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<b>(57) Abstract</b>		
<p>A method of controlling the viewing of television programmes according to their content involves sending codes using an auxiliary data channel which indicate the level of sexual, violent, distressing, etc. content. These codes are assembled into a wide screen signalling (WSS) signal and detected at a receiver. The receiver is programmed by entering corresponding codes which indicate allowable or forbidden content and cause the display to be blanked and the sound to be muted in dependance on the transmitted codes. A system, programme source and receiver are also described.</p>		

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## DESCRIPTION

## TELEVISION

5           The invention relates to a method of and apparatus for enabling the inhibition of television programme display in dependence on the programme content.

10           A law has been passed in the USA which requires that all television receivers having a display above a certain size sold from 1998 will have to have a means of enabling parents to prevent children from viewing coded programmes containing violence, sex, and bad language. A so called "V-chip" is proposed which will monitor a code transmitted with the television signal and disable the television receiver when the code indicates forbidden programme material including scenes of violence, sex or other matter which might be  
15           considered objectionable by some audiences or unsuitable for children.

          In the US V-chip system, the broadcaster rates each programme in four censorship categories. The values for each category are then transmitted simultaneously as part of the extended data services (EDS) of the Closed  
20           Captioning (CC) system. The values are transmitted for as long as the programme is on the air.

          Using an access control mechanism, the parent sets a threshold for each category. If a rating exceeds the pre-authorised value, the V-chip; suppresses the video and audio signals. As the reaction of the V-chip decoder is near  
25           instantaneous, the system can easily handle channel hopping. Moreover, the parent does not have to worry about missing content warnings in TV guides or at the start of programmes.

          The Electronic Industries Association (EIA) defines the four censorship categories and the number of data bits required to transmit the code:

- 30           •       MPAA rating (equivalent to film classifications, e.g. 18, PG, etc.) - 3 bits
- violence content advisory level - 2 bits (which allows for a scale of 0 to

3)

- sexual content advisory level - 2 bits
- mature content advisory level - 2 bits.

5 The same principles apply to a system being field-tested in Canada but, at present, the two are not identical.

All American TV sets built after July 1993 had to include a CC decoder to provide subtitling. Current CC decoders (such as the SAA5252 decoder sold by Philips Semiconductors) are capable of blanking out the TV picture when switched into full-text mode. They also have adequate display features to generate an OSD menu so that parents can program the censorship thresholds.

10 Unlike teletext, CC data can be recorded and reproduced by a VHS VCR during play-back of a programme. Thus recorded and pre-recorded tapes could also contain censorship data.

In Europe, the question of implementing a V-chip type system is altogether more complex than North America. The broadcasters are not regulated by a single government, and cultural and language differences mean variance in acceptable moral standards. Then there are the technical issues of coping with a 625-line TV system that has little spare capacity for extra data signals.

20 The obvious solution is to use the American system but this has some disadvantages.

First, for broadcasters, the CC signal would occupy valuable teletext transmission capacity (one line would be permanently lost) and different encoding systems would be required

25 Secondly, it would be very expensive for broadcasters in terms of the duplicate transmission equipment and data bridges (in cable amplifiers) required for both teletext and CC signals.

30 Thirdly, consumer electronics manufacturers would have additional overheads in providing teletext and CC decoding in every TV set and PC TV card.

The concept of enabling a parent to control viewing of a television receiver using information transmitted by the broadcaster is not new and was proposed in W083/02208 published on 23rd June 1983. In that document it is proposed that a code is sent via the teletext signal transmitted with the television signal, the code being formed as a selected row number of a given teletext page. Thus the page number and row number is transmitted in the field blanking period on the occurrence of a possibly offensive event. At the receiver a teletext decoder is permanently set to look for the relevant page and identify the row number as and when transmitted. The particular row numbers indicated particular gradings of sound and vision events.

Our co-pending UK Patent Application No. 9619878.3 (PHB34110) discloses a method of using teletext signals in which the classification data is sent in an extension packet which is transmitted at approximately one second intervals by the UK television programme providers. This enables regular transmission of the data and relatively fast updating of the classification, although it may not be sufficiently fast for all envisaged applications. The use of teletext based transmission does, however, have the disadvantage that it cannot be reliably recorded on tape or replayed from tape using a standard VHS recorder. Thus recording "off air" would destroy the transmitted code and replaying a prerecorded tape would not make available such a code to the television receiver even if it was recorded on the tape.

It is an object of the invention to enable an editorial function to be exercised over the output of a television receiver by a parent or other person in authority over that receiver.

The invention provides a method of enabling an authorised person to disable the sound and/or visual display of a television programme or a part thereof in dependence on the programme content, the method including the steps of;

- i) classifying the whole and/or instantaneous content of a television programme,
- ii) generating code words representing the allocated classification,

and

- iii) inserting the code words in a Wide Screen Signalling Signal (WSS) multiplexed with the television signal representing the programme.

5 An advantage of using bits of the WSS is that programme providers are increasingly transmitting this code and decoders are becoming readily available as they are fitted to Wide Screen (16 : 9 aspect ratio ) Television Receivers. Thus an editing facility can be relatively easily added at the programme originating source and the WSS signal can be relatively inexpensively decoded  
10 at the receiver. A further advantage is that the WSS has been designed to be recordable on and replayable by a standard VHS cassette recorder. Thus the control of programme material recorded on tape can be assured by providing the classification code within the WSS signal on the tape in conjunction with the pre-recorded programme.

15 A further advantage of using the WSS transmissions to convey the code is that in many countries the infrastructure is already in place for inserting the WSS signal into the transmitted signal and that a significant and increasing number of television receivers now incorporate WSS decoders. Thus there is increasingly a viewer demand for the WSS facility as increasing numbers of  
20 Wide Screen Television Receivers are purchased and an editing facility can be relatively easily added to both at the receiver and at the programme originating source.

Thus to enable the disabling of the sound and/or visual display the programme provider monitors the content of the programme and provides an  
25 appropriate indication of its content by means of a code inserted in a WSS an signal. The person in control of the television set can then use this code to determine whether or not such programmes should be displayed (visually and/or orally). By using the WSS signal to convey the code a teletext decoder is either not required or is free to perform its normal tasks and in particular  
30 mixed text and picture and "in vision" functions remain available.

The WSS may be transmitted once in each television frame, the code

words being assembled from bits inserted in a plurality of frames.

The code words thus become available at less than one second intervals and consequently the classification can easily be frequently changed at relatively precise times if desired. This enables the occasional occurrence of possibly offensive events to be edited out while still allowing viewing of the programme as a whole. For example, news and current affairs programmes may include distressing or offensive scenes, such as incidents from war zones, as relatively short portions of the programme as a whole.

The method may include the further step of generating error correction bits for insertion in the WSS with the code words. In one embodiment the code words are protected by means of a Hamming code, the code words being 4/8 Hamming coded.

