CSW VIEWER V39

CSW Viewer is for viewing the pulse lengths graphically of CSW files and Commodore TAP files.

Its main use is to get timing values from sound sample files after converting them to CSW files, preferably V2.0 files. A user of CSW Viewer can indirectly call the CSW.exe program to convert multiple WAV files to CSW. Data from Spectrum and Amstrad and similar formats can be written to a TZX file.

Pulses, waves and certain types of series of waves or pulses can be given coded colours to help to inspect data that was encoded on a cassette. There are standard file formats and many non-standard file formats that have been used with commercial cassette software.

CSW Viewer is also useful for determining why CSW files won't load, often because the waves are not regular enough. Commodore 64 standard files have waves with 3 lengths close together and will require the waves in a CSW file to have particularly regular waves.

IMPORTANT POINTS

The program will run with a resolution of 1024x768 with font scaling at 112% or less. Higher resolution can have larger font scaling.

A selected range is inclusive of the last point.
The left and right mouse buttons can set the values in the range edit boxes by clicking on a point. The left button sets the start box value and the right button sets the end box value.
The time elapsed before the first point displayed on the pulse lengths graph is displayed above the graph.
All whole number values calculated are rounded.

The time span of a range of points is given in milliseconds for use with TZX files.
Mean wavelengths are given in 48K Spectrum T States. The TZX format mainly uses pulse lengths in T States.

The 'Create CSW file' page will create files with the CSW format V2.1, which is not official yet but it complies with the format update specifications of V2.0.

Wavelengths from TAP files are split into 2 equally lengthed pulses.
The overflow pulse length for TAP V0 files is set at 3000.

Wavelengths must be within a tolerated range for colouring all computer data bytes. Short waves have a larger tolerated range. KCS short waves are expected to be half the length of long waves except with Dragon files. The Dragon computer does not use waves of exactly the frequency it is documented to use.

The colours used are listed here:

Gap	Yellow
Row of pulses	Maroon
Carrier tone	Grey
Data start mark	Teal
Data end mark	Sky blue
Bit 0	Blue
Bit 1	Aqua
Bit 2	Navy
Bit 3	Olive
Bit 4	Lime
Bit 5	Fuchsia
Bit 6	Purple
Bit 7	Red
Start bit	White
Stop bit	Black
Parity mark	Money green

INSTRUCTIONS FOR COMMON USES

Converting WAV files to CSW files:
Select the 'Create CSW file' tab. See an additional document with CSW Viewer. The CSW.exe program must be in the same directory as CSW Viewer. Do not use excessively long directory paths. The converted files can be loaded into CSW Viewer with the 'Open Ffile' button.

This feature has been removed:
Finding the quantity of carrier tone pulses and a mean carrier tone pulse length:
Look for the start of the carrier tone, which you recognise by many pulses of roughly equal size. Enter the X-axis value for the first carrier tone pulse in the range start edit box. Find the end of the carrier tone and enter the X-axis value of the last pulse in the range end edit box. Press the 'Calculate mean carrier tone pulse length' button to see the mean length in samples and Spectrum T states. The quantity of pulses in the range is automatically shown.

Finding data start mark pulse lengths:
After a carrier tone some types of files have a data start mark that is usually 1 or 2 waves. Colour these as a data start mark. There are not many waves to use to get the lengths of data start mark pulses so the values are not very accurate. *Enter the X-axis value in both range edit boxes for the required pulse and press the 'Calculate mean carrier tone pulse length' button to see the mean length in samples and Spectrum T states.*

Finding data bit wavelengths/Finding baud rate of KCS type files:
Select the first and last pulses of a data block. The 'Total pulses in range' must be an even number. Press the '2' button on the 'Find wave values' page. Do not select multiple data blocks because the wave coupling will be wrong if there is an odd number of carrier tone pulses between the data blocks. The data analysis chart will be filled with counts of wavelengths. The frequency of the waves will be given and mean wavelengths in samples and 48K Spectrum T States. The baud rate will be given for KCS and Acorn/MSX files. The quantity of short waves and long waves will also be shown.

Finding wavelengths when there are 3 wavelengths used (Commodores):
Select the first and last pulses of a data block. The 'Total pulses in range' must be an even number. Quite a few long waves need to be selected. Press the '3' button on the 'Find wave values' page. The data analysis chart will be filled with counts of wavelengths. The frequency of the waves will be given and mean wavelengths in samples and 48K Spectrum T States. The quantity of short waves, medium waves and long waves will also be shown.

