

SELECTIVE CALL RECEIVERS FOR RECEIVING SIGNALS IN SYNCHRONOUS COMMUNICATION SYSTEMS

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Field of the Invention

This invention relates generally to selective call receivers for synchronous communication systems. In particular, this invention relates to, but is not necessarily limited by, battery savings in selective call receivers for synchronous communication systems.

Background of the Invention

Selective call receivers for receiving information in synchronous communication systems are known in the art. Such selective call receivers typically have two modes of operation, namely, a synchronous mode and an asynchronous mode. In the synchronous mode, a selective call receiver is synchronized to a signal which provides information. This signal is typically a carrier frequency or channel that is encoded with the information. In some synchronous communication systems, a signal can provide information for more than one selective call receiver. Parameters for encoding the information such as format and baud rate are conventionally specified by a signaling protocol for the synchronous communication system.

An example of a synchronous communication system is Motorola's FLEX™ roaming system. In the FLEX™ roaming system, signals comprise cycles that are transmitted within a predetermine time. These cycles can be transmitted on different channels by different transmitters. Transmission of such cycles are synchronized to an external clock such as, for example, a Global Positioning System (GPS) time source. Hence, a cycle on one channel begins at the same time as other cycles on other channels of the system. The signaling protocol defines one hundred and twenty-eight frames of data bits for each cycle. Some of these frames are mandatory frames which have to be transmitted at the start of a cycle. Every frame in a cycle begins with a synchronization codeword. Such a codeword enables selective call receivers in the synchronous mode to synchronize to the signals. In the FLEX™ roaming system, selective call receivers in the

synchronous mode receives information from mandatory frames and assigned frames within each cycle of a signal. The assigned frames are determined based on three operating parameters namely, an address base frame, a pager collapse value and a system collapse value. These
5 three operating parameters are defined in the FLEX™ signaling protocol. The address base frame and the pager collapse value are stored in a memory within the selective call receivers. The system collapse value is provided to the selective call receivers with the signal.

As is known in the art, battery savings for selective call receivers is a
10 much sought after goal. Conventionally, battery save ratio (BSR) provides a measure of such battery savings by determining how much information selective call receivers have to sample in order to detect an address. When sampling a channel, a selective call receiver can be controlled to receive specific portions of a signal and, therefore, can remain in a low power
15 mode during other portions. High current drain elements within the selective call receiver such as, for example, a receiver is typically controlled in this manner. For example, a selective call receiver in the FLEX™ roaming system operating in the asynchronous mode preferably has to sample channels at a rate that guarantees detection of the
20 mandatory frames within one cycle. Conventionally, this rate is lowered when the selective call receiver is synchronized to the channels in the synchronous mode. As a result, selective call receivers in the synchronous mode require less sampling and therefore operate with better BSRs than in the asynchronous mode.

25 Selective call receivers can lose synchronization with signals in certain situations. For example, users of the selective call receivers may move into areas where signals are poorly received or not received at all. In such areas, a controller typically sets a selective call receiver to operate in the asynchronous mode. Changing to the asynchronous mode occurs after
30 lapse of a time interval since synchronization was last acquired. In the FLEX™ roaming system, this time interval can be based on a search window during which a selective call receiver searches for a synchronization codeword in a mandatory frame or an assigned frame. Duration of the search window usually depends on how accurate a clock
35 within a selective call receiver keeps time relative to the predetermined time during which signals are transmitted. Typically, clocks within selective call receivers are referenced to crystals with tolerances in frequency drift

measured in parts per million (ppm). For example, a crystal with a ± 300 ppm tolerance has a worst case frequency drift that translates to a drift of 300 microseconds per second in time.

Controlling a selective call receiver so that it remains operating in the synchronous mode therefore provides battery savings. One example of such controlling is described in US Patent 5,252,963 in which a search window to search for synchronization codewords is widened based on elapsed time since synchronization was last acquired. However, such a search window has a maximum duration beyond which the selective call receiver enters the asynchronous mode.

Therefore, it is desirable for selective call receivers to have battery savings prior to being operated in the asynchronous mode after the search window is at the maximum duration.