This enables secure reception of the classification codes and consequently minimises the possibility of disabling or allowing display erroneously due to errors in transmission or detection of the classification code words.

A further possibility for protection against error is to require two or more successive transmissions of a code to be the same before the programme classification is deemed to be valid.

One or more classification criteria may be each encoded using code words comprising two bits and an individual criterion may apply to the whole programme or to individual events within a programme. The classification criteria may include one or more of; violent content, sexual content, distressing content, mature language.

The use of two bit code words for each criterion allows the setting of four possible levels for that criterion. For example taking the criterion of violent conduct the code 00 could represent zero violent content, the code 01 a low level of violent conduct, the code 10 a medium level of violent conduct, and the code 11 a high level of violent conduct.

One of the code words may represent the region of origin of the programme, and the region of origin may be represented by a four bit code.

The indication of the region of origin of the programme may be useful in view of the sensibilities of different cultures. Thus what is offensive to one nationality or religious group may not be to another and consequently the possibility of modifying the meaning of a particular code depending on the programme origin and the sensibilities of the controlling authority for the TV receiver could be useful. Thus certain communities may have a greater or lesser tolerance of sexual or violent conduct and by providing a region of origin code the level may be accordingly increased or decreased at the location of the receiver.

Alternative words to replace word(s) deemed unsuitable for a selected classification level may be provided.

These words may be transmitted on an auxiliary channel, for example that for the proposed Audetel service which provides an audio assistance signal for describing action in a scene.

The invention further provides a method of disabling the sound and/or visual display of a television programme, the method comprising the steps of;

- iv) establishing the authority of the user to define the programme or parts thereof which are to be disabled,
- v) entering into a memory within the television receiver code words corresponding to programme content it is desired to suppress,
- vi) receiving television signals generated by a method as set forth in the preceding paragraphs,
- vii) comparing the received code words with the entered code words, and
- viii) disabling the sound and/or visual display in dependence on the result of the comparison.

The reception of television signals having an undesirable content for a potential audience, for example children, can be controlled using this method.

A television set or video recorder equipped with WSS decoder can be used to monitor the classification of a programme according to its content and if a user



enters a classification which it is desired to suppress then means can be provided to disable the output of a television set or the record function of a video recorder.

5 Step iv) of the method may be accomplished by entering a Personal Identification Number (PIN). Alternatively or in addition step iv) of the invention may be accomplished by monitoring a physiological characteristic of the authorised person.

A relatively simple method of establishing authority is to issue a PIN which is known only to the authorised user. The entered PIN is then  
10 compared with the stored PIN (known only to the authorised user) and if coincidence is found then the classification codes may be updated.

The disadvantage of using a PIN is that it may be forgotten by the user or may be discovered by non-authorised users. An alternative which requires more complex equipment to implement is to monitor a physiological  
15 characteristic of the user, for example fingerprints, voice, facial features, etc.

The code words may be entered using a remote control unit.

Remote control units are now normally provided with television sets and usually have a numeric keypad. Consequently they can be used for entering a PIN. Most remote control units are provided with other keys whose functions  
20 can be used for entering the desired classification codes.

An on-screen display message may be generated to aid the entering of the code words.

By this means a step by step process of entering the codes relating to the different classification criteria can be guided by means of successive  
25 displayed instructions and choices.

An on screen display message which informs the viewer of the reason the sound or visual display is disabled may be generated.

Such a message will prevent a viewer from thinking there is a fault in the television set which is causing the display or sound to cease. The messages  
30 may, for example, be of the form "sound inhibited because of mature language", or "display inhibited because of distressing event."

An inhibited sound may be replaced with an alternative sound.

Thus an undesirable word or passage could be replaced by a "bleep" or other sound. This would ensure that the viewer realised that it was the control function that caused the word to be inhibited whereas it might be thought that there was a fault if the word was replaced by silence.

The alternative sound may be defined by the received signal.

Thus a range of sounds might replace the original words. For example, the replacing sound may depend on the length of the passage to be replaced. In a further example alternative non-objectionable words might be transmitted in an auxiliary channel to replace the words not allowed by the selected classification. Such alternative words may be transmitted, for example, using any spare capacity in the proposed Audetel service.

The invention further provides a television signal programme source including a WSS signal insertion arrangement, means for classifying television signals to be transmitted according to the programme content they convey, means for generating code words representing the classification allocated to the programme or part thereof, and means for inserting the code words within the WSS.

Many current television signal sources include a WSS inserter which insert a WSS signal into the vertical blanking interval to indicate, inter alia, the aspect ratio of the picture being transmitted. The WSS signal includes three bits in each frame which are currently defined as PAL plus helper signals. In one embodiment of the present invention it is proposed to use these three bits to transmit the classification code rather than the PAL plus helper code. This is, of course, incompatible with any PALplus transmissions.

Means may be included for changing the classification within the duration of a single programme.

This enables the use of the classification code in two modes. The first is to prevent the reception of a whole programme deemed to be unacceptable and the second is to allow viewing of a programme but to delete possibly offending events. The length of events which can be excluded depends on the

frequency of transmission of the codes. The WSS signal is transmitted once per frame i.e. every 40 msec and consequently the minimum update time is 40 msec but with the embodiments described this time is increased as the classification code is spread over a plurality of successive WSS signals as the spare capacity is insufficient to transmit the proposed classification code in one frame.

Means may be provided for error correcting the code words. The words may be protected by means of a Hamming code. The code words may be 4/8 Hamming coded.

By error protecting the code words the possibility of falsely inhibiting or allowing display of programmes or events within programmes due to errors in transmission are reduced.

An alternative to Hamming coding the classification code is to require that it is received two or more times in identical form before it is acted upon.

The code words may comprise words defining the level of one or more of the following categories; sexual explicitness, violence, mature language, distressing images or sounds.

These categories may apply to either sound or vision and may apply to the whole programme or to individual events within a programme. For example news programmes may portray high levels of violence in particular reports such as from war zones. They may also contain distressing content, for example pictures of starving people as a result of famine. Other examples of material which may be distressing to some viewers include the display of operations in medical programmes.

The code words may further include a code word indicating the region of origin of the programme.

Different regions and countries have differing conventions and material which is acceptable in one region may not be in a different region. Consequently what is considered a low level of violence in one region may be considered a medium or high level of violence in another region.

The invention still further provides a record carrier containing data

representing a television programme, classification code words representing allocated classifications for the whole and/or instantaneous content of the programme, and a widescreen signalling (WSS) signal wherein the code words are contained in the WSS signal.

5           This enables the classification and control of reproduction of pre-recorded media such as video tapes or optical discs which may be purchased by persons who the authorised person does not wish to watch them. That is, parents may consider their child's choice of video inappropriate. If the record carrier is classified in the same way as broadcast material the same control can  
10 be exercised over their viewing.

The use of the WSS signal has the advantage over the use of teletext for transmitting the classification code that the WSS signal was designed to be recordable on a VHS cassette recorder, unlike the teletext signal which cannot be recorded by a standard VHS recorder.

