

GBPPR 'Zine



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"I voted, did you? Gotta get the Manchurian Candidate out of the driver's seat before we're all soaring off a cliff into oblivion. Be smart.

...

The Manchurian Candidate was a movie about a fake president who was put there by foreign enemies to destroy America. Scary concept. Rise up!"

--- November 2, 2010 Tweets from the actor Sylvester Stallone. Are people finally waking up? (twitter.com/TheSlyStallone/status/29485903438#)

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GBPPR 1 GHz RF Spectrum Analyzer – Part 1

Overview

A RF spectrum analyzer is one of the most useful tools an experimenter can have. The spectrum analyzer project shown here will be a slight improvement on the "Spectrum Analyzer for the Radio Amateur" project from Wes Hayward (W7ZOI) and Terry White (K7TAU) which was covered in the August and September issues of *QST* magazine. There will also be a few ideas taken from the "Scotty's Spectrum Analyzer" project by Scotty Sprowls, most notably, his really nice first IF (1013.3 MHz) bandpass cavity filter. You *must* read and study carefully the "Spectrum Analyzer for the Radio Amateur" article before embarking on this project, as it covers some of the more in-depth concepts and construction notes which will not be covered here. Wes Hayward also has several "Spectrum Analyzer Update" PDF files on his website (www.w7zoi.net) which should also be studied as they include a number of tweaks and improvements to his design. These update files also include the necessary final IF/logarithmic amplifier calibration information.

Most of the components used in this RF spectrum analyzer project were obtained from ham radio swapfests or salvaged from old two-way radios, cellular phones, or cable TV distribution gear. Some components may be hard to track down, but equivalent parts can be substituted with minor tweaking of the circuits. No PCB patterns will be provided as all the PC board layouts were done by hand using Sharpie markers and a straight edge. You'll want to keep the PC board traces as short as possible and utilize a large ground plane and isolate the RF inputs and outputs. The PC boards were all made from double-sided (1 oz.) 1/32-inch FR4 material.

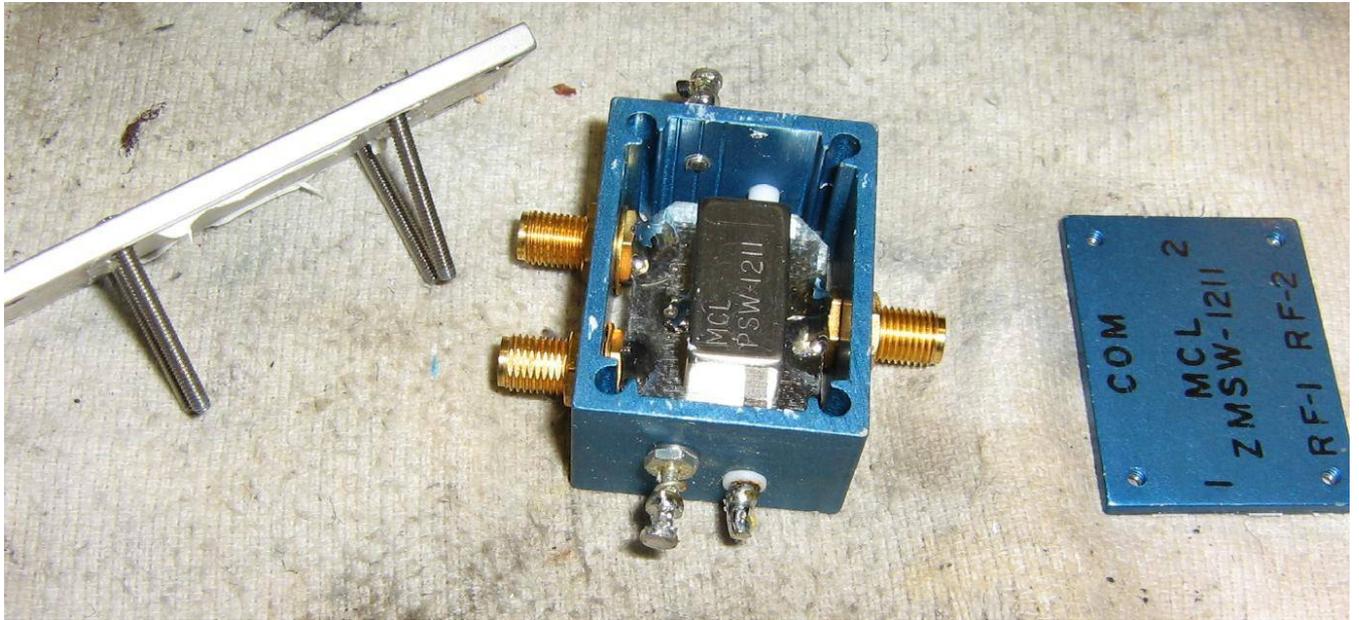
The key to building a high-performance RF spectrum analyzer is isolation and shielding. Construct the spectrum analyzer as a series of well-shielded modules which each perform only one function. This will also make debugging (and future modifications) much easier. All the individual modules and their interconnections should be shielded and filtered. Coax jumpers should be high-quality RG-142, or (ideally) 100% shielded conformable coax like UT-141. Failing to properly do this will result in numerous spurious images in the final displayed spectrum.

Voltage regulators will also not be documented in the schematics, but try to use the newer, lower-noise equivalents of the common three-terminal voltage regulators. The two VCOs should be operated off of a separate voltage regulator from the other circuits. Each module should have its own voltage regulator, with feed-through capacitors and ferrite beads on the incoming lines, for the best interference/noise rejection performance.

This spectrum analyzer will consist of an incoming RF signal, up to 1000 MHz and -30 dBm max., feeding a Mini-Circuits SRA-11 mixer which has a sweeping Local Oscillator (LO) signal from 1013 to 2013 MHz. This mixer will create a 1013.3 MHz first IF output which will then be sharply bandpass filtered using a 4-pole cavity filter made from copper pipe plumbing parts. The 1013.3 MHz first IF will then feed another Mini-Circuits SRA-11 mixer which has a fixed LO signal of 1024 MHz. This mixer will produce the final IF frequency of 10.7 MHz. The 10.7 MHz IF signal will then pass through a narrowband resolution filter and then onto additional IF amplification and logarithmic detection using an Analog Devices AD603 and AD8307. The final video output signal will be a logarithmic representation of the incoming RF signal and will drive the "Y" input (0.5 V/div) on an oscilloscope operating in "X/Y" mode. A sweep generator will control both the sweeping first local oscillator and the "X" input (0.5 V/div) on the oscilloscope.

Component changes in several pictures are due to constant tweaking. Refer to the schematics for the final design. Updates to this project will be available at www.qsl.net/n9zia/spec.

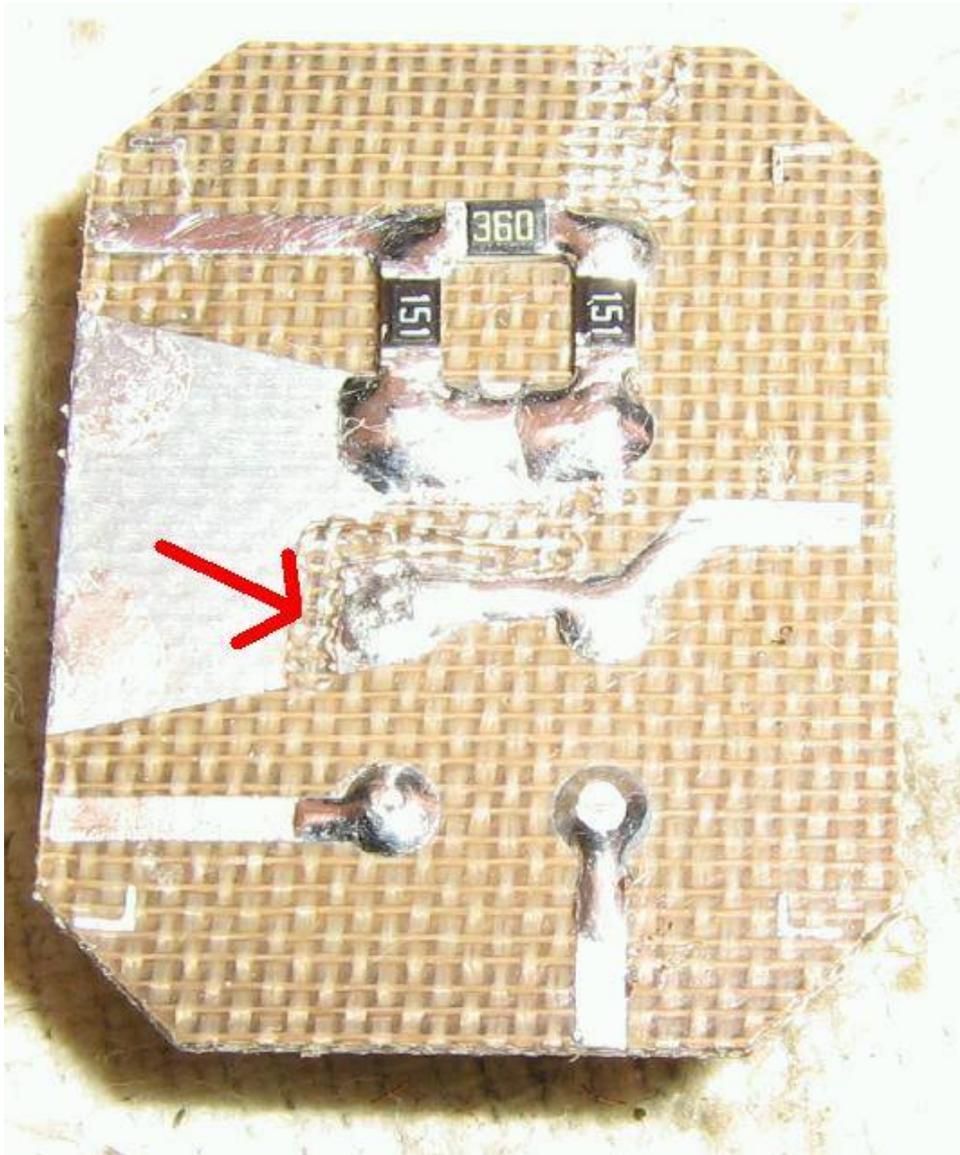
Pictures & Construction Notes



Using a surplus Mini-Circuits ZMSW-1211 PIN diode switch case for holding a Mini-Circuits SRA-11 mixer.

ZMSW-1211 PIN diode switches are often available at swapfests for very low cost and the aluminum case they use (and PC board pattern) are perfect for converting into RF mixers.

There are probably much better mixers for use in this spectrum analyzer project, but I got these SRA-11 mixers for free. The "ideal" mixer will have 40+ dB isolation between the LO and RF ports. Note that the first mixer will have the incoming RF signal (DC to 1000 MHz) on its IF port. This is done as the IF port has a better low frequency response than the other mixer ports.



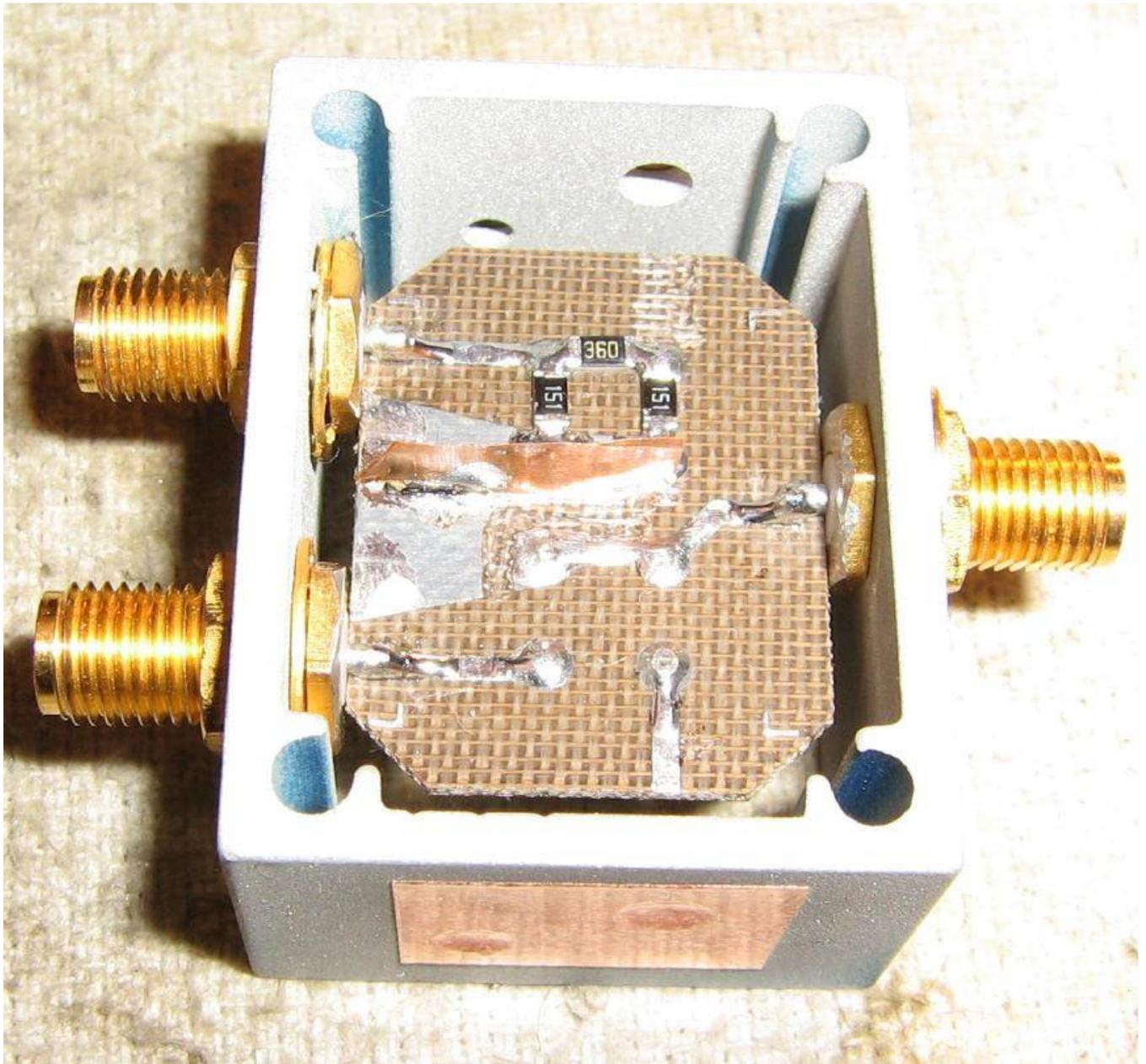
Modifying the PC board of the ZMSW-1211 PIN diode switch to fit a SRA-11 mixer.

Isolate the SRA-11's pin 3 on both sides of the PC board by grinding away the copper using a Dremel tool.

A resistive 3 dB attenuator pad will be added to the LO port. Note the picture shows components for a 6 dB pad.

Pinout for the Mini-Circuits SRA-11:

LO	Pin 8
RF	Pin 1 (Blue Ring)
IF	Pin 3
Ground	Pins 2, 5, 6, 7
Not Used	Pin 4

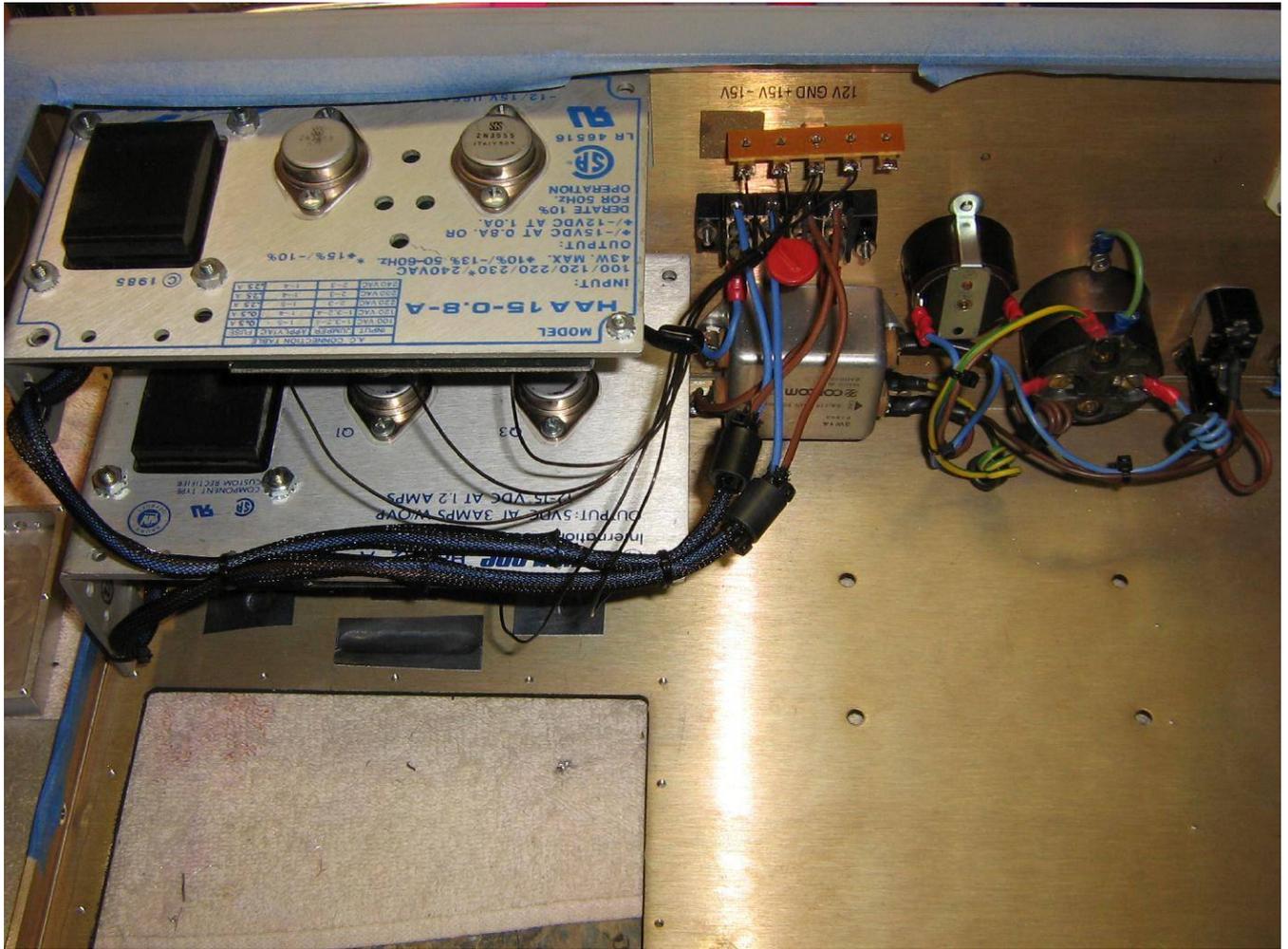


Putting the new SRA-11 mixer together.

A small little copper shield was added to further help isolate the LO and RF ports.



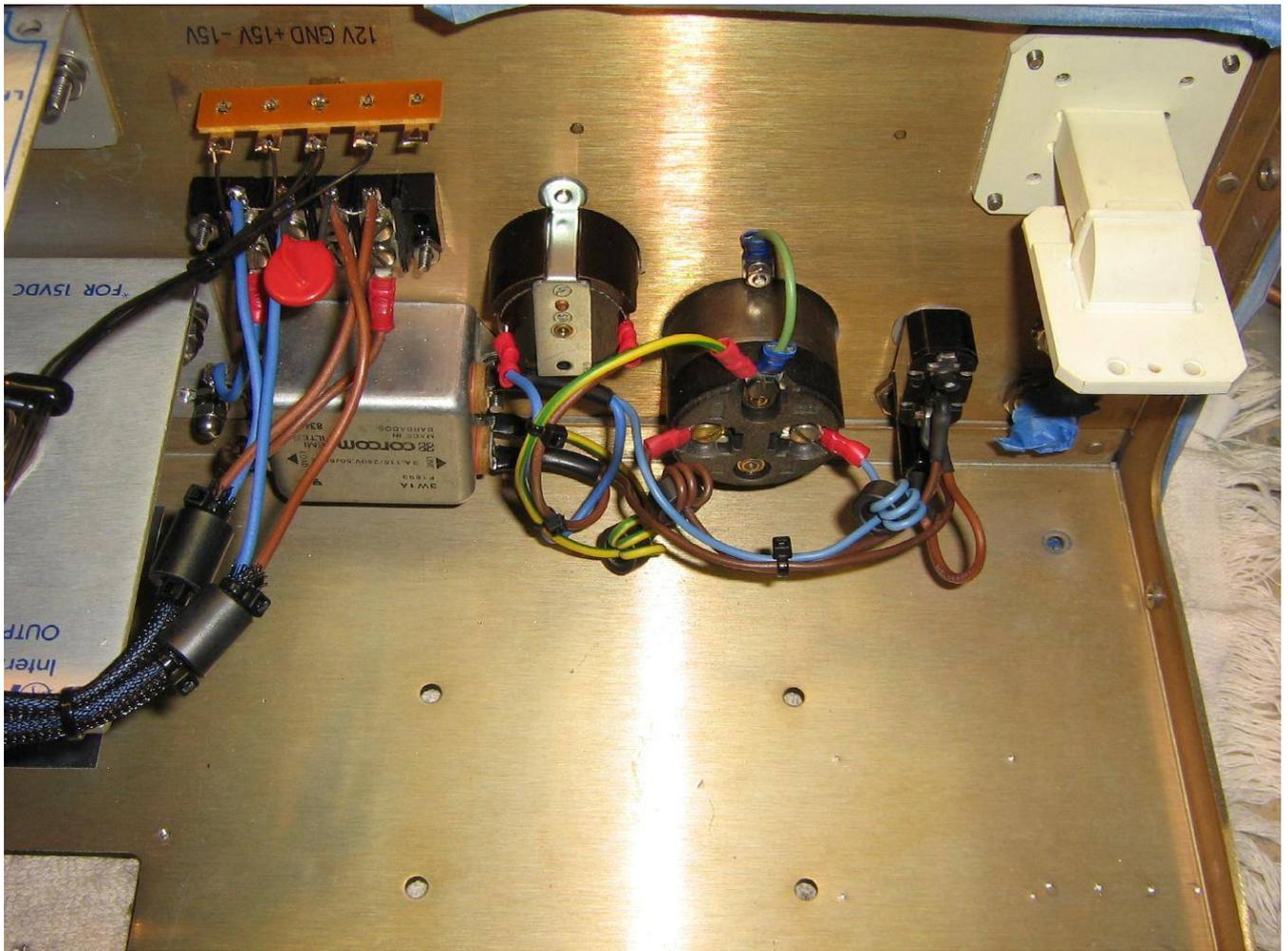
This spectrum analyzer project will be housed in in an old Hughes AML-STX-141 Ku-band CATV link transmitter case.



Power for the modules will be provided by two linear power supplies. Don't even think of using switching power supplies – as most are too noisy.

One power supply provides ± 15 VDC and the other is for +12 VDC.

The +12 VDC power supply will be used for powering auxiliary items like relays, lights, etc. to help keep the main ± 15 VDC power lines clean.



Incoming 120 VAC mains power.

The AC sockets were stock to the AML-STX-141 and an AC line filter, fuse, MOVs, and power switch were added to the rear-panel.



Modifying the front-panel of the AML-STX-141 to house all the controls for the spectrum analyzer.
Standard auto body repair techniques were used to fill in any unused holes.



Behind the finished front-panel showing some of the switches and sweep generator controls.

The meter will not be used at this time.

Potentiometer on the lower-right is for **Sweep Rate**.

The blue potentiometer is for **Fine Tune**.