Colouring pulses of Spectrum/Amstrad/Sam Coupé bytes:
Enter the X-axis value of the first data pulse in the range start edit box. Find the end of the file by finding the start of a gap or the carrier tone of the following file. Enter the X-axis value of the last data pulse in the end edit box. The 'Total pulses in range' must be an even number. The 'Total Spectrum bytes in

range' value should be a whole number. If it isn't you have got something wrong or the data does not finish with a whole byte (uncommon but some non-standard formats do this). Press 'Colour pulses in range as from bit 7 to bit 0'.

There is checking of wavelengths which could mean that no pulses will be coloured. There must be a clear distinction between short and long waves.

Colouring pulses of ZX81 bytes:
There are not any carrier tone or start mark pulses with ZX81 files. '0' bits are represented by 4 waves and '1' bits by 9 waves. There are short gaps between bits with a standard length. Select a range from the first pulse of the first byte to the last pulse of the last byte. Press 'Colour pulses in range as ZX81 bits and bytes'.

There is checking of wavelengths and gap lengths which could mean that no pulses will be coloured.

Colouring pulses of Enterprise/Jupiter Ace bytes:
Use the same procedure as for the Spectrum but use the 'Colour pulses in range as from bit 0 to bit 7' button.

There is checking of wavelengths which could mean that no pulses will be coloured. There must be a clear distinction between short and long waves.

Colouring pulses of KCS / Acorn / MSX / Dragon bytes:
Select a range from the first pulse of the first start bit of an 8N1 data block to the last pulse of the stop bit of the last byte of the data block. It is difficult to know where the last byte ends but this does not matter. Press the correct button for the data from the 'Colour Kansas City Standard Data Bits And Bytes' group box.

There is checking of wavelengths which could mean that no pulses will be coloured. There must be a clear distinction between short and long waves. Short waves are expected to be half the length of long waves except for the Dragon.

The Dragon computer does not use waves of exactly the frequency it is documented to use. Dragon files has a carrier tone with two alternating waves. There is a data start mark with one short wave. The data is recorded from bit '0' to bit '7' and does not have start bits or stop bits.

If the byte format is not 8N1 then only the first byte could be coloured.

Often it is necessary to adjust the end of the range to get the last stop bit and press the button again.

Colouring pulses of Commodore bytes:
Select a range from the first pulse of the first start bit to the last pulse of the data end mark of the file. Press the 'Colour pulses in range as Commodore bits and bytes' button.

The data end mark is a long wave with VIC-20 and C64 files and a medium wave with Plus 4 files.

There is checking of wavelengths which could mean that no pulses will be coloured. There must be a clear distinction between short, medium and long waves.

Saving and loading point colours:
After colouring data pulses press the 'Point colours to file' button and the point colours will be saved. The file will have the same name as the CSW or TAP file loaded from and the extension COL. This file will hold the number of pulses which will be checked against the number of pulses when you try to load from a saved COL file.

Finding a gap length:
Find the first pulse of a gap by seeing where pulses do not look a similar size to the coupled pulses at the end of the preceding data and/or are not the typical size. Enter the X-axis value of the first pulse of the gap in the range start edit box. Find the end of the gap, which usually is the pulse before the first pulse of

a following carrier tone and enter its X-axis value in the range end edit box. The time span is automatically shown in seconds and samples.

Finding Spectrum data quantity in bytes:
Find the first pulse of data, which is the first pulse after the data start mark pulses and is the third pulse after the carrier tone. Enter its X-axis value in the range start edit box. Find the last pulse of the data before where the pulses are from a gap or carrier tone and enter its X-axis value in the range end edit box. The 'Total pulses in range' must be an even number. If the 'Total Spectrum bytes in range' is not a whole number you have got something wrong or the data does not finish with a whole byte (uncommon).

CSW.EXE

You may also want to download the CSW.exe V2.0 utility:
http://www.ramsoft.bbk.org/maketzx.html#DOWNLOAD
ftp://ftp.worldofspectrum.org/pub/sinclair/tools/pc
http://www.acornpreservation.org/makeuef/index.html

The CSW format and the CSW.exe utility are both excellent and will accurately preserve almost any computer cassettes readable waves. The Atari computers are one exception since they use a detection of the general frequency of waves rather than reading individual waves. The waves at the changes of frequency can be quite misshaped.

