

Cutting the Cable: Receiving Broadcast Television

Cliff LoVerme
Michael LoVerme Memorial Foundation
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Today's Agenda

- About the Michael LoVerme Memorial Foundation
- Where to find this presentation
- Analog Television
- The Digital Transition
- Types of Digital Televisions
- How to Receive DTV
- Digital TV Stations available in our area
- Helpful Websites
- Beyond Over-the-Air – Streaming Services
- Questions

About the Michael LoVerme Memorial Foundation



<https://mlmf.org/>



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Where to find this presentation:

<https://mlmf.org/events/workshops/>



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Analog Television

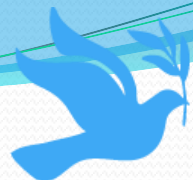
- Analog Television 1941 – 2009
 - 1920 – 1940: Many companies competing for the standard
 - B & W 1941 (525 line standard)
 - Color 1965 (color network programming readily available)
 - 1972 sales of Color TVs passed sales of B&W TVs
 - 1989 B&W TVs are no longer sold
 - 2015 – difficult to GIVE AWAY an Analog TV
 - 2019 – Recycle your Analog TV at Staples or Best Buy



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The Digital Transition - 2009

- Why did we convert to Digital Television?
 - “Digital television transmission more efficiently uses the available bandwidth and can easily integrate other digital services.” (Wikipedia)
 - This allows more content to be transmitted in the same spectrum
 - It also allows some of the spectrum to be used for other purposes – mostly cellular telephone services and emergency response networks



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Types of Digital Televisions

- Standard Definition (SD)
 - Analog screen size (480i) with 4:3 Aspect Ratio
- High Definition (HDTV)
 - Widescreen 16:9 Aspect Ratio
 - 720p aka “HD”
 - 1280 x 720 pixels = 0.9 megapixels
 - Progressive scan (Broadcast)
 - 1080p and 1080i aka “Full HD”
 - 1920 x 1080 pixels = 2.1 megapixels
 - 1080i Interlaced scan (Broadcast)
 - 1080p Progressive scan (Blu-Ray Disc)



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Types of Digital Televisions

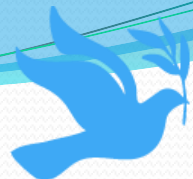
- High Definition (HDTV) (continued)
 - 4K aka “Ultra HD”
 - $3840 \times 2160 = 8.3$ megapixels
 - 2160p Progressive Scan
 - 10-bit color depth (as opposed to 8-bit depth for all other HDs)
 - Displays over 1 billion colors (as opposed to 16 million for all other HDs)
 - Limited 4K content available (still)
 - No broadcast available – only Direct TV, Dish, and Xfinity
 - Ultra HD Blu-ray players (around \$200)
 - Redbox is starting to roll-out 4K Ultra HD Blu-ray movies in its kiosks
 - Upscaling HD content to “near” 4K quality



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What do I need to receive DTV?

- You will need:
 - A Digital Television OR an Analog Television AND a Digital Converter Box
 - An Antenna designed to receive broadcast DTV frequencies
 - An interconnecting cable



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What if I only have an Analog TV?

- Two choices:
 - Buy a Digital Television
 - Advantage – HDTV
 - Disadvantage – Higher cost: \$150
 - Buy a Digital Converter Box
 - Advantage – Cheap < \$40
 - Disadvantage – can only display Standard Definition Television - 4:3 aspect ratio





How to Receive Broadcast Television

- Connect an antenna to your Digital TV or converter box via coaxial cable (RG6). Keep cable as short as possible.
- If using a Digital TV select the “Digital” mode from the input source menu. (You may have to switch from “Cable” to “Antenna” in the setup menu.)
- If using a converter box the unit will power up in the digital mode (the only mode it has)
- Find the “Channel Learn” (Auto-Program) function and start it
 - The tuner will then check every digital channel for signals. If it finds a signal it will save that channel.
 - This can take up to half an hour if there are many channels available



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Antennas

- Indoor
- Outdoor
- Amplified
- Small
- Medium
- Large
- Directional
- Multi-Directional
- In Tewksbury you will need a small outdoor, multi-directional antenna or an amplified indoor antenna to get all the Boston stations. You should not need an amplified outdoor antenna.



