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Supplement 3

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**SERIES J: TRANSMISSION OF TELEVISION, SOUND
PROGRAMME AND OTHER MULTIMEDIA SIGNALS**

**Guidelines for the implementation of
Recommendation J.111 "Network Independent
Protocols"**

**Example of digital video broadcasting (DVB)
systems for interactive services**

ITU-T J-series Recommendations – Supplement 3

(Previously CCITT Recommendations)

ITU-T J-SERIES RECOMMENDATIONS

TRANSMISSION OF TELEVISION, SOUND PROGRAMME AND OTHER MULTIMEDIA SIGNALS

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SUPPLEMENT 3 TO ITU-T J-SERIES RECOMMENDATIONS

GUIDELINES FOR THE IMPLEMENTATION OF RECOMMENDATION J.111 "NETWORK INDEPENDENT PROTOCOLS"

EXAMPLE OF DIGITAL VIDEO BROADCASTING (DVB) SYSTEMS FOR INTERACTIVE SERVICES

Source

Supplement 3 to ITU-T J-series Recommendations was prepared by ITU-T Study Group 9 (1997-2000) and was approved under the WTSC Resolution No. 5 procedure on the 19th of November 1998.

FOREWORD

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The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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GUIDELINES FOR THE IMPLEMENTATION OF RECOMMENDATION J.111 "NETWORK INDEPENDENT PROTOCOLS"

EXAMPLE OF DIGITAL VIDEO BROADCASTING (DVB) SYSTEMS FOR INTERACTIVE SERVICES

(Geneva, 1998)

1 Scope

The basic requirement of an interaction channel is that the user be able to respond in some way to the Interactive Service (IS). This response may take the form of "voting" for a particular participant in a competitor show, "purchasing" goods demonstrated/advertised in a shopping channel programme, etc. This would be achievable within a one-way (reverse direction) narrowband path.

A higher level of interactivity might require that a user who has made a response to an IS be sent an acknowledgement. This might be the case where the consumer has made a credit card purchase from a shopping channel via the basic interaction channel. That consumer would expect to receive an acknowledgement that his credit card transaction had been accepted. This level of interactivity would require a two-way interaction channel: one in the reverse direction and the other in the forward direction.

A further level of interactivity would occur where, in response to information in the interactive service, the consumer requests further information on particular topics from the source of the service, or from a central database via the source of the IS. This would require that the forward channel be broadband. In this particular example, the reverse path would only need to be a narrowband one, but it is likely that applications will arise whereby the consumer will need to make a broadband response/contribution to the IS and also receive a broadband "answer" from the service source.

This Supplement is intended to explain the ways in which the network-independent protocols specified in Recommendation J.111 [2] can be used in conjunction with an interaction network as specified, for instance, in Recommendation J.113 [1] to implement the full range of Interactive Services (IS) complementing broadcast television services.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- [1] ITU-T Recommendation J.113 (1998), *Digital video broadcasting interaction channel through the PSTN/ISDN*.
- [2] ITU-T Recommendation J.111 (1998), *Network independent protocols for interactive systems*.
- [3] IEEE Std 802-1990, *Local and Metropolitan Area Networks: IEEE Standard Overview and Architecture*.
- [4] ISO/IEC 13818-1:1996, *Information technology – Generic coding of moving pictures and associated audio information – Part 1: System*.

ISO/IEC 13818-2:1996, *Information technology – Generic coding of moving pictures and associated audio information – Part 2: Video*.

ISO/IEC 13818-3:1998, *Information technology – Generic coding of moving pictures and associated audio information – Part 3: Audio*.
- [5] DAVIC 1.0 specification part No. 7 (January 1996), *High-layer and Mid-layer protocols*.



