

MUSSEER

A DIVISION OF THE SELMER COMPANY, INC.

We at Musser want to thank you for selecting one of our percussion instruments. Generations of **American Craftsmanship**, Knowledge and pride go into each and every **Musser Product**.

In Striving to offer the highest quality instruments and service in meeting your musical needs, we ask that you please complete both the Registration Form, and our Customer Satisfaction Survey.

If you are pleased, **tell everyone**; if you are not, **please let us know. WE WANT TO KNOW.**

Thank you,

All Employees
Musser Division
The Selmer Company

SPECIFICATIONS FOR MUSSER "PLUS ONE" GRAND SOLOIST



MODEL NUMBER: M450

NAME: "PLUS ONE" GRAND SOLOIST

KEYBOARD SPECIFICATIONS:

RANGE: 4-1/2 Octaves +1 Note- 57 Notes - E2 TO C7
Keyboard height is adjustable from 35-1/4" to 39-1/2".

BAR SIZES: Length of lowest note 19" graduating down to 7-5/8" highest note.

<u>WIDTH AND THICKNESS:</u>	E2 to G#2	3-1/4" wide by 1" thick
	A2 to C3	2-7/8" wide by 1" thick
	C3# to F3	2-1/2" wide by 15/16" thick
	F3# to C4	2-1/4" wide by 15/16" thick
	C4# to C5	2" wide by 15/16" thick
	C5# to C6	1-3/4" wide by 7/8" thick
	C6# to C7	1-5/8" wide by 3/4" thick

MATERIAL: High grade rosewood.

FINISH: Painted with clear lacquer and hand rubbed. The ends of all sharp bars on player side are fully rounded.

RESONATOR SPECIFICATIONS:

MATERIAL: High grade light aluminum alloy tubing.

FINISH: Highly durable copper vein electro-static finish.

CONSTRUCTION: Braces shall be 1/8" thick steel fastened with screws and locking nuts to aluminum resonators. Resonators are hinged to fold with a detachable low end section and are solidly braced to eliminate any sag. The E2 through C3 range is tunable.

ENDS OF INSTRUMENT: The end supports and rails are made of selected hardwood and hand stained to a piano type finish. 37" wide x 34.5" tall x 98-1/4" long.

MADE IN THE U.S.A.

Weight is approximately 260 lbs.

ASSEMBLY INSTRUCTIONS FOR THE M450 GRAND SOLOIST MARIMBA

Note: Due to the great size, weight, cost and beautiful finish on your Grand Soloist Marimba, great care should be taken when assembling and moving the instrument.

CAUTION!!!

Lay Resonators flat on the floor. If Resonators are rested on the open mouths of the tubes, they may fall over. If you must rest the Resonators up side down on the open mouths of the tubes, make sure the two hinged halves are left at a 45 to 90 degree angle for stability.

Wash your hands with soap and water and dry thoroughly before handling the Keyboard. See "Care and Maintenance" #1 for further information.

Do not over tighten the rail brackets! See "Care and Maintenance" #2 for further information.

ASSEMBLY INSTRUCTIONS

1. With Casters locked, attach High End half of Crossbar to High End Board. (Pull Pin down on Crossbar and push into End Board receptacle until holes are aligned; release Pin upward through both holes.) Unlock Casters and rest End Board on angle with Crossbar touching the floor.
2. With Casters locked, attach Low End half of Crossbar to Low End Board (as above). Unlock Casters on Low End Broad. Join High and Low halves of Crossbars in center. See Figure A.

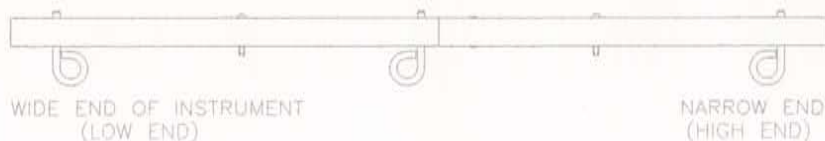


FIGURE A

3. Attach Diagonal Braces and secure Wing Nuts. Braces are not identical and are therefore marked for High and Low Ends. Height adjustment will not work smoothly if these Braces are installed on wrong ends or not tightened properly. High End is the Narrow End; Low End is the Wide End of the instrument.

