

Audio Spectrum Analyser

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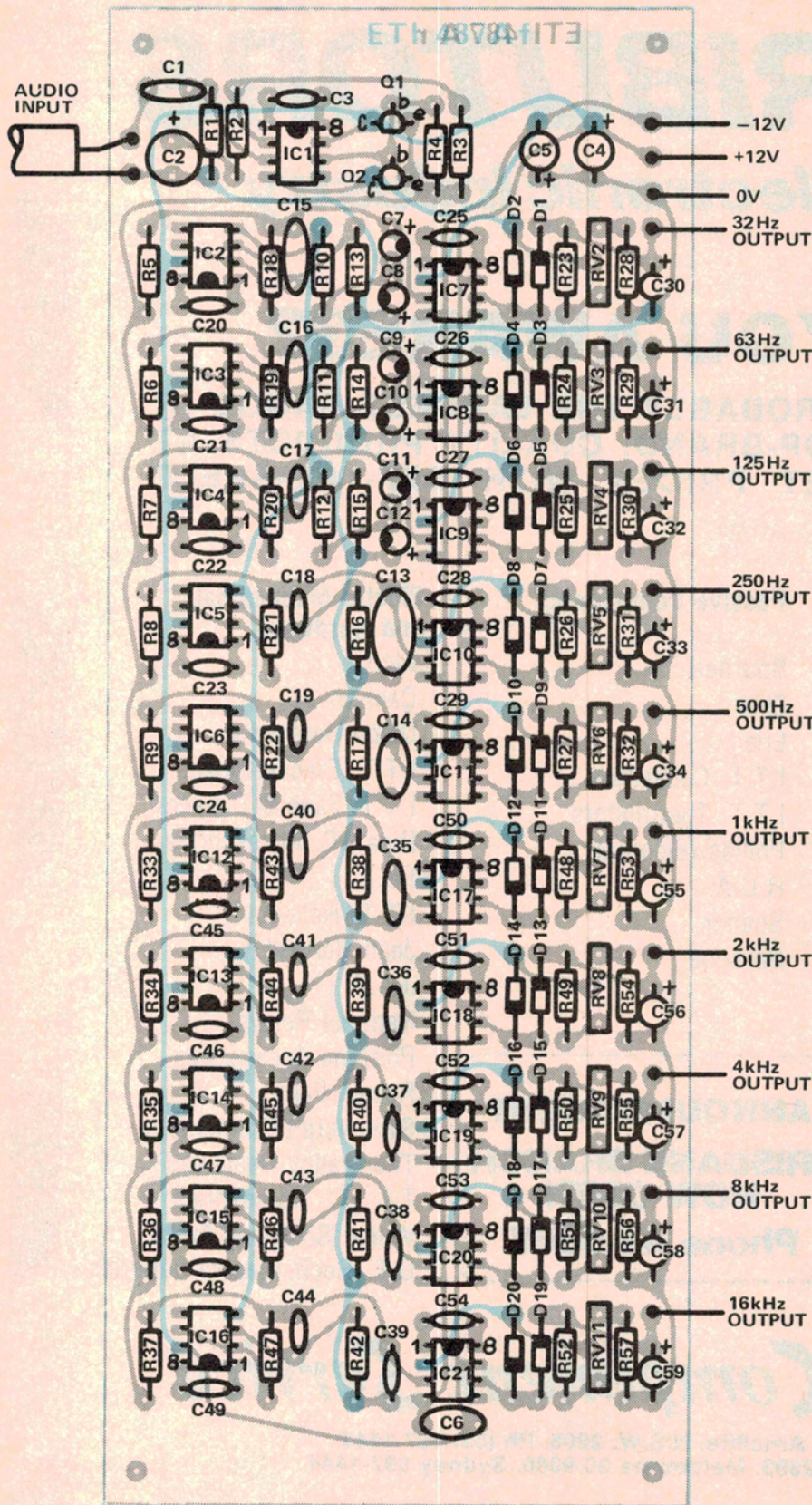


Fig. 5. The component overlay of the filter-rectifier board.

