

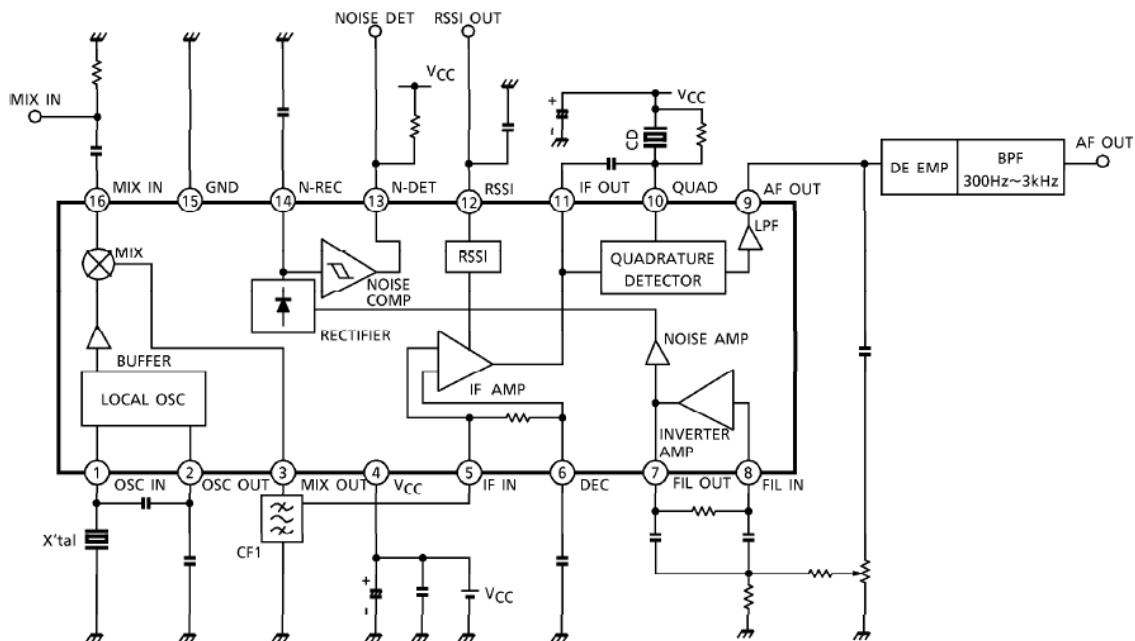
TA31136 Audible S Meter

By KA6BFB

The TA31136 FM Detector Integrated Circuit from Toshiba is used in many modern FM ham rigs. This includes mobiles from Kenwood, Icom, and Yaesu, as well as many handhelds. This chip includes a Received Signal Strength Indicator (RSSI) pin that has an output voltage that corresponds to signal strength. This is a very convenient signal to have access to for transmitter hunting. The output is good over about a 70 dB range.

The block diagram for the IC is shown below from the Toshiba datasheet. Pin 12 is the RSSI output.

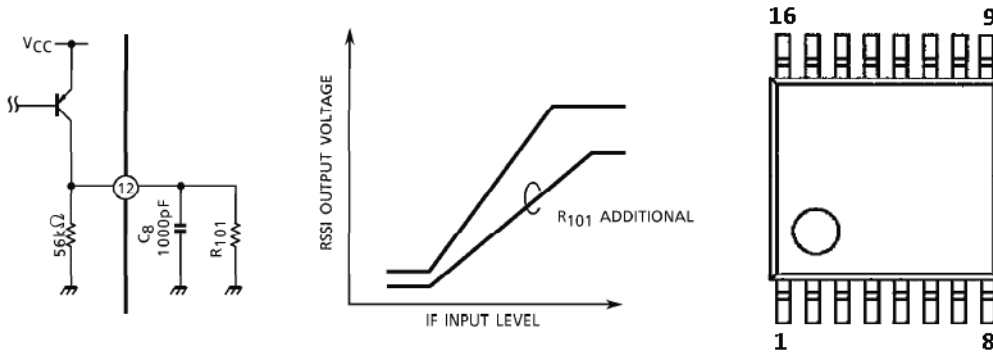
BLOCK DIAGRAM



The description of the RSSI pin, again from the Toshiba datasheet is shown below, along with the physical pin out of the device.

