



Satellite TV & Linux

Geostationary Satellites

- We want the satellite to stand still
- But the earth is rotating at 1 revolution per 24H
- So we want the satellite to move with us
- Some physics: $GmM/r^2 = mw^2r \rightarrow r = 36,000$ Km
(earth radius is only 6,000 Km)
- All satellites are located above the equator, which is South of Israel
- positions are longitude e.g. 13E, 4W, 7W etc ...

Satellites Dish



- A dish, is a hyperbolic shaped reflector (mirror), concentrating incoming radio waves at it's focus
- This is similar to taking a magnifying glass and focusing the Sun's light at a spot
- An LNB (low noise block) is located at the dish's focus
- Prime vs. offset dish

LNB - Low Noise Block

- The LNB is comprised of:
 - Dipole antenna – The actual antenna
 - Low Noise Amplifier – Amplify the signal before “catching” noise is from the electronics.
 - Frequency Down conversion – Convert to Frequencies that can be transferred via coax without being attenuated too much
- Quad LNB. Monoblock LNB, multiple LNBS



Diseqc –

Digital Satellite Equipment Control

- Diseqc 1.0 – connects to 4 LNBs
- Diseqc 1.1 – connects to 4 Diseqc 1.0
- Diseqc 1.2 & 1.3 – mobile dish
- Diseqc 2.x – same as 1.x but bidirectional

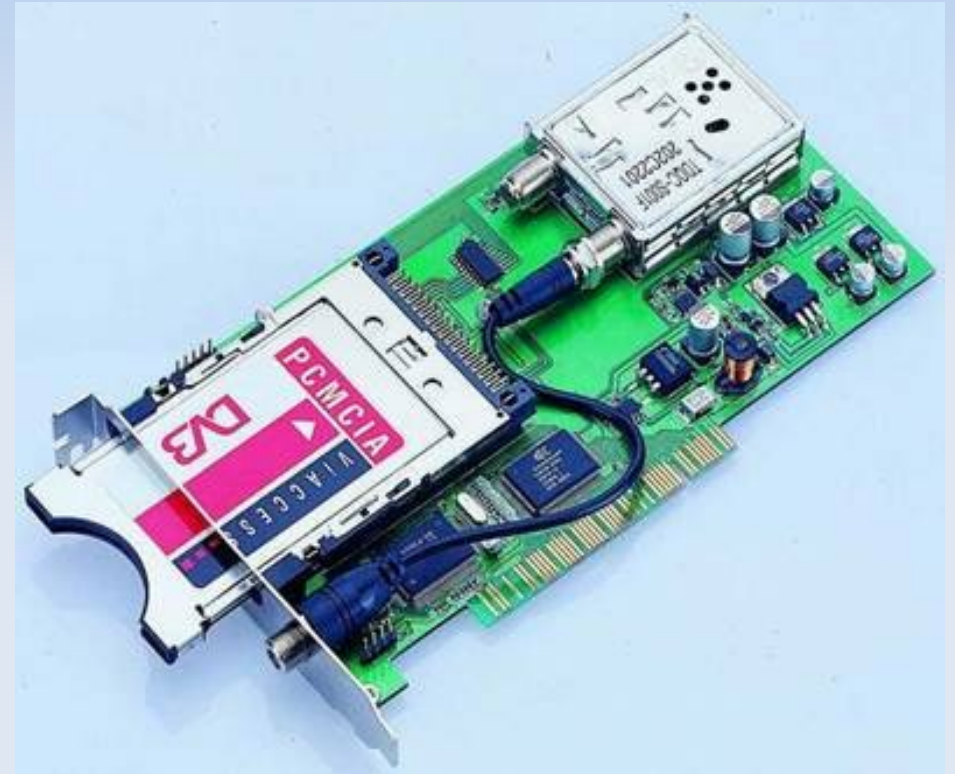


Transponder

- Required information:
 - Frequency
 - Symbol Rate (SR)
 - Polarization
 - FEC (can be set to auto)
- May have many channels
- Statistical Multiplexing
- Feeds

Encryption / Conditional access

- CSA (Common Scrambling Algorithm)
- CAM (Conditional access module)
- FTA (Free To Air)
- Smart Card



DVB-S Vs. DVB-S2

- DVB-S: QPSK (4PSK), TRELLIS, MPEG2
- DVB-S2: 8PSK, LDPC, H-264. introduced to support HD. (though HD is possible via DVB-S)
- DVB-T, DVB-H, ATSC etc ...