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Antennas

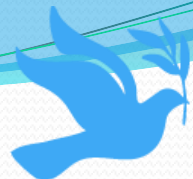
- Indoor



Local
10 miles
\$11.



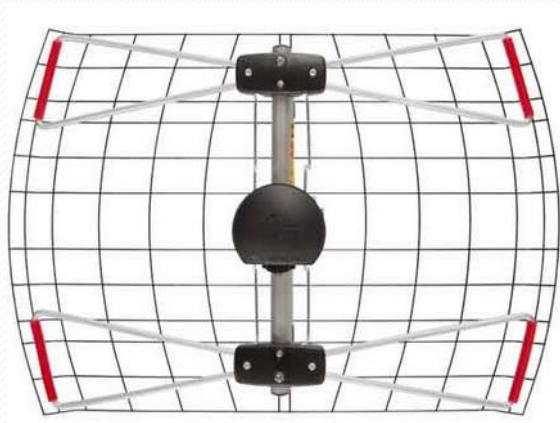
40 miles
Amplified
\$33.



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Antennas

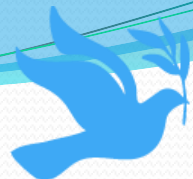
- Outdoor



50 mile range
\$ 55.



60 mile range
\$ 60.



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Antennas

- Outdoor



125 mile range
360° rotation
\$ 50.



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Broadcast Stations in our Area

- Major Networks:
 - CBS
 - NBC
 - ABC
 - FOX
 - PBS



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Broadcast Stations in our Area

- Lesser Networks:
 - Ion
 - MeTV
 - ThisTV
 - The CW
 - Univision (Spanish)
 - Telemundo (Spanish)
- Truly Independent Stations



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Broadcast Stations in our Area

Demo of Available Broadcast Stations
Station List Handout



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FCC Repack

- In March of 2016, the Federal Communications Commission (FCC) started an auction designed to repurpose television airwaves for new uses by wireless companies.
- At the conclusion of the auction in March of 2017, the FCC announced that nearly 1,000 local television stations must move to new frequencies between 2018-2020.
- Stations are assigned to a particular timeframe, or phase, to complete their frequency moves (see below for phase schedule).
- This only impacts viewers who receive their local stations using an antenna - Cable and Satellite service customers are not impacted.

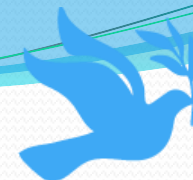


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FCC Repack – Transition Schedule












Phase	Testing Period Start Date	Phase Completion Date
0		9/13/2018
1	9/14/2018	11/30/2018
2	12/1/2018	4/12/2019
3	4/13/2019	6/21/2019
4	6/22/2019	8/2/2019
5	8/3/2019	9/6/2019
6	9/7/2019	10/18/2019
7	10/19/2019	1/17/2020
8	1/18/2020	3/13/2020
9	3/14/2020	5/1/2020
10	5/2/2020	7/3/2020

