

APOGEEACOUSTICS, INC.

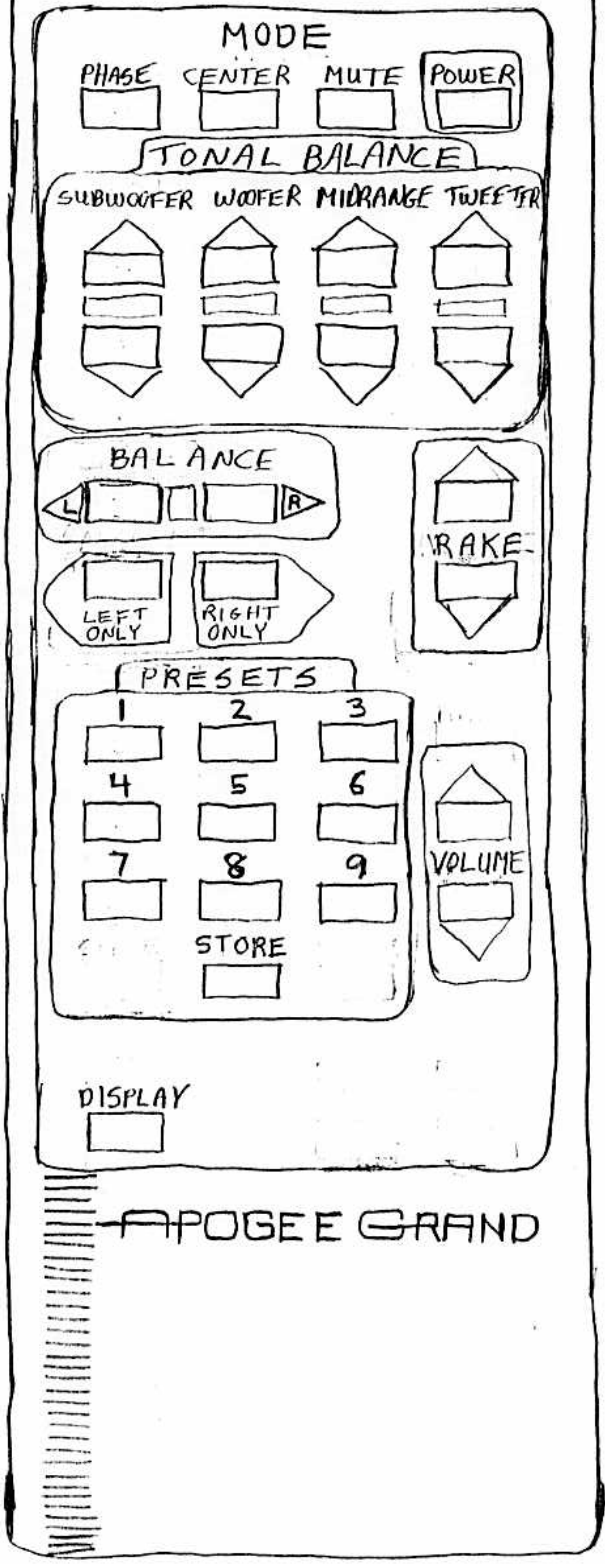
TO: Bill Orner
 FROM: Andy Lewis
 DATE: 1-7-92
 RE: Remote Control Code set
 NO. OF PAGES: 1

ID NAME = H445.ASM

EXECNUM CODE	EQU IF	62 OFALIB	;Decimal number of Executor		
B12	DB	11011010B	;Store	|	DP0
A9	DB	11110010B	;1		DP1
B9	DB	11110110B	;2		DP2
C9	DB	11111100B	;3		DP3
A10	DB	11111000B	;4		DP4
B10	DB	11111110B	;5		DP5
C10	DB	11101110B	;6		DP6
A11	DB	11100110B	;7		DP7
B11	DB	11100010B	;8		DP8
C11	DB	11001100B	;9		DP9
D10	DB	10010010B	;Volume Up		VL+
D11	DB	10001010B	;Volume Down		VL-
C1	DB	11101010B	;Mute		MUT
D6	DB	10100100B	;Rake Up	|	CH+
D7	DB	11100100B	;Rake Dn	|	CH-
D1	DB	11010010B	;Power		PWR
B1	DB	10110010B	;Center	|	ENT
A1	DB	11111010B	;Phase	|	RCL
A3	DB	11010100B	;Sub Up	|	PLA
A4	DB	10110100B	;Sub Dn	|	REW
B3	DB	10110110B	;Woofers Up	|	FFD
B4	DB	10111000B	;Woofers Dn	|	REC
C3	DB	11000100B	;MID Up	|	PAU
C4	DB	10010100B	;MID Dn	|	STP
D3	DB	10000100B	;Tweeter Up	|	TVC
D4	DB	10101010B	;Tweeter Dn	|	FAD
A6	DB	11011000B	;Balance <	|	A10
B6	DB	11001000B	;Balance >	|	B11
A7	DB	10111010B	;Left	|	C12
B7	DB	11001010B	;Right	|	D13
A14	DB	10011010B	;Display	|	E14
					F15
					G16
					H17

ID.SSS, Page 1, Thu Jan 02 16:01:09 1992 Qianju Luo

LASTFUN:



APOGEE GRAND

Apogee Grand DAX Communications Protocol

Addresses

L - **left** channel
R - **right** channel
B - **both** channels

Commands

- A **Mute** (two bytes) Transmit ASCII "A" plus 0 for unmute and 1 for mute.
- C **Absolute Phase** (two bytes) Transmitt ASCII "C" plus 0 for normal and 1 for reverse.
- D **Tweeter phase** (two bytes) Transmit ASCII "D" plus 0 for normal and 1 for reverse.
- E **Mid phase** (two bytes) Transmit ASCII "E" plus 0 for normal and 1 for reverse.
- F **Woofers phase** (two bytes) Transmit ASCII "F" plus 0 for normal and 1 for reverse.
- G **Sub phase** (two bytes) Transmit ASCII "G" plus 0 for normal and 1 for reverse.
- H **Display** (two bytes) Transmitt ASCII "H" plus 0 to 4 to select the various screens.
- I **Initialize** (two bytes) Transmitt ASCII "I" plus 0. Transmitted by control board when reset button is pressed. Display board responds with transmission off all parameters for both left and right.
- J **Display Mode** (two bytes) Transmitt ASCII "J" plus 0 or 1. A "0" puts display in normal mode, a "1" puts display in blink mode.
- K **Rake level** (two bytes) Transmit ASCII "S" plus 0 to 8, 8 being -4.
- M **Mid level** (two bytes) Transmit ASCII "M" plus 0 to 31, 31 being -3dB.
- N **Noise** (two bytes) Transmit ASCII "N" plus 0 for off and 1 for on.
- O **Left/Right Only** (two bytes) Transmitt ASCII "O" plus ???
- P **Power** (two bytes) Transmitt ASCII "P" plus 0 for off and 1 for on.
- Q **Preset** (two bytes) Transmitt ASCII "Q" plus 0 to 9 for the preset selected. This information is only used to show the preset number on the display.
- S **Sub level** (two bytes) Transmit ASCII "S" plus 0 to 31, 31 being -3dB.
- T **Tweeter level** (two bytes) Transmit ASCII "T" plus 0 to 31, 31 being -3dB.
- U **Phase Request** (two bytes) Transmit ASCII "U" plus 0 for latch #1 and 1 for latch #2

Apogee Grand DAX Communications Protocol

- V **Volume level** (two bytes) Transmit ASCII "V" plus 0 to 64 for level.
- W **Woofers level** (two bytes) Transmit ASCII "W" plus 0 to 31, 31 being -3dB.
- X **Phase Data #1**, receive ASCII "X" plus 1 byte of data
- Y **Phase Data #2**, receive ASCII "Y" plus 1 byte of data

C:\WORKSFILES\PROTOCOL.WPS

Brand New

Noritake

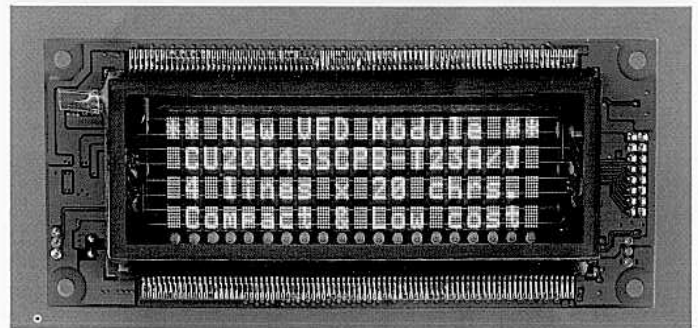
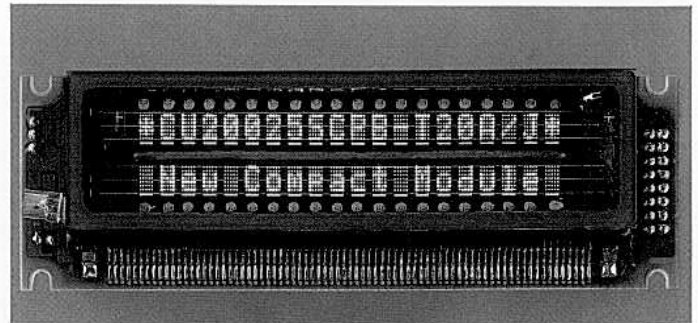
itron[®]

Vacuum Fluorescent Display

T-Version Module

Features

- ◆ Ultra Super Compact
- ◆ Long Life and High Reliability
- ◆ 5V Operation
- ◆ ASCII, European and Japanese Katakana characters
- ◆ Built-In Self Test Function
- ◆ Control Data
BS, HT, LF, FF, CR, CLR, Cursor ON/OFF, Set Cursor, 4 Step Luminance Control, Vertical Scroll, Block Cursor Blink Speed Control, Selection of Flickerless/Quick Mode Software Reset
- ◆ Parallel and TTL Level Serial Input (300, 600, 1200, 2400, 4800, 9600, 19200BPS)



Part No.	No. of Characters	Character Size(W×H)mm	Character Format	Typ. Icc (mA)	No. of UDFs(※)	Weight (grms)
CU20025SCP-B-T20A	2×20	2.6×4.7		320	8	70
CU20045SCP-B-T23A	4×20	3.0×5.0		400	2	120
CU20049SCP-B-T20A	4×20	6.4×9.1		1100	2	380
CU40026SCP-B-T20A	2×40	3.3×5.1		700	2	150

※ UDFs.....User Definable Fonts

※※ 1×20, 1×40 module available soon

Noritake

VACUUM FLUORESCENT DISPLAY MODULE SPECIFICATION

Model : CU200211SCP B-T60A

SPECIFICATION NO. : DS-186-0000-00
DATE OF ISSUE : Feb. , 6, 1991
REVISION :

PUBLISHED BY : ISE ELECTRONICS CORP./JAPAN

1 . General Description

1 . 1 Application : Readout of computer, micro-computer, communication terminal and automatic instruments.

1 . 2 Construction : Single board display module consists of 40 character (2 x 20) VFD, refresh memory, character generator, control circuit, DC / DC converter and all necessary control logics. Interface level is TTL compatible and the module can be connected to the CPU bus of host directly.

1 . 3 Drawing : See attached drawings.

2 . Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Logic Input Voltage	VI	0	-	5.5	VDC	-
Power Supply Voltage	VCC	0	-	7.0	VDC	-

3 . Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition	
Logic Input Voltage	"H"	VIH	2.0	-	-	VDC	-
	"L"	VIL	-	-	0.8		
Logic Output Voltage	"H"	VOH	2.4	-	-	VDC	IOH=-2.0mA
	"L"	VOL	-	-	0.5		IOL=2.0mA
Power Supply Voltage	VCC	4.75	5.0	5.25	VDC	-	
Power Supply Current	ICC	-	1100	1300	mADC	VCC=5.0V	

Slow start power supply may cause erroneous operation.

ICC might be anticipated twice as usual at power on rush.

4 . Optical Specifications

Number of characters	: 40(2 lines x 20 chrs)
Matrix format	: 5 x 7 dot + Comma and Decimal point
Display area	: 196.35 x 28.7 mm (X x Y)
Character size	: 6.4 x 11.2 mm (X x Y)
Character pitch	: 9.9 x 16.0 mm (X x Y)
Dot size	: 1.0 x 1.3 mm (X x Y)
Dot pitch	: 1.35 x 1.65 mm (X x Y)
Luminance	: 350 cd/m ² (100 fL) Min.
Color of illumination	: Blue-green

5 . Environmental Specifications

Operating temperature	: - 10 to +65 °C
Storage temperature	: -40 to +85 °C
Operating humidity	: 20 to 80 % RH
Vibration	: 10 to 55 Hz , 10 Gmax., 3 directions, 30 min. each
Shock	: 100 G , 9 mS.

6 . Functional Descriptions

This module provides the functions of 8 bit parallel and serial data write.

Each control data and character fonts are shown in Character Table 0 and Character Table 1.

All data write should be done during BUSY line is low.

\overline{CS}	\overline{WR}	Function	Bus direction
0	↑	Data write	Module ← Host
1	×	No operation	Module × Host

↑ : Rising edge of pulse × : Don't care

6 . 1 Character data write

Character font is displayed on the screen , and HT is executed .

(see para . 6 . 2 . 2 HT)

6.2 Control data write

Detail of control data are shown in this clause. The term "Cursor" is the same meaning of "Writing Position".

6.2.1 BS : Back Space (08 Hex)

The cursor moves one character to the left.
At the left end, it moves to the upper right end.
At the top left end, the cursor doesn't move.

6.2.2 HT : Horizontal Tab (09 Hex)

The cursor moves one character to the right.
At the right end, the cursor moves to the lower left end.
At the bottom right end, the cursor motion is depended upon DC1 and DC2 mode.

DC1 : The cursor moves to the top left end.

DC2 : All displayed characters are scrolled up one line.

The cursor moves to the bottom left end and all written characters in the top line is disappeared. The bottom line is cleared.

6.2.3 LF : Line Feed (0A Hex)

The cursor moves to the same column on the lower line.
At the bottom line, it is depended upon DC1 and DC2 mode.

DC1 : The cursor moves to the same column on the top line.

DC2 : All displayed characters are scrolled up one line.

The cursor keeps the same column on the bottom line, and the bottom line is cleared.

6.2.4 FF : Form Feed (0C Hex)

The cursor moves to the top left end.

6.2.5 CR : Carriage Return (0D Hex)

The cursor moves to the left end on the same line.

6.2.6 CLR : Clear (0E Hex)

All displayed characters are cleared. The cursor doesn't move.

6.2.7 DC1 : Device Control 1 (11 Hex) ... Character over write mode

DC2 : Device Control 2 (12 Hex) ... Scroll up mode

Alternative LINE ENDING MODE is specified by DC1 and DC2 when character data or HT or LF is written. Just after power on or initialize, DC1 is selected (Default Mode).

6.2.8 DC5 : Device Control 5 (15 Hex) ... Cursor is displayed as a blinking all dot character.

DC6 : Device Control 6 (16 Hex) ... Cursor is turned to invisible.

Above two codes control the cursor rendition. DC5 is default mode. The mode is maintained until other mode is selected. The blinking speed can be varied by ESC sequence. (see para. 6.2.11 ESC)

6.2.9 CT0 : Character Table 0 (18 Hex) ... International character font

CT1 : Character Table 1 (19 Hex) ... KATAKANA character font

Above two codes select Character Table. Just after power on, CT0 is selected (Default Mode). Any characters from those 2 tables can be displayed on the screen by the bank selection.

6.2.10 Attribution of DP, COM and COL.

DP : Decimal Point (1C Hex)
 COM : Comma (1D Hex)
 COL : Semi colon (DP+COM) (1E Hex)

Above data attribute to the character code succeeding. Only above data without character code may ignore (defined as a NUL).

Character code without above data shows character only.

6.2.11 ESC : Escape (1B Hex)

The character or data strings succeeding of ESC code control the various functions such as user definable font, cursor addressing, screen luminance control, selection of data writing mode, blink speed control and initialize.

(1) User Definable Font (UDF)

User's desired fonts can be defined by software. The fonts will be memorized in RAM of the CPU.

Syntax : ESC (1B Hex) + "C" (43 Hex) + CHR + PT1 + PT2 + PT3 + PT4 + PT5

Any 5 x 7 dot patterns consisted of data form PT1 thru PT5 can be stored in character code location specified by CHR.

Maximum number of UDF are 4 characters at once. Storing more than 4 will kill the oldest font. However, within the 4 character codes where already defined by UDF, the over-write-latest font replaces the former font.

1st byte : ESC (1B Hex)

2nd byte : "C" (43 Hex)

3rd byte : CHR (00 Hex to FF Hex)

Specify the character code location from 00 Hex to FF Hex by CHR.

If CHR overlaps the control codes such as BS, HT, etc., the control function will be lost. And therefore, overlap to the ESC code may not avail further UDF.

4th to 8th byte : PT1 thru PT5

Specify ON or OFF of 37 dot position (5 x 7 dot + DP and Comma).

Following table shows the relation of dot position and the data formation.
 ("1" = dot turn on, "0" = dot turn off)

	7(MSB)	6	5	4	3	2	1	0(LSB)
4th byte	8	7	6	5	4	3	2	1
5th byte	16	15	14	13	12	11	10	9
6th byte	24	23	22	21	20	19	18	17
7th byte	32	31	30	29	28	27	26	25
8th byte	*	*	*	PCOM	PDP	35	34	33

*: don't care PDP: Decimal Point PCOM: Comma

Following is the dot assignment.

P1	P2	P3	P4	P5
P6	P7	P8	P9	P10
P11	P12	P13	P14	P15
P16	P17	P18	P19	P20
P21	P22	P23	P24	P25
P26	P27	P28	P29	P30
P31	P32	P33	P34	P35



After execution of above sequence, a defined font will be stored in the character code location "CHR" (Hex)

Following is an example of UDF sequence.

Example : "!" dot pattern should be stored in character code location A0 Hex.

Desired Dot Pattern

		●		
		●		
		●		
		●		
		●		

Turn on dot number

P3

P8

P13

P18

P33



Assign turn on dot number to the bit table as follows.

	7	6	5	4	3	2	1	0	Data (Hex)
4th Byte	1	0	0	0	0	1	0	0	84
5th Byte	0	0	0	1	0	0	0	0	10
6th Byte	0	0	0	0	0	0	1	0	02
7th Byte	0	0	0	0	0	0	0	0	00
8th Byte	0	0	0	0	0	0	0	1	01

Then Syntax should be written : 1B + 43 + A0 + 84 + 10 + 02 + 00 + 01 (Hex)

(2) Cursor Moving

The cursor can be moved any position of the screen by following ESC sequence.

Syntax : ESC (1B Hex) + "H" (48 Hex) + 1 Byte data

Column Line	Left end	2nd	3rd	- - - - -	Right end
Top	00	01	02	- - - - -	13
Bottom	14	15	16	- - - - -	27

Data = 28 Hex to FF Hex : The cursor doesn't move.

(3) Luminance Control

The screen luminance can be varied by following ESC sequence.
Just after power on, the screen luminance is set to 100%.

Syntax : ESC (1B Hex) + "L" (4C Hex) + 1 Byte data

Data = 00 Hex to 3F Hex : approx. 30%
 40 Hex to 7F Hex : approx. 50%
 80 Hex to BF Hex : approx. 75%
 C0 Hex to FF Hex : 100%

(4) Selection of Writing Mode

Flickerless Mode can be selected by following ESC sequence.

Syntax : ESC (1B Hex) + " S " (53 Hex) ... Flickerless Mode

Within Flickerless Mode, although BUSY might become longer, flickerless-high speed-continuous-data write can be achieved since refreshing of the screen has priority over the data acceptance.

Quick data write with minimum BUSY time will be given by Quick Write Mode since the data acceptance has the priority over the refreshing of the screen.

Within this mode, continuous high speed data write may cause flicker display.

Note :

When serial data write with high speed baud rate at Flickerless Mode, it may have the read error of the data. Busy check within Flickerless Mode or setting to the Quick Write Mode is recommended for serial data write.

Just after power on or initialize, Quick Write Mode is selected until other mode is set. After selected Flickerless Mode, Quick Write Mode can't be selected unless otherwise Initialize.

(5) Blink Speed Control

Blinking speed of cursor can be varied by following ESC sequence.

Syntax : ESC (1B Hex) + " T " (54 Hex) + 1 Byte Data

Data =	00 Hex	...	256
	FF Hex	...	255
	FE Hex	...	254
	:		
	01 Hex	...	1

Period of Blinking = Data Value x 31 mS

At power on default, 20 (14 Hex) is set to data.

(6) Initialize

All displayed characters and all setting factors are cleared by following ESC sequence.

Syntax : ESC (1B Hex) + " I " (49 Hex)

Execution of above sequence, module is reset as just after power on.

6.3 Test Mode

Test Mode is set by SIN (T0) is low more than 100mS at power on or initialize.

During Test Mode, all character fonts are displayed automatically, and no any data are acceptable.

6.4 Character and control code table

Following 2 character tables can be selected. (see para . 6.2.9)

6.4.1 International character font

				D7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
				D6	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	
				D5	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	
				D4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
D3 D2 D1 D0				0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0000	0					SP	0	0	P	^	F	E	Σ		"	A	0	à	á	
0001	1			DC1	!	1	A	Q	a	4	'	0	i	±	A	N	á	ñ	ñ	
0010	2			DC2	"	2	B	R	b	r	f	≡	€	2	A	ò	á	à	á	
0011	3				#	3	C	S	c	s	l	x	E	3	A	ó	á	à	á	
0100	4				\$	4	D	T	d	t	L	÷	0	'	A	õ	á	à	á	
0101	5			DC5	%	5	E	U	e	u	o	°	¥	¥	A	ö	á	à	á	
0110	6			DC6	&	6	F	U	f	u	r	?	!	¶	E	ö	á	à	á	
0111	7				'	7	G	U	g	u	ó	E	E	-	9	x	9	+	+	
1000	8	BS	CT0	(	8	H	X	h	x	€	≤	"	,	è	0	à	á	á	á
1001	9	HT	CT1	)	9	I	Y	i	y	ñ	≥	0	4	é	0	á	á	á	á
1010	A	LF		*	:	J	Z	j	z	0	#	@	#	è	0	á	á	á	á	
1011	B		ESC	+	:	K	I	k	i	ç	λ	Γ	€	3	è	0	á	á	á	
1100	C	FF	DP	,	<	L	\	l	l	π	0	7	4	è	0	á	á	á	á	
1101	D	CR	COM	-	=	M	I	m	ı	τ	ı			h	i	Y	i	Y	ı	
1110	E	CLR	COL	.	>	N	^	n	^	φ	0	0	0	ı	i	B	T	P	P	
1111	F			/	?	0	_	o	°	0	°	°	°	ı	i	B	T	P	ı	

CFX101

Character Table 0

6.4.2 KATAKANA character font

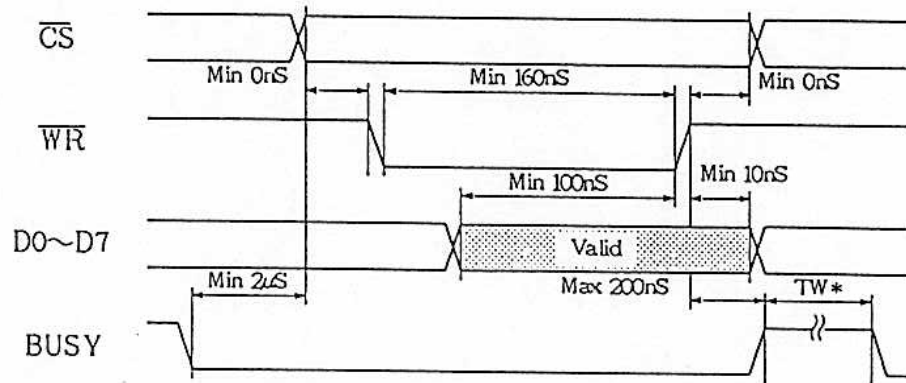
				D7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
				D6	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	
				D5	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	
				D4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
D3	D2	D1	D0		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0			SP	0	0	P	`	F	E	M		-	0	3	0	1
0	0	0	1	1		DC1	!	1	A	0	a	a	Γ	3	。	ア	キ	△	月	■
0	0	1	0	2		DC2	"	2	B	R	b	r	0	0	Γ	イ	ウ	×	火	■
0	0	1	1	3			#	3	C	S	c	s	※	9	」	ウ	テ	モ	本	■
0	1	0	0	4			\$	4	D	T	d	t	3	0	、	エ	ト	ト	本	■
0	1	0	1	5		DC5	%	5	E	U	e	u	4	0	。	オ	ナ	工	金	■
0	1	1	0	6		DC6	&	6	F	V	f	v	4	0	フ	カ	二	三	上	■
0	1	1	1	7			'	7	G	W	w	0	0	フ	キ	フ	ラ	本	■	
1	0	0	0	8	BS	CT0	<	8	M	X	x	Π	フ	イ	ウ	本	リ	命	■	
1	0	0	1	9	HT	CT1	)	9	I	Y	i	y	4	フ	ト	ノ	ル	同	〒
1	0	1	0	A	LF		*	:	J	Z	j	z	Φ	+	エ	コ	ノ	ノ	↓	
1	0	1	1	B		ESC	+	:	K	E	k	e	□	+	オ	サ	ヒ	口	ノ	
1	1	0	0	C	FF	DP	,	<	L	\	l	1	4	0	フ	シ	フ	フ	■	
1	1	0	1	D	CR	COM	-	=	M	]m	]m	]m	]m	ユ	ス	ノ	ノ	ノ	+
1	1	1	0	E	CLR	COL	.	>	N	^n	^n	^n	^n	ヲ	キ	ヨ	セ	ホ	ノ	
1	1	1	1	F			/	?	0	_	o	※	b	ス	ウ	マ	マ	ノ	ノ	

CFX102

Character Table 1

7 . Timing

7 . 1 Parallel Interface Timing



TW^* : see para 8 . BUSY TIME

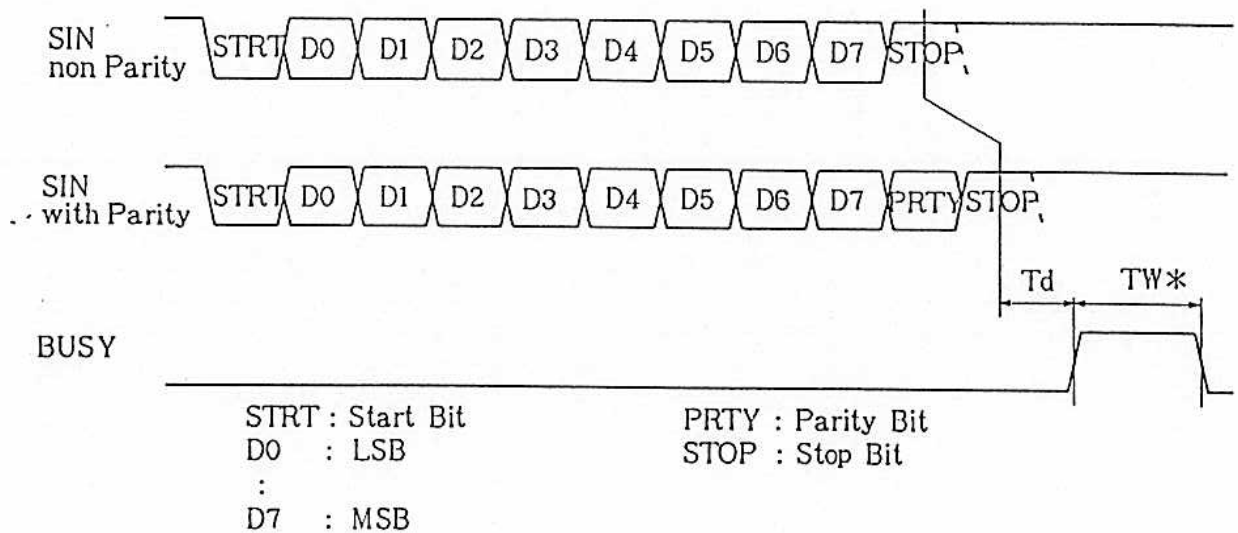
7 . 2 Serial Interface Timing

Serial data write, asynchronous-8bit TTL level is also acceptable.