Only a minority of cassettes will require a wider frequency range than the default range. CSW.exe is a DOS program but will use long file names if used with Windows.

KNOWN BUGS WITH CSW V2.0

Known bugs with CSW V2.0:
The 'number of pulses' is sometimes set to 0.
The 32-bit 'number of pulses' in the header of CSW files only has a 24-bit number written. This bug does not appear often with tapes less than 45 minutes.
The 'number of pulses' is short by 1 if an extremely short WAV file is converted and compression is not used.
The output file name sometimes turns to all lowercase.
Directory path lengths and file name lengths are limited in length if called by CSW Viewer because of a limitation with the Windows API function CreateProcess.
CSW files are created with the name of the WAV file up to the first dot instead of the last.
It is unreliable with very short files with less than 20 samples.

KNOWN BUGS WITH CSW V1.3 (USES FORMAT REVISION V1.1)

Files often finish with a special code for a 32-bit value without a following value.
Polarity is often recorded wrongly.

TAP FORMAT

The similar TAP format used by the Commodore community I have found is slightly less accurate due to conversion from one sampling rate to another, one wave at a time, discarding the fractional part of the converted value. MTAP does this even though rounding only requires adding 0.5 before disregarding the fractional part. It stores only wavelengths in V0 and V1 files. V2 files store pulse lengths for the shorter pulses, which most data pulses comprise of. TAP files are larger because there is no compression. Some converters clean gaps unnecessarily, often altering the sizes of gaps. V0 files do not attempt to record gap lengths.

KNOW PROGRAMS SUPPORTING CSW V2.0

MakeTZX	V2.33+,
RealSpectrum	V0.97.08+,
Spectaculator	V6.0+,

Electrem Future	2nd binary release+,
MakeUEF	V1.2+.
SpecEmu	V2.3+
TZX2WAV	V0.1+
WinTZX	V0.5A+
B-Em	V1.2+
BeebEm	V3.4+
CSW.dll by Fraser Ross	V1.1+
CSW.dll by Mark Woodmass	
Tape2WAV	V1.2+
ZXSpin	V0.1d+

CSW V2.1 FORMAT EXTENTION

Flags byte:
b0: initial polarity; if set, the signal starts at logical high.

b2: creators signature in header extention data, if set.

Header extention data:
First byte uchar: Number of chunks.
Chunks[Number of chunks]:
  First byte uchar: Chunk ID,
  Second byte uchar: Chunk length,
  The rest uchar: Chunk data.

Currently used chunks:
Chunk ID 2:
Creators signature:
  ASCIIZ[Chunk length].

Any bug reports or suggestions for enhancements should be sent to fraser.ross8@btinternet.com.

CSW Viewer author:
Fraser Ross

CHANGE LOG

4/5/11 Release 39
Fixed minor arithmetic errors with removing a phase shift from a WAV file before converting to CSW.
The background colour of the charts is now fixed.
Fixed reading of TAP V2 file longer wavelengths that follow the special code.

12/3/11 Release 38
Fixed the loading of point colours which was not working in V37.
Fixed the 2 wavelengths data means finding feature which was not working in V37.
Removed the mean pulse length finding button. This might be brought back in a later version.
Changed the ‘Find values’ tab caption to ‘Find wave values’.
The background colour of the charts is now white due to a bug.
The Windows 9x series is no longer supported.
Added labels to show when point colours are being loaded or saved.
Reorganised the mean wavelength values finding buttons and statistics.
Added a ‘Colour pulses in range as 1200 baud, 8N2 format. (MSX)’ button.
Added a ‘Colour pulses in range as Dragon’ button.
Improved the ‘LOADING DATA’ label which was not always getting removed.
Improved the ‘Colour pulses in range as ZX81 bits and bytes’ button.
Improved loading of CSW and TAP files by double clicking on a file when there are spaces in the file name or the directory of it.

24/3/09 Release 37
Added a ‘Colour pulses in range as Commodore bits and bytes’ button.
Reworded two of the buttons on the ‘Colour code pulses’ page.
The data start colour is now teal instead of using the start bit colour.
The data end colour is now sky blue instead of using the stop bit colour.
The parity mark colour used in Commodore files is money green.
Fixed tabulation on the ‘Search’ page.
Fixed checking for an even number of pulses when finding mean wavelengths using the ‘Find values’ page which was not done with V36.

