

It is yet another object of the invention to provide such a system and method in which data compression is employed in an unique to make most efficient use of available memory.

According to the invention in a first aspect there is provided a television schedule information transmission system, which comprises a central data processing system, means connected to said central data processing system for providing schedule information data including day, time and channel of television programs for a predetermined territory to said central data processing system, said central data processing system including means for formatting the schedule information data for the predetermined territory into a predetermined schedule information transmission format, means coupled to said central data processing system for transmitting the schedule information data for the predetermined territory in the predetermined schedule information transmission formats, a plurality of regional data processing systems, each located in a region of the predetermined territory, said plurality of regional data processing systems each including means for receiving the schedule information data for the predetermined territory, means for selecting the schedule information data for the region in which each of said plurality of regional data processing systems is located and means for transmitting the schedule information data for the region, and a plurality of subscriber data processing systems in each of the regions, each of said plurality of subscriber data processing systems including means for receiving at least a portion of the schedule information data for the region, means for storing the schedule information data received by the subscriber data processing system, means for assembling portions of the schedule information data received by the subscriber data processing system for

display to a user of the subscriber data processing system and a display connected to said means for assembling portions of the schedule information data to display the portions of the schedule information data to the user so that the user can use the portions to select television programs for reception.

According to the invention in a second aspect there is provided in a television schedule information transmission system, the method which comprises transmitting schedule information data including day, time and channel of television programs for a predetermined territory to a plurality of regional data processing systems each located in a region of the territory, selecting the schedule information data for each region with its regional data processing system, transmitting the schedule information data for each region with its regional data processing system to a plurality of subscriber data processing systems in each region, assembling portions of the schedule information data received by each subscriber data processing system for display to a user of each subscriber data processing system, and displaying the portions of the schedule information data to the user so that the user can use the portions to select television programs for reception.

According to the invention in a third aspect there is provided a television schedule information transmission system comprising a central data processing system for a predetermined territory having means for transmitting television schedule data including day, time and channel of television programs for the predetermined territory and a plurality of subscriber data processing systems in the predetermined territory, means in said central data processing system for transmitting the television schedule

data as commands, the commands including instructions for said plurality of subscriber data processing systems in said system and television schedule information used by the commands in said plurality of subscriber data processing systems to assemble and display a television schedule to the user so that the user can use the television schedule to select television programs for reception.

According to the invention in a fourth aspect there is provided in a television schedule information transmission system, the method which comprises transmitting commands from a central data processing system to a plurality of subscriber data processing systems, the commands including instructions for the plurality of subscriber data processing systems in said system and television schedule information used by the commands in the plurality of subscriber data processing systems to assemble and display a television schedule, assembling the television schedule from the television schedule information in each of the plurality of subscriber data processing systems, and displaying the television schedule to a user of each of the plurality of subscriber data processing systems.

According to the invention in a fifth aspect there is provided a television schedule transmission system comprising a central data processing system for a predetermined territory having means for transmitting television schedule data including day, time and channel of television programs for the predetermined territory and a plurality of subscriber data processing systems in the predetermined territory, means in said central data processing system for transmitting a predetermined character string comprising a portion of said television schedule data to said plurality of subscriber data

processing systems for use in selecting which television programs to receive, means in each of said plurality of subscriber data processing systems for determining whether the predetermined character string has been acquired by that subscriber data processing system, and means in each of said plurality of subscriber data processing systems for storing the predetermined character string in that subscriber data processing system if it has not already been acquired.

According to the invention in a sixth aspect there is provided in a television schedule information transmission system, the method which comprises transmitting a predetermined character string comprising a portion of the schedule information including day, time and channel of television programs to a plurality of subscriber data processing systems in said system, determining in each of the plurality of subscriber data processing systems whether the predetermined character string has been acquired by that subscriber data processing system, and storing the predetermined character string in that subscriber data processing system if it has not already been acquired.

According to the invention in a seventh aspect there is provided in a television schedule information transmission system including a direct broadcast satellite, a central data processing system having means for transmitting television schedule data for the direct broadcast satellite to the direct broadcast satellite, and subscriber data processing systems having means for receiving the television schedule data for the direct broadcast satellite from the direct broadcast satellite, the improvement which comprises a plurality of regional data processing systems, each located in a region of a predetermined territory, a means for transmitting television schedule data for the predetermined

territory to said plurality of regional data processing systems, said plurality of regional data processing systems each including means for receiving the television schedule data for the predetermined territory, means, coupled to said means for receiving the television schedule data for the territory, for selecting the television schedule data for the region in which each of said plurality of regional data processing systems is located and means, coupled to said means for selecting the television schedule data for the region, for transmitting the television schedule data for the region to a plurality of said subscriber data processing systems in each of the regions.

