



DOWNLOADING PROCESS FOR PROGRAMMING  
A RADIOELECTRIC FREQUENCY  
SYNTHESIS RECEIVER

9608893-5  
IPDS

5           The present invention concerns frequency  
conversion radio receivers using a frequency  
synthesizer as a local oscillator. Memory means  
contain data used to select the broadcast programme to  
be picked up in a given region, simply by designating  
10 it by its serial number. Television programmes are  
broadcast by short-wavelength radio waves in accordance  
with a frequency allocation plan broken down into  
numbered channels to which predetermined carrier  
frequencies correspond. In order to prevent  
15 interference between different geographic regions, the  
same programme will be broadcast on different channels.  
Therefore it is impossible to programme a frequency  
synthesis receiver such as a television receiver or a  
video recorder uniquely and finally at the factory  
20 outlet. Therefore programming has to be done during  
installation to satisfy regional conditions. Since the  
uninformed user may have difficulty in programming his  
receiver, it would be desirable to provide him with an  
integrated memory circuit programmed for use in a  
25 specific region. This solution involves an assortment  
of circuits to be controlled, which complicates product  
distribution. Insertion of this type of circuit by the  
user could be a source of failure and changing it when  
moving into another region would be a complicated  
30 operation. Preprogramming on the usage site can be  
done using various aids, for example a bar code reader  
or a digital keypad associated with a programming  
guide. Again, this would require the user to take some  
actions and to refer to a document describing the  
35 various programming options.

Nowadays, everyone is familiar with the use of  
the public telephone and there are telephone services  
that are accessible from anywhere free of charge in  
order to obtain all sorts of information. A new and  
40 particularly easily implemented method of downloading

is based on this observation.

The subject of the invention is a downloading process based on the use of the public telephone network and on the user calling a receiver on a free or  
5 charged number, so that he can be served through the telephone line with programming data appropriate to his region.

More specifically, this process is applicable to a frequency synthesis radioelectric receiver  
10 containing a rewritable memory that holds digital data designed to adjust the frequency of the tuning means, the said data being called up by choosing a broadcast programme appearing in an ordered list known to the operator, characterized in that the said data are  
15 downloaded into the said memory by using the public telephone network to make a call to a loading centre that retains sets of data appropriate to programming the said rewritable memory for several reception regions [lacuna]

20 Another subject of the invention is a radioelectric receiver equipped with modulator-demodulator means designed for implementation of the said process.

The invention will be better understood by  
25 reading the description below and the attached figures in which:

Figure 1 shows a downloading system in accordance with the invention.

Figure 2 is a sketch showing an embodiment of  
30 the system in Figure 1.

Figure 1 shows a radioelectric receiver 1, such as a television receiver or a video recorder, that is remote controlled by modulated infra-red radiation received by the window 2. This infra-red radiation is  
35 emitted by a remote control box 3 that generally contains a keypad and a display device 4. This remote control box 3 could also contain control knobs acting on indexes appearing on a television screen with appropriate menus.

In the case shown in Figure 1, the remote control box contains two housings M and E designed to hold the earphone and the microphone respectively of a telephone handset 7. Housing M is coupled to an internal microphone, and housing E is coupled to an internal earphone. These two electroacoustical transducers are connected to a modulator-demodulator (MODEM) circuit that makes the interface with a microprocessor circuit used to send commands by modulation of infra-red radiation. A simplified and less expensive system could also be envisaged in which only the data from the earphone of the handset 7 are used to programme the receiver, without making use of the possibility of a telephone link in the opposite direction. In the case shown in Figure 1, the telephone 5 is connected firstly to the public telephone network 6 and secondly to the remote control box 3 through an acoustic link via the handset 7. There is a downloading centre in the network 6 that, during a call from the user of receiver 1, will send data to this receiver to programme the tuning system memory remotely. The advantage of an acoustic modem link for the infra-red remote control is that it avoids any wire connection, however, the invention also covers the case of a wire telephone connection with the remote control 3 or directly with the receiver 1 that contains the tuning system. The acoustic link is easy for the user to install and it need only be made once, when setting up the television receiver in each new region. A suction grip magnetic coupler could also make the connection by means of the magnetic radiation emitted by the telephone.

Note that programming the tuning system in a frequency synthesis television is not the same for radio reception as for cable reception. In order to differentiate between these two options, the user could be invited to choose between two different free-call numbers, or if there is only one call number for the downloading centre, the user could be asked to send an

appropriate command. The region from which the call is made could be determined at the remote programming centre in agreement with the telephone network operator, but if this is impossible, the user could be  
5 asked to input his postal code.

