REMOTE CONTROL FOR MENU DRIVEN SUBSCRIBER ACCESS TO TELEVISION PROGRAMMING

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Abstract

An expanded television program delivery system is disclosed which allows viewers to select television and audio program choices from a series of menus. Menus are partially stored in a set-top terminal in each subscriber’s home. The menus may be reprogrammed by signals sent from a headend or from a central operations center. The system allows for a great number of television signals to be transmitted by using digital compression techniques. An operations center with computer-assisted packaging allows various television, audio and data signals to be combined, compressed and multiplexed into signals transmitted on various channels to a cable headend which distributes the signals to individual set-top terminals. Various types of menus may be used and the menus may incorporate information included within the video/data signal received by the set-top terminal. A remote control unit with icon buttons allows a subscriber to select programs based upon a series of major menus, submenus, and during program menus. Various billing and statistics gathering methods for the program delivery system are also disclosed.
Fig. 2

202 OPERATIONS CENTER

PROGRAM PACKAGING MENU MANAGEMENT
DELIVERY CONTROL

206 PROGRAM DELIVERY

MASTER CONTROL UPLINK SITE

211 SIGNAL PROCESSOR

212 NETWORK CONTROLLER

214

216

220 CABLE HOUSEHOLD

PRESS ORDER BUTTON HERE TO ORDER

222 REMOTE/CUSTOMER INTERFACE

ANALOG SIGNALS
DIGITAL COMPRESSED SIGNALS (YCTV)
OTHER DIGITAL OR ANALOG
UP-STREAM/INTERACTIVITY
**Fig. 3a**

<table>
<thead>
<tr>
<th>MHz</th>
<th>Channels Menus</th>
</tr>
</thead>
<tbody>
<tr>
<td>750</td>
<td>HDTV &amp; Future</td>
</tr>
<tr>
<td></td>
<td>Local</td>
</tr>
<tr>
<td>320</td>
<td>ALA CARTE CHANNELS</td>
</tr>
<tr>
<td></td>
<td>ENTERTAINMENT CHOICE</td>
</tr>
<tr>
<td>0</td>
<td>NON-THEATRICAL, INFORMATION VIDEOS</td>
</tr>
<tr>
<td></td>
<td>SPORTS ACCESS</td>
</tr>
<tr>
<td></td>
<td>MOVIE LIBRARY</td>
</tr>
<tr>
<td></td>
<td>HIT MOVIES</td>
</tr>
<tr>
<td></td>
<td>ANALOG PAY-PER-VIEW</td>
</tr>
<tr>
<td>280</td>
<td>PAY CHANNELS</td>
</tr>
<tr>
<td></td>
<td>BASIC AND EXPANDED BASIC</td>
</tr>
<tr>
<td></td>
<td>LOCAL BROADCAST CHANNELS</td>
</tr>
</tbody>
</table>

**Fig. 3b**

<table>
<thead>
<tr>
<th>Channel Menu</th>
<th>Programming Category</th>
<th># Channels Allocated</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>MOVIES</td>
<td>50</td>
</tr>
<tr>
<td>B</td>
<td>SPORTS</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>CHILDRENS</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>DOCUMENTARY</td>
<td>14</td>
</tr>
<tr>
<td>E</td>
<td>ENTERTAINMENT</td>
<td>10</td>
</tr>
<tr>
<td>F</td>
<td>SPECIALTY CHANNELS</td>
<td>15</td>
</tr>
<tr>
<td>G</td>
<td>LOCAL</td>
<td>N/A</td>
</tr>
<tr>
<td>H</td>
<td>HDTV</td>
<td>4</td>
</tr>
<tr>
<td>I</td>
<td>INTERACTIVE</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>COMBINED</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
**Fig. 3c**

<table>
<thead>
<tr>
<th>VCTV COMP</th>
<th>COMBO RATIO</th>
<th>HIT MOVIES 6 MOVIE SELECTIONS WITH START TIMES EVERY 15 MINUTES</th>
<th>HIT MOVIES 6 MOVIE SELECTIONS WITH START TIMES EVERY 30 MINUTES</th>
<th>HIT MOVIES 6 MOVIE SELECTIONS WITH START TIMES EVERY 15 MINUTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8:1</td>
<td>available menus (1, 2 &amp; 3)</td>
<td>priority one menus</td>
<td>priority one plus two menus</td>
</tr>
<tr>
<td>2</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>4:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>4:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>8:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>8:1 or max</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>8:1 or max</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VCTV COMP:
- 750 MHz (110)
- 108 MHz (18)
- 112 items/48 promos/32 + stations

Values:
- 236
- 230
- 233
Develop Program Schedule And Menus Using CAP

Identify Time Slots For Local Availability

Edit Program Schedule And Menus As Necessary

Obtain And Generate Franchise Information

Generate Program Control Information Signal

Identify Desired External Program Source Feeds

Gather And Receive Programs Via External Feeds

Control External Programs To Standardized Digital Format

Combine Programs

Combine Live Program Signal Feeds With Combined Programs

Combine Program Control Information With Combined Programs

Amplify Combined Signal

Identify Desired Internal Programs

Access Stored Digital Program Signals

Convert Internal Programs To Standardized Digital Format

Combine Appropriate Stored Digital Program Signals Using CAP

Signal Packager About Needed Live Signal Feeds

Identify Programs Not Prerecorded, Stored and Available

Fig. 5
## PROGRAM CONTROL INFORMATION

**Chronologically by Channel**

<table>
<thead>
<tr>
<th>Time</th>
<th>Program Name</th>
<th>Length</th>
<th>Menu Code</th>
<th>Description</th>
<th>Video</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00 PM</td>
<td>Cheers</td>
<td>.5</td>
<td>E24</td>
<td>C</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Terminator</td>
<td>2.0</td>
<td>A33</td>
<td>Tx</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>PrimeTime</td>
<td>1.0</td>
<td>D14</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Football Special</td>
<td>.5</td>
<td>B24</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>12:30 PM</td>
<td>Simpsons</td>
<td>.5</td>
<td>E14 &amp; C13</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Football Game</td>
<td>3.0</td>
<td>B13</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>Jaws</td>
<td>2.0</td>
<td>E16</td>
<td>Tx</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Bugs Bunny</td>
<td>1.0</td>
<td>C25</td>
<td>A</td>
<td>N</td>
</tr>
</tbody>
</table>

**Fig. 6**
Fig. 8a

Fig. 8b
Fig. 9a
Fig. 9b
Fig. 10a
Fig. 10b
Fig. 11a
Fig. 13
Fig. 15a

Thursday, February 26, 1994

7:35 PM

COX

WELCOME TO COX CABLE

Regular Cable TV On
Channels 2 Thru 39
Complete Lineup On Channel 40

YOUR CHOICE

Programs You Can Order On Demand
Use Remote Buttons A Thru J
Move Yellow Cursor Thru Blue Screen Boxes

Press GO Here for Remote Instructions

1000
Fig. 15b

CURRENT TIME: TUESDAY 9:40PM
TUESDAY FEBRUARY 26, 1994

WELCOME TO COX CABLE

TELEVISION AT YOUR COMMAND!
PRESS CHANNEL NUMBERS 02 THRU 40
FOR REGULAR BROADCAST AND CABLE TV

PRESS MENU BUTTONS A THRU H FOR YOUR CHOICE TV-

SELECT PROGRAMS YOU CAN ORDER ON DEMAND.
JUST MOVE YELLOW CURSOR THRU BLUE SCREEN BOXES.
SEE CHANNEL 41 FOR ACCOUNT REVIEW
<table>
<thead>
<tr>
<th>Channel</th>
<th>Channel</th>
<th>Channel</th>
<th>Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
</tr>
<tr>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
</tr>
<tr>
<td>37</td>
<td>38</td>
<td>39</td>
<td>40</td>
</tr>
<tr>
<td>41</td>
<td>42</td>
<td>43</td>
<td>44</td>
</tr>
</tbody>
</table>

Press A/B Above for Channels Press C/D Below for Menus Press G/H for info on prices

**FIG. 16a**
FIG. 16b
FIG. 16c
FIG. 16d
FIG. 18a
Current Time: 9:45 pm

Welcome!

Hit Movies
at your command

press GO on any title for more info

<table>
<thead>
<tr>
<th>Home Alone 3 (PG)</th>
<th>Daybeast (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firestorm (R)</td>
<td>Terminator 4 (R)</td>
</tr>
<tr>
<td>You and Me (R)</td>
<td>Detective Smith (PG)</td>
</tr>
<tr>
<td>Wild Thing (R)</td>
<td>Four Score (PG)</td>
</tr>
</tbody>
</table>

press GO here for regular TV
Saturday, December 28, 1984 6:31 P.M.

BASIC SERVICE
CHANNELS 2-12

You now just pay $14 per month for basic service.

Highlights this month:

Other services:

Press GO Here for info on BASIC PLUS
Press GO Here for info on ECONOMY PACKAGE
Press GO Here for info on PREMIUM ALA CARTE
Press GO Here for channels and menus

FIG. 18c
Saturday, December 28, 1984
6:32 P.M.

BASIC PLUS
CHANNELS 13-23

Channels 13-23 are the nation's most widely distributed cable services and are available to you for only $8.00 per month.

Highlights this month

FIG. 18d
Saturday, December 28, 1984

ECOMONY PACKAGE
CHANNELS 24-34

When you order you can immediately enjoy channels 24-34. These popular satellite channels will extend your viewing choice.

Highlights this month

Available to you for $7.00 per month

FIG. 18e
Saturday, December 28, 1984

6:34 P.M.

ALA CARTE & PREMIUM CHANNELS
CHANNELS 35-44

Press GO on any premium channel number on the CHANNELS & MENUS screen for information and prices

Highlights this month

You can then immediately enjoy any of the premium or A la carte services.

YOUR CHOICE

PRESS GO HERE FOR CHANNELS AND MENUS

FIG. 18f
THE LEARNING CHANNEL

TLC

The Learning Channel is available as part of the ECONOMY PACKAGE of eleven channels for just $7.00 per month.

Press Here for info on PREMIUM ALA CARTE
Press Here for channels and menus

FIG. 18g
Arnold Schwarzenegger returns again in this sci-fi action thriller set in the present 2025 and in the far future 9010 AD.

$1.95 Running Time 2:34
Carolco Theatrical Release 1994

Press [Go] Here to Order
Press [Go] Here to Preview

Press [Go] Here to Return to Menu A
Press [Go] Here to Return to Cable TV

FIG. 19a
Terminator
4
Current Time: 9:46 pm
Next Start Time: 10:00 pm
$1.95 running time 2:34
Arnold Schwarzenegger returns again in this science fiction action thriller set in the present, 2025, and in the far future-9010A.D. from Carolco 2/15/94 theatrical release
Press ORDER button here to order
Press GO here to return to HIT MOVIE menu
press GO here for regular TV
Thursday, February 26, 1994

You movie will begin at 8:00PM

TERMINATOR 4 (R)

THANK YOU

for your Hit Movie order

We'll return here at 7:59PM

You can now return to regular Cable TV

$1.95 Running Time 2:34
Carolco Theatrical Release 1994

Press GO Here to
resume Progress

Press GO Here to Return to Cable TV

FIG. 20a
Thank you for your Hit Movie Order.

We'll return you here at 10:00 pm.

press GO here for regular TV
press GO here to join in progress

Current Time: 9:47 pm
Next Start Time: 10:00 pm

FIG. 20b
Thursday, February 26, 1994

1556

You movie will begin at 8:00 PM

TERMINATOR 4 (R)

YOUR MOVIE WILL START IN

:52

You may press the Red CANCEL Button during the first 5 minutes to exit without charge.

$1.95 Running Time 2:34 Carolco Theatrical Release 1994

Press Go Here to resume Progress

Press Go Here to Return to Cable TV

FIG. 21a
It's time for your movie
Terminator 4 starts in :58 seconds

Remember, you can press ESCAPE
during first 5 min. to exit without charge

FIG. 21b
Fig. 22a

ESCAPE TIME LEFT: 2:13

YOUR CHOICE
Press CANCEL to ESCAPE NOW at NO CHARGE
Press GO Here to Resume Movie
Press GO Here to Return to Cable TV

1130
You are ESCAPING after the first 5 minutes. Your account has been charged so you can return to your movie thru Menu A at any time, until the Menu changes, to finish watching your selection. Thank you.
Fig. 22c

Thursday, February 26, 1994
7:59 PM

TERMINATOR 4 (R)

Your account has already been charged for this selection so please enjoy until the menu changes on 03/01/94. You can join the selection in progress at any of the following times.

Just press GO

next 1-15 16-30 31-45 46-60 61-75 76-90 91-105 106-
start min. min. min. min. min. min. min. min.
time in in in in in in in end

YOUR CHOICE
Press GO Here to Return to Cable TV

1135
Main Menu

Welcome!

Movie Library
consult guide or scroll thru the list

Current Time: 9:45 pm

Press GO on any title for more info
Press GO and title number 1653 here

<table>
<thead>
<tr>
<th>Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001 Alien (R)</td>
<td>1978</td>
</tr>
<tr>
<td>0002 Aliens (R)</td>
<td>1989</td>
</tr>
<tr>
<td>0003 Aliens III (R)</td>
<td>1992</td>
</tr>
<tr>
<td>0004 American Gigolo (R)</td>
<td>1978</td>
</tr>
<tr>
<td>0005 An American Tale (G)</td>
<td>1986</td>
</tr>
</tbody>
</table>

press GO here for regular TV

FIG. 23
Julia Roberts stars in this 1990 thriller about a young woman who escapes a psychotic husband. He finds her. Watch out!

$1.25 To Order  Next start time 2/12/94 1:30 am

Press ORDER button here to order

Press GO here to return to B menu

press GO here for regular TV

FIG. 24
Thank you for ordering from our movie library

We will automatically turn on your VCR on the air date at 2/12/94 1:30 am
Running time for your selection 2:12
Make sure you have a rewound tape in your VCR.
Enjoy!

Press GO here to return to B menu

press GO here for regular TV

FIG. 25
Fig. 26a
Fig. 26b

Main Menu

D

Discovery VIDEO SELECT SERVICES

Current Time
7:45 pm

documentaries
information
videos
how to
news specials

: DISCOVERY CHANNEL CHOICE :
LEARNING CHANNEL CHOICE
TRAVEL DESTINATIONS
TIME-LIFE CHOICE
BBC CHOICE
PBS CHOICE

: CBS NEWS TODAY :
CBS LIBRARY
ABC NEWS TODAY
ABC LIBRARY
NBC LIBRARY
INDEPENDENTS CHOICE

Press GO here for regular TV

1042
Fig. 27a

Thursday, February 26, 1994

9:21 PM

DISCOVERY CHANNEL

CHANNEL®

CHOICE

Press GO On Any Title For More Information

REDISCOVERING AMERICA
WAR BIRDS - the latest jet fighters
CHEETAH ON THE RUN
INVENTION
IN THE COMPANY OF WHALES
OPERATION OVERLORD

YOUR CHOICE

Press GO Here to Return to Menu D
Press GO Here to Return to Cable TV

1148
Fig. 27b

Discovery Channel Choice

Press GO on any item for more info

REDISCOVERING AMERICA
WAR BIRDS the latest jet fighters
CHEETAH ON THE RUN INVENTION

Press GO here for main menu
Press GO here to return to regular TV

Current Time 7:45 pm
Thank you for taking a look at our offering.
Fig. 28a

Thursday, February 26, 1994

Discovery
CHANNEL®

NEXT START TIME 8:30 PM

WAR BIRDS

Stunning Footage Compiled From Discovery's Most Popular Series WINGS. Contains Three Gulf War Dogfights and Carrier Landing Crash Footage.

5:49 Running Time 1:30

Press GO Here to Order

YOUR CHOICE

TV

Press GO Here to Return to Cable TV

1152
Stunning footage compiled from Discovery's most popular series: Wings. Contains 3 Gulf War dogfights and carrier landing crash footage.

A must see for aviation enthusiasts. Price $.49

Press ORDER button here to order

Press GO here to return to main menu

Press GO here for regular TV
Fig. 29A

Thursday, February 26, 1994

YOUR SELECTION WILL START AT 9:30 PM

WAR BIRDS

THANK YOU
for ordering from the Discovery Channel Choice Library. We will return here automatically 60 seconds prior to start time.

5:49 Running Time 1:30

Press GO Here to Join in Progress

YOUR CHOICE TV

Press GO Here to Return to Cable TV

1154
Fig. 29b

THANK YOU for ordering from the Discovery Channel's choice library
Your selection starts in 12 min. 59 sec.

We will return here automatically 60 sec. prior to start time.

Call 1-800-255-8000 for free Discovery Catalog

Press GO here to join in progress

Press GO here for regular TV
Fig. 29c

Come back and enjoy this selection at no additional charge until the Menu changes. Thank You!
Current Time: 10:15 pm  
Welcome!  

F  
Specialty Channels  
available for economical monthly subscription prices, like magazines  

Press GO on any title for more info  

<table>
<thead>
<tr>
<th>Sci-fi Channel</th>
<th>People</th>
<th>Natural World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovery Aviation</td>
<td>Beauty</td>
<td>Science</td>
</tr>
<tr>
<td>Discovery Travel</td>
<td>Wheels</td>
<td>Computer</td>
</tr>
<tr>
<td>Gourmet</td>
<td>Home</td>
<td>Heritage</td>
</tr>
<tr>
<td>Fitnet</td>
<td>Politico</td>
<td>Atlas</td>
</tr>
</tbody>
</table>

press GO here for regular TV  

FIG. 30
Billed at $1.10 per month

You pay just $13.00 per year

24 hours a day of great TV enjoyment for the science fiction buff. From cult classics to new originals, this channel is out of this world.

Press ORDER button here to order

Press GO here for main menu

press GO here for regular TV

FIG. 31
Thank you for subscribing!  
You are joining the channel in progress.

FIG. 32
You are a current subscriber.
Thank you!
...joining now in progress

FIG. 33
Thursday, February 26, 1984

**MAGAZINE CHANNELS**

Available for economical monthly subscription prices
Press ➡️ On Any Title For More Information

<table>
<thead>
<tr>
<th>SCI-FICTION</th>
<th>PEOPLE</th>
<th>NATURAL WORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVIATION</td>
<td>BEAUTY</td>
<td>SCIENCE</td>
</tr>
<tr>
<td>TRAVEL</td>
<td>WHEELS</td>
<td>COMPUTER</td>
</tr>
<tr>
<td>GOURMET</td>
<td>HOME</td>
<td>HERITAGE</td>
</tr>
<tr>
<td>FITNET</td>
<td>OUTDOOR</td>
<td>ATLAS</td>
</tr>
</tbody>
</table>

**FIG. 35**
THE SCIENCE FICTION CHANNEL

24 hours a day of great TV enjoyment for the science-fiction buff, from cult classics to new originals, this channel is out of this world.

$1.10 Per Month or $13.80 Per Year

Press Here to ORDER

Your Choice

Press Here to Return to Menu F

Press Here to Return to Cable TV

FIG. 36
THANK YOU FOR SUBSCRIBING!
You are joining the Channel in progress.

FIG. 37
FIG. 38
FIG. 40
This week's show which aired 2/22/94 and featured stories on Medicaid fraud; Elizabeth Taylor; Ross Perot in Japan; Andy Rooney.

FIG. 41
FIG. 42
FIG. 43
Staring Gary Shanding in this week's episode Larry's interview guest is Ross Perot who became offended by Larry's personal questions. Perot launches an investigation of Larry's past. Great fun from HBO. Enjoy until the menu changes on 11/2/94.

Press $9.99 here to ORDER.
<table>
<thead>
<tr>
<th>CHILDREN'S PROGRAMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press Go On Any Title For More Information</td>
</tr>
<tr>
<td>BEAUTY AND THE BEAST from Disney</td>
</tr>
<tr>
<td>ALADDIN from Disney</td>
</tr>
<tr>
<td>THE SIMPSONS from Fox</td>
</tr>
<tr>
<td>THE MAGIC BOX from TLC Ready Set Learn</td>
</tr>
<tr>
<td>BEAKMAN'S WORLD from Columbia Pictures</td>
</tr>
</tbody>
</table>

Press Go Here to Return to Cable TV

FIG. 45
Thursday, October 26, 1994

Next Start Time 8:30PM

BEAUTY AND THE BEAST (G)

This 1991 Disney animation feature is still a hit for children of all ages. Order now and your young ones can enjoy this wonderful classic until the menu changes on 11/1/94.

$1.10
Running Time 1:95

Press GO Here to ORDER

Press GO Here to Return to Menu E

Press GO Here to Return to Cable TV

FIG. 46
Thursday, October 26, 1994
7:48 PM

B

SPORTS

Press Go On Any Time For More Information

NFL HIGHLIGHTS this week
CHARLOTTE 400 in progress
EVENTS THIS WEEK

YOUR CHOICE

Press Go Here to Return to Cable TV

FIG. 47
NFL HIGHLIGHTS

Sunday, Oct. 22
Game highlights produced by CBS Sports, this 1 hour special reviews all the great action including the big Dallas fumble!

$.69 Receiving Time 1:00
Press Go Here to ORDER

Press Go Here to Return to Menu B
Press Go Here to Return to Cable TV

FIG. 48
**Thursday, October 26, 1994**

**SPORT EVENTS**

**THIS WEEK On Menu B**

Press Go On Any Time For More Information

<table>
<thead>
<tr>
<th>TODAY: Charlotte 400</th>
<th>MON: WWF Wrestling</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRI: Houston Open Tennis Finals</td>
<td>TUE: Collegiate Gymnastics</td>
</tr>
<tr>
<td>SAT: College Football / Boxing</td>
<td>WED: Stuntman Challenge</td>
</tr>
<tr>
<td>SUN: NFL / Golf</td>
<td>EVENTS THIS MONTH</td>
</tr>
</tbody>
</table>

**FIG. 49a**
Thursday, October 26, 1994

TENNIS FINALS: HOUSTON OPEN
Begins Friday evening at 6:00 ET on Menu B

Check out Menu B for this Friday evening for both the men's and woman's finals in Houston. Woman's final at 6:00PM ET and Men's final immediately following. This event is live. Agassi, Becker, Seles and Graf won today.

$.95 Event scheduled for 5-6 hrs.

Press Here to Return to Sports Events
Press Here to Return to Menu E
Press Here to Return to Cable TV

FIG. 49b
Thursday, October 26, 1994

COLLEGE FOOTBALL / BOXING
Saturday action on Menu B

Press Go On Any Title For More Information

COLLEGE FOOTBALL
(all times ET)

- ALC vs Tenn 1:00 pm
- Duke vs Virgina 1:00 pm
- Penn St vs West Va 1:30 pm
- Clemson vs Rutgers 3:00 pm
- Purdue vs Notre Dame 2:30 pm
- S. Cal vs Wash 4:00 pm
- Mich vs UCLA 1:30 pm
- Miami vs Texas 3:00 pm
- LSU vs Auburn 1:00 pm
- Army vs Ala 1:00 pm
- Syracuse vs Albany 1:30 pm
- LSU vs Auburn 2:00 pm
- BOXING: Holyfield vs. Lewis 9:00 pm

FIG. 49c
Thursday, October 26, 1994

COLLEGE FOOTBALL
Saturday at 1:00 PM on Menu B

LSU (4-0-1) plays at Auburn (3-1-0) in this exciting SEC battle this Saturday. Southeast Regional Sports Network is telecasting this event in 6 states. If you can't see this game, just select Menu B this Saturday at 1:00 PM. Enjoy the game!

$2.75
Complete Game

Your Choice

Press Go Here to Return to Menu B
Press Go Here to Return to Cable TV

FIG. 49d
Thursday, October 26, 1994
8:10 PM

HDTV
High Definition Television

Several Cable Networks, Like HBO, Showtime and Discovery will be introducing exciting new HDTV channels for your enjoyment through this MENU.

Press Here to Return to Cable TV

FIG. 50a
FIG. 50b
Fig. 51a

Thursday, October 26, 1994

7:57 PM

G X*PRESS

TV Guide Library Service
Press GO On Any Item for Show Schedules

NETWORK SCHEDULES next 7 days
TODAY’S SCHEDULES next 6 hours
TV GUIDE PICKS all networks next 7 days

Note: Press GUIDE RECORD button on any show listed and we will automatically set your VCR to tape it

YOUR CHOICE

TV

You haven't subscribed to TV Guide X*PRESS yet
Press GO Here to ORDER for just $2.95/month
Press GO Here to Return to Cable TV

1036
Fig. 51b
Fig. 51c
Fig. 51d

Thursday, October 26, 1994

7:59 PM

HBO SCHEDULE TODAY

Press GO On The Day You Want To Review

Press GUIDE RECORD on Any Show To Automatically Set Your VCR to Tape

Press GO On
Arrow Bars To
Move Schedule

8:00 pm  Making of Terminator 4
8:30 pm  Dream On
9:00 pm  Great Fights of the 1980's
9:30 pm  Robin Williams of The Comedy Shop
10:00 pm Patriot Games (R)
12 mid  Passenger 57 (R)
2:00 am  JFK (R)
4:00 am  Home Alone II (G)

YOUR CHOICE

Press GO Here for HBO 7-day Schedule
Press GO Here for NETWORK SCHEDULES
Press GO Here to Return to Menu G - GUIDE
Press GO Here to Return to Cable TV

1242
Fig. 51e

Thursday, October 26, 1994
7:59 PM

HBO
SCHEDULE TODAY
TV Guide
X*PRESS

Press GUIDE RECORD on Any Show To Automatically Set Your VCR to Tape

GREAT FIGHTS OF THE 1980's
9:00 pm 10/26/94 on HBO

This 30 minute special takes a look at the great boxing duels of the 1980's. Compiled from HBO's sports library and features Sugar Ray Leonard, the Spinks brothers, Mike Tyson, Boom Boom Mancini and many others. Includes the 10 greatest knockout punches landed in the '80's.

YOUR CHOICE:

Press GO Here to Return to Schedule
Press GO Here to Return to Cable TV

1244
FIG. 51f
FIG. 51g
Current Time: 9:45 pm

Favorite Channel Program Menu

Programs at your command

press GO on any title to watch what program

<table>
<thead>
<tr>
<th>NBC Nightly News (NBC)</th>
<th>CBS Nightly News (CBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel of Fortune (ABC)</td>
<td>MacNeil/Lehrer Report (PBS)</td>
</tr>
<tr>
<td>Cheers (WZZZ)</td>
<td>Murphy Brown (WZYZ)</td>
</tr>
<tr>
<td>Golden Girls (WZWZ)</td>
<td>In The Heat of the Night (WZXZ)</td>
</tr>
</tbody>
</table>

press GO here for regular TV

FIG. 51h
MOOD QUESTION MENUS

<table>
<thead>
<tr>
<th>LENGTH OF PROGRAM DESIRED</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SHORT</td>
<td>30 MINUTES OR LESS</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>30 TO 60 MINUTES</td>
</tr>
<tr>
<td>LONG</td>
<td>60 MINUTES OR MORE</td>
</tr>
</tbody>
</table>

FIG 51i

<table>
<thead>
<tr>
<th>TYPE OF PROGRAM DESIRED</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SERIOUS</td>
<td></td>
</tr>
<tr>
<td>THOUGHTFUL</td>
<td></td>
</tr>
<tr>
<td>LIGHT</td>
<td></td>
</tr>
</tbody>
</table>

FIG 51j

<table>
<thead>
<tr>
<th>DO YOU WISH AN ACTIVE OR PASSIVE PROGRAM?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTIVE</td>
<td></td>
</tr>
<tr>
<td>PASSIVE</td>
<td></td>
</tr>
</tbody>
</table>

FIG 51k
Thursday, October 26, 1994

**INTERACTIVE SERVICES LEVEL A**

There are three levels of interactivity possible with your cable television digital converter.

