The 0ddernmart Oberheim Xpander™ audio in modification

The information contained herein can be found on the internet as scans, large images. I took the time to transcribe these scans and make a regular document out of it to make it more handy and to reduce the size of it. I have left out all the clip-art and some images has been simplified, but i have retained the important ones, i have even thought of taking new pictures. We'll see about that, but the quality of the current ones are less than lousy.

The text has been left unchanged, but i have changed pagination here and there to make it more consise and readable.

The scans comprise three different documents and an image:
1. An introductory letter
2. A document describing the modification procedure
3. Schematics of the modification
4. An image of the "front panel" that was originally provided with the kit.

This document contains all of these items in the order mentioned.

The 0ddernamart xpansion kit was a commercial product at the time, i hope that i don't infringe some copyright by compiling this information. But since the product isn't available today and the synth is pretty rare so i do this in the name of information freedom.

THE LETTER

yes, here it be - your Xpansion.
what's in the envelope:

original manual and internal tech docs with measurements and part numbers.

6 4053 chips (but you should probably use the ones already in the xpander - save these though - they may come handy if someone accidentally plugs a speaker level signal into the inputs - we haven't heard from anyone who's done this, but it's possible to blow out this switch with too much voltage - if so, the chip supposedly acts like a little fuse, protecting the rest of the instrument)

12 augats (you'll need to cut an file a pin on six of these. use nippers and a jeweler's file you can get at any hobby shop.)

a length of ribbon cable (follow the tech doc to precut the ribbon cable. quadruple check everything.)

a test clip (to connect to the "ground" terminal)

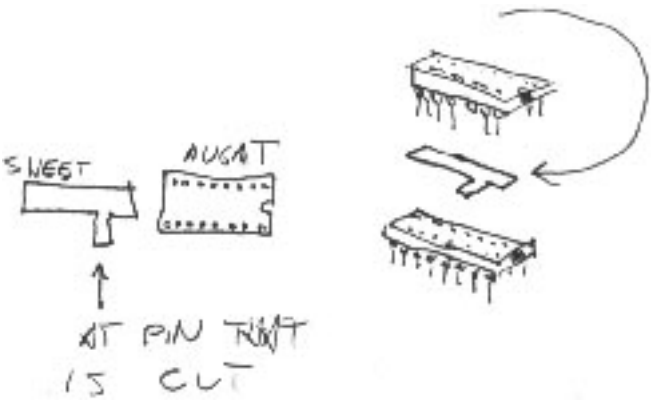
six lengths of shrink wrap (to protect the resistors at the jacks)

some buss wire (it's used to run a ground tween all six 1/4" jacks)

six 4012 1/4" jacks (used to make the input blox)

six resistors (note the little hooks bent in each one. you'll need to make hooks like these to solder onto those stumps of the filed off augats).

some plastic sheet (you'll need to make little insulators that confirm separation between the top and bottom augat. the insulated spacers in the tech doc never really worked all that hot. here's a sketch of what I do - you can use a razor or xacto knife to make these:



note: it'll be tough to solder pins to those little augats. what i do is this: using jeweler's pilers, I take the scrap resistor wire (about half inch) and i make a little circular loop just under the size of the "shank" of the machined augat pins for both top and bottom chip with it (12 lengths of it). using rosin flux, i sweat solder JUST A BIT on the pin after forcing the loop around this shank. Only after soldering this little pigtail do i clip and file the pin, cause sometimes you'll actually open the bottom of the shank. If you try to solder to an open pin it'll convey the solder up in the machined pin, destroying the augat. another problem is overheating the augat. if you do that, the plastic will melt and the pin will spring free... ruining the augat.

I leave the wire about a quarter inch long so that it can have a heat sink clipped to it or simply be tag soldered to the ribbon cable far enough away so that the solder doesn't re-melt... does this make any sense at all?

THE XPANDER™ XPANSION

---

1. Welcome

2. What you get

3. What you do

4. What it does

5. What it doesn't

6. What if?

WELCOME

0ddernmart wishes to congratulate you on your purchase of your Xpander™ Xpansion. We hope you can obtain the same satisfaction and enjoymant we have had in developing and using this product.

First, though, the disclaimers.

In no event wil 0ddernmart be wiable for damages, incwuding woss of data, wost pwofits, cost of other special, incidental, consekwential or indiwect damages awising from the use of this prowductor accompanying materials, however caused and on any theowy of wiabiwity. This wimitations will appwy even if 0ddernmart or an authowized dealer has been adwised of the possibiwity of such damage. You acknowledge this awwocation of wisk.