Following baud rates can be selected by combination of the Jumper wires .
(see para . 9 . Jumper wires)

300 , 600 , 1200 , 2400 , 4800 , 9600 , 19200 BPS

Besides, parity bit-even, odd and non parity can be selected by 2 jumper wires .
(see para 9 . Jumper wires)



T_d : 10 μS (Typ.) at Quick Write Mode
0 μS (Min.) ~ 800 μS (Max.) at Flickerless Mode

TW^* : see para . 8 . BUSY Time

8. BUSY Time

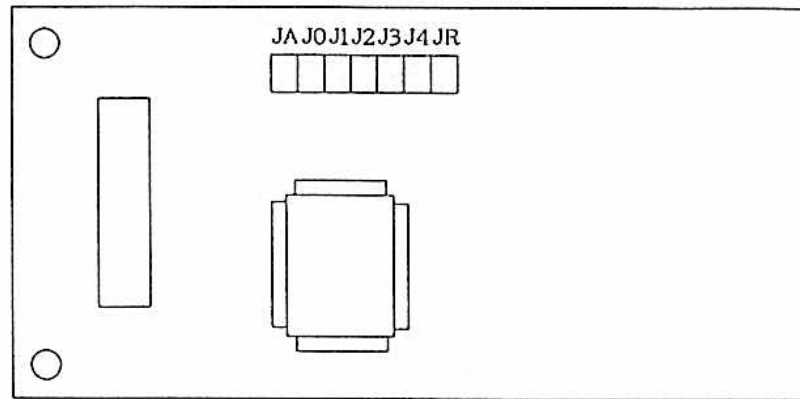
Input data execution time (TW*) at Quick Write Mode are shown as follows.

Data		Execution time (TW)		Data Writing Mode
		DC1 Mode	DC2 Mode	
Character Data, HT, LF		200 μ S (Max)	900 μ S (Max) at scrolling	Quick write mode
BS, FF, CR, CT0, CT1, DC1, DC2 DC5, DC6, DP, COM, COL		200 μ S (Max)		
CLR		700 μ S (Max)		
ESC	1st byte	200 μ S (Max)		
	2nd byte	"C"	200 μ S (Max)	
		"I"	1200 μ S (Max)	
		Except "C", "I"	200 μ S (Max)	
3rd byte ~		200 μ S (Max)		

Above execution time are only talking about Quick Write Mode as mentioned.
 Within Flickerless Mode, Approximately 2 to 15 times of above table should be considered.
 Operating with Flickerless Mode, therefore, always watching of BUSY line is recommended.

9 . Jumper wires

Position of jumper wire



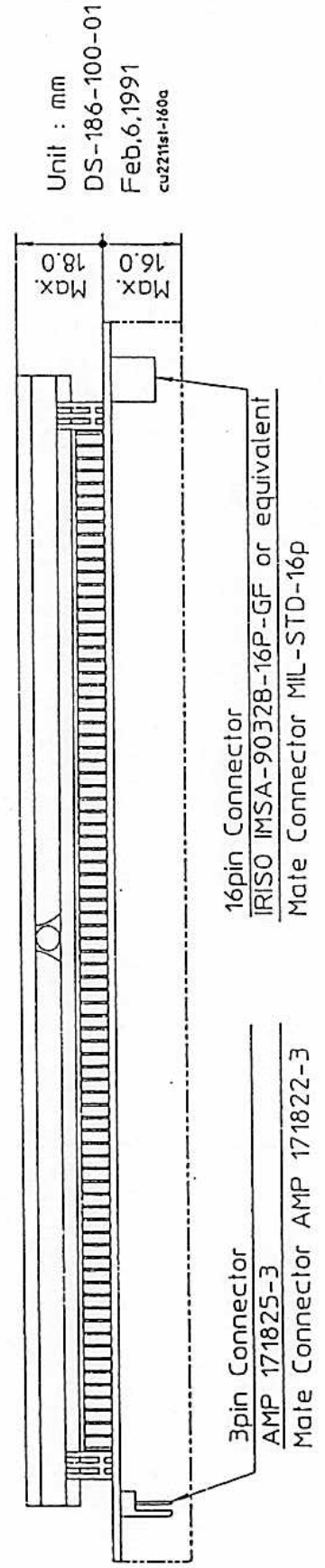
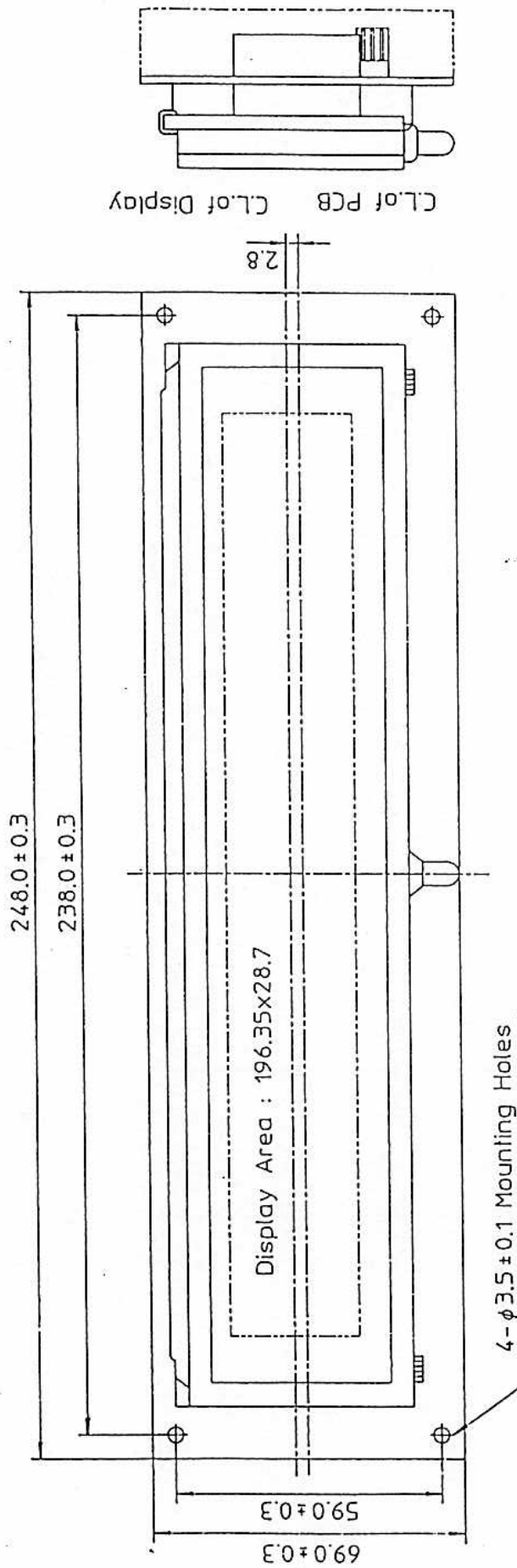
Jumper Function Table

JA	J4	J3	J2	J1	J0	Function	
x	x	x	1	1	1	Baud rate selection	19200 BPS
x	x	x	1	1	0		9600 BPS
x	x	x	1	0	1		4800 BPS
x	x	x	1	0	0		2400 BPS
x	x	x	0	1	1		1200 BPS
x	x	x	0	1	0		600 BPS
x	x	x	0	0	1		300 BPS
x	x	x	0	0	0		300 BPS
x	1	1	x	x	x	Parity selection	Even Parity
x	1	0	x	x	x		Odd Parity
x	0	x	x	x	x		Non Parity
1	x	x	x	x	x	Character font selection	International Font (CTO)
0	x	x	x	x	x		JIS Font (CTI)
1	1	1	1	1	1	Setting at Factory	

0 : Short 1 : Open X : Don't care

11. Outline dimension

CU200211SCP-B-T60 Outline Dimension



Unit : mm
 DS-186-100-01
 Feb,6,1991
 cu221st-160a

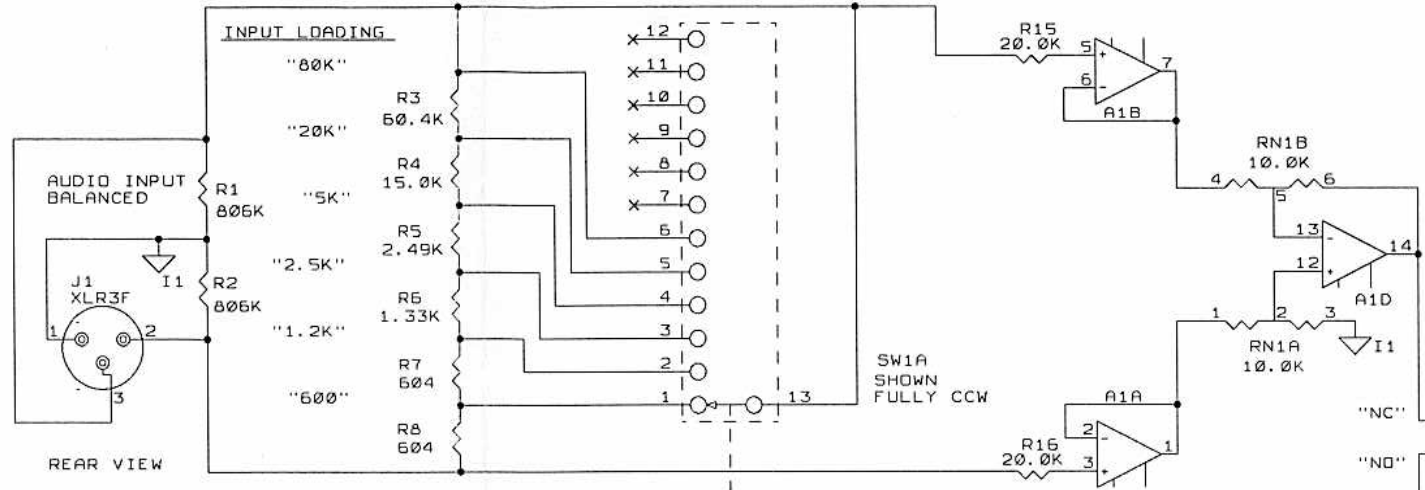
IMPORTANT PRECAUTIONS

- * All VFD Modules contain MOS LSIs or ICs. Anti-Static handling procedures are always required.
- * VF Display consists of Soda-lime glass. Heavy shock more than 100 G, thermal shock greater than 10 °C/minute, direct hit with hard material to the glass surface -- especially to the EXHAUST PIPE -- may CRACK the glass.
- * Do not PUSH the display strongly. At mounting to the system frame, slight gap between display glass face and front panel is necessary to avoid a contact failure of lead pins of display. Twist or warp mounting will make a glass CRACK around the lead pin of display.
- * Neither DATA CONNECTOR or POWER CONNECTOR should be connected or disconnected while power is applied. As is often the case with most subsystems, caution should be exercised in selectively disconnecting power within a computer based system. The modules receive high logic on strobe lines as random signals on all data ports.
Removal of primary power with logic signals applied may damage input circuitry.
- * Stress more than specification listed under the Absolute Maximum Ratings may cause PERMANENT DAMEGE of the modules.
- * +5 volts power line must be regulated completely since all control logics depend on this line.
Do not apply slow-start power. Provide sufficient output current power source to avoid trouble of RUSH CURRENT at power on. (At least output current of double figure of I_{cc} , listed on the specification of each module, is required.)
- * Data cable length between module and host system is recommended within 300 mm to be free from a mis-operation caused by noise.
- * Do not place the module on the conductive plate just after the power off. Due to big capacitors on the module, more than 1 min. of discharging time is required to avoide the failure caused by shorting of power line.
- * 2 hours pre-running with the test mode operation may help the stability of the brightness of the VFD when power was not applied more than 2 months.
- * Steady repeating of a fixed (static) message displaying, longer than 5 hours in a day may cause the phosphor burn-out problem. An automatic shut down programming, scrolling message using DC2 mode or 2 hours test mode operation during the idling of the host is recommended.

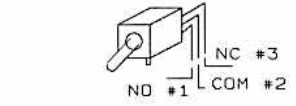
INPUT LOADING SELECT
BALANCED

REFERENCE DESIGNATORS

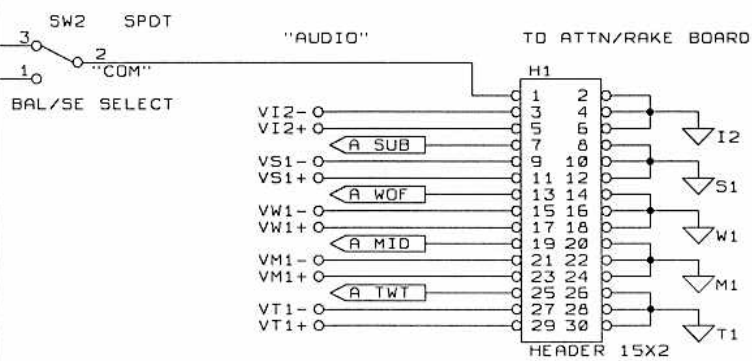
- R1 - R17
- C1 - C10
- H1 - H2
- REG1 - REG2
- SW1 - SW2
- A1
- J1



REAR VIEW

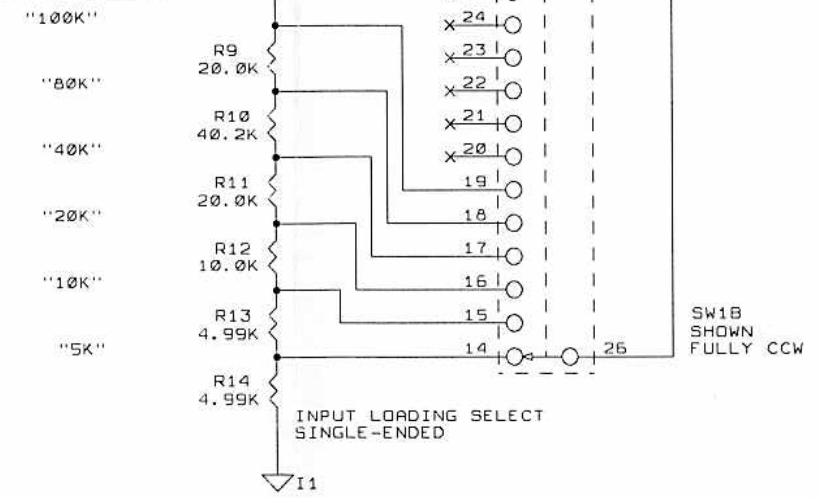


BAT POINTS TO BAL INPUT JACK
WHEN SWITCH IS TOGGLED AS SHOWN.

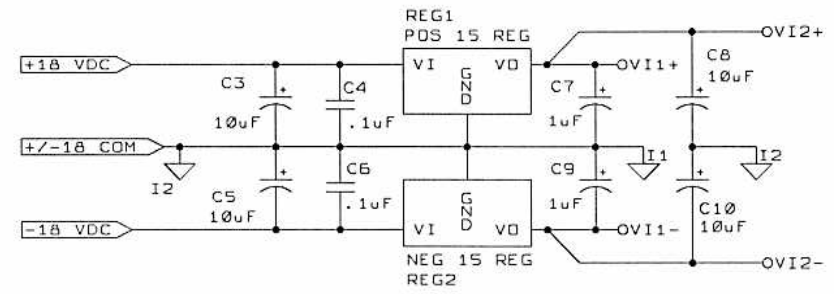


AUDIO INPUT
SINGLE-ENDED
FROM RCA BOARD

INPUT LOADING



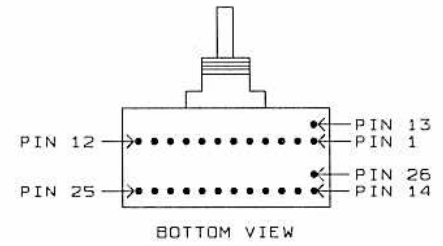
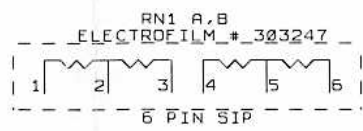
INPUT LOADING SELECT
SINGLE-ENDED



FILTER BOARD
INPUT SECTION

ORCAD IV FLAT FILE LINK

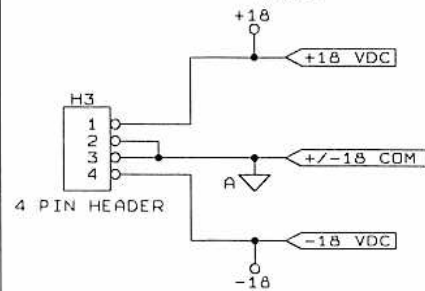
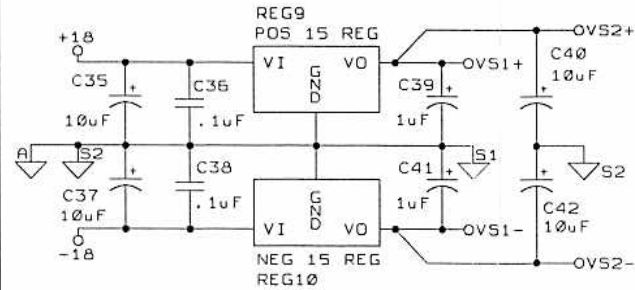
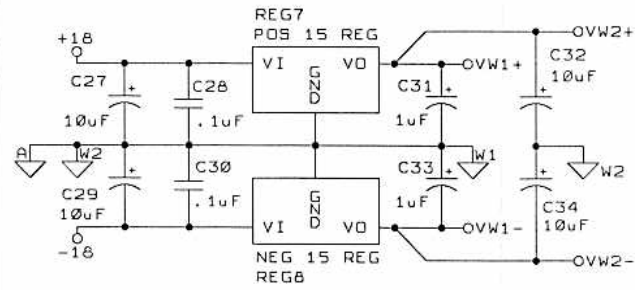
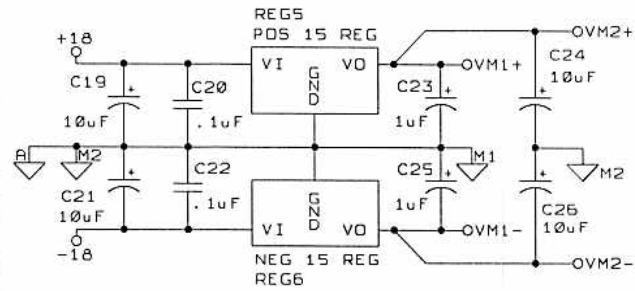
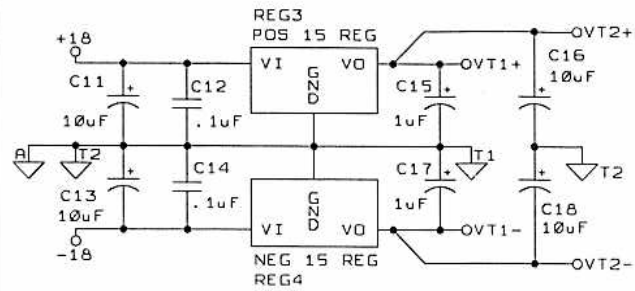
ILINK
IAPGR062B.SCH
IAPGR063B.SCH



SW1 ELECTROSWITCH (APOGEE) # 75-4218
.625" SHAFT - FROM MOUNTING SURFACE
ADJUSTABLE; 2-12 POSITIONS.

WHEN SHAFT IS ROTATED
FULLY CCW, PIN 13 COM IS CONNECTED
TO PIN 1

APOGEE ACOUSTICS INC.		
ASSY-350-0002-000 REV B		
PCB-413-0003-000 REV B		
Title GRAND DAX - FILTER BOARD		
Size B	Document Number APGR061B.SCH	REV B
Date: February 11, 1992	Sheet 1 of 3	drawn by jer



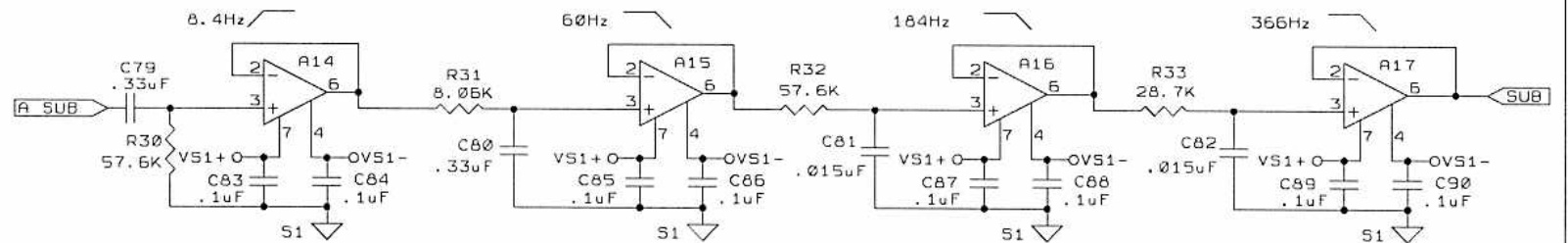
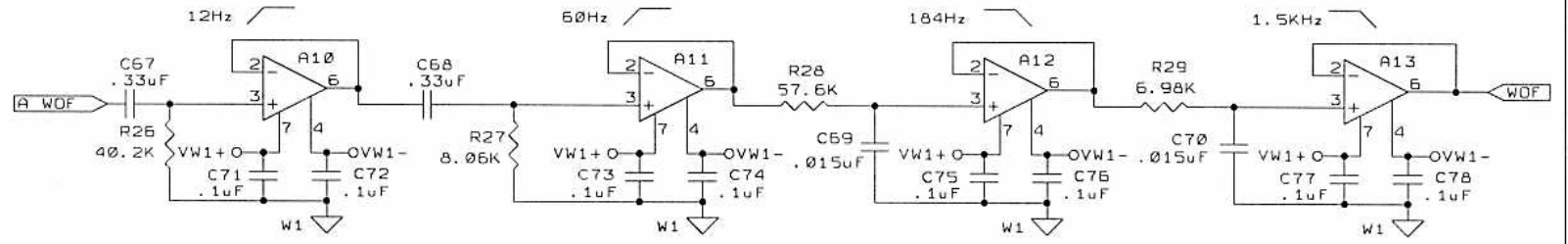
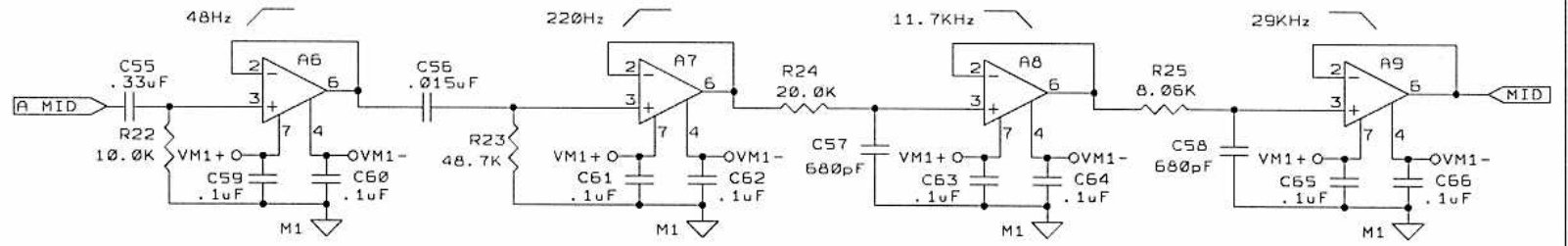
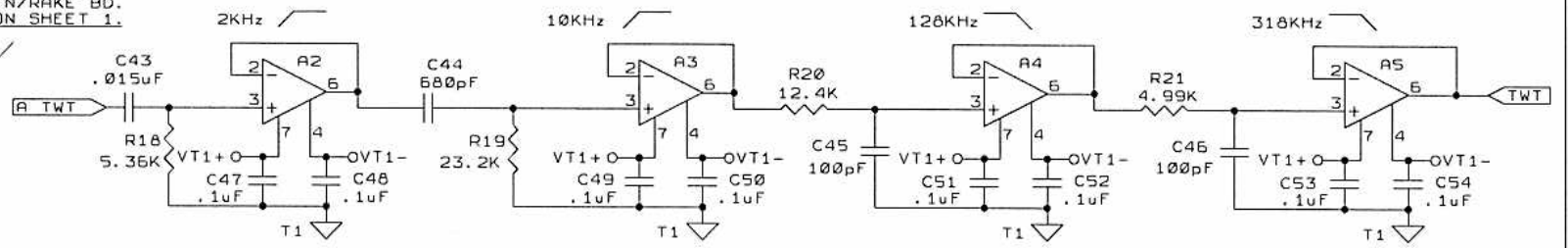
REFERENCE DESIGNATORS

REG3 - REG10
 C11 - C90
 H3
 R18 - R33
 A2 - A17

NOTES:

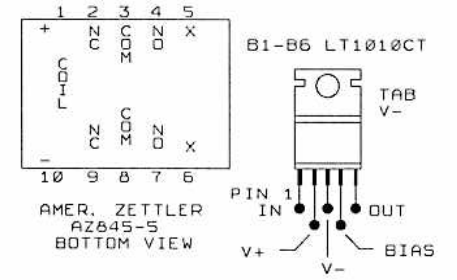
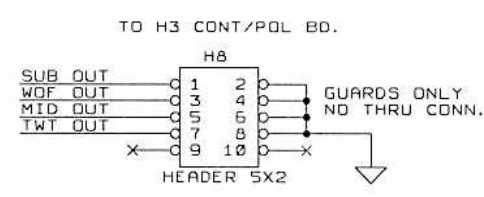
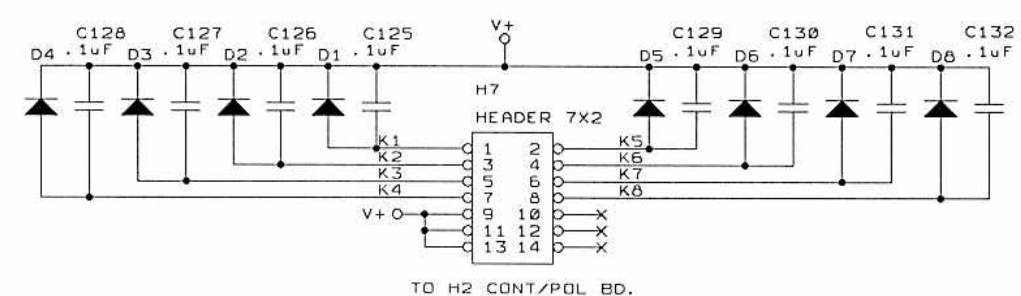
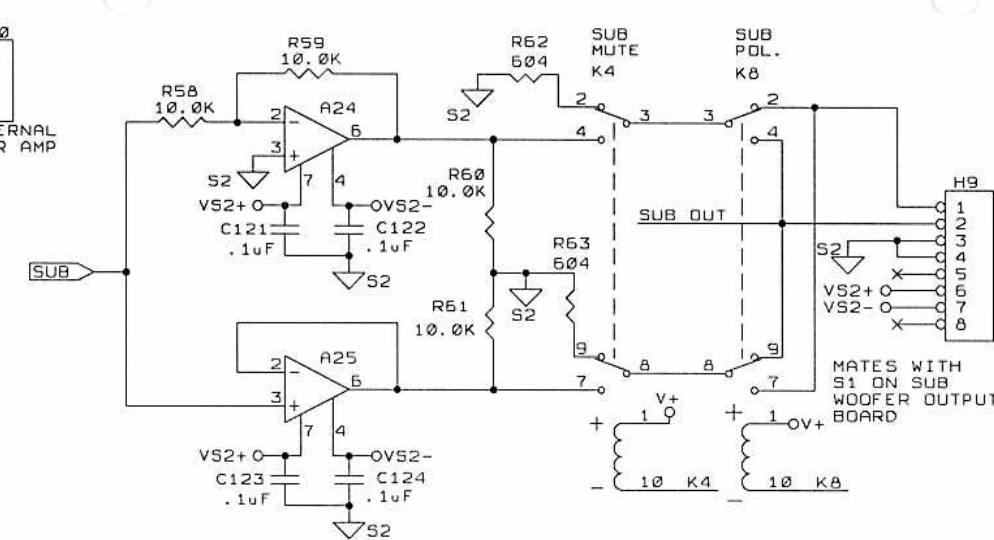
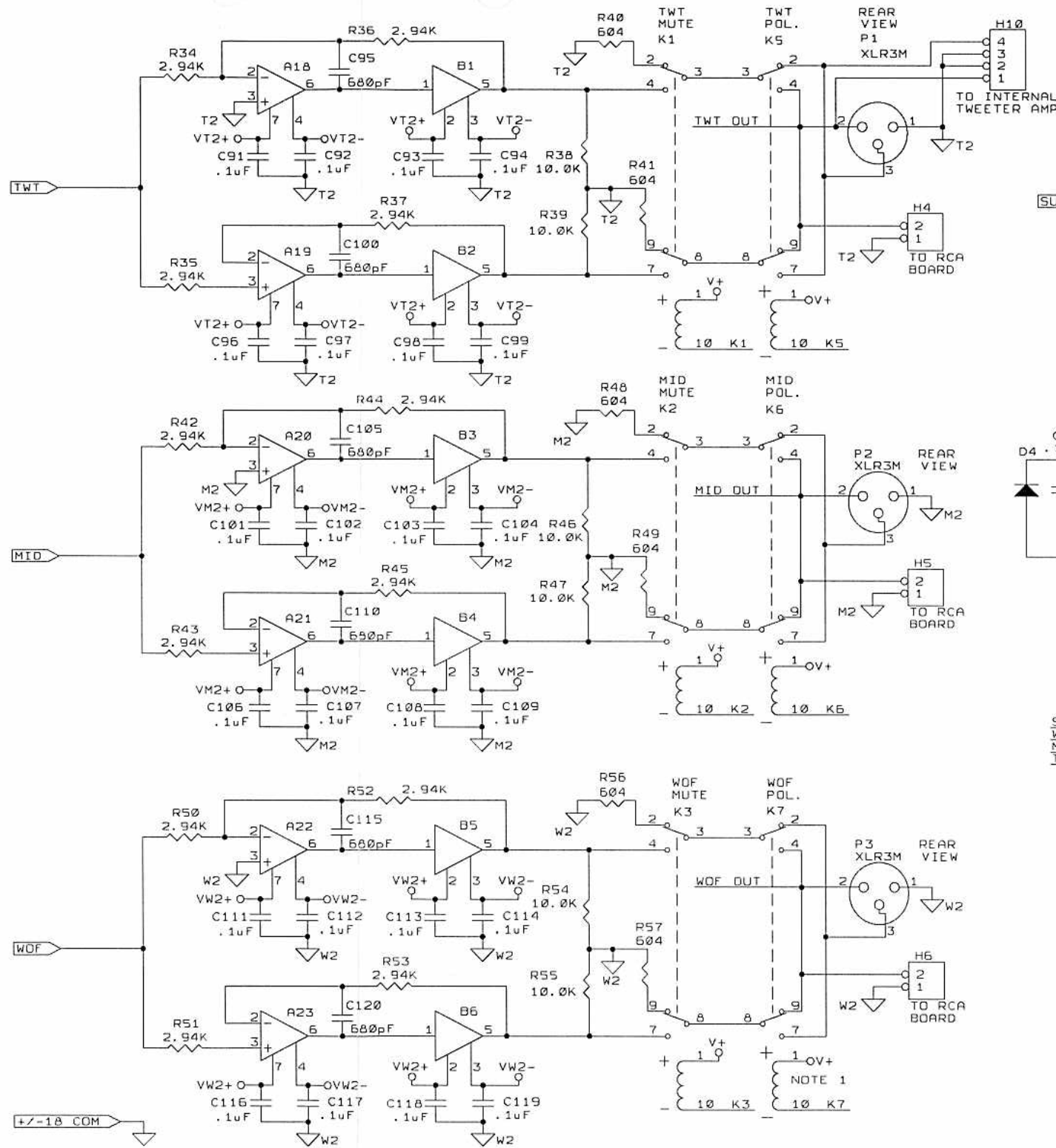
- OPA606KP PIN1,5 = OFFSET TRIM - LEAVE OPEN.
 PIN 8 = NO CONNECT.

FROM ATTN/RAKE BD.
 VIA H1 ON SHEET 1.



FILTER BOARD
 FILTER SECTION

APOGEE ACOUSTICS INC.		
Title GRAND DAX - FILTER BOARD		
Size B	Document Number APGR062B.SCH	REV B
Date: February 11, 1992	Sheet 2 of 3	drawn by je



- NOTES:
1. WOOFER SECTION OUTPUT SIGNAL IS INVERTED RELATIVE TO OTHER CHANNELS. THIS IS ACCOMPLISHED THROUGH PROGRAM CONTROL OF K7 RELAY.
 2. OPA606KP PIN 1,5,8 = NC
 3. REFERENCE DESIGNATORS

- P1 - P3
H4 - H10
A18 - A25
B1 - B6
K1 - K8
R34 - R63
C91 - C132
D1 - D8

FILTER BOARD OUTPUT SECTION

APOGEE ACOUSTICS INC.		
Title GRAND DAX - FILTER BOARD		
Size B	Document Number APGR063B.SCH	REV B
Date: February 11, 1992	Sheet 3 of 3	drawn by jer

GRAND DAX - FILTER BOARD

ASSY-350-0002-000 REV B

B.O.M.

THIS FILE: AWORKS - APGR060B.doc 11-FEB-92
 ASCCI - APGR060B.bom 11-FEB-92

FROM ORCAD FILE: APGR061B.SCH INPUT (ROOT SHEET) 11-FEB-92
 APGR062B.SCH FILTERS
 APGR063B.SCH OUTPUT

* INDICATES CHANGED OR ADDED TO SINCE 12-NOV-91, 09-JAN-92 AND 16-JAN-92

1	1	A1	OPAMP BURR BROWN # OPA404KP SOLE SOURCE 14 PIN 300 MIL DIP
2	24	A2,A3,A4,A5,A6,A7,A8,A9, A10,A11,A12,A13,A14,A15, A16,A17,A18,A19,A20,A21, A22,A23,A24,A25	OPA606KP OPAMP BURR BROWN # OPA606KP SOLE SOURCE 8 PIN 300 MIL DIP
3	6	B1,B2,B3,B4,B5,B6	POWER BUFFER LINEAR TECHNOLOGY # LT1010CT SOLE SRC TO-220 5 LEAD
3a	8	D1,D2,D3,D4,D5,D,D7,D8	DIODE - GENERIC 1N4148
4	80	C1,C2,C4,C6,C12,C14,C20, C22,C28,C30,C36,C38,C47, C48,C49,C50,C51,C52,C53, C54,C59,C60,C61,C62,C63, C64,C65,C66,C71,C72,C73, C74,C75,C76,C77,C78,C83, C84,C85,C86,C87,C88,C89, C90,C91,C92,C93,C94,C96, C97,C98,C99,C101,C102, C103,C104,C106,C107,C108, C109,C111,C112,C113,C114, C116,C117,C118,C119,C121, C122,C123,C124,C125,C126, C127,C128,C129,C130,C131, C132	.1uF 50WVDC +/-20% CERAMIC Z5U AVX # SR205E 104 MAA MEPCO # CZ20C 104 M RADIAL .2W x .2H x .125T x .020LD x .1LS

5	20	C3, C5, C8, C10, C11, C13, C16, C18, C19, C21, C24, C26, C27, C29, C32, C34, C35, C37, C40, C42	10uF 35WVDC 10% TANT SPRG # 150D106X9035R2 MLRY # CS13BF106K AXIAL .289D X .822L X .025LD 1.10" CTRS/BD
---	----	---	---

5a	10	C7, C9, C15, C17 C23, C25, C31, C33 C39, C41	1uF 35WVDC 10% TANT SPRG # 150D105X9035A2 MLRY # CS13BF105K AXIAL .135D X .422L X .020LD .600 BD/CTRS
----	----	--	--

6	6	C43, C56, C69, C70, C81, C82	.015uF 100WVDC 1% POLYPRO REL-CAP # PPMT153G1A SOLE SOURCE AXIAL .190D X .438L X .020LD .600 CENTERS/BOARD
---	---	------------------------------	--

7	9	C44, C57, C58, C95, C100, C105, C110, C115, C120	680pF 100VDC 2.5% POLYPRO ERO # KP 1830-168/013 SOLE SRC RAD .283W X .236H X .177T X .020LD X .20OLS .2 CTRS/BD
---	---	---	--

8	2	C45, C46	100pF 100WVDC 2.5% POLYPRO ERO # KP 1830-110/013 SOLE SRC RAD .283W X .236H X .177T X .020LD X .20OLS .2 CTRS/BD
---	---	----------	---

9	5	C55, C67, C68, C79, C80	.33uF 100WVDC 1% POLYPRO REL-CAP # PPMT334G1A
---	---	-------------------------	--

SOLE SOURCE
 AXIAL .260D X .680L X .025LD
 1.00" CENTERS/BOARD

10	1	H1	HEADER 15X2 STRAIGHT PINS LATCH EJECT 3M # 3440-6202 .100 X .100 - .025 SQ. PINS
11	1	H3	4 PIN HEADER RIGHT ANGLE POL/FRIC. LOCK MOLEX # 26-61-5040 .156 CNTRS - .045 SQ. PINS
12	1	H8	HEADER 5X2 STRAIGHT PINS LATCH EJECT 3M # 3662-6202 .100 X .100 - .025 SQ. PINS
12a	4	H2, H4, H5, H6	2 PIN HEADER STRAIGHT PINS POL/FRIC. LOCK MOLEX # 22-11-2022 .100 CNTRS - .025 SQ. PINS
13	1	H7	HEADER 7X2 STRAIGHT PINS LATCH EJECT 3M # 3314-6202 .100 X .100 - .025 SQ. PINS
* 14	1	H9	8 PIN HEADER SINGLE ROW BOARD TO BOARD SAMTEC # TSW-108-15-H-S .100 CNTRS - .025 SQ. PINS
* 14a	1	H10	4 PIN HEADER STRAIGHT PINS POL/FRIC. LOCK MOLEX # 22-11-2042 .100 CNTRS - .025 SQ. PINS

15	1	J1	XLR3F FEMALE XLR BLK/GOLD/PC MT. NEUTRIK # NC3FDH-B-0 SOLE SRC
16	ITEM 16 NOT USED		
17	8	K1,K2,K3,K4,K5,K6,K7,K8	DPDT RELAY AMERICAN ZETTLER # AZ-845-5 OMRON # 10 PIN 300 MIL DIP
18	3	P1,P2,P3	XLR3M MALE XLR BLK/GOLD/PC MT. NEUTRIK # NC3MDH-B-0 SOLE SRC
* 19	2	R1,R2	806K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
20	1	R3	60.4K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
21	1	R4	15.0K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
22	1	R5	2.49K 1/4 WATT 1% METAL FILM

DALE # RN-60D
 SOLE SOURCE
 AXIAL .390L X .140D X .025LD
 .600" CTRS/BOARD

23	1	R6	1.33K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
----	---	----	--

24	10	R7,R8,R40,R41,R48,R49, R56,R57,R62,R63	604 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
----	----	---	--

25	6	R9,R11,R15,R16,R17,R24	20.0K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
----	---	------------------------	--

26	2	R10,R26	40.2K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
----	---	---------	--

27	12	R12,R22R38,R39,R46,R47, R54,R55,R58,R59,R60,R61	10.0K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
----	----	--	--

28	3	R13,R14,R21	4.99K 1/4 WATT 1% METAL FILM
----	---	-------------	------------------------------------

.600" CTRS/BOARD

 36 ITEM 36 NOT USED

 37 3 R28,R30,R32 57.6K
 1/4 WATT 1%
 METAL FILM
 DALE # RN-60D
 SOLE SOURCE
 AXIAL .390L X .140L X .025LD
 .600" CTRS/BOARD

 38 1 R29 6.98K
 1/4 WATT 1%
 METAL FILM
 DALE # RN-60D
 SOLE SOURCE
 AXIAL .390L X .140L X .025LD
 .600" CTRS/BOARD

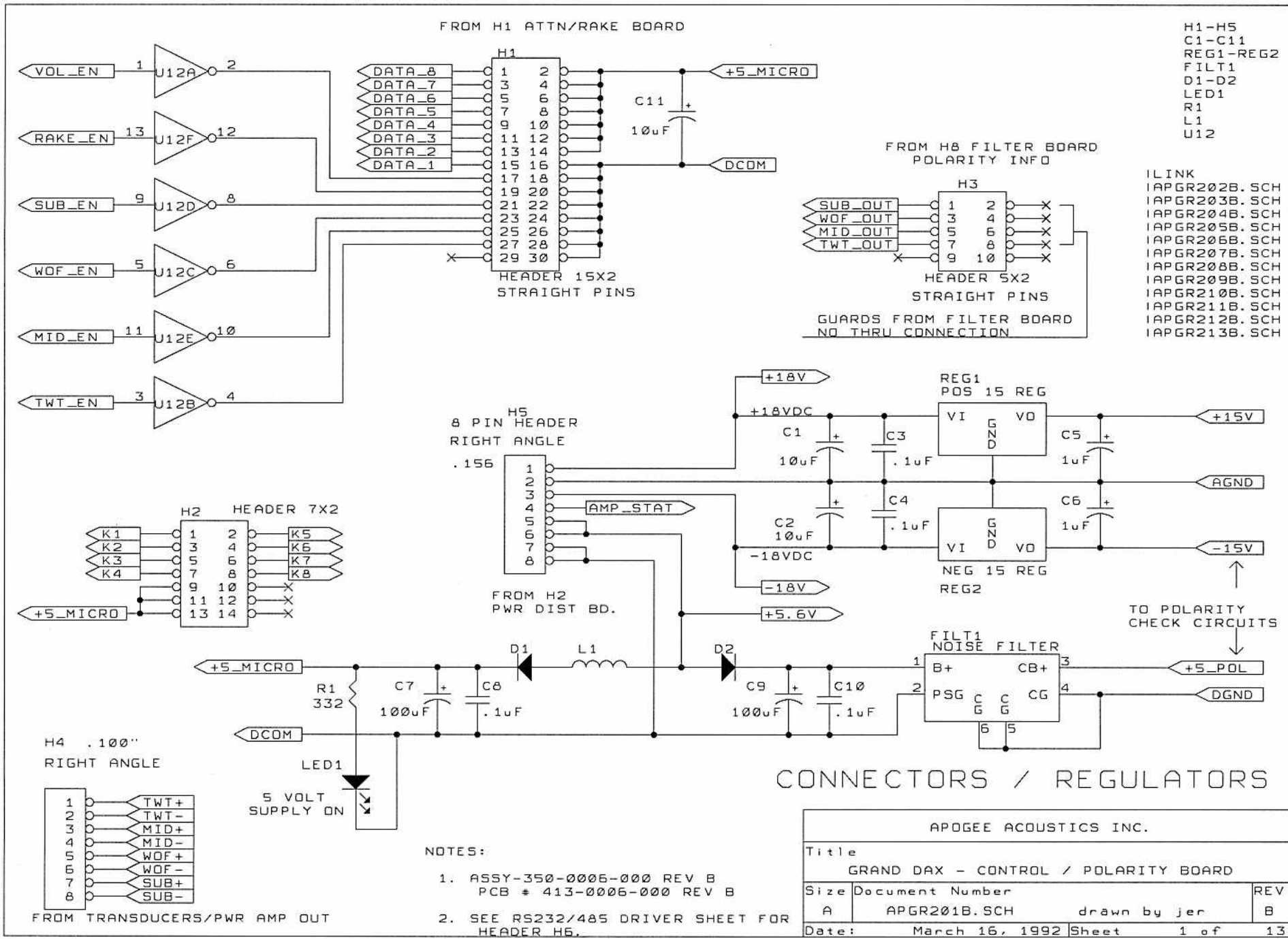
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 1/4 WATT 1%
 METAL FILM
 DALE # RN-60D
 SOLE SOURCE
 AXIAL .390L X .140L X .025LD
 .600" CTRS/BOARD

 40 12 R34,R35,R36,R37,R42,R43,
 R44,R45,R50,R51,R52,R53 2.94K
 1/4 WATT 1%
 METAL FILM
 DALE # RN-60D
 SOLE SOURCE
 AXIAL .390L X .140L X .025LD
 .600" CTRS/BOARD

 41 5 REG1,REG3,REG5,REG7,REG9 POS 15 REG
 NATL # LM340AT-15
 TO-220
 NO HEAT SINK

 42 5 REG2,REG4,REG6,REG8,
 REG10 NEG 15 REG
 NATL # LM320T-15
 TO-220
 NO HEAT SINK

43	1	RN1	10.0K RESISTOR NETWORK 4 RESISTORS ELECTROFILM # 303247 SOLE SRC 6 PIN SIP
44	1	SW1	ROTARY SW ELECTROSWITCH/APOGEE # 75-4218 (.625 SHAFT FMS) 2-12 POS. 2 DECKS ONE POLE/DECK
45	1	SW2	SPDT RIGHT ANGLE PC MOUNT AUGAT/ALCO # MTM106DVRA
* 46	1	PC1	PRINTED CIRCUIT BOARD APOGEE # PCB-413-0003-000 REV B



H1-H5
 C1-C11
 REG1-REG2
 FILT1
 D1-D2
 LED1
 R1
 L1
 U12

ILINK
 IAPGR202B.SCH
 IAPGR203B.SCH
 IAPGR204B.SCH
 IAPGR205B.SCH
 IAPGR206B.SCH
 IAPGR207B.SCH
 IAPGR208B.SCH
 IAPGR209B.SCH
 IAPGR210B.SCH
 IAPGR211B.SCH
 IAPGR212B.SCH
 IAPGR213B.SCH

FROM H8 FILTER BOARD
 POLARITY INFO

H3
 SUB_OUT
 WOF_OUT
 MID_OUT
 TWT_OUT

HEADER 5X2
 STRAIGHT PINS

GUARDS FROM FILTER BOARD
 NO THRU CONNECTION

FROM H1 ATTN/RAKE BOARD

H5
 8 PIN HEADER
 RIGHT ANGLE

H2
 HEADER 7X2

K1
 K2
 K3
 K4
 K5
 K6
 K7
 K8

H4 .100"
 RIGHT ANGLE

1 TWT+
 2 TWT-
 3 MID+
 4 MID-
 5 WOF+
 6 WOF-
 7 SUB+
 8 SUB-

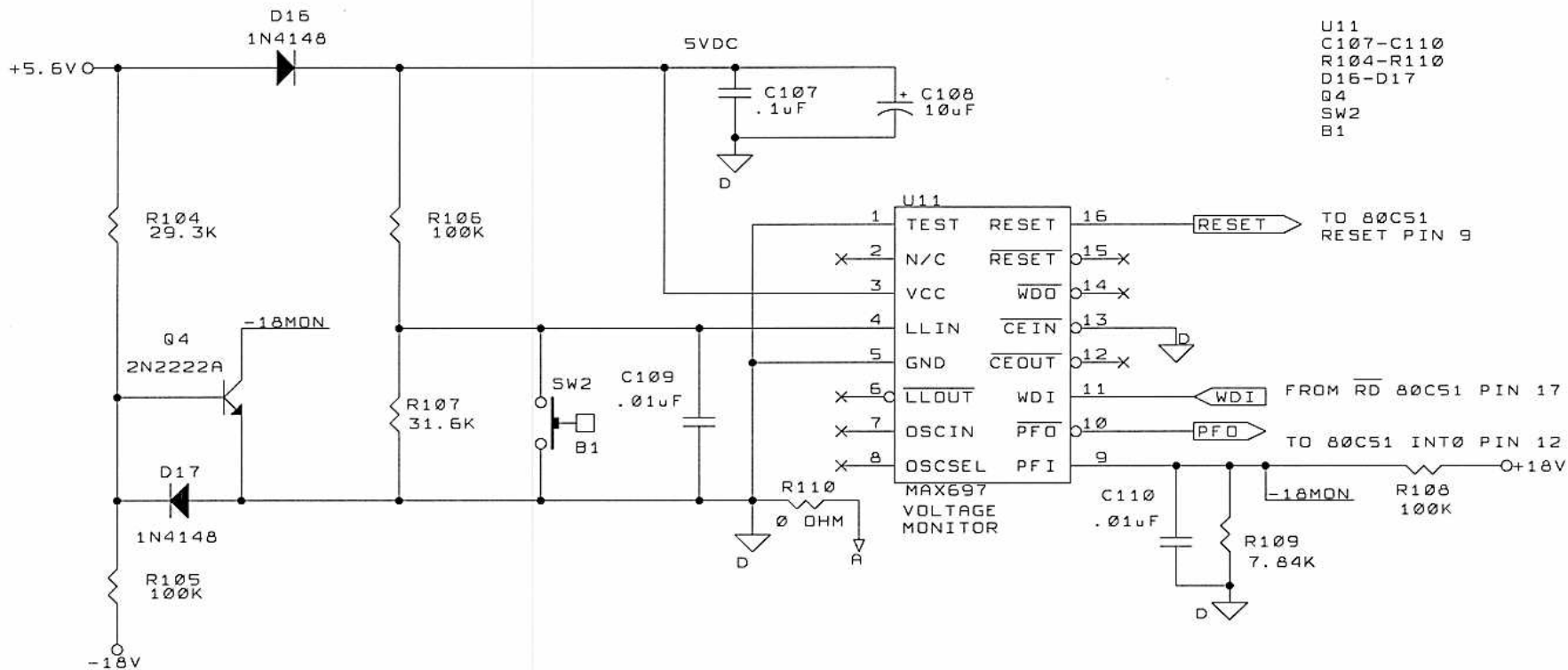
FROM TRANSDUCERS/PWR AMP OUT

NOTES:

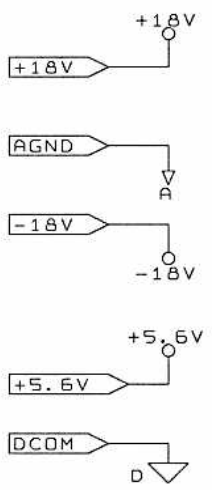
1. ASSY-350-0006-000 REV B
 PCB # 413-0006-000 REV B
2. SEE RS232/485 DRIVER SHEET FOR
 HEADER H6.

