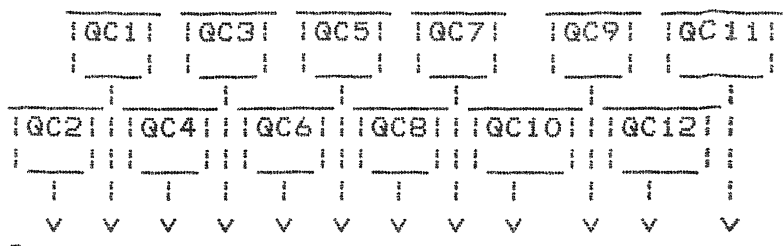


```

; QUANT.WSP /WSP /MRH
; Test program for QUANTifier box
;
;
;

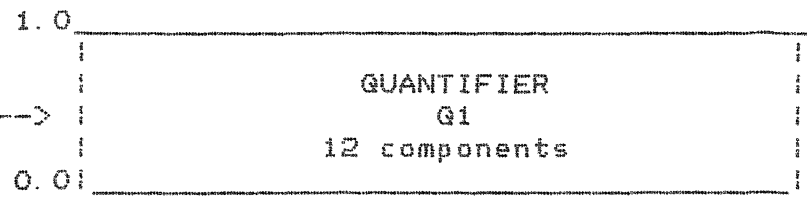
```



```

| RG |
|RANDOM| -->
|___|
| ^ |
|   |

