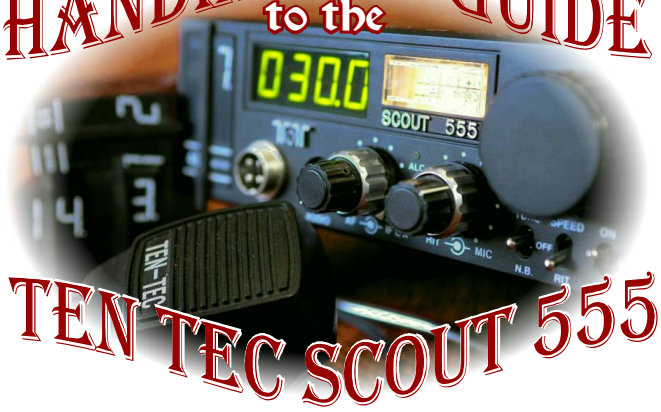
The HANDIMAN'S GUIDE to the TEN TEC SCOUT 555



by Paul Harden, NA5N

The model 555 Ten Tec Scout is one of the most unique ham radios ever built with the band module concept for a simple full functioned 50 watt CW/SSB HF rig — and it's 5W QRP cousin, the **model 556 Argo**. It's small size, by 1990 standards, made it ideal for portable and mobile use. The Scout remains a unique and excellent little HF transceiver still today with that legendary Ten Tec performance. The Scout was the most popular transceiver ever produced by Ten Tec, being manufactured over an 8-1/2 year run from late 1992 through 2001. More Scouts were manufactured than any other Ten Tec model. They sell today used in the $500–600 range, about what the Scout cost new in the 1990s.

Maintenance and Troubleshooting. The Scout/Argo is a mess inside and a mechanical packaging marvel, but doesn't take long to learn your way around. It really is a very clever, well designed transceiver circuit. Unfortunately, the Ten Tec Scout/Argo manual contains only very basic alignment procedures and no troubleshooting aids. The board photos are next to useless for parts identification. Many circuits and filters are shared for both receive and transmit, switched by a host of diodes, that can be confusing at first.

To assist those needing to understand, troubleshoot or repair their Scout or Argo, I have prepared the following illustrations based on my experience and some reverse engineering. I have an Argo and three Scouts (one a surface mount version), one of which I use regularly on the air for CW and mostly QRP.

PCB Parts Layout drawings of the three main boards shows all major components including most diodes, along with the function of the board connectors and a few other details. The connectors, active components, and diodes are a good place to find yourself in the schematic and for signal tracing.

Functional Block Diagram drawings show the major circuit elements and the signal flow in both RX and TX, since many of the circuits are shared, including signal flows through the band modules.

Cautions. The output levels of the PTO and the LO from the band modules varies from band-to-band and unit-to-unit which effect most other Scout signal levels. The oscope waveforms shown are typical with the 20M band module and will show this variability between different units and band modules, but are sufficient for tracing signals through the circuit for proper gains and levels, or identifying a failure. The AGC ensures proper receiver performance and the TX ALC ensures full 50W output to compensates for these changes in signal power.

I certainly hope you find this information helpful in understanding the Scout circuitry and for troubleshooting and repair if needed, as so little detailed information or parts layout seems available.