15           The invention yet further provides a television receiver suitable for receiving and displaying television signals from such a television signal source or record carrier, the television receiver comprising a WSS decoder capable of decoding the WSS signal, means for extracting the code words representing the classification allocated to the currently received programme, means for  
20 entering information representing any programme classification which represents programmes whose display it is desired to inhibit, means for comparing the entered and received classification, and means for allowing or disabling display of the programme in dependence on the result of the comparison.

25           Thus codes corresponding to programmes or parts of programmes which it is desired to suppress are entered into a television receiver. Corresponding codes are received via the WSS signal and can be compared, within the receiver, with the entered codes to enable control of the display and audio output of the receiver. By including the codes in the WSS signal it is not  
30 necessary to have a teletext decoder permanently looking for a particular page. Instead the teletext decoder can perform its normal function of acquiring user

selected pages and it will not be involved in the control of the output of the television set in response to transmitted classification codes.

Authorization means may be provided for allowing only an authorised person to enter the programme classification.

5           The authorization means may comprise means for entering a PIN, means for comparing the entered PIN with a stored PIN, and means for allowing the entry of programme codes if the stored and entered PINs are identical.

10           This provides an easy secure means for ensuring that only an authorised person, for example a parent, can alter the classification codes. It does, however, have the disadvantage that the code may be forgotten or compromised. In the first case it is then difficult to change the classification and in the second case an unauthorised person may be able to change the classification.

15           Alternatively the authorization means may comprise means for monitoring a physiological characteristic of the authorised person, means for storing the monitored characteristic, means for requesting a change in the acceptable programme content, means for monitoring the characteristic in response to the request, means for comparing the monitored and stored  
20           characteristics, and means for allowing alterations to the acceptable programme content in the event of a correct comparison.

Various physiological characteristics may be used, for example fingerprints, facial characteristics.

25           Fingerprint detectors are known from their proposed use with credit card verification at point-of-sale terminals. A means for recognising facial characteristics is disclosed in EP-A-0 551 941 (PHB33765).

The advantage of using physiological characteristics is that they are difficult to falsify and there is no need to remember PINs or other external data.

30           Means may be provided for generating an on screen display message to inform the viewer why the sound and/or display has been disabled.

This prevents the viewer from assuming there is a fault in the receiver

when a programme cannot be received or is interrupted due to its classification.

Means may be provide for replacing unsuitable words with an alternative audio signal. The alternative audio signal may represent alternative unobjectionable words. The alternative words may be received as part of the television signal.

Thus where objectionable words occur they may be replaced, for example, by a bleep signal. Alternatively they may be replaced by an alternative unobjectionable word. One way of achieving this is by use of an auxiliary channel in which the programme generator transmits alternative words. An auxiliary channel which could be used is the proposed Audetel channel for transmitting audio assistance messages for the blind or partially sighted.

Means may be provided for disabling the sound and visual display if no classification code is received with the television signal.

This enables control of the reproduction of programmes which have not been classified. This may be either due to their age or because, for example a video tape, they originate from an illicit source. In particular, tapes which are highly objectionable may be produced without a corresponding classification code.

The above and other features and advantages of the invention will be illustrated by and be apparent from the following description, by way of example, of an embodiment of the invention with reference to the accompanying drawings, in which:-

Figure 1 shows a television system for carrying out a method according to the invention,

Figure 2 shows in block schematic form a television programme source according to the invention.

Figure 3 shows a scheme for code words for classifying programmes, the code words being inserted into a teletext extension packet.

5 Figure 4 shows in block schematic form a television receiver according to the invention.

Figure 5 illustrates a process for programming the television receiver to operate according to the method of the invention, and

10 Figure 6 illustrates possible on-screen display messages when the method is invoked.

Figure 1 is a block schematic diagram of a system in which methods according to the invention may be carried out. The system shown in Figure 1  
15 comprises a television signal source 1, a television transmission medium 2, and a plurality of television receivers 3-1 to 3-n. The television signal programme source may be a normal television broadcast equipment, either terrestrial broadcast or satellite broadcast or could be the programme source for a cable television network. The television programme source includes a  
20 wide screen signalling (WSS) signal inserter and means for entering programme classification codes into a selected part of the WSS signal. The transmission medium 2 may take any convenient form for example it could be radio waves as broadcast by a terrestrial transmitter or a satellite transmitter or could be a cable network for a cable TV system. The television receivers  
25 3-1 to 3-n are connected to the programme source via the transmission medium 2. A further possible programme source 1 is a video tape or disc on which a programme is recorded for replay by a video tape recorder or a video disc player in which the case the transmission link 2 may be simply the tape recorder or disc player and a cable connecting the tape recorder or disc player  
30 to the television receiver.

An embodiment of a television signal programme source according to the

invention is shown in block schematic form in Figure 2. The television programme source comprises a source of video and audio signals 10 which may for example be a television camera whose video output is fed via a WSS signal inserter 11 to a transmission network 12. The audio output from the television signal source 10 is fed via a line 13 to a further input of the transmission network 12. An editing system 14 is connected to the WSS signal inserter 11 and has a further input which is fed from a TV access control equipment 15.

The TV access control equipment 15 is arranged to insert into a selected part of the WSS signal code words classifying the content of the television programme being created by the signal source 10. The TV access control equipment 15 has a first input 16 which receives data from a TV programme scheduling system. This data will for example provide an overall indication of the content of the programme which can be used to inhibit display of that programme at a receiver. The information may for example define the levels of violence, sexual content, mature language or distressing content which may occur in the programme.

The TV access control equipment 15 has a second input 17 which receives data from pre-recorded material. Pre-recorded material may already include the coding to indicate the type of content present in the programme and may also include instantaneous data to classify particular events during a programme. A keyboard or other input device 18 is connected to a further input of the TV access control equipment 15. This is to enable an operator to insert appropriate classification codes into a live programme. It is of course necessary to delay the actual transmission of the programme by a short period so that there is time for the operator to enter the appropriate codes at the appropriate times. Such transmission delays are well known for live programmes to enable the broadcasting authority to cut out any undesirable occurrences. For example in live phone in programmes to cut out any libellous or obscene comments made by a person phoning in.

The codes generated by the TV access control equipment 15 or received



by it and passed to the editing system are then inserted into a selected part of the WSS signal. In particular they may be inserted into bits which have previously been used for the PAL plus helper signal.

5 Figure 3 shows the content of the WSS signal modified to enable the invention to be carried out. Thus it comprises a clock run in period start code, bits containing information defining the picture aspect ratio defining a camera mode, subtitles, and sound. There are then three bits available which are, according to the invention, used to transmit classification codes for the programme. These three bits have been defined in the WSS specification as  
10 defining the PAL plus helper signal but this embodiment of the invention proposes to use these bits to define the classification code on the basis that at least in the UK it is unlikely that PAL plus broadcasts will take place on any significant scale.