**Level A** is live interactivity with specially encoded cable and broadcast programs... available whenever you see this symbol...

This service offers enlightening information about programs, fun quizzes for the family, geographical facts, contests, and much more!

**YOUR CHOICE**

Press GO Here to order Level A interactivity for just $4.95 per month and enjoy interactivity immediately

Press GO Here for More Information

Press GO Here to Return to Cable TV

1304
Fig. 52b

Thursday, October 26, 1994
8:00 PM

INTERACTIVE SERVICES
LEVEL B

This level of interactivity allows you to access a wide range of services including:

- PRODIGY
- AMERICA ON LINE
- X*PRESS
- AIRLINE RESERVATIONS
- HOTEL RESERVATIONS
- ENCYCLOPEDIA
- ATLAS
- SHOPPING CENTER
- ASSOCIATED PRESS
- U.S. YELLOW PAGES

To take advantage of these services, an INTERACTIVE MODEM is required. This is available from your cable system. For installation and price information, contact your cable system today.

YOUR CHOICE

Press GO Here for More Information
Press GO Here to Return to Cable TV

1306
Thursday, October 26, 1994

INTERACTIVE SERVICES
LEVEL C

Your digital converter can be connected to specially adapted CD-I and CD-ROM units that offer an enormous range of multi-media experiences for you and your family. Your cable system representative can describe all the details.

A free brochure is available

Please call today for details.

YOUR CHOICE
Press GO Here to order Level A interactivity for just $4.95 per month and enjoy interactivity immediately

Press GO Here to Return to Cable TV

1308
INTERACTIVE PROGRAMMING VENTURES™

Press GO On Any Interactive Menu

QUIZ
FAST FACTS
MORE INFO
WHERE IN THE WORLD
PRODUCTS

You Are Watching:
TREASURES FROM A LOST VOYAGE,
The Story of the S.S. Central America.

YOUR CHOICE

Press GO Here for live interactivity with This Show
Press GO Here to Resume Show Without Interactivity
Press GO Here For Interactive Menu 1

1312
In September 1857, the S.S. Central America, a sidewheel paddle steamer, sank approximately 160 miles off the coast of the Carolinas. In addition to carrying 578 passengers, the ship was carrying more than $1 million worth of gold -- now worth about $500 million. Now more than 100 years later, two high school buddies put together a scientific team that located the ship and recovered the cargo. END
The incoming water produced a deadly domino effect. The boiler fires went out, and the engines stopped. Since the coal was wet, the engines could not be restarted. While the ship had bilge pumps to get rid of the water, the bilge pumps needed the engines for power. Since no power was available, the pumps could not prevent the ship from flooding.
Fig. 52h

INTERACTIVE PROGRAMMING VENTURES TM

Press GO On Any Interactive Menu

QUIZ
FAST FACTS
MORE INFO
WHERE IN THE WORLD
PRODUCTS

Press GO On Your Answer

Question 1 of 48:
What is the minimum wind speed required for a storm to be classified as a HURRICANE?

More than 40 mph
More than 45 mph
More than 74 mph
More than 85 mph
More than 100 mph

YOUR CHOICE

Press GO Here to Resume Show Without Interactivity
Press GO Here For Interactive Menu 1

1318
Fig. 52i

**INTERACTIVE PROGRAMMING VENTURES TM**

Press GO on any Interactive Menu

QUIZ
FAST FACTS
MORE INFO
WHERE IN THE WORLD
PRODUCTS

Your Answer:
More Than 74 mph
IS CORRECT!

Press GO for:
Another Question
No More Questions

YOUR CHOICE

Press GO Here to Resume Show Without Interactivity
Press GO Here to Return to Cable TV

1320
Fig. 52j

INTERACTIVE PROGRAMMING VENTURES™

Press GO on any Interactive Menu

QUIZ
FAST FACTS
MORE INFO
WHERE IN THE WORLD
PRODUCTS

Press GO for:
Another Question
No More Questions
More Info on Earth's Rotation

Your Answer:
Clockwise
IS INCORRECT - SORRY!

The correct answer is
"counterclockwise." In the Southern
Hemisphere, hurricane winds circulate
clockwise due to the effects of the
earth's rotation.

YOUR CHOICE

Press GO Here to Resume Show Without Interactivity
Press GO Here to Return to Cable TV

1324
Fig. 53a

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODIGY</td>
<td>SHOPPING CENTER</td>
</tr>
<tr>
<td>AMERICA ON LINE</td>
<td>GAMES</td>
</tr>
<tr>
<td>X PRESS</td>
<td>ATLAS</td>
</tr>
<tr>
<td>AIRLINE RESERVATIONS</td>
<td>ASSOCIATED PRESS</td>
</tr>
<tr>
<td>HOTEL RESERVATIONS</td>
<td>U.S. YELLOW PAGES</td>
</tr>
<tr>
<td>encyclopedia</td>
<td>CABLE FAX MAIL</td>
</tr>
</tbody>
</table>

THURSDAY OCTOBER 26 1994
8:02 PM

PRESS GO ON ANY TITLE FOR MORE INFORMATION

YOUR CHOICE

PRESS GO HERE TO RETURN TO CABLE TV

1330
Fig. 53b

Thursday, October 26, 1994

8:03 PM

AIRLINE INFORMATION AND RESERVATIONS

Press GO Here to Check on Your Current Reservations
Press GO Here to Check or Make Airline Reservations

YOUR CHOICE

Press GO Here to Continue
Press GO Here to Erase Above and Repeat
Press GO Here to Return to Cable TV

1332
Fig. 53c

Thursday, October 26, 1994
8:03 PM

AIRLINE INFORMATION AND RESERVATIONS

Press GO Here to Check on Your Current Reservations
Press GO Here to Check or Make Airline Reservations

Domestic Flight or International Flight

Press GO on the year of your flight
1994 or 1995

Press GO on the month of your flight
JAN FEB MAR APR MAY JUN
JUL AUG SEP OCT NOV DEC

YOUR CHOICE

Press GO Here to Continue
Press GO Here to Erase Above and Repeat
Press GO Here to Return to Cable TV

1334
**Fig. 53d**

<table>
<thead>
<tr>
<th>State Abbreviation</th>
<th>State Abbreviation</th>
<th>State Abbreviation</th>
<th>State Abbreviation</th>
<th>State Abbreviation</th>
<th>State Abbreviation</th>
<th>State Abbreviation</th>
<th>State Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>AK</td>
<td>AZ</td>
<td>AR</td>
<td>CA</td>
<td>CO</td>
<td>CT</td>
<td>DE</td>
</tr>
<tr>
<td>HI</td>
<td>ID</td>
<td>IL</td>
<td>IN</td>
<td>IA</td>
<td>KS</td>
<td>KY</td>
<td>LA</td>
</tr>
<tr>
<td>MA</td>
<td>MI</td>
<td>MN</td>
<td>MS</td>
<td>MO</td>
<td>MT</td>
<td>NE</td>
<td>NV</td>
</tr>
<tr>
<td>SD</td>
<td>TN</td>
<td>TX</td>
<td>UT</td>
<td>VT</td>
<td>VA</td>
<td>WA</td>
<td>WV</td>
</tr>
<tr>
<td>D.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AIRLINE INFORMATION AND RESERVATIONS**

Press **GO** on the STATE You will DEPART:

Press **GO** on the STATE you will ARRIVE:

**YOUR CHOICE**

Press **GO** Here to Continue
Press **GO** Here to Erase Above and Repeat
Press **GO** Here to Return to Cable TV

1336
Fig. 53e

Thursday, October 26, 1994

AIRLINE INFORMATION
AND RESERVATIONS (Continued)

Press GO on the ARIZONA airport you will DEPART:

PHOENIX    FLAGSTAFF    TUCSON
PRESCOTT    YUMA          Minor Airport List

Press GO on the DC airport you will ARRIVE:

NATIONAL    DULLES    BWI
Check Flights to all Three D.C. Airports

Press GO on your preferred departure time:

Morning    Mid-day    Late aft.    eve/night    anytime

Press GO on your preferred arrival time:

Morning    Mid-day    Late aft.    eve/night    anytime

YOUR CHOICE
Press GO Here to Continue
Press GO Here to Erase Above and Repeat
Press GO Here to Return to Cable TV

1338
Here are your airline flight options for a morning departure from Phoenix to Dulles.

**Press GO on Any Flight to Check Availability and Fare**

<table>
<thead>
<tr>
<th>Depart Time</th>
<th>Arrive Time</th>
<th>Airline</th>
<th>Flight No.</th>
<th>Stops</th>
<th>Connecting Through</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:15 AM</td>
<td>1:30 PM</td>
<td>AMERICAN</td>
<td>32</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>7:30 AM</td>
<td>2:45 PM</td>
<td>AMERICAN</td>
<td>212</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>8:00 AM</td>
<td>3:07 PM</td>
<td>DELTA</td>
<td>49</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>10:30 AM</td>
<td>7:15 PM</td>
<td>US AIR</td>
<td>285</td>
<td>1</td>
<td>Chicago</td>
</tr>
<tr>
<td>11:25 AM</td>
<td>6:10 PM</td>
<td>UNITED</td>
<td>10</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>11:45 AM</td>
<td>8:40 PM</td>
<td>UNITED</td>
<td>77</td>
<td>1</td>
<td>Dallas</td>
</tr>
</tbody>
</table>
AIRLINE INFORMATION AND RESERVATIONS (Continued)

DELTA FLIGHT # 49 from Phoenix to Dulles direct
departs 8:00 AM and arrives 3:07 PM

To check availability, enter month, day and year
with your remote - example 03 21 94

Month: 11 Day: 25 Year: 9

Press GO Here to Erase Above Entries and Repeat
Press GO Here if Above Entries are Correct

YOUR CHOICE

Press GO Here to Return to Airline Main Menu
Press GO Here to Return to Menu 1
Press GO Here to Return to Cable TV
Thursday, October 26, 1994  8:05PM

AIRLINE INFORMATION AND RESERVATIONS (continued)

DELTA FLIGHT #49 from Phoenix to Dulles direct
departs 8:00 AM and arrives 3:07 PM

SEATS AVAILABLE ARE SHOWN IN BLUE
3 First Class Seats Remaining
15 Coach Class Seats Remaining

Press ☐ on Any Blue Seat(s) to Make Reservations

First Class  Coach Class  Aircraft Equipment 757

Press ☐ Here to Erase Above and Repeat

Press ☐ Here to Cancel Above and Exit

Press ☐ Here to Continue

Fig. 53h
Thursday, October 26, 1994
8:06 PM

AIRLINE INFORMATION AND RESERVATIONS (Continued)

You have selected SEATS: 23A, 23B
DELTA FLIGHT #49 from Phoenix to Wash.Dulles

Date: 11/25/94 Departs 8:00 AM and arrives 3:07PM

One Way Fare: $295.00 23A  Round Trip Fare: $419.00 23A
         $295.00 23B  Round Trip Fare: $419.00 23B
Total: $590.00 Total: $838.00

Press GO Here to Select ONE WAY or ROUND TRIP TO CONFIRM YOUR RESERVATION:

YOUR CHOICE

Press GO Here to Charge to Your Credit Card
Press GO Here and an Agent Will Call You
Press GO Here to Exit Without Reservation

1346
AIRLINE INFORMATION AND RESERVATIONS (continued)

CREDIT CARD CHARGE

Amount: $590.00  Delta Flight # 49  
One Way: Phoenix to Dulles  Date: 11/25/94  
Departs: 8:00 AM  Arrives: 3:07 PM  Dinner  
American  Express  Visa  Discover  Master Charge  

Enter Your Credit Card Number:  
2177735  
Enter Expiration Date (example 09/97):  
Month:  
Year:  

Press here to Erase Above and Repeat  
Press here to Cancel Above and Exit  
Press here to Confirm Above Charge  

Fig. 53j
AIRLINE INFORMATION
AND RESERVATIONS

Processing credit card
information

FIG. 53k
Fig. 53l

Thursday, October 26, 1994

AIRLINE INFORMATION AND RESERVATIONS

Your flight has been booked, seats reserved, and your credit card has been charged.
This is your confirmation #R03574661

Press GO Here to pick up your tickets at the Delta airport counter
Press GO Here to have your tickets mailed to you

For your convenience:

Press GO Here to store your credit card # IN MEMORY for your next reservation

You can recheck your reservation through MENU 1, Airline Reservations

YOUR CHOICE

Press GO Here to Return to Cable TV

1352
**Fig. 54a**

![DMX Demonstration](image)

Here are the menu options you'll enjoy:

<table>
<thead>
<tr>
<th>Top 5</th>
<th>Hard Rock</th>
<th>Easy Listening</th>
<th>New Age</th>
<th>Country Top 40</th>
<th>Rhythm and Blues</th>
<th>Classical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 10</td>
<td>Heavy Metal</td>
<td>Instrumentals</td>
<td>Favorite Light Rock</td>
<td>New Country</td>
<td>Blues Legends</td>
<td>Classical Piano</td>
</tr>
<tr>
<td>Top 40</td>
<td>Rock Classics</td>
<td>Easy List. Favorites</td>
<td>Beatles Only</td>
<td>Country Classics</td>
<td>Soul</td>
<td>Classical Strings</td>
</tr>
<tr>
<td>Rock</td>
<td>Rap</td>
<td>Jazz</td>
<td>Rock Legends</td>
<td>Bluegrass</td>
<td>Soul Classics</td>
<td>Classical Guitar</td>
</tr>
<tr>
<td>'30s</td>
<td>'40s</td>
<td>'50s</td>
<td>'60s</td>
<td>'70s</td>
<td>'80s</td>
<td>'90s</td>
</tr>
<tr>
<td>Waltz</td>
<td>Latin</td>
<td>Disco</td>
<td>Polka</td>
<td>Reggae</td>
<td>Dance Fever</td>
<td>Teen Dance</td>
</tr>
</tbody>
</table>

You are listening to:
MAGGIE MAE by Rod Stewart

More Information on Current Artist/Song
Screen ON/OFF
All this for just $4.95 per month. Less than 1/2 the cost of one CD! ORDER NOW.

YOUR CHOICE
Press GO Here to Order DMX
Press GO Here to Return to Cable TV

1038
When you order DMX you will instantly be able to access all the different stations through Menu 1. To enhance listening enjoyment, you might want to connect your stereo speakers to your TV set. If you listen to music in a different room or if you want to watch TV in one room while another family member listens to DMX in a separate room, a TUNER ATTACHMENT is available from your cable system. In any event, order DMX today for only $4.95 per month and enjoy commercial-free digital radio instantly.
Imagine over 40 stations of music delivered to your home in stunning digital quality -- with no commercial interruptions. This is DMX (Digital Music Express) and it is available now through your cable system. Each station has its own format -- rock, classical, country, soul, rap, easy listening, jazz, new age, big band era, dance, and many others -- so there will always be something playing that you will enjoy.
**Fig. 54d**

**DMX Demonstration**

Here are the menu options you'll enjoy:

Press GO on the station you want

<table>
<thead>
<tr>
<th>Top 5</th>
<th>Hard Rock</th>
<th>Easy Listening</th>
<th>New Age</th>
<th>Country Top 40</th>
<th>Rhythm and Blues</th>
<th>Classical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 10</td>
<td>Heavy Metal</td>
<td>Instrumentals</td>
<td>Favorite Light Rock</td>
<td>New Country</td>
<td>Blues Legends</td>
<td>Classical Piano</td>
</tr>
<tr>
<td>Top 40</td>
<td>Rock Classics</td>
<td>Easy List Favorites</td>
<td>Beatles Only</td>
<td>Country Classics</td>
<td>Soul</td>
<td>Classical Strings</td>
</tr>
<tr>
<td>Rock</td>
<td>Rap</td>
<td>Jazz</td>
<td>Rock Legends</td>
<td>Bluegrass</td>
<td>Soul Classics</td>
<td>Classical Guitar</td>
</tr>
<tr>
<td>'30s</td>
<td>'40s</td>
<td>'50s</td>
<td>'60s</td>
<td>'70s</td>
<td>'80s</td>
<td>'90s</td>
</tr>
<tr>
<td>Waltz</td>
<td>Latin</td>
<td>Disco</td>
<td>Polka</td>
<td>Reggae</td>
<td>Dance Fever</td>
<td>Teen Dance</td>
</tr>
</tbody>
</table>

You are listening to:
Piano Concerto by Rachmaninoff No. 3 op. 30 1909

More information on current artist/song

All this for just $4.95 per month. Less than 1/2 the cost of one CD!

Screen ON/OFF

ORDER NOW.

**YOUR CHOICE**

Press GO here to order DMX
Press GO here to return to cable TV
**Fig. 54e**

**DMX Demonstration**

Here are the menu options you'll enjoy:

Press GO On the station you want

<table>
<thead>
<tr>
<th></th>
<th>Top 5</th>
<th>Easy Listening</th>
<th>New Age</th>
<th>Country Top 40</th>
<th>Rythm and Blues</th>
<th>Classical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 10</td>
<td>Heavy Metal</td>
<td>Instrumental</td>
<td>Favorite Light Rock</td>
<td>New Country</td>
<td>Blues Legends</td>
<td>Classical Piano</td>
</tr>
<tr>
<td>Top 40</td>
<td>Rock Classics</td>
<td>Easy List Favorites</td>
<td>Beatlest Only</td>
<td>Country Classics</td>
<td>Soul</td>
<td>Classical Strings</td>
</tr>
<tr>
<td>Rock</td>
<td>Rap</td>
<td>Jazz</td>
<td>Rock Legends</td>
<td>Bluegrass</td>
<td>Soul Classics</td>
<td>Classical Guitar</td>
</tr>
<tr>
<td>'30s</td>
<td>'40s</td>
<td>'50s</td>
<td>'60s</td>
<td>'70s</td>
<td>'80s</td>
<td>'90s</td>
</tr>
<tr>
<td>Waltz</td>
<td>Latin</td>
<td>Disco</td>
<td>Polka</td>
<td>Reggae</td>
<td>Dance Fever</td>
<td>Teen Dance</td>
</tr>
</tbody>
</table>

Seirgei Rachmaninoff was born in Oenega, Russia on April 9, 1873. He was a pianist, composer and a conductor. Rachmaninoff composed the Third

More Information on Current Artist/Song

Screen ON/OFF

All this for just $4.95 per month. Less than 1/2 the cost of one CD! ORDER NOW.

YOUR CHOICE

Press GO Here to Order DMX
Press GO Here to Return to Cable TV

1412
**Fig. 55e**

**HIT MOVIES from**

Press **On Any title For More Information**

- **HOME ALONE 3 (PG)**
- **FIRESTORM (R)**
- **YOU AND ME (R)**
- **WILD THING (R)**
- **ALIENS 4 (R)**
- **DAYBEAST (R)**
- **TERMINATOR 4 (R)**
- **DETECTIVE SMITH (PG)**
- **FOUR SCORE (PG)**
- **SEA WORLD (PG)**

Press **Here to Return to Cable TV**
Fig. 55f

Thursday, February 26, 1994

7:44 PM
HIT MOVIES from REQUEST

Press (55) On Any Title For More Information

<table>
<thead>
<tr>
<th>HOME ALONE 3 (PG)</th>
<th>DAYBEAST 4 (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRESTORM (R)</td>
<td>TERMINATOR 4 (R)</td>
</tr>
<tr>
<td>YOU AND ME 4 (R)</td>
<td>DETECTIVE SMITH (PG)</td>
</tr>
<tr>
<td>WILD THING 4 (R)</td>
<td>FOUR SCORE (PG)</td>
</tr>
<tr>
<td>ALIENS 4 (R)</td>
<td>SEA WORLD (PG)</td>
</tr>
</tbody>
</table>

Press (60) Here to Return to Cable TV

FIG. 55g
FIG. 56d
TERMINATOR 4 (R)

ARNOLD SCHWARZENEGGER
RETURN AGAIN IN THIS
SCI-FI ACTION THRILLER
SET IN THE PRESENT, 2005 AND
IN THE FAR FUTURE - 9010 AD.

$1.95 RUNNING TIME 2.34
CAROLCO THEATRICAL RELEASE 1994

PRESS HERE TO ORDER
PRESS HERE TO RETURN TO MENU A
PRESS HERE TO RETURN TO CABLE TV

FIG. 56e
FIG. 56f
TERMINATOR 4 (R)

Arnold Schwarzenegger returns again in this sci-fi action thriller set in the present 2025 and in the far future 9010 AD

$1.95 Running Time 2:34
Carolco Theatrical Release 1994

Press Here to Order
Press Here to Preview

YOUR CHOICE

Press Here to Return to Menu A
Press Here to Return to Cable TV

FIG. 56g
FIG. 57a
FIG. 57b
THURSDAY, OCTOBER 26, 1994 8:30 PM

MONTHLY ACCOUNT REVIEW
PRESS GO ON MENUS FOR DETAILS

AS OF THIS DATE
FOR
Mr. JAMES SMITH
114 GREEN ST.
SAN DIEGO CA.

YOUR ORDER
OVER $20.00
ARE DISCOUNTED
20%

<table>
<thead>
<tr>
<th>MENU</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>18.30</td>
</tr>
<tr>
<td>B</td>
<td>4.00</td>
</tr>
<tr>
<td>C</td>
<td>2.75</td>
</tr>
<tr>
<td>D</td>
<td>3.85</td>
</tr>
<tr>
<td>E</td>
<td>2.15</td>
</tr>
<tr>
<td>F</td>
<td>3.00</td>
</tr>
<tr>
<td>G</td>
<td>2.95</td>
</tr>
<tr>
<td>H</td>
<td>N/A</td>
</tr>
<tr>
<td>I</td>
<td>4.95</td>
</tr>
<tr>
<td>J</td>
<td>4.95</td>
</tr>
</tbody>
</table>

THANK YOU FOR ORDERING 4.95

PRESS GO HERE TO RETURN TO CABLE TV

FIG. 58a
Your Choice TV™

This month's orders to date from:

<table>
<thead>
<tr>
<th>Menu</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$18.30</td>
</tr>
<tr>
<td>B</td>
<td>4.00</td>
</tr>
<tr>
<td>C</td>
<td>.50</td>
</tr>
<tr>
<td>D</td>
<td>2.80</td>
</tr>
<tr>
<td>E</td>
<td>1.20</td>
</tr>
<tr>
<td>F</td>
<td>3.00</td>
</tr>
<tr>
<td>G</td>
<td>Free</td>
</tr>
<tr>
<td>H</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Total $29.80

Viewer's top choice this month:
Terminator 4 on Menu A

Call 1-800-533-4000 for inquiries

Mr. James Smith
114 Green Steet
San Diego, CA

Your orders over $20.00 are all discounted 20%

Thank you for ordering from Your Choice TV™

FIG. 58b
<table>
<thead>
<tr>
<th>Date</th>
<th>Movie</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-01-94</td>
<td>Four Score</td>
<td>2.25</td>
</tr>
<tr>
<td>10-04-94</td>
<td>Home Alone</td>
<td>2.25</td>
</tr>
<tr>
<td>10-09-94</td>
<td>You and Me</td>
<td>2.25</td>
</tr>
<tr>
<td>10-13-94</td>
<td>Godfather 5 (Premiere)</td>
<td>7.50</td>
</tr>
<tr>
<td>10-13-94</td>
<td>Detective Smith</td>
<td>2.25</td>
</tr>
<tr>
<td>10-26-94</td>
<td>Terminator 4 -20%</td>
<td>1.80</td>
</tr>
</tbody>
</table>

**TOTAL** 18.30

Note: Menu A changes on 11/01/94

YOUR 20% DISCOUNT NOW IN EFFECT

**FIG. 59a**
MONTHLY ACCOUNT REVIEW

Menu A

HIT MOVIES

<table>
<thead>
<tr>
<th>Date</th>
<th>Movie</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-01-94</td>
<td>Four Score</td>
<td>2.25</td>
</tr>
<tr>
<td>03-04-94</td>
<td>Home Alone</td>
<td>2.25</td>
</tr>
<tr>
<td>03-09-94</td>
<td>You and Me</td>
<td>2.25</td>
</tr>
<tr>
<td>03-12-94</td>
<td>Terminator 4</td>
<td>2.25</td>
</tr>
<tr>
<td>03-13-94</td>
<td>Godfather 5 (premiere)</td>
<td>7.50</td>
</tr>
<tr>
<td>03-15-94</td>
<td>Detective Smith - 20%</td>
<td>1.80</td>
</tr>
</tbody>
</table>

Total 18.30

Note: Menu A changes on 4/1/94

Your 20% discount now in effect!

Press GO here for ACCOUNT REVIEW
Press GO here to return to regular TV

FIG. 59b
BASIC SERVICE
CHANNELS 2-12

You now just pay
$14 per month
for basic service.

Highlights this month
other services:

Press \( \text{} \) Here for info on BASIC PLUS

\[ \text{FIG. 62} \]
Saturday, December 28, 1984

BASIC PLUS
CHANNELS 13-23

Channels 13-23 are the nation's most widely distributed cable services and are available to you for only $8.00 per month.

Highlights this month

Press [here to order]

FIG. 63
Saturday, December 28, 1984

ECOMONY PACKAGE
CHANNELS 24-34

When you order you can immediately enjoy channels 24-34. These popular satellite channels will extend your viewing choice.

Highlights this month

Available to you for $7.00 per month.

FIG. 64
Press GO on any premium channel number on the CHANNELS & MENUS screen for information and prices.

Highlights this month

You can then immediately enjoy any of the premium or À la carte services.

FIG. 65
THE LEARNING CHANNEL

TLC

The Learning Channel is available as part of the ECONOMY PACKAGE of eleven channels for just $7.00 per month.

YOUR CHOICE

TV

GO

Press 50 Here to Return to Schedule

FIG. 66
<table>
<thead>
<tr>
<th>BASIC</th>
<th>BASIC PLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 CBS</td>
<td>13 CNN</td>
</tr>
<tr>
<td>3 NBC</td>
<td>14 CNN</td>
</tr>
<tr>
<td>4 NBC</td>
<td>15 DISC</td>
</tr>
<tr>
<td>5 ABC</td>
<td>16 ESPN</td>
</tr>
<tr>
<td>6 ABC</td>
<td>17 TBS</td>
</tr>
<tr>
<td>7 FOX</td>
<td>18 TNT</td>
</tr>
<tr>
<td>8 PBS</td>
<td>19 USA</td>
</tr>
<tr>
<td>9 WTFC</td>
<td>20 FAM</td>
</tr>
<tr>
<td>10 WKN</td>
<td>21 NICK</td>
</tr>
<tr>
<td>11 WYAB</td>
<td>22 MTV</td>
</tr>
<tr>
<td>12 C-SPAN</td>
<td>23 TWC</td>
</tr>
</tbody>
</table>

FIG. 67
ENTERTAINMENT CHOICE
This week's episodes of the best on TV
Press 60 On Any Time For More Information

MURPHY BROWN
90210
ROSE ANN
SIENFIELD
LARRY SANDERS from HBO

FIG. 68
FIG. 69
Thursday, February 26, 1994
10:05 PM

MONTHLY ACCOUNT REVIEW
Menu A - HIT MOVIES

press GO here to return to cable TV

FIG. 70
FIG. 71
Thursday, February, 26, 1994

Next Start Time 10:00 PM

60 MINUTES

This week's show which aired 2/12/94 and featured stories on: Medicaid fraud: Elizabeth Taylor; Ross Perot in Japan: Andy Rooney

Press GO Here to ORDER

FIG. 72
Thursday, October 26, 1994

MUSIC from DMX
Digital Music Express

Press GO Here to see all the music that you can enjoy and the special DMX introduction

FIG. 75
THE CONTENTS OF THIS TAPE OR DISC CONTAINS CONFIDENTIAL COPYRIGHTED MATERIALS FOR THE EXCLUSIVE VIEWING OF THE SENIOR MANAGEMENT AND THE BOARD OF DIRECTORS OF DISCOVERY COMMUNICATIONS, INC.

