

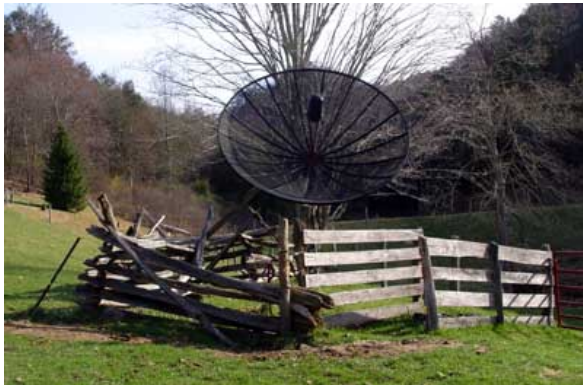
23cm EME - Patch Feed Construction and Mounting Techniques

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North America & 3m Dishes

- North American is the birth place the 3m TVRO
- 2.6 Million 3m dishes were installed in the USA.
- Only 150,000 C-band dished are still in use.
- Abandoned 3m dishes are usually available for free
- EME Amateur should move fast before they are gone



My Path to 23cm QRV

- My neighbor offered his 3m dish if I removed it
- The dish was 30 yrs. old but in excellent condition
- I devised a simple way to mount it to my SPID RAZ
- What feed to use and how to mount in on a TVRO?



Easy Decisions – Station Setup

- I have a TS-2000X with the 1296 MHz module
- VHF Designs 150 SSPA / WA2ODO 0.3 dB NF preamp
- Feed line / sequencer / isolation relays / WSJT-X
- SPID RAZ – AZ / EL Rotor with 1 deg. resolution
- Feed? Septum or Patch

Difficult Decision (for me)

- I have a KL6M 23cm band Septum (unassembled)
- The Septum feed is the gold standard
- The TVRO feed support will not hold a Septum
- I learned about the SM6FHZ / SM6PGP Patch feed

KL6M Septum



SM6PGP CP Patch



Septum vs. Patch Feed

- The Septum feed has superior performance potential
- The Septum feed is bigger and heavier
- The Septum feed can handle a 1kw of power
- The Patch feed has good performance potential
- The Patch feed is smaller and lighter
- The Patch feed is native dual pol linear
- The Patch requires an external hybrid divider for CP
- My Patch feed is limited to 250w max power

Septum Feed Mounting

- The Septum feed is bigger and relatively heavy
- The Septum feed requires robust support legs
- The typical TVRO feed support is not compatible

RF Ham Design Feed Mount



Typical TVRO Feed Mounting

- The TVRO Dish is design to support a Chaparral feed
- The Chaparral feed has scalar ring mounting points
- Repurposing the original TVRO feed support is EASY

Typical TVRO Feed Mounting



The “Eureka” Moment

- The Chaparral and Patch feed are the same diameter
- A modified Chaparral will hold the Patch feed elements
- This Patch feed design mounts directly to the TVRO
- The focus point is correct for the Patch feed

Chaparral Feed in TVRO



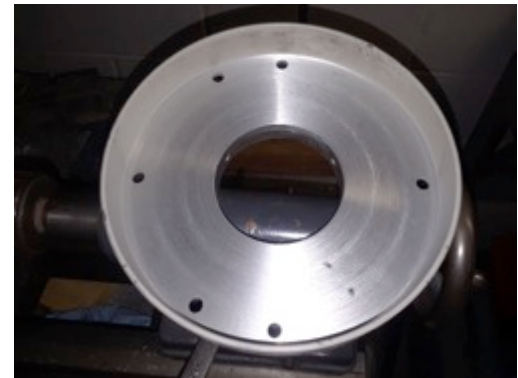
Patch Feed in TVRO



Modify the “Chaparral” Feed

- Find a Chaparral C-Band choke (aluminum)
- Removed the inner rings with a lathe
- The inner diameter of the Chaparral is 160mm

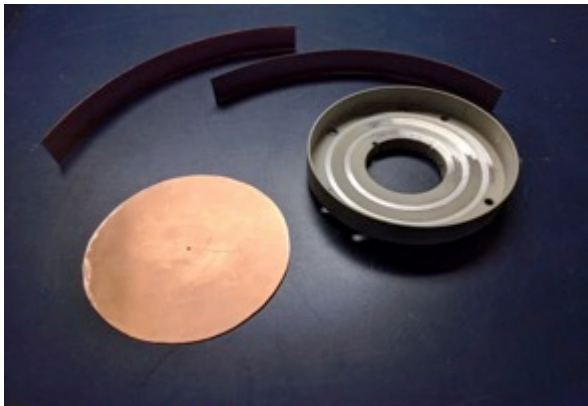
Remove the Inner Rings in Chaparral C-Band Feed with Lathe



Building the “Chaparral” Patch

- Chaparral choke become the foundation of the Patch
- The inner diameter of the Chaparral is 160mm
- The Patch reflector is 160mm and fits inside the choke
- The Patch baffle is glued to the inside of the outer ring

