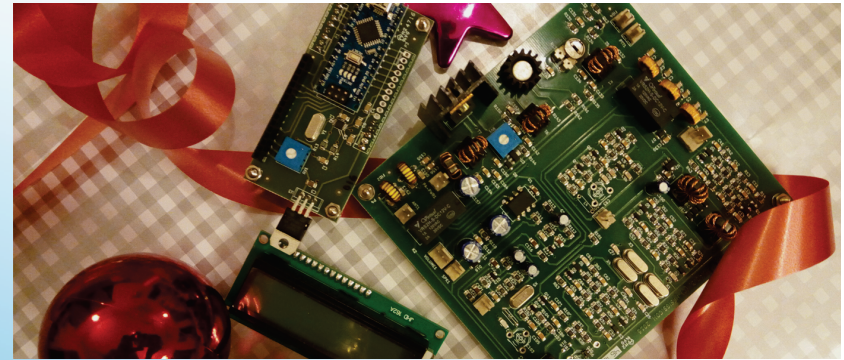


Isaac Schofer, AC3CJ

# The BITX40: A Radio For Experimenters

- Our project was to build, test, calibrate and get the BITX40 radio on the air



- We worked on the radio over the weekends at the local makerspace
- We took it to the park to test it

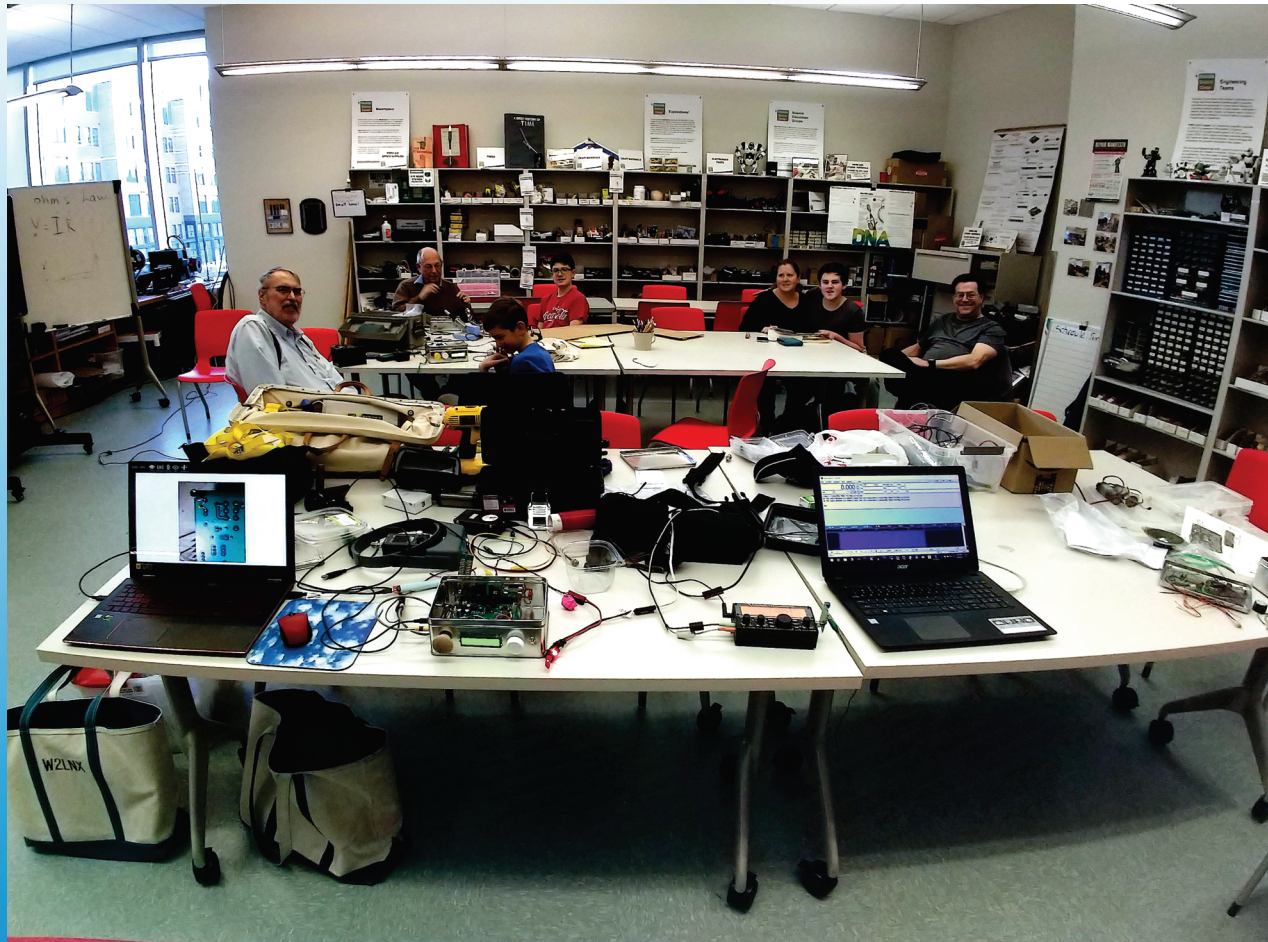
## The BITX40 Project



- The BITX40 is a \$59 five watt 40 meter band transceiver from India
- Radio board and Arduino display board are pre-assembled and tested
- Case and speaker not included
- Additional parts are needed