10/22/92

FIG. 76
Thursday, February 26, 1994
9:27 PM

Your Selection Will Start At 9:30 PM

WAR BIRDS

THANK YOU
for ordering from the
Discovery Channel
Choice Library.
We will return here
automatically 60 seconds
prior to start time.

Press GO Here to
Join in Progress

FIG. 77
FIG. 78
FIG. 79
NFL HIGHLIGHTS

Sunday, Oct. 22
Game highlights
produced by CBS Sports,
this 1 hour special reviews
all the great action including
the big Dallas fumble!

Press GO Here to ORDER

FIG. 80
Thursday, October 26, 1994

Saturday action on Menue B

COLLEGE FOOTBALL / BOXING

Press ☰ on any title for more information

<table>
<thead>
<tr>
<th></th>
<th>Time</th>
<th></th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALC vs Tenn</td>
<td>1:00 pm</td>
<td>Duke vs Virginna</td>
<td>1:00 pm</td>
</tr>
<tr>
<td>Penn St vs West Va</td>
<td>1:30 pm</td>
<td>Clemson vs Rutgers</td>
<td>3:00 pm</td>
</tr>
<tr>
<td>Purdue vs Notre Dame</td>
<td>2:30 pm</td>
<td>S. Cal vs Wash</td>
<td>4:00 pm</td>
</tr>
<tr>
<td>Mich vs UCLA</td>
<td>1:30 pm</td>
<td>Miami vs Texas</td>
<td>3:00 pm</td>
</tr>
<tr>
<td>LSU vs Auburn</td>
<td>1:00 pm</td>
<td>Army vs ALA</td>
<td>1:00 pm</td>
</tr>
<tr>
<td>Syracuse vs Albany</td>
<td>1:30 pm</td>
<td>LSU vs Auburn</td>
<td>2:00 pm</td>
</tr>
</tbody>
</table>

BOXING: Holyfield vs. Lewis 9:00 pm

**FIG. 81**
TENNIS FINALS: HOUSTON OPEN
Begins Friday evening at 6:00 ET on Menu B

Check out Menu B for this Friday evening for both the men's and woman's finals in Houston. Woman's final at 6:00PM ET and Men's final immediately following. This event is live. Agassi, Becker, Seles and Graf won today.

$.95 Event scheduled for 5-6 hrs.

TO ORDER just select
Menu B on Friday, 10/27

Press Here to Return to Sports Events
Press Here to Return to Menu E
Press Here to Return to Cable TV

FIG. 82
**FIG. 83**
FIG. 84
FIG. 85
FIG. 87
INTERACTIVE PROGRAMMING VENTURES™

Press GO on any Interactive Menu

- QUIZ
- FAST FACTS
- MORE INFO

WHERE IN THE WORLD

PRODUCTS

YOUR CHOICE

FIG. 88
FIG. 89
Fig. 91
Fig. 92

INTERACTIVE PROGRAMMING VENTURES TM

Press GO On Any Interactive Menu

QUIZ
FAST FACTS
MORE INFO
WHERE IN THE WORLD
PRODUCTS

YOUR CHOICE

Press GO Here to Resume Show Without Interactivity
Press GO Here For Interactive Menu 1
Fig. 93
Fig. 98

HIT MOVIES from
Press On Any title For More Information

HOME ALONE 3 (PG)  DAYBEAST (R)
FIRESTORM (R)       TERMINATOR 4 (R)
YOU AND ME (R)      DETECTIVE SMITH (PG)
WILD THING (R)      FOUR SCORE (PG)
ALIENS 4 (R)        SEA WORLD (PG)

Press Here to Return to Cable TV
These Arrow Buttons Will Move the Yellow Cursor Thru the Blue Screens.

Press the GO Button to Activate Each Screen.

**FIG. 99**
FIG. 100
HIT MOVIES from REQUEST

Press [GO] On Any Title For More Information

TERMINATOR 4 (R)

FIG. 101
Thursday, February 26, 1994

Your Movie Will Begin At 8:00PM

TERMINATOR 4 (R)

YOUR MOVIE WILL START IN
1:00

You may press the
Red CANCEL Button
during the first 5 minutes
to exit without change

Press [GO] Here to
Join in Progress

FIG. 102
FIG. 103
COLLEGE FOOTBALL
Saturday at 1:00 PM on Menue B

LSU (4-0-1) plays at Auburn (3-1-0) in this exciting SEC battle this Saturday. Southeast Reg Sports Network is telecasting this event in 6 states. If you can't see this game, just select Menu B this Saturday at 1:00 PM. Enjoy the game!

FIG. 104
<table>
<thead>
<tr>
<th>CHILDREN'S PROGRAMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press <strong>GO</strong> On Any Title For More Information</td>
</tr>
<tr>
<td><strong>Entertainment</strong></td>
</tr>
<tr>
<td>Beauty and the Beast from Disney</td>
</tr>
<tr>
<td>Aladdin from Disney</td>
</tr>
<tr>
<td>The Wizard of Oz</td>
</tr>
<tr>
<td>Charlie Brown Halloween</td>
</tr>
<tr>
<td>Pinocchio from Disney</td>
</tr>
<tr>
<td>Bugs Bunny and Road Runner Hour</td>
</tr>
</tbody>
</table>

**FIG. 105**
Thursday, October 26, 1994

Next Start Time 8:30 PM

BEAUTY AND THE BEAST (G)

This 1991 Disney animation feature is still a hit for children of all ages. Order now and your young ones can enjoy this wonderful classic until the menu changes on 11/1/94.

$1.10
Running Time 1:95

Press ⬅️ Here to ORDER

Press ⬅️ Here to Return to Menu E
Press ⬅️ Here to Return to Cable TV

FIG. 106
FIG. 108
WAR BIRDS

Stunning footage compiled from Discovery's most popular series: Wings. Contains three Gulf War dogfights and carrier landing crash footage.

Press © Here to ORDER

FIG. 109
Thursday, October 26, 1994
7:56 PM

Next Start Time 8:00PM

THE LARRY SANDERS SHOW

Starring Gary Shanding in this week's episode Larry's interview guest is Ross Perot who became offended by Larry's personal questions. Perot launches on investigation of Larry's past Great fun from HBO Enjoy until the menu changes on 11/2/94

$.69 Running Time 26:00

Press Goto Here to ORDER

Press Goto Here to Return to Menu E

Press Goto Here to Return to Cable TV

FIG. 110
**FIG. 111**
THANK YOU FOR SUBSCRIBING!
You are joining the Channel in progress.

FIG. 112
Thursday, February 26, 1994
9:25 PM

THE SCIENCE FICTION CHANNEL

24 hours a day of great TV enjoyment for the science-fiction buff, from cult classics to new originals, this channel is out of this world.

Press GO Here to ORDER

FIG. 113
FIG. 114
FIG. 115
**FIG. 116**
FIG. 117
FIG. 118
HDTV
High Definition Television

*FIG. 119*
HDTV
High Definition Television

Press $button 1$ on the HDTV channel you want to view.
Discovery's WINDOW ON THE WORLD W

YOUR CHOICE

Press $button 2$ Here to Return to Cable TV

FIG. 120
INTERACTIVE PROGRAMMING VENTURES™

Press GO on any Interactive Menue

QUIZ
FAST FACTS
MORE INFO
WHERE IN THE WORLD
PRODUCTS

More than 74 mph

Press GO Here to Resume Show Without Interactivity

FIG. 121
**FIG. 122**
Here are your airline flight options for a morning departure from Phoenix to Dulles.
Press (GO) on Any Flight to Check Availability and Fare

<table>
<thead>
<tr>
<th>Time</th>
<th>Flight</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 AM</td>
<td>DELTA</td>
<td>49</td>
</tr>
<tr>
<td>3:07 PM</td>
<td>DELTA</td>
<td>0</td>
</tr>
</tbody>
</table>

**FIG. 123**
FIG. 124
**AIRLINE INFORMATION AND RESERVATIONS**

Press on the STATE you will DEPART:

<table>
<thead>
<tr>
<th>State</th>
<th>City</th>
<th>State</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

Press on the STATE you will ARRIVE:

<table>
<thead>
<tr>
<th>State</th>
<th>City</th>
<th>State</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**FIG. 125**
AIRLINE INFORMATION AND RESERVATIONS (continued)

Press the ARIZONA airport you will DEPART:

PHOENIX

Press on the DC airport you will ARRIVE:

DULLES

Press on your preferred departure time:

Press on your preferred arrival time: anytime

Press Here to Continue

FIG. 126
MUSIC from DMX
Digital Music Express

Press Here for More Information
Press Here to Return to Cable TV

FIG. 127
FIG. 128
Thursday, October 26, 1994  7:59 PM

Your GUIDE RECORD has been activated for:

9:00 pm GREAT FIGHTS OF THE 1980'S

FIG. 129
Thursday, February 26, 1994
7:45 PM

Next Start Time 8:00PM

TERMINATOR 4 (R)

Arnold Schwarzenegger returns again in this sci-fi action thriller set in the present 2025 and in the far future 9010 AD

$1.95 Running Time 2:34
Carolco Theatrical Release 1994

Press $5 Here to Order

YOUR CHOICE

Press $5 Here to Return to Menu A

Press $5 Here to Return to Cable TV

FIG. 131
TERMINATOR 4 (R)

Arnold Schwarzenegger returns again in this sci-fi action thriller set in the present 2025 and in the far future 9010 AD

$1.95 Running Time 2:34
Carolco Theatrical Release 1994

Press Here to ORDER

Press Here to Return to Menu A
Press Here to Return to Cable TV

FIG. 132
REMOTE CONTROL FOR MENU DRIVEN
SUBSCRIBER ACCESS TO TELEVISION
PROGRAMMING

CROSS-REFERENCE TO RELATED
APPLICATION

[0001] This patent application is a Continuation of commonly owned U.S. patent application Ser. No. 07/991,074, filed Dec. 9, 1992, the contents of which are incorporated by reference herein.

BACKGROUND OF THE INVENTION

[0002] The invention relates to television entertainment systems for providing television programming to consumer homes. More particularly, the invention relates to cable television packaging, delivery and presentation systems which provide consumers with many television programming options.

[0003] Advances in television entertainment have been primarily driven by breakthroughs in technology. In 1939, advances on Vladimir Zworykin's picture tube provided the stimulus for NBC to begin its first regular broadcasts. In 1975, advances in satellite technology provided consumers with increased programming to homes.

[0004] Many of these technology breakthroughs have produced inconvenient systems for consumers. One example is the ubiquitous three remote control home, having a separate and unique remote control for the TV, cable box and VCR. More recently, technology has provided cable users in certain parts of the country with 100 channels of programming. This increased program capacity is beyond the ability of many consumers to use effectively. No method of managing the program choices has been provided to consumers.

[0005] Consumers are demanding that future advances in television entertainment, particularly programs and program choices, be presented to the consumer in a user friendly manner. Consumer preferences, instead of technological breakthroughs, will drive the television entertainment market for at least the next 20 years. As computer vendors have experienced a switch from marketing new technology in computer hardware to marketing better useability, interfaces and service, the television entertainment industry will also experience a switch from new technology driving the market to consumer useability driving the market.

[0006] Consumers want products incorporating new technology that are useful, and will no longer purchase new technology for the sake of novelty or status. Technological advances in sophisticated hardware are beginning to surpass the capability of the average consumer to use the new technology. Careful engineering must be done to make entertainment products incorporating new technology useful and desired by consumers.

[0007] In order for new television entertainment products to be successful, the products must satisfy consumer demands. TV consumers wish to go from limited viewing choices to a variety of choices, from no control of programming to complete control. Consumers wish to advance from cumbersome and inconvenient television to easy and convenient television and keep costs down. Consumers do not wish to pay for one hundred channels when due to lack of programming information, they seldom, if ever, watch programming on many of these channels.

[0008] The concepts of interactive television, high definition television and 300 channel cable systems in consumer homes will not sell if they are not packaged, delivered and presented in a useable fashion to consumers. The problem is that TV programming is not being managed, packaged, delivered, and presented to consumers in a user friendly manner.

[0009] Consumers are already being bombarded with programming options, numerous "free" cable channels, subscription cable channels and pay-per-view choices. Any further increase in TV entertainment choices, without a user friendly presentation and approach, will likely bewilder viewers with a mind-numbing array of choices.

[0010] The TV industry has traditionally marketed and sold its programs to consumers in bulk, such as continuous feed broadcast and long-term subscriptions to movie channels. The TV industry is unable to sell its programming in large quantities on a unit per unit basis, such as the ordering of one program. Consumers prefer a unit sales approach because it keeps costs down and allows the consumer to be more selective in their viewing.

[0011] Additionally, viewership fragmentation, which has already begun, will increase. Programming not presented in a user friendly manner will suffer with a decrease in viewership and revenue.

[0012] What is needed is an economical system which can gather television programming in a variety of formats, package the programs, deliver the programs, and present the programs through a user friendly interface which allows the consumer to easily select from among the many program choices. The system must be capable of handling hundreds of programs in different formats, be expandable for future types of programming, include a method for billing consumers, and be inexpensive. The present invention is addressed to fulfill these needs.

SUMMARY OF INVENTION

[0013] The present invention is an expanded cable television program delivery system that dramatically increases programming capacity using compressed transmission of television program signals. Developments in digital bandwidth compression technology now allow much greater throughput of television program signals over existing or slightly modified transmission media. The present invention is a program delivery system which provides subscribers with a user friendly interface to operate and exploit a six-fold or more increase in current program delivery capability.

[0014] Subscribers will be able to access the expanded program package and view selected programs through a menu-driver access scheme that allows each subscriber to select individual programs by sequencing a series of menus. The menus are sequenced by the subscriber using simple alpha-numeric and iconic character access, allowing the subscriber to access desired programs by simply pressing a single button rather than recalling from memory and pressing the actual two or more digit numeric number assigned to a selection. Thus, with the press of single buttons, the subscriber can advance from one menu to the next. In this
fashion, the subscriber can sequence the menus and select a program from any given menu. The programs are grouped by category so that similar program offerings are found on the same menu.

**0015** B. System Description

**0016** 1. Major System Components

**0017** In its most basic form, the system uses a program delivery system in conjunction with a conventional cable television system. The program delivery system contemplates (i) at least one operations center, where program packaging and control information are received and then assembled in the form of digital data, and (ii) a digital compression system, where the digital data is compressed, combined/multiplexed, encoded, and mapped into digital signals for satellite transmission (i.e., modulated, upconverted and amplified). The program delivery system transports the digital signals to the concatenated cable television system where the signals are received at the cable headend. Within the cable headend, the received signals may be decoded, demultiplexed, managed by a local central distribution and switching mechanism and then transmitted to subscriber homes via the cable system.

**0018** The delivery system employs an in-home decompression capability employing a decompressor housed within a set-top terminal in each subscriber’s home. The decompressor remains transparent from the subscriber’s point of view and allows any of the compressed signals to be demultiplexed and individually extracted from the composite data stream and then individually decompressed upon selection of a corresponding program by the subscriber. Within the set-top terminal, video signals are converted into analog signals. Control signals are extracted, decompressed and either executed immediately or placed in local storage in a ROM. The program control signals correspond to specific television programs with menu program options that each subscriber may access through a subscriber interface. The subscriber interface is a combined alpha, numeric and icon remote control device which provides direct or menu-driven program access.

**0019** An array of menu templates are generated by either a computer program within the set-top terminal or by the cable headend. The menu templates are generated using the program control information signals received from the Operations Center. A computer program within the set top terminal generates the on-screen menu displays and allocates a specific menu program option for each program signal. A combined alpha and numeric remote control device provides the user interface to each program signal, allowing selection of a specific menu option which corresponds to a particular program signal.

**0020** 2. Operations Center and Digital Compression System

**0021** The Operations Center performs two primary services, packaging television programs and generating the program control signal. At the Operations Center television programs are accumulated from various sources in both analog and digital form. The programs are then packaged into groups and categories which allow for easy menu access to programs and provides optimal marketing of programs to subscribers. The packaging process also accounts for any groupings by transponder which are necessary. After a packaging scheme is developed, the program control information which, among other things, describes the packaging, is generated by a computer and delivered with the packaged programs to the head end and/or subscriber. The system also accommodates local cable and television companies with programming time for local advertising and/or programming time availability.

**0022** The delivery system employs digital compression techniques to increase existing satellite transponder capacity by at least a 6:1 ratio, resulting in a six-fold increase in program delivery capability. The input signals are compressed, combined and encoded prior to satellite transmission, and subsequently transmitted to various receive sites. There are a number of compression algorithms that presently exist which can achieve the resultant increase in capacity and improved signal quality desired for the invention.

**0023** 3. System Control

**0024** Network management, control and monitoring of all compressors and decompressors in the network, is performed by a network controller at the cable headend, where program selection activity, and account and billing information is monitored. In the preferred embodiment, the network controller monitors, among other things, automatic pollback responses from the set-top terminals remotely located at each subscriber’s home. The polling and automatic pollback cycle occurs frequently enough to allow the network controller to maintain accurate account and billing information as well as monitor authorized channel access. In the simplest embodiment, information to be sent to the network controller will be stored in ROM within each subscriber’s set-top terminal and retrieved only upon polling by the network controller.

**0025** Control information from the set top terminal will be sent to the network controller at the cable headend and not directly to the operations center. The digital compression and delivery system of the preferred embodiment provides a one-way path from the Operations Center to the cable headend. Thus, program monitoring and selection control will take place only at the cable headend by the local cable company and its decentralized network controllers (i.e., decentralized relative to the Operations Center which is central to the program delivery system). The local cable company will in turn be in communication with the operations center or a regional control center which accumulates return data from the set-top terminal for statistical or billing purposes. Alternatively, the operations center, and statistical and billing sites could be collocated.

**0026** 4. Menu-Driven Program Selection

**0027** At a given receive site, any of the compressed signals may be demultiplexed or individually extracted from the data stream and passed from the cable headend over the cable system to the subscriber’s set-top terminal. Within the set-top terminal, the individual compressed signals are decompressed and either placed in local storage (from which the menu template may be created), executed immediately, or sent directly to the screen. A combined alpha, numeric and icon remote control device provides the subscriber interface to the system.

**0028** Through this interface, the subscriber may select desired programming through the system’s menu-driven scheme or by directly accessing a specific channel by its
actual number. The menu-driven scheme provides the subscriber with one-step access to all major menus, ranging from hit movies to specialty programs. From any of the major menus, the subscriber can in turn access submenus and minor menus by alpha character access. By using menu-driven, iconic or alpha-character access, the subscriber can access desired programs by simply pressing a single button rather than recalling from memory and pressing the actual channel number to make a selection. The subscriber can access regular broadcast and basic cable television stations by using either the numeric keys on the remote control and pressing the corresponding channel number, or one of the menu icon selection options.

[0029] It is an object of the invention to provide a user friendly interface for subscribers to access television programs.

[0030] It is an object of the invention to efficiently package and deliver television programs to subscriber homes.

[0031] It is an object of the invention to allow users to easily navigate through hundreds of programming choices using on-screen menus.

[0032] It is an object of this invention to allow subscribers to select a program from among hundreds of choices without a television viewing guide.

[0033] It is an object of this invention to efficiently utilize digital compression techniques to deliver hundreds of television program options to subscribers’ homes.

[0034] It is an object of this invention to provide pay-per-view type program access in the same system as specialty channel and broadcast television access.

[0035] It is an object of this invention to allow users to subscribe on-screen to specialty channels.

[0036] It is an object of this invention to provide centralized national system of program packaging and delivery for cable television.

[0037] It is an object of this system to provide a centralized program packaging and delivery system with the capability for incorporating local availability of program and advertising time.

[0038] It is an object of this invention to monitor subscriber viewing choices for statistical purposes.

[0039] It is an object of this invention to provide on-screen billing information to subscribers.

[0040] It is an object of this invention to provide sophisticated on-screen television menus which can incorporate still video and moving video.

[0041] It is an object of this invention to provide a system capable of advertising products and services with on-screen television menus.

[0042] It is an object of this invention to provide a user friendly system capable of offering High Definition Television (HDTV) programs.

[0043] It is an object of this invention to provide a user friendly system capable of offering interactive television services.

[0044] It is an object of this invention to provide a user friendly cable system capable of supplying both television programming and digital audio programming.

[0045] It is an object of this invention to provide a system which offers HDTV, interactive services, and digital audio programming.

[0046] It is an object of this invention to provide a more compelling way for cable operators to promote not only their pay per view options, but also to promote their current offerings of cable service through menu and screen generation for local, customized programming of menu screens.

[0047] It is an object of this invention to allow subscribers to access digitally compressed audio channels with the same decompression system used for their television.

[0048] These and other objects and advantages of the invention will become obvious to those skilled in the art upon review of the following description, the attached drawings and appended claims.

DESCRIPTION OF THE DRAWINGS

[0049] FIG. 1. FIG. 1 is a schematic of the overall system design.

[0050] FIG. 2. FIG. 2 is a schematic of the primary components of the invention.

[0051] FIG. 3a. FIG. 3a is a diagram of the bandwidth allocation for a 750 MHz system.

[0052] FIG. 3b. FIG. 3b is a diagram/chart of the compressed channel allocation for the system.

[0053] FIG. 3c. FIG. 3c is a diagram showing how three cable television systems with different bandwidths may use the program delivery system of the present invention simultaneously.

[0054] FIG. 3d. FIG. 3d is a diagram showing three different cable headend systems, each system receiving the entire satellite signal and stripping those parts of the signal which cannot be handled by the local cable system.

[0055] FIG. 3e. FIG. 3e is a diagram showing dynamic change in bandwidth allocation from a typical week day prime time signal.

[0056] FIG. 4a. FIG. 4a is a block diagram of the Operations Center and Master Control Site.

[0057] FIG. 4b. FIG. 4b is a block diagram of the computer assisted packaging shown in FIG. 4a.

[0058] FIG. 5. FIG. 5 is a flow chart of the processing occurring at the Operations Center.

[0059] FIG. 6. FIG. 6 is a chart of the program control information carried by the program control information signal.

[0060] FIG. 7a. FIG. 7a is a block diagram of the internals of the set top terminal.

[0061] FIG. 7b. FIG. 7b is a block diagram of an alternative embodiment of the internals of the set top terminal.

[0062] FIG. 8a. FIG. 8a is a perspective front view of a set top terminal.
[0063] FIG. 8a. FIG. 8b is a perspective rear view of a set top terminal.

[0064] FIG. 9a. FIG. 9a is a schematic of a basic decompression box and upgrade module, with the associated connections.

[0065] FIG. 9b. FIG. 9b is a schematic of an alternative embodiment of a simple decompression unit and upgrade module, with associated connections.

[0066] FIG. 10a. FIG. 10a is a drawing of storage for on-screen menu templates stored in graphics memory of the set top terminal.

[0067] FIG. 10b. FIG. 10b is a drawing showing the hierarchical storage of graphics memory for the set top terminal.

[0068] FIG. 10c. FIG. 10c is a drawing of a flow chart showing the steps required for the microprocessor to retrieve, combine and display a menu.

[0069] FIG. 10d. FIG. 10d is a drawing of a flow chart showing the steps required for the microprocessor to sequence program menus.

[0070] FIG. 11a. FIG. 11a is a schematic showing the two parts of a remote control unit.

[0071] FIG. 11b. FIG. 11b is a drawing of the complete remote control derived from FIG. 11a.

[0072] FIG. 12a. FIG. 12a is a color photograph showing a perspective view of the preferred remote control unit of the present invention.

[0073] FIG. 12b. FIG. 12b is another drawing of the preferred remote control unit shown in FIG. 12a.

[0074] FIG. 13. FIG. 13 is a flow chart of the progression of primary menus in the menu driven system of the set-top terminal.

[0075] FIG. 14a. FIG. 14a is a drawing of the basic menus used in the present invention, including the ten major menus represented by icons.

[0076] FIG. 14b. FIG. 14b is a drawing of the basic menus used in the present invention, in addition to FIG. 14a.

[0077] FIGS. 15a-15b. FIGS. 15a-15b are drawings of introductory menus.

[0078] FIGS. 16a-16d. FIGS. 16a-16d are drawings of home menus.

[0079] FIG. 17. FIG. 17 is a drawing of an alternative of a home menu.

[0080] FIGS. 18a-18g. FIGS. 18a-18g are drawings of major menus.

[0081] FIGS. 19a-19b. FIGS. 19a-19b are drawings of hit movie description menus.

[0082] FIGS. 20a-20b. FIGS. 20a-20b are drawings of hit movie confirmation submenus.

[0083] FIGS. 21a-21b. FIGS. 21a-21b are drawings of hit movie notification submenus.

[0084] FIG. 22a. FIG. 22a is a drawing of a hit movie escape during program menu.

[0085] FIG. 22b. FIG. 22b is a drawing of a hit movie during program hidden menu.

[0086] FIG. 22c. FIG. 22c is a drawing of a hit movie re-entry submenu.

[0087] FIG. 23. FIG. 23 is a drawing of a movie library major menu.

[0088] FIG. 24. FIG. 24 is a drawing of a hit movie description menu.

[0089] FIG. 25. FIG. 25 is a drawing of a movie library confirmation menu.

[0090] FIGS. 26a-26b. FIGS. 26a-26b are drawings of major menus.

[0091] FIGS. 27a-27b. FIGS. 27a-27b are drawings of submenus for the major menus shown in FIGS. 26a-26b.

[0092] FIGS. 28a-28b.

[0093] FIGS. 29a-29c. FIGS. 29a-29c and FIGS. 29a-29c are drawings showing examples of submenus for the menus shown in FIGS. 27a-27b.

[0094] FIG. 30. FIG. 30 is a drawing of a specialty channel major menu.

[0095] FIGS. 31-34. FIGS. 31-34 are drawings of submenus related to FIG. 30.

[0096] FIGS. 35-39. FIG. 35 is a drawing of a magazine channel major menu.

[0097] FIGS. 36-38. FIGS. 36-38 are drawings of submenus related to FIG. 35.

[0098] FIGS. 39-43. FIG. 39 is a drawing of a documentary/news major menu.

[0099] FIGS. 40-42. FIGS. 40-42 are drawings of submenus related to FIG. 39.

[0100] FIGS. 43-47. FIG. 43 is a drawing of an entertainment choice major menu.

