

STB 개요 및 DVB-SI



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Confidential

HUMAX

IRD ?

IRD

(Integrated Receiver / Decoder)



✓ MPEG2 System (13818-1)

- transport stream, private section, program specific information (pat, pmt, cat)

✓ DVB-SI (EN 300 468)

- Service의 개념, Network의 개념, SI Tables (NIT, BAT, SDT, EIT, TDT, TOT 등)의 용도 및 STB에서의 활용

✓ 위성 방송

- satellite, transponder, channel search, Inb, diseqc 등

STB --> STB +IP Hybrid

HUMAX



참고: <http://www.humaxdigital.com/kr/digital.php>

방송 + IP
= 방송 환경(시장)의 변화

커넥티드 디바이스 확산
태블릿, 스마트폰, 스마트 TV,
PC, 게임 콘솔, OTT Box 등
보급 확산

스트리밍 서비스 확산
홀루, 넷플릭스, 유튜브,
러브필름(아마존) 등

수동적 → 능동적 TV시청
VoD, 캐치업(다시보기),
SNS, 앱(App) 등 양방향
콘텐츠 소비 증가

N-Screen 확대
다양한 디바이스에서 콘텐츠
소비 니즈 증가

Pay-TV 사업자의 차세대
하이엔드 방송서비스 촉발

IP-enabled STB 출현
(IP-Hybrid, HGS)

IP Hybrid 셋톱박스 (DTR-T1010)



- ▶ 영국 BBC iPlayer, ITV Player, 4OD and Demand 5 등 IP 서비스 지원
- ▶ 영화와 시리즈를 Library 이용가능
- ▶ 저장, 정지, Live TV 재생
- ▶ 한개채널 보면서 다른채널 저장가능 (1TB HDD 내장)

위성방송 셋톱박스(HDR-1000S)



- ▶ HD PVR 위성방송 수신용
- ▶ 영국 freesat HD 방송수신 (Free time 서비스)
- ▶ 영국 BBC iPlayer, ITV Player, 4OD and Demand 5 등 IP 서비스 지원
- ▶ 한개채널 보면서 다른채널 저장가능 (500GB HDD 내장)

케이블방송 셋톱박스(iCord Cable)



- ▶ HD PVR 케이블 방송수신용
- ▶ 한개채널 보면서 다른채널 저장가능 (500GB HDD 내장)
- ▶ HUMAX TV Portal 서비스 지원
- ▶ Home Networking 기능 지원

지상파방송 셋톱박스 (HDR-FOX T2)



- ▶ 2튜너 hd PVR 지상파 방송수신용
- ▶ 영국 BBC, ITV, Channel 4 무료 HD 채널 수신
- ▶ HUMAX TV Portal 서비스 지원
- ▶ Home Networking 기능 지원

✓ Channel

- 두 가지 의미로 혼용되는데, 전문적으로 **Tuner부**를 의미한다. 즉 frequency 단위가 Channel 임.
- 다른 하나는 일반적으로 '**채널전환**'의 의미로 쓰이는데, 이 때의 채널은 Program과 같은 말임.

✓ Program (MPEG2-System) = Service (DVB 용어)

✓ Network vs. Original Network

- Network

- ts를 전송하는 **망**으로 요약 할 수 있으며 여러서비스(프로그램)가 다 중화되어있는 ts는 위성 송신이 되기까지 여러 전송망을 통 할 수 있다.

