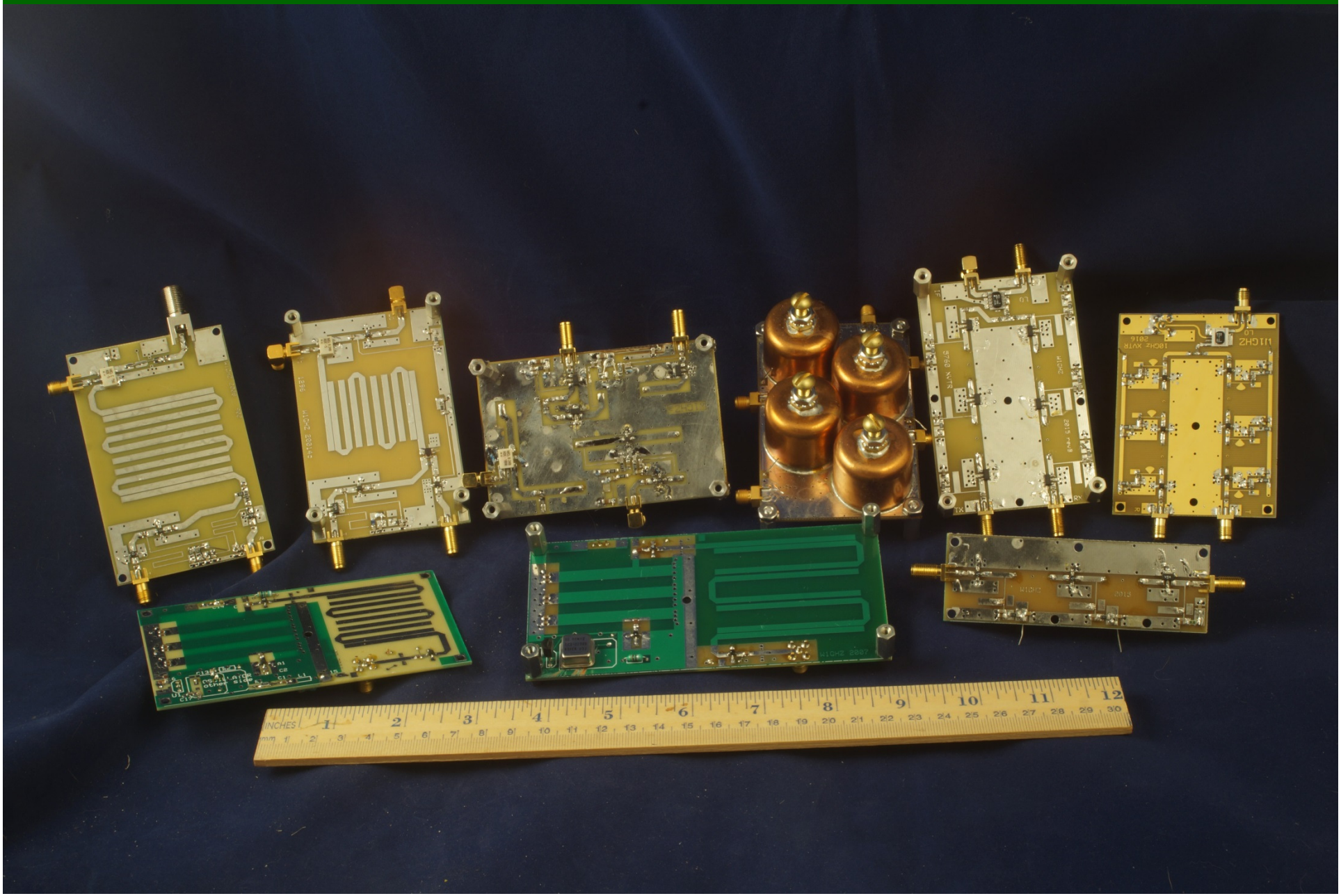
# Cheap & Simple Transverters

*and*

*Microwave Multiband*

Paul Wade W1GHZ

# 902 MHz to 10 GHz



# Cheap and Simple Transverters

- Design Philosophy – Gain is Cheap
- Cheap MMICs for gain
- Ordinary capacitors and resistors
- Ordinary PC board material (FR4)
- Cheap SMA connectors from China (ebay)
- Cheap gain makes up for losses

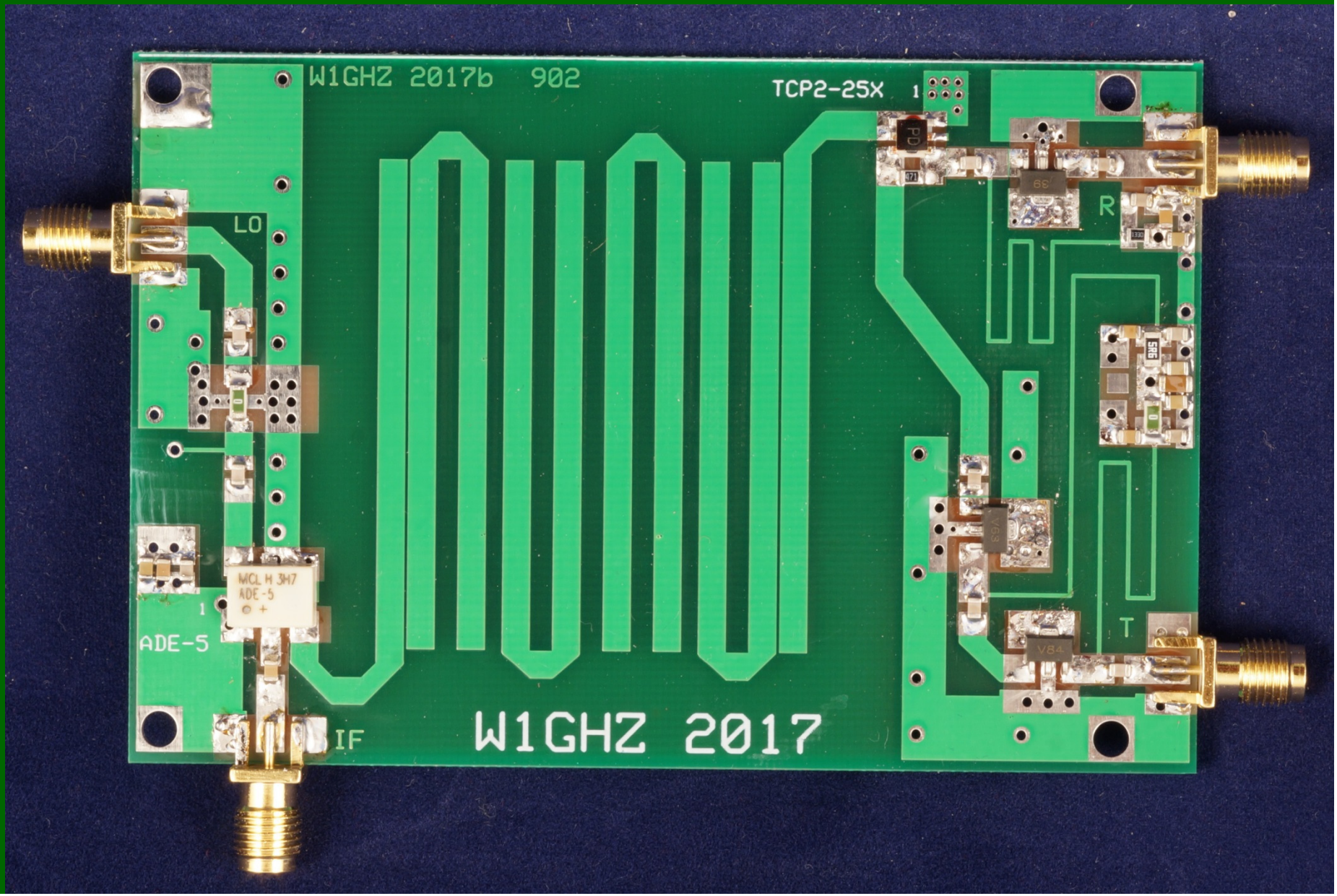
- Printed Filters – Magic is in PC Board
- Pipe-cap Filters – cheap and readily available

- Modular – one band at a time
  - Goal: > $100 per band
- Add bits for higher performance