PARTS LIST - ETI 487

Resistors all 1/2W 5%

R1	.....	220k
R2	.....	2k2
R3	.....	220k
R4	.....	1k
R5-R9	.....	10k
R10-R17	.....	1M
R18-R22	.....	220R
R23-R27	.....	1M
R28-R32	.....	100k
R33-R37	.....	10k
R38-R42	.....	1M
R43-R47	.....	220R
R48-R52	.....	1M
R53-R57	.....	100k
R58,59	.....	180k
R60	.....	100k
R61	.....	82k
R62,63	.....	15k
R64	.....	22k
R65	.....	470R
R66	.....	18k
R67	.....	15k
R68	.....	12k
R69	.....	820R
R70	.....	180k
R71	.....	12k
R72,73	.....	10k
R74	.....	2k2
R75	.....	4k7
R76-R78	.....	10k
R79	.....	22k
R80	.....	56k
R81	.....	5k6
R82	.....	3k9
R83	.....	18k
R84	.....	100k
R85	.....	390k
R86	.....	1M
R87	.....	6k8
R88	.....	10k
R89	.....	18k
R90	.....	47k
R91,92	.....	100k
R93	.....	47k
R94	.....	100k
R95	.....	47k
R96	.....	10k

Potentiometers

RV1	.....	47k log rotary
RV2-RV11	.....	250k trim

Capacitors

C1	.....	100n polyester
C2	.....	10µ 25V electro
C3	.....	3p3 ceramic
C4,5	.....	10µ 25V electro
C6	.....	100n polyester
C7,8	.....	3µ3 16V tantalum
C9,10	.....	1µ5 16V "
C11,12	.....	1µ0 16V "

Construction

Due to the complexity of the unit it is recommended that PC boards are used. These boards are assembled as per the overlay diagrams. Watch the orientation of all the ICs, diodes, capacitors, etc., when installing them. Note that as the board is not a plated through type that the tracks on the top side of the board must also be soldered to the components. This prevents the use of sockets for the ICs but they are not really worth the cost for low priced ICs

Capacitors continued

C13	.....	220n	polyester
C14	.....	100n	"
C15	.....	68n	"
C16	.....	33n	"
C17	.....	18n	"
C18	.....	8n2	"
C19	.....	3n9	"
C20-C24	...	33p	ceramic
C25-C29	...	10p	"
C30-C34	...	2μ2	25 V electro
C35	.....	47n	polyester
C36	.....	27n	"
C37	.....	12n	"
C38	.....	6n8	"
C39	.....	3n3	"
C40	.....	2n2	"
C41	.....	1n0	"
C42	.....	560p	ceramic
C43	.....	270p	"
C44	.....	150p	"
C45-C49	...	33p	"
C50-C54	...	10p	"
C55-C59	...	2μ2	16 V electro
C60,61	...	25μ	16 V "
C62	.....	820p	ceramic
C63	.....	2n7	polyester
C64	.....	5n6	"
C65	.....	33p	ceramic
C66	.....	150p	"
C67	.....	3p3	"
C68	.....	150p	"
C69	.....	10p	"
C70	.....	33p	"
C71	.....	2n2	polyester
C72	.....	560p	ceramic
C73,74	...	220μ	25 V electro
C75,76	...	10μ	25 V "

Semiconductors

IC1-IC21	...	LM301A
IC22	...	4017 (CMOS)
IC23-IC25	...	4016 (CMOS)
IC26-IC28	...	LM301A
IC29	...	4011B (CMOS)
IC30	...	LM301A
IC31	...	7812
IC32	...	7912
Q1	.....	BC548
Q2	.....	BC558
Q3,4	.....	BC548
Q5-Q7	.....	BC558
D1-D27	...	1N914
D28-D31	...	1N4001

Miscellaneous

- PC boards ETI 487A, 487B
- Transformer PL24-5VA
- Case to suit
- 3 core flex and plug
- 240V power switch
- Input / output terminals to suit

as used.

With the board 487A be very careful as there is 240V on the board. It is recommended that the wires be terminated directly to the board, without PC board pins, and that the 240V tracks on the underside of the board be coated with epoxy to prevent contact.

We mounted the unit into a home-made box as we did not have a commercial one on hand to suit.