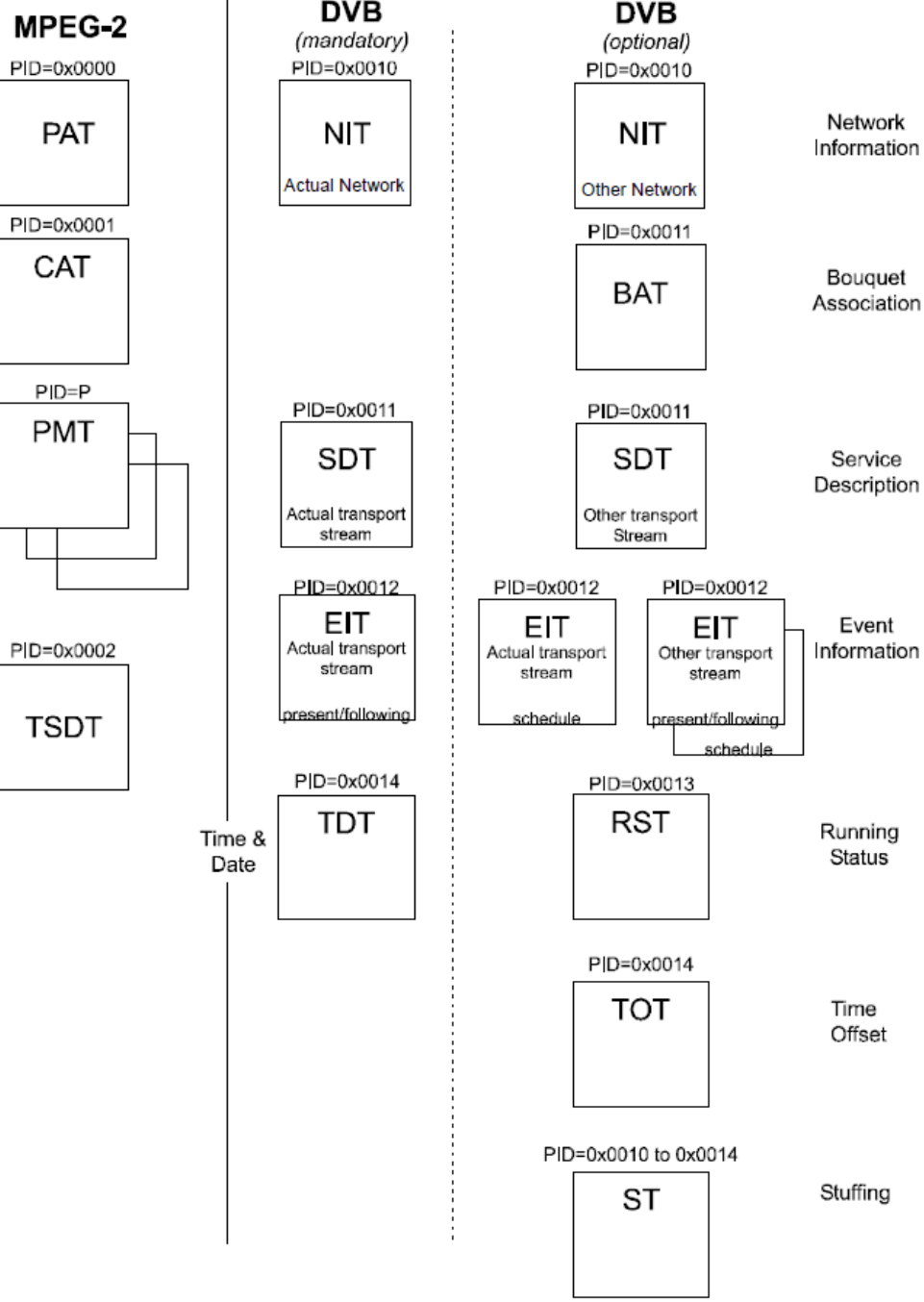
- Original network

- ts는 여러 네트워크를 통하여 전송되어 질 수 있는데 , **최초** 현재 수신되는 ts를 전송한 네트워크

DVB SI관점에서 Channel List와 EPG의 이해



- ✓ MPEG2-System: 13818-1
- ✓ DVB SI 구현: EN 300 468
- ✓ DVB SI 가이드라인: TR 101 211



Value	Description
0x00	program_association_section
0x01	conditional_access_section
0x02	program_map_section
0x03	transport_stream_description_section
0x04 to 0x3F	reserved
0x40	network_information_section - actual_network
0x41	network_information_section - other_network
0x42	service_description_section - actual_transport_stream
0x43 to 0x45	reserved for future use
0x46	service_description_section - other_transport_stream
0x47 to 0x49	reserved for future use
0x4A	bouquet_association_section
0x4B to 0x4D	reserved for future use
0x4E	event_information_section - actual_transport_stream, present/following
0x4F	event_information_section - other_transport_stream, present/following
0x50 to 0x5F	event_information_section - actual_transport_stream, schedule
0x60 to 0x6F	event_information_section - other_transport_stream, schedule