Choke, Patch Reflector & Baffle



160mm Diameter



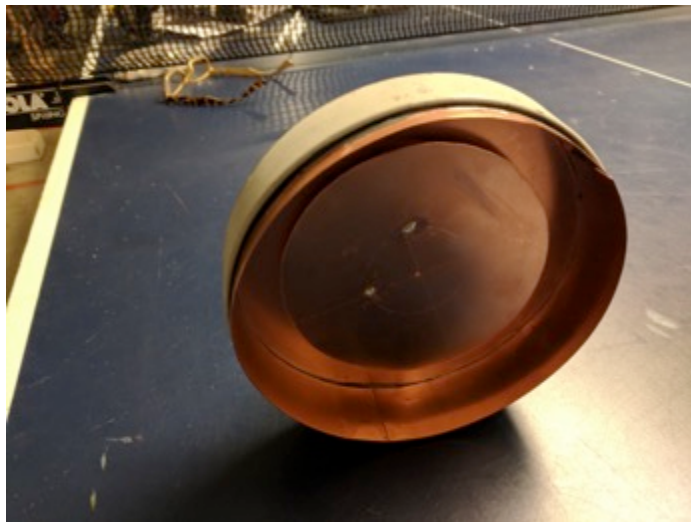
Baffle glued to Choke



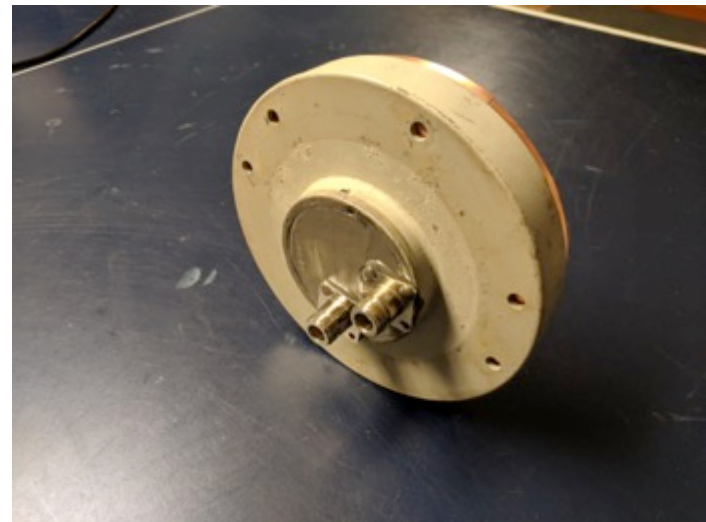
The completed “Chaparral” Patch

- Add driven patch and probes for V-pol & H-pol
- N-Type connectors for V-pol & H-pol
- Use plenty of JB Weld epoxy to hold it all together

Front View – Completed Patch



Rear View – V & H-Pol N-Type F



Full Assembled Patch Feed

- Add three brass feed mounting bolts
- Add Radom (Rubbermaid food container #3)
- Add BFR – Beam Forming Ring

23cm Band Patch Feed



Installed in TVRO Dish



The “Chaparral” Patch mounting

- Feed position is adjustable with 3” bolts / nut position
- Add Radom (Rubbermaid food container #3)
- Beam Forming Ring supported on fiberglass strips

Feed Mount Bolts



Rubbermaid Radome



Adding the BFR



Adding Hybrid Divider

- CP is generated by feeding V-pol & H-pol – 90 Deg.
- Unused Hybrid port is terminated in 50 ohms
- Preamp is isolated from TX power with T/R relay



23cm Patch – On-Air Experience

- Sun Noise = 10 dB / ON0EME = -11 on WSJT
- On Air results in 2018
- 170 QSOs (147 - JT65 / 3 - CW)
- 107 Initials
- WAC
- VUCC - 80
- WAS - 22
- DXCC - 34

23cm Patch on Toki 550 Umbrella Dish

- My interest in the 23cm Patch was focused on the Toki
- I needed a small / light weight feed for a portable dish
- The patch and hybrid mount nicely on the button hook

23cm Patch on Toki 550



Hybrid & Radome on Patch



70cm EME with Cake Pan Feed

- The same feed mounting holds a 70cm loop feed
- Use a 16" x 3" Cake baking pan (aluminum)
- Loop Feed design by OK1DFC

Feed Mount Bolts



70cm loop feed mounted



70 cm Loop - On-Air Experience

- Sun Noise = 6 dB / Estimated 20 dBi gain
- On Air results in June 2018 / 180W SSPA
- 18 QSOs
- 14 Initials
- VUCC - 14
- WAC – 3
- WAS - 3

Credits – These are the Designers

- Thanks to SM6FHZ / SM6PGP for the 23cm Patch Feed design
- [http://moonbouncers.org/
Circularly%20polarized%20patch%20feed%20for%201296%20M
Hz_A.pdf](http://moonbouncers.org/Circularly%20polarized%20patch%20feed%20for%201296%20MHz_A.pdf)
- Many thank to OK1DFC for the 70cm Loop Feed design
- <http://www.ok1dfc.com/eme/technic/432feed/432feed.htm>
- Thanks to KL6M for access to Septum feed parts
- Thanks to G4DML for practical patch experience sharing

Summary

- North America is blessed with an abundance of TVRO dishes
- Using the factory feed support system can speed construction
- Mount different feeds using a “standardized” support system
- The 23cm Band Patch is worthy of a close look
- The 70cm Loop Feed is easy to build and performs nicely.
- Standard mounting allows 23cm to 70cm feed swap in 30 mins.
- Future plans to build standard mount for Septum Feed.

- Thanks to K2UYH and all my other Elmers.