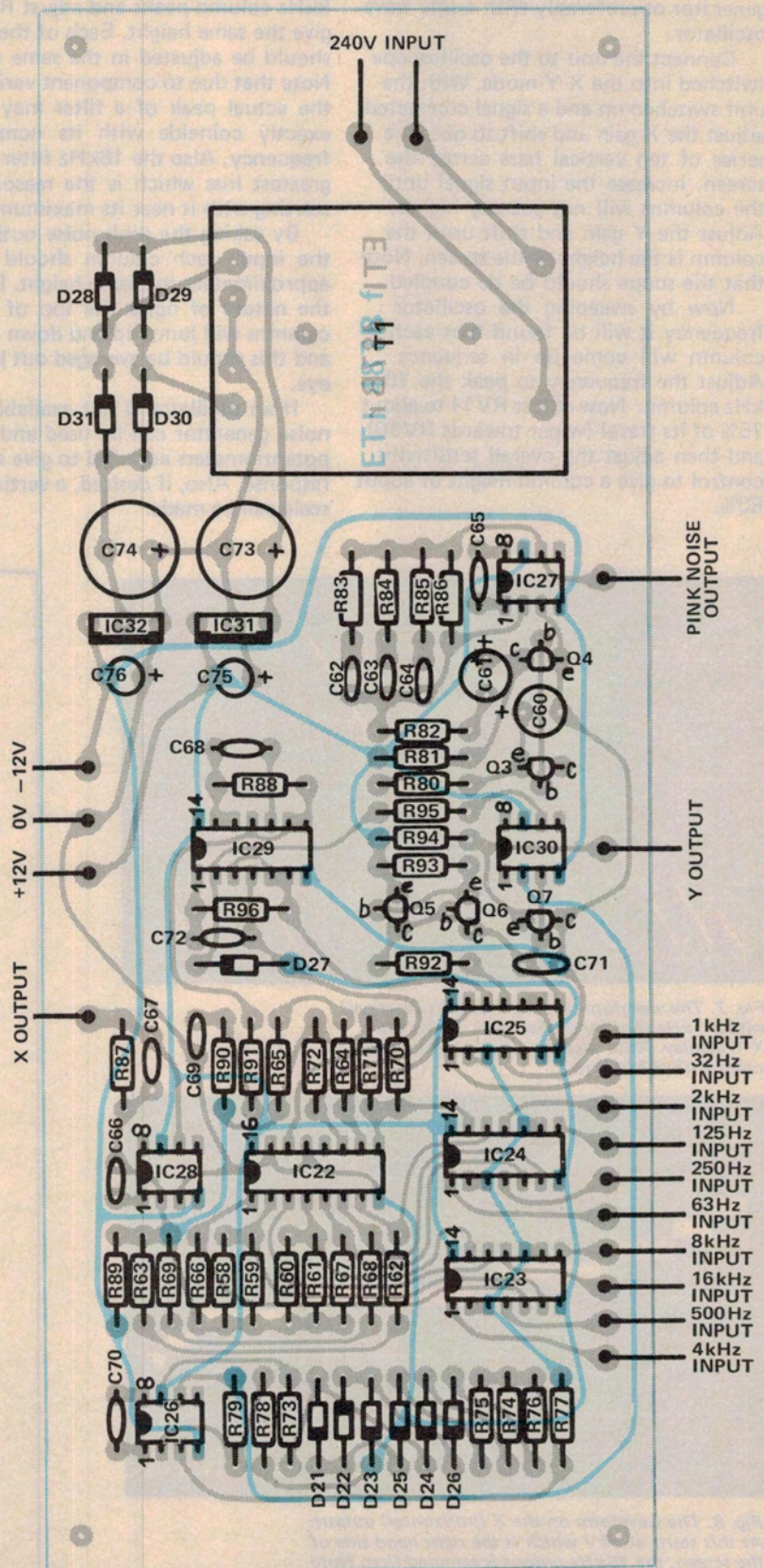


Fig. 6. The component overlay of the logic-power supply board.

Project 487

Alignment

This can be done using the pink noise generator or preferably with a sine wave oscillator.

