Parts List for SCAF-1 Audio Filter

Qty	Part No	Reference	Description
1	ZSC005		Enclosure
1	ZSC006		PC board
10	ZCOM0069	C1,C4,C9,C10,C11, C14,C16,C21,C25, C28	Capacitor, 0.1 µF 5%, polyester film (104)
4	ZCOM0028	C7,C19,C22, C23	Capacitor, 0.01 µF 5%, polyester film (103)
1	ZSC008	C8	Capacitor, 0.0022 µF 5%, polyester film (222)
1	ZSC009	C26	Capacitor, 0.047 µF 5% polyester film (473)
2	ZSC010	C15,C20	Capacitor, 47 µF 20% electrolytic
1	ZCOM0081	C24	Capacitor, 100 µF 20% electrolytic
9	ZSC012	C2,C3,C5,C6,C12,C13, C17,C18,C27	Capacitor, 220 µF 20% electrolytic
1	ZSC013	R17	Potentiometer, 20 kΩ linear, board mount
1	ZSC015	DS1	LED, red diffused, 2mm flat top
1	ZCOM0062	D3	Diode, 1N4007
2	ZSC016	D1,D2	Diode, zener 1N4733
2	ZSC017	R1,R4	Resistor, 5.6 kΩ, 1/4 W 5% (green-blue-red-gold)
10	ZSC018	R2,R3,R5,R6,R14,R15, R21,R22,R24,R25	Resistor, 33 Ω, 1/4 W 5% (orange-orange-black-gold)
3	ZSC019	R7,R8,R9	Resistor, 10 kΩ, 1/4 W 5% (brown-black-orange-gold)
1	ZCOM0018	R16	Resistor, 15 kΩ 1/4 W 5% (brown-green-orange-gold)
2	ZSC020	R10,R12	Resistor, 2 kΩ, 1/4 W 5% (red-black-red-gold)
2	ZSC021	R11,R13	Resistor, 18 kΩ, 1/4 W 5% (brown-gray-orange-gold)
2	ZCOM0019	R18,R23	Resistor, 1 kΩ 1/4 W 5% (brown-black-red-gold)
1	ZSC022	R26	Resistor, 10 Ω, 1/4 W 5% (brown-black-black-gold)
1	ZSC023	R19	Resistor, 470 Ω, 1/4 W 5% (yellow-violet-brown-gold)
1	ZCOM0022	R27	Resistor, 100 Ω 1/4 W 5% (brown-black-brown-gold)
1	ZSC001	R20	Potentiometer, 2 kΩ linear, panel mount
2	ZSC024	U1,U2	IC, MAX295CPA
1	ZSC025	U5	IC, LM555 timer
1	ZCOM0066	U6	IC, LM386 low voltage audio power amplifier
2	ZSC027	U3,U4	IC, 741 op amp
1	ZSC028	S1	Switch, toggle DPDT
1	ZSC002	J2	Jack, 1/4” stereo
1	ZCOM0008	J3	Jack, stereo 3.5mm (1/8"), chassis mount
1	ZCOM0077	J4	Jack, 2.1mm DC power, panel mount
1	ZCOM0011	J1	Jack, RCA hex-flanged, chassis mount
4	ZCOM0013		Spacer, 3/8" long, 1/4"dia #4 round, nylon
1	ZCOM0015		Knob
4	ZCOM0059		Screw, 4-40 x 3/8", SS, ph pan hd MS
4	ZCOM0033		Screw, 4-40 x 3/4", SS, ph pan hd MS
4	ZCOM0034		Lock washer, 4-40, SS, split ring
4	ZCOM0031		Nut, 4-40 SS
1	ZCOM0079		Plug, DC power, 2.1mm x 5.5mm
7	ZCOM0043		Wire, UL 1007, 24 AWG, feet
2	ZCOM0005		Socket, 8 pin DIP
4			Rubber feet

Assembly Manual
SCAF-1 Filter

Assembling your kit will require one or two evening's work. You will need a temperature-controlled soldering iron, or a regular soldering iron of not more than 25 watts output, and suitable solder. The solder used must be electronic grade solder with rosin flux, NOT acid flux, and NOT water soluble flux. Note that if you build your kit with these fluxes, all warranties are void and we will not offer any form of repair service. If you have solder and don't know what it is, don't use it!

Lead-free solder can also be used without damaging the board, but is not recommended. Unfortunately the warranty does not cover units soldered with lead-free solder, because we do not have the capability to repair those boards. Lead-free solder may be more environmentally friendly if the unit should be disposed of in a landfill, but it makes rework and repair of soldered joints very difficult. In our opinion, lead-free solder is best suited for machine soldering, and is mainly meant for consumer electronics that are meant to be discarded rather than repaired. The authors of the RoHS laws in Europe apparently agree with us, as solder with lead for hobbyists is generally exempt from those laws.

The following solders are recommended for assembling your kit:

Kester:
Flux Core types "44", and "285", 60/40 or 63/37 (Sn/Pb) content, in diameters between 0.020" (0.5mm) and 0.035" (0.89mm), with 0.020" being the preferred diameter.