```



```

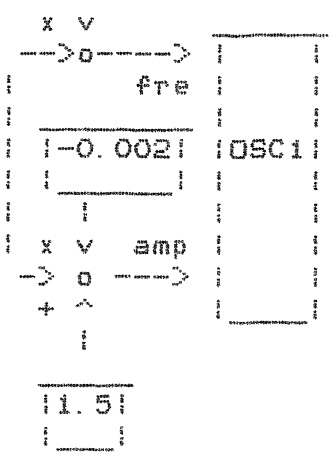
|TRIG|
|___|

```

```

|OCTAVE|
|VALUE |
|___|

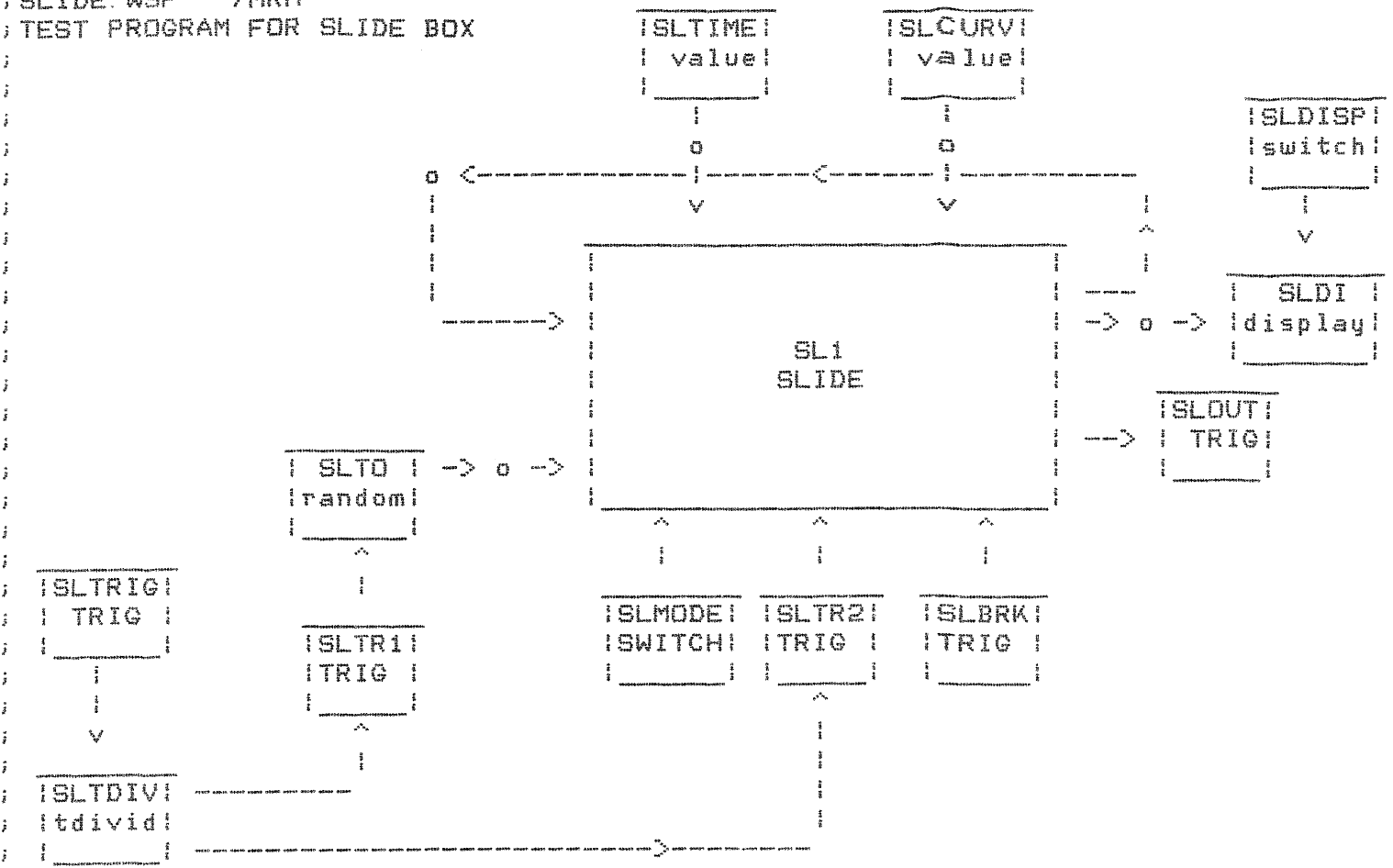
```



```
GEN DSC1 ;oscillator
QUANT Q1 12 ;quantifier with twelve components
220.0 233.08 246.94 261.62 277.18 293.66
311.12 329.62 349.22 369.98 391.98 415.29
TRIG RTRIG ;trigger to get new random number
RANDOM RQ,,,RTRIG 24681357
CONNEX CQIN RQ Q1/IN
VALUE QC1 1.0 ;component tuning controls
VALUE QC2 1.0
VALUE QC3 1.0
VALUE QC4 1.0
VALUE QC5 1.0
VALUE QC6 1.0
VALUE QC7 1.0
VALUE QC8 1.0
VALUE QC9 1.0
VALUE QC10 1.0
VALUE QC11 1.0
VALUE QC12 1.0
CONNEX CONG1 QC1 Q1/C1 ;connect component controls
CONNEX CONG2 QC2 Q1/C2
CONNEX CONG3 QC3 Q1/C3
CONNEX CONG4 QC4 Q1/C4
CONNEX CONG5 QC5 Q1/C5
CONNEX CONG6 QC6 Q1/C6
CONNEX CONG7 QC7 Q1/C7
CONNEX CONG8 QC8 Q1/C8
CONNEX CONG9 QC9 Q1/C9
CONNEX CONG10 QC10 Q1/C10
CONNEX CONG11 QC11 Q1/C11
CONNEX CONG12 QC12 Q1/C12
VALUE OCTAVE 1.0 ;octave control on oscillator's
CONNEX CFRE Q1 DSC1/FRE OCTAVE ;frequency input
VALUE -0.002 -0.002272727 ;controls to convert QUANTifier
VALUE 1.5 1.5 ;output to amplitude in range
CONNEX CAMP Q1 DSC1/AMP -0.002 1.5 ;0.5 to 1.0
"OCTAVE_v.v"_TO_ALTER_OCTAVE
"QCn_v.v"_TO_TUNE_COMPONENTS
"RTRIG_ON"_FOR_NEW_RANDOM_NUMBER_INPUT
```

*Handwritten signature or scribble*

SLIDE.WSP /MRH  
 TEST PROGRAM FOR SLIDE BOX



When SLTRIG is ON, a new random number is generated as the destination (SLTD) of the slide, at the same time as trigger SLTR2 is set to start a slide from the old value to SLTD. A connection is made from the output of SL1 back to its own input, so that new slides automatically start at the current output value. The duration of the slide is controlled by SLTIME, the mode by SLMODE, and the curve form by SLCURV.