- [6] ISO/IEC 13818-6:1998, *Information technology – Generic coding of moving pictures and associated audio information – Part 6: Extensions for DSM-CC*.
- [7] ETS 300 468 (1995), *Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems*.
- [8] prTS 101 198 – *"Digital Video Broadcasting (DVB); Carriage of Internet Protocol (IP) via DVB broadcast channels"*.
- [9] RFC 768 (1980), *User Datagram Protocol*.
- [10] RFC 791 (1981), *Internet Protocol*.
- [11] RFC 793 (1981), *Transmission Control Protocol (TCP)*.
- [12] RFC 1332 (1992), *The Internet Protocol Control Protocol (IPCP)*.
- [13] RFC 1661 (1994), *The Point-to-Point Protocol (PPP)*; RFC 1662 (1994), *PPP in HDLC-like Framing*.
- [14] RFC 1717 (1994), *The PPP Multilink Protocol (MP)*.
- [15] "Universal Network Object Specification", Version 1.0 (identical to OMG-UNO Specification for CORBA 2.0).
- [16] RFC 1157 (1990), *Simple Network Management Protocol (SNMP)*.
- [17] RFC 1323 (1992), *TCP extensions for high performance*.
- [18] RFC 1889 (1996), *RTP: A Transport Protocol for Real-time Applications*.
- [19] RFC 1334 (1992), *Authentication Protocols*.
- [20] RFC 1340 (1992), *Assigned Numbers*.

3 Abbreviations

For the purposes of this Supplement, the following abbreviations apply:

API	Application Programming Interface
ASN.1	Abstract Syntax Notation One
BCD	Binary Coded Decimal
BER	Basic Encoding Rules
BIOP	Broadcast Inter ORB Protocol
BIOP	Broadcast Inter-ORB Protocol (see DSM-CC ISO/IEC 13818-6 [6])
CATV	Cable Television
CDR	Common Data Representation
CHAP	Challenge Handshake Authentication Protocol
DAVIC	Digital AudioVisual Council
DSM	Digital Storage Media
DSM-CC	DSM – Command and Control
DSM-CC U-N	DSM-CC User-to-Network
DSM-CC U-U	DSM-CC User-to-User
DVB	Digital Video Broadcasting Project ¹

¹ The Digital Video Broadcasting Project (DVB) is a consortium of broadcasters, manufacturers, network operators and regulatory bodies created for designing standards for the delivery of digital television.

GIOP	General Inter-ORB Protocol (see DSM-CC ISO/IEC 13818-6 [6])
HDLC	High-level Data Link Control (protocol)
HFC	Hybrid Fibre Coax
IETF	Internet Engineering Task Force
IIOP	Internet Inter-ORB Protocol
IOP	Inter-ORB Protocol (see DSM-CC ISO/IEC 13818-6 [6])
IOR	Interoperable Object Reference (see DSM-CC ISO/IEC 13818-6 [6])
IP	Internet Protocol
IPCP	IP Control Protocol
IS	Interactive Service
ISDN	Integrated Services Digital Network
ISP	IS Provider
LCN	Local Connection Name
LCP	Link Control Protocol
LLC	Link Layer Control
LSB	Least Significant Bit
MD5	Message Digest 5 (This is a hash scrambling algorithm)
MIB	Management Information Base
MJD	Modified Julian Date
MMDS	Multipoint Microwave Distribution System
MP	Multilink Point-to-Point Protocol
MPEG	Moving Picture Expert Group
MPEG TS	MPEG Transport Stream
NCP	Network Control Protocol
NSAP	Network Services Access Point
ORB	Object Request Broker (see DSM-CC ISO/IEC 13818-6 [6])
OSI	Open Systems Interconnection
PAP	Password Authentication Protocol
PPP	Point-to-Point Protocol
PSTN	Public Switched Telephone Network
RFC	Request For Comments
RPC	Remote Procedure Call
RTP	Real Time Protocol
SI	Service Information
SIS	Systems for Interactive Services
SMATV	Satellite Master Antenna TeleVision
SNAP	SubNetwork Attachment Point
SNMP	Simple Network Management Protocol