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Summary of the Invention

It is an object of this invention to improve on battery savings in selective call receivers for receiving signals in synchronous communication systems.

According to one aspect of the invention, there is provided a selective call receiver for a synchronous communication system, said selective call receiver comprising:

- 25 a clock for providing time information;
- a receiver for receiving a signal on a respective channel of one or more channels when synchronized to said signal, said signal includes a plurality of cycles, each of said cycles being transmitted within a predetermined time and having a plurality of frames including one or more
- 30 mandatory frames;
- a demodulator coupled to said receiver to demodulate said signal to derive a demodulated signal,
- a baud rate detector coupled to said demodulator to baud rate detect said demodulated signal; and
- 35 a controller coupled to said clock, said receiver and said baud rate detector,

wherein, upon lapse of a maximum duration of a search window during which said signal from said respective channel is not received by said receiver, said controller is adapted to determine a baud rate detect interval for baud rate detecting other signals received on at least one other
5 channel of said channels, said baud rate detect interval being based on said maximum duration and duration of said mandatory frames in one cycle.

Preferably, said controller can be further adapted to determine
10 whether duration of said baud rate detect interval is sufficient for baud rate detecting said other signals.

Suitably, said controller can be further adapted to determine number of times to baud rate detect said other signals within said baud rate detect
15 interval.

Preferably, said controller can be further adapted to control said baud rate detector to baud rate detect said other signals within said baud rate detect interval.
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Suitably, said selective call receiver can further comprise a synchronization codeword detector for sampling a synchronization codeword within said plurality of frames, said synchronization codeword detector being coupled to said demodulator and said controller.
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Preferably, said selective call receiver can further comprise a memory for storing said maximum duration.

Suitably, said selective call receiver can further comprise a memory
30 for storing said channels.

According to another aspect of the invention, there is provided a method for battery savings in a selective call receiver for a synchronous
35 communication system, said method comprising the steps of:

receiving a signal on a respective channel of one or more channels when synchronized to said signal, said signal includes a plurality of cycles, each of said cycles being transmitted within a predetermined time and having a plurality of frames including one or more mandatory frames; and

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determining, upon lapse of a maximum duration of a search window during which said signal from said respective channel is not received by said receiver, a baud rate detect interval for baud rate detecting other signals received on at least one other channel of said channels, said baud rate detect interval being based on said maximum duration and duration of said mandatory frames in one cycle.

Preferably, said method can further comprise the steps of:
checking whether said baud rate detect interval is sufficient for baud rate detecting said other signals; and
performing baud rate detecting said other signals when said baud rate detect interval is sufficient.

Suitably, said step of checking can comprise the step of:
calculating number of times to baud rate detect said other signals within said baud rate detect interval.

Preferably, said method can further comprise the step of:
setting said selective call receiver to operate in an asynchronous mode when said baud rate detect interval is insufficient for baud rate detecting said other signals.

Suitably, said method can further comprise the step of:
performing a synchronization codeword sampling of at least one of said other signals upon detecting baud rate of said at least one of said other signals.

Preferably, said method can further comprise the step of:
setting said selective call receiver to operate in a synchronous mode when said synchronization codeword sampling detects a synchronization codeword in said at least one of said other signals.

Brief Description of the Drawings

5 In order to describe the invention and to put it into practical effect, reference will now be made to preferred embodiments as illustrated with reference to the accompanying drawings in which:

FIG. 1 shows structure of a FLEX™ signal.

10 FIG. 2 shows a block diagram of a selective call receiver operating in a FLEX™ roaming system in accordance with a preferred embodiment of the invention;

FIG. 3 is a timing diagram illustrating a search window and a baud
15 rate detect interval for the selective call receiver of FIG. 2; and

FIGs. 4a and 4b are flow diagrams showing a method for battery savings in the selective call receiver of FIG. 2.