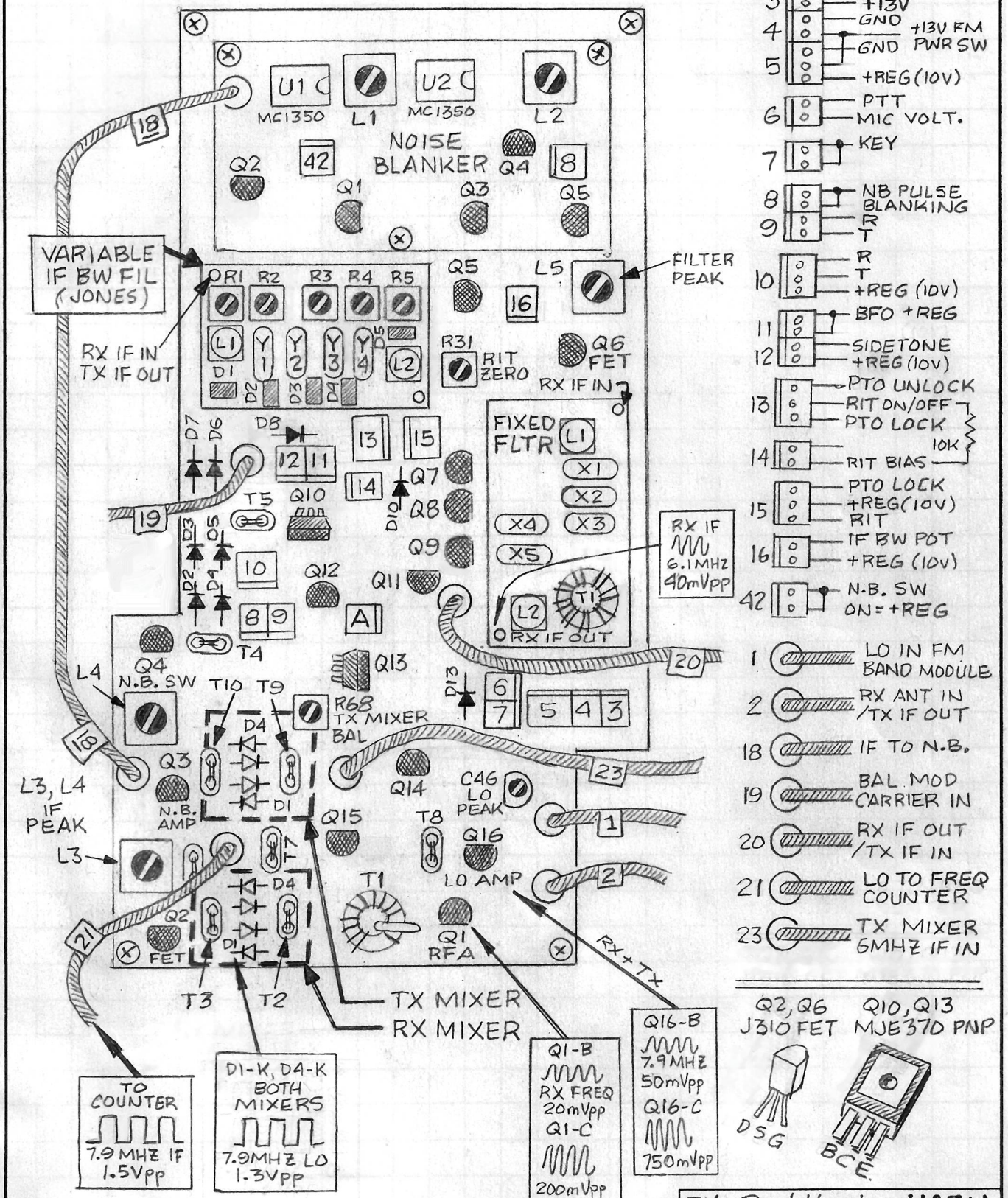
73/72, Paul NA5N

A 1993 ad for the Ten Tec Scout

TITLE	SHEET OF
TEN TEC SCOUT 555. RECEIVER CONTROL BOARD	DATE OCT. 2020

TEST CONDITIONS

RX: 20M, INJECT 20mVpp (-30dBm) AT ANT.
TX: 20M, DUMMY LOAD, CW KEY DOWN



CONNECTORS

3	GND
4	+13V GND GND (+13V FM PWR SW)
5	+REG (10V)
6	PTT MIC VOLT.
7	KEY
8	NB PULSE BLANKING
9	R T
10	R T +REG (10V)
11	BFO +REG
12	SIDETONE +REG (10V)
13	PTO UNLOCK RIT ON/OFF PTO LOCK
14	RIT BIAS (10K)
15	PTO LOCK +REG (10V) RIT
16	IF BW POT +REG (10V)
42	N.B. SW ON = +REG
1	LO IN FM BAND MODULE
2	RX ANT IN /TX IF OUT
18	IF TO N.B.
19	BAL MOD CARRIER IN
20	RX IF OUT /TX IF IN
21	LO TO FREQ COUNTER
23	TX MIXER 6MHZ IF IN