SRM	Session and Resource Manager
STB	Set Top Box
STU	Set Top Unit
TCP	Transmission Control Protocol
TS	Transport Stream
TV	TeleVision
UDP	User Datagram Protocol
ULP	8-bit Upper Layer Protocol
UN	User-Network (see DSM-CC ISO/IEC 13818-6 [6])
UNO	Universal Networked Object
UNO-CDR	UNO – Common Data Representation
UNO-RPC	UNO – Remote Procedure Call
UTC	Universal Time Coordinated
UU	User-to-User (UU) signalling (see DSM-CC ISO/IEC 13818-6 [6])

4 Use of the interaction channel

Adding interactivity to the DVB environment brings on some changes in the system set-up. A broadcaster is able to transfer information to the end user, using the DVB MPEG-2 transport mechanisms as defined in several DVB-related ETSI deliverables. In order to make a real interactive broadcast possible, end-user information has to be used. This is possible by feeding back information from the end user to an Interactive Service Provider (ISP). The ISP has contacts with the broadcaster and could even be the same organization, as shown in Figure 1.

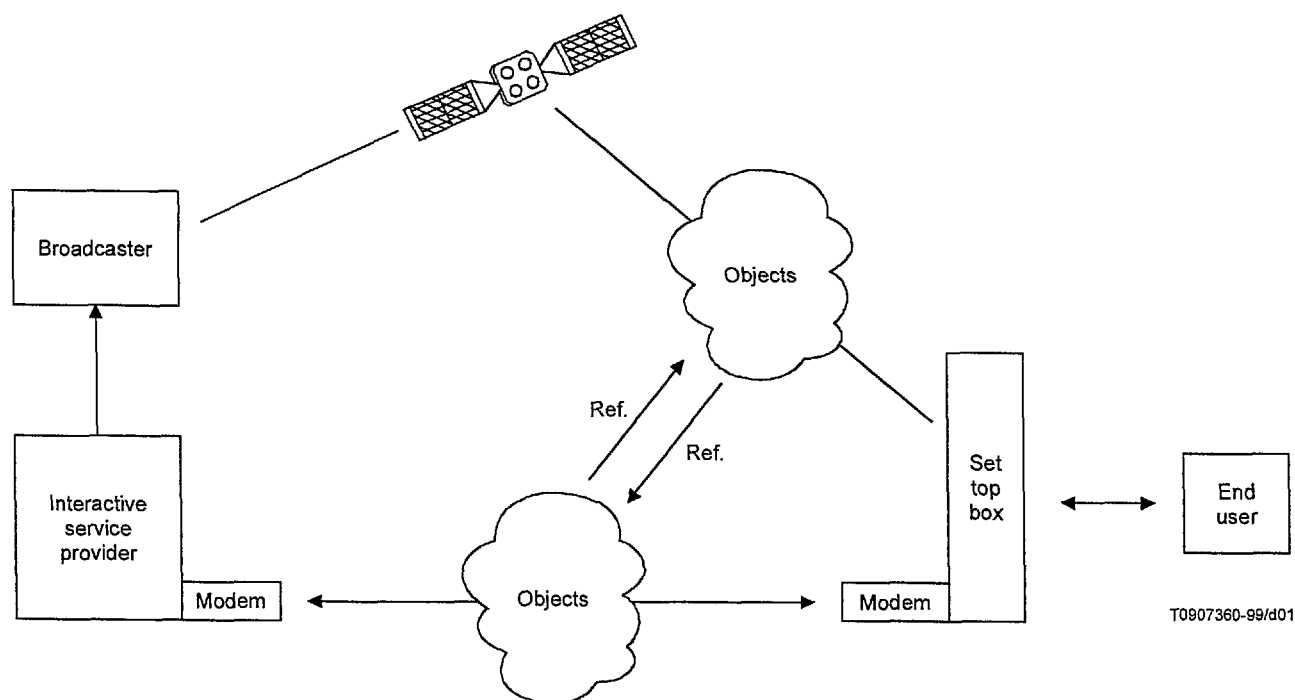


Figure 1 – High-level system overview for Interactive Services (IS) supporting broadcast to the home with narrowband return channels