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Jacob

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(54) **PROGRAMABLE SWITCH FOR CONFIGURING CIRCUIT TOPOLOGIES**

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(65) **Prior Publication Data**

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Related U.S. Application Data

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G10H 3/12	(2006.01)
G10H 1/02	(2006.01)
H03K 19/173	(2006.01)

(52) **U.S. Cl.**
USPC **84/742**; 84/735; 84/737; 326/38

(58) **Field of Classification Search**
USPC 84/735, 737, 742, 743, 726; 326/37–41, 326/47
See application file for complete search history.

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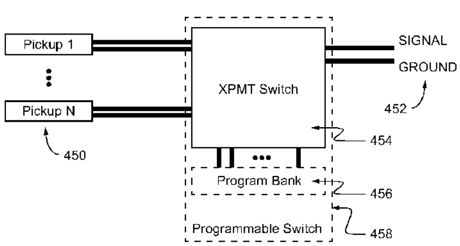
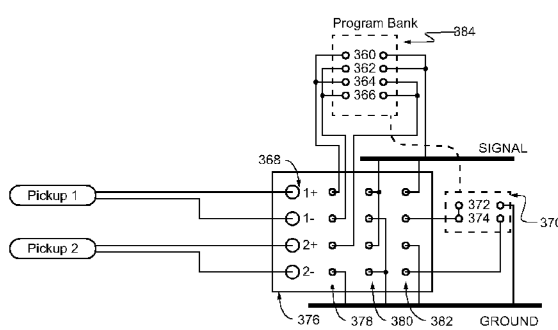
Assistant Examiner — Dylan White

(57) **ABSTRACT**

The disclosed invention is a programmable switch for configuring circuit topologies. The switch can be any type of mechanical or electronic switch. Every setting of the switch can be programmed by a user, selecting topologies such as circuit elements in series, in parallel, in phase or out of phase. In a dual switch embodiment, the first switch selects the circuit elements to be used, and the second switch configures those selected elements in a wide variety of topologies. This division in switch circuit design between element selection and then topology provides an extremely wide range of circuit topologies available, unlike prior art designs.