RSSI function

A DC voltage corresponding to the input level of IF input pins (pin 5) is output to the RSSI pin (P12). While the linear range is about 80dB when $V_{CC} = 2V$, the range can be expanded to 80dB. However, in such a case, note that the temperature characteristics of the RSSI output may alter due to a disparity between the temperature coefficient of the external resistor and the internal resistance of the IC.



This project is the evolution of two earlier versions. The first version was built with dead bug construction and mounted on a portion of a credit card in my Puxing 777. I am still using this today (October 2015). For the second version I provided artwork for a single sided PCB intended for the home builder. I have had many requests for a professionally built PCB and I have finally decided to do it. In each iteration I changed the Flip Flop IC for more commonly available parts. This one should last a long time.

The schematic is shown below. When the radio is initially powered up, pin 6 of the flip flop is briefly kept low while C_3 is charging. This results in the VCO output being inhibited. The radio will stay in this state until the user wants to use the audible S meter function. Briefly bringing the ENABLE pin low toggles the flip flop and enables the audible S Meter audio. On the Puxing 777 I used an unnecessary button on the radio for this. Once the Audible S meter function is enabled, the radio must be turned off to disable it.

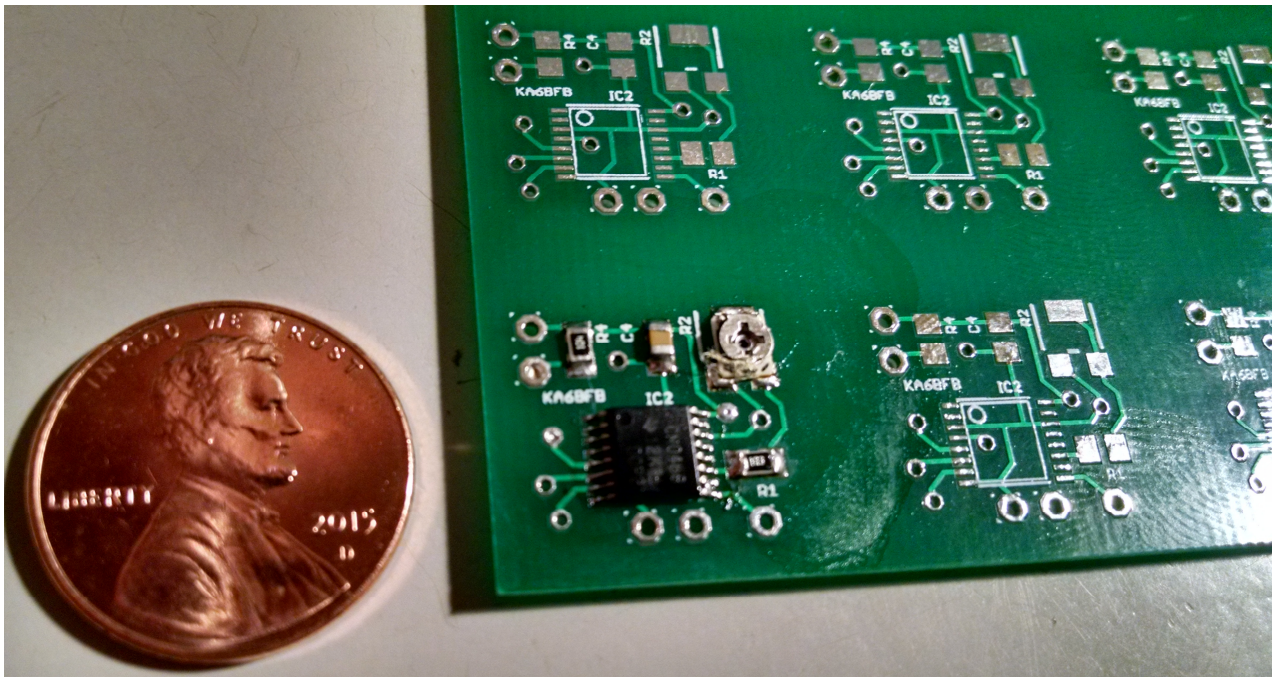
Only 5 connections are necessary. The RSSI connects to pin 12 of the TA31136 IC. GND should be easy to find anywhere in the radio. The 5V in the Puxing was found on the VCC pin of a memory chip on the Puxing. The audio out is tied to the high side of the volume pot on the radio so that the volume control also adjusts the loudness of the Audible S meter. The enable function connection will be determined by the user. Any momentary switch that provides a ground level briefly will do.