Q2, Q6 J310 FET

Q10, Q13 MJE370 PNP

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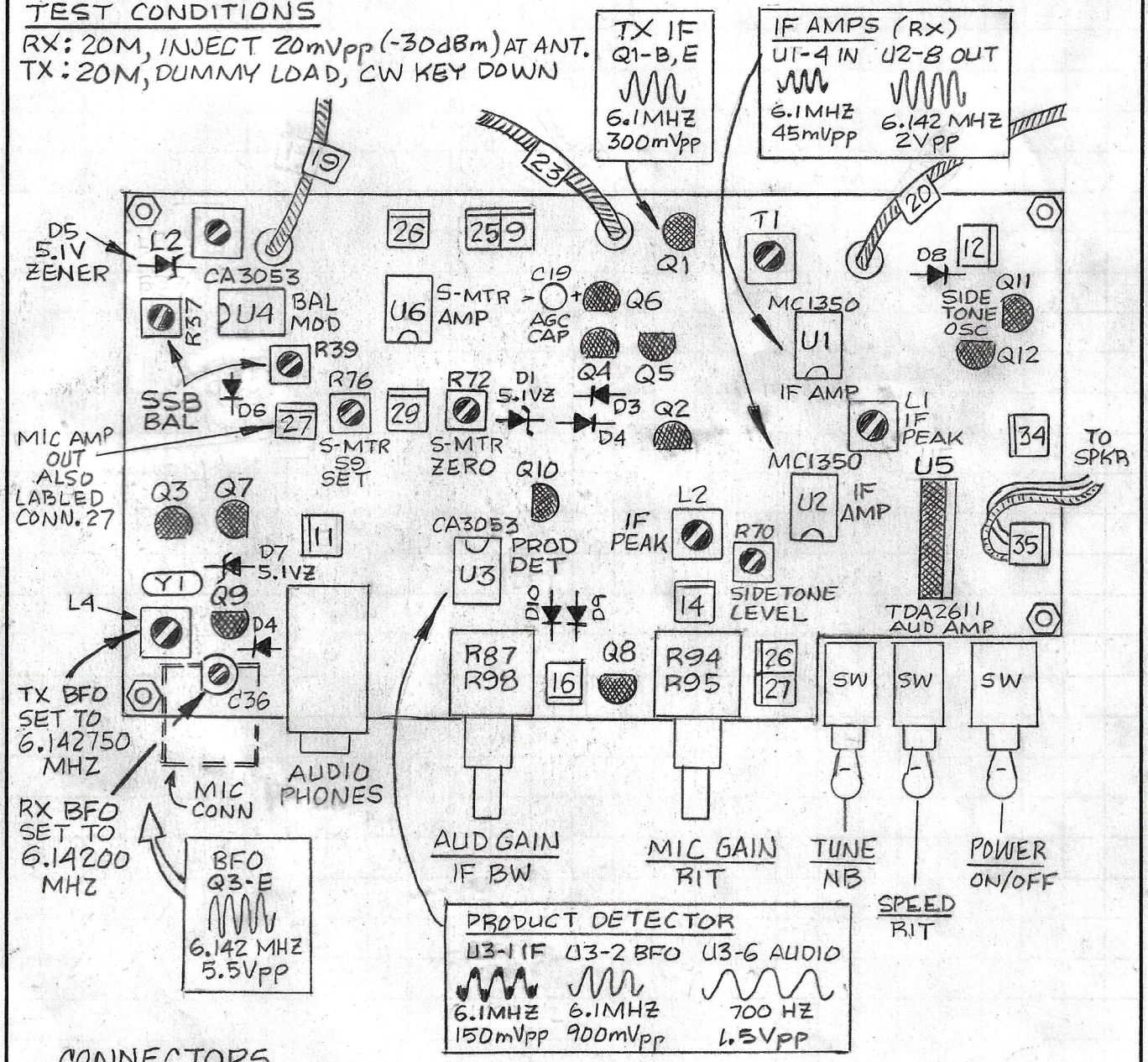
TITLE TEN TEC SCOUT 555 | SHEET OF