21 Claims, 22 Drawing Sheets





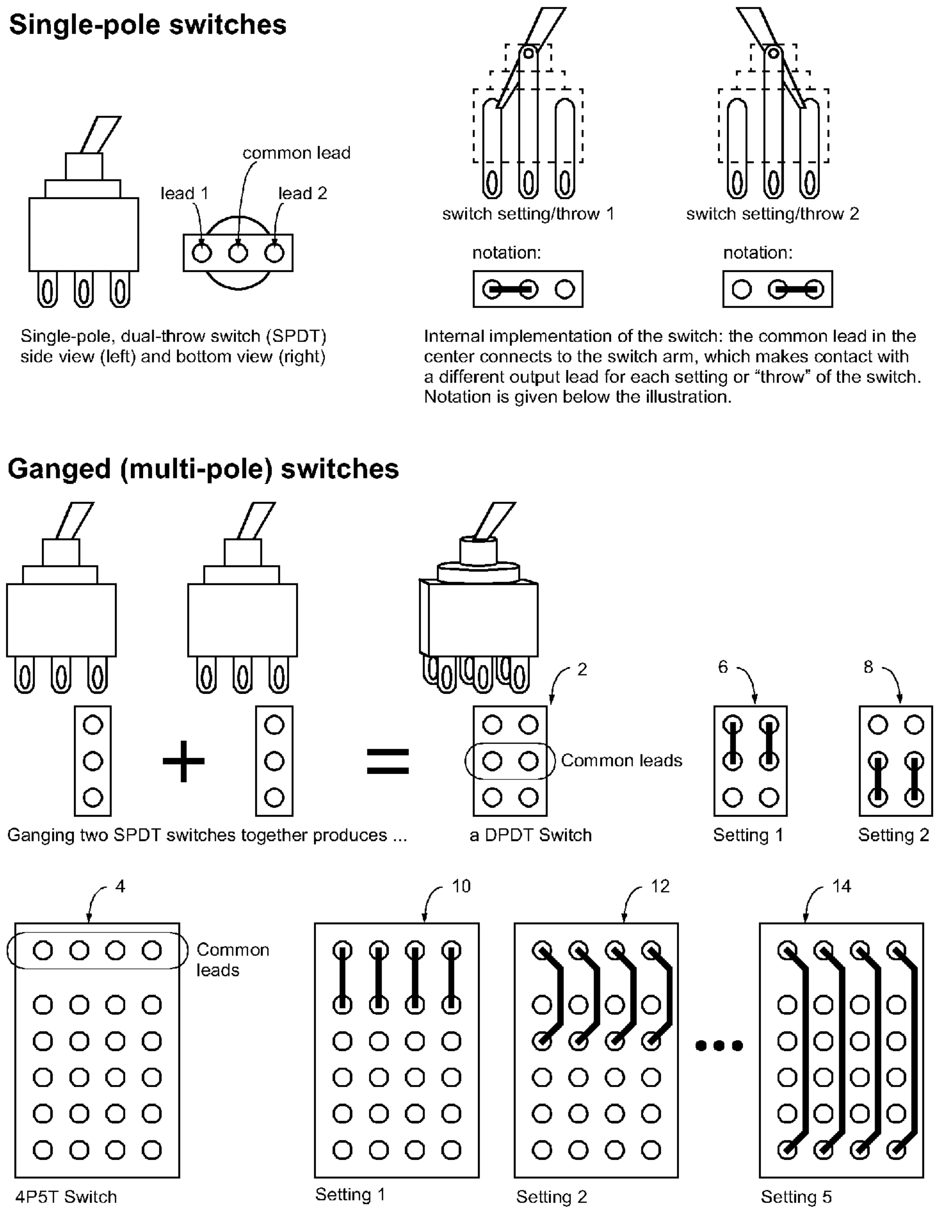
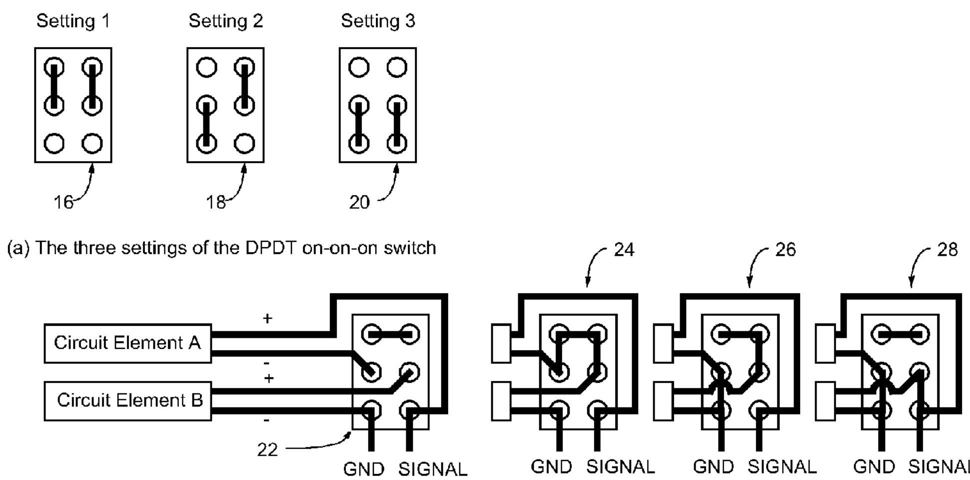


Figure 1

(prior art: ganged switch operation/notation)