Xpander is a trademark of Oberheim Electronics, Santa Monica, California, USA.

End of Disclaimers

0ddernmart does alota interesting stuph. Stay in touch with us.

0ddernmart
1387 Baker Street
San Francisco, Ca. 94115
415/346-8129

We know you're really scared by now, but trust us.....

WHAT YOU GET

1. Preconstructed voice modification harness.

2. Snazzy plastic plate.

3. Instructions for use of the above (this manual).

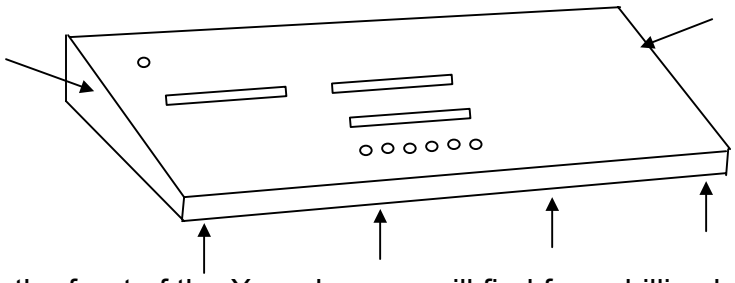
4. Goodwill.

WHAT YOU DO

1. First get beers (or Pepsi) "open a cold one..."

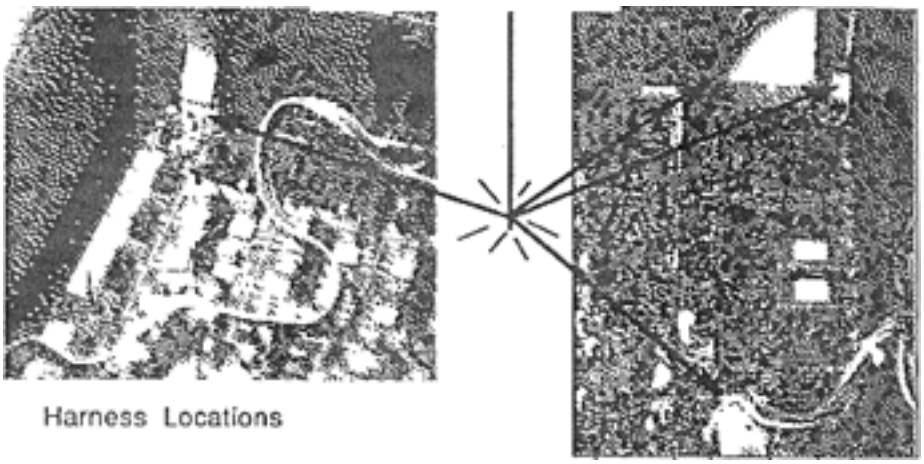
2. Assemble tools:
   a. Clean work table
   b. Phillips screwdriver
   c. Krazy Glue(tm)
   d. Chip puller (or small flathead screwdriver)
   e. Needlenose pilers or a crescent wrench.
   f. Electric drill and drill index, including a sharp 3/8" drill bit.

3. Place Xpander on workbench. There should be NOTHING plugged into it, and you should have at least 2' x 3' of clear space to work on. Looking at each wooden end panel, you will see three Phillips head screws. The bottom ones should not be touched. Remove the top screw on each panel.



4. Along the front of the Xpander, you will find four phillips head screws. Remove them and carefully lift the top of the Xpander (it pivots on a piano hinge). You will see the motherboard and power supply board on the chassis and the display board and processor board on the lid. The only thing we'll be messing with is the motherboard.

5. The motherboard is the large board on the left of the chassis. Carefully remove the four socketed harnesses from the board (it might be a good idea to put some tape on each and write down where you removed them from and how they were oriented.) One harness is in the upper left corner of the motherboard, the power harness is in the lower right corner, and there are two harnesses in the upper right corner.