4. Note hole at the bottom end of each rail. Note small Pin in each Rail bracket on End Boards.
5. Unfold Rail #2 and align Holes in Rail with Pins in Bracket on End Boards. (Rails are numbered 1 to 4 from player to audience.) When aligned, push on Rail directly above Pin to seat Rail in bracket. Rails will fit High and Low brackets firmly. Tighten Screw lightly with Torque Wrench to snug up Rail to Rubber on bracket. See Figure B.



FIGURE B

6. Repeat Step 5 with Rail #3. Insert short metal Bar Brace located under Rail #2 into receptacle located under Rail #3. Rails #2 and #3 are not connected.
7. Unfold Plain Scale Resonators and lock open with Pivoting Latch.
8. Place Low End of the two metal Resonator Support Strips into deep set of Rubber Slots located on Low Height Adjustment Plate. Place High End of two metal Resonator Support Strips into Rubber Slots located on High Height Adjustment Plate. (The shallow set of slots on the Low End are for high temperature and high humidity conditions. See section on Tuning for further information.)
9. Repeat Steps 7 and 8 with Sharp Set of Resonators.

10. Repeat Step 5 with Rails #1 and #4, taking care to fit Metal Braces on these Rails into receptacles on Rails #2 and #3. Rubber Bumper fits inside the Metal Resonator Support Strip, next to the 'G' Sharp and 'A' Resonator Tubes. See Figure C.

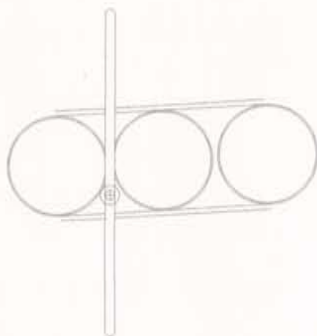


FIGURE C

11. With Turnbuckle Assembly fully loosened, carefully place Natural Bars on instrument. Tighten Turnbuckle to taste. Repeat with Sharp Bars. **When packing the Bars for transport, loosen the Turnbuckle, place a blanket or packing foam over entire length of Keyboard, and roll the Bars snugly into material, from Low End to High. When unpacking, place highest bar near its proper position, and unroll Bars from top to bottom so that blanket or packing material ends up on top of Keyboard.** This procedure minimizes the risk of scratching the tops of the bars.

Your new instrument is guaranteed against defects in workmanship and material through normal use. Please use good judgement in selecting your mallets. Use of brass or steel ball mallets will nullify the guarantee. Do not use acrylic or lexan mallets on wood keyboards.