Multicore (previously Ersin-Multicore):
RA (Activated Rosin) Type Flux Core, with diameters from .022" to .032"
RMA (Mildly Activated Rosin) Type Flux, with diameters from .022" to .032"

Radio Shack Rosin Core Solders

R / S Part #	Content Sn/Pb	Diameter	Spool Weight
64-017	60/40	0.032" (0.81mm)	0.5 oz (14g)
64-005	60/40	0.032" (0.81mm)	2.5 oz (71g)
64-009	60/40	0.032" (0.81mm)	8.0 oz (0.25kg)

(The above solder recommendations are copied from Elecraft manuals with permission. Thanks, Elecraft!)

You will also need a Phillips screwdriver, a small blade straight screwdriver, one and preferably two pairs of long nose pliers, a pair of regular pliers, a wire cutter, a wire stripper, a 6" (15 cm) ruler, a magnifier and a volt-ohm meter. You will also need a source of REGULATED 12 volts DC. Typical "wall-wart" transformers are not regulated, although models are available that are. The power supply that powers your transceiver is an excellent source of regulated 12 VDC.

We recommend that you **inventory the parts before beginning the assembly of your kit**. This step is not strictly necessary. However, it is better to resolve any confusion about parts before any parts are installed.

Virtually all electronic components include nomenclature indicating what they are. When you assemble a kit, it is wise (within reason) and good practice to orient the components in a manner which is consistent and which allows you to readily view the description of the component when looking at the board. Install resistors so that their color coding bands all run in the same direction. All fixed value capacitors should be mounted so that their value can be read by holding the PC board in one of two different directions (from the front or from one side). Diodes and electrolytic capacitors **must** be oriented according to the polarities.

Examine the PC board. The top is the side with the silk-screened component outlines. Note the following conventions used on the PC board silk-screen and on the layout diagram:

- Ovals with two holes are always used for capacitors.
- Holes with circles around them are for one end of a resistor or a diode or RF choke.
- All resistors are mounted vertically, in the hole inside the silk-screened circle. The upper resistor lead is bent over, close to the body of the resistor, and inserted into the hole next to the resistor body.
- Integrated circuits have either a notch on the end that has pin one, or a circle near pin one. The hole in the circuit board for pin one has a square solder pad; the solder pads for all the other pins are round. The solder mask and the layout diagram show a notch.

☐ There are 15 small brown or blue plastic film capacitors. Using a magnifier, sort into four piles by value: 10 marked "104" (0.1 µF), 4 marked "103" (0.01µF), 1 marked "222" OR "2n2J250" (0.0022 µF), and 1 marked "473" (0.047 µF).

☐ Install and solder the following capacitors, starting with C26, the capacitor marked "473". The easiest way to find the capacitor location is to look for the oval and then the capacitor number.

☐ Install C8, the capacitor marked "222" or "2n2J250".

☐ Install __ C7, __C19, __C22 and __C23, all marked "103".

☐ There are two 8 pin dip sockets. Install these at locations U1 and U2. Be sure that the notch is correctly oriented as per the parts placement drawing. Solder two corner pins of each socket, make sure that the sockets are flat on the circuit board, and then solder the other pins. You can use the black foam the sockets and chips are mounted on to steady the other side of the board while soldering.

☐ Install the ten brown 0.1 µF capacitors marked "104" at __C1 __C4 __C9 __C10 __C11 __C14 __C16 __C21 __C25 __C28.

☐ Note that all fixed value resistors are installed vertically, with one lead down into a PC Board hole, the other lead bent 180° and going into the adjacent hole. You will want to keep the parts layout drawing close at hand. The diode should be installed in the hole with the circle around it, and the lead that was bent down the side should go in the other hole. Also note that the solder pads circling the holes for resistor mounting are small, as are chip pads, whereas the pads for diodes are larger.

☐ Note: You will be soldering the resistors onto the board in the following steps. The resistor color codes are spelled out; however with the pastel colors used they are sometimes hard to read. A magnifying glass can be very helpful to read color codes. Also, it is good practice to use an ohmmeter to verify a value.

☐ Install and solder ten 33 Ω 1/4 watt resistors (orange-orange-black-gold):
__R2, __R3, __R5, __R6, __R14, __R15, __R21, __R22, __R24, and __R25.

☐ Install and solder the 10 Ω 1/4 watt resistor (brown-black-black-gold) at __R26.

☐ Install and solder two 2 kΩ 1/4 watt resistors (red-black-red-gold) at __R10 and __R12.

☐ Install and solder three 10 kΩ 1/4 watt resistors (brown-black-orange-gold) at __R7, __R8 and __R9.
(These resistors are all located next to the notch end of U2.)

☐ Install and solder two 5.6 kΩ 1/4 watt resistors (green-blue-red-gold) at __R1 and __R4.

☐ Install and solder two 1 kΩ 1/4 watt resistors (brown-black-red-gold) at __R18 and __R23.

☐ Install and solder two 18 kΩ 1/4 watt resistors (brown-gray-orange-gold) at __R11 and __R13.

☐ Install and solder the 15 kΩ 1/4 watt resistor (brown-green-orange-gold) at __R16.