As a non-restrictive example, Figure 2 shows the diagram of a television receiver 1 that comprises a frequency synthesis tuner 10 capable of being connected to an antenna 8 or a cable network 9. The tuner  
10 contains a matching register into which a binary number is loaded to determine the frequency to be received. This register is connected to a data bus D and a control bus C. These two buses are themselves connected to a microprocessor 13, an electrically  
15 reprogrammable memory 14 and RAM/ROM memories 15. An address bus A and an infra-red remote control receiver 2 are also provided. The tuner 10 outputs a sound signal S and a composite video signal on sound and picture channels, after amplification at intermediate  
20 frequency. The sound and picture channel amplifiers are contained on a plate 11 connected to the tuner 10 and to a circuit 12 that separates the synchronization signals SYNC, the luminance signal Y, and the chrominance signals C. Figure 2 does not show how  
25 these signals are used. The remote control receiver 2 receives modulated infra-red radiation that is emitted by the remote control box 3 placed close to the telephone 5. The telephone handset 7 is acoustically connected to a microphone M that retransmits audible  
30 data transported through the line LL of the telephone network 6. It is also connected to an earphone E when provision is made for a command to be sent to the downloading centre using the box 3. The downloading centre includes an exchange 16 connected to line LL, a  
35 memory 17 connected to this exchange and a selection circuit 18 used to choose one of the sets of data stored in memory 19 as a function of the contents of the memory 17.

A set of data contains as many data groups as

there are programmes to be received stored under a label that characterizes the reception region. Each programme line contains an order number followed by a binary word that fixes the tuner operating frequency.

5 The channel number, and possibly the station name that transmits on this channel in the chosen region, can be added to these two items of information. The "GEMSTAR" code could also be added in order to simplify the programming of video recorders. Together, the

10 programme lines attached to a region represent one page in memory 19. This page is selected as a function of the contents of memory 17. When the user wants to programme his television receiver, he dials a free number on his telephone 5, after connecting the handset

15 7 to the remote control box 3 and switching on the television receiver. A display on the television screen can guide the user as to what he should do (inform him of the telephone call number to dial, etc.). When the connection has been made, the exchange

20 7 can locate the source of the telephone call and load a word corresponding to one of the region labels into memory 17. Selector 18 then points to the programming instructions set contained in memory page 19 selected by the contents of memory 17. This set of instructions

25 is then sent to the handset 7 earphone and the signals are sent into box 3 that contains a modulator-demodulator (MODEM) through microphone M. The signals are formatted to be sent to the remote control receiver 2. The microprocessor 13 loads the data arriving at

30 receiver 2 into the electrically reprogrammable memory 14 where they become available to tune the tuner 10 within the region from which the telephone call was made.

When the public telephone network operator does

35 not provide any information about the source of the call, memory 17 can be loaded with information supplied by the user. The centre can then formulate a question by speech synthesis or by a display on the remote control. For example the user may be invited to input

his postal code on the keypad, or to state it aloud and specify whether or not he is connected to cable.

When downloading data have been loaded into memory, the user is informed by a message appearing  
5 either on the remote control, or on the television screen.

In the example described above, the television remote control box is equipped for coupling with the telephone network. Within the scope of the invention,  
10 direct coupling can be provided with the television or video recorder. In this case, an accessory containing a telephone jack and a connector could be provided to connect to the receiver internal bus. This accessory will need to respect the protocol for exchange with the  
15 telephone network and it will also contain an output/input controller to manage data exchanges with the electrically reprogrammable memory that contains the tuner programming table.

The method of using the programming system  
20 based on downloading is particularly simple, and comprises the following steps:

- plug in the receiver and couple the telephone handset with an appropriate device dependent on the receiver,
- 25 - the receiver displays a message stating the telephone number to be called depending on the reception means used (antenna or cable),
- make the call on the public telephone,
- the relevant information is then downloaded,
- 30 - the "end of loading" message appears,
- hang up the telephone.

The advantage of the programming process by downloading is that it can take account of the changes that occur when the number of received stations  
35 increases.

It is possible that the tuner may need to be readjusted after downloading by pressing the + and - keys. This manual or automatic correction is justified by local reception conditions.

Since receivers change with time, it may be necessary to ask the user to specify the make and the year of manufacture of the product. However, this type of information may be acquired by the downloading  
5 centre without action by the user, if data can be exchanged bilaterally.

The above description was given only as a non-restrictive example, and it is obvious that other alternatives could be envisaged within the scope of the  
10 invention.

CLAIMS



1. Programming process for a frequency synthesis radioelectric receiver containing a rewritable memory  
5 that holds digital data designed to adjust the frequency of the tuning means of the said receiver, the said data being called up by choosing a broadcast programme appearing in an ordered list known to the operator, characterized in that the said data are  
10 downloaded into the said memory (14) by using the public telephone network (6) to make a call to a loading centre that retains sets of data appropriate to programming the said rewritable memory for several reception regions.
- 15 2. Process according to Claim 1, characterized in that it consists in coupling the telephone handset (7) of the phone (5) used for the call to an infra-red remote control box (3) associated with the said receiver (1).
- 20 3. Process according to either of Claims 1 and 2, characterized in that it consists in making a bilateral link between the said loading centre and the digital control circuits of the said receiver.
4. Process according to any one of the previous  
25 claims, characterized in that the data transfer makes use of an acoustic coupler and a modulator-demodulator.
5. Process according to any one of Claims 1 to 4, characterized in that the said receiver is a television.
- 30 6. Process according to any one of Claims 1 to 4, characterized in that the said receiver is a video recorder.
7. Device for embodiment of the process according to any one of the previous claims, characterized in  
35 that the digital control circuits (13, 14, 15, 2, 3) in the said receiver (1) are temporarily connected to a telephone (5) belonging to the public network (6) by means specially adapted to downloading the data necessary to tune a frequency synthesis tuner (10).