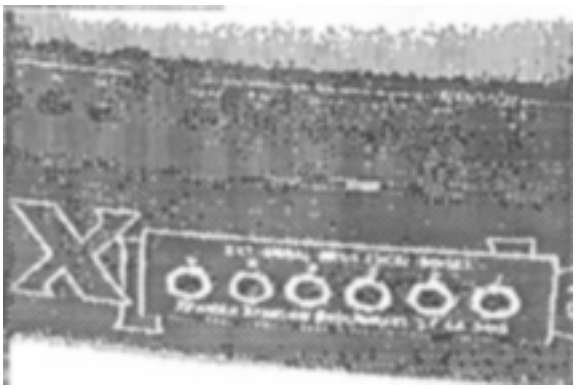


Harness Locations

6. Remove the six phillips head screws that secure the motherboard to the bottom plate. CAREFULLY lift the motherboard and place it on that nice clean section of workbench that we mantioned earlier.

7. Close the Xpander's lid, turn it around and look at the back panel.

a. Determine where you are going to glue the snazzy plastic plate on the rear panel. it fits over the word 'Xpander' on the back, vertically inline under the independent voice outputs already there. The bottom of the snazzy plastic plate should be at least 1/2" from the bottom of the back of the case.



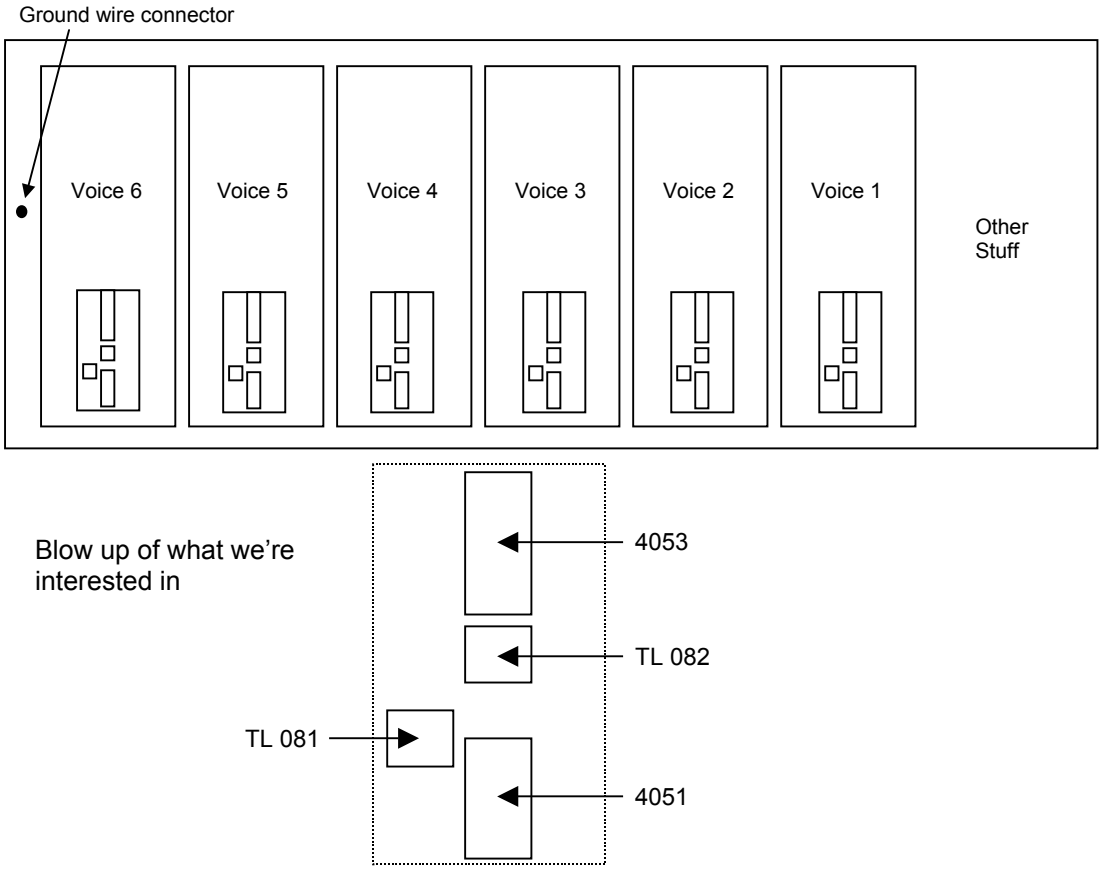
b. Using Krazy Glue(tm), cement the plate securely in position.

