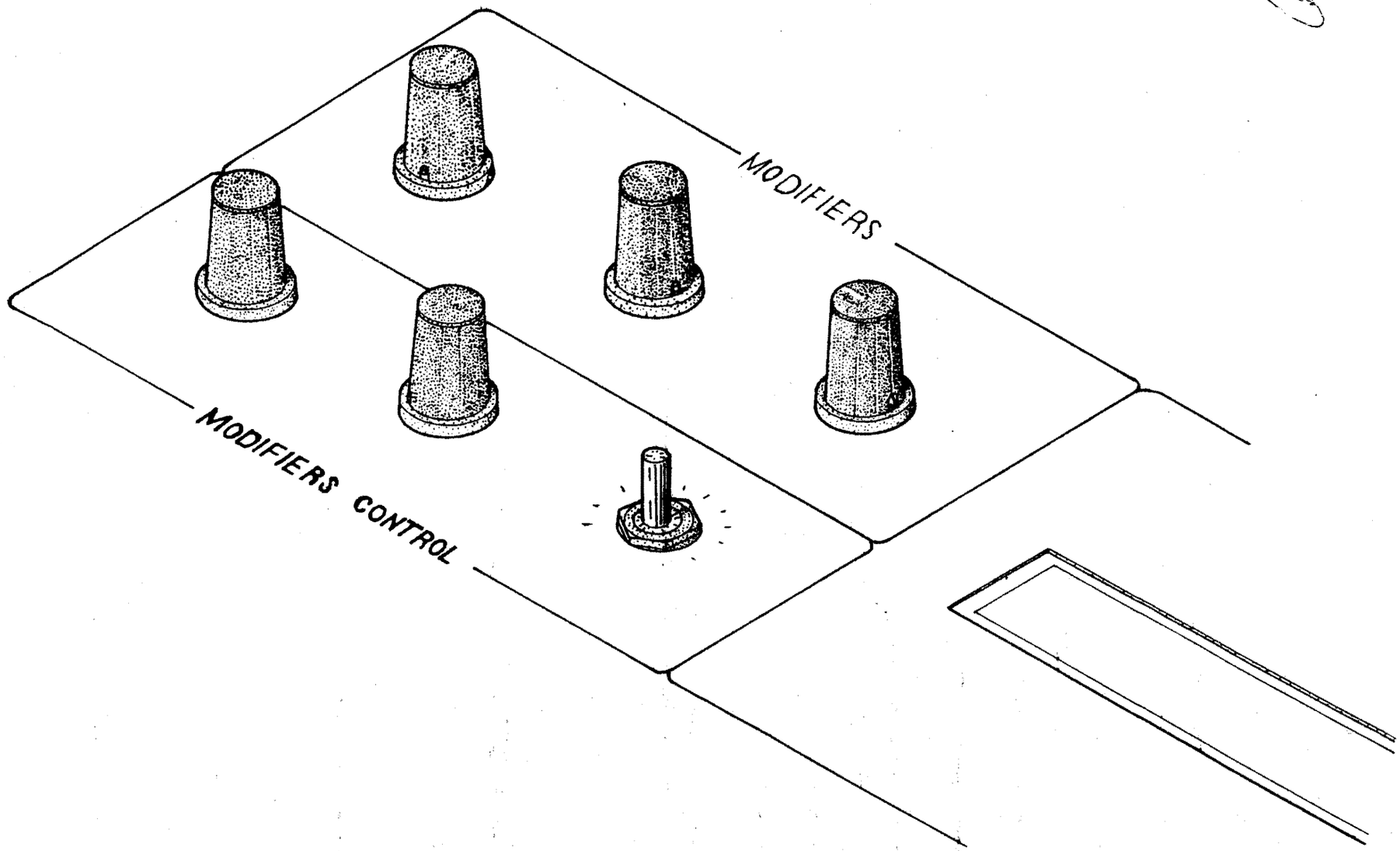

MODIFIERS
MODIFIERS CONTROL

INTRODUCTION

The PPG WAVE 2 is a polyphonic digital synthesizer that uses 8 independantly tuneable oscillators.Almost 2000 different waveforms are digitally generated,64 in each of 32 wavetables.This unique feature allows panning through up to 64 waveforms in the course of a single event or note.Simple or complex waveforms can then be treated with envelope generators,filters and modulation oscillators before being stored in the 100 programme capasity memory.Two dofferent programmes can be stored in each memory space,and this used with the split keyboard and stereo output facility,allows for maximum versatility.

The WAVE 2 do also contain an extremely flexible 8 track sequencer including record update and a 10 fonction arpeggio programme.

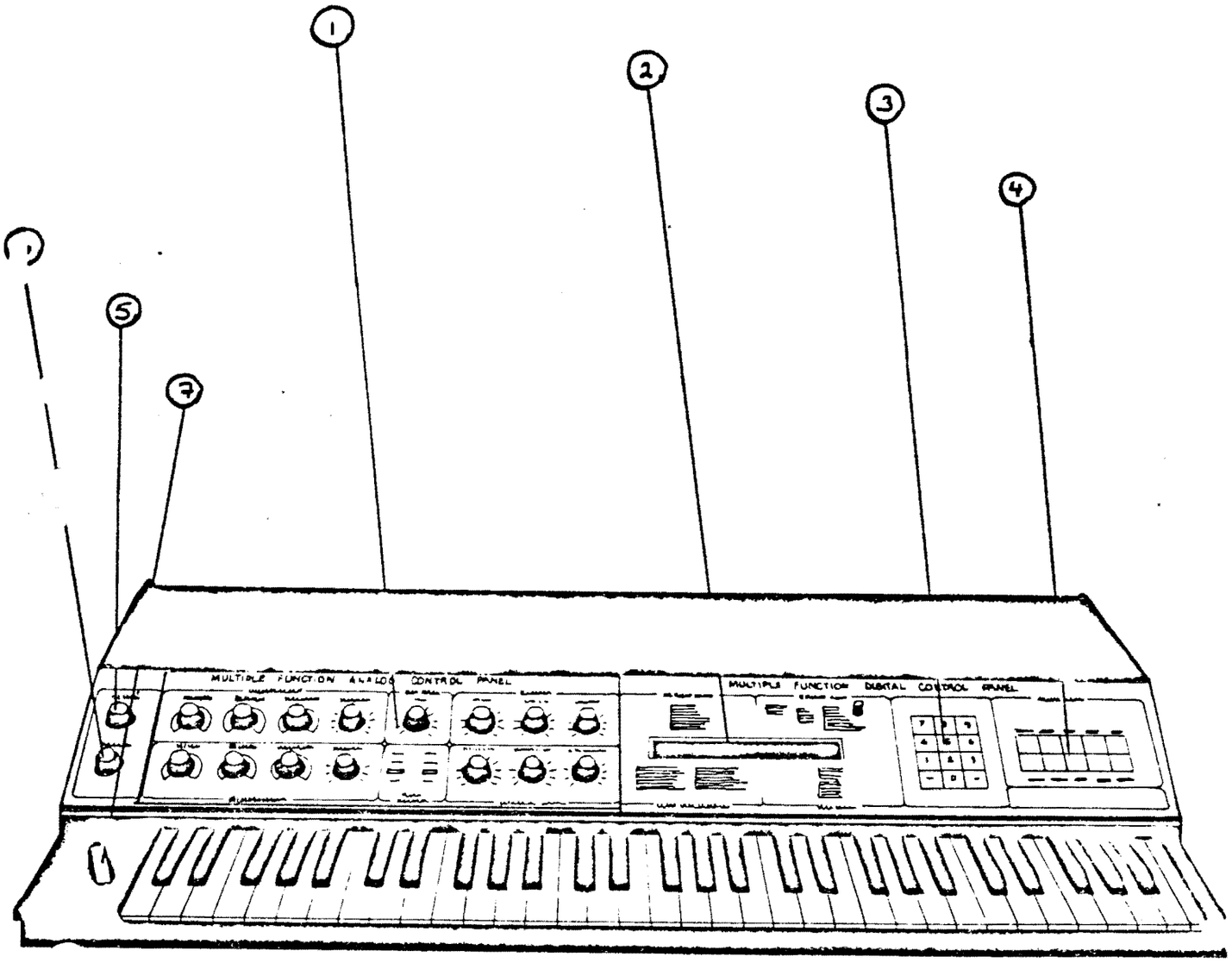

1
2
3
4
5
MULTIPLE FUNCTION ANALOG CONTROL PANEL
MULTIPLE FUNCTION DIGITAL CONTROL PANEL

DIAGRAM 1

FRONT PANEL CONTROLS

1 ANALOGUE PANEL-controls all analogue functions
2 DISPLAY PANEL-80 character LCD display
3 NUMERIC KEYPAD-used in various ways in conjunction with the display.
4 DIGITAL KEYPAD-for addressing all system function
5 MASTER TUNING-to simultaneously tune all oscillators
6 MASTER VOLUME-output volume
7 PITCH WHEEL-spring loaded pitch control

