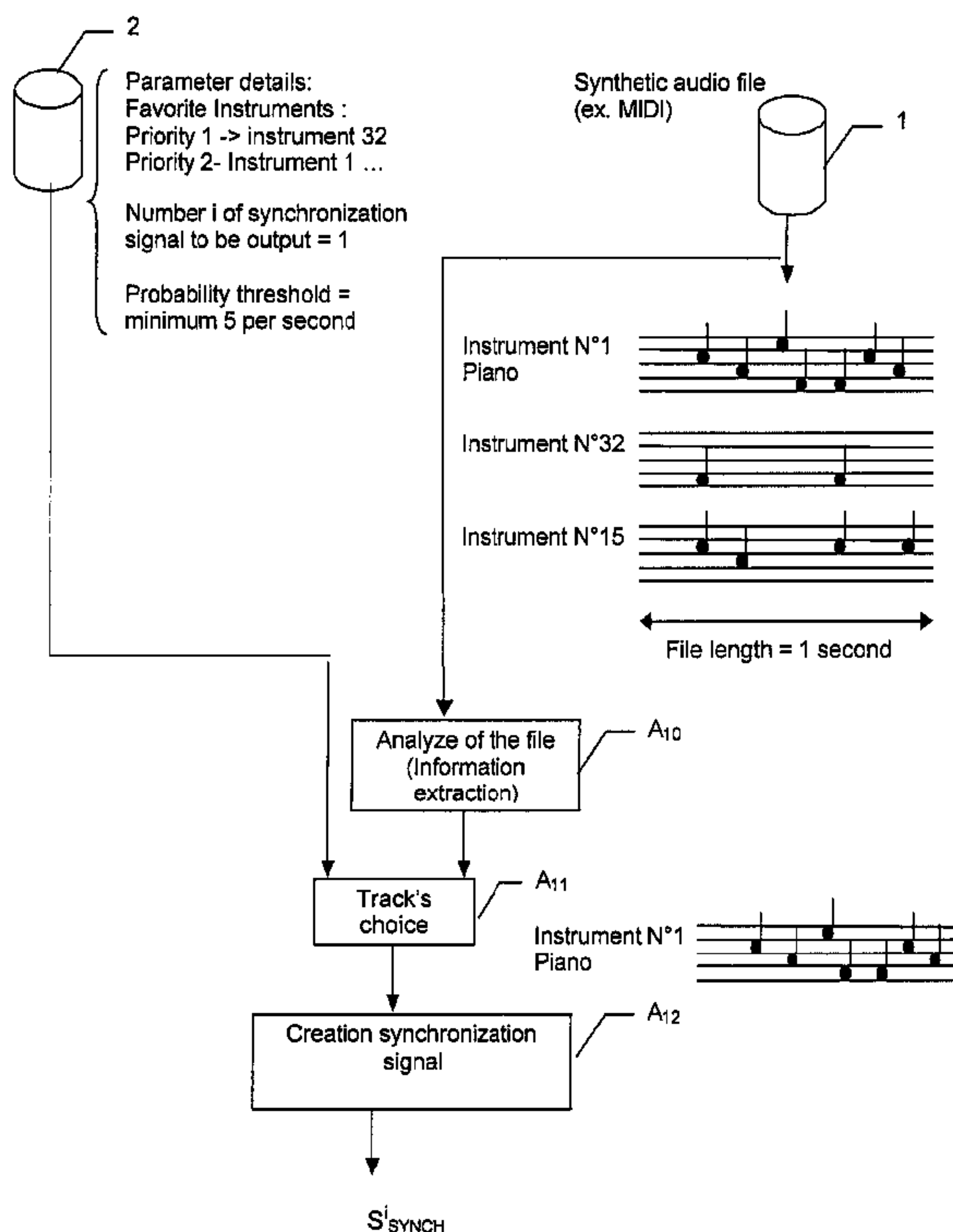




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(54) **Titre : METHODE PERMETTANT DE SYNCHRONISER AU MOINS UN PERIPHERIQUE MULTIMEDIA D'UN DISPOSITIF DE COMMUNICATION PORTATIF, ET DISPOSITIF DE COMMUNICATION PORTATIF CORRESPONDANT**
 (54) **Title: METHOD FOR SYNCHRONIZING AT LEAST ONE MULTIMEDIA PERIPHERAL OF A PORTABLE COMMUNICATION DEVICE, AND CORRESPONDING PORTABLE COMMUNICATION DEVICE**



(57) **Abrégé/Abstract:**

The invention relates to a method for synchronizing at least one multimedia peripheral of a portable communication device with a synthetic audio file (1), which method comprises a step of generating at least one synchronization signal (S^1_{SYNCH}) from said

(57) Abrégé(suite)/Abstract(continued):

synthetic audio file (1). According to the invention, said method comprises an initialization step (A_0) consisting in memorizing, at said portable communication device, parameters (2) including at least a list of preferred instruments; and a generating step (A_1) comprising a step of analyzing ($A_{1,0}$) information read from said synthetic audio file (1) relating to each instrument for which a track can be extracted in said synthetic audio file (1), and a step of deciding ($A_{1,1}$) which extracted track is to be used for generating said synchronization signal (S^1_{SYNCH}) as a function of said parameters. Said parameters (2) also include a predetermined frequency threshold, and said means for reading and analyzing are adapted to determine the frequency apparition of notes in said synthetic audio file for each extracted track