CONNECTIONS / REGULATORS

APOGEE ACOUSTICS INC.		
Title GRAND DAX - CONTROL / POLARITY BOARD		
Size A	Document Number APGR201B.SCH	REV B
Date: March 16, 1992	Sheet 1 of	13



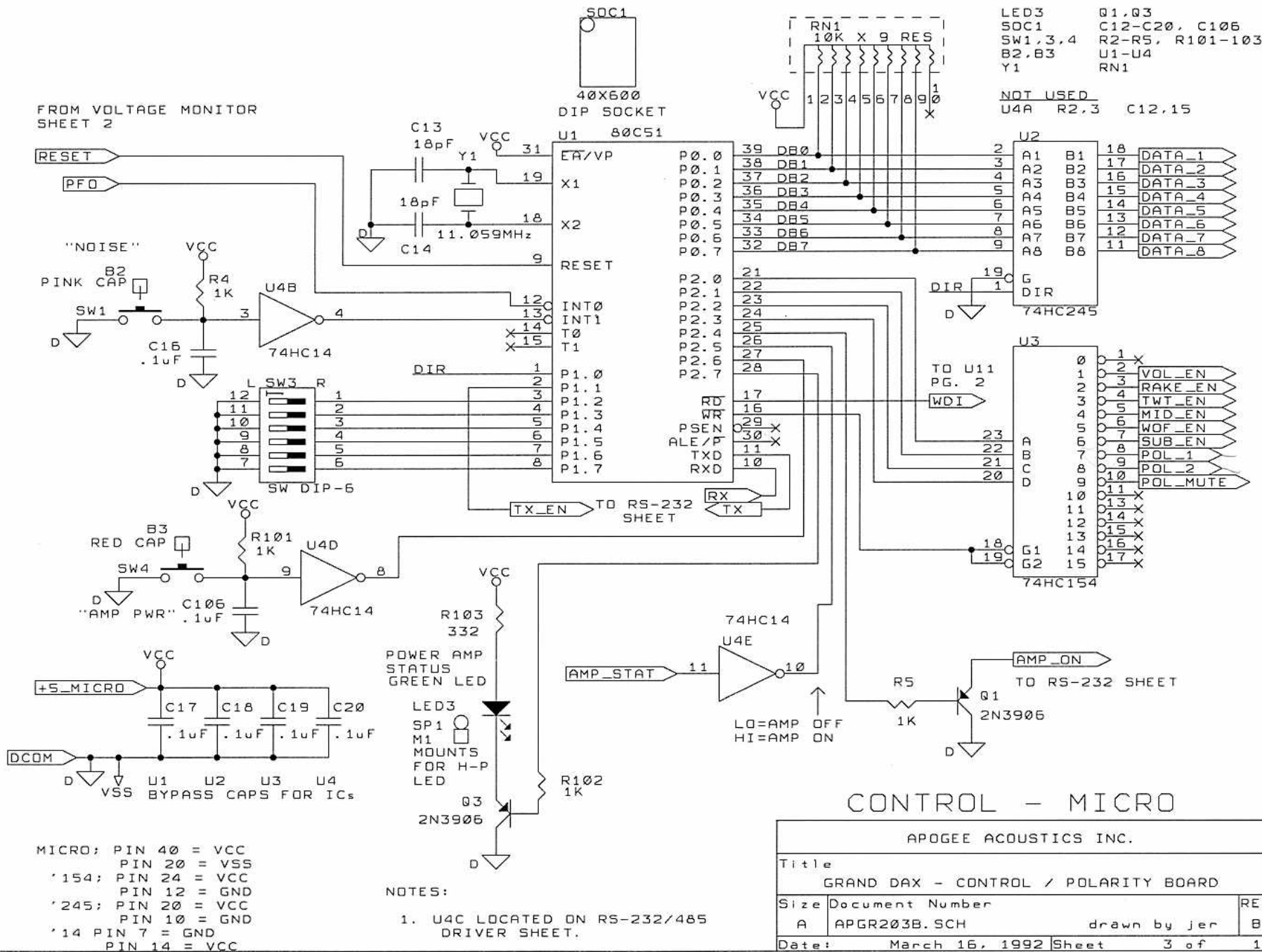
U11
 C107-C110
 R104-R110
 D15-D17
 Q4
 SW2
 B1



VOLTAGE MONITOR

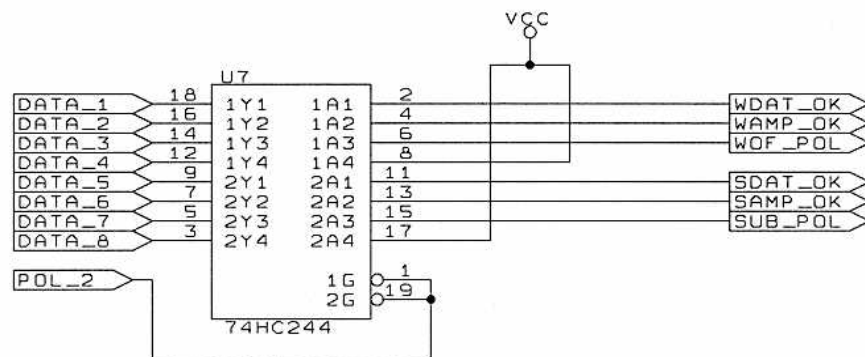
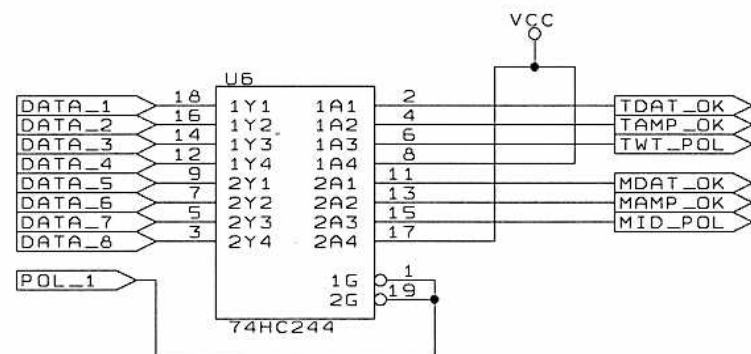
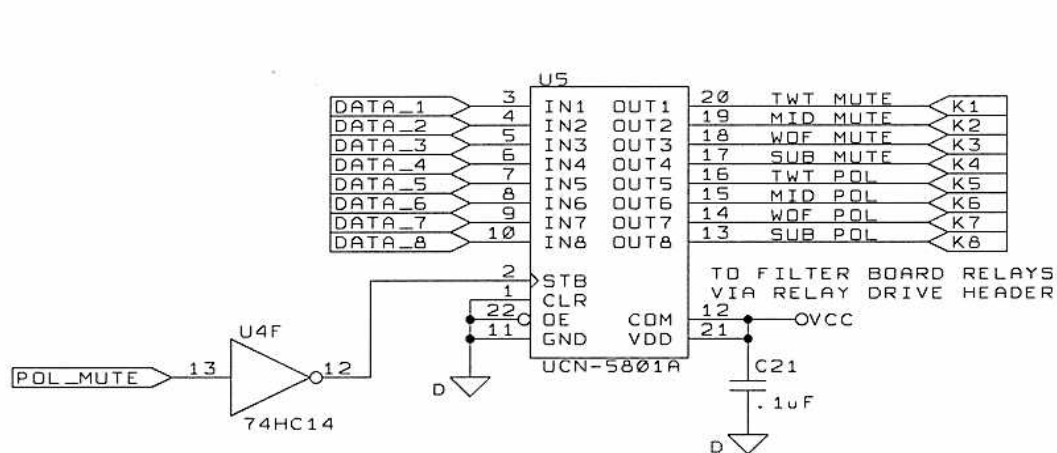
APOGEE ACOUSTICS INC.		
Title GRAND DAX - CONTROL / POLARITY BOARD		
Size A	Document Number APGR202B.SCH rev by jer	REV B
Date:	March 16, 1992	Sheet 2 of 13

FROM VOLTAGE MONITOR
SHEET 2

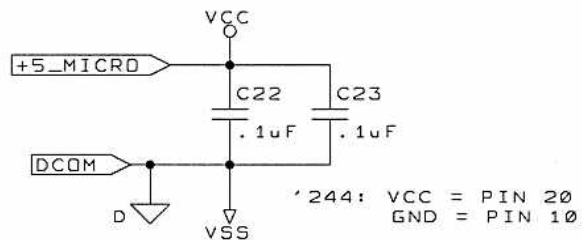


Title		
GRAND DAX - CONTROL / POLARITY BOARD		
Size	Document Number	REV
A	APGR203B.SCH	drawn by jer B
Date:	March 16, 1992	Sheet 3 of 13

U4-U7
C21-C23

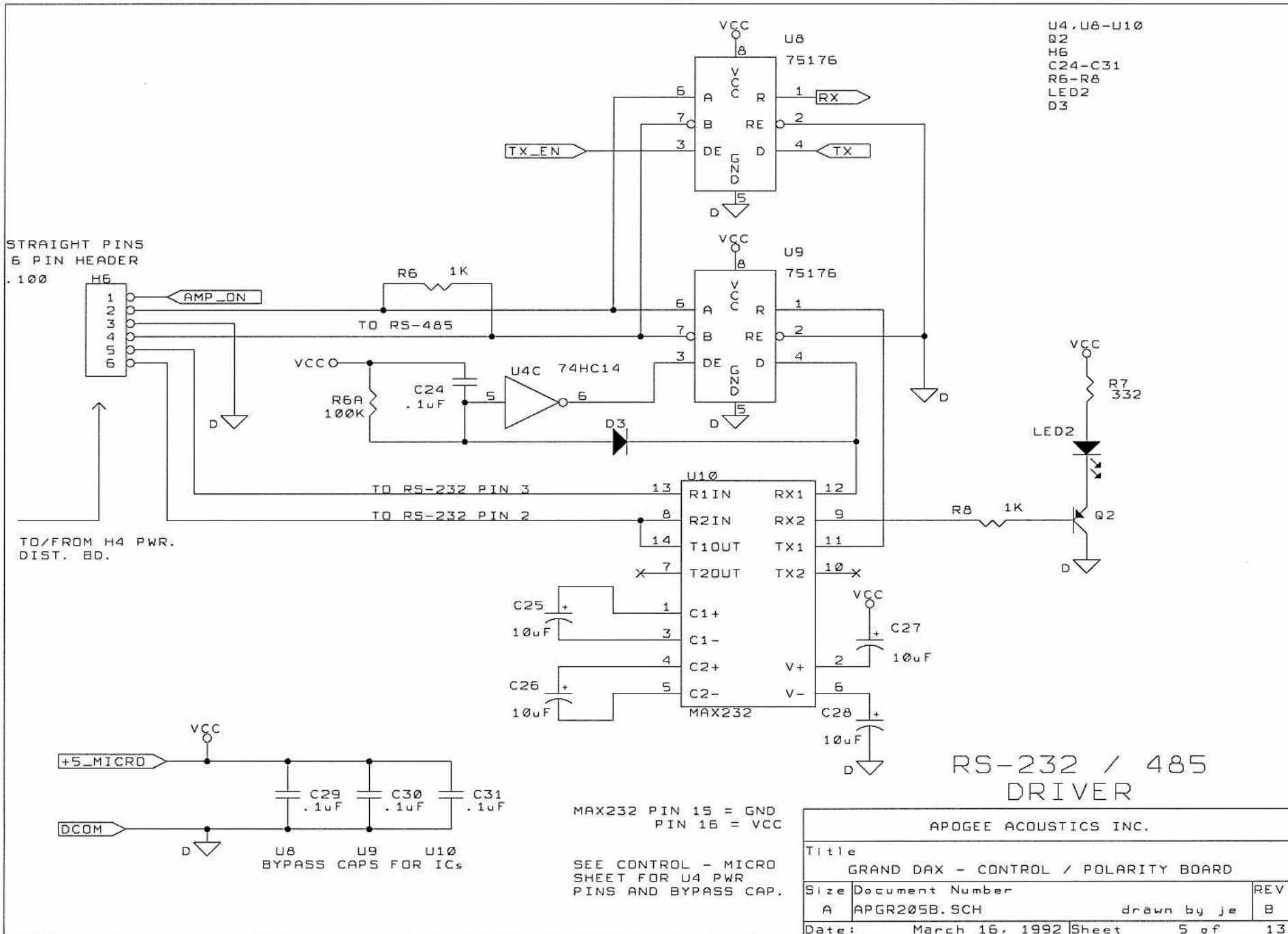


BYPASS CAPS FOR '244s



CONTROL - MISC.

APOGEE ACOUSTICS INC.		
Title GRAND DAX - CONTROL / POLARITY BOARD		
Size A	Document Number APGR204B.SCH	REV B
Date:	March 16, 1992	Sheet 4 of 13



- U4, U8-U10
- Q2
- H6
- C24-C31
- R6-R8
- LED2
- D3

STRAIGHT PINS
6 PIN HEADER
.100

TO/FROM H4 PWR.
DIST. BD.

RS-232 / 485 DRIVER

APOGEE ACOUSTICS INC.

MAX232 PIN 15 = GND
PIN 16 = VCC

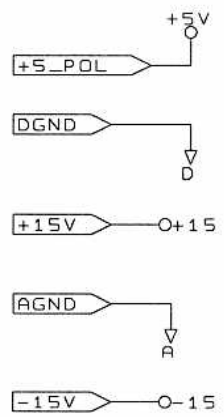
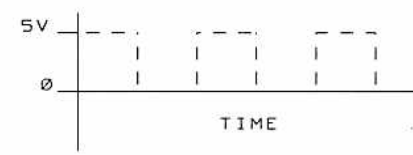
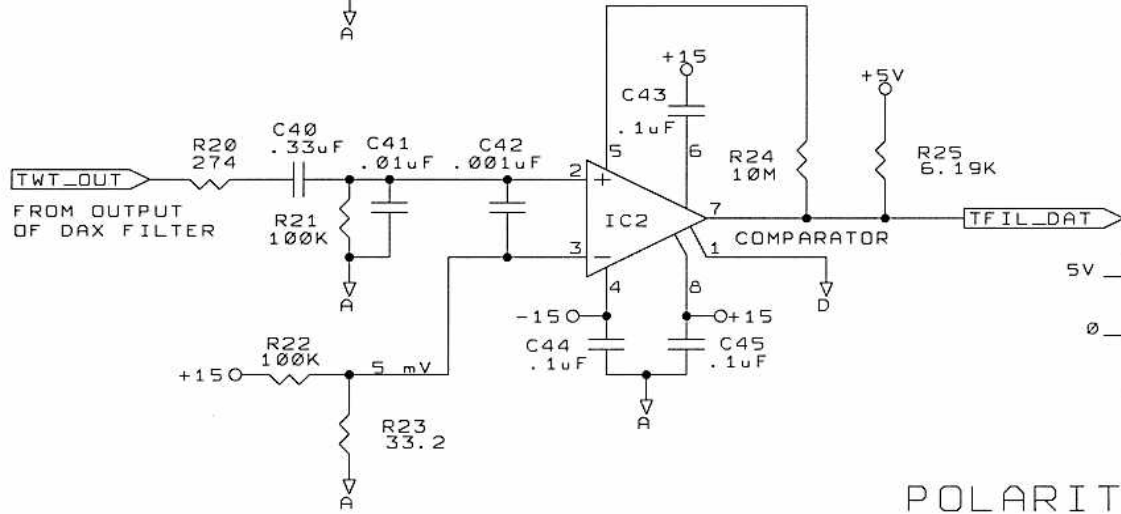
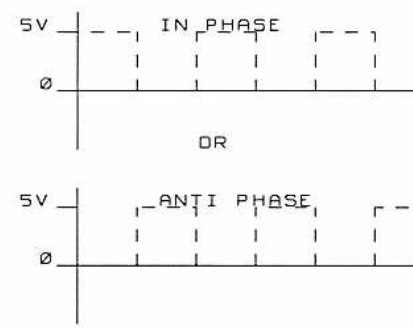
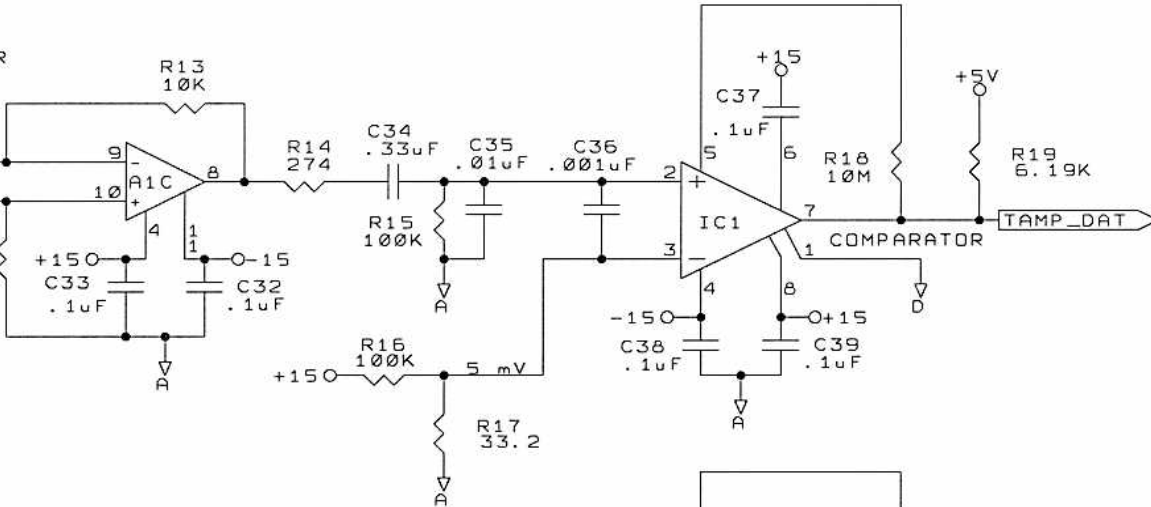
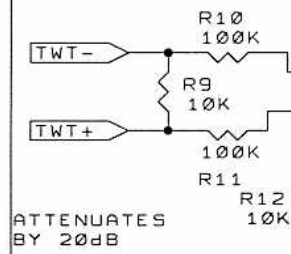
SEE CONTROL - MICRO
SHEET FOR U4 PWR
PINS AND BYPASS CAP.

U8 U9 U10
BYPASS CAPS FOR ICs

Title			GRAND DAX - CONTROL / POLARITY BOARD		
Size	Document Number	A APGR205B.SCH		drawn by	je
Date:	March 16, 1992	Sheet	5 of	REV	B

R1
IC1-IC2
R9-R25
C32-C45

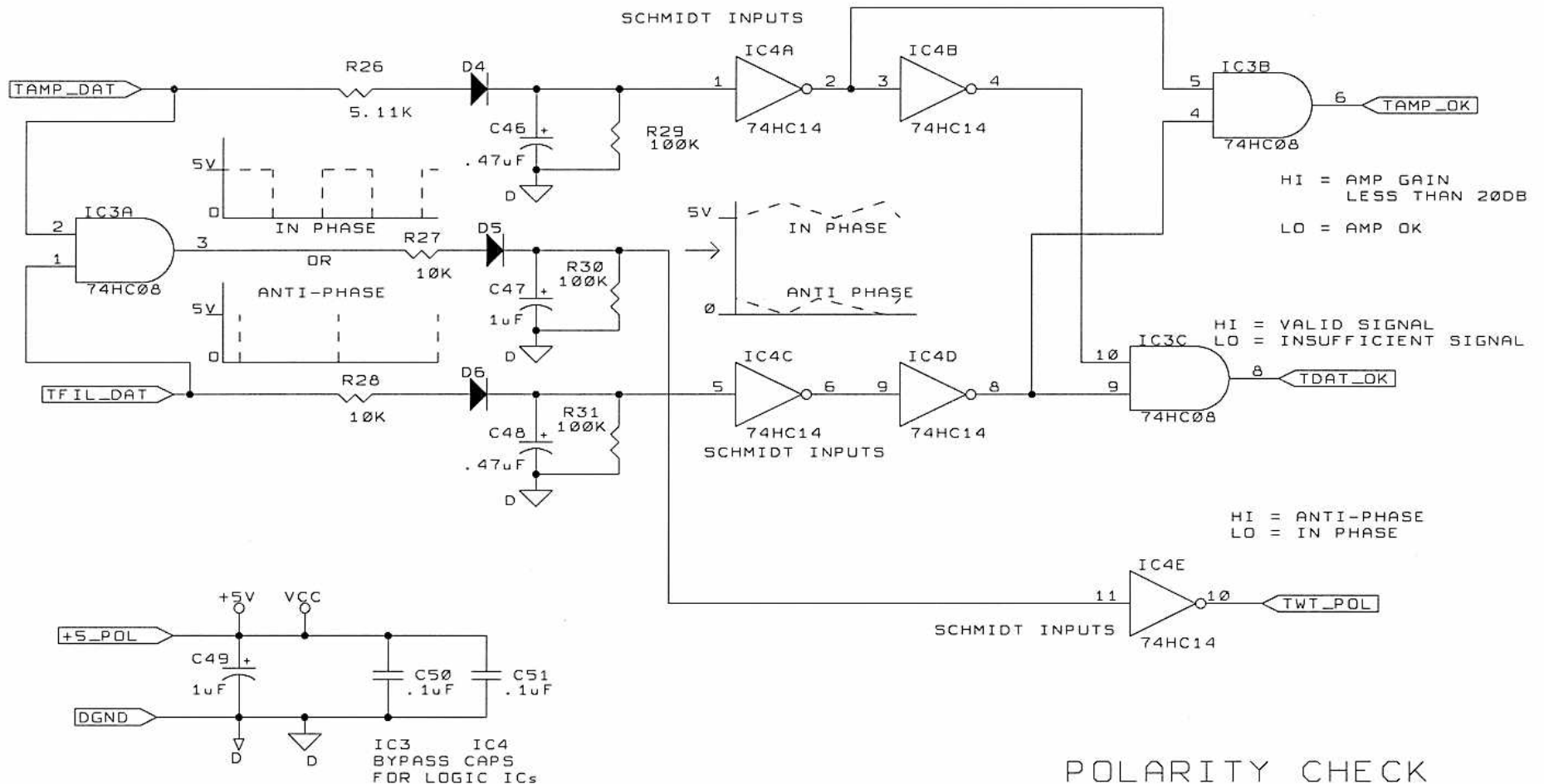
FROM TWT TRANSDUCER



POLARITY CHECK TWEETER - INPUT

APOGEE ACOUSTICS INC.			
Title GRAND DAX - CONTROL / POLARITY BOARD			
Size	Document Number	drawn by je	REV
A	APGR206B.SCH		B
Date:	March 16, 1992	Sheet	6 of 13

IC3-IC4
D4-D6
R26-R31
C46-C51



NOTES:

1. ANTI PHASE OUTPUT SPIKES RESULT FROM SLIGHT PHASE ERRORS THROUGH POWER AMP.
2. 14 PIN LOGIC ICs: PIN 7 = DGND
PIN 14 = VCC

POLARITY CHECK
TWEETER - OUTPUT

APOGEE ACOUSTICS INC.		
Title GRAND DAX - CONTROL / POLARITY BOARD		
Size	Document Number	REV
A	APGR207B.SCH	drawn by je B
Date:	March 16, 1992	Sheet 7 of 13

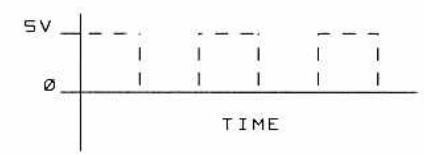
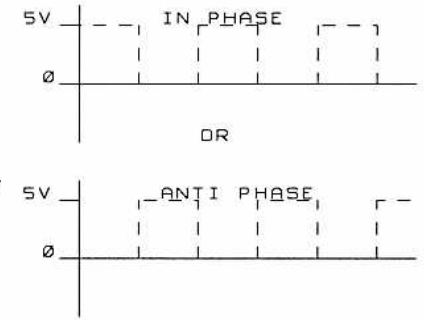
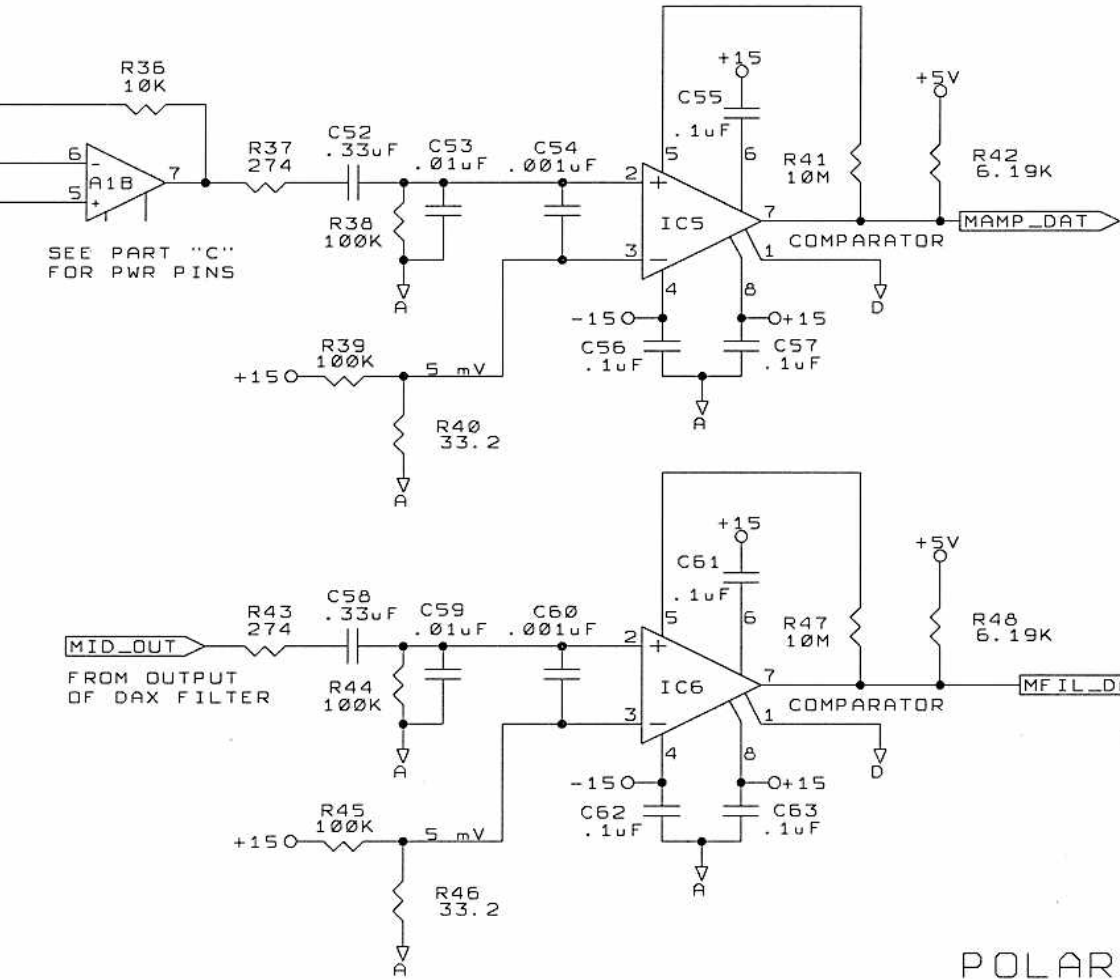
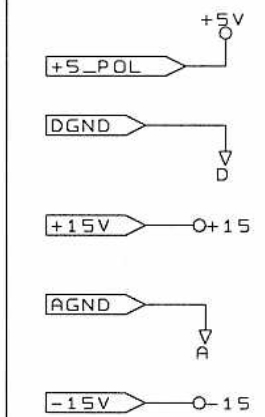
IC5-IC6
A1
R32-R48
C52-C63

FROM MID TRANSDUCER

MID-
MID+
ATTENUATES BY 20dB

SEE PART "C" FOR PWR PINS

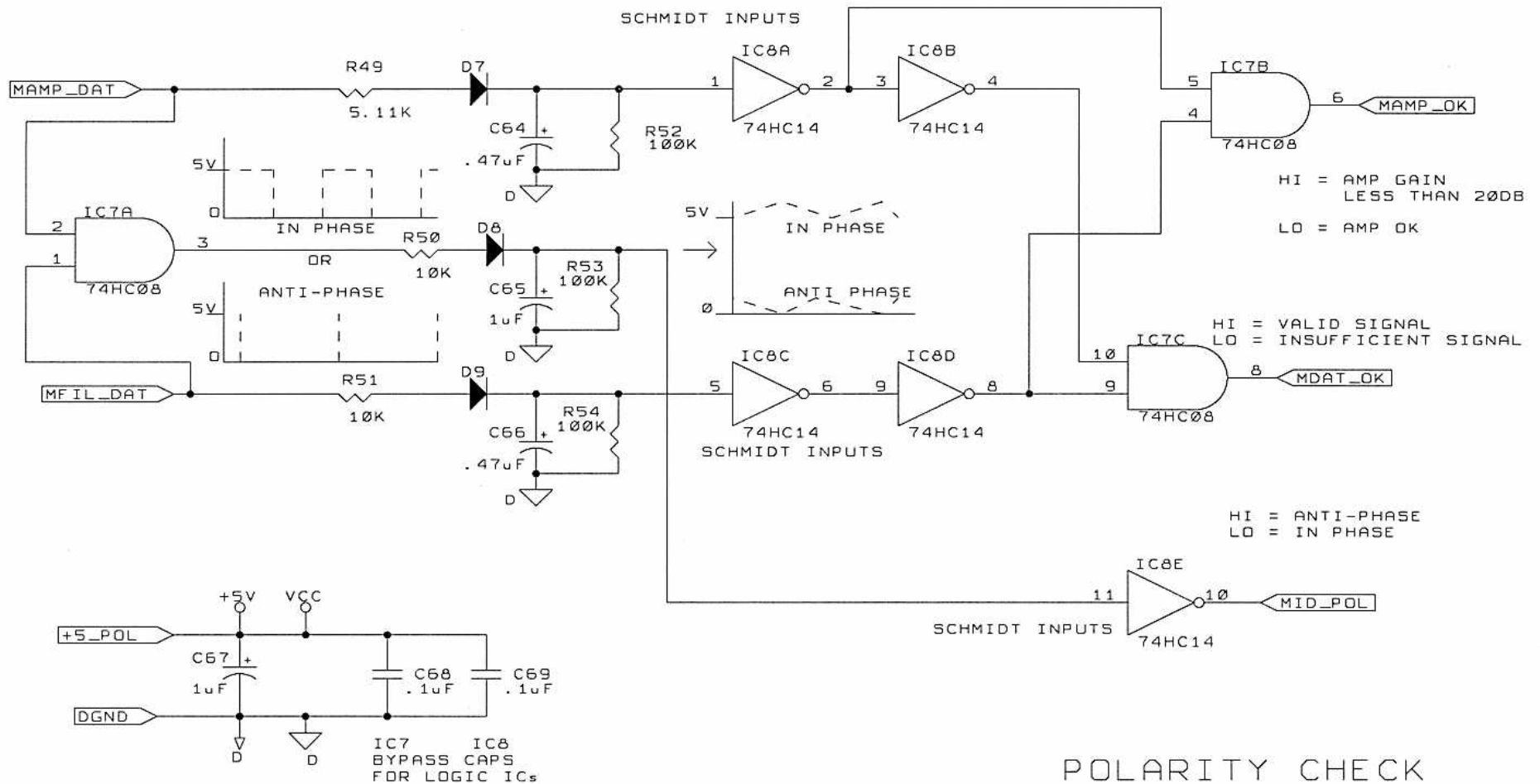
MID_OUT
FROM OUTPUT OF DAX FILTER



POLARITY CHECK
MID-RANGE / INPUT

APOGEE ACOUSTICS INC.			
Title GRAND DAX - CONTROL / POLARITY BOARD			
Size	Document Number	drawn by je	REV
A	APGR208B.SCH		B
Date:	March 16, 1992	Sheet	8 of 13

