Tabutronic chess board driver
by Graham O'Neill

1. Installation

<u>1.1 Windows</u>

You must first install the software that comes with the Tabutronic board as this includes the USB driver that allows your computer to talk to the board.

For Fritz and ChessBase my driver is 64 bit, which means it will only run in Fritz version 15 and above, and ChessBase 13 and above.

Download and run the setupTAB.exe program and it will lead you through installing the files (TAB_DLL.dll and gon-TAB64.dll) for the required programs. The setup program doesn't install for LucasChess as the drivers are already included in that program's download.

For Arena, ChessBase, Fritz and Shredder the setup program will also install programs to allow you to select which board to use if you have multiple boards. For example, for Arena this is called "Arena eBoard" and will show you the screen:
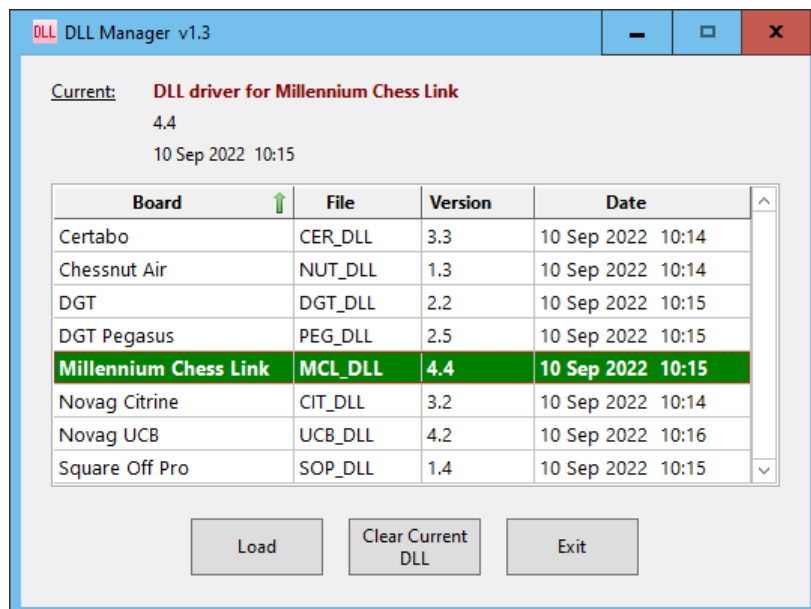
Which boards are listed depends on which drivers you have installed. The top of the screen shows which driver is currently selected (Millennium Chess Link in the above picture). In the list you can choose a different driver and then click *Load* to select it as the current driver. The option to *Clear Current Driver* allows you to revert to the DGT Rabbit Plugin if you have that installed for your DGT board. You do not need to install Rabbit for my drivers.

<u>1.2 Linux</u>

My program uses Pascal and Qt5 which might not work on your PC initially. If you find that the driver doesn't load at all install the Pascal/Qt5 support library by running:

       Ubuntu/Debian: `sudo apt install libqt5pas1`
   Fedora/Mageia: `sudo dnf install qt5pas`

The only GUI that currently uses my driver is LucasChess and that already has it installed. If you want to reload it then you will need the libctab.so file.

GUI	File name	Probable Location
LucasChess	libtab.so	/home/yourname/LucasChessR2/bin/OS/linux/DigitalBoards

You will probably also have to grant your user name access to the serial ports using either `chmod` to grant RW access or by editing the `\etc` group file with `sudo gedit group`.

2. General information

Sometimes the system won't release the COM port even though my driver has finished and this will stop you from reconnecting the board again. In this case the easiest solution is to unplug the board's USB connection at the computer and plug it back in again. You can also try turning off power management in the Properties of the port in the Ports section of Device Manager in Windows (C:\Windows\System32\devmgmt.msc):
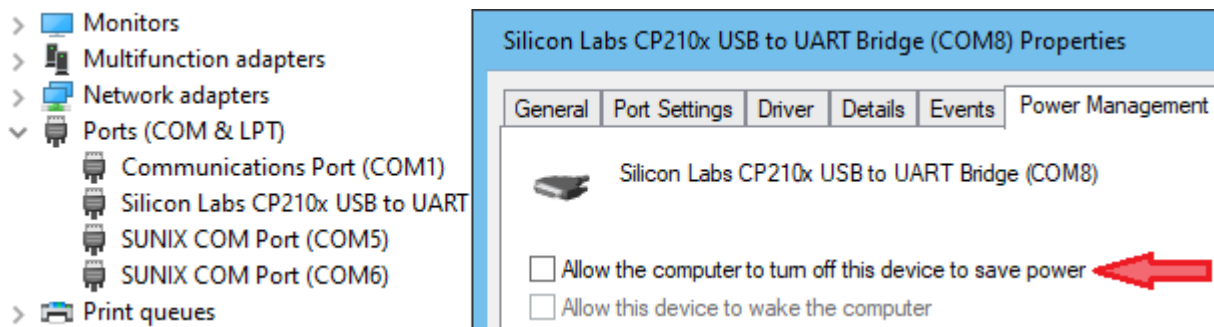
My driver screen cannot be closed using the normal close window button as that would leave the GUI without the response it is expecting. Normally it will close automatically when you complete the required action but if you need to force it to close (perhaps the driver keeps failing to talk to the board) then you need to do this by deactivating the board in the GUI.

