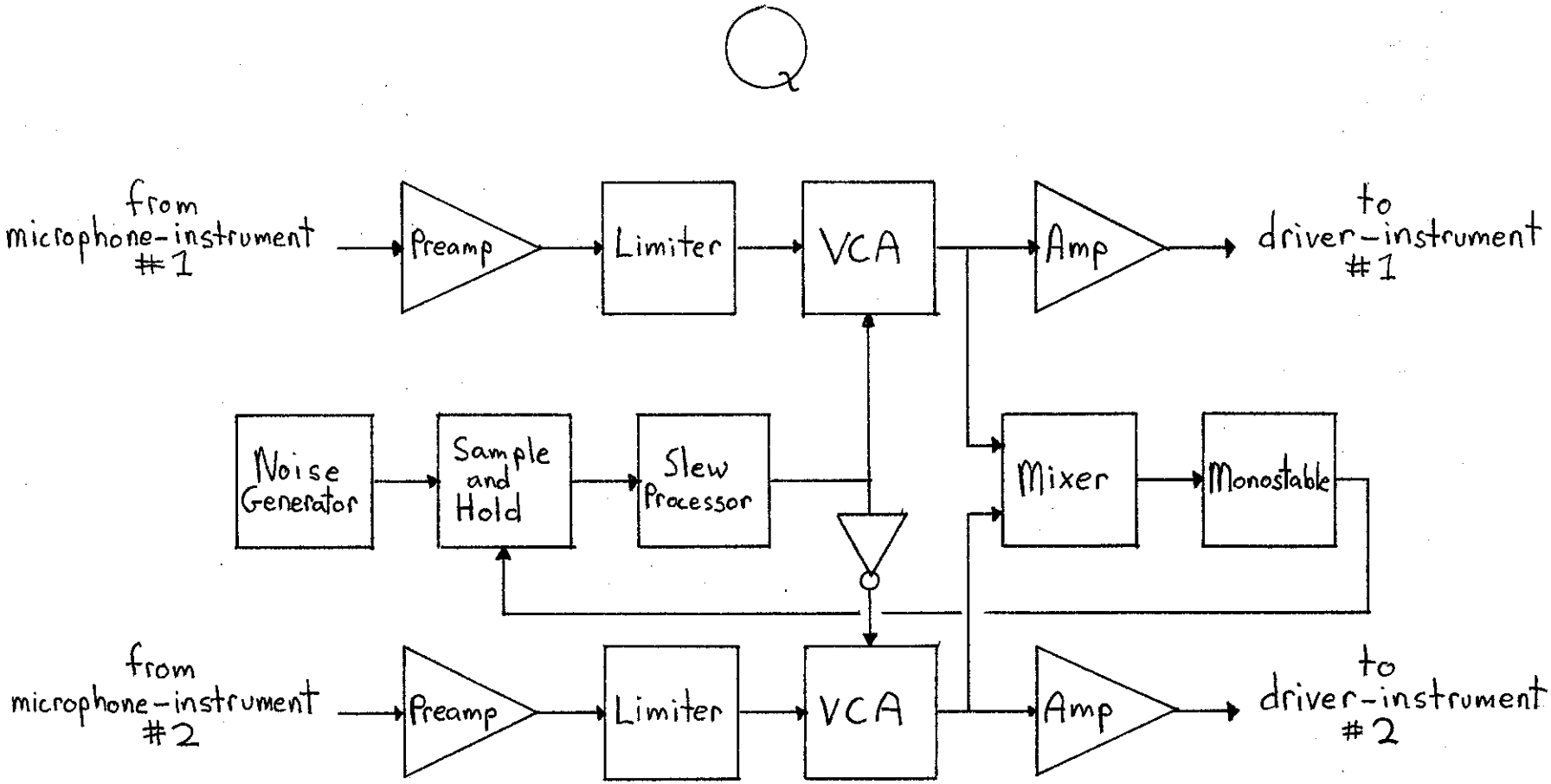
from microphone-instrument #1
Preamp
Limiter
VCA
Amp
to driver-instrument #1
Noise Generator
Sample and Hold
Slew Processor
Mixer
Monostable
from microphone-instrument #2
Preamp
Limiter
VCA
Amp
to driver-instrument #2

for four performers with brass or woodwind instruments, electronics, and one assistant