0x70	time_date_section
0x71	running_status_section
0x72	stuffing_section
0x73	time_offset_section
0x74	application information section (TS 102 812 [15])
0x75	container section (TS 102 323 [13])
0x76	related content section (TS 102 323 [13])
0x77	content identifier section (TS 102 323 [13])
0x78	MPE-FEC section (EN 301 192 [4])
0x79	resolution notification section (TS 102 323 [13])
0x7A	MPE-IFEC section (TS 102 772 [50])
0x7B to 0x7D	reserved for future use
0x7E	discontinuity_information_section
0x7F	selection_information_section
0x80 to 0xFE	user defined
0xFF	reserved

Table 1: PID allocation for SI

Table	PID value
PAT	0x0000
CAT	0x0001
TSDT	0x0002
reserved	0x0003 to 0x000F
NIT, ST	0x0010
SDT, BAT, ST	0x0011
EIT, ST CIT (TS 102 323 [13])	0x0012
RST, ST	0x0013
TDT, TOT, ST	0x0014
network synchronization	0x0015
RNT (TS 102 323 [13])	0x0016
reserved for future use	0x0017 to 0x001B
inband signalling	0x001C
measurement	0x001D
DIT	0x001E
SIT	0x001F

Figure 2: General organization of the Service Information (SI)