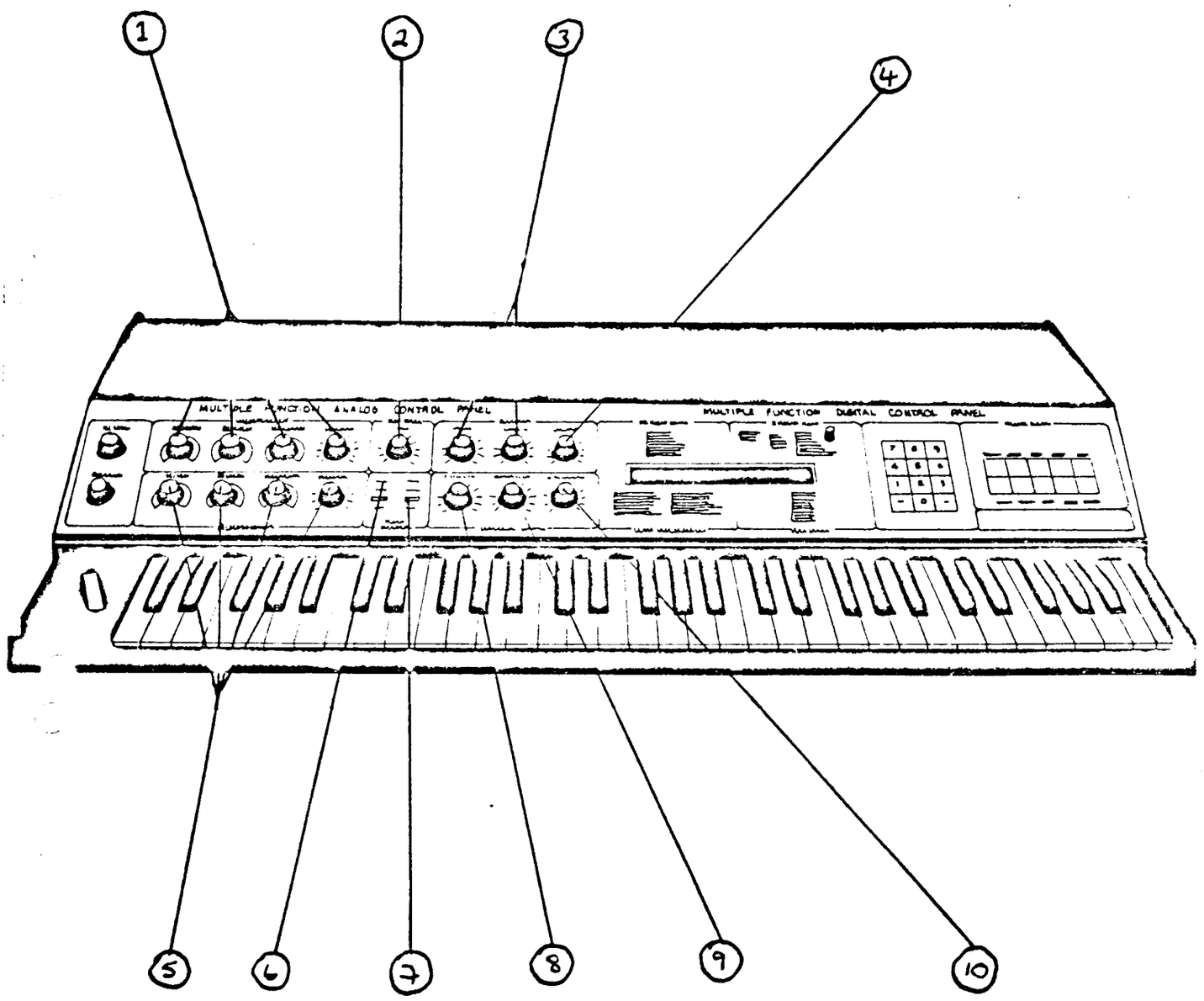
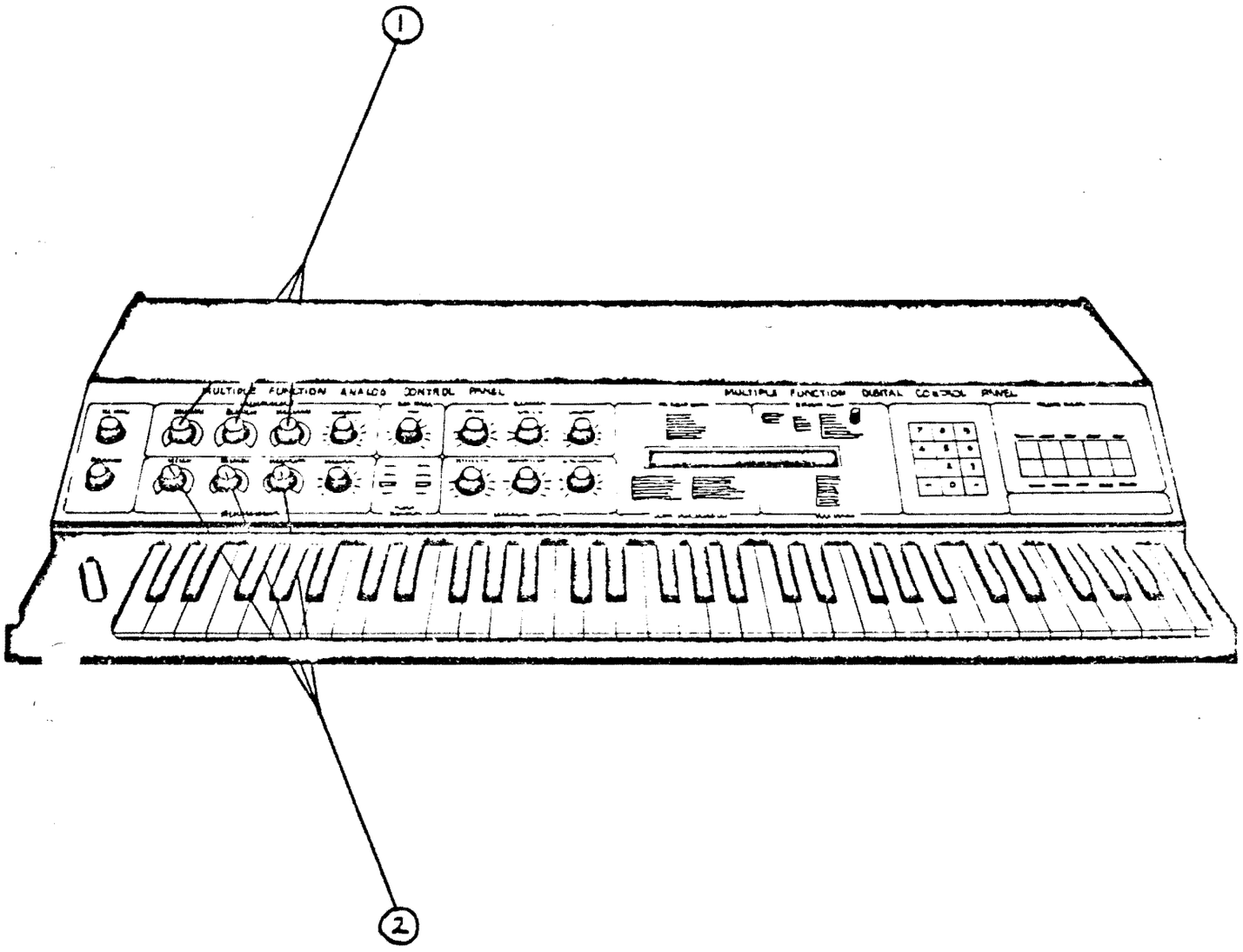

1
2
3
4
MULTIPLE FUNCTION ANALOG CONTROL PANEL
MULTIPLE FUNCTION DIGITAL CONTROL PANEL
5
6
7
8
9
10

DIAGRAM 2

ANALOGUE PANEL 1

1 ADSR 1---Attack:0-15 seconds
Decay :0-30 seconds
Sustain:sustain level(not length)
Release:0-30 seconds

2 LFO RATE
3 FILTER cut off
emphasis
4 PWN Partial wave numbers
5 ADSR 2---Similar to ADSR 1
6 GROUP INDICATOR LEDs. In conjunction with the GROUP button on the digital panel, these indicate which group are being addressed:- A,B or A & B.
7 PANEL INDICATOR LEDs. In conjunction with the PANEL button on the digital panel, these indicate which analogue panel is selected.
8 ENVELOPE 1 - VCF. Amount of ADSR 1 CV on filter.
9 ENVELOPE 2 - LOUD. Amount of ADSR 2 CV on VCA.
10 ENVELOPE 1 - WAVES. Amount of ADSR 1 CV on PWN


1
MULTIPLE FUNCTION ANALOG CONTROL PANEL
MULTIPLE FUNCTION DIGITAL CONTROL PANEL
2

ANALOGUE PANEL 2

1 LFO. Delay: Introduces a delay before LFO has effect.
Waveshape: Continuosly variable through triangle ramp, reverse ramp and square waves.
MOD INT: Output level of LFO.
2 ENV 3 This is an AR envelope only.
Attack Release and output level controlling pitch.

