POLY-SPLIT

Many times we've talked about how the personality of our computer based equipment is a function of the operating system software that we happen to be running at the moment. Let's play some head games with the gear and feed it some code that will give it a split personality.

POLY-SPLIT does just that; it gives us two complete polyphonic synthesizer systems under the control of one keyboard. Play a chord or note on the lower keys and they are always assigned to a lower group of outputs. Play on higher keys and the result is assigned to another group.

Before we get into the listing of this program and its operation and use, we need to keep one fact clearly in mind; POLY-SPLIT is simply an extension of the polyphonic personality offered in MUS 1.0. All of the options offered by that code (STGs, dynamic output refresh, etc.) are provided by this one also. Since many of MUS 1.0's subroutines are used by POLY-SPLIT you must have this PROM or its equivalent available, and the variables that you manually initialize for MUS 1.0 (see LAB NOTES: MUS 1.0, April/ May 1978 Polyphony) must be set for POLY-SPLIT also.

In addition to OUTS, CTRL, etc. which MUS 1.0 used there is a new variable which is unique to POLY-SPLIT; OUT2 ($BF). This is the variable that tells the program how many channels are to be set aside for use exclusively by AGO keys below the split point. Notice specifically that if MUS 1.0's STG option is selected, the number entered into this variable must include those channels which will be producing envelope transients. (i.e. The number entered for OUT2 will always be an even number when STGs are being used.)

For example, if you have hardware (QuASH, etc.) for eight channels, this number is entered into the normal MUS 1.0 location for it; OUTS ($EA). If you want to split these into three channels for low keys and five for high keys, you would set OUT2 ($BF) to contain 03.

The program appears at the end of this column and is loaded starting at location $000 in the same way that we've loaded programs in the past. If you're the careful sort, you will also save the program on tape as soon as it's loaded so that if there's a problem it won't wipe out all of your work.

When the program has been loaded, preset the MUS 1.0 variables according to your preferences and application, and set the low channels variable (OUT2) as discussed above.

Run the program from location $000. With POLY-SPLIT running, keys 0 and 1 on the command keyboard retain the functions that they had under MUS 1.0. Key 0 clears and mutes the system; key 1 causes all of the channels to produce a note corresponding to middle C on the AGO keyboard.

A use for command key 2 has now been added; it provides a means of changing the split point while you're playing. Touch this pad and, as long as it's held down, any key on the AGO keyboard that you press will become the new split point. Now while playing, any key below the split point will be assigned to the channels that you've set aside for them, while keys greater or equal to the split point will be assigned to the remaining channels.