Table 12: Possible locations of descriptors

Descriptor	Tag value	NIT	BAT	SDT	EIT	TOT	PMT
network_name_descriptor	0x40	*	-	-	-	-	-
service_list_descriptor	0x41	*	*	-	-	-	-
stuffing_descriptor	0x42	*	*	*	*	-	-
satellite_delivery_system_descriptor	0x43	*	-	-	-	-	-
cable_delivery_system_descriptor	0x44	*	-	-	-	-	-
VBI_data_descriptor	0x45	-	-	-	-	-	*
VBI_teletext_descriptor	0x46	-	-	-	-	-	*
bouquet_name_descriptor	0x47	-	*	*	-	-	-
service_descriptor	0x48	-	-	*	-	-	-
country_availability_descriptor	0x49	-	*	*	-	-	-
linkage_descriptor	0x4A	*	*	*	*	-	-
NVOD_reference_descriptor	0x4B	-	-	*	-	-	-
time_shifted_service_descriptor	0x4C	-	-	*	-	-	-
short_event_descriptor	0x4D	-	-	-	*	-	-
extended_event_descriptor	0x4E	-	-	-	*	-	-
time_shifted_event_descriptor	0x4F	-	-	-	*	-	-
component_descriptor	0x50	-	-	*	*	-	-
mosaic_descriptor	0x51	-	-	*	-	-	*
stream_identifier_descriptor	0x52	-	-	-	-	-	*
CA_identifier_descriptor	0x53	-	*	*	*	-	-
content_descriptor	0x54	-	-	-	*	-	-
parental_rating_descriptor	0x55	-	-	-	*	-	-
teletext_descriptor	0x56	-	-	-	-	-	*
telephone_descriptor	0x57	-	-	*	*	-	-
local_time_offset_descriptor	0x58	-	-	-	-	*	-
subtitling_descriptor	0x59	-	-	-	-	-	*
terrestrial_delivery_system_descriptor	0x5A	*	-	-	-	-	-
multilingual_network_name_descriptor	0x5B	*	-	-	-	-	-
multilingual_bouquet_name_descriptor	0x5C	-	*	-	-	-	-
multilingual_service_name_descriptor	0x5D	-	-	*	-	-	-
multilingual_component_descriptor	0x5E	-	-	-	*	-	-
private_data_specifier_descriptor	0x5F	*	*	*	*	-	*
service_move_descriptor	0x60	-	-	-	-	-	*
short_smoothing_buffer_descriptor	0x61	-	-	-	*	-	-
frequency_list_descriptor	0x62	*	-	-	-	-	-
partial_transport_stream_descriptor (see note 1)	0x63	-	-	-	-	-	-
data_broadcast_descriptor	0x64	-	-	*	*	-	-
scrambling_descriptor	0x65	-	-	-	-	-	*
data_broadcast_id_descriptor	0x66	-	-	-	-	-	*
transport_stream_descriptor (see note 2)	0x67	-	-	-	-	-	-
DSNG_descriptor (see note 2)	0x68	-	-	-	-	-	-
PDC_descriptor	0x69	-	-	-	*	-	-
AC-3_descriptor (see annex D)	0x6A	-	-	-	-	-	*
ancillary_data_descriptor	0x6B	-	-	-	-	-	*
cell_list_descriptor	0x6C	*	-	-	-	-	-
cell_frequency_link_descriptor	0x6D	*	-	-	-	-	-
announcement_support_descriptor	0x6E	-	-	*	-	-	-
application_signalling_descriptor	0x6F	-	-	-	-	-	*
adaptation_field_data_descriptor	0x70	-	-	-	-	-	*
service_identifier_descriptor (see [15])	0x71	-	-	*	-	-	-
service_availability_descriptor	0x72	-	-	*	-	-	-
default_authority_descriptor (TS 102 323 [13])	0x73	*	*	*	-	-	-
related_content_descriptor (TS 102 323 [13])	0x74	-	-	-	-	-	*
TVA_id_descriptor (TS 102 323 [13])	0x75	-	-	-	*	-	-
content_identifier_descriptor (TS 102 323 [13])	0x76	-	-	-	*	-	-
time_slice_fec_identifier_descriptor (EN 301 192 [4]) (see note 3)	0x77	*	-	-	-	-	-
ECM_repetition_rate_descriptor (EN 301 192 [4])	0x78	-	-	-	-	-	*
S2_satellite_delivery_system_descriptor	0x79	*	-	-	-	-	-
enhanced_AC-3_descriptor (see annex D)	0x7A	-	-	-	-	-	*
DTS_descriptor (see annex G)	0x7B	-	-	-	-	-	*
AAC_descriptor (see annex H)	0x7C	-	-	-	-	-	*
XAIT_location_descriptor (see [i.3])	0x7D	*	*	*	*	*	*
FTA_content_management_descriptor	0x7E	*	*	*	*	-	-
extension_descriptor	0x7F	*	*	*	*	*	*
user defined	0x80 to 0xFE						
forbidden	0xFF						



딱딱하고
지루한
이야기

...

MPEG2 TS (Transport Stream) Analysis

File: ASTRA1_11836_H_27500_AUTO_SturmderLiebe_20090924_1549.ts [38.01 mb/s] [15.00%]