☐ Install and solder the 470 Ω 1/4 watt resistor (yellow-violet-brown-gold) at __R19.

☐ Install and solder the 20 kΩ board mount potentiometer, marked "203", at R17.

After installing these resistors you should still have a 100 Ω (brown-black-brown-gold) resistor that will be installed later.

Notes on Diodes: There are three diodes used in the SCAF-1 filter. Each diode is marked on the parts placement drawing. The parts placement drawing shows each diode with a circle showing the body and the bent lead, as with the resistors mounted earlier. **All diodes must be mounted with the banded end up**, and the cathode lead bent down the side of the diode body. The banded end is the cathode. The diode should be installed in the hole with the circle around it, and the lead that was bent down the side should go in the other hole.

☐ Install and solder D3, the black epoxy bodied diode marked 1N4007. Save the trimmed leads from this diode and from the next step; they will be used later.

☐ In the same way, install and solder D1 and D2, the glass-packaged diodes marked 1N4733.

☐ Install and solder U6, the LM386. As with the following chips, make sure that the end that has pin one, marked by a notch or a circle, matches the parts placement drawing. Be sure you have the correct part before soldering. Be sure to solder two corner pins first, make sure that the chip is flat on the board, and then solder the other pins.

☐ Install and solder U5, the LM555.

☐ Install and solder U3 and U4, marked "741".

Notes on electrolytic capacitors: the capacitors are polarized. Note that the placement drawing shows a circle for the location of each electrolytic, and which lead is the positive lead, marked with a "+". Also, note that the longer lead of the electrolytic is the positive lead. The negative lead is marked on the side of the electrolytic by a stripe with an outline of a negative sign "–". Be sure to install all electrolytics as marked with the correct polarity.

Install and solder the electrolytic capacitors:

☐ Install two 47 μF electrolytic capacitors, __C15 and __ C20.

☐ Install the 100 μF electrolytic capacitor C24.

☐ Install nine 220 μF capacitors, __C2, __C3, __C5, __C6, __C12, __C13, __C17, __C18 and __C27.

☐ You were instructed to save the leads from the diodes earlier. Select the two thickest leads. Using a long nose pliers, put a 45° bend in one end of each lead, about 1/16" (2 mm) from the end. Insert these leads on the top of the board into the holes marked "A" and "C" which are at the edge of the board. Have the leads coming out the top of the board facing away from the board. Solder the two leads, this time soldering on top of the board. These leads will be for the panel mounted LED.

This completes wiring of the PC board.

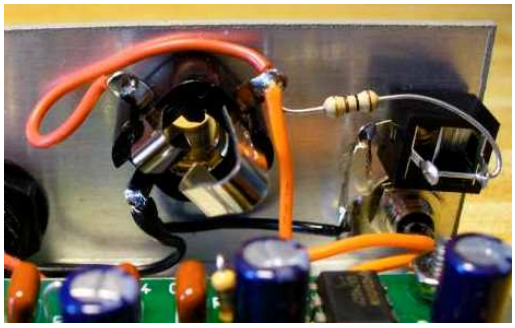
Chassis:

☐ Mount the four feet to the bottom corners of the chassis.

☐ Mount the black plastic power jack on the rear of the chassis, oriented so that the center power solder tab is on top. Note that the chassis hole is tight but will accept the part. (You may possibly need to remove a little paint with a small file.) Tighten the nut finger tight.

☐ Hold the hex-flanged RCA jack in your hand and tighten the nut finger tight. Using long nose pliers, bend the solder terminal 45° towards the end of the connector with the solder terminal. Remove the nut and solder terminal, but leave the flat washer on. Now mount the RCA jack at the lower left hole of the rear of the chassis, place the solder terminal over the body, with the solder terminal pointing toward the center of the chassis, and tighten the nut. Be sure to use two tools, one on each side, so as not to damage the jack. 9 mm or 3/8" wrenches work best, but if those tools are not available, then pliers will do if care is taken to not damage the paint.

☐ Mount the 1/8" (3.5 mm) small stereo jack above the hex-flanged RCA jack, so that the ground solder tab sticking out sideways is parallel to the bottom of the chassis and pointing towards the middle of the chassis. This jack will be either the headphone or speaker output jack. You will wire it as one or the other later.



☐ Mount the 1/4" (6.4 mm) large stereo jack in the middle rear of the chassis. Mount the jack so that the "tip" and "ring" solder terminals (the two terminals that are not for ground) are upwards. A 12 mm wrench is helpful for tightening the nut, but if you do not have the correct wrench then you can use a pair of pliers, if you are very careful to not scratch the paint.

☐ Install the 2 kΩ potentiometer on the front of the panel, in the hole on the right as seen from the outside, being sure to put the tab in the small hole. A 10 mm wrench is helpful for tightening the nut, but if you do not have the correct wrench then you can use a pair of pliers, if you are very careful to not scratch the paint. Do not install the knob yet.