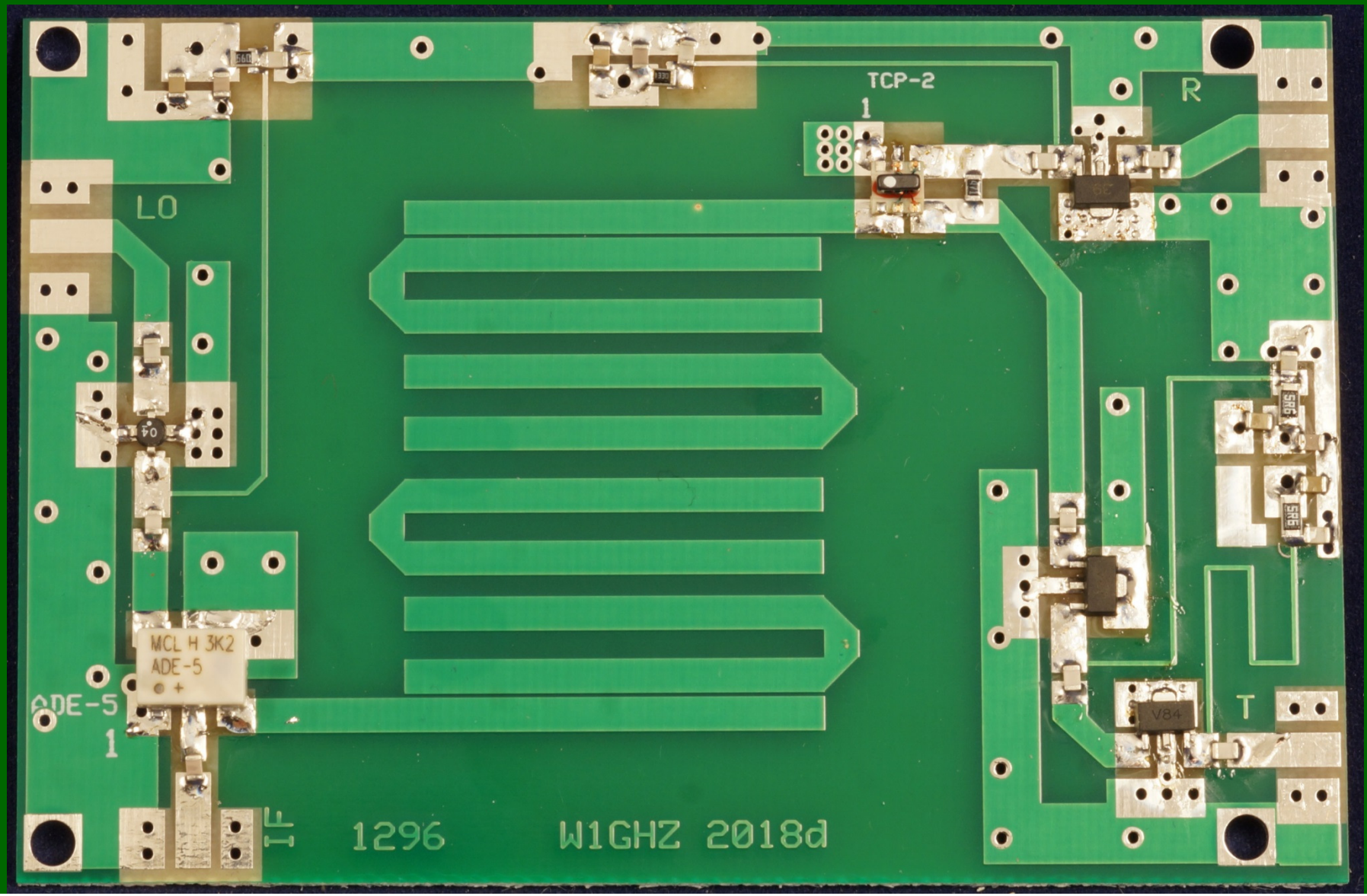
# Transverter Updates

- New MMICs –
  - Higher gain and power
  - Lower Noise Figure
  - New footprint – SOT-89 package
- Synthesizer for LO
  - No multipliers, except 5.7 & 10 GHz
  - Frequency accuracy
- Soldermask – protect filters, ease assembly