TRIG SLTRIG  
TRIG SLTR1  
TRIG SLTR2  
TDIVID SLTDIV SLTRIG 2  
SLTR1 SLTR2

TRIG SLBRK  
TRIG SLOUT  
SWITCH SLMODE LIN

SHOW TEXT "SLMODE LIN/EXP" FOR MODE  
SHOW TEXT "SLTRIG ON" TO START SLIDE  
SHOW TEXT "SLBRK ON" TO INTERRUPT SLIDE

SLIDE SL1 SLMODE SLTR2 SLBRK SLOUT

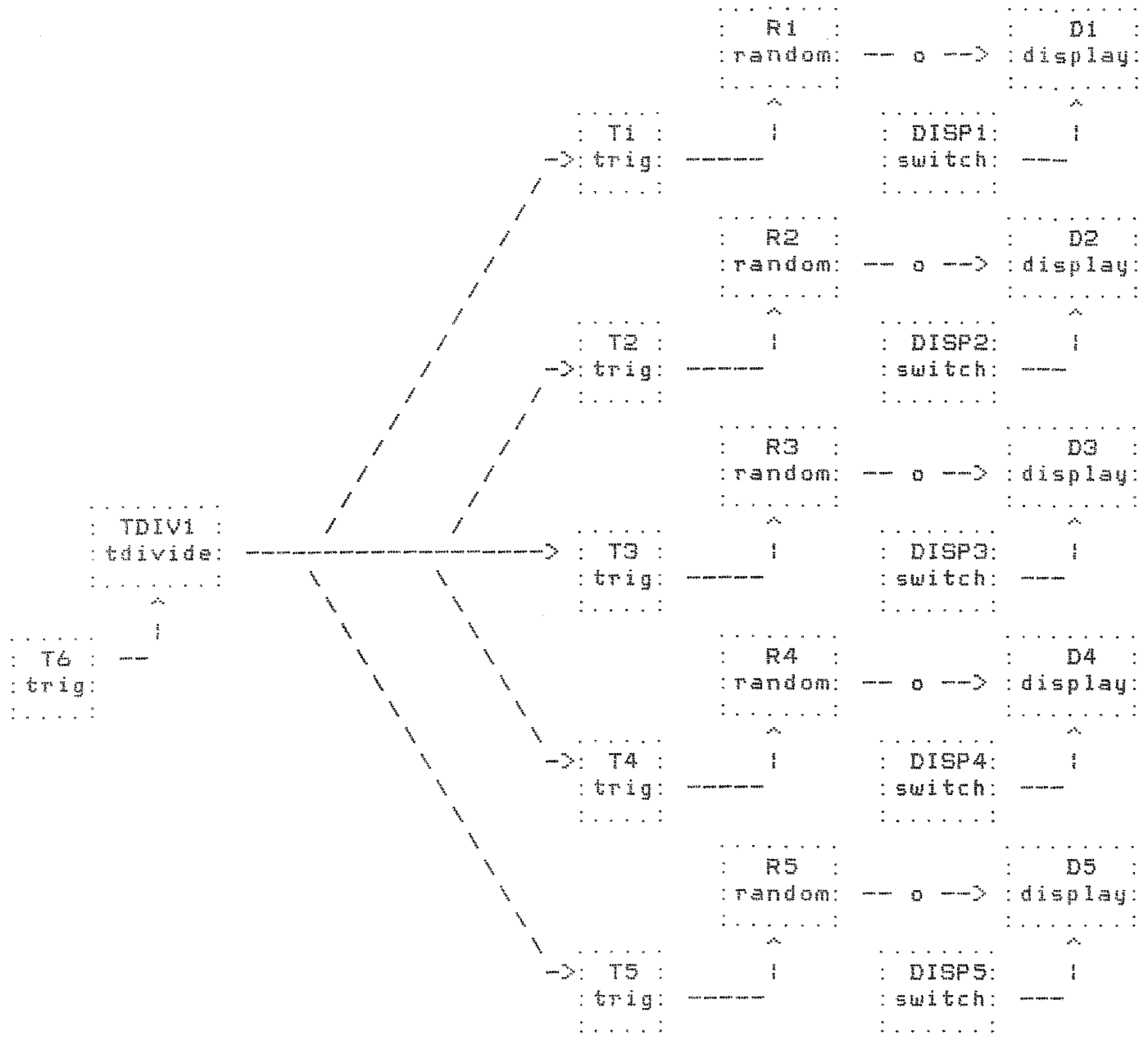
RANDOM SLTO,,,SLTR1  
VALUE SLTIME 5.0  
VALUE SLCURV