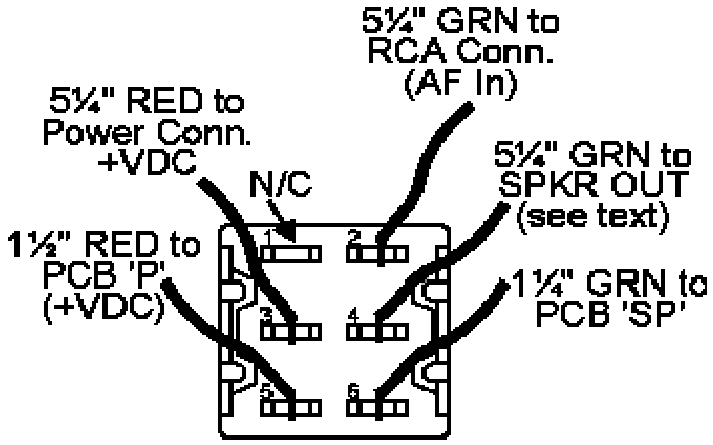
Many of the following steps will ask you to cut wires to a certain length, strip about 3/16" (5 mm) of the insulation from each end, and then tin the ends. For your convenience, the wires are summarized in the following table. If you like you can prepare the wires now, or if you prefer you can wait until following steps ask you to prepare the wires.

Quantity	Color	Length (in)	Length (cm)	Additional Instructions
2	green	5 1/4"	13 cm	
1	red	1 1/2"	4 cm	
1	red	5 1/4"	13 cm	
1	green	1 1/4"	3.2 cm	
2	red	2"	5 cm	
1	black	3"	8 cm	Strip 1" (2.5 cm) of insulation from one end. Strip the other end like usual. Tin both ends.
1	black	1 1/2"	4 cm	
1	green	4 3/4"	12 cm	

2	black	2"	5 cm	

☐ Examine the toggle switch. Note that the front mounting shaft has a slot, and a formed washer that will engage the index hole on the front of the panel. **Important Note:** The slot is on the **bottom** of the switch.

The following diagram shows the preparation and wiring of the switch. This diagram is from the perspective of looking at the rear of the switch. Do not install the switch yet. Refer to the following drawing as you do the following steps to prepare the switch.



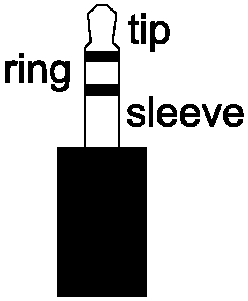
☐ Prepare a 5 1/4" (13 cm) green wire, stripped and tinned at both ends, and solder it to pin 2 of the switch.

☐ Referring to the switch drawing, in similar manner prepare and solder wires as shown to the rest of the pins. Note that pin 1 of the switch is unused. (5 1/4" = 13 cm, 1 1/2" = 4 cm, 1 1/4" = 3.2 cm)

☐ Each output jack can be wired for a mono (2-conductor) plug or a stereo (3-conductor) plug. Decide now how you would like each plug wired.

Note: several of the following steps will have you attach wires without soldering one end. Do not solder the wire until the instructions tell you to do it.

☐ If you would like the 1/4" (6.4 mm) plug to be wired for a mono (2-conductor) plug, then skip the rest of this step and go to the next step. If you would like the plug to be wired for a stereo (3-conductor) plug, then cut a 2" (5 cm) red wire, and strip and tin both ends. Use this wire to connect the ring and tip solder lugs on the 1/4" (6.4 mm) stereo jack. Make sure that the wire does not get in the path of the plug. Solder the end of the wire on the ring terminal; do not solder the other end of the wire.



☐ Cut a black wire 3" long (7.5 cm). Strip 1" (2.5 cm) of the insulation from one side and 3/16" (5 mm) from the other side. Tin both ends. Feed the side with 1" (2.5 cm) of insulation removed through the ground solder terminal of the hex flanged RCA connector up to the ground terminal, which is the terminal sticking out of the side, of the 1/8" (3.5 mm) small stereo jack. Solder these two connections. The rest of the wire will go along the bottom of the chassis to the ground terminal of the 1/4" (6.4 mm) large stereo jack later.

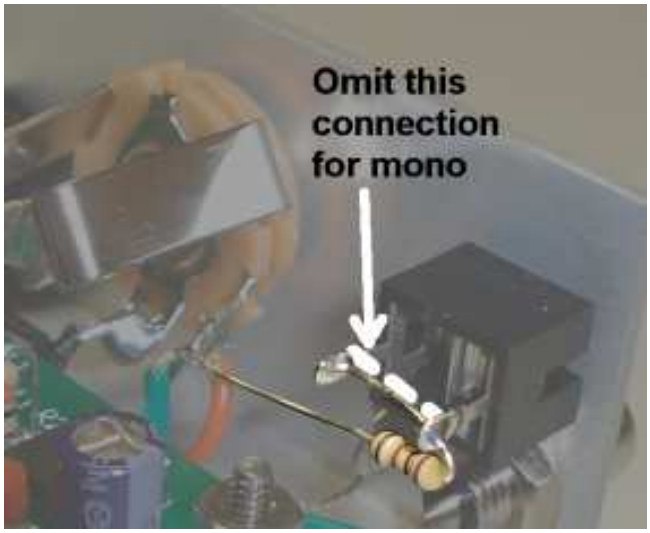
☐ Cut two black wires, one 1 1/2" (4 cm) long, and the other 2" (5 cm) long; strip and tin all ends. Solder one end of both wires to the ground connector on the power jack, which is the solder terminal facing the

large stereo jack. The hole in the ground connector is so small that it may be easier to solder one wire to the ground terminal, and then solder the second wire to the first wire. The other end of the 1 1/2" (4 cm) wire will go to the ground terminal of the large stereo jack in the next step.