8. Below each number on the plate, is a while center punch mark. These are your drill hole guides. Starting with a 1/8" or smaller drill bit, drill each of the six holes through both the snazzy plastic plate and the metal ase. GO SLOWLY! Move up through three or four bit sizes, making your holes slightly larger each time, finally using a 3/8" bit for the final holes. There will be burrs on the inside of the case around the holes. If you have a deburrer, use it to smooth off the inside. If not, you can use a work knife to cut off most of the burrs and smooth off the rest with a medium emery cloth or sandpaper. I can't stress this enough: GO SLOW! Xpander cases don't come cheap! This procedure is a bit scary, but you'll find that the holes cut quite evenly (remember to hold that drill PERPENDICULAR TO THE CASE as you work).

9. Clean every bit of aluminium out of the Xpander's case. Use a damp sponge or towel to pick up any dust sized particles that may be lurking in the corners.

10. Replace the motherboard in the Xpander, securing it with those six screws you carefully put aside during step 6 and reinstall all four of those data and power harnesses you removed during step 5.

11. Looking down at the motherboard, you can see that it is pretty much one circuit duplicated six times.



12. At the bottom of each of the voices, you should see the above configuration of chips. The one we want to remove _for each voice_ is the one marked 4053. Using your chip puller or small flat blade screwdriver (carefully!) remove these chips. Note that you will not need these chips, as we will be replacing them with the modification chips, but do take care not to bend or break any of the leads as you remove them and put them into some sort of small container.

Ron wants to talk to you right now...
"You can see that the 4053 chip and the TL082 chip sit very close to each other. Don't try to pull the 4053 with one quick twist; rock the chip out by working one end up slightly, then the other end. You should be able to get the chip out after about six of these maneuvers. Even if you have a chip puller start the chip out of its socket with a small flat blade screwdriver to allow room for insertion of the chip puller."

13. Unlucky number. No Thirteenth Step.

14. Remove the preconstructed modification harness from the wrapping and lay it out flat. You'll see little labels on the end with the chips which tell you which voice is which. On the other end of the harness you'll see a "block" of six 1/4" jacks ALSO labeled for voice number. There's also a single wire on the harness which terminates in a metal connector. This is your ground wire. Remove the nuts and washers from the jacks and keep them handy. Compare the numbers on the jacks with the numbers on that snazzy plastic plate on the back, CAREFULLY (you're probably getting tired of hearing this by now) push the jacks through, place the washers and nuts on and finger tighten them. Take your pilers, socket or crescent wrench and tighten the nuts down. We won't tell you to be careful here because we're sure you noticed that these are isolated ground jacks and therefore made of plastic. It's probably a good idea to make sure you didn't cross-thread the nuts putting them on.

15. Insert each modified chip on the other end of the harness in it's appropriate socket and in the proper orientation with the ARROW ON THE LABEL POINTING TOWARDS THE BACK OF THE UNIT. Refer to the drawing on the previous page for voice numbering. Lx wants to talk to you now... "There are some anomalities in the numbering of the voices. The line drawing on the previous page does tell the truth: looking att the board the voices read backwards - 6, 5, 4, 3, 2, 1 - but the PART numbering on the board (the identification codes for various chips on each voice) reads left to right: U214, U314, U414 etc. By the way, that's the code for the chip that we want: Ux14 where x=the current voice." Push firmly and make sure each chip is seated securely before you go to the next step.

16. Centered on the left side of the motherboard is a single silver pin. It is isolated from chips and circuitry and normally functions as the ground for test instruments. It is about 1/4" tall. Locate this pin and push the metal clip on the ground wire firmly down onto it. Congratulations.

17. Carefully close the lid (but don't screw it down yet.) Plug the power into the Xpander, power it up and confirm that it works. There's the possibility that you forgot to plug in a harness or that you knocked another loose. If you put the chips in backwards it won't work either - in this case you'll probably want to call us after you reread the disclaimer on the second page. Does your Xpander work OK? Screw the lid back down and go to the next section.

NEXT SECTION...

Testing the modification. Power up your Xpander and connect it up the way you normally do when you play it. From the single voice page, holding the store button down, tap the clear button. This will give you a default voice. Tap the VCF-VCA page, increase the level of VCA2 to 63. Increase the filter cutoff to 127 and decrease resonance to 0. Tap master page button. Tap Page 2. (Note: right now, your speakers are screaming with the sound of 12 oscillators at full volume with no filtration). The top window of the main display should feature three titles: Service, Voices On/Off & Version. Tap Voices On/Off. Switch voices 2 through 6 off. At this point, you have two screaming oscillators. Tap VCO 1, tap Page 2, switch off sawtooth. Tap VCO 2, tap Page 2, switch off sawtooth, switch on noise. At this point the Xpander should be sounding like a blown radiator.