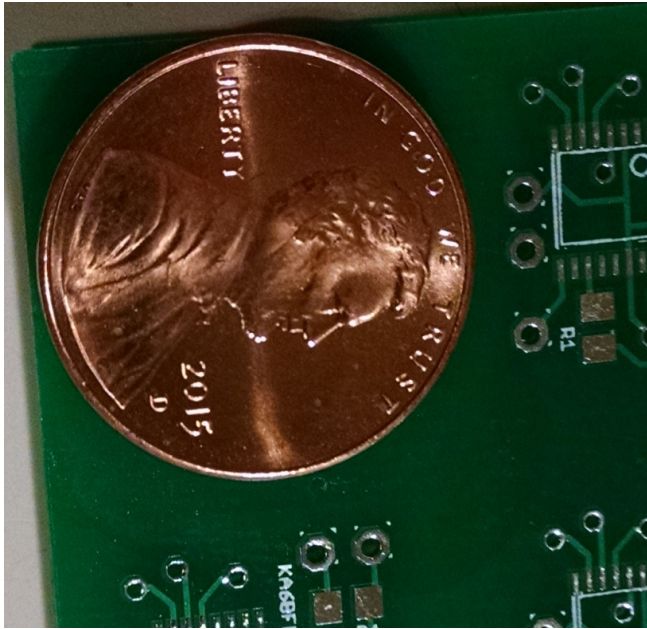
Shown below is the parts list

Part	Value	Digikey P/N
C1	0.01uF	1276-1245-1-ND
C2	0.0047uF	445-11349-1-ND
C3	1uF	1276-1026-1-ND
C4	0.1uF	478-3352-6-ND
IC1	74AHC2G00DP	568-8792-1-ND
IC2	CD4046BPWR	296-14109-1-ND
R1	10k	P10KACT-ND
R2	100k	TC33X-104ECT-ND
R3	100k	P100KACT-ND
R4	100k	P100KACT-ND
PCB	Email KA6BFB	N/A

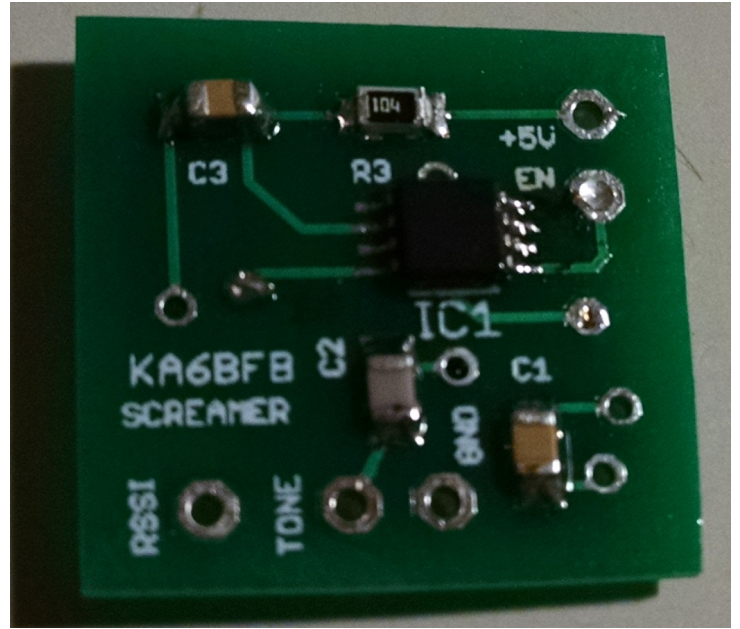
The PCB uses medium sized 0805 SMD parts and the ICs are smaller than previous versions. The PCB is only 0.6mm thick. The finished board can usually be placed in most hand held radios I have seen. To give an intuitive sense of the size, here are a few pictures.



Here is a panel of Screamer circuits, with the bottom left populated for comparison.



Here is the Penny covering the top of the Screamer.



Here is the bottom of the Screamer.

A video showing the screamer in use can be see at https://youtu.be/Cp_Dx_7vqlk