Amateur Television Journal

JuLY, 2026
issue # 213
BATVC web site: www.kh6htv.com
ATN web site: www.atn-tv.com

Jim Andrews, KH6HTV, editor - kh6htv@arrl.net www.kh6htv.com

Dennis, WA7DRO & Patty, KM7GFD

Jim, KH6HTV, working the W0BTV rptr on 10 GHz

Portland ATV Visits Boulder ATV

On Saturday, June 20th, we had unexpected out of town visitors to Boulder and the ham shack of KH6HTV. Dennis Belles, WA7DRO, and his wife, Patty, KM7GFD, dropped by while on their grand circle vacation tour of the great state of Colorado. Dennis is the trustee for the Portland, Oregon, ATV repeater, W7AMQ. (***https://www.oregonatv.org/***)

The Portland ATV cross-band repeater has an input frequency of 426.25 MHz, AM. It transmits on 1257 MHz, FMTV. Dennis is very interested in updating their repeater to hi-def, digital TV using DVB-T. So he and Jim had a long discussion about the details in building such a repeater.

Dennis and Patty showed up at a "perfect" time for a real live demo. That Saturday afternoon, I happened to have set up and was in my back yard testing my 10 GHz rig. (*note: I have to move it outdoors to a "sweet spot" in the yard where I have a visual, un-obstructed line-of-sight view to the repeater site. 10 GHz does not tolerate having trees and other vegatation blocking the view !*) So when the Belles showed up, I alerted other Boulder ATV hams to also get on the air. So they were able to see the W0BTV repeater in live action with Steve, WA0TQG, up in the mountains on 70cm via his personal linking repeater; Bill, AB0MY, on 23cm and Don, N0YE, on 3cm. Plus they also saw the repeater's down-links on 70cm, DVB-T and 5cm, FM-TV. The above photo shows Dennis chatting on 2 meters FM with the Boulder ATV gang.

==========

Amateur Television Network (ATN) with Affiliate Station W0BTV has a Wide Reach

ATN & Boulder's W0BTV reaches out across the USA and overseas thanks to the BATC.

(*for W0BTV, https://batc.org.uk/live/AB0MY -- or NOYE*)

We know that the San Diego, California ATV group re-broadcasts regularly the Boulder ATV weekly net. (*Thursday afternoons, starting at 3:00 pm Mountain Time Zone*). We have lots of technical discussions and apparently one was of particular interest there in San Diego. We got the following letter, plus the above photo, from Mario, KD6ILO, the head of the San Diego group.

Hi Jim --- Your topic on 5.8GHz (COT's) component, availability and simple assembly was great with our STEM viewers even with the camera live demo on the Hi-Des Modulator. Talked with their instructor to see if it's feasible to approve a couple of unit components for the students to assemble and for their science and technology class in July. I have to dig mine out of storage.

Thanks Jim & mahalo nu'i loa! warmest regards & 73, Mario, KD6ILO

What Mario was referring to was my sharing with the group a simple ATV display that I had put together as part of our publicity table for the upcoming BARC/BCARES Field Day operation. It was

Low Cost ATV With 5.8 GHz FM-TV Gear

As part of the display I had made up a short video slide show to play continuously on a video monitor after being transmitted via FM-TV. Here are the slides. If any other ATV group would like a copy of them, I can share the power-point file. Send your request to kh6htv at gmail.com

73 de Jim, KH6HTV

5.8 GHz

FM-TV

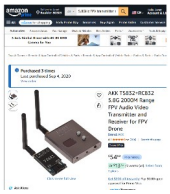
For Radio Amateurs

Entry Level ATV

- Are you thinking about trying "Amateur TV" ?
- Tight Budget ? No or very little $ to spend ?
- Best Choice today – the 5.8 GHz band, drone TV gear, mass market, thus very low cost
- It is analog using FM-TV, but works great !

Amazon Has It All !