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                0010 :*********************************
                0020 :*                               *
                0030 :*         POLY-SPLIT            *
                0040 :*                               *
                0050 :*   A PROGRAM FOR POLYPHONIC    *
                0060 :*       SPLIT KEYBOARD          *
                0070 :*                               *
                0080 :*             BY                *
                0090 :*        JOHN SIMONTON          *
                0100 :*                               *
                0110 :* (C) 1979 - PAIA ELECTRONICS    *
                0120 :*                               *
                0130 :*********************************
                 0010 KTBL .DL 00E0
                 0020 NTBL .DL 00D8
                 0030 HKEY .DL 00A2
                 0040 SPLT .DL 00A1
                 0050 OUT2 .DL 00EC
                 0060 OUTT .DL 00EB
                 0070 OUTS .DL 00EA
                 0080 TRGN .DL 0DC3
                 0090 INIT .DL 0D21
                 0100 NOTE .DL 0D2B
                 0110 POLY .DL 0D71
                 0120 DECD .DL 0F00
                 0130 :
                 0140 :FIRST, SYSTEM THINGS ARE DISPOSED OF.  THE SYSTEM IS
                 0150 :INITIALIZED USING MUS 1.0'S "INIT" ROUTINE, THEN THE
                 0160 :QUASH CHANNELS ARE REFRESHED AND THE AGO KEYBOARD
                 0170 :SCANNED ALSO USING ROUTINES FROM MUS 1.0
                 0180 :FINALLY, THE PIEBUG ROUTINE "DECODE" IS USED TO READ THE
                 0190 :COMMAND KEYBOARD AND ANY COMMANDS ARE EXECUTED.
                 0200 :0-SYSTEM CLEAR AND RE-INIT; 1-TUNE ALL CHANNELS;
                 0210 :2-SET SPLIT POINT, ANY AGO KEY PRESSED BECOMES SPLIT
                 0220 :
                 0230      .OR 1000
                 0240 :
1000-  A5 EB     0250 STAR LDA *OUTT    :GET THE # OF RESERVED LOW CHANS
1002-  85 EC     0260      STA *OUT2    :SAVE PERMANENTLY
1004-  A2 07     0270 POSP LDX 07       :SET UP A POINTER/COUNTER
1006-  A9 00     0280 SLP9 LDA 00       :AND GET READY TO ZERO STUFF
1008-  95 A2     0290      STA *HKEY,X  :ZERO THE TEMPORARY BUFFER
100A-  CA        0300      DEX          :AND POINT TO THE NEXT
100B-  10 F9     0310      BPL SLP9     :IF SOME ARE LEFT, LOOP
100D-  20 21 0D  0320      JSR INIT     :MUS 1.0 - INTIALIZE SYSTEM
1010-  20 2B 0D  0330 SLP6 JSR NOTE     :MUS 1.0 - REFRESH AND READ AGO KBD
1013-  20 00 0F  0340      JSR DECD     :PIEBUG - READ COMMAND KEYBOARD
1016-  F0 EC     0350      BEQ POSP     :IF COMMAND = 0, BRANCH TO RE-INIT
1018-  C9 01     0360      CMP 01       :IS COMMAND = 1?
101A-  D0 07     0370      BNE NTST     :NO, BRANCH TO NEXT TEST
101C-  A9 2E     0380      LDA 2E       :WILL BECOME MIDDLE C
101E-  20 23 0D  0390      JSR INIT+02  :USE PART OF MUS 1.0 INITIALIZE
1021-  F0 ED     0400      BEQ SLP6     :BRANCH ALWAYS
1023-  C9 02     0410 NTST CMP 02       :IS COMMAND = 2?
1025-  D0 08     0420      BNE SPLI     :NO, BRANCH TO POLY-SPLIT PROGRAM
1027-  A5 E7     0430      LDA *KTBL+07 :GET THE LOWEST KEY DOWN
1029-  F0 E5     0440      BEQ SLP6     :IF NONE ARE DOWN, LOOP
102B-  85 A1     0450      STA *SPLT    :SAVE THE KEY AS THE SPLIT POINT
102D-  D0 E1     0460      BNE SLP6     :BRANCH ALWAYS
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                        0470  :
                        0480  :NOW THE SPLIT PROGRAM.  AT THIS POINT A LIST OF THE
                        0490  :AGO KEYS WHICH THE MUS 1.0 SUBROUTINE "LOOK" FOUND TO