Preparation

Pair instruments with similar or overlapping ranges: flute and soprano saxophone, trombone and french horn, clarinet and trumpet, etc. Install a miniature microphone (such as a Sony ECM-16) inside the mouthpiece or bore of one instrument of each pair. Attach a wide-range P.A. horn driver to the mouthpiece end of each of the others. Connect each microphone-instrument to its driver-instrument through the configuration of electronic modules shown in the patch diagram.

Seat the instrumentalists in chairs that are separated by as much distance as is practical, either on stage or in four corners of the area occupied by the audience. Bias the Voltage-Controlled Amplifiers (VCAs) half-open. Fully attenuate the output of the Noise Generator. Raise the preamp and power amp gains until both channels are just below the threshold of feedback.

When either of the microphone-instrumentalists slaps a key or thunks a valve, the signal at the output of the VCA triggers the Monostable. The Monostable in turn triggers the Sample and Hold. When the Noise Generator is fully attenuated, the output of the Sample and Hold always remains at ground level (0 volts). As the level of the Noise Generator is raised, the Sample and Hold

produces a widening range of positive and negative random voltages.

Transitions in the Sample and Hold output are smoothed by the Slew Processor. The slewed signal controls one VCA directly and is inverted to control the other; thus, whenever the gain of one VCA increases, that of the other decreases. When one VCA is attenuated enough that its output signal is below the threshold level of the Monostable, only the signal from the other VCA can trigger the Sample and Hold.

Each instrument pair, with its electronics, acts as a complex filter whose frequency characteristics are determined by the fingerings of the instruments and by the distance separating the two performers. The amount of resonance (Q) is a function of the gain of the channel. Initially each filter has a fixed, medium Q, and slaps or thunks simply "ring" the filter. When in the course of the performance the Sample and Hold begins to affect the level of the VCAs, these slaps also trigger changes in the gain and therefore in the Q. By the end of the performance the Q varies between zero (when the VCA is fully attenuated) and a large positive value (when the channel is oscillating with feedback).

Performance

The task of the assistant is to raise the level of the Noise Generator from zero to its maximum. The amount

of time that he takes to do so determines the length of the performance. Fifteen minutes is the minimum length.

The performers in each instrument pair work together to produce short, articulated pulses of sound. The microphone-instrumentalist initiates each event by changing her fingering with a loud slap or thunk; the driver-instrumentalist changes his fingering as soon as he hears or feels his partner's slap in his instrument.

At the beginning of the performance the sounds should be very short and sparse: each microphone-instrumentalist should wait at least ten seconds between slaps, and the driver-instrumentalists should act only in direct response to the slaps. Once the Sample and Hold has begun to change the gains, feedback can occur; when it does, the affected pair should try to eliminate it in one of two ways:

1) They may quietly and independently change fingerings until they have re-tuned their filter to cancel that frequency of feedback.

2) The microphone-instrumentalist may slap repeatedly until the Sample and Hold produces a voltage that lowers the gain of their VCA below feedback level.

Because of the complementary nature of the control voltages, whenever one pair of performers has managed to cancel feedback by the second method they have probably initiated it for the other pair. As the range of the control voltages increases, a considerable amount of

activity may be needed to produce states in which neither pair is feeding back. During these later, more chaotic parts of the performance the instrumentalists should take advantage of these stable states and rest without slapping for as long as possible.

The assistant may end the performance by shutting off the amplifiers any time after he has raised the level of the Noise Generator to its maximum.

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