- Total Entry Cost = $ 135 !
- No Kidding, only $ 135. Cost of a quality HT
- Items needed: TV camera, TV transmitter, TV receiver, Video monitor, + battery to power all



FM-TV Transmitter & Receiver

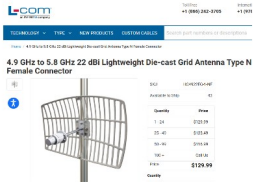
1. TS832 transmitter is powerful - 600 mW
2. Both units are frequency synthesized 5.65 – 5.95 GHz, 40 channels
3. Run on +12 Vdc
4. Includes rubber duck antennas

5 cm, 5.8 GHz Band

1. 5 cm ham band is 5.65 to 5.925 GHz
2. 5.8 GHz, ISM band (Wi-Fi) is 5.725 to 5.875 GHz. Need to avoid due to strong RFI !
3. Boulder ATV hams use FM-TV simplex, Ch 3-2, 5.685 GHz
4. Boulder, NCAR, ATV repeater has FM-TV, 24/7 Beacon on Ch 3-6, 5.905 GHz

ANTENNAS

- A pair of "Rubber Ducks" are included with the TS-832 transmitter and the RC-832 receiver
- Rubber ducks OK for local use in your neighborhood.
- For long distance ATV-DX, use BBQ grid antennas with much higher gain.



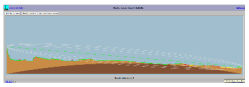
76 km FM-TV DX !

Pete & Debbie as seen by Gary, 76 km distance

WB5PJB at Daniel's Park

112 km Boulder Repeater 5 cm, FM-TV DX !

W0BTV repeater includes a 5 cm, 3 Watt, FM-TV transmitter plus 10 dBi omni antenna. Runs as a 24/7 Beacon as a test signal for hams. We have received it up to 112 km at Briggsdale, Colorado.



==========

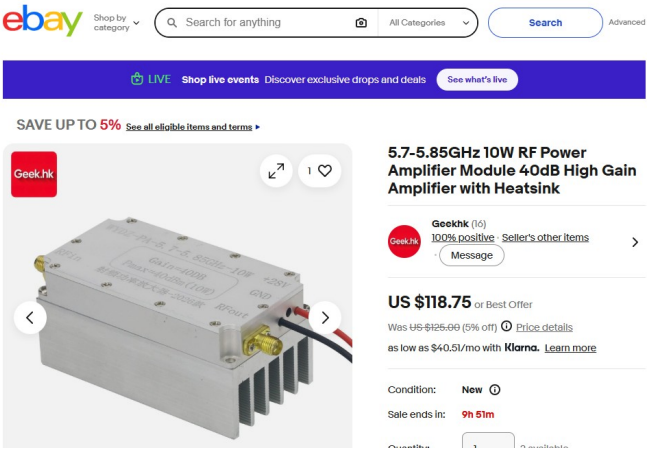
San Diego ATV Group's Cube-Sat Relays ATV from Mauritius

Pat Momple, Triolet, Mauritius

Mario, KD6ILO writes -- " Our CubeSat FSO2 CubeSat onboard [TOTEM-SDR] was scanning when it was over the SE Atlantic and picked up SB8FA's video card test signal and video which was relayed back through our constellation network. We wanted to let you know, it was a test via an hybrid RF/optic data controller multiplexer to a (laser) terminal onboard FSO2 that relayed back the

data stream to our ground station on the wavelength of 1549.72 nm (on a frequency of approximately 193.5 THz).
--- *Who said we couldn't view the transponder... if there is a way there are means with current technologies* ---
==========

NEW 5.8 GHz, 10 Watt Amplifier



While searching E-Bay for another item, I stumbled upon this very interesting amplifier. For the past couple of years, E-Bay has been offering great little similar amplifiers for the 33 cm, 23 cm, & 13 cm bands. They were all 10 to 15 Watt amps requiring +24 Vdc power and in a very similar package. I have bought all of them and they worked great. Both for FM and DVB-T service.