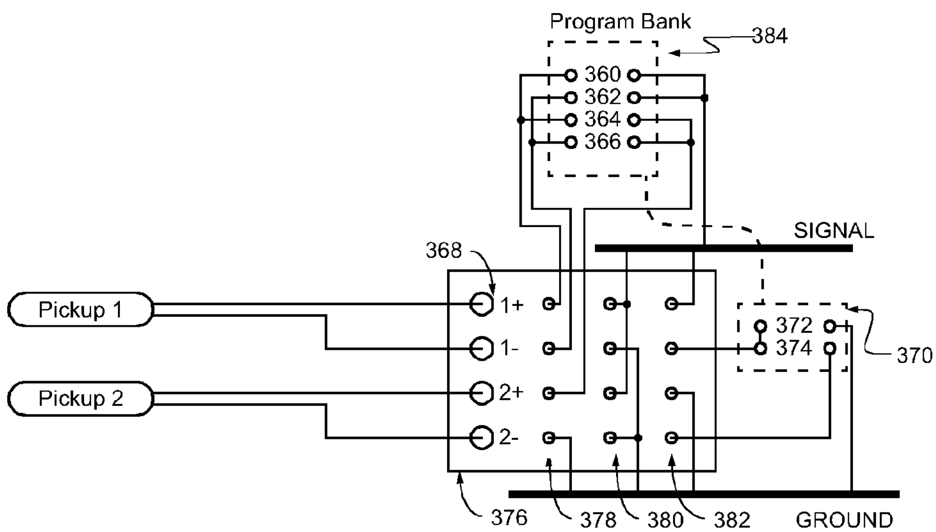


(a) The three settings of the DPDT on-on-on switch

(b) The DPDT on-on-on switch wired **22** to produce circuit elements A and B in series (**24**, switch setting 1), element A singly (**26**, switch setting 2), and element A in parallel with element B (**28**, switch setting 3)

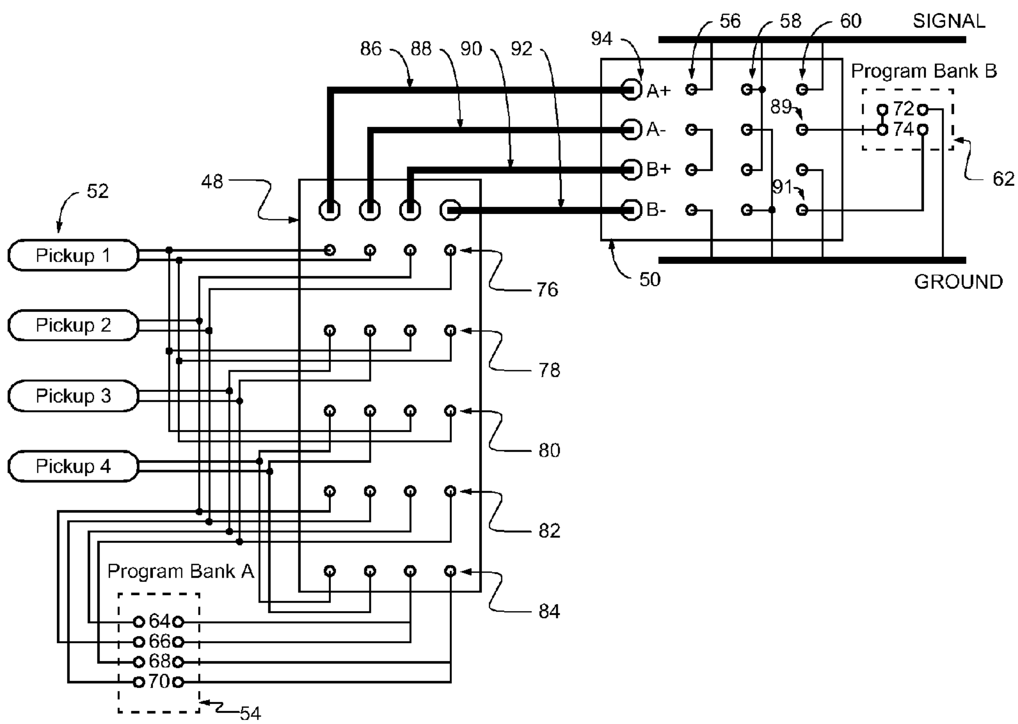
Figure 2

(prior art: on-on-on DPDT switch operation)



Program Bank
384
360
362
364
366
SIGNAL
368
Pickup 1
1+
1-
Pickup 2
2+
2-
372
374
370
376
378
380
382
GROUND

