

```
01 LBL "FB"      ;Enter Frequency and Bandwidth
02 CF 01
03 FIX 1
04 X=Y?
05 SF 01
06 STO 01
07 X<>Y
08 STO 00
09 PI
10 *
11 2 E6
12 *
13 STO 07
14 RCL 00
15 RCL 01
16 /
17 STO 02
18 RTN
19 LBL "O"       ;Calculate Number of Elements
20 10
21 /
22 10^X
23 2
24 *
25 1
26 -
27 LN
28 X<>Y
29 ENTER
30 X^2
31 RCL 00
32 X^2
33 -
34 X<>Y
35 /
36 RCL 01
37 /
38 ABS
39 LN
40 ABS
41 /
42 1
43 +
44 2
45 /
46 LBL "N"       ;Enter Number of Elements
47 SF 00
48 CF 21
49 FIX 0
50 RND
51 STO 03
52 "N="
53 ARCL 03
54 TONE IND 03
55 AVIEW
56 PSE
57 CLX
58 FIX 2
59 VIEW L
60 SF 21
61 RTN
62 LBL "BC"      ;Calculate Butterworth Constants
63 CF 00
64 CF 02
65 SF 03
66 CF 04
67 LBL 13
```

```

68 PI
69 RCL 03
70 /
71 STO 08
72 1
73 STO 11
74 STO 12
75 STO 13
76 2
77 STO 06
78 FS? 02
79 RTN
80 LBL 14
81 RCL 13
82 RCL 08
83 2
84 /
85 *
86 SIN
87 2
88 *
89 STO 10
90 XEQ 17
91 X<=Y?
92 GTO 14
93 GTO 03
94 LBL "C?" ;Enter Ripple/Bandwidth
95 CF 00
96 SF 02
97 CF 03
98 SF 04
99 X#0?
100 CF 04
101 X=0?
102 1
103 STO 04
104 10
105 /
106 10^X
107 FRC
108 SQRT
109 1/X
110 ENTER
111 X^2
112 1
113 -
114 SQRT
115 +
116 LN
117 RCL 03
118 /
119 E^X
120 ENTER
121 1/X
122 +
123 2
124 /
125 STO 09
126 XEQ 13
127 RCL 04
128 40
129 /
130 10^X
131 X^2
132 STO Y
133 1
134 ST+ Z
135 -
136 /
137 LN

```

```

138 RCL 03
139 2
140 *
141 /
142 E^X
143 ENTER
144 1/X
145 -
146 2
147 /
148 STO 10
149 X^2
150 STO 14
151 LBL 15
152 RCL 11
153 RCL 08
154 2
155 /
156 RCL 13
157 *
158 SIN
159 STO 11
160 *
161 RCL 06
162 RCL 10
163 *
164 /
165 4
166 *
167 STO 10
168 RCL 14
169 RCL 08
170 RCL 12
171 *
172 SIN
173 X^2
174 +
175 STO 06
176 XEQ 17
177 X<=Y?
178 GTO 15
179 FS?C 10
180 RTN
181 GTO 03
182 LBL "C3"      ;Enter Chebyshev Filter Bandwidth
183 SF 10
184 XEQ "C?"      ;Enter Ripple/Bandwidth (Line 94)
185 SF 03
186 23.014
187 RCL 09
188 LBL 16
189 ST* IND Y
190 DSE Y
191 GTO 16
192 GTO 03
193 LBL 17
194 RCL 12
195 14
196 +
197 RCL 10
198 STO IND Y
199 1
200 ST+ 12
201 2
202 ST+ 13
203 RCL 03
204 *
205 RCL 13
206 RTN
207 LBL "Z"      ;Enter Impedance Value

```

```

208 STO 05
209 RTN
210 LBL "T"      ;Enter Filter Type
211 X=0?
212 GTO 03
213 RCL 03
214 FS? 00
215 GTO "N"      ;Enter Number of Elements (Line 46)
216 RDN
217 CF 05
218 X<0?
219 SF 05
220 FS? 05
221 FC? 01
222 GTO 00
223 GTO 03
224 LBL 00
225 ABS
226 5
227 X=Y?
228 GTO 03
229 DSE X
230 X=Y?
231 GTO 03
232 DSE X
233 X=Y?
234 GTO 03
235 RDN
236 FIX 0
237 CF 09
238 FRC
239 X#0?
240 SF 09
241 X#0?
242 10^X
243 FC? 09
244 LASTX
245 RND
246 SF 12
247 "# "        ;Pound sign, 1 space
248 ARCL X
249 FC? 02
250 >" BTW"
251 FS? 02
252 >" CHB"
253 AVIEW
254 FS? 09
255 "HI-"
256 FC? 09
257 "LO-"
258 FC? 01
259 "BAND"
260 FC? 05
261 >"PASS"
262 FS? 05
263 >"STOP"
264 AVIEW
265 CLA
266 ARCL 03
267 >" ELEMENT"
268 AVIEW
269 CLA
270 ARCL 05
271 >" \11"      ;Append 1 space, omega
272 AVIEW
273 CF 12
274 ENG 03
275 ADV
276 "FREQUENCY: "
277 ARCL 00