3 PANEL INDICATOR LEDs. Second panel indicator will be lit.

4 ALL REMAINING CONTROLS HAVE THE SAME FUNCTION AS IN ANALOGUE PANEL 1.

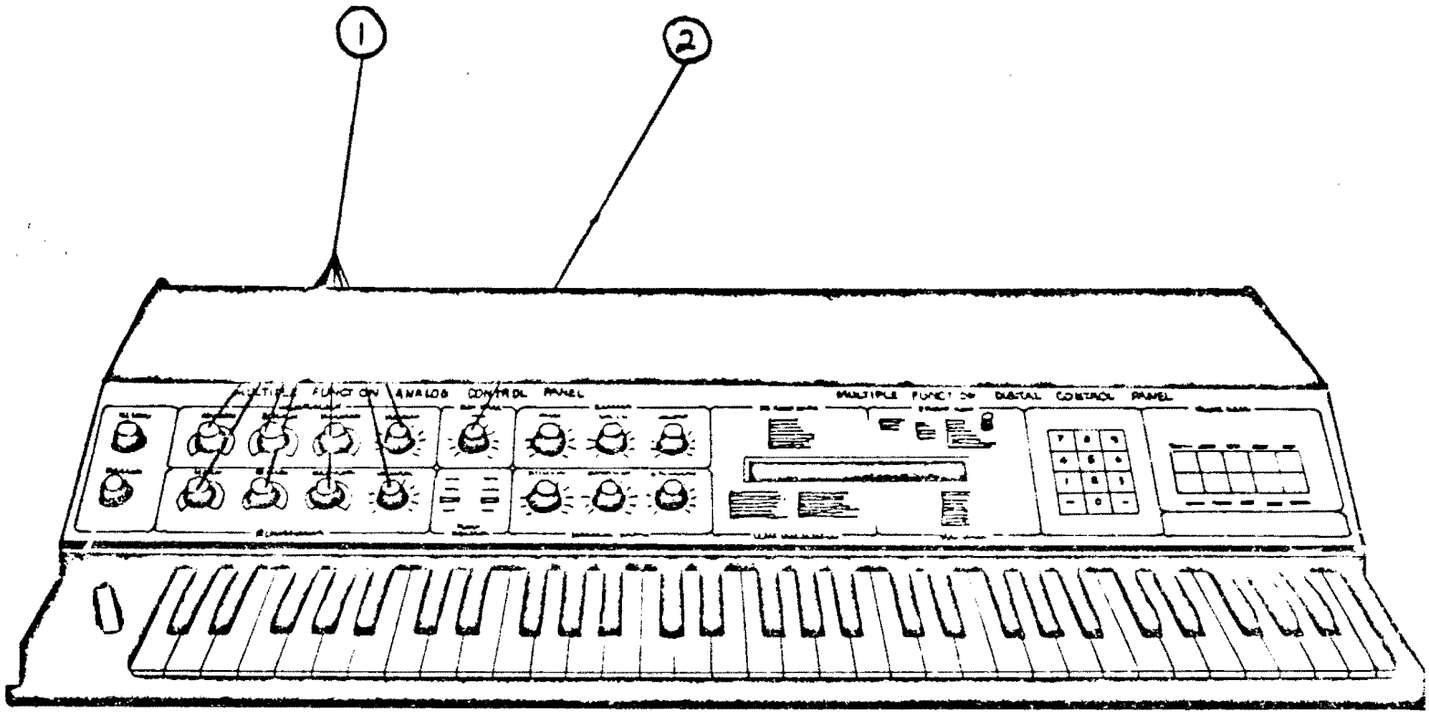


DIAGRAM 4

ANALOGUE PANEL 3

1 8 SEQUENCER OUTPUTS. The functions of these outputs are assigned when in the sequence mode as explained in section

2 SEQU. This controls the master clock rate for the sequencer.

3 PANEL INDICATOR LEDs. Third panel indicator will be lit.

4 ALL REMAINING CONTROLS HAVE THE SAME FUNCTIONS AS IN ANALOGUE PANEL 1

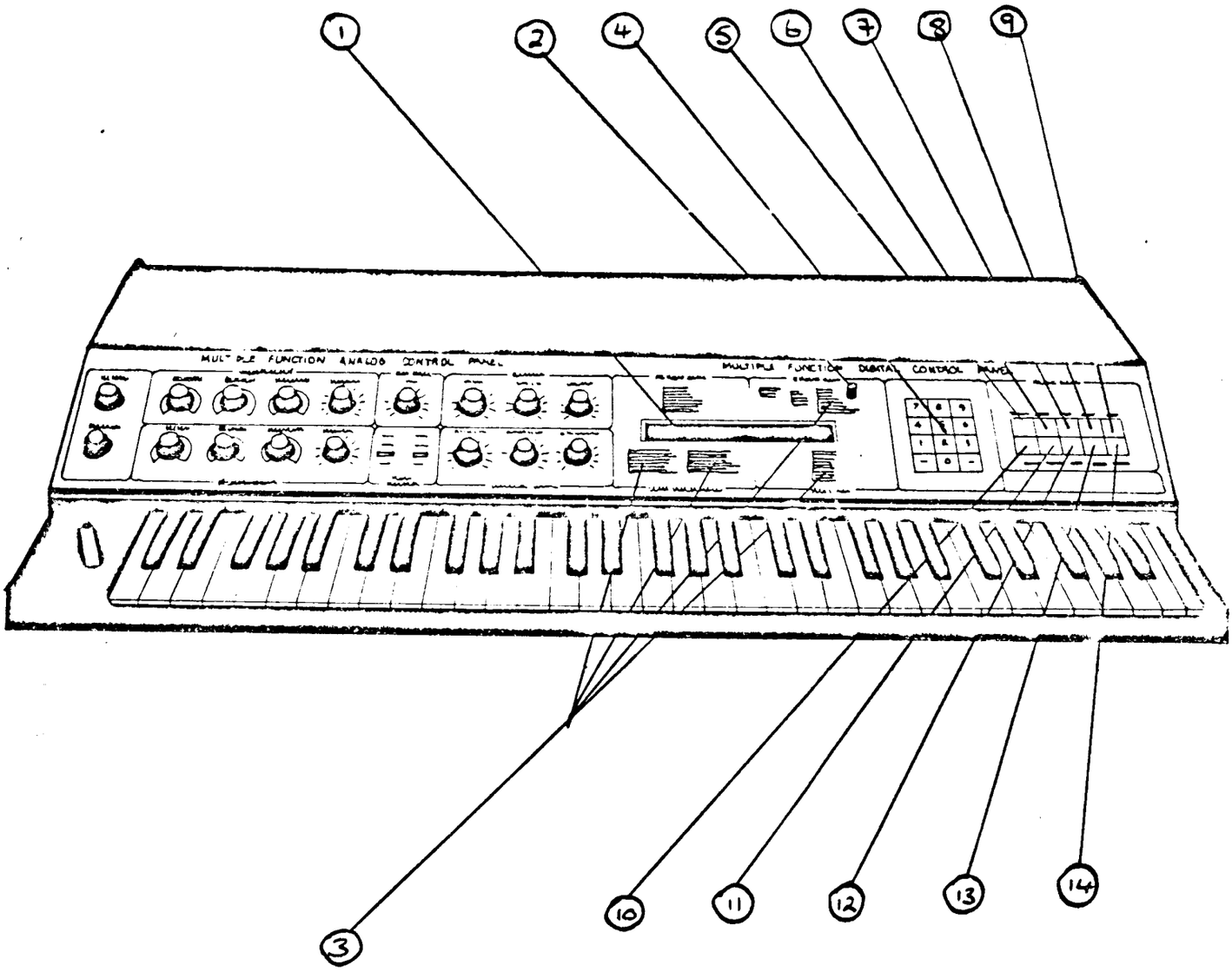

1
2
4
5
6
7
8
9
MULTIPLE FUNCTION ANALOG CONTROL PANEL
MULTIPLE FUNCTION DIGITAL CONTROL PANEL
3
10
11
12
13
14

DIAGRAM 5

DIGITAL PANEL

1 LCD DISPLAY.

2 LCD DISPLAY BRIGHTNESS CONTROL.

3 PROGRAMMING CODES.For use with display.

4 NUMERIC KEYPAD. Digits 0 - 9 together with left and right arrows for cursor movement.

5 PROGRAMME BUTTON. This button will always move the cursor to the programme point of the display. To change a programme use this button together with the desired programme number.