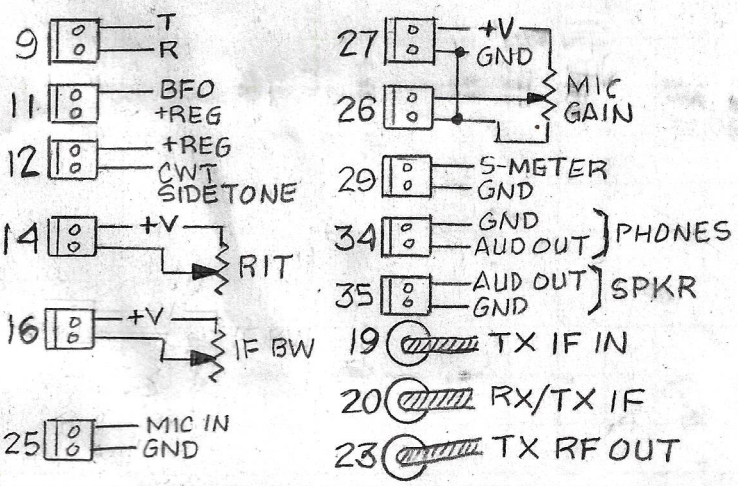
IF/AUDIO BOARD | DATE OCT. 2020

TEST CONDITIONS

RX: 20M, INJECT 20mVpp (-30dBm) AT ANT.
TX: 20M, DUMMY LOAD, CW KEY DOWN



CONNECTORS



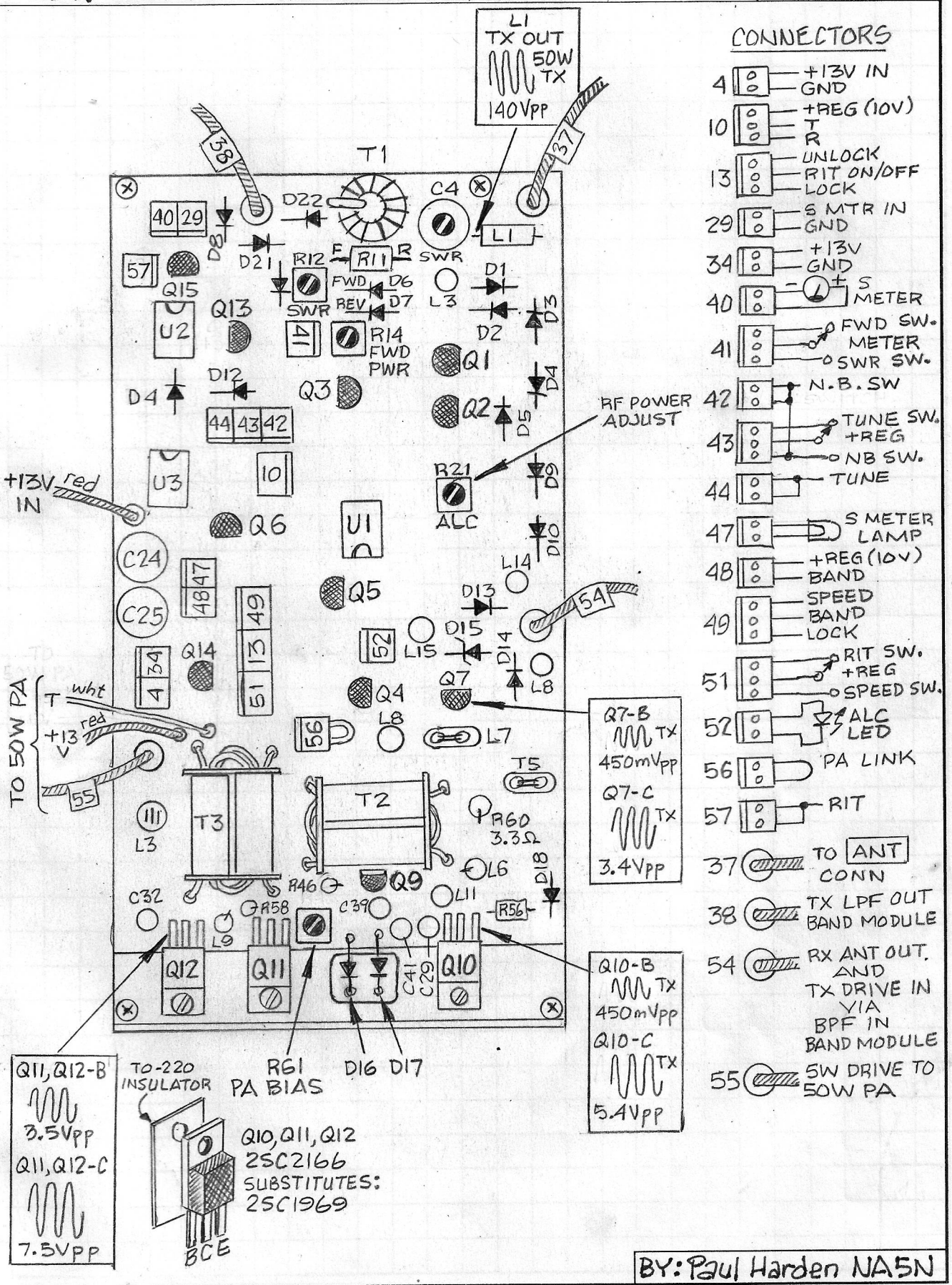
BY: Paul Harden NA5N

TITLE **TEN TEC SCOUT 555**

LOW LEVEL DRIVER (LLD) BOARD

SHEET OF

DATE OCT. 2020



CONNECTORS

4	+13V IN, GND
10	+REG (10V), T, R
13	UNLOCK, RIT ON/OFF, LOCK
29	S MTR IN, GND
34	+13V, GND
40	S METER
41	FWD SW. METER, SWR SW.
42	N.B. SW
43	TUNE SW. +REG, NB SW.
44	TUNE
47	S METER LAMP
48	+REG (10V), BAND
49	SPEED, BAND, LOCK
51	RIT SW. +REG, SPEED SW.
52	ALC LED
56	PA LINK
57	RIT
37	TO ANT CONN
38	TX LPF OUT BAND MODULE
54	RX ANT OUT, AND TX DRIVE IN VIA BPF IN BAND MODULE
55	5W DRIVE TO 50W PA