Due to "political issue" DVB-S2 development was forked and stalled. There were many half baked branches.

- About 6 months ago, there was a decision to create a new API: S2API. It was merged into kernel 2.6.28

Israel's Upcoming DVB-T

- AFAIK:
 - H264 – not supported by regular DVBT STB
 - Channels: 1,2,10,33,99
 - Channels 9 & 23 not included (politics ?)
 - Will indoor antenna suffice ?
 - Probably commence on July 2009

Software

- Drivers – depends on adapter, may be built in into kernel. There is also a loopback device.
- VDR – as close as can be to a real STB.
- MYTHTV – full blown HTPC. Distributed.
- Kaffeine – KDE app
- Cmdline – use your favorite media player via /dev/dvb

VDR

MBC2

VDR

Tue 17.02.2009 16:00 - 18:00

THE LAST SIGN

Kathy is tormented by the ghost of her abusive, alcoholic husband she must come to terms with her past if she is to find peace and love. Drama- Andie MacDowell / Samuel Le Bihan

Record

Tue 17 02 16:49

VDR

Schedule - MBC Action

VDR

Tue 17 16:00	* PRISON BREAK
Tue 17 17:00	BUFFY THE VAMPIRE SLAYE
Tue 17 18:00	LAW & ORDER
Tue 17 19:00	TNA XPLOSION
Tue 17 20:00	THE UNIT
Tue 17 21:00	ONG-BAK
Tue 17 22:40	ON THE EDGE
Tue 17 23:10	LAW & ORDER
Wed 18 00:10	THE UNIT
Wed 18 01:00	DETENTION
Wed 18 02:30	TNA XPLOSION
Wed 18 03:20	ON THE EDGE
Wed 18 03:50	AMERICAN GLADIATORS
Wed 18 04:30	LAW & ORDER

Record

Now

Next

Tue 17 02 16:50

Myth - Main

main

Watch TV

Media Library

Manage Recordings

VDR

Information Center

Optical Disks



Tue Feb 17, 16:32

mythTV

Myth – Watch TV

FAR AND AWAY

7

16:00-18:30 (150 minutes)

16:56

MBC MAX

A young man leaves Ireland with his landlord's daughter after some trouble with her father, and they dream of owning land at the big giveaway in Oklahoma ca. 1893. Adventure- Tom Cruise/Nicole Kidman

Browsing

لدي مال ولكنّه على شكل ملاعق

Myth – Watch TV



Paused

1:04 of 1:26

أنت منزعج لأن ما أخبرتاك عنه صحيح

Myth – Weather

Three Day Forecast

02/17/2009...

Tel Aviv, Israel

Tuesday



High 17°C
Low 8°C

Wednesday



High 19°C
Low 10°C

Thursday



High 24°C
Low 13°C

Updated Tue Feb 17 17:42:39 2009

Myth – Program Guide

MBC2 SHATTERED GLASS

16:36

Not Recording

The true story of journalist Stephen Glass who quickly rose from a minor writing post in Washington, to a freelance feature wri...

17/2	17:30	18:00	18:30	19:00
1 CH 1	כך היה בפוליטיקו	מהדורה מקומית	מאחורי הקלעים	מדד יומי
2 ch 2	עושים סדר		שש עם	מה קורה
3 ch 10	חמש בערב עם		אהרוני ואני	לונדון את קירשנבאו
4 MBC2	THE LAST SIGN	SHATTERED GLASS		
5 MBC4	DR PHIL	THE DOCTORS		OPRAH WINFREY SHOW

Mythweb - Listings



MythWeb: Tue Feb 17, 2009, 03:21 PM

Original

Search

(Advanced)

MythTV: Listings | Searches | Recording Schedules (Manual, Custom) | Upcoming Recordings | Recorded Programs | Backend Status

Currently Browsing: Tue Feb 17, 2009, 06:15 PM

Jump To:

06:00 PM

Tue Feb 17, 2009

	06:15 PM	06:30 PM	06:45 PM	07:00 PM	07:15 PM	07:30 PM	07:45 PM	08:00 PM	08:15 PM	08:30 PM	08:45 PM	09:00 PM
1 CH 1	מהדורה מקומית	מאחורי הקלעים	...	מדד יומי		ישראל בחרת				דד ליין		מבט
2 ch 2	שש ענף			מה קורה		חדשות: תכנית חיסכון		חדשות				המפורסמים באים
3 ch 10	אהרונם ואני			לונדון את קירשנבאום				חדשות 10				ראש בקיר ...
4 MBC2	SHATTERED GLASS							DEMOLITION MAN				
5 MBC4	THE DOCTORS			OPRAH WINFREY SHOW				AL HELM AL DAE'E				WA TAMDY ALAYAM
6 MBC Action	LAW & ORDER			TNA XPLOSION				THE UNIT				ONG: ...
7	FAR AND AWAY	CHEAPER BY THE DOZEN						UNDERCOVER BROTHER				

Find: 2.6. Previous Next Highlight all Match case

Mythweb - Schedule

MythTV: [Listings](#) | [Searches](#) | [Recording Schedules \(Manual, Custom\)](#) | [Upcoming Recordings](#) | [Recorded Programs](#) | [Backend Status](#)

3

ch 10

לונדון את קירשנבאום

Tue, Feb 17, 07:00 PM to 08:00 PM (60 mins)

ירון לונדון ומוטי קירשנבאום בתוכנית אירוח יומית, עם הזווית המעניינת של אירועי היום.

Category: Unknown

Type: Unknown (68239791)

Original Airdate: 2009

Length: 1 hr

Playback Group: Default

MythTV Status: **Never Record**

Possible conflicts:

Filters

חדשות 10

- ☒ Current Recording
- ☒ Earlier Showing
- ☒ Previous Recording
- ☒ Will Record
- ☒ Conflicts

More: [Search IMDB](#)

[Search TV.com](#)

[Search Google](#)

[Find other showings of this program](#)

[What else is on at this time?](#)

Schedule Options:

- ☒ Don't record this program.
- ☐ Record only this showing.
- ☐ Record this program in this timeslot every day.
- ☐ Record this program in this timeslot every week.
- ☐ Find and record one showing of this title.
- ☐ Find and record one showing of this title each day.
- ☐ Find and record one showing of this title each week.
- ☐ Record at any time on channel ch 10.
- ☐ Record at any time on any channel.

Advanced Options: (Hide)

Recording Profile: [Default](#)

Transcoder: [Autodetect](#)

Recording Group: [Default](#)

Storage Group: [Default](#)

Playback Group: [Default](#)

Recording Priority: [0](#)

Time Stretch Default: [1.00](#)

Duplicate Check method: [Subtitle and Description](#)

Check for duplicates in: [All recordings](#)

Software

- VDR – as close as can be to a real STB. can be used with soft-device. Has many plug-ins. (but no Hebrew subtitles AFAIK).
- MYTHTV – full blown HTPC. Distributed, Harder to install...
- Kaffeine – KDE app
- Cmdline – use your favorite media player
- Both myth/vdr can record multiple channels on same transponder

Linux Based STB

- There are a few Linux Based receivers on the market.
- Dreambox is the popular choice – popular enough to be a target for copies ...
- Features like time shifting. (modules without a hard-drive requires an external NFS server)
- Some software images supports only original Dreamboxes (there are rumors about bricking the non originals).
- Original and alternate firmwares

EPG – Electronic Program Guide

- Some channels have On-line EPG
- TV_GRAB_* :
Perl based scripts, which downloads EPG from different Internet sites, and converts them to an XMLTV format
- tv_grab_dvb – may be used for cross source eit.

Websites

- www.lyngsat.com - info: sat, freq, chans, etc...
- www.dvbsupport.net/freetv.html - free TV
- www.sat-israel.com - פורום הלווינים הישראלי
- www.mythtv.org - mythtv
- www.cadsoft.de/vdr - vdr
- <http://dvbn.happysat.org/viewforum.php?f=17> - Linux specific sat forum, discussions on many issues, HD (VDP AU), patches to vdr/myth/kaffeine, etc ...