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Detailed Description of the Invention

FIG. 1 shows structure of a FLEX™ signal 1. The structure of FLEX™ signal 1 is defined in accordance with the FLEX™ messaging protocol.
25 FLEX™ signal 1 includes a plurality of cycles 2. Each of the cycles 2 has one hundred and twenty-eight frames that are transmitted within a predetermined time of four minutes. One or more of these frames are mandatory frames that are transmitted at the start of each cycle 2. FIG. 1 indicates a mandatory frame 3 which has a synchronization field 4, a block
30 information field 5, an address field 6, a vector field 7 and a message field 8. Synchronization field 4 contains two synchronization codewords which are referred to as "A" and "Â" in the FLEX™ messaging protocol. Synchronization field 4 also includes one bit within a frame information word for indicating that FLEX™ signal 1 is for multichannel selective call
35 receivers operating in a FLEX™ multichannel or roaming system. In this specification, a valid channel is a roaming channel that is used by the

FLEX™ roaming system to provide information to multichannel selective call receivers.

FIG. 2 shows a block diagram of a selective call receiver 9 for the FLEX™ roaming system in accordance with a preferred embodiment of the invention. This FLEX™ roaming system is a synchronous communication system. Selective call receiver 9 comprises a receiver 10, a demodulator 11, a baud rate detector 12, a controller 13, a memory 14 and a clock 15. Controller 13 comprises a battery saver 16 and a synchronization codeword detector 17. Receiver 10 couples to an antenna 18 for receiving signals transmitted on one or more channels. These signals include FLEX™ signals having the structure of FLEX™ signal 1. FIG. 2 shows examples of two FLEX™ signals 19, 20 transmitted on respective channels of transmitters 21, 22. Demodulator 11 couples to receiver 10 to demodulate such FLEX™ signals. Thereafter, demodulated signals from demodulator 11 can be provided to baud rate detector 12, when required, to detect baud rate of the FLEX™ signals. Demodulator 11 also couples to synchronization codeword detector 17. Synchronization codeword detector 17 samples the demodulated signals to detect synchronization codewords in synchronization field 4 of a FLEX™ signal. In this specification, signals provided to baud rate detector 12 and synchronization codeword detector 17 are assumed to be demodulated signals. Controller 13 couples to control baud rate detector 12 and, through battery saver 16, receiver 10. Battery saver 16 interfaces with receiver 10 and includes circuitry for enabling or disabling power to receiver 10. Controller 13 also couples to memory 14 and clock 15. Memory 14 stores operating parameters of selective call receiver 9 such as a list of channels that are valid channels. Clock 15 provides time information to controller 13 such as elapsed time with respect to different fields of mandatory frame 3.

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To operate selective call receiver 9 in a synchronous mode, synchronization codeword detector 17 has to detect synchronization codewords in synchronization field 4 of either mandatory or assigned frames. Controller 13 controls synchronization codeword detector 17 for detecting the synchronization codewords within a search window. The search window for selective call receiver 9 is referred to as an "A" search window as synchronization codeword detector 17 is for searching either

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the mandatory or assigned frames to detect the "A" and "A" synchronization codewords. This "A" search window is a time interval that is based on tolerance of a crystal within clock 15 and a battery save ratio (BSR) desired for selective call receiver 9 when operated in the synchronous mode. (In
5 this specification, it is assumed that transmitters 21,22 have clock references with negligible tolerances compared with clock 15.) Each time the synchronization codewords are detected, controller 13 reduces the duration of the "A" search window to a minimum duration. The minimum duration enhances battery savings for selective call receiver 9 because the
10 high power mode is enabled for as short a time as possible to detect the synchronization codewords. However, when the synchronization codewords are not detected, the "A" search window increases as time passes. Such increases depend on the tolerance of the crystal as explained in the background to this application. Typically, search windows
15 for selective call receivers also have a maximum duration beyond which such selective call receivers are operated in an asynchronous mode. The maximum duration is based on factors that include duration of one frame and a desired BSR. In a FLEX™ system, the maximum duration for the search window is the duration of one frame or 1.875 seconds. Beyond the
20 duration of one frame, selective call receivers may be incorrectly searching and detecting a synchronization codeword of a different frame. The desired BSR depends on assigned frames for selective call receiver 9. Such assigned frames depend on an address base frame and a pager collapse value which are operating parameters stored in memory 14 and a system
25 collapse value provided by FLEX™ signal 1. The collapse value specifies the assigned frames in a cycle 2 for selective call receiver 9 in accordance with the FLEX™ messaging protocol. For example, when the collapse value is four, each sixteenth frame in cycle 2 is an assigned frame. Hence, selective call receiver 9 samples, in addition to the mandatory frames, one
30 frame for every sixteen frames within the one hundred and twenty-eight frames in cycle 2. These sixteen frames of cycle 2 have a duration of thirty seconds. To maintain the desired BSR at, for example, a ten to one ratio (10:1) when sampling one frame in thirty seconds, the maximum duration of the "A" search window cannot exceed three seconds. However, three
35 seconds is longer than the duration of one frame and, therefore, for selective call receiver 9 to sample every sixteenth frame at the desired BSR, the maximum duration of the "A" search window cannot exceed the