- Programs
 - Program 28106 [Das Erste]
 - PID 100 [PMT]
 - PID 101 [Video/PCR]
 - PID 102 [Audio]
 - PID 103 [Audio]
 - PID 104 [Teletext]
 - PID 106 [PES]
 - PID 1066 [DSMCC/C]
 - PID 2072 [DSMCC/B]
 - PID 2073 [AIT]
 - PID 2076 [DSMCC/B]
 - PID 2077 [DSMCC/B]
 - PID 2171 [DSMCC/B]
 - Program 28107 [Bayerisches FS S d]
 - Program 28108 [hr-fernsehen]
 - Program 28110 [Bayerisches FS Nord]
 - Program 28111 [WDR K In]
 - Program 28112 [BR-alpha*]
 - Program 28113 [SWR Fernsehen BW]
- Packets
 - PID 0 [PAT]
 - PID 1 [CAT]
 - PID 16 [NIT]
 - PID 17 [SDT/BAT]
 - PID 18 [EIT]
 - PID 20 [TDT/TOT]
 - PID 100 [PMT]
 - PID 101 [Video/PCR]
 - PID 102 [Audio]
 - PID 103 [Audio]
 - PID 104 [Teletext]

1	program association	00	044d	0 (1/1)	41	

section [program association]

{

```

time_first_received    000:00:00:00.275
time_last_received     000:00:00:09.268
table_id               0           0x0
section_syntax_indicator 1         0x1
private_indicator      0           0x0
reserved_1             3           0x3
section_length         41          0x29
table_id_extension     1101        0x44D
reserved_2             3           0x3
version_number         18          0x12
current_next_indicator 1           0x1
section_number         0           0x0
last_section_number    0           0x0

```

entry [program association]

{

```

program_number 0 0x0
program_map_PID 16 0x10

```

}

entry [program association]

{

```

program_number 28106 0x6DCA
program_map_PID 100 0x64

```

}

entry [program association]

{

```

program_number 28107 0x6DCB
program_map_PID 200 0xC8

```

}

entry [program association]

{

```

program_number 28108 0x6DCC
program_map_PID 300 0x12C

```

1	program map	02	6dca	0 (1/1)	222
---	-------------	----	------	---------	-----

section [program map]

```
{
    time_first_received      000:00:00:00.454
    time_last_received       000:00:00:09.245
    table_id                 2                      0x2
    section_syntax_indicator  1                      0x1
    private_indicator        0                      0x0
    reserved_1               3                      0x3
    section_length            222                    0xDE
    table_id_extension        28106                 0x6DCA
    reserved_2               3                      0x3
    version_number           28                    0x1C
    current_next_indicator    1                      0x1
    section_number           0                      0x0
    last_section_number       0                      0x0
    PCR_PID                  101                    0x65
    program_info_length       0                      0x0
    entry [ program map ]
    {
```

```
        stream_type  2  0x2  ITU-T Rec.H.262|ISO/IEC 13818-2 Video or ISO/IEC 11172-2 constrained parameter video stream
```

```
        reserved_1    7  0x7
```

```
        elementary_PID 101 0x65
```

```
        reserved_2    15 0xF
```

```
        ES_info_length 6  0x6
```

descriptor [STD_descriptor]

```
{
    descriptor_tag  17 0x11
    descriptor_length 1 0x1
    descriptor_text  .
    descriptor_hex   fe
}
```

descriptor [stream_identifier_descriptor]

```
{
    descriptor_tag  82 0x52
    descriptor_length 1 0x1
```

1	network information - actual	40	0001	0 (1/2)	1012	
2	network information - actual	40	0001	1 (2/2)	640	
3	network information - other	41	0003	0 (1/1)	432	

section [network information - actual]

```
{
  time_first_received      000:00:00:05.555
  time_last_received       000:00:00:05.555
  table_id                 64          0x40
  section_syntax_indicator  1          0x1
  private_indicator        1          0x1
  reserved_1               3          0x3
  section_length            1012       0x3F4
  table_id_extension       1          0x1
  reserved_2               3          0x3
  version_number           10         0xA
  current_next_indicator    1          0x1
  section_number           0          0x0
  last_section_number       1          0x1
  reserved                 15         0xF
  network_descriptors_length 87        0x57
  descriptor [ linkage_descriptor ]
  {
    descriptor_tag  74      0x4A
    descriptor_length 7      0x7
    descriptor_text  .T.....
    descriptor_hex   04 54 00 01 00 0c 01
  }
}
```