Hardware issues

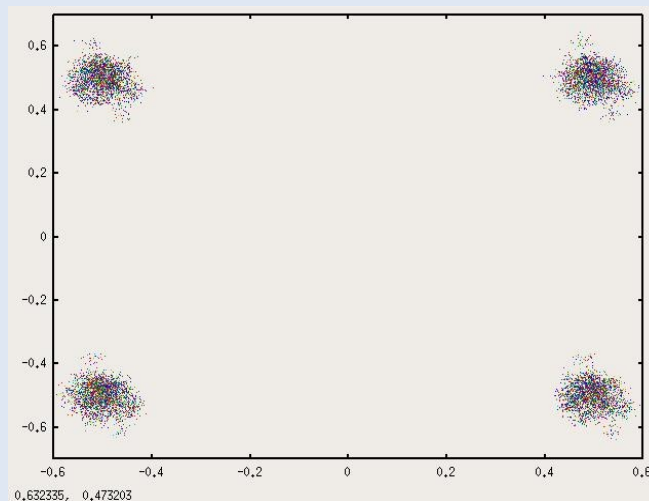
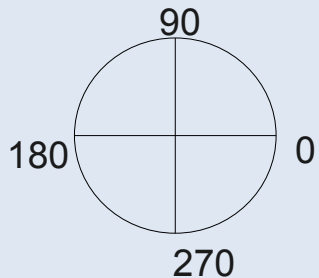
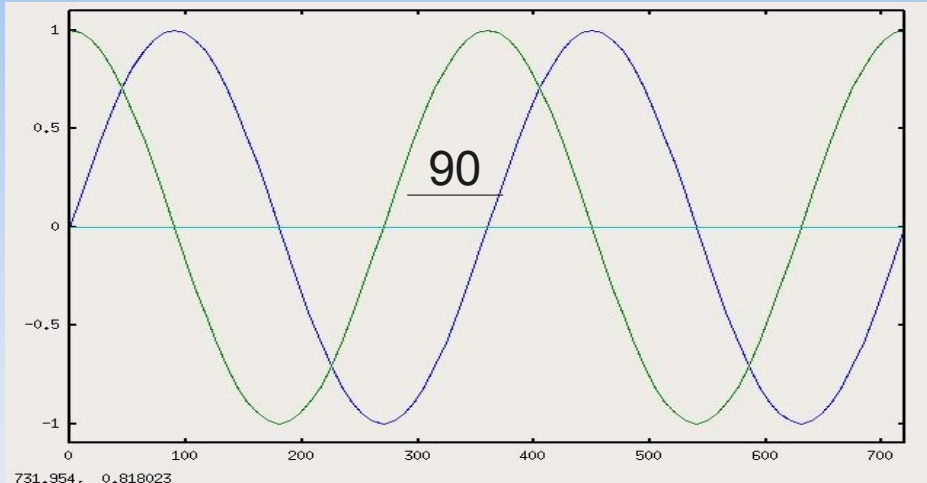
- NVIDIA Vs. ATI
- NVIDIA's VDPAU (Video Decode and Presentation API for Unix) offload portions of the video decoding/post-processing to the GPU.
- SS2 (DVB-S), S2-3600 (USB. Problems ?),
- FULL HD
- interlaced

Before you buy

- PC Hardware: GPU (VDPAU, 8400gs vs. newer, vc1), DVB-Card (Budget/FF), display, lirc.
- STB (FTA only ?)
- Which satellites (num, size, and mobility of dishes. Num LNBs).
- Is South (SE/SW) blocked ?
- How many TVs

Modulation: PSK

(Just for general knowledge)



QPSK / 4PSK / QAM-4

- A Sine wave is transmitted, its phase holds the information
- 4PSK (QPSK) –
4 options (2 bits/sym):
45, 135, 225, 315
- 8PSK –
8 options (3 bits/sym):
0, 45, 90, 135, 180, 225, 270, 315

Error correction

(Just for general knowledge)

- Convolution code. Aka Trellis:
Not all sequences of data are valid, choose the "path" that is most probable.
- LDPC – low density parity check. For Each group of data bits, a sum is calculate. Each bit is a member of more than one group. In case of contradiction between bits and sum, the error can be corrected using other sums.



Satellite TV & Linux

The End