ABSTRACT

The invention relates to a method for synchronizing at least one multimedia peripheral of a portable communication device with a synthetic audio file (1), which method comprises a step of generating at least one synchronization signal (S_{SYNCH}^i) from said synthetic audio file (1). According to the invention, said method comprises an initialization step (A_0) consisting in memorizing, at said portable communication device, parameters (2) including at least a list of preferred instruments; and a generating step (A_1) comprising a step of analyzing (A_{10}) information read from said synthetic audio file (1) relating to each instrument for which a track can be extracted in said synthetic audio file (1), and a step of deciding (A_{11}) which extracted track is to be used for generating said synchronization signal (S_{SYNCH}^i) as a function of said parameters. Said parameters (2) also include a predetermined frequency threshold, and said means for reading and analyzing are adapted to determine the frequency apparition of notes in said synthetic audio file for each extracted track

**METHOD FOR SYNCHRONIZING AT LEAST ONE MULTIMEDIA
PERIPHERAL OF A PORTABLE COMMUNICATION DEVICE, AND
CORRESPONDING PORTABLE COMMUNICATION DEVICE**

The present invention relates to a method for synchronizing at least one
5 multimedia peripheral of a portable communication device, such as a mobile phone,
with a synthetic audio file.

The wording "multimedia peripherals" relates here to the different parts of the
portable communication which can be activated in synchronization with music, for
instance, in case of a mobile phone:

- 10 - the ringer for alerting a user in case of reception of an incoming call or a
 message;
- vibrator means which might be used either instead of or combined with the
 ringing;
- the backlighting which is used for illuminating the display;
- 15 - the backlighting used for illuminating one or several keys on the keypad;
- Any dedicated illuminating devices such as leds which could be provided
 on the mobile phone.

Synthetic audio files relate to all kinds of files which contain numeric data
enabling a synthesizer to generate a music or melody, such as the standardized
20 files known as MIDI (Acronym for Musical Instrument Digital Interface), or SP-MIDI,
or SMAF (Acronym for Synthetic music Mobile Application Format). More precisely,
MIDI files do not contain any sound. They are in fact text files, containing encoded
commands which enable a synthesizer to play notes. Numbers specify each note's
position relative to the start of the music and its time-value, and its volume, including
25 Crescendos and Diminuendos. Other commands set the instrument (e.g. 1=Grand
Piano, 74=Flute) for each track/channel, the Tempo changes and the overall volume
and stereo balance per track.

Providing a portable communication device, such as a mobile phone, with
means to synchronize one peripheral multimedia, as defined hereinabove by way of
30 non-limitative examples, with a synthetic audio file is already known.

Generally, the synthetic files used for this particular application are specific as
they contain a particular instrument which is to be used for synchronizing one

peripheral multimedia, for instance instrument 125 in case of the ringing tone, or instrument 12 in case of the vibrator the ringer of the mobile phone. These specific synthetic files can be loaded in the memory of the mobile phone at the time of manufacturing. Alternatively, the user can download new synthetic files, either via
5 the cellular network to which the mobile phone is affiliated, or via any type of networks including Internet, or from a PC. Once these files have been downloaded and stored in the memory of the mobile phone, the user has generally the possibility, via a specific menu, to choose the file which can be used for synchronizing each multimedia peripheral provided in its mobile phone.

10 The possibility for a user to give a personal touch to its portable communication device is consequently limited to what manufacturers or networks operators or services providers propose. However, the synthetic audio files which are proposed do not always correspond to the user's preferences.

A larger choice could be given to the user if he could use any type of synthetic
15 audio files, even those which have not been created for the purpose of synchronizing a multimedia peripheral of a portable communication device. However in this case, if the file does not contain any information for the synchronization (for instance no track relating to either instrument 125 or to instrument 12), the user will not be able to use this file for synchronization purpose.

20 The aim of the invention is to remedy the above drawback by proposing a solution enabling to systematically synchronize a multimedia peripheral with information coming from any type of synthetic audio file, whatever the content of this audio file, and especially even in case in which no synchronization information is contained in this audio file.

25 To this aim, an object of the present invention is to provide a method for synchronizing at least one multimedia peripheral of a portable communication device with a synthetic audio file, which method comprises a step of generating at least one synchronization signal from said synthetic audio file, characterized in that it further comprises the following steps:

30 - An initialization step consisting in memorizing, at said portable communication device, parameters including at least a list of preferred instruments;

- A generating step comprising a step of analyzing information read from said synthetic audio file relating to each instrument for which a track can be extracted in said synthetic audio file, and a step of deciding which extracted track is to be used for generating said synchronization signal as a function of said parameters;

5

wherein said parameters also include a predetermined frequency threshold, said step of analyzing information further comprising determining the frequency apparition of notes in said synthetic audio file for each extracted track, and said deciding step consisting in choosing an extracted track corresponding to an instrument which belongs to said list of preferred instruments according to a comparison between the frequency apparition of notes and said predetermined frequency threshold.

