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<tr>
<td>Author(s)</td>
<td>Lee, Kenneth.</td>
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Paper No. 8
What is Digital TV?
- Consumer
  - TV set that receives and displays digital TV signals
- Consumer Electronics Manufacturers
  - TV set with digital signal processing within
- Broadcasters
  - Digital transmission of video, audio and data

Digital Transmission
- Source Coding
- MPEG Compression
- Channel Coding
  - Reed-Solomon Coding, Convolutional Coding
- Modulation
  - OFDM
- Broadcast

Scope
- Introduction on DTV
- Diversity through DTV
- Interactivity through DTV
- The Road Ahead
- Conclusion

Benefits of Digital TV
- More efficient
- More robust
- Better picture quality
- Crystal clear digital quality sound
- More choice (programmes & applications)
- Greater interaction with TV

Block Diagram of Digital TV System
2nd Regional Symposium On New Media & Learning Technologies
8 – 10 September 1999, Singapore

INTERACTIVITY & DIVERSITY THROUGH DIGITAL TV
Kenneth Lee, TCS

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• Diversity through DTV
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Block Diagram of Digital TV System

Benefits of Digital TV
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How can I receive Digital TV?
- Set-top box
- Integrated Digital TV set
- PC plug-in card

Diversity through Digital TV
- Digital TV Standards
- Delivery Platforms
- Applications
- Content

Digital TV Standards
- Advanced Television Systems Committee, USA
- Digital Video Broadcasting, Europe
- Digital Broadcasting Experts Group, Japan

Comparison of DTV Standards

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<th>ATSC</th>
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<th>DIBEG</th>
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World Adoption of Digital TV Standards

Delivery Platforms
DTV Applications

- TV Mobile
- Single Frequency Network (SFN)
- High Definition TV (HDTV)
- Multi-Channel Surround Sound
- Data Broadcasting
- Multi-lingual Subtitling/Multilanguage Audio
- Digital Video Recording
- Interactive Services

TV Mobile

- Concept of TV anytime, anywhere with updated information on the move
- Successfully tested on MRT trains, SBS buses and LRT trains
- Possible launch in other public transportations

Single Frequency Network (SFN)

- Multiple transmitters are deployed for effective coverage
- Same frequency is used for these multiple transmitters
- Frequency spectrum is conserved

High Definition TV (HDTV)

- Widescreen (16:9)
- 1920 x 1080 > 2 million pixels
- Superior picture quality

Multi-Channel Surround Sound

- Recreate cinematic experience at home
- 5.1 speaker system
- Dolby AC-3

Data Broadcasting

- Data can either be programme related or otherwise
- Examples include Digital Teletext, Web pages etc

Multi-Lingual Subtitling/Multilanguage Audio

- More than one language can be carried in the digital bitstream simultaneously

Digital Video Recording

- Quality as good as the source
- Either on tape or on hard disk

Interactive Services

- Interactive applications can be enhanced with local storage (hard disk)
- Further details to be provided later
Digital TV Content (1)
- Video
  - Standard Definition TV (SDTV)
  - Enhanced Definition TV (EDTV)
  - High Definition TV (HDTV)
- Audio
  - Multi-Channel Surround Sound
  - Multi-Language Audio

Digital TV Content (2)
- Data
  - Multi-lingual Subtitles/ Closed Captions
  - Interactive content
  - Programme associated data
- Web pages/ Multimedia content
- Digital Teletext
- File transfer/ Software download

Interactive Digital Broadcasting
- Merges mass appeal of traditional TV with rich, interactive power of Internet
- TV is pervasive and easy to use
- May or may not require a return/ back channel
  - telephone lines
  - cable
  - wireless

Degree of Interactivity
- Proto-interactivity
  - return path is not required
  - eg Teletext
- Full interactivity
  - return path is required
  - eg E-commerce

Medium of Interactive Content
- Broadcast
  - Audio, video and data streaming
- Walled Garden
  - Cached content
- Internet
  - Web browsing/ searching

Interactive Services
- Electronic Programme Guide (EPG)
- E-commerce/ Home Banking
- Personalized TV
- Interactive Advertisement
- On-demand Information/ Digital Teletext
- Polling/ Quiz
- Online Education
- Internet
- Games
Electronic Programme Guide (EPG)
- Programme guide for the multi-channel services
- Navigation tool
- Provide descriptions of programmes
- Allows sorting, searching, querying
- Gateway to interactive services
- Set user preference

E-Commerce/ Home Banking
- Pay Bills
- Purchase Merchandise
- Book Airline Tickets/ Travel Packages
- Order Groceries
- Check Bank Statements
- Transfer of Funds

Personalized TV
- Requires hard disk
- Based on user profile
- Creates your own channel
- Automatically records your favourite programmes
- Control over viewing
- Watch when you want, what you want and how you want

Interactive Advertisement
- Can be based on user profile
- Direct marketing channel
- Banner ads
- Special ad content
- Provide detailed product information

On-demand Information/ Digital Teletext
- Data broadcast
- Could be programme related or otherwise
- Real-time information
  - Weather
  - Traffic
  - Stock market

Polling/ Quiz
- Feedback from viewers through polling
- Simple home viewers’ quiz
Online Education/Course
- Course material is broadcast
- Interactive exercises/tests
- Enhance learning experience
- Programme may be repeated with the help of local storage

Internet
- Web browsing
- Email
- Internet Chat
- File Transfer/Software Download
- Simultaneously while watching the TV

Games
- Online gaming
- Interactive games

Benefits of Interactive Digital Broadcasting
- Viewers
  - convenience
  - value-added services
- Advertisers
  - capture consumers’ feedback
  - targeted advertising
- Broadcasters
  - new revenue opportunities

Technologies & Standards of Interactive Digital Broadcasting

Who has started Interactive TV?
**Issues to Interactive Digital Broadcasting**
- Interactive platform
- Return channel platform
- Conditional access/Security
- Business Model
- Privacy

**Factors to Successful Interactive Services**
- Relevant content
- Value-added
- Ease of use
- Instant access
- Secure network
- Local storage
- Built-in safety checks

**The Road Ahead......**

**Future Trends**
- Set-top boxes will have increasing power and storage capacity
- Voice technology
- Home networking
- More converging products
- Ubiquitous wireless and net access
- Bumper bandwidth

**TCS' Direction**
- Exploit latest technology to provide quality picture and sound
- Provide value-added programmes and services to our viewers
- Continue to enrich and delight the world

**Conclusion**
- DTV is here to stay
- New and wide range of services
- Change the lifestyle of people
- Evolve and converge with the Internet and telecommunications