6 DIGITAL. This will change the display to the digital display in order to alter routing and control functions.

7 TUNING. This will change the display to the tuning display in order to check individual tuning of oscillators.

8 ANALOGUE By using this button the display will indicate the settings of all the controls on the analogue panel on a scale of 0 - 63. If another panel is selected using the panel button, the display will automatically change to that panel.

9 SEQUENCE. This is used for sequence and arpeggio functions. The cursor will appear under the sequence mode heading.

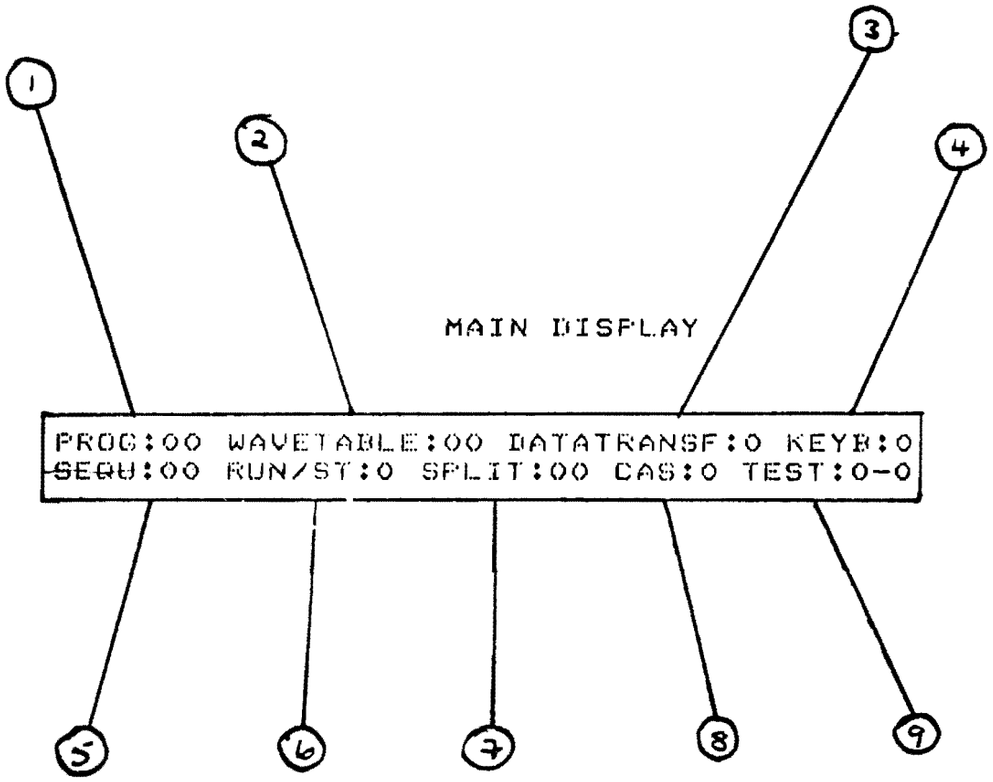
10 GROUP. This button is used to change the group. Any control changes made will only affect the group in use.The group LEDs on the analogue panel indicate the state selected by this button.

11 DATAT. Use this button to return to the main display where the cursor will be under the data transfer column. This button is also used to transfer data from one group to another, or from one programme to another.

12 KEYBOARD. This button can also be used to return to the main display and the cursor will appear under the Keyboard column. The Keyboard modes can be changed using this button as explained in section

13 PANEL. This is used to change the analogue control panel between its three modes and is indicated by the panel indicator LEDs.

14 RUN/STOP. This can be used to obtain the sequence display where the cursor will appear under the RUN/ST headings. If in the main display this button will move the button to RUN/ST in that display.


1
2
3
4
MAIN DISPLAY
PROG:00 WAVETABLE:00 DATATRANSF:0 KEYB:0
SEQU:00 RUN/ST:0 SPLIT:00 CAS:0 TEST:0-0
5
6
7
8
9

DTAGRAM 6

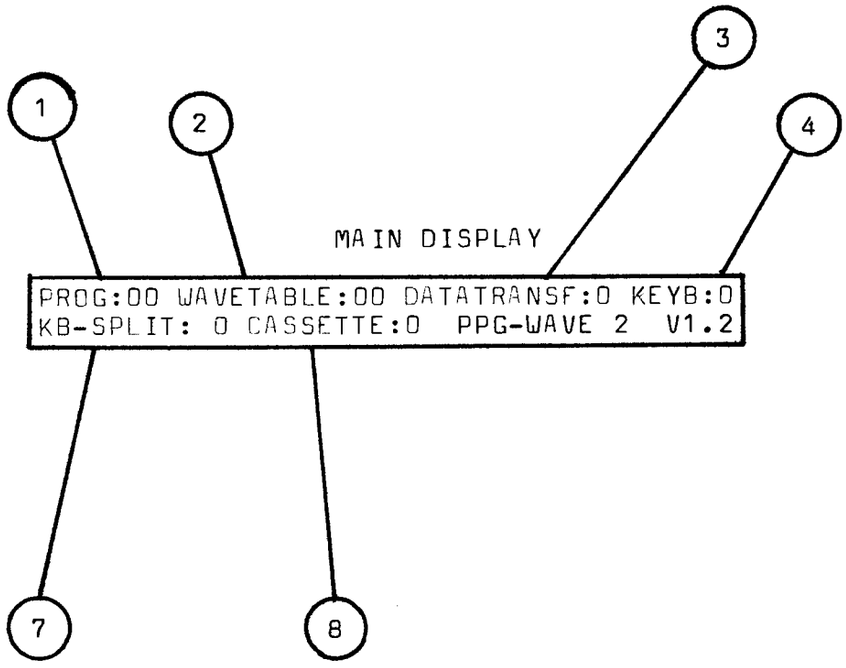

1
2
3
4
MAIN DISPLAY
PROG:00 WAVETABLE:00 DATATRANSF:0 KEYB:0
KB-SPLIT: 0 CASSETTE:0 PPG-WAVE 2 V1.2
7
8

DIAGRAM 6

3,1,7 SPLIT. Indicates the point at which the keyboard is split using Keyboard modes 4-8. The keyboard can be split at any point and the number entered here corresponds to the number of semitones from the left hand end of the keyboard.
3,1,8 CASSETTE. Indicates the state of the cassette interface.

0 = no function.
1 = load from cassette into memory. Automatically checked if error 9 appears in cassette column.
2 = programmes loaded to cassette.
3 = sequences loaded to cassette.
4 = run loaded sequences with this command to check recording. If error occured 9 appears in cassette column.