duration of one frame (1.875 seconds). When the crystal within clock 15 has, for example, a tolerance of ± 300 ppm which translates to an increase to the "A" search window of 600 microseconds per second in time, then the "A" search window is at the maximum duration after approximately fifty two
 5 minutes (1.875 seconds divided by 600 microseconds per second).

Selective call receiver 9 operates in the synchronous mode when synchronized to FLEX™ signal 1 transmitted on a respective channel. When in the synchronous mode and upon lapse of the maximum duration
 10 of the "A" search window during which receiver 10 does not receive FLEX™ signal 1, controller 13 is adapted to determine a baud rate detect interval. FIG. 3 is a timing diagram illustrating an "A" search window 25 and a baud rate detect interval 26 for selective call receiver 9. "A" search
 window 25 and baud rate detect interval 26 is determined by controller 13.
 15 FIG. 3 also shows "A" search window 25 and baud rate detect interval 26 relative to mandatory frames 27,28,29,30 of any valid channel for selective call receiver 9. Each of mandatory frames 27,28,29,30 has a respective synchronization field 31,32,33,34. Baud rate detect interval 26 is for baud
 rate detector 12 to perform baud rate detecting of FLEX™ signals on other
 20 channels. These other channels are remaining channels in the list of valid channels stored in memory 14.

Baud rate detect interval 26 is initially based on the maximum duration of "A" search window 25 (for selective call receiver 9 in the synchronous mode) and duration of mandatory frames 27,28,29,30. Hence, when the
 25 maximum duration for the desired BSR for selective call receiver 9 is A_{sync} seconds and there are four mandatory frames in cycle 2, then baud rate detect interval 26 (T_{BD}) is determined as:

$$T_{BD} = (\text{Duration of first three mandatory frames} - A_{sync}) s \quad \text{--- (a)}$$

30 where s is seconds.

Alternatively, based on 1.875 seconds as the duration of each of mandatory frames 27,28,29,

$$T_{BD} = (3 \times 1.875 - A_{sync}) s \quad \text{--- (b)}$$

$$= (5.625 - A_{sync}) s \quad \text{--- (c)}$$

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The remaining mandatory frame 30 is left aside to be used by synchronization codeword detector 17 for detecting synchronization codewords when required. Specifically for FLEX™ signals, about two seconds is required for synchronization codeword detector 17 to sample one or more of the other channels to detect the synchronization codewords within mandatory frame 30. These two seconds are based on approximate duration of one frame (1.875 seconds) plus one synchronization field (0.115 seconds). Such other channels are sampled as they have been baud rate detected and are, therefore, likely to be valid channels for selective call receiver 9. Depending on the number of valid channels stored in memory 14, it may be possible for baud rate detect interval 26 to be sufficient for baud rate detecting signals on every one of the valid channels or even repeatedly baud rate detecting such signals. Typically, a baud rate detect takes about one hundred milliseconds for a signal on one channel. Hence, when selective call receiver 9 has, for example, ten other valid channels, then baud rate detecting signals on these other valid channels requires one second. Therefore, baud rate detector 12 can perform baud rate detecting of all the signals as long as baud rate detect interval 26 is of more than one second duration.

