The invention relates to a transmission method according to the preamble of claim 1 and a reception method according to the preamble of claim 2. Methods of this type are known from the British Broadcasting Corporation's research report BBC RD 1988/1 of March 1988 and the article "BBC-datacast - The transmission system", published in Conference Proceedings of the Institute of Electronic and Radio Engineers, London, volume 69, pages 93 to 98, September 1990.

As a means of transmitting data signals in a television signal, the U.K. Teletext Specification envisages using a specially marked teletext line asynchronously to a teletext cycle (cf. BBC Research Report BBC European 1988/1). The teletext line is a so-called "pseudo row", which is not detected by teletext decoders at so-called "level 1" of the teletext standard WST (world system teletext). Supplementary data relating to the limited basic data set at "level 1" is transmitted in the pseudo rows at configuration levels 2 and 3 of the WST standard, to represent special characters, fine structures or colour hues. In the case of data signal transmission independent thereof, software data for remote programming of personal computers can in particular be transmitted (tele-software).

The videotext transmission and distribution equipment used in the Federal Republic of Germany and Berlin (West) by ARD and ZDF cannot transmit or detect pseudo rows, especially when inserted in the videotext cycle independently of the videotext page structure, any more than the videotext receivers now on the German market can. The transmission of data signals envisaged by UK Teletext was accordingly not included in the ARD/ZDF/DBP television text specification.

The problem underlying the invention is to describe transmission of data signals in a television signal, compatible with the ARD/ZDF/DBP television text specification. The invention also

attempts to provide a particularly simple, automatic means of receiving and analysing data signals with compatible signal transmission of this type.

In respect of the transmission of data signals the problem is solved by the characterising features of patent claim 1. In respect of the reception of such transmitted data signals it is solved by the characterising features of parallel patent claim 2.

The invention will be explained in detail with reference to the accompanying drawings, in which:

Fig. 1 is a diagrammatic representation of a special videotext page transmitted and received by the method of the invention,

Fig. 2 is a block diagram showing an embodiment of the circuit layout at the transmitter and receiver, for carrying out the method of the invention, and

Fig. 3 is a block diagram of the receiver part, which is only indicated as a circuit block in Fig. 2.

The special videotext page shown diagrammatically in Fig. 1 is transmitted non-cyclically in the videotext cycle and comprises a packet of data signals. The packet length is variable, to ensure adaptation to the particular form of application. The length of the data packets is desirably adjusted to the number of lines available in each video field. They need not necessarily always be lines in the vertical blanking interval (picture return), although this is the commonest form of application. If no part of the picture is transmitted in the television signal virtually all the lines of each field will be available for transmitting data signals.

As shown in Fig. 1, each special videotext page comprises a packet head of e.g. 24 x 8 bits and a control and/or user data packet of e.g. 40 x 8 bits. The packet head is in the first row

#0 of the special videotext page, while the control and/or user data is divided between rows #1 to #23.

In the Fig. 2 circuit diagram showing the equipment for carrying out the method at the transmitter and receiver, the user data is produced in a data source 1 at the transmitter and passed on as a "data transmission" to a coder 2 which encodes user data in videotext code. The encoded data transmission shown as a separate block 3 is formed into a user data packet in the packet formatting unit 6.

Encoding and packetising in blocks 2 and 6 are controlled by a circuit 5, which converts the requirements coming from a control input 4 in respect of the data format of the data packets into corresponding control information for blocks 2 and 6.

The n user data packets produced by the packet formatting unit 6 are illustrated as blocks 8^1 to 8^n in Fig. 2. As will be seen from Fig. 1, there is a control data packet in addition to the user data packets; this is illustrated in Fig. 2 and produced by a control packet generator 7 under the control of the circuit 5. The user data packets 8^1 to 8^n and control data packet 9 are fed by the packet transmitter 10 to a videotext computer 12 as a special videotext page as shown in Fig. 1. The packets 8^1 to 8^n and 9 contain the packet head and control and user data in the desired format as illustrated in Fig. 1.

