

music player•27/1/67

org=20000 /origin of music on drum  
nbuf=34. /number of drum buffers  
lbuf=120. /size of each  
size=lbufxnbuf /space taken on each field (4080.)  
mar=16. /margin after each buffer  
lea=iot 4677  
lei=iot 4577  
la2=iot 5077

/common section

3/ jmp brk  
4, jmp go

beg, lio (i /initial entry  
dia  
clavcli  
dcc  
xx

tun, lio (500 /load tuning word  
dia  
lio (i pr2-500  
law 500  
dcc  
xx  
jmp tn1

dun, lsm  
cliVclavhltVlaiVclf 7

pla, lio (100 /play  
dia  
lio (i pr2-100  
law 100  
dcc  
xx  
jmp pl1

go, lsm  
szs 50 i  
jmp .+4  
lat  
dac twd  
jmp tun  
szs 60  
jmp pla

com, lio (pr2 /load tape and compile  
dia  
lio (i pr3-pr1  
law pr1  
dcc  
xx  
jmp cm1

constants

twd, 333300  
vol1, 0  
vol2, 0  
tempo, 0  
op, 0  
dp, 0  
mss, skp  
pr1,

/last volume word read  
/last volume word on drum  
  
/compiler buffer pointer  
/drum pointer  
/skip if any music is on drum

/player

dimension buf(lbuf+mar)

500/

brk,

cks  
ril 5s  
spi i  
jmp dsb  
lio mpa  
dia  
lio mpf  
law buf  
dcc  
hlt  
law i lbuf  
adm ptr  
law 14.  
adm ttt  
lac i p11  
ral 4s  
adm t11  
lac i p22  
ral 4s  
adm t22  
lac i p33  
ral 4s  
adm t33  
lac 2  
ral 4s  
adm t44

dsb,

lac 0  
lio 2  
jmp i 1

tn1,

law 100  
dap to

/temporary tuning word loader

tn2,

law pt  
dap ti  
cla

lio twd  
rcl 3s  
dio twd  
sub (3  
dac mpa

ti,

lac .  
mul mpa  
scl 9s  
add i ti

to,

dac .  
idx to  
sad (dac 500  
jmp tn3  
idx ti  
sad (lac pt+100  
jmp tn2  
jmp ti  
lio (i 100

tn3,

```

dia
lio (400
law 100
dcc
xx
jmp dun

p11,      xct mss          /play
          jmp dun      /nothing to play
          cli vcmi
          la2
          dzm t11
          dzm t22
          dzm t33
          dzm t44
          law 252
          lea
          clf 4
          law buf
          dap ptr
          lio (org lbuf+mar
          dio mpf
          dzm mpa
          cli
          dia
          lio (org lbuf+mar
          law buf
          dcc          /read first buffer
          xx
          cbs
          esm
ptr,      lio .
          idx ptr
          lac i ptr
          sad (-0
          jmp vol      /change volume
          sza i
          jmp fin      /end of music
          law 1
          rcl 6s
          dap p11
          law 2
          rcl 6s
          dap p22
          law 3
          rcl 6s
          dap p33
          lio i ptr
          law 4
          rcl 6s
          dap p44
          rir 2s
          cmi
          dio tt
          szf 4
          jmp .+20.
          repeat 21.,nop
          clf 4
p44,     lio .
          lac i p11

```

```

    ral 2s
    adm t11
    iot 14
    lac i p22
    ral 2s
    adm t22
    iot 114
    lac i p33
    ral 2s
    adm t33
    iot 214
    lai
    ral 2s
    adm t44
    iot 314
p11,   lac
    adm t11
    iot 14
p22,   lac
    adm t22
    iot 114
p33,   lac
    adm t33
    iot 214
    lai
    adm t44
    iot 314
    isp ttt
    jmp p11
nxm,   idx ptr
    sas (lio buf+lbuf
    jmp ptr
    law lbuf
    adm mpa
    sas (size
    jmp nx2
    dzm mpa
    lac (i
    adm mpf
    jmp nx3
nx2,   repeat 6,nop
nx3,   law i 15.
    add mpa
    lia
    dba
    stf 4
    jmp ptr

fin,   szs 60
    jmp pl1
    jmp dun

vol,   lei
    stf 4
    jmp nxm

pt,    /prototype pitch table
/twelfth root of 2 = 1.059463094359295264581
decimal
0      1458          1545          1637

```

1734  
2185  
2752  
3468  
4369  
5505  
6935  
8738  
11009  
13871  
17476  
22019  
27742  
34953  
44037

1837  
2314  
2916  
3674  
4629  
5832  
7348  
9258  
11664  
14696  
18515  
23328  
29391  
37031  
46656  
octal

1946  
2452  
3089  
3892  
4904  
6179  
7785  
9808  
12358  
15570  
19616  
24715  
31139  
39233  
49430