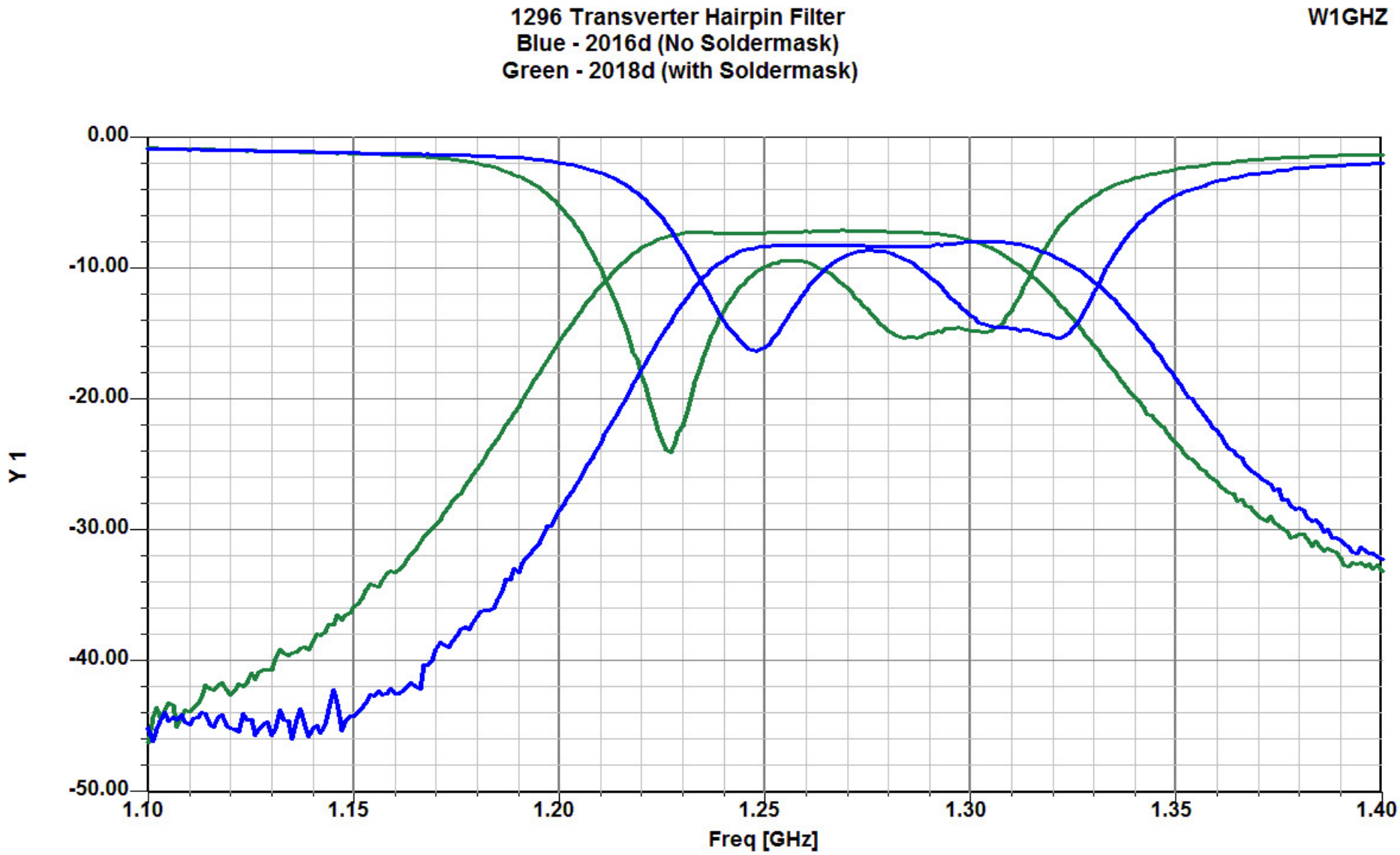
# 902 MHz - soldermask



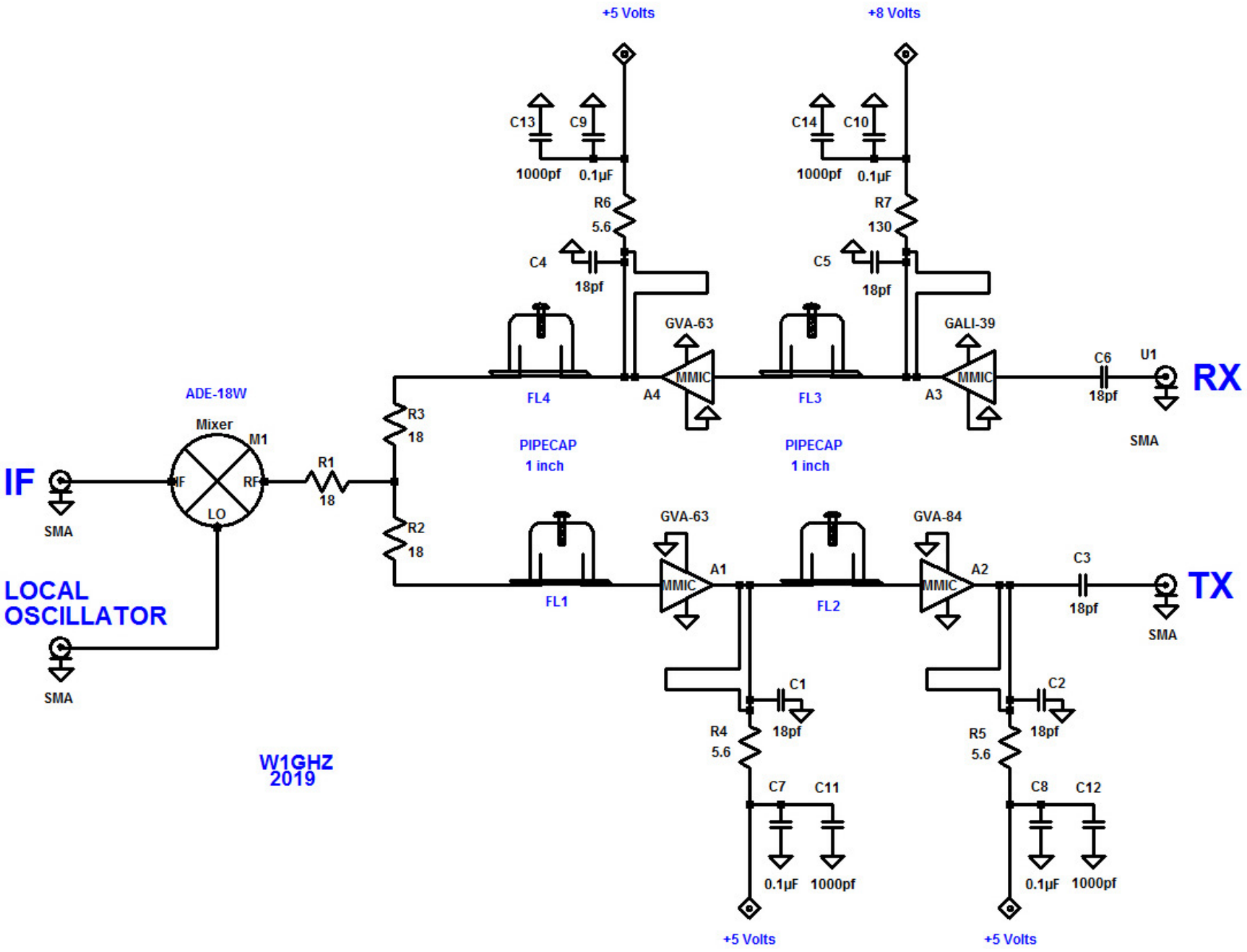
# 1296 – soldermask, new MMICs



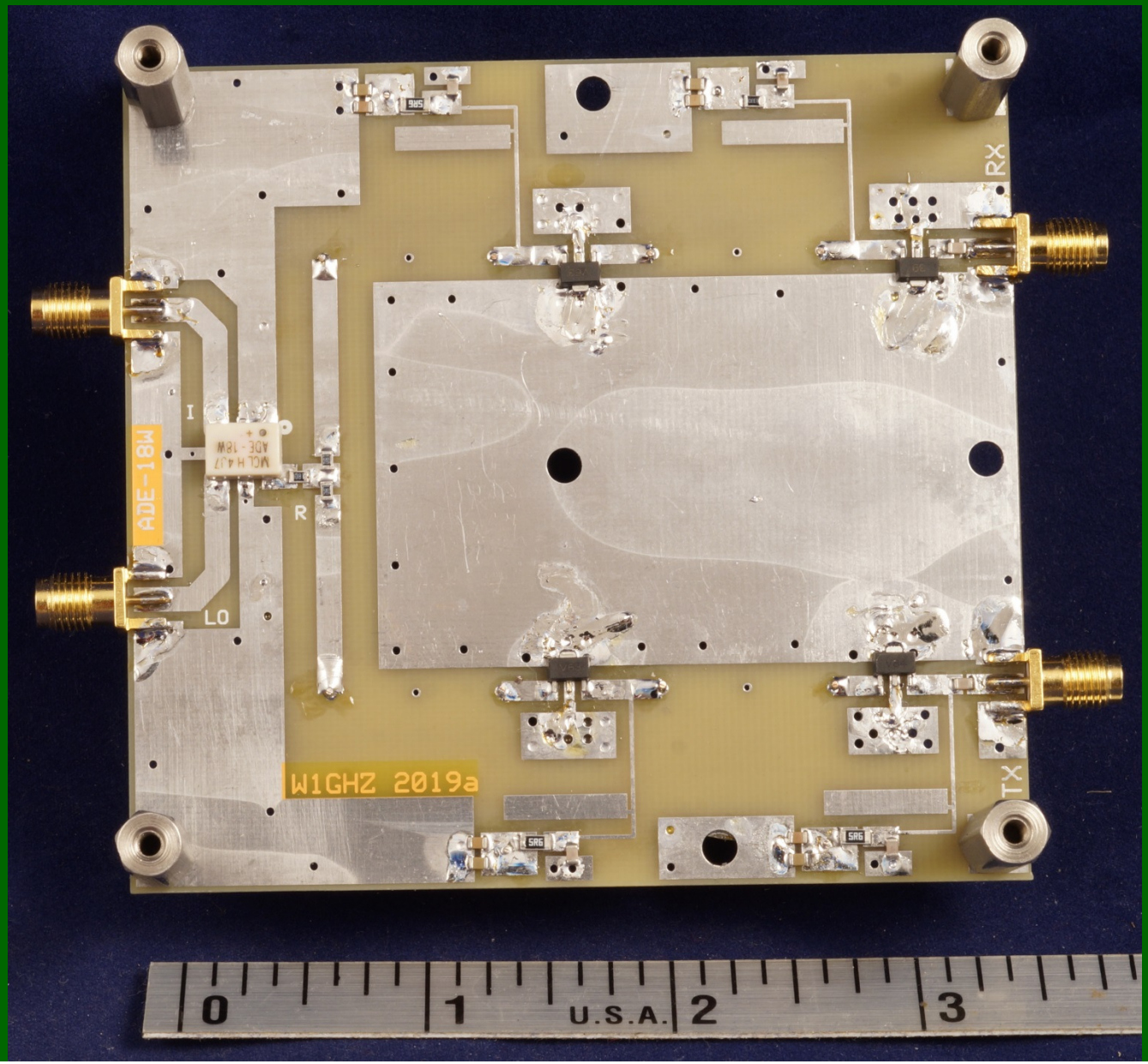
# Hairpin Filter with Soldermask



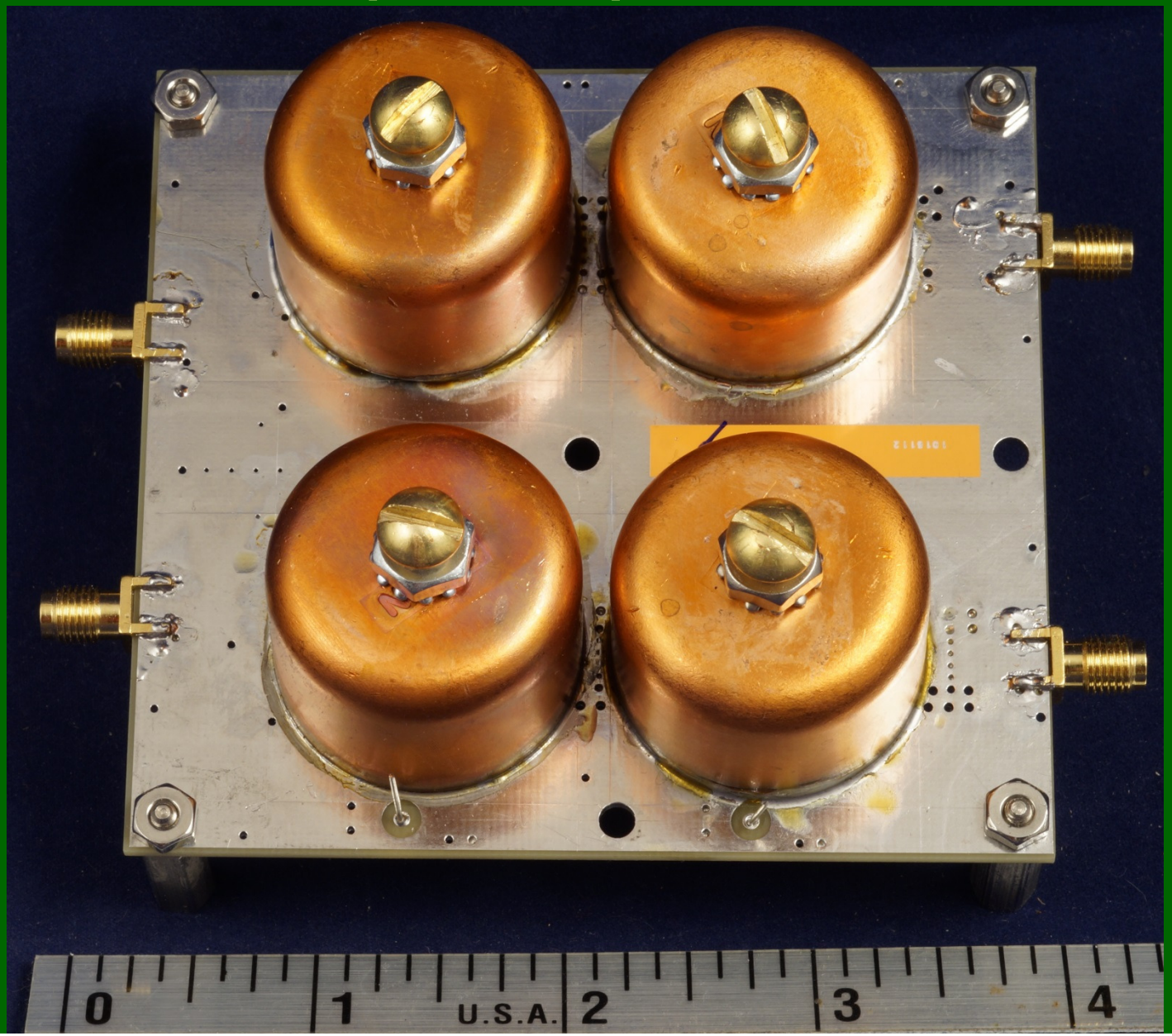
# 2304 & 3456 MHz TRANSVERTER



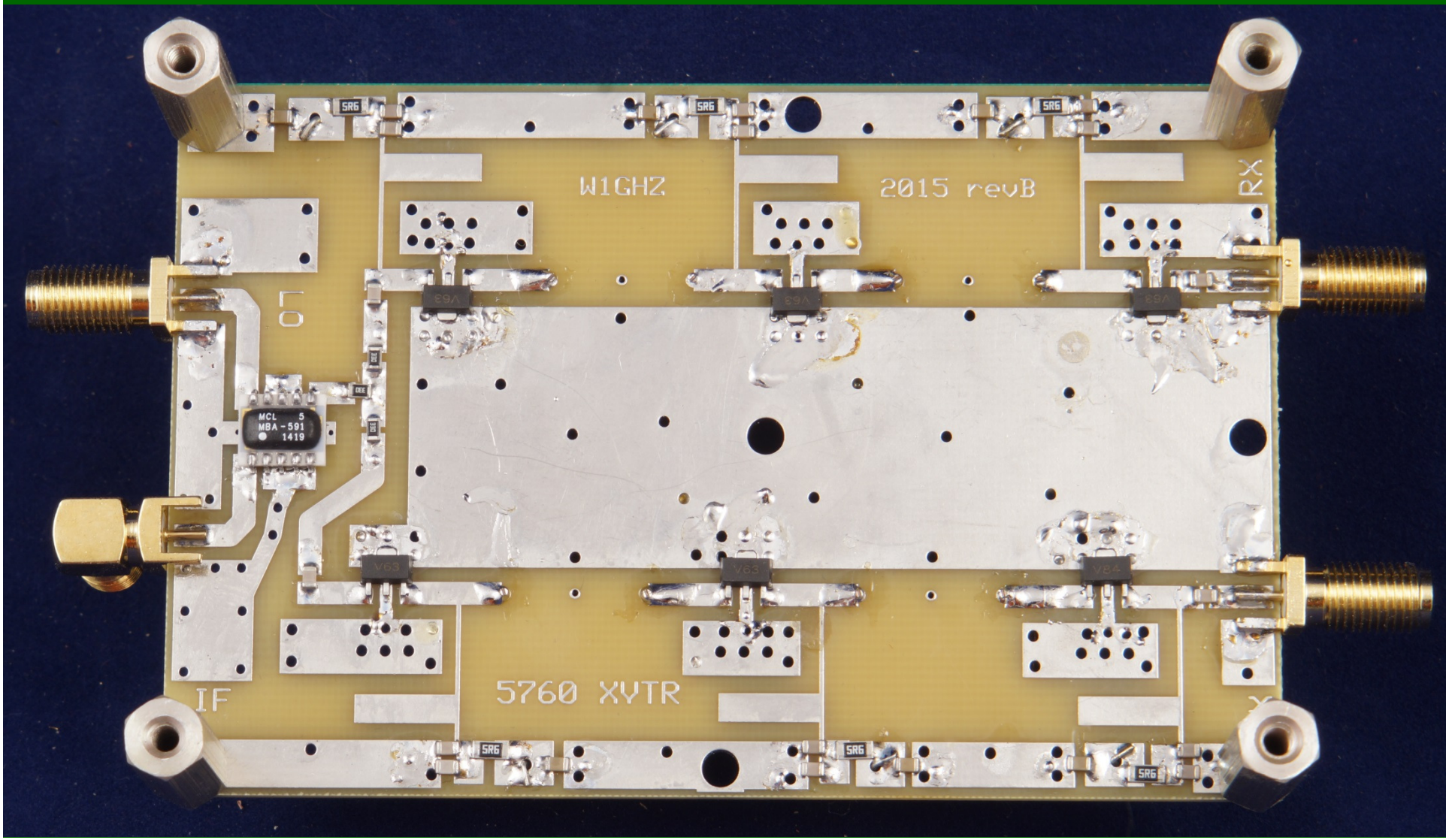
# 2304 or 3456 MHz



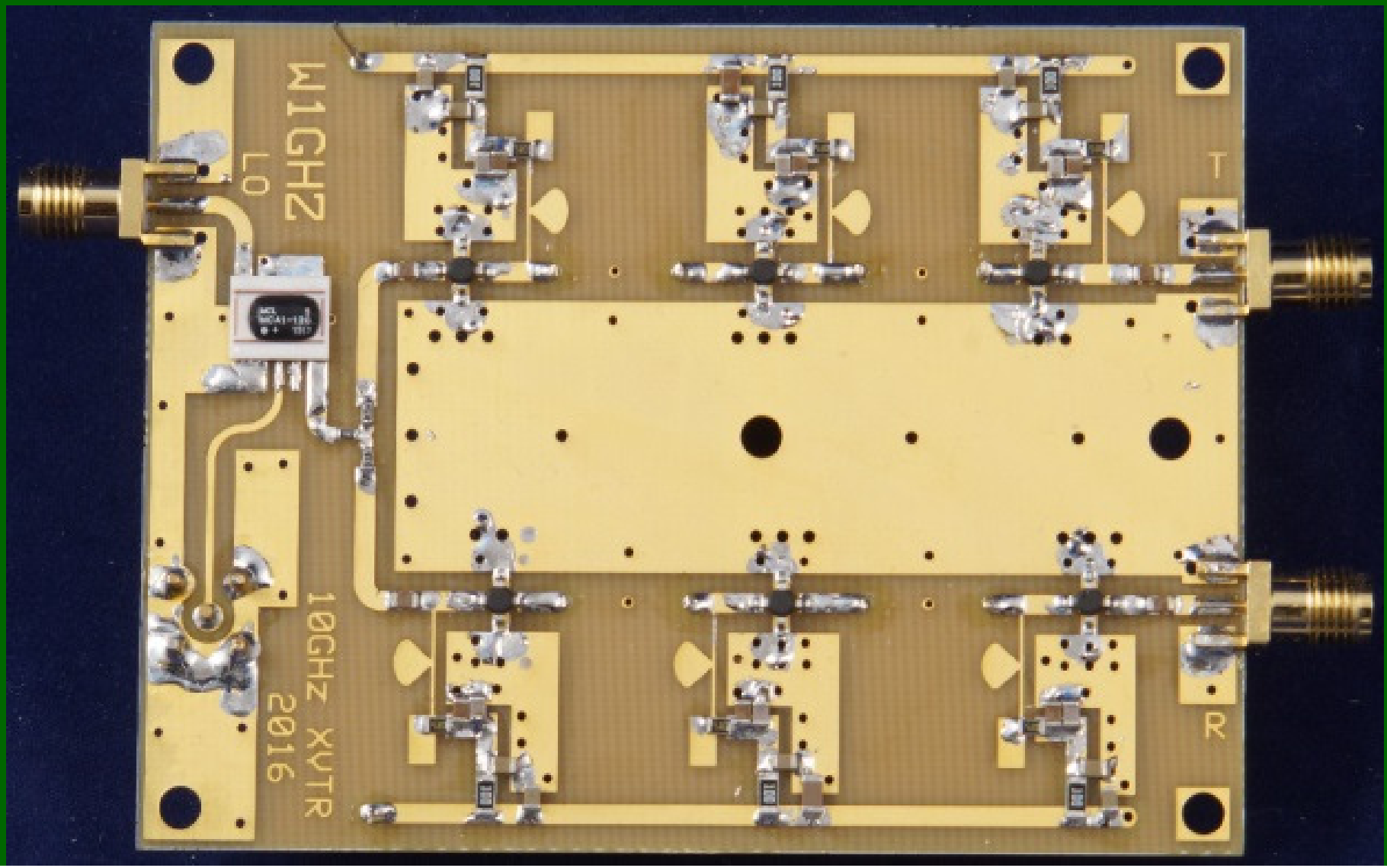
# Pipe-cap Filters



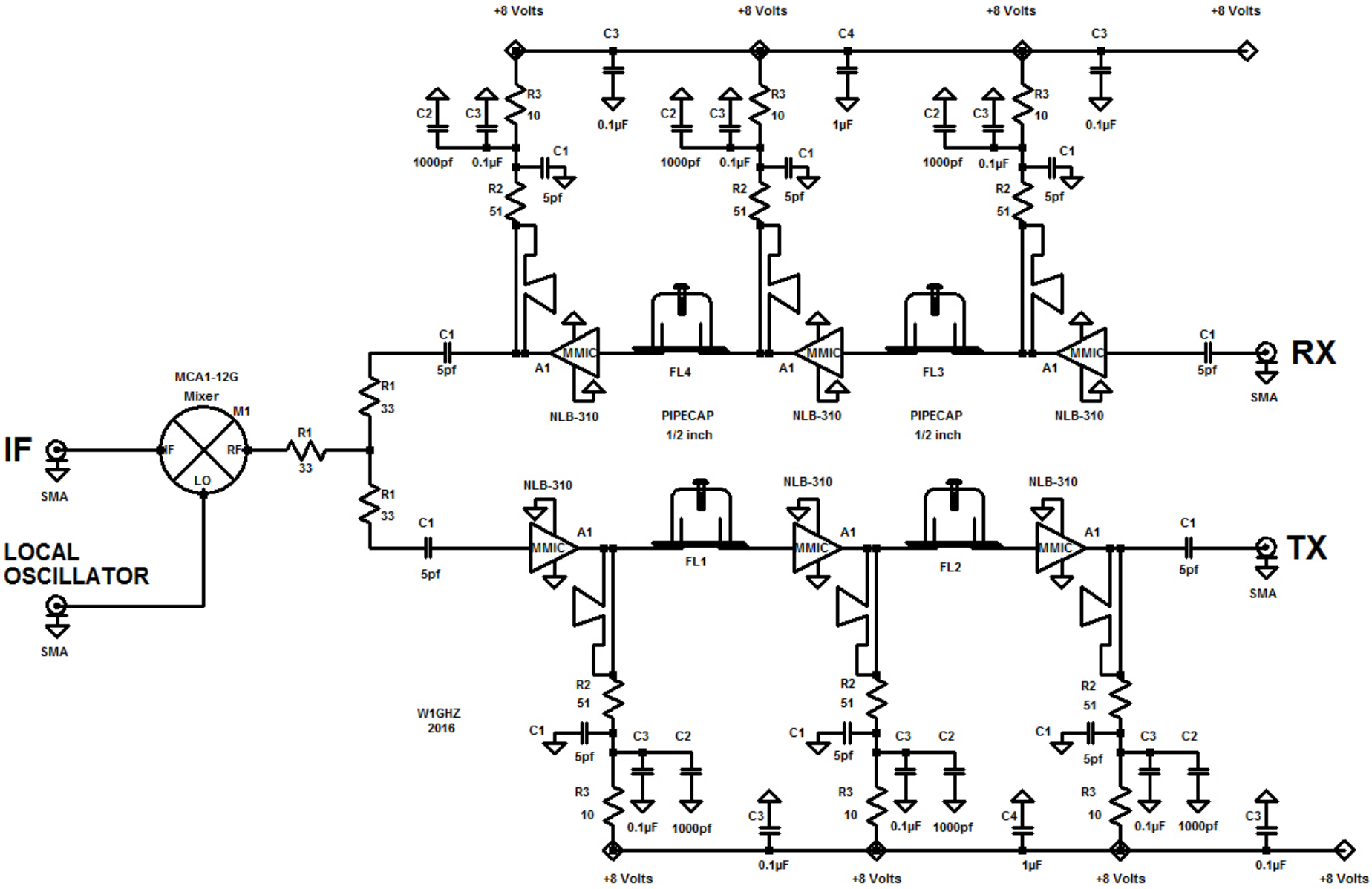
# 5760 Transverter



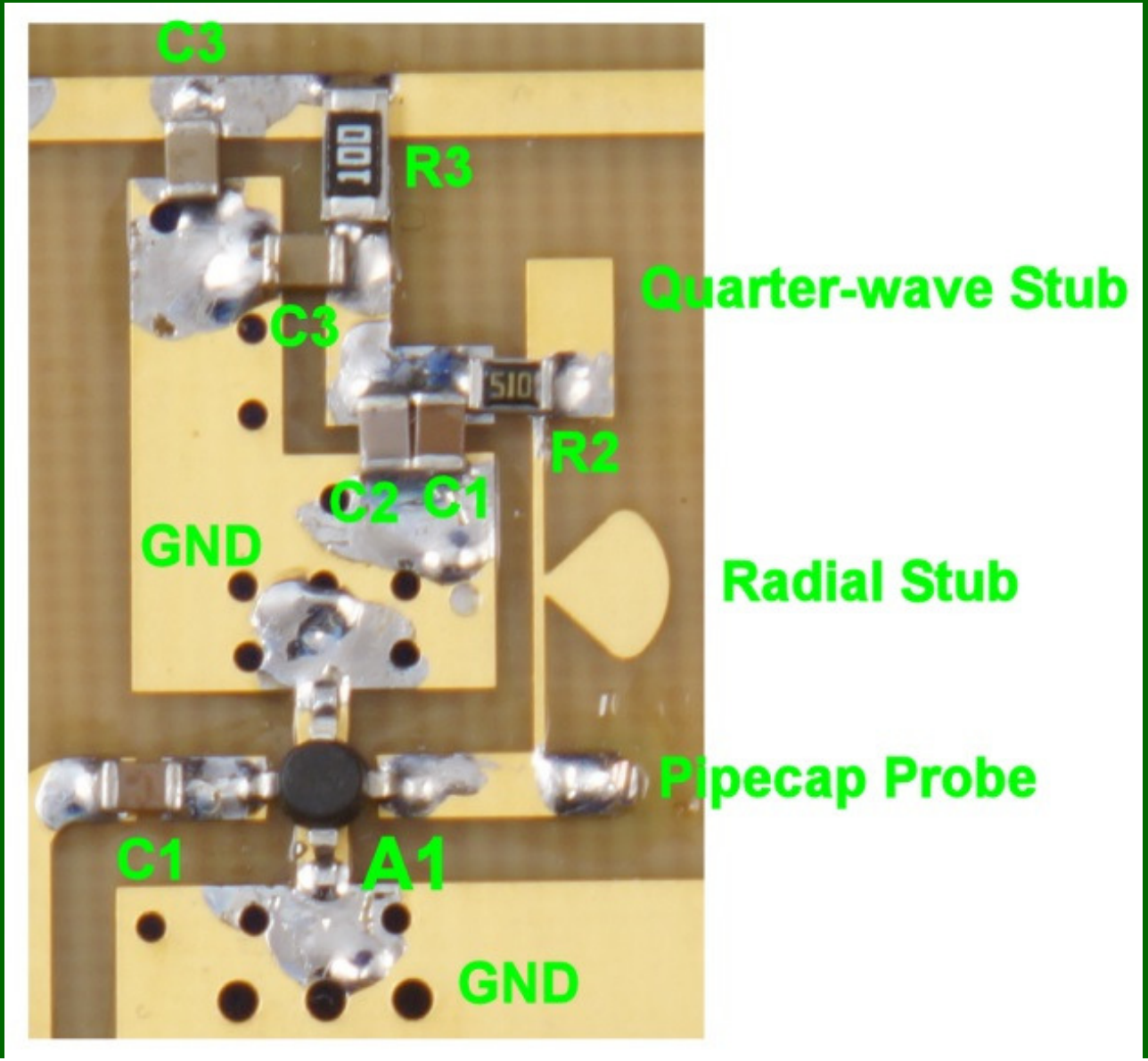