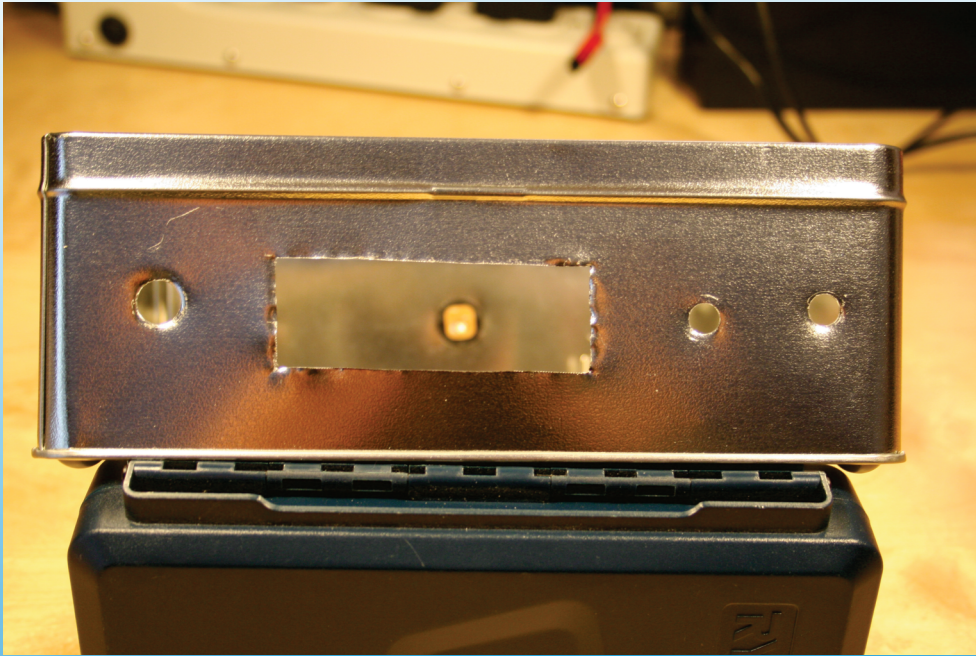


## The BITX40 Kit



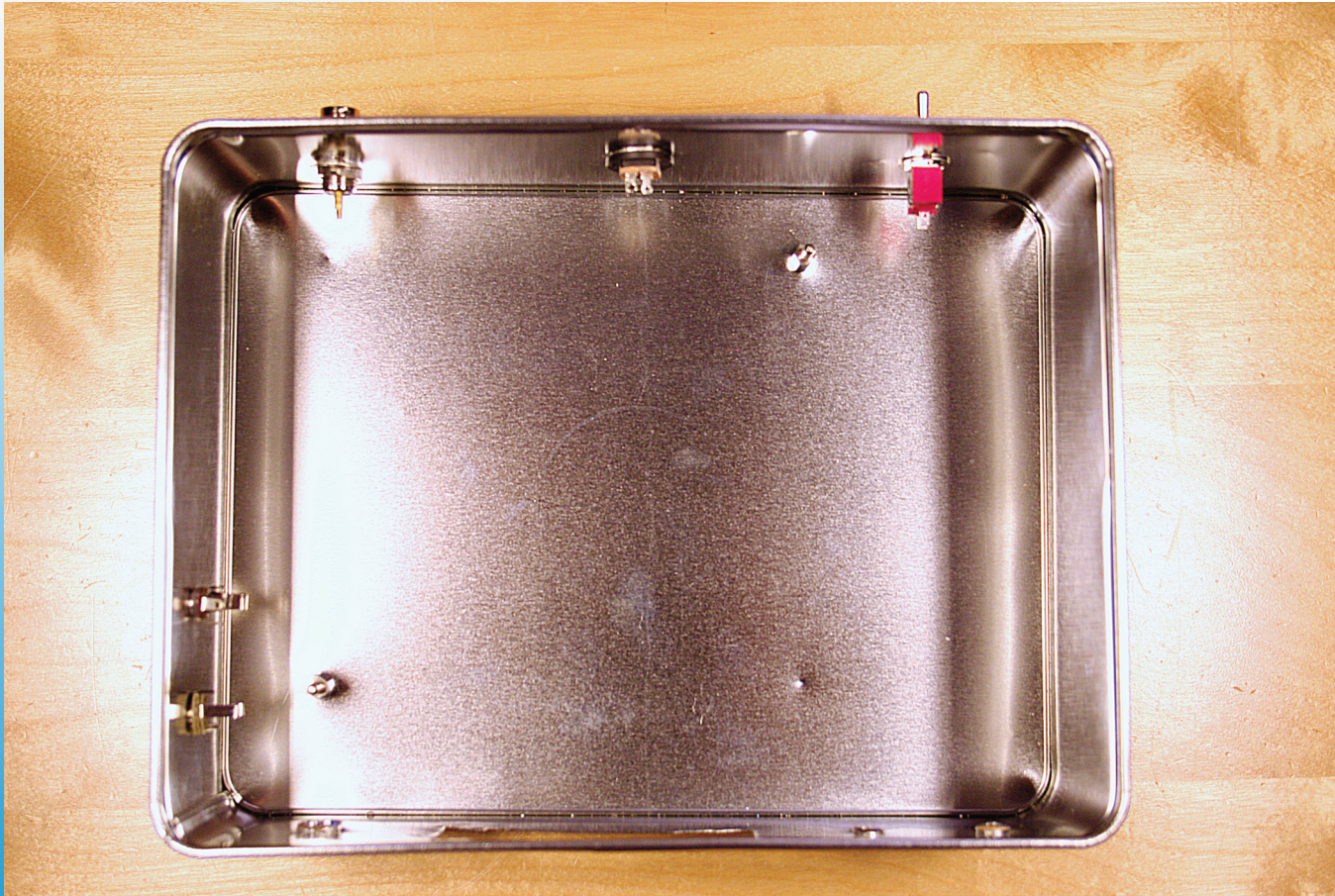
# Rockville Science Center Makerspace





- Holes in case need to be cut for Arduino display board, controls and connectors