```

```
278 >" MHz"
279 FS? 01
280 FS? 09
281 XROM 29,08 ;PRA
282 "BANDWIDTH: "
283 ARCL 01
284 >" MHz"
285 FC? 09
286 XROM 29,08 ;PRA
287 FIX 0
288 RCL 02
289 10
290 *
291 "ELEMENT Q: "
292 ARCL X
293 FC? 01
294 XROM 29,08 ;PRA
295 FC? 02
296 GTO 00
297 FIX 2
298 "BP RIPPLE: "
299 ARCL 04
300 >" dB"
301 FS? 04
302 >"DEF"" ;Internal quotes must be converted to \22 to compile
303 XROM 29,08 ;PRA
304 LBL 00
305 CLX
306 STO 12
307 STO 13
308 "LC VALUES:--"
309 FC? 03
310 ARCL 04
311 FS? 03
312 >"3"
313 >" dB BW"
314 XROM 29,08 ;PRA
315 ENG 3
316 ADV
317 CF 06
318 CF 07
319 23
320 RCL Z
321 FS? 01
322 +
323 FS? 05
324 -
325 SF 12
326 XEQ IND X
327 FS? 01
328 ADV
329 "----" ;4 dashes
330 XROM 29,01 ;ACA
331 XROM 29,01 ;ACA
332 XROM 29,01 ;ACA
333 ADV
334 ADV
335 ADV
336 ADV
337 ADV
338 LBL 03
339 CLX
340 CLD
341 FIX 2
342 BEEP
343 RTN
344 LBL 19
345 *
346 STO 13
347 FS? 06
```

348 VIEW 13
349 RCL 07
350 X^2
351 *
352 1/X
353 VIEW X
354 FC? 06
355 VIEW 13
356 ADV
357 RTN
358 LBL 20
359 RCL 05
360 X^2
361 ST/ 10
362 ST* 11
363 RTN
364 LBL 21
365 SF 07
366 LBL 22
367 RCL 05
368 RCL 02
369 /
370 RCL 07
371 /
372 STO 10
373 RCL 05
374 X^2
375 /
376 STO 11
377 LBL 23
378 XEQ 32
379 $X \leq Y?$
380 RTN
381 CF 06
382 RCL IND 08
383 FC? 07
384 SF 06
385 FC? 07
386 RCL 11
387 FS? 07
388 RCL 10
389 XEQ 19
390 XEQ 32
391 $X \leq Y?$
392 RTN
393 SF 06
394 RCL IND 08
395 FS? 07
396 RCL 11
397 FC? 07
398 RCL 10
399 FC? 07
400 CF 06
401 XEQ 19
402 GTO 23
403 LBL 26
404 RCL 05
405 RCL 07
406 /
407 STO 10
408 RCL 05
409 X^2
410 /
411 STO 11
412 RTN
413 LBL 24
414 XEQ 26
415 FS? 09
416 XEQ 20
417 GTO 27