According to the invention in a eighth aspect there is provided in a television schedule information transmission system, the method which comprises transmitting television schedule data including day, time and channel of television programs for a direct broadcast satellite to the direct broadcast satellite, receiving the television schedule data for the direct broadcast satellite from the direct broadcast satellite at a subscriber data processing system, transmitting schedule information data including day, time and channel of television programs for a predetermined territory to a plurality of regional data processing systems each located in a region of the territory, receiving schedule information data for a predetermined territory in a regional data processing system located in a region of the predetermined territory, selecting the schedule information data for the region in which the regional data processing system is located and transmitting the schedule information data for the region to a subscriber data processing system for use by a user to select television programs for reception.

According to the invention in a ninth aspect there is provided in a television

schedule information transmission system including a central data processing system having means for transmitting television schedule data. and a subscriber data processing system having means for receiving at least some of the television schedule data transmitted by said central data processing system, the improvement which comprises said subscriber data processing system including a memory for storing database items comprising the television schedule information, each of the database items having a handle as an index into a handle table identifying memory locations corresponding to the handle.

According to the invention in a tenth aspect there is provided in a television schedule information transmission system, the method which comprises transmitting television schedule data, receiving at least some of the television schedule data at a subscriber data processing system as database items comprising the television schedule information, each of the database items having a handle, and using the handle as an index into a handle table identifying memory locations corresponding to the handle.

According to the invention in a eleventh aspect there is provided in a television schedule information transmission system including a central data processing system for a predetermined territory having means for transmitting television schedule data for the predetermined territory including updates of television schedule data previously transmitted and a plurality of subscriber data processing systems in the predetermined territory, each of said plurality of subscriber data processing systems including a receiver for television schedule data,

a memory for storing television schedule data, said memory being coupled to said receiver, the improvement which comprises means in said central data processing system for assigning a transmission priority for the updates of television schedule data previously transmitted relative to other television schedule data.

According to the invention in a twelfth aspect there is provided in a television schedule information transmission system, the method which comprises establishing a relative priority for transmission of the television schedule information between updates of originally transmitted television schedule information and originally transmitted schedule information, transmitting the television schedule information in accordance with the relative priority and receiving at least some of the transmitted television schedule information at a subscriber data processing system.

According to the invention in a thirteenth aspect there is provided a television schedule information transmission system comprising a central data processing system for a predetermined territory having means for transmitting television schedule data including day, time and channel of television programs for the predetermined territory and a plurality of subscriber data processing systems in the predetermined territory, each of said plurality of subscriber data processing systems including a receiver for said television schedule data, a memory for storing said television schedule data, said memory being coupled to said receiver, means in said central data processing system for identifying, said television schedule data by a time relative to other television schedule data, means in said subscriber data processing system for determining if said television schedule data received by said subscriber

data processing system has a time identification later than a time identification of television schedule data stored in said memory and a display connected to said means for assembling portions of the schedule information data to display the portions of the schedule information data to the user so that the user can use the portions to select television programs for reception.

According to the invention in a fourteenth aspect there is provided in a television schedule information transmission system, the method which comprises transmitting television schedule data with an identification of the transmitted television schedule data by time relative to other transmitted television schedule data, receiving the transmitted television schedule data with a subscriber data processing system, storing the television schedule data in a memory of the subscriber data processing system, subsequently supplying television schedule data including an identification by time relative to other television schedule data, comparing the identification by time of the subsequently supplied television schedule data with the identification by time of the television schedule data stored in the memory, replacing the stored television schedule data with the subsequently supplied television schedule data if the identification by time of the subsequently supplied television schedule data is later than the identification by time of the stored television schedule data, and maintaining the stored television schedule data in the memory if the identification by time of the stored television schedule data is later than the identification by time of the subsequently supplied television schedule data.

According to the invention in a fifteenth aspect there is provided in a

television schedule information transmission system including a central data processing system for a predetermined territory having means for transmitting television schedule data for the predetermined territory and a plurality of subscriber data processing systems in the predetermined territory, each of said plurality of subscriber data processing systems including a receiver for television schedule data, a memory for storing television schedule data, said memory being coupled to said receiver, the improvement which comprises a real time clock in said central data processing system for establishing a single system time for said transmission system, said means for transmitting television schedule data including means for transmitting the single system time, said receiver including means for receiving the single system time, said memory having a stored value for calculating local real time from the single system time.

According to the invention in a sixteenth aspect there is provided in a television schedule information transmission system, the method which comprises establishing a single system time related to real time, transmitting the single system time to a subscriber data processing system, transmitting television schedule data expressed in the single system time to the subscriber data processing system, providing a value to the subscriber data processing system for calculating local real time from the single system time, and calculating local times for a television schedule from the schedule data expressed in the single system time using the value.