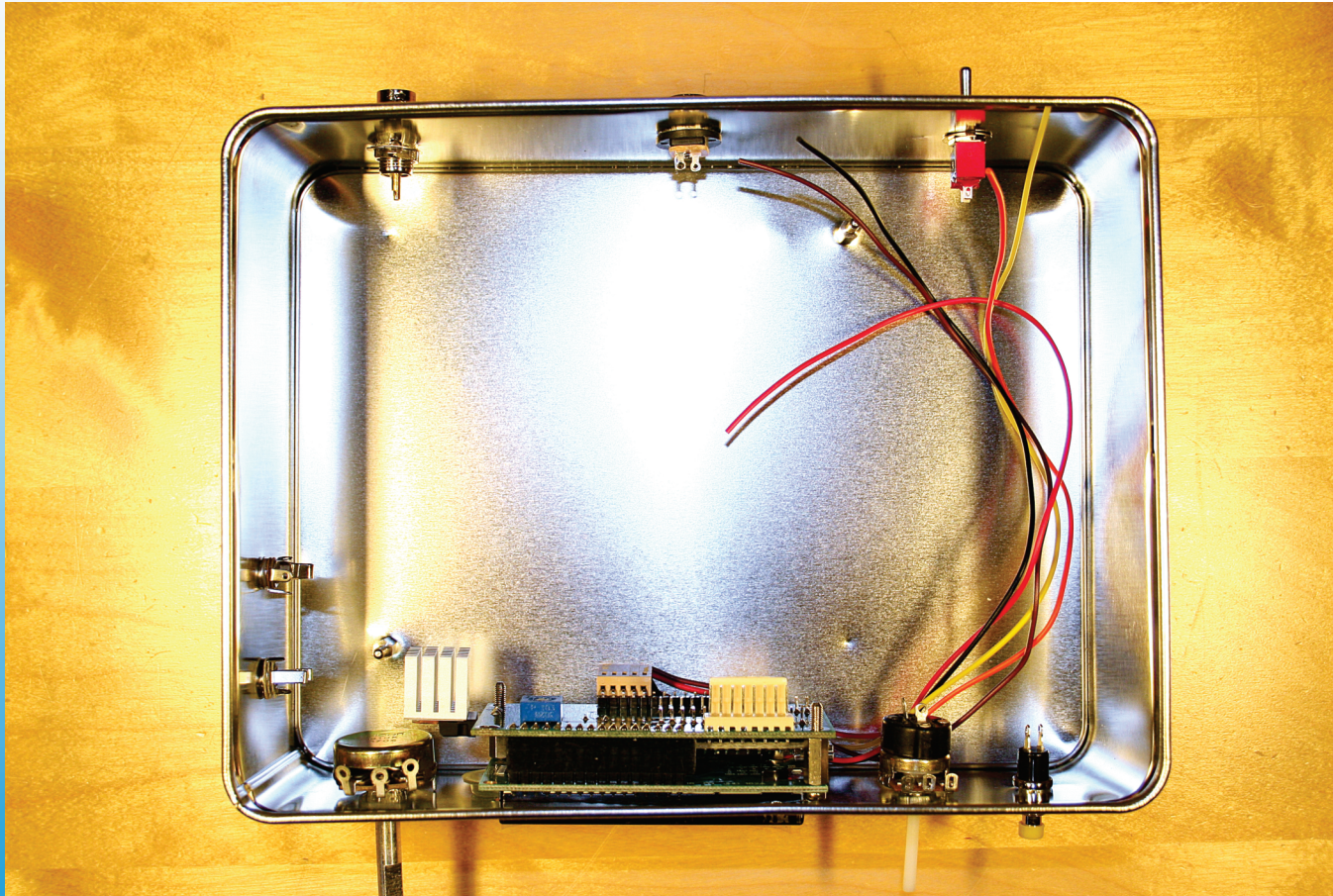
**Assembly**



Attached connectors to case

# Assembly

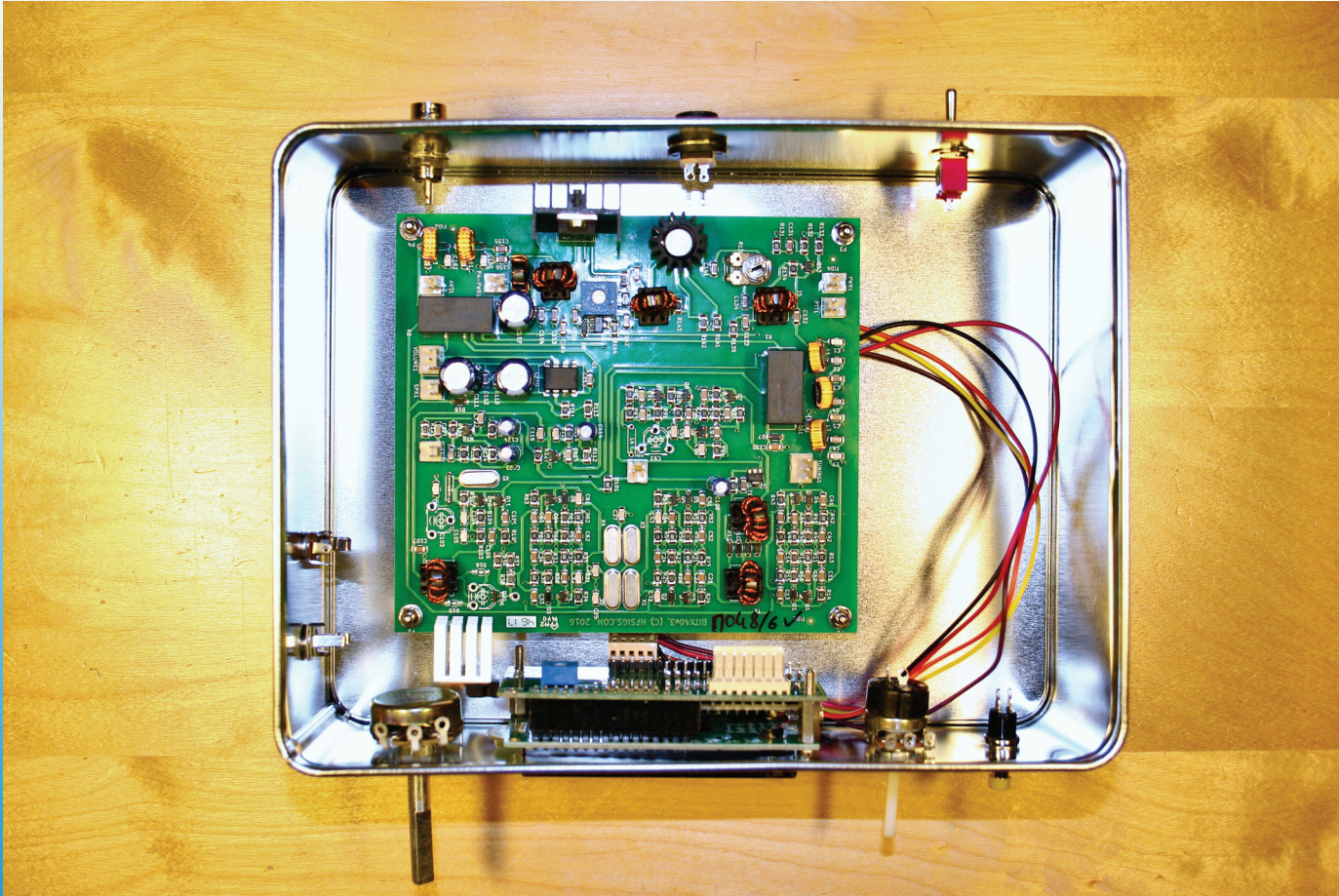




Attached knobs and Arduino display

# Assembly

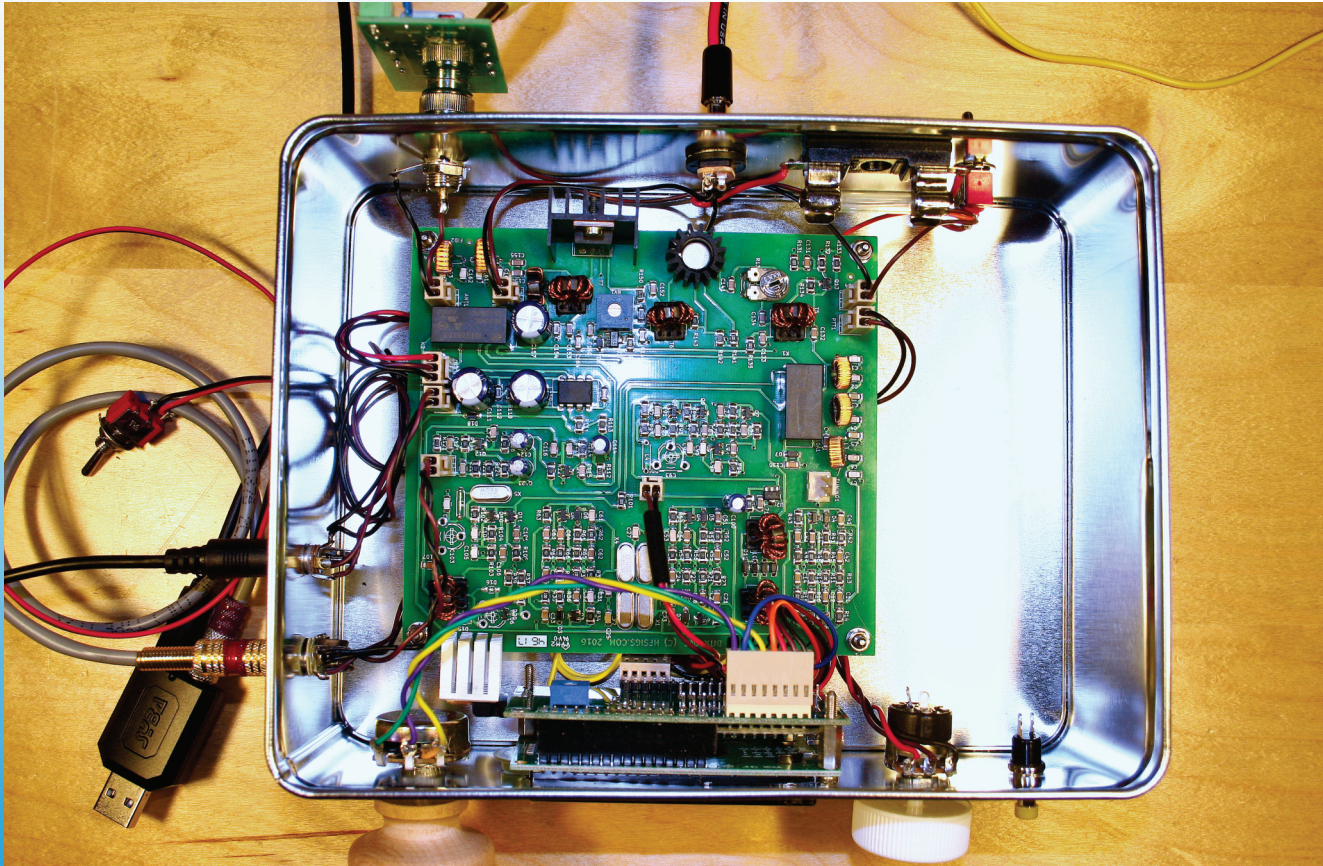




Mounted radio board