10

For instance, an extracted track can be chosen if it corresponds to an instrument which belongs to said list of preferred instruments and if the frequency apparition of notes for this track is greater or equal to said predetermined frequency threshold.

15

According to one possible embodiment of the invention, said method may further comprise a step for determining if a synchronization track is present in said synthetic audio file.

20

In case a synchronization track is determined, said synchronization track may be automatically chosen for generating said synchronization signal. Alternatively, it can be decided to choose another track as a function of said parameters, even in case a synchronization track has been found. Alternatively, it can also be decided to elect the best track between either a synchronization track, or another extracted track chosen as a function of said parameters.

25

In any case, the method according to the invention enables a user to use any kind of synthetic audio file, whatever the presence or absence of a synchronization track in this file.

30

According to the invention, said deciding step preferably consists in choosing an extracted track corresponding to an instrument which belongs to said list of preferred instruments.

Said parameters may also include priority information for each preferred instrument. In this case, the extracted track will be preferably chosen according to said priority information.

A second object of the present invention is a portable communication device comprising at least one multimedia peripheral which can be activated with synchronism with at least one synchronization signal generated from a synthetic audio file, characterized in that it comprises:

- 5 - Means for memorizing, at said portable communication device, parameters including at least a list of preferred instruments;
- Means for reading and analyzing information read from said synthetic audio file relating to each instrument for which a track can be extracted in said synthetic audio file, and
- 10 - Means for selecting which extracted track is to be used for generating said synchronization signal as a function of said parameters and for creating said synchronization signal;

and in that, said parameters also include a predetermined frequency threshold, said means for reading and analyzing being adapted to determine the frequency
15 apparition of notes in said synthetic audio file for each extracted track, and means for selecting causing the selection of an extracted track corresponding to an instrument which belongs to said list of preferred instruments according to a comparison between the frequency apparition of notes and said predetermined frequency threshold.

20 Other features and advantages of the invention will become apparent from the following description of embodiments of the invention given by way of non-limiting examples only and with reference to the accompanying drawings, in which:

- FIG. 1 shows schematically the different steps involved in the method according to a first possible embodiment of the present invention ;
- 25 - FIG. 2 shows an example of synchronization extraction according to the present invention, for a particular example of MIDI file;
- FIG. 3 illustrates schematically possible means to implement the method according to the present invention.

30 In relation with figures 1 and 2, the method for synchronizing at least one multimedia peripheral of a portable communication device according to the invention consists in generating at least one synchronization signal S_{SYNCH}^i from a given synthetic audio file 1.

According to a first aspect of the invention, the method comprises an initialization step A_0 during which some parameters 2, including at least a list of

preferred instruments, are memorized at the level of said portable communication device.

Said initialization step A_0 may be performed at the manufacturing of the portable communication device. Alternatively or in combination, a suitable menu can
5 be configured by the user himself.

In the example shown on figure 2, the list of preferred instruments comprises two favorite instruments, namely instrument N°32 (corresponding to Guitar harmonic for the MIDI standard), and instrument N° 1 (corresponding to Grand Piano for the MIDI standard).

10 According to a second aspect of the invention, a generating step A_1 is performed, comprising a step A_{10} of analyzing information read from synthetic audio file 1 and relating to each instrument for which a track can be extracted in said synthetic audio file, and a step A_{11} of deciding which extracted track is to be used for generating said synchronization signal as a function of said parameters.

15 For illustrative purpose, let's assume that synthetic audio file 1 contains several tracks corresponding to several instruments, among which we can find, as illustrated on figure 2, at least the following tracks:

- a track relating to Instrument N°1 (Piano) with the corresponding notes to be played for this instrument;
- 20 - a track relating to Instrument N°32 (Guitar harmonic) with the corresponding notes to be played for this instrument;
- a track relating to Instrument N°15 (tubular bells) with the corresponding notes to be played for this instrument.

In the example of figure 2, the score corresponding to each of the instruments
25 has been given for duration of one second. Of course, longer duration are possible.

During generating step A_1 , and more precisely during step A_{10} , at least those three tracks will be extracted.

Deciding step A_{11} will then consist in choosing an extracted track corresponding to an instrument which belongs to said list of preferred instruments.
30 Extracted track corresponding to instrument N°15 will not be considered furthermore since it does not belong to the list of preferred instruments.

In this preferred embodiment, parameters 2 also include priority information for each preferred instrument. In this case, the extracted track will be preferably chosen according to said priority information. For the given example, priority information has

been set to priority 1 for instrument N° 32 and to priority 2 for instrument N°1, which means that, as both tracks corresponding to both instruments can be found in synthetic audio file 1, preference will be given to instrument N°32.

Other parameters can be added: In the preferred embodiment, parameters 2
5 also include a predetermined probability or frequency threshold. In this specific case, step A₁₀ of analyzing information further comprises determining the frequency apparition of notes in synthetic audio file 1 for each extracted track, and deciding step A₁₁ consists in choosing an extracted track not only corresponding to an instrument which belongs to said list of preferred instruments, but also according to
10 a comparison between the frequency apparition of notes and said predetermined frequency threshold. The comparison may consist in selecting a track only among the extracted tracks for which the frequency apparition of notes is greater or equal to said predetermined frequency threshold.

