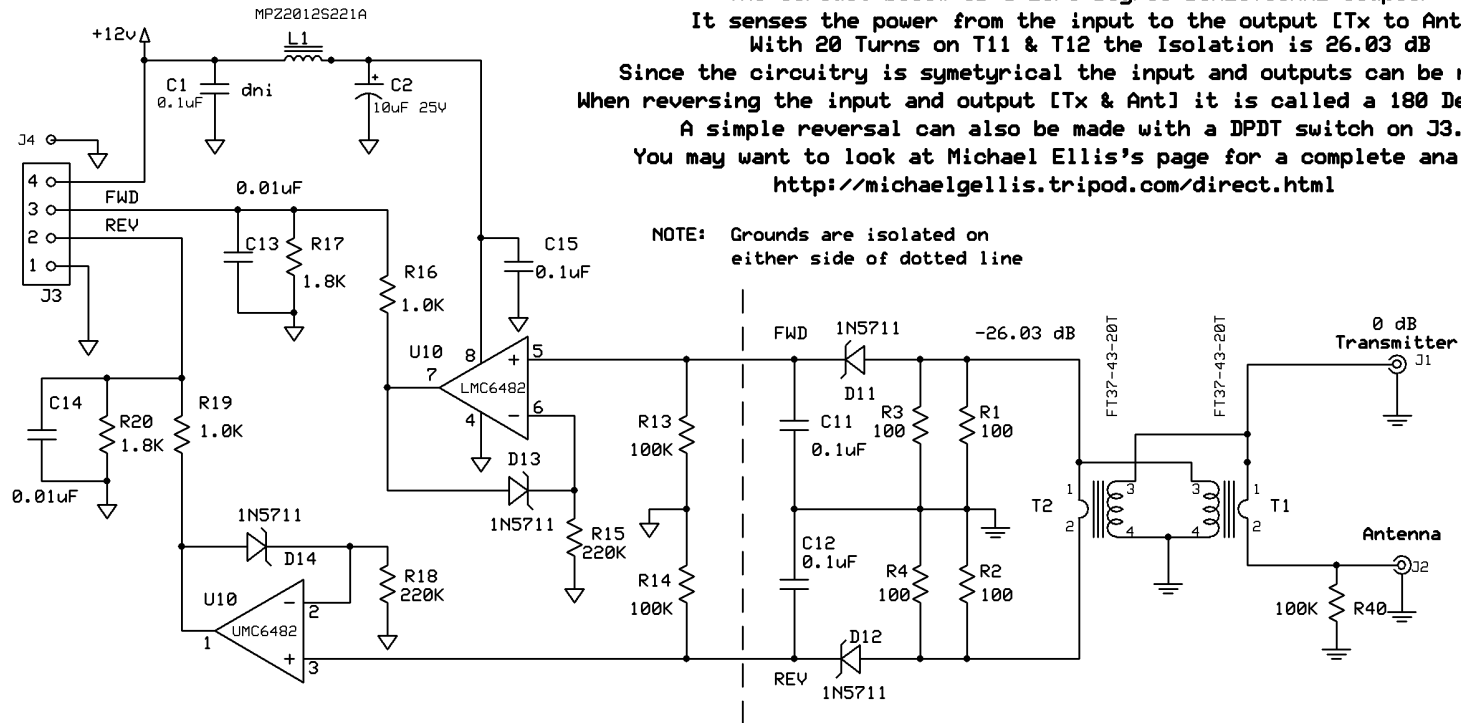


Construction Notes:

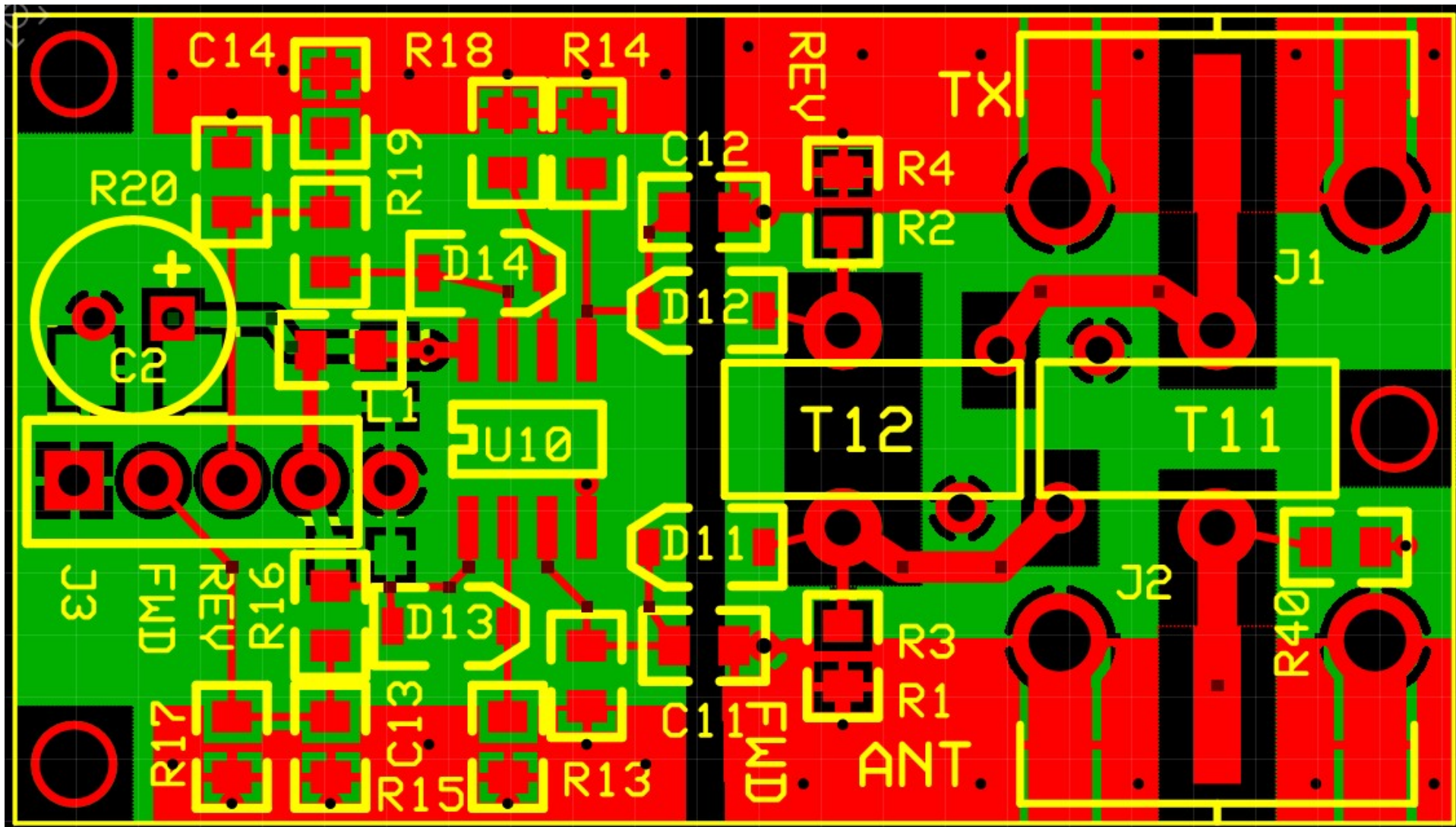
1. C1, C2, C15, R3 & R4 are all located on the bottom side [C1 is dni]
 2. C2 is also on the top side as a through hole part. Bottom side is for a Tantalim cap in a B case
 3. J1 & J2 can be an end launch BNC or SMA. Mounted in a box any connector can be used with wire or Co-Ax to the PCB.
 4. J3 & J4 can be a 5 pin and combined. You can use a 4 pin plug or a 3 pin and a 2 pin.
 5. R1, 2, 3, 4 are 0.25 Watt. With 2 in parallel they are a 50 Ohm Termination @ 0.5 Watt.
- Note: $100 \text{ W} = 50 \text{ dBm} -26.03 \text{ dB} = 24.97 \text{ dBm}$ or 0.249 Watts

The circuit below is a Zero Degree DIRECTIONAL Coupler
 It senses the power from the input to the output [Tx to Ant]
 With 20 Turns on T11 & T12 the Isolation is 26.03 dB
 Since the circuitry is symetrical the input and outputs can be reversed.
 When reversing the input and output [Tx & Ant] it is called a 180 Degree Coupler
 A simple reversal can also be made with a DPDT switch on J3.
 You may want to look at Michael Ellis's page for a complete analysis
<http://michaelgellis.tripod.com/direct.html>



Note: The main circuit is a copy of the openHPSDR ALEX TX sense circuit designed by Graham Haddock KE9H.


| | | |
|---|-----------|---------------|
| Alex Directional Coupler | | |
| PWR/SWR Mon for HL2 & Others | | |
| K9IVB | Rev 1.0 | Page # 1 of 1 |
| | 6/26/2019 | |