Advantageously, the invention enables a pseudo-synchronous mode to thereby provide battery savings for selective call receiver 9. Such battery savings is possible because controller 13 efficiently controls baud rate detector 12 and synchronization codeword detector 17 to regain synchronization using the mandatory frames of a signal on any one of the other valid channels. A further advantage of the invention is that the pseudo-synchronous mode delays operating selective call receiver 9 in the asynchronous mode even when "A" search window 25 is at the maximum duration for the synchronous mode and this, therefore, enhances battery savings.

FIGs. 4a and 4b are flow diagrams showing a method 40 for battery savings in selective call receiver 9. In method 40, steps 42 to 48 describe operation of selective call receiver 9 in a synchronous mode after starting from an asynchronous mode. After start 41 and from the asynchronous mode at step 42, controller 13 controls synchronization codeword detector 17 to search for synchronization codewords to attain synchronization with a

FLEX™ signal on a respective channel. This respective channel is a valid channel stored in a list of valid channels in memory 14. When controller 13 has determined that the synchronization codewords have been detected at decision step 43, method 40 proceeds to step 44 in which controller 13
5 resets "A" search window 25 to a minimum duration. Next at decision step 45, controller 13 determines when to sample a next assigned frame based on the collapse value and the address base frame stored in memory 14. The collapse value and the address base frame are two operating parameters for determining assigned frames in conjunction with a system
10 collapse value provided by FLEX™ signals from valid channels in accordance with the FLEX™ messaging protocol. For a "No" following decision step 45, controller 13 waits for time to elapse until the next assigned frame is received by receiver 10. For a "Yes" following decision step 45, controller 13 controls synchronization codeword detector 17 to
15 search for the synchronization codewords in the next assigned frame at step 46. This next assigned frame then becomes a current frame. When the synchronization codewords are detected with a "Yes" following decision step 47, information within the current frame is processed at step 48 and "A" search window 25 is reset to the minimum duration. However, with a
20 "No" following decision step 47 when the synchronization codewords are not detected, controller 13 increases "A" search window 25 at step 49 by a length of time, ΔT_A . The length of time is based on elapsed time between the current frame to a next assigned frame and clock 15. Clock 15 is typically referenced to a crystal having a crystal tolerance which affects
25 ΔT_A . For example, when the next assigned frame is sixteen frames or thirty seconds later and the crystal tolerance is ± 500 ppm, then the length of time, ΔT_A to add to "A" search window 25 is:

$$\Delta T_A = (2 \times 500 \text{ ppm} \times 30) \text{ s} = 0.03 \text{ s} \quad \text{--- (d)}$$

30 Following step 49, controller 13 compares "A" search window 25, now increased by ΔT_A , to a desired BSR. For example, when the desired BSR is ten to one (10:1), then maximum duration of "A" search window 25 is limited to one frame or 1.875 seconds as explained earlier. Therefore, so long as "A" search window 25 does not exceed 1.875 seconds, selective
35 call receiver 9 remains in the synchronous mode and method 40 returns to step 45 with a "No" from decision step 50.

However, when "A" search window 25 exceeds the maximum duration of 1.875 seconds, then method 40 proceeds with a "Yes" to step 51. Following a "Yes" from decision step 50, controller 13 sets selective call receiver 9 to operate in a pseudo-synchronous mode. The pseudo-synchronous mode is illustrated by steps 51 to 57 in FIG. 4b. At step 51, controller 13 determines baud rate detect interval 26 which depends on duration of "A" search window 25, number of mandatory frames in a cycle of the FLEX™ signal and time from the current frame to the start of mandatory frames in a next cycle. The duration of "A" search window 25 is determined by controller 13 following step 49. Hence, assuming that each cycle in the FLEX™ signal has four mandatory frames, baud rate detect interval 26 (T_D) is determined as follows:

$$T_D = (5.625 - T_A) \text{ s} \quad \text{--- (e)}$$

where T_D = baud rate detect interval 26,
 5.625 s = duration of three mandatory frames, and
 T_A = duration of "A" search window.