☐ Bring the shorter 1 1/2" (4 cm) black wire from the power jack, and the 3" (7.5 cm) black wire from the RCA jack and the small stereo jack, to the middle terminal, which is the ground terminal, of the large 1/4" (6.4 mm) stereo jack. Make sure that the wires do not get in the path of the plug, and then solder the two wires to the ground terminal.

☐ Note: The SCAF-1 filter has two outputs, one designed for headphones, the other for a speaker. A 100 Ω resistor will be installed in series with the headphone jack to prevent hiss in some headphones; this resistor should not be installed in series with the speaker jack. You must decide whether you will be plugging in headphones into the 1/4" (6.4 mm) jack or into the 1/8" (3.5 mm) jack. Make a note of which jack is which.

☐ Prepare to install the remaining 100 Ω resistor between the 1/4" (6.4 mm) jack and the 1/8" (3.5 mm) jack. This resistor is R27 on the schematic. Mechanically connect one end to the tip terminal of the 1/4" (6.4 mm) jack. If you prefer the 1/8" (3.5 mm) jack to be wired for a mono (2-conductor) plug, then connect the other end of the resistor to the tip terminal of 1/8" (3.5 mm) jack, which is the outside terminal. If you prefer the jack to be wired for a stereo (3-conductor) plug, then connect the other lead to <u>both</u> non-grounded terminals of the 1/8" (3.5 mm) jack. Do not solder yet.



☐ Find the green 5 1/4" (13 cm) wire soldered to pin 4 of the switch. Solder the other end to the jack you have designated the speaker jack, soldering to the unsoldered terminal that already has the 100 Ω resistor attached. Solder the resistor to the terminal as well. If you have designated the large 1/4" (6.4 mm) jack as the speaker jack, then also solder the 2" (5 cm) red wire which should also be connected to the terminal.

☐ Solder the 100 Ω resistor to the other terminals to which it is connected.

☐ If you wish the 1/4" (6.4 mm) jack to be wired for stereo, then make sure that the 2" (5 cm) red wire that connects the two outer terminals of the large jack is soldered at both ends.

☐ Find the long red wire attached to pin 3 of the switch. Solder the other end to the center pin solder terminal of the black plastic power connector, which should be facing up.

☐ Now mount the switch to the front panel. The indexing washer that prevents the switch from rotating goes on the inside of the front panel, with the tab in the little hole. On the outside of the panel, first install the toothed lockwasher, and then the nut. An 8 mm or 5/16" wrench works best to tighten the nut, but a pair of pliers can be used if you are very careful to not scratch the paint.

In several of the following steps, you will solder wires to the circuit board. Electrically it does not matter if the wires are above or underneath the circuit board. However**, the finished product looks much nicer if the wires are all underneath the board**, and so that is how we recommend that you route the wires. For the same reason, we also recommend that you **attach the wires to the circuit board from the bottom and solder them from the top**.

☐ Prepare a red wire and a black wire, each 2” (5 cm) long. Strip and tin the ends of the wires. Feed the two wires from below to the two holes marked “POT” and solder them. (The polarity is not important.)

☐ Cut a 4 3/4” (12 cm) green wire, and strip and tin both ends. Find the 5 1/4” (13 cm) long green wire soldered to pin 2 of the switch. Solder both the wire that you just cut, and also the green wire connected to pin 2 of the switch, to the center pin of the hex flanged RCA jack. Bring the other end of the wire that you just cut, and solder it to the hole labeled “IN” at the front of the PC Board.

☐ Attach the short green wire from pin 6 of the switch to the hole on the front of the board labeled “SP”.

☐ Find the short red wire attached to pin 5 of the switch; bring the wire to the hole labeled “P” on the front edge of the circuit board. Solder and trim. This completes the switch wiring.

☐ By default, the SCAF-1 filter is connected so that the filter is at its widest bandwidth when the knob is fully clockwise. If this is how you would like your SCAF-1 wired, then connect and solder one of the potentiometer wires to the top terminal of the front panel-mounted potentiometer. Attach and solder the other wire to the center potentiometer terminal. If instead you would prefer your SCAF-1 wired so that the filter is at its narrowest bandwidth when the knob is fully clockwise, then connect and solder one wire to the center terminal and the other wire to the bottom terminal.

☐ Solder the other end of the longer 2” (5 cm) black wire from the ground connector of the power jack to the hole labeled “GND” on the rear of the PC Board from the bottom.

This completes the connection of the wires to the circuit board.

☐ Mount the board to the chassis using the 3/4” (19 mm) stainless steel screws, nylon spacers, stainless nuts and lockwashers. The head of the screw should be on the outside of the chassis, and the lockwasher and nut should be holding the circuit board. It is best to attach all these parts loosely first, and then tighten the parts after making sure that no wires are pinched.