IC7-IC8
D7-D9
R49-R54
C64-C69



NOTES:

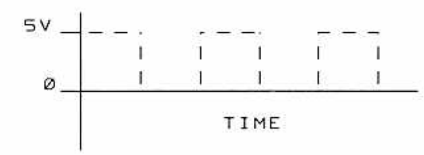
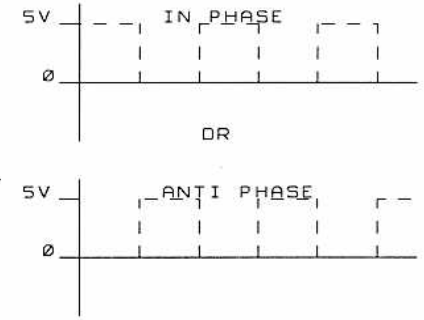
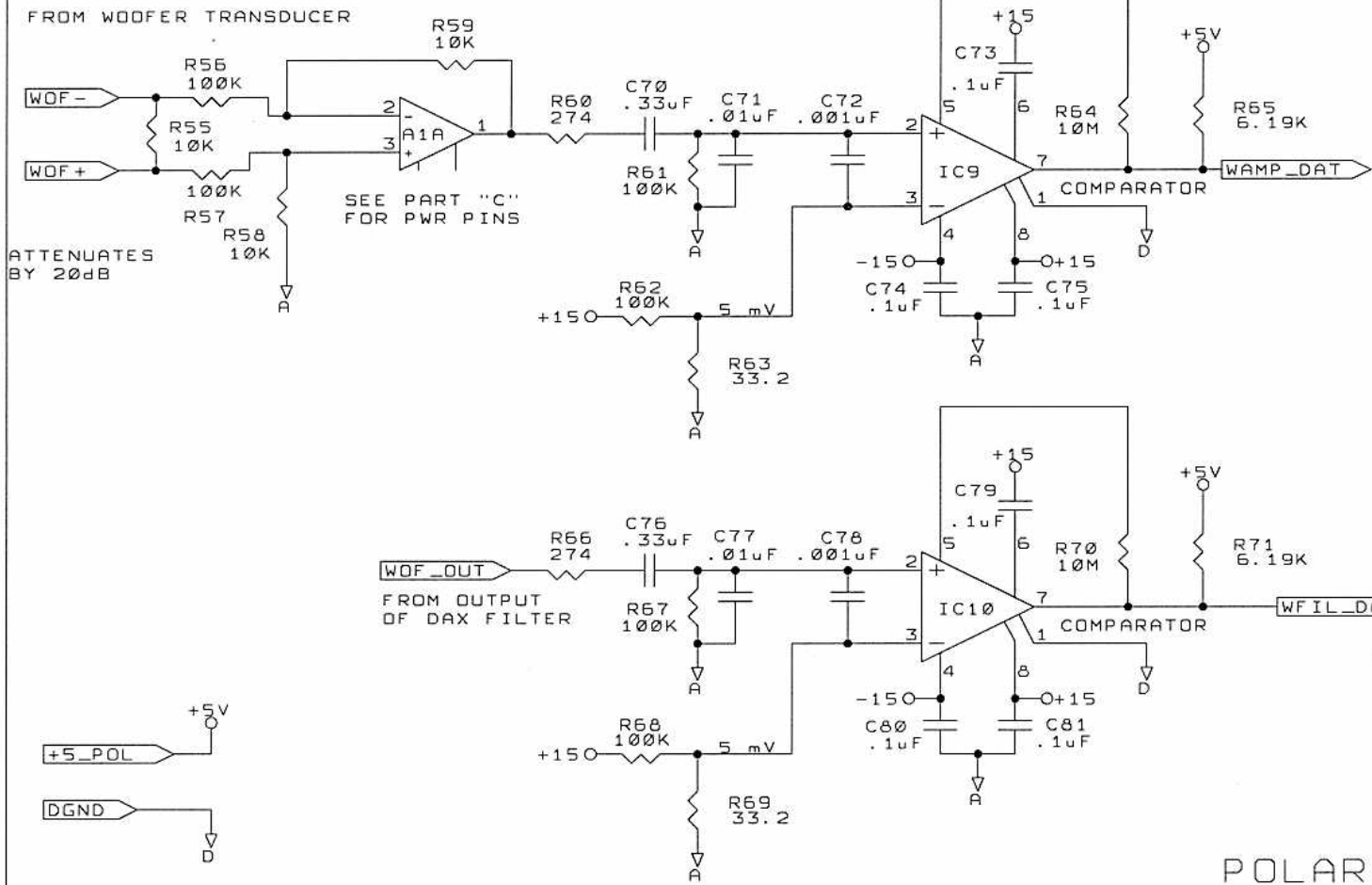
1. ANTI PHASE OUTPUT SPIKES RESULT FROM SLIGHT PHASE ERRORS THROUGH POWER AMP.
2. 14 PIN LOGIC ICs: PIN 7 = DGND
PIN 14 = VCC

POLARITY CHECK
MID-RANGE / OUTPUT

APOGEE ACOUSTICS INC.

Title			REV
GRAND DAX - CONTROL / POLARITY BOARD			B
Size	Document Number	drawn by je	
A	APGR209B.SCH	B	
Date:	March 16, 1992	Sheet	9 of 13

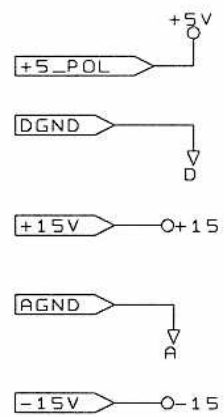
IC9-IC10
A1
C70-C81
R55-R71



ATTENUATES BY 20dB

SEE PART "C" FOR PWR PINS

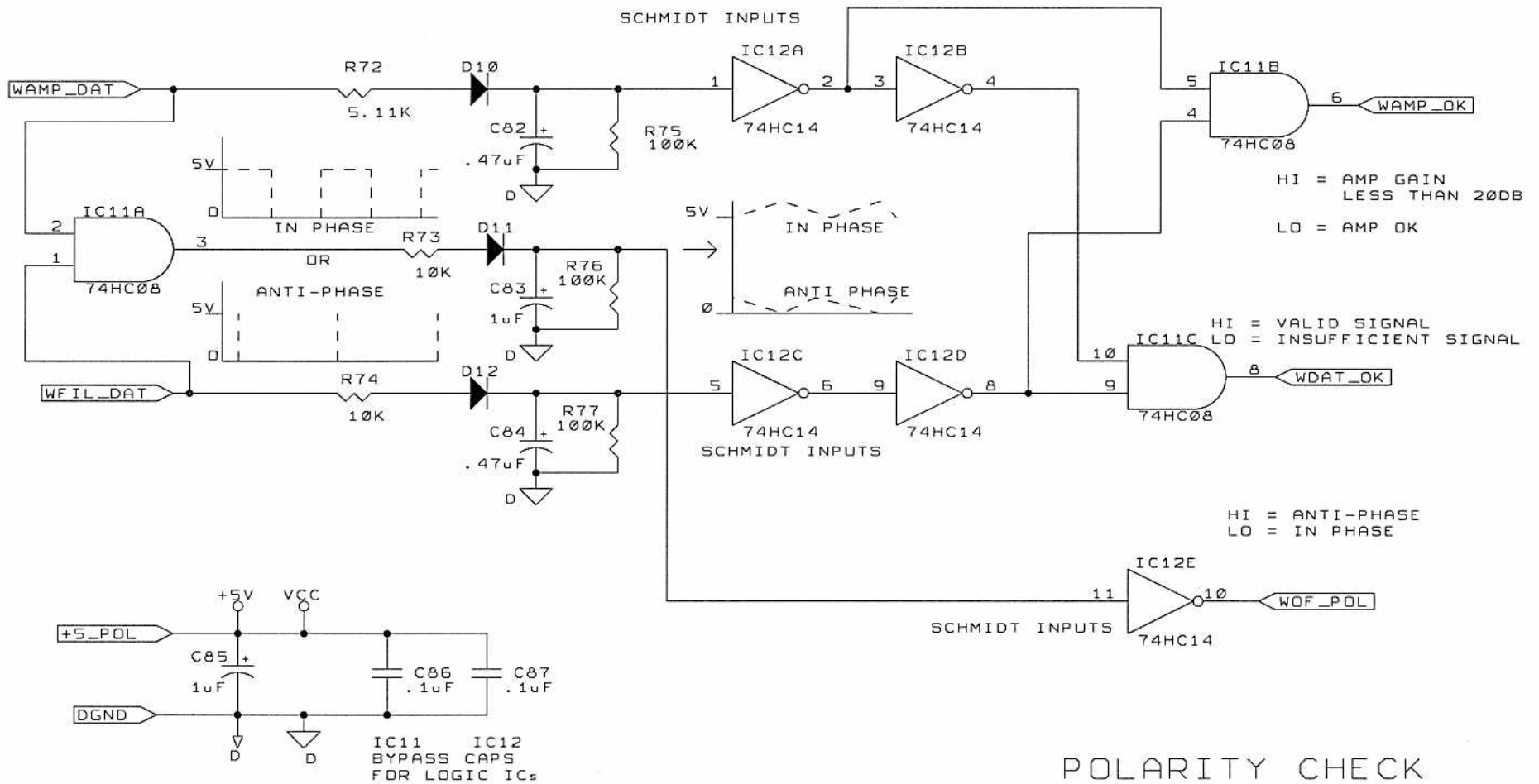
FROM OUTPUT OF DAX FILTER



POLARITY CHECK WOOFER / INPUT

APOGEE ACOUSTICS INC.		
Title GRAND DAX - CONTROL / POLARITY BOARD		
Size A	Document Number APGR210B.SCH	REV B
Date: March 16, 1992	Sheet 10 of	13

IC11-IC12
D10-D12
R72-R77
C82-C87



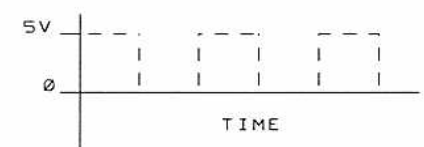
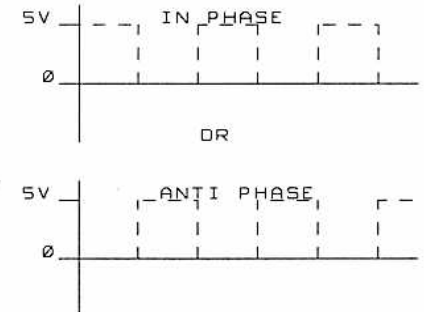
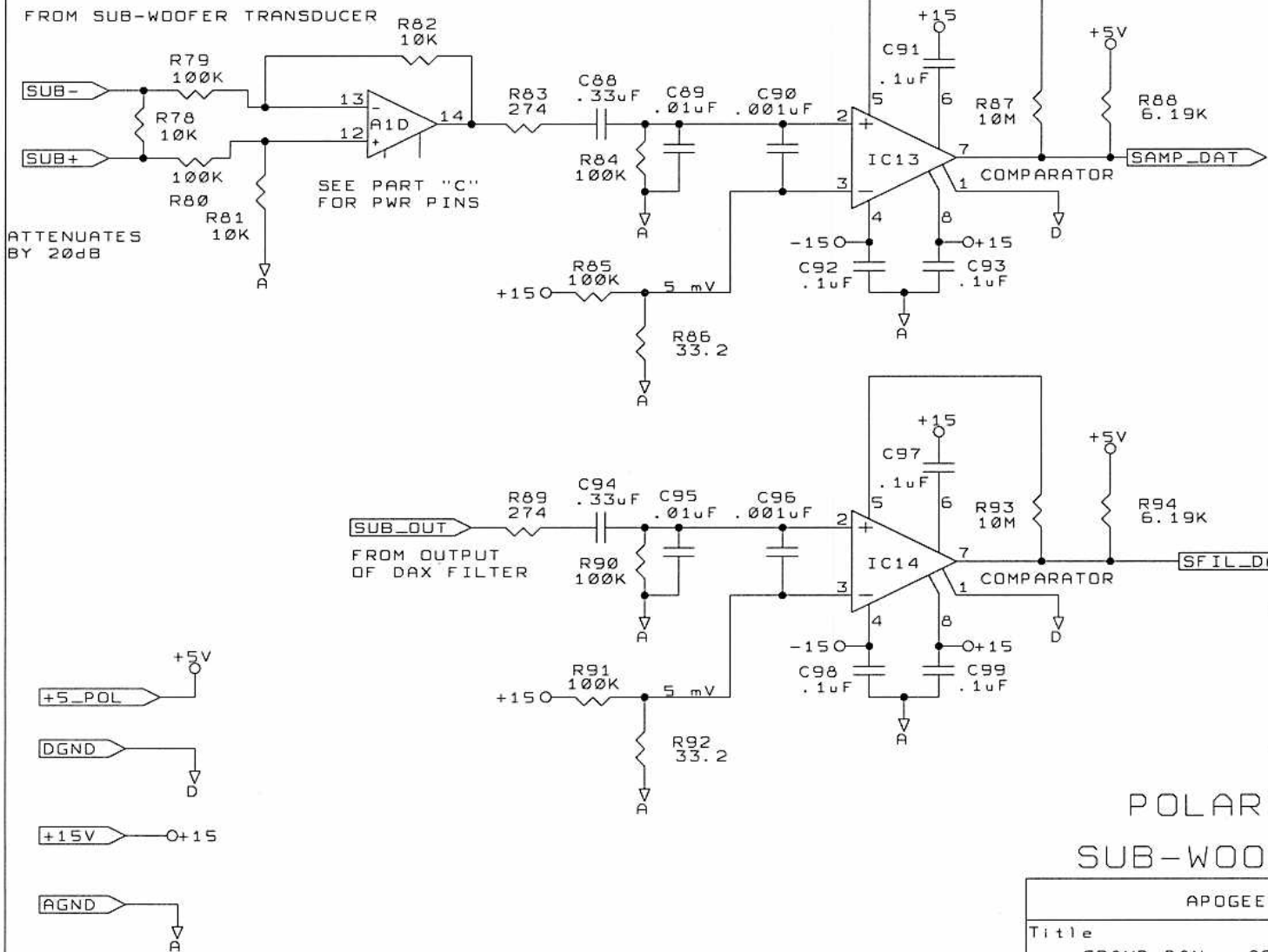
NOTES:

1. ANTI PHASE OUTPUT SPIKES RESULT FROM SLIGHT PHASE ERRORS THROUGH POWER AMP.
2. 14 PIN LOGIC ICs: PIN 7 = DGND
PIN 14 = VCC

POLARITY CHECK
WOOFER / OUTPUT

APOGEE ACOUSTICS INC.		
Title GRAND DAX - CONTROL / POLARITY BOARD		
Size A	Document Number APGR211B.SCH	REV B
Date: March 16, 1992	Sheet 11 of	13

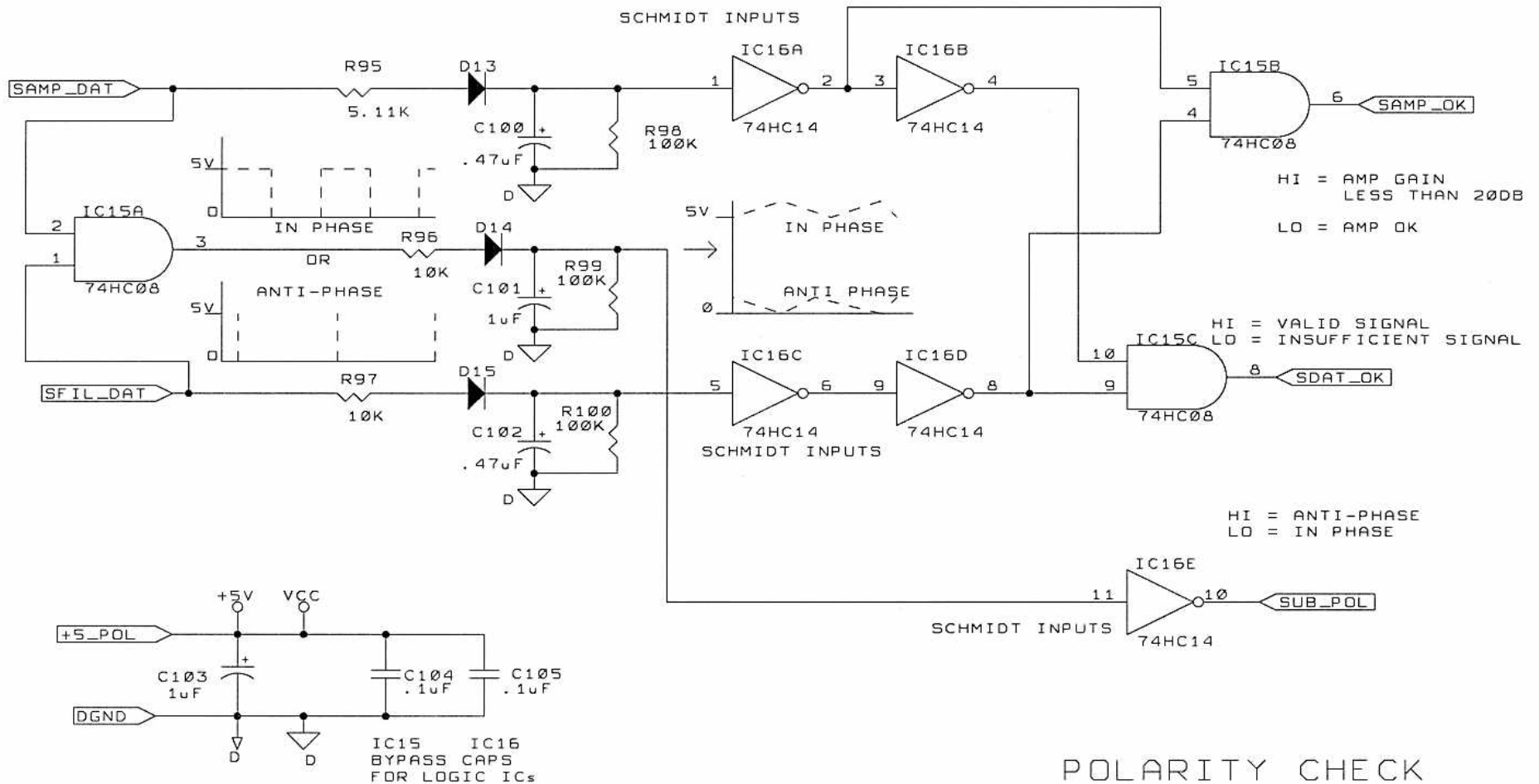
A1
IC13-IC14
C88-C99
R78-R94



POLARITY CHECK SUB-WOOFER / INPUT

APOGEE ACOUSTICS INC.		
Title GRAND DAX - CONTROL / POLARITY BOARD		
Size	Document Number	REV
A	APGR212B.SCH	B
Date:	March 16, 1992	Sheet 12 of 13
	drawn by je	

IC15-IC16
R95-R100
C100-C105
D13-D15



NOTES:

1. ANTI PHASE OUTPUT SPIKES RESULT FROM SLIGHT PHASE ERRORS THROUGH POWER AMP.
2. 14 PIN LOGIC ICs: PIN 7 = DGND
PIN 14 = VCC

POLARITY CHECK
SUB-WOOFER / OUTPUT

APOGEE ACOUSTICS INC.		
Title GRAND DAX - CONTROL / POLARITY BOARD		
Size	Document Number	REV
A	APGR213B.SCH drawn by jer	B
Date:	March 16, 1992	Sheet 13 of 13

GRAND DAX - CONTROL / POLARITY BOARD REV B

ASSY-350-0006-000 REV B

B.O.M.

THIS FILE: AWORKS - APGR200B.doc 16-MAR-92

FROM ORCAD FILES:

APGR201B.SCH (ROOT) 16-MAR-92
 APGR202B.SCH
 APGR203B.SCH
 APGR204B.SCH
 APGR205B.SCH
 APGR206B.SCH APGR207B.SCH
 APGR208B.SCH APGR209B.SCH
 APGR210B.SCH APGR211B.SCH
 APGR212B.SCH APGR213B.SCH

* INDICATES CHANGED FROM 16-DEC-91, 12-FEB-92 OR 5-MAR-92 PRINTING

Item	Quantity	Reference	Part
1	8	C46,C48,C64,C66,C82,C84, C100,C102	.47uF 35WVDC 10% TANT SPRG #150D474X9035A2 MLRY #CS13BF474K AXIAL .135D X .422L X .020LD .600 CTRS/BD
		ALTERNATE	35WVDC 10% TANT SPRG # 199D474X9035AA1 NEMCO # TB .47/35K1 RADIAL .177D X .340H X .020LD X .100LS .100 CTRS/BD
2	10	C5,C6,C47,C49,C65,C67, C83,C85,C101,C103	1uF 35WVDC 10% TANT SPRG #150D105X9035A2 MLRY #CS13BF105K AXIAL .135D X .422L X .020LD .600 CTRS/BD
		ALTERNATE	35WVDC 10% TANT SPRG # 199D105X9035AA1 NEMCO # TB 1/35K1

RADIAL .177D X .340H X .020LD
 X .100LS
 .100 CTRS/BD

3 3 C1,C2,C11

10uF
 35WVDC 10%
 TANT
 SPRG # 150D106X9035R2
 MLRY # CS13BF106K
 AXIAL .289D X .822L X .025LD
 1.10" CTRS/BD

ALTERNATE

USE SAME PART CALLED OUT FOR
 C25... BELOW

* 4 5 C25,C26,C27,C28
 C108

10uF
 25WVDC 20%
 TANT
 SPRG # 199D106X0025CA1
 RADIAL .216D X .360H X .025LD
 .100" CTRS/BD
 C108 HAS DUAL FOOTPRINT - .1 AND
 .250" LEADSPACING

5 2 C7,C9

100uF
 10WVDC 10%
 TANT
 SPRG # 150D107X9010R2
 MLRY # CS13BC107K
 AXIAL .289D X .822L X .025LD
 1.10" CTRS/BD

ALTERNATE

10WVDC 10%
 TANT
 NEMCO # TB 100/10K 250
 MALLORY # TDC107K010WSG
 KEMET # T354G107K10AS
 AVX # TAP107K010HSB
 RADIAL .350D (max) X .650H (max)
 X .02LD X .250LS
 .250 CTRS/BD

6 2 C13,C14

18pF
 100VDC +/-10%
 CERAMIC NPO
 AVX # SR15 1A 180 KAA
 RADIAL .15W x .15H x .10T x
 .020LD X .1LS

7	8	C36, C42, C54, C60, C72, C78, C90, C96	.001uF 100WVDC +/-10% CERAMIC X7R AVX # SR151C102KAA RADIAL .15W x .15H x .10T x .02LD x .1LS
* 8	10	C35, C41, C53, C59, C71, C77, C89, C95, C109, C110	.01uF 100WVDC +/-10% CERAMIC X7R AVX # SR201C103KAA RADIAL .2W x .2H x .125T x .020LD x .1LS
* 9	52	C3, C4, C8, C10, C16, C17, C18, C19, C20, C21, C22, C23, C24, C29, C30, C31, C32, C33, C37, C38, C39, C43, C44, C45, C50, C51, C55, C56, C57, C61, C62, C63, C68, C69, C73, C74, C75, C79, C80, C81, C86, C87, C91, C92, C93, C97, C98, C99, C104, C105, C106, C107	.1uF 50WVDC +/-20% CERAMIC Z5U AVX # SR205E 104 MAA MEPCO # CZ20C 104 M RADIAL .2W x .2H x .125T x .020LD x .1LS
10	8	C34, C40, C52, C58, C70, C76, C88, C94	.33uF 100WVDC 1% POLYPRO REL-CAP # PPMT334G1A SOLE SOURCE AXIAL .260D X .680L X .025LD 1.00" CENTERS/BOARD
* 11	3	R1, R7, R103	332 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
* 12	40	R6A, R10, R11, R15, R16, R21, R22, R29, R30, R31, R33, R34, R38, R39, R44, R45, R52, R53, R54, R56, R57, R61, R62, R67, R68, R75, R76, R77, R79, R80, R84, R85, R90, R91, R98, R99, R100, R105, R106, R108	100K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD

13	6	R4, R5, R6, R8 R101, R102	1K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
14	20	R9, R12, R13, R27, R28, R32, R35, R36, R50, R51, R55, R58, R59, R73, R74, R78, R81, R82, R96, R97	10K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
15	8	R14, R20, R37, R43, R60, R66, R83, R89	274 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
16	8	R17, R23, R40, R46, R63, R69, R86, R92	33.2 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
17	8	R18, R24, R41, R47, R64, R70, R87, R93	10M 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
18	8	R19, R25, R42, R48, R65, R71, R88, R94	6.19K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD

19	4	R26,R49,R72,R95	5.11K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
<hr/>			
* 19A	1	R104	29.3K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
<hr/>			
* 19B	1	R107	31.6K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
<hr/>			
19C	1	R109	7.84KK 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
<hr/>			
* 19D	1	R110	0 OHM JUMPER 22 GA. WIRE .600" CTRS/BOARD
<hr/>			
20	1	RN1	10K X 9 RES THICK FILM BUSSED CONFIG BOURNES # 4610X-101-103 BECKMAN # L10-1C103 10 PIN SIP
<hr/>			
21	1	Y1	11.059MHZ QUARTZ CRYSTAL FOX # HC49S