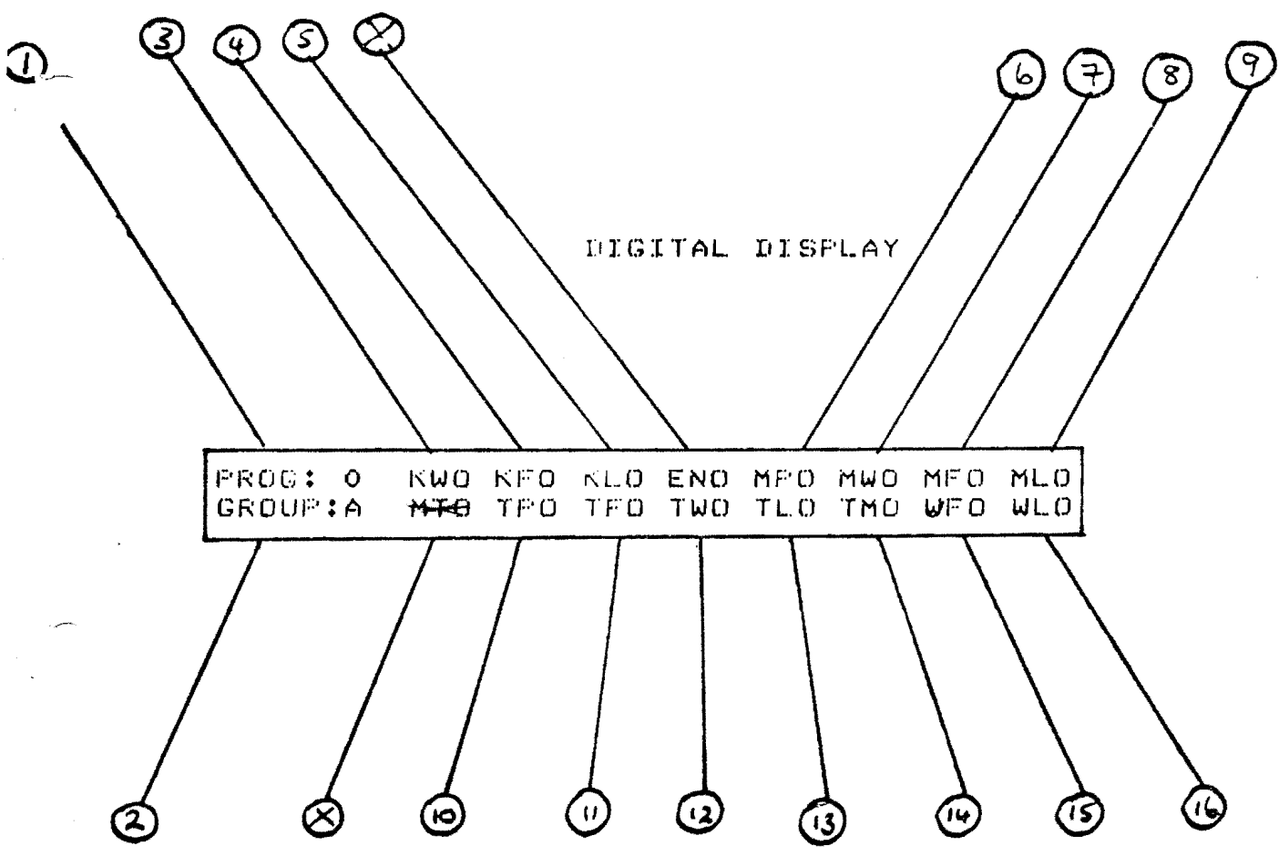

DIGITAL DISPLAY
PROG: 0 KWO KFO KLO ENO MFO MWO MFO MLO
GROUP: A MTO TFO TFO TWO TLO TMO WFO WLO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

DIAGRAM 7

3.2.DIGITAL DISPLAY

3.2.1 PROG Indicates selected programme.
3.2.2 GROUP As it is possible to programme different sounds into each group, two displays are necessary for each programme. The display for the other group is obtained using the GROUP button on the display select panel.

3.2.3 KW Keyboard voltage on partial wave numbers.Range 0 = off, - 7 = maximum.

3.2.4 KF Keyboard voltage on the filter frequency.Range 0 = off, - 7 - maximum.

3.2.5 KL Keyboard voltage on VCA.Range 0 = high end loud, 4 = equal balance, 7 = low end loud.

3.2.6 MP LFO on the pitch.(vibrato)

3.2.7 MW LFO on partial wave numbers.

3.2.8 MF LFO on the filter frequency.

3.2.9 ML LFO on the VCA.

NOTE:IN ALL LFO FUNCTIOS 0 = off, 1 = on. THE INTENSITY IS CONTROLLED ON THE ANALOGUE PANEL.

3.2.10 TP Touch sensitivity on pitch. 0 - off, 1 = increase in pitch, 2 = decrease in pitch.

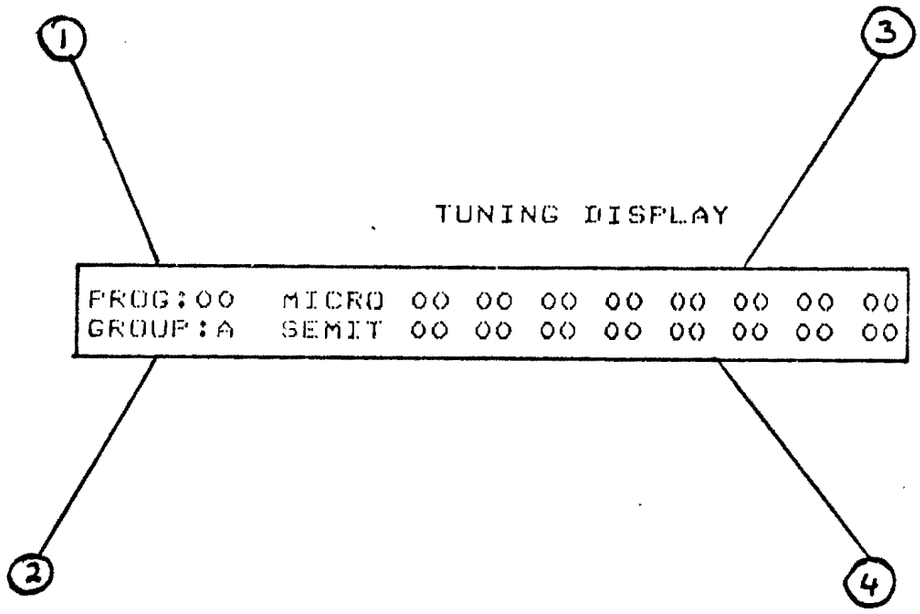
3.2.11 TF Touch sensitivity on filter. 0 = off, 1 = on.

3.2.12 TW Touch sensitivity on partial wave numbers. 0 = off, 1 = on.

3.2.13 TL Touch sensitivity on loudness. 0 = off, 1 = on.

3.2.14 TM Touch sensitivity on LFO modulation intensity. 0 = off, 1 = on.

3.2.15 VF The velocity at which the keyboard is struck on filter. 0 = off, 1 = on.
3.2.16 The velocity at which the keyboard is struck on loudness.


1
3
TUNING DISPLAY
PROG:00 MICRO 00 00 00 00 00 00 00 00
GROUP:A SEMIT 00 00 00 00 00 00 00 00
2
4

DTAGRAM 8

TUNING DISPLAY (see diagram 8)

3.3.1 PROG Indicates selected programme.

3.3.2 GROUP Indicates group. See section 3.2.2.

3.3.3 MICRO Fine tuning facility.

0 = off
1 = +1
2 = +2
3 = -1

3.3.4 SEMIT Individual oscillator tuning. The numbers indicated are semitones from the left hand end of the Keyboard. New values can be entered by using the numeric keyboard or by playing the relevant note. As each value is entered the cursor will automatically move to the next position to facilitate fast tuning.

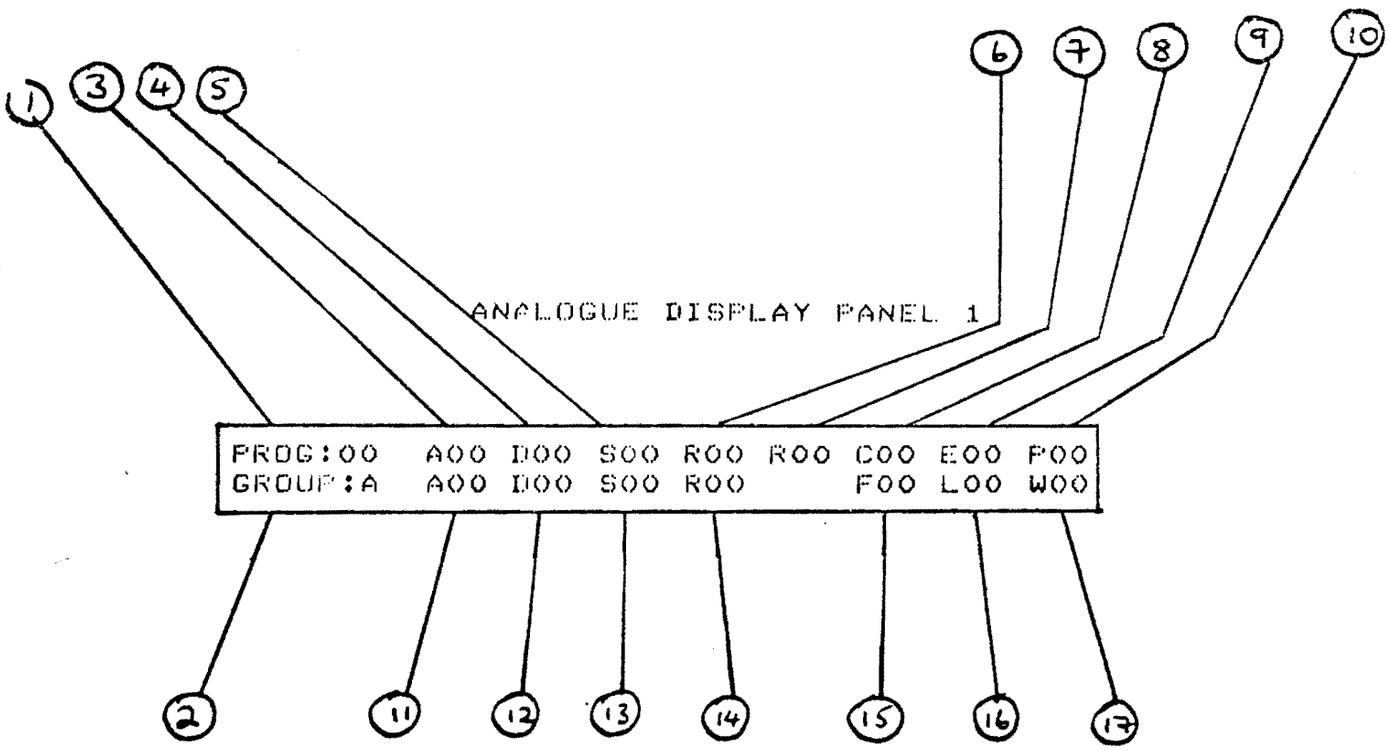

ANALOGUE DISPLAY PANEL 1
PROG:00 A00 D00 S00 R00 R00 C00 E00 P00
GROUP:A A00 D00 S00 R00 F00 L00 W00
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

DIAGRAM 9

3.4 ANALOGUE DISPLAY PANEL 1 (see diag 9)

All values shown on this display are on a digital range of 0 - 63. Any movement of an analogue panel control will result in a change of the value in the relevant display column. If the original values need to be seen again after changing the controls, simply re-enter the programme number. The layout of these values on the display correspond to the analogue panel layout.