Now, there is this one for the 5 cm (5.8 GHz) band. Key specs. are 40 dB gain, 10 Watts (+40dBm) max. output power, 24-28Vdc. The package is similar to the previous amps and just a bit larger. For DVB-T service, we need to run about -8 dB lower output, so would anticipate it would give about 1.6 Watts output. It will be interesting if some of our readers buy this amp and give us a test report on it.

CAUTION: With this much power for FM service and a high gain parabolic dish antenna, we need to definitely be aware of the RF safety hazard of using such a device.

Using the ARRL's RF Exposure Calculator (***https://www.arrl.org/rf-exposure-calculator***) and assuming 10 Watts FM with 100% duty cycle and a +27dBi antenna at 5.8 GHz we find for an Uncontrolled Environment the minimum Compliance Distance from such an antenna is a minimum of **10.1 meters (i.e. 33.2 ft.)** Thus do NOT stand in front of such a transmitter/antenna, nor point it at other people or animals ! ! !
==========

Cheap ATV ? - an Editorial

Jim Andrews, KH6HTV

I kept getting these similar email letters in essence asking "*Jim, I want to get into ATV, but I have almost no money to spend on it. What do I need to get ? Can I use this satellite TV receiver I found at a flea market?*"

My first reaction is: "I *am sorry, but the only part of ham radio which costs essentially nothing is to buy a Chinese 2m/70cm hand-held HT from Baofeng, TIDradio, etc. One can get these often for under $30.*" Any other aspect of ham radio is going to require an investment of money to participate in.

For Amateur Television (ATV), we have the choice between analog with either AM-TV or FM-TV -- or -- digital with either ATSC, DVB-S, or DVB-T. But the world, including amateur radio, especially ATV, is transitioning away from antique, obsolete, analog, especially NTSC, AM-TV.

If you really want to enjoy ATV, there needs to be more than just yourself to watch your pictures. Being a solo prophet crying in the wilderness is no fun. As they say "It takes two to tango" I can personally vouch for that having lived on the island of Maui, Hawaii and being the only ATV ham there. So if you are serious about doing ATV, it is best to find others in your area who are also interested so you will have ham buddies to do ATV QSOs with. Hopefully that means there is an ATV repeater group in your area. Or at least several others already doing simplex ATV. So to join in the existing group, you definitely need to adopt the same TV system the others are using. Plus, they become your go-to Elmers for ATV.

Receivers: Receivers are by far the least expensive part of ATV. A dedicated set-top box TV receiver plus a small video monitor can be had for $100 or less. Consumer grade, DVB-S (satellite TV) and DVB-T (terrestrial broadcast TV) and even combo DVB-S/T receivers can be purchased on-line for less than $50. I have also found on-line an NTSC AM-TV / VUSB-TV receiver for $60. Most TV receivers only cover the VHF/UHF bands and stop at the high end around 950 MHz. Sole exception is for DVB-S where they only cover the L-band from 1 to 2 GHz. Thus for working other ham bands, one needs to incur the added cost of either up or down converters.

Transmitters: This is where the real expense for ATV comes in. A transmitter consists of a modulator and an RF power amplifier. The modulator takes the audio/video, either as analog composite video or digital HDMI, and processes it into the desired modulation format and includes a frequency synthesizer to put it on the desired ham band. Modulators outputs are typically of the order of a milli-watt and thus need an rf power amplifier to boost the signal to the useable Watts level. The rf amplifier needs to be a linear amplifier. Sole exception is for FM-TV which would use a class C amplifier.

ATV Repeaters: My most recent survey and repeater directory (see my app. note AN-74) of the existing ATV repeaters in the USA shows there are at present no repeaters doing strictly AM anymore. They have all transitioned to digital. Many of them at present still are dual-mode and still support older analog users in the transition.

