

# DVBGuide

*Version 0.85, 6<sup>th</sup> January 2008*

**A DVB EPG capture utility**

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# Introduction

**DVBGuide** is a utility to capture the Electronic Programme Guide (EPG) data as broadcast over a digital television DVB network. The original intended purpose for **DVBGuide** was to provide guide data for Windows® Media Center (when used in conjunction with a separate utility such as *QuickGuide*). However, since the EPG data is written in the widely supported *XMLTV* format, **DVBGuide** may find other uses that require the capture of EPG data on a Windows platform.

The key features of **DVBGuide** are:

- ❑ Runs from the Windows command line;
- ❑ Uses any DVB-T or DVB-C tuner that has a BDA driver;
- ❑ Generates EPG data in *XMLTV* format;
- ❑ Generates a matching `ChannelInfo.xml` file for use with *QuickGuide*;
- ❑ Limited support for Windows Media Center category classifications;
- ❑ Option to set the PC system time from broadcast timestamp;
- ❑ Option to write NIT, PAT and SDT tables as comma separated value files;
- ❑ Silent mode for incorporation into a batch process.

Windows Media Center has its own Guide service provided free by Microsoft and its partners. So, why would anyone want to use **DVBGuide** instead? There are three main reasons:

- ❑ The Media Center PC is not connected to the Internet making the Guide service unavailable;
- ❑ The Guide service is unavailable in the region of use (but broadcast EPG data is available);
- ❑ Dissatisfaction with the normal Guide service because of inaccuracies, bad mapping of channels to names used by the broadcaster, and slow response to scheduling changes.

Changes introduced in Version 0.85 are:

- ❑ Support for DVB-C tuners (with associated new command line options to set tuning parameters and a command line option to set DVB type);
- ❑ Revised tuner initialisation and signal lock acquisition for better compatibility with a wider variety of tuner hardware;
- ❑ Support for extended event descriptors (used by some broadcasters instead of the short text description);
- ❑ Support for multiple language title/description records per EPG event.

## Caveat emptor

There are four main variables that will affect how well (or how badly) **DVBGuide** behaves for real use cases.

- ❑ *XMLTV* parser(s) used to interpret the output of **DVBGuide**;
- ❑ Windows platform and service patches/update version;
- ❑ DVB tuner hardware and driver;
- ❑ Regional differences in adherence to MPEG transport and DVB standards by transmitting systems and broadcasters. Similarly, standards adherence variations between DVB types (e.g. terrestrial and cable).

**DVBGuide** has had rather limited testing by the developer across different *XMLTV* parsers. For the most part it has been tested using *QuickGuide* (which, in turn, supplies Guide data to MCE 2005). This limited testing would not be an issue if the *XMLTV* format were tightly specified. Unfortunately it is not – particularly in the way dates are formatted. This has been found to be a problem although, with dates at least, what is and is not acceptable to different parsers is becoming clearer.

Regarding the platform, testing has so far been done on

- ❑ Windows XP with Service Pack 2;
- ❑ Windows Media Center Edition 2005 with Rollup 2 and latest patches;
- ❑ Windows Vista.

Using any of the above operating systems will remove the second variable.

Regarding the third variable, user feedback shows good compatibility across a wide range of DVB-T tuner hardware. But a small minority of tuners still give rise to problems (either unable to initialise/build graph or unable to lock signal). With the new addition of support for DVB-C tuners, very limited testing has been performed with cable tuner hardware.

The author would be interested in details of any tuner that is not able to get as far as the capturing of EPG stage (assuming that the signal is otherwise OK). For such hardware, please run **DVBGuide** with the “-d” debug option and capture all programme output to a text file. Then email this text file with a report of the problem.

The last variable is the hardest one to deal with. Testing by the author has only been carried out in the United Kingdom with broadcasts from London’s Crystal Palace transmitter. If you’re one of the 10 million people within the coverage area of this transmitter then you’re in luck! Hopefully, **DVBGuide** should work for you. If you receive the Freeview DVB-T service elsewhere in the UK then you’re also likely to be OK (although regional variations in the content and format of MPEG Transport Streams may just possibly cause problems).

