



MEGABYTE Mark I Rig: This is a guide to adjusting and really getting the most from the sail

First, you need to sail the boat flat as flat is fast. Also, *do not try to over-trim the boat to windward, as the boat will slow down quickly if you over-trim or pinch. If there is a chop you must fall off a few degrees and go for speed. Typically, you want to trim the boom so that it aligns (or points to) with the aft, leeward corner of the boat's stern.*

Second, keep your weight forward – sit adjacent to and slightly forward of the traveler in light air, medium air, or when sailing downwind. If you look at your wake you can see if the stern is dragging – experiment by moving aft and forward. You want to keep the stern out as much as possible unless you are planning, then dig it in for stability.

Third, use the three (3) control lines (Cunningham, Outhaul, Vang) – much of the time. In a puff/gust of wind, adjusting the mainsheet can/should be your primary control to depower the sail. The **Cunningham** is the first control line you will use and you should use it frequently assuming the outhaul is set correctly. *Play the Cunningham in the puffs and gusts as the MB really responds to these adjustments.* The Cunningham is a powerful adjustment to the sail shape and can make a considerable difference in boat speed. The Cunningham is the first go-to adjustment after the mainsheet. Care must be taken because too much tension in the luff of the sail, due to Cunningham tension, will pull the mainsail air flow forward (depowering the sail) so experiment with leaving a few wrinkles along the luff. – depending on the wind pressure, your weight, and the need to work at keeping the boat flat.

Once the Outhaul is set you can leave it unless the wind velocity changes.

The mainsheet changes the sail shape dramatically and can reduce/induce depth as well as twist. In a gust, the technique found helpful is to ease about 6" – 12" of mainsheet, hang out, and then tighten the mainsheet as the gust decreases – all this while using your weight to best advantage to keep the boat flat. It's a process of almost continuously playing the mainsheet, adjusting your body weight and position, and tweaking the tiller (for adjusting sailing angle) – you're adjusting power in the sail and power in the boat. With the mainsheet tightened in you can point higher (watch your tell tales carefully here!) and as soon as you hit a lull, ease the mainsheet slightly and bear away a little to keep your speed through the water. *Remember, you also need to keep the upper leach at the top of the sail open enough so the sail maintains flow. That's really important.*

Traveler: Does/can the traveler play a role in sail trim? Most definitely! And it can/should be used in tandem with the Vang. The role of the traveler increases as wind pressure increases. In light air, position the traveler at the midline of the hull, pull the mainsail in (pointing at the leeward corner of the transom) and snug up the Vang. As wind pressure increases you can move the traveler to leeward before pulling in the mainsail. This will place more downward force on the boom (& sail)

Using the Traveler (single traveler car or 2 traveler cars+bridle)

Effective use of the traveler necessitates that the ends of the lines attached to the traveler car (or attached to each traveler in the case where 2 traveler cars and a bridle is used) should be tied together. This simple arrangement enables the skipper to have full control of the line from the windward side of the boat – especially when the skipper has forgotten to release the traveler line on the leeward side of the boat.

- In light winds it is typical to keep the traveler car cleated in the centerline of the boat.
- However, as wind pressure increases it is very helpful to release the leeward traveler line just before commencing to tack. This procedure will result in the traveler car sliding to the leeward side of the boat after the tack. That leeward position is optimal for tuning the mainsail prior to moving the traveler away from the leeward side of the boat. When the traveler car is moved away from the leeward side of the boat the skipper will experience acceleration on the new tack. The positioning of the traveler car on the traveler rail relative to the windward and leeward sides of the boat is mentioned elsewhere in these notes – some experimentation may be needed to appreciate the effect of the traveler car being in different positions.
- Should you have 2 traveler cars and a bridle configuration, all the above applies. However, the difference is found in the angle of the mainsheet block attached to the bridle vs. when the same block is attached to the traveler car (the angle is more obtuse in the latter). The consequence of the bridle is that the skipper has an additional variable that can be used to tune sail shape: changing the angle of the force generated by the mainsheet on the boom. In the bridle situation the same downward force results when the traveler cars are both on the leeward side of the boat. However, when the windward traveler car is moved towards the windward side of the boat, the angle of the mainsheet relative to the boom changes a lot more than when a single traveler is used. This is because the bridle places the bottom block of the mainsheet at a more acute angle to the horizontal, than can be achieved via the single traveler car. This variable can be used in both heavier air pressure and light air pressure. Being able to provide a more horizontal force on the boom (after completing a tack & tuning the sail with the traveler in the leeward position) can help the skipper to avoid distorting the sail shape (tuning).
- The value of the 2 traveler cars+bridle is true for the MK II rig as well as the MK I rig.

Sail Twist

Due to friction over the water, windspeed is typically less at the base (foot) of the sail than at the head of the mast. Consequently, the head has to accept increased wind. The result is that the apparent wind at the head is further aft than the wind at the base. The need for sail twist is therefore evident. A good guide is:

- *Too little twist and the leech is closed and airflow stalled*
- *Too much twist and the leech is open, losing power*
- *With the correct amount of twist the sail telltales are streaming and max power is obtained*

Tell-Tales

With modern harder finishes the MB sail is less sensitive so tell-tales are an essential guide in indicating the status of the airflow over the draft of the sail and consequently whether the boat is being sailed too high or too low.

