

Manual mode: In the manual mode, the user manually specifies either of the software and the hardware sound sources. Further, a specific synthesizing mode is designated if the CPU-aided software sound source is specified.

Compulsory mode: In the compulsory mode, the sound source to be used is forcibly determined according to running state, of application programs other than the sound generation program without regard to the user's intention.

[0022] A memory map of the RAM 13 or 20 will be described hereunder. The arrangement of the inventive musical sound generator is not so different from general personal computers. Further, the general personal computer can be used as the musical sound generator provided that it executes operations related to the waveform synthesis. Thus, the content of the RAM 13 or 20 is not so different from that of the personal computer. The memory space of the RAM 13 or 20 is divided into a plurality of areas as shown in Figure 6. In Figure 6, an OS area is occupied by the operating system as in the general personal computer. The application program areas (1) to (n) accommodate various application programs other than the waveform synthesizing program. These areas are allocated one by one for the invoked application programs. Song data and other miscellaneous data are stored in a data area, while the wave data is loaded into a wave data area WAVE when the synthesizing is carried out by the waveform memory readout method. Lastly, a designated one of waveform synthesizing programs is stored in a waveform synthesizing program area.

[0023] The operation of the musical sound generator according to the invention will be described hereunder. The musical sound is generated by executing a specific application program of the personal computer, namely, the waveform synthesizing program. Otherwise, the waveform synthesizing program may be implemented as a facility of the OS in the form of a transient program which is automatically installed at the time of boot-up of the system. Even though the memory address and execution permission of the waveform synthesizing program depends on configuration of the OS environment, user operation, number of application programs, operating conditions etc., the waveform synthesizing program is executed as one of the applications (1) to (n). Upon power-on or reset of the musical sound generator, as shown in Figure 7, various registers and flags are set/reset for initialization in step S1. In step S2, system administration process of the OS is executed. In steps S3 to S5, the application program (1), the waveform synthesizing program, and the application program (n) are respectively executed. The waveform synthesizing program is executed to generate one sample value of the wave data at one cycle of the program invocation. The application programs (1) to (n) do not include the

waveform synthesizing program. These application programs may be related to music performance, or to entirely different affairs. After step S5, the procedure returns to S2.

5 [0024] If there is no change in execution status of the application programs, the loop of S2 to S5 is repeatedly executed. Otherwise, if there is a change in the execution status of the application programs, such a change is detected at the system administration process in step
10 S2. If the change of the status is of program termination, the relevant execution step of the application program is skipped. If the change of the status is of program invocation, a step to execute a new application program is added in the loop, and the whole loop is executed
15 repeatedly. Thus, the executing period of the loop changes dependently on the running situation of the application programs and the system load. However, regardless of the running situation of the application programs, one sample value of the wave data of the
20 musical sound is always generated per loop. A series of the sample values are generated continuously by repeating the loop to create a desired waveform. Thus, if the generated wave data is simply converted into an analog signal, the sampling period is varied, so that jitter may occur in the reproduced musical sound. The data
25 buffer is provided before the D/A converter 23 in order to temporarily store the generated wave data of the sound. The data buffer is accessed for readout of the wave data at a fixed sampling frequency f_s . If the musical sound generation is conducted by a fixed program in a certain case where the system is not a personal computer but a stand-alone electronic musical instrument, sound
30 source module, or any other systems having a facility to generate sound, the execution period of the loop process can be fixed. In other words, the loop process is executed at a fixed interval. In such a case, it is very practical to make the loop interval to coincide with the reciprocal of the sampling frequency f_s so that the data buffer can be eliminated.

40 [0025] The waveform synthesizing program executed in step S4 is described hereunder referring to Figures 8 to 11. The program is executed after loading thereof from the storage unit 15 according to a predetermined operation. In step Sa1, the synthesizing mode and the
45 hardware setup are checked. In the hardware setup check, optional devices are recognized by the check method described before. As for the operating mode, both of the synthesizing mode and the voice allocation mode are checked as well. With respect to the operating mode setup, if other application programs are executed before invoking the waveform synthesizing program, the voice allocation mode may be turned to the compulsory mode. Otherwise, the synthesizing mode and the voice allocation mode may be set up according to the user
50 choice via a displayed menu to input desired settings. Further, if various sound source devices are recognized in the hardware check, it is possible to set either of the CPU select mode or the sound source select mode.