If you live outside of the United Kingdom (and particularly in a non-English language speaking area) or are using DVB-C then problems with EPG capture are

more likely. **DVBGuide** captures all the EPG data by tuning to a single Transport Stream (TS) multiplex frequency. However, unlike the UK's DVB-T Freeview service, broadcasters may choose not to send the entire network EPG data set on every transport stream (just as broadcasters may choose not to send EPG data at all – in which case you're really out of luck!). If your broadcaster only sends EPG data for the current TS then you can still use **DVBGuide**, but it will need to be run separately for each multiplex frequency. The separate *XMLTV* data files produced would then need to be renamed and merged in some way. This whole process could perhaps be automated in a batch file.

# Version history

Version	Date	Comments
0.85	6 <sup>th</sup> January 2008	Added support for DVB-C tuners. Revised initialisation and tuner lock mechanism for better compatibility with certain tuners. Added support for extended event descriptions and multiple languages per event.
0.80	4 <sup>th</sup> September 2007	More changes to date/time formats to fix problems with certain parsers. <i>Bug fix</i> : attempt to use tuners other than DVB-T.
0.75	18 <sup>th</sup> June 2007	Further changes to date/time specification. <i>Bug fix</i> : invalid stop date for event durations longer than 24 hours.
0.72	29 <sup>th</sup> March 2007	Minor changes to date/time specification to fix problems when <i>QuickGuide</i> is used with daylight saving time in operation.
0.70	11 <sup>th</sup> February 2007	<i>Bug fixes</i> : empty or missing event title. <i>Additions</i> : multi-lingual character set support, programme events in <i>XMLTV</i> file sorted in date/time order.
0.60	3 <sup>rd</sup> December 2006	First public release.

## Version 0.85

The main new feature that Version 0.85 brings is support for DVB-C cable tuners in addition to the DVB-T support that has been present in all previous versions.

Whilst problems of **DVBGuide** not working with a small minority of tuner hardware have not been fully resolved, changes to initialisation and the signal lock mechanism have improved the situation.

Some broadcasters use an alternate mechanism (known as extended event descriptors) to transmit programme event text. Support for this was missing from previous versions of **DVBGuide** (since initially no broadcaster had been found that used this method). Extended event descriptor support is now present (and confirmed as working with one particular cable EPG that uses them). A related addition is the support for title/description records in multiple languages for a single programme event.

In summary, the changes in Version 0.85 are:

- ❑ Support for DVB-C tuners (with associated new command line options to set tuning parameters and a command line option to set DVB type);
- ❑ Revised tuner initialisation and signal lock acquisition for better compatibility with a wider variety of tuner hardware;
- ❑ Support for extended event descriptors (used by some broadcasters instead of the short text description);
- ❑ Support for multiple language title/description records per EPG event.

## Version 0.80

The “+0000” date/time suffix introduced in Version 0.75 caused problems with some *XMLTV* parsers. The ISO 8601 standard (which specifies the date formatting) defines the “+” character to immediately follow the date/time numerals. However, it is common practice in *XMLTV* files for the “+” to be preceded by a space character. Whilst some *XMLTV* parsers don’t care whether the space is there or not, other parsers insist on it. Hence, the EPG data produced by Version 0.75 was unreadable by some applications. The extra space is now present.

**DVBGuide** 0.80 only works with DVB-T sources; other DVB variants (e.g. satellite or cable) are not supported. In previous versions, **DVBGuide** would attempt to use the first BDA tuner that it found – whatever the type. In some cases this meant that it would try to use a DVB-S tuner and then fail even if a DVB-T tuner was also present. Version 0.80 uses a new mechanism that ignores all tuners unless they are DVB-T.

In summary, the changes in Version 0.80 are:

- ❑ All dates in *XMLTV* file are UTC and given the suffix “ +0000”;
- ❑ Tuners that are not digital terrestrial are ignored.
- ❑ Additional information included in generated NIT and SDT table files (carrier frequency and bandwidth in NIT, default authority domain string in SDT).

## Version 0.75

Unfortunately, the “UTC” suffix introduced in Version 0.72 does not appear to be understood by all *XMLTV* parsers. It is hoped that the “+0000” suffix change in Version 0.75 now fixes the problem for all parsers. The changes are:

- ❑ All dates in *XMLTV* file are now specified with the suffix “+0000” to signify that they are specified as UTC rather than local time;
- ❑ **Bug fix:** invalid event stop date in *XMLTV* file for the (unusual) case of an event duration being specified as longer than 24 hours;



## Version 0.72

Version 0.72 fixes just one problem when *QuickGuide* is used on the resulting *XMLTV* file whilst daylight saving time is in operation. The changes are:

- ❑ All dates in *XMLTV* file are now specified with the suffix “UTC”.  
According to the *XMLTV* specification this is not strictly required, but does appear to be necessary for *QuickGuide* to interpret times correctly;
- ❑ The creation date at the start of the *XMLTV* file is now specified in UTC rather than local time;
- ❑ Additional messages when the set system time command line option is used.