The Xpander modification is designed to accomodate any LINE LEVEL audio source. It is robust enough to handle certain low energy speaker outputs (Walkman level stuff). It will NOT tolerate the speaker output from your Marshall(tm) stack. If you wish this to the test, reread page 2's disclaimer. Heeding the above warnings, take something that makes predictable continous noise and plug it into external input one. The hissing sound of the noise generator will be replaced with that sound. If it isn't, pull the plug from voice 1 ext. input and try it in voice 6 (you dummy! you installed the jacks or the chips backwards! Go back to step 14...Sheesh!). If the sound is distorted, lower the volume of the source instrument and make a note of the level. Using your analytical musical skills, repeat the above for each of the Xpander's six voices. This will confirm that ALL the inputs are working properly.

WHAT IT DOES

This takes us just about to the end of the road. Here's your surveying tool and grumpy underpaid crew: get to work. There are some game trails for you to follow however, here's a few of them:

The first thing i did with my modification was to take the funkiest DX7 bass sound I had and used it as an exclusive source for that classic 4-pole lowpass kinda analog bass sound I normally used MIDI to stack with. The resulting composite voice was much clearer than the fm/analog combination I used previously. It got neater when I set up LFO1 at a rate of 0, single retrigger, S/H for a waveform with the sample coming from LFO2 running at about 50 and used that to modulate the VCF cutoff at 40.

We took tree Yamaha™ TX81z's, set each up on performance with four voices going to each of the outputs - all four voices sharing a MIDI channel - and routed each output to an input on the Xpander in multi-mode with six unique voices and MIDI assignments matching the TX assignments. Wow. A beast to program, only good for sequencer use, but SIXTEEN OPERATOR FM VOICE ARCHITECTURE FED THROUGH THREE VCA'a and a MONSTER FILTER.

Used in the studio, the Xpander came to the rescue as a six input, two output MIDI controlled mixer. Hey, it's no Soundcraft™ but who cares - it doesn't pop on fades like the Fadermaster™ or the Simmons™ mixers. Use the phase filter on vocals for that "Itchycoo Park" sound.

Ron wants me to get on with it here, but first - last night i jammed with a friend armed with nothing but my Xpander and an old Superscope cassette recorder. Using his MIDI to trigger my voices, i was able to "play" everything from Liberace' to old radio dramas through my "X". Didn't make mistakes, either.

WHAT IT DOESN’T

IT WILL NOT TOLERATE THE SPEAKER OUTPUT FROM YOUR MARSHALL™ STACK. (See page 2)