SHOW TEXT "SLTIME v.v" FOR DURATION  
SHOW TEXT "SLCURV v.v" FOR CURVE FORM

CONNEC CSL1 SL1 SL1/START  
CONNEC CSL2 SLTO SL1/END  
CONNEC CSL3 SLTIME SL1/TIME  
CONNEC CSL4 SLCURV SL1/C

SWITCH SLDISP OFF  
DISPLA SLDI SLDISP  
CONNEC CSL5 SL1/OUT SLDI  
SHOW TEXT "SLDISP ON" FOR DISPLAY

; TEST PROGRAM FOR TDIVIDE BOX



TR T1  
TR T2  
TR T3  
TR T4  
TR T5  
TR T6

TDIV TDIV1 T6 5 ;T6 is control trigger, 5 outputs  
T1 T2 T3 T4 T5 ;output triggers

RA R1,,T1 1234567 ;R1 controlled by T1, constant is random seed  
RA R2,,T2 3456789 ;R2 controlled by T2  
RA R3,,T3 5678901 ;R3 controlled by T3  
RA R4,,T4 7890123 ;R4 controlled by T4  
RA R5,,T5 9012345 ;R5 controlled by T5

SW DISP1 ;switches to control display

SW DISP2

SW DISP3

SW DISP4

SW DISP5

DISP D1 DISP1

DISP D2 DISP2

DISP D3 DISP3

DISP D4 DISP4

DISP D5 DISP5

CON C1 R1 D1

CON C2 R2 D2

CON C3 R3 D3

CON C4 R4 D4

CON C5 R5 D5

"DISPn\_ON" \_FOR\_DISPLAY

"T6\_ON" \_FOR\_NEW\_RANDOM\_NUMBERS

RANGE | ---  
| |

| TDELAY |  
| (VAL) | ----> 0

| R1 | x | 0  
| RANDOM | ----> 0  
| | ^ |

| DISPLAY |  
| ^ |  
| |

| T2 |

| TRIG | ----> | TDELAY | ----  
| | |

| BASE | ----> | freq |  
| | ^ |

| ON/OFF |  
| FRE |  
| |

TIMING		SUST		RAMP		INTEXT
				SWITCH		
				^		

| OSC |  
| |  
| |

INVERT		HOLD		TRIG		TRIG
				T1		BREAK
v v v v v v v v

| GAIN | ---  
| | ^ |  
| |

| ON/OFF |  
| AMP |

\* \*\*\*\*\*  
\* ENV1 \*  
\* FUNCTION GENERATOR \*

| trig | ----> | T6 | ----> | TDIVIDE | ----> | TRIG | ---->  
	^	^	^	^
TRIG				

				+	+	+	+
				o <-	o <-	o <-	o <-

SEG1		SEG2		SEG3		SEG4
RAND		RAND		RAND		RAND

				+			

AMP0		AMP1		AMP2		AMP3		AMP4
RAND		RAND		RAND		RAND		RAND


CF1		CF2		CF3		CF4
VAL		VAL		VAL		VAL

```

CR GEN G1 ; oscillator
CR RA R1 ; random generator and
CR VAL RANGE 10. ; controls -
CR VAL BASE 200. ; connect to frequency input, to
CR CON C1 R1 G1/FRE RANGE BASE ; vary in range 200 - 210

CR SW SUST ; function generator switches
CR SW INVERT
CR SW HOLD
CR SW RAMP LIN ; linear ramps to start with
CR SW INTEXT EXT ; SWITCH for INT/EXT switch
CR SW TIMING 0
CR TRIG T1 ; direct trig for ENV1
CR TRIG T6
CR TRIG BREAK ; "abort" trigger
; ; function generator

CR FUNC ENV1 4 INTEXT T1 BREAK 3 SUST HOLD INVERT RAMP TIMING
; durations curve-forms breakpoints triggers
;-----
0.0
0.1 1.0 1.0 1.0
0.2 1.0 0.82
2.0 1.0 0.81
1.0 1.0 0.0 T6

CR VAL GAIN 1.0 ; gain control on function
CR CON C2 ENV1 G1/AMP GAIN ; generator output

CR TR T11
CR TR T12
CR TR T13
CR TR T14
CR VAL SPEED 1.0 ; boxes to be connected to
CR RAN SEG1,,,T11 54321789 ; the function generator's control
CR RAN SEG2,,,T12 43215679 ; inputs
CR RAN SEG3,,,T13 32145679
CR RAN SEG4,,,T14 21345679

T11 ON ; turn these on to get the random
T12 ON ; generators started
T13 ON
T14 ON

CR TR T15
CR TR T16
CR TR T17
CR TR T18