Figure 6



SIGNAL
GROUND
Program Bank B
Program Bank A
Pickup 1
Pickup 2
Pickup 3
Pickup 4
A+
A-
B+
B-
52
48
86
88
90
92
94
56
58
60
89
91
72
74
62
50
76
78
80
82
84
64
66
68
70
54

Figure 10

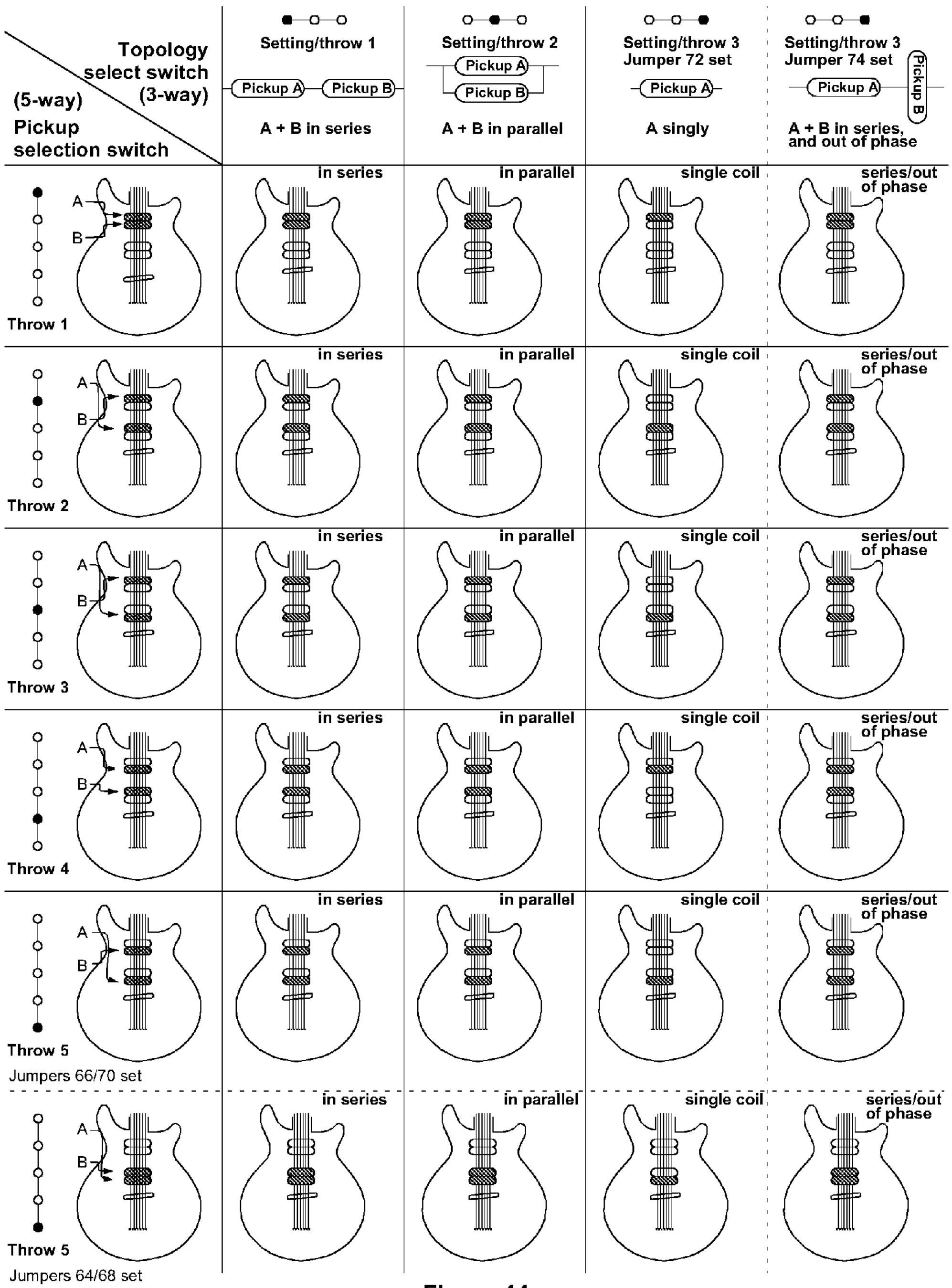

Topology select switch (3-way)