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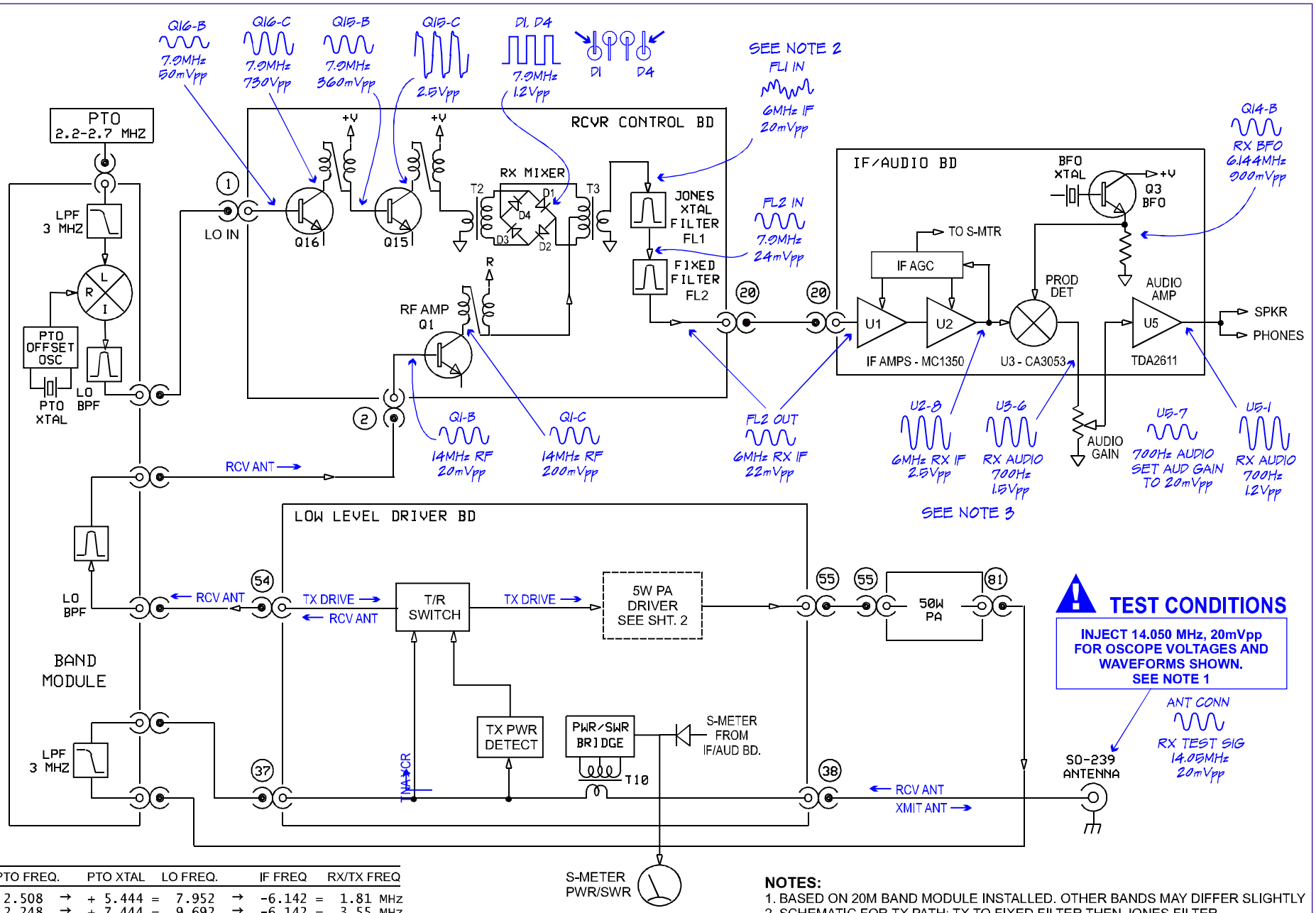
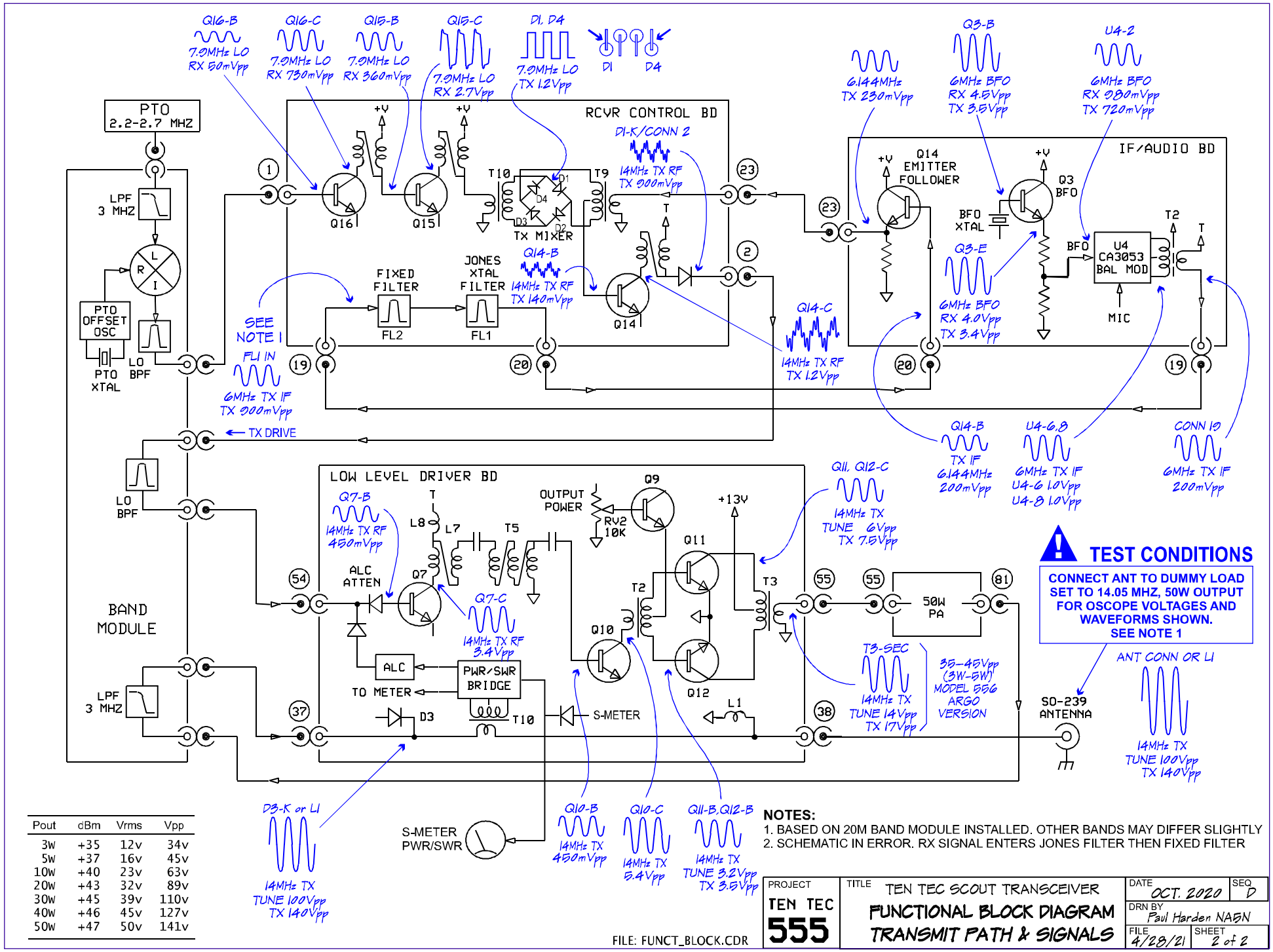