## Version 0.70

Version 0.70 includes the following main changes:

- ❑ **Bug fix:** crash when writing *XMLTV* file for an event where the programme title was not broadcast;
- ❑ **Bug fix:** generating invalid *XMLTV* file for events where the title is broadcast but is empty;
- ❑ Support for many of the multi-lingual and accented character mechanisms defined in the DVB specification added;
- ❑ ISO639 two character language code attribute now correctly present in programme title and description;
- ❑ Programme events in the *XMLTV* file are now sorted in date/time order – not strictly required by the *XMLTV* specification but it makes manual examination of the file contents easier;
- ❑ Improved MCE category support (but this is still very much work in progress);
- ❑ *XMLTV* programme events now include audio and video attributes if those attribute descriptors are present in the broadcast EPG;
- ❑ Other minor bug fixes.

## Version 0.60

First public release.

# Operation

## Parameters

### DVB tuner type

DVBGuide defaults to working with DVB-T (i.e. terrestrial) tuners. If a cable tuner is being used then a command line parameters is required to force use of DVB-C.

### Tuner parameters

There are four individual tuning parameters that can be set. Some of these are only appropriate for certain DVB tuner types. The four parameters are:

- ❑ Bandwidth (*DVB-T only*);
- ❑ Carrier frequency;
- ❑ Modulation type;
- ❑ Symbol rate.

Typical operation requires at least one of these parameters to be set: the carrier frequency for the Transport Stream multiplex that is to be used for EPG data capture. The only occasion when this parameter can be omitted is when the DVBGuide's default of 506000 kHz is acceptable.

The carrier frequency must be specified in kHz. Tables of multiplex frequencies for regional transmitters are usually freely available from your broadcaster. However, if you are using Windows Media Center then there is an easy way to determine channel frequencies. Go into the *Settings/Guide/Edit Channels* menu and frequencies will be given for each channel that you normally receive. Note that these frequencies are in MHz so add three zeros (or move the decimal point three digits to the right) to get a frequency in kHz.

In the United Kingdom, the frequency used may be for any one of the six<sup>1</sup> multiplexes broadcast by your local transmitter. If you are aware of reception problems on certain channels (e.g. freeze frame video or picture break-up) then, since you have a choice, avoid multiplexes that carry those problem channels.

For DVB-T, another parameter that you may need to supply is the bandwidth frequency in MHz. This information will be available from your broadcaster but since there are only three permissible values (6, 7 or 8 MHz) for this it is easy to determine by trial and error. If the default of 8 MHz doesn't work (i.e. fails to result in a tuning lock) then try 7. And if that doesn't work try 6.

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<sup>1</sup> If your local transmitter is Crystal Palace then the additional multiplexes carrying the current High Definition trials should be avoided since these only carry EPG data for the HD broadcasts.

For the United Kingdom, the default bandwidth of 8 MHz applies across the entire region. The default carrier frequency of 506000 will work for the 10 million people or so in the coverage area of London's Crystal Palace transmitter since this is the frequency<sup>2</sup> of the main BBC multiplex (i.e. that carries BBC ONE and BBC TWO).

There are two other optional parameters, modulation type and symbol rate, either of which may need to be supplied. For the values to use here, again the technical information should be available from your broadcaster. Experimentation has shown that both parameters can usually be omitted for terrestrial but are required for cable.

When specifying modulation types such as 64-QAM, **DVBGuide** accepts the strings "64-QAM", "64-qam", "64QAM" or "64qam" (i.e. with or without the hyphen and case is ignored).

## EPG timeout

Be prepared to wait for an entire set of EPG data records to be captured. This is a relatively slow process. The actual time taken will depend on your broadcaster's choice of number of days in the EPG and the TS bandwidth devoted to EPG data packets. It will also obviously depend on the total number of channels carried by the network.

As a reference point, the UK's Freeview seven day EPG is specified to have a broadcast repetition rate of 270 seconds (i.e. every individual EPG event will be broadcast at least once during that time). This is confirmed by experiments that show that the complete EPG is usually captured in a little less than five minutes and results in around 11,500 unique EPG records. Consequently the default EPG timeout of 10 minutes seems appropriate.