Alex Directional Coupler BOM 6/30/2019

| | | Part # | Mfg | Mouser | Pkg | Qty | Note | Current 2019 \$ 1 @ \$x.xx |
|---|--|--------------------|-----------------------|-------------------------|-------------|----------|-----------------------------------|-------------------------------------|
| C1 | MLCC - SMD/SMT 25volts 0.1uF X7R 1 Aluminum Electrolytic Capacitors - Leaded 10uF 50volts 5x11 LS | C0805C104K3RACTU | Kemet | 80-C0805C104K3R | C0805 | 0 | Do not Insert | |
| C2 | 5mm | EEU-HD1H100B | Panasonic | 667-EEU-HD1H100B | 0.1 LS | 1 | | \$0.50 |
| Alt C2 | Tantalum Capacitors - Solid SMD 25V 10uF 10% AEC-Q200 B Case [1210] | TAJB106K025TNJ | AVX | 581-TAJB106K025TNJ | B case | Optional | Any B case @ 20V or more | \$0.62 |
| Alt C2 | Tantalum Capacitors - Solid SMD 20V 10uF 10% 1210 ESR= 2.1 Ohms | TAJB106K020RNJV | AVX | 581- TAJB106K020RNJV | B case | | Any B case @ 20V or more | \$0.18 |
| C12,C15 | MLCC - SMD/SMT 25volts 0.1uF X7R 1 | C0805C104K3RACTU | Kemet | 80-C0805C104K3R | C0805 | 2 | | \$0.26 |
| C13, C14, D11, D12, D13, D14 | MLCC - SMD/SMT 0805 0.01uF 50volts Y5V +80-20% | GRM216F51H103ZA01D | Murata | 81-GRM40Y103Z50D | C0805 | 2 | any | |
| | Schottky Diode RF Connectors / Coaxial Connectors 50 OHM BNC V- BITE | 1N5711W-7-F | Diodes, Inc. | 621-1N5711W-F | SOD- 123 | 4 | | \$0.37 |
| J1, J2 | | 361V504ET | Bomar Interconnect | 678-361V504ET | V-Bite | 2 | | \$9.13 |

| | | | | | | | | |
|--------------------------|---|-----------------|---------------------------------|-------------------------|-------|---|----------|--------|
| | | | Winchester Interconnect / Bomar | 991-1037-ND | | | Digi Key | \$6.69 |
| | | 361V504ET | Bomar Interconnect | 80K0247 | | | Newark | \$3.01 |
| J3 | 4 PIN | or 5 pin | MOLEX | 538-22-12-2044 | | 1 | | |
| J4 | 1 Pin or combine with J3 | | | | | | | |
| L1 | FERRITE CHIP 220 OHM 3A | MPZ2012S221A | TDK | 810-MPZ2012S221A | C0805 | 1 | | \$0.12 |
| R1, R2, R3, R4 | Thick Film Resistors - SMD 1/4W 100ohms 1%T/R | RK73H2ATTD1000F | KOA Speer | 660- RK73H2ATTD1000F | C0805 | 4 | | \$0.12 |
| R1, R2, R3, R4 Alt | Thick Film Resistors - SMD 100 ohm 0.5% 0.5W AEC-Q200 | SG73G2ATTD1000D | KOA Speer | 660- SG73G2ATTD1000D | C0805 | | | \$0.23 |
| R13, R14,R40 | Thick Film Resistors - SMD 1/8watts 100Kohms 5% | RK73B2ATTD104J | KOA Speer | 660-RK73B2ATTD104J | R0805 | 3 | | 0.11 |
| R15, R18 | Thick Film Resistors - SMD 1/8watts 220Kohms 5% | RK73B2ATTD224J | KOA Speer | 660-RK73B2ATTD224J | R0805 | 2 | | 0.11 |
| R16, R19 | Thick Film Resistors - SMD 0.25W 1Kohm 5% 200ppm | SG73P2ATTD102J | KOA Speer | 660- SG73P2ATTD102J | R0805 | 2 | | 0.11 |
| R17, R20 | Thick Film Resistors - SMD 1/8W 1.8K OHM 5% | RK73B2ATTD182J | KOA Speer | 660- RK73B2ATTD182J | R0805 | 2 | | 0.11 |

| | | | | | | | | | |
|---|--|---|--------|------------------------|----------------|---|-----------------------------------|--------|---|
| T11, T12 | FT50-43-20T #22ga 15" - 1T secondary from RG6 #18ga | 1T through center made from RG6 center conductor and insulator - Braid removed | | FT50-43 | | 2 | Kits and Parts | | |
| U10 | LMC6482 | LMC6482IM/NOPB | TI | 926- LMC6482IM/NOPB | SOIC-8 | 1 | | \$1.75 | |
| Alternate parts | | | | | | | | | |
| J1, J2 | RF Connectors SMA ST PCB- JCK BHD EMT I- AU Gold w/hard | 73251-1290 | Molex | 538-73251-1290 | | | | \$6.61 | end launch bulkhead with hardware |
| | Expert Electronics Charge Receptacle: JR/HRC/AIRZ | EXRA055J | Expert | LXJBFT | Panel Mount | | Tower Hobbies and others | \$2.99 | 3 pin Bulkhead holder aka servo |
|  | | | | | | | | | |
| | 2 pin power receptacle | any 2 pin connector to match power leads | | | | | | | For Case Mounting |
| | Mini Din Connectors 4 Pos Female Panel Mount W/ wires | MD-40PL100 | CUI | 490-MD-40PL100 | Panel Mount | | | \$2.76 | For Case Mounting |
| | 2-56 screw and nut for chassis mount | Can put on #4 spacer | | | | | 3 | | |