[0101] FIGS. 44-48. FIG. 44 is a drawing of a submenu related to FIG. 43.

[0102] FIGS. 49-53. FIG. 45 is a drawing of a children's programs major menu.

[0103] FIGS. 54-58. FIG. 46 is a drawing of a program description submenu related to FIG. 45.

[0104] FIGS. 59-63. FIG. 47 is a drawing of a sports major menu.

[0105] FIGS. 64-68. FIGS. 49a-49d. FIGS. 48 and 49a-49d are drawings of submenus related to FIG. 47.

[0106] FIGS. 50a-50b. FIGS. 50a-50b are drawings of menus related to high definition television programming.

[0107] FIGS. 51a-51f. FIGS. 51a-51f are drawings of menus related to program guide services.

[0108] FIGS. 51g-51l. FIGS. 51g-51l are drawings of broadcast television menus.

[0109] FIGS. 51m-51w. FIGS. 51m-51w are drawings of mood question menus.

[0110] FIGS. 52a-52c. FIGS. 52a-52c are drawings of interactive television promotional menus, for Levels A.
satellite transmission 206 technologies, accepts video, audio and data signals ranging in signal quality, and input from a number of sources.

0125] Upon receipt of the programming signal at the cable headend 208, the signal is again treated if necessary and sent into a concatenated cable system to the subscriber’s home. The signal reaches the subscriber’s home in a compressed format and must be decompressed prior to viewing. Included in the delivered program signal is information which enables equipment at the subscriber’s home to display menus for choosing particular programs. Depending on the particular embodiment, the television program signal may arrive at the subscriber’s home via one or more coaxial cables, fiber cables, twisted pairs, cellular telephone connections, or personal communications network (PCN) hookups.

0126] This connection between the subscriber’s home and the cable headend 208 allows for two-way communications. Utilizing this two-way communications, the cable headend 208 receives information about a subscriber’s account, billing, and programs viewed. Also, the cable headend 208 is capable of sending computer data or computer software information to the subscriber’s home.

0127] As shown in FIG. 1, an analog cable TV system 210 can exist alongside and within the digitally compressed system of the present invention. The digital transmissions do not effect the analog system. In fact, the analog cable signal may be transmitted simultaneously on the same cable as the digital signal. The cable headends may continue to supply subscribers with local channels in an analog signal format.

0128] FIG. 2 shows a more detailed overview of the operation of the present invention. The Operations Center 202 shown performs program packaging and delivery control. In the preferred embodiment, the packaged program signal will be treated at a master control uplink site 211 prior to being transmitted to the satellite 206. Various satellite multi-accessing schemes and architectures can be used with the system, including both single channel per transponder time division multiplex (TDM) and multiple channel per transponder single channel per carrier (SCPC). Time division multiplexing is the more desirable scheme. The signal is transmitted from the satellite 206 to the cable headend 208 where a computer system including a digital switch treats the signal and delivers it through cables to a subscriber’s home. In alternate embodiments, multiple Operations Center 202 and multiple uplink sites can be simultaneously utilized.

0129] In the embodiment shown in FIG. 2, two cables 216 are used between the cable headend 208 and the subscriber’s home. In this particular embodiment, analog signals, digitally compressed signals, other digital signals and up-stream/interactivity signals are sent and received over the two cables 216.

0130] The cable headend 208 receives the digitally compressed and multiplexed signal from the satellite 206 and processes the signal for further distribution to the subscriber homes. The cable headend 208 performs two primary functions in the cable delivery system. It will act as a signal processor 212 and distribution center for routing the digitally compressed signals to subscribers and it will act as a network controller 214 receiving information from subscrib-
ers and passing the information on to the Operations Center 202 or other remote sites (such as regional, statistical and billing sites not shown). In order to perform these two functions, the cable headend 208 of the preferred embodiment is equipped with two computer processors working in unison. Use of two processors performing different functions increases the speed and capability of the cable headend 208 without a significant increase in cost. One processor, the signal processor 212, handles the receiving and processing of the satellite 206 signal for distribution to subscribers. The second processor acts as a network controller 214 and monitors activity of the subscriber’s set top terminal 220. The cable headend 208 can be operated by one CPU or a series of CPU’s which perform the signal processing and network control functions.

[0131] The signal processor 212 will treat the signal as necessary for use by the subscriber’s set top terminal 220. In the simplest embodiment, the amount of processing that is necessary by the signal processor 212 is limited to demultiplexing and frequency allocation. However, in alternative embodiments, the signal processor 212 demultiplexes the signal, allocates frequencies and then re-multiplexes the signal using a different multiplexing scheme prior to the signal’s distribution to the subscriber. In addition, for embodiments in which the control of local availability time is desired at the cable headend 208, the signal processor 212 must be capable of compressing and adding additional signals to the satellite 206 signal. In order to incorporate local programming, the signal processor 212 would demultiplex the satellite 206 signal, compress the local programming, combine the compressed local program with the satellite 206 signal and then multiplex the signal prior to delivery to the subscriber terminals. Most of the activities necessary for incorporating local programming will be automatically performed by the signal processor 212. In the preferred embodiment, the signal processor 212 incorporates all the necessary digital switching capability to serve numerous subscribers.

[0132] Signals received by the cable headend 208 must be decompressed before transmission from headend to subscriber location only when the compression algorithm used for the cable system differs from the one used for satellite transmission 206. This difference may result from different bandwidth constraints between the cable transmission media and the satellite 206 transponder. Such a difference would necessitate the use of separate compression algorithms to maintain desired signal quality and throughput over both of the transmission mediums.

[0133] System control is performed by the network controller 214. The primary task of the network controller 214 at the cable headend 208 is to manage the configuration of the set top terminals, which includes receiving and processing signals from the set top terminal units. The network controller 214 must also monitor selections at subscribers’ homes, maintain accurate account and billing information, authorize subscriber channel access, and authorize particular set top terminals to operate in the system. Information required to operate the network will be stored in memory (either in RAM, ROM, magnetic or optical Read/Write) at the cable headend 208 and also in memory (RAM and/or ROM) within each subscriber’s set top terminal 220. Two-way communications between the network controller 214 and set top terminal 220 will occur over cable links. Interactive television programming can be accommodated through the network controller 214. In addition, the network controller 214 will be able to access set top terminals via telephone lines for trouble shooting, special features or sophisticated reprogramming.

[0134] The network controller 214 regularly polls each set top terminal 220 to acquire needed information to operate the system. The network controller 214 sends signals to set top terminals to authorize their operation and to authorize access to specific channels. If a subscriber has failed to pay a recent bill, the network controller 214 can deauthorize the subscriber’s set top terminal 220. When a subscriber orders a program or channel the network controller 214 checks the subscriber’s account for good standing and then authorizes the access by signaling the set top terminal 220.

[0135] To perform its functions, the network controller 214 must work closely with the signal processor 212. In many instances the program control information signal received from the Operations Center 202 must be modified prior to being sent to the set top terminals. These modifications to the program control information are made by the network controller 214 working in conjunction with the signal processor 212 to send a set top terminal 220 control information stream (STTCIS). From the signal processor 212, the network controller 214 receives the program control information signal which includes cable franchise specific information added by the Operations Center 202. The network controller 214 modifies the program control information signal, if necessary, and communicates the new information to the signal processor 212. The signal processor 212 then forwards the information to the set top terminal 220 in the form of the STTCIS. In most instances the network controller 214 will modify the program control information signal by adding additional information. In a simple embodiment the program control information signal can be passed through the cable headend 208 to the set top terminal 220 without any modifications.

[0136] Although the signal processor 212 will handle the addition of simple local availabilities (e.g. local advertisements) into the signal sent to the set top terminal 220, the network controller 214 will handle any of the more sophisticated local programming needs such as interactive programming and certain data services. The network controller 214 will receive any electronic signals sent by the set top terminal 220 including those in response to interactive service requests and some data service requests. The network controller 214 coordinates the necessary switching and access to allow the subscriber to enjoy these services.

[0137] The network controller 214 has the capability of performing “on the fly programming” changes, assisting in masking portions of subscriber’s television screens (split screen video), assist in selecting different audio signals for the same video (foreign languages), assist in interactive features, create tiered programming, etc. For last minute changes to programming (such as for a local emergency or important regional events), an operator using the network controller 214 can modify the program control information signal “on the fly” and change menus available to the subscriber. This accommodates short notice changes to program packaging that can not be provided to the Operations Center 202 in advance. In order to accommodate split screen techniques for promo and demo video (which will be
described later), those undesired video portions of the screen
must be masked. The network controller 214 can send the
necessary control information to inform the set top terminal
220 to mask portions of a specific channel's video. For
example, a video channel with a split screen showing four
separate videos would require a ¼ mask to focus the viewer
on the featured video clip.

[0138] Tiered programming allows different users to view
different video even though they are "tuned" to the same
channel. For example, the network controller 214 may know
the demographics of its subscriber’s through a database, by
"learning" from prior subscriber choices, from an interactive
selection, or from other means. Using the demographics
information, the network controller 214 may target commer-
cials to the correct audience by showing different commer-
cials to subscriber’s with different demographics. Even
though subscriber’s will believe they are "tuned" to one
channel, they will be switched to a different channel for the
tiered video. Alternatively, the subscriber’s may be offered
an option of several commercials from which to choose.

[0139] To accommodate foreign speaking subscribers,
multiple audio channels for television programming may be
provided. The subscriber may be shown menus of programs
available in his native language. The function of choosing
the correct audio to correspond to the selected language
may be handled by either the set top terminal 220 or the network
controller 214 depending upon the configuration. Local
programming in several languages or additional audio chan-
nels for a foreign language translation of a popular television
program may be provided by the network controller 214.
Using a picture-on-picture feature, sign language may be
similarly made available to certain set top terminals for the
deaf. Also, a text overlay may be easily produced on the
lower part of the screen for the deaf.

[0140] In the more sophisticated and expensive embody-
ments, the network controller 214 can act as a central
computer and provide intra-set top terminal interactive
games, inter-set top terminal interactive games, computer
bulletin board type services, message services (Electronic
mail) etc. For example, a subscriber may play war games
with six of his (anonymous) fellow subscribers each in their
own home each operating a separate tank. The network
controller 214 gathers the players via set top terminal
communications and acts as the referee. A bulletin board or
message system can be set up to discuss a particular program
such as "Twin Peaks Whodunit" for enthusiasts. These
interactive features are further described below with the
interactive services level B menu and the set top terminal
hardware upgrade level B interactive unit.

[0141] Also shown in FIG. 2 is the set top terminal 220
that receives the signals from the cable headend 208 and
manipulates them for the subscriber. The set top terminal
220 is equipped with local computer memory and the
capability of interpreting the digitally compressed signal
to produce menus for the subscriber. Although the set top
terminal 220 is shown on top of the subscriber’s television
222, it may be placed anywhere in the subscriber’s home
that is accessible by the remote control. The remote control
communicates the subscriber’s selections to the set top
terminal 220. The subscriber’s selections are generally
based upon menus or other prompts displayed on the tele-
vision screen. A typical menu is shown in FIG. 2 on the

[0142] One of the achievements of the present invention is
effective utilization of digital compression technology by
packaging television programs into categories that allow
easy access to television programs by consumers. With
current digital compression techniques for video, the typical
50-channel capacity cable satellite receiving system can be
increased to 300 channels. Presently, one transponder is used
for each satellite delivered channel. The preferred embo-
diments use 18 satellite transponders and compression ratios
of 4:1 to 8:1 to achieve a capacity of 136 satellite delivered
channels. More transponders or higher compression ratios
can be used to deliver up to the channel capacity of any
existing cable system.

[0143] Typical program packaging and delivery first
involves the digitizing of the video signals. This is then
followed by one of a variety of digital compression tech-
niques that are available. Following compression the chan-
nels must be multiplexed and sent to the satellite 206
that will provide the uplink. A variety of multiplexing
schemes may be used in the system. In some situations, it
may be advantageous to use different multiplexing schemes
in different parts of the overall system. In other words, one
multiplexing scheme may be used for satellite transmission
206 and a second remultiplexing scheme for the land trans-
mis.

[0144] Once the signal has arrived at the uplink or master
control site, it must be modulated, upconverted, and ampli-
fied. Various types of satellites and transponders are able of
delivering digital signals may be used in this cable television
packaging and delivery system. An example of a digital
satellite that may be used is the AT&T Telstar 303.

[0145] In order to achieve the required throughput of
video and audio information for the system, digital com-
pression techniques for video are employed. A television
signal is first digitized. The object of digitization is two-fold:
First, in the case of an analog signal, like a television picture,
digitization allows the signal to be converted from a wave-
form into a digital binary format. Secondly, standard digital
formats are designed to have the resulting pictures or video
stills take up less space on their respective storage mediums.
Essentially, standard digital formats define methods of com-
pression.

[0146] A video screen is divided into picture elements
known as pixels. Images define one pixel at a time are
referred to as “bit-mapped” images. Most compression tech-
niques take the bit-mapped images and convert them into a
series of mathematical algorithms both to reduce storage
space and to allow for the mathematical manipulation of
images that is often not possible with analog formats. This
is possible because many images have pixels that repeat
themselves. For example, a photograph of a blue, cloudless
sky will have a great number of “repeating” picture ele-
ments. This redundancy can be represented with great pre-
cision by mathematical formulas. Finally, once images have
digitized, the standard digitized formats also include tech-
niques required to re-render the images into their final form,
either fully bit-mapped or into an analog wave-form. There
are three basic digital compression techniques: within-frame
(intraframe), frame-to-frame (interframe), and within-car-
rrier. Intraframe compression processes each frame in a
television picture to contain fewer visual details and, there-
fore, the picture contains fewer digital bits. For example,
information on blocks of pixels is sent rather than individual digitized pixels themselves. A six by six block of pixels contains thirty-six pixels. Each pixel can be defined by an eight-bit word. Therefore, a six by six block of pixels equals two hundred eighty-eight bits. If the information on the block rather than the individual pixels themselves, is transmitted, this reduces the amount of information transmitted. Blocks of various sizes may be used as is known by those skilled in the art.

[0147] Interframe compression transmits only changes between frames, thus omitting elements repeated in successive frames. Motion prediction technology and motion detection technology are necessary to determine what portions of a changing picture may be compressed. Therefore, if a block does not vary between several frames, the block is transmitted once, and repeated at the receive site for successive frames.

[0148] Within-carrier compression allows the compression ratio to dynamically vary depending upon the amount of changes between frames. If a large number of changes occur between frames, the compression ratio drops from, for example, sixteen-to-one to eight-to-one. If action is intense, the compression ratio may drop to four-to-one.

[0149] Various compression methods are used for the above techniques. In vector quantization, a block is compared to a library of standard blocks and a best fit comparison is made between the two. Each block in the library has a corresponding sixteen bit code. Only this code is transmitted to represent the block, rather than the actual block of pixels itself. Therefore, a two hundred eighty-eight bit block of pixels is converted into a sixteen bit code resulting in a compression ratio of: 288 bits/16 bits=18. The converse process is performed at the receive site to convert the sixteen bit codes into two hundred eighty-eight bit blocks for reproduction on a television receiver. Other types of compression are known to those skilled in the art, including, for example, discrete cosine transform (“DCT”).

[0150] Several standard digital formats representing both digitizing standards and compression standards have been developed. For example, JPEG (joint photographic experts group) is a standard for single picture digitization. Motion picture digitization may be represented by standards such as MPEG or MPEG2 (motion picture engineering group specification). Other proprietary standards have been developed in addition to these. Although MPEG and MPEG2 for motion pictures are preferred in the present invention, any reliable digital format with compression may be used with the present invention.

[0151] Various hybrids of the above compression techniques have been developed by several companies including AT&T Communication Labs, Inc., General Instrument, Scien-tific-Atlanta, Philips, and Zenith. As is known by those skilled in the art, any of the compression techniques developed by these companies, and other known techniques, may be used with the present invention.

[0152] FIG. 3a shows effective allocation of 750 mHz of bandwidth for television programming. In FIG. 3a bandwidth is allocated for both analog and digitally compressed signals. In the preferred embodiment, the bandwidth is divided so that each category of program receives a portion of the bandwidth. These categories correspond with major menus of the user interface software. The representative categories shown in FIG. 3a include: (1) high definition TV made possible through the use of compression technology, (2) A la Carte Channel category which provides specialty channels for subscription periods such as monthly, and (3) pay-per-view.

[0153] FIG. 3b shows a chart of compressed channel allocation for a variety of programming categories that have been found to be desirable to subscribers. By grouping similar shows or a series of shows into blocks of channels, the system is able to more conveniently display similar programming with on-screen television menus. For example, in the movie category, which has the greatest allocation of channels, the same movie may be shown continuously and simultaneously on different channels. Each channel starts the movie at a different time allowing the subscriber to choose a more suitable movie start time.

[0154] In order to accommodate cable TV systems that have different bandwidths and channel capacities, the television programming and television program control information may be divided into parts such as priority one, two, three. The large bandwidth cable TV systems can accommodate all the parts of the television programming and all parts of the television programming control information. Those cable TV systems with a more limited bandwidth are able to use the program delivery system 200 by only accepting the number of parts that the cable system can handle within its bandwidth.

[0155] For instance, as is shown in FIG. 3c, three cable television systems with different bandwidths may use the program delivery system 200 simultaneously with each system accepting only those parts of the information sent which is capable of handling. Priority one programming and menus 230 are accepted by all three systems. Priority two television programming and menus 233 are not accepted by the cable television system whose capacity is the smallest or in this case 330 mHz (40 channels) system. Priority two television programming and menus 233 are accepted and used by the two larger capacity cable television systems shown. Priority three television programming and menus 236 are only used by the largest capacity television system which is capable of handling all three parts—Priority one, two and three programming and menu information.

[0156] With this division of television programming and menus, the program delivery system 200 may be utilized simultaneously by a variety of concatenated cable systems with varying system capacities. By placing the highly watched or more profitable programming and menus in the Priority one division, both users and owners of the cable TV systems will be accommodated as best as possible within the limited bandwidth.

[0157] FIG. 3d shows three different cable headend 208 systems, each system receiving the entire satellite signal from the Operations Center 202 and stripping those parts of the signal which cannot be handled by the local cable system due to bandwidth limitations. In this particular embodiment, the three local cable television systems shown have bandwidth limitations which correspond with the bandwidth limitations depicted in the previous FIG. 3c. As the bandwidth decreases, the programming options available to the viewer in the exemplary on-screen menu decreases. Using
this preferred embodiment, the Operations Center 202 is able to send one identical signal to the satellite 206 that is sent to all the cable headends. Each cable headend 208 accepts the entire signal and customizes the signal for the local cable system by stripping those portions of the Operations Center 202 signal that are unable to be handled by the local cable system. An alternate embodiment requires the Operations Center 202 to send different signals for reception by different capacity cable headends.

[0158] There are several ways in which the cable headend 208 may strip the unnecessary signal from the Operations Center 202. A person skilled in the art will derive many methods from the three examples discussed below. One simple method is for the cable headend 208 receiver to receive the entire signal and then manipulate the signal to strip away those unnecessary portions. A second method is for the signal to be sent in three portions with each portion having a separate header. The cable headend 208 would then recognize the headers and only receive those signals in which the proper header is identified. For the second method, the Operations Center 202 must divide the signal into three parts and send a separate header lead before each signal for each part.

[0159] The third and preferred method is for a set of transponders to be assigned to one priority level and each cable headend 208 to receive signals from the transponders corresponding to the proper priority level. For example, if there are three priority levels and 18 transponders, transponders one through nine may be assigned to priority level one, transponders ten through fourteen priority level two, and transponders fifteen through eighteen assigned to priority level three. Thus, a cable headend 208 capable of operating at priority level two only would only receive signals from transponders one through nine, and ten through fourteen.

[0160] In addition to dividing the television programming and menus into parts, the Operations Center 202 of the preferred embodiment is also capable of dynamically changing the bandwidth allocation for a particular category of programming. FIG. 3e depicts this dynamic change in bandwidth allocation from a typical week day prime time 238 schedule to a Saturday afternoon in October 240 (during the college football season). FIG. 3e highlights the fact that the bandwidth allocated to sports is limited to eight selections during week day prime time 238 but is increased to sixteen selections during a Saturday afternoon in October 240. This dynamic increase in bandwidth allocation allows the system to accommodate changes in programming occurring on an hourly, daily, weekly, monthly, seasonal and annual basis.

[0161] In addition to dynamically allocating bandwidth for programming categories, the Operations Center 202 can also dynamically change the menu capacities in order to accommodate the change in programming and bandwidth. For example, on a Saturday afternoon in October 240, the major menu for sports may include a separate subcategory for college football. This subcategory would, in turn, have a separate submenu with a listing of four, six, eight, or more college football games available for viewing. In order to accommodate this dynamic menu change, the Operations Center 202 must add a submenu listing to the major sports menu, create a new or temporary submenu for college football, and allocate the necessary menu space on the college football submenu.

[0162] Once the television programs have been packaged and a program control information signal is generated to describe the various categories and programs available, the packaged programs are then digitized, compressed, and combined with the program control information signal. Upon the signal's departure from the Operations Center 202 the breakdown into categories is insignificant and the signal is treated like any other digitally compressed signal.

[0163] FIG. 4a shows the basic operations that must occur in order for the packaged signal to be sent to the satellite 206. External digital and analog signals must be received from television programming sources and converted to a standard digital format 242, defined above for the computer assisted packaging equipment (CAP) 246. Also within the Operations Center 202, stored programs 244 must be accessed using banks of looping tape machines or other video storage/retrieval devices, either analog or digital, and converted to a standard digital format 242 prior to use by the CAP 246.

[0164] The programmer/packager utilizing the CAP 246 must input a variety of information in order to allow the CAP 246 to perform its function of generating program control information and packaging programs. Some of the information required by the CAP 246 are the date, time slots and program categories desired by the television programmer.

[0165] The CAP 246 system includes one or more CPUs and one or more programmer/packager consoles. In the preferred embodiment, each packager console includes one or more CRT screens, a keyboard, a mouse (or cursor movement), and standard video editing equipment. In large Operations Centers 202s multiple packager consoles may be needed for the CAP 246.

[0166] As shown in FIG. 4b, the first step in the operation of the CAP 246 is selecting the type of programming 248 which will be packaged. Basically there are 6 broad categories in which most television programming can be classified: static programming 250, interactive services 252, pay per view 254, live sports specials 256, mini pays 258, and data services. Static programs are programs which will show repetitively over a period of time such as a day or week. Static programs include movies showing repetitively on movie channels, children's programs, documentaries, news, entertainment.

[0167] Interactive services include interactive programs using the Vertical Blanking Interval (VBI) or other data streams synchronized with the programming to communicate interactive features (such as those used in education), and games. Pay per view are programs which are individually ordered by the subscriber. After ordering, the subscriber is authorized to access the program for a limited time, (e.g. three hours, two days, etc.). Live sports specials are live events usually related to sports which subscribers are unlikely to watch on taped delay.

[0168] Mini pays are channels to which each set top box may subscribe. The subscriptions for mini pays 258 may be daily, weekly, or monthly. An example would be the Science Fiction channel. Data services are services in which information is interactively presented to the subscriber using a modem or other high rate of speed data transfer. Some examples are Prodigy, services for airline reservations, and TV guide services (e.g. TV Guide X, PRESS™, InSight™, etc.). Data could also include classified or other forms of advertising.
[0169] After selecting the type of programming, the packager must identify a pool of programs (within the category) to be packaged. The next CAP 246 step varies for different program categories. For the category of live sports, additional program interstitial elements 262 may be added such as promos and other sports news before further processing. For the live sports, static, interactive services 252 and pay per view 254 categories the following CAP 246 step is for one television program to be selected 264. This is followed by each program individually being assigned dates to be played or a start date (for continuous play) and start times 266. Many dates and start times may be assigned to any given program. The program information for these categories may then be processed for allocation of transponder space and setting of prices.

[0170] Mini pays and data services require less processing by the CAP 246. After identifying the mini pays 258, the CAP 246 may proceed to allocation of transponder space and pricing for the mini pays 258. Data services in the preferred embodiment generally do not require allocation of transponder space and generally do not require price setting. The information for data services 260 may be directly processed for menu configuration. In alternate embodiments the data services 260 may be processed through these portions of the CAP 246 program.

[0171] The CAP 246 then uses an interactive algorithm to allocate transponder space 268 and set prices 270. The factors weighed by the algorithm are: 1. buy rates of the program, 2. margin of profit on the program, 3. length of the program, 4. any contractual requirement which overrides other factors (such as requirement to run a specific football game live in its entirety). The information on buy rates of the program may be obtained from the Central Statistical and Billing Site or a Regional Statistical and Billing Site as will be described later. The CAP 246 must consider the priority levels of programming when allocating transponder space. Particularly, as in the preferred embodiment, transponders are assigned to three priority levels.

[0172] Following transponder allocation and price setting, the CAP 246 proceeds to menu configuration 272. The positioning of programs within the menu configuration 272 can have an effect on subscriber buy rates for the program. Therefore, an algorithm accounting for either a manually assigned program importance, or a calculated weight of the program importance, is used to determine each program’s position within the menu scheme. For instance, a popular program with a high profit margin may be assigned a high weight of importance and shown in a prominent place in the menu scheme. Alternatively, a high profit program with sagging sales may be manually assigned a prominent place in the program schedule to increase sales.

[0173] After a series of entries by the programmer/packager at the Operations Center 202, the CAP 246 displays draft menus or schedules (including priority levels) for programming. The packager may now manipulate the menus and schedules and make changes as he feels necessary. After each change, the packager may again display the menus or schedules and determine if any more changes are necessary. When the packager is satisfied with the menu configuration 272 and scheduling of television programs, he may then instruct the CAP 246 to complete the process.

[0174] After menu configuration 272, the CAP 246 may begin the process of generating a program control information signal 274. In order to generate program control information signals which are specific to a particular cable headend 208 system, the CAP 246 incorporates cable franchise configuration information 276. In the preferred embodiment, basic cable franchise configuration information 276 is stored at the Operations Center 202. The cable franchises upload changes to their specific franchise information from time to time to the Operations Center 202 for storage. Preferably a separate CPU handles the management of the cable franchise information. From the stored cable franchise information, the CAP 246 generates a cable franchise control information signal which is unique to each franchise.

[0175] Using the unique cable franchise control information signals 278 and the menu configuration 272 information, the CAP 246 generates the program control information signal 274. The program control information that is unique to a particular cable franchise may be identified in various ways such as with a header. With the header identification, the cable headend 208 may extract the portions of the program control information signal which it needs. Now, the CAP 246 may complete its process by electronically packaging the programs into groupings 280 for the signal transmission and adding the program control information to the packaged programs 282 to form a single signal for transmission. Through manual entries by the packager or by comparing against a list of programs, the CAP 246 will determine whether the programs are arriving from external sources 204 or sources internal to the Operations Center 202.

[0176] Upon completion of the CAP’s functions, the Operations Center 202 or the uplink site compresses 284, multiplexes 286, amplifies 288 and modulates 290 the signal for satellite transmission 292. In a basic embodiment, the CAP 246 will also allow entry of time slots for local avails where no national programming will occur.