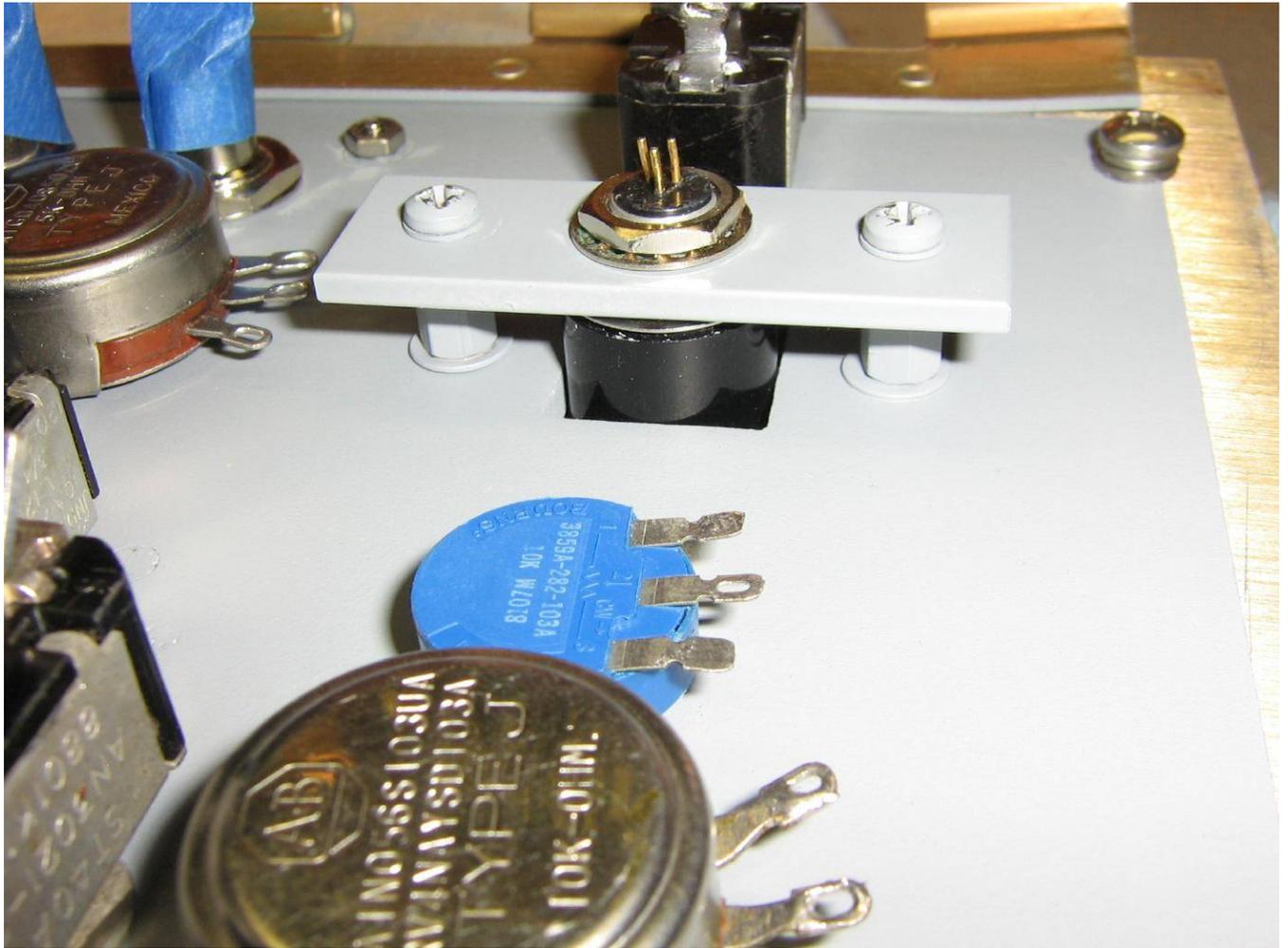
The multiturn potentiometer on the bracket is for **Coarse Tune**.

The switch above the multiturn pot is for **Zero Span**.

The potentiometer to the left of the multiturn pot is for **Sweep Width**.

The BNC jacks are for the oscilloscope **x** and **y** outputs and a tap for the VCO sweeping signal.

The other switches for things like the marker generator, resolution and video filters, and controls for a future FM demodulator.



Coarse tuning control was a multitrack 10k ohm potentiometer with a turns counter from an old Tektronix 1502 TDR.

This pot required a little mounting bracket for proper operation.



Behind the finished front-panel showing some of the switches for the RF input section.

The three little standoffs will hold an optional Hittite HMC307 31 dB attenuator evaluation board.

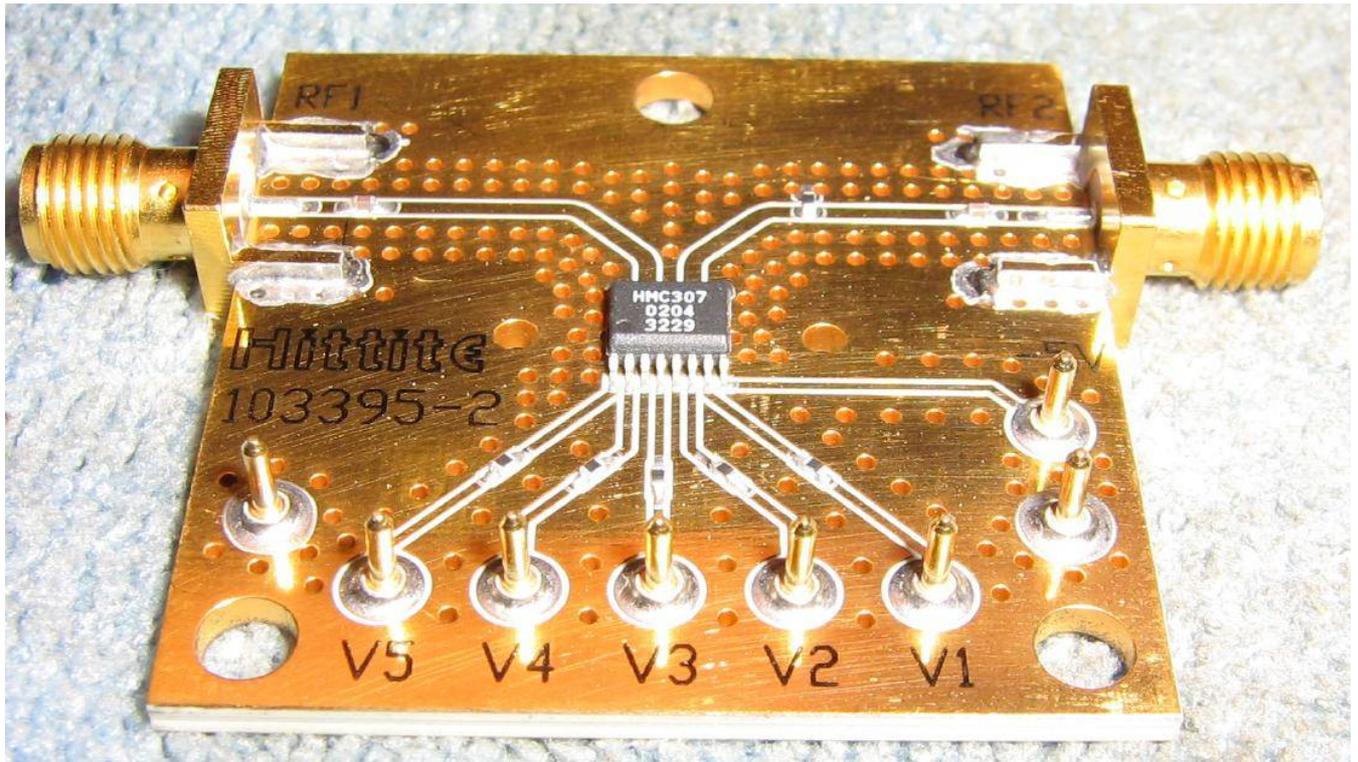
The switches on the left control the attenuator controls (1 to 16 dB).



Completed front-panel overview.

Some of the switches (and meter) are not in use right now, and will be reserved for future upgrades.

Yes, I bought a Brother P-touch label maker...

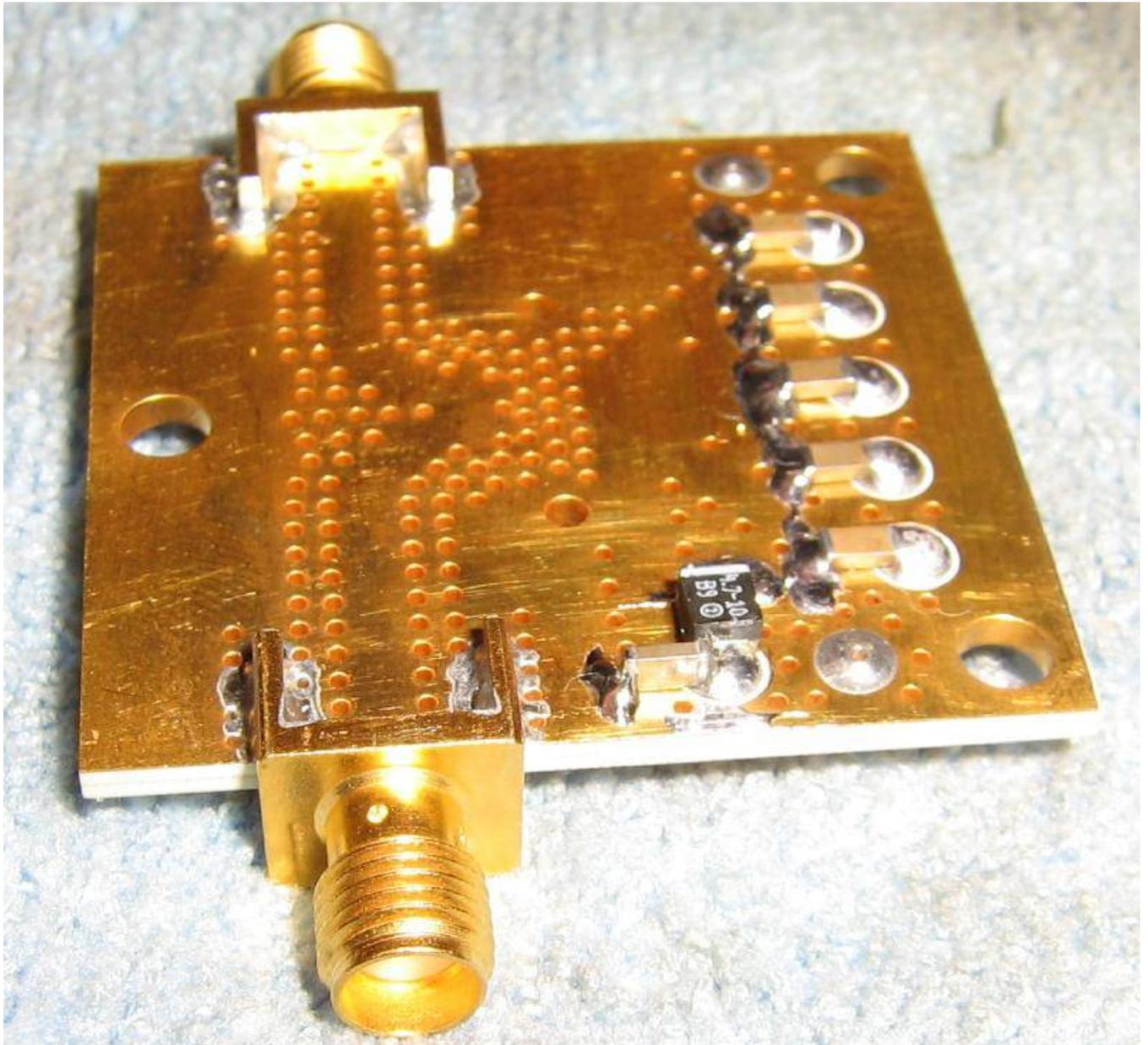


Hittite HMC307 31 dB step attenuator evaluation board.

This is optional, but an input RF step attenuator is very handy on your spectrum analyzer.

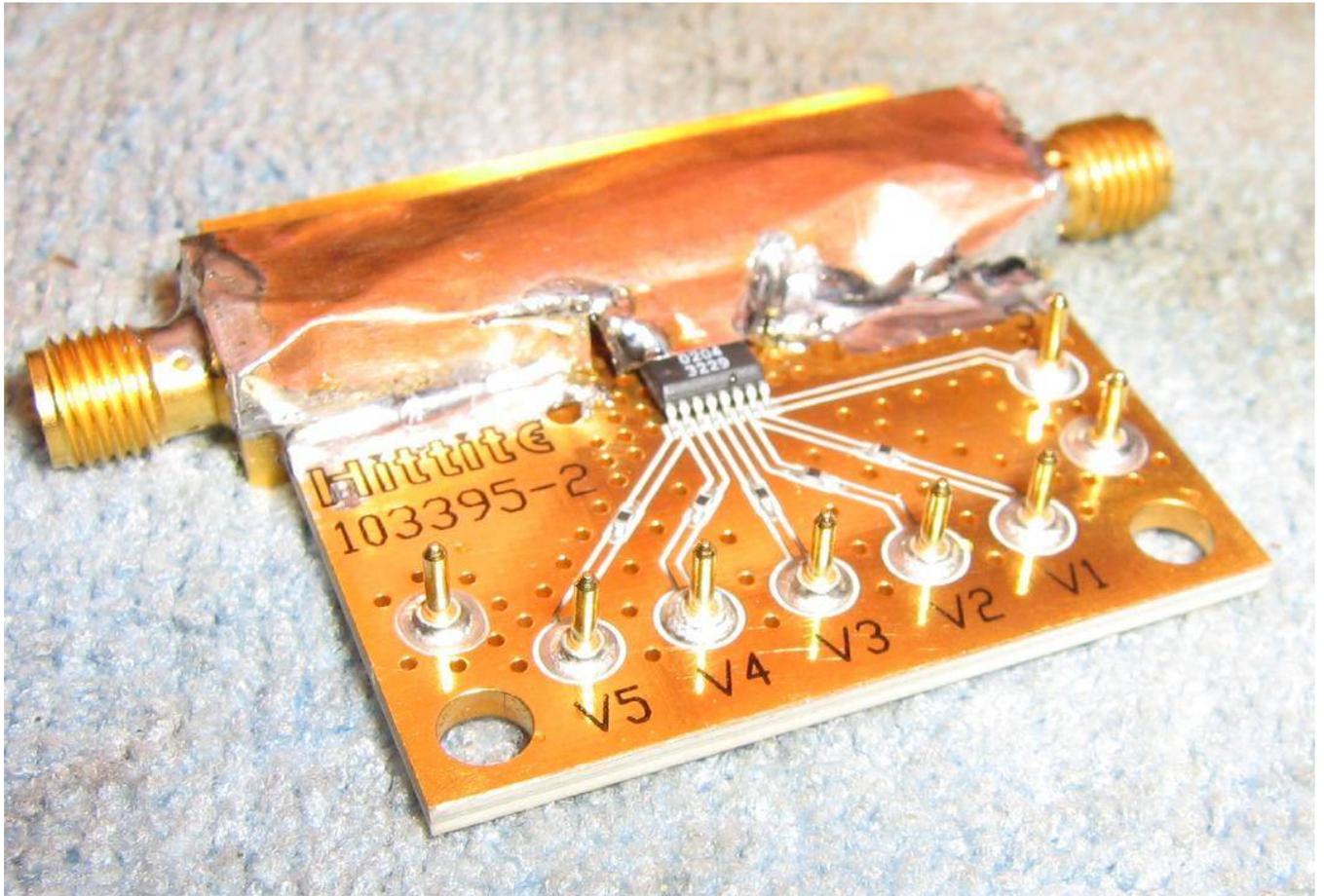
This particular step attenuator can be easily controlled using only toggle switches on the 1, 2, 4, 8, and 16 dB control lines.

The Hittite HMC307 runs at -5 VDC which is regulated down from the main -15 VDC supply line. The control lines also operate at -5 VDC.

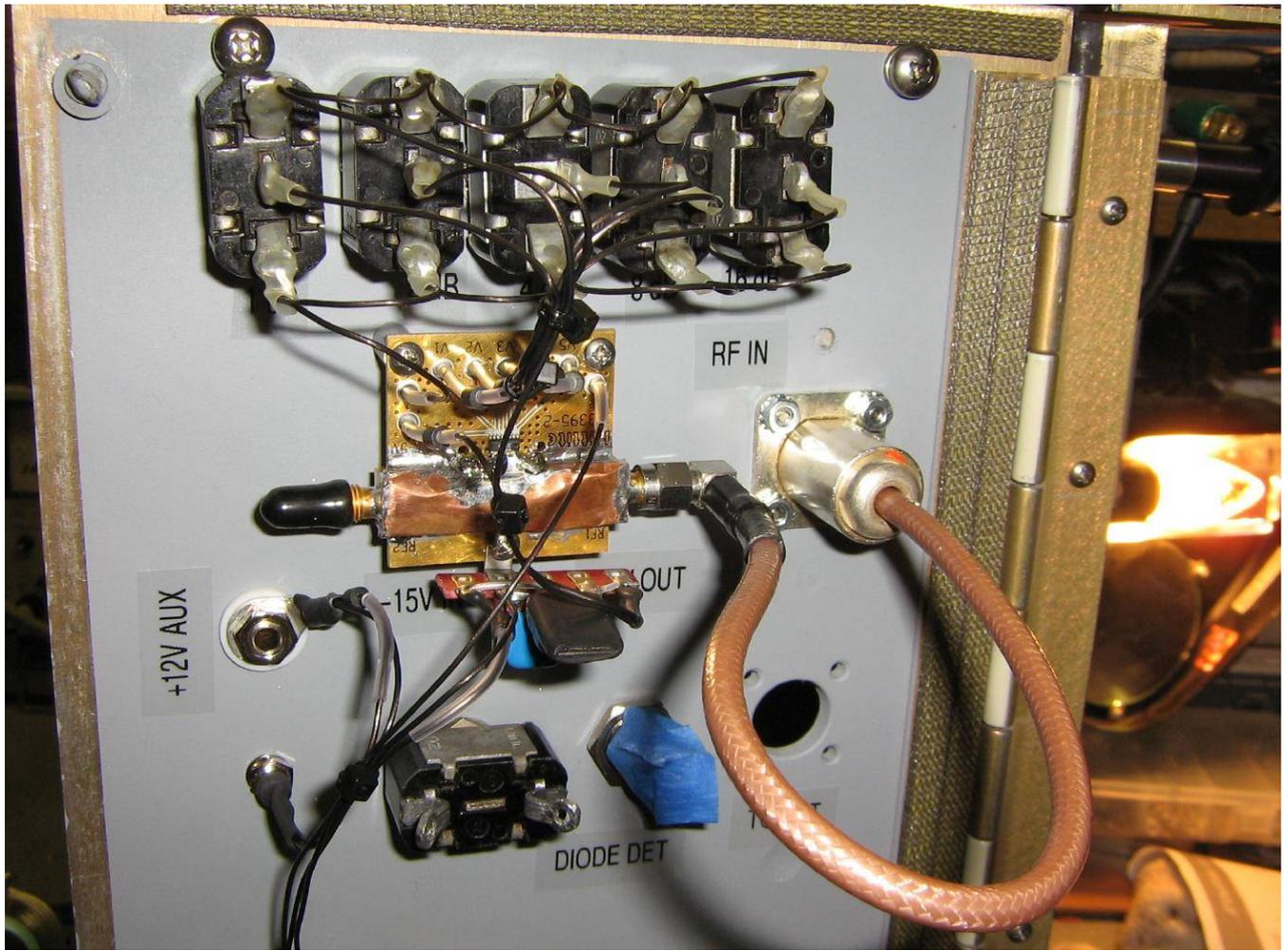


A few minor modifications were made to the Hittite HMC307 evaluation board.

Surface-mount $0.01 \mu\text{F}$ capacitors were added to the control lines and a $2.2 \mu\text{F}$ capacitor was added to the main power line.



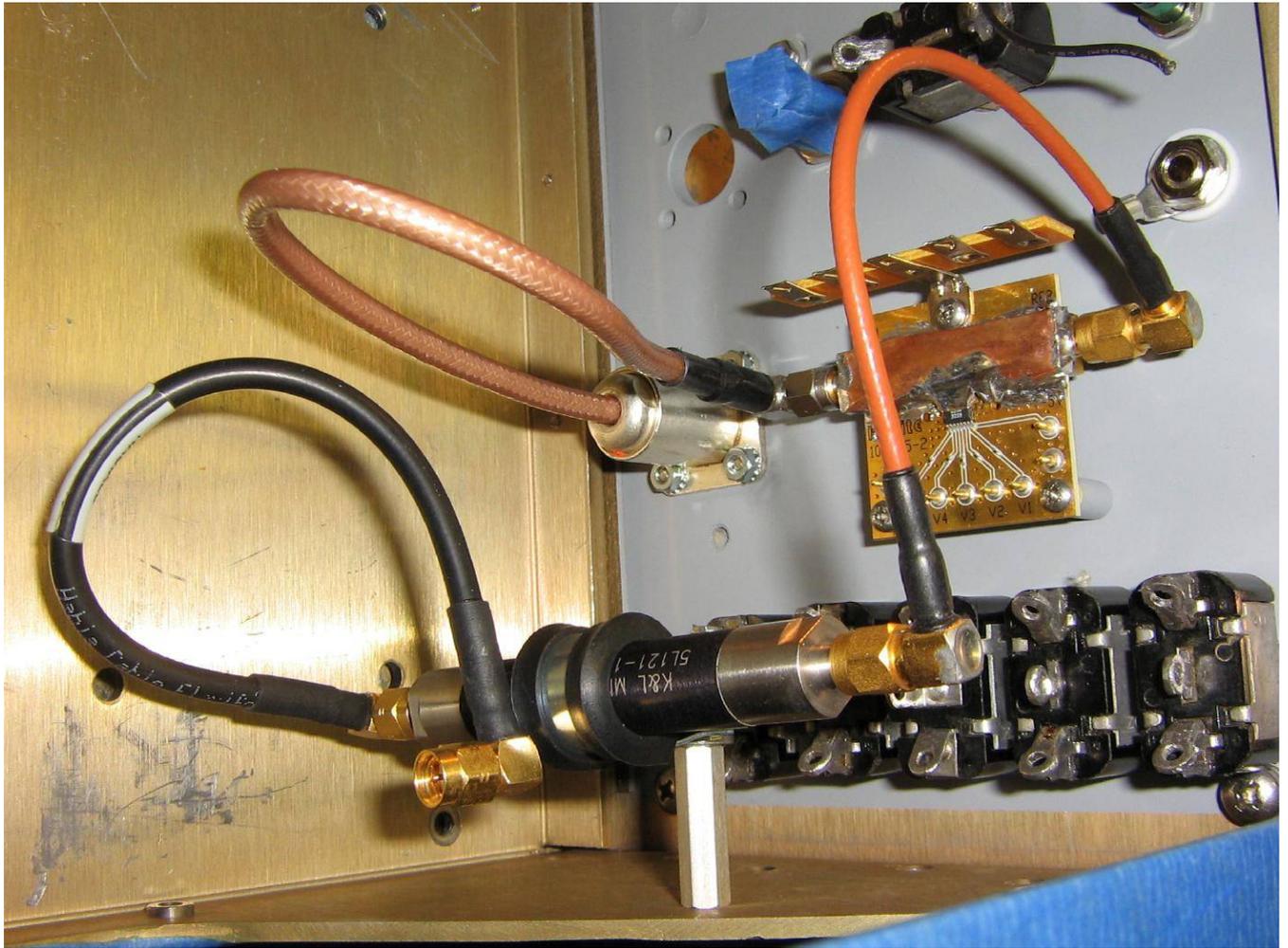
A copper shield was added to help prevent external RF interference.