entry [network information]

```
{
  transport_stream_id      1      0x1
  original_network_id      133    0x85
  reserved_future_use       15     0xF
  transport_descriptors_length 13   0xD
  descriptor [ satellite_delivery_system_descriptor ]
  {
    descriptor_tag  67 0x43
    descriptor_length 11 0xB
    frequency      12.0705 GHz
    orbital_position 19.2
    west_east_flag  1 0x1 east
    polarization    0 0x0 linear - horizontal
    modulation      1 0x1 QPSK
    symbol_rate     27.5000 MSymbol/s
    FEC_inner       3 0x3 3/4 conv. code rate
  }
}
```

entry [network information]

```
{
  transport_stream_id      2      0x2
  original_network_id      133    0x85
  reserved_future_use       15     0xF
  transport_descriptors_length 13   0xD
  descriptor [ satellite_delivery_system_descriptor ]
  {
    descriptor_tag  67 0x43
    descriptor_length 11 0xB
    frequency      11.7975 GHz
    orbital_position 19.2
    west_east_flag  1 0x1 east
    polarization    0 0x0 linear - horizontal
    modulation      1 0x1 QPSK
    symbol_rate     27.5000 MSymbol/s
    FEC_inner       3 0x3 3/4 conv. code rate
  }
}
```

SDT

1	service description - actual	42	044d	0 (1/1)	196
2	service description - other	46	03f3	0 (1/1)	116
3	service description - other	46	041b	0 (1/1)	136
4	service description - other	46	0431	0 (1/1)	326
5	service description - other	46	0437	0 (1/1)	268

section [service description - actual]

{

```

time_first_received      000:00:00:01.097
time_last_received       000:00:00:08.530
table_id                 66                0x42
section_syntax_indicator 1                0x1
private_indicator        1                0x1
reserved_1               3                0x3
section_length           196              0xC4
table_id_extension       1101             0x44D
reserved_2               3                0x3
version_number           0                0x0
current_next_indicator   1                0x1
section_number           0                0x0
last_section_number      0                0x0
original_network_id      1                0x1
reserved                 255              0xFF

```

entry [service description]

{

entry [service description]

{

```

service_id      28106  0x6DCA
reserved        63     0x3F
EIT_schedule_flag 1     0x1
EIT_present_following_flag 1 0x1
running_status  4      0x4      running
free_CA_mode    0      0x0
descriptors_loop_length 17 0x11

```

descriptor [service_descriptor]

{

```

descriptor_tag      72 0x48
descriptor_length    15 0xF
service_type        1 0x1  digital television service
service_provider_name_length 3 0x3
service_provider_name  ARD
service_name_length  9 0x9
service_name         Das Erste

```

}

entry [service description]

{

```

service_id      28107  0x6DCB
reserved        63     0x3F
EIT_schedule_flag 1     0x1
EIT_present_following_flag 1 0x1
running_status  4      0x4      running
free_CA_mode    0      0x0
descriptors_loop_length 27 0x1B

```

descriptor [service_descriptor]

{

```

descriptor_tag      72 0x48
descriptor_length    25 0x19
service_type        1 0x1  digital television service
service_provider_name_length 3 0x3
service_provider_name  ARD
service_name_length  19 0x13
service_name         Bayerisches FS S d

```

}

id...	Name	Table ID	Exten...	Number	Length
1	event information - actual, now...	4e	6dca	0 (1/2)	259
2	event information - actual, now...	4e	6dca	1 (2/2)	157
3	event information - actual, now...	4e	6dcb	0 (1/2)	417
4	event information - actual, now...	4e	6dcb	1 (2/2)	374
5	event information - actual, now...	4e	6dcc	0 (1/2)	283

section [event information - actual, now/next]