[0177] FIG. 5 is a more detailed flow chart of some of the functions performed by the CAP 246 after an initial program schedule has been entered and menu configurations generated. The flow chart 300 shows six basic functions that are performed by the CAP 246: (1) editing program schedule for local availability 304 (only for non-standard services, i.e. those services that are not national cable services); (2) generating program control information signals 307; (3) processing external programs 310; (4) processing internal programs 320; (5) processing live feeds 330; and (6) packaging of program information 340. In an alternate embodiment, the CAP 246 is capable of incorporating local programs and accommodating local availability for local television stations.

[0178] Following completion of the programming scheduling (accounting for local availability if necessary) and menu generation 304, the CAP 246 may perform three tasks simultaneously, generating program information signals 307, processing external programs 310 and processing internal programs 320.

[0179] The CAP 246 automatically identifies external programs needed 312 and identifies which external feed to request the external program 314. The CAP 246 gathers and receives the external programming information and converts it to a standard digital format 316 for use. The CAP 246 also identifies internal programs 322, accesses the internal programs 324, and converts them to a standard digital format if
necessary 326. In addition, the CAP 246 identifies live signal feeds 333 that will be necessary to complete the packaged programming signal 336. In its final task, the CAP 246 completes the packaging of the programs, combines the packaged program signal with the program control information signal, amplifies the signal and sends it out for further processing prior to uplink.

[0180] In the preferred embodiment, the Operations Center 202 and uplink or master control site are collocated. However, the Operations Center 202 and uplink site may be located in different geographical places. Also, functions and equipment within the Operations Center 202 may be remotely located. For instance, the program storage may be at a different site and the programs may be sent to the CAP 246 via landline.

[0181] In alternate embodiments using multiple Operations Centers, it is preferred that one Operation Center be designated the Master Operations Center and all other Operations Centers be Slave Operations Centers. The Master Operations Center performs the functions of managing and coordinating the Slave Operations Centers. Depending on the method in which the Slave Operations Centers share functions, the Master Operations Center coordination function may involve synchronization of simultaneous transmissions from multiple Slave Operations Centers. To perform its functions, the Master Operations Center may include a system clock for synchronization.

[0182] An efficient method of dividing tasks among Operations Centers is to assign specific satellite transponders to each Operations Center 202 and to assign external program sources 204 to the nearest Operations Center 202. Of course this division of resources may not always be possible. Since programming will be grouped into priority levels with each priority level likely to be assigned specific satellite transponders, it is also possible to assign each Operations Center to a priority level. For example, in a three priority level system with two Slave Operations Centers and 18 transponders, the Master Operations Center may be assigned priority level 1 and assigned 9 transponders. Slave Operations Center A may be assigned priority level 2 and 5 transponders, while Slave Operations Center B is assigned priority level 3 and 4 transponders. In a multiple Operations Center configuration dynamic bandwidth allocation and dynamic menu capacity allocation become more complex and must be coordinated by the Master Operations Center.

[0183] Similar to multiple Operations Centers, a delivery system may have multiple satellite uplinks. Preferably each Operations Center has one or more uplink sites. Each Operations Center controls the functions of its assigned uplink sites and may assign one site as a master uplink site.

[0184] The program control information signal generated by the Operations Center provides data on the scheduling and description of programs to the network controller 214 or in alternate configuration directly to the set top terminal 220 for display to the subscriber. In the preferred embodiment, the program control information signal is stored and modified by the network controller 214 and sent to the set top terminal 220 in the form of a set top terminal control information stream (STTCIS). This configuration is required to accommodate differences in individual cable systems and possible differences in set top terminal devices. The set top terminal 220 integrates either the program control signal or the set top terminal control information stream together with data stored in the memory of the set top terminal 220, to generate on-screen displays for assisting the subscriber in choosing the programs he wishes to view. (Throughout the description the term “program control information” is being used to indicate control information coming from the cable headend 208 to the set top terminal 220, whether it is sent directly from the Operations Center, processed by the Network controller 214 and then forwarded to the set top box (STTCIS), or transmitted over telephone lines.)

[0185] The types of information that can be sent via the program control signal include: number of program categories, names of program categories, what channels are assigned to a specific category (such as specialty channels), names of channels, names of programs on each channel, program start times, length of programs, description of programs, menu assignment for each program, pricing, whether there is a sample video clip for advertisement for the program, and any other program, menu or product information.

[0186] The goal of the menu driven program selection system is to allow the subscriber to choose a program by touring through a series of menus utilizing a remote control for cursor movement. The final choice in the series of menus will identify one particular channel and one time for activation of that channel. Armed with a channel and activation time the set top terminal 220 can display the selected program on the television for the viewer. To achieve this goal a simple embodiment assigns an intelligent alphanumeric code to each program. This alphanumeric code identifies the category of the program, the menu in which the program should be displayed, its transmission time(s), and the position on the menu that the program should be displayed.

[0187] In this simple embodiment, the program; control information, including these menu codes, is sent continuously from the Operations Center to the network controller 214, and ultimately to the set top terminal 220. For example, four hours worth of programming information can be sent via the program control information signal continuously in the format shown in FIG. 6.

[0188] FIG. 6 shows the basic information that is needed by the set top terminal 220. The program descriptions shown are coded abbreviations. For example, C for comedy, N for news, S for sports, A for cartoons, and TX for text. If there is a textual description for a program, such as a movie, the description may be given following that program’s coded description or may be communicated following the four hours’ worth of programming information. As is shown in the coded listing, program descriptions for programs greater than a half hour in length need not be repeated (each half hour). The video description code informs the set top terminal 220 of whether there is still or live video available to advertise the program.

[0189] For example, a sporting program may be assigned a code of B35-010194-1600-3.25-Michigan St. vs. USC. The letter B would assign the program to category B, sports. The second alpha-numeric character number 3 would assign the program to the third menu of the sports category. The third character of the code, number 5, assigns the program to the fifth program slot on the third menu. The next six characters, Jan. 1, 1994, represent the date. The following
four characters, 1600 represent the start time which is followed by the length of the program and the program name. This entry represents a sports show, a college football game, which will be aired at 4:00 PM on New Years Day 1994.

[0190] In the 12:30 Channel 1 entry of FIG. 6, two menu codes are shown. By allowing two menu codes, programs that may fit under two different category descriptions may be shown in both menus to the subscriber. With this minimal amount of information being communicated to the set top terminal 220 on a regular basis, the terminal is able to determine the proper menu location for each program and the proper time and channel to activate for the subscriber after his menu selection.

[0191] The program control information signal and STTCIS can be formatted in a variety of ways and the on-screen menus can be produced in many different ways. For instance, if the program control information signal carries no menu format information, the menu format for creating the menus can be fixed in ROM at the set-top terminal. This method allows the program control signal to carry less information but has the least flexibility since the menu formats can not be changed without physically swapping the ROM holding the menu format information. In the preferred embodiment, the menu format information is stored at the set top terminal 220 in temporary memory either in a RAM or EPROM. This configuration provides the desired flexibility in the menu format while still limiting the amount of information needed to be communicated via the program control information signal. New menu format information would be sent via the program control information signal or the STTCIS to the set top terminals each time there was a change to a menu.

[0192] In the simplest embodiment, the menus remain fixed and only the text changes. Thus, the program control information signal can be limited to primarily text and a text generator can be employed in the set top terminal 220. This simple embodiment keeps the cost of the set top terminal 220 low and limits the bandwidth necessary for the program control information. Another simple embodiment uses a separate channel full-time (large bandwidth) just for the menu information.

[0193] As will be described later, live video signals may be used in windows of certain menus. These video signals can be sent via the program control information signal, STTCIS, or can be taken off channels being transmitted simultaneously with the menu display. If the video signal is taken off a channel, less information needs to be sent via the program control information signal. However, this technique requires that separate decompression hardware be used for the program control information and the channel carrying the video. Separate decompressors for the video signals and program information signal allows for the greatest flexibility in the system and is therefore the preferred embodiment. A separate decompressor also assists in assuring that the switch from menus to television programming is smooth and without any significant time delay.

[0194] Live video for menus, promos or demos may be sent to the set top terminal 220 in several ways: a) on a dedicated channel, b) on a regular program channel and scaled to size, c) sent along with the program control information signal, etc. However, in the preferred embodiment, a great deal of short promos or demo video are sent using a split screen technique on a dedicated channel.

[0195] Using a split screen technique, any number of different video clips may be sent (e.g. 2,4,6,8). To show the video dip on a menu, the video must either be scaled and redirected to a video window on a menu screen or a masking methodology can be used. Masking involves playing the entire channel of video (all 2,4,6, or 8 split screens) in background and masking the unwanted video clip portions of the split screen by playing the menu in foreground and overlaying the unwanted background video. Masking is the least expensive method because it does not require any special hardware and it increases video throughput to the set top terminal 220. However, using the masking technique without any video redirecting causes each video clip to be located in a different position on the screen. It also requires the masking to be different for each video clip and makes consistent format difficult. Scaling and redirecting video is generally difficult, expensive and requires additional hardware.

[0196] In order to limit the amount of bandwidth needed to transmit the program control information signal, various compression techniques employed for non-video may be used such as block coding, contour coding, block encoding, and run-length encoding. Further, the program control information signal may be divided into text and graphics, or video, text and graphics and then recombined at the set top terminal 220 using a text generator, graphics decompression, and video decompression as necessary.

[0197] FIG. 7a shows a basic block diagram of a digital compression set top terminal 220. In some respects, the set top terminal 220 is similar to other converter boxes currently available and can include a variety of error detection, decryption 600 and coding techniques such as anti-taping encoding. The set-top terminal must also have a tuner 603, digital demodulator 606, and demultiplexers 609, 616 as well as audio equipment 612, 614. Also shown in FIG. 7a is a remote control interface 626 for receiving and processing signals from remote control unit 900. A modem 627 is provided for allowing communication between a microprocessor 602 and the cable head end. NTSC encoder 625 provides an NTSC video output to be output as a standard television signal.

[0198] The microprocessor 602 is capable of executing program instructions stored in memory. These instructions allow a user to access various menus by making selections on the remote control 900. The various program instructions for accessing menus and performing other functions are described below.

[0199] The manner in which the video is decompressed and the menus are generated from the program control signal or STTCIS varies depending on the specific embodiment of the invention. However, at a minimum, one video decompressor capable of decompressing one video signal must be used. Basic menu format information may be stored in a graphics memory comprising ROM, non-volatile RAM, EPROM, and/or EEPROM 620. Video decompressors 618 and 622 may be used if the video is compressed, and additional equipment to generate menus may be included. In one embodiment, a separate decompressor 622 is used to process the program control information signal and a video combiner 624 incorporates video and menu graphic infor-
In the preferred embodiment, the program signal is sent with three primary parts, compressed video (or video location information), compressed graphics, and text. After the program signal is demultiplexed into its component parts, a video decompressor, a graphic decompressor, a text generator and a combiner are used to assist in creating the menus.

[0200] FIG. 7b shows a basic block diagram of an alternative digital compression set top terminal 220. The same components shown in FIG. 7a are repeated in FIG. 7b, and given the same reference number (e.g., tuner 603, modem 617, NTSC encoder 625, etc.). FIG. 7b also shows the addition of a smart card interface 617 to allow additional features to be included on a smart card insertable into the smart card interface 617. Error correction circuitry 607 is also shown receiving the demodulated signal, prior to demultiplexing the signal. Memory associated with the microprocessor 602, the demultiplexer 609, the decryptor 600, and the video decompressor 618 is shown in FIG. 7b.

[0201] Box 700 in FIG. 7b shows the elements of an upgrade module which is described below with respect to FIGS. 9a and 9b. The remaining circuitry in FIG. 7b shows a basic decompression box 720, also described below.

[0202] The circuitry in box 700 includes a video, graphics and text demultiplexer 616, a text and graphics video plane combiner 624, a graphic decompressor 622 and a graphics memory 620. Graphics in memory 620 is preferably run-length compressed, however other methods of compressing graphics may be used as is known by those skilled in the art.

[0203] The generated menus and video are combined in the combiner 624 and output to an anti-taping encoder 619. Any method of anti-tapping encoding known by those skilled in the art may be used with the present invention.

[0204] FIGS. 8a and 8b show front and back views respectively for the preferred embodiment of the set top terminal 220. The front panel of the set top terminal 220 as shown in FIG. 8a includes an infrared sensor 630 and a series of LED displays 640. These LED displays 640 preferably indicate with an icon or a letter (e.g. A-K) the major menu currently selected by the set top terminal 220. This visual display will remain lit while the subscriber is watching (or listening to) programming within a major menu. The LEDs 640 of the preferred embodiment also show the channels selected directly by a user, or menu channel selections which range from 1 to 50.

[0205] LEDs 640 are preferably provided to indicate a decompression error, a processing error, or other error. Text messages may alternatively be provided to more clearly indicate particular errors to servicemen or subscribers. These error indications aid in repairing or correcting any such errors in the set top terminal 220 or assist in programming the set top terminal 220. Further displays may include current channel, time, volume level, sleep time, parental lock (security), account balance, use of a hardware upgrade, second channel being recorded by VCR, use of the Level D music hardware upgrade in a separate room, and any other displays useful to a subscriber to indicate the current status of the set top terminal 220.

[0206] The LED's 640 may also provide an indication of the digital audio channel currently tuned. With this display feature, subscribers may use the digital audio feature without activating the television screen. The source of a signal and output selected (e.g., a subscriber's separate audio system, a VCR, etc.) may be displayed. Although LED's are preferred, the set top terminal 220 may also use a CRT, LCD's, or other display technology.

[0207] On the right front half of the set top terminal 220 there is a flapped opening 635 into a cavity that allows the insertion of a magnetic cartridge (or similar portable storage device, including optical disk, ROM, EPROM, etc.). This cartridge opening 635 allows the set top terminal 220 to be upgraded or reprogrammed locally with the use of a magnetic tape cartridge. Game cartridges may also be accepted through a similar flapped opening allowing the subscriber to play video games using the set top terminal 220.

[0208] On the top or cover of the set top terminal 220 are located pushbutton controls 645. In the preferred embodiment these pushbutton controls 645 duplicate the two-part alpha-numeric remote control that will be described later. Any function that can be performed on the remote may also be performed at the set top terminal 220 using the duplicative pushbutton controls 645.

[0209] FIG. 8b provides a rear view of one embodiment of the set top terminal 220 including the input/output equipment of the terminal. Moving from left to right there are a pair of output terminals 650, a pair of input terminals 652, a pair of stereo/audio output terminals 654, a satellite dish input port 656, a telephone jack 658 and an RS232 port 660. Further to the right there is an upgrade port 662 and a cover plate 664 held in place by a series of sheet metal screws.

[0210] The set top terminal 220 has two outputs 650, one for a television and one for a VCR. Control signals may be transmitted through the VCR output to allow the VCR to be automatically controlled by the set top terminal 220. Certain programs may be selected by a subscriber from menus, and the VCR will be automatically activated to record the selected program.

[0211] The set top terminal 220 is equipped to handle one or two cable inputs by way of inputs 652 for incoming signals. In addition, a phone jack 658 and RS232 or 422 port 660 are provided for maintenance, trouble shooting, reprogramming and additional customer features. In alternate embodiments, the telephone jack 658 may be used as the primary mode of communication between the cable headend 208 and the set top terminal 220. This connection is possible through the local telephone companies, cellular telephone companies or personal communications networks (PCN).

[0212] In an alternative configuration, in areas without cable services where subscribers use backyard satellite systems (TV RO) to receive packaged television services, the set top terminal 220 will include the appropriate hardware to allow connection to the satellite 206 reception equipment through port 656. In this configuration, the menu system within the set top terminal 220 will be programmed directly from the operations center. Additionally, an upstream communication mechanism must be in place at the subscriber's home (i.e. modem) to communicate information to the operations center.

[0213] In order to provide the greatest flexibility possible and prevent the set top terminal 220 from becoming outdated during the terminal's useful life, an additional electronic card slot or expansion slot has been built into the
preferred embodiment. This expansion slot is covered by the metal plate cover 664 shown in FIG. 8a. It is anticipated that additional memory or capabilities may be needed for certain customer features and also to update the system as the cable delivery system's capabilities increase. The expansion slot provides an easy method to upgrade the terminal hardware.

In the preferred embodiment, the set top terminal 220 includes a hardware upgrade port 662 as shown in FIG. 8b, in addition to the expansion slots behind plate 664. The hardware upgrade port 662 should accommodate at least a four-wire connection for: (1) error corrected, decrypted data output of the set top terminal 220, (2) control interface, (3) decompressed video output of set top terminal 220, and (4) video input port. In the preferred embodiment multiple wires are used to perform each of the four functions. The four sets of wires are combined in a single cable with a single multi-pin connector. Port 662 may also be used to attach various hardware upgrades below to a set top terminal 220.

In the preferred embodiment, multi-pin connections may be used for the multwire cable. The multipin connection 662 may range from DB9 to DB25. A SCSI, or small computer systems interface, port may also be provided. Alternatively, four or more ports may be provided instead of the single port depicted.

The preferred embodiment has four hardware upgrades available for a set top terminal 220: a Level B interactive unit, a Level C interactive unit with compact disc capability, a Level D digital radio tuner for separate room use, and a Level E information download unit. Each of these upgrades is connected to the set top terminal 220 unit via the same upgrade port 662 described earlier. The same four wires in a single cable described earlier may be used.

The Level B interactive unit will allow the user access to online data base services for applications such as home shopping, airline reservations, news, financial services, classified advertising, home banking, and interactive teletext services. For example, with this upgrade, a user will be able to reserve plane tickets or buy consumer electronics. The primary feature of this upgrade unit is that it allows actual transactions to occur requiring two way communications via modem with outside services. This added two way communications capability may be with the cable headend 208. Additionally, this two way communications may occur over cellular or PCN.

The Level C interactive unit will employ a high volume local storage capacity, including compact disc or other random access digital data formats. This unit will allow use of interactive multi-media applications. For example, computer games, multi-media educational software, encyclopedias, other reference volumes (e.g. Shakespeare library), etc. In the preferred embodiment, many of these applications will interact with live programming providing additional information and interactivity to the basic program feed. For example, a viewer watching a show set in a foreign country may be able to retrieve additional information, maps, economic data, etc. about that country that are stored on the compact disc. In the level C applications, the upgrade hardware may closely monitor the television broadcast via additional data channels (e.g. vertical blanking interval, or other digital data encoded within live video) providing context sensitive interactivity.

The Level D hardware upgrade, digital radio tuner, will allow the subscriber separate access to the digital radio channels while other programming (not necessarily radio) is being viewed on the television. Typically this upgrade would be used for digital radio usage in a separate room from that of the television. The upgrade has a separate tuner, decompressor, and visual display. In the preferred embodiment a second remote control (scaled down version) is provided to access the audio system.

The Level E hardware upgrade allows the subscriber to download large volumes of information from the operations center or cable headend 208. The Level E hardware upgrade will enable subscribers to download data such as books to local storage. Primarily the Level E hardware upgrade is additional local storage via hard disk, floppy, optical disk, magnetic cartridge etc. Preferably a small portable reader called "EveryBookTM" is also provided with the upgrade to enable downloaded text to be read without the use of a TV.

The downloadable information may be text or video supplied by the operations center or cable headend 208. With this upgrade, books may be downloaded and read anywhere with the portable reader. Using this upgrade video may be downloaded and stored in compressed form for later decompression. The video would be decompressed only at the time of viewing. Important text that the public desires immediate access may be available through this system. Text such as the President's speech, a new law, or a recent abortion decision rendered by the Supreme Court may be made immediately available.

Using a more sophisticated port, especially the SCSI port, multiple hardware upgrade units may be connected, or "daisy-chained" together, to operate simultaneously.

FIG. 9a shows sets of wires in a single cable connecting an upgrade module 700 and the simple decompression box 720 through a port similar to the hardware upgrade port 662. The simple decompression box 720 preferably is an industry standard decompression box capable of communicating with an upgrade module to enhance functionality. For example, a microprocessor in the simple decompression box 720 will be able to communicate with a microprocessor in an upgrade module 700.

Thus, as shown in FIG. 9a, if this type of connection is built into a simple decompression box that does not have the full functionality of the set top terminal 220, an upgrade module unit 700 may be connected providing the simple decompression box 720 with the full functionality of a set top terminal 220. Subscribers who have purchased simple decompression boxes 720 may be given all the functions of a set top terminal 220 inexpensively.

In the preferred embodiment, multi-pin connections may be used for a multwire cable connecting decompression box 720 with the upgrade module 700. The multi-pin connection may range from DB9 to DB25. A SCSI, or small computer systems interface, port may also be included. Alternatively, four or more ports may be provided instead of the single port depicted.

The digital data set of output wires of the simple decompression box 720 will preferably output error corrected and decrypted data to the upgrade set top terminal 700. The second set of wires, the interface connection, allows the microprocessor in the upgrade module 700 to
communicate to the microprocessor of the simple decompression box 720. In this manner, the video circuitry of the upgrade module 700 and the simple decompression box 720 may be synchronized. The third set of wires, the decompressed video output, can provide the upgrade module 700 with a decompressed video signal to manipulate. The fourth set of wires, video input set, allows the simple decompression box 720 to accept a video signal that is a combined text, graphics, and video signal.

[0227] Upgrade module 700 preferably includes at least the following circuitry: a video, graphics and text demultiplexer; a text and graphics video plane combiner; a run-length graphics decompressor; and, a run-length compressed graphics memory (non-volatile RAM, ROM, EPROM, or EEPROM). By means of communications through the multi wire connection between upgrade module 700 and simple decompression box 720, compressed video and control signals may be demultiplexed by the demultiplexer within upgrade module 700. The run-length graphics decompressor, by communicating with the run-length compressed graphics RAM, permits decompression of the input compressed video signal. The text and graphics video plane combiner in upgrade module 700 allows the demultiplexed and decompressed signal to be output, through simple decompression box 720, to a subscriber's television with both video and overlay menus with text.

[0228] FIG. 9a shows the CATV input 722, the video input 724, and the video and audio outputs 726, 728, as part of simple decompression box 720. This is the preferred embodiment because this will reduce the component cost of upgrade module 700. Upgrade module 700 could simply be a cartridge insertable into simple decompression box 720. Alternatively, as shown in FIG. 9b, the CATV input 722, the video input 724 and the video and audio outputs 726, 728 may be included as part of upgrade module 700.

[0229] The electronics of the set top terminal 200 must receive signals from the Cable headend 208 or Operations Center and separate the program control information from the packaged programs. After separation of the program control information, this signal may be used to generate program menus allowing the user to select specific television programs from within the packaged programs. After selection of a particular program, the set top terminal 220 will demultiplex and extract a single channel signal then decompress the appropriate channel signal to allow the user to watch his selected program. Although the set top terminal 220 can be equipped to decompress all the program signals, this adds unnecessary cost since the subscriber will view one channel at a time. Upon the occurrence of an error in this selection and decompression procedure, the set top terminal 220 LED display will warn the subscriber of an error.

[0230] During the normal functioning of the set top terminal 220 the LED display can be customized by the user to display the time, the program channel, VCR activation or other pertinent information. Although the set top terminals may be operated using the keyboards located on top of the set top terminal 220 box, it is expected that most subscribers will use the remote control.

[0231] Although the preferred embodiment decompresses one channel at a time for the viewer, users who desire to use the picture-on-picture capability of their televisions can be provided with an upgrade to the set top terminal 220 allowing two channels to be tuned and decompressed at any given time. Once two signals are available to the television the picture-on-picture capability may be utilized to its fullest potential. With the picture-on-picture capability available in the set top terminal 220, a special television is not required for picture-on-picture functionality.

[0232] In the preferred embodiment all of the customer features available on the set top terminal 220 will be controllable via on-screen menu displays. In this manner, the subscriber using a cursor may easily customize the programming of his set top terminal 220. The basic programming of each set top terminal 220 will be located on ROM within the set top terminal 220. Random access memory, the magnetic cartridge capability, and the extension card slot will allow upgrades and changes to be easily made to the set top terminal 220.

[0233] In the preferred embodiment, the set top terminal 220 will include features that are now being adopted in the industry such as parental controls and locks, electronic diagnostics and error detection, mute, on-screen volume control, sleep timer, recall of last selection, etc. Each of these features has a corresponding menu that allows on-screen customizing and activation of the feature. The set top terminal 220 also includes a sophisticated favorite channel list and favorite program list.

[0234] In addition to all the features that the set top terminals supports with its current internal programming, additional features may be added or existing features upgraded through remote reprogramming of the set top terminal 220. Utilizing the resident operating system on the ROM, the cable head end is able to reprogram the random access memory of the set top terminal 220. With this capability the cable head end can remotely upgrade software on the set top terminals.

[0235] In the preferred embodiment, the cable head end will reprogram the menu format from time to time based upon special events or programming needs, such as Olympic telecasts, presidential elections, etc. This reprogramming will occur by using the program control information channel and sending the appropriate signals over this channel. In an alternative embodiment, one channel is dedicated for the special programming needs. When reprogramming is to occur, the cable head end will send an interruption sequence on the program control information channel that informs the set top terminal 220 that reprogramming information is to follow. Significant reprogramming of the set top terminals will occur infrequently. However, the changing of color or formats on menus occur more often. In alternative embodiments, color changes to menus may be accomplished via the program control information itself and does not require reprogramming from the cable head end.

[0236] In the preferred embodiment, the basic building blocks or templates of the on-screen menu displays will be stored on graphics memory consisting of non-volatile RAM, ROM, EPROM, or preferably, EEPROM, as shown as 620 in FIG. 10. With the information from this graphics memory 620, the microprocessor 602, graphics decompressor 622, text generator 621 (if necessary), and video combiner 624 will build a menu screen. The memory files of the graphics memory or EEPROM 620 are preferably categorized into three categories, background graphics 800, logo graphics 820, and menu and display graphics 850.
A background graphics file 800 will store menu backgrounds such as: universal main menu backgrounds 804, universal submenu backgrounds 808, promo backgrounds 812 and custom menu formats 816. A logo graphics file 820 will store any necessary logos such as: Your Choice TV logos 824, Network logo files 828, cable system logo files 832, studio logo files 836, and graphic elements file 840. A menu display and cursor graphics file 850 will store menu display blocks 854 and cursor highlight overlays 858 as well as any other miscellaneous files needed to build the menus.

Using this method of storing menus, the menus can be changed by reprogramming the graphics memory 620 of the set top terminal 220. To revise the entire design of displayed menus, the network controller 214 or operations center instructs the EEPROM 620 to be erased and reprogrammed with new menu templates. To change one menu format or logo, the network controller 214 or operations center instructs just the one location in memory to be erased and rewritten. Obviously, this menu reprogramming can be done locally (at the set top terminal 220) by a serviceman.

As shown in FIG. 10a, each memory subtitle is further divided into various memory blocks. For example, the background graphics file 800 contains the universal main menu backgrounds 804. The universal main menu backgrounds memory 804 includes memory units UM1, UM2 and UM3, as shown in FIG. 10a. Similarly, the logo graphics file 820 and menu display and cursor graphics file 850 further contain within those subtitle individual memory blocks (for example, studio logo file 836 has memory block SL1; menu display block 854 has memory menu display block MD1).

FIG. 10b shows the hierarchical storage of text transmitted from the cable head end as STTSCIS. Although text may be continuously transmitted with the video signals to set top terminals 220, text may also be transmitted intermittently. In such a case, the text is stored in the set terminal. Preferably, the text is transmitted and stored in a compressed format using known techniques. Additionally, the text is preferably stored in graphic memory 620 within set top terminal 220.