Three bits are of course inadequate to enable a comprehensive  
15 classification code to be transmitted. In our co-pending UK Patent Application No. 9619878.3 (PHB34110) sixteen bits are used to encode the classifications while a further sixteen error protection bits are transmitted to reduce the likelihood of erroneous codes being detected and acted upon. The present embodiment uses a plurality of successive WSS signals (which are transmitted  
20 once per television frame or every 40 msec in Europe) and aggregates the bits from the successive signals. Thus, for example the code may be spread over eight frames with the first bit being a flag bit which indicates the start of an eight frame sequence and the other two bits provide a total of sixteen bits over an eight frame sequence.

25 The WSS signal has been designed for reliable reception and further error protection may be unnecessary. If, however, it is desired to enhance the reliability of the received classification code it would be possible to add error protection bits, for example by increasing the eight frame sequence to a larger number of frames. A sixteen frame sequence would enable a 4/8 Hamming  
30 code error protection scheme to be implemented. A further possibility would be to retain an eight frame sequence but to require identity between two or

more successive eight frame sequences before deeming a received classification to be valid. Any of these error protection arrangements will, of course, reduce the rate at which the classification codes can be changed, which may have some effect on the response time for the control of events within a programme. This effect is reduced by the relatively frequent repetition of the WSS signal where even with 4/8 Hamming code protection a new code can be transmitted in less than a second.

A proposal for allocating these message bits is as follows:

2 bits for sexual content of the whole programme

2 bits for sexual content of individual events within a programme

2 bits for violence content within a programme

2 bits for violent content of incidents within a programme

2 bits for distressing incidents within a programme

2 bits for mature language within a programme and

4 bits for an indication of the region of origin of the programme.

The allocation of two bits for each of the programme content classifications allows four possible levels to be set for that particular content. For example the code 00 could mean no content of that type, the code 01 a low level content, the code 10 a medium level content, and the code 11 a high content level. It is considered useful to have a coding as far as sexual and violent content is concerned for the whole programme and for individual incidents within a programme. Thus for example a parent could decide that programmes having a low or medium sexual content level could be viewed by children so long as the individual events containing sexual content were inhibited. Thus they would set the acceptable programme level to 01, while they may wish to eliminate incidents having sexual content altogether and thus set the event within the programme code to 00. The same considerations apply to violent content within a programme. The distressing content classification is likely to be only of limited duration within a programme. The types of content which are being considered here are for example details where in medical programmes operations are being shown. In this case viewers may

well be interested in the medical techniques but find the portrayal of operations distressing. Other instances where distressing content may occur is in news or current affairs programmes. For example interviews with recently bereaved persons may be distressing to some people or pictures showing the effects of famine or other disasters. The mature language content of a programme will normally also be fairly intermittent and hence it is considered that the proscribing of a whole programme on that basis is perhaps not appropriate and that the instances which the mature language occurs can be suppressed.

The region of programme origin code is considered useful in that different areas and countries have different moral codes and consequently what may be classified as a low level of violence in one region may be classified as a medium or even high level of violence in another region. The same considerations may well apply to sexual content and also distressing or mature language content. It would be possible within the receiver to modify the codes for sexual, violent, distressing and mature language content in accordance with the code for the region of origin of the programme. Thus in region 1 medium level sexual content may correspond to high level sexual content in region 2.

It is also possible to bar programmes originating from a given region, for example for political or religious reasons.

As shown in Figure 3 the WSS signal as defined by the ETSI specification ETS 300294 includes a run-in section of 29 elements based on a 5MHz clock, a start code of 24 elements, group 1 of 24 elements giving 4 data bits which define the picture aspect ratio, group 2 of 24 elements giving data 4 bits allocated to Enhanced Services of which three bits were reserved for PAL plus data, group 3 of 18 elements giving 3 data bits which define the presence and position of sub-titles, and group 4 of 18 elements giving 3 data bits which define the audio signal. In the present embodiment it is proposed to use 3 data bits from group 2 for the transport of the classification code, these three bits being those which in the standard are proposed for use for the PAL plus data. Thus bits b5, b6, and b7 in group 2 are used to transport the classification code.

Clearly the classification code proposed requires the use of sixteen bits and only a very rudimentary classification code could be defined with only three data bits (a choice of eight possible codes). In order to overcome this problem it is proposed to spread the classification code over a plurality, in the case illustrated eight, of successive WSS cycles. In this case bit b5 is used as a flag bit to enable the start of a sequence to be identified while bits b6 and b7 enable two bits of data to be transmitted for each WSS signal cycle. Thus over eight cycles a total of sixteen data bits can be transmitted. If it is desired to error protect the data by means for example of a Hamming code then extra data bits will be required. A 4/8 Hamming code could be used if the plurality was increased to sixteen to give a total of thirty two bits. An alternative is not to add error checking bits but instead to repeat transmissions and check for correlation.

Figure 4 shows in block schematic form an embodiment of a television receiver according to the invention. As shown in Figure 4 the television receiver comprises an aerial 20 which feeds a conventional tuner 21 and IF and demodulator block 22. A combined video and blanking signal is available at the output of the block 22 and is fed to a teletext and WSS decoder 23 and a colour decoder 24. The output of the colour decoder 24 is fed to a video selector 25 which also receives a display signal output from the teletext decoder 23 and a blanking signal via an ORgate 26 from the teletext decoder 23.

A control processor 27 controls in conventional fashion the operation of the television receiver using the WSS signal to determine the picture aspect ratio, subtitles and audio. It receives control instructions from a remote control unit 28 which the viewer uses to select a particular channel for display and selects other functions such as teletext display or on screen menu displays. The processor 27 will also receive from the teletext and WSS decoder 23 the codes which are present in the WSS signal representing the content of sexual matter, violent matter, distressing matter or mature language. It will also store within a non volatile memory 29 codes, which have been entered by the user

using the remote control unit, which set the levels of sexual, violent, distressing or mature language content which are acceptable for display. The processor 27 will compare the received codes with the stored codes and depending on the output of that comparison will produce a signal on line 30 which is fed to the video selector 25 via the ORgate 26 and which in appropriate circumstances will cause the video display to be blanked. It will also feed a signal via a line 31 to an audio selector 32 which will cause the audio output to be muted in appropriate circumstances.

The audio selector produces an output which is fed to the standard audio circuits represented by block 33 and to a loudspeaker 34, while the video selector 25 produces an output which is fed to standard video circuits 35 and to a display device 36. The audio selector 32 has a further input fed from a terminal 37 to which an alternative audio source may be connected. This may be for example a tone generator which replaces any offending words by a bleep or it may be connected to an auxiliary channel for example an Audetel channel to provide alternative words for the offensive words. The Audetel channel is a channel proposed for use for providing an audio assistance signal which provides a description of the scene to help the following of a programme by persons unable to see the display screen clearly or at all, for example blind or partially sighted persons. There will normally be some spare capacity on this channel which will enable an alternative word for possibly offensive words to be transmitted by the broadcaster or to be encoded within any programme source since Audetel will be idle while there is dialogue.

