one sample value for one sampling period is generated by the execution of a predetermined wave data generation algorithm. The detail of the processing in step Sa15 will be described later. In step Sa16, the register SCOUNT is incremented by "1" whenever the sample value computation is executed once. In step Sa17, it is tested if the register SCOUNT reaches cycle "m". If it is detected NO, the procedure returns to step Sa15. Otherwise, the procedure advances forward to step Sa18 in Figure 10 in case that the check result is YES. Thus, the steps Sa15 and Sa16 are repeated until the loop cycle of the sample value computation reaches to "m".

[0031] In step Sa18 of Figure 10, the flag BUSY is switched to "0" to disable the counting up of the timer. Then, in step Sa19, a frequency Fs is calculated by the following equation (1).

$$Fs = (m \cdot margin)/(TCOUNT \cdot Tt) \quad (1)$$

In this equation, the "margin" is a constant set smaller than value 1 to provide the computation devices including the CPU 10 with some margin, considering the processing power of the devices. As described before, TCOUNT indicates invocation times of the timer during the period required to "m" cycles of the execution of the sample value calculation, while Tt indicates a pitch of the timer. Thus, the product of TCOUNT and Tt corresponds to the period required for completing the sample value calculation process to generate one waveform.

[0032] Thus, the frequency Fs calculated by the equation (1) is the frequency of the waveform sampling, and the constant "margin" reflects the processing power of the hardware setup.

[0033] In step Sa20, it is detected whether the calculated frequency Fs is greater than 32 kHz or not. This critical frequency "32 kHz" is employed considering the minimum quality of the musical sound to be generated. If this detection result is positive, which means that the processing power of the CPU is evaluated as sufficient for maintaining the minimum quality of the sound, the procedure advances forward to step Sa21. In step Sa21, an adequate sampling frequency fs smaller than and closest to the calculated frequency Fs is selected out of 32 kHz, 44.1 kHz, 48 kHz, and 50 kHz. If the calculated frequency Fs is 47 kHz, the sampling frequency fs is set to 44.1 kHz, which is closest to and smaller than 47 kHz. The value smaller than the calculated frequency Fs is selected because the constant margin does not make sense if the sampling frequency fs is set to exceed the processing power of the CPU. After step Sa21, the flags DACENBL, ENBLFLG and SETFLAG are all set to "1" in step Sa22, and the procedure returns. This flag operation enables the D/A converter 23 to output the musical sound. Further, this flag operation indicates that the sampling frequency fs is set up. Consequently, the nonoperable state is changed to the operable state.

[0034] Under the operable state, upon the next execution of the waveform synthesizing program, check of step Sa4 results in "No" so that the synthesizing is done by the processing shown in Figure 11 if the waveform synthesizing should be carried out by the external sound source device. Otherwise, if only the CPU is used for the waveform synthesizing, check of step Sa4 results in "Yes" and check of step Sa5 results in "No" so that the synthesizing is carried out through steps Sa6 to Sa8.

[0035] On the other hand, in Figure 10, if the result of the test about the calculated frequency Fs in step Sa20 is turned out "No", which means that the minimum quality of the sound cannot be retained, the procedure advances forward to step Sa23. In the step Sa23, the user is warned that the minimum quality of the sound is not available, and the backup waveform computation mode is called. The backup waveform computation mode is the waveform memory readout mode which is selected as a secondary choice when the minimum quality of the sound is not affordable with the primary synthesizing mode selected out of the available CPU synthesizing modes. In step Sa24, it is tested whether the backup waveform computation mode is designated or not. If YES, the procedure goes forward to step Sa25, where original waveforms are prepared by the primary computation mode and are stored in the RAM 13 or 20 in advance. Further, the sound is actually reproduced when the stored waveform is read out at the sampling frequency 32 kHz, which is automatically determined. Thus, the waveform synthesizing is effected virtually with the waveform memory readout mode, so that the minimum quality of the reproduced sound can be retained even if the low performance CPU is equipped in the system. After that, the process in step Sa22 is executed to switch the nonoperable state to the operable state, and the procedure returns. On the other hand, if the backup waveform calculating mode is not specified in step Sa24, the procedure goes forward to step Sa26, in which a termination command for the sound synthesizing program is detected. If the termination of the sound synthesizing program is commanded, the operation finishes, by clearing the flag SETFLG to "0" in step Sa27. In case that the calculated frequency Fs is smaller than 32 kHz, and the backup waveform calculation mode is neither specified nor the program termination is commanded, the warning alarm is continued. Thus, the waveform synthesizing is done with the computation devices such as the CPU 10. The sampling frequency fs is optimized with respect to the CPU performance. Further, if the performance of the CPU is low, the synthesizing is executed by switching to the waveform memory readout mode, which can reduce the CPU load.

[0036] For summary, the CPU-aided second waveform generator comprises a computerized waveform generator operable according to a given algorithm at a variable operation speed to create a digital waveform by successively computing sample values of the digital waveform. The computerized waveform generator is