Depending upon the use of the text, it will be stored in one of three portions of memory. Information sent with the text will either direct the text to a particular portion of memory, or include information as to the priority of text. The microprocessor 602 may then direct the text to the appropriate memory location for storage.

If the text is to be used frequently and over a long period of time, a long term storage 875 will be used. If the text will be used for a shorter period of time (for example, a month), the text will be directed to an intermediate storage area 877. If the text is to be used immediately, or for a short period of time (for example, within a few days) the text is directed to a short term storage area 879. Microprocessor 602 locates the appropriate text required for a particular menu and retrieves it from the appropriate portion of memory 620. The text is output from the graphics memory 620 to the text generator 621. Text generated from the text generator 621 is thereafter directed to text/graphics combiner 624.

FIG. 10c shows the steps performed by the microprocessor 602 for creating a menu based upon a series of overlay screens. These instructions are stored in memory within the set top terminal 220. Alternatively, these instructions or routines are transmitted from the operations center 202 to be stored in memory within the individual set top terminals 220.

Initially, microprocessor 602 instructs tuner 603 to select a channel. The channel is decompressed, and error corrected and decrypted, if necessary. If the video is to be reduced in size, so as to be placed within a video window 1556, or is a split screen video window which must be enlarged, the video is scaled to the appropriate size. Additionally, the video may be required to be redirected to a portion of the television screen. This is done by creating a series of offsets for each pixel location of the video.

Graphics must also be used to create a menu in most instances. As is shown in block 882, the microprocessor 602 must fetch a background file, fetch a logo file and fetch a menu display and cursor file in most instances. Each of these files must be decompressed. Following decompression, the file is sent to video combiner 886.

Similarly, microprocessor 602 must fetch text, as shown in block 884. Depending upon the memory location of the text, microprocessor 602 will fetch the text for long-term, intermediate-term, or short-term storage, as described above. Based upon this memory retrieval, the text is generated and sent to video combiner 886. Video combiner 886 combines the video (if any) with as many screens of a decompressed graphics as are necessary, and any text. The image or portions of the image are stored in combiner 886 until all overlays are received by combiner 886. Thereafter, the entire image is sent, under direction of another routine, to be displayed on the television screen, as represented by display block 888.

FIG. 10f is a full chart of programming instructions performed by microprocessor 602 for sequencing menus. Upon powerup of the set top terminal 220, start up routine 890 is performed. Any error checking is thereafter performed (891), and introductory menu subroutine 892 is performed. This subroutine displays the introductory menu and the microprocessor thereafter awaits for an input 893.

If the subscriber inputs a channel selection 894, video for the particular channel is decompressed 895. Otherwise, the microprocessor performs another routine 896 to display the home menu 897.

At the home menu portion of the sequence of routines, a subscriber may select one of the major menus, thus starting the sequence of displays represented by routine block 898. Alternatively, a subscriber may go directly to a major menu by depressing a menu select button on remote 900 and the microprocessor will execute another the go to submenu subroutine 896.

Once a subscriber has selected a major menu, the appropriate subroutines are executed by the microprocessor using a series of instructions shown in block 898. After each display, microprocessor 602 awaits for a selection by the subscriber, shown as block 899. These blocks could be also represented as decision blocks.

After displaying the major menu, and receiving a selection by the user, a particular submenu for a subcategory is displayed, if such a menu exists. Again, microprocessor
602 waits for an input from the subscriber after executing a routine to display a program listing submenu. Thereafter, after receiving an input, microprocessor 602 performs the next routine for displaying a program description submenu. Thereafter, if a particular selection requires a confirmation menu, that subroutine is executed and the appropriate menu displayed. Thereafter, the selected video is decompressed, and displayed on the television screen. If there are any display overlay menus or hidden menus, the proper subroutine is executed by microprocessor 602 and these menus are displayed.

[0252] At any time during the selection of menus in major menu block 896, the subscriber may also depress another major menu button to move into a second column of process instructions (represented by major menu 2, major menu 3, etc. columns). Thus, a subscriber may move from major menu to major menu. Additionally, a subscriber may depress a home menu button on remote 900 to return to the home menu at any time.

[0253] The various subroutines executed by microprocessor 602 allow a subscriber to navigate through the various menus of the present invention. A subscriber may sequence back through menus or return to the home menu with a one-touch return of the home menu button on remote 900. All of these functions help to add to the system's user friendliness.

[0254] As shown in FIGS. 11a and 11b, a two-section remote control is shown. To reduce costs and make the set top terminal 220 as user friendly as possible, a standard television remote control 860 is augmented by adding a new section 862 that provides the additional digital menu access and ordering functions. FIG. 11a depicts the addition of menu access and cursor movement control to a Gerald RC 650 Remote Control. The cursor movement and function buttons required for the set top terminal's operation may be added to any standard remote control format allowing the user to feel more at home with the new remote control. FIG. 11b shows the two-section remote control combined in a single unit 864.

[0255] The remote control 864 has an ordering button 866, four-way cursor movement, and a “go” button 868, and menu access buttons 870. The remote operates using infrared with the signals being received by the infrared sensor on the front of the set top terminal 220.

[0256] In the simplest embodiment the remote may be built with only cursor movement and a go button. In more sophisticated embodiments the remote control may be provided with buttons that are programmable to perform specific functions for a series of entries. An intelligent or smart remote would increase both the cost and capability of the set top terminal 220 system. Using this augmented remote control the subscriber can navigate the program menu system of the set top terminal 220.

[0257] FIGS. 12a and 12b show an alternative and preferred embodiment of the remote control for use in the present invention. The standard television receiver remote control switches or buttons 920 are again separated from the menu accessing ordering function buttons 950. The standard television receiver remote control buttons 920 include volume control, channel select, power and signal source buttons. The menu buttons 950 include cursor movement and select, menu select, and pay television buttons. However, the standard buttons 920 are separated from the menu access and ordering buttons 950 in the longitudinal direction of the remote, as opposed to the width-wise separation, shown in FIG. 11a. Additionally, the color of the buttons or the surrounding background may differ between the standard television remote control buttons 920 and the menu buttons 950 to visually differentiate between these two groups of buttons.

[0258] The width and depth of the remote control unit 900 are considerably less than the length to allow the remote control unit 900 to fit easily within a user’s palm. The remote control unit 900 in preferably has the center of mass balanced substantially near the longitudinal middle. This allows a user’s thumb to naturally be placed in substantially the middle portion of the remote control unit 900, when it is picked up by a user.

[0259] Since the center of mass of the remote control unit 900 is placed substantially near the longitudinal middle of the remote 900, thereby having a user’s thumb naturally fall in this same center region, the standard remote 920 and menu access 950 switches or buttons most frequently accessed and depressed by a user are placed within easy reach of the user’s thumb. Channel and volume increment and decrement buttons 910 are placed near this center of mass and longitudinal center line. The channel buttons 910 are preferably beveled in opposing directions to allow a user to feel for and press a desired button without looking down at remote 900. Similarly, the volume buttons 910 are preferably beveled in opposing directions for the same reason.

[0260] Additionally, the channel buttons 910 could have a surface texture, different from those of the volume buttons 910 to allow even easier differentiation between channel and volume buttons 910. For example, the volume buttons could have a rough surface texture, while the channel buttons could have a smooth surface texture.

[0261] Also placed in the longitudinal center, within easy reach of a user’s thumb, are cursor movement buttons 970 and “go” button 975. The “go” button 975 selects an option corresponding to the placement of the cursor. As opposed to buttons, a joystick may be used with a selection on the stick, or a trackball, depressible for selecting a desired choice. The cursor buttons 970 are placed ninety degrees apart, with the “go” button 975 placed within the center of the cursor movement buttons 970, as shown in FIG. 12c. The cursor movement buttons 970 are preferably beveled inwardly toward the “go” button 975. The “go” button 975 975 is recessed below the level of the cursor movement buttons 970 so that it is not accidentally pressed while depressing the cursor movement buttons 970. In addition to the beveling on the cursor movement buttons 970, they may also have a surface texture to allow a user to feel for and select the appropriate button without looking down at the remote 900. Directional arrows could be raised or recessed on the surface of the cursor movement buttons 970 for this purpose.

[0262] Menu select buttons 960 are placed near buttons 970 as shown in FIG. 12b. Menu select buttons 960 are preferably the largest buttons on remote 900. Menu select buttons 960 preferably have icons or other graphics imprinted on their top surface or adjacent to the corresponding button. For example, a button for the sports menu may contain a baseball icon. The icons represent the pro-
programming available on the particular major menu selected by the menu select buttons 960. The icons may also be raised above the level of the menu select buttons to provide a textured surface. This would allow a user to select an appropriate menu button 960 by feel, without looking at the remote control unit 900. The icons would require substantial differences in texture, while still providing a meaningful graphic related to the associated menu.

As shown in FIGS. 12a and 12b, labels and icons are provided for the following major menus: movies, sports, children’s programming, documentary/news, entertainment, magazines, programming guide, HDTV (high definition television), interactive TV, music, and an additional button for further programming. Menu select buttons 960 may also be labeled A through J for the above programs, with the last button for all additional major menus labeled K-Z.

The layout of the user select buttons for the remote 900 have been designed to allow a user to select an appropriate button without viewing the remote by using the layout of buttons shown in FIGS. 12a and 12b, in conjunction with textured or beveled buttons. With this “eye-off-the-remote” construction, most of the frequently used buttons may be located by the sense of touch alone. However, to aid selection of an appropriate button visually, certain buttons may have different colors. For example, the menu select buttons 960 may all be of a color different from the rest of the buttons on the remote 900. Additionally, the colors should be selected to provide for ease of location and identification by a user. For example, if the buttons are printed in black ink, yellow menu select buttons 960 are preferred, because yellow would provide the greatest visual contrast with the black ink.

Although remote 900 is described with a variety of channel selection buttons, nearly all buttons from a standard remote control (section 920 buttons) could be eliminated. The present invention would allow a subscriber to use a remote control containing only menu select buttons and/or cursor movement and select buttons.

The power button 924 and “go” button 975 preferably have a separate color from the other buttons on the remote 900. The power button 924 is preferably a separate color because this button is used infrequently. The power button is placed out of a user’s thumb’s reach so it is not accidentally depressed. The power button 924 should be distinguished from the other buttons because a television viewer must locate this button first before viewing any programming. Similarly, the “go” button 975 is used often because it provides the means for a user to select options, and thus should be easily distinguished from the other buttons.

Pay television buttons 980 may also be assigned a color different from the other buttons on the remote 900. By making the pay television buttons 980 a different color, it would help a user to avoid selecting an undesired pay television program.

As used herein, “button” is contemplated to include all manner of switches or touch sensitive circuitry to activate a particular function in the remote control unit 900. Additionally, although the remote control unit 900 communicates with the set-top box by means of infrared transmission, other forms of communication are contemplated, including ultrasound, radio frequency and other electromagnetic frequency communication.

FIG. 13 shows the basic structure of the program menu system. Although the term “menus” has been used above, the menus could also be seen as defining zones or categories of programming. The first series of menus, Introductory menu 1000, Home menu 1010, Major Menus 1020, and Submenus 1050 execute subscriber program selection inputs. The main program menus 1200 provide a subscriber with additional features or options after a program has been selected and shown. There are two primary types of during program menus 1200: Hidden Menus 1300 and Program-Overlay Menus. Both are described in the following text and figures. The menu sequence and each menu structure has been particularly program designed using the “eye-off-the-remote” design concept. A subscriber can easily navigate through the menu system with the cursor movement and “go” buttons 970, 975. Since the subscriber never needs to take his eye off the television screen, the cable operator is likely to have the subscriber’s complete attention.

The introductory menu screen 1000 automatically appears upon power-up and initialization of the set top terminal 220. The introductory menu screen 1000 welcomes the user to the cable system and provides important announcements or messages. In addition, the introductory menu 1000 can be used to inform the subscriber if he has a personal or group message that has been sent to his set top terminal 220 by the cable headend. The subscriber may then access the personal or group message with an appropriate key entry while viewing the introductory menu 1000. Since the introductory menu 1000 must be viewed by each subscriber, it also provides an opportunity for the cable provider to run advertisements.

Following the introductory menu screen 1000 the subscriber will normally be advanced to the home menu screen 1010. The home menu 1010 is the basic menu that the subscriber will return to make his first level of viewing decisions. From the home menu 1010, the subscriber is able to access all television programming options. Some programming options may be accessed through a menu on the screen, others directly by a button selection on the remote control 900, or both, on-screen selection and remote control 900 direct access.

In the normal progression through the menu screens, the subscriber will be forwarded to a major menu screen 1020 that correlates to his direct remote control 900 selection or selection from the home menu screen 1010. The selections on the home menu 1010 are for large categories of programming options and therefore the major menu 1020 allows the subscriber to further refine his search for the television program of his choice.

Following the major menu 1020 the subscriber will navigate through one or more submenue screens 1050 from which he will choose one particular program for viewing. For most programming selections the user will proceed from the home menu 1010 to a major menu 1020 and then to one or more submenus 1050. However, for certain programming options or functions of the set top terminal 220 the user may skip one or more menus in the sequence. For example, in the preferred embodiment the subscriber may directly access a major menu 1020 by pressing a single icon button. In an alternative embodiment, the introductory menu 1000 will provide the user with the capability of directly accessing
information on his cable television account without proceeding through a series of menus.

[0274] The series of menus shown in FIG. 13 is the normal or standard format for a variety of alternative embodiments to the present invention. An introductory screen upon power up that contains important messages, followed by a home menu 1010 with major programming categories is the basis upon which many alternative embodiments of the menu driven selection process can be built.

[0275] Skipping a sequence or level of the menu structure is possible and desired in certain instances. In simple alternate embodiments it is possible to combine the home menu 1010 and introductory menu 1000 into one menu that performs both functions. It will be obvious to one skilled in the art that the specific functions of the Home menu 1010 and Introductory menu 1000 may be exchanged or shared in a number of ways. It is also possible to allow a user to skip directly from the introductory menu 1000 to a submenu 1050. This can be accomplished most easily with a separate direct access remote control 900 button. Generally, a subscriber will access a television program through execution of a submenu 1050.

[0276] The During program menus 1200 are enacted by the set top terminal 220 only after the subscriber has selected a television program. These menus provide the subscriber with additional functionality and/or additional information while he is viewing a selected program. The During program menus 1200 sequence can be further subdivided into at least two types of menus, Hidden Menus 1380 and Program Overlay Menus 1390.

[0277] To avoid disturbing a subscriber during viewing of a program, the Hidden Menus 1380 are not shown to the subscriber but instead “reside” at the set top terminal 220 microprocessor. The Hidden Menus 1380 do not effect the selected program audio. The microprocessor awaits a button entry either from the remote 900 or set top terminal 220 buttons before executing or displaying any Hidden Menu options. The Hidden Menus 1380 provide the subscriber with additional functions such as entering an interactive mode or escaping from a selected program.

[0278] Program Overlay Menus 1390 are similar to Hidden Menus 1380 in that they occur during a program. However, the Program Overlay Menus 1390 are overlayed onto portions of the television screen and not hidden. The Program Overlay Menus 1390 allow the subscriber to continue to watch the selected television program with audio but place additional information on portions of the television screen. Most overlays cover small portions of the screen allowing the subscriber to continue to comfortably view his program selection. Other Overlays which are by their nature more important than the program being viewed will overlay onto greater portions of the screen. In the preferred embodiment, some Program Overlay Menus 1390 reduce or scale down the entire programs video screen and redirect the video to a portion of the screen.

[0279] All menu entries may be made either from buttons available on the top cover of the set top terminal 220 or from the remote 900.

[0280] FIG. 14a shows the preferred embodiment for subscriber selection of television programming. FIG. 14b shows additional major menu 1020 categories, 1042, 1044, 1046, 1048, which may used with the invention. Again, the introductory menu 1000 followed by the home menu 1010 is the preferred sequence of on-screen displays. In the preferred embodiment shown in 14a, the home menu 1010 provides a choice of ten major menus 1022, 1024, 1026, 1028, 1030, 1032, 1034, 1036, 1038, 1040. Upon selection of a major menu 1020 category from the home menu 1010, the program proceeds to a major menu 1020 offering further viewer selections. Each major menu 1020 is customized to target the expected viewership. Depending on the number of available program choices the major menus 1020 either breakdown the major category into sub-categories or provide the subscriber with access to further information on a particular program.

[0281] For example, the major menu 1020 for children’s programming provides a list of subcategories 1052 from which the subscriber selects. Upon selection of a subcategory a submenu 1054, 1056 listing program choices within that sub-category is shown to the subscriber. Upon selection of a particular programming choice within the first submenu 1050, the subscriber is then provided with a second submenu 1058 describing the program that the subscriber has selected. From this menu, the subscriber may now confirm his program choice and receive a confirmation submenu 1060 from the set top terminal 220 software.

[0282] Since the system utilizes digital signals in compressed format, High Definition Television programming can also be accommodated through the menu system. In addition, since the set top terminal 220 has two way communication with the cable headend, interactive television programming is possible, with return signals generated by the set top terminal 220. Similarly, the system can support “movies on demand” where a subscriber communicates through the set top terminal 220 with an automated facility to order movies stored at the facility.

[0283] Using this on-screen menu approach to program selection, there is nearly an unlimited number of menus that can be shown to the subscriber. The memory capability of the set top terminal 220 and the quantity of information that is sent via the program control information signal are the only limits on the number of menus and amount of information that can be displayed to the subscriber. The approach of using a series of menus in a simple tree sequence is both easy for the subscriber to use and simply implemented by the set top terminal 220 and remote control device 900 with cursor movement. A user interface software programmer will find many obvious variations from the preferred embodiment shown.

[0284] FIGS. 15a and 15b show examples of introductory menu screens that are displayed on the subscriber’s television. FIG. 15a, the preferred embodiment, welcomes the subscriber to the cable system and offers the subscriber three options. The subscriber may choose regular cable television (channels 2 through 39), programs on demand (e.g., movies), or instructions on the use of the remote control 900. Other basic program options are possible on the introductory menu screen 1000. For example, instead of, or in addition to, the remote control 900 instructions, a system “help” feature can be offered on the introductory menu 1000.

[0285] FIG. 15b shows an alternate embodiment for the introductory menu screen 1000. In the upper left-hand corner of the menu, there is a small window 1002 that may
be customized to the subscriber. A subscriber will be given
the option of showing the current time in this window. In the
upper right-hand corner a second customized window 1004
is available in which a subscriber may show the day and
date. These windows may be easily customized for subscrib-
ers to show military time, European date, phase of the moon,
quote of the day, or other informational messages. These
windows may be customized by subscribers using on-screen
menu displays following the introductory menu 1000.

[0286] In the preferred embodiment, the subscriber is
given the capability of accessing base channels such as
regular broadcast TV and standard cable channels directly
from the introductory menu 1000 by entering the channel
number. The subscriber is also given the capability of
directly accessing his account with the cable company.
Further, in the preferred embodiment, the subscriber may
directly access a major menu 1020 and bypass the home
menu screen 1010. If the subscriber is familiar with the
programming choices available on the major menus 1020,
he may select an icon button 960, or a lettered key (alpha
key) from his remote control 900 and directly access the
desired major menu 1020. If any key entry other than those
expected by the set top terminal 220 software program is
made, the home menu 1010 is placed on the television
screen. In addition, after a period of time if no selections are
made from the introductory menu 1000, the program may
default to the home menu screen 1010.

[0287] FIGS. 16a, 16b, 16c, and 16d are examples of
home menus 1010 that may be used in the set top terminal
220 software. FIGS. 16a-16d all employ multiple window
features to make the menu user friendly and offer a
significant number of choices. It is preferred that a channel
line up and the major menu 1020 categories both appear on
the home menu 1010.

[0288] FIG. 16a, the preferred home menu 1010
embodiment, displays both the standard channel line up and the
programming on demand icons for selection by the sub-
scriber. FIG. 16a also shows various levels of subscription
programming, including a “Basic” cable package and a
“Basic Plus” package. Each of the choices of subscription
programming preferably is assigned a different color. This
increases the user friendliness of the present invention.

[0289] In FIGS. 16b-16d, the left half of the screen is used to
list the channel number and network abbreviation of the
most popularly watched networks. The right half of the
screen offers access to a variety of major menus 1020 listed
by category names.

[0290] FIG. 16b shows an embodiment in which only
eight major menus 1020 are utilized. By pressing the alpha-
numeric or icon key 960 corresponding to the category of
programs the subscriber desires, the appropriate major menu
1020 is accessed. In addition, the subscriber may employ an
on-screen cursor to select any option shown in the menu. To
move the cursor, the subscriber may use either the cursor
movement keys on the remote control 900 or similar keys
located at the top of the set top terminal 220.

[0291] FIG. 16c shows how additional major menus 1020
are displayed on the home menu screen 1010. When there
is no longer room available for additional major menu 1020
choices on the home screen, the subscriber may access a
second screen of the home menu 1010. For example, in FIG.
16c, if additional major menus 1020 “T” through “Z”
existed, the subscriber would access those menus by high-
lighting and selecting the J through Z menu option (or press
the J-Z on his remote 900). After selecting J through Z, the
second or extended home menu screen 1010 would appear
on a subscriber’s television set. This menu would then list
options J through Z separately by name. Theoretically,
the home menu 1010 may have many extended home menu
screens. However, any more than a few extended home
menu screens would confuse the average subscriber.

[0292] The home menu 1010 of FIG. 16d adds an addi-
tional feature at the bottom of the television screen 1011.
This option allows a subscriber to see only those program
selections that are available on broadcast television. FIGS.
16a-d are but a few of the numerous variations available for
the home menu 1010.

[0293] Additionally, as shown in FIG. 17, in an alternate
embodiment, the home menu 1010 (or menu which would
normally follow the introductory menu 1000) can be simply
the standard cable channel line-up. Offering the standard
cable line-up on a separate menu may make selection easier
for viewers with small television screens.

[0294] FIGS. 18a and 18b are examples of major menus
1020. In particular, FIGS. 18a and 18b show a major menu
1040 whose category is hit movies. The hit movie category is a
list of recently released movies which have been found to
be popular among movie goers. This movie list is changed
once or twice a week to keep in line with new movie
releases. Again, multi-window and customized window
features are utilized to make the menu user as friendly as
possible.

[0295] FIG. 18a shows the preferred embodiment of the
hit movies menu 1040. The hit movies menu icon along with
the hit movies category letter A are displayed. The current
date and time are displayed at the top of the screen over a
menu background. Ten movie selections are displayed in
the center of the screen 1009, each in a box which may be
highlighted when selected. In the lower left part of the
screen, a logo window 1512 is available as well as two other
option choices 1011, Movie Library and Return to Cable TV.
In an alternate embodiment, the return to Cable TV option
is changed to return to the Home menu 1010 (or return to
other viewing choices).

[0296] In FIG. 18b, the left upper window 1002 displays
time current time and the right upper window 1004 displays a
message. This menu provides a list of eight movie titles and
their rating 1009. If the subscriber desires further informa-
tion on any particular movie he may select a movie using the
cursor movement buttons and press the “go” button on the
remote control 900 or set top terminal 220 box.

[0297] It is important in creating user friendly-interfaces
that the menus are consistent and follow a pattern. A manner
of making the menus is discussed below with respect to
FIGS. 55 and 56. This consistency or pattern between the
different menus provides a level of comfort to the subscriber
when encountering new menus. In the major menu 1020
example of FIG. 18a, the upper sash 1502 and lower sash
1504 remain consistent throughout menus in the preferred
embodiment. The logos 1508, icons 1510 and titles also
remain consistent in the same locations.

[0298] In the major menu 1020 example of FIG. 18b, the
customized windows 1002, 1004 in the upper corners
remain constant from menu to menu. Also, the name of the menu and category are at the top and center of the menu screen 1039. To make the menu aesthetically pleasing, the instructions are given across the center of the screen and choices in large legible type are provided. Additionally, at the bottom of most menu screens 1011, the subscriber is given the option of returning to regular TV or returning to the home menu 1010.

[0299] FIGS. 18c-18g show alternative embodiments of major menus 1020 for the home menu shown in FIG. 16a. FIGS. 18c-18g show various major menus directed to the type of subscription services available (basic service 1420, basic plus 1422, economy package 1424, ala carte and premium channels 1426). These menus also provide promotional or advertising information, for example, the cost for the particular subscription service. FIG. 18g shows a major menu for the Learning Channel 1428, one of the individual channels shown in the home menu of FIG. 16a.

[0300] These menus may be grouped in similar colors or shades of colors. For example, the basic subscription service could have a light pink color. As the subscription services increase in terms of the number of channels available, the color shading may increase correspondingly. Therefore, the premium subscription service (ala carte service) would have a dark red color, contrasting with the light pink color of the basic subscription service.

[0301] In FIG. 18b, the movie titled Terminator Four is highlighted, signifying that the subscriber has chosen this program option from the hit movie major menu. FIGS. 19a and 19b show submenus 1050 which would follow the selection of Terminator Four on the hit movie major menu. In FIG. 19a, the sash across the top of the screen 1502 remains constant from major menu 1020 to program description submenu 1050. Again in FIG. 19b, for the comfort of the subscriber, the left upper window 1002 remains the same and shows the current time. The upper right-hand corner 1004 carries a message stating the next start time for the movie selected.

[0302] In order to allow subscribers to view hit movies at their convenience, multiple start times for the same movie are provided. In order to provide the multiple start time service, the same movie must be shown on multiple channels at staggered start times. For example, if Terminator Four is a two-hour length movie it can be shown continuously on eight different channels, with each showing delayed fifteen minutes after the previous showing. This allows the subscriber to begin viewing the movie within a fifteen minute time interval. Since the subscriber is not required to find the channel which has the correct start time, the subscriber is unaware that the movie is being shown on eight different channels. In fact, with the use of the submenus 1050, a subscriber is able to nearly effortlessly choose the correct channel and correct activation time for viewing the desired movie. The channel selection is invisible to the subscriber.

[0303] The set top terminal 220 is able to automatically determine which channel will next begin to show the selected movie using any number of techniques. For example, the set top terminal 220 will have an internal clock representing the current time. The set top terminal 220 could compare the current time with the start times for the movie on the various channels. Alternatively, a signal could be sent with the movie on all channels. This signal will set, or reset, a counter to indicate that a particular channel will next begin the movie. Those skilled in the art may recognize that other methods to determine the next available start time and channel for the selected movie are available.

[0304] The FIGS. 19a and 19b movie description submenus 1120 retain the title in a window at the top center of the screen. A multiple window technique is used in the middle of this menu to display a description of the movie and one or more video frames that assist the subscriber in selecting the movie. This window of video 1556 that is provided by the menu may be a still picture, a short but repetitive video cut, or a portion of the movie that is currently showing on any one of the channels carrying the movie at the time of the submenus 1050 display.

[0305] Just below the video window, the submenu provides the cost of viewing the movie and the movie length in hours and minutes. An additional strip window 1558 is provided, below the video and description windows, informing the subscriber of the movie’s release date.

[0306] Moving towards the bottom of the menu, the subscriber is given at least three options. One, the ability to order the movie 1009, two, to return to the hit movie menu 1011, and three, to press “go” and return to regular TV 1011. In the preferred embodiment, the subscriber is also given the option of previewing the movie. FIGS. 19a and 19b show that the Order option has been selected by the subscriber 1009.