CR RAN AMP1,,,T15 12345679
CR RAN AMP2,,,T16 65432179
CR RAN AMP3,,,T17 76543219
CR RAN AMP4,,,T18 87654321

T15 ON ; get an output from these too
T16 ON
T17 ON
T18 ON

CR VAL CF1 1.0
CR VAL CF2 1.0
CR VAL CF3 1.0
CR VAL CF4 1.0

CR TDIV TDIV1 T6 B ; divide ENV1's final output
T11 T12 T13 T14 T15 T16 T17 T18 ; trigger

CR TRIG T2 ; set up a TRIG-DELAY box between

```



```

CR VAL TDELAY ;the function generator's trigger
CR TDELAY TDEL1 T2 T1 10 ;T1 and a new TRIG T2, with a store
CR CON C9 TDELAY TDEL1/TIME ;for 10 trig signals

CR VAL 0.5 0.5 ;to control deviation

CR CON C3 SPEED ENV1/SPEED ;connect to control inputs
CR CON C5 SEG1 ENV1/D1,,0.5 ;random output in range 0.5 to 1.5
CR CON C6 SEG2 ENV1/D2,,0.5
CR CON C7 SEG3 ENV1/D3,,0.5
CR CON C8 SEG4 ENV1/D4,,0.5
CR CON C21 AMP1 ENV1/A1 0.5 0.5 ;random output in range 0.5 to 1.0
CR CON C22 AMP2 ENV1/A2 0.5 0.5
CR CON C23 AMP3 ENV1/A3 0.5 0.5
CR CON C24 AMP4 ENV1/A4 0.5 0.5
CR CON C31 CF1 ENV1/C1
CR CON C32 CF2 ENV1/C2
CR CON C33 CF3 ENV1/C3
CR CON C34 CF4 ENV1/C4

CR SW AMP ;switches to control graphic
CR SW FRE ;display -
CR DISP DAMP AMP ;display boxes for amplitude and
CR DISP DFRE FRE 1 ;frequency (no scaling for this!)
CR CON C10 G1/FRE DFRE ;connect oscillator inputs to
CR CON C11 G1/AMP DAMP ;display boxes

```

```

READ TEST2

```

INT/EXT			T21		BREAK2
INTEX2	HOLD2	TIME2	TRIG	RAMP2	TRIG
V	V	V	V	V	V

```

* * * * *
* * * * *
* * ENV2 * *
* FUNCTION GENERATOR *
    
```

```

^ ^ ^ ^
||||| ||||| | + | + | + | +
||||| ||||| 0 <- 0 <- 0 <- 0 <-
    
```

SEG1	SEG2	SEG3	SEG4
RAND	RAND	RAND	RAND
^	^	^	^

10.51  
VAL  
|

T11	T12	T13	T14
TRIG	TRIG	TRIG	TRIG

```

| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
    
```

GA0	GA1	GA2	GA3	GA4
VAL	VAL	VAL	VAL	VAL

```

| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
    
```

CF1	CF2	CF3	CF4
VAL	VAL	VAL	VAL

; This can only be used in conjunction with TEST1.WSP, since it makes use  
 ; of boxes that have been defined there. The FUNCGEN created here is  
 ; intended to be able to replace the random generator that, in TEST1,  
 ; is connected to the FREQUENCY input of oscillator Q1. Do this by typing:

```
; >C1 ENV2
; at the terminal. The first four segments of this FUNCGEN (ENV2) will be
; controllable by the same boxes as those that control ENV1, since we make
; those connections (C51 etc) here; except that segment gain for ENV2 will
; be controlled by VALUE boxes GAO - GA17.
```

```
;
CR SW HOLD2 ;function generator switches, trigs
CR SW RAMP2 EXP ;exponential interpolation
CR SW INTEX2 BOTH ;INT and EXT triggering
CR SW TIME2 0 ;calculate every sample
CR TRIG T21 ;direct trig for ENV1
CR TRIG BREAK2 ;"abort" trig
;FUNCGEN with ? segments
```

```
CR FUNC ENV2, ,INTEX2 T21 BREAK2, ,HOLD2, ,RAMP2 TIME2
; durations curve-forms breakpoints triggers
;-----
```