# 10 GHz Transverter



# 10368 MHz TRANSVERTER



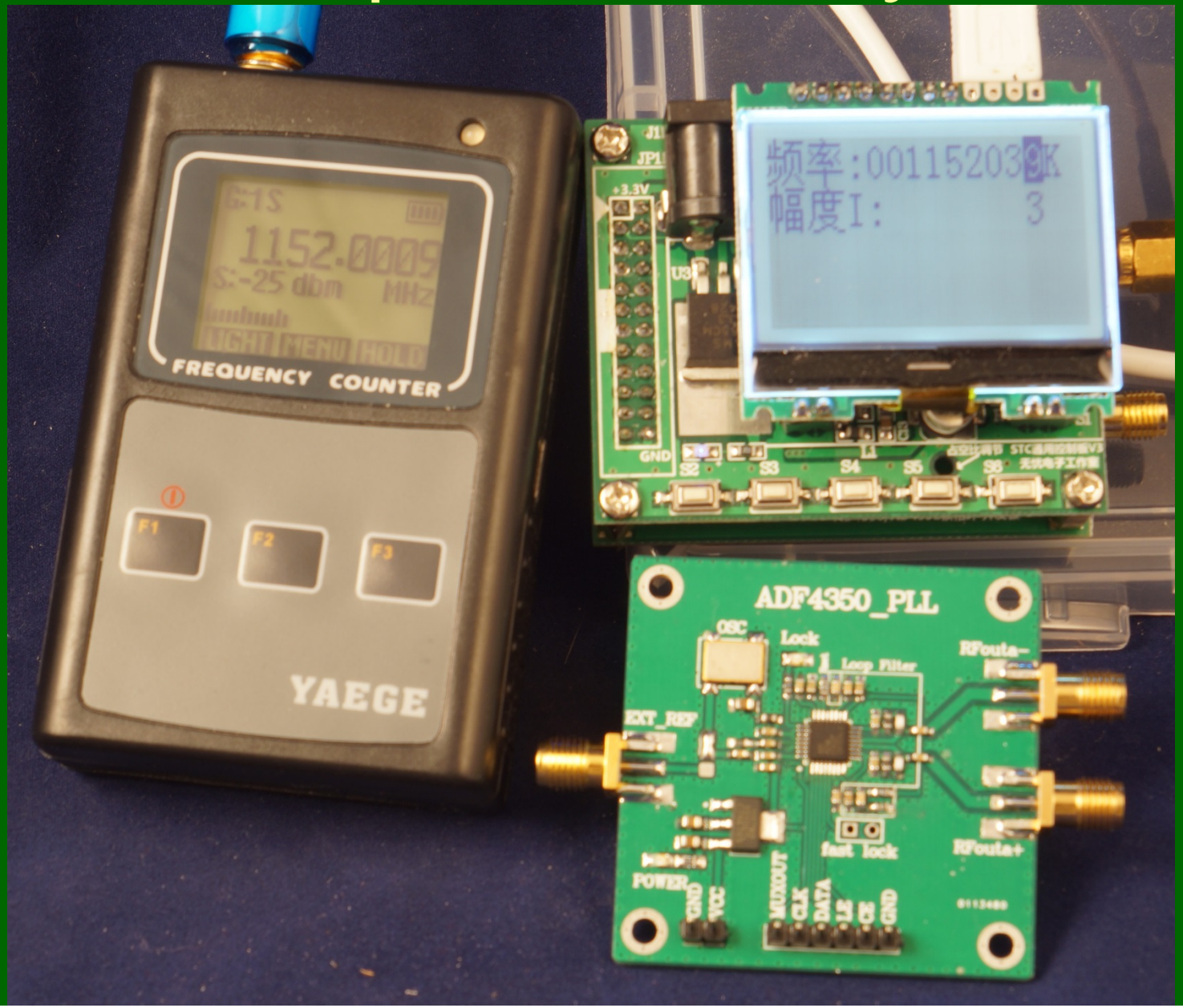
# Six identical amplifiers



# Local Oscillator

- Synthesizer
  - Flexible frequency for Multiband
- Cheap ones go to 4 GHz
  - ADF4350, ADF4351
  - Need Multplier for 5 & 10 GHz
- DigiLO – to 6GHz
- ADF5355 – to 13 GHz
- DB6NT - $$

# LO – Cheap Chinese Synthesizer



**ADF4350 Board+ 137Mhz-4.4G RF source Sweep Phase Locked Loop Board+12864 Display**

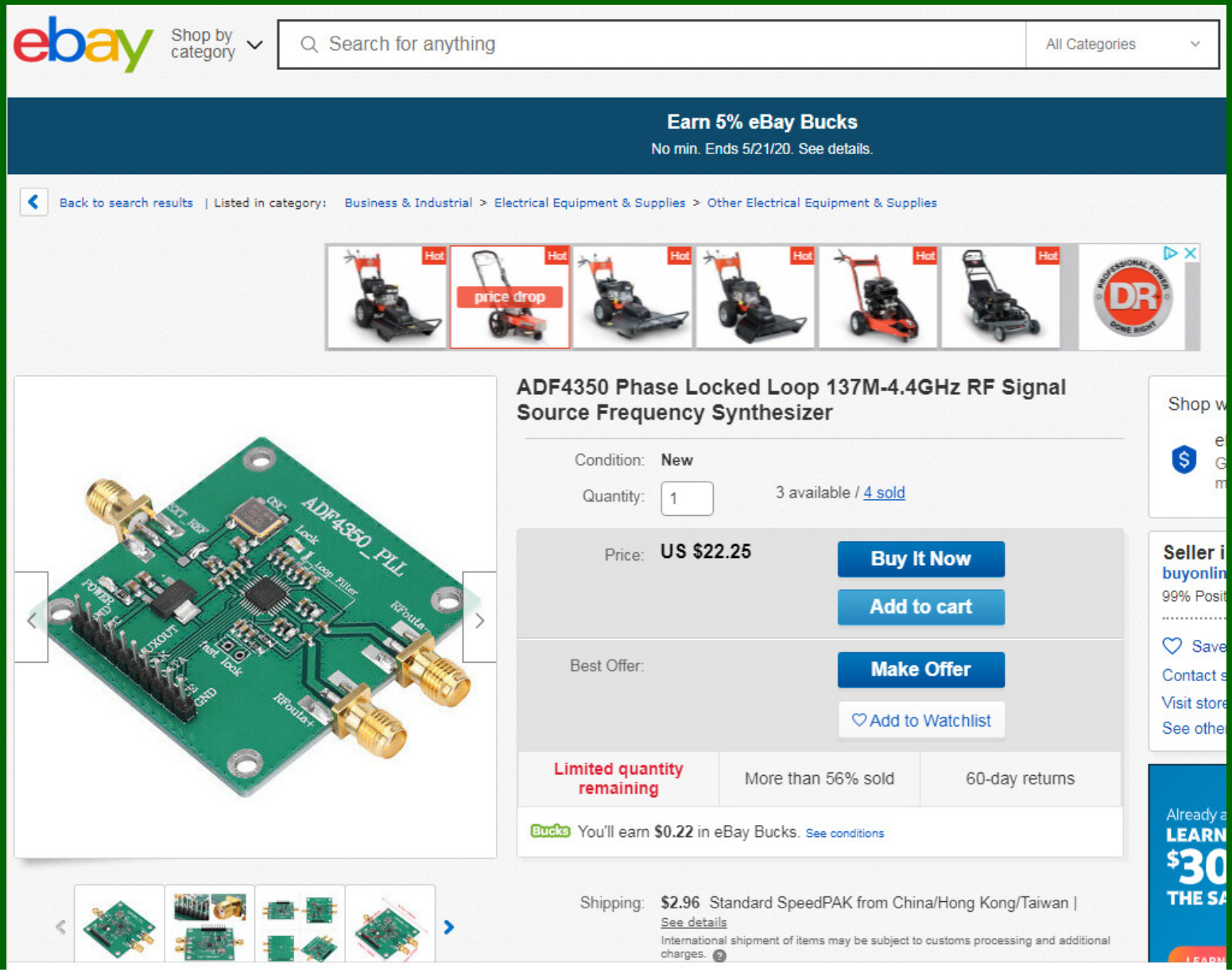
$65.25

# Signal source
# 10 GHz/ 24 GHz

- 1, measuring power range-45～-5 dBm (external RF attenuator can be extended to 80dBm)
- 2, the measurement resolution of 0.1 dBm power
- 3, measurement frequency range 1 1MHz-5GHz
- 4, the measured power 1nW ~ 2W
- 5, the working voltage of 5VDC (direct selection MICRO-USB powered)
- 6, the working current <50 mA
- 7, the working temperature of -40 ℃ ~ 65 ℃ degrees Celsius
- 8, storage temperature -40 ℃ ~ 65 ℃ degrees Celsius
- 9, size 50 * 50 * 25 mm length X

