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May 26 92

Dear Woody,

Here is a collection of set-up & troubleshooting instructions for cloud Music, especially the music part.

Hope all goes smoothly in Linz.

When it comes time to arrange for returning the installation, could you do me a personal favor and make sure that the cases are returned to me at 10 Beach?

Thanks.

All the best, David

May 25 92. David B. to Woody V.
Here is supplementary troubleshooting/set-up info for the Cloud Music
music synthesizer of 1976 (hopefully the old machine will work
perfectly and you won't need even to look at these pages.....which
came from Mars)

(retyped in 1992, a boiled down version of 1976 letter to Bob
Watts & Bob Diamond). See also the other 2 pages "How to Set Up
"Cloud Music" (May 4 92 to David Muller).

Description of the Music Synth:

   The master oscillator board (#12) has an assortment of frequency
dividers and multipliers to generate mean-tuned pitch references.
These audio frequency square waves appear on the matrix buss (the 6
plastic panels with spaghetti wiring on the rear of synth). The 6
harmony boards (HB1-6) take their reference frequencies from the
matrix panels. The HB boards consist of phase-locked-loops which
glide from one reference frequency to the next. These boards also
convert the square waves to triange waves.

   Boards 1,2 and 3 are A-to-D converters which convert incoming
voltages from the video analyzer to 3-bit words used to switch
harmonies.

   Boards 4 & 5 are events counters and adders: two on board
#4, four on board #5.

   Board 13 has output audio mixing. Board 14 has the LED displays.

   Before plugging in the music synth, make sure the 14 circuit
boards are all fully pushed into their sockets! Also be careful
not to let any wires get accidentally jammed between plug-in
boards and their sockets.

   Note numbering of boards, from left to right (looking at system
from the front, that is, the side the boards slide out from, with
video inputs on left & audio outputs on the right):
     1 2 3 4 5 HB1 HB2 ... HB6   12 13 14

   Note that all the components on all the boards are to the right.
     "   "   soldering side is to the left
     "   "   board #12 has its black plastic pushing-out lever on the
bottom and that all other boards have theirs on top.   (Board 12 is
the blue one with two blue pulling handles).

   Note that all the boards are numbered on their right sides.

Check that power supply is connected to rest of unit. There are 3 connectors: red banana, black banana and the (black) cinch-jones plug & jack.

Plug in power cord. Turn on power. Power toggle switch is on power supply.

The power supply pilot lamp should light up. If it doesn't, check fuse on power supply (use 3/4 amp replacement).

Connect the 6 audio output jacks on right side to line inputs of the audio mixer. Set up sound system so you can monitor sound. (See "How to Set Up" instructions)

The six LED digital readout displays should light up. These are on board #14.

Sound should be heard! The gains of the 6 individual "harmonies" should be slowly rising and falling one after the other, in a period that lasts abount 100 seconds. (Each channel should rise & fall about 24 db every 100 secs).

Notice controls on left side of unit:

Input select switches A and B should both be on "input" when operating sound unit and video unit together.

Music synth's operation can be checked out independently of the incoming video voltages. Here's how:

Positions 1 thru 6 on these rotary switches are for checking out operation of the A/D converters (normally driven by the video voltages) and for audio checkout as well.... 2 channels can be checked at a time. To do this, switch input selector A to 1 and selector B to 2. Put red toggle switch (at upper left edge of left side) to "manual low" position. Turn "Voltage Source 'to A' " knob fully counterclockwise. The top left LED display on board #14 should read "0". Now slowly turn knob of voltage source clockwise. The LED display should show successively "1" "2" "3" and "4". Now switch red toggle to "manual high". The LED display should show "7". Turning voltage source knob back the other way should cause display to move from "7" to "6" "5" "4" & "3".

Repeat this check with voltage source 'to B' knob, which should have the same effect on the upper right hand display on board #14 (channel 2).

Then... check channels 3 and 4 by moving Input Selector switch A to 3 and switch B to 4. Repeat as above. To check channels 5 and 6, switch A goes to 5 and switch B goes to 6. The displays for 3 and 4 on board #14 are the middle ones, left and right, the displays for 5 and 6 are the bottom ones, left and right.

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Sounds should be smoothly pitched & free from wavering or siren-like aimless wandering. If such occur, one or more of the matrix wires has come loose. These are on the matrix boards at the rear side of the synth. Inspect them to see if unattached wires are in evidence. Check them by wiggling. Note matrix positions below. For ex., if channel 3 (at audio output jack 3), position 4 (at left-side Input Selector switch) has wavery sound (middle left display showing "4"), then check wires on 3rd matrix board from left, 4th wire from the top. (there are 3 wire sets on each matrix; each governs one oscillator).

If you find loose matrix wire ends, push them back into the matrix bed, following the matrix harmony notation diagram*

When running the synth from video (as opposed to checkout mode) the red toggle switch (on synth's left side) should be in the "auto shift" position.

The switch marked "Events Counter (select count)" functions when red toggle switch is in "auto shift" position. Whenever a video input voltage changes enough to cause one of the harmonies to switch, a count is entered into an internal "events counter" (on board #4). After 8, 16, 24, 32 or 40 counts the circuitry on this counter shifts the harmonies from range 0-4 to range 3-7, and back again. When shift is in high (3-7) position the decimal point to the right of the upper right-hand LED display will light up.

If there is very little sky-cloud action, try setting the "Events Counter (select count)" switch to 8. If there is some or plenty of sky action try a higher position.

To adjust video analyzer voltages to operate the music synth, connect video outputs to the six input jacks on synth's left side. With red toggle in "manual low" position, adjust voltages on board the video analyzer so that darkest sky area produces "0"s on all 6 LED displays (board #14) and lightest sky produces "4"s. Then move red toggle switch to "auto shift" position.

If circuit faults develop on the boards, the best means of trouble-shooting is with a card extender (yes Dave has one circa 1976) . i.e. switch off synth, remove suspect board, attach same to extender, plug extender back into card slot & poke around with a scope. All the chips on the boards are standard 1976 CMOS.

If 1 of the 6 audio channels has problems, try localizing trouble by switching HB1 thru HB6 -- they are interchangeable. If all else fails, run the synth with less than 6 working channels.

If 1 or 2 of the 6 channels fails to respond to the rotary switch checkout proc. above, try switching boards 1,2,3. These A to D converter boards are interchangeable.

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