# Assembly





Soldered wires to connectors and controls, and plugged them into the radio board

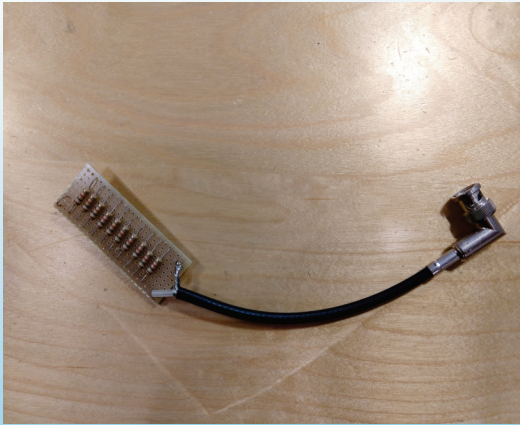
# Assembly





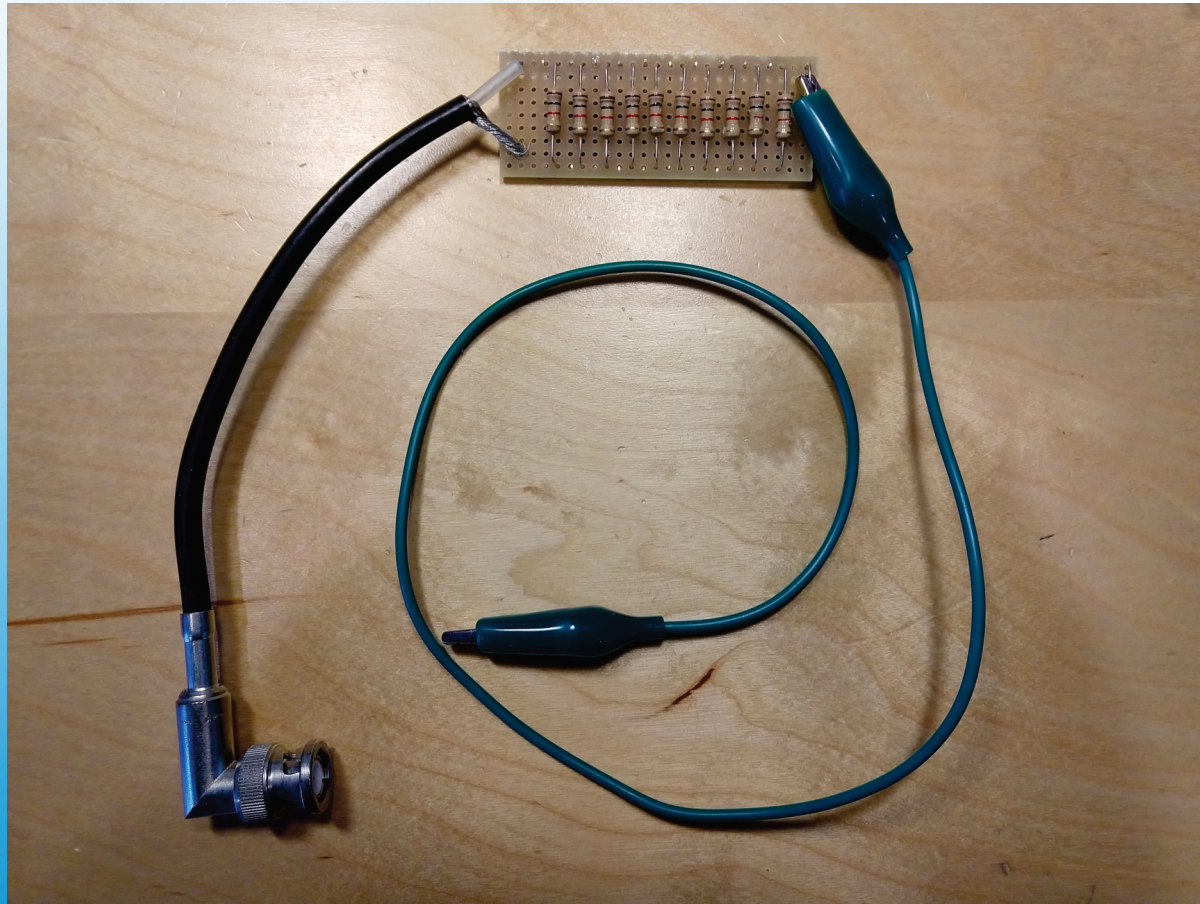
**Dummy Load**





- Made of 20 one kilohm resistors in parallel
- Transmitting without an antenna will damage the radio