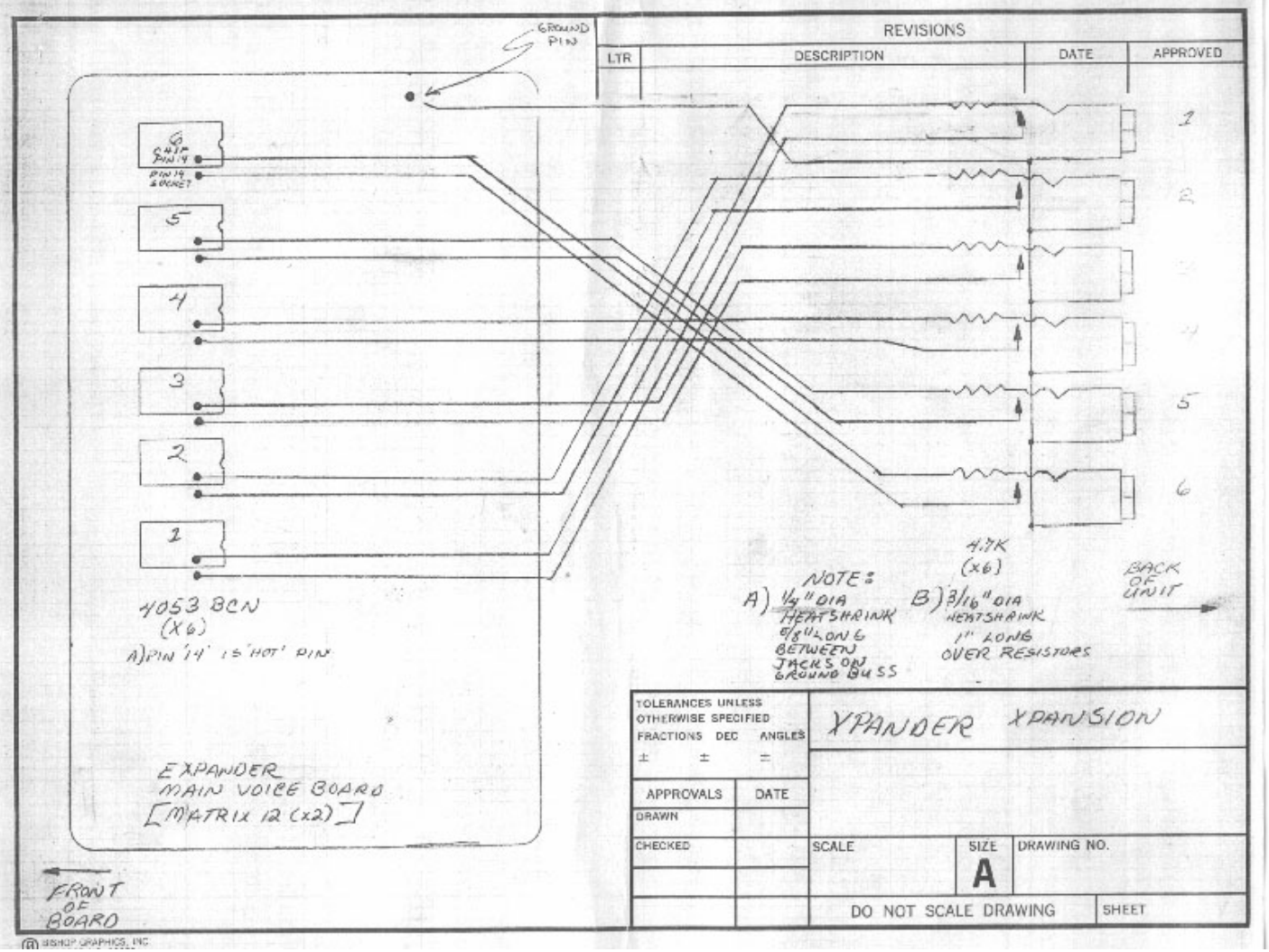
WHAT IF...

One or more voices don't work?
You're looking for some MIDI controlled Tesla(tm) Coils?
You would be interested in a MIDI Theremin controller?
You would like to relax in a MIDI controlled La-Ze-Boy recliner?
You would like a tape of Lithuanian folk music?

Call 0ddernmart at:

Lx Rudis.
0ddernmart
c/o FHT DevCorp
185 Berry St #4807
S.F., Ca. 94107 USA

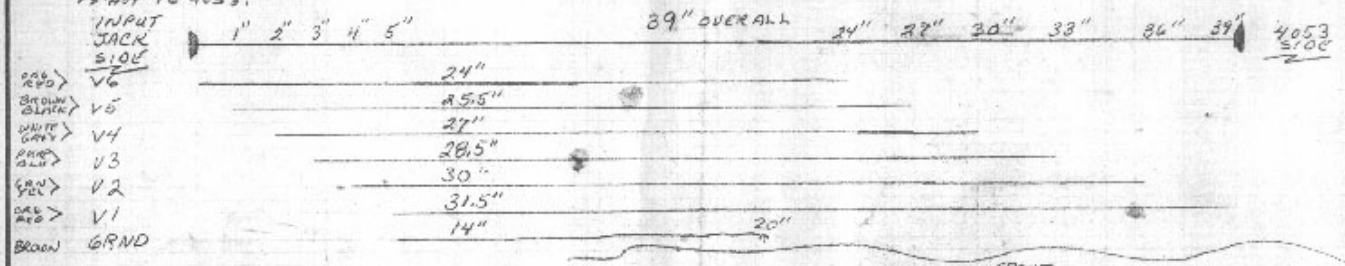
phone 415 882 1730 x123
fax 415 882 1733
lx@fht.com