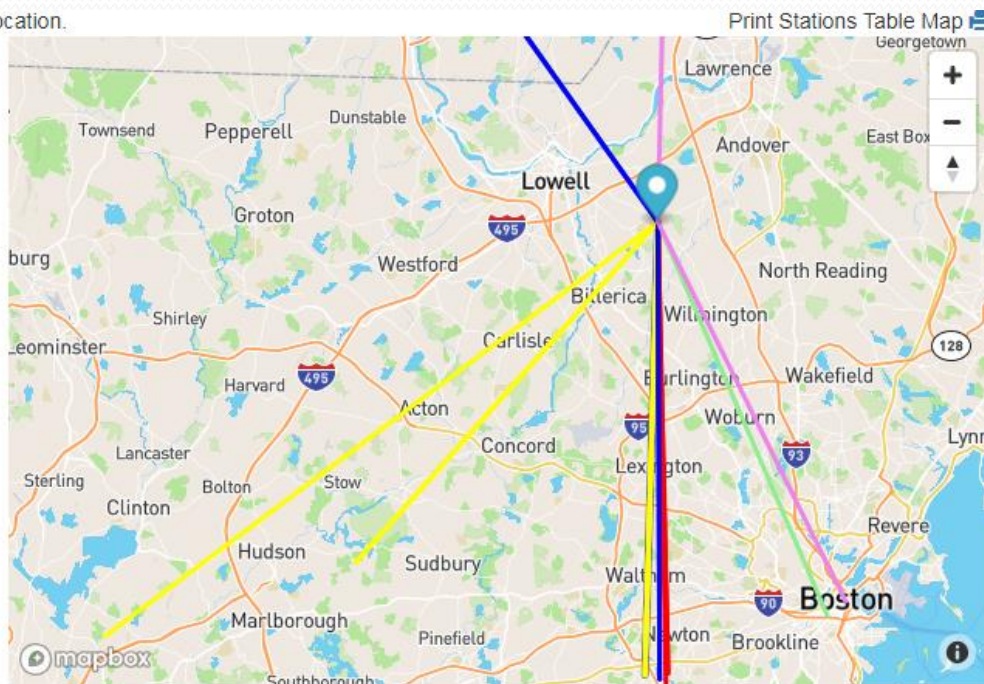
Helpful Websites



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Up to 50 channels from 20 over-the-air stations may be received at this location.

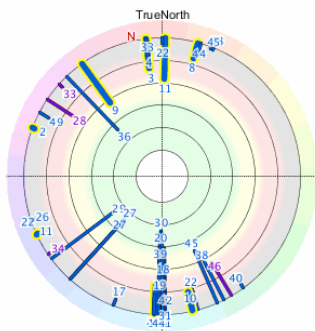
Stations	Antenna	FCC Repack
WUTF-DT 27.1 UNI RF Channel: 29 31 miles at 248°	 Yellow	
WFXZ-CD 24.1 BOX RF Channel: 19 20 miles at 196°	 Yellow	
WCVB-DT 5.1 ABC RF Channel: 20 20 miles at 196°	 Yellow	
WBZ-DT 4.1 CBS RF Channel: 30 20 miles at 196°	 Yellow	
WGBH-DT 2.1 PBS RF Channel: 19 20 miles at 196°	 Yellow	
WUNI-DT 66.1 UNI RF Channel: 27 21 miles at 236°	 Yellow	
WGBX-DT 44.1 PBS RF Channel: 43 20 miles at 108°	 Yellow	



www.antennaweb.org

Tewksbury Public Library

All Channels



Search Criteria

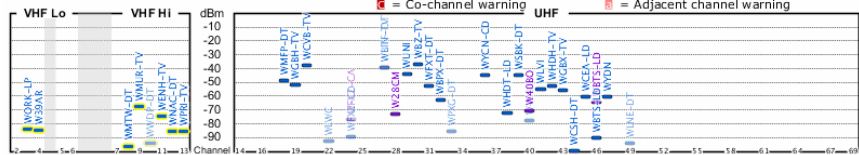
Address: exact
Tewksbury, MA
Height: 10.0 ft.