In the example of figure 2, the frequency threshold is set to a minimum of 5
15 notes per second. Analyze of file 1 performed at step A₁₀ shows that seven notes exist for instrument N° 1, while only two notes exist for instrument N°32. In this case, decision on the track performed at step A₁₁ may consist in choosing track N° 1, despite the fact that priority 1 was set for instrument N°32, because the frequency apparition of notes for instrument N° 32 is below the frequency threshold.

Parameters 2 may also include the number I of synchronization signals which
20 must be output. In the example of figure 1, this number has been set to 1. Parameters 2 could also comprise criteria relating to duration of notes, like a duration threshold. In this case, analysis of the duration of notes is performed for each instrument of the audio file, and only instrument for which the greater number
25 of notes which duration is superior to the duration threshold has been found is selected. Another parameter could be a transition threshold between two successive notes for the same track...

At last, synchronization signal Sⁱ_{SYNCH} is created at step A₁₂, from the selected track. This signal can correspond to a succession of pulses corresponding to each
30 note of the selected track, or may be adapted according to the type of peripheral which must be activated.

According to one possible embodiment of the invention, said method may further comprise a step A₃ for determining if a synchronization track is present in said synthetic audio file.

In case a synchronization track is determined, said synchronization track may be automatically chosen for generating said synchronization signal. Alternatively, it can be decided to choose another track as a function of parameters 2, even in case a synchronization track has been founded. Alternatively, it can also be decided to elect the best track between either a synchronization track, or another extracted track chosen as a function of parameters 2. This last case corresponds to what is shown on figure 1, wherein step A_4 enables to select the best track.

Figure 3 shows schematically part of a portable communication device comprising at least one multimedia peripheral (not shown) which can be activated with synchronism with at least one synchronization signal S_{SYNCH}^i generated from a synthetic audio file 1 stored in a memory of the device, implementing the method according to the invention. The portable communication device comprises synchronization generation means S including:

- Means M for memorizing, at said portable communication device, parameters 2 including at least a list of preferred instruments, and eventually other parameters such as priority information, frequency threshold, and/or number of signals to be generated;
- First extractor means E_1 for reading and analyzing information read from synthetic audio file relating to each instrument for which a track can be extracted in said synthetic audio file 1, and
- Second extractor means E_2 for first, selecting which extracted track is to be used for generating said synchronization signal S_{SYNCH}^i as a function of said parameters and then, for creating said synchronization signal S_{SYNCH}^i .

The above synchronization generation means are controlled by the portable device 's software.

Peripherals which can be activated in synchronism with synchronization signal S_{SYNCH}^i can be a ringer and/or vibrator and or display backlight and or key backlight, and or any dedicated led on the portable communication device.

CLAIMS

1. A method of synchronizing at least one multimedia peripheral of a portable communication device with a synthetic audio file, the method comprising:

5 storing in the portable communication device a plurality of parameters including a list of preferred instruments and a desired number of notes per unit length of time;

10 reading information from the synthetic audio file relating to an instrument corresponding to each track available in the synthetic audio file and an actual number of notes per unit length of time of each track available in the synthetic audio file;

selecting a track from among the tracks available in the synthetic audio file based on the list of preferred instruments and the desired number of notes per unit length of time; and

15 generating at least one synchronization signal from the synthetic audio file using the selected track.

2. The method of claim 1, further comprising determining if a synchronization track is present in said synthetic audio file (1).

20 3. The method of claim 2, wherein if a synchronization track is determined to be present in said synthetic audio file, said synchronization track is automatically chosen for use in generating said at least one synchronization signal.

25 4. The method of claim 1, wherein selecting a track step comprises: selecting said track from among said tracks available in said synthetic audio file that corresponds to an instrument which belongs to said list of preferred instruments.

5. The method of claim 4, wherein said parameters also include priority information for each preferred instrument, and wherein selecting said track is also based on said priority information.

6. The method of claim 1, wherein selecting a track comprises: selecting a
5 track corresponding to an instrument which belongs to said list of preferred instruments and for which the desired number of notes per unit length of time is greater than or equal to said actual number of notes per unit length of time.

7. A portable communication device comprising:

10 at least one multimedia peripheral that can be activated in synchronization with at least one synchronization signal generated using a selected track that is selected from a plurality tracks available in a synthetic audio file;

a memory configured to store a plurality of parameters including a list of preferred instruments and a desired number of notes per unit length of time;

15 a reading unit configured to read information from the synthetic audio file relating to an instrument corresponding to each track available in the synthetic audio file and an actual number of notes per unit length of time of each track available in the synthetic audio file;

20 a selecting unit configured to select a track from among the tracks available in the synthetic audio file based on the list of preferred instruments and the desired number of notes per unit length of time; and

a generating unit configured to generate the at least one synchronization signal from the synthetic audio file using the selected track.