Mounting the Hittite HMC307 evaluation board and connecting the RF input line.

RF input to the spectrum analyzer is via a panel-mount N jack.

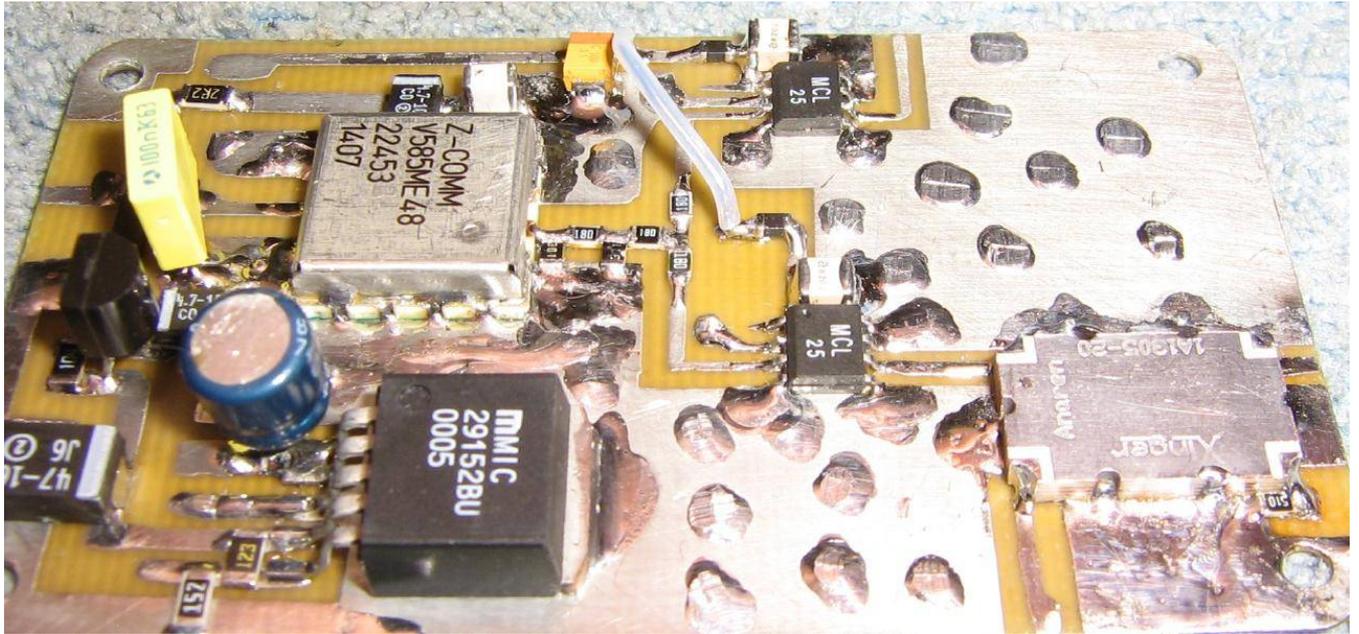
A 7905 voltage regulator is mounted on a solder terminal block to power the Hittite HMC307 evaluation board. The toggle switches control the -5 VDC going to the HMC307's attenuator control lines (V1 to V5).



After the step attenuator is a 1000 MHz low-pass filter.

This is to prevent higher (out-of-band) frequency signals from becoming spurious images in the spectrum analyzer's display.

This particular low-pass filter is a K&L 5L121-1000/T5000-O/O. It's a five section low-pass filter with a 3 dB point at 1000 MHz and an insertion loss of around 0.65 dB. This filter was found at a swapfest. A Mini-Circuits equivalent would be the SLP-1000.



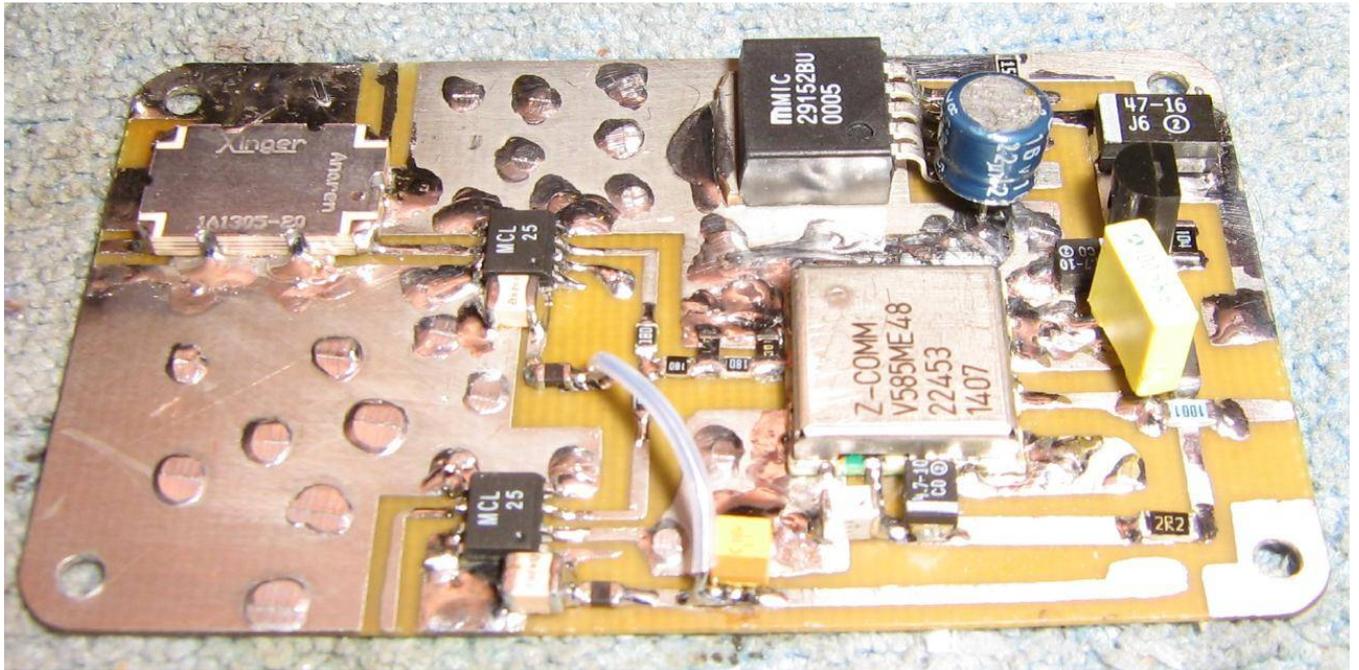
First local oscillator circuit.

Based around a Z-Communications V585ME48 VCO sweeping between 1013 – 2013 MHz and feeding two Mini-Circuits VNA25 RF amplifiers. One of these outputs is going to the local oscillator port on the first SRA-11 mixer, and the other output will be used for a future tracking generator project.

An optional Anaren 1A1305-20 directional coupler is inline with the signal feeding the first SRA-11 mixer. This will be used for an optional (and experimental) marker generator input.

Avoid using ceramic capacitors on the VCO's tuning line as they can be microphonic and will introduce excessive phase noise to the VCO. Also keep the external voltage tune line well-shielded by using coaxial cable back to the sweep generator.

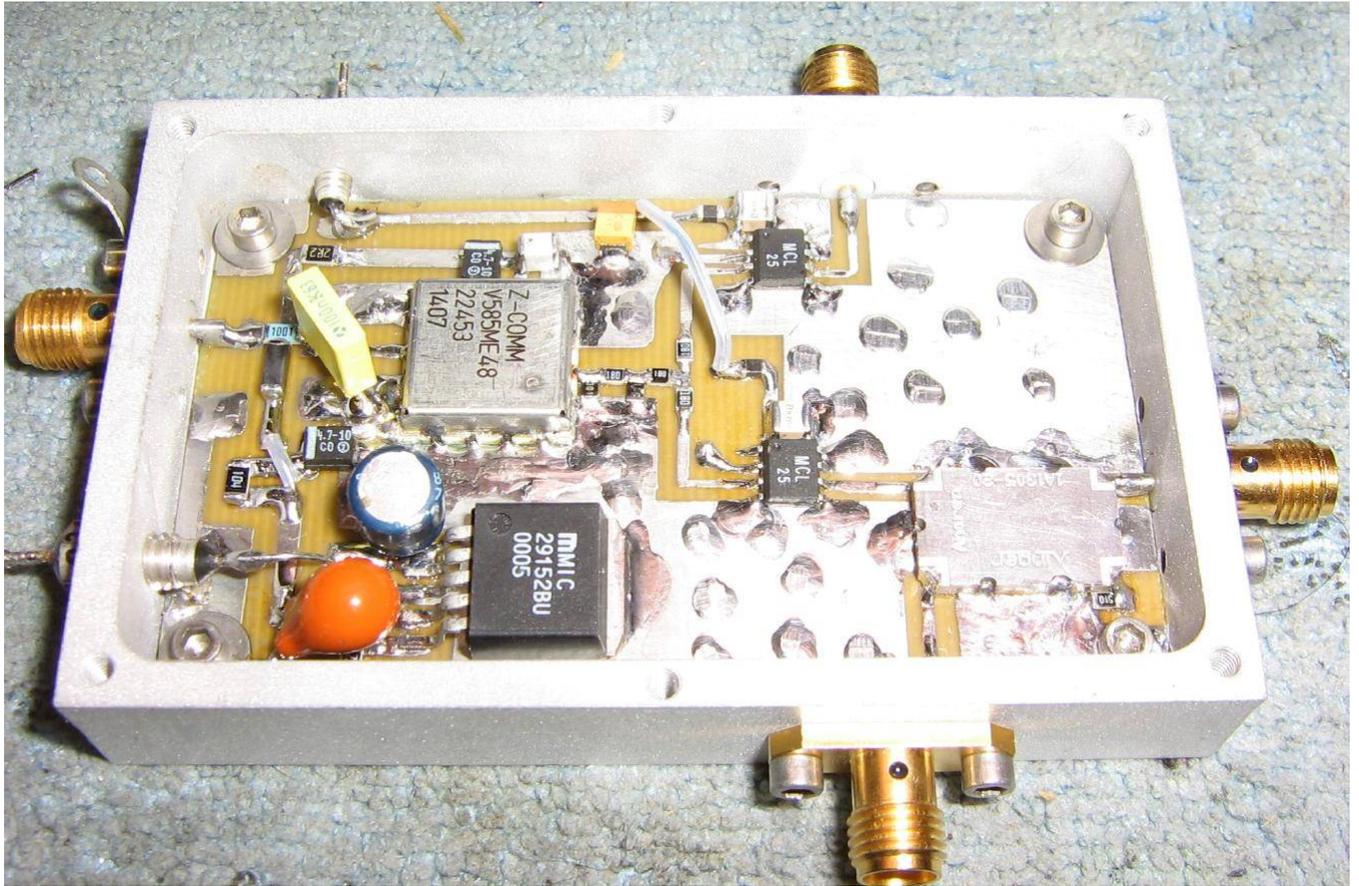
High-quality ATC capacitors were used for the VCO and RF amplifier bypass. Avoid poor-quality or leaded components here.



First local oscillator circuit – alternate view.

First local oscillator tuning and RF output specifications:

<u>Tune (Volt)</u>	<u>Frequency (MHz)</u>	<u>Power Output (dBm)</u>
0.9	1013	+13.5
1.0	1028	+13.5
2.0	1144	+13.5
3.0	1240	+13.6
4.0	1325	+13.6
5.0	1410	+13.6
6.0	1455	+13.4
7.0	1567	+13.2
8.0	1632	+13.1
9.0	1709	+12.9
10.0	1789	+12.8
11.0	1851	+12.8
12.0	1930	+12.7
13.0	1996	+12.5
13.3	2013	+12.4
14.0	2062	+12.4
15.0	2125	+12.3



First local oscillator circuit – finished overview.

The case is from an old cellular-band receive pre-amplifier.

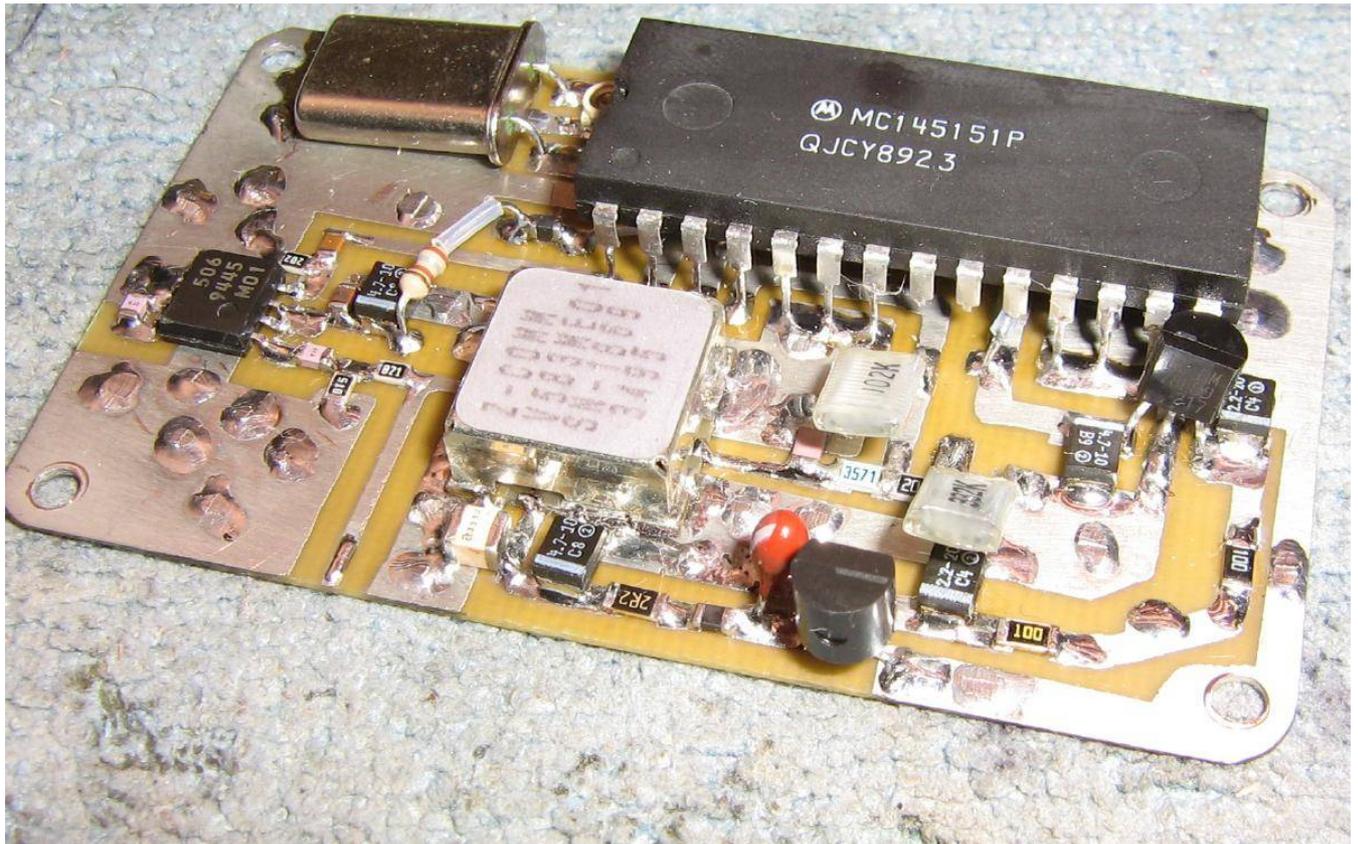
Incoming voltage lines are via 1000 pF feed-through capacitors. The VNA25s are on a separate +5 VDC power line from the VCO.

The SMA connector on the left is for the **VoIt Tune** input.

The SMA connector on the right is the **Local Oscillator 1** output.

The top SMA connector is for the (optional) **Local Oscillator 2** output.

The bottom SMA connector is for the (optional) **Marker Generator** input.



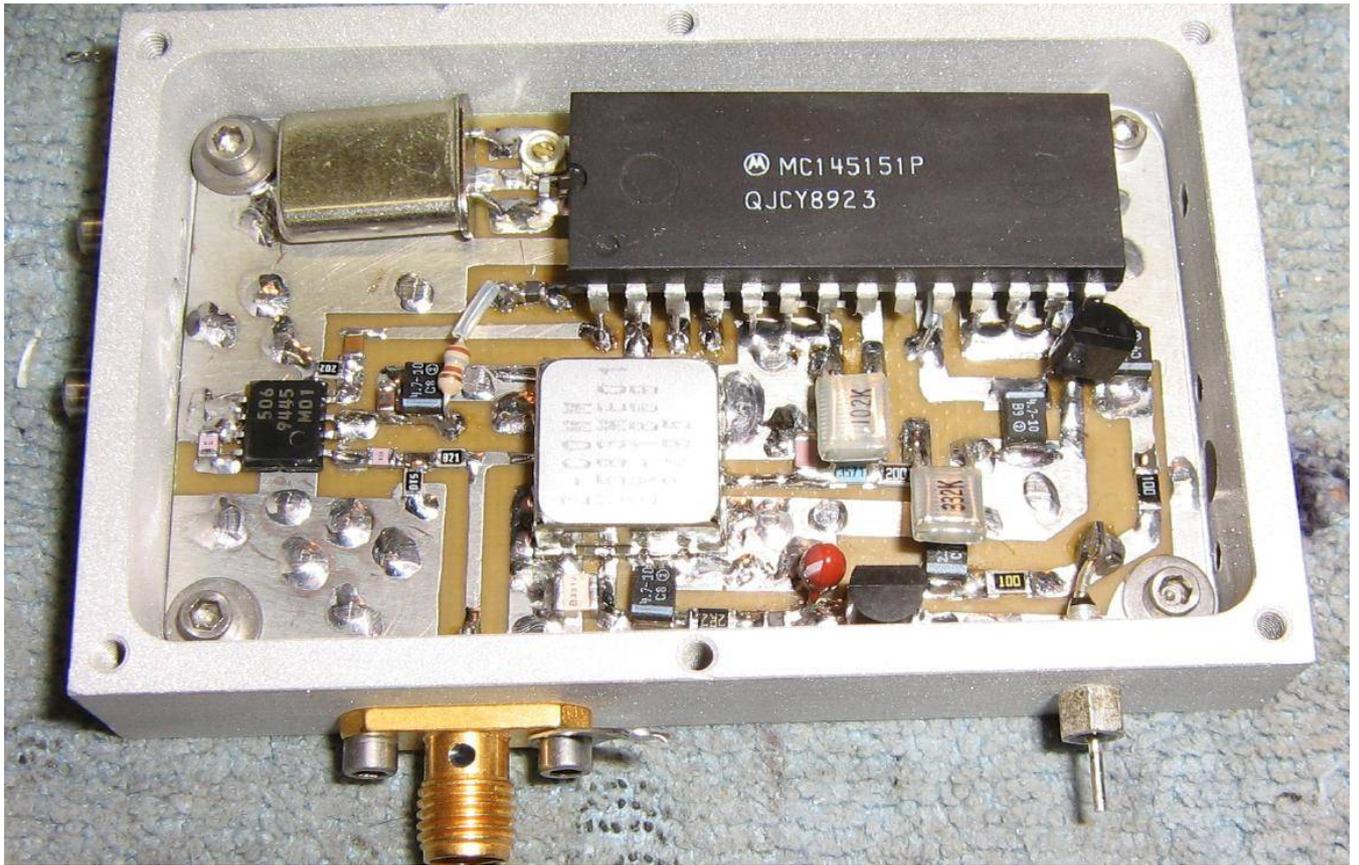
Second local oscillator circuit.

Phase-Locked Loop (PLL) synthesizer controlling a Z-Comm V583ME01 VCO at 1024 MHz. The PLL is based around a Motorola MC145151 synthesizer and a Fujitsu MB506 "divide-by-128" prescaler. The PLL reference frequency of 1 MHz is derived from a 8 MHz crystal.

The VCO is run off a separate low-noise +5 VDC regulator. The MC145151 is run at +9 VDC, as the final tuning voltage (apprx. +4.3V) for the VCO is a little too close to +5 VDC supply and there should be some overhead.

Use film capacitors and 1% metal-film resistors in the PLL loop filter section to avoid microphonics.

A variable capacitor is part of the loading on the 8 MHz reference crystal for slightly tweaking the final output frequency.

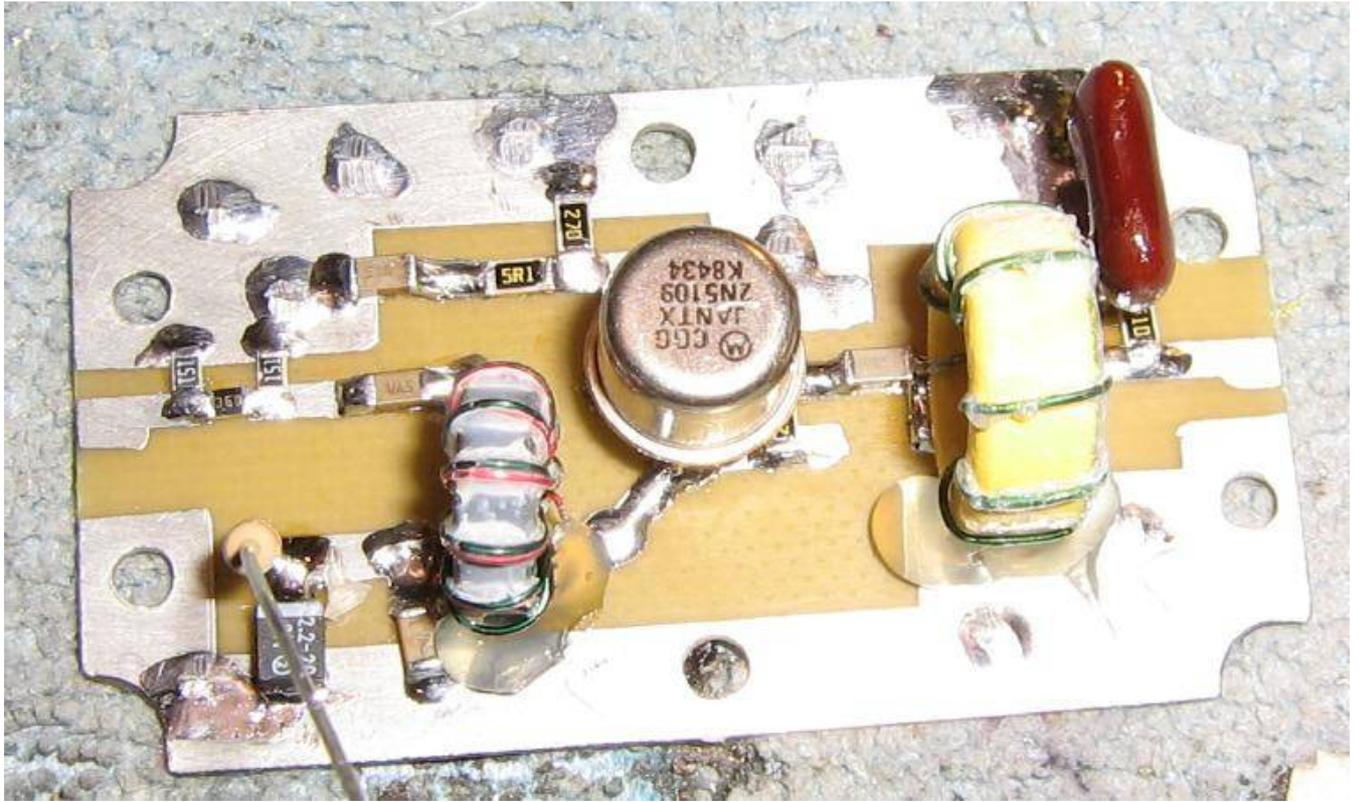


Finished second local oscillator.