5/3/09 Release 36
Colouring of data waves now calculates mean wavelengths and expects waves to be within a tolerated range for all computers. KCS and Acorns use a long wavelength that is the short wavelength X 2. Other computers use separate wavelengths.
The entering of an estimate of a baud rate for KCS/Acorn data is removed.
When 2 or 3 distinct wavelengths are not found a message is now given.
The ‘Colour code pulses’ page has been rearranged and has some rewording.
Corrected information in this document about pulse colouring for Spectrum, Acorns and ZX81.
Fixed TZX data block writing buttons that wrongly expected Enterprise colouring in releases 33, 34 and 35.
Fixed the writing on the buttons for Spectrum and Enterprise colouring that was wrong with releases 34 and 35.
Fixed a minor bug that restricted Spectrum data blocks to FFFFF bytes.

18/1/09 Release 35
Fixed a minor bug with loading point colours in release 34.
Fixed a bug with creating a CSW file in release 34.
Fixed a bug where the window would resize itself in release 34.

16/1/09 Release 34
The ‘number of pulses is zero bug’ is always corrected now when a CSW file is created.
Colouring pulses of data blocks was slow in release 33 and is now fixed.
The ‘Colour code pulses’ page has been rearranged and has some rewording.
Added a ‘Colour pulses in range as ZX81 bits and bytes’ button.
Added a ‘Colour pulses in range as end mark’ button and the colour is black.
Added a ‘Colour pulses in range from bit 0 to bit 7’ button.
The ‘Colour pulses in range as sync pulses / row of pulses’ button has been split into two buttons: ‘Colour pulses in range as synchronisation pulses’ set the colour to white. ‘Colour pulses in range as row of pulses’ sets the colour to maroon.
Moved some buttons on the ‘Create TZX file’ page into the only group box.

24/9/08 Release 33
Fixed a bug that prevented release 32 from loading V1.1 CSW files.
Fixed a bug with loading the point colours from a COL file which is present in release 32.
Fixed a bug with the initial time, 00.00, not being displayed on the graphical display page after loading a file.
Fixed some minor bugs with the TZX chunk writing buttons which are present in releases 29, 30, 31 and 32.
Relaxed checking of TAP file headers for potential compatibility with future format changes.
Fixed removing of phase shift which is broken in release 32.

4/6/08 Release 32
Fixed a bug that displayed 1 too many data analysis chart pages when the number of counts is an increment of 50.
Fixed page increment size on data analysis chart track bar.
Increased font size on data analysis chart legend.
Made the data analysis chart invisible when not displaying data.
Added file summary fields for machine type and video standard from TAP files.
Changed input file label to a memo using separate lines for directories.

Improved CSW file loading time for large files.
Short CSW files load slightly slower.
Improved exception handling.
Allowed all minor versions of the TZX format V2.
Allowed unknown blocks with TZX files.
Added controls for the TZX signal level block.

24/9/06 Release 31
Fixed a bug that prevented phase shift removal from working sometimes.
Fixed a minor bug with gap pulse finding which did not start from the next page with V29 and V30.
Fixed minor bugs with messages returned from the DLL files.
Fixed a minor bug with displaying the creators signature.
Fixed a minor reading, buffer overrun bug with calculating time span at the last pulse of the file.
Fortunately no erroneous data was seen by the user.
Made colouring of Spectrum data pulses require an even number of pulses.
Improved detection of mean bits values. This is not a bug fix.
Reduced the font size for the file name and directory.
Added a 'Small Monitor' button to reduce some font sizes for small monitor users.
The program had more rewriting done for this version.

23/6/06 Release 30
Fixed the writing of an incomplete last byte to TZX files.
Fixed the compression type label which always said "RLE".
Fixed checking of minor version number of CSWViewer.dll.
Improved behaviour for files with 0 pulses.
Removed the need for package files.
Added support for Commodore TAP files.
Added new controls for the mean value finding graph.
The program had more rewriting done for this version.