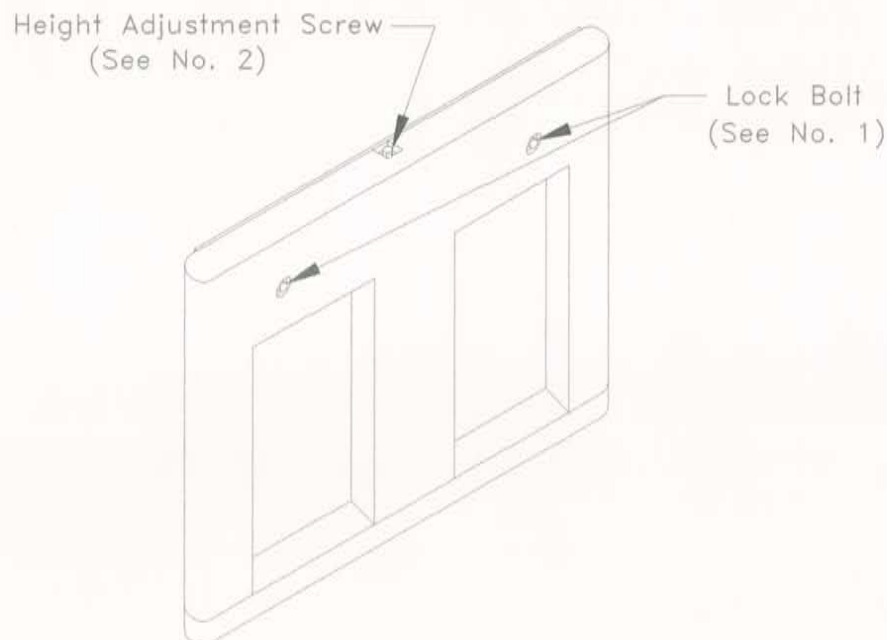
OPERATION OF THE HEIGHT ADJUSTMENT

1. Use special cranks, supplied with unit, to loosen the four locking bolts recessed on the outside of the two end frames.

CAUTION!

Locking bolts must be loose or damage to the height adjustment screw will result.

2. To raise or lower height, turn height adjustment screw recessed into top of end frame. Clockwise motion raises, counterclockwise lowers end plates. Do not raise or lower one height adjustment plate more than 1 to 1-1/2 inches without compensating on the other end. This may cause the height adjustment plate to bind against the end frame. Both ends can be adjusted up or down simultaneously by two people to the desired height required for the player.
3. When height adjustment plates are at lowest settings, height adjustment screw could rattle if it is left loose. To prevent this, put slight pressure on the screw by turning $\frac{1}{4}$ turn clockwise after the lowest point is reached.
4. **Always retighten the four lock bolts** when the desired height is reached.
5. When raising or lowering the adjustment plates, the keyboard must be kept as level as possible. This may require applying slight hand pressure to one side of the plate to balance the keyboard evenly.



CARE AND MAINTENANCE OF YOUR M450 GRAND SOLOIST MARIMBA

To maintain the tuning, appearance, tone and sturdiness of your M450 the following guidelines should be followed.

- 1.** *Never touch the keyboard with your hands.* The lacquer protecting the bars can be destroyed in a few years by oils and acids. Therefore, do not lean on the keyboard when checking the music or turning pages. Do not tap bars to check pitches or allow concert goers to touch your keyboard. *Always wash your hands with soap and water, and dry thoroughly before setting up or packing the keyboard. A pair of clean cotton gloves may be used in lieu of soap and water.*
- 2.** *Do not over-tighten the 'drum key screws' on the rail brackets!.* These screws are meant to 'snug-up' the rail to the rubber covered bracket only. Turn this screw with supplied torque wrench just until you see the rail start to compress the rubber bumper. When you begin to feel resistance, stop. The rail will stay in place even if this screw is loose. If there is any sound coming from one of the rail end board junctions, tighten that screw 1/4 to 1/2 turn. Loosen before re-moving rails for travel.
- 3.** Clean your bars with a soft cotton cloth. *Do not wax or use lemon oil. Wax and oil leave a coating, which could shorten the ring or flatten the pitch.* If you are unable to remove a blemish with a soft, dry cotton cloth, use a very small amount of a non-wax dusting spray.
- 4.** You may treat the frame like any piece of fine furniture. Fingerprints should be wiped off with a soft cloth. Spray or paste wax may be used on the frame, being careful not to touch the bars with the same cloth.
- 5.** When rolling the M450 over high door thresholds, ramps, or other inclined surface, raise the height adjustment plate one or two inches and secure all four locking bolts before moving. This increases the ground clearance under the lowest resonators. *Do not adjust one end plate more than 1 to 1-1/2 inches without making the same adjustment to the other end plate. This could cause the height adjustment plate to bind against the end board. If two people are available, adjust both ends at the same time.*
- 6.** *Twice a year:* Clean the inside of the resonator tubes with a vacuum. Lint from yarn mallets will build up in the tubes, reducing volume. Apply a few drops of light motor oil (such as 3 in 1 household oil) to the threads of the tunable resonators. Turn the cap until about 1/2" of thread is showing and apply a few drops of oil to the thread. Screw the cap *in* part way to work the oil onto the rest of the threads. *Be careful not to unscrew the cap completely out of the tube.*