# 3456 MHZ Lunch Box Transverter

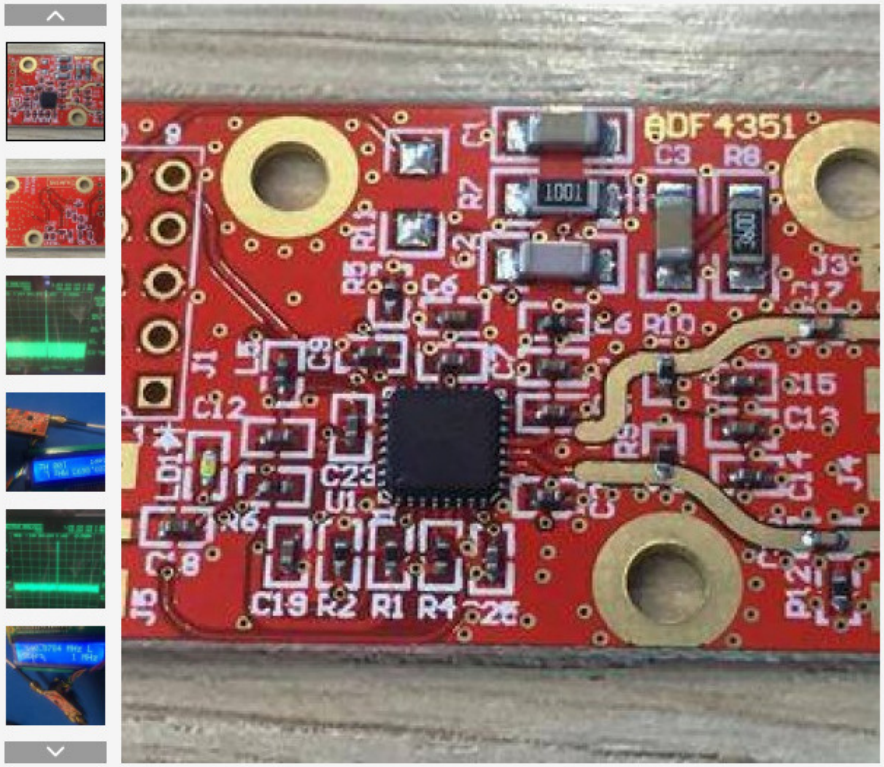
# ADF4350


ebay
Shop by category
Search for anything
All Categories
Earn 5% eBay Bucks
No min. Ends 5/21/20. See details.
Back to search results | Listed in category: Business & Industrial > Electrical Equipment & Supplies > Other Electrical Equipment & Supplies
Hot
price drop
ADF4350 Phase Locked Loop 137M-4.4GHz RF Signal Source Frequency Synthesizer
Condition: New
Quantity: 1
3 available / 4 sold
Price: US $22.25
Buy It Now
Add to cart
Best Offer:
Make Offer
Add to Watchlist
Limited quantity remaining
More than 56% sold
60-day returns
Bucks You'll earn $0.22 in eBay Bucks. See conditions
Shipping: $2.96 Standard SpeedPAK from China/Hong Kong/Taiwan |
See details
International shipment of items may be subject to customs processing and additional charges.

# Better ADF4351

SV1AFN.COM HOME ABOUT US PRODUCTS CONTACT US 0

Home > Products




SV1AFN.com

## ADF4351 PLL Synthesizer Module

Price: 28,23€ (VAT excluded) 35,00€

Quantity: — 1 +

ADD TO WISHLIST ADD TO CART

Downloads:

- ADF4351_SCH.PDF
- ADF4351BASICPLLDEBUG.PDF
- ADF4351CHEATSHEET.PDF

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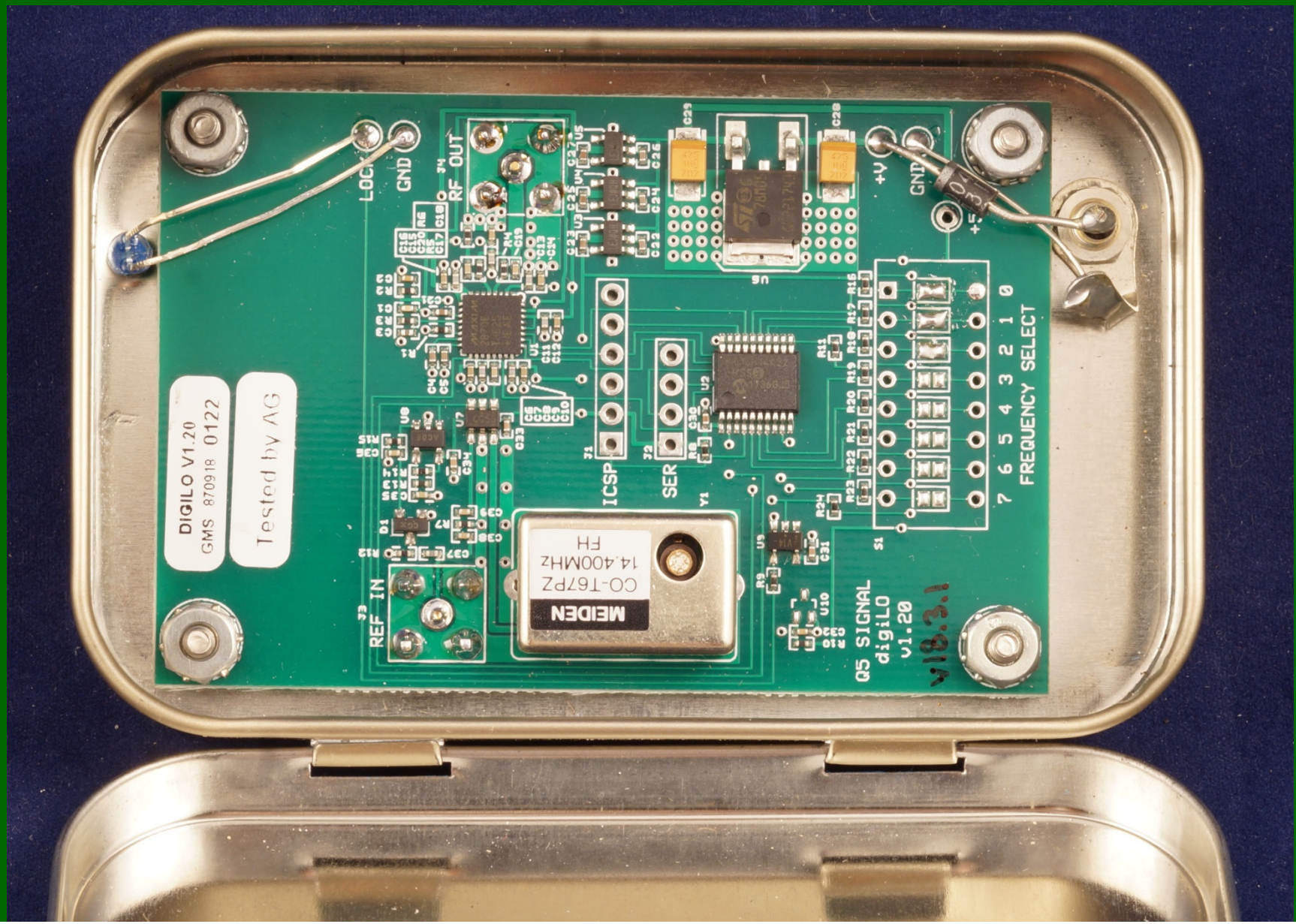
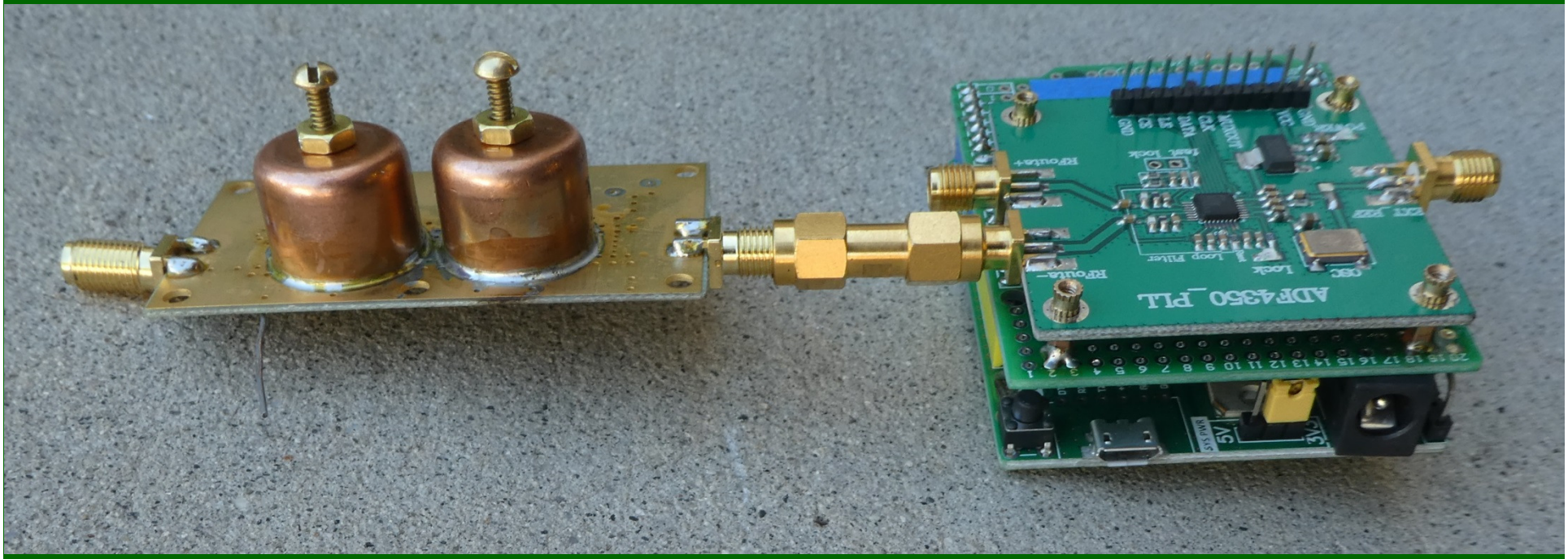
# Local Oscillator - digiLO