Figure 4 shows a television receiver but the invention could equally well be applied to a video recorder. In that case the outputs of the audio and video selector circuits 32 and 25 would be fed to record heads on the video recorder. Thus only programmes having the authorised codes would be recorded on the video recorder. An alternative arrangement for a video recorder would be to allow recording of the received television programme regardless of the classification codes associated with it, but to record those codes on the tape so that on replay the television receiver is able to react to the output from the

video recorder in the same way that it would react to a broadcast programme. In this way a programme can be recorded for viewing by a number of different persons, each of whom may have a different allowable classification level for particular content. Thus a whole programme may be played back through one television receiver, but only a restricted version through another.

Figure 5 A-E illustrates an on screen display sequence which enables a person to enter the codes into a television receiver. On initial switch on the on screen display sets out a message which invites the user to enter a personal identification number. This is assuming that authorization is checked by means of a PIN. The PIN may be burnt into a memory by the manufacturer who then informs the buyer of the number of the PIN so that the owner can initiate the selection of the classification. An alternative is to set the PIN to all zeros at the factory and for a routine to be entered into when the set is first switched on to change the PIN to any number that the user desires. Subsequently when it is desired to change the classification a key to request this is pressed on the remote control unit. This brings up the on screen display message which invites the user to enter the PIN. This is shown as screen 1 in Figure 5A.

The user then enters the PIN and if this is checked correctly the next on screen display is presented. This is numbered 2 in Figure 5A. Initially the television receiver will be set to receive all programmes but by using the television access control system a choice can be made as to whether programmes of a certain type are to be excluded. The on screen display instructs the user which key to press to continue the process, in this instance the red key. The next screen presented, screen 3, invites the user to either press a green key to select the type of programme that can be received or to press a red key if he wishes to leave the state unchanged. Assuming that the green key has been pressed the fourth screen is presented. This invites the user to decide whether programmes with sexual content should be excluded and invites the user to press one button if such matter is to be excluded and a different button if the matter is not to be excluded. Assuming that the user

would like to exclude at least some of the sexual content then screen 5 is presented. This will invite the user to exclude either high levels, moderate or high levels or any level. In this particular example the user chooses to exclude high levels only. In this particular instance the user who has chosen  
5 to exclude high level only sexual content and is then invited to indicate whether this content should be excluded only when the events occur or whether all programmes which include high levels of sexual content should be completely excluded. Again the user is invited to press red in one instance and green in the other. That completes the programming for sexual content.

10 A similar process is followed for violent content and is shown on screens 7, 8 and 9. Screens 10, 11 and 12 show the process for enabling distressing content to be excluded. In this particular case it is only excluded for the events in which the distressing content is present and not for the whole programme. It is considered that distressing content is unlikely to be relevant to a whole  
15 programme but only to events within a programme. Such distressing content may be for example the showing of operations in medical programmes or the showing of the scenes of accidents or other disasters in news programmes. These incidents will only be a small portion of such programmes and the programmes can be enjoyed readily with those incidents deleted.

20 A similar process is shown in screens 13 to 15 which enables the programming of the mature language content which is acceptable. Again this only excludes the specific events rather than the programme as a whole since the occurrence of possibly offensive words is likely to be only a small proportion of the programme as a whole especially if programmes having  
25 excessive sexual or violent content are already excluded. Screens 16 and 17 illustrate the programming of the region of origin. It enables the user to exclude programmes from certain regions if desired. This may be desirable for example where a particular country is transmitting propaganda material which may not contain excessive sexual content or violent content or even  
30 distressing content or mature language, but the authorised person may wish to prevent reception of programmes of such a nature. An alternative use for the

region of origin codes is to modify the effective codes for sexual, violent, distressing content or mature language depending on the source of the programme. Thus from region A it may be desired that the level of sexual content accepted is moderate level only because what is considered moderate  
5 in region A may be considered to be high in the region where the receiver is located. This code of changing may be programmed permanently into the receiver or may be settable by the user. Screen 18 is the final screen presented and confirms the choices which have been made by the user. This screen is similar in content to screen 2 which is presented when the entry to  
10 the access control system is obtained. Thus once a setting has been made this will be displayed on screen 2 at a subsequent access.

It will be apparent that these on screen display messages are by way of example only and that the actual messages may be tailored for particular markets and will of course be in the language of the country in which the set  
15 is located. The control processor may, of course, store various on screen displays in a number of different languages, the language choice being made by the user when accessing the on screen displays thus enabling a common control processor to serve sets sold in various different countries.

Figure 6 shows examples of on screen messages which are displayed  
20 when the access control system is in operation. Thus, the first screen shows that the programme is not available and states that it is due to high levels of sexual content. This message will of course vary according to the reason for non availability of that particular programme and is defined by the coding associated with it. The second screen shows that the television is temporally  
25 blanked due to moderate violent content. Thus, during most of the programme the display will be available, but there is a temporary blanking of the visual display to prevent the viewer seeing violent content. The third screen shows similarly that the display is temporally blanked due to distressing content. The fourth screen shows the picture displayed with a message superimposed upon  
30 it stating that the sound has been muted because of mature language.

Consequently, since the viewer is informed that the sound is temporally muted



he or she will not assume that there is a fault with the sound channel of the television receiver.

In the particular examples described authorization of the user able to change the coding has been by means of a PIN. There are however various other ways in which a user can be authorised. One possibility would be a fingerprint detector so that it would be necessary for the user to place his or her hand or fingers on a detector pad which compare the fingerprint with one stored in the receiver. This would avoid any problems of forgetting the PIN or the PIN being compromised, for example one of the children discovering the PIN and resetting the classification codes. A further possibility is to include a video camera on the receiver which will look at the face of the person wishing to change the code. The output of the video camera can be compared with a stored image within the receiver and if coincidence is found then updating of the classification code can be allowed. The latter two methods may be used for example when a personal computer is fitted with a TV programme receiver facility. The necessary processing circuits for the fingerprint or face recognition will then be within the personal computer circuits.

By including the classification codes within the WSS signal, the monitoring of particular pages of a teletext transmission can take place in parallel with the monitoring of the classification codes. For example, when watching a television programme there are sometimes in vision pages of the teletext signal which put up messages on the screen, for example latest scores in football or cricket matches, which would not be monitorable if the classification system required a particular page to be monitored for the classification code. In that case it would be necessary to have at least two acquisition channels in the teletext decoder, one permanently allocated to the classification code page. By using the WSS signal rather than a packet within the teletext signal it is not necessary to have a specific acquisition channel permanently allocated to the classification code transmission.