			0.5
0.2	1.		1.
0.2	1.		0.5
0.18	1.		0.
0.17	1.		0.5
0.16	1.		1.
0.15	1.		0.
0.14	1.		0.75
0.13	1.		0.25
0.12	1.		0.7
0.11	1.		0.3
0.1	1.		0.65
0.09	1.		0.35
0.08	1.		0.6
0.07	1.		0.4
0.06	1.		0.55
0.05	1.		0.45
0.04	1.		0.5

END

```
CR VAL GAO 1.0 ;new gain controls
CR VAL GA1 1.0
CR VAL GA2 1.0
CR VAL GA3 1.0
CR VAL GA4 1.0
CR VAL GA5 1.0
CR VAL GA6 1.0
CR VAL GA7 1.0
CR VAL GA8 1.0
CR VAL GA9 1.0
CR VAL GA10 1.0
CR VAL GA11 1.0
CR VAL GA12 1.0
CR VAL GA13 1.0
CR VAL GA14 1.0
CR VAL GA15 1.0
CR VAL GA16 1.0
CR VAL GA17 1.0
```

```
CR CON C50 GAO ENV2/A0 ;connect them to ENV2
CR CON C51 GA1 ENV2/A1
CR CON C52 GA2 ENV2/A2
CR CON C53 GA3 ENV2/A3
```

CR CON C54 GA4 ENV2/A4  
CR CON C55 GA5 ENV2/A5  
CR CON C56 GA6 ENV2/A6  
CR CON C57 GA7 ENV2/A7  
CR CON C58 GA8 ENV2/A8  
CR CON C59 GA9 ENV2/A9  
CR CON C60 GA10 ENV2/A10  
CR CON C61 GA11 ENV2/A11  
CR CON C62 GA12 ENV2/A12  
CR CON C63 GA13 ENV2/A13  
CR CON C64 GA14 ENV2/A14  
CR CON C65 GA15 ENV2/A15  
CR CON C66 GA16 ENV2/A16  
CR CON C67 GA17 ENV2/A17