My software does not support the Gesture Control that the Tabutronic software provides since I do not have the ability to control the GUI to that extent from my driver.

2.1 Using Bluetooth to connect

My driver will allow you to connect to your board using Bluetooth if you have the Certabo BT Module (updated with the BT_Sentio_Cerno image from the Tabutronic Software web page).

Since this board uses "classic" Bluetooth rather than BluetoothLE it is necessary to pair the board to your PC first. You do this using the normal process of pairing a device, with the Tabutronic probably appearing with the device name "raspberrypi".

For Windows 11 there is a trick to being able to discover the board. In the Windows *Settings > Bluetooth & devices > Devices* screen scroll down to the *Device Settings* section and select "Advanced" for the Discovery type:
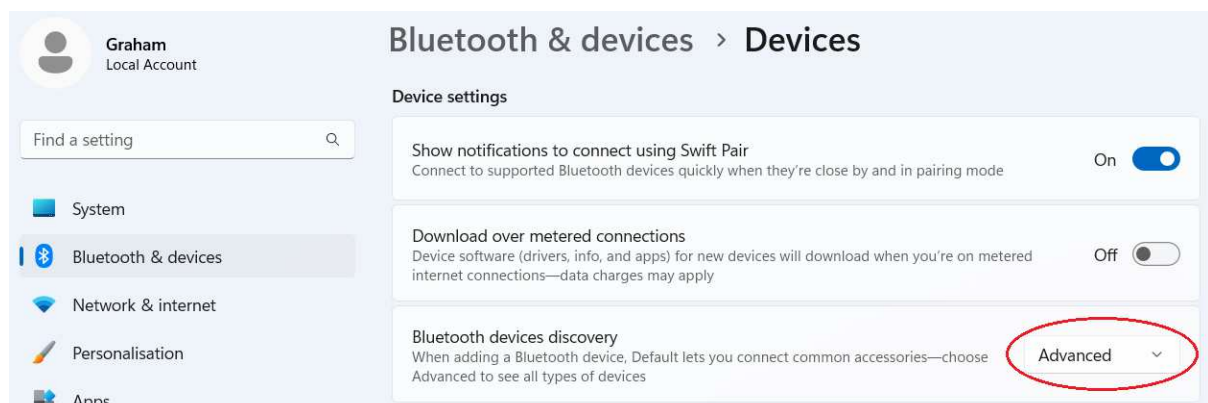
Before activating the board in the GUI turn on the BT Module and wait for about a minute for it to start. When it is ready it will show the central four LEDs on the board. In my driver the connection type should be set to 'Bluetooth' since 'Auto' will only search the serial COM ports. Then when you activate the board it will take a further five or six seconds to connect. (If it fails to connect it will try for about ten seconds). After that it should operate the same as when connected using a cable.

2.2 Using BluetoothLE to connect

My driver will allow you to connect to your board using BluetoothLE if you have the Certabo BLE Module.

For BluetoothLE the board **does not need pairing** to your computer.