Connect the unit to the oscilloscope switched into the X Y mode. With the unit switched on and a signal connected, adjust the X gain and shift to obtain a series of ten vertical bars across the screen. Increase the input signal until the columns will not get any higher. Adjust the Y gain and shift until the column is the height of the screen. Note that the scope should be dc coupled.

Now by sweeping the oscillator frequency it will be found that each column will come up in sequence. Adjust the frequency to peak the 16 kHz column. Now adjust RV11 to about 75% of its travel (wiper towards RV10) and then adjust the overall sensitivity control to give a column height of about 80%.

Now using the same amplitude adjust the signal generator frequency until the 8kHz column peaks and adjust RV10 to give the same height. Each of the filters should be adjusted in the same way. Note that due to component variations the actual peak of a filter may not exactly coincide with its nominal frequency. Also the 16kHz filter has the greatest loss which is the reason for starting with it near its maximum gain.

By taking the pink noise output to the input each column should be approximately the same height. Due to the nature of noise the top of the columns will jump up and down a little and this should be averaged out by the eye.

If an oscillator is not available the noise generator can be used and the potentiometers adjusted to give an even response. Also, if desired, a vertical dB scale can be made.

Making negatives

This method can be used to copy ETI artwork from October 1977 on only. The film used is Scotchal 8007 which is UV sensitive and can be used under normal subdued light.

Cut a piece of film a little larger than the pc board and expose it to UV light through the page of the magazine. The non emulsion side should be in contact with the page. This surface can be detected by picking it up by one corner and it will curl towards this surface. Exposures of about 20 minutes are normally necessary.

The film can now be developed by placing it emulsion side up on a table, pouring some Scotchal 8500 developer on the surface and rubbing it with a clean tissue.

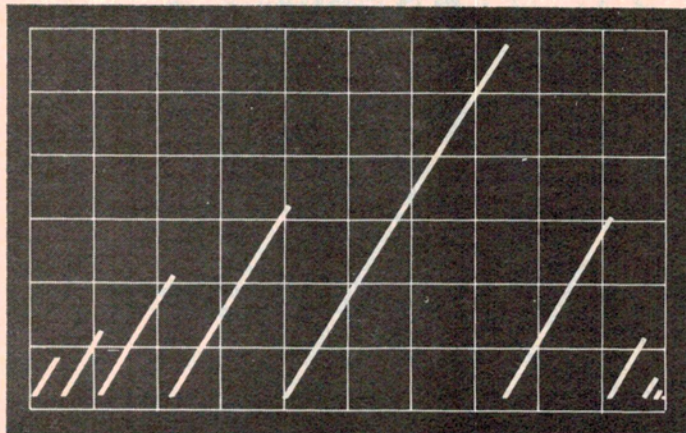


Fig. 7. The waveform on the Y output (vertical) with a 1kHz tone input. See page 12 for the X-Y display. Note that the time between cycles varies with the height.