According to the invention in a seventeenth aspect there is provided in a television schedule information transmission system including a central data

processing system for a predetermined territory having means for transmitting television schedule data for the predetermined territory and a plurality of subscriber data processing systems in the predetermined territory, each of said plurality of subscriber data processing systems including a receiver for television schedule data, a memory for storing television schedule data, said memory being coupled to said receiver, the improvement which comprises said means for transmitting television schedule data being configured to transmit the television schedule data as a show list for each day in the television schedule, said subscriber data processing system being configured to maintain show lists for a rolling window comprising a plurality of days extending from present time into future time.

According to the invention in a eighteenth aspect there is provided in a television schedule information transmission system, the method which comprises transmitting television schedule data as a show list for each day in the television schedule and maintaining show lists for a rolling window comprising a plurality of days extending from present time into future time.

According to the invention in a nineteenth aspect there is provided a television schedule information transmission system, which comprises a central data processing system, means connected to said central data processing system for providing schedule information data including day, time and channel of television programs for a predetermined territory to said central data processing system, said central data processing system including means for formatting the schedule information data for the predetermined territory into a predetermined schedule

information transmission format, means coupled to said central data processing system for transmitting said schedule information data, a plurality of regional data processing systems. each located in a region of the predetermined territory, said plurality of regional data processing systems each including means for receiving said schedule information data for the predetermined territory, means for selecting a regional portion of said schedule information data for a region in which each of said plurality of regional data processing systems is located and means for transmitting said regional portion of said schedule information data, and a plurality of subscriber data processing systems in each of the regions, each of said plurality of subscriber data processing systems including means for receiving at least some of said regional portion of said schedule information data, means for storing said regional portion of schedule information data received by the subscriber data processing system, means for assembling selected portions of the schedule information data received by the subscriber data processing system for display to a user of the subscriber data processing system and a display connected to said means for assembling said selected portions of the schedule information data to display said selected portions of the schedule information data; said means for transmitting said regional portion of said schedule information data for the region has an ability to transmit said regional portion of said schedule information data in different places of a television broadcast signal and each of said subscriber data processing systems includes a means for locating said regional portion of said schedule information data in the television broadcast signal.

According to the invention in a twentieth aspect there is provided a television

schedule information system, comprising:

- (a) a central data processing system;
- (b) a data source coupled to the central data processing system, the data source having:
 - (1) television schedule data including day, time and channel of television programs for direct broadcast satellite and for a predetermined territory;
- (c) the central data processing system comprising:
 - (1) a formatter that changes the television schedule data received from the data source into formatted television schedule data conforming to a predetermined format; and
 - (2) a central transmitter coupled to the formatter which transmits the formatted television schedule data received from the formatter;
- (d) a direct broadcast satellite which receives the formatted television schedule data for the direct broadcast satellite from the central transmitter;
- (e) a plurality of regional data processing systems, each regional data processing system receiving the formatted television schedule data for the predetermined territory from the central transmitter and comprising:
 - (1) a data selector which selects a regional portion of the formatted television schedule data for the predetermined territory; and
 - (2) a regional transmitter coupled to the data selector which transmits the regional portion of the formatted television schedule data to a corresponding region;
- (f) a plurality of subscriber data processing systems located in each region, comprising:

- (1) a data receiver which receives the formatted television schedule data for the direct broadcast satellite from the direct broadcast satellite and at least part of the regional portion of the formatted schedule data supplied by the regional transmitter;
- (2) a data selector coupled to the data receiver to select at least some of the formatted television schedule data from the direct broadcast satellite and at least some of the regional portion of the formatted television schedule data from the regional transmitter;
- (3) a memory coupled to the data selector which stores the formatted television schedule data selected by the data selector;
- (4) a data assembler coupled to the memory which assembles portions of the formatted television schedule data stored in the memory; and
- (5) a display coupled to the data assembler that displays the assembled portions of the schedule data.

According to the invention in a twenty first aspect there is provided a television schedule information system, comprising:

- (a) a central data processing system with a transmitter which transmits first and second television schedule data including day, time and channel of television programs for a direct broadcast satellite and for a predetermined territory, respectively;
- (b) a direct broadcast satellite which receives the first television schedule data from the transmitter of the central data processing system and re-transmits the first

television schedule data;

(c) a plurality of regional data processing systems each of which receives the second television schedule data, selects second television schedule data corresponding to a region of the receiving regional data processing system and transmits the second schedule data for the region to the region;

(d) a plurality of subscriber data processing systems, each of which receives the first television schedule data from the direct broadcast satellite and second television schedule data from one of the regional data processing systems and assembles the first and second television schedule data for display; and

(e) a television coupled to one of the plurality of subscriber data processing systems which displays at least some of the first and second assembled schedule data.

Brief Description of the Drawings

Figures 1 - 5 are block diagrams of television schedule information, transmission and utilization systems in accordance with the invention.