☐ Plug a 1/4" (6.4 mm) plug into the large stereo jack, and check to see if capacitors C11 or C14 on the circuit board interfere with the plug. If a capacitor interferes with the plug, bend it gently out of the way.

☐ On the 1/4" jack, the jack may be so tight that it is difficult to insert and remove a 1/4" plug. If this is true, then use pliers to carefully bend the piece of metal that touches the tip of the plug outwards so that it does not press as hard on the plug. Do not bend the piece of metal so much that it does not make good contact with the plug.

☐ LED mounting – note that the anode has the longer lead. Measure 3/8” (9.5 mm) back from the LED red plastic body, and at that point, using the long nose pliers, bend the leads out away from each other at 90°.

☐ There are two solid wire leads coming from the front of the board, from the points “A” and “C”. These become “rails” for mounting the front panel LED. “A” is for Anode, “C” is for cathode. Bend the rail leads so that they are parallel to the chassis bottom and to each other and 1/4” (6.4 mm) apart.

☐ Rest the LED on top of the rails, with the LED face inserted through the front panel. Make sure the longer lead, the anode, rests on the anode rail from the PC board and the cathode lead on the other. Adjust placement so the LED is just through the front panel hole, lined up correctly. Tack-solder the leads to the rails. (We searched for a more elegant way to do this, but we have not found a better way for kit building.)

☐ Check that all ground wire connections on the rear connectors are soldered. This completes the wiring.

☐ Plug the MAX 295 U1 and U2 chips into their sockets. You may need to form the pins slightly to get them in. Be sure to align the chips so that the dot is next to the notch of the socket.

Warning – DO NOT use the typical "12 volt DC" wall wart power cube. These supplies rarely offer anything but unfiltered pulsing DC and at voltages considerably higher than 12 or 14 volts. You must use a well-filtered regulated DC source not exceeding 14.5 volts output. Most stations have such supplies for other equipment, and some transceivers offer an auxiliary 12 VDC output. These are suitable sources.

☐ Attach the knob to the front panel potentiometer, aligning the pointer properly before tightening.

To align the filter and put it in service you will need at least two cables. One cable goes from the audio output of your transceiver to the hex-flanged RCA jack on the SCAF-1, so it will need an RCA plug for terminating in the filter. Another cable will be a DC coaxial power plug, 2.1mm inner diameter x 5.5 mm outer diameter, to a 12–14 VDC regulated power supply.

☐ Move the front panel switch into the "down" position. Turn the SCAF-1 front panel knob fully counterclockwise. Set the rear potentiometer at half scale. Plug the 12-volt supply into the filter. Plug the audio output from a receiver into the audio input.

To align the filter, you will need to listen to the audio output. Headphones are recommended for this task, since they are more sensitive. If you do not use headphones, and do not ever plan to use headphones with your SCAF-1 audio filter, then using an external speaker will work fine.

☐ Plug headphones into the jack you have specified for headphones, or alternatively plug an external speaker into the external speaker jack. If you are using headphones, put them on now.

☐ Set the receiver so that either a wide CW filter or a narrow SSB filter is in use. Adjust the receiver audio so that a normal listening level of hiss and background noise is present. Turn the front panel switch up. The LED should light, and you should hear a distinct change in the receiver audio.

☐ Adjust the rear internal potentiometer, which is the filter's audio gain potentiometer, so that the audio level of a received signal inside the SCAF-1 passband is essentially the same whether the SCAF-1 switch is up or down. This is the recommended setting. However, if your receiver does not provide enough audio output or provides too much, then you can choose to adjust the potentiometer for the most comfortable listening.

☐ Put the top on the unit, and secure it with the short stainless steel screws provided.

With the filter in circuit, turn the frequency cut-off control fully clockwise, and tune in an SSB signal. Now, experiment with the filter switched in and out of circuit, and try adjusting the front panel knob, which adjusts the low-pass cut-off frequency. You will quickly learn the capabilities of your SCAF-1. Then do the same with CW signals.

At this point further discussion about using the filter is pointless, since the operation of the filter is so simple and effective. Note that data modes are useable with the filter in line as well; simply adjust the cut off frequency so that the desired signals pass through.

This filter is an unusual product. While the benefit of the filter may be limited in the case of the top of the line transceivers, in most radios it will make operating considerably less fatiguing and more enjoyable. CW operators will also appreciate the fact that the filter is absolutely real time in its output, unlike most DSP filters, so that the CW monitor coming through the headphones or speaker is 100% real time.

In any case, because technical specifications tend to be less meaningful in a product like this, we at Idiom Press would especially appreciate your telling your friends about this product, putting up reviews on **www.eham.net** etc.

Warranty

Your SCAF-1 filter is warranted against defects in material and workmanship for 90 days from the date of purchase from Idiom Press or from an authorized Idiom Press dealer.

This warranty does not cover damage or failure caused by or attributable to Acts of God (such as nearby lightning strikes), abuse, misuse, improper or abnormal usage, faulty construction, use of acid core or water soluble resin solders in construction, faulty installation, improper maintenance, application of excessive voltage, or improper construction or repair.