TUNING YOUR MUSSER M450 RESONATORS

Aural Illusions

Before we discuss how to adjust the patent pending tuning caps on your M450, you should be aware that all marimbas are subject to a few strange acoustical phenomena that occur in certain rooms that can confuse even the most attentive and well trained ears. You may have already noticed these peculiarities on some other marimba. Consider these sounds to be the equivalent of optical illusions (“aural illusions?”).

A typical teaching studio or home music room will have unpredictable effects on an instrument like the marimba. The distance of the resonators to the ceiling, the distance to the side walls, the distance between the side walls and the sound absorbing properties of all the surfaces have a tremendous effect on the tone, decay and volume of each note. Sometimes a note will seem to have very little volume compared to its neighbor (a result of “standing” or “stationary” wave forms), but moving your head a foot or two one way or another eliminates the problem completely. The first thing to do when you hear something odd is to move the marimba three feet or so to a different location in the room. If the results are the same, stand on the audience side of the keyboard and listen to the same note.

Moving your ears or the marimba around the room will usually eliminate most of the problems caused by the geometry of a small room. It will do nothing to mitigate the effects of acoustic ceiling tile, carpeting on the floor or mysterious buzzes coming from lighting fixtures, filing cabinets or windowpanes. Do not expect as powerful a tone and resonance in a room covered with sound absorbing materials.

The best place to listen to a marimba, of course, is in a good concert hall. Most of the oddities caused by small room acoustics will be eliminated in a good hall. An auditorium with a 2 to 3 second reverberation time and solid reinforcement of all registers is ideal for performance and critical listening.

Tuning vs. Balancing

We do not really “tune” the marimba in the same sense that a harp, piano or violin is tuned. We are not concerned with the absolute pitch of the resonator, as we are the relationship of the pitch of the resonator to that of the bar. In fact, we do not even tune the resonator exactly to the pitch of the bar. As we will see, the tone is usually the best when the pitch of the resonator appears to be slightly above that of the bar.

What we are really doing when we tune the resonators is balancing the timbre, volume and sustaining qualities of the instrument. Wooden keyboard percussion instruments are particularly finicky in terms of their tone quality. One reason for this is each marimba bar is unique. The grain of the wood, its density and elasticity, and therefore much of the tone quality are the results of nature. Only man controls the actual tuning (pitch) of the bar.

Weather and Pitch

An even more important reason that the tone of a marimba varies more than other instruments is the fact that the two vibrating systems, bar and resonator, do not react to temperature and humidity changes in the same manner. The bars react to high temperature and humidity by expanding and thus going flat. While there is a certain amount of expansion of the resonator tubes in hot weather, this slight flattening of the pitch is overshadowed by another factor.

“The pitch of the resonator follows the temperature”.

The speed of sound increases as the temperature rises. As a result, a column of air of fixed length sharpens as the temperature rises. A way to visualize this is to imagine that the sound waves are making their round trips through the resonators more quickly, and so their frequency increases.

Basic envelopes

The audible “shape” of the sound (the attack, after ring and decay time) is called the “envelope” of the sound. This envelope is one of the main things you listen for when adjusting resonators. When the bar and the resonator are in the proper relationship to one another, the tone will be full; rich in fundamental, and the ring of the bar after the attack will decay smoothly.

If the temperature gets too warm, the resonator will be too sharp to the bar.

This results in the tone sounding “woofy” and the decay time being too short.

If the temperature gets too cool, the resonator will be too flat to the bar.

This results in the tone sounding thin and weak. It will lack in fundamental and the decay time will be long, but most of the after ring will be too soft to be heard.