3.4.1 PROG Indicates selected programme.

3.4.2 GROUP Indicates group.See section 3.2.2.

3.4.3 A = ATTACK envelope 1 16 steps.

3.4.4 D = DECAY envelope 1 32 steps.

3.4.5 S = SUSTAIN envelope 1 64 steps.

3.4.6 R = RELEASE envelope 1 32 steps.

3.4.7 R = LFO RATE 32 steps.

3.4.8 C = FILTER CUTOFF FREQUENCY 64 steps.

3.4.9 E FILTER EMPHASIS 16 steps.

3.4.10 P = PARTIAL WAVE NUMBER 64 steps.

3.4.11 A = ATTACK envelope 2 16 steps.

3.4.12 D = DECAY envelope 2 32 steps.

3.4.13 S = SUSTAIN envelope 2 64 steps.

3.4.14 R = RELEASE envelope 2 32 steps.

3.4.15 F = ENVELOPE 1 CONTROL VOLTAGE ON FILTER 32 steps.

3.4.16 L = ENVELOPE 2 CONTROL VOLTAGE ON VCA 32 steps.

3.4.17 W = ENVELOPE 1 CONTROL VOLTAGE ON PARTIAL WAVE NUMBER 32 steps.

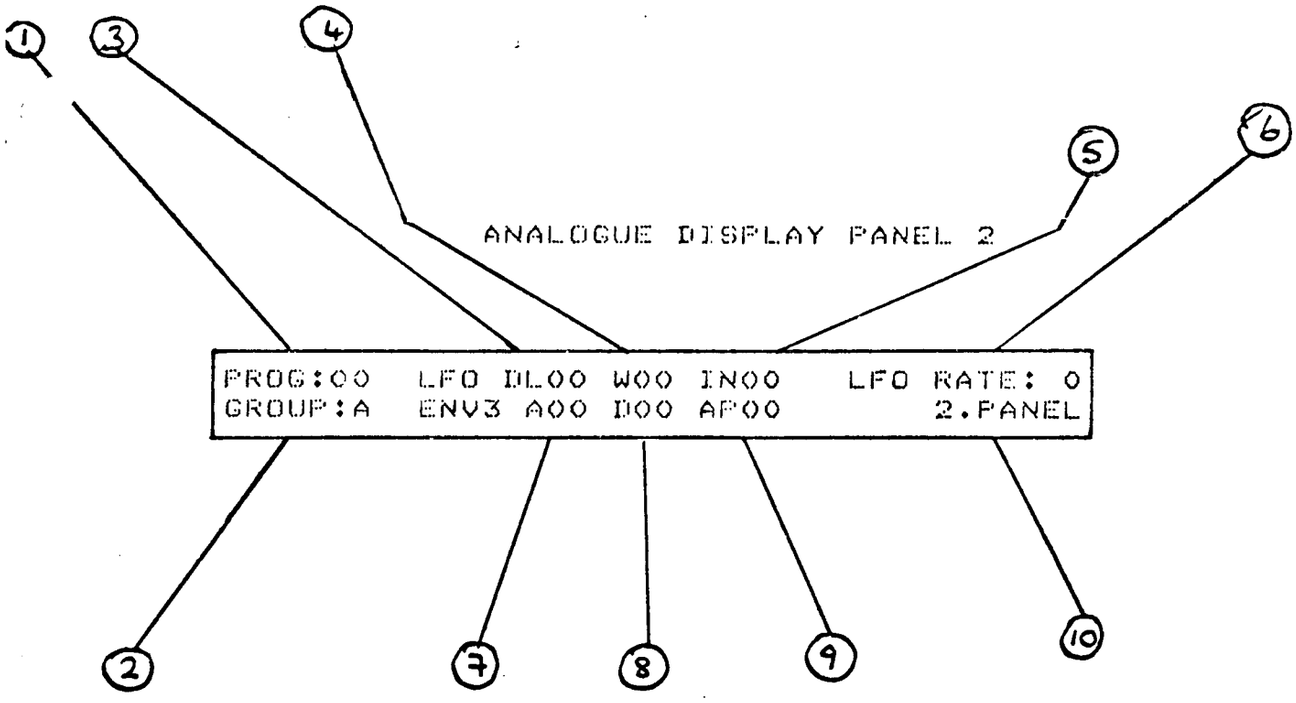

1
3
4
5
6
ANALOGUE DISPLAY PANEL 2
PROG:00 LFO DL00 W00 IN00 LFO RATE: 0
GROUP:A ENV3 A00 D00 AP00 2.PANEL
2
7
8
9
10

DIAGRAM 10

3.5 ANALOGUE DISPLAY PANEL 2 (see diagram 10)

3.5.1 PROG Indicates prog number.

3.5.2 GROUP Indicates group.

3.5.3 DL = LFO delay time 16 steps.

3.5.4 W = LFO waveshape 4 steps.

3.5.5 IN = LFO output level (mod intensity) 16 steps.

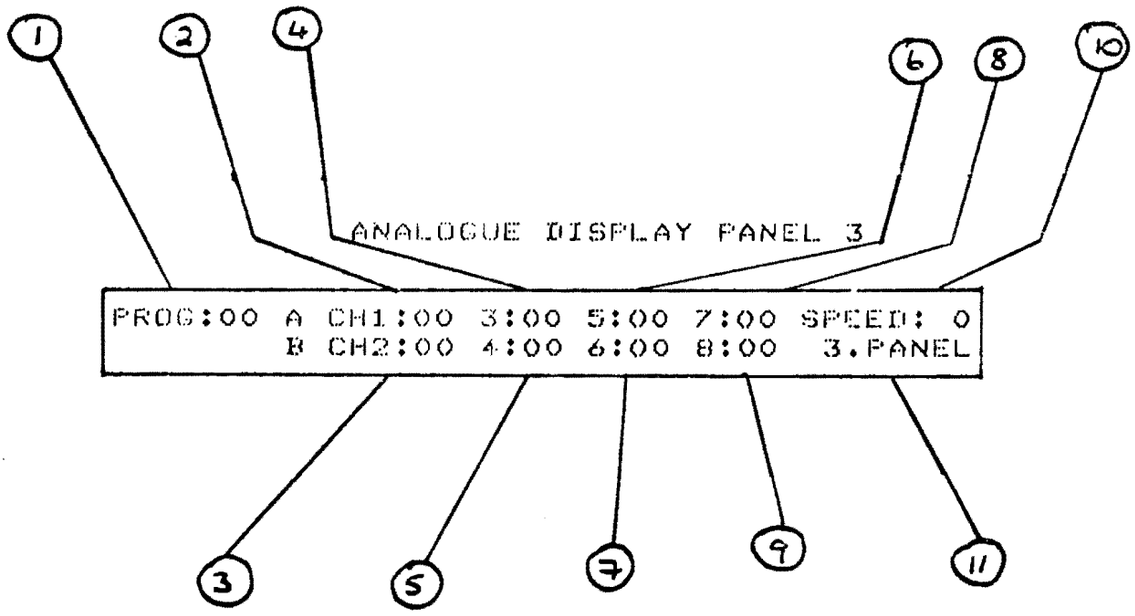
3.5.6 LFO RATE 32 steps.

3.5.7 A = ATTACK envelope 3 16 steps.

3.5.8 D = DECAY envelope 3 16 steps.

3.5.9 AP = ENVELOPE 3 control voltage on pitch 16 steps.

3.5.10 Indicates second panel is in use.


1
2
4
6
8
10
ANALOGUE DISPLAY PANEL 3
PROG:00 A CH1:00 3:00 5:00 7:00 SPEED: 0
B CH2:00 4:00 6:00 8:00 3.PANEL
3
5
7
9
11

DTAGRAM 11

3.6.ANALOGUE DISPLAY PANEL 3 (see diag 11)

3.6.1 PROG Indicates prog number.

3.6.2 - 3.6.9 SEQUENCER OUTPUT VALUES 64 steps.