In determining baud rate detect interval 26 with the first three mandatory frames, a fourth or remaining mandatory frame is kept for use as will be explained.

Following step 51, method 40 proceeds to step 52 in which controller 13 checks whether baud rate detect interval 26 is sufficient to baud rate detect signals on other valid channels stored in memory 14. When baud detect interval 26 is insufficient, method 40 proceeds with a "No" to step 42 in which controller 13 sets selective call receiver 9 to operate in the asynchronous mode. Otherwise, with a "Yes", method 40 proceeds to step 53 in which controller 13 controls baud rate detector 12 to perform baud rate detect of the signals from start of baud rate detect interval 26. Depending on the number of valid channels stored in memory 14, it is possible for baud rate detect interval 26 to be sufficient for baud rate detecting the signals more than once. Accordingly, controller 13 also calculates at step 53 how many times these signals can be baud rate detected within baud rate detect interval 26. Hence, when baud rate detection can be performed on the signals from the channels in a time interval T_B , controller 13 determines the number of T_B intervals possible within baud rate detect interval 26.

Proceeding to decision step 54, controller 13 checks whether any valid channel has been baud rate detected. When no valid channel has been baud rate detected within baud rate detect interval 26, method 40 proceeds with a "No" to step 57 in which "A" search window 25 is further
5 increased to account for time to the start of another baud rate detect interval 26. Following step 57, steps 51 to 54 are repeated until either controller 13 sets selective call receiver 9 to operate in the asynchronous mode of step 42 or a valid channel has been baud rate detected at decision step 54.

10 When a valid channel has been baud rate detected at decision step 54, method 40 proceeds to step 55 in which controller 13 controls synchronization codeword detector 17 in performing a synchronization codeword sampling to search for synchronization codewords in the fourth or remaining mandatory frame. Method 40 then proceeds to decision step
15 56 in which controller 13 checks whether the synchronization codewords have been detected in the valid channel.

Following a "Yes" from decision step 56, method 40 returns to step 44 in which controller 13 set selective call receiver 9 to operate in the synchronous mode and resets "A" search window 25 to the minimum
20 duration. Otherwise, with a "No" from decision step 56, method 40 proceeds to step 57 and repeats steps 51 to 54 as described above.

It is to be noted that method 40 can be applied with mandatory frames or both mandatory frames and non-mandatory frames in signals of the
25 other channels. Even in the worst case when no information is sent during the non-mandatory frames, method 40 requires approximately four minutes to apply baud rate detect interval 26 to the mandatory frames. However, when method 40 is applied with both mandatory frames and non-mandatory frames, less time may be required for selective call receiver 9 to
30 regain synchronization. This is because information is likely to be found in non-mandatory frames of the signals when the FLEX™ roaming system supports a high volume of signal traffic. For example, method 40 can be applied with baud rate detect interval 26 to sample the other channels every thirty seconds after the mandatory frames. This provides a total of
35 eight samples per cycle of two hundred and forty seconds. Hence, assuming that each channel requires one hundred milliseconds for baud rate detecting, then the time required time for baud rate detecting ten

channels is one second. This provides a thirty to one (30:1) BSR. Selective call receiver 9 in the asynchronous mode is typically sampling to detect the mandatory frames. To ensure detection of at least one of these mandatory frames in FLEX™ signals with, for example, four mandatory frames per cycle, such FLEX™ signals have to be sampled after every duration of three frames or 5.625 seconds. This translates to a BSR of 5.625:1. Thus, the BSR using method 40 for non-mandatory frames is significantly lower than the BSR for the asynchronous mode.

Advantageously, the invention enables battery savings for selective call receivers, such as selective call receiver 9, operating in a synchronous communication system. Using method 40 of the invention, controller 13 efficiently controls baud rate detector 12 and synchronization codeword detector 17 to operate selective call receiver 9 in the pseudo synchronous mode to regain synchronization with any one of the other valid channels. Thus, even when "A" search window 25 is at the maximum duration for the synchronous mode, the pseudo synchronous mode delays operating selective call receiver 9 in the asynchronous mode and this, therefore, enhances battery savings.