There are as many possible envelopes as there are individual marimba bars. As you gain more experience with tuning resonators you will begin to hear certain categories of symptoms of out of tune resonators. In time, you may even become more aware of changes in temperature and be able to predict how the instrument will sound from your impression of the room conditions.

When to tune

Musser percussion instruments are tuned to sound their best at “normal” room temperature (72°f) and a moderate humidity level (50%). Most players will not hear any serious deviations in resonator response down to 68°f and up to 74°f. The M450 has a 6° range in which all but the fussiest players will be happy with a medium setting of the resonator tuning caps.

If your marimba is kept in an institutional setting where the temperature and humidity are kept constant, there may be little need to adjust the resonators. After you have found the settings that you prefer for the stable conditions in your building, you can virtually forget that the tuners are there.

Since each bar is unique you may find that certain notes need more or less adjustment than others. **Do not assume that your instrument will sound its best when all of the adjustable caps are equally extended.** This will rarely, if ever be the case.

Tune a resonator when you hear one of the four following conditions:

The envelope of a note is too short,

The envelope of a note is too long,

Overall fundamental or volume is too soft compared to next note.

Overall fundamental or volume is too loud compared to next note.

In high humidity or temperature conditions you may improve the sound of your marimba by using the shallow rubber slots in the low-end resonator support. Before taking the trouble to remove the bars and change position, raise the low end of the resonator by the two support strips up about 1/2". If you prefer this sound, change the low end of the resonator to the shallow slots.

How to tune

Turning the tuning caps clockwise sharpens the pitch of the resonator.
Sharpen the resonator to increase the volume.

Turning the tuning caps counter-clockwise flattens the pitch of the resonator.
Flatten the resonator to increase the length.

Each complete turn moves the cap 1/24th of an inch. Since the volume of air in the lower resonators is greater than the upper, the lower notes are less sensitive to the tuners than the upper notes. A keen ear may be able to hear a slight change after one turn of the tuning cap on the "F" below middle "C", but no change will be heard on the bottom few notes until several revolutions have been made.

The adjustable tuning cap has a range of about 3/4 of an inch. The "normal" position for the cap is with about 3/8ths of an inch of threads showing, this is about half way. Individual bars and personal taste may affect the normal position by 1/8th of an inch or so in either direction.

**HOW TO OBTAIN MALLETS,
REPLACEMENT PARTS, OR SERVICE**

CONTACT YOUR LOCAL LUDWIG/MUSSER AUTHORIZED DEALER. THE DEALER WILL CONTACT OUR DEALER SERVICE DEPARTMENT TO ASSIST YOU.

IF YOU CANNOT LOCATE AN AUTHORIZED DEALER, PLEASE CALL 219-522-1675 AND ASK FOR DEALER SERVICE.

WE CAN ALSO BE REACHED ON THE INTERNET AT [HTTP://WWW.LUDWIG-DRUMS.COM](http://www.ludwig-drums.com)

VISIT OUR LUDWIG/MUSSER WEB SITE ON THE INTERNET

<http://www.ludwig-drums.com>

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- Drum Outfit
- Marching
- Mallet Instrument
- Total Percussion