2062  
2598  
3273  
4124  
5196  
6546  
8248  
10391  
13092  
16495  
20873  
26185  
32991  
41566  
52370

consta  
pr2,  
variab

/phase 2 compiler

```
                offset pr2-pr1
pr1/
dimension bf2(1buf)      /compiler buffer

b,      b+4/      /bar pointer
n,      n+4/      /note pointer
t,      t+4/      /time
p,      p+4/      /pitch
f,      f+4/      /articulation flag (- when part runs out)
a,      a+4/      /articulation

cm1,    eem
        dzm ij
        law not
        dac nl

gnp,    rpb      /read one part
        spi
        jmp er    /end of all parts
        cmi
        dio ct1
        law 4
        sad ij
        jmp tm    /too many parts
        law b
        add ij
        dap b1
        dzm fl    /0 while reading notes
        lac nl
        dac off   /note offset

re1,    lac fl
        dac fls   /save in case of checksum
        lac ct1
        dac cts
        lac nl
        dac nls
        law i 104
        dac ct
        dzm csm

re3,    lac nl
        dac i b1
        rpb
        lai
        adm csm
        lai
        lio fl
        sni i
        add off   /relocate
        sza i
        jmp re6   /note/bar marker
        dac i nl
        idx nl
        sad (100000
        jmp sf    /storage full
        sad (20000
        lac (70000
        dac nl

re7,    isp ct1
```

```

        jmp re4
        rpb          /done
        lai
        sas csm     /last checksum
        jmp re5
        idx ij
        jmp gnp
re4,    isp ct
        jmp re3
        rpb          /end of block
        lai
        sad csm
        jmp re1
re5,    jsp txx
        text /cksm
/
        cleVcliVcmiVhlt
        lac cts
        dac ct1
        lac fls
        dac fl
        lac nls
        dac nl
        jmp re1
er,     lac ij
        dac np
        sza
        jmp re8
        jsp txx
        text /No parts
/
re6,    jmp dun
        idx fl
        jmp re7
sf,     jsp txx
        text /Storage full. Subdivide all parts.
/
tm,     jmp dun
        jsp txx
        text /No jump block after 4 parts.
/
ts,     jmp er
        jsp txx
        text /too slow
/
tf,     jmp tf1
        jsp txx
        text /too fast
/
tf1,    cleVcliVcmiVhlt
re8,    lat
        dac tm2
        and (777
        sas tm2
        jmp tf
        law i 40
        add tm2
        spa
        jmp ts

```

```
szs 20
xct mss
jmp r10 /reset drum pointers
law i 2
adm op
law 7777
and dp
lia
dia
xor dp
ior (lbuf
lia
law bf2
dcc
hlt
jmp q0
r10, law 170. /erase previous music
dac tempo
law 252
dac vol1
dac vol2
lac (org
dac dp
law bf2
dac op
```

```

q0,      dzm bc          /bar count
          dzm mes       /last bar in error
          law (600000
          dac n
          dac n+1
          dac n+2
          dac n+3
          law t          /clear out unused parts
          dap .+1
          dzm .
          idx .-1
          sas .+2
          jmp .-3
          dzm p+3
q8,      idx bc          /initialize measure
          clf 2
          dzm ij
          clc
          dac pro
lu2,     law b
          add ij
          dap b1
          add (n-b
          dap n1
          add (t-n
          dap t1
          add (p-t
          dap p1
          add (f-p
          dap f1
q89,     lac i n1
          dac foo
          lac i foo
          and (law
          sas (jmp
          jmp .          /?
b1,      lac .
          dac foo
          lac i foo
          sad (jmp
          jmp q88        /part has run out
          stf 2         /F2 means some part still has bars
          dac i n1
          law i 1
          adm i b1
q86,     dzm i f1
          dzm i t1
          idx ij
          sas np
          jmp lu2
          szf 2 i
          jmp end
          lac pro
          sma
          jmp q56        /some part has run out