(5-way) Pickup selection switch
Setting/throw 1
Pickup A
Pickup B
A + B in series
Setting/throw 2
Pickup A
Pickup B
A + B in parallel
Setting/throw 3
Jumper 72 set
Pickup A
A singly
Setting/throw 3
Jumper 74 set
Pickup A
Pickup B
A + B in series, and out of phase
in series
in parallel
single coil
series/out of phase
A
B
Throw 1
Throw 2
Throw 3
Throw 4
Throw 5
Jumpers 66/70 set
Throw 5
Jumpers 64/68 set

Figure 11

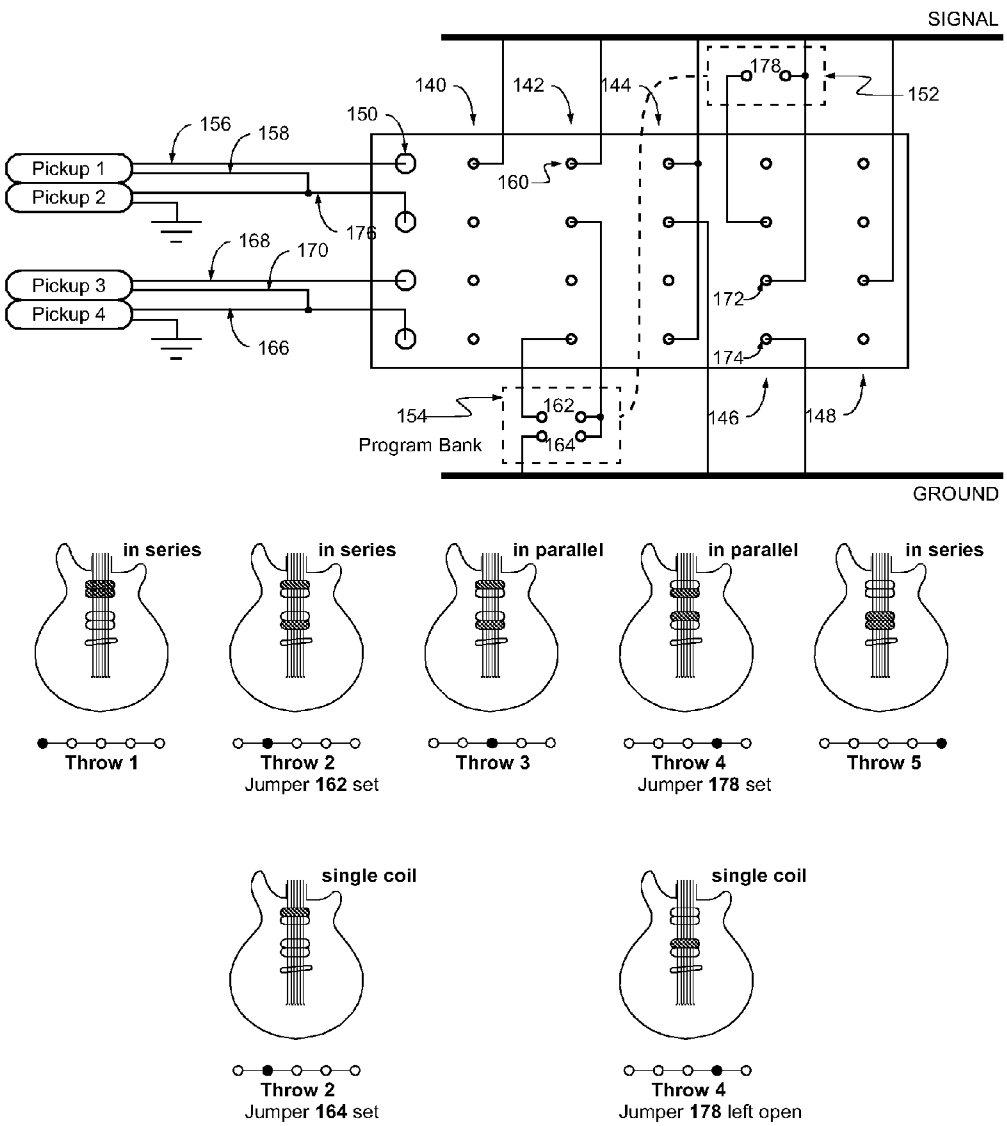
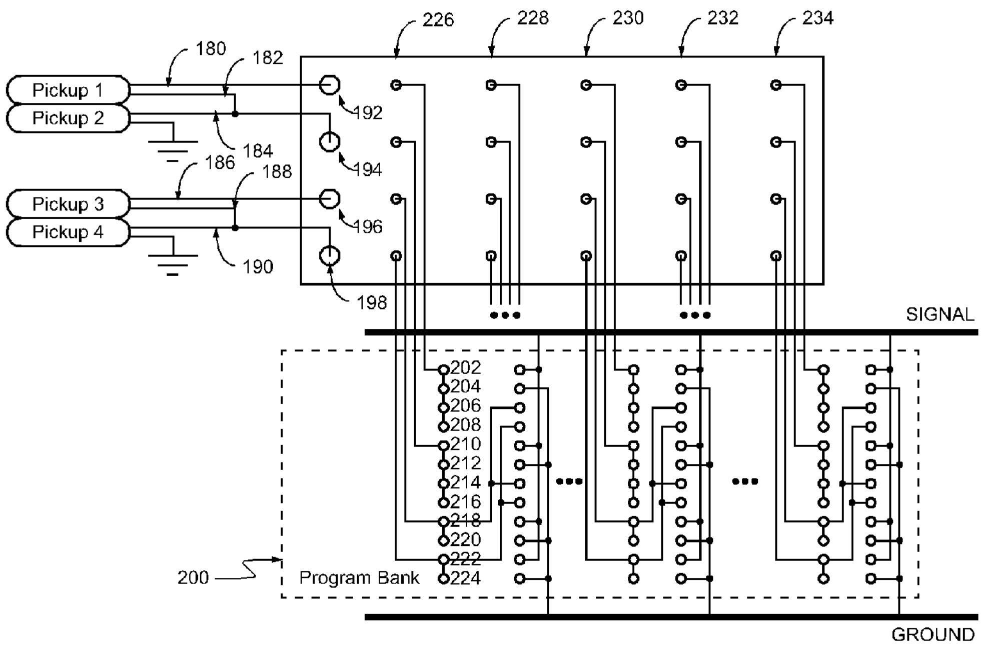

