nonlinearcircuits

329 Phase/Flange build & BOM

This module is based on the Aries 329 Phase/Flange. The main differences are in semiconductor component selection and it is all 0805 & SMD, otherwise it is pretty close to the original. The schematic for this module that can be easily found on the net has a component PD10, with 2 + terminals and 2 − terminals. Searching for this component shows a full wave bridge rectifier……hmm…. can't be right, though reading various DIY forums shows few people were sure and there do not seem to be any online photos of the 329 PCB. It turns out PD10 was a resin block 10 stage phase shift network available in the late 70s. The Tau pipe phaser had two and the phaser in the Arp Quadra had one. The Arp Quadra Service manual shows the internals and that is what is used in this module. Normally I would avoid any circuit requiring 11 matched NPN transistor pairs, at least since the LM394 was discontinued, but now we have the BCM847, which is cheap and matched.

BOM

(Check http://www.taydaelectronics.com or Mouser to see what kind of pots & jacks you need, part # given in notes, of course you can buy these anywhere, but the pictures show what type will suit)

The ( ) after the component indicate how the component is labelled on the PCB. For example (d) means 10k resistors are marked on the PCB with just a 'd'. Get extras, it is easy to drop surface mount parts or some other mishap!

component	quantity	notes	component	quantity	notes
100kB pot	4	Tayda: A-1848	33pF (33p)	1	0805
3.5mm kobiconn style socket	9	Tayda: A-865	100pF (101 or 100p)	5	0805
DPDT on-on switch	1	Tayda: A-4568	2.2nF (222)	2	0805
50k trimpot	2	Tayda: A-2500	10nF (103)	1	0805
100k trimpot	1	Tayda: A-2506	22nf (223)	20	0805 (get good ones!)
			100nF (104)	4	0805
10 pin eurorack power connector	1		680nF (684)	5	0805, I used 1µF (105) instead, no difference.
TL074	1	SOIC 0.050 pitch	100R	2	0805
TL072	1	SOIC 0.050 pitch	470R	1	0805
BC847	4	SOT-23 Tayda: A-1339	1k (1)	3	0805
J112 or J108 FET	2	thru-hole **MUST BE MATCHED, see below**	2k7	1	0805
BCM847DS	11	Mouser: 771-BCM847DS115	3k3	2	0805
			10k (d)	4	0805
10R resistor	2	thru hole	15k	3	0805
100nF capacitor	2	thru hole, 2.5mm pin spacing	18k	2	0805
10µF 25V (or more) electro	2	thru hole, 2 mm pin spacing	33k	2	0805
			47k	1	0805
			56k	1	0805
			100k (c)	10	0805
			120k	1	0805
			150k	6	0805
			220k	6	0805
			390k	1	0805
			470k	1	0805

Matching FETs

Do not just solder in 2 FETs, even if from the same batch. They vary a lot. You do not need to match them to 1µV but buy a batch of at least 10 or so and find the 2 closest to each other, maybe within a few mV is okay. There is a FET matching schematic included with the main schematic, just test different pairs and find the 2 with the lowest voltage across points A and B. To be honest I used my Peak Atlas DCA Pro analyser. This page is worth a read and has a good testing circuit too - http://www.geofex.com/article_folders/fetmatch/fetmatch.htm