                        0500  :BE PRESSED HAS BEEN COMPILED AND SAVED IN THE INPUT BUFFER
                        0510  :AREA "KTBL".  WE BEGIN BY REMOVING FROM THE INPUT BUFFER
                        0520  :ALL THOSE KEYS WHICH ARE ABOVE THE SPLIT POINT AND
                        0530  :TRANSFERING THEM TO THE TEMPORARY BUFFER AREA "HKEY".
                        0540  :
102F-   A0 07          0550  SPLI LDY 07       :SET UP POINTER TO HIGH BUFFER
1031-   A2 07          0560       LDX 07       :AND ONE TO INPUT BUFFER
1033-   B5 E0          0570  SLP0 LDA *KTBL,X  :GET THE KEY
1035-   F0 0F          0580       BEQ SNX1     :IF ZERO, GO TO NEXT
1037-   C5 A1          0590       CMP *SPLT    :GREATER THAN SPLIT POINT?
1039-   90 08          0600       BCC SNX0     :IF NOT GREATER, BRANCH
103B-   99 A2 00       0610       STA HKEY,Y   :GREATER, SAVE IN HIGH BUFFER
103E-   88             0620       DEY          :POINT TO NEXT HIGH KEY BUFFER
103F-   A9 00          0630       LDA 00       :PREPARE AND
1041-   95 E0          0640       STA *KTBL,X  :ZERO THIS KEY
1043-   CA             0650  SNX0 DEX          :POINT TO NEXT KEY
1044-   10 ED          0660       BPL SLP0     :IF SOME LEFT, LOOP
                        0670  :
                        0680  :NEXT THE NUMBER OF CHANNELS AVAILABLE FOR LOW KEY USE
                        0690  :IS TRANSFERRED TO THE TEMPORARY COUNTER "OUTT" AND THE
                        0700  :MUS 1.0 ALLOCATION PROGRAM POLY IS CALLED TO ASSIGN LOW
                        0710  :KEYS TO LOW CHANNELS.
                        0720  :
1046-   A5 EC          0730  SNX1 LDA *OUT2    :GET THE NUMBER OF LOW CHANS AVAILABLE
1048-   85 EB          0740       STA *OUTT    :AND PUT IT IN THE TEMPORARY COUNTER
104A-   20 75 0D       0750       JSR POLY+04  :AND CALL THE MAIN PORTION OF POLY
                        0760  :
                        0770  :NOW THAT THE LOW KEYS HAVE BEEN ALLOCATED TO LOW CHANNELS,
                        0780  :THE HIGH KEYS ARE TAKEN FROM "HKEY" AND PLACED BACK IN THE
                        0790  :INPUT BUFFER (KEYS ALREADY ALLOCATED ARE REMOVED FROM THE
                        0800  :INPUT BUFFER).  SIMULTANEOUSLY THE LOW CHANNELS ARE MOVED
                        0810  :TO HKEY AND ALL LOW CHANNELS IN THE OUTPUT BUFFER
                        0820  :ARE MARKED AS "IN USE" SO THAT THEY WILL BE IGNORED
                        0830  :WHEN HIGH KEYS ARE ALLOCATED.
                        0840  :
104D-   A4 EC          0850       LDY *OUT2    :A COUNTER TO MOVE ONLY THE LOW CHANNELS
104F-   A2 07          0860       LDX 07       :AND A POINTER/COUNTER
1051-   B5 A2          0870  SLP1 LDA *HKEY,X  :GET THE HIGH KEY FROM TEMP BUFFER
1053-   95 E0          0880       STA *KTBL,X  :PUT IT IN THE INPUT BUFFER
1055-   88             0890       DEY          :ONE LESS LOW CHANNEL  TO DO
1056-   30 08          0900       BMI SNX2     :ALL LOW CHANNELS DONE, BRANCH
1058-   B5 D8          0910       LDA *NTBL,X  :GET THE LOW NOTE
105A-   95 A2          0920       STA *HKEY,X  :PUT IT IN TEMPORARY BUFFER
105C-   09 40          0930       ORA 40       :THEN SET THE TRIGGER TO MARK NOTE
105E-   95 D8          0940       STA *NTBL,X  :AND REPLACE THE NOTE
1060-   CA             0950  SNX2 DEX          :ONE LESS CHANNEL, POINT TO NEXT
1061-   10 EE          0960       BPL SLP1     :IF SOME LEFT, LOOP
                        0970  :
                        0980  :NOW POLY IS CALLED AGAIN, THIS TIME TO ALLOCATE HIGH CHANNELS