8. The device of claim 7, wherein said multimedia peripheral is at least one
25 of a ringer, a vibrator, a display backlight, a key backlight, and any dedicated light emitting diode (LED) on the portable communication device.

9. A portable communication device comprising:

at least one multimedia peripheral to be activated in synchronization with at least one synchronization signal generated using a selected track that is selected from a plurality tracks available in a synthetic audio file;

5 a memory to store at least one parameter including a desired number of notes per unit length of time;

a reading unit to read information from the synthetic audio file relating to an actual number of notes per unit length of time of each track available in the synthetic audio file;

10 a selecting unit to select a track from among the tracks available in the synthetic audio file based on a comparison of the desired number of notes per unit length of time and the actual number of notes per unit length of time of each track; and

a generating unit to generate the at least one synchronization signal from the synthetic audio file using the selected track.

15 10. The device of claim 9, wherein the reading unit is further configured to determine if a synchronization track is present in the audio file.

20 11. The device of claim 10, wherein, responsive to the reading unit determining that the synchronization track is present in the synthetic audio file, the selecting unit is to select the synchronization track for use in generating the at least one synchronization signal.

12. The device of claim 9, wherein the multimedia peripheral is at least one of a ringer, a vibrator, a display backlight, a key backlight and a dedicated light emitting diode (LED).

25 13. The device of claim 9, wherein the selecting unit is further configured to select the track from among the tracks available in the synthetic audio file for which the actual number of notes per unit length of time is greater than or equal to the desired number of notes per unit length of time.

14. The device of claim 9, wherein the at least one parameter further includes a list of preferred instruments.

15. The device of claim 14, wherein the selecting unit is further configured to select the track from among the tracks based on both the comparison of the
5 desired number of notes per unit length of time and the actual number of notes per unit length of time of each track and on whether the track corresponds to an instrument included in the list of preferred instruments.

16. The device of claim 9, wherein the at least one parameter further includes a number of synchronization signals to be output.

10 17. The device of claim 9, wherein the at least one parameter further includes a desired duration of notes.

18. The device of claim 9, wherein the at least one parameter further includes a transition threshold between successive notes for the same track.

15 19. A method of synchronizing at least one multimedia peripheral of a portable communication device with a synthetic audio file, the method comprising:

receiving in the portable communication device at least one parameter including a desired number of notes per unit length of time;

20 reading information from the synthetic audio file relating to an actual number of notes per unit length of time of each track available in the synthetic audio file;

selecting a track from among the tracks available in the synthetic audio file based on a comparison of the desired number of notes per unit length of time and the actual number of notes per unit length of time of each track; and

25 generating at least one synchronization signal from the synthetic audio file using the selected track.

20. The method of claim 19, further comprising determining if a synchronization track is present in the audio file.

21. The method of claim 19, further comprising selecting the synchronization track for use in generating the at least one synchronization signal responsive to
5 determining that the synchronization track is present in the synthetic audio file.

22. The method of claim 19, wherein selecting the track from among the tracks available in the synthetic audio file further comprises selecting the track for which the actual number of notes per unit length of time is greater than or equal to the desired number of notes per unit length of time.

10 23. The method of claim 19, wherein the at least one parameter further includes a list of preferred instruments.

24. The method of claim 23, wherein selecting the track from among the tracks available in the synthetic audio file further comprises: selecting the track based on both the comparison of the desired number of notes per unit length of
15 time and the actual number of notes per unit length of time of each track and on whether the track corresponds to an instrument included in the list of preferred instruments.

25. The method of claim 19, wherein the at least one parameter further includes a number of synchronization signals to be output.

20 26. The method of claim 19, wherein the at least one parameter further includes a desired duration of notes.

27. The method of claim 19, wherein the at least one parameter further includes a transition threshold between successive notes for the same track.

28. A portable communication device comprising:
25 means for receiving in the portable communication device a desired number of notes per unit length of time;

means for reading information from a synthetic audio file relating to an actual number of notes per unit length of time of each track available in the synthetic audio file;

5 means for selecting a track from among the tracks available in the synthetic audio file based on a comparison of the desired number of notes per unit length of time and the actual number of notes per unit length of time of each track; and

means for generating at least one synchronization signal from the synthetic audio file using the selected track.