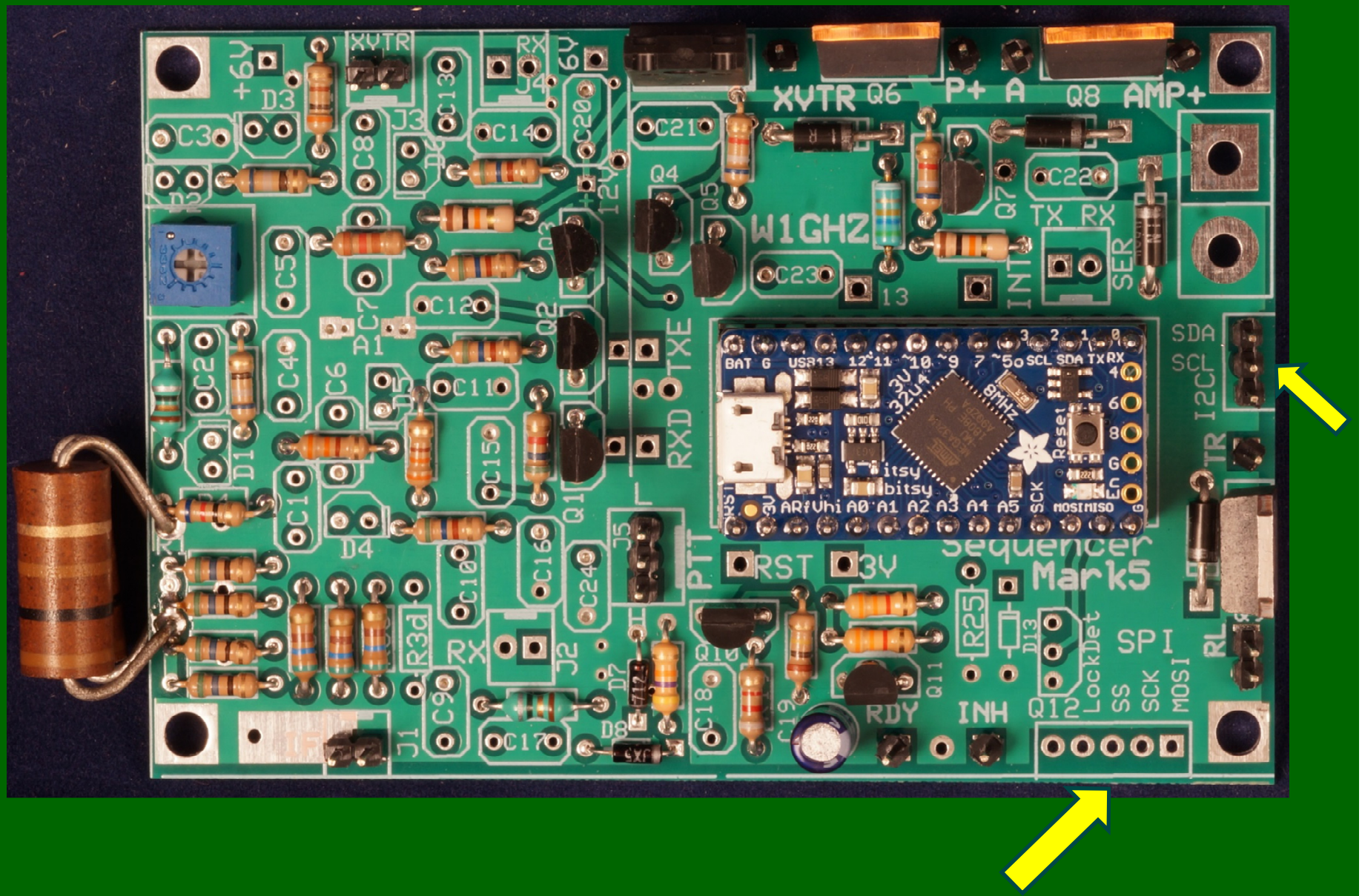
# SDMG Group Transverter

- Control ADF4350 with Arduino
- Multiple transverter boards
- Select band and LO frequency with Arduino
- Group build
- Add bands as desired

# Synthesizer on Arduino,
# 10 GHZ Multiplier,
# by Drew, N7DA

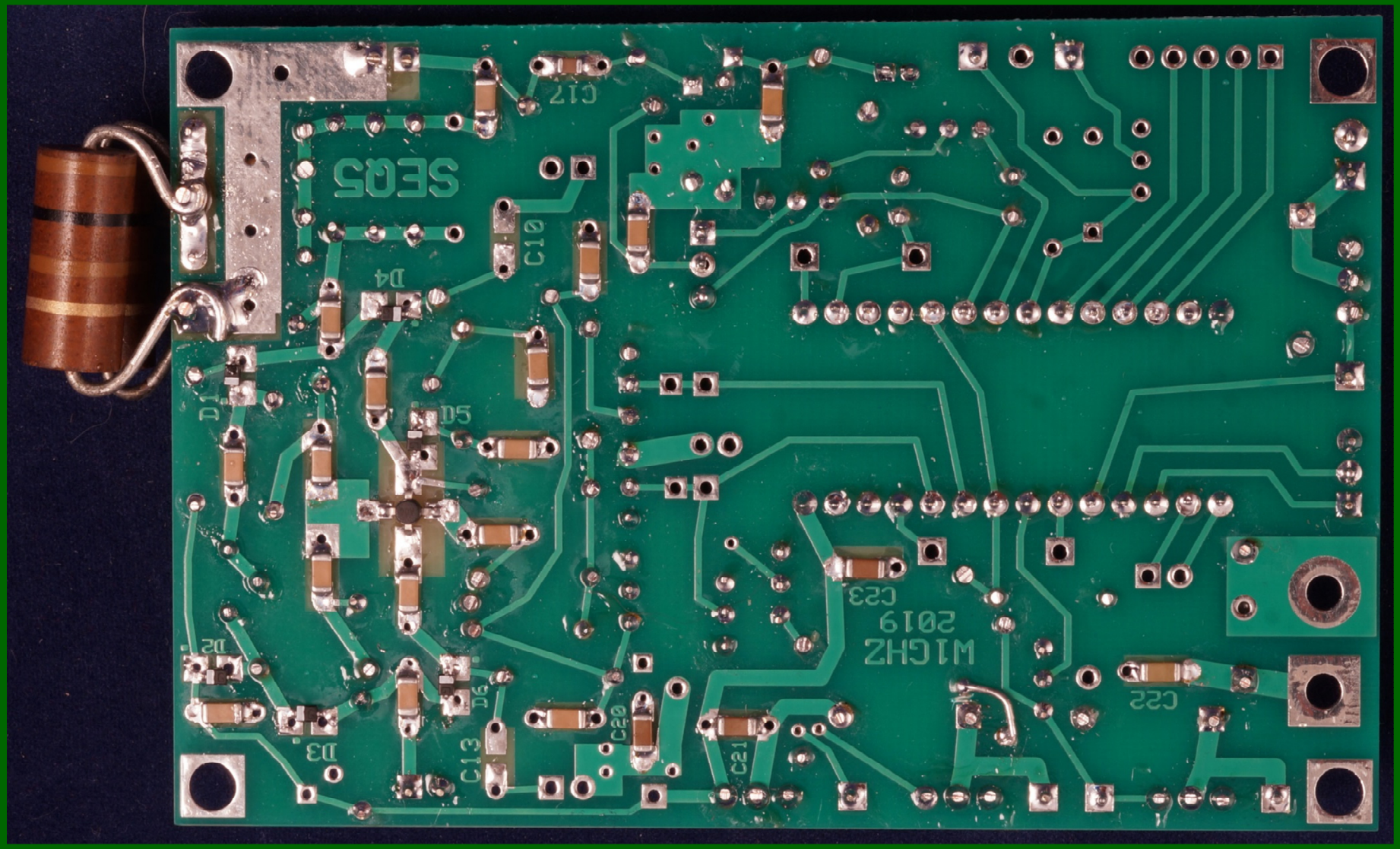


# Sequencer + IF interface



# IF interface – PIN diode switch

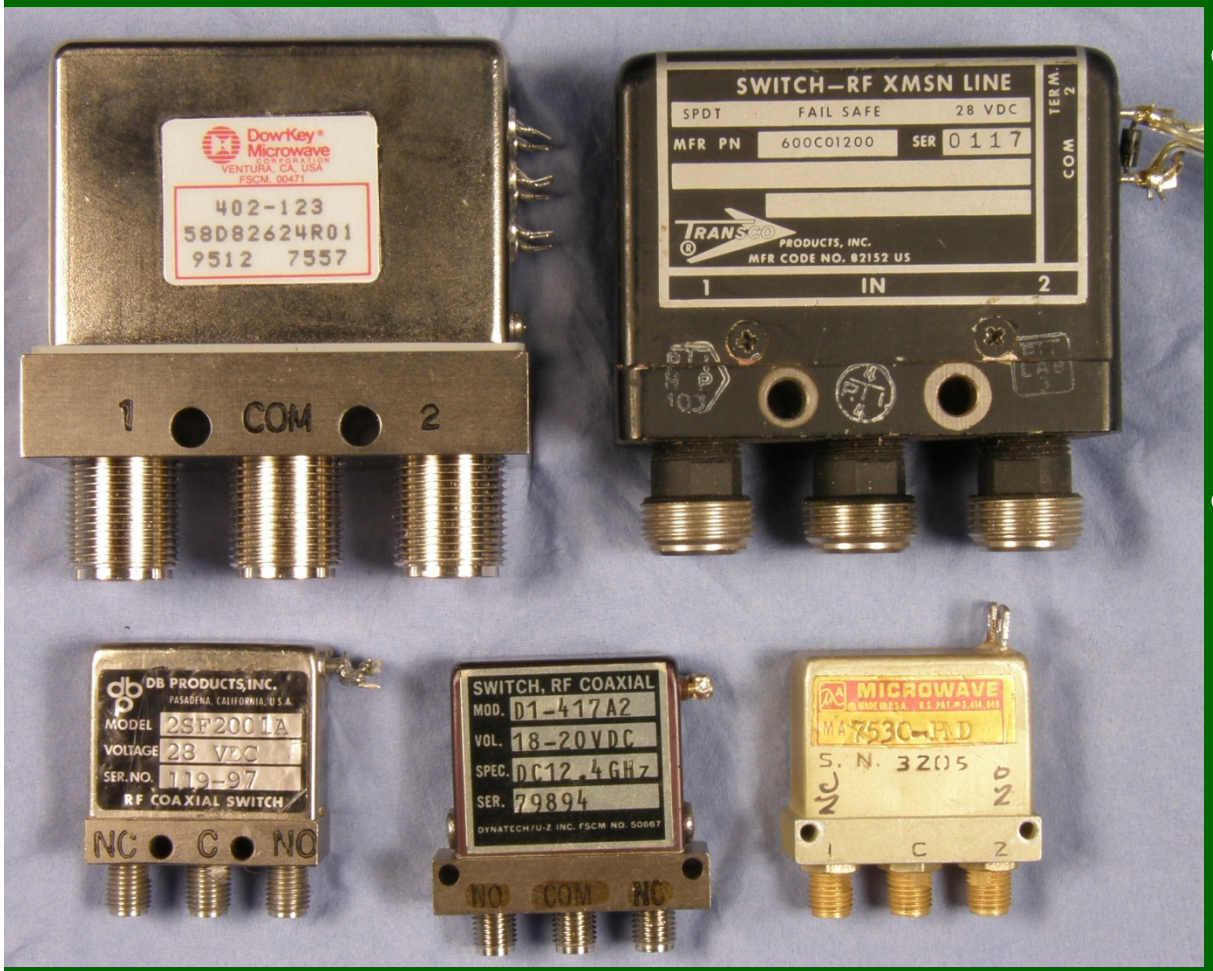
## *RF on the PCB backside*



# What else could Arduino do?

- Load Synthesizer Frequency
- Inhibit Transceiver output
- VSWR monitor and shutdown
  - analog inputs
- Monitor voltage
- Temperature monitor (external sensor)
- TR relay auxiliary contacts
- Latching relay driver
- Multiband transmit protection (Rover)