30

From reading the present disclosure, other modifications will be

apparent to persons skilled in the art. Such modifications may involve other features which are already known in the design and use of television systems and component parts thereof and which may be used instead of or in addition to features already described herein. Although claims have been formulated in this application to particular combinations of features, it should be understood that the scope of the disclosure of the present application also includes any novel feature or any novel combination of features disclosed herein either explicitly or implicitly or any generalisation of one or more of those features which would be obvious to persons skilled in the art, whether or not it relates to the same invention as presently claimed in any claim and whether or not it mitigates any or all of the same technical problems as does the present invention. The applicants hereby give notice that new claims may be formulated to such features and/or combinations of such features during the prosecution of the present application or of any further application derived therefrom.

## CLAIMS

- 5 1. A method of enabling an authorised person to disable the sound and/or visual display of a television programme or a part thereof in dependence on the programme content, the method including the steps of;
- i) classifying the whole and / or instantaneous content of a television programme,
  - 10 ii) generating code words representing the allocated classification, and
  - iii) inserting the code words in a Wide Screen Signalling Signal (WSS) | multiplexed with the television signal representing the programme.
- 15 2. A method as claimed in Claim 1 including the further step of generating error correction bits for inserting in the WSS with the code words.
3. A method as claimed in Claim 1 or Claim 2 in which the WSS is transmitted once in each television frame and the code words are  
20 assembled from bits inserted in a plurality of frames.
4. A method as claimed in Claim 1 or 2 or 3 in which the code words are protected by means of a Hamming code.
- 25 5. A method as claimed in Claim 1, 2 or 3 in which the code words are assembled from bits inserted in eight successive frames.
6. A method as claimed in Claim 1, 2 or 3 in which the code words are assembled from bits inserted in sixteen successive frames and  
30 are 4/8 Hamming coded.

7. A method as claimed in any preceding claim in which one or more classification criteria are each encoded using code words comprising two bits.

5 8. A method as claimed in any preceding claim in which one or more of the classification criteria apply to the whole programme.

9. A method as claimed in any preceding claim in which one or more of the classification criteria apply to individual events within a  
10 programme.

10. A method as claimed in any preceding claim in which the classification criteria include one or more of; violent content, sexual content, distressing content, mature language.

15 11. A method as claimed in any preceding claim in which a code word represents the region of origin of the programme.

12. A method as claimed in Claim 11 in which the region of origin  
20 is represented by a four bit code.

13. A method as claimed in any preceding claim comprising the step of providing alternative words to replace word(s) deemed unsuitable for a selected classification level.

25 14. A method of enabling an authorised person to disable the sound and/or visual display of a television programme or a part thereof in dependence on the programme content, the method being substantially as described herein with reference to the accompanying drawings.

30 15. A method of disabling the sound and / or visual display of a

television programme, the method comprising the steps of;

- iv) establishing the authority of the user to define the programme or parts thereof which are to be disabled,
- v) entering into a memory within the television receiver code words corresponding to programme content it is desired to suppress,
- vi) receiving television signals generated by a method as claimed in any preceding claim ,
- vii) comparing the received code words with the entered code words, and
- viii) disabling the sound and / or visual display in dependence on the result of the comparison.

16. A method as claimed in Claim 15 in which step iv) is accomplished by entering a Personal Identification Number (PIN).

17. A method as claimed in Claim 15 in which step iv) is accomplished by monitoring a physiological characteristic of the authorised person.

18. A method as claimed in any of Claims 15 to 17 in which the code words are entered using a remote control unit.

19. A method as claimed in any of Claims 15 to 18 including the step of generating an on screen display message to aid the entering of the code words.

20. A method as claimed in any of Claims 15 to 19 including the step of generating an on screen display message which informs the viewer of the reason the sound or visual display is disabled.

21. A method as claimed in any of Claims 15 to 20 including the step of replacing an inhibited sound with an alternative sound.

5 22. A method as claimed in Claim 21 in which the alternative sound is defined by the received signal.

10 23. A television signal programme source including a WSS signal insertion arrangement, means for classifying television signals to be transmitted according to the programme content they convey, means for generating code words representing the classification allocated to the programme or part thereof, and means for inserting the code words within a Wide Screen Signalling Signal.

15 24. A television signal programme source as claimed in Claim 23 including means for changing the classification within the duration of a single programme.

20 25. A television signal programme source as claimed in Claim 23 or 24 including means for error correcting the code words.

26. A television signal programme source as claimed in Claim 25 in which the words are protected by means of a Hamming code.

25 27. A television signal programme source as claimed in any of Claims 23 to 26 in which the code words comprise words defining the level of one or more of the following categories; sexual explicitness, violence, mature language, distressing images or sounds

30 28. A television signal programme source as claimed in Claim 27 in which the code words further include a code word indicating the region of origin of the programme.

29. A record carrier containing data representing a television programme, classification code words representing allocated classifications for the whole and / or instantaneous content of the programme, and a Wide  
5 Screen Signalling Signal (WSS); wherein the code words are contained in the WSS.

30. A record carrier as claimed in Claim 29 in which the record carrier is a VHS video tape.

10

31. A television receiver suitable for receiving and displaying television signals from a television signal source as claimed in any of Claims 23 to 28 or a record carrier as claimed in Claim 29 or Claim 30, the television receiver comprising a WSS decoder capable of decoding a WSS  
15 signal, means for extracting the code words representing the classification allocated to the currently received programme, means for entering information representing any programme classification which represents programmes whose display it is desired to inhibit, means for comparing the entered and received classification, and means for allowing or disabling  
20 display of the programme in dependence on the result of the comparison.

32. A television receiver as claimed in Claim 31 comprising authorization means for allowing only an authorised person to enter the programme classification.

25

33. A television receiver as claimed in Claim 32 in which the authorization means comprises means for entering a PIN, means for comparing the entered PIN with a stored PIN, and means for allowing the entry of programme codes if the stored and entered PINs are identical.

30

34. A television receiver as claimed in Claim 32 in which the

authorization means comprises means for monitoring a physiological characteristic of the authorised person, means for storing the monitored characteristic, means for requesting a change in the acceptable programme content, means for monitoring the characteristic in response to the request,  
5 means for comparing the monitored and stored characteristics, and means for allowing alterations to the acceptable programme content in the event of a correct comparison.

35. A television receiver as claimed in any of Claims 31 to 34  
10 comprising means for generating an on screen display message to inform the viewer why the sound and / or display has been disabled.

36. A television receiver as claimed in any of Claims 31 to 34  
15 comprising means for replacing unsuitable words with an alternative audio signal.

37. A television receiver as claimed in Claim 36 in which the alternative audio signal represents alternative unobjectionable words.

20 38. A television receiver as claimed in Claim 37 in which the alternative words are received as part of the received television signal.

39. A television receiver as claimed in any of Claims 31 to 38  
25 comprising means for disabling the sound and visual display if no classification code is received with the television signal.