ATV Ham Bands: By far the best all around band for ATV is our 70 cm band (420-450 MHz). It has the same characteristics as the UHF broadcast TV band. Most ATV activity is found there. ATV equipment in general is the least expensive there. The next favorite ATV band is the 23 cm band. The higher microwave bands are rarely used for ATV except for point-to-point links. Sole exception is in the eastern hemisphere where the ATV hams there are very lucky to have their own geo-stationary satellite, QO-100, with 2.4 GHz up-link and 10 GHz down-link using DVB-S.

BUDGET: Your choice is going to be either $100 -- or -- 1 kilo-buck +. i.e. analog or digital. For digital, you need to plan on spending of the order of $1,000. This is about the same as buying an entry level HF transceiver, such as the popular ICOM IC-7300.

AM-TV: In general, I discourage potential ATV hams from even considering AM. The ATV world is transitioning from analog to digital. The equipment is becoming much harder to find. However for those folks still interested in considering AM-TV, I suggest you read my new app. note AN-75 on AM-TV. It will help you find equipment to do AM-TV.

FM-TV: This can be an entry level into ATV for about $100. However, at present about the only commercially available gear is for the 5 cm, 5.8 GHz band. It is gear made for the very large consumer market for video from drones. Buzz word there is "FPV" which stands for First Person View. See the earlier article in this issue of our newsletter.

ATSC: This is the USA digital TV broadcast standard. It has been shunned by most of the rest of the world for technical reasons. At present, there is only one USA ATV repeater supporting ATSC. It is WD0GIV, in New Orleans, LA.

DVB-S: This is the European standard used for Satellite TV. The receivers operate in the L band (1-2 GHz) as the IF frequency for 10-12GHz LNB down-converters, thus covering the ham 23 cm band. These receivers are dirt cheap new for < $50. So even finding one at a flea market is not that important. Where the rub comes in for DVB-S is finding a low cost modulator. I have not yet found any myself. Google searches always only come up with very expensive (many kilo-bucks) modulators intended for use in commercial earth station terminals for up-links to satellites. The sole exception found will be the modulators offered by the British Amateur Television Club (BATC) on their web site (www.batc.org.uk) Their members have designed what they call their Portsdown Transmitter. They sell blank, bare p.c. boards for folks to assemble their own modulator. Their web site gives full details on how to DIY (i.e. Do It Yourself). Most all ATV hams in Europe are using DVB-S, with the Portsdown, pecially for working the QO-100 satellite, but also for their repeaters. Here in the USA, only one repeater group is using strictly DVB-S. It is W6CX, Mt. Diablo Amateur Radio Club in northern California. The WR8ATV, ATCO repeater in Columbus, Ohio uses both DVB-S and DVB-T, with DVB-T being more popular among it's users.

DVB-T: This is the European digital TV standard for terrestrial broadcast stations. It has been adopted by most of the world. Most USA, ATV repeaters groups are also using DVB-T. The most expensive item to get started with DVB-T will be the modulator. Fortunately, there are several vendors with modulators in the $400-500 price range. The one must commonly used by USA ATV hams comes from the company Hi-Des in Taiwan. For new USA hams getting started in ATV, my personal recommendation is to go digital with DVB-T.

I hope this helps potential ATV hams make the fundamental decision of which modulation mode to settle on for their gear.

73 de Jim Andrews, KH6HTV, Boulder, Colorado

==========

Pictures from the Boulder, Colorado, BARC / BCARES Field Day - 2026

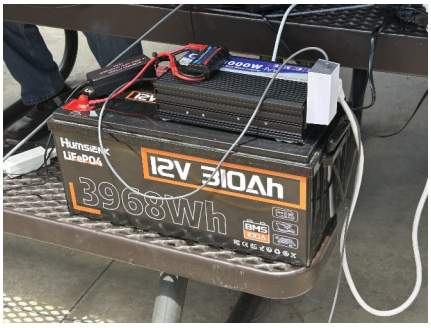
Bettaso Mountain Parks Open Space, Field Day Site

