

**MIDDLE TENNESSEE AMATEUR RADIO SOCIETY  
REPEATER TECHNICAL UPDATE WEB PAGE**

**146.700**

**K4EGC 10/70 is a 100% Solar Installation**



**Note: Be sure to list your call with all work or T/S completed below, with date accomplished above the work completed statement. Newest above oldest below.**

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**MTARS - 10/70 Tower Climb**

Larry Cagle, K4WLO

July 13th, 2021

This is the completion report for the 10/70 Renovation and Upgrade Project which began over two years ago.

On Saturday, July 11th, Michael Glennon and myself met Tim Moffet, the climber for Richard Meyers of Communications Evolutions, Inc. at the tower site to do the work. The proposed work was completed in one day and there is no further tower work contemplated at this time.

The items we intended to accomplish:

1. Remove, inspect and reinstall the DB224 antenna at the 100 ft point on the tower and replace the 1/2 inch Andrews coax with 7/8th Andrews coax.
2. Install a new Diamond DX510N 2m/70cm collinear repeater antenna at the top for expanded service and to serve as the backup antenna in case of DB224/coax failure in the future.
3. Install a custom 2m/70cm beam to facilitate monitoring/control/experimentation.
4. Install 900 MHz Yagi antenna for additional monitoring/control/experimentation.

The proposal document and proposed tower drawing was circulated at the July 2021 meeting for all to comment on. This work has now been completed with some slight modifications from the original drawing. A new drawing is attached.

Each task was completed much as proposed with some slight improvements and modifications along the way. The drawing and photo shows the result.

The DB225 was removed and processed as proposed. The findings seem to indicate now that both the noise issue and other signal related issues may well have been the additions of a kluge of adapters that were used during the original installation to resolve a mismatched connector problem. The antenna harness had an N male on it but the coax had a PL259 male so this adapter assortment was used to make the connection. To say the least, it must have been lossy and probably consumed some power intended for the antenna. Today when I examined the cable piece cut off to install the new connector, the connector was broken when originally tightened which allowed it to leak. There was plenty of indication of water damage and corrosion inside. This was likely the source of noise as it was actually loose inside the connector. The antenna was inspected carefully by Michael and I, all the screws and nuts tightened again and it was reinstalled. The original coax was replaced with 7/8 EIA cable and new connectors. As nearly as possible, it's at the same height and same orientation as before. No changes in pattern were made.

The DX510N Diamond Emergency antenna was installed on a 4 foot standoff on the north facing leg. The original DB224 coax was used with new connectors installed.

The custom 2m/440 beam was installed higher on the tower than planned with 1/2 Andrews coax and new connectors. A short RG213 jumper was used with an N barrel to make the hardline connection to the beam.

The 900 MHz Yagi was also installed somewhat higher than planned to get, as nearly as possible, to the tree tops which are at 80 – 85 feet. The coax is 1/2 inch Andrews hardline with new connectors.

Finally, higher than planned, we mounted a utility side mount on the South facing leg at 50 ft with a taped and sealed piece of 1/2 inch Andrews coax and a new connector for future use. Since it's at the 50 feet point, we feel confident that we can climb it ourselves when the antenna is added.

All the coax is now brought to the base of the tower (as opposed to the head-high bridge that was used before) to facilitate coax shield grounding at the base of the tower for additional lightning protection. It will pass underground into the building where it can be protected with lightning arrestors close to the building ground.

Soon, Frank and I will bury the coax in underground conduit and pass it in at the base of the wall. At this point, the project will be fully complete. We are fully operational now and back on the original DB224 antenna.

Larry Cagle, K4WLO

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20FEB18

10/70 currently operational

Visited the site today to check battery water-level and review other projects underway. The water level in all cells was at normal levels. Specific gravity in all cells checked greater than 1.30 which indicates a very good

level of charge. While there was little good quality sunshine today, overcast skies produced from 3.8 to 8.5 Amperes of charge and during the brief full sun periods charge rates exceeded 16 Amperes. This is a normal condition for charged batteries running on a steady load with intermittent charge periods. The 10/70 machine has experienced a winter time sky with some 17 days now of little to no sunshine. On Saturday, Feb 17th, the nighttime voltage reached 11.7V. Our very rough estimate is that 11.7V under transmit load represents maybe 50% charge. Today, the battery terminal voltage reached 14.5V around 2:30PM. With a perfect conditions 675W available at the panels, with system losses we can deliver a maximum current to the batteries of about 43 Amperes with fully discharged batteries. This is good performance for a minimal solar system. K4WLO

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10/13/2017

10/70 currently operational

history – during the net (Tuesday Oct 10) the repeater stopped responding. K4WLO investigated and found that the repeater's final amplifier was bad. Larry removed the repeater from the site and shipped it the the Kenwood Repair Center today (Oct 13). Also, today W4WRB and KA9J installed the spare YAESU repeater at the 10/70 site and it is operational.

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10/12/2017 146.700 Having problems with repeater low power output, will be off the air. We are working on it.

146.820 Also had some problems. This is also being looked into. Seem to have RF problem outbound.

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04/04/2017 146.700

This afternoon, Larry (K4WLO) and I went up to the .70 repeater and switched over to the new batteries. We still have to go up again and 'dress up' the wiring, but as of right now, everything that we can do with the equipment we have has been done. With the 5th solar cell, the solar cells wired in series, and the new batteries, the system is charging much better than previously. If you have any questions, I'll be happy to answer them.

01/2017 New 2m antenna has been installed at 100 ft. Also the 70cm hard line is up at the site but not installed on the tower yet.

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11/2016 146.700 Tower is replaced with Rohn 45G and new guy wires are installed.

Also looking into installing 70cm radio and also link antenna to [M.T.E.A.R.S. System](#) for Emergency communications.

"Future plans possibly" to include a 220 repeater system, and a 6M system, A.P.R.S. linking.