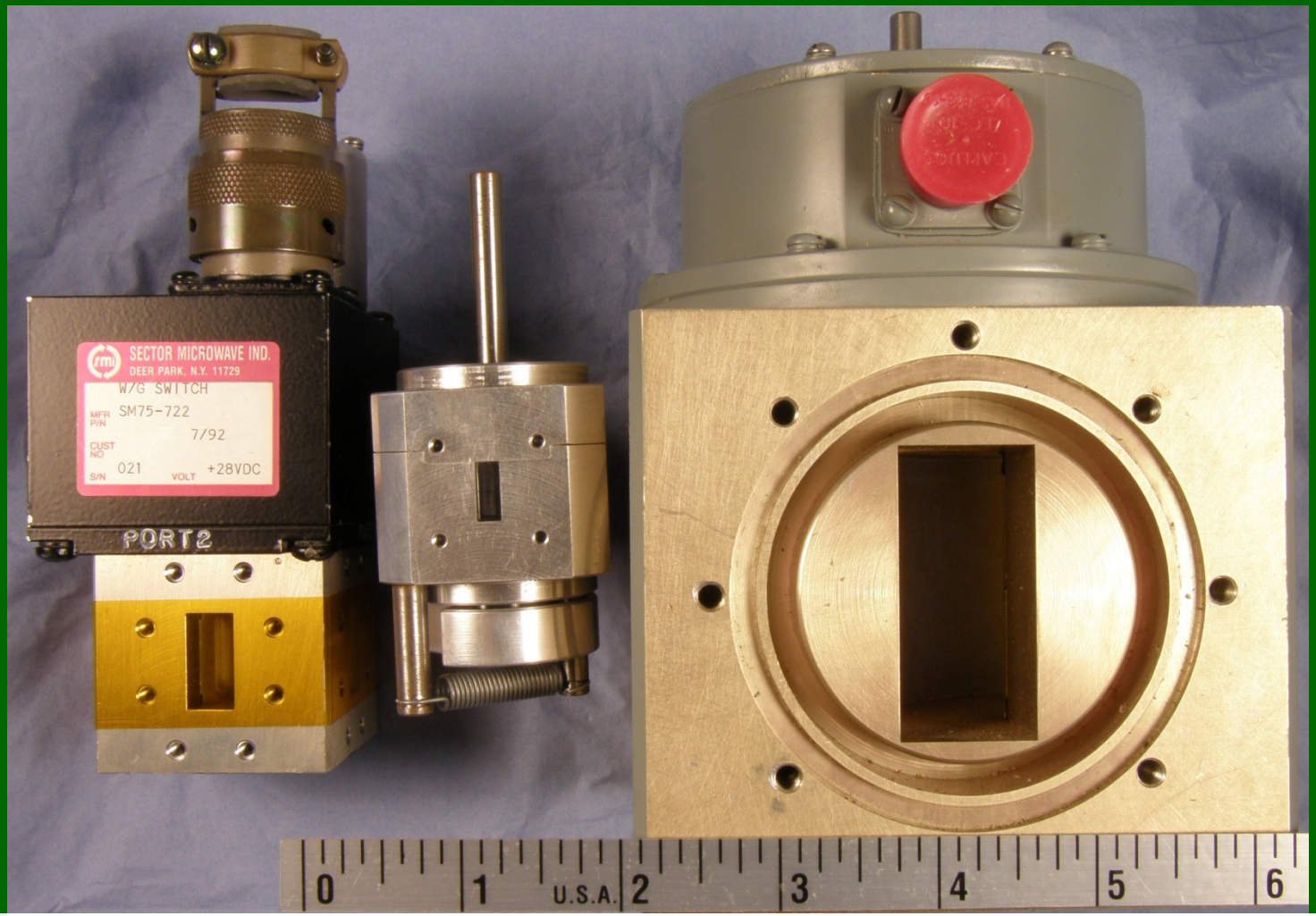
# Coax Relay



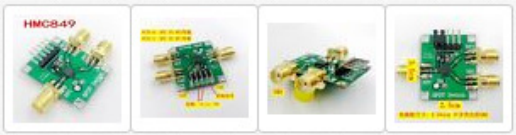

- **ON**
  - High Power
  - High Isolation
- **SWITCHING**
  - Low Power
  - Low Isolation
  - Easily damaged

# Waveguide Switches

- High Power and Isolation
- but ***NOT*** while switching



# Solid-state switch



$ Have one to sell? Sell now

**HMC849 RF Switch Module Single-Pole Double-Throw 6GHz Bandwidth**

Condition: **New**

Sale ends in: 02d 06h 30m

Quantity: 1 2 available

Was: ~~US $16.88~~

You save: $0.84 (5% off)

Price: **US $16.04**

Buy It Now

Add to cart

♡ Add to Watchlist

**Free shipping**

Bucks You'll earn **$0.16** in eBay Bucks. See conditions

Shipping: FREE Standard SpeedPAK from China/Hong Kong/Taiwan | See details

International shipment of items may be subject to customs processing and additional charges.

Item location: shenzhen, China

Ships to: Worldwide See exclusions

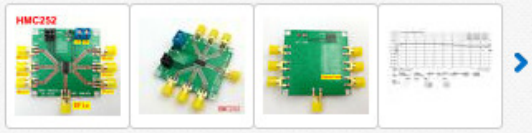
Delivery: Estimated between **Tue. Jun. 23 and Thu. Jul. 16**

This item has an extended handling time and a delivery estimate **greater than 21 business days.**

Please allow additional time if international delivery is subject to customs processing.

Payments: PayPal VISA MasterCard American Express Discover

# Switch for Multiband LO



$ Have one to sell? Sell now

**HMC252 DC to 3GHz Non-reflective Single Pole Six Throw SP6T RF Switch 3V-5V New**

★★★★★ 1 product rating

Condition: **New**

Quantity: 1 More than 10 available

Price: **US $21.99**

Buy It Now

View Cart

Best Offer:

Make Offer

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| Free shipping | 60-day returns | Longtime member |
|---|---|---|

Bucks You'll earn **$0.22** in eBay Bucks. See conditions

Shipping: **FREE** Standard SpeedPAK from China/Hong Kong/Taiwan | See details

International shipment of items may be subject to customs processing and additional charges.

Item location: shenzhen, China

Ships to: Worldwide See exclusions

Delivery: Estimated between **Tue. Jun. 9 and Thu. Jul. 2**

This item has an extended handling time and a delivery estimate **greater than 11 business days.**

Please allow additional time if international delivery is subject to customs processing.

Payments: PayPal VISA

PayPal CREDIT

# FT-817 with Panadapter

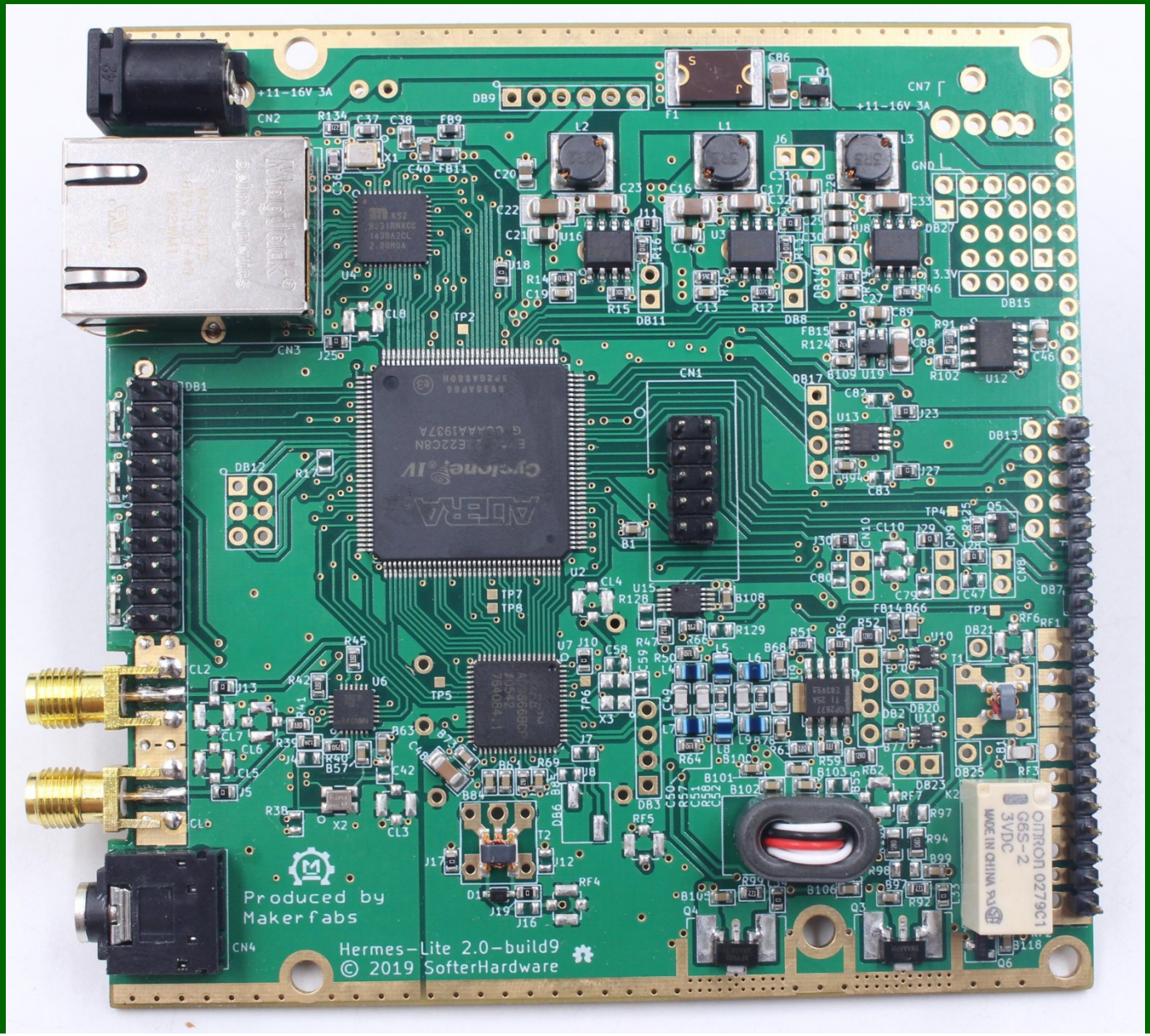
# SDR

- Several wideband SDR available
- Good receiver
- Clean transmit a problem

- Simple matter of software…

- Better as test equipment?  satsagen

# Hermes Lite SDR



# Get it on the air!

# More Details

- www.w1ghz.org

- Arduino sketches (software)
- Pictures, schematic, parts list, etc.

- Boards are available