Although the invention has been described with reference to preferred embodiments, it is to be understood that the invention is not restricted to the preferred embodiments described herein.

We claim:

Claims

1. A selective call receiver for a synchronous communication system,
said selective call receiver comprising:
- 5 a clock for providing time information;
 a receiver for receiving a signal on a respective channel of one or
more channels when synchronized to said signal, said signal includes a
plurality of cycles, each of said cycles being transmitted within a
predetermined time and having a plurality of frames including one or more
10 mandatory frames;
 a demodulator coupled to said receiver to demodulate said signal to
derive a demodulated signal,
 a baud rate detector coupled to said demodulator to baud rate detect
said demodulated signal; and
15 a controller coupled to said clock, said receiver and said baud rate
detector,
 wherein, upon lapse of a maximum duration of a search window
during which said signal from said respective channel is not received by
said receiver, said controller is adapted to determine a baud rate detect
20 interval for baud rate detecting other signals received on at least one other
channel of said channels, said baud rate detect interval being based on
said maximum duration and duration of said mandatory frames in one
cycle.
- 25 2. The selective call receiver as claimed in Claim 1 wherein said
controller is further adapted to determine whether duration of said baud
rate detect interval is sufficient for baud rate detecting said other signals.
- 30 3. The selective call receiver as claimed in Claim 1 wherein said
controller is further adapted to determine number of times to baud rate
detect said other signals within said baud rate detect interval.
- 35 4. The selective call receiver as claimed in Claim 1 wherein said
controller is further adapted to control said baud rate detector to baud rate
detect said other signals within said baud rate detect interval.



5. The selective call receiver as claimed in Claim 1 wherein said selective call receiver further comprises a synchronization codeword detector for sampling a synchronization codeword within said plurality of frames, said synchronization codeword detector being coupled to said demodulator and said controller.

6. The selective call receiver as claimed in Claim 1 wherein said selective call receiver further comprises a memory for storing said maximum duration.

7. The selective call receiver as claimed in Claim 1 wherein said selective call receiver further comprises a memory for storing said channels.

8. A method for battery savings in a selective call receiver for a synchronous communication system, said method comprising the steps of:

receiving a signal on a respective channel of one or more channels when synchronized to said signal, said signal includes a plurality of cycles, each of said cycles being transmitted within a predetermined time and having a plurality of frames including one or more mandatory frames; and

determining, upon lapse of a maximum duration of a search window during which said signal from said respective channel is not received, a baud rate detect interval for baud rate detecting other signals received on at least one other channel of said channels, said baud rate detect interval being based on said maximum duration and duration of said mandatory frames in one cycle.

9. The method as claimed in Claim 8 wherein said method further comprises the steps of:

checking whether said baud rate detect interval is sufficient for baud rate detecting said other signals; and
performing baud rate detecting said other signals when said baud rate detect interval is sufficient.



10. The method as claimed in Claim 9 wherein said step of checking comprises the step of:

calculating number of times to baud rate detect said other signals within said baud rate detect interval.

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11. The method as claimed in Claim 8 wherein said method further comprises the step of:

setting said selective call receiver to operate in an asynchronous mode when said baud rate detect interval is insufficient for baud rate detecting said other signals.

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12. The method as claimed in Claim 8 wherein said method further comprises the step of:

performing a synchronization codeword sampling of at least one of said other signals upon detecting baud rate of said at least one of said other signals.

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13. The method as claimed in Claim 12 wherein said method further comprises the step of:

setting said selective call receiver to operate in a synchronous mode when said synchronization codeword sampling detects a synchronization codeword in said at least one of said other signals.

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14. A selective call receiver substantially as described herein with reference to and as illustrated by the accompanying drawings.

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15. A method for battery savings in a selective call receiver for a synchronous communication system substantially as described herein with reference to and as illustrated by the accompanying drawings.

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