RF power output is around +11 dBm, which is a little low for this application, but will still work.

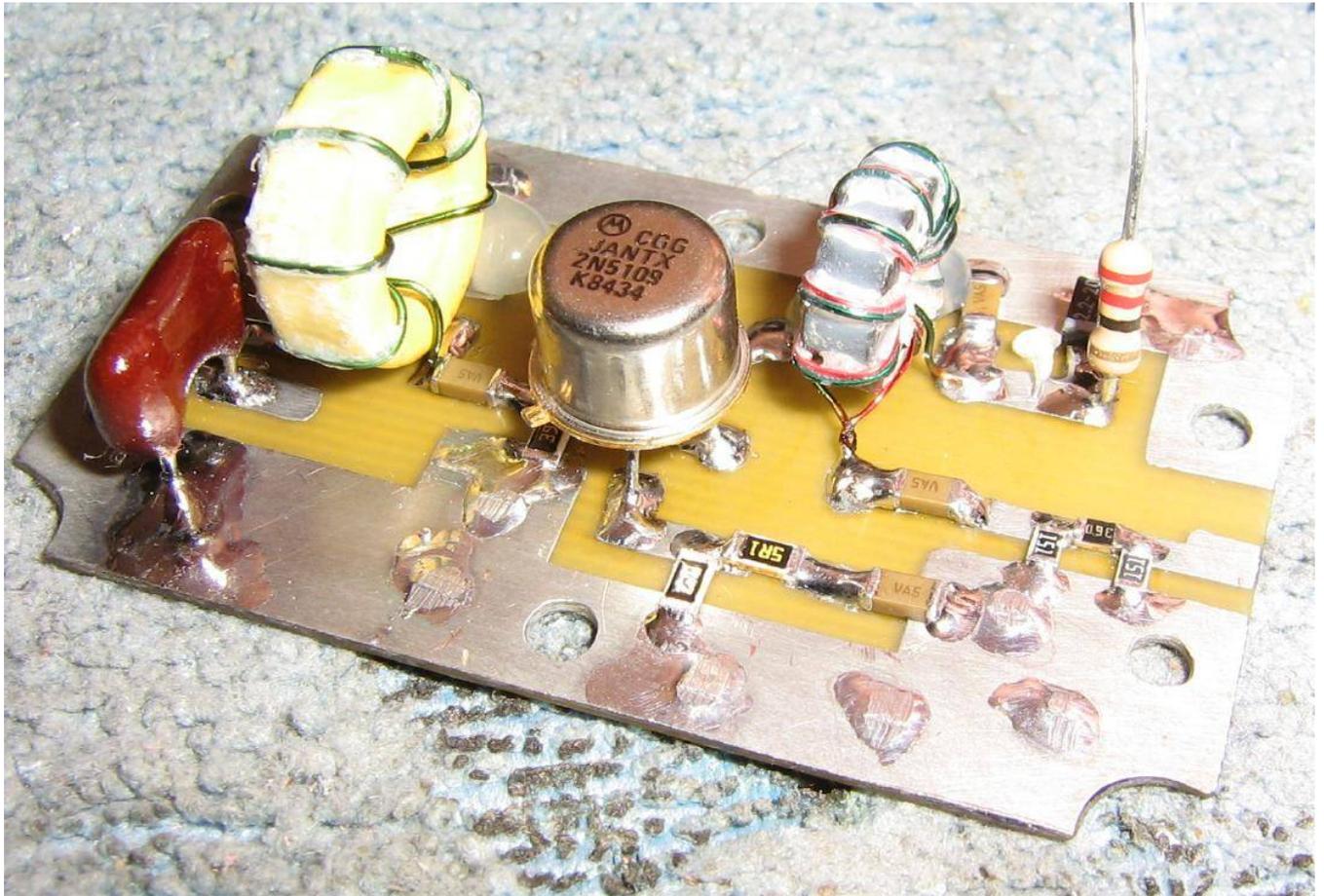
The bottom SMA connector is for the **Second Local Oscillator** output.

This 1024 MHz local oscillator signal will feed the LO port on the second mixer.



Post-mixer 10.7 MHz amplifier.

Stock circuit from the original W7ZOI/K7TAU project which provides a high-dynamic range post-mixer 10.7 MHz IF amplifier. This helps to recover some of the power lost through the two mixers and bandpass cavity. It also provides the first bit of final filtering via the low-pass diplexer circuit.



Post-mixer 10.7 MHz amplifier – alternate view.

The yellow toroid is approximately $0.3 \mu\text{H}$ and consists of nine turns of #24 enameled magnet wire on a T-30-6 powdered-iron core. That's a T-50-6 core in the picture, but there's a bit of leeway here.

A 6 dB resistive attenuator pad helps to maintain a 50 ohm input impedance and tames the high-impedance of the resolution filters down line.

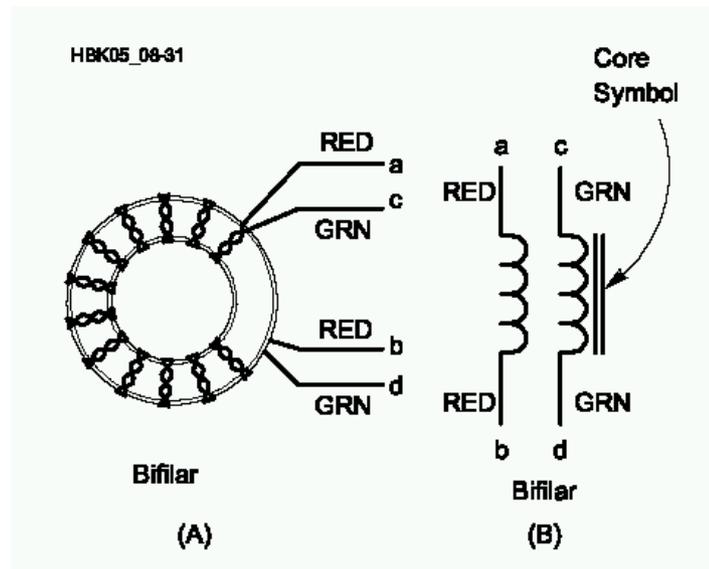
The other toroid forms a 4:1 matching transformer to convert the 200 ohm output impedance of the 2N5109 down to 50 ohms. It consists of ten bifilar (twisted together) turns of #28 enameled magnet wire on a FT-37-43 ferrite core. Each winding measured around $0.42 \mu\text{H}$. Be sure to keep track of the phasing when winding the core.



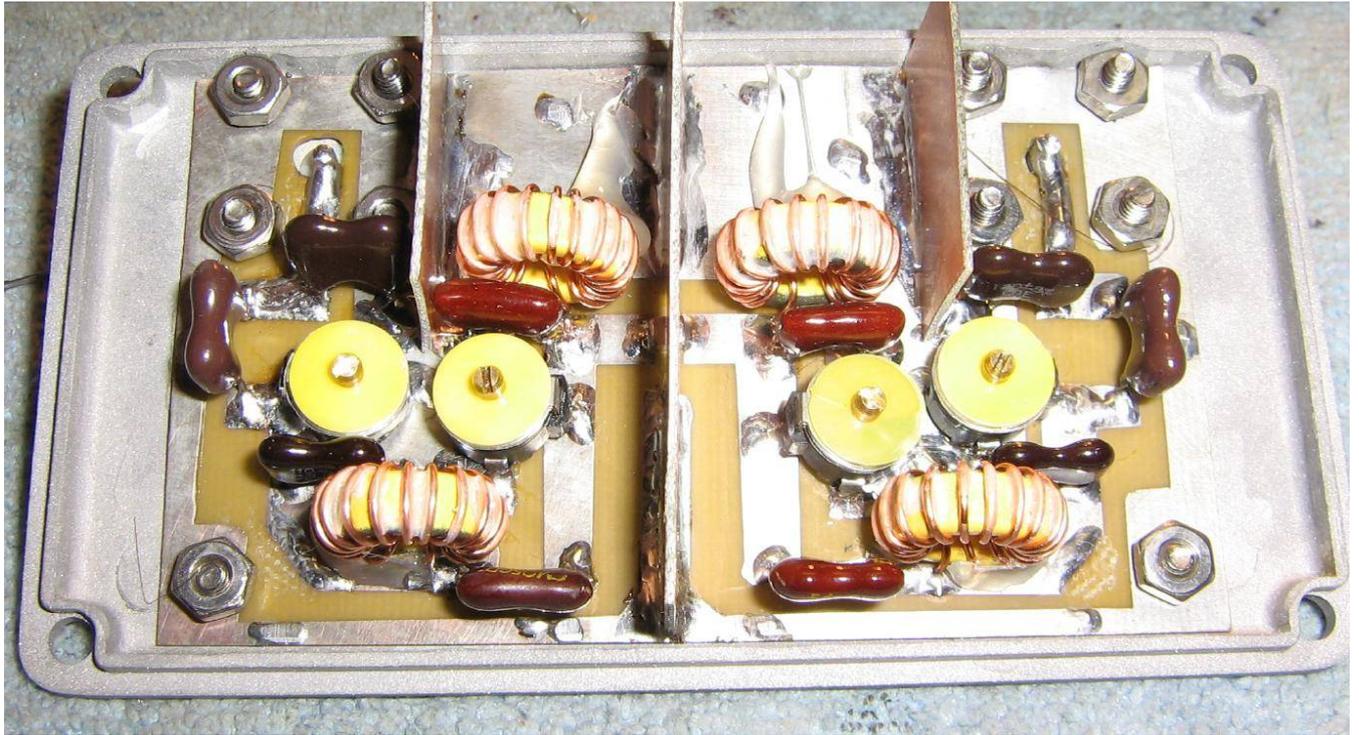
Finished post-mixer 10.7 MHz amplifier. Gain is around +17 dB at 10.7 MHz.

It's housed in an old 900 MHz preamplifier case and the 2N5109 should have a heatsink.

The RF input is from the IF port of the second mixer.



Bifilar-Wound Toroid



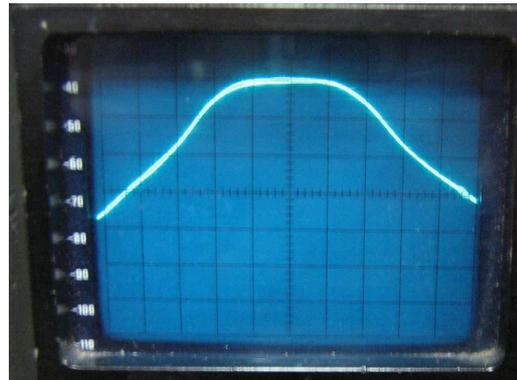
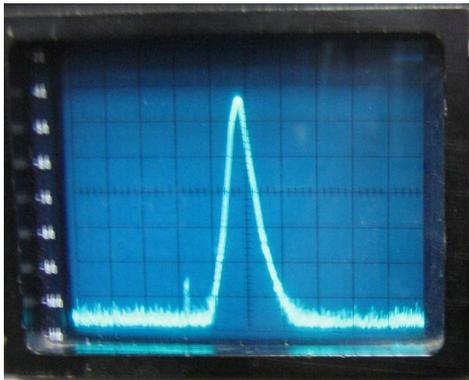
10.7 MHz IF resolution filter with a 3 dB bandwidth of 300 kHz and an insertion loss of around 4 dB.

This is also a stock circuit from the original W7ZOI/K7TAU project, with a few minor tweaks of capacitor values to tune up from 10 MHz to 10.7 MHz.

Try to keep the toroids at right-angles or well-shielded for maximum isolation. Capacitors are all silver mica, except for the 3.3 pF cap which is ceramic surface-mount.

This circuit is built onto the lid of a salvaged Bud CU-124 case for ease of removal for modification or tuning.

You'll need a 10.7 MHz signal generator and RF power meter (or diode detector or tracking generator) to properly tune the filter.



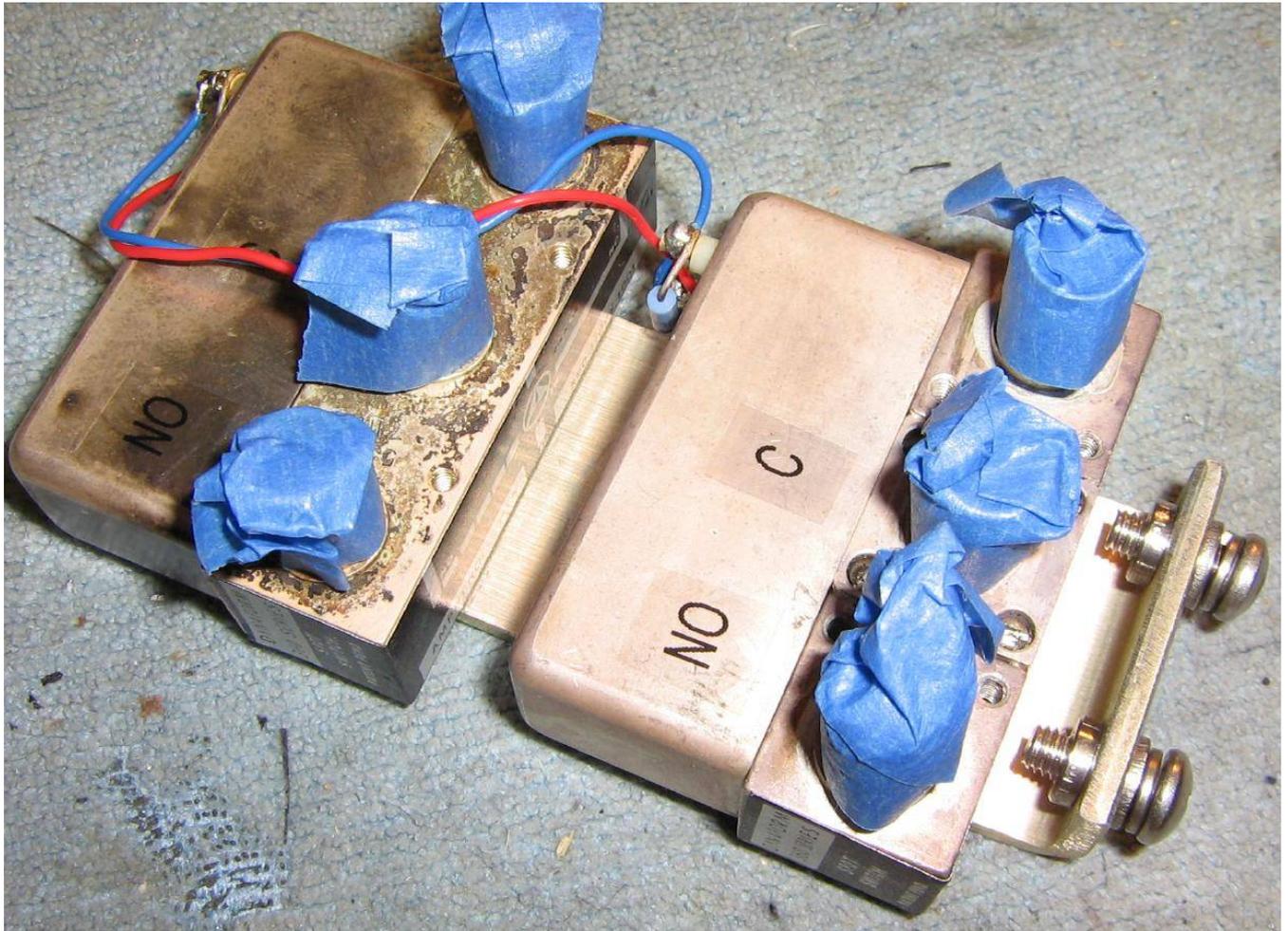
On the left, is a tracking generator sweep of this filter without any tuning (ignore the spur on the lower-left). The span is 1 MHz per horizontal division and 10 dB per vertical division. Note that it's a few hundred kilohertz off frequency and the insertion loss is kinda high. On the right is the spectrum view after proper tuning of the four capacitors. This view is 100 kHz per division.



The 300 kHz (and future 30 kHz) resolution filters are fitted in separate cases for maximum isolation.

These are in turn attached to the case the sweeping generator and synchronization circuits will be housed in.

A few pieces of (optional) microwave absorbing foam knock down any resonances in the resolution filter cases.

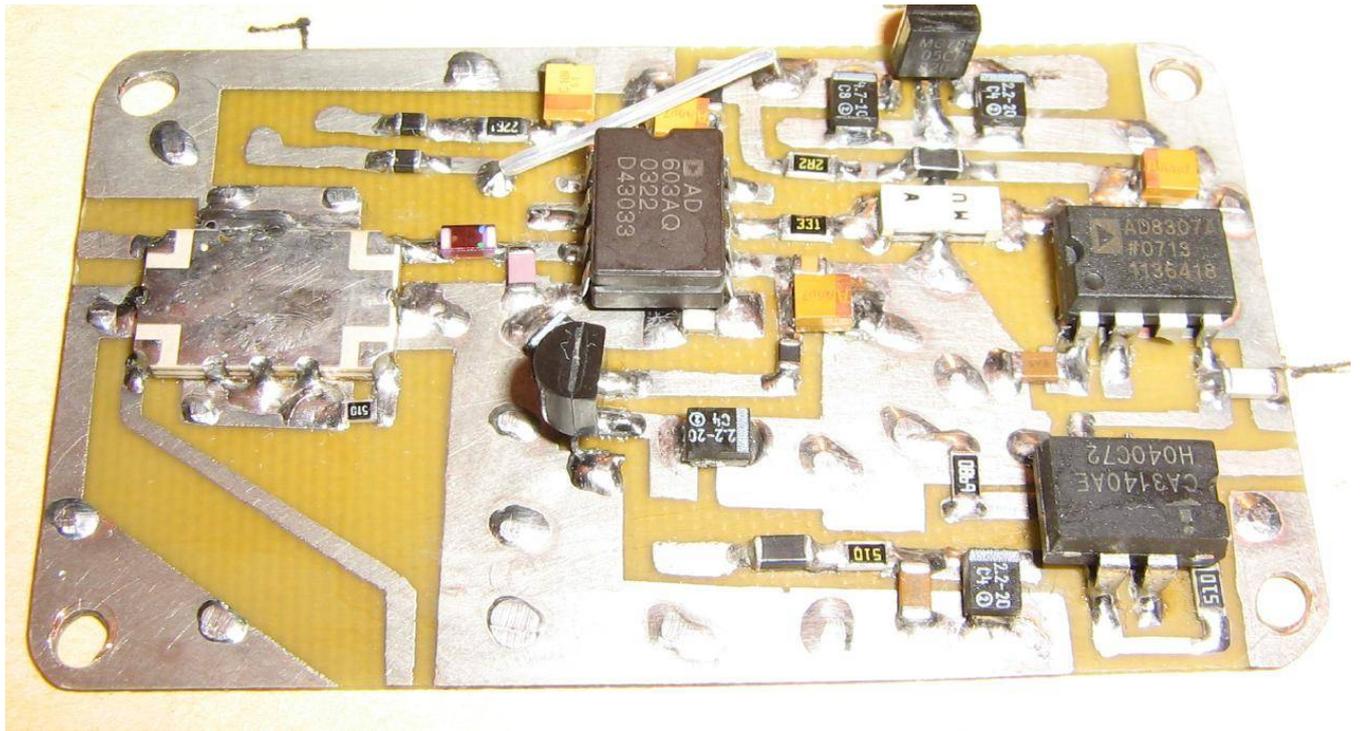


High-quality RF switches will be used to switch between the 300 kHz and 30 kHz resolution filters.

This will provide maximum isolation while still making it easy to remove the resolution filters for tuning.

These Dynaform 360 RF switches require +28 volts for switching. We'll "fake" this by connecting their negative terminals to -15 volts and switching +12 volts to their positive terminals.

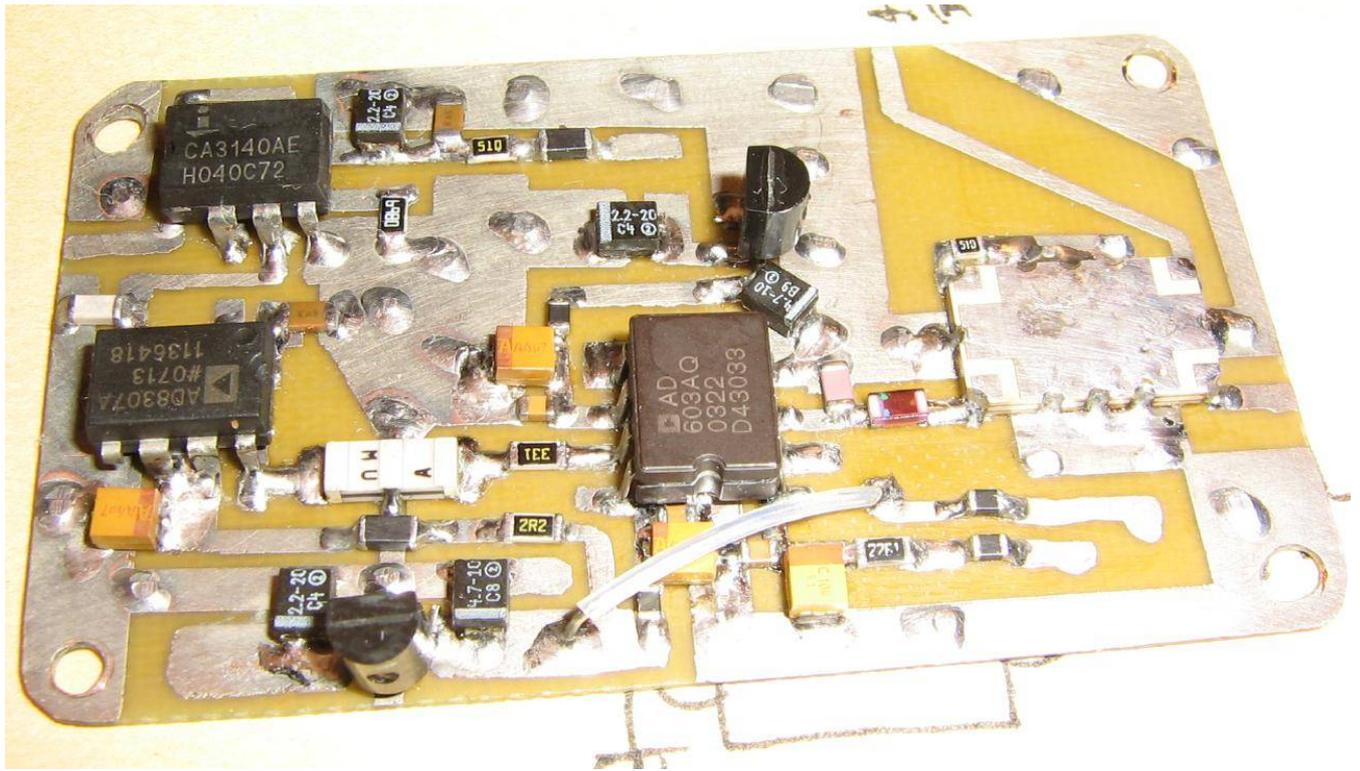
When facing up, the center TNC connector is common, the left TNC connector is Normally Open (NO), and the right is Normally Closed (NC).



10.7 MHz IF amplifier, logarithmic detector, and video driver circuit.

The 10.7 MHz input (from the resolution filter) is on the left. It passes through an optional directional coupler to sample the 10.7 MHz IF for future FM demodulation purposes. A simple series inductor / shunt capacitor network matches the 50 ohm input to the 100 ohm input impedance of the Analog Devices AD603. An external 10k ohm potentiometer varies the gain of the AD603 IF amplifier from +10 to +50 dB. The output of the AD603 passes through a Murata SFECV10M7KA00-R0 10.7 MHz ceramic IF filter with a 110 kHz bandwidth (Digi-Key 490-1229-1-ND) to knock down spurious RF images that passed through from the resolution filters.