418 LBL 25
419 XEQ 26
420 FC? 09
421 XEQ 20
422 LBL 27
423 XEQ 32
424 X<=Y?
425 RTN
426 RCL IND 08
427 FS? 09
428 1/X
429 RCL 11
430 *
431 VIEW X
432 XEQ 32
433 X<=Y?
434 RTN
435 RCL IND 08
436 FS? 09
437 1/X
438 RCL 10
439 *
440 VIEW X
441 GTO 27
442 LBL 01
443 SF 07
444 LBL 02
445 RCL 02
446 RCL 05
447 /
448 RCL 07
449 /
450 STO 10
451 RCL 05
452 X^2
453 *
454 STO 11
455 LBL 28
456 XEQ 32
457 X<=Y?
458 RTN
459 SF 06
460 RCL IND 08
461 FS? 07
462 RCL 10
463 FC? 07
464 RCL 11
465 FC? 07
466 CF 06
467 XEQ 19
468 XEQ 32
469 X<=Y?
470 RTN
471 CF 06
472 RCL IND 08
473 FS? 07
474 RCL 11
475 FC? 07
476 RCL 10
477 FC? 07
478 SF 06
479 XEQ 19
480 GTO 28
481 LBL 07
482 SF 07
483 LBL 06
484 XEQ 32
485 RCL IND 08
486 STO 14
487 RCL 05

```
488 /
489 RCL 07
490 /
491 STO 10
492 1/X
493 RCL 07
494 X^2
495 /
496 RCL 02
497 /
498 STO 11
499 FS? 07
500 GTO 29
501 RCL 05
502 X^2
503 ST* 10
504 ST/ 11
505 LBL 29
506 XEQ 32
507 X<=Y?
508 GTO 12
509 XEQ 30
510 GTO 29
511 LBL 12
512 SF 06
513 XEQ 30
514 RTN
515 LBL 30
516 FC? 07
517 VIEW 11
518 FS? 06
519 GTO 12
520 RCL 14
521 RCL IND 08
522 STO 14
523 *
524 1/X
525 SQRT
526 STO 09
527 LBL 12
528 FS? 06
529 0
530 RCL 02
531 X<>Y
532 -
533 RCL 13
534 -
535 RCL 10
536 *
537 VIEW X
538 FS? 07
539 VIEW 11
540 ADV
541 FS? 06
542 RTN
543 RCL 09
544 RCL 10
545 *
546 LBL 31
547 VIEW X
548 ADV
549 RCL 09
550 STO 13
551 RTN
552 LBL 32
553 1
554 ST+ 12
555 RCL 12
556 14
557 +
```


558 STO 08
559 RCL 12
560 RCL 03
561 1
562 +
563 RTN
564 LBL 10
565 SF 05
566 LBL 08
567 XEQ 34
568 GTO 33
569 LBL 11
570 SF 05
571 LBL 09
572 SF 07
573 XEQ 34
574 RCL 05
575 X^2
576 ST* 06
577 ST* 10
578 ST/ 11
579 LBL 33
580 XEQ 32
581 X<=Y?
582 GTO 12
583 XEQ 36
584 GTO 33
585 LBL 12
586 SF 06
587 XEQ 32
588 XEQ 36
589 RTN
590 LBL 34
591 XEQ 32
592 RCL IND 08
593 STO 14
594 RCL 05
595 *
596 STO 11
597 RCL 07
598 ST/ 11
599 *
600 1/X
601 STO 10
602 RCL 02
603 /
604 STO 06
605 SF 08
606 RTN
607 LBL 35
608 FS? 08
609 GTO 12
610 RCL 09
611 CHS
612 RCL 11
613 *
614 GTO 31
615 LBL 12
616 RCL 10
617 RCL 09
618 /
619 GTO 31
620 LBL 36
621 FC? 07
622 VIEW 06
623 FS? 06
624 GTO 12
625 RCL 14
626 RCL IND 08
627 STO 14

628 *
629 SQR
630 1/X
631 FC? 05
632 GTO 12
633 FC?C 08
634 SF 08
635 FC? 08
636 CHS
637 LBL 12
638 STO 09
639 RCL 02
640 FC? 06
641 +
642 RCL 13
643 +
644 RCL 11
645 *
646 VIEW X
647 FS? 07
648 VIEW 06
649 ADV
650 FS? 06
651 RTN
652 FS? 05
653 GTO 35
654 RCL 10
655 RCL 09
656 /
657 GTO 31
658 END

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1142 BYTES

HP-41C BW & Chebyshev Filters by Terry Mickelson PPC V9 N2 P20 Mar 1982

Program Registers Needed: 164

Row 1 (1 - 5)



Row 2 (6 - 16)



Row 3 (17 - 24)



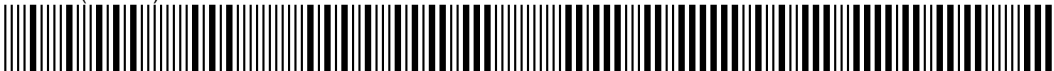
Row 4 (25 - 37)



Row 5 (38 - 46)



Row 6 (47 - 53)



Row 7 (54 - 62)



Row 8 (62 - 66)



Row 9 (67 - 78)



Row 10 (79 - 90)



Row 11 (90 - 95)



Row 12 (95 - 103)



Row 13 (104 - 115)



