The files contained in this ARChive give you the information necessary to
build a better XL/XE power supply. The article originally appeared in the
December 1987 issue of Michigan Atari Magazine (MAM). Unfortunately,
the figures which accompanied the article in print are available only in
hardcopy format at this time (our kingdom for a Scanner!). If you're lucky
enough to have an Atari user group nearby which has been receiving MAM, you
can get the diagrams from them. If not and you wish to get copies, please
send a SASE to:
        Unicorn Publications
        Michigan Atari Magazine
        3487 Braeburn Circle
        Ann Arbor, MI 48108

Indicate that you want copies of the Power Supply diagrams and we'll send
them out to you. Thanks and enjoy!

REPLACEMENT XL/XE POWER SUPPLY
by D.F.Neff

THE PROJECT

Some time ago, I wrote an article describing how to troubleshoot and repair
your Atari power supply. At the time that article was written, Atari was
using a two-tone (coffee and cream) power supply which was easily disassembled
by removing four screws. As soon as the article was published, Atari switched
to a black, sealed power supply which was not repairable. To make matters
even worse, this new power supply has a higher failure rate than the old
two-tone power supply. This article provides you with the information you
need to build a new power supply for your XL or XE. Figure 1 shows the
schematic circuit of the new power supply.

figure one

THE ADVANTAGES

The power supply you are going to build will be better than your original from
Atari. First, it's easily repaired if a problem develops. Second, it's
heavily filtered to help eliminate interference on your monitor screen.
Third, it has self contained surge protection to prevent damaging voltage
spikes. Fourth, and of special interest to SysOps, the power supply can
provide back-up power through very short power loses (the type that make your
house lights flicker but not go out). Fifth, if someone expresses an interest
in it, I can show you how to modify the circuit to provide battery back-up
power through a lengthy power outage.

CONSTRUCTION

Resist the temptation to use a printed circuit board, and instead, use
point-to-point wiring on the mounting lugs to construct this circuit. Begin
by marking and drilling all the holes for the mounting screws, cords, and
switches. Next, mount the transformer at the rear of the box with two 4-40x1/4
machine screws and nuts. Install the lug tie strips in convenient locations
in the remaining space by using one 4-40x1/4 machine screw and nut for each
strip. VR1 must be attached to the side of the box using a 4-40x1/4 machine
screw and nut. Gently bend the legs of VR1 away from the metal of the box to
avoid the possibility of shorts. Now, construct the circuit as shown in
Figure 1. Pay special attention to the polarity of capacitors C1, C3, diodes
CR1, CR2, ZR1 and the leg numbering sequence of VR1 (see Figure 2). C2 should
be attached directly to legs 2 and 3 of VR1. The leads of C2 should be as
short as possible.

Figure two

If you are replacing an existing Atari power supply, you should cut the two
power cords off of it for use on this new power supply. Otherwise, you must
buy the plug and cords shown in the parts list. The plug in the list is a
five pin plug which is similar to the Atari seven pin plug shown in Figure 3.
Unfortunately, this five pin plug is identical to the Atari video plug for
your monitor signal. If you accidentally put the power supply plug in the
video jack, you will almost certainly damage your computer when you switch the
power on. Therefore, you should label both of these plugs at this time to
avoid getting them confused with one another later.

Cut the AC plug off of one the Radio Shack two-wire line cords and replace it with the five-pin plug. Connect one wire to the two pins on one side of the plug and the other wire to the two pins on the opposite side. No connection is made to the fifth pin at the bottom.

Figure 3 shows the reassembled plug as if you are looking at the pins and the wire is extending away in front of you. The wire connected to the pins on your Left should be connected to SW2 at the point identified with a "+" in Figure 1. The wire connected to the pins on the right of Figure 3, should be connected to the junction of L2 and C5. Do not connect this wire to the case or to a ground. Doing so will disable the interference filter.

Figure Three

THE CIRCUIT

M1 is a Metal Oxide Varistor (MOV) which provides the surge protection. It works by providing a short circuit to excessive voltages (such as surges). An extended period of high voltage will cause the MOV to fail and become a permanent short circuit to protect your computer. This, in turn, will blow fuse F1 to protect your house wiring. If, in the future, you find that F1 has failed and all replacement fuses also fail quickly, you should suspect that M1 is bad and replace it. N1 is a neon pilot light which also contributes slightly to the surge protection.

CR1, CR2 and C1 rectify the AC to DC. Your voltmeter should indicate approximately nine volts DC across C1.

VR1 is a five-volt regulator. VR1 will get hot and must be attached to the metal case to provide a heat sink.

ZR1 is a Zener diode which provides over-voltage protection in case VR1 fails. Remember that zener diodes are mounted in reverse polarity compared to standard diodes. If your voltmeter shows less than three volts across C3, you probably have ZR1 installed wrong.

C3 is a five-volt storage capacitor which acts like a battery. C1 and C3 will keep your computer running through those momentary power outages we mentioned earlier. SysOps may want to extend this power back-up capability by adding more C1's and C3's. Just add the additional capacitors in parallel to the ones shown in Figure 1. The more you add, the longer your computer will run without power. But, keep in mind that for the price of several extra capacitors you could install battery back-up instead.

C4, C5, L1, and L2 provide filtering to reduce electrical noise. SW2 is an optional momentary switch to provide cold reboots without wear and tear on your console switch.

Reassemble the power supply case, making sure there are no loose wires touching the case metal. Use your voltmeter to check for five volts DC across the plug, with polarity as shown in Figure 3. If everything checks out ok, you can plug this new power supply into your computer and become an Atarian again.

NOTE FROM THE AUTHOR

This article and many of my other Atari service/construction articles are in the public domain. Any user group may reproduce my articles for free. I would appreciate receiving a complimentary copy of your newsletter containing my article. I also welcome your comments and suggestions concerning my Atari articles. You may contact me by writing to: Don Neff, Michigan Atari Computer Enthusiasts, P.O. Box 2785, Southfield, Michigan, 48037.

PARTS LIST

Item	Description	Radio Shack#
C1	4700uF Cap.	272-1022
C2	0.1uF Tant.	272-1432
C3	0.1F Cap.	276-1440
C4,5	47pF Cap.	272-121
CR1,2	3 Amp Rect.	276-1141
F1	1 Amp Fuse	270-1250
L1,2	100uH Choke	273-102
M1	MOV	276-568
N1	Neon Pilot	272-712
SW1	AC Switch	276-602
SW2	Momentary Sw.	275-619
T1	Transformer	273-1511
VR1	5 Volt Reg.	276-1770
ZR1	Zener Diode	276-561

MISCELLANEOUS

--	5 Lug Strips	274-688
--	Case	270-253
--	Console Plug	274-003
--	Fuse Holder	270-362
--	Line Cords	278-1255
--	Machine Nuts	64-3018
--	Machine Screws	64-3011
--	Strain Relief	278-1636