SIGNAL
GROUND
Pickup 1
Pickup 2
Pickup 3
Pickup 4
140
142
144
146
148
150
152
154
156
158
160
162
164
166
168
170
172
174
176
178
Program Bank
in series
in series
in parallel
in parallel
in series
Throw 1
Throw 2
Jumper 162 set
Throw 3
Throw 4
Jumper 178 set
Throw 5
single coil
single coil
Throw 2
Jumper 164 set
Throw 4
Jumper 178 left open

Figure 12



226
228
230
232
234
180
182
Pickup 1
Pickup 2
192
184
194
186
188
Pickup 3
Pickup 4
196
190
198
SIGNAL
202
204
206
208
210
212
214
216
218
220
222
224
200
Program Bank
GROUND

Figure 13

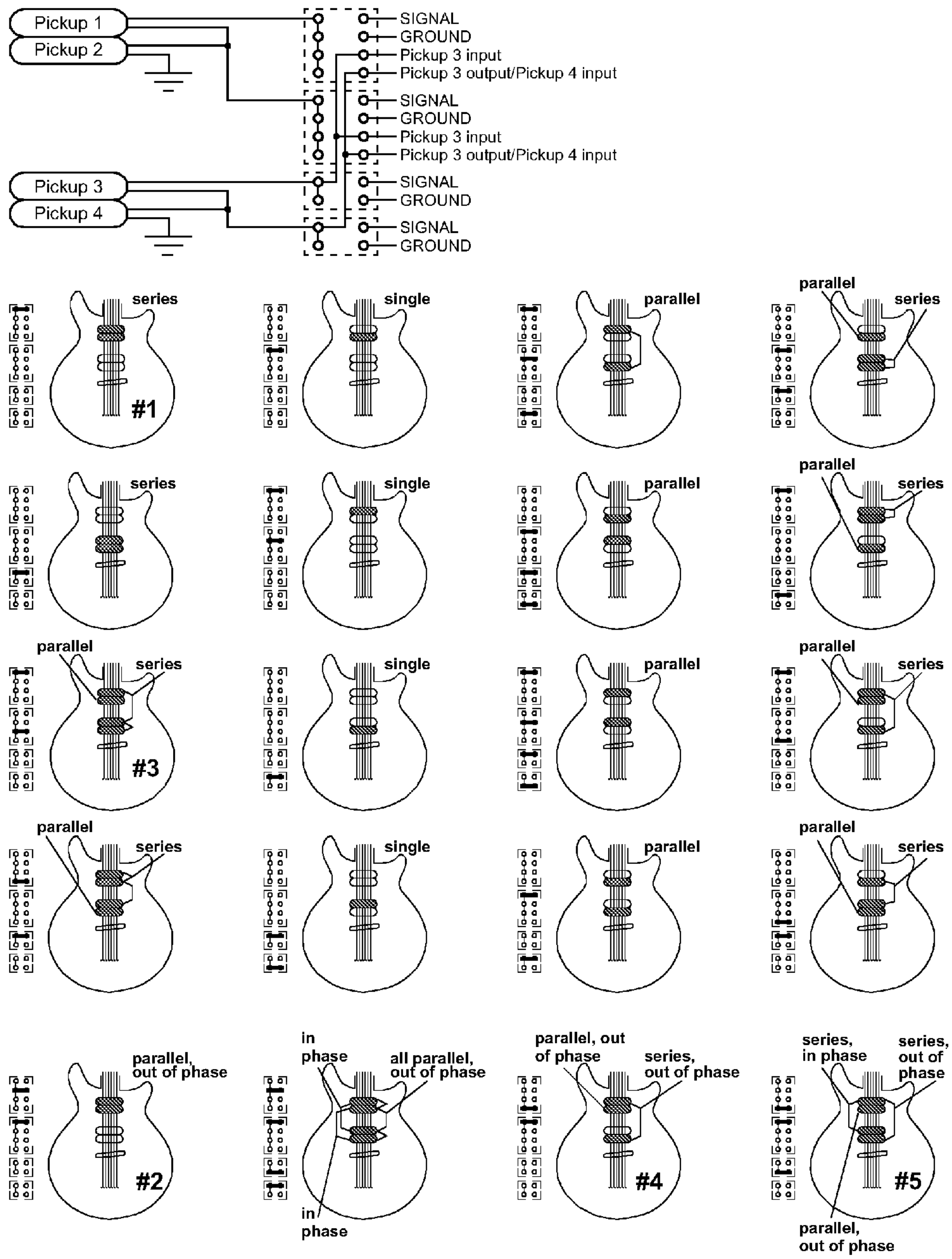

Pickup 1
Pickup 2
Pickup 3
Pickup 4
SIGNAL
GROUND
Pickup 3 input
Pickup 3 output/Pickup 4 input
SIGNAL
GROUND
Pickup 3 input
Pickup 3 output/Pickup 4 input
SIGNAL
GROUND
SIGNAL
GROUND
series
#1
single
parallel
parallel
series
series
single
parallel
parallel
series
parallel
series
#3
single
parallel
parallel
series
parallel
series
single
parallel
parallel
series
parallel, out of phase
#2
in phase
all parallel, out of phase
in phase
parallel, out of phase
series, out of phase
#4
series, in phase
series, out of phase
#5
parallel, out of phase

Figure 14