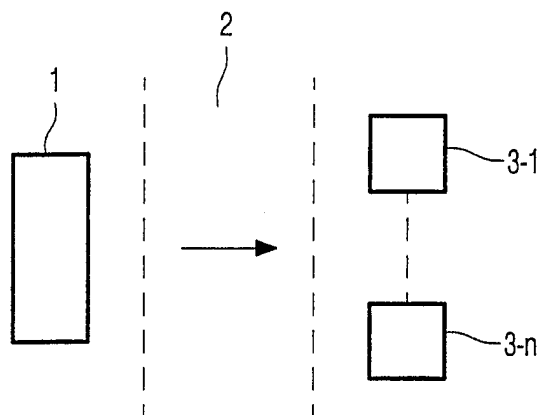


FIG. 1

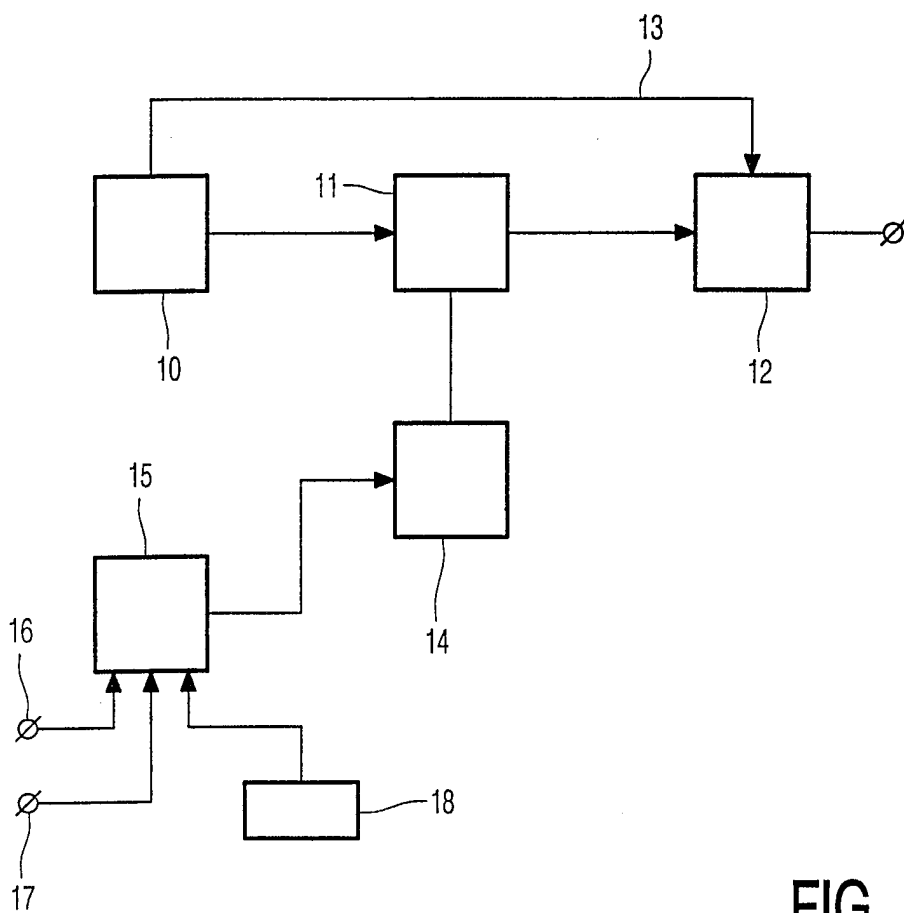
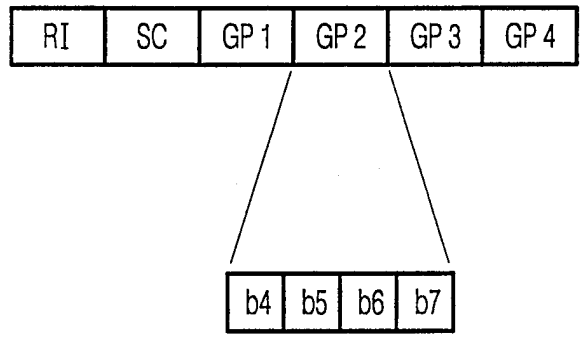


FIG. 2



FRAME No.	b5	b6	b7	OUTPUT DATA
1	1	D0	D1	SP
2	0	D0	D1	SI
3	0	D0	D1	VP
4	0	D0	D1	VI
5	0	D0	D1	DI
6	0	D0	D1	MI
7	0	D0	D1	} RP
8	0	D0	D1	
1	0	D0	D1	SP
⋮	⋮	⋮	⋮	⋮