Promotional Items

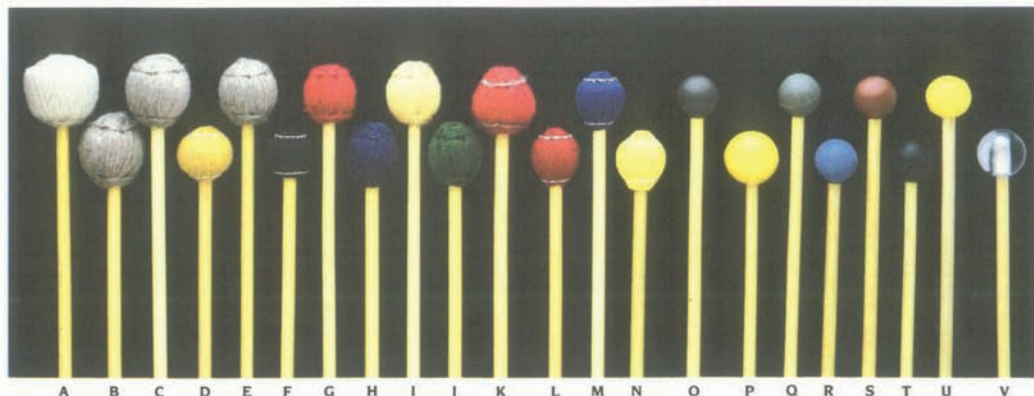
- Catalogs/Brochures
- Posters
- Wearables

What's New

- Press Releases of New Products
- Percussion Events

Dealers

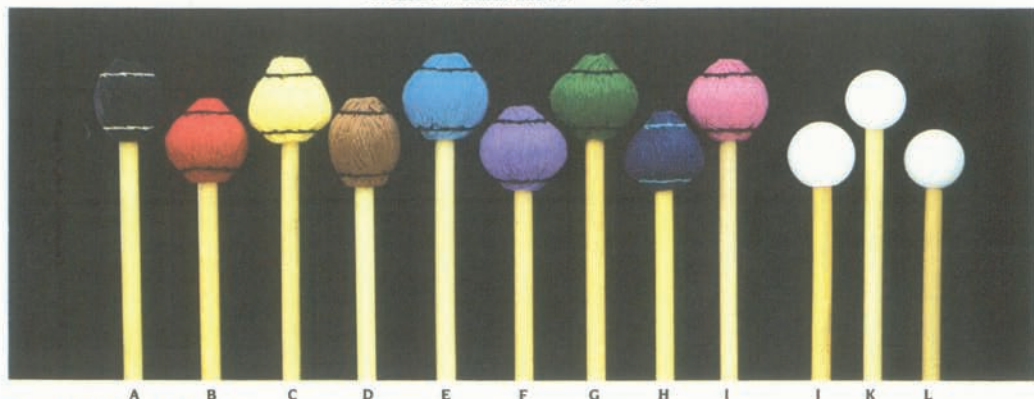
- USA by State
- Canada by Province
- International Distributors



Rattan Handle Mallets

These high quality mallets feature select rattan handles. Rubber heads are hardness-graduated for a wide selection of tonal responses. Finest grade cord or yarn is used on covered mallets. Each mallet is carefully matched and balanced for flex, weight, and size. Packed in clear-view vinyl cases. The professional Gary Burton Signature Mallets (M-220, M-221) are crafted to his personal specifications.