18/4/06 Release 29
Fixed the button for 3 wave data, which gave inaccurate calculations due to bugs.
Fixed a bug that prevented TZX files of the V1.13 specification from opening.
Fixed phase shift removing for some WAV files.
Added the missing files TeeUI7C6.bpl and VCLX60.bpl to Borland-BCB6.zip.
Added a bookmark feature to the search page.
Changed time span in milliseconds to time span in samples.
Improved the behavior when opening WAV files that are 16 bit or stereo, for conversion to CSW.
Made many minor user interface improvements.
Put the main program code in a DLL file.
The program had a big rewriting for this version.

18/8/05 Release 28
Fixed a bug with bits mean finding and Acorn baud rate.
Added new pulse colouring buttons for Atom cassettes and 300 baud BBC cassettes.
Linked with zlib V1.2.3, which fixes more security vulnerabilities.
The package files in Borland-BCB6.zip in the directory:
ftp://ftp.worldofspectrum.org/pub/sinclair/tools/pc/drivers/ are now required.

10/6/05 Release 27
Linked with zlib V1.2.2 which fixes:
- Potential security vulnerability when decoding invalid compressed data,
- Fix bug when decompressing dynamic blocks with no distance codes,
- Do not return an error when using gzread() on an empty file.

Removed the need for package support files.

4/4/05 Release 26
Allowed opening of a CSW file in CSW Viewer by associating the extention with CSW Viewer and opening a file with a file manager.
Improved the problem handling with memory allocation.

Made the displayed tab sheet the file summary after loading a new file.
Fixed TZX support, which does not work with V24 and V25.
Made TZX buttons always available after opening a TZX file.
Now adds an extention to new TZX files if one is not typed.

4/3/05 Release 25
Corrected ticks on bottom axis of both graphs.
Rearranged the file summary page.
Changed bits pulse mean length in samples to wave mean length in samples.
Added a new button for 3 wave data.

19/1/05 Release 24
Reduced the font size on the graphical view page legend.
Improved the "How to record" document.
Made many improvements to the graphs.
Improved speed of file loading and the speed in general.
Changed the required package files.

12/12/04 Release 23
Fixed a bug with phase shift removing, which only affected WAV files with a particular end to the samples.
Added the necessary file (since release 16): BCBSMP40.BPL to borland-win.zip.

19/11/04 Release 22
Increased maximum creator's signature size to 150 characters.
Made a change to the recommended method of smoothing gaps in the "How to record" document.
Fixed loading of CSW V1.1 files which have not worked since release 20.
Changed wavelength toleration for detecting Acorn waves to be equal to MakeUEF V1.2.

20/10/04 Release 21
Put back the option to select multiple WAV files for conversion to CSW.
Simplified phase shift removing to only –90 degrees on the whole file.
Made new 'remove phase shift' check box state held in registry.
Removed recording of phase shifts in CSW files.
Created a new document on recording WAV files for conversion to CSW files.
Changed default low cut-off frequency to 1000Hz.

11/10/04
I removed release 20 from WOS due to rethink on CSW file creation.

2/10/04 Release 20
Added creators signature facility for creating CSW files.
Fixed a small inaccuracy with TZX block 11 trailing gaps.
Improved the file opening dialog box settings.
Disallowed files with sampling rate of 0.
Began phase shift keying of waves in WAV files before passing a temporary WAV file to CSW.exe.
Added number of samples information to file summary.
Made the time span in the file summary appear sooner.
Reduced the size of the font for the file name and directory and changed the colour to maroon.
Changed the name of some tabs.
Changed recommended filter ranges.
Changed wavelength toleration for detecting Acorn waves.
Changed an initial edit box value for searching for a pulse.
Removed the option to select multiple WAV files for conversion to CSW because of the 'number of pulses' bug with CSW.exe.

7/8/04 Release 19
Changed code for pure data and file TZX blocks so any inaccuracy is carried onto the optional trailing gap.
Fixed bug with tolerated wavelength of data bits when using TZX output buttons for pure data and file.

Fixed font size of Values Finder graph title which is bugged in release 18.

20/7/04 Release 18
Completed TZX file output page with support for TZX blocks 11, 12, 13, 14, 20, 2A and 30.
Added a gap finding button that uses pulse colour codes.
Changed the time span on the File summary page to show minutes and seconds.
Changed the time span on the Graphical display page to show minutes and seconds.
Changed name of Pulse colouring page to Pulse colour coding.
Changed words on mean pilot finding panel.