CR CON C71 CF1 ENV2/C1  
CR CON C72 CF2 ENV2/C2  
CR CON C73 CF3 ENV2/C3  
CR CON C74 CF4 ENV2/C4

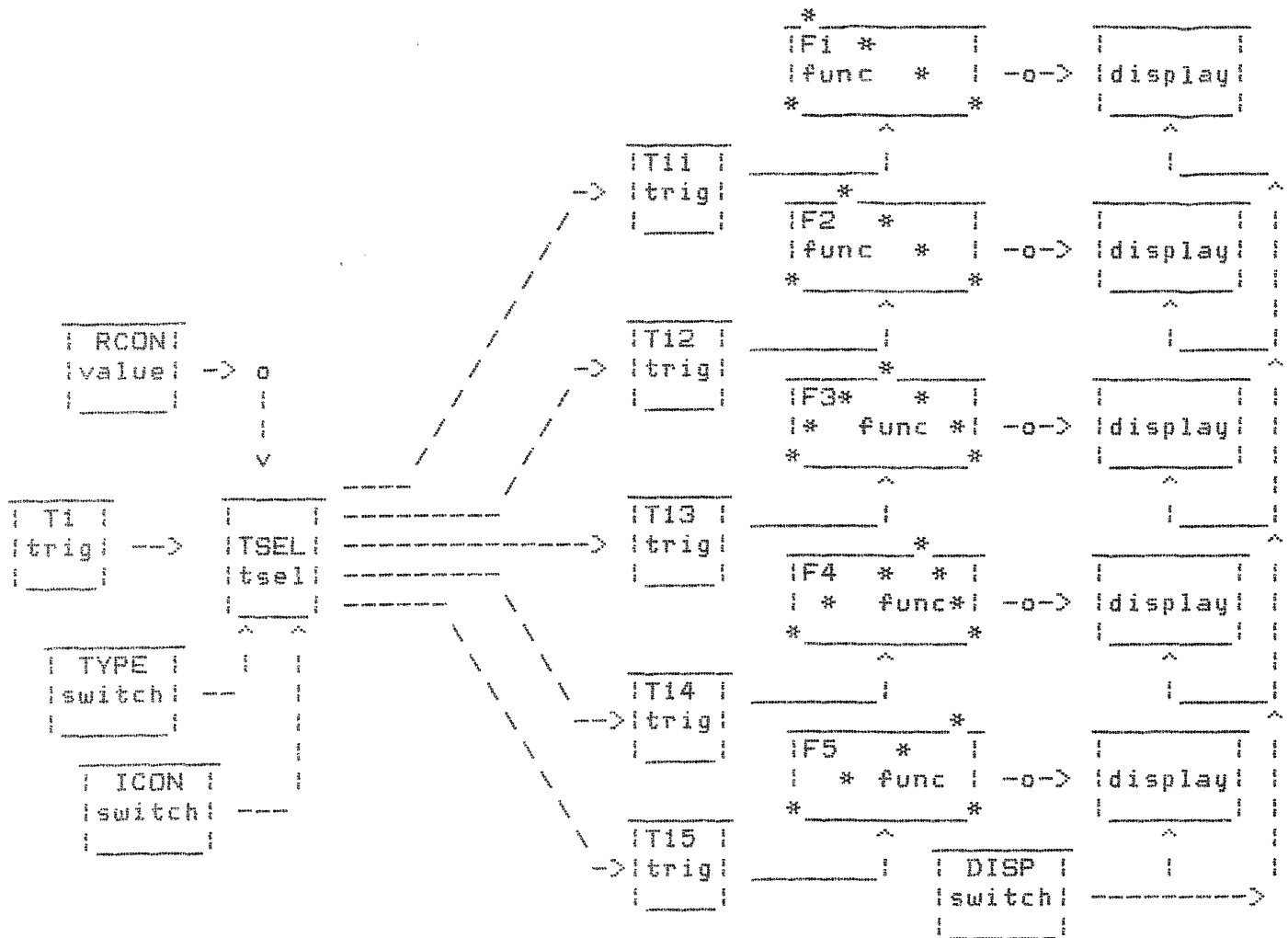
;connect old CURVE controls to ENV2

CR CON C81 SEG1 ENV2/D1  
CR CON C82 SEG2 ENV2/D2  
CR CON C83 SEG3 ENV2/D3  
CR CON C84 SEG4 ENV2/D4

;connect old DURATION controls

; TSELEC\_WSP /WSP /MRH

; TEST PROGRAM FOR TSELEC BOX (TRIGGER SELECTOR)



```

TR T1 ;main trigger
SW TYPE -1 ;chooses selection type (-1=circular,
;0=signal controlled, +1=switch controlled)
VAL RCON ;controls selection when type=0
SW ICON ;controls selection when type=1

```

```

TR T11 ;output triggers
TR T12
TR T13
TR T14
TR T15

```

```

TSELEC TSEL TYPE 5 T1 ICON ;5 outputs, source is trigger T1
T11 T12 T13 T14 T15 ;trigger outputs
CON C10 RCON TSEL/CON ;connect RCON to control input
RCON 0.

```

```

SW INTEXT EXT ;all function generators will have external
;triggering only

```

```

FUNC F1 2 INTEXT T11
; durations curve-forms breakpoints
; -----

```

durations	curve-forms	breakpoints
		0.0
0.0	0.0	1.0
10.0	0.0	0.0

```

FUNC F2 2 INTEXT T12

```

durations	curve-forms	breakpoints
		0.0
2.5	0.0	1.0
7.5	0.0	0.0

```

FUNC F3 2 INTEXT T13

```

durations	curve-forms	breakpoints
		0.0
5.0	0.0	1.0
5.0	0.0	0.0

```

FUNC F4 2 INTEXT T14

```

durations	curve-forms	breakpoints
		0.0
7.5	0.0	1.0
2.5	0.0	0.0

```

FUNC F5 2 INTEXT T15