The logarithmic detector is based around the infamous Analog Devices AD8307 and the video driver is a CA3140 op-amp.

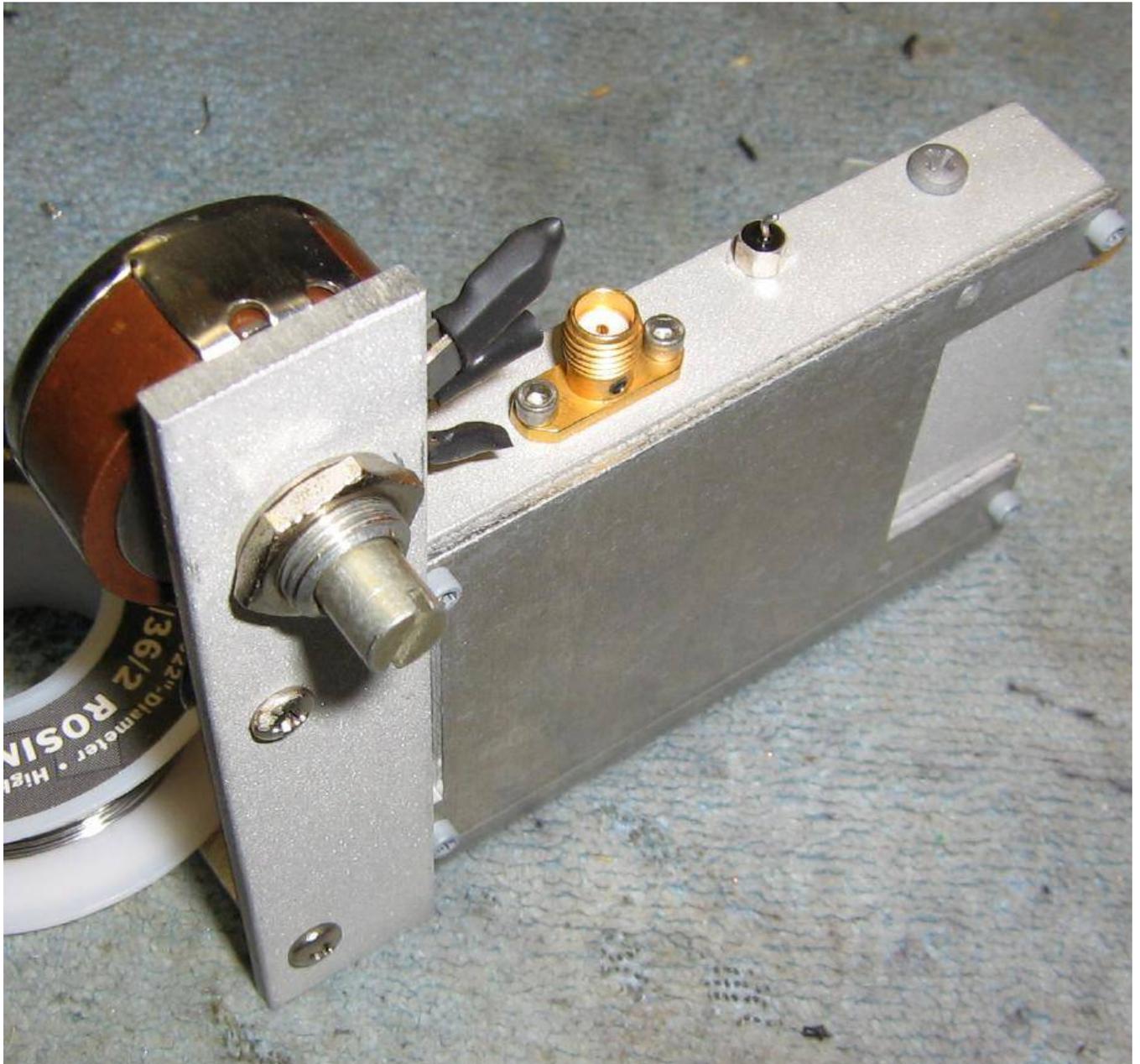


10.7 MHz IF amplifier, logarithmic detector, and video driver circuit – alternate view.

This circuit is based on the IF amp/log detector in the "Updates" PDF file on W7ZOI's website and in *Experimental Methods in RF Design*.

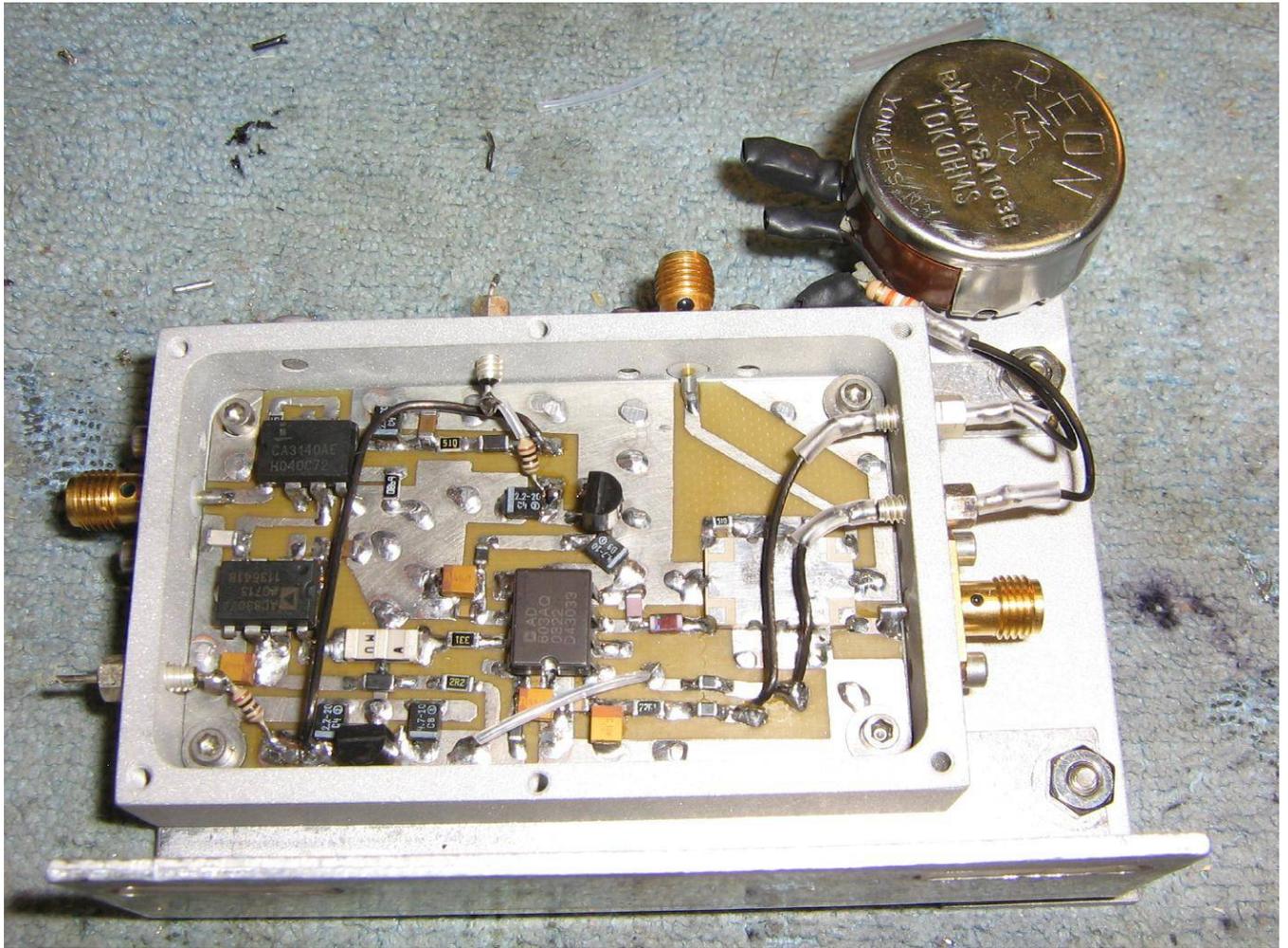
The AD603 is run at ± 5 VDC instead of a single supply, as the AD603 can be unstable in that mode and this also eliminates a lot of external components.

The Anaren XC0900A-10 directional coupler is actually designed for the 800 MHz cellular band, but it works fine for just picking off the incoming 10.7 MHz IF. This sample can then be sent to an external FM demodulator or to other signal processing circuits.



The **IF Gain Adjust** 10k ohm potentiometer is mounted externally on a little bracket.

This provides the 0–1 volt tuning voltage the AD603 requires. The control and power lines go to the potentiometer via 1000 pF feed-through capacitors.



Finished 10.7 MHz IF amplifier, logarithmic detector, and video driver circuit overview.

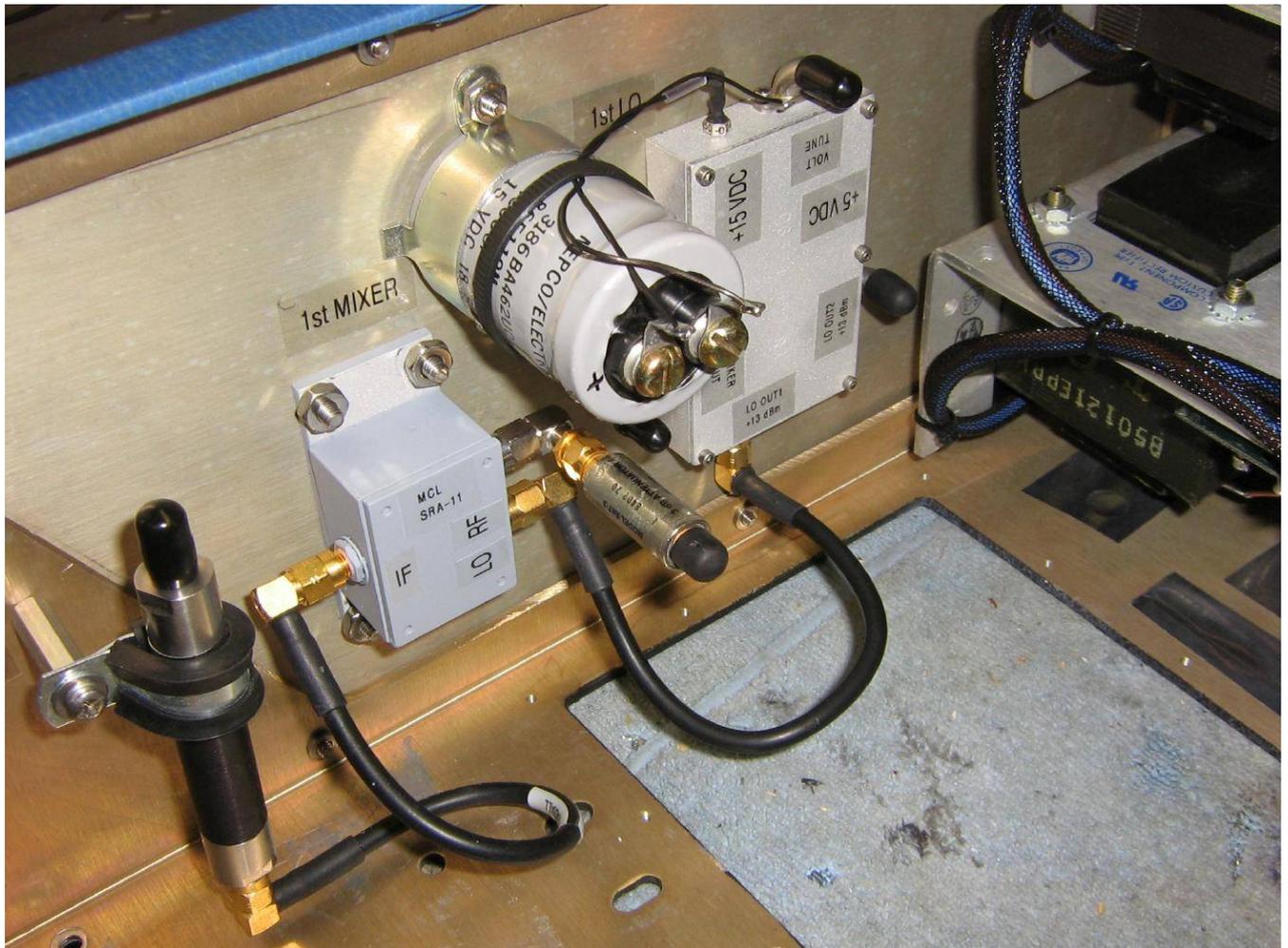
+15 VDC input is via the lower-left feed-through capacitor.

-15 VDC input is via the top-center feed-through capacitor.

The SMA connector on the left is for the **Video Output**.

The SMA connector on the top-center is for the (optional) **10.7 MHz Sample**.

The SMA connector on the right is for the **10.7 MHz IF Input**.

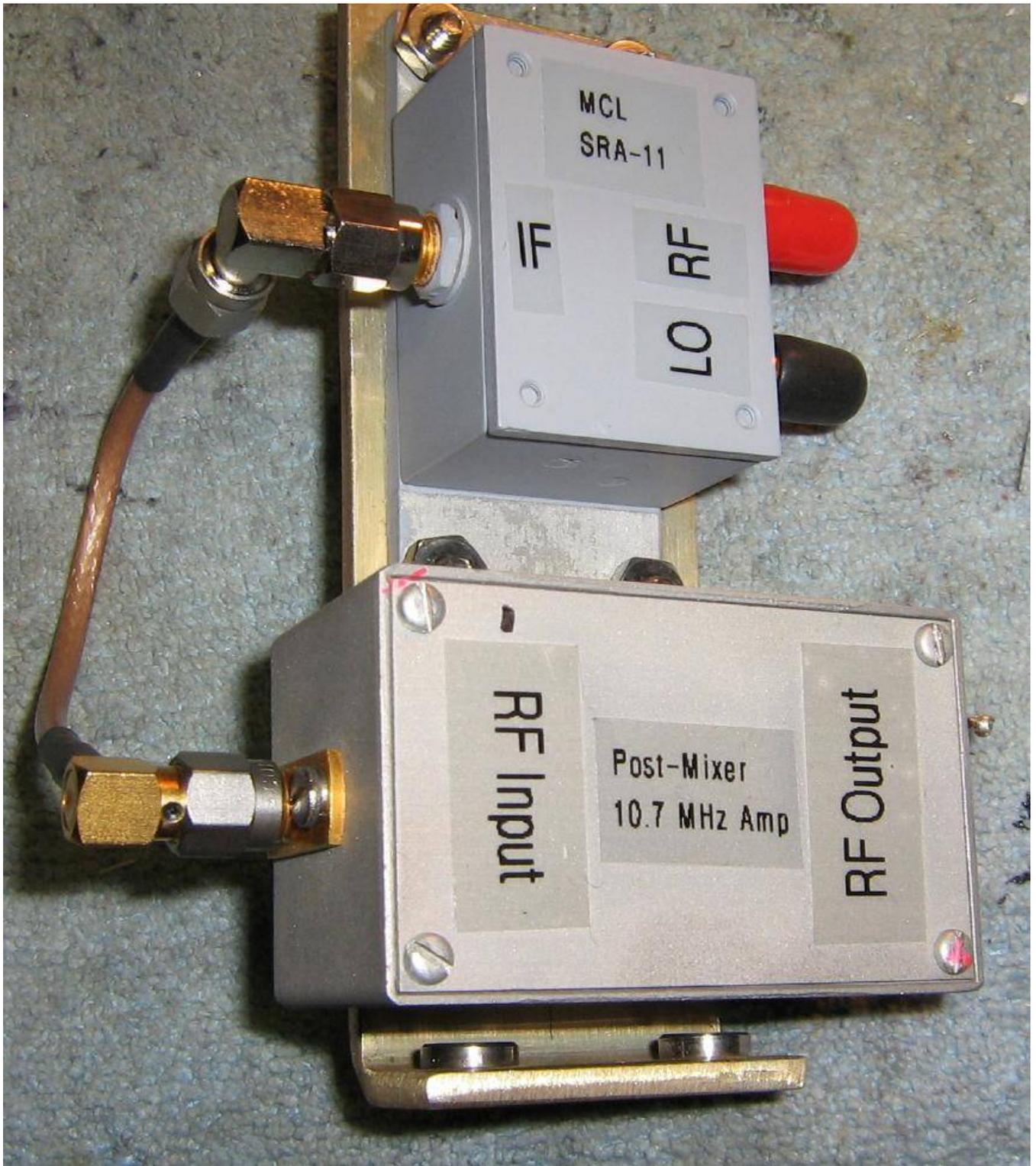


Completed left-panel of the spectrum analyzer.

Low-pass filter is on the lower-left feeding the IF port on the first mixer.

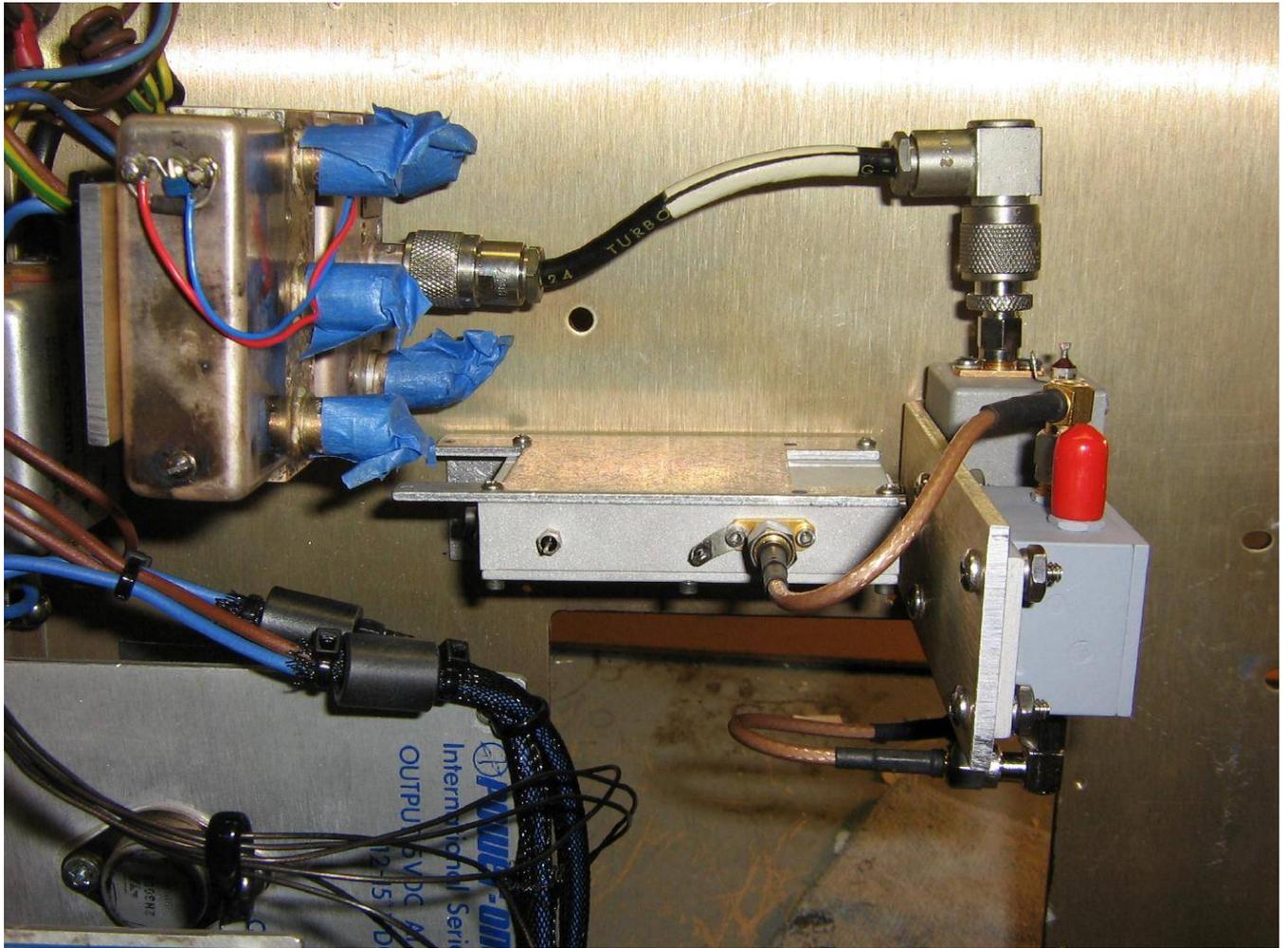
A large 4,600 μF electrolytic capacitor is mounted near the first local oscillator module and will serve as a "single point" for distributing the +15 VDC and ground signals to the other modules.

There is a Mini-Circuits SAT-3 3 dB attenuator on the RF port of the first mixer. This is to help the first mixer "see" 50 ohms on all ports and to isolate any impedance mismatch with the 1013.3 MHz bandpass cavity filter.



Overview of the second mixer and the post-mixer 10.7 MHz IF amplifier.

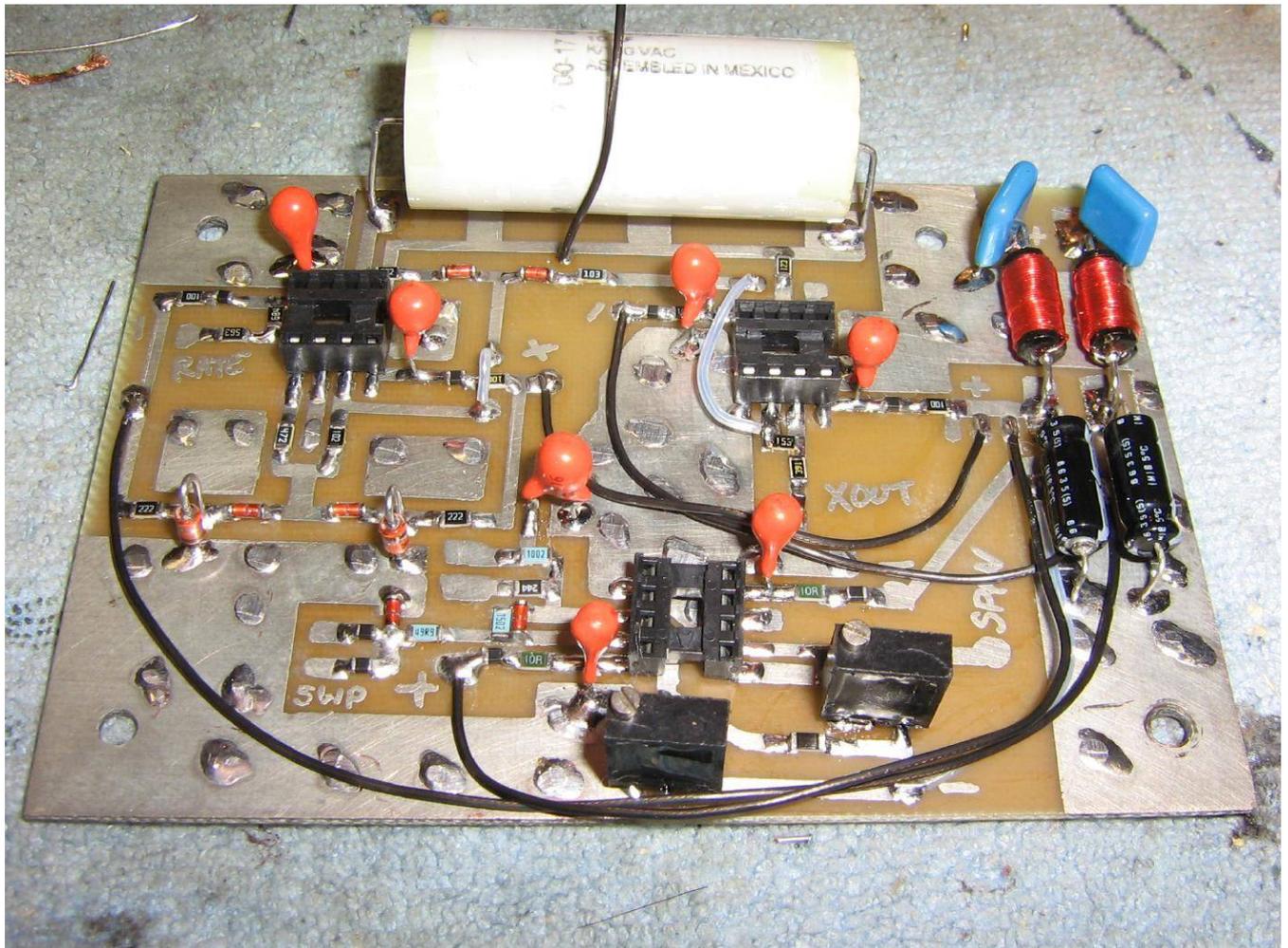
They are both mounted on a L-bracket.