In Windows the BluetoothLE in my driver currently only works in Windows 10 build 10.0.15063.0 (also known as version 1703) or later. This is from 2017 so any update since then will be OK. You will need to install the Microsoft Visual C++ Redistributable; the x86 version for Arena/LucasChess/Shredder and the x64 version for Fritz/ChessBase. You can download these from Microsoft's website (under "Other Tools, Frameworks, and Redistributables") https://visualstudio.microsoft.com/downloads/
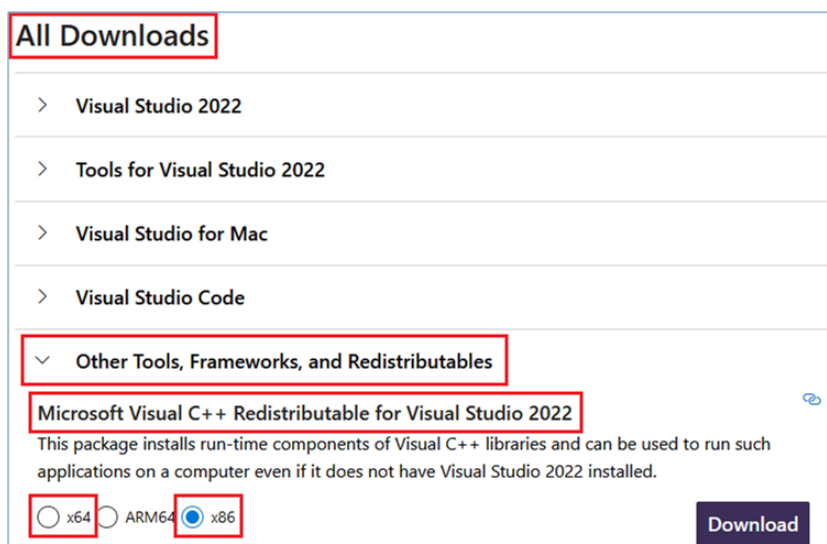
In Linux for BluetoothLE support you need to load:

Ubuntu/Debian: `sudo apt install libdbus-1-dev`
Fedora/Mageia: `sudo dnf install dbus-devel`

2.3 Configuration screen

The first time you access my DLL file you will be prompted to set some configuration details to tell my driver how to connect to and use the board.

Connection
    The Tabutronic generally works well with the 'Auto' option in Windows so use that most of the time unless you are using Bluetooth in which case see the Bluetooth section below. If for some reason Auto doesn't seem to work you can specify a particular port. However, on Linux the Auto option is slow as it tries to send and receive data from each port so on that OS it is better to be specific if you can.

LED Display
    This specifies when the LEDs on the board will be displayed. Normally they show for your moves and the computers, but the response will be slightly faster if you only show the

LEDs when the computer moves. You can also turn off the LEDs completely, for example if you are using the board for a human vs. human game and just want the GUI to record the moves.

Show possible moves
    This option is useful for people learning chess. When you pick up a piece the board will show you all the squares that the piece can be moved to.

LED flash (Moves, Captures)
    The default is to have the LEDs on constantly when displaying the computer's move and flashing to highlight captures. You can change this so that the LEDs will flash when moves are displayed if that's what you prefer.

2.4 Making moves

The Tabutronic does not have piece recognition so sometimes the order of moving the pieces is important so that the software understands the move you are making.

Captures
    It doesn't matter if you lift the moving piece or the captured piece first.

Castling
    Like all eBoards you must move the king first and then the rook.

Take backs
    Move the piece for the take back first. If the move being taken back was a capture you will then be prompted to replace the piece that was taken. For taking back castling moves, move the king first and you will then be prompted to move the rook.

Promotions
    When the computer promotes a pawn the LEDs will show which piece to promote to. When you promote a pawn the computer will flash the LEDs for the RNBQ positions. Select the piece to promote to by placing and removing any piece on one of those four squares.

2.5 Setting up positions

In GUIs that allow you to set up different starting positions, you can access the screen to do this by lifting up both kings. You will see something like:

Place the pieces on the board where you want them and then check that the screen is showing them correctly. Because the board doesn't have piece recognition you will see a red square and dot where an unidentified piece is located. You can correct this by clicking on the pieces to the side of the board and then clicking on the board. If you right-click then the piece of the opposite colour will be set.

You must also use the rotation button to set the board orientation (normally white is at the bottom) and the swap button to indicate which side has the next move. Press OK when the board is ready.

3. Use with Arena

A problem with Arena is that it never sends actual positions to the driver, so it isn't possible to start a game from a position other than the normal starting position.

3.1 Playing an engine

In *Engines > Manage* select the engine you want to play against and in *Levels* set the time control to be used. Select *File > New* to start a new game.