Don, N0RE, & Kai, CU student, working the pile-up on 20m SSB

Ameya, KE0IDV, working WinLink

Hex Beam & Step-IR Antennas

110 Vac Power



12 Vdc Power

BCARES, 70cm, 3W, DVB-T Transmitter

DVB-T, 70cm, Quad Receiver (left) & HDMI quad viewer

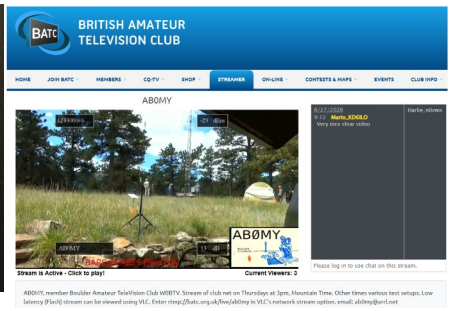
Allen, K0ARK, BCARES E.C. at the video control panel

Allen, K0ARK, used all of the above to relay our Field Day activities to the outside world via a StarLink Terminal.

TV cameras in tents with 70cm DVB-T transmitters ---> Shelter house 70cm receivers & video control console ---> StarLink up-link to satellites ---> Internet ---> YouTube ---> Internet ---> AB0MY ---> 23cm, DVB-T transmitter ---> W0BTV-ATV repeater 70cm DVB-T transmitter ---> N0YE 70cm receiver ---> internet ---> BATC in U.K. server ---> internet ---> Viewers World-Wide ! ! !

Video to You Tube via StarLink

Rebroadcast on 70cm, DVB-T via W0BTV-ATV repeater



then streamed to the world via the BATC in the U.K.

==========

ATCO has a NEW new, enhanced web site. Check it out at www.atco.tv

Five ATV Outputs

- 423 MHz — DVB-T, 2 MHz b/w digital
- 427.25 MHz — VSB analog
- 1258 MHz — FM analog
- 1268 MHz — DVB-S, 3125 symbol rate
- 10.350 GHz — FM analog

Five ATV Inputs

- 439.0 MHz — DVB-T, 2 MHz b/w digital
- 439.25 MHz — analog
- 1288 MHz — FM analog
- 1288 MHz — DVB-S, 4167 symbol rate c
- 10.250 GHz — FM analog

==========

KH6HTV "KISS" Field Day: Well once again this year BARC elected to not adopt a sign up register for folks wanting to operate the field day SSB or CW transmitters (2A-CO). So, once again I opted to do my own KISS operation. Less than 10 minutes set-up time to being on the air on HF. I went over the hill to the east 0.2 miles from the BARC site and set up under a tree. I wanted to be far enough away to avoid creating any RFI to the BARC operation. Plus I stayed off of the bands they were using. The rig was an IC-7300 with a 12V, 24 A-hr LiFePO battery. Antenna was

MFJ hamsticks with an MFJ mag. mount on my Saab convertible. It worked fine and the location had a very quiet noise floor, free from urban RFI. I only worked Saturday afternoon from 1:30 to 4 pm.

To be perfectly honest, the site ended up being far less than ideal. Great swarms of biting flies arrived to feast on my body. So after 2 1/2 hours, I gave up. Will not do it again next year ! Hate those flies !
Results: 2 contacts on 10 meters, 11 contacts on 15 meters & 4 contacts on 20 meters. The high-light of the whole afternoon was working my old Maui, Hawaii ham club station, KH6RS, on 15 meters ! 73 de Jim, KH6HTV, Boulder, Colorado

==========

W0BTV Details:

Inputs: 23 cm Primary (CCARC co-ordinated) + 70 cm & 3 cm secondary all digital using European Broadcast TV standard, DVB-T with standard 6 MHz wide TV channels. Frequencies listed are the center frequency of the TV channel.
23 cm = 1243 MHz (primary), 70 cm = 441 MHz & 3 cm = 10.380 GHz
Outputs: 70 cm Primary (CCARC co-ordinated), Channel 57 -- 423 MHz with 6 MHz BW, DVB-T
Also, secondary analog, NTSC, FM-TV output on 5.905 GHz (24/7 microwave beacon).
Operational details in AN-51d Technical details in AN-53d. Available at: *https://kh6htv.com/application-notes/*