Idiom Press is not responsible or liable in any way for direct, indirect, special or consequential damages arising out of or in connection with the use or performance of the product or other damages with respect to loss of property, loss of revenues or profit, or costs of removal, installation or reinstallation.

Except as provided herein, Idiom Press makes no express warranties, and any implied warranty of merchantability or fitness for a particular purpose is limited in its duration to the duration of the written limited warranties set forth herein.

Always contact Idiom Press at **idiom@idiompress.com** before returning a unit! For repair, warranty or otherwise, contact Idiom press for instructions. Always include a letter carefully describing the problem. If the unit was purchased from a dealer, include a copy of your sales receipt.

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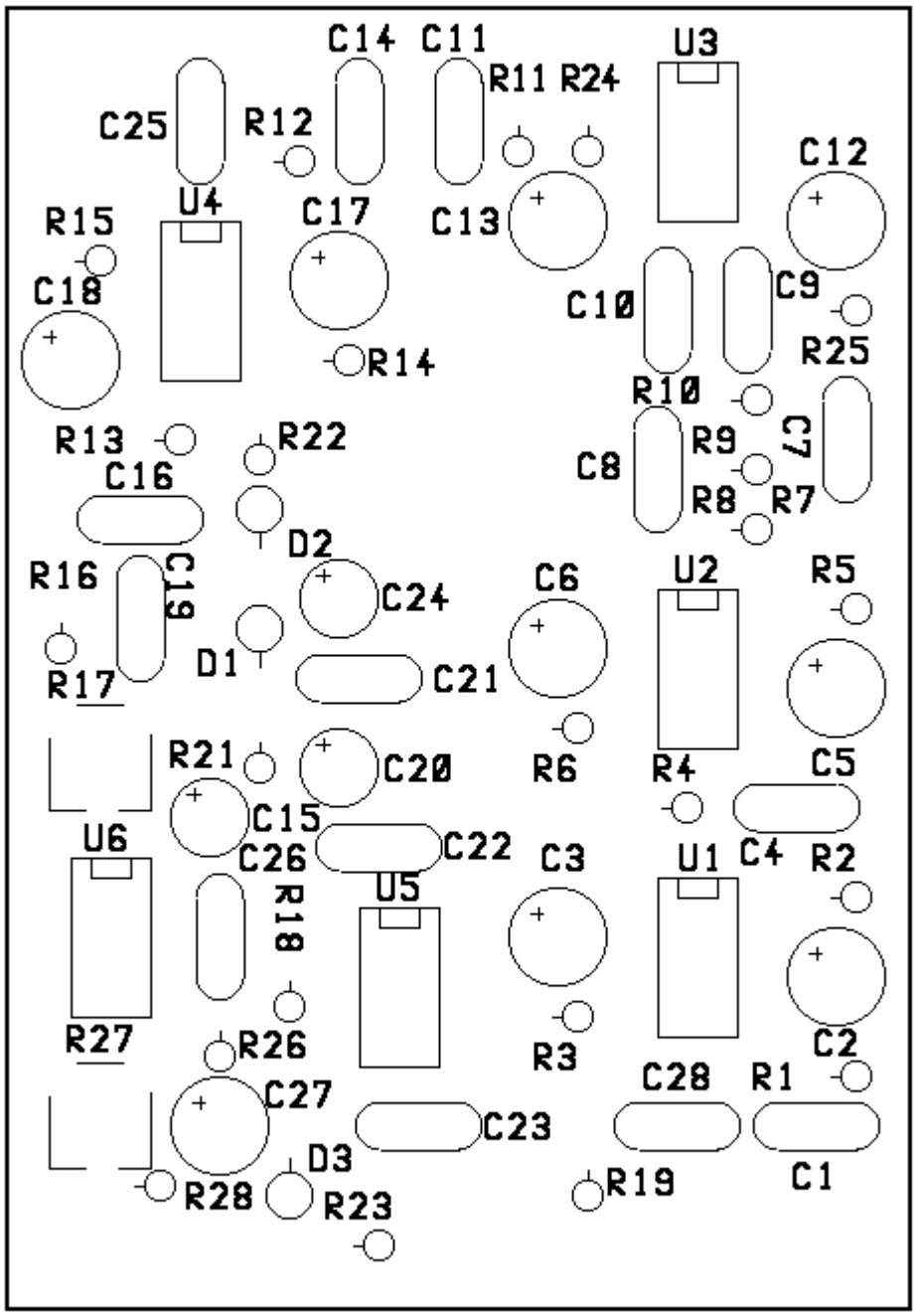
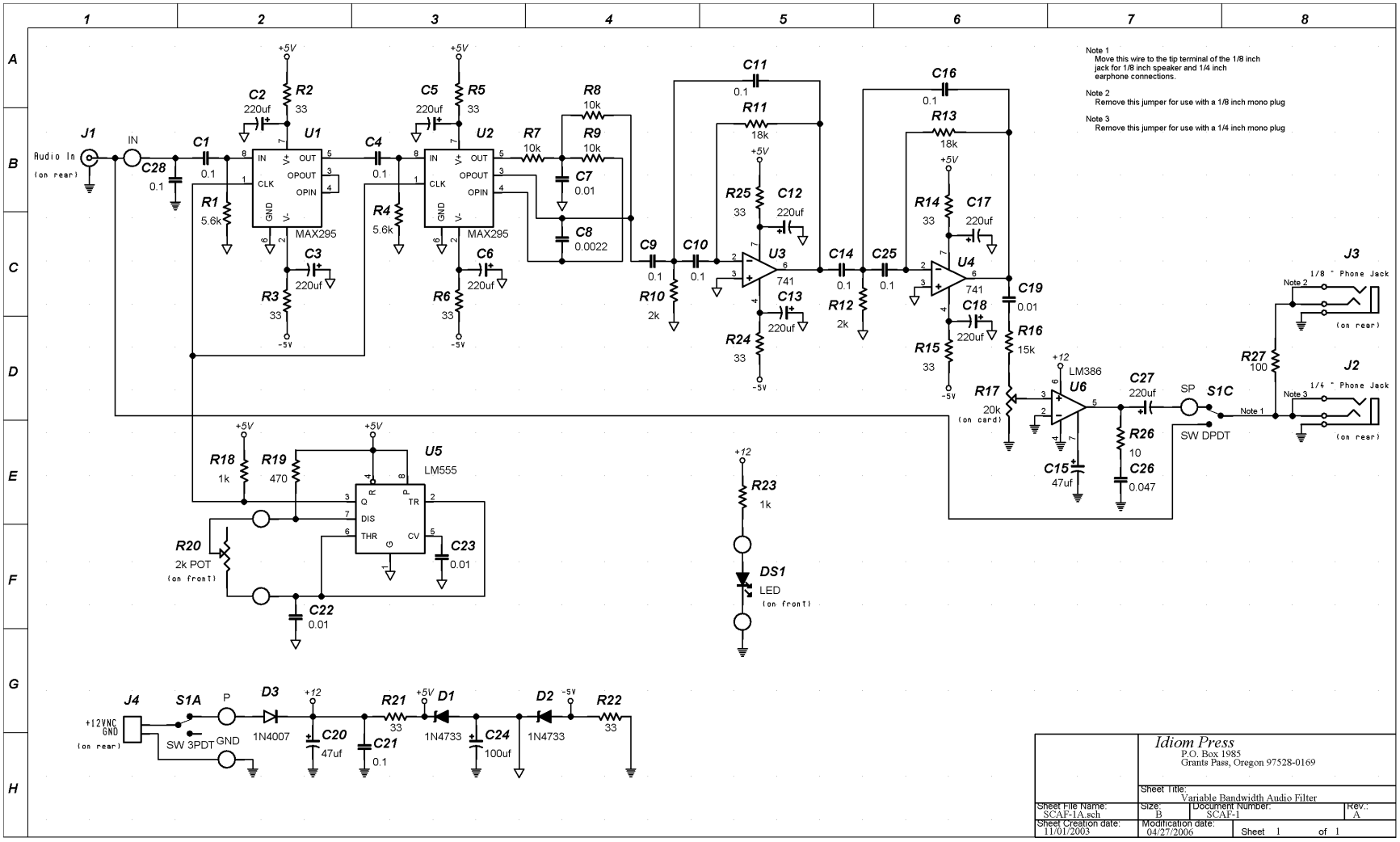
Component Layout Drawing – SCAF-1 Filter