22/6/04 Release 17
Fixed bug with CSW V1.01 format files, which have not loaded since release 10.
Improved the error checking with reading and writing of files.
Added a new pulse colouring button for sync pulses or a sequence of pulses (maroon).
Changed the default point colour to the gap colour.
Joined range time span and range selection panels.
File summary headings now removed when not in use.
Added time span to the file summary.
Made minor changes to the file summary headings.
The file summary now works better with zero sized files.
Improved the wording and layout of Values finder page.
Cleared the window of old values etc. when opening a new CSW file.
Started TZX file output page.

22/5/04 Release 16
Added new pulse colouring buttons for: pilot (grey), gap (yellow) and special pulses (any chosen colour).
Changed ordering of the tabs.
Fixed bug where CSW files could not be read after reading an uncompressed CSW file.

30/4/04 Release 15
Removed time span calculation button and made the time span automatically calculated.
Added two buttons for saving and loading of the point colours.
Fixed minor bug where the file was not closed when the number of pulses is incorrect.

26/3/04 Release 14
Invalid CSW V1.01 files with a 0 byte, at the end of the file, have not been accepted since release 11.
Added frequency filter range to CSW file creator tab.
Improved the Acorn bits coupling.
Made minor changes to words on application.
Some error handling possibly does not work because of compiler bugs.

11/2/04 Release 13
Made a workaround to make calling of CSW.exe work with some versions of Windows.
Extended the size of the digits in the edit boxes.
Added Go to seconds and Go to point buttons.
Added Pulse coupling page and moved the Spectrum bytes coupling button to it.
Added standard Acorn start bits, bytes, and stop bits coupling button.
Added a Searching page and pulse finding button mainly for finding gaps.
Added About page.
Changed the font in the File summary page.

30/1/04 Release 12
Fixed incorrectly enabled buttons after using CSW file creator with no file loaded for viewing.
Now closes files after reading data.
Added the files TeePro6C4.bpl and TeeUI6C4.bpl to Tee6C4.zip.

16/1/04 Release 11
Fixed initial polarity message, which has been wrong since release 1.
Added a new tab for control of CSW.exe with multiple file selection. The output file name cases are preserved as with the input file. Why are they not when running in a command prompt window?

Loading of data is now faster.
'1' bit mean length detection now less often reports 'not found.'
Fixed checking of the number of pulses in the header which was not done if the final pulse length was greater than 255.
Added TeePro6C4.bpl to used runtime packages.

19/12/03 Release 10
Added displaying of time elapsed before the first point on the graph.

28/11/03 Release 9
Fixed slightly incorrect baud rate reporting for Acorn files.
Improved CSW file reading.
Fixed incorrectly enabled button.
Changed some user interface writing.

30/10/03 Release 8
Fixed 'loading data' message.
Add use of graph with pilot pulse mean length button.
Added pause size displaying in seconds with more accuracy than ms.
Added displaying of total of '0' and '1' bits after using mean finding button.
Added displaying of baud rate for Acorn tapes after using mean finding button.

14/10/03 Release 7
Fixed multiplication constant for calculating mean T states for pilots and 0s and 1s bug. It was being held from use with the first file loaded and used with a later loaded file, which might have a different sample rate.
Improved the exception handling.

2/10/03 Release 6
Fixed time span calculation bug. The bug only affected CSW files not with a sample rate of 44100.
Fixed mean '0' and '1' bit pulse lengths in samples bug. Previously they were 0.5 too much.
Fixed almost unnoticeable mistake with the wavelength counts graph.
Added 'exception handling' to the program.

30/9/03 Release 5
Changed to a tabbed interface.
Added '0' and '1' bits mean pulse length finder with graph.
Added a feature for coupling pulses, so as to view the pulses as bytes.
Added total bytes in range information.
Added automatic updating of total pulses in range.
Increased file summary information. (Polarity information is omitted for V1.01 files.)

24/9/03 Release 4
Added selecting of range using mouse.
Changed the word average to mean.

17/9/03 Release 3
Pulses coupling feature added.
Brought back non-rounding of pulse length in samples.
Added instructions.

15/9/03 Release 2
Time span calculation added.
Changing of files enabled.
Removed figures of calculated values after the decimal point.
Calculated values rounded to whole number.
Improved user interface.
Moved TEE6C4.BPL from zip file to WOS driver's directory.