[0307] FIGS. 20a and 20b show the next submenu 1125 in the hit movie menu sequence from the selection of Terminator Four. This particular submenu 1125 shows confirmation of the subscriber’s hit movie order of Terminator Four. FIG. 20a retains the sash across both the top 1502 and bottom 1504 of the screen. The format of the FIG. 20b menu 1125 maintains the current time in the left upper window 1002, the title in the top center window, and the next start time in the upper right-hand window 1004.

[0308] The center of the submenu screens 1125 is a video window 1556 which may be used for still or moving video. The submenu provides the subscriber with two on-screen options. The subscriber may return to regular TV 1009 or may join the movie Terminator Four already in progress 1011. In an alternative embodiment of this submenu 1125, the user is given the ability to return directly to the home menu screen 1010.

[0309] When the movie’s start time is approaching, the set top terminal 220 will automatically bring the viewer to the correct channel carrying the movie Terminator Four.

[0310] FIGS. 21a and 21b are notification submenus informing the user that his program selection is about to begin (e.g., counting down until start time). Using this submenu, the set top terminal 220 warns the user prior to switching him away from the channel he is viewing to a prior selected program channel. This notification submenu is provided to the subscriber approximately one or more minutes before the set top terminal 220 changes the viewing channel.

[0311] Both notification submenu examples allow the subscriber to cancel his movie order. In FIG. 21a, the subscriber is notified in the center of the screen that he may cancel within the first five minutes. In FIG. 21b the subscriber may
press escape to cancel his order without charge. The notification submenu of FIG. 21b informs the user of the start time at the upper right portion of the screen.

[0312] The notification submenu of FIG. 21b is a simple three-window menu. A strip window at the top of the screen 1103 notifies the subscriber of the movie selected and the amount of time before the movie will begin. The center window is a large video window 1556 for displaying a scene from the movie. At the bottom of the screen the submenu carries another strip menu 1105 which informs the user that he may escape from his program selection without charge.

[0313] Using a notification submenu 1127, the set top terminal 220 may allow a subscriber to view other programs prior to his movie start time. The subscriber is amply notified of the set time of his program and effortlessly moved to the correct channel to view his selected program. This notification-type submenu may be used to move a subscriber from his current channel to any preselected channel for viewing a program which has been ordered at an earlier time. In the preferred embodiment, the amount of time provided by the notification submenu may be customized by the subscriber to a length of his preference. The notification submenu also allows a subscriber to cancel or escape from his previously selected program choice and avoid any charges. If a subscriber cancels or escapes he is returned to the channel that he is currently watching.

[0314] As shown in FIG. 22a, in the preferred embodiment, the subscriber is given a During Program Menu, specifically an Overlay menu 1130 to inform him when his five minutes of movie escape time have expired. Once the time has expired the subscriber will be billed for the movie selection.

[0315] FIG. 22b is an overlay menu 1133 warning the user that he is escaping a program after being charged for the order of that program. The warning overlay menu 1133 of FIG. 22b follows in sequence and is prompted by a hidden menu which constantly monitors for subscriber input during viewing of the program. The hit movie hidden menu (not shown) specifically waits for certain key entries by the subscriber. In particular, the hit movie hidden menu awaits for a key stroke such as escape, cancel or an icon selection. If the escape button is depressed during the viewing of a hit movie the overlay menu of FIG. 22a or FIG. 22b will be shown. A strip menu in the lower sash of FIG. 22b allows the subscriber to resume full screen viewing of the hit movie.

[0316] FIG. 22b is a representative example of an overlay menu 1133. It has a dark lower background sash and a light colored informational sash. The upper portion of the screen continues to display the video of the program selected. FIG. 22c is a reentry to ordered selection submenu 1135 for the hit movie category. The reentry to ordered selection sub-menus appear whenever a subscriber selects a programming option (program, event, or subscription channel), that the subscriber has already ordered. This menu has a program title window with a text title entry, and a description of the order that has already been placed for the program (or channel). In the preferred embodiment, the submenus which allow reentry to ordered selection provide the subscriber with the added option of joining the program within any fifteen minute interval. This special feature of the preferred embodiment allows a subscriber who has viewed one-half of a particular program to rejoin the program at the half-way point. In this manner, the program delivery system mimics a VCR tape recording of the program. For example, if a subscriber had rented a videotape of the movie Terminator 4 and had watched thirty minutes of the movie, he would have left his videotape in the thirty minute position. With the menu of FIG. 22c a subscriber to the system who has watched thirty minutes of Terminator 4 may reenter the Terminator movie at the thirty-one to forty-five minute interval as shown in FIG. 22c. The nine-fifteen minute blocks of the menu display blocks are representative of the choices available for a two-hour hit movie. Other variations are possible depending on the length of the movie and the timing intervals desired.

[0317] FIG. 23 shows the major menu for the movie library category 1048. The movie library category provides subscriber access to a large number of movies. Using several transmission channels, each movie in the library is shown at least once during a one-month period. Using the movie library, a subscriber may access information on a particular movie and ascertain the various start times for that movie. In the preferred embodiment, the subscriber will use the movie library in conjunction with his VCR or other video taping machinery. In that way, a subscriber may tape movies which are shown at inconvenient start times for later viewing. By activating the proper features of the set top terminal 220, a subscriber may have the terminal activate the television and the VCR and perform all the functions necessary to tape a movie.

[0318] The movie library major menu shown is an extended menu having many follow-on extensions to the major menu shown. The extended menus continue to show lists of movies in alphabetical order. In an alternative embodiment, the movie library is broken down into subcategories of various types of movies. For instance, movie categories such as murder-mystery, documentaries, westerns, and science fiction would appear on the movie library major menu. By selecting one of these movie library subcategories the subscriber would be moved onto a particular submenu for that movie library subcategory. Each submenu would list movie titles whose contents fall within the particular subcategory.

[0319] Following a selection of a movie title, the subscriber is displayed a movie description submenu. FIG. 24 shows a typical movie description submenu 1140. In order to maintain a similar pattern throughout the menus, FIG. 24, movie description submenu 1140 for the movie library, is designed similarly to FIG. 19b which is a movie description submenu for the hit movies category. The primary difference between FIGS. 24 and 19b is the display of the movie library title number in the upper right-hand corner of FIG. 24. FIG. 24 provides three options for the subscriber. The subscriber may order the movie described, return to the movie library major menu, or return to regular TV.

[0320] FIG. 25 shows a confirmation submenu 1142 for the movie library. This menu screen confirms the movie selection, start date, start time and informs the subscriber that his VCR will be automatically turned on. During this submenu, the user may return to the movie library major menu, return to regular TV or cancel his movie library order by pressing the escape button. FIG. 25 shows that the subscriber has selected to return to regular TV. The sub-
scriber’s VCR or other video taping equipment must be connected to the set top terminal 220 for the automatic taping feature to operate.

[0321] The series of FIGS. 26a, 27a, 28a and 29a, and the series of FIGS. 26b, 27b, 28b, and 29b depict a typical menu sequence including a major menu 1028, 1042 (FIGS. 26a and 26b), a subcategory submenu 1148 (FIGS. 27a and 27b), a program description submenu 1152 (FIGS. 28a and 28b), and a confirmation submenu 1154 (FIGS. 29a and 29b). This simple progression of menus repeats itself through the menu tree of FIGS. 14a and 4b.

[0322] In the preferred embodiment, FIGS. 26a, 27a, 28a, and 29a are a series of menus which are categorized in the Documentary and News Major category. Whereas in the alternate embodiment, FIGS. 26b, 27b, 28b, and 29b are a series of menus that relate to the Discovery® video selection services category. FIG. 26b is the Discovery video selection service major menu 1042. This major menu shows twelve different categories of services available to the subscriber. The upper right-hand corner window of this major menu briefly describes the types of services which are available on this menu. After selecting a subcategory from this major menu the set top terminal 220 moves the subscriber to a submenu describing programs that are available in the subcategory. FIGS. 26a and 26b show that the subcategory Discovery channel choice has been selected by the subscriber from a major menu.

[0323] FIG. 27a is a submenu for subcategory Discovery channel choice 1148, and shows six programming choices available for this subcategory. In an alternate embodiment, FIG. 27b displays only four program choices. By choosing one of the programming choices on this Discovery channel choice submenu, the subscriber may obtain more information about the particular program. Again, the subscriber is able to return to the major menu or return to regular TV by selecting options in the lower part of his screen. In FIGS. 27a and 27b, the subscriber has highlighted and selected the program War Birds for further description.

[0324] FIGS. 28a and 28b are description submenus 1152 which describe an available program, War Birds. Since the preferred embodiments follow a pattern throughout the menus, FIGS. 28a and 28b are similar to FIGS. 24, 19a and 19b which describe other programming selections available on the system. FIGS. 28a and 28b use the upper right-hand corner window 1004 to inform the subscriber of the next start time available for the particular program War Birds. In packaging the special selection of programs, the programmer at his option may show an identical program on several channels in order to permit the subscriber greater flexibility in start times. FIGS. 28a and 28b show the use of a strip menu across the lower half of the screen displaying a message and the price of the program. Similar to other submenus, the subscriber may order the program, return to the major menu, or return to regular TV simply by selecting the choices on the lower part of his screen. FIGS. 28a and 28b depict the subscriber ordering the program War Birds.

[0325] FIGS. 29a and 29b are confirmation submenus 1154 similar to confirmation submenus in other major menu categories. It confirms the subscriber’s order of the program War Birds. The FIG. 29a confirmation submenu retains the video window from the prior submenus and also displays the program running time. The submenu of FIG. 29b shows a strip window 1105 on the lower part of the screen displaying an “800” number and advertising the Discovery catalog. Similar windows may be used throughout submenus to assist in advertising for particular programs, channels, or groups of programs. Many variations of the confirmation submenu are possible.

[0326] This confirmation submenu allows the user to join the selected program already in progress or return to regular TV. In addition, by depressing the escape button, the subscriber may cancel his order of War Birds from this screen.

[0327] FIG. 29c is an example of an overlay menu 1156 presented when a subscriber is exiting from a program selection in which he may rejoin at a later time. This exiting ordered program overlay menu 1156 is appropriate whenever a subscriber may return to a program or channel without additional charges. Since many of the programs selections are authorized for viewing on a two-day, weekly, or monthly basis, the exiting ordered program overlay is useful in a number of situations.

[0328] This overlay menu follows a similar format as other overlay menus having a darker colored lower sash and lighter colored second sash with text information. The sashes are overlayed on the program video currently being watched by the subscriber.

[0329] Additionally, an exiting ordered program overlay menu 1156 may be provided for one-time viewing program selections which a view cannot return. These exiting ordered program overlay menus would thank the viewer for ordering the particular program or channel and entice the viewer to order a similar program from the same network. For example, an exiting program overlay menu for a live sports event such as boxing, would thank the viewer and remind him that the network carries regularly scheduled boxing events on a weekly basis.

[0330] FIGS. 30 through 34 relate to the ordering of specialty channels through the menu driven system. FIG. 30 is a major menu 1044 that lists fifteen specialty channels that are available for subscription and viewing. In this particular major menu 1044, the lower half of the screen 1009, which is utilized to provide the various programming choices, is divided into three vertical sections allowing room for fifteen choices. This major menu category is different from the others in that individual programs are not ordered but instead channels are subscribed to on a monthly or yearly basis. To use this submenu, a subscriber need only select and press “go” on the channel of his choice.

[0331] After the subscriber selects a channel, the channel description submenu 1160 of FIG. 31 replaces the major menu on the subscriber’s television screen. This description submenu 1160 has windows that are similar to other description submenus used throughout the menu driven system. In this description submenu 1160, the upper right-hand corner 1004 is used to display the subscription cost for the channel. The upper left-hand corner 1002 of this submenu is used to display the method in which the subscription price will be billed to the subscriber. In this specific scenario, the current time has little bearing on the subscriber’s decision to order the displayed channel and therefore is not shown on the television screen. FIG. 31 shows that the subscriber has ordered the Science Fiction channel.

[0332] FIG. 32 shows a submenu 1164 which confirms the subscriber’s order and thanks him for subscribing. If the
subscriber is already paying for the selected channel, instead of FIG. 32 confirming his order, he is provided with the divided menu 1156 of FIG. 33 informing him that he is a current subscriber of the Science Fiction channel. In both the screen of FIG. 32 and the screen of FIG. 33, the subscriber is allowed to join the channel in progress. After an ample period of time for the subscriber to read the screen menu, the menu is removed from the television screen and the subscriber has a complete view of the programming in progress. This is shown in FIG. 34 for the Science Fiction channel.

[0333] FIGS. 35-38 refer to the selection of a magazine channel. In particular, FIGS. 35-37 show a series of menus for selecting and ordering one specific magazine channel, the sci-fi channel.

[0334] FIG. 35 shows a major menu for magazine channels 1030. This major menu falls under the letter F, Major Menu, and has an icon showing three magazines. The magazine channel major menu has a menu display block with 15 options, three columns, each with five selection options. Magazine channels are specialty channels targeted to a particular audience. In the preferred embodiment, each of the magazine channels has a monthly subscription. FIG. 35 shows the sci-fi menu for the magazine channel.

[0335] FIG. 36 is a channel description submenu 1170 for the sci-fi channel. This menu has a network logo in the upper left hand part of the screen generated from the logo graphics file 820. The name of the channel is prominently displayed across the top. In the preferred embodiment, the text for a channel or network name is stored in long-term text storage. The text description of the channel on the right part of the screen may also be stored in long-term text storage. A video window 1556 and a video description window 1557 are also shown. This channel description submenu is similar to other program menu menus and exemplary of the channel description submenus for any magazine channel.

[0336] If the subscriber orders a science-fiction channel, he will receive the confirmation menu 1172 shown in FIG. 37. This is a representative confirmation menu for subscribing to any network channel. A second sash of approximately equal width to the upper sash of the background menu is displayed in a color preferably different than that of the upper sash. Within the confirmation sash, a network logo and a standard text description thanking the subscriber are placed on the screen. At any time during this menu screen, the subscriber may cancel his subscription to the channel by pressing cancel on his remote 900 or set top termination button 645.

[0337] In the preferred embodiment shown, the area of the screen below the two sashes is filled with video from the channel being subscribed. In an alternative embodiment, further text information is provided instead of a video display.

[0338] FIG. 38 shows a reentry to ordered subscription submenu, similar to submenu 1156 in FIG. 33. This particular reentry submenu (magazine channel reentry submenu 1173) is for the magazine channel Gourmet. A light colored second sash is provided at the top of the screen with the network logo and text informing the subscriber that he has already ordered this particular channel. The reentry submenus 1156 generally allow a subscriber to immediately join programming in process. The current program on the Gourmet channel is shown in most of the remaining portion of the screen.

[0339] In this particular preferred embodiment shown, a special title sash is included as an overlay in the lower portion of the screen. This sash identifies the current program being shown on the channel with a text description. The set top terminal may derive this text description from either the STTCS, the VBI, or other digital signals.

[0340] FIGS. 39-42 show a series of menus for selecting the documentary news program from the CBS library, called 60 Minutes. Although this is a regularly scheduled weekly program, it may be viewed by subscribers to the present invention at nonscheduled times. FIG. 39 shows a major menu 1028 for documentary and news programs. This major menu has a specific icon and letter designation which are shown in the upper left hand corner. This major menu has 12 selection options 1009 in the menu display blocks. They comprise two rows, each with six options. In this particular menu, the upper left hand corner option is highlighted. In general, the upper left hand corner option is the default for the cursor highlight overlay 1526.

[0341] FIG. 40 shows a subcategory submenu 1174 displaying five options. This subcategory menu shows specific programs which are available. The cursor highlight overlay is at the top of the screen in its default position. From this cursor position, the subscriber may order the program 60 Minutes.

[0342] FIG. 41 shows the next menu in the sequence for ordering the program 60 Minutes. This program description submenu 1176 displays the network logo, program title, program description, video window, video description window, and the next program start time. In the preferred embodiment, the next program start time is displayed beneath the current time. The program title and program description text may be stored in the intermediary text storage 877. In the preferred embodiment, the video description window 1556 displays running time and price of program. If the subscriber orders the program from the program description menu, he is sequenced to a confirmation menu.

[0343] FIG. 42 is a confirmation submenu 1178 for the program 60 Minutes. In this embodiment shown, the program description menu and confirmation menu are nearly identical. The primary difference being the confirmation text description and ability to join the program in progress. In the embodiment shown, the confirmation text is customized for the particular program CBS Library. In alternate embodiments, the confirmation text is a standard text being generated from long-term text storage. Confirmation submenus may be designed to show the user more video and less menu graphics and text.

[0344] FIG. 43 is a major menu 1026 for category E, Entertainment Choice. The Entertainment Choice category shows the best entertainment programming available during a given week. FIGS. 43 and 44 show the selection of a program in the Entertainment Choice category. The Entertainment Choice major menu 1026 has a menu display block for five programs.

[0345] FIG. 44 shows a program description submenu 1182 for a selection on the Entertainment Choice major
menu. In this program description submenu, the next start is shown in the upper right hand corner. The program title text is shown centered, along with program description text on the right half of the screen. The video window and video description window are provided on the left half of the screen. In the particular embodiment shown, the program is placed on the first line of text in the video description and the run time is shown on the second line of text in the video description window. The program may be ordered by highlighting the menu display block beneath the program description text using cursor movement keys. This submenu allows the subscriber, via a strip menu located in the lower sash, to return to the major menu, namely menu E 1026.

[0346] FIGS. 45 and 46 relate to the category of Children’s Programs. FIG. 45 is the major menu 1024 for Children’s Programs, displaying five program options in its menu display blocks. FIG. 46 is a program description submenu displaying the program Beauty and the Beast. This program description submenu is similar to that shown in FIG. 44. Again, a strip menu in the lower sash allows the subscriber to return to the major menu, in this case, menu C 1024. In alternative embodiments, the subscriber may return to the home menu from any submenu screen. This return to home menu feature may also be embodied in a strip menu in the lower sash.

[0347] FIGS. 47, 48, and 49a-49d relate to menus available within the major category of Sports. FIG. 47 is an example of a major menu screen 1022 for the Sports category. This window exemplifies the ability to mix pay-per-unit programs, free programs, and a subcategory selection, all within one major menu screen. This is also representative of the mixing of programming types and subcategories that may be conducted at any menu level (major menu or submenu). By highlighting one of the three menu blocks shown, the subscriber may obtain more information on each of the three different types of programming that are available.

[0348] FIG. 48 is a program description submenu 1222 for NFL Highlights, which a subscriber would receive if he made the NFL Highlights selection on the major menu 1022 of FIG. 47. In particular, FIG. 48 shows a program description submenu for a program which must be paid for once each week for viewing. Once the program has been ordered by that particular set top terminal, the terminal is authorized to allow subscriber viewing for the remainder of the football week.

[0349] FIGS. 49a-49d illustrate the manner in which a category or subcategory of programs may be shown in a weekly schedule 1224. Seven of the menu display block options of FIG. 49a are for daily live events. The eighth menu selection block in the lower right hand corner of the menu display blocks allows the viewer to see what live programming is available during the month. In this manner, future television programs may be advertised.

[0350] FIG. 49b shows a live programming event menu 1226 which is available only on a particular day. Since the text description of this menu may be updated at least once a day, circumstances which affect the live program may be described in the text. For example, in a single elimination tennis tournament, the star tennis players who have not been eliminated may be listed in the text. From this menu, the subscriber may return to the subcategory submenu, Sports Events, or return to the major menu letter B, Sports, or return to cable TV. In the preferred embodiment, the subscriber is given the ability to sequence back to his last menu screen and, in some instances, sequence back to subcategory menu screens.

[0351] FIG. 49c and 49d relate to programming on a particular day (Saturday). The submenu of 49c falls within a subcategory of a major menu and is therefore three menu sequences below the home menu. This particular menu 1228 lists an odd number of programming options. The menu display blocks allow 12 football games selections and one boxing event, which is a larger box across the lower part of the screen. By changing the menu display block sizes, the package can focus the subscriber’s attention on a particular program. Menus may show standard time, such as eastern time, or may show regional times to the subscriber.

[0352] FIG. 49d is a program description submenu 1229 whose description text will generally remain constant for a period of one week. The program title text “College Football” is frequently used and may be stored in long-term text storage.

[0353] FIGS. 50a and 50b relate to HDTV. FIG. 50a is an example of a menu 1032 advertising a new feature of the system. Promotional menus, such as FIG. 50a, may be dispersed throughout the menu driven program selection system. This particular menu describes the HDTV feature and explains its unavailability until a future date. FIG. 50b shows the integration of HDTV services into the menu driven program delivery system. If the subscriber selects the major menu for HDTV, he will either receive a description of the service with a suggestion to order the system, or a text note that he is a current subscriber and a listing of the currently available program selections in HDTV 1232. If the subscriber has not paid to join the particular service, HDTV, he may be allowed to join one of the programs in progress for a limited time as a demo to entice the subscriber to order.

[0354] If the subscriber has paid his HDTV fees, a subscriber proceeds as he would in any other major menu screen.

[0355] This particular major menu shows an example of how a follow-on or second screen may exist for the same menu. In this particular case, a second screen exists for the major menu HDTV 1032. The subscriber may access the second screen 1232 by selecting the last menu display block in the lower part of the screen “Other HDTV Selections”. Following this selection, the subscriber will be given a second screen of program selections. In this manner, any menu can have multiple screens with many program choices. This type of screen pagination on one menu allows the packager to avoid categorizing program selections within that same menu. In an alternative embodiment, the options available to the subscriber may be scrolled on one menu screen with the text within the menu display blocks changing as the subscriber scrolls up or scrolls down.

[0356] In the preferred embodiment, TV guide services, listing programs available on network schedules, will be available on a major menu, as shown in FIG. 51a. In the preferred embodiment, the major TV guide menu 1036 would offer submenus, such as network schedules for the next seven days, today’s network schedules for the next six
hours, and TV guide picks for the next seven days. If the particular set top terminal 220 has been subscribed to the TV guide service, the subscriber may proceed to a submenu showing schedules of programs. If the subscriber chooses the network schedule submenu 1236, he is offered a list of network schedules to choose from as shown in FIG. 51b. If a subscriber were to choose, for instance, HBO, the submenu 1238 shown in FIG. 51c would appear. This submenu allows a subscriber to choose the program date that interests him. Following selection of a date, the subscriber is shown a more specific submenu 1242 listing programs available on the particular date as shown in 51d.

[0357] Following a program choice, a program description submenu 1244 is placed on the television screen as shown in FIG. 51e. In addition, from this program description submenu, the viewer may choose to record the selected program on his VCR using the guide record feature. If the guide record feature is chosen, the guide record submenu 1248 shown in FIG. 51f provides the subscriber with further instructions. In order for the set top terminal 220 to perform the guide record functions and operate the VCR, control signals must be sent from the set top terminal 220 to the VCR via the video connection 650 or via a separate connection between the set top terminal 220 and the VCR. The VCR must be capable of interpreting these control signals from the set top terminal 220 and performing the desired function (such as, activating the record feature). In the preferred embodiment, the VCR control signals are sent with the video signal and output from the output 650, as described above.

[0358] FIGS. 51g and 51h refer to the broadcast TV menu option available in FIG. 14b. FIG. 51g is a major menu 1046 displaying subcategories of programs available on a group of channels called generically “broadcast TV.” For each subcategory there is a separate submenu listing programs that are available in the particular subcategory on a group of channels called broadcast TV.

[0359] By using the broadcast TV menu, the subscriber does not need a written guide of available television programming on the major networks. Although the preferred embodiment categorizes television programs available on the major networks, a simple chronological listing of programs may also be used.

[0360] Following a subcategory selection on the broadcast TV menu such as favorite channels, the set top terminal 220 will display a submenu of programs as shown in FIG. 51h. The favorite channel program menu 1256 of FIG. 51h allows the subscriber to choose among eight programs in progress at 9:45 p.m. on a broadcast TV network.

[0361] Using this methodology, the subscriber may also be allowed to choose among television programs which will be available for viewing in the next half hour or hour. When the time of the preselected program is approaching, the set top terminal 220 will display a notification menu or window to the subscriber (similar to FIGS. 21a and 21b) informing him of an eminent change of channels to a previously selected program.

[0362] In order for the set top terminal 220 to establish a favorite channel list, menus querying the subscriber and allowing the subscriber to input his selection of eight favorite channels must be displayed. Alternatively, the set top terminal 220 box can “learn” which channels are a subscriber’s favorite channels. A simple learning process would involve the set top terminal 220 determining which channels were the most often watched and assume those channels are the subscriber’s favorite channels. Favorite channels are preferably stored in memory in the set top terminal 220. FIG. 51g, the broadcast TV menu 1046, has a separate category for often watched channels which allows the subscriber of the set top terminal 220 in a learning mode to choose eight additional channels for display.

[0363] In a manner similar to learning the most often watched channels of the subscriber, the terminal can also determine the most often watched shows by the subscriber. After developing (or learning) a list of popular shows or querying the subscriber for a list of popular shows the terminal can display a submenu allowing the subscriber to choose one of his popular shows for viewing.

[0364] In order for the set top terminal 220 to develop submenus for subcategories in FIG. 51g which relate to the content of the programs, the terminal must receive information on the content of the programs from the Operations Center 202 (via the cable headend 208). Normally the set top terminal 220 would receive this information in the form of the program control information signal (or STICIS).

[0365] Although various embodiments of menus for broadcast TV are possible, the goals of each are the same—to eliminate or augment printed guides to television programs.

[0366] In an alternative embodiment, a program viewing suggestion feature is available as an additional feature. This feature gives the indecisive viewer or lazy viewer suggestions as to which programs he should watch. The set top terminal 220 uses a matching algorithm to accomplish the program viewing suggestion feature.

[0367] In order for the set top terminal 220 to make decisions on which programs the subscriber should watch, the terminal must create a personal profile for the particular viewer. From the data in the particular viewer’s personal profile and the television program information available in the program control information signal, the set top terminal 220 is able to select a group of programs which the particular viewer is most likely to watch.

[0368] In order for this feature to operate, the set top terminal 220 builds a personal profile for each viewer and stores the information in a memory file by viewer name. To build a personal profile, the viewer answers a series of questions presented on a series of menu screens. These personal profile screens request the viewer to input information such as name, sex, age, place of birth, place of lower school education, employment type, level of education, amount of television program viewing per week, and the number of shows in particular categories that the viewer watches in a given week such as, sports, movies, documentaries, sitcoms, etc. Any demographic information which will assist the set top terminal 220 in suggesting television programs to the viewer may be used.

[0369] Once a personal profile has been created (in a particular set top terminal 220), it can be indefinitely stored in nonvolatile memory. A selection at the home menu screen 1010 activates the program selection feature. Following activation of the feature, the set top terminal 220 will present
the viewer with a series of brief questions to determine the viewer’s mood at that particular time. For example, the first mood question screen 1260 may ask the viewer to select whether he desires a short (30 minute), medium (30-60 minute), or long (60 plus minute) program selection, as shown in FIG. 51f. The second mood question screen 1262 requests the viewer to select between a serious program, a thoughtful program, or a light program, as shown in FIG. 51f. And the third mood question screen 1264 requests whether the user desires a passive program or an active program, as shown in FIG. 51k. The viewer makes his selection in each question menu utilizing the cursor movement keys and “go” button on his remote control 900. A variety of other mood questions are possible such as fatigue level of the viewer.