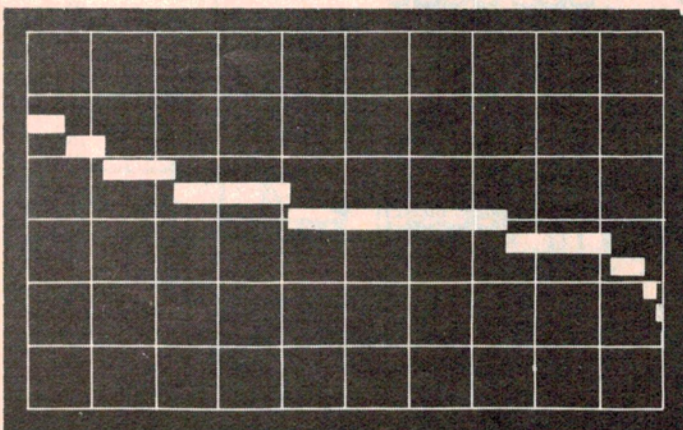
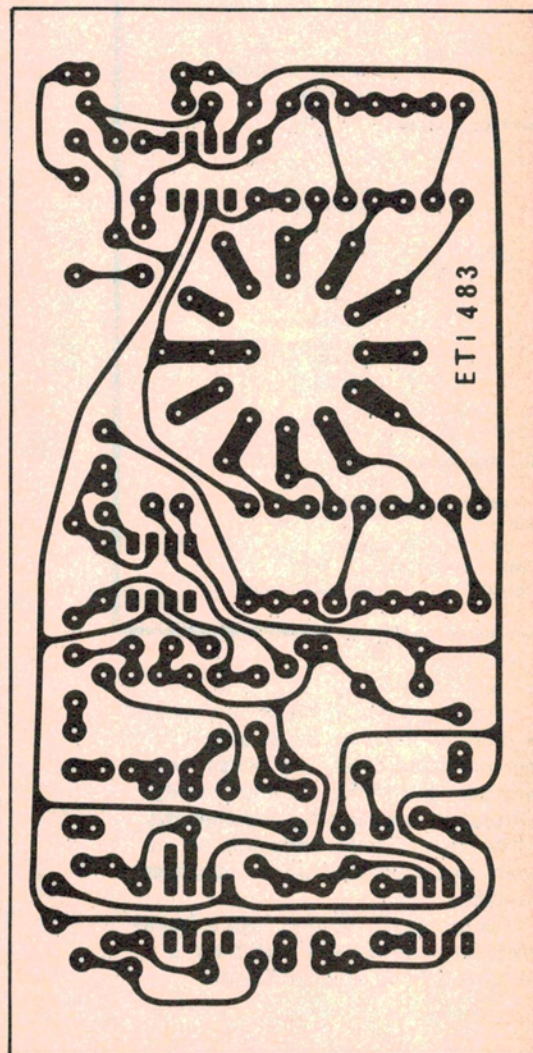


Fig. 8. The waveform on the X (horizontal) output. As this starts at +4V which is the right hand side of the screen, the 16kHz output is sampled first. Note that the time between steps corresponds to that in fig. 7.

The printed circuit layout of the sound level meter ETI 483 shown full size.