The non-cyclic datastream emanating from the packet transmitter 10 is mixed with the cyclic datastream of "normal" videotext pages, indicated as a ring magazine 11, i.e. is inserted as a special page between two "normal" videotext pages, by the videotext computer 12. The computer 12 feeds the videotext data (now containing the special page according to the invention) to an adding stage 13 in the usual way, and the adding stage inserts it in a video signal in accordance with television standards, e.g. in the lines provided for the purpose in the vertical blanking interval of each field.

The video signal with the videotext data inserted, including the special videotext page according to the invention, passes along the transmission path 14 indicated diagrammatically as a wire (wideband cable connection, optical waveguide connection, terrestrial broadcasting link, satellite broadcasting link) to the receiver 15, which is shown in detail in Fig. 3.

The TV tuner 159 of the receiver 15 illustrated in Fig. 3 converts the video/videotext signal, which may e.g. have been transmitted at high frequency, to a baseband signal, from which the videotext part is separated in a stage 154 for separating videotext from data. The received videotext datastream at the output of the data separating stage 154 is constantly searched by a videotext page acquisition stage 157 for the appearance of the special videotext page number pre-programmed at the receiver. Pre-programming is effected by means of a page number input 155 connected to a control circuit 153, which in turn controls the acquisition stage 157. When the special videotext page number which is being searched for appears in the received videotext datastream, the special page is decoded and stored temporarily in the videotext page memory 158.

The temporarily stored special videotext page is examined in an analysis stage 152 under the control of the circuit 153, as to whether it contains a control data packet intended for control at the receiver, and if so whether the data transmission identifier of the packet is the same as a pre-programmed identifier at the receiver. This last-mentioned pre-programming step is taken by means of an identifier input 156 connected to the control circuit 153.

If the identifiers are the same the temporarily stored special videotext page, and possibly all special videotext pages subsequently received under the same number, are processed in the analysis stage and decoded in the decoder 151 connected to its output. The resultant data signal corresponds to the data transmitted from the output of the data source 1 (Fig. 2). This

signal may, for example, be stored and further processed on a personal computer.

C L A I M S

1. A method of transmitting data signals in a television signal - particularly within a videotext datastream - wherein the data signals are transmitted in packets as special videotext pages, characterised in that the variable length of the non-cyclically transmitted data packets is adjusted to the number of lines available for transmission per video field, and that each special videotext page comprises a packet head and a control and/or user data packet, the packet head being transmitted in the first row and the control and/or user data in the remaining rows of the special videotext page.

2. A method of automatically receiving the data signals transmitted by the method of claim 1, characterised in that

a) the videotext datastream received is constantly searched for the appearance of a special videotext page number pre-programmed at the receiver;

b) on the appearance of the special videotext page number which is being searched for in the videotext datastream, the special videotext page which is being searched for is decoded and stored temporarily;

c) the data content of the temporarily stored special videotext page is examined as to whether it contains a control data packet intended for control at the receiver, the data transmission identifier of that packet in that case being compared for matching with an identifier pre-programmed at the receiver, and

d) if they match, the data signals of the temporarily stored special videotext page, and possibly all special videotext pages subsequently received under the same special videotext page number, are processed at the receiver.

* C L M S *

3. A method according to claim 2, characterised in that review pages for future data transmissions are provided for pre-programming at the receiver within the videotext datastream, the individual data transmissions being marked with different, associated special videotext page numbers and data transmission identifiers, and that on selection of the data transmissions desired by the user the associated special videotext page numbers and data transmission identifiers are taken from the relevant review page into the receiver and stored there.

4. A method according to claim 2 or 3, characterised in that each control data packet contains a code identifier for identification at the receiver of the code used for the data user signals at the transmitter, which identifier controls decoding of data user signals at the receiver if a subscriber authorisation is present.

5. A method according to any of claims 2 to 4, characterised in that the transmission repertoire of data transmission archives where the identifiers are publicly advertised may be called up through a return channel which may be switched to the transmitting institution by the user, the data transmissions called up being transmitted in due course and automatically received by the subscriber who called them up, through the pre-programming of the relevant special videotext page numbers and data transmission identifiers.

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