Overview of the second mixer in position.

The 1024 MHz second local oscillator module is mounted behind it.

The output from the post-mixer 10.7 MHz IF amplifier module goes to the common port on the bottom RF switch.

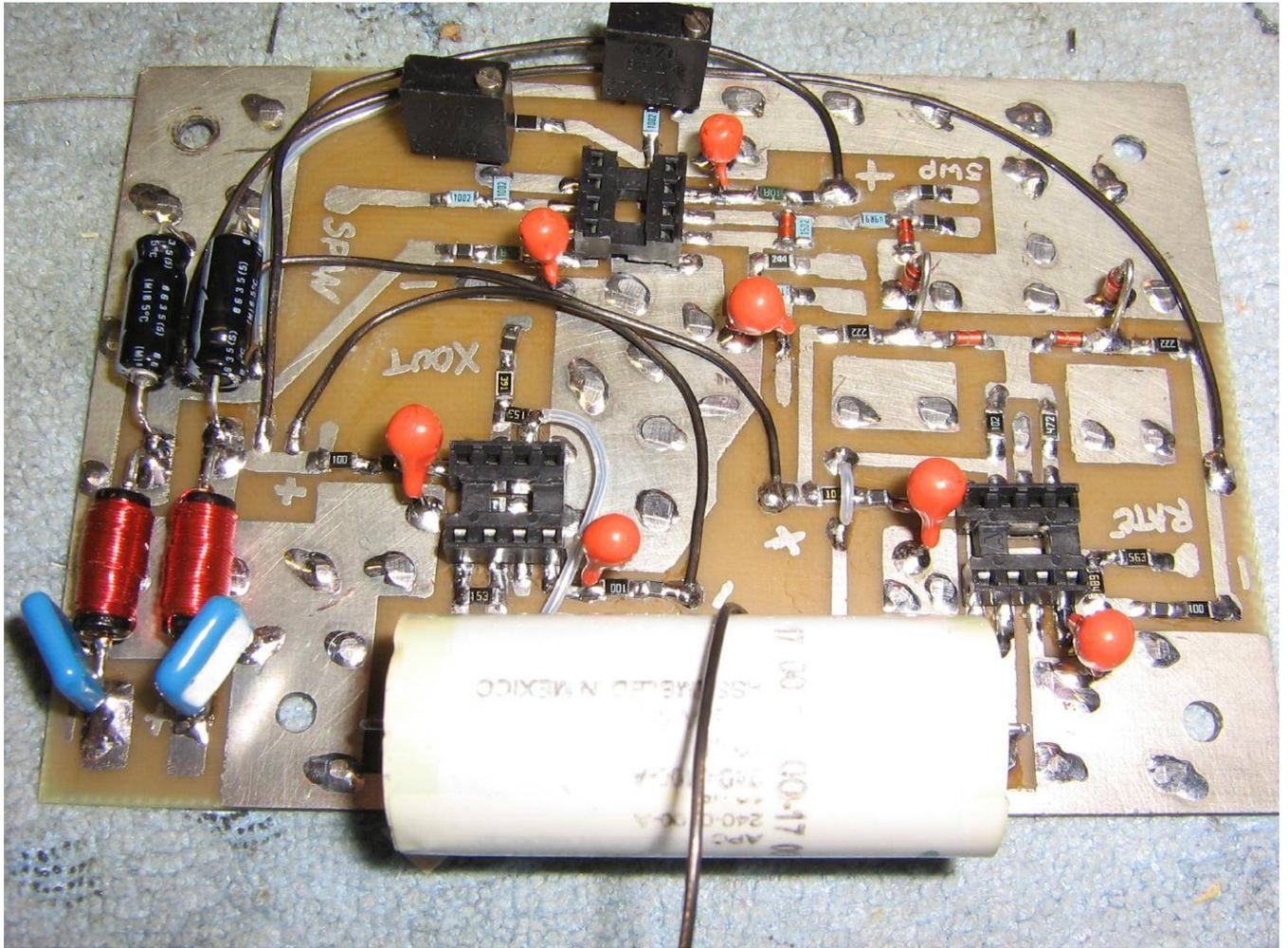


Overview of the sweep generator and synchronization circuit.

This is also a stock circuit from the original W7ZOI/K7TAU project, with a few minor tweaks.

The $1\ \mu\text{F}$ non-polarized capacitor was increased to $10\ \mu\text{F}$ in order to slow the sweep rate down a bit. This is so when using a narrow resolution filter the signal doesn't "sweep" through the filter faster than it can be displayed.

The original LM358 op-amps were also replaced with rail-to-rail, low-noise equivalents (LTC1047, etc.). All op-amps have $10\ \mu\text{F}$ bypass caps and series $10\ \text{ohm}$ resistors and a ferrite bead on their power lines. These are not shown in the schematic.



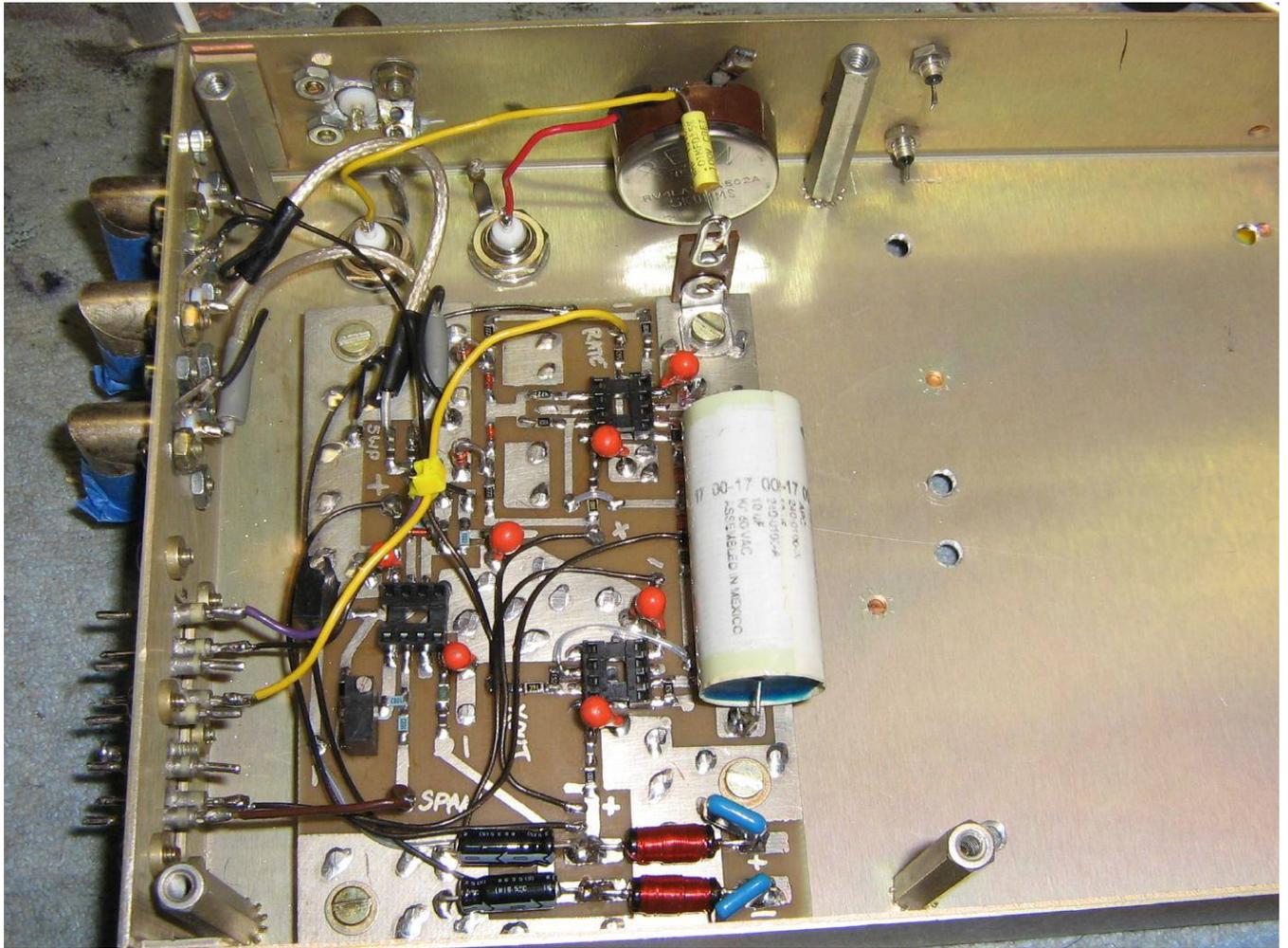
Alternate view of the sweep generator and synchronization circuit.

The large tubular object is a non-polarized 10 μF capacitor.

The two multiturn potentiometers are for centering and the maximum span calibration.

Try to use all 1% metal-film resistors in this circuit.

This circuit has two sweep outputs, one of which goes to the front-panel. This is handy for just using the sweep generator's ramp signal to sweep an external VCO and diode detector combination when tuning filters. The sweep outputs should be well-shielded.



Installation of the sweep generator and synchronization circuit into its own project box.

The 5k ohm potentiometer on the top for **Log Gain Adjust**. The 0.01 μF capacitor from the wiper terminal is for an optional video filter to be switched in to clean up the final spectrum display.

This particular box had a number of feed through capacitors which will be ideal for passing the tuning signals in and out. BNC connectors will be used for the sweep and X/Y outputs.

An optional 10.7 MHz IF input BNC jack was added for future projects.



Constructing the 1013.3 MHz first IF cavity bandpass filter.

Shown are 1-inch diameter copper pipe and some K&S Metals 0.093-inch brass plate stock.

This filter design is straight from Scotty's spectrum analyzer project. View his detailed construction and layout notes at: scottyspectrumanalyzer.com/cavity.html

The main purpose of this filter is to attenuate the image frequency of 1034.7 MHz and the second LO frequency of 1024 MHz. When properly constructed, this filter should attenuate those two frequencies by at least 80 dB.

There was one problem with the filter shown here. Mine didn't work! My mechanical construction skills are not quite that good, so that was probably part of the problem. You'll need to follow Scotty Sprowls' instructions and dimensions *exactly*, or yours won't work either. Several people have gotten this same cavity filter to work, so the instructions and design are sound.



Cut the 1-inch diameter copper pipe to 3.1-inch lengths and solder them together.

Try to use silver-solder as the high melting temperature will be handy for when you need to solder the other connections using regular solder.

Clean the copper pipe with emory cloth and use solder flux paste on areas for solder to flow. You'll need to clamp the pipes together somehow for soldering. Use some ingenuity here!

Use a belt sander to make them all even when finished.



Solder the four main tuning stubs.

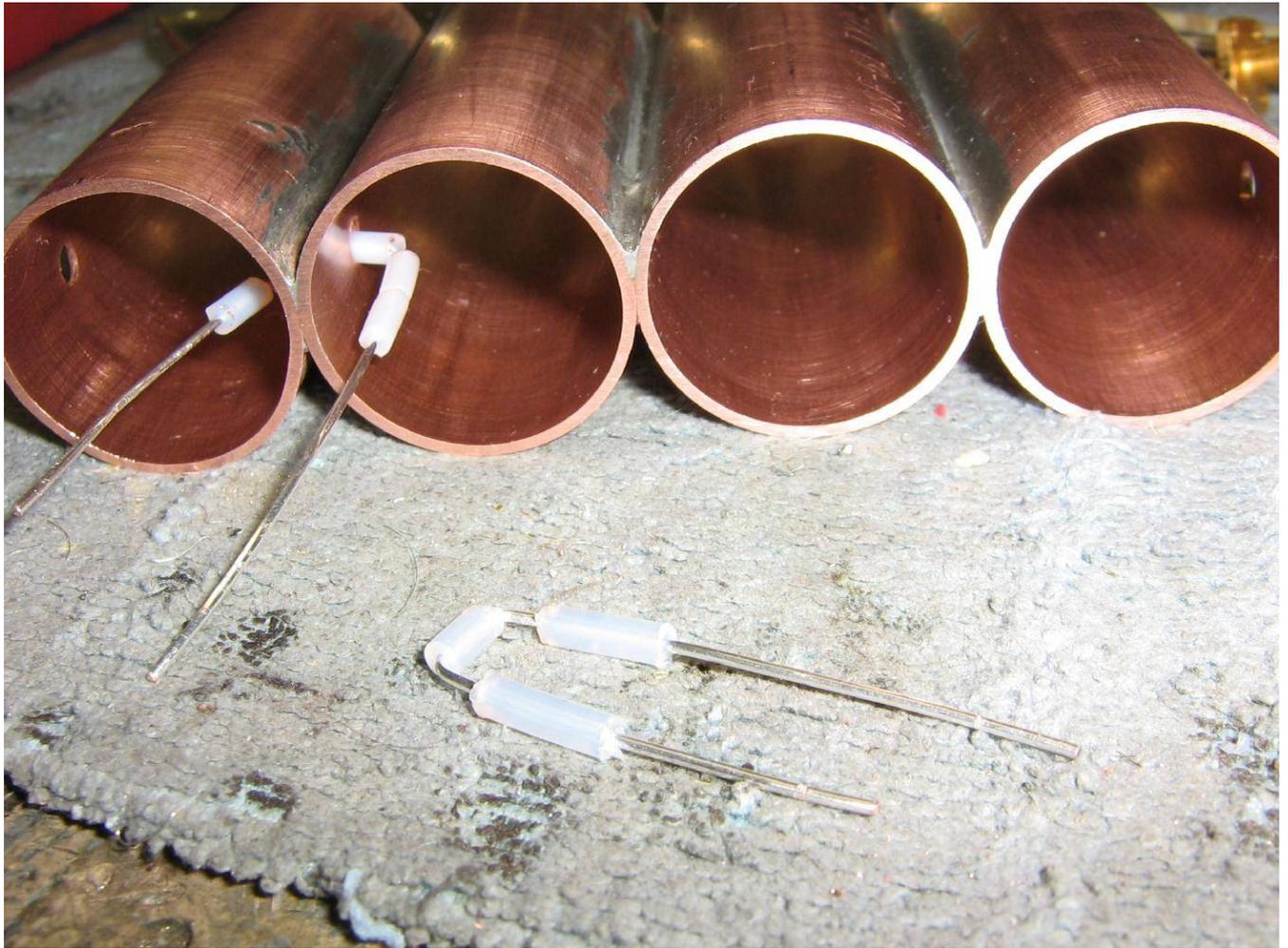
1/4-inch diameter brass tube was used here. Copper would give better RF performance.

Drill the holes in the base plate a little smaller than 1/4 inch (15/64), then use a reamer to widen them. Pass the tuning stubs through these holes so they are 2.72 inches above the brass plate. The friction should hold the brass stubs in place while you solder them.



Tuning stubs soldered.

Try not to get too much solder on top of the brass plate. This can effect the final tuning of the cavity.



Installing the coupling loops 0.7-inches above the bottom brass plate.

They are made from the center conductor and Teflon insulation from scap pieces of UT-141 hardline coax.

The spacing from the copper pipe is *very* critical and I think that's why my version didn't work.

Each of these coupling loops should be the same distance (0.06-inch) from the edge of the copper pipe.



Installing the input and output probes.

These are also scrap pieces of UT-141 hardline coax but with SMA connectors installed.

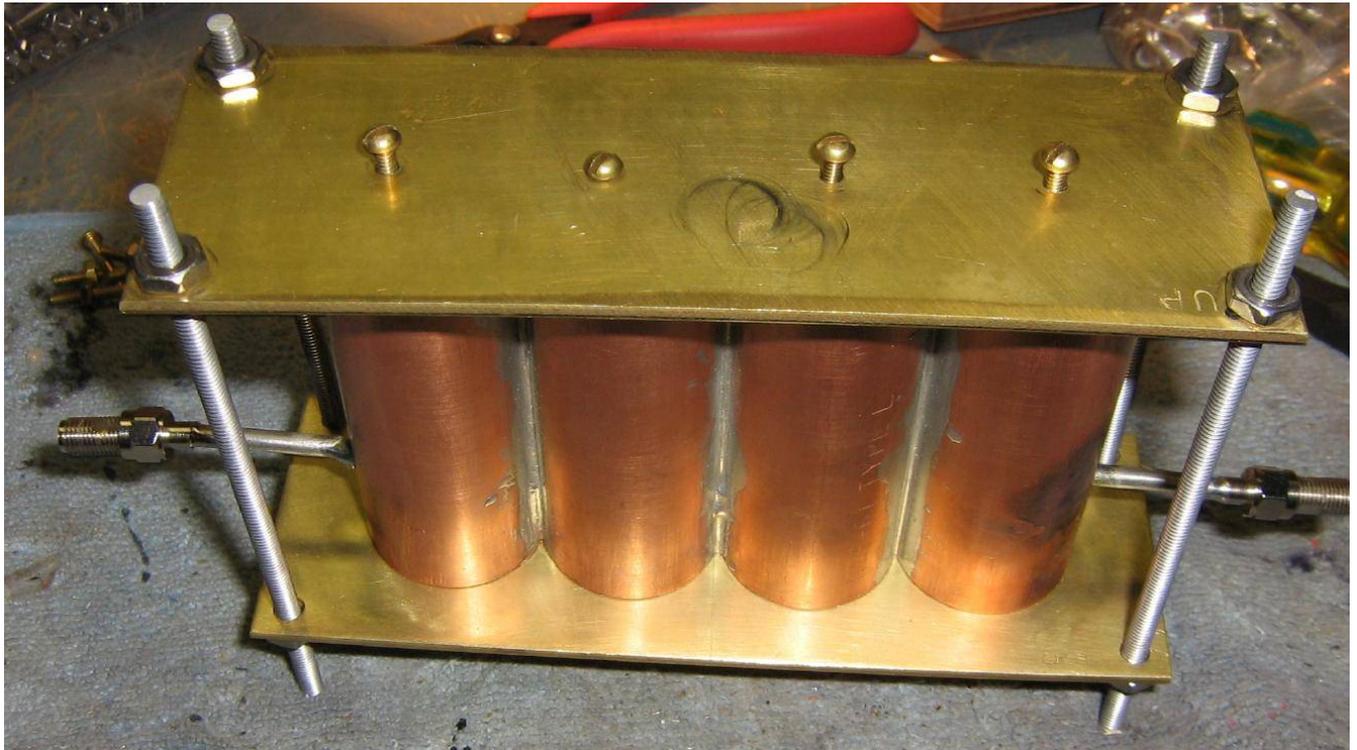


Coupling loops in place.



Top overview.

Be sure the tuning stubs are centered in the copper pipe.



Assembled 1013.3 MHz cavity bandpass filter – that didn't work!

The filter's insertion loss will be around 8 dB and the 3 dB bandwidth around 2 MHz if all the coupling loops are the proper distance from the side of the copper pipe. Lower insertion loss means the filter's 3 dB bandwidth might be a little too large and won't properly attenuate the image signal.

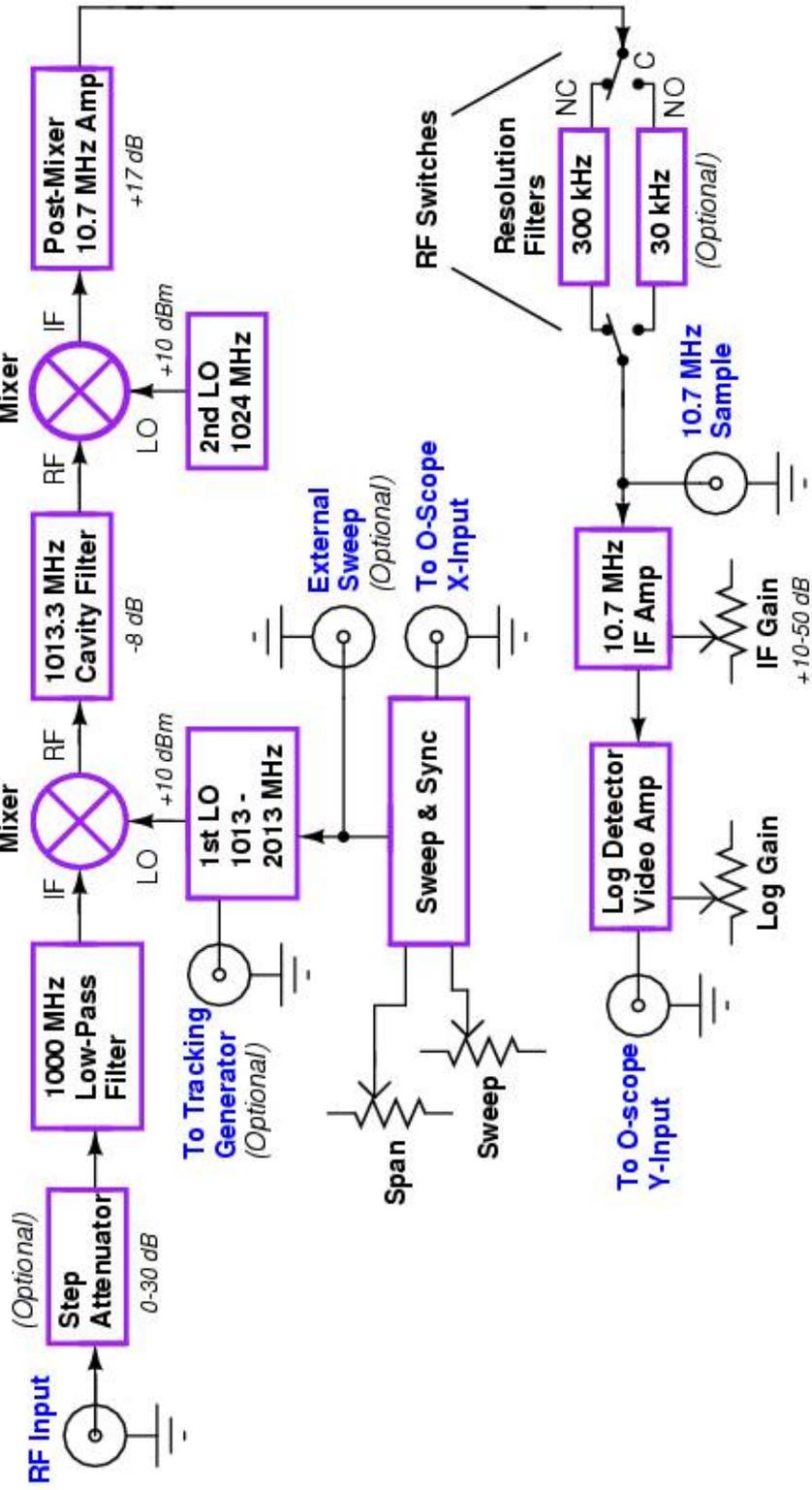
I used some pieces of #8-32 threaded rod to hold the top plate on to ease soldering. This also makes a handy mounting point for the filter.