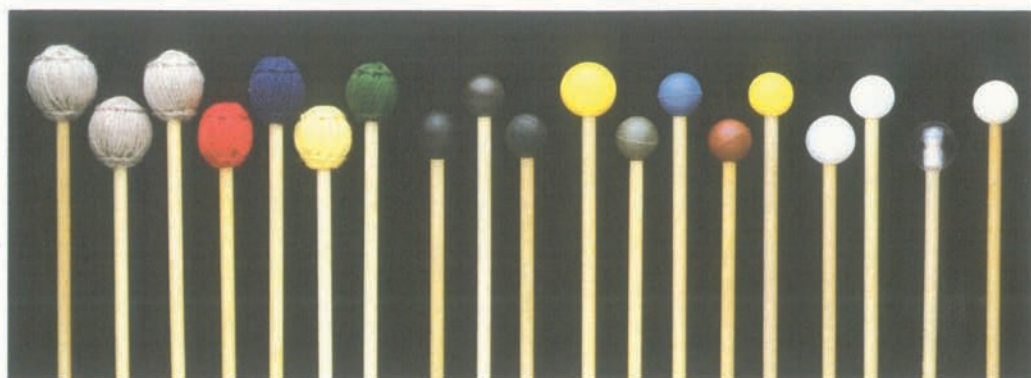
Description	Model No.	Description	Model No.
A. Yarn 1 1/8", Very Soft, Natural (M)	M-204	N. Cord 1", Soft, Yellow (V)	M-218
B. Yarn 1 1/8", Very Soft, Gray (M)	M-223	O. Phenolic 1", Hard, Brown (B, X)	M-215
C. Yarn 1 1/8", Soft, Gray (M)	M-210	P. Rubber 1 1/8", Medium Soft, Yellow (M)	M-205
D. Yarn 1 1/8", Medium Hard, Gold (M, V)	M-221	Q. Rubber 1", Hard, Gray (B, X)	M-214
E. Yarn 1 1/8", Soft, Gray (M)	M-209	R. Rubber 1", Medium Hard, Blue (M, B, X)	M-213
F. Yarn 1 1/8", Soft, Black (M, V)	M-220	S. Rubber 1", Medium, Red (M, X)	M-212
G. Yarn 1", Hard, Red (M)	M-206	T. Rubber 1", Medium Soft, Black (M)	M-224
H. Yarn 1", Medium, Blue (M, V)	M-207	U. Rubber 1", Soft, Yellow (M)	M-211
I. Yarn 1", Medium Soft, Yellow (M)	M-208	V. Lexan 1 1/8", Very Hard, Clear (B, X)	M-203
J. Yarn 1", Soft, Green (M)	M-222		
K. Yarn 1", Soft, Red (M)	M-219		
L. Cord 1", Hard, Red (V, X)	M-216		
M. Cord 1", Medium, Blue (V)	M-217		



Good Vibes Mallets

Good Vibes are recognized as the world's finest professional mallets. Handles are choice light rattan, carefully selected and matched for size, weight, and flex. Select premium yarn is wound around a solid, specially formulated and shaped rubber core, then carefully hand-stitched. Packed in clear-view vinyl cases.

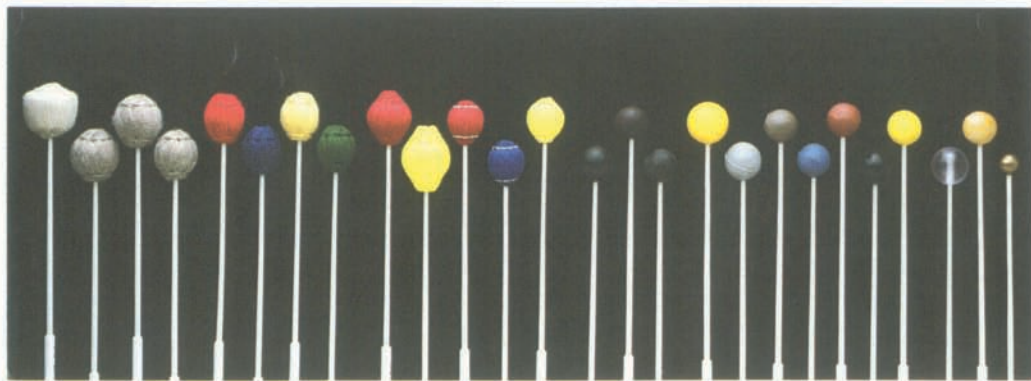
Description	Model No.	Description	Model No.
A. Yarn 1 1/8", Hard, Black (X)	M-232	G. Yarn 1 1/8", Medium Hard, Green (V)	M-239
B. Yarn 1 1/8", Hard, Red (V)	M-236	H. Yarn 1 1/8", Medium Soft, Navy Blue (M, V)	M-228
C. Yarn 1 1/8", Medium Hard, Yellow (M, V)	M-229	I. Yarn 1 1/8", Medium Soft, Pink (V)	M-233
D. Yarn 1 1/8", Medium Hard, Brown (X)	M-231	J. Poly 1 1/8", Medium Hard, White (B, X)	M-226
E. Yarn 1 1/8", Medium Hard, Royal Blue (V)	M-235	K. Poly 1", Medium Hard, White (B, X)	M-225
F. Yarn 1 1/8", Medium Hard, Violet (V)	M-237	L. Nylon 1", Hard, White (B, X)	M-227



Birch Handle Mallets

For the mallet player who wants a straight, but firmer, wood handle mallet. Precision matched for balance, these mallets come with rubber, plastic, or yarn heads. Packaged in clear vinyl cases.