- I used the dummy load for transmitting tests

## Dummy Load



Dummy Load with 1 foot wire

## Dummy Antenna



- YouKits FG-01 graphical antenna analyzer
- Set to repeatedly sweep across 40 meter band
- Quick check of BITX40 receiver



**Sweeping Signal Generator**

- Elecraft XG3, 1 mW 7.020 MHz signal
- BITX40 calibration instructions are provided



**Calibrated Signal Generator**

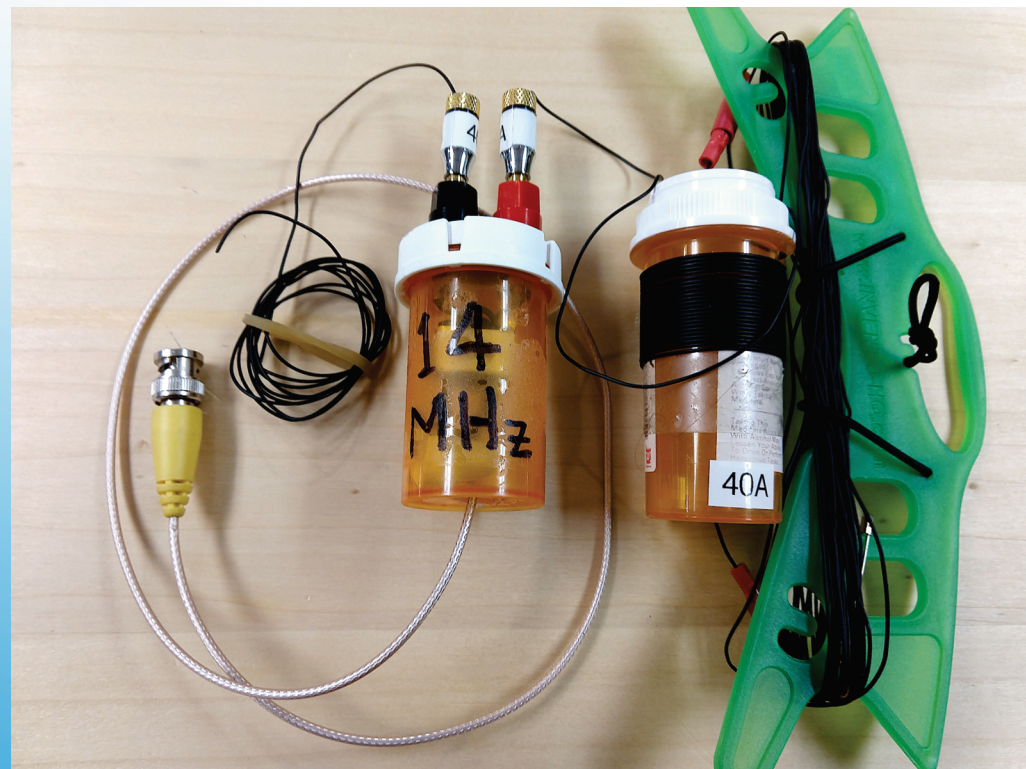


- Inexpensive USB hub
- Inexpensive SYBA USB audio interface
- USB to serial adapter for push to talk
- Used for digital modes communication