When a boat is being sailed correctly upwind, both the windward and leeward luff tell-tales will stream aft horizontally. 'Pinching' results in the windward luff tell-tales lifting upwards. If the leeward tell-tales lift, you will be sailing too low.

Leech tell-tales are also fitted to the mainsail normally at the batten pockets. Their purpose is to indicate the air flow over the leech area of the sail, enabling the skipper to adjust mast bend with the Cunningham, Vang and mainsheet tension (remember the role of the traveler for setting the initial tension in the leech, in conjunction with snugging up the Vang) for optimum pointing ability and maximum speed when beating.

Batten Adjustment

The upper, full-length batten should have very little tension on it via the tensioning system at the end of the batten. Too much tension and the top of the sail will struggle to invert when changing tack. This low tension setting is especially important in low wind pressure conditions. The newest MK I sails (made by MAD Sails) does not use the full-length top batten (that batten is now shorter).

Hiking Straps

Adjust the hiking -straps to allow straight-leg hiking. Your hiking should focus on keeping the boat as near flat as possible – aided by adjusting the Cunningham, and outhaul.

If you are finding your boat speed is off – consider easing all your settings off a tiny bit to gain boat speed. Boat speed will give you height (better pointing) and improved maneuverability to get in and around the course, especially if there is chop.

Here's a breakdown of typical settings for the MB (note these will change with body weight and chop):

Light Air (Up to 10 knots):

- Cunningham (Downhaul): Snug, with slight wrinkles from mast joint to clew.
- Outhaul: Loose, foot should be about one-hand's length (about 6") from the center of the boom (creates good draft/aerofoil shape in the sail) [Note that the Cunningham plays an even more important role in the MK II rig because the upper mast section is even more flexible and is even more easily flexed via the Cunningham, than in the MK I rig].
- Mainsheet: Move the traveler to windward and keep the leech tension loose. You want twist. My guide is to keep the top batten parallel to the boom. Practice with a partner that can get behind your boat and let you know when the top batten is parallel so you can mark your mainsheet and train your eye. Remember you want to keep the leech open and not tight.
- Vang: Snug up the Vang AFTER you've adjusted the Cunningham and Outhaul and have set/tuned the mainsheet tension (using the traveler).
- Draft (curvature) of upper part of sail: Picture the draft of the sail at the first batten/sail seam – imagine the draft is balanced – 50%:50% on either side of the mid-point of the draft of the sail. This is the optimum draft of the sail in light air – it facilitates air movement over the sail.

Body weight

- Upwind: Body weight centered slightly forward of the mainsheet block.
- Reaching: Same, slightly aft.
- Downwind: As far forward as possible without feet leaving the cockpit. Heel the boat as necessary.

Medium Air (10 to 18 knots):

- Cunningham: Enough to smooth out the wrinkles between clew and mast joint. Slightly less in chop, if you're not overpowered.
- Outhaul: Slightly less than one-hand's length (4"-5") from center of boom. Marks on the boom for the becket block help make this setting consistent.
- Vang: Tighten the vang in relation to the power in the sail plan: If overpowered, have enough vang on to prevent the mainsheet from going up when you ease the mainsheet. If not overpowered, have it snug to taught (not overly tight).
- Mainsheet: Mainsheet traveler is initially on leeward end of traveler rail. Use mainsheet to set the leech tension. Then move the traveler towards the midline to pull the boom in towards the leeward corner of the transom. This is the most efficient sequence for developing optimum form/shape of the sail. Easing the mainsheet will add more power

unless you have sufficient boom vang on. The draft of the upper part of the sail (at first batten below full-length batten)Your draft position will be at 50% or slightly more.

- Draft (curvature) of upper part of sail: Picture the draft of the sail at the first batten/sail seam – imagine the draft is balanced – 50%:50% on either side of the mid-point of the draft of the sail. In medium wind (air pressure) the draft of the sail will tend to move slightly back to the leech (55:45). Tighten the Cunningham to move the draft forward (45:55). This will help to depower the upper part of the sail. If more depowering is needed, tighten the Cunningham a little more. Drop the traveler to the leeward end, use the mainsheet to tighten the leech, then pull the traveler back up to the midline/to windward to pull the boom back to the leeward corner of the transom. Watch the telltales to guide you regarding achieving good airflow over the sail in the decreased draft state (due to tighter foot via Outhaul, and decreased draft at top of sail).

Body weight

- Upwind: Body location should be at the widest point of the boat (at/slightly behind the traveler). You should be in a hiking position, legs near straight - to keep the boat flat (adjust the length of the hiking straps to enable near-straight legged hiking. Adjust the horizontal position of the hiking straps according to leg length).
- Reaching: Body angled back from feet (~45 degrees), move further aft (back) as you start planing.
- Downwind: Straddle the centerboard until planing, then move aft as necessary (to improve stability).

