4. SIGNAL CONNECTIONS AND SIGNAL ADJUSTMENTS

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4.1. Audio signal connections to the VMS 80

The following AF-connections are required:

a) cutterdrive
b) cutter-feedback
c) pick-up

Respective connectors are located at the central connecting panel which is accessible behind the front lid of the machine. Fig. 4.1.1.

When the machine is operated in combination with Neumann amplifiers, the necessary connecting cables come with the machine or are available as an accessory. To combine the machine with other amplifiers, please refer to the circuit diagrams to identify the respective pins of the multi-pin connectors.

4. SIGNAL CONNECTIONS AND SIGNAL ADJUSTMENTS

4.2. Preview head distances

The stereo preview head mounted on the tape playback deck must be located exactly 0.5 turntable revolution ahead at any speed and may deviate only ± 1 %.This distance is both a function of the turntable RPM and the tape speed as follows:

Turntable rotation	33 1/3	45 RPM
Tape speed 30"/s	68.58	50.68 cm
" " 15"/s	34.29	25.34 cm
" " 7.5"/s	17.15	12.70 cm
Preview time	0.900	0.667sec.

→27 STRIPE FRAMES

4.3. Preview signal level adjustment

A calibrated play-back, as well as proper alignment of the SAL 74 cutterdrive logic as described in its instruction manual. At this standard alignment, a level of +4 dBm$\hat{=}$ 1.228 V produces a peak velocity of 5 cm/s in each flank and a meter reading of 0 vu at the control desk.

Set up a 100 Hz sine wave signal at a level of + 10dBm. The reading on the peak level meters will then be 100 %. After pressing the "+6 vu" push button at the vu meters, they will indicate 0 vu.This signal will result in a peak velocity of 2.213 cm/s which results in an amplitude of 35.2 µm (RIAA). Both the horizontal and the vertical component of this amplitude will be 24.9 µm, or essentially 25 µm (1 mil).

Testing will be done without cutting a disk, solely using the meters on the operating terminal. Push START. Without feeding a preview signal into the machine, adjust a Land of 10 µm (0.4 mil) and a groove width of 40 µm (1.6 mil). Both figures shall add up to exactly 50 µm on the PITCH meter.

Connect the test signal indicated above to the preview input "left" and adjust the trim-pot

...4.3. PREVIEW LEFT on the VSA PC-board until 150 µm (6 mil) is read on the PITCH meter. In other words: the pitch computer is to be adjusted in such a way, that it adds to the 40 µm width plus 10 µm land, four times the horizontal space requirement.

Now connect the preview signal to the preview input "right" and proceed with the same alignment but adjusting the PREVIEW RIGHT potentiometer to a value of 150 µm (6mil) on the PITCH meter. In both cases the DEPTH meter must indicate the figure 90µm (3.6 mil), i. e. the adjusted quiescent groove and the space for two times the additional vertical excursion.

6mil

L ch

.4m

1.6mil

R ch

6mil.

100Hz 10dbm

L or R

Pitch meter - 6 mils

Depth meter - 3.6 mils

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GOTHAM AUDIO CORPORATION

ENGINEERING BULLETIN

RE: Calibration Method for VMS 80 Pitch/Depth

DATE: 9 April 1981

This is a fast method SFT obtained from GN during recent trip and should help clients keep the VMS 80 operating at its peak of performance.

1. Set 100 Hz at 0 PEAK = 10 cm/s (+10 dB line level).
2. Operate TEST switch on BE panel (lower left).
3. ~~Operate FIXED switch on same panel.~~
4. Set 40 um (1.6 mil) DEPTH, 10 um (0.4 mil) LAND. MUST indicate 50 um (2 mil) on PITCH meter.
5. Feed 100 Hz to RIGHT and LEFT channels separately. (SK-A all zeroed!) You should now read 150 um (6 mil) PITCH, 90 um (3.6 mil) DEPTH. Trim PV LEFT + RIGHT (on rightmost PC card below) until this 6 mil PITCH is shown.
6. Feeding LATERAL signal gives: 150 um (6 mil) + 40 um (1.6 mil). VERTICAL gives ~~250~~ um (~~6~~ mil) + 140 um (~~5.6~~ mil).