## Digital Modes Interface

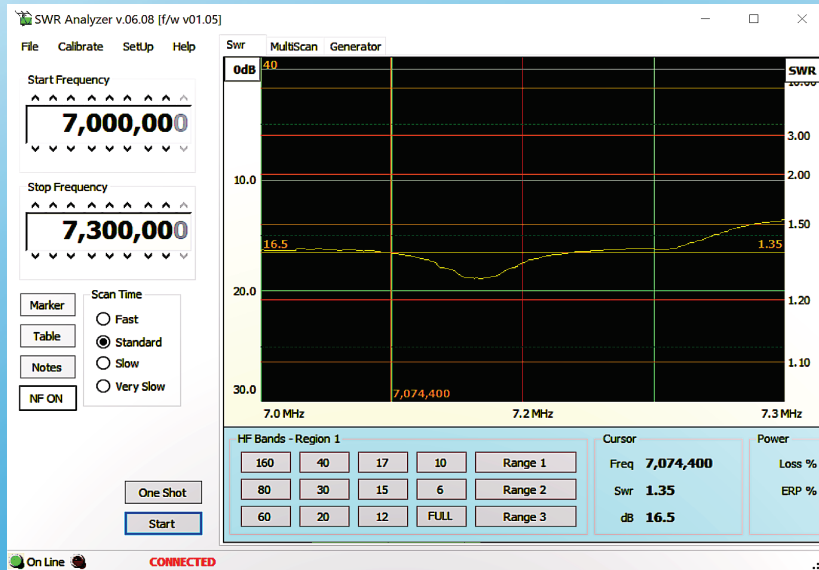
- Off center fed dipole with loading coil
- We went to the local park and tested our antennas



## The Antenna



- \$50 antenna analyzer from India
- Fox Delta AAZ-0217MX
- Measured SWR of less than 1.5:1
- Windows software included



# Antenna Analyzer

WSJT-X v2.0.1 by K1JT

File Configurations View Mode Decode Save Tools Help

Single-Period Decodes						Average Decodes					
UTC	dB	DT	Freq	Message		UTC	dB	DT	Freq	Message	
205015	15	0.3	1330	~ CQ VA2PM FN46	NA	204600	-7	1.3	1537	~ CQ KA1AQP FN42	NA
205015	-11	-0.3	1407	~ CQ HA1ZW JN86	EU	204623	Tx		1537	~ KA1AQP AC3CJ FM19	
205015	-11	0.4	1434	~ 5V7EI IZ4CMT JN54		204645	Tx		1537	~ KA1AQP AC3CJ FM19	
205015	-4	0.5	1646	~ KM4UJI N9ZTO R-10		204630	-10	1.3	1535	~ CQ KA1AQP FN42	NA
205015	-13	0.2	1780	~ K1GUY TNX NB		204715	Tx		1537	~ KA1AQP AC3CJ FM19	
205015	-17	0.4	1960	~ JI1NNE IW9FDD R-22		204700	-19	0.3	1535	~ CQ F6BNT IN95	EU
205015	-19	0.3	2020	~ G4SBC IW9FDD -22		204730	-7	0.4	1547	~ KN2J KK4IAJ EM74	
205015	-15	0.4	2386	~ JT1CO F6FEF JN05		204745	Tx		1537	~ KA1AQP AC3CJ FM19	
205015	-19	0.2	2435	~ SV7BVM F5PEG RR73		204800	-7	0.4	1547	~ KN2J KK4IAJ EM74	
205015	-21	0.3	2523	~ JT1CO IZ3XJM R-12		204815	-12	0.4	1538	~ JT1CO IZ3NXC JN65	
205015	-17	0.3	2634	~ JT1CO EA3HRU JN01		204830	-3	0.4	1546	~ KN2J KK4IAJ EM74	
205015	-15	0.9	2707	~ SM7ETW EA3UU -16		204830	11	0.4	1982	~ CQ N4TZ EN70	NA
205015	0	0.4	1317	~ KF8MZ AJ4FJ -06		204845	-1	0.3	1737	~ CQ KI3C FM18	NA
205015	-15	0.3	1445	~ AE8S AK3F 73		204909	Tx		1737	~ KI3C AC3CJ FM19	
205015	-15	0.5	1685	~ CU5AM G3VSQ IO91		204915	0	0.5	1747	~ KC2QJB N9ZTO R-19	
205015	-19	0.3	2420	~ CQ 9A2AJ JN85	EU	204930	Tx		1737	~ KI3C AC3CJ FM19	
205015	-20	0.3	2562	~ K1GUY DG5YCB R-10		204915	-10	-0.4	1739	~ N8DOD N4VSP R-01	
205015	-20	0.1	2805	~ IS0KNG DG6YIP JO31		205000	Tx		1737	~ KI3C AC3CJ FM19	

CQ only   Log QS0   Stop   Monitor   Erase   Decode   Enable Tx   Halt Tx   Tune    Menus

40m   **7.074 000**

Tx even/1st   Tx 1737 Hz    Hold Tx Freq  
 Rx 1737 Hz   Report -1  
 Auto Seq    Call 1st