```

/get time for each part. If part is at end of bar or end of music,

/get zero

```
q9,      dzm i j
         law 2s
         dac sf1      /shift counter for volume
         clc
         dac ps
         clf 5
q10,     law b      /check this part
         add ij
         dap b1      /set pointers
         add (n-b
         dap n1
         add (t-n
         dap t1
         add (p-t
         dap p1
         add (f-p
         dap f1
         add (a-f
         dap a1
q15,     law i 7
t1,      add .
         sma
         jmp q13      /sufficient time exists
f1,      lac .      /refill
         szm
         jmp q14      /flag on, get articulation
n1,      lac .
         dac po1
         lac i po1
         ral 3s
         and (7
         add (q1x
         dap q12
         law 777
         and i po1
         dac temp      /duration
q12,     xct .
e,       dac i a1
         cma
         adm i t1
         idx i f1
l,       lac i po1
         ral 9s
         and (77      /pitch
         dac i p1
         idx i n1
         lac temp
         ral 3s
         adm i t1
         jmp q15
q1x,     jmp l      /l
         jmp s      /s
         nop       /e
         ral 1s    /h
         ral 2s    /q
         jmp sv1   /set volume
```

```

        jmp q13          /end of bar, can't get any time
        jmp q1y         /set tempo

q1y,    law 7777
        and i po1
        dac tempo
q1z,    idx i n1
        sad (and
        lac (law
        dac i n1
        jmp n1
s,      ral 2s
        add temp
        jmp e

sv1,    lac sfl
        ior (ral
        dac sv1
        add (rar-ral
        dac sv2
        lac vol1
        rar 8s
sv1,    xx
        lio temp
        rcr 2s
sv2,    xx
        rar 8s
        dac vol1
        jmp q1z

q14,    dzm i p1
a1,     lac .
        adm i t1
        dzm i f1
        jmp q15
q13,    lac i t1
        sza i
        jmp .+3          /no time
        stf 5           /F5 means some part has time
        jmp q77+1
        lac i f1
        spa
        jmp q77         /end of part already noted
        lac ij
        dac ps         /some part is short
q77,    dzm i p1       /if no time, make it a rest
        lac sfl
        ral 2s
        add (2s
        dac sfl       /sfl=2s,4s,6s,8s
        idx ij
        sas np
        jmp q10       /check next part

```

q99,

```
szf 5 i
jmp q8 /no time in any part
lac ps
sma
jmp mis /some part is short
lac t /calculate least time
sza i
law 7777
lio t+1
sni
jmp .+5
sub t+1
sma
cla
add t+1
lio t+2
sni
jmp .+5
sub t+2
sma
cla
add t+2
lio t+3
sni
jmp .+5
sub t+3
sma
cla
add t+3
dac temp
cmaVlia
add t
sma
dac t
lai
add t+1
sma
dac t+1
lai
add t+2
sma
dac t+2
lai
add t+3
sma
dac t+3
lac temp
mul tempo
rcr 1s
div tm2
hlt
dac temp
lac vol1
sad vol2
jmp d2
dac vol2
jda put
clc
jda put
```

```

d2,      lac p
         ral 6s
         ior p+1
         ral 6s
         ior p+2
         jda put
         law 7770
         sub temp
         sma
         cla
         add temp
         lia
         cma
         adm temp
         lai
         ral 6s
         ior p+3
         rar 6s
         jda put
         lac temp
         sza
         jmp d2          /if too long, break it up
         jmp q9

end,     cla          /end of music
         jda put
         jsp put+1
         lio dp
         dia
         lio (lbuf
         law bf2
         dcc          /write out last buffer
         hlt
         law 7777
         and dp
         sza
         jmp en2
         law i i-size
         add dp
         dia
         lio (i-size
         law bf2
         dcc          /write out patch at top of last field
         hlt

en2,    law 600
         dap mss      /music now exists
         lem
         szs i 10
         jmp dun
         jmp pla

put,    0
         dap pux
         law bf2+lbuf
         sad op
         jmp wrb
         lac put
         dac i op
         idx op

pux,    jmp .

```

```

wrb,      lio dp
          dia
          lio (lbuf
          law bf2
          dcc
          hlt
          law bf2
          dac op
          law lbuf
          adm dp
          and (7777
          sad (lbufxnbuf
          jmp wr2
          sas (lbuf
          jmp put+5
          law i lbuf+i-size
          add dp
          lia
          dia
          lio (i-size
          law bf2
          dcc
          hlt
          jmp put+5
wr2,      law i-size
          adm dp
          jmp put+5

p1,       lac .

q88,      lac i f1          /part is out of music
          spa
          jmp q86+1        /already know about it
          lac ij
          dac pro          /record that fact
          clc
          dip i f1
          jmp q86+1

q56,      jsp txx
          text /Part /
          law 1
          add pro
          jdp dpt
          jsp txx
          text / is out of music at measure /
          lac bc
          jdp dpt
          jsp txx
          text /.

          jmp q9

mis,      lac bc
          sad mes
          jmp q99          /error already printed
          jsp txx
          text /Measure /
          lac bc

```

```
jdp dpt
jsp txx
text / of part /
law 1
add ps
jdp dpt
jsp txx
text / is too short.
```

```
lac bc
dac mes
jmp q99
```

dpt,

```
0
dac dp1
dzm dp2
dpp, dac dp3
mul (1
div .+1
10.
sas dp2
jmp dpp
sni
lio (20
tyo
lac dp3
dac dp2
lac dp1
sas dp2
jmp dpp
jmp i dpt
```

txx,

```
dap txy
lio i txy
idx txy
lac (607600
rcl 6s
sad (lai
```

txy,

```
jmp .
sad .+2
jmp txx+1
swp
tyo
lia
jmp txy-3
```

constants  
pr3,  
variables  
not,  
start 5