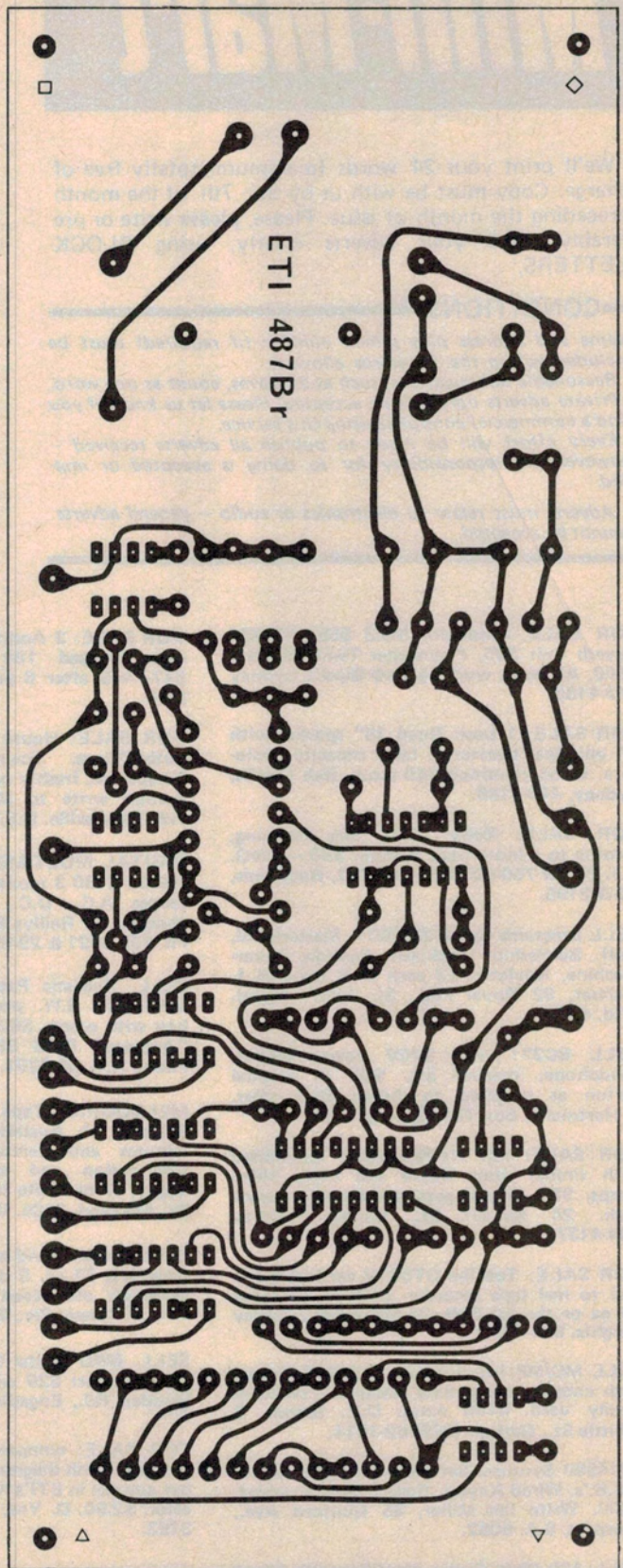
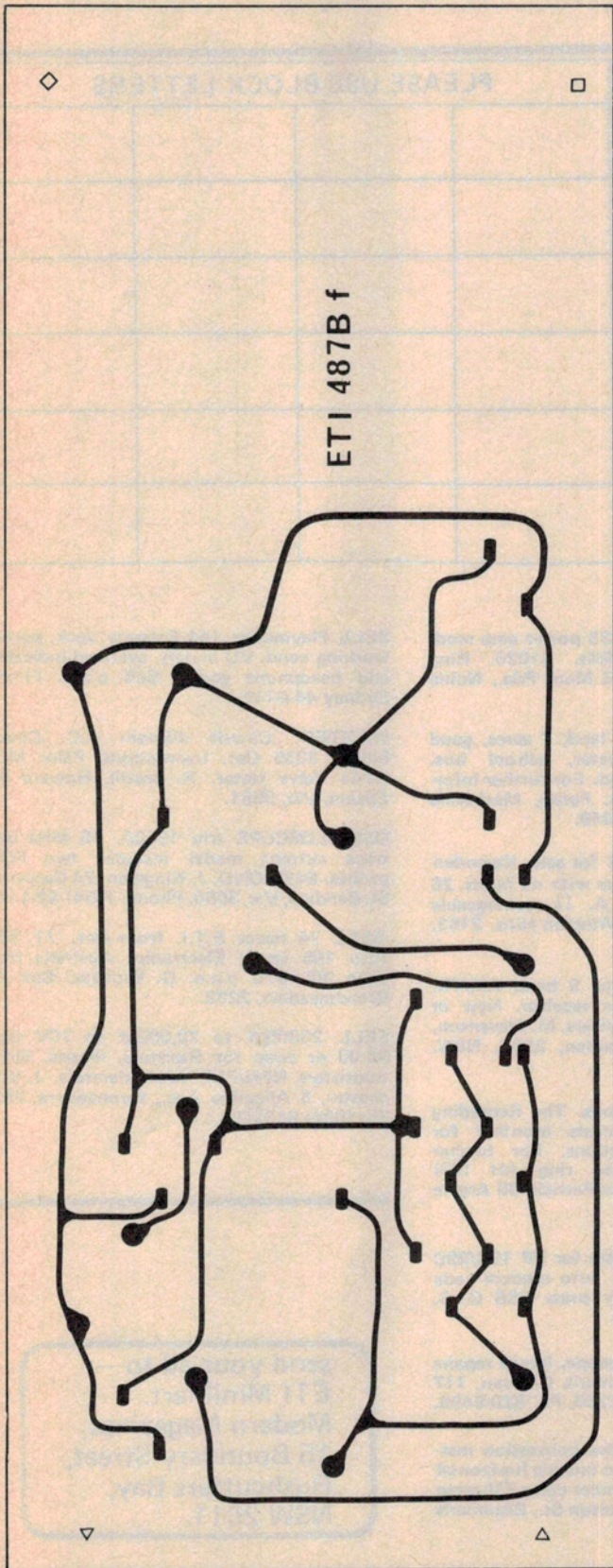


Fig. 9. Both sides of the ETI 487B board shown full size.