{

time_first_received	000:00:00:00.691	
time_last_received	000:00:00:09.150	
table_id	78	0x4E
section_syntax_indicator	1	0x1
private_indicator	1	0x1
reserved_1	3	0x3
section_length	259	0x103
table_id_extension	28106	0x6DCA
reserved_2	3	0x3
version_number	19	0x13
current_next_indicator	1	0x1
section_number	0	0x0
last_section_number	1	0x1
transport_stream_id	1101	0x44D
original_network_id	1	0x1
segment_last_section_number	1	0x1
last_table_id	78	0x4E

entry [event]

{

```

entry [ event ]
{
    event_id                36176            0x8D50
    start_date              24/09/2009
    start_time              13:10:00
    duration                00:50:00
    running_status          4                0x4            running
    free_CA_mode            0                0x0
    descriptors_loop_length 232              0xE8
    descriptor [ short_event_descriptor ]
    {
        descriptor_tag      77  0x4D
        descriptor_length    31  0x1F
        ISO language_code    deu
        event_name_length    16  0x10
        event_name           Sturm der Liebe
        event_description_length 10  0xA
        event_description     Folge 922
    }
    descriptor [ extended_event_descriptor ]
    {
        descriptor_tag      78                0x4E
        descriptor_length    93                0x5D
        descriptor_number    0                0x0
        last_descriptor_number 0                0x0
        language_code        deu
        length_of_items      0                0x0
        text_length          87                0x57
        text                 Cosima und Charlotte haben Geburtstag. Susanne bleibt. Fanny nimmt einen neuen Job an.
    }
    descriptor [ component_descriptor ]
    {

```

id	name	table id	extension	number	length
1	time date	70	N/A	N/A	5
2	time offset	73	N/A	N/A	26

section [time offset]

{

```
time_first_received    000:00:00:08.553
time_last_received    000:00:00:08.553
table_id              115      0x73
section_syntax_indicator 0      0x0
private_indicator     1      0x1
reserved_1            3      0x3
section_length        26      0x1A
UTC_date              24/09/2009
UTC_time              13:49:47
reserved              15      0xF
descriptors_loop_length 15      0xF
```

descriptor [local_time_offset_descriptor]

{

```
descriptor_tag        88      0x58
descriptor_length      13      0xD
```

entry [local time offset]

{

```
country_code          DEU
country_region_id     0      0x0
reserved              1      0x1
local_time_offset_polarity 0    0x0
local_time_offset      512    0x200
time_of_change_date    25/10/2009
time_of_change_time    01:00:00
next_time_offset       256    0x100
```

}

}

```
CRC_32                2198513372 0x830AA6DC
```

SI의 활용

◀ TV ▶

Astra 1(18.2E)

1000 DISCOVERY GESCHICH..

1001 HIT24

HD NÄ

◆ 1002 NDR FS HH

● 1003 SEASONS

1004 ZDFdokukan

🔒 CX

1005 TAQUILLA 10

CX

1006 CINEMANÍA

CX

1007 CINEMANÍA 2

1008 MTV Base.

🔒

1009 MTV Deutschland



Sort



Filter



Edit

◀ TV ▶

Astra 1(18.2E)

1000 DISCOVERY GESCHICH..

1001 HIT24

HD NA

◆ 1002 NDR FS HH

● 1003 SEASONS

1004 ZDFdokukan

🔒 CX

1005 TAQUILLA 10

CX

1006 CINEMANÍA

CX

1007 CINEMANÍA 2

1008 MTV Base.

🔒

1009 MTV Deutschland

Sort Filter Edit

Video
Audio
Subtitle

MPEG2
System



Seasons magazine

[News/Current affairs] Présenté par Guillaume Desenfant.

Actor : John Miller, Julia Porter

Teddy ist eine Fehlproduktion. Aber nicht einmal als Son derangebot wird der kleine Bär an den Mann gebracht.