W0BTV ATV Net:

We hold a social ATV net on Thursday afternoon at 3 pm local Mountain time (22:00 UTC). The net typically runs for 1 to 1 1/2 hours. ATV nets are streamed live using the British Amateur TV Club's server, via: ***https://batc.org.uk/live/*** Select ***ab0my or n0ye***. We use the Boulder ARES (BCARES) 2 meter FM voice repeater for intercom. 146.760 MHz *(-600 kHz, 100 Hz PL tone required to access*).

Newsletter Details:

This newsletter was started in 2018 and originally published under the title "*Boulder Amateur Television Club - TV Repeater's REPEATER*" Starting with issue #166, July, 2024, we have changed the title to "*Amateur Television Journal.*" This reflects the fact that it has grown from being simply a local club's newsletter to become the "de-facto" ATV newsletter for the USA and overseas hams. This is a free ATV newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 800+, both in the USA and overseas. News and articles from other ATV groups are welcomed. Permission is granted to re-distribute it and also to re-print articles, as long as you acknowledge the source. All past issues are archived at: https://kh6htv.com/newsletter/

ATV HAM ADS -- *Free advertising space is offered here to ATV hams, ham clubs or ARES groups. List here amateur radio & TV gear*

For Sale - or - Want to Buy

Well we now have the ultimate "For Sale" ad from one of our ATV readers. Here below is an ad of "**Antennas For Sale**" -- with the kicker, you buy the antennas and you get a nice house and land in southern California thrown into the deal. Such a deal. Don't miss out on this one !

Hi Jim -- My name is Tom Board, WB6HYH. (***taboard17@gmail.com***) For several years I have been President of **ATN-CA**. However, I just recently gave up the position due to I will be moving from Southern California to Florida sometime in the next couple of months. That brings me to why I am sending you this email. I have quite an antenna farm on my residential lot with **no HOA**. I have had these antennas up and well maintained for 30+ years. I am willing to sell the house with the antennas if a ham wants to buy it.

// ANTENNAS

TOWER & BEAMS

Tower-mounted HF beam, VHF/UHF arrays, and a multi-band dipole — already up and in the air for great communications.

// OPERATING

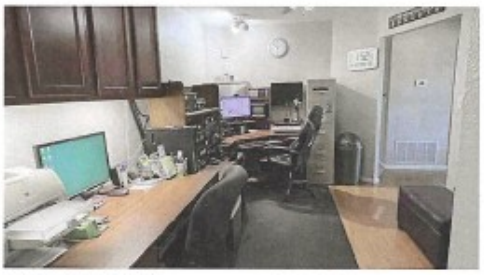
THE OFFICE

A dedicated office/radio room with built-in cabinetry, neatly run weather-tight cabling from the antennas, and plenty of room for all your rigs and accessories.

// LIFESTYLE

ROOM TO OPERATE

Single-story living on a large, flat, block-walled lot with RV parking and quiet street sightlines — ideal for Field Day, contesting, DXing, and antenna experimenting.



THE RADIO ROOM // DEDICATED OFFICE

TOWER & HF BEAM // IN THE CLEAR

AN ANTENNA SYSTEM THAT'S READY TO KEY UP

Most operators spend years building what's already standing here: the permits, the tower work, the antennas in the clear. Bring your rig, connect, and you're on the air.

For a Licensed Amateur Radio Operator, the antennas and towers stay with the home — the hard infrastructure is done. The station equipment, desk, radios and accessories are not included in the sale. Antenna and tower specifications available on request.

73 — AND WELCOME HOME.