```

durations	curve-forms	breakpoints
		0.0
10.0	0.0	1.0
0.0	0.0	0.0

```

SW DISP ;switch for display

```

```

DISPLA D1 DISP
DISPLA D2 DISP
DISPLA D3 DISP
DISPLA D4 DISP
DISPLA D5 DISP

```

```

CON C1 F1 D1
CON C2 F2 D2
CON C3 F3 D3
CON C4 F4 D4
CON C5 F5 D5

```

```

"DISP_ON" FOR_DISPLAY
"TYPE_-1" FOR_CIRCULAR_DISTRIBUTOR
"TYPE_0" FOR_VALUE_CONTROLLED__"RCON" FOR_VALUE_(0-1)
"TYPE_1" FOR_SWITCH_CONTROLLED__"ICON" FOR_VALUE_(1-5)
"T1_ON" TO_TRIGGER_TSELEC_BOX

```

;SYSDON.WSP /EUN/MRH  
;SYSTEM CONNECTION FILE FOR WSP

840201

## \* New commands:

ALTER - alters the contents of previously defined boxes; this is an optional command, as command lines that begin with the user-defined name of a box, followed by a list of parameters, are interpreted as ALTER commands. Lines that begin with a user-defined name without a parameter list are interpreted as instructions to display the contents and parameters of the box in question.

CLEAR - deletes all boxes

READ - reads a user file from disk

SAVE - creates a disk file containing box and connection data

STATUS - obtains information about the current system status, including size of free data area

## \* Changed commands:

CREATE - the word CREATE need not be written at the beginning of the command line. If a line begins with a boxtype (e.g. SWITCH, FUNC, etc) it is understood as an instruction to create a box. For example:

>TRIG T1

has the same effect as

>CREATE TRIG T1

## \* New box-types:

TDIVIDE - when a trig signal is input, several specified TRIG boxes are set to the ON position

TSELECT - when a trig signal is input, one of several specified TRIG boxes is selected and set to ON

USER - an undefined box, which may be defined by the user in FORTRAN code

## \* Changed box-types:

SWITCH - now combines the functions of both MULTSWITCH and SWITCH, i.e. it can have the values ON and OFF, or the values UP, DOWN and MIDDLE, or INT, EXT and BOTH (for FUNCTION generators), or LIN and EXP (linear and exponential), or integer values

MULTSW - deleted

FUNCTION- now includes these additional facilities:

- a) a switch to determine whether ramps are to be linear or exponential (as in EMSETT envelopes), with curve forms defined in the range -10 to +10
- b) control inputs for curve forms
- c) control inputs for amplitudes
- d) TRIG outputs at the end of each segment
- e) the DELAY control has been removed, since this function is better performed by the TDELAY box
- f) a switch to determine how often the generator is to calculate and output new data
- g) a TRIG input to interrupt the generator (i.e. jump immediately to the final breakpoint)

TDELAY - the user can now specify the number of TRIG signals that are to be stored



## \* New commands:

- MODIFY - replaces ALTER; the sign # can be used to indicate parameters that are to be put to default values; the sign \* can be used as a wild card to indicate that several boxes are to be modified and/or displayed simultaneously
- SET - sets various system parameters and flags
- SHOW - displays information about system parameters, flags, boxes, etc; the wild card \* can be used to display several boxes; with >SHOW TEXT it is possible to display a user-defined text string on the terminal screen

## \* Changed commands:

- CALCUL - deleted: function taken over by SET and SHOW
- STATUS - deleted: function taken over by SET and SHOW
- CREATE - a) >CREATE boxtype  
causes the program to print out the format required to CREATE a box of the specified type  
b) it is not necessary to define any parameters when CREATING a box  
>CREATE boxtype username  
is all that is essential: all parameters then receive default values. The sign # can be used to indicate a default value (as can leaving the parameter out with multiple commas [, ,])

## \* New box-types:

- QUANTifier - transforms an input signal between 0 and 1 to one of several specified values
- SLIDE - single-segment function generator

## \* Changed box-types:

- FUNCTION - it is no longer necessary to specify the number of segments when a FUNCTION box is created; this parameter can be left blank, and the word END written when all the desired segments have been defined
- CONNec - real-number constants can now be specified as MULT and ADD parameters