NOTE: German disk standards permit a min. groove width of 25 um (0.5 mil) and LAND down to ZERO!

At GN 25.03.81
ENG-2/p1

4.4. Adjustment of the phase relationship between cutting and preview signals

Accurate pitch control according to both amplitude and phase requires a definite co-ordination to the stylus movement. Put in another way: the phase relationship between the preview and the cutting signal stereo pair has to be checked and if necessary one of the signal pairs has to be turned by 180°. To do this, there is a phase alternator switch on the VSA 80 PC-board. Fig. 4.4.0.

To position this switch properly the VMS 80 comes with a pitch-phase test tape; its tape speed is 15 ips. It contains two pulse sequences, each for 1 minute, separated by leader tape. The single pulses in a sequence are recorded in such a way that when transcribed to a disk at 33 1/3 RPM, a pulse will be recorded every third revolution. Since there is no standardized relationship between tape magnetisation and output signal polarity, the first pulse sequence causes either a mainly vertical and the second a mainly lateral cutter movement or vice versa. In the correct position of the phase switch of the VSA 80 PC-board, the lateral cut pulse sequence will cause a microscope groove picture according to fig. 4.4.1., i. e. the pitch computer has created the necessary land between two adjacent grooves.

...4.4. If the polarity switch is in the wrong position, the pulses cause a microscope picture according to fig. 4.4.2. The phase recognition in the computer was not able to properly evaluate the pulse and caused an overcut.

The pulse sequences which create a vertical cutter movement produce the following picture for the correct and reverse phase relationship:

Fig. 4.4.3. shows the correct phase relationship, the computer created sufficient space and groove depth to record the pulse.

Fig. 4.4.4. shows the typical wrong phase relationship between preview and cutting signal. That leads again to an overcut. The indicated phase reversing switch has to be switched into its other position.

Note: Due to the fact that the rather short pulses must have a large space between them, so they will influence the pitch computer singly(about 3 turntable revolutions) some patience is necessary to find the pulses in the micorscope picture.

4.5. Automatic motion control connections

To control the complete cutting procedure program consisting of start, creating of a preselected number of timed marker grooves (spirals),and cutting of the lead-out groove the VMS 80 lathe has an automatic motion control facility (AMC). Normally this AMC is controlled by a light barrier on the playback tape deck which distinguishes between audio and leader tape. This light barrier is to be connected to the VMS at the main connecting panel in the machine console using the multi-connector MS 541. Its sensitivity is adjusted by means of the AMC SENSE trimmer potentiometer on the VAS PC-board.

A green and a red LED are located above the AMC SENSE trim pots. Put audio tape in combination with leader tape on the tape deck and position the leader tape in the light barrier. Turn the AMC SENSE trim pot clockwise until the greed LED lights. Now position the audio tape in the light barrier and observe the red LED; it must now be lit. This indication may not change when the magnetic tape is moved toward the light soruce of the light barrier by means of the pressure roller.
Finally, using the CUT SELECTOR rotary switch select any number of cuts on the CUT NUMBER read-out and push START. Each time leader tape passes through the light barrier, the CUT NUMBER must advance one count until the preselected cut number is reached.

4.5.1. ADD LAND adjustment

The end of each section of leader tape triggers the ADD LAND program (increased land to prevent pre-echos). The amount of increase is to be set by means of the potentiometer 4.7. The number of turntable rotations with increased land may be preselected by means of the sliding switch S1 on the VAS PC-board. Its 5 positions, with the numbers 1 to 5, mean the number of rotations with increased land.

One or two rotations are usual for effective pre-echo suppression. In exceptional cases one may wish to select a higher number.