3.6.10 SPEED Indicates sequencer clock speed 64 steps.

3.6.11 Indicates third panel in use.

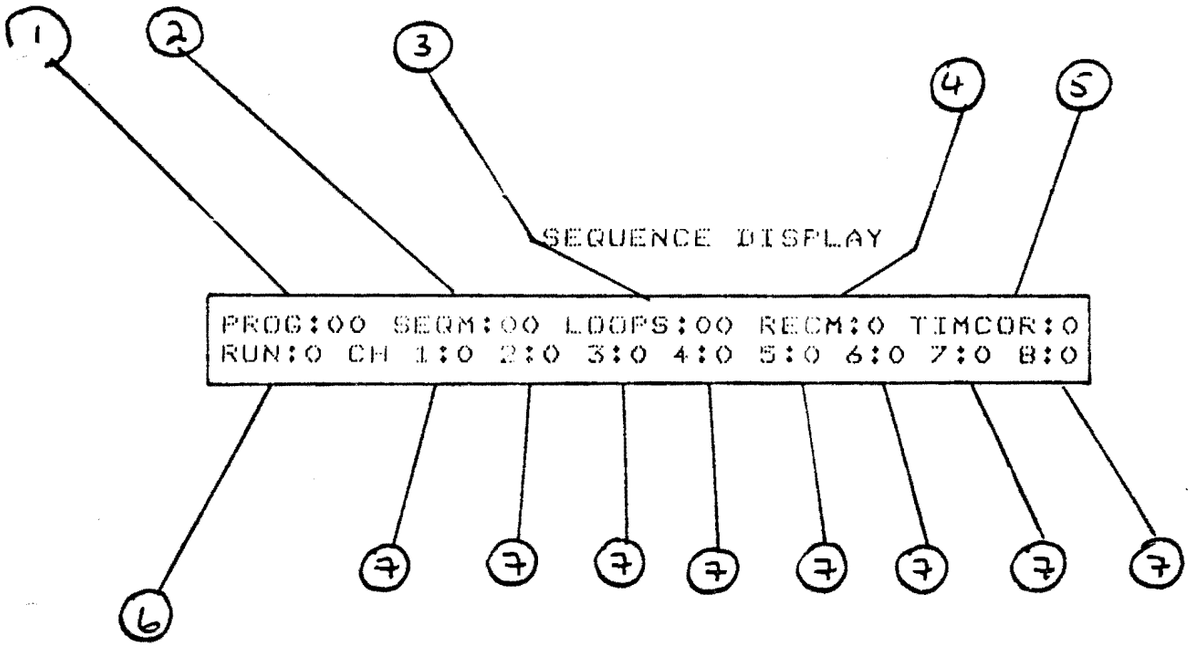

1
2
3
4
5
SEQUENCE DISPLAY
PROG:00 SEQM:00 LOOPS:00 RECM:0 TIMCOR:0
RUN:0 CH 1:0 2:0 3:0 4:0 5:0 6:0 7:0 8:0
6
7
7
7
7
7
7
7
7

DIAGRAM 12

3.7.1 PROG Indicates prog number.

3.7.2 SEQM 00 - 09 sequence numbers.
11 - 15 & 21 - 25 arpeggios.

3.7.3 LOOPS 00 - 98 defines number of sequence repeats. 99 sequence repeats indefinitely.

3.7.4 RECM Record modes.
0 = no function
1 = record new sequence
2 = update sound & memory
3 = update sound & memory (sequence will run on for checking until stopped).
4 = channel parameter update.
8 = clear memory (press twice to clear).
9 = channel parameter update, playback only.

3.7.5 TIMCOR Time correction.
0 = no correction
1 = correction to whole note
2 = correction to half note
4 = correction to quater note
8 = correction to eigth note

3.7.6 RUN/ST 0 = no sequence or arpeggio
1 = start at beginning
2 = start at point where sequence last stopped
3 = step

3.7.7 CH1-8 Channel functions
0 = normal playback
1 = record
2 = edit
3 = off (will free osc.to play on keyboard).
4 = update pitch
5 = update pitch
6 = update loudness
7 = update filter
8 = update partial wave
9 = update envelope 1 CV on filter

SECTION 4 UPDATE, TRANSFER & STORAGE OF PROGRAMMES

4.1 To select or change any value on the display the cursor must be at the position of the value to be changed.

4.2 The programme number is shown on all displays and a new programme can be selected regardless of which display is in use.However , upon selection the main display will always appear.

4.3 Any values changed will not affect the memory and the new sound will be lost as soon as a new programme is selected unless it has first been stored.

4.4 To store a sound, place a 9 in data transf., press pros., then enter the desired pros number.

4.5 It should be remembered when updating sounds that the changed values will only affect the group selected and indicated by the group LEDs.This facility allows for different sounds to be programmed for each group.

4.6 Likewise, when adjusting envelope 3 and the LFO controls make sure the second panel LED is on.

ARPEGGIOS

5.1 The WAVE 2 will store one arpeggio which can be altered in various ways by entering number codes in the SEQM column on the sequence display.

5.2 To enter an arpeggio put the desired number code in the SEQM column and you will hear the last stored arpeggio. Play the new chord in arpeggio form remembering to keep all the notes depressed.

5.3 Different arpeggio modes can be selected while the arpeggio is running.

5.4 Arpeggio speed is controlled by the sequencer clock rate on the third panel.

5.5 Different parts of the arpeggio can be heard by entering values of between 1 & 16 in the loops column during playback.

SEQUENCER

6.1 To erase all previously recorded sequences and clear sequence memory, enter 8 in RECM column.The display will flash question marks and the clear command is confirmed by pressing 8 again. This is a safety feature to safeguard against accidental erasure.

6.2 To record a new sequence use the following procedure:

1. in SEQM column enter sequ number
2. in RECM column enter 1
3. in TIMCOR column enter desired time correction
4. in CH:1 enter 1
5. in RUN/ST enter 1

A timing note will now be heard. If required adjust this to a metronome beat with envelope 2, and change the tempo with the sequencer clock rate.

The sequencer will not start recording until the first note is played. To assist with timing for future lines, the first four notes played on this first line are intro notes only. They will be heard when recording subsequent lines but not on playback.

6. play in the first line and press the run stop button to end.
7. this line may now be heard by entering a 1 in the run/st column
8. to enter the next line place a 1 in channel 2 and then a 1 in run/st. The four intro beats will be heard then the sequence will start.It will stop automatically at the end.

6.3 NOTES

6.3.1 All commands to the sequencer must be made before running it. Commands cannot be entered while it is running.

6.3.2 The time correction facility can be set to different values for each line.

6.3.3 To erase all or part of a sequence line enter a 2 in the relevant channel and run it. Press the run/st button for the part of the line to be erased.

6.3.4 It is possible at any time, even while it is running, to select a new programme or modify the sound in any way.

6.3.5 Any oscillators not used in recording can still be used with the Keyboard.e.g.it is possible to use 6 oscillators in recording and play along with the sequence using the two remaining oscillators.

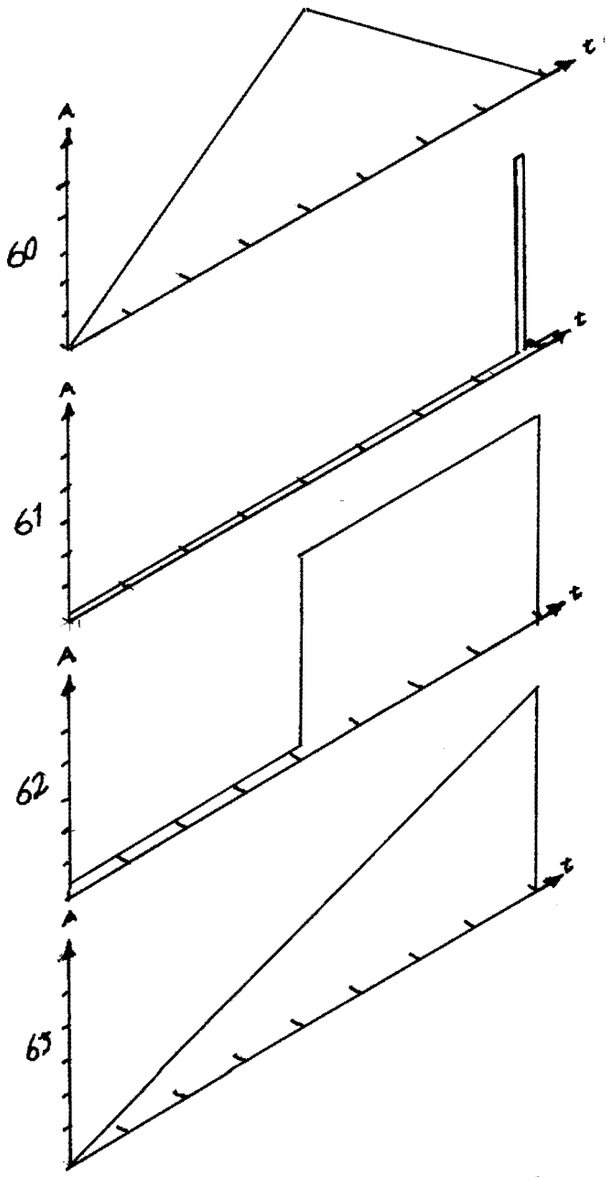
6.3.6 If a split point is entered, the keyboard to the left of this point can be used to control the pitch of the sequence.