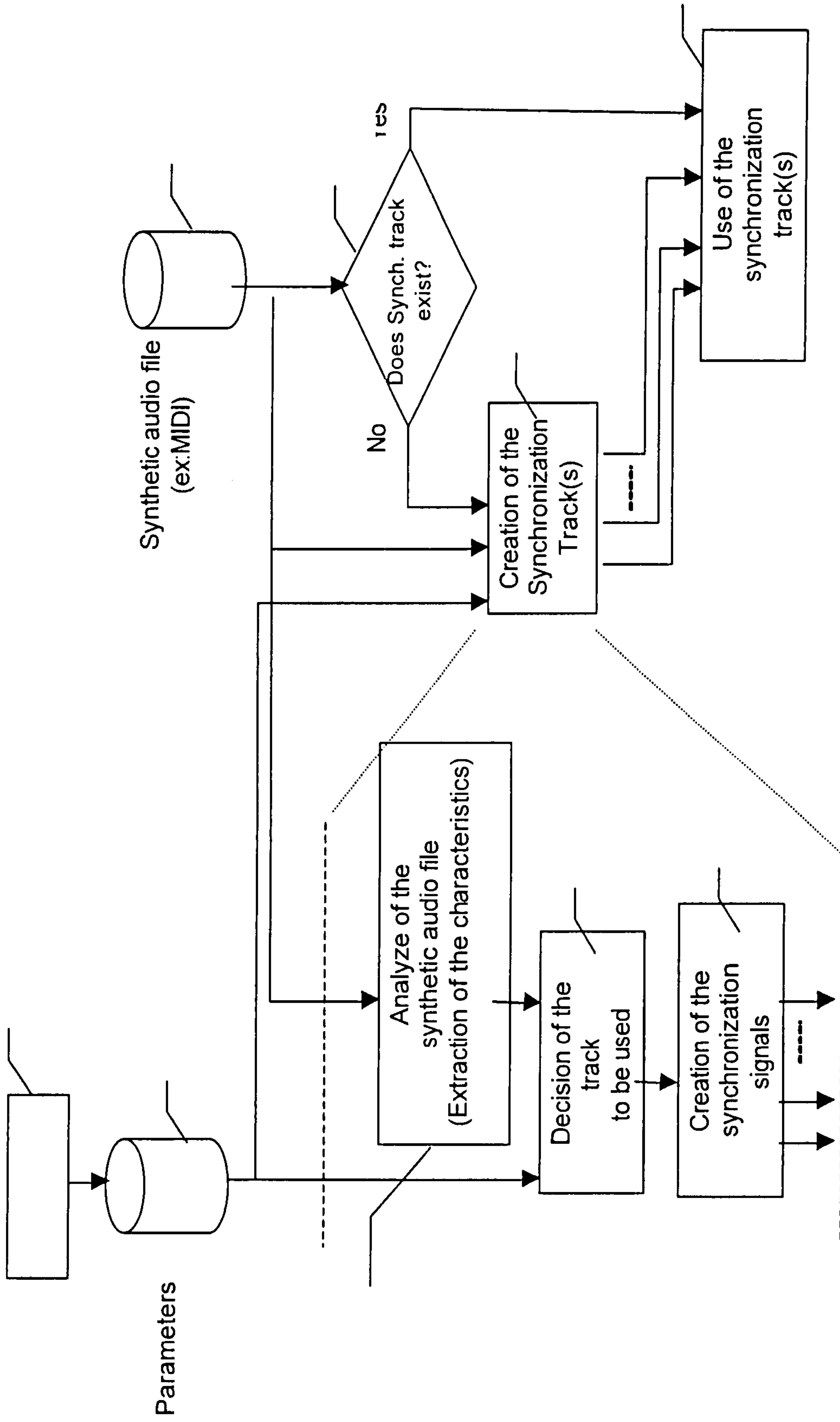


FIG. 1

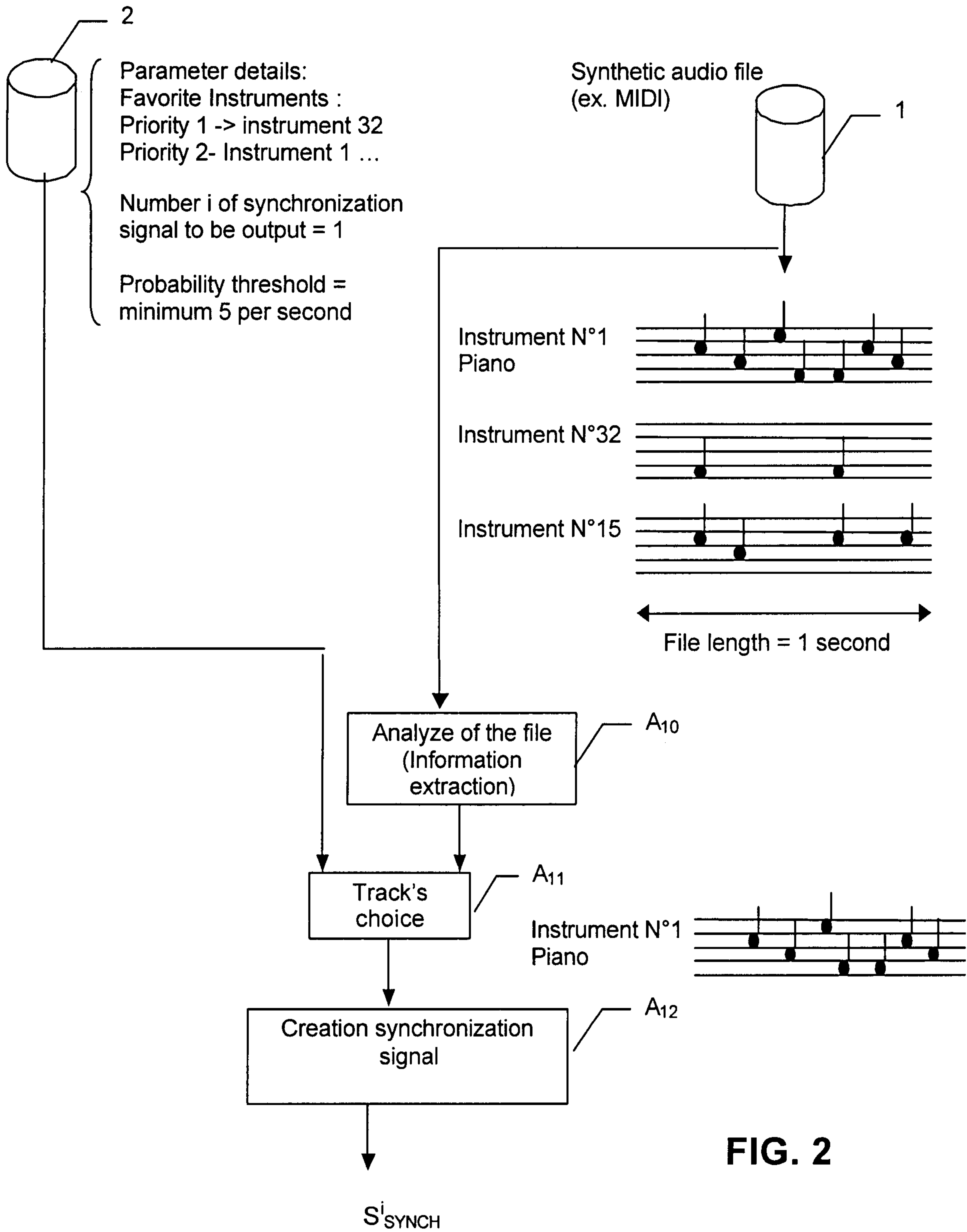


FIG. 2

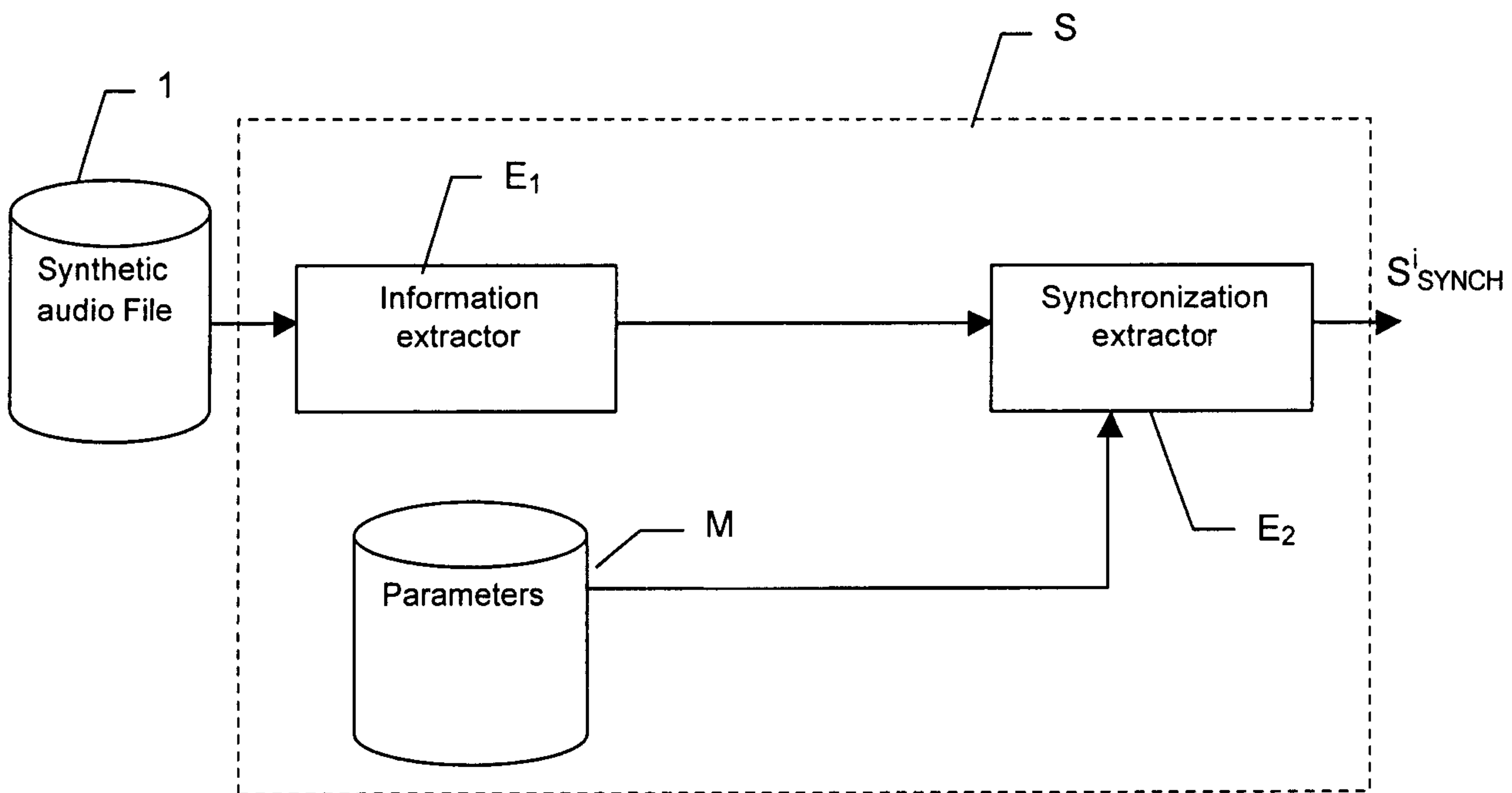
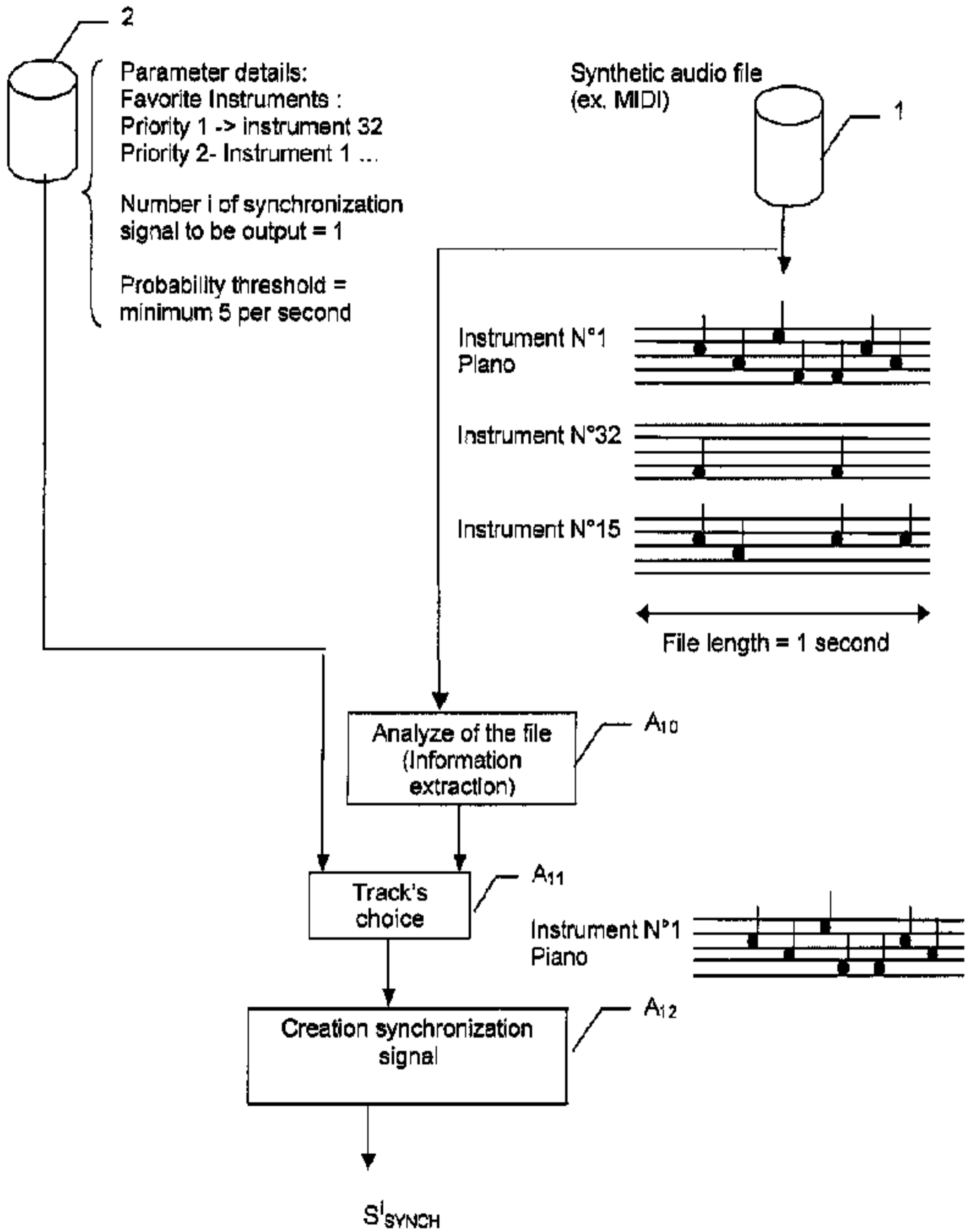


FIG. 3



2

Parameter details:
 Favorite Instruments :
 Priority 1 -> instrument 32
 Priority 2- Instrument 1 ...

Number i of synchronization
 signal to be output = 1

Probability threshold =
 minimum 5 per second

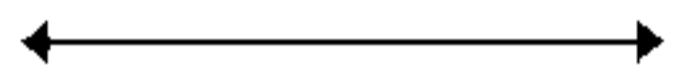
Synthetic audio file
 (ex. MIDI)

1

Instrument N°1
 Piano

Instrument N°32

Instrument N°15



File length = 1 second

Analyze of the file
 (Information
 extraction) A10

Track's
 choice A11

Instrument N°1
 Piano



Creation synchronization
 signal A12

S^i_{SYNCH}