Setting up

The main trim-pot to worry about is the 50k Gain. Depending upon your FETs you may have a lot of clipping on the outputs, so use this to reduce the clipping. I have found some clipping is good, probably it is just me, you can always just attenuate the input signal, and there is a pot on the panel for that. Anyway in an effort to remove all clipping, I reduced the two 150k resistors to 100k, circled in blue below. The module still made a classic phaser sound but all the extra fun was no longer to be found. Anyway these are the resistors to change if you want to make it lame and the Gain trim-pot doesn't get you there. I suggest you leave in the 150k resistors and let it rule the world.
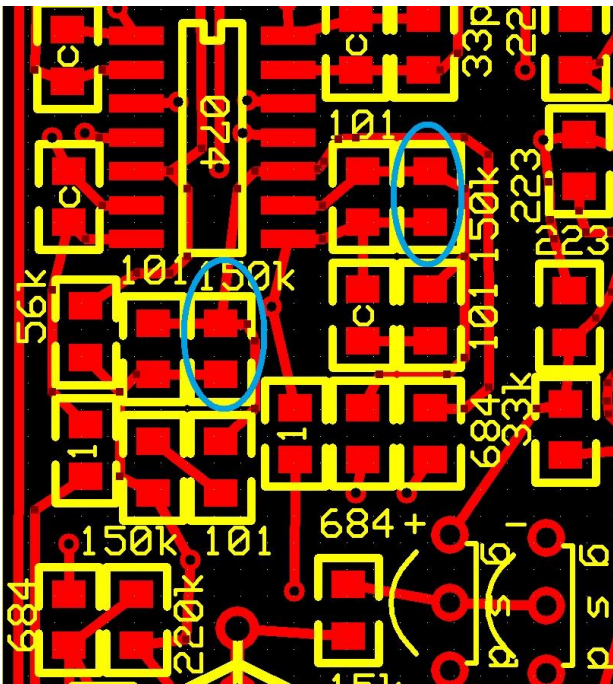
The trim-pot near the Q pot sets the Q range, somewhere around the middle seems fine, but wind it up or back as you like.

Regarding the 100k trim-pot, turn the Freq pot to zero, and adjust this trim-pot to a point just before you can hear any phasing effect with a signal passing thru. It is basically setting the turn-on point, again somewhere near the middle is good enough if you are not too fussed.

single NPN = BC847
dual NPN = BCM847
All pots 100k
d=10k l=1k
c=100k

Q
Q
104
104
104
50k
freq
c
c
c
220k
220k
220k
33p
101
c
101 150k
684 33k
684
150k 101
684
220k 220k
684
50k
gain
684
18k
3k3
684
d
d
d
main
aux
phase
222
3k3 222
15k
15k
15k
15k
18k
CV
linCV

223 223
223
223 223
223
223 223
223
223
223 223
223
223
223 223
223
223 223
223
223 223
223
223 223
223
223 223
223 223
100p
c
2u2
220k
33k 223
220k*
220k
100k
iniFrq
104
10u 104
10u
104
10u

EAT
YOUR
MAKEUP
d d
470R
100R
100R
103
nonlinearcircuits
47k*
104
1v/oct
120k
150k
390k
150k
2u2
+
-
+
-
invert on-on
2k7 150k
470k
10R
1Voc
red
in
1Voc
in
10R

based on
Aries329
phase/flange
vers1
set
phasers
to kill

audio in
audio in
10k
10k
level
100k
GND
100n
220k
220k
220k
GND
33p
100k
074d
Q TRIM
50k
100k
GND
Q

680n
GND
220k
220k
V-
10k
680n
680n
18k
18k
3k3
3k3
2n2
2n2
Sw
invert phase
18k
100R
10n
100R
100R
470R
V+

680n
680n
150k
150k
100p
100p
GND
100p
100p
074c
150k
100k
100p
1k
Phased out

must be matched
J112
A
15k
J112
B
15k
15k
V+
gain TRIM
50k
GND
15k

1u can replace all 680n if easier

220k
lin input
33k
GND
100k trim
220k
GND
V+
33k

22n (capacitor array — multiple stages)

* only install if using a 100kB pot for 1v/oct atten

CV
100k
GND
072a
-
+
120k
100k
100pF
GND

1v/oct
1v/oct
1v/oct atten
100kA
GND
150k
47k*
150k
150k
GND
2k7
072b
-
+
470k
fund freq
100kB
V-
V+
V+
390k

100k
100k
GND
100k
56k
074b
-
+
100k
1k
Aux out
100k
100k
100k
GND
074a
-
+
100k
1k
Main out

FET matching – measure voltage across A & B
Choose 2 with lowest voltage
GND
10u
1M
15k
A
R33k
15k
B
1M
GND
GND
GND
GND
V+

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Aries329 phase/flange vers1
drawn - AndrewF
Rev 1.0
27/11/2015
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