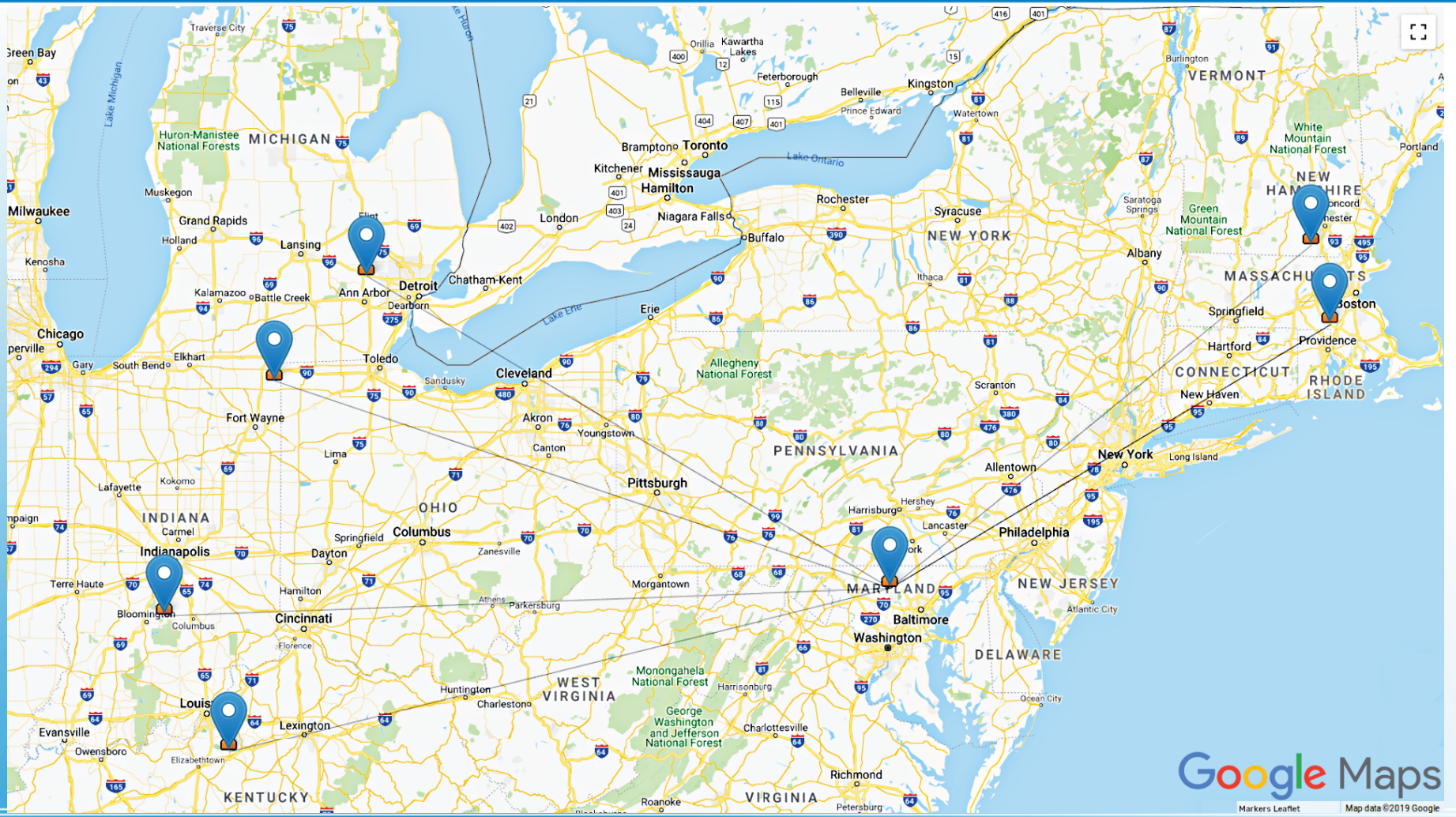
Generate Std Msgs   Next   Now   Pwr

KI3C AC3CJ FM19	<input checked="" type="radio"/>	Tx 1
KI3C AC3CJ -01	<input type="radio"/>	Tx 2
KI3C AC3CJ R-01	<input type="radio"/>	Tx 3
KI3C AC3CJ RR73	<input type="radio"/>	Tx 4
KI3C AC3CJ 73	<input type="radio"/>	Tx 5
CQ AC3CJ FM19	<input type="radio"/>	Tx 6

DX Call: KI3C   DX Grid: FM18   Az: 159   49 mi  
 2019 Mar 24 20:50:37  
 Receiving   FT8   Last Tx: KI3C AC3CJ FM19   7/15   WD:6m

# Operating the BITX40





# Operating the BITX40

- Fun to build
- Great radio for digital modes
- Good for experimenting
- Recommended to be built with experienced mentor

**What I learned**





Clockwise: David, N3ADE; David, W2LNX; Marc, N4DR; Joshua, KC3MAF;  
Joshua, KC3ICM; Joshua, KC3LLR; Isaac, AC3CJ

# MARC's Kids

I would like to thank all of the mentors who did an astounding job helping MARC's Kids,

David, W2LNX

David, N3ADE

Marc, N4DR

Special thanks to David, W2LNX for being my elmer and making the workshop possible

**Thank You**





**Questions after the forum**