Description	Model No.	
A. Yarn 1 1/8". Very Soft, Gray (M)	M-412	K. Rubber 1 1/2", Medium Soft, Yellow (M)
B. Yarn 1 1/2", Soft, Gray (M)	M-410	L. Rubber 1", Hard, Gray (B, X)
C. Yarn 1 1/8", Soft, Gray (M)	M-409	M. Rubber 1", Medium Hard, Blue (M, B, X)
D. Yarn 1", Hard, Red (M)	M-406	N. Rubber 1", Medium, Red (M, X)
E. Yarn 1", Medium, Blue (M, V)	M-407	O. Rubber 1", Soft, Yellow (M)
F. Yarn 1", Medium Soft, Yellow (M)	M-408	P. Poly 1 1/8", Medium Hard, White (B, X)
G. Yarn 1", Soft, Green (M)	M-411	Q. Poly 1", Medium Hard, White (B, X)
H. Phenolic 1 1/8", Hard, Black (B, X)	M-424	R. Lexan 1 1/8", Very Hard, Clear (B, X)
I. Phenolic 1", Hard, Brown (B, X)	M-405	S. Nylon 1", Hard, White (B, X)
J. Phenolic 1", Hard, Black (B, X)	M-428	



Two-Step Handle Mallets

Musser's exclusive two-step fiber-glass handles are thick near the end for well-balanced handling and thin near the head for strong striking force. Excellent flexibility, yet highly warp resistant. All mallets precision matched for balance. Available in a wide variety of graduated rubber, plastic, metal, and wood balls as well as cord or yarn-covered balls. Packaged in clear vinyl cases.

Description	Model No.	
A. Yarn 1 3/8". Soft, Natural (M)	M-19	P. Phenolic 1", Hard, Black (B, X)
B. Yarn 1 3/8". Very Soft, Gray (M)	M-12	Q. Rubber 1 1/2", Medium Soft, Yellow (M)
C. Yarn 1 1/2", Soft, Gray (M)	M-10	R. Rubber 1 1/8", Hard, Gray (B, X)
D. Yarn 1 1/8", Soft, Gray (M)	M-9	S. Rubber 1", Hard, Gray (B, X)
E. Yarn 1", Hard, Red (M)	M-6	T. Rubber 1", Medium Hard, Blue (M, B, X)
F. Yarn 1", Medium, Blue (M, V)	M-7	U. Rubber 1", Medium, Red (M, X)
G. Yarn 1", Medium Soft, Yellow (M)	M-8	V. Rubber 1", Medium Soft, Black (M)
H. Yarn 1", Soft, Green (M)	M-11	W. Rubber 1", Soft, Yellow (M)
I. Cord 1 1/2", Medium Hard, Red (M, V)	M-27	X. Lexan 1 1/8", Very Hard, Clear (B, X)
J. Cord 1 1/2", Medium, Yellow (M, V)	M-29	Y. Wood 1", Hard, Maple ()
K. Cord 1", Hard, Red (V, X)	M-16	Z. Brass 3/8", Very Hard, Gold (Steel Bells)
L. Cord 1", Medium, Blue (V)	M-17	
M. Cord 1", Soft, Yellow (V)	M-18	
N. Phenolic 1 1/8", Hard, Black (B, X)	M-24	
O. Phenolic 1", Hard, Brown (B, X)	M-5	

USAGE CODE: V = Vibraphone, M = Marimba, X = Xylophone, B = Bells