COMING SOON · OFFERED AT

$800,000

8236 MATTERHORN CT.
RANCHO CUCAMONGA, CA
91730

4 BR · **2** BA · **2,247** sq ft
13,516 sq ft lot
Single-story · RV parking

DEIDRE PFEIFER
FIRST TEAM REAL ESTATE · DRE# 01008873
AGENT DRE# 01456203

+1 (909) 230-8181
DeeAgent4U@gmail.com
Private preview by appointment

WHAT CONVEYS: Only the antennas and towers will remain, and only for a licensed amateur radio operator. The "station" itself — desk, radios, and accessories — is NOT included in the sale. For any other buyer, the antennas and towers will be taken down before move-in.

Description of Antennas at
8236 Matterhorn Court, Rancho Cucamonga, CA 91730

- Description of antennas:
  - 160, 80 & 40 meter trapped dipole (homebrew)
    - This antenna works exceptionally well. I have been using it for 20+ years.
    - The apex is at about 40 feet with the ends at about 15 feet .
    - Will easily handle 1.2 KW.
  - Mosley Classic CL-33M WARC, Triband Beam for 20, 15 & 10 meter bands plus dipole element for 17 and 12 meter bands
    - This antenna was just removed, cleaned and re-assembled with the 17 & 12 meter element about 3 years ago. Before that I had been using this antenna with excellent results all over the world. It is currently working even better!
    - This antenna is on a crank-up tower and when tower is fully extended is at about 50 feet
    - Will easily handle 1.2 KW.
  - 6 meter band, 5 element Beam (homebrew)
    - This beam was also removed and cleaned about 3 years ago.
    - This beam is mounted about 5 feet above the Mosley beam making it at about 55 feet
    - I have always had excellent results with this beam.
    - I'm not sure what the rating is as I have never exceeded 100 watts on 6 meters, but I pretty sure it would handle at least 500 watts if not more.
  - Comet, CX-333, Tri-band Vertical for 2m, 1.25m & 70cm
    - This vertical was installed new about 3 years above the 6 meter beam putting it at about 60 feet
    - This antenna only requires one cable and then uses a triplexer to the different radios
    - This antenna only handles 100 watts
  - 70cm, Commercial Built, 9 element, Dual, Phased Vertical Beams for FM
    - These two 9 element beams are properly phased for maximum forward gain
    - This antenna is at about 45 feet on a second tower that is mounted on the roof of the house
    - This antenna will handle 100 watts
  - 70cm, Directive Systems, 15 element, Horizontal Beam for SSB
    - This antenna is at about 50 feet on the roof mounted tower
    - 13.5 dBd Gain, Power rating of 1.5 KW
  - 2m, Directive Systems, 6 element, Horizontal Beam for SSB
    - This antenna is at about 55 feet on the roof mounted tower
    - 10.1 dBd Gain, Power rating of 1.5 KW
  - 1.2GHz, Directive Systems, 25 element, Ring Yagi Beam for ATV Receive
    - This antenna is at about 60 feet on the roof mounted tower
    - 18.5 dBi Gain, Power rating of 550 watts
- All of these antennas are mounted on one of two towers;
  - **Tower 1** is a ground mounted, self-supported, 52', winch driven crank-up tower mounted behind the garage
    - This tower supports the Mosley Classic Beam, 6m Beam and Comet tri-band Vertical
  - **Tower 2** is a roof mounted, Guyed, 30' tower consisting of 3 sections of Rohn 25
    - This tower supports the center of the trapped dipole and the 2m, 70cm and 1.2GHz antennas
  - Both of these towers have rotors to turn the mentioned antennas, except the dipole
- There is also a 6' diameter, commercial duty grid dish for ATV or microwave communications on 2.4GHz
  - This dish has a gain of about 30 dBi at 2.4GHz and a power rating of more than you will use!
- There are also five 6' to 8' ground rods located at various location around the house including one at the station location in the house. All cables are well hidden in walls or cabinets for a clean looking station.
- Any of these antennas can be removed or all antennas and towers **will be** removed if house is sold to a non FCC licensed person.