Note 1
Move this wire to the tip terminal of the 1/8 inch jack for 1/8 inch speaker and 1/4 inch earphone connections.
Note 2
Remove this jumper for use with a 1/8 inch mono plug
Note 3
Remove this jumper for use with a 1/4 inch mono plug
J1
Audio In
(on rear)
IN
C28
0.1
C1
0.1
R1
5.6k
U1
MAX295
C2
220uf
R2
33
C3
220uf
R3
33
C4
0.1
R4
5.6k
U2
MAX295
C5
220uf
R5
33
C6
220uf
R6
33
R7
10k
R8
10k
R9
10k
C7
0.01
C8
0.0022
C9
0.1
R10
2k
C10
0.1
C11
0.1
R11
18k
R25
33
C12
220uf
U3
741
C13
220uf
R24
33
C14
0.1
R12
2k
C25
0.1
C16
0.1
R13
18k
R14
33
C17
220uf
U4
741
C18
220uf
R15
33
C19
0.01
R16
15k
R17
20k
(on card)
U6
LM386
C27
220uf
R26
10
C26
0.047
C15
47uf
SP
S1C
SW DPDT
Note 1
J3
1/8 " Phone Jack
Note 2
(on rear)
J2
1/4 " Phone Jack
Note 3
(on rear)
R27
100
R18
1k
R19
470
U5
LM555
R20
2k POT
(on front)
C22
0.01
C23
0.01
R23
1k
DS1
LED
(on front)
J4
+12VDC
GND
(on rear)
S1A
SW 3PDT
P
GND
D3
1N4007
C20
47uf
C21
0.1
R21
33
D1
1N4733
C24
100uf
D2
1N4733
R22
33
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