Connect the board to your computer, set up the pieces and activate the board using *Extras > DGT - Chessboard*:
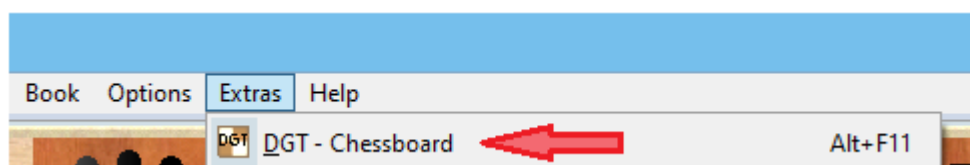
The first time you do this you must go to the *Options* tab of the screen that appears and set the details as shown here:
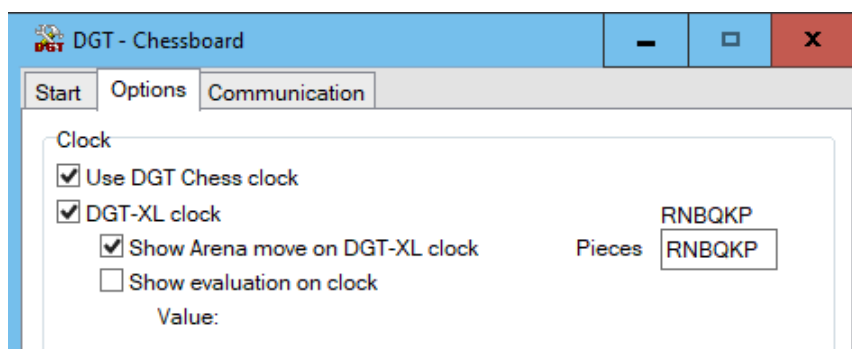
Set up the configuration details in my driver if required.

You can now make the first move as white, or click *Game > Move Now!* to make the computer play the first move. After that make moves on the board and they will appear on the Arena screen.

If you want to play a new game use *File > New* again.

3.2 Different starting positions

You can start a game (or analysis) from a specific position but you must do it by setting the position up using the board.

Select the engine(s) you want to use and activate the board as normal. You can click 'Setup' on my driver's New Game screen or lift up both kings. In Arena select *Position > Set-up a Position*. Follow the instructions given in *General Information* above to set up the new position.

In the Arena Setup screen make sure the side to move and other indicators are correct and click *OK*. You can now make the first move or make the computer move or start the analysis as normal.

<u>3.3 Take back moves</u>

If you want to take back a move wait until it is your turn to play and then take back the moves you want on the board. The screen in Arena will automatically be updated. When you then make your amended move Arena will ask if this is a new variation or if the old moves should be overwritten.

<u>3.4 Analysing a game</u>

You can either use the *Position > Set-up a Position* option above to setup the pieces or you can make many moves manually and use this to either get to the starting position you want or analyse a game. You can also use this method to make Arena record the moves in a human vs. human game.

Having selected the engine and started a new game click on *Position > Analyze Now!* (or click the *Analyze* button in the Moves window). This will start the engine analyzing the position (unless an opening book is selected, in which case nothing will happen until you are out of book) and you can makes moves on the board for both white and black.

If you now want to play the engine from the current position turn off analyze mode. You can now make the next move or click *Game > Move Now!* to make the engine move.
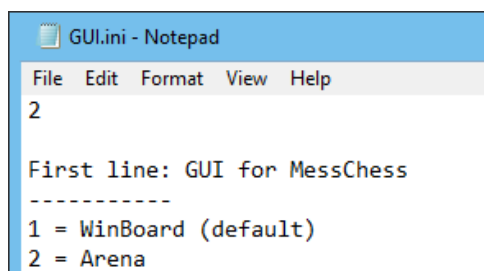
<u>3.5 Replaying a game</u>

You can play through the moves of a saved game but unfortunately Arena doesn't send the move information to the board, so you need to follow the moves on the screen too. But you can still add and analyse variations. Get the board ready for a new game, load the PGN file you want and put Arena into Analysis mode. You can now go through the moves using the right-arrow key while making the moves on the board.

4. Use with CB-Emu (Arena)

CB-Emu is a program by Franz Huber that allows you to play against old chess computers on your PC, using ROM emulations of their processors.

The Setup installation for my driver will load the files into the appropriate folder (<path>\CB-Emu\MessChess\Arena) and you can then use your eBoard by running the Arena.exe program from that folder.

You can also run Arena directly from the MessChess.exe program but to do this you need to edit a file in the CB-Emu\MessChess folder. MessChess defaults to using Winboard rather than Arena, so change this by editing GUI.INI using a text editor (like Notepad), not a word processor (like Word). Change the first line from 1 to 2:

Please note: The emulations can run quite slowly and some of them have to emulate entering moves as if buttons were pressed on the original chess computer. Please be patient when making moves on the board!