[0370] After the viewer has responded to the mood question menus which determine his mood, the set top terminal 220 finds the best programming matches for the viewer and displays an offering of several suggested programs to the viewer (three or more programs are preferred). The matching algorithm compares the viewer profile data with information about the program derived from the program control information (or STT/CIS) signal, such as show category, description type, length, etc. Using the personal profile information and mood questions suggested above, the following types of outcomes are possible. If the set top terminal 220 is presented with a young lady viewer, educated in Boston who watches sitcoms on a regular basis, and desires a short, light, passive program, a match might be found with the 30-minute sitcom Cheers, the sitcom Designing Women and Murphy Brown. Taking another example, a middle-aged male viewer from the Boston area, wishing a longer length, light, passive program suggestion might be suggested the New England Patriots game, the Boston Red Sox game and a science fiction movie.

[0371] With this program selection feature, the set top terminal 220 can intelligently assist the specific viewer in selecting a television program. Instead of the set top terminal 220 requiring an input of personal profile information, the terminal may also “learn” a subscriber’s viewing habits by maintaining historical data on the types of programs the viewer has most frequently watched. This information can then be fed to the matching algorithm which selects the suggested television programs.

[0372] Using this methodology, it is even possible for the set top terminal 220 to suggest programs for two viewers. By using two sets of viewer profile information, the matching algorithm can find the best match for joint viewing. For example, the set top terminal 220 can suggest programs for a couple watching television simultaneously.

[0373] FIGS. 52a, 52b, and 52c demonstrate the use of promotional menus to sell subscriptions to services in the system. In particular, FIG. 52a is a promotional menu 1304 for Level A interactive services. Level A interactive services offers subscribers additional information about programs such as quizzes, geographical facts, etc. This information may be received by the set top terminal 220 in several data formats including VBI and in the program control information signal. FIG. 52b is a promotional menu 1306 for Level B interactive services which include a variety of on-line type services such as Prodigy, Yellow Pages, Airline Reservations, etc.

[0374] FIG. 52c is a promotion menu 1308 for the Level C interactive services. The Level C interactive services utilize local storage such as CD technology to offer an enormous range of multi-media experiences. The Level C interactive services require a hardware upgrade as described earlier. Specially adopted CD-I and CD-ROM units are needed for this service.

[0375] FIGS. 52d through 52j show menus that are available using the interactive Level A services. When interactive Levels A services are available in a television program, the system will display the interactive logo consisting of the letter “I” and two arrows with semicircular tails. In the preferred embodiment the set top terminal 220 will place the interactive logo on the television screen as an overlay menu 1310. In the preferred embodiment, the set top terminal 220 will detect that there is data or information available about a television program which can be displayed to a subscriber using the interactive service. When the set top terminal 220 senses that there is interactive information available, it will generate the interactive logo overlay menu and place it on the television screen. For example, the set top terminal 220 will detect that information on a television program is being sent in the vertical blanking interval (VBI) and generate an interactive logo overlay menu which will appear on the subscriber’s television screen for approximately fifteen seconds during each ten minute interval of programming.

[0376] When the subscriber sees the interactive logo on his television screen, he is made aware of the fact that interactive services are available in conjunction with his television program. If the subscriber presses his interactive remote control button, an additional overlay menu will be generated by the set top terminal 220 and placed on the screen. This menu 1310 is shown in FIG. 52f being overlayed on an interactive television program. From this menu the subscriber may select interactive features or return to the television program without interactive features.

[0377] If the subscriber selects interactive features he will be presented with the interactive Level A submenu 1312 in FIG. 52e. From this submenu the subscriber may choose a variety of different types of textual interactivity with the current television program. Some examples are quizzes, fast facts, more info, where in the world, products, etc. At any time during the interactive submenus the user may return to the television program without interactive features.

[0378] This interactive submenu has an example of taking a complete television program video, scaling it down to a smaller size and directing the video into a video window of a submenu.

[0379] FIG. 52f shows an interactive fast facts submenu 1314. In this submenu textual information is given to the subscriber in the lower half of his screen. This textual information will change as additional data is received by the set top terminal 220 relating to this television program.

[0380] FIG. 52g shows the use of the submenu another “more information” in the interactive service. This submenu 1316 gives additional information related to the television program to the viewer in textual form in the lower half of the screen. FIG. 52h is an interactive submenu 1318 for the subcategory “quiz.” In this interactive subcategory, the user is presented with questions and a series of possible answers. If the subscriber desires, he selects one of the answers to the
quiz question. After his selection, the set top terminal 220 sequences to another menu. The set top terminal 220 sequences to the interactive quiz answers submenu which informs the subscriber whether he has chosen the correct answer or not. FIG. 52 shows a correctly answered quiz question 1320 and FIG. 52 shows an incorrectly answered quiz question 1324. In the preferred embodiment, the menu graphics for both of these menus 521 and 522 is the same. The only difference is in the text which can be generated by the text generator of the set top terminal 220.

[0381] FIG. 53a is an example of a submenu for Level B interactive services. From this menu screen 1330, any of a number of on-line data services could be accessed. In FIG. 53a, the airline reservations selection has been selected by the subscriber.

[0382] FIGS. 53b through 531 provide an example of a sequence of menus that a subscriber may encounter with an on-line data service. In particular, this example relates to airline information and reservations and the subscriber in this sequence is reserving and purchasing airline tickets. FIG. 53b is an example of the first submenu 1332 for a data service offering various options. In this case, the subscriber has the option of checking current reservations or making new reservations. In each of these submenus related to a data service, the subscriber is able to return to the home menu 1010 or regular cable TV and exit the data service. FIG. 53c requires the subscriber to enter information related to his airline reservation in this submenu 1334, such as: domestic or international flight, year of flight reservation, month of flight reservation.

[0383] FIG. 53d is another submenu in the airline information and reservation data service. FIG. 53d provides an example of how the subscriber may choose among many options on a single screen 1336. In this manner, the preferred embodiment of the system can avoid the use of a separate keyboard for textual entry. Although a separate keyboard may be provided as an upgrade, it is an added expense which some subscribers may wish to avoid. FIG. 53d shows an "eye off the remote" approach to entering information. FIG. 53d allows the user to choose the State in which he will depart and the state in which he will arrive. The airline information reservation submenu 1338 shown in FIG. 53e allows a subscriber to choose the airports from which he will depart and arrive and also the approximate time period of his departure and his arrival. FIG. 53f, an airline information and reservation submenu 1340, allows a subscriber to view six available flights. A subscriber may select one of the flights to check on its availability.

[0384] FIG. 53g, an airline information and reservation submenu 1342, allows a subscriber to enter the month, day and year for the availability date he desires. In this submenu, the subscriber is offered the option of correcting any errors in the entered information. This particular submenu is for a particular flight, including flight number.

[0385] FIG. 53h, an airline information and reservation submenu 1344, allows a subscriber to view remaining seats available on a flight. From the menu, the subscriber may select his seat assignments. This submenu is an example of how information may be graphically shown to a subscriber using a portion of the menu and different coloring schemes. In this menu, the lower half of the screen shows the passenger compartment of an airplane with all the seat locations graphically represented by square blocks. By coloring the available seat locations in blue and the unavailable seat locations in a different color, the menu can present a great deal of information in a limited amount of space. This graphic presentation of information for the interactive on-line data services is an important method of visually displaying large amounts of information to the subscriber.

[0386] FIG. 53i, an airline information and reservation submenu 1346, allows the subscriber to choose a one-way or round-trip ticket and to confirm his reservations. If the subscriber desires to proceed, he may charge his airline ticket to his credit card by choosing the appropriate strip menu on the lower part of the screen.

[0387] FIG. 53j, an airline information and reservation submenu 1348, is an example of how credit card purchases may be made using the interactive on-line data services. In this particular menu, the subscriber is charging a round-trip plane ticket on his credit card. The subscriber simply needs to enter his credit card number, expiration date, and credit card type to charge his airline ticket.

[0388] FIG. 53k, an airline information and reservation submenu 1350, is an example of a menu which may be shown whenever an on-line data service is processing a request sent by the subscriber. In this particular menu, the on-line data service is processing the subscriber's credit card charge for his airline ticket.

[0389] FIG. 53l, an airline information and reservation submenu 1352, confirms a subscriber's airline ticket purchase and passes on information where the ticket may be picked up.

[0390] FIG. 54a is a major menu 1038 displaying the digital/audio program choices which are available for subscribers who have paid the monthly fee. In a chart format, the major menu shows the top five, top ten, and top forty songs available in six different categories of music. Below the chart, the system is able to provide a text message describing the particulars of the audio program selected.

[0391] The digital/audio feature of the invention allows a subscriber to listen to CD quality audio selections through his stereo. This can be accomplished by running cables directly from the set top terminal 220 to the subscriber's amplifier/stereo system. Alternatively, the user may listen to audio selections through his television system.

[0392] FIGS. 54d and 54e are the same major menu 1038 as FIG. 54a but shows a different selection and a different program description in the lower text 1408, 1412. From any of the menu screens for the digital/audio feature, the subscriber may return to regular cable TV with the press of a single button.

[0393] FIGS. 54f and 54c are promotional menus 1400, 1404 for the digital/audio feature. Using the same logos and menu format, the system can provide a text description enticing the subscriber to pay the monthly fee and join the service. In FIG. 54b, the menu allows the user to test the system with a free demonstration. The menu in FIG. 54c allows the subscriber to request additional promotional information about the system. Both FIGS. 54b and 54c are representative of promotional menus that may be used throughout the menued system.
[0394] FIGS. 55a through 55g and FIGS. 56a through 56g, show how menus are generated by the set top terminal 220. FIGS. 55a through 55g display the building of a major menu screen for the category hit movies. FIG. 55a shows the background graphics for the hit movie major menu. The background graphics 1500 comprise an upper sash 1502 across the top of the screen and a lower sash 1504 across the bottom of the screen. The background graphics are generated from the background graphics file 800 in the memory files of the graphics memory (preferably EEPROM 620). In particular, the hit movie major menu background graphics are located in the universal main menu backgrounds subfile 804 of the background graphics file 800. This universal major menu background graphic 1500 is consistently used in nearly all the major menus. FIG. 55b shows the logo graphics for the hit movie major menu. The logo graphics 1508 for this major menu consist of an icon window 1510, a cable company logo 1512 in the lower left-hand portion of the screen, a channel company logo 1514 in the upper right-hand part of the screen and two “go” buttons 1516. The icon graphics 1510 are consistently shown in each of the major menus. The cable company logo 1512 is consistently shown in the lower left-hand part of the screen in nearly every major menu. These logo graphics 1508 are created from the logo graphics file 820 in the EEPROM 620. In particular, the cable company logo 1512 in the lower left-hand corner of the screen is located in the Your Choice TV logos 824 part of the logo graphics file. The network logo 1514 in the upper right-hand corner of the screen is generated from the network logo file 828 of the logo graphics file 820. The “go” buttons 1516 are generated from the graphic elements file 840 of the logo graphics file 820.

[0395] FIG. 55c shows the addition of menu displays 1520 to the hit movie major menu. In particular, FIG. 55c shows a ten block main menu display 1520 and a strip menu 1522 in the lower part of the screen. The ten display blocks 1520 of FIG. 55c are generated from the menu display block’s subfile 854 of the menu display and cursor graphics file 850 shown in FIG. 10. The strip menu 1522 located on the lower part of the screen is also generated from the menu display block’s subfile 854.

[0396] FIG. 55d shows the addition of a cursor highlight overlay 1526 to the hit movie major menu. The cursor highlight overlay 1526 is generated from the cursor highlight overlay’s sub-menu 858 of the menu display and cursor graphics file 850 shown in FIG. 10. In the preferred embodiment, the cursor highlight overlay 1526 is shown by default to be in the upper left-hand menu display block of each major menu. This cursor highlight overlay 1526 can be moved on the screen by the subscriber using his cursor movement buttons 970.

[0397] FIG. 55e shows the text 1530 generated for the hit movies major menu. In the preferred embodiment, the text 1530 is generated separately by a text generator in the set top terminal 220. Those portions of the text that generally remain the same for a period of weeks or months may be stored in EEPROM 620 or other local storage. For example, the text “HIT MOVIES from” 1531 will consistently appear on each hit movies’ major menu. This text may be stored on EEPROM 620 or other local storage. Further, text such as that which appears at the lower center part of the screen “PRESS HERE TO RETURN TO CABLE TV” 1532 appears many times throughout the menu sequence. This text may also be stored locally at the set top terminal 220. Text which changes on a regular basis, such as the movie titles (or other program selections), will be transmitted to the set top terminal 220 by either the operations center 202 or the network controller 214 of the cable headend 208. In this manner, the cable headend 208 may change the program selections available on any major menu 1020 by modifying the program control information signal sent by the operations center 202 and transmitting the change via the STPCs. It is preferred that the text 1530 be generated separately from the graphics because the text can be stored locally in a more compact manner requiring less storage space. In addition, it allows for easy communication of text changes from the operations center 202 or cable headend.

[0398] In alternative embodiments, portions of the text, particularly those portions which remain constant, may be incorporated into the graphics and stored in either the background graphics file 800 or the logo graphics file 820.

[0399] FIG. 55f shows the addition of day 1534, date 1536 and time 1538 information to the hit movies major menu. This information may be obtained in a variety of ways. The day, date, and time information 1540 may be sent from the operations center 202, the cable headend (signal processor or network controller 214), the uplink site, or generated by the set top terminal unit 220 internally. Each manner of generating the day, date, and time information 1540 has advantages and disadvantages which may change given the particular embodiment and costs. In the preferred embodiment, the day, date, and time 1540 are generated at a central location such as the operations center and are adjusted for regional changes in time at the cable headend.

[0400] FIG. 55g shows the results of the information in FIGS. 55a to 55j being integrated in the combiner 624 and then displayed on the television screen 222. The subscriber in viewing the hit movie major menu 1040 is unaware of the fact that the menu comprises several distinct part.

[0401] FIGS. 56a through 56g show the creation and display of a program description sub-menu for a hit movie. Similar to the major menu, the submenu is created in parts and combined before being sent to the television screen. FIG. 56a shows the background graphics 1550 for the program description submenu. In the preferred embodiment, the upper sash 1552 and lower sash 1554 of the background graphics 1550 are stored together in one location on the EEPROM 620. The video window and half-strip window 1558 are also co-located in storage on the EEPROM 620. The half-strip window 1558 beneath the video window serves 1556 as a means for describing the videos shown in the video window 1558. Both sets of graphic information 1550, the sashes 1552, 1554 and video window 1556 with description 1558, are located in the universal submenu backgrounds subfile 808 of the background graphics file 800. Both sets of backgrounds appear in many menus and are used many times during a sequence of menus.

[0402] FIG. 56b shows the additional logo graphics information 1508 needed to create the program description submenu. In the preferred embodiment, the "go" logo 1516 can be stored once in memory 620 and directed to the correct portion of the screen in which it is needed for a particular menu. Similar to FIG. 55b, the information needed to create the "your choice" logo 1512 and "go" buttons 1516 is stored in the logo graphics file 820.
FIG. 56c shows the menu display information 1520 for the program description submenu. Similar to FIG. 55c, the information needed for FIG. 56c menu display blocks is stored in the menu display blocks' subfile 854 of the menu display and cursor graphics 850. In this particular submenu, there are three menu display blocks of rectangular shape.

FIG. 56d shows the addition of cursor highlight overlay information 1526 for the program description submenu. This information is obtained from the cursor highlight overlay subfile 858. For most major menus 1020 and submenus 1050, only one cursor highlight overlay 1526 will appear on the screen at a given time. More cursor highlight overlays 1526 will appear on a screen when the subscriber is presented with more than one question. The number of cursor highlight overlays 1526 will generally correspond with the number of questions being presented to the subscriber on the menu. The cursor highlight overlay 1526 is generally assigned a default position on each menu screen and is moved by the subscriber using either the remote control 900 or the buttons 645 located at the top of the set-top terminal 220.

FIG. 56e shows the text generation 1530 necessary for the program description submenu for a hit movie. As in FIG. 55e, some of the text for the program description submenu is consistently on each program description menu, such as “PRESS HERE TO RETURN TO CABLE TV.” This textual information may be stored locally as opposed to being derived from the STTCIS. Regardless of where the text information is stored, it must be processed through the text generator 621 before being sent to the combiner 624.

FIG. 56f shows the addition of video 1560 to the video window 1556. In an alternative embodiment, the video shown in the program descriptionsubmenu is a still picture. The still picture may be stored in a compressed format (such as JPEG) at the set top terminal 220. These video stills 1560 that are used on program description submenus as well as other menus, may be transmitted by the operations center 202 through the program control information signal from time to time.

In the preferred embodiment, the video window 1556 shows a moving video picture. For the hit movies category, the moving video picture may be obtained directly from a current feed of the described movie. For example, the movie video 1560 shown may be taken directly off of a channel which is currently showing the movie Terminator. The set top terminal 220 would decompress the channel with the movie Terminator and then manipulate the video signal to place it in the video window 1556. This manipulation of the video signal includes scaling down the size of the video screen and redirecting the video to a portion of the menu screen which is within the video window of the menu.

FIG. 56g shows the final product resulting from the combining of FIGS. 56a through 56f. The combiner 624 integrates each of these portions of information into a single menu screen 1120.

The combiner 624 which displays the menus on the television screen obtains information primarily from three locations, the graphics generator 622, the text generator 621, and the video decompressor 618 (with other video manipulation equipment, if necessary). The graphics generator 622 primarily obtains information from the graphic memory unit 620 but may receive information in the STTCIS. The text generator 621 primarily receives its information from a separate memory for text. However, in certain embodiments the text information may be stored in the graphics memory 620 or may be taken directly off the STTCIS. The video signal which is sent to the combiner 624 may come directly from one or more video decompressors or ancillary video manipulation equipment.

One of the methods for video clips or promotional video to be sent to the set top terminal 220 is through the use of split screen video techniques. FIG. 57a shows the throughput of a single channel using a split screen video technique to divide the channel into four parts. In this manner, four different video clips may be simultaneously sent on a single channel. Program description submenus can acquire one of the video clips shown on the split channel at any given time. Generally, this requires the set top terminal 220 to decompress the entire channel, acquire one-fourth of the video information, scale the video (if necessary), and redirect the video. Using this split screen technique 1602, numerous video clips may be sent over a limited number of channels.

FIG. 57b shows an embodiment 1604 in which forty-eight different video clips are sent simultaneously on a single channel using split screen video techniques. In this embodiment, the video signal may need to be scaled upwardly to enlarge the picture for viewing in a video window or on a full screen.

FIG. 57c shows an alternative embodiment, which avoids the need for redirecting video into the portion of the screen which houses the video window 1556, masking and menu graphics are used to cover the portions of the channel video that are not needed. This masking technique allows the split screen video to remain in the same portion of the screen that it is transmitted by the operations center. The masking then is adjusted to cover the undesired portions of the screen. These masks would be stored in the background graphics file 800 similarly to other background files for menus. The advantage of the system is the cost savings in not needing to redirect video. The disadvantage of the system is that the video window on a description submenu, for example, would not remain in the same location from menu to menu. This inconsistency in video window location detracts from the aesthetically pleasing aspects of the menu layouts.

If the masking technique were used in conjunction with the split screen video shown in FIG. 57a, each sub-
menu would have approximately one-quarter screen of video and three-quarter screen of graphic and text information. For example, a submenu or promo menu for a basketball game would mask all but the upper right-hand corner of the screen. Following masking, other background graphics 1550, logo graphics 1508, menu display 1520, cursor graphics 1526, and text information 1530 would be overlayed over the three-quarter mask. In a similar manner, a submenu or promo menu for a hockey game would also have a three-quarter mask. This three-quarter mask would mask all but the lower right-hand corner of the screen. Again, the remaining menu graphics, logos and textual information would overlay the three-quarter mask. As you can see from this example, four different three-quarter masks must be stored in the background graphics file 800 for use in the four possible video window positions.

[0415] The split screen video technique may also be used for promoting television programming. Since a great number of short video clips may be sent continuously (such as in FIG. 57b), full or partial screen promotional (or informational) may be provided to the subscriber. With this large quantity of promotional video, subscribers may be given the opportunity to “graze” through new movie or television programming selections. The subscriber would simply graze from promotional video to promotional video until he found the television program of his liking. Once he has found that program he may choose to order it.

[0416] FIGS. 58a, 58b and 59a, 59b relate to the monthly account review capabilities available to the subscriber. In the preferred embodiment, the subscriber may choose to access the monthly account review capability from both the introductory menu 1000 and home menu 1010. The monthly account review screen shows alternative window types that are available to the set top terminal 220. For example, in the upper left-hand corner of the monthly account review, the current time and date are both shown. The upper right-hand corner provides the subscriber with instructions on how to use the monthly account review capability. FIG. 58a also shows that windows may be created in a variety of shapes. For instance, on the lower right-hand and part of the screen 1612 two triangularly shaped windows with messages are shown. In addition, on the left lower part of the screen 1612 a window in the shape of a trapezoid is shown with a textual message inside.

[0417] The monthly account review provides a list of charges from the first day of the month to the date of viewing for each major menu. Charges are incurred on a pay-per-view basis and on a subscription basis (weekly, monthly, quarterly, etc.). At the lower part of the screen, the total of the charges incurred for the month is listed. The account status also can be calculated on a weekly, quarterly or semi-annual basis.

[0418] If the user moves his cursor to highlight one of the eight menus listed and depresses the “go” button, he will obtain further billing information on the menu. FIGS. 58a and 58b show in screens 1610 and 1612, respectively, the subscriber selecting menu A for further information.

[0419] FIGS. 59a and 59b are submenus for the monthly account review and displays detailed billing information about selections made on menu A. The date of each movie selection, title of the movie, and price for each movie is displayed (1614, 1616). Also, any discounts which have been granted are displayed. The total charges on this menu and the day in which the menu will be charged are shown in the lower part of the screen. From this submenu, the subscriber may either return to regular TV or return to the major menu for the monthly account review. If the submenu information does not fit on a single screen, an extended submenu may be utilized with follow on extension screens. Alternatively, a scrolling feature may be used enabling the subscriber to scroll additional information onto the first submenu screen.

[0420] The account information necessary to create the monthly account review menus may be stored either in the memory of the set top terminal 220 or at a remote location that communicates with the set top terminal 220. In the simplest embodiment, the set top terminal 220 records a subscriber’s selections locally and calculates the monthly account review based upon the subscriber’s selections which require the payment of fees. This monthly account information is stored locally and sent to the cable headend 208 at least once a month for back-up and billing purposes.

[0421] Alternatively, the subscriber’s viewing selections and billing information may be continuously maintained at the cable headend 208 or a remote site connected via communication lines to the cable headend 208. The cable headend 208 or the remote site must regularly transmit the monthly account information to the set top terminal 220. Each embodiment has advantages and disadvantages. If the account information and processing is done locally at the set top terminal 220, each set top terminal 220 must be provided with the memory and necessary processing capability to maintain the account. This greatly increases the cost of a set top terminal 220. If the account information is maintained remotely, the remote site must remain in regular contact with the set top terminal 220 in order to provide the subscriber with billing information.

[0422] To accommodate homes with multiple viewers two or more set top terminals 220 may be placed on a single bill or two accounts may be created for one set top terminal 220.

[0423] FIG. 60 shows an example of remote statistical and billing sites. In this arrangement, statistical and billing information from a community of set top terminals 1720 is communicated through cable headend 208 sites to regional statistical and billing sites 1730 (SBS). A regional SBS may serve several cable headend 208 sites. The regional SBS 1730 calculates billing and statistical information and passes necessary billing information back downstream through the network controller at the cable headend 208 to an appropriate single set top terminal 220 in a subscriber’s home. In addition, the regional SBS communicates the billing and statistical information received on program viewer choices to the central SBS 1740.

[0424] The central SBS 1740 accumulates the data received from a number of regional statistical and billing sites and calculates national statistical and billing information. In the preferred embodiment the regional SBS 1730 prints and mails bills to subscribers. The central SBS 1740 can calculate program ratings, shares and HUTS (homes using televisions) for the nation and by region. With interactive TV programs sophisticated statistical information may be gathered through the network controllers of the cable headends.
This arrangement for billing and statistical information provides the operators of the system with the advantages of distributive processing. Remote billing sites may serve regions of the country by having each cable headend in a region of the country connected to one regional billing site. The information from the regional billing sites may then be communicated on a less frequent basis to the operations center or a central billing location. This method of distributed processing of billing enables the central billing location to receive fewer communications and be more efficient. In addition, the communication links between the cable headend’s network controller and regional sites will be of shorter distance than communication links to the operations center from the cable headends. This should result in a cost savings to the system operator.

However, the regional statistical and billing may be eliminated and all communications from the cable headend may proceed to the Central SBS 1740. In fact, the Central SBS 1740 can be collocated with the Operations Center and all functions performed at one central location.

If the cable program packaging and delivery system is established in just one locale, the network controller can perform all the statistical and billing procedures.

Figs. 61 through 89 are additional representative menus which include color indications.

Figs. 90 through 98 demonstrate the generation of menu screens.

Fig. 99 is an example of a help menu which may be accessed from the introductory menu. In alternative embodiments, help or instruction menus may be accessed from any displayed menu. Fig. 99 instructs the subscriber on the use of the subscriber interface (remote control unit 900). In particular, Fig. 99 instructs the subscriber on the use of arrow buttons for cursor movement. Fig. 99 also shows how additional instructional information can be provided with follow-on menus by depressing “go” in the lower portion of the screen (highlighted in yellow).

Fig. 100 is an exemplary introductory menu with access to remote instructions.

Figs. 101 through 131 are additional representative menus which include color indications.

Figs. 132 through 134 demonstrate the generation of menu screens.

What is claimed is:

1. A remote control unit adapted for use with a set-top terminal, the set-top terminal receiving a plurality of television signals and generating a plurality of menus associated with the television signals, each menu belonging to a hierarchy of menus including main menus and submenus, each menu corresponding to a single program or a group or related programs and having menu options that represent one of the programs or group of programs, the remote control unit comprising:

   means within the remote control unit, for communicating with the set-top terminal to provide thereby communications adapted to allow selection of a desired program from the plurality of hierarchical menus; and

   a plurality of switches, coupled to the means for communicating, comprising:

   menu select switches for causing the communication of a signal adapted to directly selecting a desired menu from the plurality of hierarchical menus, each menu select switch corresponding to a particular menu and having an icon representing that particular menu, wherein a selected submenu is directly selected by depressing a menu select switch that corresponds to that selected submenu without first selecting one of the main menus; and

   cursor movement switches for causing the communication of a signal adapted to moving a cursor through menu options presented on the plurality of menus;

   whereby a user by touch may distinguish the cursor movement switches and menu select switches from the remainder of the plurality of switches without looking at the remote control unit.

2. The remote control unit of claim 1 wherein the plurality of switches includes two groups of switches, a standard group including volume control and channel select switches, and a special group including the cursor movement switches and the menu select switches, whereby the two groups of switches are physically separated from each other on the remote control unit proximate the center of mass of the remote control unit.

3. The remote control unit of claim 1 further comprising a joystick for cursor movement.

4. The remote control unit of claim 1 further comprising a ball for cursor movement.

5. The remote control unit of claim 1 further comprising a rolling-depressible button for cursor movement.

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