If the timeout is set too short then only a partial capture of the EPG will result. Since EPG capture is unlikely to be a time-critical process there is usually little to be gained by setting a short timeout.

If the EPG timeout is set to 0 then the EPG capture part of **DVBGuide** does not take place. This may be used if **DVBGuide** is only being used to set the system date or to write tables as CSV files.

## Setting system date/time

An accurate EPG is only useful to a PVR application if the current date and time is also accurate. **DVBGuide** may optionally be used to synchronise the PC system date/time to that broadcast.

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<sup>2</sup> The Crystal Palace BBC mux frequency is actually 506 MHz less an offset of 167 kHz. Such offsets are sometimes introduced to avoid co-channel interference between neighbouring transmitters. However, most BDA tuner cards will cope without this offset being specified (and Media Center does not include these offsets in its display of frequencies).

Note that **DVBGuide** must be run with Administrator privileges if the system time is to be set successfully.

## Writing tables as CSV files

A bonus extra feature, but probably one not likely to be used much, is the option to write the Network Information Table, the Program Association Table and the complete set of Service Description Tables to comma separated value files.

## Command line options

**DVBGuide** has the following command line options:

- aX** Set DVB tuner type to (C)able or (T)errestrial (default is T).
- bN** Set tuning bandwidth to *N* MHz (default is 8). *DVBT only*.
- cNNN** Set tuning carrier frequency to *NNN* kHz (default is 506000).
- d** Show debug information. Not normally required.
- eNNN** Set EPG capture timeout to *NNN* seconds (default is 600 or 10 minutes). A timeout of 0 will disable EPG capture.
- mXXX** Set tuning modulation type (e.g. "64-QAM").
- q** Enable quiet mode.
- sNNN** Set tuning symbol rate.
- t** Set the system time from the broadcast time stamp.
- v** Display version information and exit.
- w** Write NIT, PAT and SDT tables as comma separated value files. Not normally required.

Numbers are specified using C language conventions (i.e. default is decimal, prefix with 0x for hex, prefix with 0 for octal).

## Output files

Captured EPG data is always written to the file `dvbepg.xml`. A matching `ChannelInfo.xml` file is also produced containing channel "friendly" names, virtual channel numbers and their mapping to the channel identifiers used in the *XMLTV* format file. The *XMLTV* format file itself contains the channel identifier to friendly name mapping but does not include the virtual channel numbers.

Not that it matters if the `dvbepg.xml/ChannelInfo.xml` combination is used with *QuickGuide* but for the technically minded; **DVBGuide** eschews the normally recommended dotted channel domain notation and uses the channel service number (in hexadecimal) as the channel identifier.

Note that the broadcast of logical channel (i.e. virtual channel) numbers is not a mandatory part of the DVB specifications. For the UK's Freeview system, this information is sent as "user defined" data<sup>3</sup>. It is this information that DVBCGuide uses to construct the `ChannelInfo.xml` file. So, this file will be generated correctly in the United Kingdom.

In other regions, if this logical channel information is missing then all the virtual channel numbers will be set to 0. This is not a major problem. The output file could be edited; with the correct channel numbers entered manually from information provided by *QuickGuide's Dumper* program.

## Platform

**DVBCGuide** is a Win32 console application. It requires DirectShow support and a DVB-T or DVB-C tuner card with a Broadcast Driver Architecture (BDA) driver. Currently, testing has been performed on Windows XP SP2 and Windows Media Center 2005 with Rollup 2 and Windows Vista. It may work on older versions of Windows but no guarantees are offered.

Typically, you will run the **DVBCGuide** from a command line window or from a batch file or command script (possibly as part of a scheduled task).

## Future enhancements

Whilst there is no guarantee that future versions will be released, some or all of the following areas are likely to receive attention in any future version:

- ❑ Better support for content categories;
- ❑ Support for re-tuning during EPG capture to support regions where the entire EPG is not broadcast on every transport stream in a network;
- ❑ Full support for all languages and character sets possible according to the DVB specification;
- ❑ Tuner selection where more than one tuner is available;
- ❑ Support for DVB-S and other DVB variants;
- ❑ Usability enhancements for better integration with Windows Media Center.

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<sup>3</sup> A logical channel number descriptor in the Network Information Table.

# Contacting the author

Feedback to the author may be made via [pclare@bigfoot.com](mailto:pclare@bigfoot.com) or via the community forums on The Green Button.

# References

The following publications were referred to in the course of the development of **DVBGuide**.

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