So landet er schließlich

bei Mr. Winkle, der mit defektem Spielzeug handelt Im Lager macht Teddy die sonderbarsten Begegnungen: er trifft Virgil, den Hund von Mr. Winkle, Springclown Jac

bei Mr. Winkle, der mit defektem Spielzeug handelt.

1006 DCINE Espanol

[News] Von Nachtteulen und Frühaufstehern
Das Geheimnis des Aralsees ⓘ

Favourite: 23:15 TUE 12/06/2008

22:00 24:30

15 HD NA CX 🔒 1080i ⋮ ⏸ ⏹ 🔊

SI 최강 - EPG (TV Guide)

HUMAX



TV Guide - Table

07:18 TUE 12 JUN 2008

1002 Europa Europa

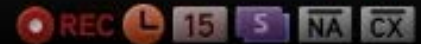
Das Geheimnis des Aralsees ⓘ

TUE 12 JUN 06:00-07:30

[Film] Der Aralsee, einst doppelt so groß...

Favourite1

powered by tv tv



Mon 11 Jun

06:00

07:00

08:00

1000 CNN Int.

Seasons magazine

Le garage de Seasons

1001 Discovery

Silberflügel

Timm Th

1002 Europa Europa

Das Geheimnis des Aralsees ⓘ

Roots Germania

1003 Info/Teleuniwersy...

Von Nachtenten und Frühaufstehern

1004 Jetix

Receiving information

1005 KINO POLSKA

N24(2)

Doku: Krieg ⓘ

N24 Nachric..

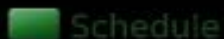
1006 Playboy

Heute ist

Halten Sie, bitte!



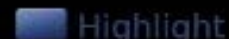
List



Schedule



Find



Highlight



OPT+ Option

Q&A
감사합니다!

- ✓ TS는 누가 정의했나?
- ✓ TS란?
- ✓ 한 packet은 몇 바이트?
- ✓ Transponder란? (TP)
- ✓ PSI와 SI의 차이는?
- ✓ PSI에는 어떤 것들이 있나?
- ✓ SI에는 어떤 것들이 있나?
- ✓ PSI/SI는 STB application에서 어떻게 활용되고 있나?
- ✓ Time 정보는 어떤 Table에 들어오는가?
- ✓ 한 TS에는 몇 개의 Program이 존재하는 지 알려면 뭘 봐야 하나?
- ✓ Table과 Section의 차이점
- ✓ PID란?
- ✓ PES란?
- ✓ ES란?
- ✓ Audio / Video를 Decoding하기 위해서 필요한 정보는 어떤 Table에 들어 있는가?

- ✓ Section Number란?
- ✓ Version Number란?
- ✓ PSI와 SI의 근간이 되는 section으로, Mpeg2 System에서 정의한 것은? (___) section
- ✓ Section Binary 추출하기, 어떻게 할 수 있을까요?
- ✓ PAT의 Bit-rates 계산하기, 어떻게 할 수 있을까요?
- ✓ lyngsat.com , satcodx.com (?) 사이트 둘러보기
- ✓ 위성, 안테나 관련
 - Diseqc의 역할은? LNB의 역할은?, TP, Polarization, FEC 이란?
 - RF(Radio Freq.)와 IF(Intermediate Frequency)의 차이점.
 - tuner가 받아들일 수 있는 frequency 범위
- ✓ (참고자료: 위성방송.doc, 13818-1, 300 468 등)

QUIZ (2)

1. 다음 질문에 해당하는 값은?

NIT Act = { nid = 0x1, { ts#1_onid=0x101, ts#1_tsid=0x201 }, ... }

- (1) PAT의 ts_id ?
- (2) SDT Act의 ts_id?
- (3) SDT Act의 on_id?

2. 다음 상황에서 CBS의 network id는?



QOOK TV, OCN에서 캡처한 스트림에, SDT Actual을 보니, ts_id = 1, on id = 999, service ids = { 101, 102, 103 } 이었다