DIGI-KEY # X426
 RADIAL .4W X .15H X .183T X
 .192LS X .019LD
 .2 CTRS/BD

* 22	3	LED1,LED2,LED3	LED - GREEN T1-3/4 H-P # HLMP 3502-009 LED1,2 MTD ON BOARD INTERNALLY LED3 SHOWS THROUGH PANEL
* 22b	1	M1	LED MOUNT FOR LED3 BIVAR # 909-235
* 22c	1	SP1	SPACER FOR M1 MOUNT FOR LED CENTERLINE OF .160" BIVAR # 905-060
23	2	D1,D2	DIODE 1N4007 GENERIC
* 24	15	D3,D4,D5,D6,D7,D8,D9,D10, D11,D12,D13,D14,D15 D16,D17	DIODE 1N4148 GENERIC
* 25	3	Q1,Q2,Q3	PNP TRANSISTOR 2N3906 GENERIC TO-92
* 25A	1	Q4	NPN TRANSISTOR 2N2222A GENERIC TO-18
26	1	L1	INDUCTOR 50 uH 10% MILLER # 5504 RADIAL 1.12W X .81H X .81T X .75LS X .042 LD
27	1	FILT1	NOISE FILTER MURATA # BNX002-01

28 1 H1
HEADER 15X2
STRAIGHT PINS
LATCH EJECT
3M # 3440-6202
.100 X .100 - .025 SQ. PINS

29 1 H2
HEADER 7X2
STRAIGHT PINS
LATCH EJECT
3M # 3314-6202
.100 X .100 X .025 SQ. PINS

30 1 H3
HEADER 5X2
STRAIGHT PINS
LATCH EJECT
3M # 3662-6202
.100 X .100 X .025 SQ. PINS

31 1 H4
8 PIN HEADER
RIGHT ANGLE
POL/FRIC LOCK
MOLEX # 22-12-2084
.100 CNTRS .025 SQ. PINS

32 1 H5
8 PIN HEADER
RIGHT ANGLE
POL/FRIC LOCK
MOLEX # 26-61-5080
.156 CNTRS .045 SQ. PINS

33 1 H6
6 PIN HEADER
STRAIGHT PINS
POL/FRIC LOCK
MOLEX # 22-11-2062
.100 CNTRS - .025 SQ. PINS

34 1 REG1
POS 15 REG
NATL # LM340AT-15
LIN TECH # LM340AT-15
TO-220
NO HEAT SINK

35 1 REG2
NEG 15 REG
NATL # LM320T-15
LIN TECH # LM320T-15
TO-220 PKG NO HEAT SINK

36	1	A1	OPAMP BURR BROWN # OPA404KP SOLE SOURCE 14 PIN 300 MIL DIP
----	---	----	---

37	8	IC1,IC2,IC5,IC6,IC9,IC10, IC13,IC14	COMPARATOR LINEAR TECH # LT1011CN8 8 X 300 MIL DIP
----	---	--	--

38	4	IC3,IC7,IC11,IC15	74HC08 QUAD AND GATE GENERIC 14 X 300 MIL DIP
----	---	-------------------	--

* 39	6	IC4,IC8,IC12,IC16 U4,U12	74HC14 HEX SCHMIDT INVERTER GENERIC 14 X 300MIL DIP
------	---	-----------------------------	--

* 40	1	U1 SEE SOC1 SOCKET	80C51 MICROPROCESSOR SIGNETICS # SC87C51-CCN40 40 X 600 MIL DIP
------	---	---------------------------	--

41	1	U2	74HC245 GENERIC 20 X 300 MIL DIP
----	---	----	--

* 42	1	U3	74HC154 - SKINNY DIP GENERIC 24 X 300 MIL DIP
------	---	----	---

43	1	U5	UCN-5801A LATCHED DRIVER 8 BITS SPRAGUE # UCN-5801A 22 X 400 MIL DIP
----	---	----	--

44	2	U6,U7	74HC244 OCTAL TRI-STATE BUFFER GENERIC 20 X 300 MIL DIP
----	---	-------	--

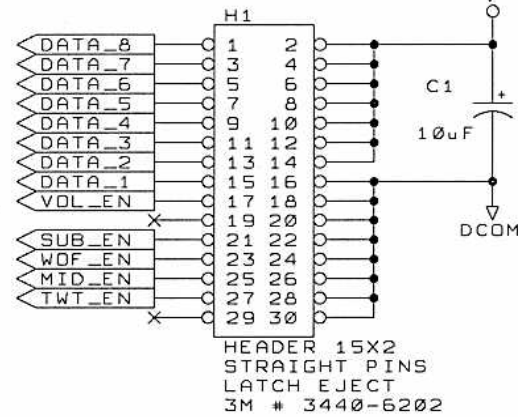
45	2	U8,U9	75176 RS-485 TRANSCEIVER TI # SN75176B 8 X 300 MIL DIP
46	1	U10	MAX232 RS-232 DRIVER/REC MAXIM # MAX232 16 X 300 MIL DIP
* 46A	1	U11	MAX697 VOLTAGE MONITOR MAXIM # MAX697CPE 16 X 300 MIL DIP
* 47	1	B1	WHT CAP FOR SW2 .39 DIA. ALCO # C-22-9
* 48	1	B2	PINK CAP FOR SW1 .39 DIA. ALCO # C-22-12
* 48a	1	B3	RED CAP FOR SW4 .39 DIA. ALCO # C-22-2
49	3	SW1,SW2,SW4	PUSHBUTTON RIGHT ANGLE MOMENTARY SPDT ALCO # MPS-103F-RA
50	1	SW3	SW DIP-6 AMP # 5-435166-1 12 X 300 MIL DIP .68L X .38W X .29H
* 51	1	SOC1	40 PIN 600 MIL SOCKET AUGAT # 540-AG10D
* 52	1	PC1	CONTROL/POLARITY PRINTED PCB APOGEE # PCB 413-0006-000 REV B

DRCAD IV FLAT FILE LINK

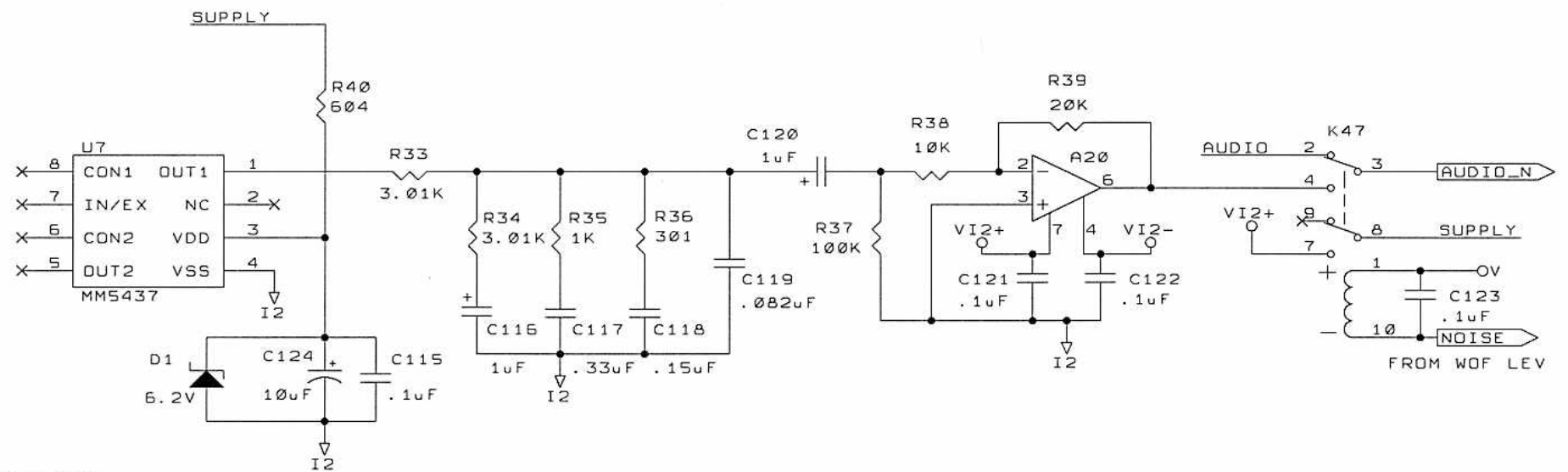
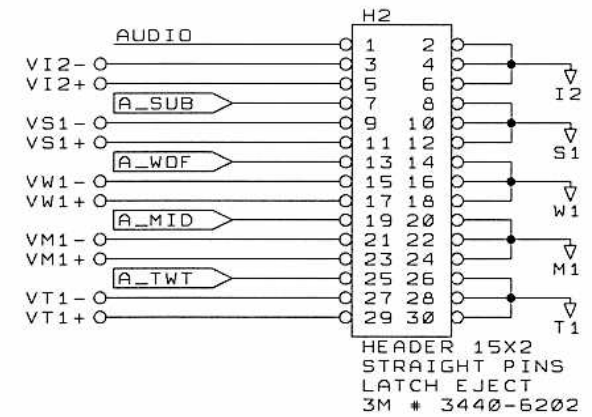
ILINK
 IAPGR102B.SCH
 IAPGR103B.SCH
 IAPGR104B.SCH
 IAPGR105B.SCH
 IAPGR106B.SCH
 IAPGR107B.SCH
 IAPGR108B.SCH
 IAPGR109B.SCH
 IAPGR110B.SCH

"RAKE ENABLE"
 IS NOT USED

FROM H1 CONT/POL BOARD



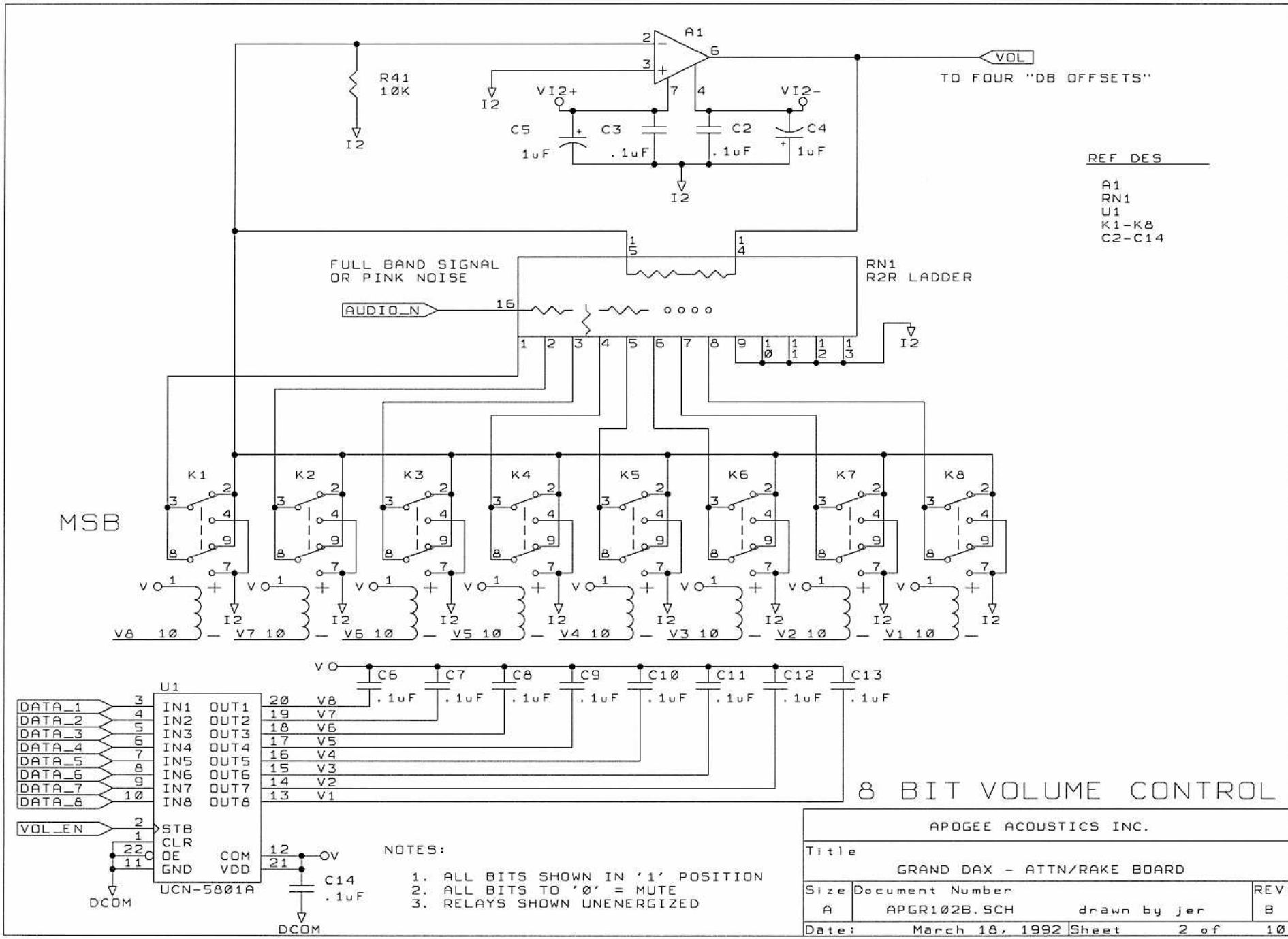
TO/FROM H1 FILTER BOARD



REF DES.
 H1-H2
 A20
 U7
 D1
 K45
 C1, C114-C124
 R33-R40

NOISE GENERATOR
 AND
 CONNECTOR SHEET

APOGEE ACOUSTICS INC.		
ASSY-350-0005-000 REV B		
PCB-413-0005-000 REV B		
Title GRAND DAX - ATTN/RAKE BOARD		
Size A	Document Number APGR101B.SCH drawn by jer	REV B
Date: March 18, 1992	Sheet 1 of	10



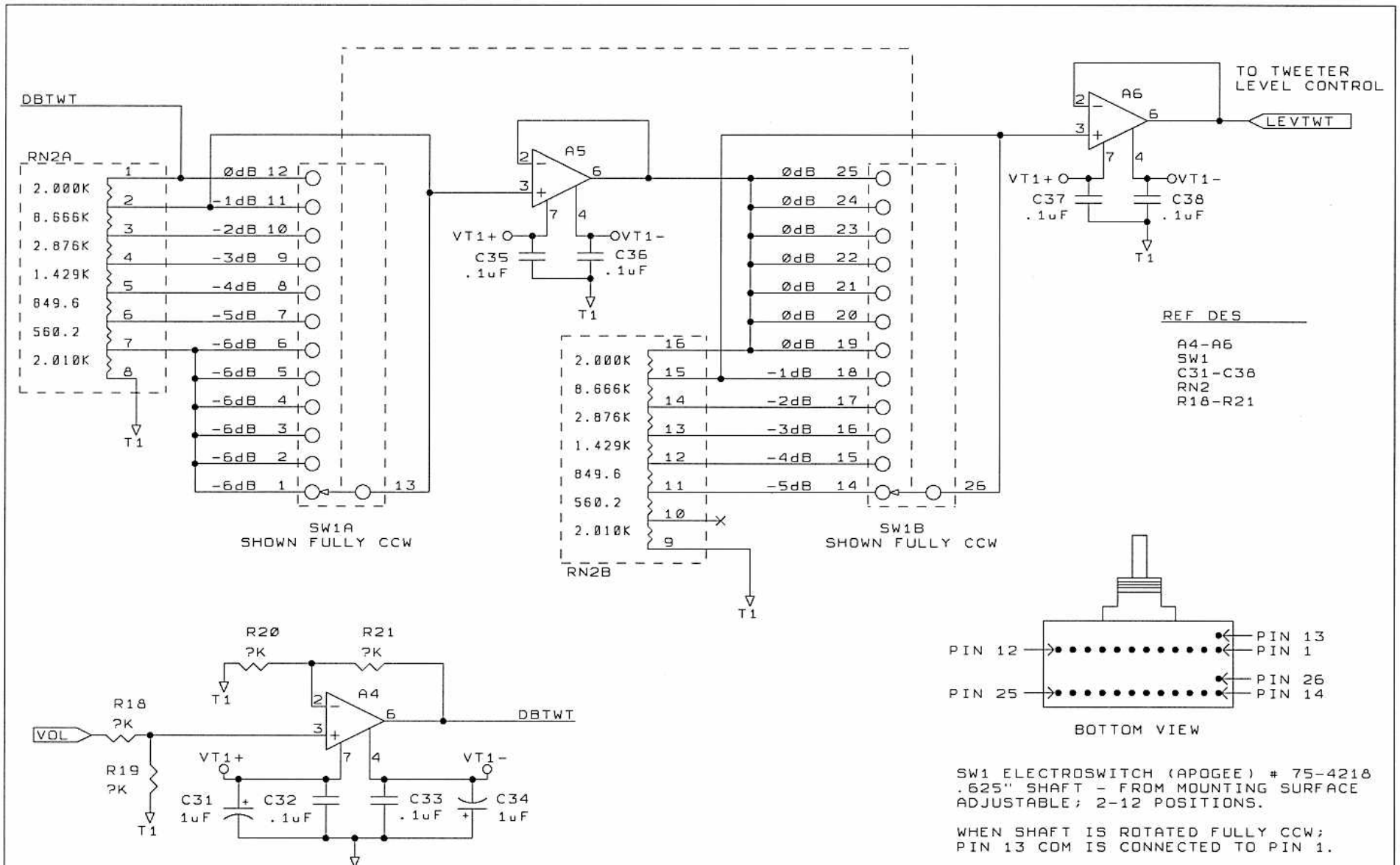
REF DES
 A1
 RN1
 U1
 K1-K8
 C2-C14

8 BIT VOLUME CONTROL

APOGEE ACOUSTICS INC.

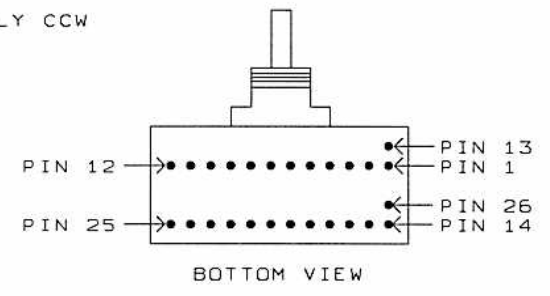
Title		
GRAND DAX - ATTN/RAKE BOARD		
Size	Document Number	REV
A	APGR102B.SCH drawn by jer	B
Date:	March 18, 1992	Sheet 2 of 10

- NOTES:
1. ALL BITS SHOWN IN '1' POSITION
 2. ALL BITS TO '0' = MUTE
 3. RELAYS SHOWN UNENERGIZED



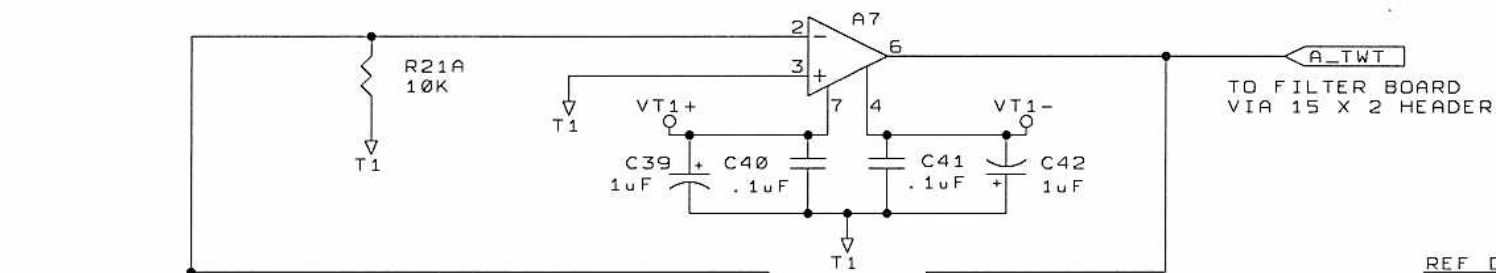
- REF DES
- A4-A6
 - SW1
 - C31-C38
 - RN2
 - R18-R21

TWEETER
dB OFFSET
BP1 - 11dB

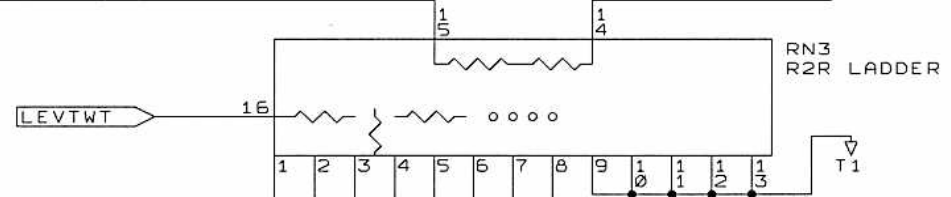


SW1 ELECTROSWITCH (APOGEE) # 75-4218
.625" SHAFT - FROM MOUNTING SURFACE
ADJUSTABLE; 2-12 POSITIONS.
WHEN SHAFT IS ROTATED FULLY CCW;
PIN 13 COM IS CONNECTED TO PIN 1.

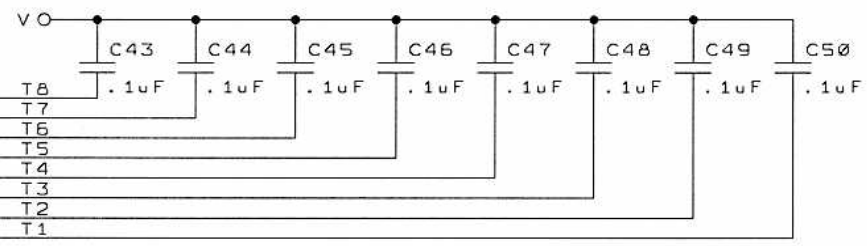
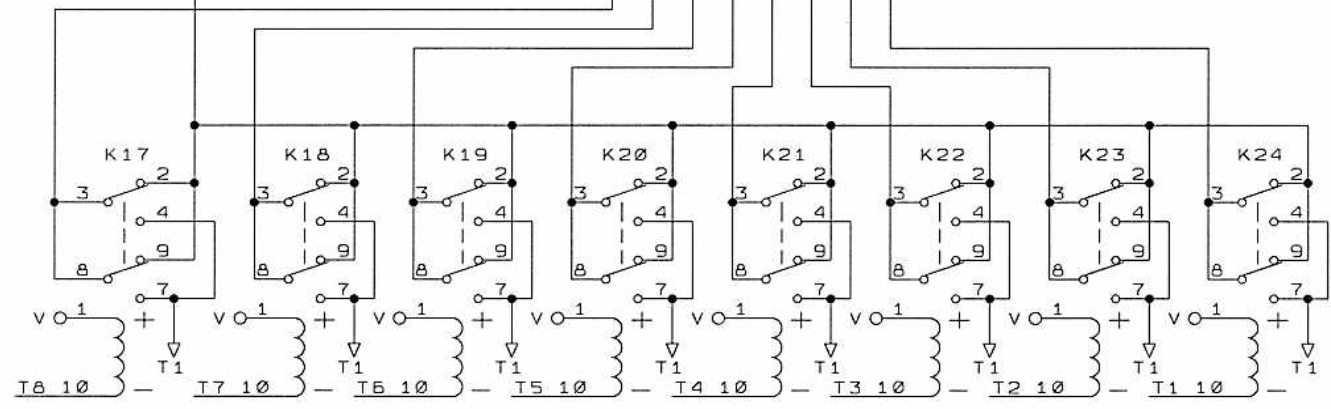
APOGEE ACOUSTICS INC.		
Title GRAND DAX ATTN/RAKE BOARD		
Size A	Document Number APGR103B.SCH drawn by Jer	REV B
Date: March 18, 1992	Sheet 3 of	10



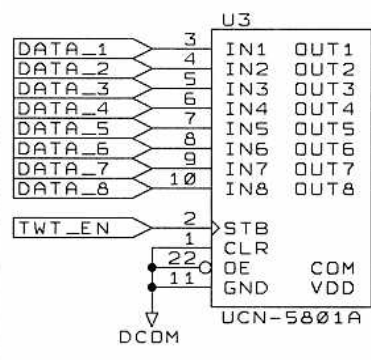
REF DES
 A7
 U3
 RN3
 R2R LADDER
 C39-C51
 K17-K24



MSB

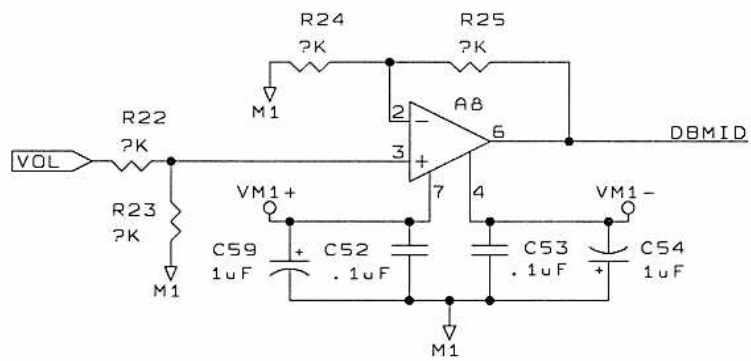
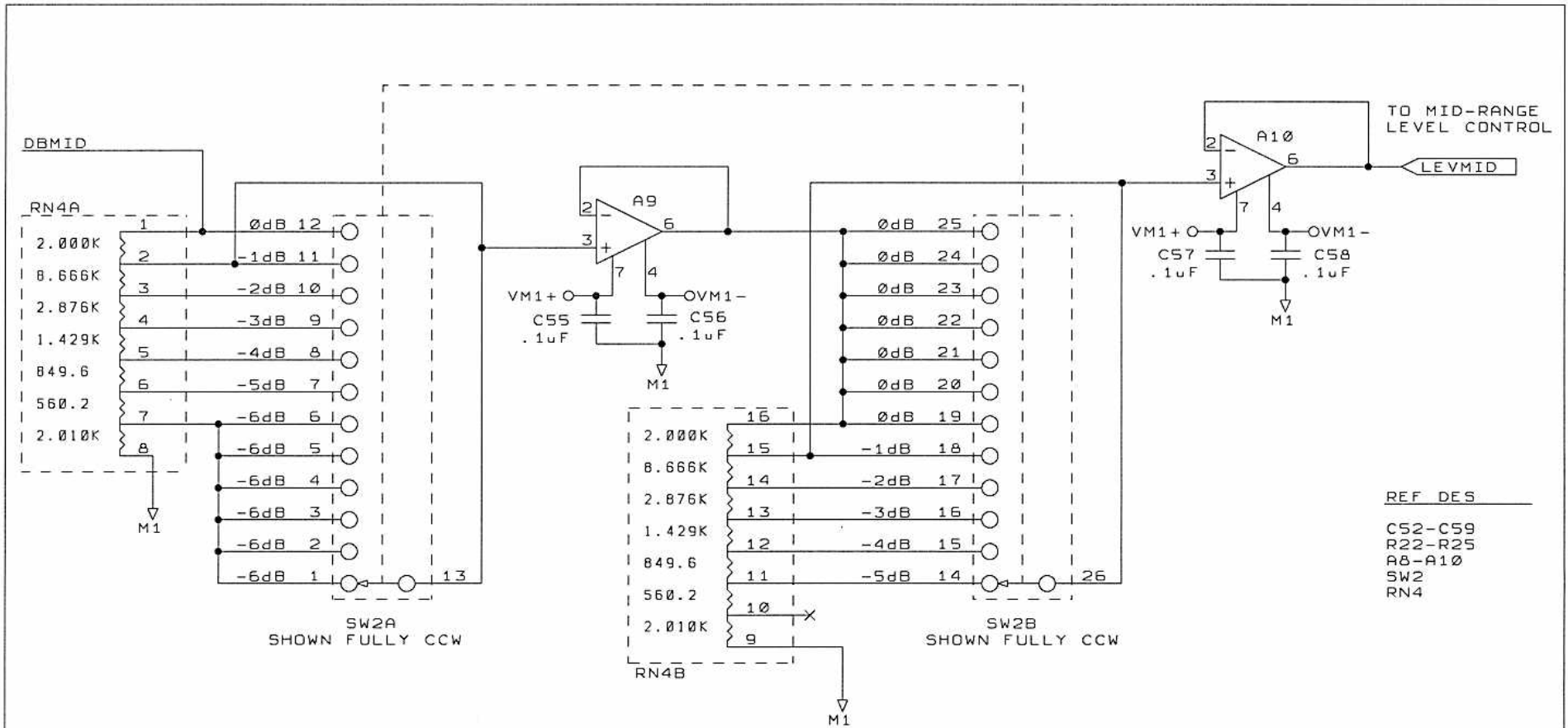