db datecode
201801291705

www.tvfool.com

Channel			Signal			Dist		Azimuth	
Call	sign	Real (Virt)	Netwk	NM(db)	Power (dBm)	Path	miles	True	Magn
WB2-TV	30		CBS	54.2	-36.6	LOS	20.5	182°	(196)°
WCVB-TV	20		ABC	53.2	-37.6	LOS	20.5	182°	(196)°
WBTV-DT	27	(66.1) Tei		49.2	-37.6	LOS	20.5	222°	(236)°
WBTV-TV	27			51.6	-39.2	LOS	20.6	222°	(236)°
WUNI	29	(27.1) Uni		47.2	-43.7	LOS	31.3	233°	(248)°
WVBC-CD	36		ABC	44.0	-47.0	LOS	13.2	182°	(196)°
WSBK-DT	39	(38.1) Ind		45.9	-45.0	LOS	20.5	182°	(196)°
WMFP-DT	18	(62.1) Ind		42.4	-48.4	1Edge	20.6	180°	(194)°
WGBH-TV	19		PBS	39.3	-51.6	1Edge	20.5	182°	(196)°
WHDH-TV	42	(7.1) NBC		45.6	-52.6	1Edge	20.5	182°	(196)°
WFTS-TV	31	(25.1) Fox		38.2	-52.2	1Edge	21.0	179°	(193)°
WLVI	41		CW	35.8	-55.1	1Edge	21.0	179°	(193)°
WGBX-TV	43		PBS	35.4	-55.4	1Edge	20.5	182°	(196)°
WFSB-LD	45		ABC	42.4	-60.2	2Edge	19.4	157°	(171)°
WYDN	42	(68.1) Ind		30.1	-60.2	1Edge	20.6	182°	(196)°
WBXP-DT	32	(68.1) Ton		28.1	-62.8	1Edge	20.6	180°	(194)°
WMUR-TV	9	(9.1) ABC		22.2	-67.6	1Edge	31.9	325°	(339)°
WHDH-TV	38		ABC	27.2	-72.2	2Edge	19.4	157°	(171)°
WENH-TV	11	(11.1) PBS		16.5	-74.3	2Edge	39.3	1°	(16)°
WBTS-LD	46			13.3	-64.5	LOS	14.0	150°	(164)°
W4080	40	(40.1) NBC		13.0	-77.9	1Edge	20.6	180°	(194)°
W4080	40			13.0	-77.9	1Edge	20.6	180°	(194)°
WORK-LP	3	(33.1) CBS		6.9	-83.9	2Edge	40.2	353°	(8)°
W280M	28			6.2	-72.6	1Edge	14.4	304°	(318)°
W39AR	4	(39.1) Ind		5.9	-84.9	2Edge	40.2	353°	(8)°
WVBT-DT	12	(64.1) CBS		5.9	-84.9	2Edge	50.1	182°	(196)°
WVFX-DT	13	(12.1) CBS		5.1	-85.8	2Edge	50.5	183°	(198)°
WPXG-DT	33	(21.1) Ton		5.0	-85.8	2Edge	40.2	353°	(8)°
WFGZ-CA	24			1.6	-77.3	1Edge	20.6	180°	(194)°
WVFX-TV	24		ABC	-83.9	-83.9	2Edge	20.5	182°	(196)°
WBTS-LD	46	(46.1) Ind		0.4	-90.4	2Edge	20.5	182°	(196)°
WLWC	22		CW	-90.2	-92.9	2Edge	59.2	165°	(179)°
WDOP-DT	10	(46.1) Ind		-3.1	-93.9	2Edge	42.2	167°	(182)°
WMLB-TV	15	(15.1) ABC		-9.1	-93.9	2Edge	51.1	184°	(198)°
WMTW-DT	8	(8.1) ABC		-5.3	-96.1	2Edge	88.7	15°	(30)°
WCBS-DT	44	(6.1) NBC		-9.0	-99.9	2Edge	60.2	170°	(31)°
WEKOW-TV	49	(52.1) PBS		-11.3	-102.1	2Edge	65.1	207°	(312)°
WVBT-DT	22	(69.1) Ton		-12.7	-102.1	2Edge	82.0	210°	(315)°
WLEK-LD	22			-15.3	-106.1	2Edge	21.8	360°	(14)°
WORK-LP	33			-15.8	-94.7	2Edge	16.2	312°	(326)°
WDXP-TV	40	(58.1) Ton		-16.3	-107.2	Troppo	77.8	144°	(159)°
WVBT-DT	22		ABC	-17.7	-109.0	2Edge	77.0	251°	(266)°
WRGN-LD	34			-18.0	-96.9	1Edge	48.3	236°	(250)°
WMEA-DT	45	(26.1) CBS		-18.7	-109.5	2Edge	59.8	21°	(35)°
WVCB-CD	38	(12.1) CBS		-18.8	-109.6	2Edge	75.4	290°	(305)°
WVBT-DT	22			-18.8	-109.6	2Edge	75.4	290°	(305)°
WGBY-DT	22	(57.1) PBS		-19.2	-110.0	2Edge	77.0	251°	(266)°
WLPT-LD	11	(22.1) NBC		-19.3	-110.1	2Edge	83.8	245°	(259)°
WRGN-LD	25	(34.1) Ind		-20.9	-111.8	2Edge	48.8	215°	(233)°
WVBT-DT	22		ABC	-21.1	-111.8	2Edge	77.0	251°	(266)°
WCNTA	24		PBS	-21.7	-112.6	2Edge	84.5	313°	(328)°