5. Use with Fritz and ChessBase

5.1 Playing an engine

Having set up the game details (engine, time etc) you can activate the board from the Board tab. For example, in the Easy Game menu:
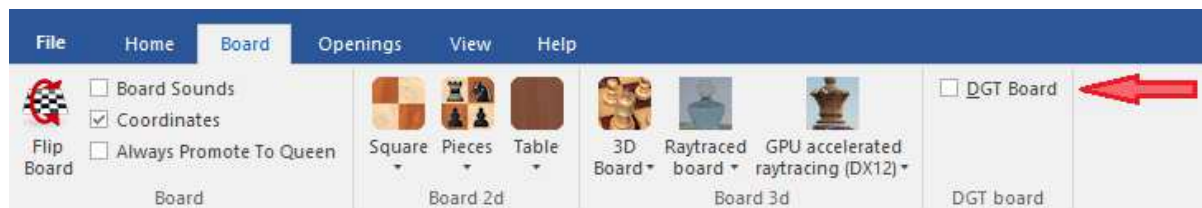
For PlayChess the option to enable the DGT board is on the *Server Settings* screen.

The driver will then load and attempt to connect to the board. Once connected you can make the first move or make the engine move using the *Move Now* button.

5.2 Different starting positions

The Fritz and ChessBase programs are written expecting the board to be a DGT, which means they expect the board to have piece recognition. You can only set up the position using the board: you can try using *Home > Setup Position* but I found it to be extremely unreliable.

On the board remove both kings to put my driver into Setup mode and follow the instructions given in *General Information* above.

5.3 Take back moves

You can take back moves by waiting until it is you turn to move and then taking back the computer's last move and then your own move. The LEDs on the board will lead you through the sequence of moves. When you want to enter your replacement move just make it on the board. Fritz automatically adds this move as a new variation so you will need to right click on the variation and select *Promote variation* to make it the main line.

5.4 Analysing a game

To analyse a game or position put Fritz into Infinite Analysis mode and then make a sequence of moves from the starting position. You can also use this method to make Fritz record the moves in a human vs. human game.

If you now want to play the engine from the current position turn off analyze mode. You can now make the next move or click *Move Now* to make the engine move.

5.5 Replaying games

You can also play through the moves of a saved game. Start a new game and get the board ready for white's first move. Put the engine into Analysis mode and then load the game (for example using *File > Open > Open Database*). You will see the moves in the game panel. You can now play through the game using the right-arrow key, with the board's LEDs showing the moves. You can also arrow through a set of moves and then make them all on the board.

It is possible to enter variations using the board but I have found this to be very unreliable. It seems to be safer to enter variation moves using the mouse on the screen while also playing the moves on the board. To return to the main line click on the move before your variation and my driver will prompt you to replace the pieces (this step doesn't appear to work at all

using the original DGT Rabbit plugin so it looks like ChessBase never programmed this into their software). You can then continue playing through the game or enter another variation.

6. Use with LucasChess

In order to use my driver in LucasChess you need to tell the GUI that you have an electronic board. This is done through the *Options > Configuration* screen. Go to the *Boards* tab and select Tabutronic for *Digital board*. (In the old LucasChess turn on *Enable DGT board*).

When using my board I prefer not to have the tutor popup on the screen so in the *Engines Configuration* I normally go to the *Tutor* tab and turn on *Disabled at the beginning of the game*.

6.1 Playing an engine

Use the *Play* option to select an engine to play against. This will show you a screen where you can select the opponent, choose the colour to play, set the time controls, specify a starting position and so on. Once you have completed this click the *Accept* button.

If you didn't activate the board using the option on the *Play* screen you can now enable it using the button on the menu bar:

Set up the configuration details in my driver if required, and then play the moves on the board and they will appear on the screen in LucasChess.

To start a new game use the *Cancel* button and then *Play* again, or use *Adjourn* to save a game for continuation later.

You can deactivate and activate the board again at any time.

6.2 Different starting positions

There are two places where you can set up special positions. One is when using *Play against an engine* (on the *Initial moves* tab) and the other is in *Tools > Create your own game > Utilities > Change starting position > Edit starting position*. Both will display a screen asking for the new position.

Activate the board and then remove both kings to put my driver into Setup mode. Follow the instructions given in *General Information* above.

6.3 Take back moves

You can take back moves by waiting until it is you turn to move and then taking back the computer's last move and then your own move. The LEDs on the board will lead you through the sequence of moves. When you want to enter your replacement move just make it on the board.

6.4 Analysing a game

You can play through your own game by using the *Tools > Create your own game* option. Enter the moves you want, including taking back moves. To analyse a move double click on

it in the move list panel. You can also use this method to make LucasChess record the moves in a human vs. human game.

To enter a variation right-click on the move and use the *Append variation* button to display the variation screen. For this screen you cannot use the board though and must enter the moves using the mouse.

6.5 Replaying games

You can also play through the moves of a saved game. