

DVBGuide

Version 0.80, 4th September 2007

A DVB-T EPG capture utility

© Copyright 2006-2007 Conquest Consultants

Copyright

DVBGuide and all associated documentation are copyright Conquest Consultants.

License and distribution

DVBGuide is copyright software. It may be distributed freely provided that all files are included in the distribution, no files (including the distribution zip file) are modified and no charge is made for the distribution or any software package or media containing the distribution. **DVBGuide** is licensed for personal non-commercial use only. Conquest Consultants reserve the right to alter the free distribution and use terms for any future versions or derivatives of **DVBGuide** that may be produced.

Provided that the above distribution terms are adhered to, the distribution Zip file may be freely copied to and mirrored on ftp and web sites.

Disclaimer

DVBGuide comes without any express or implied warranty. You use this software at your own risk. Conquest Consultants have no obligation to support or upgrade this software. Conquest Consultants cannot be held responsible for any act of copyright infringement or other violation of applicable law that results from use of this software.

Ownership of all product names and trademarks mentioned within are acknowledged.

Contents

Introduction	1
<i>Caveat emptor</i>	2
Version history	3
Version 0.80	3
Version 0.75	4
Version 0.72	4
Version 0.70	4
Version 0.60	5
Operation	5
Parameters	5
Carrier frequency and bandwidth	5
EPG timeout	6
Setting system date/time	6
Writing tables as CSV files	7
Command line options	7
Output files	7
Platform	8
Future enhancements	8
Contacting the author	8
References	9

Introduction

DVBGuide is a utility to capture the Electronic Programme Guide (EPG) data as broadcast over a digital television DVB-T 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 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 0.80 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).

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-T tuner hardware and driver;
- ❑ Regional differences in adherence to MPEG transport and DVB-T standards by transmitting systems and broadcasters.

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.

Testing has only been performed on a small selection of DVB-Tuner hardware. This is likely to be a problem area that could prevent **DVBGuide** from working correctly. Using the debug output option may provide additional information to help solve this type of problem if it is encountered. User feedback from version **DVBGuide** version 0.60 shows that some types of DVB-T tuner hardware/drivers do indeed cause problems. The cause of these problems is being investigated but they have not been specifically addressed yet. The only tuner currently known not to work with **DVBGuide** is a Genesyslogic USB tuner (vendor ID 0x0DB0, product ID 0x5581). But there may well be others.

The last variable is the hardest one to deal with. Testing 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) then problems with EPG capture are most likely. **DVBGuide** captures all the EPG data by tuning to a single Transport Stream (TS) multiplex frequency. However, unlike the UK's 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
0.80	4 th 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 th 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 th 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 th 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 rd December 2006	First public release.

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 will currently only work 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

Carrier frequency and bandwidth

Typical operation requires at least one parameter to be set: the carrier frequency for the Transport Stream multiplex that is to be used for EPG data capture. In the United Kingdom, the frequency used may be for any one of the six¹ 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.

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 to get a frequency in kHz.

The other 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

¹ 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.

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.

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 frequency² of the main BBC multiplex (i.e. that carries BBC ONE and BBC TWO).

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.

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

² 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).

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:

- bN** Set tuning bandwidth to *N* MHz (default is 8).
- 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.
- q** Enable quiet mode.
- 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” data³. It is this information that DVBGuide

³ A logical channel number descriptor in the Network Information Table.

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

DVBGuide is a Win32 console application. It requires DirectShow support and a DVB-T 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 **DVBGuide** 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.

Contacting the author

Feedback to the author may be made via 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**.

- [1] *Information technology – Generic coding of moving pictures and associated audio information: Systems*, International Standard, ISO/IEC 13818-1, Second Edition, December 2000.
- [2] *Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems*, ETSI, EN 300 468 V1.7.1, May 2006.
- [3] *Digital Video Broadcasting (DVB); Carriage and signalling of TV-Anytime information in DVB transport streams*, ETSI, TS 102 323 V1.2.1, November 2005.
- [4] *Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)*, ETSI, TS 101 211 V1.7.1, February 2006.
- [5] *Plan for UK DTT SI*, Digital TV Group, Version 4.
- [6] *Platform SDK help*, Microsoft Platform SDK for Windows Server 2003 SP1.