Row 14 (116 - 126)



Row 15 (127 - 136)



Row 16 (137 - 149)

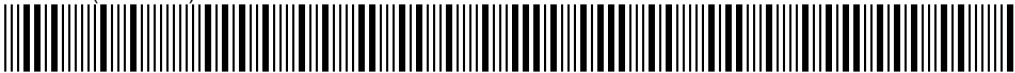


HP-41C BW & Chebyshev Filters by Terry Mickelson PPC V9 N2 P20 Mar 1982

Row 17 (150 - 161)



Row 18 (162 - 174)



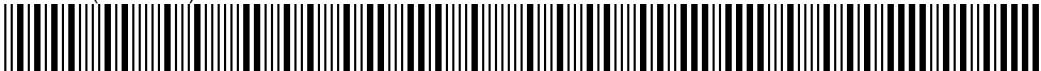
Row 19 (175 - 181)



Row 20 (182 - 185)



Row 21 (185 - 190)



Row 22 (190 - 197)



Row 23 (198 - 207)



Row 24 (207 - 212)



Row 25 (212 - 219)



Row 26 (220 - 228)



Row 27 (228 - 236)



Row 28 (236 - 245)



Row 29 (246 - 250)



Row 30 (250 - 254)



Row 31 (255 - 259)



Row 32 (259 - 262)



Row 33 (262 - 267)



HP-41C BW & Chebyshev Filters by Terry Mickelson PPC V9 N2 P20 Mar 1982

Row 34 (267 - 271)



Row 35 (271 - 276)



Row 36 (276 - 278)



Row 37 (278 - 282)



Row 38 (282 - 284)



Row 39 (284 - 290)



Row 40 (291 - 292)



Row 41 (292 - 298)



Row 42 (298 - 300)



Row 43 (300 - 302)



Row 44 (303 - 308)



Row 45 (308 - 312)



Row 46 (312 - 315)



Row 47 (316 - 323)



Row 48 (323 - 329)



Row 49 (329 - 338)



Row 50 (339 - 348)



HP-41C BW & Chebyshev Filters by Terry Mickelson PPC V9 N2 P20 Mar 1982

Row 51 (348 - 357)



Row 52 (358 - 365)



Row 53 (366 - 377)



Row 54 (377 - 384)



Row 55 (384 - 390)



Row 56 (391 - 399)



Row 57 (399 - 405)



Row 58 (406 - 415)



Row 59 (415 - 420)



Row 60 (420 - 426)



Row 61 (427 - 435)



Row 62 (435 - 443)



Row 63 (443 - 455)



Row 64 (455 - 462)



Row 65 (463 - 468)



Row 66 (469 - 477)

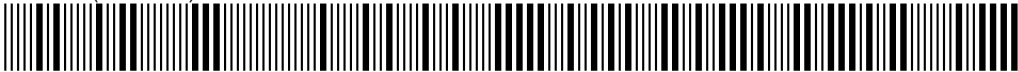


Row 67 (477 - 483)



HP-41C BW & Chebyshev Filters by Terry Mickelson PPC V9 N2 P20 Mar 1982

Row 68 (484 - 493)



Row 69 (494 - 503)



Row 70 (503 - 509)



Row 71 (509 - 515)



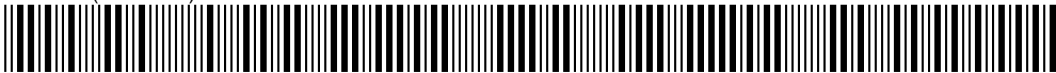
Row 72 (516 - 523)



Row 73 (524 - 535)



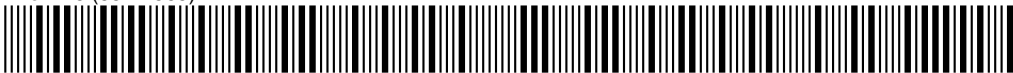
Row 74 (536 - 544)



Row 75 (545 - 554)



Row 76 (554 - 565)



Row 77 (565 - 572)



Row 78 (572 - 579)



Row 79 (579 - 584)



Row 80 (585 - 591)



Row 81 (591 - 600)



Row 82 (601 - 609)



Row 83 (610 - 619)



Row 84 (619 - 626)



HP-41C BW & Chebyshev Filters by Terry Mickelson PPC V9 N2 P20 Mar 1982

Row 85 (626 - 634)



Row 86 (635 - 645)



Row 87 (646 - 653)



Row 88 (653 - 658)

