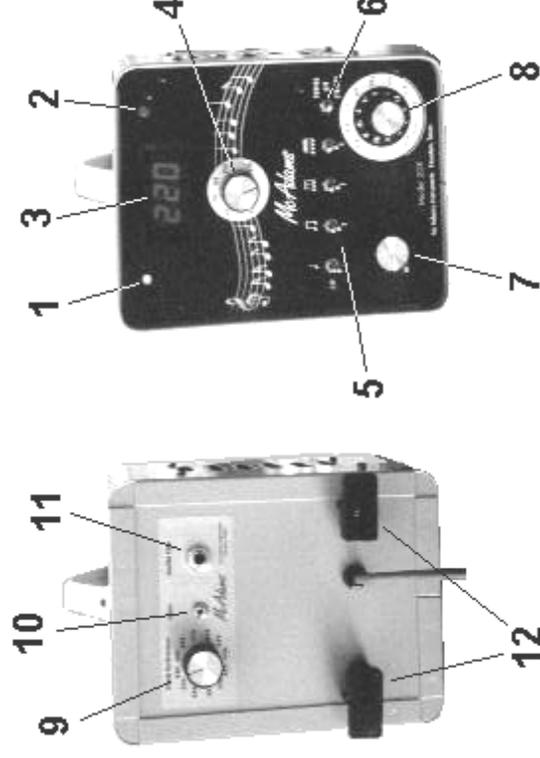
7) ON-Off/Volume Control - In the lower left is the volume control knob. The same knob controls the power to turn the metronome on and off.

8) Time Signature/Tuning Note Selector - In the lower right of the front panel is a knob with two sets of markings. When in the metronome mode, this knob selects the time signature. When in the tuning note mode, it selects the desired tuning note.

Rear Panel Controls

Refer to the rear panel of your metronome. This section describes the controls and items on the rear panel in order from the upper left to the lower right (as you face it).

- 9) Tuning Note Pitch Reference** - In the upper left of the rear panel *may* be a knob to control the pitch reference frequency. This is an optional feature and may not be present on your metronome. If there is no knob, then your metronome is fixed permanently at A 440. (All models have the pitch reference markings, even if the control and knob are not there.)
- 10) Remote Mute Jack** - In the middle of the rear panel is a 1/8" phone jack that can be used to mute the metronome. The cable assembly to accomplish this is an optional extra.
- 11) Audio Output** - On the right is a 1/4" phone jack for connecting the metronome to another amplifier's "line in" or auxiliary input.
- 12) Cord Winding Knobs** - Near the bottom of the rear panel are two knobs for storing the power cord when the metronome is being transported.



Troubleshooting the Model 20

Problem

You turn it on but there are no lights and no sound.

No metronome beats sound, but the red light is on. The green light may or may not flash.

Some tuning notes do not sound.

No sound, crazy stuff in display.

Some silver toggle switches do not do anything when put in the down position.

Display jumps between one tempo and another (say 120 and 122).

Lights work but no sound.

Metronome tempo knob skips some tempos, such as 182.

Before calling about a repair, try this test. Put the mode select toggle switch (6) up to the TUNING position. Turn the tuning note selector (8) to "F". Turn it ON with the volume control mark pointing up. You will briefly see the selected reference pitch (usually 440) in the display, then F. The red light will be on and you will hear an F tuning note at a moderate volume. Rotate the tuning note selector and you will see and hear all 12 of the notes. Put the mode select toggle switch to STRINGS. You will hear a low E. Rotate one click counterclockwise and then back to E. You will hear a high E. Rotate counterclockwise and you will hear only D, C, A, and G.

Put the mode select toggle switch in the middle position (off). Rotate the tempo knob (4) all the way left and right. Tempo will change from 30 to 220. With the note selector on F, you will hear the metronome if any of the x1, x2, x3, and x4 switches is put up or down. If x1, x2, x3, and x4 are all off, it will go silent.

9 If it passes all of these tests the circuits are OK. **See Metronome Operation.**

Try this

Plug it in (don't laugh!). Try another power outlet. Remove extension cords.

Some switch combinations are normally silent. Try the test listed below.

Make sure the rightmost silver toggle switch is in the TUNING position. Some notes are silent in the STRINGS position. See the test below.

Turn off, wait 5 seconds, then turn back on. The little computer can become confused if switched off and then right back on without a pause.

This is normal. Some combinations of switches produce no sound. For details, see the Metronome Operation section.

Turn the metronome tempo knob a tiny bit one way or the other.

Turn the volume up. Move toggle switches to up position. Remove remote mute cable and audio output cable.

Above 100 beats per minute, only even numbers are available. Above 180, the tempos change in increments of 4.

Put the mode select toggle switch (6) up to the TUNING position. Turn the tuning note selector (8) to "F". Turn it ON with the volume control mark pointing up. You will briefly see the selected reference pitch (usually 440) in the display, then F. The red light will be on and you will hear an F tuning note at a moderate volume. Rotate the tuning note selector and you will see and hear all 12 of the notes. Put the mode select toggle switch to STRINGS. You will hear a low E. Rotate one click counterclockwise and then back to E. You will hear a high E. Rotate counterclockwise and you will hear only D, C, A, and G.

Put the mode select toggle switch in the middle position (off). Rotate the tempo knob (4) all the way left and right. Tempo will change from 30 to 220. With the note selector on F, you will hear the metronome if any of the x1, x2, x3, and x4 switches is put up or down. If x1, x2, x3, and x4 are all off, it will go silent.

9 If it passes all of these tests the circuits are OK. **See Metronome Operation.**

Limited Warranty

McAdams Instruments warrants the Model 20 series Metronomes to be free from defects in material or workmanship for a period of one year from the date of the original retail purchase. In the event of a failure during this time that is attributable to faulty workmanship or material, McAdams Instruments will repair or replace components to the extent deemed necessary to restore said Model 20 series metronome to proper operating condition at no charge for parts or labor.

This warranty does not cover repairs made by any party other than McAdams Instruments or damages that, in the opinion of McAdams Instruments, are the result of abuse or neglect.

All implied warranties, including warranties of merchantability and fitness for a particular purpose are hereby limited to the period of one year from the date of the original retail purchase. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

McAdams Instruments assumes no liability in any event arising from the use of whatever technical information may be supplied to any party.

McAdams Instruments assumes no liability for any damages resulting from delay or loss of use in repair or for incidental or consequential damages caused by malfunction, defect, or otherwise, and with respect to breach of any express or implied warranty. Furthermore, to the extent permitted by law, McAdams Instruments assumes no liability for any damages or bodily injury that may result from the use or misuse of its products by the purchaser or others. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.

McAdams Instruments reserves the right to discontinue models at any time, or to change specifications, price, or design without notice and without incurring any obligation.

This warranty gives you specific legal rights and you may also have other rights that vary from state to state.

This warranty is given in lieu of all other express warranties.