c = Co-channel warning **a** = Adjacent channel warning









www.tvfool.com

Helpful Websites






































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Boston			
2 (19)	WGBH		ID: "GBH 2" City: Boston, MA Owner: WGBH Educational Foundation Web Site: http://www.wgbh.org/ Station Info: Digital Educational Full-Power - 700 kW
4 (30)	WBZ		ID: "CBS 4" City: Boston, MA Owner: CBS Corporation Web Site: http://boston.cbslocal.com/ Station Info: Digital Full-Power - 825 kW
5 (20)	WCVB		City: Boston, MA Owner: Hearst Television Web Site: http://www.thebostonchannel.com/ Station Info: Digital Full-Power - 625 kW
7	WHDH		ID: "7 NBC" City: Boston, MA Owner: Sunbeam Television Web Site: http://www.whdh.com/ Station Info: Digital Full-Power - 29.7 kW Subchannels: 8.1 WHDH/NBC, 8.2 This TV
9	WMUR		City: Manchester, NH Owner: Hearst Television Web Site: http://www.wmur.com/ Station Info: Digital Full-Power - 6.5 kW Subchannels: 9.1 WMUR/ABC, 9.2 MeTV
25 (31)	WFXT		ID: "FOX 25" City: Boston, MA Owner: Fox Television Stations Web Site: http://www.myfoxboston.com/ Station Info: Digital Full-Power - 780 kW

www.stationindex.com/tv/markets/boston

Helpful Websites

9		Boston, Massachusetts				30	
Display Channel	Physical Channel(s)	Station	City	State	Expand/Contract All Print All		
2	19	WGBH-TV	BOSTON	MA		 	    PBS
4	30	WBZ-TV	BOSTON	MA			   CBS
5	20	WCVB-TV	BOSTON	MA			   ABC
6	38	WHDT-LD	BOSTON	MA			
7	42	WHDH	BOSTON	MA			   NBC
9	9	WMUR-TV	MANCHESTER	NH			   ABC
Display Channel	Physical Channel	Video	Audio	Call Sign	Network/Programming	Nickname	Notes
09-1	9.1	1080i	DD5.1	 WMUR	ABC	"WMUR 9"	
09-2	9.2	480i	DD2.0	WMUR Me	Me-TV		
Technical Data and Screensaps							
Historical, Ownership, Transition, and Translator Data							
11	11	WENH-TV	DURHAM	NH			    PBS
13	36	WYCN-CD	NASHUA	NH			

www.rabbitears.info/market.php

Helpful Websites



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WGBH-TV MA BOSTON USA (Digital)

Licensee: WGBH EDUCATIONAL FOUNDATION
Service Designation: **DT** Digital television station
Transmit Channel: **19** 500 - 506 MHz **Licensed**
Virtual Channel: **2** (viewer sees this channel number)

Network affiliation: PBS

File No.: BLEDT-20021219AAM Facility ID number: 72099
CDBS Application ID No.: 621102

42° 18' 37.00" N Latitude Site in Canadian Border Zone
71° 14' 14.00" W Longitude (NAD 27)

Polarization: Horizontal (H)

Effective Radiated Power (ERP):	700.	kW ERP
Antenna Height Above Average Terrain:	374.	meters HAAT -- Calculate HAAT
Antenna Height Above Mean Sea Level:	417.	meters AMSL
Antenna Height Above Ground Level:	370.	meters AGL

TV Zone: 1

Non-Directional	Antenna ID No.: 33022	Pattern Rotation: 0.0
Antenna Make: HAR	Antenna Model: TAD24UDA-5/60	

Additional Individual Tower Information from the Antenna Structure Registration database.
(Use the Registration Number link for detailed information.)

ASRN	Site Elevation Above Ground (meters)	Overall Height Above Mean Sea Level (meters)	Overall Height Above Mean Sea Level (meters)	NAD 83 Tower Coordinates	Convert to NAD 27
1003433	46.6	395.1	441.7	N 42° 18' 37.0" W 71° 14' 12.0"	To NAD27

transition.fcc.gov/fcc-bin/tvq?call=WGBH

Coming up Next: Beyond Over-the-Air



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- Network Websites carry most programming for streaming the day after they air for free
- Netflix
- Hulu
- Amazon Prime
- Sling TV from Dish
- Many others





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Questions?