Four brass #4 screws (3/4-inch long) are for tuning the filter. The holes were tapped for #4-40. Add locking jam nuts to the brass screws when then the filter is finally tuned.

Tune the filter using the RF output from the first local oscillator as a signal generator and a diode detector (or RF power meter).

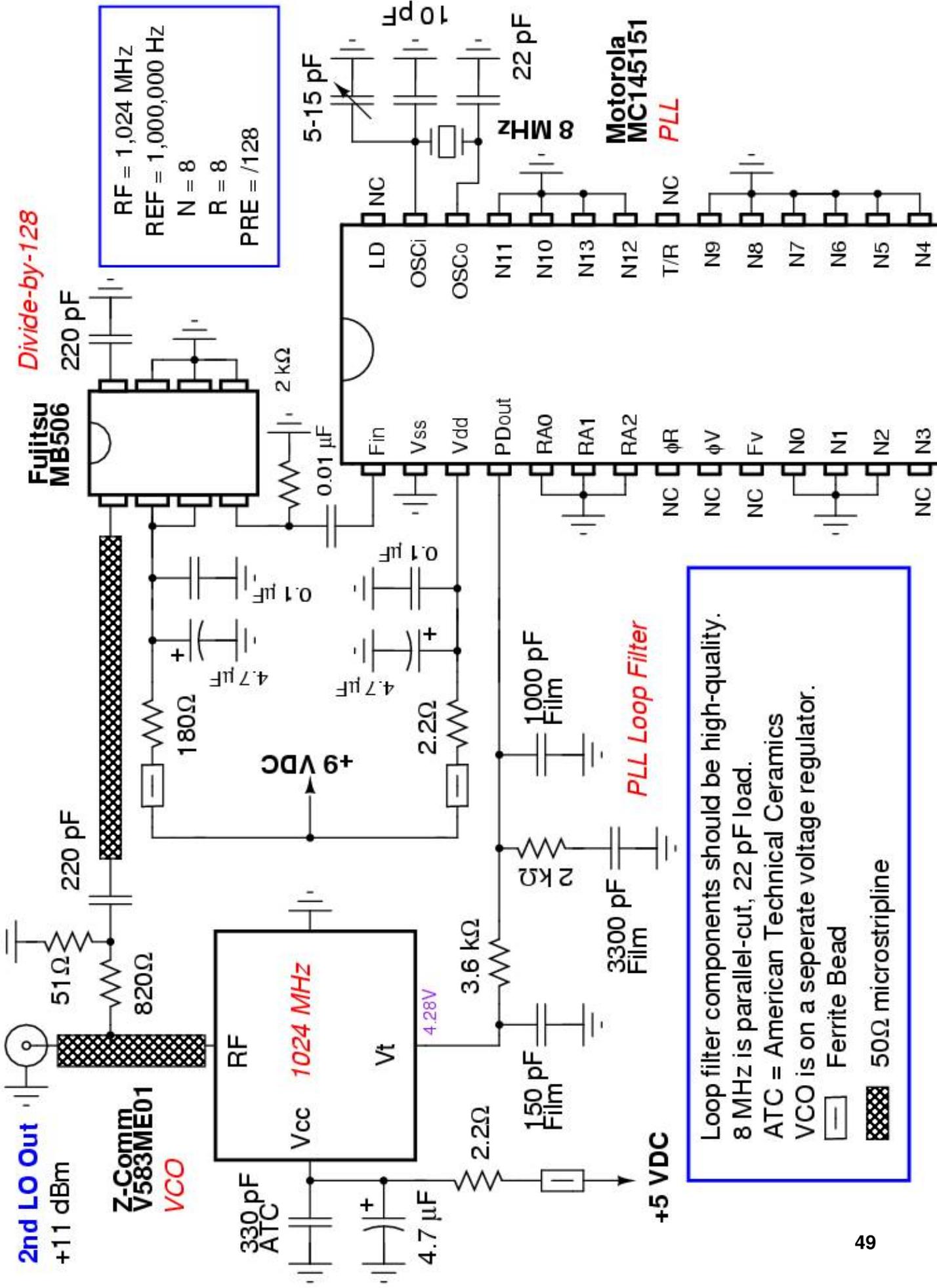
GBPPR 1 GHz Spectrum Analyzer

Block Diagram



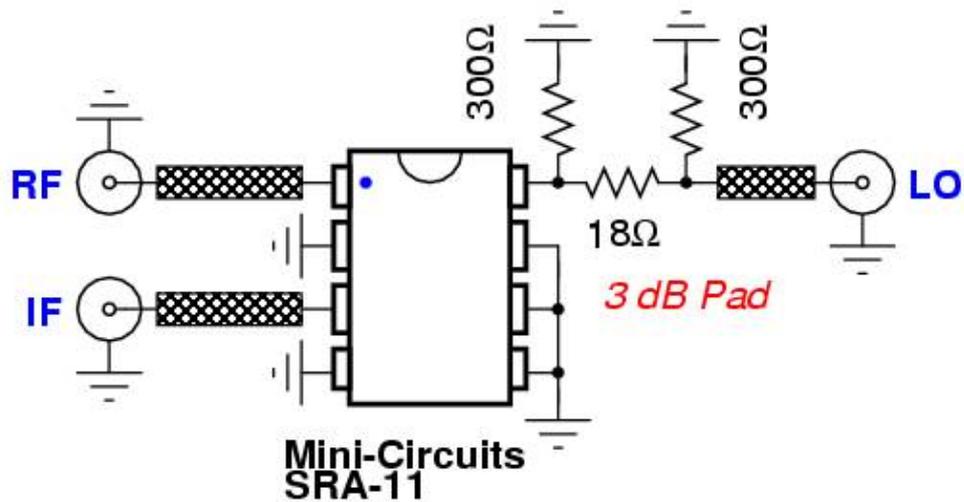
GBPPR 1 GHz Spectrum Analyzer

2nd Local Oscillator



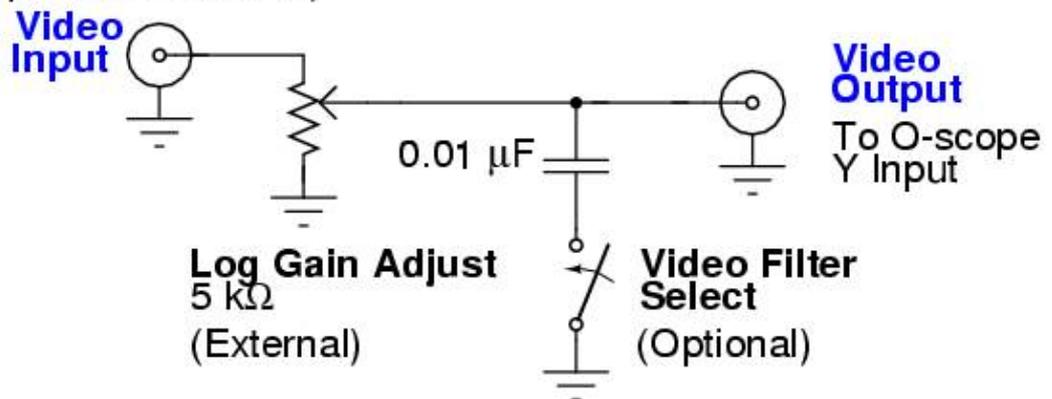
GBPPR 1 GHz Spectrum Analyzer

1st & 2nd Mixer



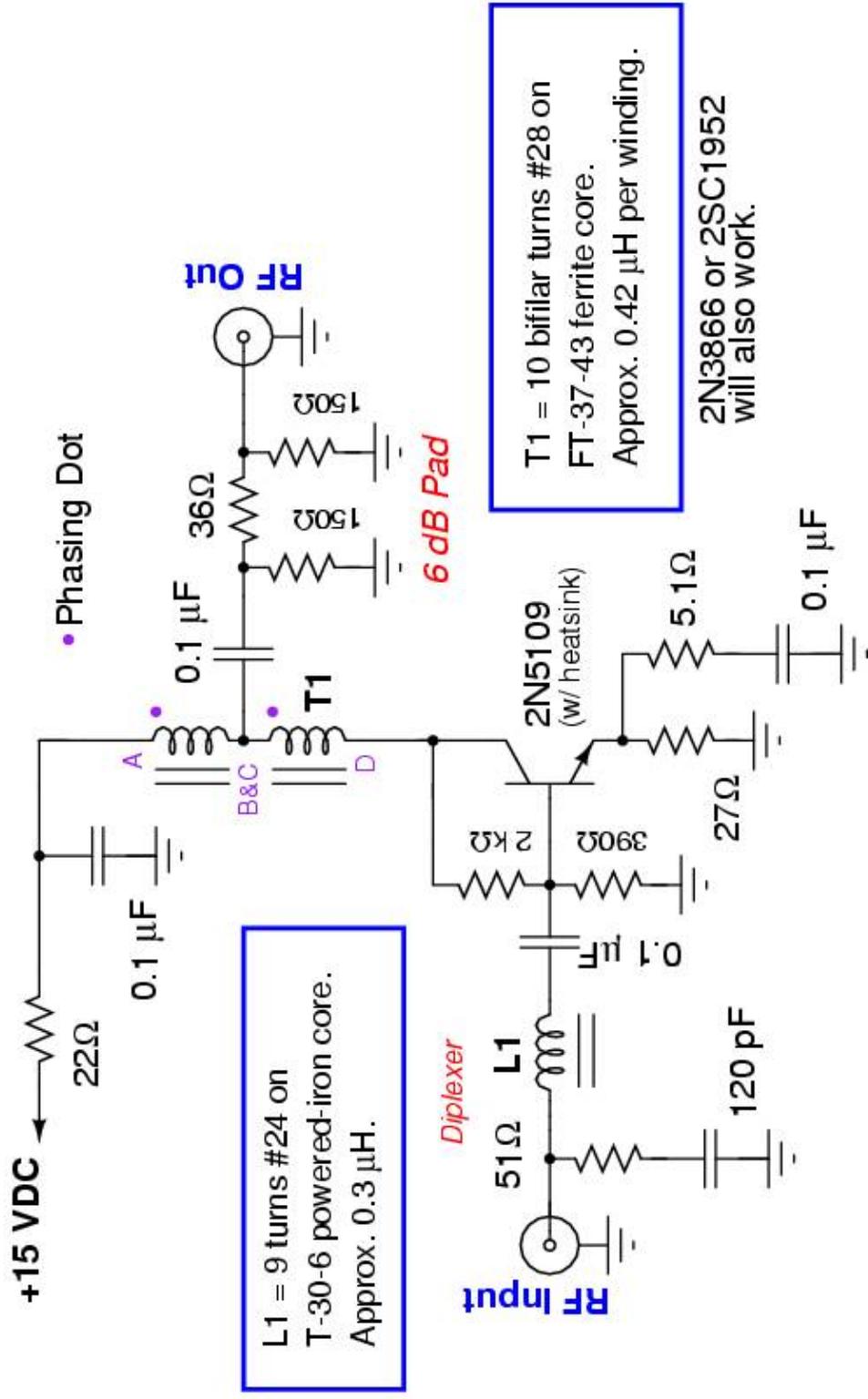
Log Gain Controls

(Output from CA3140)



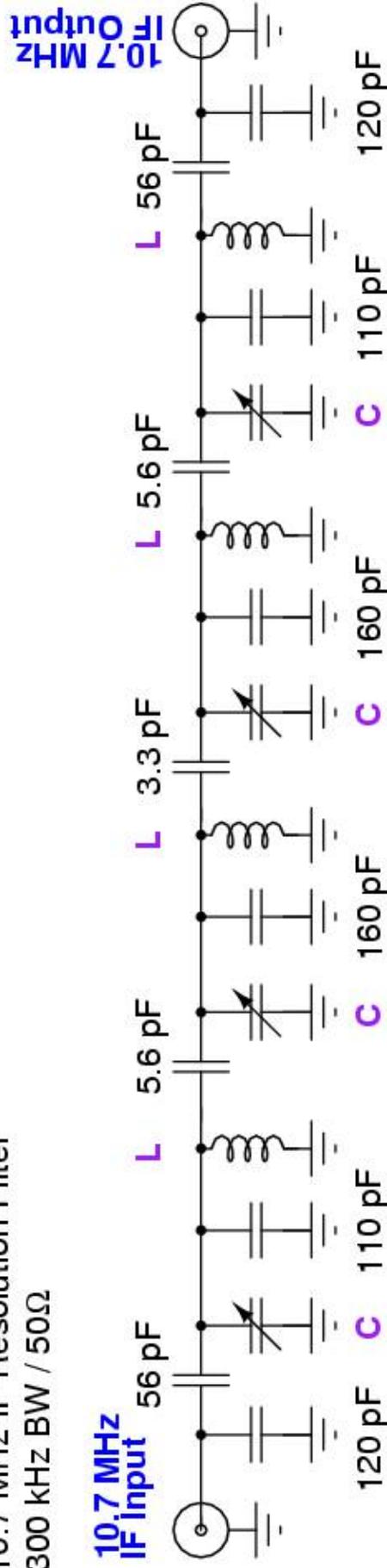
GBPPR 1 GHz Spectrum Analyzer

Post-Mixer 10.7 MHz IF Amplifier



GBPPR 1 GHz Spectrum Analyzer

10.7 MHz IF Resolution Filter
300 kHz BW / 50Ω



L = 17 turns of #22 enameled wire on a T-50-6 toroid (1.15 μ H), $Q > 250$.

C = 10-65 pF plastic dielectric trim cap (Sprague-Goodman GYD65000)

RF input is from the 10.7 MHz post-mixer amplifier.

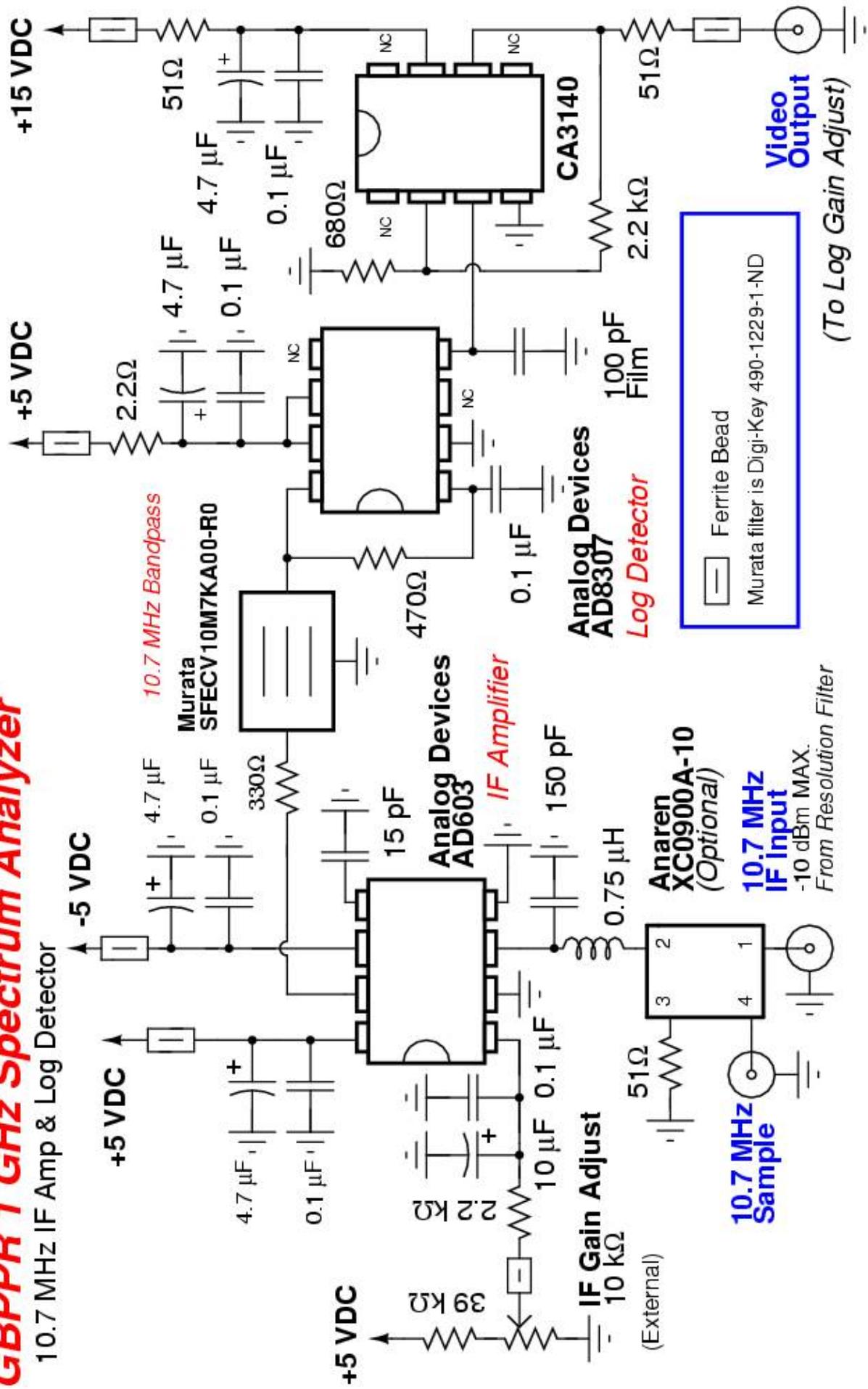
RF output goes to the IF amp/log detector.

Pad filter with resistive attenuators to match the insertion loss of the other (optional) resolution filters.

Capacitors should be silver mica or NPO ceramic, 5% or better.

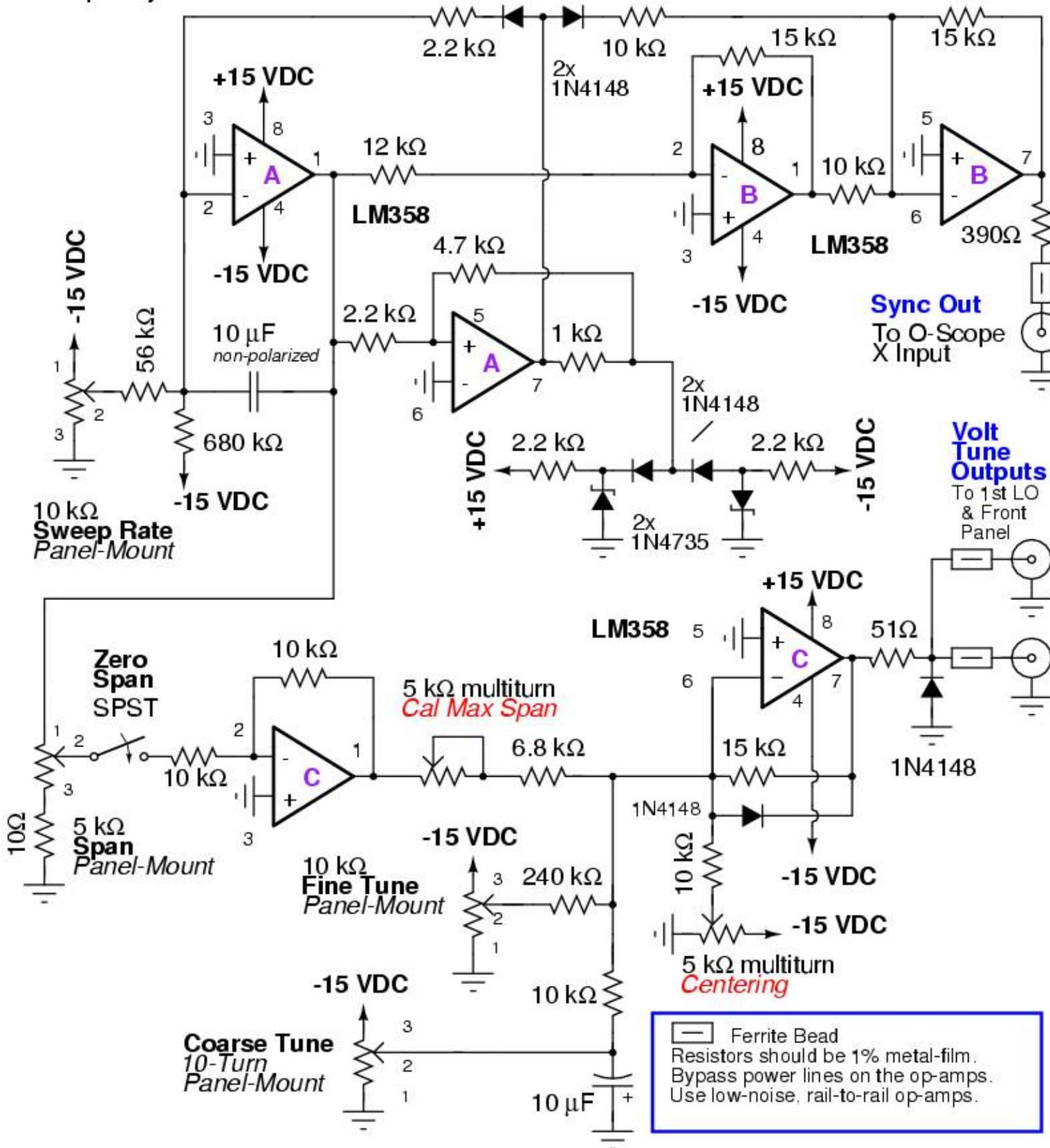
GBPPR 1 GHz Spectrum Analyzer

10.7 MHz IF Amp & Log Detector



GBPPR 1 GHz Spectrum Analyzer

Sweep & Sync Generator



Nortel DMS-100 Enhanced 911 Emergency Service Trunk Group Type

Enhanced 911 Emergency Service Trunk Group Type

Trunk group type E911 (Enhanced 911 Emergency Service) is used for dedicated 911 trunks that are incoming to a tandem office.

E911 type trunks support both Multifrequency (MF) and Dial-Pulse (DP) signaling formats.

If office parameter E911_PSAPS_USING_1_INFO_DIGIT in table OFCSTD (Office Standard) is set to "Y" (yes), datafill table E911NPD (Enhanced 911 Numbering Plan Digit) prior to datafilling field NPA in table TRKGRP (Trunk Group) for group type E911.

An Emergency Service Number (ESN) datafilled in the E911 trunk group data must also be datafilled in table E911ESN (Enhanced 911 Emergency Service Number).

Ensure that a default ESN for table TRKGRP and group type E911 is datafilled in table E911ESN. Otherwise, calls on this trunk group cannot be routed and are sent to vacant code treatment.

Datafill

The following table lists the datafill for table TRKGRP, type E911.

Field Descriptions - E911

Field	Subfield	Entry	Explanation and Action
GRPKEY		See Subfield	<i>Group Key</i> This field consists of subfield CLLI.
	CLLI	Alphanumeric (1 to 16 characters)	<i>Common Language Location Identifier</i> Enter the Common Language Location Identifier (CLLI) name assigned to the trunk group in table CLLI.
GRPINFO		See Subfields	<i>Variable Group Information</i> This field consists of subfields GRPTYP, TRAFSNO, PADGRP, NCCLS, SNPA, ECPHTIME, ORIGHOLD, SDATA, ANISEIZ, ANIPDIAL, ANIREQSG, ESCO, ESN, EXTSIG, and PRTNM.
	GRPTYP	E911	<i>Group Type</i> Enter E911 to specify the group type for enhanced 911 emergency service.
	TRAFSNO	Numeric (0 to 127)	<i>Traffic Separation Number</i> Enter the incoming traffic separation number assigned to the trunk group. If a traffic separation number is not required, enter "0". If switching unit has feature package NTX085AA (Traffic Separation Peg Count), enter a number between 1 and the value of office parameter TFAN_OUT_MAX_NUMBER in table OFCENG.

