

# MIRAGE /KLM

COMMUNICATIONS EQUIPMENT, INC.

*Notes*

KT-34A AND KT-34XA

"FROM THE HORSE'S MOUTH"

VSWR High on Low End of 15M? The tuning of the reflector controls the VSWR on the Low End of each band. The "B" Dimension tunes the 15 meter resonance of each element. Sometimes it is difficult to look at the VSWR curve and determine if the reflector has moved up or down in frequency. Try shortening the reflector "B" Dimension by 1". If the Low End VSWR improves, you can move the "B" Dimension as much as 3 inches without having much effect on 20 meters. If shortening makes the condition worse, then put "B" as long as possible and extend the "D" Dimension up to 2" as required. The "D" Dimension also effects 10 and 20 meters slightly so check for satisfactory VSWR on those bands.

VSWR High on the Low End of each Band? If you have High VSWR on the Low End of each band, check the color of your capacitor caps. If they are black you need to purchase an update kit. This consists of new capacitor tubes and caps. Follow the instructions in the kit and it should correct your Low End VSWR problem. If you already have white or light green capacitor caps and you have Low Band edge VSWR problems, remember, the reflector controls the Low End. Start with 10 meters "C" Dimension on the reflector. Adjust as required to improve the VSWR; 1 to 1½" adjustment should be the most you should change the "C" Dimension. Next check 15 Low End VSWR. If it's still high, adjust the "B" Dimension. The "A" Dimension controls 20 exclusively. Remember, you should not adjust the VSWR if it is poor only pointing the antenna in one or two directions. This indicates a problem outside the antenna created by another structure.

VSWR High on High End of 10M/15M/20M? If you have High VSWR on the High End of all three bands, start your adjustments on 10 meters as correcting 10 will also improve each band. The "C" Dimension controls 10 meters. Usually the High End has moved down slightly so shortening the "C" Dimension by as much as 1 inch may be required. Next check 15 meter High End again. If the VSWR is still High, shorten the "B" 1 to 3 inches as required. Normally, when 10 and 15 are correct, 20 will also be right but if needed the "A" Dimension can be adjusted as necessary.

What does the "A" after the KT-34 and KT-34X mean? About one year after we started making the KT-34 and KT-34X, we changed the boom wall thickness. For upgrade and repair purposes only, we designated the change with the letter "A" after KT-34 and KT-34X so we could ship the correct replacement parts. No tuning, dimension, or other part change is connected with the "A" suffix.

VSWR High when it rains? Several things can cause this. Before blaming the antenna, make sure the feedline is not the culprit. If the feedline is okay, then it may be in the capacitor sections of the antenna. Polyethelene capacitor caps may be cracked or dislodged allowing drops of water inside the capacitor. It only takes one drop to have severe effects on the VSWR. If no caps appear dislodged or cracked, then water may have been blown into one or more of the capacitor vent holes. This usually occurs only if the antenna hangs over the edge of a building or a cliff where high velocity updrafts can occur and drive droplets of water up and into the vent holes. On the older antennas the capacitor tubes had vent holes on the underside to permit drainage. Time and experience has shown that the tubes should not be vented and recent construction has eliminated this feature. Mirage/KLM now provides an update kit with new capacitor tubes and caps.

If water has been blown into the vent holes, the High VSWR condition will usually correct itself in a day or two. If it does not correct itself, it means there may be other problems. If High power was used during the rain, induced High VSWR condition arcing may have ocured inside the capacitor and a carbon path may still exist. Director D1 usually sees the Highest voltage during operation and the arcing will normally occur at the junction of the 10 and 15 meter capacitor tubes near where the "A" straps are attached to the capacitor tubes. This element can be reached and removed from the boom for repair without disturbing the rest of the installation.

VSWR High across 15M; okay on 10 and 20 after rain? This probably means water has seeped inside the 15 meter capacitors. Check for cracked or dislodged capacitor caps. 15 meters has the highest Q elements and therefore is the most sensitive to disturbances. If the antenna is located where high winds can drive moisture into the vent holes of the capacitor caps, you should purchase an update kit to correct the problem.

How close can I stack a 40M beam? 40 meter horizontally polarized antennas usually disturb 15 meters the most because of the harmonic relationship. To minimize this when stacking 40 and 15 on the same tower, orient the 40 meter antenna at a direction 90 degrees from the tribander. Stacking should not be closer than 6 feet with a two element forty and further if 40 is more than 2 elements.

How close can I stack a 2M beam? Usually the 2 meter beam will not affect the tri-bander. The two meter beam should be at least 1/2 wavelength (40 inches) away from the tribander and further if possible. The larger the 2 meter antenna, the more it may be affected.