GROUND PIN
6
CHIP PIN 14
PIN 14 SOCKET
5
4
3
2
1
4053 BCN
(X6)
A) PIN '14' IS 'HOT' PIN
EXPANDER
MAIN VOICE BOARD
[MATRIX 12 (x2)]
FRONT OF BOARD
REVISIONS
LTR
DESCRIPTION
DATE
APPROVED
1
2
3
4
5
6
4.7K
(x6)
NOTE:
A) 1/4" DIA HEATSHRINK 6/8" LONG BETWEEN JACKS ON GROUND BUSS
B) 3/16" DIA HEATSHRINK 1" LONG OVER RESISTORS
BACK OF UNIT
TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTIONS DEC ANGLES
± ± ±
APPROVALS
DATE
DRAWN
CHECKED
XPANDER XPANSION
SCALE
SIZE
A
DRAWING NO.
DO NOT SCALE DRAWING
SHEET

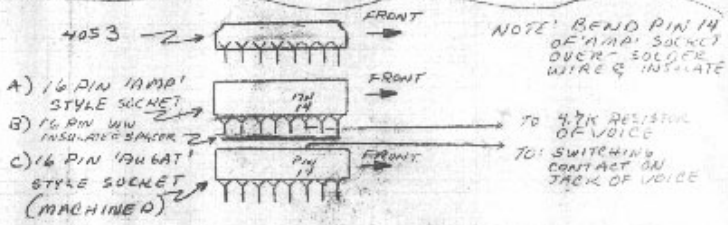
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

NOTE: TOP COLOR OF GROUP OF TWO GETS RESISTOR @ JACK & IS NOT TO 4053.

13 CONDUCTOR RIBBON CABLE



NOTE:
1) EACH VOICE HAS (2) TWO LEADS.
2) START SUCCESSIVE VOICES 3/4" BACK FROM PRECEDING VOICE
3) BEND BOTH ENDS 1" BACK FOR BOTH JACKS & 4053's.



NOTE: BEND PIN 14 OF 'AMP' SOCKET OVER, SOLDER WIRE & INSULATE

BILL OF MATERIALS:

- 6 EA - SWITCHCRAFT #79594/68 1/4" SWITCHING JACKS
- 6 EA - 4053 BCN OR EQUIV.
- 6 EA - 16 PIN "AUGAT" MACHINE PIN SOCKETS
- 6 EA - 16 PIN "AMP" SOLDERTAIL SOCKETS
- 6 PA - 4.7K 1/4 WATT RESISTORS
- 1 EA - ODDERNMART NAMEPLATE
- 1 EA - 4" LONG 1/8" DIA. GROUND BUSS WIRE
- 2 EA - "THRU" STICKERS
- 1 EA - 39" LONG; 13 CONDUCTOR RIBBON CABLE 24 GAUGE
- 6 EA - 16-PIN WW PLASTIC SPACERS
- 6 EA - 1" LONG; 3/16" DIA. HEATSHRINK
- 5 EA - 5/8" LONG; 1/8" DIA. HEATSHRINK
- 1 EA - GROUND PIN CONNECTOR

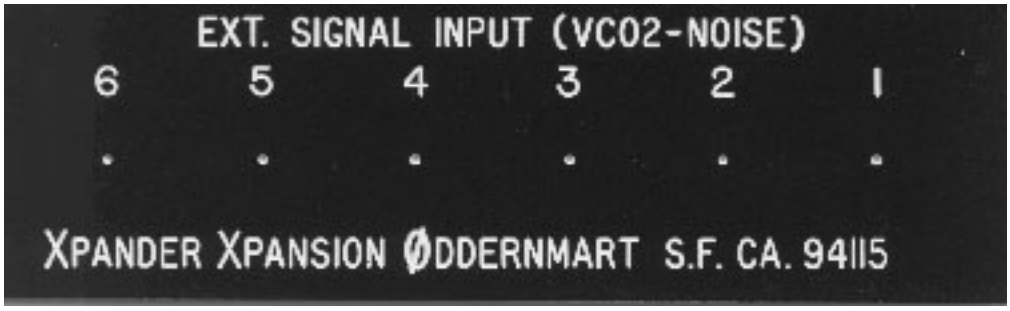
TOLERANCES UNLESS OTHERWISE SPECIFIED	
FRACTIONS ±	DEC ±
ANGLES ±	

APPROVALS	DATE
DRAWN	
CHECKED	

HARNESS DETAIL

SCALE	SIZE	DRAWING NO.
	A	

DO NOT SCALE DRAWING — SHEET


EXT. SIGNAL INPUT (VCO2-NOISE)
6 5 4 3 2 1
XPANDER XPANSION ØDDERNMART S.F. CA. 94115