For switching units without feature package NTX085AA, enter 1 to 15.

It is recommended that incoming and outgoing traffic separation numbers 1 to 9 be reserved for generic traffic separation numbers.

PADGRP	Alphanumeric (1 to 5 characters)	<i>Pad Group</i> Enter the name of the pad group assigned to the trunk group in table PADATA.
NCCLS	NCRT	<i>Operational Measurements No-Circuit Class</i> This field is not required for incoming trunk groups. Enter "NCRT" (no circuit).
PRTNM	Vector (up to 8 characters)	<i>Pretranslator Name</i> To activate this option, enter the value in table STDPRTCT. Then enter the data for field PRTNM in table TRKGRP for the E911 MF trunk with that value. The default datafill for an E911 MF trunk is "NPRT" (Nil Pretranslator).
SNPA	Numeric (5 digits)	<i>Serving Numbering Plan Area</i> Enter the serving NPA of the E911 trunk group that has a Numbering Plan Digit (NPD) datafilled in table E911NPD.
ECPHTIME	Numeric (0 to 255)	<i>Enhanced Called Party Hold Time</i> This entry indicates the number of seconds ECPH is active.
ORIGHOLD	Y or N	<i>Originator Hold</i> If the end office at which this trunk originated supports the operator hold function. Otherwise, enter "N" (no).
SDATA	See Subfields	<i>Signaling Data</i> This field consists of subfield SIGFMT and refinements.
SIGFMT	AMR4, AMR5, or BELL	<i>Signaling Format</i> Enter the format of the Automatic Number Identification (ANI) information that is incoming on the trunk. If the format type is AMR4, enter "AMR4" and datafill refinement NCATDIGS. If the format type is AMR5, enter "AMR5" and datafill refinement NCATDIGS. If the format type is BELL, enter "BELL" and datafill refinement INFODIGS.
NCATDIGS	Numeric (2 or 3 digits)	<i>Number of Category Digits</i> Datafill this field if the value in field SIGMT is AMR4 or AMR5. Enter the number of category digits expected along with the ANI.

INFODIGS	Numeric (1 or 2 digits)	<i>Information Digits</i> Datafill this field if the value in field SIGMT is BELL. Enter the number of information digits expected along with the ANI.
ANISEIZ	Numeric (2 to 30)	<i>ANI Seizure Timing</i> Enter the time, in seconds, that the trunk waits for reception of the first ANI digit or signal after the ANI request signal.
ANIPDIAL	Numeric (2 to 30)	<i>ANI Partial Dial Timing</i> Enter the time, in seconds, that the trunk waits for reception of each ANI digit or signal after the first digit.
ANIREQSG	REV or WK	<i>ANI Request Signal</i> Enter "REV" to specify that a reversal signal is used to request ANI information. This entry value is used for multifrequency or dial-pulse signaling. Enter "WK" to specify that a wink signal is used to request ANI information. This entry value is used for Public Safety Answering Point (PSAP) signaling.
ESCO	Numeric (0000 to 9,999)	<i>Emergency Service Central Office</i> Enter the number representing the end office at which the E911 trunk originated.
ESN	Numeric (000 to 15,999)	<i>Emergency Service Number</i> Enter the number associated with the Emergency Service Zone (ESZ). This number is used to obtain the Directory Number (DN) of the primary PSAP to which the call is routed by default.
EXTSIG	Y or N	<i>Extended Signaling</i> Enter "Y" to specify that the trunk uses the extended signaling protocol. Enter "N" to turn off this option.
ACKWINK	Y or N	<i>Acknowledgment Wink</i> Enter "Y" to receive an ACKWINK on incoming wireless calls over MF trunks to the E911 tandem. The E911 tandem receives the ACKWINK after receiving digits. The default setting is "N". To change the ACKWINK field to "Y", set the EXTSIG field to "Y".
OFBSR	Y or N	<i>Off-Board Selective Routing Database</i> Enter "Y" if facility uses the OFBSR for translations and routing of both MF and ISUP E911 trunks.

-End-

Datafill Example

The following example MAP display shows sample datafill for table TRKGRP, type E911.

GRPKEY	GRPINFO
E911WRLS	E911 20 ELO NCRT NPRT 613 Y 123 Y BELL 2 10 10 REV 0849 321 Y \$
E911ICNG	E911 0 ELO NCRT P621 613 Y 123 Y AMR4 3 10 10 REV 0847 005 N \$

The following example show sample datafill for table TRKGRP, type E911 using the OFBSR subfield for a MF trunk.

GRPKEY	GRPINFO
E911ICMF	E911 20 ELO NCRT NPRT 613 613 Y 0 Y BELL 1 10 10 REV 0692 111 N N \$

Bonus



End of Issue #80



Any Questions?

Editorial and Rants

How many times do we have to babysit and bail out these European assholes?

Guess Who's Paying for the Greece Bailout? That's Right -- YOU

From: www.businessinsider.com

By Henry Blodget

The bailout outrages never stop. Of the 110-billion Euro Greece bailout, 30-billion (approx \$40 billion) will be paid for by the IMF.

The U.S. supplies almost 20% of the IMF's funding (per quotas). So that means U.S. taxpayers are providing ~\$8 billion of the \$145 billion going to kick the Greek can down the road.

That's the first outrage. (Why is this our problem?)

The second outrage is that, as in some of the U.S. bailouts, our bailout money is JUNIOR to Greece's existing debt. That means that, over the next couple of years, the idiot banks that loaned bankrupt Greece money will get their money back. And then, when Greece runs out of cash again, we'll be left holding the bag (along with Germany and the rest of the folks who bailed Greece out).

In any normal financing, the lender of last resort would be SENIOR to all existing debt. It would get its money back first, before the other idiots got a penny.

In the Greece bailout, however, the new money we're putting in will be going right out the door to pay off existing lenders who would have lost their shirts. And if the Greece austerity measures don't work and there's nothing left for us? Tough.

(Why don't the existing creditors have to lose a penny? Same reason the AIG creditors didn't lose a penny. Because it would apparently be too traumatic to ask them to do that. The idea that the existing creditors might have to lose money was apparently so unthinkable that it was never even on the table.)

It's nice of us to bail out Greece, isn't it? Can't we at least get the Parthenon as collateral or something?

Welcome to Obama's World and our quest for 'mediocrity.'

Heaven forbid hard working students get acknowledged for their work! They might fly off to the moon or cure cancer or something...

Suburban School District Eliminates Class Rankings

December 7, 2010 – From: www.chicagobreakingnews.com

By Jack McCarthy

West suburban Indian Prairie District 204 has become the latest in the Chicago area to eliminate high school class ranks.

The District 204 school board on Monday voted unanimously and without discussion to eliminate traditional valedictorian and salutatorian honors at each of the district's three high schools.

Instead, new honor designations will salute groups of top academic performers beginning with the 2011–12 school year.

"It's not perfect, it'll never be perfectly just," said board member Mark Metzger. "But it's a heck of a lot more just than what we have (now)."

The new system would cite students with a 4.6 grade point average as Summa Cum Laude, or highest honor. A Magna Cum Laude -- with great honor -- designation would go to students with grade point averaged between 4.4 and 4.59.

Students with 4.2 to 4.39 grade point averages would receive Cum Laude -- with honor -- citation.

District 204 joins other districts and schools who have already eliminated class ranks, including New Trier, Illinois Math and Science Academy, Naperville District 203 and Benet Academy.

If designations were in place in 2009–10 school, nine students would have been Summa Cum Laude, 29 would have earned Magna Cum Laude and 60 would have been Cum Laude.

And it gets even worse! Fitting that all this is taking place in Obama's Chicago...

Honors Class Leads to Diversity Debate

November 23, 2010 – From: www.chicagotribune.com

By Diane Rado

When he scans the faces in his honors science courses at Evanston Township High School, chemistry teacher William Farmer can easily see who's missing: minority kids.

"Out of 26, you might have three nonwhite students," he said. One of the most racially mixed high schools in Illinois, Evanston has a mission of embracing diversity and promoting equity and excellence for all students. But its own data show that few minority students make it into the school's most rigorous courses that will best prepare them for college and the future.

Honors classrooms dominated by white students have been common in Illinois and across the nation, a byproduct of a century-old and controversial tradition of tracking, or sorting, students into different levels of classes.

Across the Chicago region, high school officials say they are making inroads in diversifying their advanced classes, but Evanston is considering the boldest step of all: eliminating an elite honors English course that has traditionally been offered to the highest-achieving incoming freshmen — usually white. The proposal has spurred an emotionally charged and race-tinged debate in the liberal, multiracial community that is home to Northwestern University.

For the most part, freshmen of all races and socioeconomic and achievement backgrounds would learn together in the same freshman humanities class, an English course that blends literature, history, art, music and philosophy and is required for graduation. The class would be taught at the honors level, according to district officials, and all students would have the opportunity to earn honors credit depending on their grades on assignments.

The superachievers — freshmen who outscore about 95 percent of their peers nationally on eighth-grade achievement tests — would no longer have their own class, beginning next fall. A year later, the same approach would be taken with freshman biology classes, if the school board approves the proposal.

Evanston Township High School District 202 Superintendent Eric Witherspoon said he hopes Evanston's plan will become a model for schools across the country.

"I'm excited about moving away from racially segregated classes," he said at a packed school board meeting earlier this week, adding that all freshmen should be taking challenging courses that will propel them to even more rigorous classes as upperclassmen. Applause broke out in some, but not all, parts of the mostly white audience.

Some parents and community members are skeptical, questioning everything from how quickly the proposal is moving forward to whether all students will benefit from being in the same class.

"What in this proposal is better for the top students?" asked Susan Mendelsohn, one of more than 20 speakers at the board meeting. Trying to tailor instruction to such a wide range of students in one class "will not work out," she said. "It is unreasonable. It expects too much."

The new humanities class would include all students able to read at the ninth-grade level, which the high school defines as scoring at or above the 40th percentile nationally on an achievement test given to eighth-graders.

A small number of students below the 40th percentile will be in a different class, to get more help. This year, 50 students are in that support class — about 8 percent of students enrolled in all freshman humanities courses.

Administrators insist that the new humanities course will be rigorous and challenging to all students.

"I can assure you that we will not be dumbing down the curriculum," Assistant Superintendent Diep Nguyen told the Tribune.

But not all parents are convinced, believing that students could be shortchanged if teachers are unable to devote enough attention to both struggling kids and high-achievers who need the most challenging material to be able to compete against the best and brightest kids across the country.

Mindy Wallis, whose children have been in top honors classes, pointed out that the high school already has mixed-level freshman humanities classes that combine students of varying levels — except for the very top honors students — so there shouldn't be a rush to make more changes.

Karen Young, also a parent, agreed, saying the district hasn't even completed its evaluation of changes made to those classes two years ago.

High school data show that nonwhite students make up the majority of the mixed-level freshmen humanities courses, while white students make up most of the honors-only classes.

"It's time for all students to experience excellence," said Naomi Daugherty, co-president of the Student Council this year. She said she once heard a substitute teacher say he could tell he was in an honors course because there were so few minorities in the room.

The proposal to eliminate the honors-only class comes at a time when the Evanston high school has repeatedly failed to meet federal academic standards, requiring a major school overhaul to increase student performance.

The school spends more than \$20,000 per student, one of the highest per-pupil expenditures in the state. But while white students have consistently scored high enough on state tests to meet the standards, black and Latino students lag far behind, according to state data.

In Washington, the federal government is pushing for states to increase academic standards to better prepare students for college and work, and the U.S. Department of Education has stepped up civil rights monitoring that gauges whether schools are providing minority students access to rigorous programs.

In Illinois, about 71 percent of students in Advanced Placement classes were white in 2006, the most recent Office for Civil Rights data available. That compares with 9.7 percent black and 9.4 percent Latino students in AP that year.

Likewise, at Evanston Township High School, white students by far take the most honors and Advanced Placement courses.

In an interview with the Tribune, Witherspoon said the school's stratified classes have been trapping minority students in lower-level courses for their entire time in high school. "They almost never ended up leaving that level, so they'd be here for four years, but they'd never make it to honors or AP classes," he said.

In Evanston and elsewhere in the Chicago region, students have been placed into different levels of classes based on several factors, including eighth-grade teacher evaluations and recommendations, as well as test scores, often on the EXPLORE test that is a precursor to the ACT college entrance exam.

Witherspoon objects to tracking incoming freshmen before they even walk in the high school doors.

"These are eighth-graders; they are just 13 years old," Witherspoon said.

The placement process has generated controversy elsewhere as well.

In June, an Oak Park parent filed a lawsuit against Oak Park Elementary School District 97, claiming her son's middle school violated student records laws when it provided information to Oak Park and River Forest High School officials involved in determining which classes her son should take. She said she wasn't allowed to review and challenge the information, and that her son was "adversely affected." The elementary school district declined to comment. High school spokeswoman Katherine Foran said the district will likely review its placement procedures as a result of the lawsuit.

The practice of tracking students has both proponents and detractors. Critics argue that it hurts minority and low-income students and those who just miss the cutoff for honors courses and might have benefited from learning alongside higher-achieving students.

Some educators support the practice, saying it's easier and can be more effective teaching to students at the same or similar levels. Parents of high-achievers often like their children in the highest tracks because they feel their children are bored or held back in classes that have to cater to the abilities of a wide range of students.

Research findings have been mixed, with some studies pointing to successful "detracking" initiatives that have boosted minority achievement, while others suggesting disadvantages, including average and high-ability students becoming bored or doing worse.

Among other findings, a 2008 study by the Consortium on Chicago School Research at the University of Chicago found that absenteeism increased among average and high-ability students after Chicago Public Schools eliminated remedial courses and mandated college prep classes for all students in 1997.

Officials in some of Illinois' largest school districts say they have been eliminating the lowest-level classes at their schools, and pushing more students into Advanced Placement classes. Still, they have continued to track students.

Farmer, the chemistry teacher, who is president of Evanston Township High School's teachers union organization, said teachers in departments affected by the proposal generally favor it, as long as they get support from administrators and training in how to effectively teach the heterogeneous courses.

For now, the proposal is aimed at freshmen English-humanities and biology; other subjects, such as math, continue to offer courses at different levels. The district has made no final decisions on whether sophomore classes will be detracked if the freshman proposals go through.

The school board will hold another public hearing on the plan Monday and is scheduled to vote Dec. 13.

Farmer believes the school board will approve the plan, saying, "I get the sense in working with the board that they really recognize the moral imperative of needing to make some drastic changes to the school structure, to reduce the predictability of student achievement based on race."

So the idea-stealing assholes at *MAKE* magazine have new scam to whip their idiot followers into a frenzy. After Microsoft released the Xbox 360 Kinect, people started buying them up for hacking purposes. The idiots at *MAKE* posted a couple stories to rile up their readers that Microsoft "didn't want them to do this," or whatever.

This is ironic, as Microsoft was a sponsor of the "Maker Faire" and has run several backpage ads in *MAKE*. *Hmmm...* Can you say propaganda to sell more Kinect units – and just before Christmas, too!

What a bunch of fucking tools...

[MSDN Blogs](#) > [Coding4Fun](#) > [Microsoft at Maker Faire 2007!](#)

Microsoft at Maker Faire 2007!

[Coding4Fun](#) 2 May 2007 5:49 PM |  [11](#)



Maker Faire 2007

Build, craft, hack, play, MAKE.
ENGINEERING • CRAFTS • SCIENCE • ART

Event Recap

2 days + 45,000 Attendees + 5,000 ft2 of Microsoft Makers = 100% Goodness

We had an amazing time at Maker Faire this year. It's always so much fun to interact with folks - show all the cool stuff you can build with our tools/technologies, and also get a better understanding of what types of projects people are making.

As they say, a picture is worth a thousand words, so check it out if you weren't able to attend:

- [Microsoft Live Spaces photos](#)
- [All Maker Faire 2007 tagged photos on Flickr](#)



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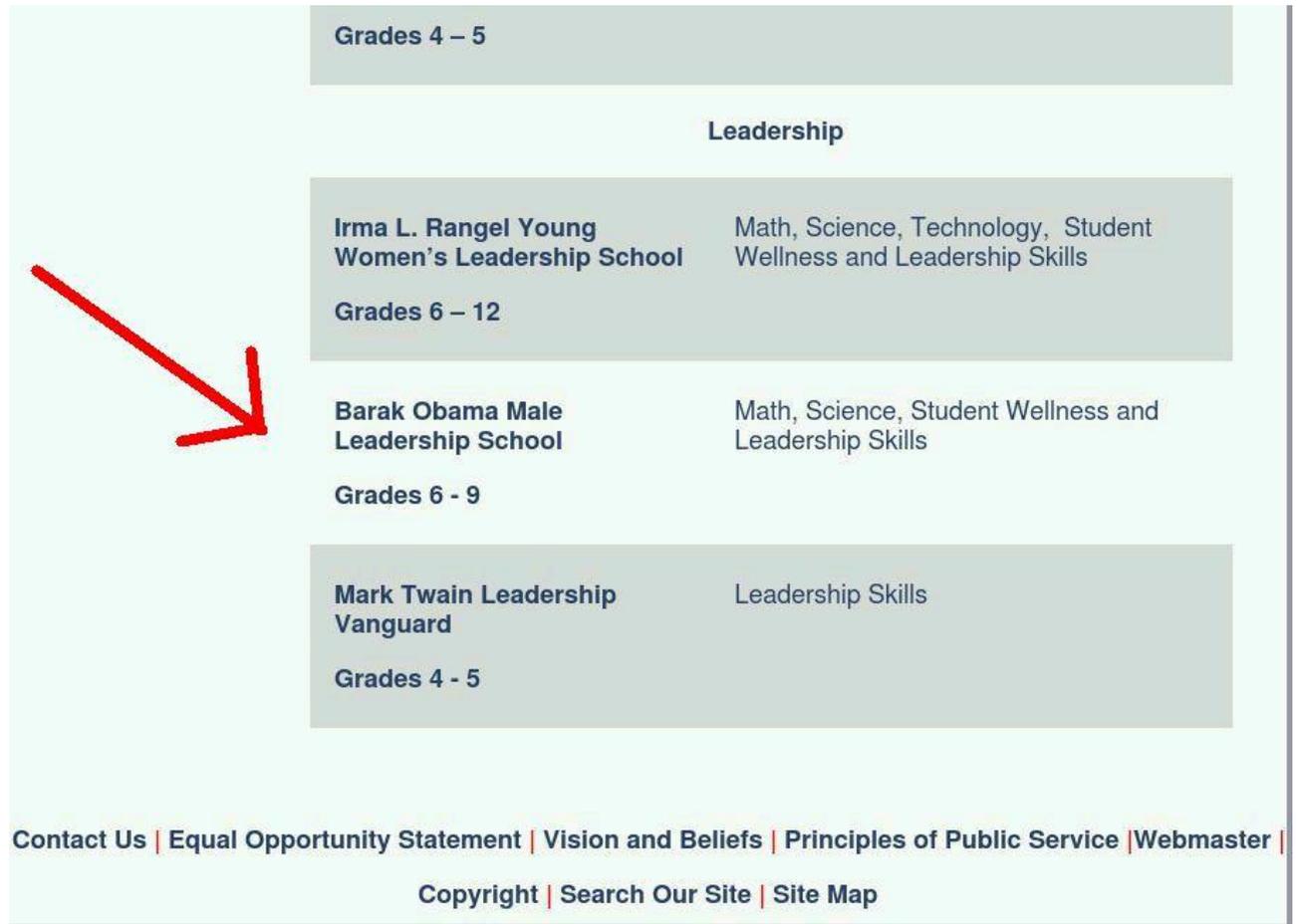
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Phone Windows Phone
7 **WPF XNA**

Archives

This "Barack Obama Male Leadership School" in Dallas, Texas sure sounds interesting! I'm sure that school is pushing out future engineers, doctors, lawyers, "community organizers," etc. left and right! LOL!

From: www.dallasisd.org/parents/magnet/magnets.htm



Grades 4 – 5	
Leadership	
Irma L. Rangel Young Women's Leadership School	Math, Science, Technology, Student Wellness and Leadership Skills
Grades 6 – 12	
Barak Obama Male Leadership School	Math, Science, Student Wellness and Leadership Skills
Grades 6 - 9	
Mark Twain Leadership Vanguard	Leadership Skills
Grades 4 - 5	

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Funny how "diversity" doesn't really involve diversity of thought.

Note that Helen Thomas was born in Lebanon, making her of a member of the Semitic race, but we all know what "anti-Semitism" really means...

Also note that the ADL was formed to use Jewish media interests to come to the aid of the kike pedophile, Leo Frank.

College Scraps Helen Thomas Award After Remarks About 'Zionists'

December 4, 2010 – From: www.aolnews.com

By Hugh Collins

Wayne State University has terminated its Helen Thomas Spirit of Diversity in Media award after the former White House correspondent claimed that the United States is controlled by "Zionists."

Thomas, 90, told a workshop on anti-Arab bias in Dearborn, Mich., that Jewish influence made it impossible to criticize Israel in the United States.

"Congress, the White House and Hollywood, Wall Street are owned by the Zionists," Thomas said on Thursday. "They put their money where their mouth is."

The university yanked the award Friday and denounced her comments. Wayne State "strongly condemns the anti-Semitic remarks made by Helen Thomas," the university said in an e-mailed statement, according to The Associated Press.

Wayne State's Journalism Institute for Media Diversity has given the Helen Thomas award for work that promotes diversity. The award "is no longer helping us achieve our goals," Matthew Seeger, an interim dean, told The Detroit Free Press.

This is not the first time that Thomas has made explosive comments. In June, she was caught on camera saying that Jews should "get the hell out of Palestine" and go home to "Poland, Germany and America and everywhere else."

Thomas, the daughter of Lebanese immigrants in Detroit, was once a pioneering political correspondent. She was the first female officer of the National Press Club and the first female member of the White House Correspondents Association. She has covered every president since Eisenhower and was known for her aggressive style. Thomas quit as a columnist for Hearst newspapers following the June incident. She later apologized for the remarks.

The Anti-Defamation League blasted Thomas on Friday and said her latest comments tarnished her legacy as a journalist.

"Helen Thomas has clearly, unequivocally revealed herself as a vulgar anti-Semite," ADL National Director Abraham Foxman said in a statement. "Her suggestion that Zionists control government, finance and Hollywood is nothing less than classic, garden-variety anti-Semitism."

Robert Cohen, executive director of the Jewish Community Relations Council of Metropolitan Detroit, applauded Wayne State's decision to withdraw the award.

"I think it was just very ironic that she made these comments at an event, the purpose of which was to address stereotyping," Cohen told the AP. "And it was very disappointing to know that she received a standing ovation from that audience."

Thomas's words also drew criticism from members of her own profession. In a New Republic article titled "Helen Thomas Lets The Mask Slip," Jonathan Chait wrote that she has a problem with Jews. Chait previously said Thomas' comments about Jews in Palestine were anti-Zionist, rather than anti-Semitic.

"I prefer to hold off on imputing motives of bigotry without strong proof, but there's not a whole lot of doubt remaining here," Chait wrote in The New Republic.

The ADL called on all institutions that have presented Thomas with awards to withdraw them. Thomas has been honored by the Society of Professional Journalists and holds more than 30 honorary degrees, according to the ADL.

"Through her words and deeds she has besmirched both herself and her profession," Foxman said. "This is a sad final chapter to an otherwise illustrious career."