How close can I stack a 40M Dipole at 90°? As close as 3 to 4 feet as long as it rotates with the tribander and is not fixed to the tower; such as wire inverted V might be.

How far should the beam be from the ground? At about 1/4 wavelength at the lowest frequency (16 feet at 20M) the antenna will begin to exhibit reasonable performance but, of course, the angle of radiation will be almost straight up so not much DX will be easily worked. At a 1/2 wavelength (32 ft.) up there is a real improvement. Recommended height for excellent performance is 45 feet or higher.

How much power can the 34 handle? All you can legally muster and then some. Lossless elements and good design have been used to virtually eliminate any power handling problems. If, however, your VSWR goes high for any reason running high power may only cause further damage.

Can the 34 be peaked for even greater gain on one portion of the band? Yes, but only .2 to .3db and at a huge sacrifice to all other performance aspects of the rest of the antenna. A high degree of interaction from band to band occurs in any tribander & gain may be severely affected on the other bands. The KT-34A and KT-34XA were designed with max gain as the top priority and it's unlikely, without a good antenna range, any further overall improvement can be made even by narrowing banding.

Can you add a 40M dipole to the end of a 34? Not without the possibility of disturbing the performance of the 34A or 34XA. If you try it anywhere, put it behind the reflector by six (6) or more feet. The recommended spot for a rotatable 40 meter dipole is above or below the tribander by 3 to 6 feet and in line with the boom. This should eliminate any noticeable interaction.

How much power will the balun take? The balun is rated at 4KW peak envelope power (PEP). It can take more for short periods but core saturation may occur causing severe overheating and loss of balance. Non-linearity can also occur perhaps generating spurious or harmonic responses.

How tight can the insulator clamp be tightened? Tests run at the factory show the clamp, when properly lubricated, can actually compress the boom material noticeably before failing. Normal tightening by hand with a spintite or small socket wrench is adequate and a hole in the clamp is provided to pin it after proper alignment has been achieved. During initial assembly, we recommend retightening after one overnight temperature cycle.

How come the F/B is lower than other beams? The KT-34A has excellent front-to-back for a tribander. Monobanders may be a bit better. The KT-34XA was designed specifically for maximum gain on each band. Front-to-back was certainly a consideration but not at the expense of gain, which rivals or exceeds many monobanders its size or larger.

How hard is the 34 to tune? Normally the KT-34A and XA are "tuned" during assembly by setting the parts to specific called out Dimensions so no tuning should be required. If tuning is required, it is not difficult if you know two things. The Reflector has the most control over VSWR at the Low End of the band and the Director D1 (right in front of the Front Driven) controls the High End. The "C" Dimension sets 10 meters, "B" sets 15 meters, and "A" Dimensions sets up 20 meters.

How long does it take to put it together? Reports back from users indicate as little as four hours and as much as forty hours. Typically eight to ten hours for the first time with a 34A and ten to twelve hours for the XA. The instructions have many detailed pictures. Common sense, pictures, and dimensions are all you should really need but much more is provided in the Assembly Manual.

How far apart in order to phase two 34's? The 34A's could be stacked at 22 to 30 feet apart and XA's 35 to 45 feet apart.

What is the best height for the 34? The Lowest band usually suffers the most at low heights. In order for 20 meters to do the best job, it should be up 45 feet or more. Over 120 feet is questionable because performance may not be optimum when the band is wide open. A lower height might be better. 60-70 feet is probably optimum for most applications.

Do power lines effect the performance? Yes, but a lot depends on their height and distance from the antenna. To make a crude check for interaction, check the VSWR with the antenna pointed in a clear direction. Then rotate the antenna towards the power lines. If VSWR changes, interaction is occurring with some probable performance degradation.

How come the non-driven elements are not grounded? They can be but the element mounting insulator Mirage/KLM uses is designed for maximum versatility of element mounting and testing. Keeping it insulated from ground maximizes this capability. If grounding is desired, a simple connection from the center of the middle jumper strap to the boom is sufficient. This jumper to ground at the middle will not effect performance or VSWR.

What is the advantage of no traps? The KT34A and XA really does have traps but our construction avoids the use of coils. Using linear loading in place of a coil greatly reduces coil losses and the linear loading portion also radiates far better than a coil. Our capacitors use air as the basic dielectric which requires that they be large but their Q is extremely high. All this adds up to no heating of components which means more power is radiated.

Can the KT be painted? Yes, but we recommend several things first. Put the antenna up and be sure it is working correctly on all bands. If possible, leave it up a few days so the aluminum oxidizes slightly. This should make the paint stick better.