FIG. 3

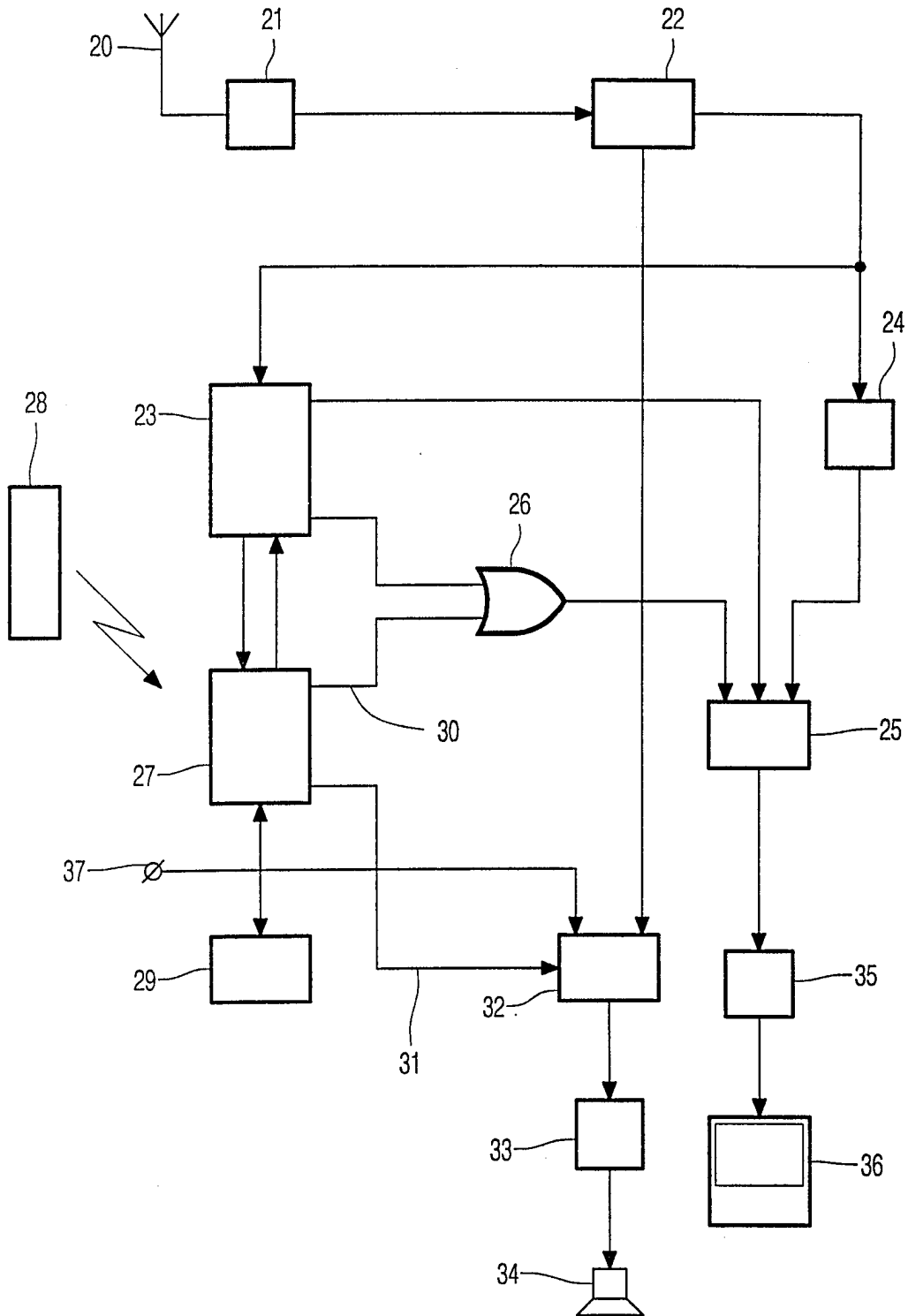


FIG. 4

WELCOME TO TACS  
The TV access control system of your  
xxxx television  
  
PLEASE ENTER YOUR PIN  
  
\* \* \* \* \*

① NUMBERS ENTERED →

TACS  
  
Your TV is at present able to receive  
ALL programmes but using TACS, you can  
choose to cut out certain programmes  
automatically which have sexual, violent or  
distressing content or bad language  
  
Press RED to continue

② RED →

TACS  
If you would like to select the kind of programme  
you can receive press GREEN.  
If you do not want to use TACS  
Press RED

③ GREEN →

TACS  
Sexual Content  
Would you like to exclude programmes  
with sexual content.  
Press GREEN if Yes,  
Press RED if No.

④ RED →

FIG. 5A

TACS  
Sexual Content  
Select the level of sexual content you would like  
EXCLUDE

Press RED high level only  
Press YELLOW moderate or high level  
Press GREEN any level

5 RED →

TACS  
Sexual Content

You have chosen to exclude high levels of  
sexual content. Would you like to exclude the  
whole programme, or only when the events occur?

Press RED for whole programme  
Press GREEN for events only

6 RED →

TACS  
Violent Content  
Would you like to exclude programmes  
violent content?

Press RED if NO  
Press GREEN if YES

7 GREEN →

TACS  
Violent Content  
Select the level of distressing content  
you would like to EXCLUDE

Press RED high level only  
Press YELLOW moderate high level  
Press GREEN any level

8 YELLOW →

FIG. 5B

TACS  
Violent Content  
You have chosen to exclude moderate or high  
levens of violent content...  
Would you like to exclude the whole programme,  
or only when the evens occur?  
Press RED for whole programme  
Press GREEN for events only

9 GREEN →

TACS  
Distressing Content  
Would you like to exclude programmes with  
distressing content?  
Press RED if NO  
Press GREEN if YES

10 GREEN →

TACS  
Distressing Content  
Select the level of distressing content you would  
like to EXCLUDE:  
Press RED high level only  
Press YELLOW moderate high level  
Press GREEN any level

11 GREEN →

TACS  
Distressing Content  
You have chosen to exclude any level of  
distressing content... This will apply  
only during the events  
Press RED to continue

12 RED →

FIG. 5C

TACS  
Mature Language  
Would you like to exclude mature language?  
  
Press RED if NO  
Press GREEN if YES

13 GREEN →

TACS  
Mature Language  
Select the level of mature language you would like to EXCLUDE  
  
Press RED high level only  
Press YELLOW moderate or high level  
Press GREEN any level

14 RED →

TACS  
You have chosen to exclude high levels of mature language. This will apply only during the events  
  
Press RED to continue

15 RED →

TACS  
Region of Origin  
Would you like to exclude programmes from certain regions of origin  
  
Press RED if NO  
Press GREEN if YES

16 RED →

FIG. 5D

TACS  
Region of Origin  
You have chosen to accept programmes  
from all regions.  
  
Press RED to continue

17 GREEN →

TACS  
You have now chosen to exclude programmes with  
\* high levels of sexual content  
\* moderate or high levels of violent content  
\* any level of distressing content  
\* high levels of mature language  
THANK YOU FOR USING TACS  
Press RED to continue

18 RED →

FIG. 5E



TACS  
Programme not available due to  
high levels of sexual content

TACS  
Temporarily blanked due to moderate violent  
content

TACS  
Temporarily blanked due to distressing  
content

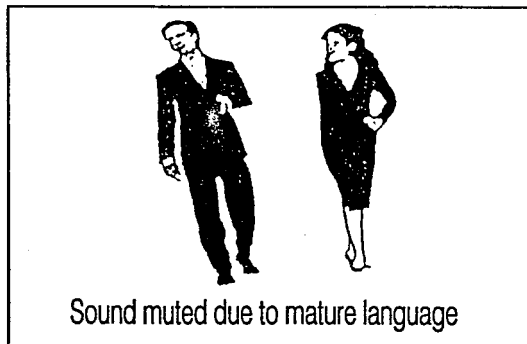


FIG. 6

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 98/00175

A. CLASSIFICATION OF SUBJECT MATTER		
<b>IPC6: H04N 7/08, H04N 7/16</b> According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
<b>IPC6: H04N, H04K</b>		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
<b>SE,DK,FI,NO classes as above</b>		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<b>WO 8302208 A1 (CHARD, FREDERIK, WILLIAM),</b> <b>23 June 1983 (23.06.83), abstract</b> --	1-39
X	<b>WO 9641438 A1 (VTECH COMMUNICATIONS, INC.),</b> <b>19 December 1996 (19.12.96), abstract</b> --	1-39
X	<b>US 4930160 A (PETER S. VOGEL), 29 May 1990</b> <b>(29.05.90), abstract</b> --	1-39
X	<b>US 5550575 A (BRETT WEST ET AL), 27 August 1996</b> <b>(27.08.96), abstract</b> --	1-39
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
Date of the actual completion of the international search		Date of mailing of the international search report
22 July 1998		24-07-1998
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86		Authorized officer <b>Bengt Romedah</b> Telephone No. +46 8 782 25 00

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 98/00175

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

30/06/98

International application No.

PCT/IB 98/00175

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WO 9641438 A1	19/12/96	AU 6329196 A US 5710815 A	30/12/96 20/01/98
US 4930160 A	29/05/90	GB 2209417 A,B GB 2209427 A,B US 4930158 A	10/05/89 10/05/89 29/05/90
US 5550575 A	27/08/96	NONE	
GB 2267768 A	15/12/93	NONE	