Heavy Air (18 to 30 knots):

- Cunningham: Grommet all the way to the boom-enough to smooth out the wrinkles. The draft position should be forward of mid-point of the curvature of the sail, at the first batten (below the top, full-length batten). Before tensioning the Cunningham, the draft of the sail (curvature) will have moved aft. Picture the draft of the sail at the first batten/sail seam – imagine the draft is balanced – 50%:50% on either side of the mid-point of the draft of the sail. In heavier wind the draft moves slightly back towards the leech (60:40 or more). In a high wind and being overpowered, it's typical to tighten the Vang. That moves the draft further aft (towards the leech) and flattens the sail. The Vang does help to depower the sail – but you need to move the draft forward of the mid-point of the sail (line at first batten), by tightening the Cunningham, so that the best aerofoil shape is in place (in high wind) to generate forward power (40:60 from luff to leech) – for boat speed. See the section on Twist so that you can ensure that the leech of the sail is not too tight (too much Vang), preventing the top of the sail from opening up and spilling pressure. The very flexible upper mast section also plays a role in spilling pressure. As it bend due to the force generated on the sail, the mast bends backwards.

This decreases the tension on the leech and so helps to spill pressure – decreasing power in the top of the sail.

- Outhaul: Depends on how much you're overpowered. If so, maxing out the outhaul is necessary. However, if not, 2"-3" at the maximum draft adjacent to the boom, will give some shape.
- Vang: Should be on hard enough so that when the mainsheet is eased, the traveler blocks move away from each other at 45 degrees or less from the cockpit deck. The boom should be trimmed so that it does not lift up at all when easing the mainsheet.
- Mainsheet: Depending on control of the boat and precision of driving, the mainsheet traveler is moved to windward after the boom has been pulled in (to the leeward corner of the transom). Why move the traveler to windward? The resultant force of the mainsheet on the boom is decreased because the angle of the mainsheet is less vertical. The result is that tension in the leech is NOT increased, which enables the upper portion of the sail to twist and spill pressure. This depowers the sail up high. You want to depower especially if you are hiking hard. Keeping the bow a little down (from pinching) and the sail powered up reduces stalling and sideways movement - easing the mainsheet a little will help to keep the boat powered up and you in control of the power status in the sail and in the boat.

Body weight

- Upwind: Body should be adjacent to the traveler (at the widest point of the boat's width). Adjust length of front pair of hiking straps just behind the traveler, so you're your legs can be close to being straight (good for managing strain on your lower back, and also helps you to have maximum outward reach when hiking).
- Reaching: Move body aft so that you're closer to being adjacent to the end of the tiller. Angle your body aft. In higher winds you can move even further aft – all this move aft helps to raise the bow, enabling the boat to plane.
- Downwind: Position your body so as to enable the stern to lift slightly out of the water (watch the wake and note when the wake is the calmest – that's a good body position. When sailing downwind in higher wind and especially in swell/waves, you will need to move your body backwards and forwards to adjust the boat's angle in the water, while also trying to take advantage of wave surfing opportunities. It's all an art (and science) to achieve maximum boat speed.

EXTRA TIPS:

Big Sailor in Light Air

- Cunningham: Should be slightly looser than others on average for power and height.
- Outhaul: Likewise, outhaul should stay looser longer as the breeze increases across the range, but not much more than one-hand's length.
- Vang: Vang should be snug at most, until hiking is necessary.
- Body weight: Body should be forward all the time. Center of weight should not be much forward of the mainsheet block, but knees at the block all the time, never aft. Looking to keep the bow knuckle in the water.
- Mainsheet: Mainsheet can be looser, and keeping the bow down for pace is best bet to maintaining VMG (Velocity Made Good).

Small Sailor in Heavy Air

- Cunningham: Should be maxed out.
- Outhaul: Outhaul should be close to maxed out most of the time.
- Vang: See description under Mainsheet. Don't over-tension as the top of the sail needs to twist and spill air pressure.
- Mainsheet: Use to set leech tension (remember to drop traveler to leeward side of traveler rail so that mainsheet tension is exerted on leech). Then snug up Vang. Then move boom to optimal position for beating (pointing to leeward corner of transom). Almost continuous sheeting out and in allows you to keep the bow down and the boat loaded (powered up) sufficiently to prevent stalling. Sheet out between 1 to 2 feet continuously, as wind pressure dictates.

Videos: Ian Bruce has some informational video's that pertain to the Byte II but are applicable primarily to the Mark II rig but have much relevance for tuning the shape of the MK I rig. Bruce designed the MB MK II rig with a Mylar laminate sail, a generous roach, smaller foot and no less than 6 full length Battens. The mast is also constructed in carbon fiber with stiffness in the lower section but with much more taper in the upper section for greater flexibility.

It is interesting how closely matched boat speed is in either rig. Note that the MK II sail cannot be used on the MK I rig.

Playlist of Ian Bruce video on Byte II (info is transferable to MB MK II and I rigs:

<https://www.youtube.com/playlist?list=PLrHdv7q1vD9tj6L8z2sjAzglZruJoAwAd>