                        0990  :
1063-   38             1000       SEC          :PREPARE FOR SUBTRACTION
1064-   A9 10          1010       LDA 10       :16 CHANNELS SUPPORTED BY MUS1
1066-   E5 EC          1020       SBC *OUT2    :LESS THE LOW RESERVED CHANNELS
1068-   AA             1030       TAX          :RESULT IS POINTER
1069-   38             1040       SEC          :ANOTHER SUBTRACTION - PREPARE
106A-   A5 EA          1050       LDA *OUTS    :TOTAL HARDWARE CHANNELS
106C-   E5 EC          1060       SBC *OUT2    :LESS LOW RESERVED CHANNELS
106E-   85 EB          1070       STA *OUTT    :BECOMES CHANNELS LEFT TO ALLOCATE
1070-   20 77 0D       1080       JSR POLY+06  :CALL MAJOR PORTION OF POLY
                        1090  :
                        1100  :FINALLY, THE REAL STATE OF THE LOW CHANNELS IS RESTORED
                        1110  :TO THE OUTPUT BUFFER.  SIMULTANEOUSLY THE TEMPORARY BUFFER
                        1120  :IS ZERO'D FOR THE NEXT PASS.
                        1130  :
1073-   A4 EC          1140       LDY *OUT2    :NUMBER OF LOW CHANNELS FOR COUNTER
1075-   A2 07          1150       LDX 07       :POINTER/COUNTER
1077-   88             1160  SLP2 DEY          :ONE LESS LOW CHANNEL
1078-   30 04          1170       BMI SNX3     :AND IF ALL DONE, SKIP NEXT TRANSFER
107A-   B5 A2          1180       LDA *HKEY,X  :GET THE REAL CHANNEL STATE
107C-   95 D8          1190       STA *NTBL,X  :PLACE IN OUTPUT BUFFER
107E-   A9 00          1200  SNX3 LDA 00       :NOW GET READY AND
1080-   95 A2          1210       STA *HKEY,X  :ZERO THIS TEMPORARY BUFFER LOCATION
1082-   CA             1220       DEX          :ONE LESS TEMP BUFFER LOCATION
1083-   10 F2          1230       BPL SLP2     :IF SOME REMAIN, LOOP
1085-   30 89          1240       BMI SLP6     :BRANCH ALWAYS TO CONTINUE
                        1250  :
                        1260  END  .EN
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1280  ***********************************
1290  *           NOTES:                *
1300  *                                 *
1310  *  DUMP PROGRAM FROM 0000-0090    *
1320  *                                 *
1330  *  SET THESE LOCATIONS:           *
1340  *                                 *
1350  *     $0E8  CTRL $40  DYNAMIC     *
1360  *     $0E9  ODLY $20  DELAY       *
1370  *     $0EA  OUTS $XX  TOT CHANS    *
1380  *     $0EB  OUTT $XX  LOW CHANS    *
1390  *                                 *
1400  *  COLD START - $0000              *
1410  *  WARM START - $0004              *
1420  *                                 *
1430  *                                 *
1440  *  NOTE THE FOLLOWING THINGS:     *
1450  *                                 *
1460  * 1) THE PROGRAM IS RELOCATABLE;  *
1470  *    IT MAY BE LOADED AND RUN IN  *
1480  *    ANY NON-CONFLICTING MEMRORY  *
1490  *    SPACE                        *
1500  *                                 *
1510  * 2) CALLING POLY TWICE IS NOT    *
1520  *    EXTRA EFFICIENT.  TIME RE-   *
1530  *    QUIREMENTS DICTATE MEDIUM    *
1540  *    TEMPO KNOB SETTING - ABOUT   *
1550  *    10 MS/SCAN                   *
1560  *                                 *
1570  * 3) AS SOON AS THE PROGRAM IS     *
1580  *    RUNNING, TOUCH COMMAND PAD   *
1590  *    2 AND THE KEY WHICH IS TO    *
1600  *    BE THE SPLIT POINT.  THEN 1  *
1610  *    TO TUNE AND FINALLY 0        *
1620  *    BEFORE PLAYING               *
1630  *                                 *
1640  ***********************************
1650  POLY-SPLIT 8.8
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