BAND	PTO FREQ.		PTO XTAL		LO FREQ.		IF FREQ		RX/TX FREQ
160M	2.508	→	+ 5.444	=	7.952	→	-6.142	=	1.81 MHz
80M	2.248	→	+ 7.444	=	9.692	→	-6.142	=	3.55 MHz
40M	2.248	→	+10.944	=	13.192	→	-6.142	=	7.05 MHz
30M	2.318	→	+13.192	=	16.262	→	-6.142	=	10.12 MHz
20M	2.252	→	+ 5.656	=	7.908	→	+6.142	=	14.05 MHz
17M	2.282	→	+ 9.656	=	11.938	→	+6.142	=	18.08 MHz
15M	2.252	→	+12.656	=	14.908	→	+6.142	=	21.05 MHz
10M	2.252	→	+19.656	=	21.908	→	+6.142	=	28.05 MHz
10M	2.200	→	+20.156	=	22.356	→	+6.142	=	28.50 MHz

NOTES:
1. BASED ON 20M BAND MODULE INSTALLED. OTHER BANDS MAY DIFFER SLIGHTLY
2. SCHEMATIC FOR TX PATH; TX TO FIXED FILTER THEN JONES FILTER
3. WITH 20mV RF INPUT, IF GAINS AND LEVELS SHOWN REDUCED BY AGC

FILE: FUNCT_BLOCK.CDR

PROJECT: TEN TEC 555	TITLE: TEN TEC SCOUT TRANSCEIVER FUNCTIONAL BLOCK DIAGRAM RECEIVE PATH & SIGNALS	DATE: OCT. 2020	SEQ: D
		DRN BY: Paul Harden NA5N	
		FILE: 4/28/21	SHEET: 1 of 2



Pout	dBm	Vrms	Vpp
3w	+35	12v	34v
5w	+37	16v	45v
10w	+40	23v	63v
20w	+43	32v	89v
30w	+45	39v	110v
40w	+46	45v	127v
50w	+47	50v	141v

NOTES:
1. BASED ON 20M BAND MODULE INSTALLED. OTHER BANDS MAY DIFFER SLIGHTLY
2. SCHEMATIC IN ERROR. RX SIGNAL ENTERS JONES FILTER THEN FIXED FILTER

FILE: FUNCT_BLOCK.CDR

PROJECT: TEN TEC 555	TITLE: TEN TEC SCOUT TRANSCEIVER FUNCTIONAL BLOCK DIAGRAM TRANSMIT PATH & SIGNALS	DATE: OCT. 2020	SEQ: D
		DRN BY: Paul Harden NA5N	
		FILE: 4/28/21	SHEET: 2 of 2

Some History and Trivia . . .

Ten Tec introduced the 555 Scout/556 Argo series of HF transceivers in 1992 to be an economical alternative to the emergence of HF rigs with an over-abundance of knobs, switches, menus, bells and whistles with price tags well over $1000 in 1990 money. Its compact size was one of the smallest HF rigs available at the time to appeal to hams looking for an all-band HF rig *easy to install and operate in a vehicle* – from trucks to small compact cars. The 50 watt (vs. 100W) output was chosen to have minimal impact on an automobile's electrical system. The optional Noise Blanker offered effective reduction of ignition noise. The Scout was a hit with mobile operators. Its novel compact size, front panel simplicity and legendary Ten Tec performance at an affordable price quickly caught on with hams for a home station as well.

It was initially advertised as an "affordable and fun" entry level rig at just $495 and $29 for each additional band module. Around 1995, the price increased to a still affordable $549, where it remained for the rest of its production life. As the Scout and the market matured, later advertising included its suitability for the experienced ham or contestor as well.

The Argo was also a hit with QRPers ... a major step-up from the popular HW-8 QRP rig. The 1990s saw a strong increase in QRP enthusiasts with the introduction of inexpensive NE602 based rigs and kits such as the Emtec NW series, Small Wonder Labs offerings, NorCal kits, and the MFJ 90xx series. These were monoband rigs; the Argo (and Argonaut), were the "Cadillacs" of multi-band QRP rigs for many years being ahead of their time with full Ten Ten performance and multi-band capable. In 1998, Elecraft introduced its K1 QRP kit and SGC released it's multi-band 20 watt SG-2020. Yaesu was the first global ham radio company to market a QRP-only rig, the FT-817 in 2000, as the Scout/Argo production was coming to an end.

There were only a two major changes in the Scout/Argo transceivers over it's 8-1/2 year production run. The LLD drivers and Argo PA transistors were IRF510 mosfets, changed to 2SC2166 NPN transistors early in the production. Around 1996, the three main boards were converted to surface mount components (SMC), no doubt simplifying assembly at the Ten Tec plant. The circuit is identical for both thru-hole and SMC versions.

Whether for QRP or 50 watt QRO, the Scout/Argo is still a viable rig today, often sought after, due to its simplicity and excellent performance for an "analog radio," even compared with many of today's offerings.