TWEETER LEVEL CONTROL



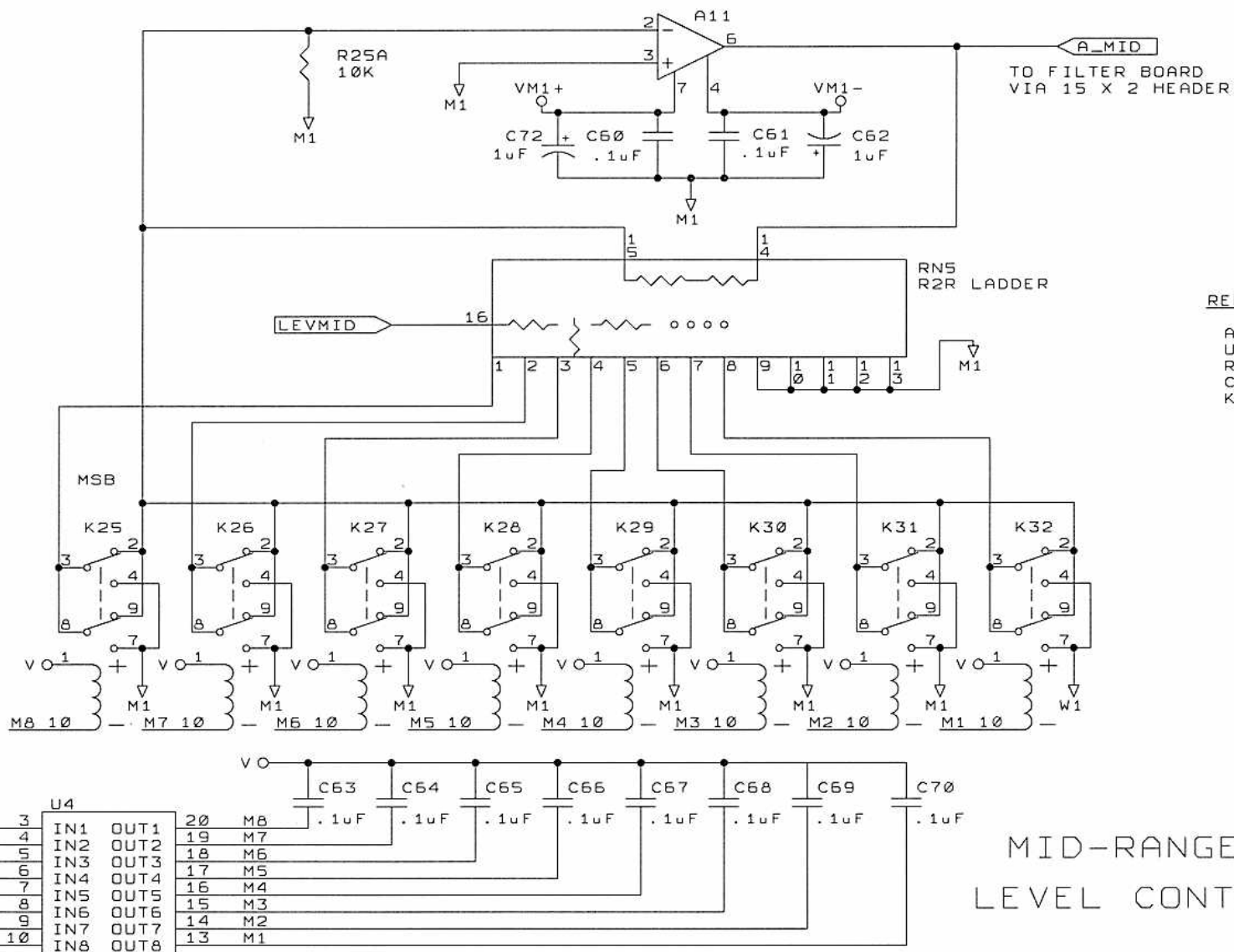
- NOTES:
1. ALL RELAYS SHOWN IN '1' POSITION
 2. ALL BITS TO '0' = LOWEST GAIN
 3. RELAYS SHOWN UNENERGIZED

APOGEE ACOUSTICS INC.		
Title GRAND DAX ATTN/RAKE BOARD		
Size A	Document Number APGR104B.SCH drawn by jer	REV B
Date: March 18, 1992	Sheet 4 of	10



MID-RANGE
dB OFFSET 0dB - 11dB

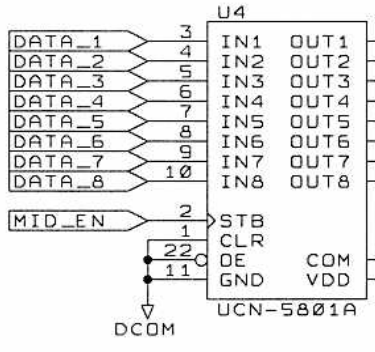
APOGEE ACOUSTICS INC.		
Title GRAND DAX ATTN/RAKE BOARD		
Size A	Document Number APGR105B.SCH drawn by jer	REV B
Date: March 18, 1992	Sheet 5 of	10



REF DES

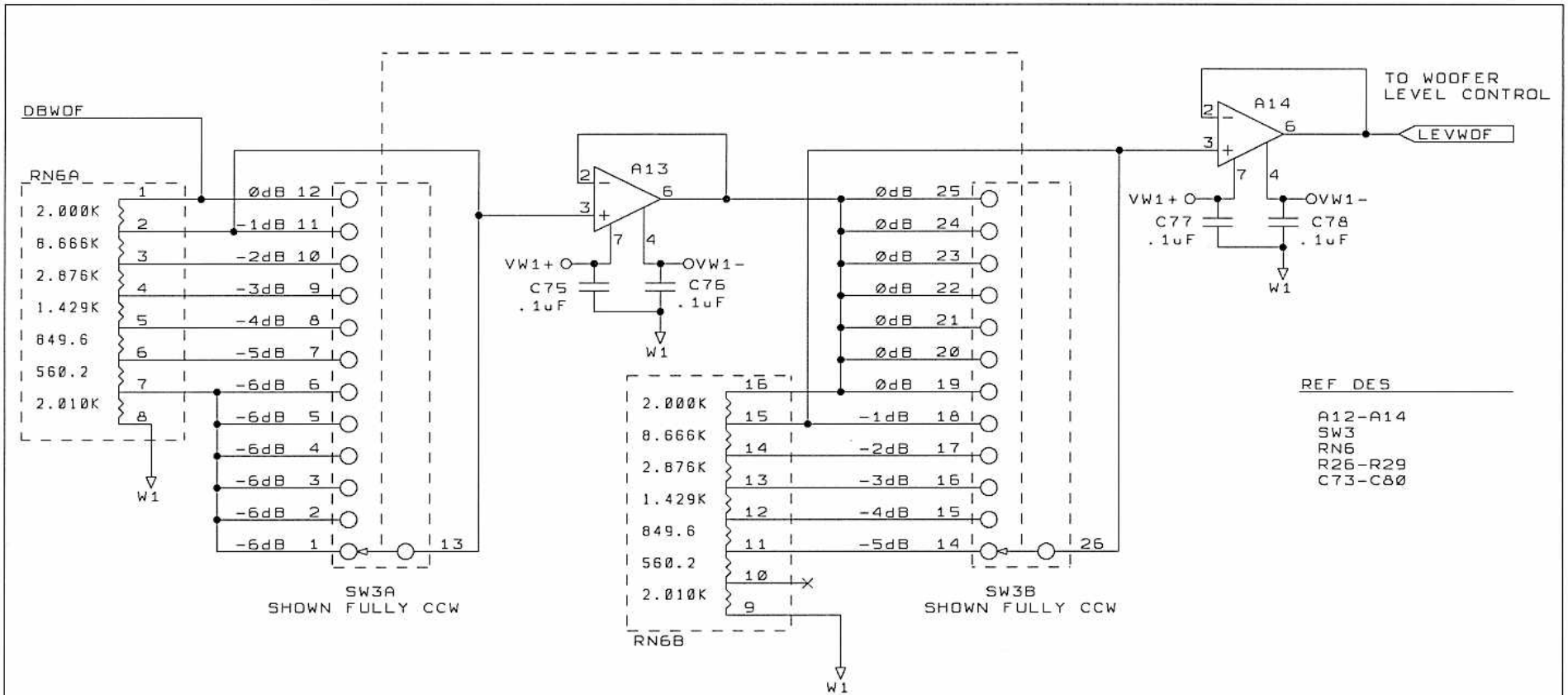
- A11
- U4
- RN5
- C60-C72
- K25-K32

MID-RANGE LEVEL CONTROL



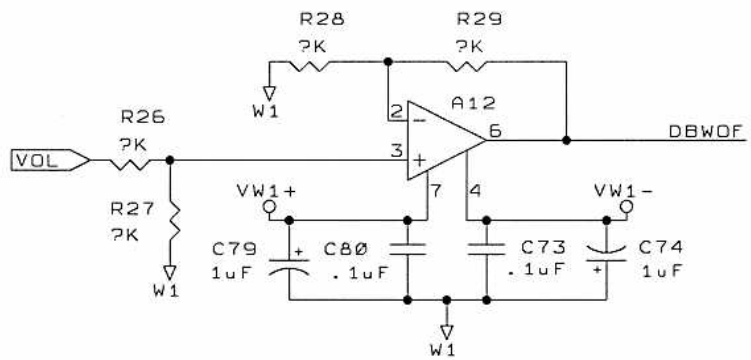
- NOTES:
1. ALL RELAYS SHOWN IN '1' POSITION
 2. ALL BITS TO '0' = LOWEST GAIN
 3. RELAYS SHOWN UNENERGIZED

APOGEE ACOUSTICS INC.		
Title		
GRAND DAX ATTN/RAKE BOARD		
Size	Document Number	REV
A	APGR106B.SCH	B
Date:	March 18, 1992	Sheet 5 of 10
	drawn by jer	



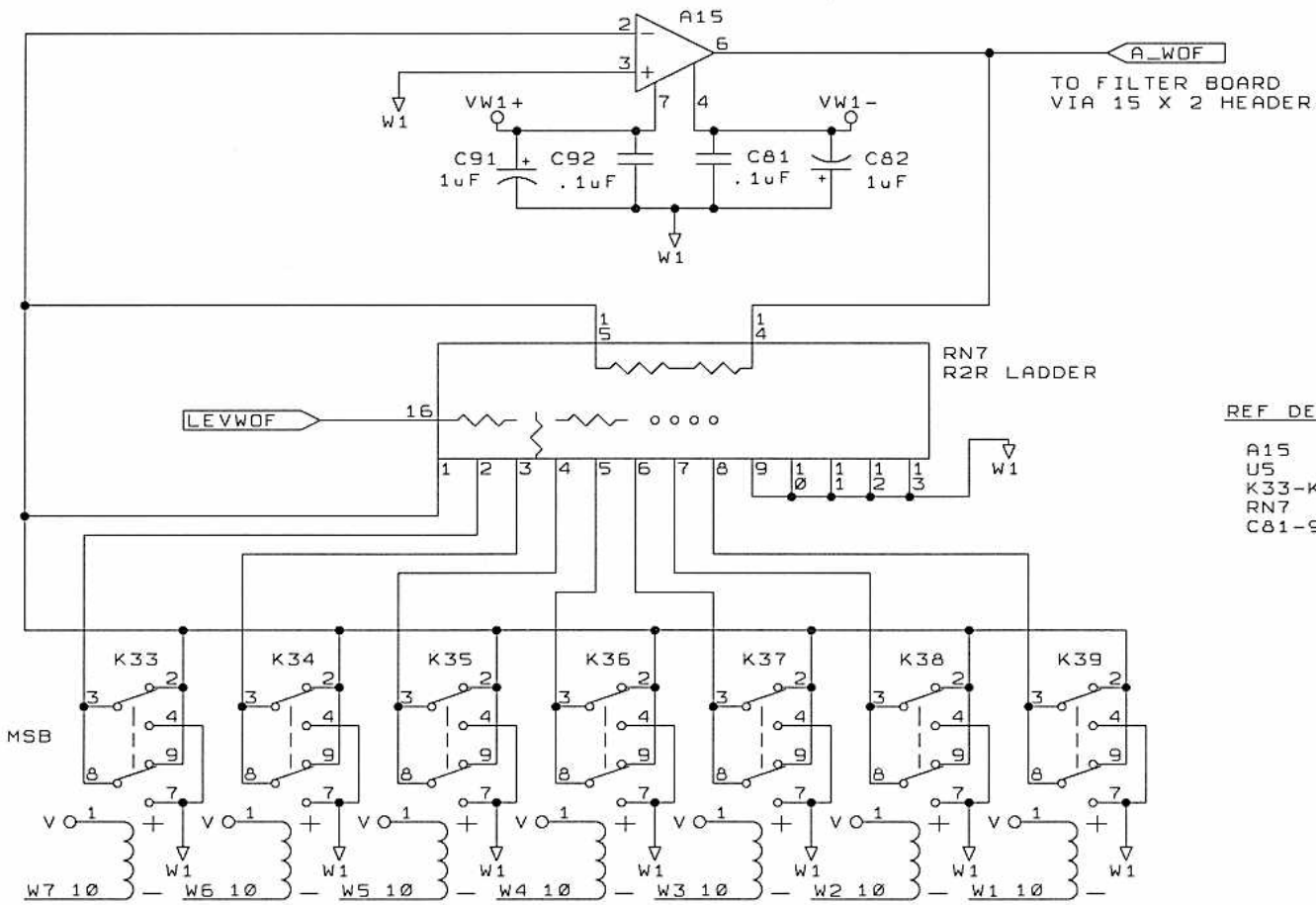
REF DES

A12-A14
 SW3
 RN6
 R26-R29
 C73-C80



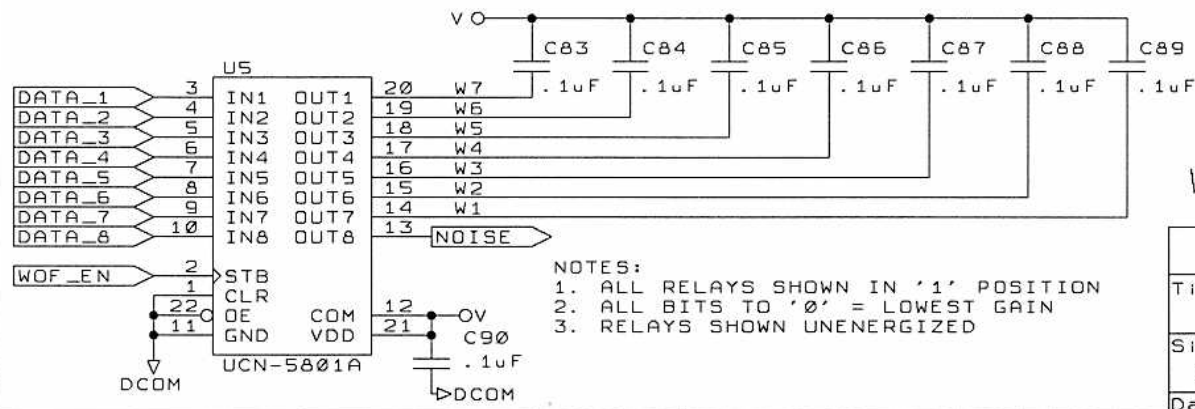
WOOFER
 dB OFFSET 0dB - 11dB

APOGEE ACOUSTICS INC.		
Title GRAND DAX ATTN/RAKE BOARD		
Size A	Document Number APGR107B.SCH drawn by jer	REV B
Date: March 18, 1992	Sheet 7 of	10



REF DES

A15
 U5
 K33-K39
 RN7
 C81-92

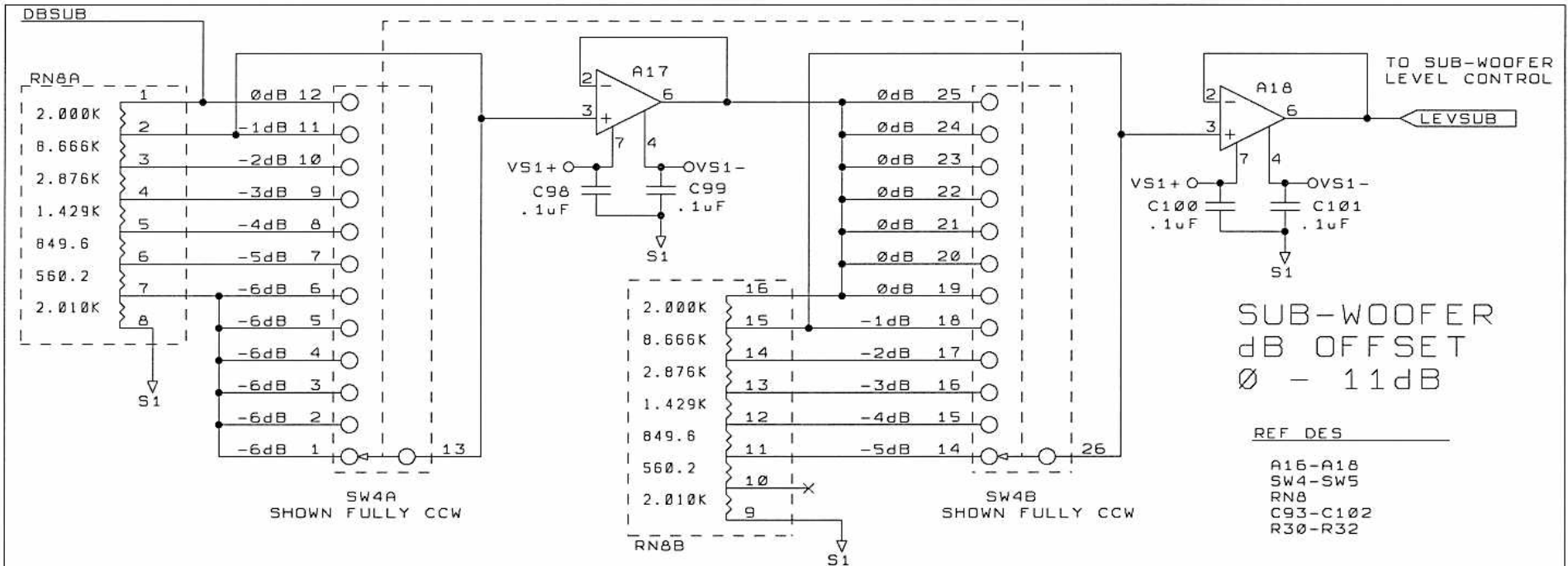


NOTES:

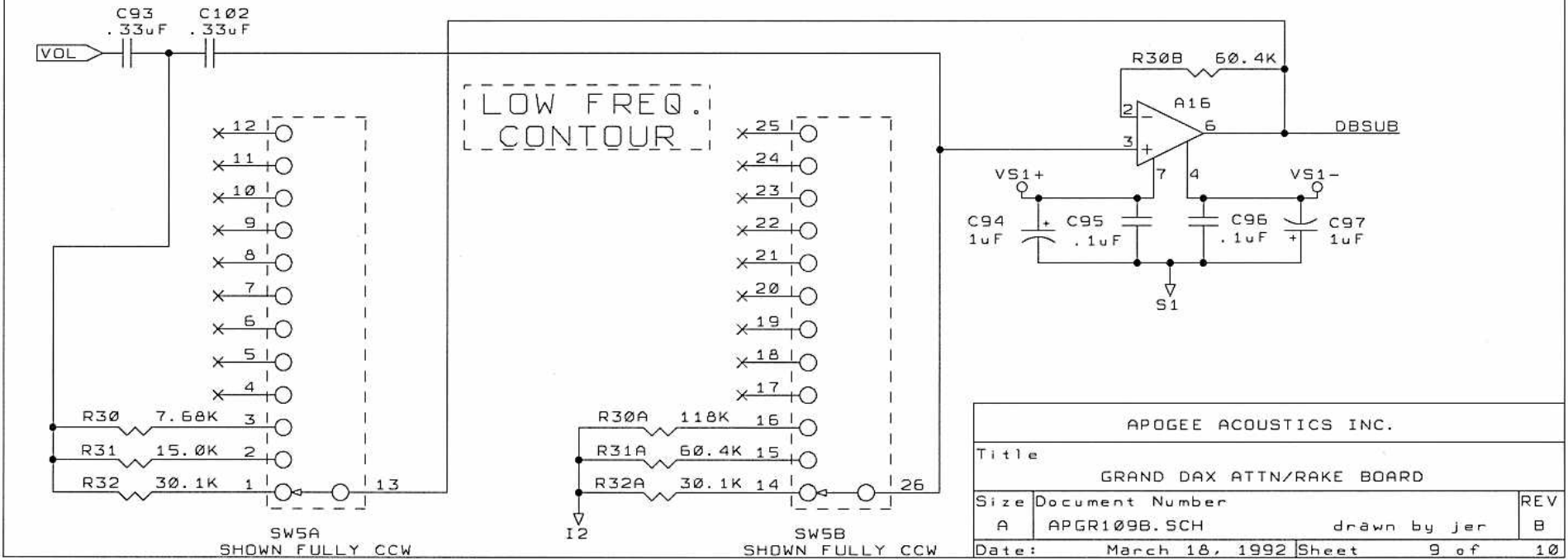
1. ALL RELAYS SHOWN IN '1' POSITION
2. ALL BITS TO '0' = LOWEST GAIN
3. RELAYS SHOWN UNENERGIZED

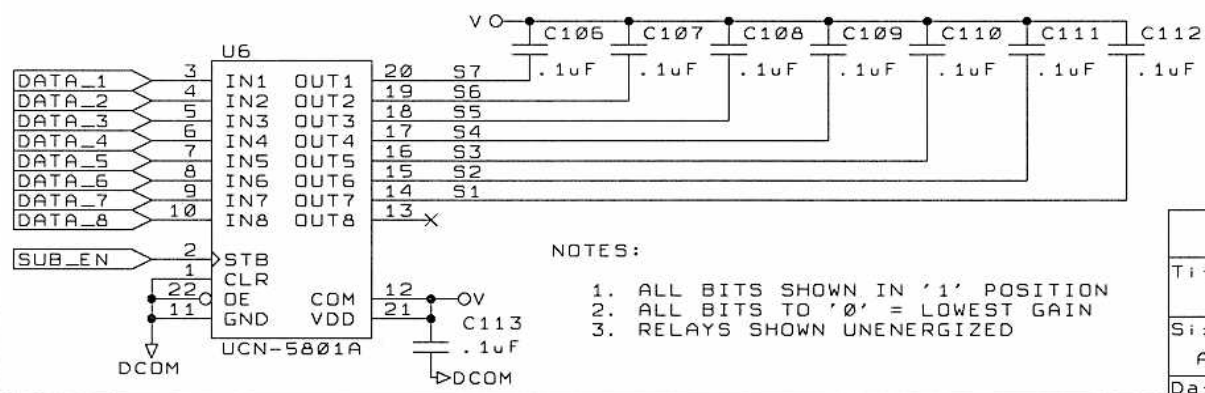
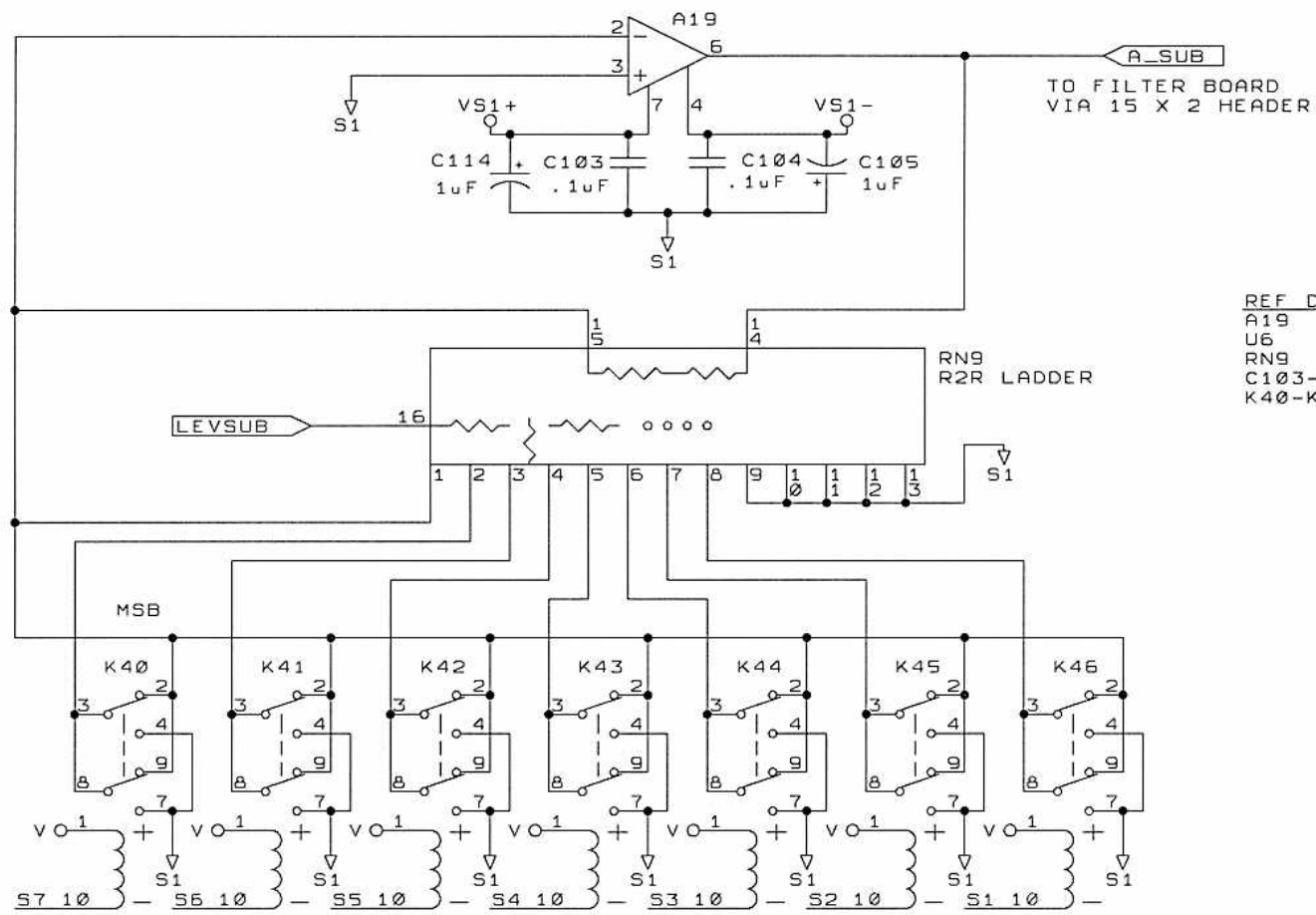
WOOFER LEVEL CONTROL

APOGEE ACOUSTICS INC.		
Title		
GRAND DAX ATTN/RAKE BOARD		
Size	Document Number	REV
A	APGR108B.SCH drawn by jer	B
Date:	March 18, 1992	Sheet 8 of 10



SUB-WOOFER
dB OFFSET
0 - 11dB





- NOTES:
1. ALL BITS SHOWN IN '1' POSITION
 2. ALL BITS TO '0' = LOWEST GAIN
 3. RELAYS SHOWN UNENERGIZED

SUB-WOOFER LEVEL CONTROL

APOGEE ACOUSTICS INC.		
Title GRAND DAX ATTN/RAKE BOARD		
Size A	Document Number APGR110B.SCH	REV B
Date: March 18, 1992	Sheet 10 of	10

GRAND DAX - ATTENUATOR / RAKE BOARD REV B

ASSY-350-0005-000 REV B

B.O.M.