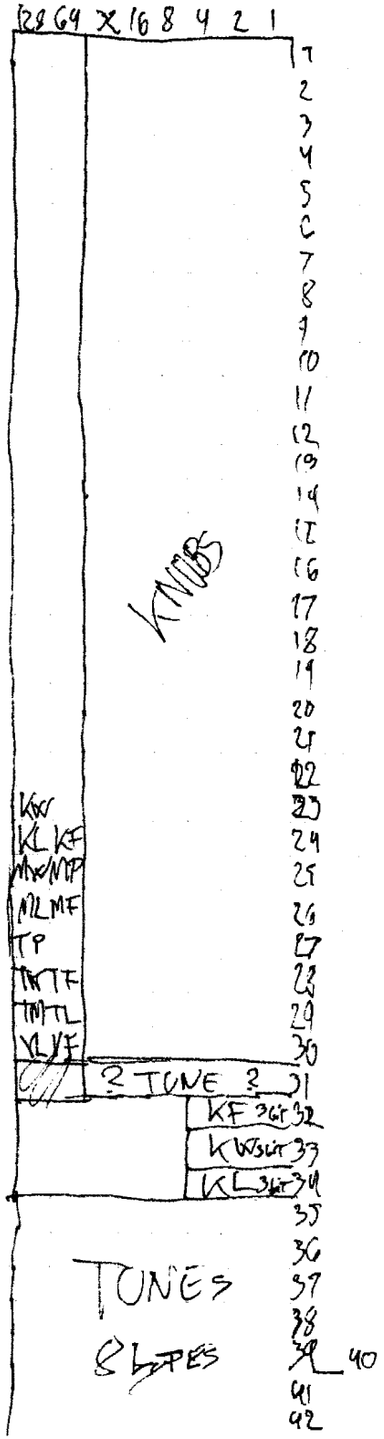
PPG WAVE 2,0 Waveforms

WAVETABLE	PARTIAL WAVE	SHAPE
0	0 sine	
0	10	
1	0	
1	15	
2	0 sine	
3	59	
5	7,22,26	
5	27,39	
6	0 sine	
6	29	
6	35	
8	0	
8	4	
8	30	
9	0 sine	
9	14	
9	15	
9	17	
9	19	
9	23	
10	0	
10	20	
11	0	
11	35	
13	55	
13	56 sine	
13	57	
13	58	
13	59 saw	
13	60	
14	1	
14	2	
14	3	
14	6	
15	0	
15	36 amp up	
16	43	
16	54	
18	33	
19	0	
19	30	
20	0 sine	
20	9-12	
20	18	
20	40	
21	0 sine	
21	8	
21	18	
21	19	
22	0 sine	
22	15 sine	
22	19	
22	29	
23	0	
24	0	
24	35 1 oct up	
26	0	
26	14	
26	21	
26	57	
27	0 sine 1 oct up	
27	1	
27	61 sine	

Wavet.	Partial w.	Shape
28	0 left saw	
28	1	
28	2	
28	12	
28	18	
28	34	
29	0 pw50%-	
29	22 99%	

pwave	
60	- triangle
61	- pulse wave
62	- rectangular
63	- sawtooth





TONE ①

A	D	S	R	R	C	E	RRV
③	⑤	⑤	②	②	⑦	①	①
+	D	S	R		F	L	W
③	⑤	⑤	②		①	①	①

37 KNOBS | 31 bytes = 186 bit

14 BUT = 20 bit

16 TUNES → { 8x 6 bit, 8x 2 bit } = 8 bytes/8bit

↓ 64 bit

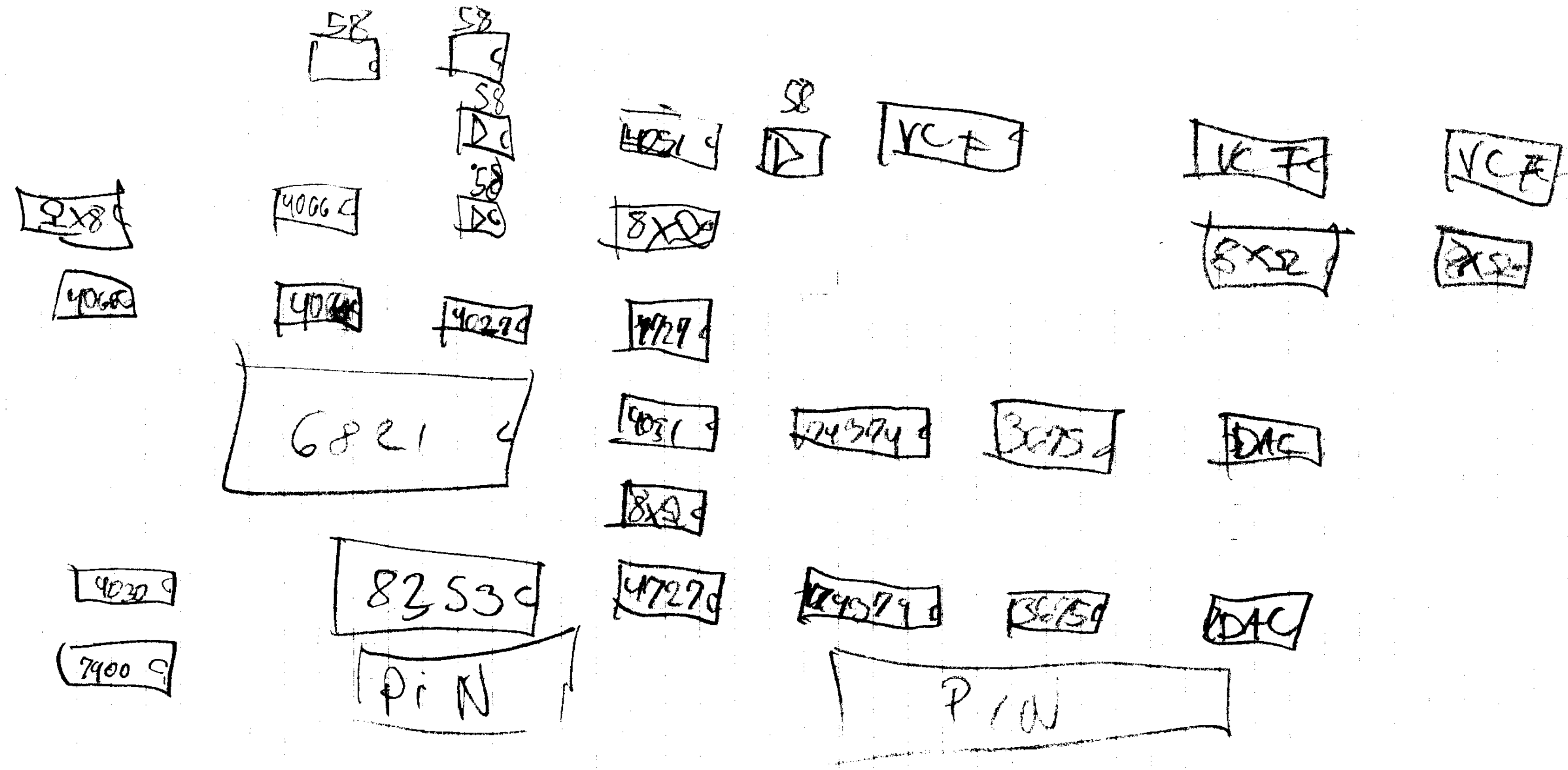
KW 0-7 = 3 bit
KF 0-7 = 3 bit
KL 0-7 = 3 bit

MP 0/1 = 1 bit
MW 0/1 = 1 bit
MF 0/1 = 1 bit
ML 0/1 = 1 bit

TP 0/1 = 1 bit
TF 0/1 = 1 bit
TW 0/1 = 1 bit
TL 0/1 = 1 bit
TM 0/1 = 1 bit

YF 0/1 = 1 bit
YL 0/1 = 1 bit

TOTAL 270 bit


6821
8253
DAC
DAC
VCF
7400
PIN