THIS FILE: AWORKS - APGR100B.doc 18-MAR-92
 ASCCI - APGR100B.bom 18-MAR-92

FROM ORCAD FILE: APGR101B.SCH (ROOT OF FLAT FILE) 18-MAR-92
 APGR102B.SCH
 APGR103B.SCH APGR104B.SCH
 APGR105B.SCH APGR106B.SCH
 APGR107B.SCH APGR108B.SCH
 APGR109B.SCH APGR110B.SCH

THERE HAVE BEEN MAJOR REVISIONS TO REV 01

Item	Quantity	Reference	Part
1	18	A1,A4,A5,A6,A7,A8,A9,A10, A11,A12,A13,A14,A15,A16, A17,A18,A19,A20	OPA606KP OPAMP BURR BROWN # OPA606KP SOLE SOURCE 8 PIN 300 MIL DIP
2	1	C1	10uF 35WVDC 10% TANT SPRG # 150D106X9035R2 MLRY # CS13BF106K AXIAL .289D X .822L X .025LD 1.10" CTRS/BD
3	81	C2,C3,C6,C7,C8,C9,C10, C11,C12,C13,C14,C32,C33, C35,C36,C37,C38,C40,C41, C43,C44,C45,C46,C47,C48, C49,C50,C51,C52,C53,C55, C56,C57,C58,C60,C61,C63, C64,C65,C66,C67,C68,C69, C70,C71,C73,C75,C76,C77, C78,C80,C81,C83,C84,C85, C86,C87,C88,C89,C90,C92, C95,C96,C98,C99,C100, C101,C103,C104,C106,C107, C108,C109,C110,C111,C112, C113,C115,C121,C122,C123	.1uF 50WVDC +/-20% CERAMIC Z5U AVX # SR205E 104 MAA MEPCO # CZ20C 104 M RADIAL .2W x .2H x .125T x .020LD x .1LS

4	18	C4, C5, C31, C34, C39, C42, C54, C59, C62, C72, C74, C79, C82, C91, C94, C97, C105, C114	1uF 35WVDC 10% TANT SPRG #150D105X9035A2 MLRY #CS13BF105K AXIAL .135D X .422L X .020LD .600 CTRS/BD
<hr/>			
5	2	C93, C102	.33uF 100WVDC 1% POLYPRO REL-CAP # PPMT334G1A SOLE SOURCE AXIAL .260D X .680L X .025LD 1.00" CENTERS/BOARD
<hr/>			
5A	1	C117	.33uF POLYESTER 10% MALLORY # 168334J63D .2 CTRS/BD
		ALTERNATE	100VDC 10% CERAMIC X7R AVX # SR301C334KAA RADIAL .3W X .3H X .150T X .2LS X .020LD .2 CTRS/BD
		ALTERNATE	REL-CAP # ETXT334K05A 50VDC 10% POLYESTER AXIAL .210D X .530L X .025LD .8 CTRS/BD
		EMERGENCY USE ONLY	SAME PART AS C93 REL-CAP POLYPRO
<hr/>			
6	2	C116, C120	1uF 63VDC 10% POLYESTER ERO # MKT 1817-510/635 RAD .295W X .453H X .217T X .020LD X .20OLS .2 CTRS/BD
		ALTERNATE	50VDC 10% CERAMIC X7R AVX # SR305C105KAA RADIAL .3W X .3H X .150T X .2LS X .020LD .2 CTRS/BD

ALTERNATE

35WVDC 10%
TANT
SPRAGUE # 150D105X9035A2
MALLORY # CS13BF105K
AXIAL .135D X .422L X
.020LD
.6 CTRS/BD

7 1 C118

.15uF
63VDC 10%
POLYESTER
ERO # MKT 1817-415/635
RAD .295W X .335H X .138T X
.020LD X .20OLS
.2 CTRS/BD

ALTERNATE

100VDC 10%
CERAMIC X7R
AVX SR301C154KAA
RADIAL .3W X .3H X .150T X
.2LS X .020LD
.2 CTRS/BD

ALTERNATE

50VDC 10%
POLYESTER
REL-CAP # ETXT 154K05A
AXIAL .22D X .4L X .025LD
.6 CTRS/BD

8 1 C119

.082uF
50VDC 10%
POLYESTER
REL-CAP # ETXT823K05A
AXIAL .190D X .400L X .032LD
.6 CTRS/BD

ALTERNATE

100VDC 10%
CERAMIC X7R
AVX # SR301C823KAA
RADIAL .3W X .3H X .150T X
.2LS X .020LD
.2 CTRS/BD

9 1 C124

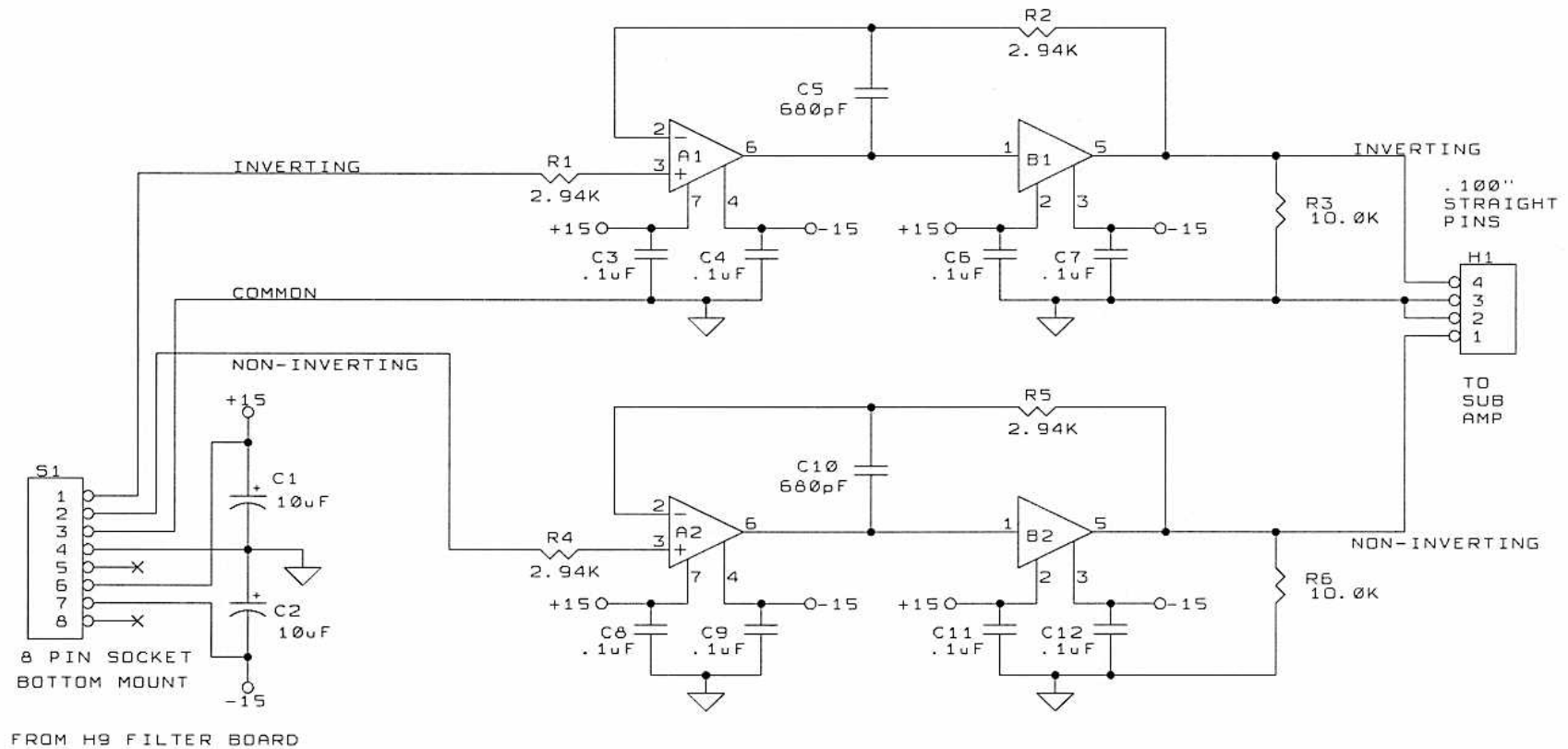
10uF
25WVDC 20%
TANT
SPRG # 199D106X0025CA1
RADIAL .216D X .360H X .025LD
.100" CTRS/BD

10	1	D1	6.2V 500mW ZENER 5% GENERIC 1N753A AXIAL .5L X .1D X .031 LD .500 CNTRS ON BOARD
11	2	H1,H2	HEADER 15X2 STRAIGHT PINS LATCH EJECT 3M # 3440-6202 .100 X .100 - .025 SQ. PINS
12	39	K1,K2,K3,K4,K5,K6,K7,K8, K17,K18,K19,K20,K21,K22, K23,K24,K25,K26,K27,K28, K29,K30,K31,K32,K33,K34, K35,K36,K37,K38,K39,K40, K41,K42,K43,K44,K45,K46, K47	DPDT RELAY AMERICAN ZETTLER # AZ-845-5 OMRON # 10 PIN 300 MIL DIP
13	5	RN1,RN3,RN5,RN7,RN9	R2R LADDER 10K ELECTROFILM # 410-0001-000 SOLE SRC 16 X 300 MIL DIP
14	4	RN2,RN4,RN6,RN8	RNET 2 X 7 ELECTROFILM # 303245 SOLE SRC 16 X 300 MIL DIP
15	12	R18,R19,R20,R21,R22,R23, R24,R25,R26,R27,R28,R29	?K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
16	4	R21A,R25A,R38,R41	10K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD

17	1	R30A	118K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
18	2	R31A,R30B	60.4K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
19	1	R30	7.68K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
20	1	R31	15.0K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
21	2	R32,R32A	30.1K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
22	2	R33,R34	3.01K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD

23	1	R35	1K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
24	1	R36	301 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
25	1	R37	100K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
26	1	R39	20K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
27	1	R40	604 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
28	5	SW1, SW2, SW3, SW4, SW5	ROTARY SW ELECTROSWITCH # (APOGEE) 75-4218 2-12 POS. 2 DECKS ONE POLE/DECK

29	5	U1,U3,U4,U5,U6	UCN-5801A LATCHED DRIVER 8 BITS SPRAGUE # UCN-5801A 22 X 400 MIL DIP
30	1	U7	MM5437 NOISE GENERATOR NAT'L # MM5437 8 X 300 MIL DIP
31	1	PC1	ATTENUATOR/RAKE PRINTED CIRCUIT BOARD APOGEE # PCB-413-0005-000 REV B



FROM H9 FILTER BOARD

SUB-WOOFER OUTPUT BOARD

REF :

C1 - C12
 R1 - R6
 A1 - A2
 B1 - B2
 H1
 S1

NOTES:

1. A1,2 = BURR BROWN # OPA606KP
2. B1,B2 = LINEAR TECHNOLOGY LT1010CT

APOGEE ACOUSTICS INC.

Title		
GRAND DAX - SUBWOOFER OUTPUT BOARD		
Size	Document Number	REV
A	APGRSUB.SCH drawn by msd; rev by jer	1
Date:	February 13, 1992	Sheet 1 of 1

GRAND DAX; SUB-WOOFER OUTPUT BOARD REV 01

ASSY-350-0002-100 REV 01

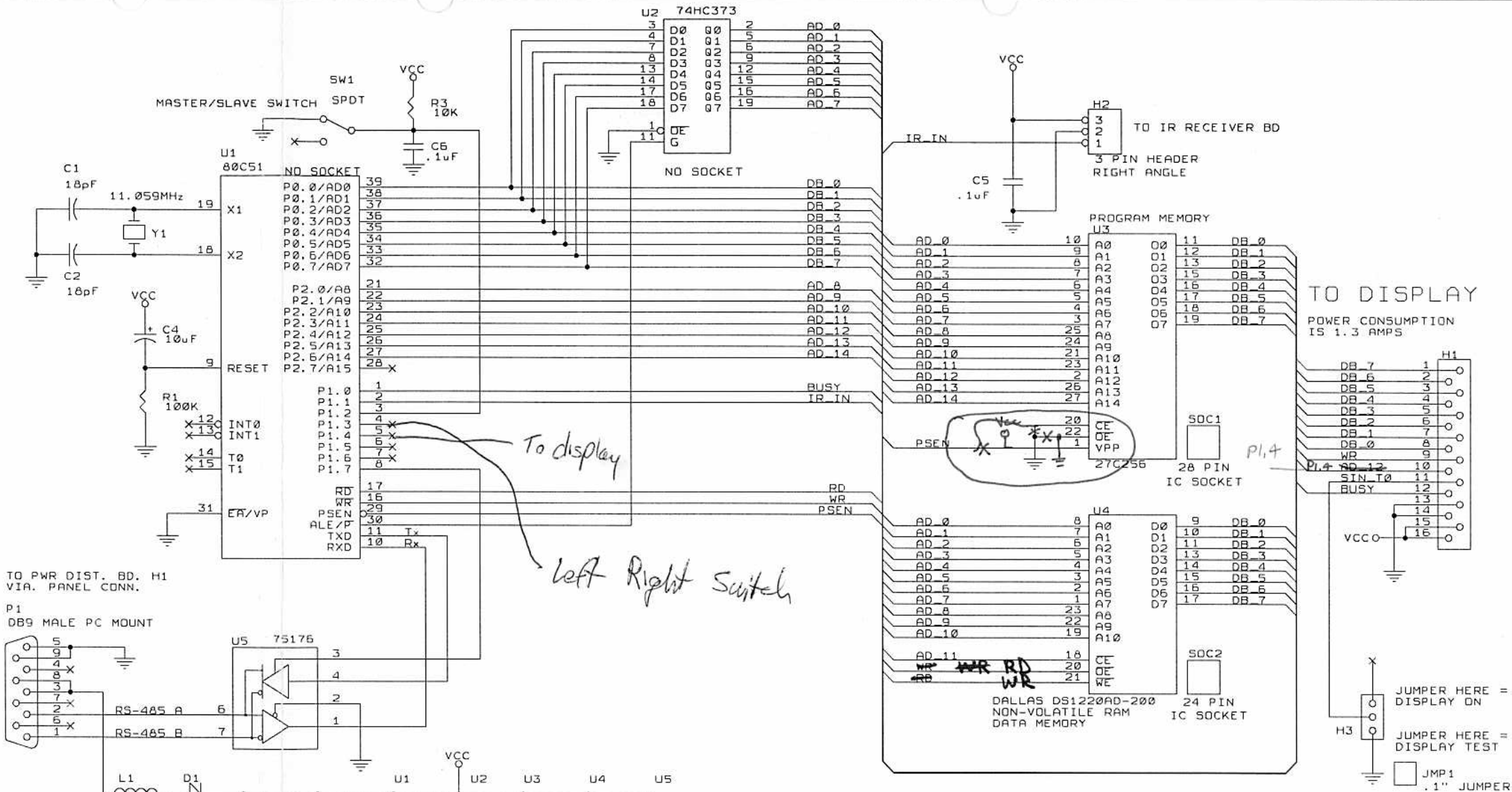
B.O.M.

THIS FILE: AWORKS - APGRSUB.doc 13-FEB-92

FROM ORCAD FILE: SUBOUT.SCH 13-FEB-92

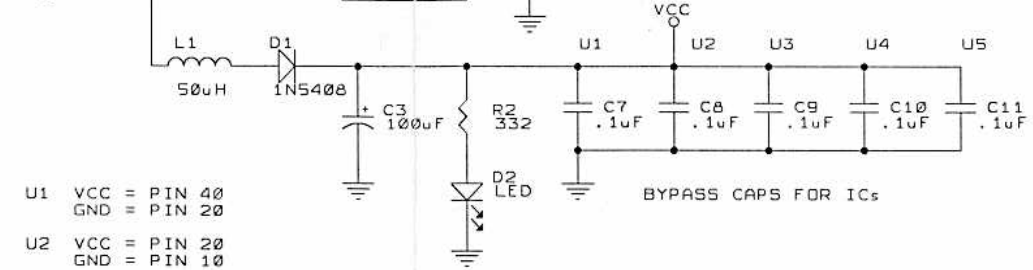
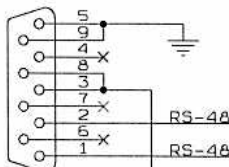
Item	Quantity	Reference	Part
1	2	A1,A2	OPA606KP OPAMP BURR BROWN # OPA606KP SOLE SOURCE 8 PIN 300 MIL DIP
2	2	B2,B1	POWER BUFFER LINEAR TECHNOLOGY # LT1010CT SOLE SRC TO-220 5 LEAD
3	2	C1,C2	10uF 35WVDC 10% TANT SPRG # 150D106X9035R2 MLRY # CS13BF106K AXIAL .289D X .822L X .025LD 1.10" CTRS/BD
4	8	C3,C4,C6,C7,C8,C9,C11, C12	.1uF 50WVDC +/-20% CERAMIC Z5U AVX # SR205E 104 MAA MEPCO # CZ20C 104 M RADIAL .2W X .2H X .125T X .020LD X .1LS
5	2	C5,C10	680pF 100VDC 2.5% POLYPRO ERO # KP 1830-168/013 SOLE SRC RAD .283W X .236H X .177T X .020LD X .20OLS .2 CTRS/BD

6	1	H1	4 PIN HEADER STRAIGHT PINS POL/FRIC LOCK MOLEX # 22-11-2042 .100 CNTRS / .025 SQ. PINS
7	4	R1,R2,R4,R5	2.94K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
8	2	R3,R6	10.0K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
9	1	S1	8 PIN SOCKET BOTTOM MOUNT SAMTEC # BSW-108-04-S-S
10	1	PC1	SUB-WOOFER OUTPUT PRINTED CIRCUIT BOARD APOGEE # PCB-413-0003-100 REV 01

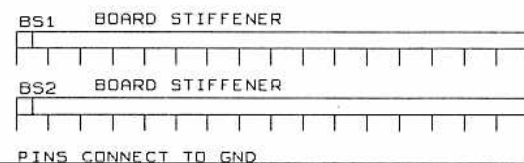


TO PWR DIST. BD. H1
VIA. PANEL CONN.

P1
DB9 MALE PC MOUNT



- U1 VCC = PIN 40
GND = PIN 20
- U2 VCC = PIN 20
GND = PIN 10
- U3 VCC = PIN 28
GND = PIN 14
- U4 VCC = PIN 24
GND = PIN 12
- U5 VCC = PIN 8
GND = PIN 5



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USER INTERFACE BOARD

APOGEE ACOUSTICS INC.			
Title GRAND DAX - USER INTERFACE BOARD			
Size	Document Number	REV	
B	APGRUSER.SCH revised by Jer	1	
Date:	January 2, 1992	Sheet	1 of 1

GRAND DAX - USER INTERFACE BOARD

*ASSY-350-0008-000 REV 01

B.O.M.

THIS PRINTING: 2-JAN-92

THIS FILE: AWORKS - APGRUSER.doc 02-JAN-92
ASCCI - APGRUSER.bom 02-JAN-92

FROM ORCAD FILE: APGRUSER.SCH 02-JAN-92

* INDICATES A CHANGE FROM 22-DEC-91 PRINTING

Item Quantity Reference Part

1	2	C1,C2	18pF 100VDC +/-10% CERAMIC NPO AVX # SR15 1A 180 KAA RADIAL .15W X .15H X .10T X .020LD X .1LS
2	1	C3	100uF 10WVDC 10% TANT SPRG # 150D107X9010R2 MLRY # CS13BC107K AXIAL .289D X .822L X .025LD 1.10" CTRS/BD
		ALTERNATE	10WVDC 10% TANT NEMCO # TB 100/10K 250 MALLORY # TDC107K010WSG KEMET # T354G107K10AS AVX # TAP107K010HSB RADIAL .350D (max) X .650H (max) X .02LD X .250LS .250 CTRS/BD
3	1	C4	10uF 25WVDC TANT SPRG # 199D106X0025CA1 RADIAL .216D X .360H X .025LD .100" CTRS/BD
* 4	7	C5,C6,C7,C8,C9,C10,C11	.1uF 50WVDC +/-20%

CERAMIC Z5U
 AVX # SR205E 104 MAA
 MEPCO # CZ20C 104 M
 RADIAL .2W x .2H x .125T x
 .020LD x .1LS

5	1	D1	1N5408 DIODE GENERIC DO-201AD PKG AXIAL .375L X .210DIA X .050LD .750 CTRS/BD
6	1	D2	LED ANY COLOR T 1-3/4 MOUNTED ON PC BOARD INTERNALLY
7	1	H1	CONNECTOR 16 PIN SAMTEC # TST-1-8-02-H-D 2 X 8 .100" CTRS .025 SQ. PINS
8	1	H2	3 PIN HEADER RIGHT ANGLE POL/FRIC LOCK MOLEX # 22-12-2034 .100 CNTRS .025 SQ. PINS
9	1	H3	HEADER 3 PIN SAMTEC # TSW-103-07-H-S .1" CTRS .025 SQ. PINS
10	1	JMP1	.1" JUMPER SAMTEC # SNT-100-BK-H-H
11	1	L1	50uH 10% MILLER # 5504 RADIAL 1.12W X .81H X .81T X .75LS X .042 LD
12	1	P1	DB9 MALE PC MOUNT .318 FOOTPRINT METAL SHELL AMP # 747840-4 WITH BOARDLOCKS

13	1	R1	100K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
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14	1	R2	332 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
----	---	----	--

15	1	R3	10K 1/4 WATT 1% METAL FILM DALE # RN-60D SOLE SOURCE AXIAL .390L X .140D X .025LD .600" CTRS/BOARD
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16	1	SOC1	28 PIN 600 MIL DIP IC SOCKET AUGAT # 528-AG10D USE ON U3
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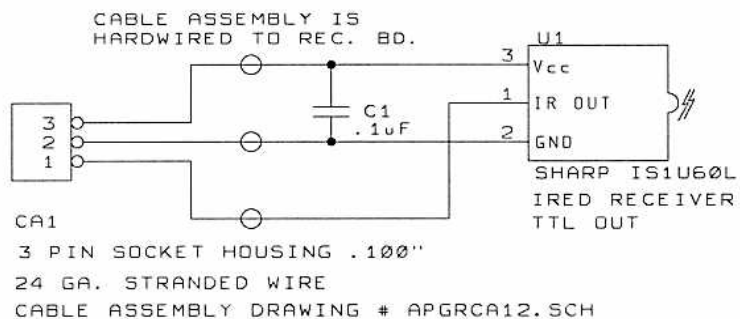
17	1	SOC2	24 PIN 600 MIL DIP IC SOCKET AUGAT # 524-AG10D USE ON U4
----	---	------	--

18	1	SW1	SPDT TOGGLE SW RIGHT ANGLE PC MOUNT AUGAT/ALCO # AE101SD1AB
----	---	-----	--

19	1	U1	80C51 MICROPROCESSOR SIGNETICS # 87C51-CCN40 40 X 600 MIL DIP NO SOCKET
----	---	----	---

20	1	U2	74HC373 TRI-STATE OCTAL D LATCH GENERIC 20 X 300 MIL DIP
21	1	U3	27C256 PROGRAM MEMORY SIGNETICS # 27C256-200 LATTICE, AMD, NEC 28 X 600 MIL DIP
22	1	U4	DS1220AD NV-RAM DALLAS SEMICONDUCTOR # DS1220AD-200 24 X 600 MIL DIP
23	1	U5	75176 RS-485 TRANSCEIVER TI # SN75176B 8 X 300 MIL DIP
24	1	Y1	11.059MHz QUARTZ CRYSTAL FOX # HC49S DIGI-KEY # X426 RADIAL .4W X .15H X .183T X .192LS X .019LD .2 CTRS/BD
* 25	2	BS1,BS2	BOARD STIFFENER ROGERS # B250-16-0.5 2 WEEK LEAD TIME ASK FOR KIM (602)-967-0624 17 PINS, .5 CENTERS, .070 HOLES
* 26	1	PC1	USER INTERFACE PRINTED CIRCUIT BOARD APOGEE # PCB-413-0008-000 REV 01

TO/FROM H2
USER INTERFACE BD.



RECEIVER MOUNTING BOARD

APOGEE ACOUSTICS INC.			
Title GRAND DAX - RECEIVER MOUNTING BD.			
Size	Document Number	drawn by	REV
A	APGRREC.SCH	jer	1
Date:	January 6, 1992	Sheet	1 of 1

GRAND DAX - RECEIVER MOUNTING BOARD REV 01

ASSY-_____ REV 01

B.O.M.

THIS FILE: AWORKS - APGRREC.doc 06-JAN-92

FROM ORCAD FILE: APGRREC.SCH 06-JAN-92

Item	Quantity	Reference	Part
1	1	U1	IREC RECEIVER SHARP # IS1U60L
2	2	C1	.1uF 50WVDC +/-20% CERAMIC Z5U AVX # SR205E 104 MAA MEPCO # CZ20C 104 M RADIAL .2W x .2H x .125T x .020LD x .1LS
3	1	CA1	CABLE ASSEMBLY DRWG. # APGRCA12.SCH 3 PIN SOCKET HOUSING .100" 24 GA. WIRE
4	1	PC1	RECEIVER MOUNTING PRINTED CIRCUIT BOARD APOGEE # PCB-413-0008-100 REV 01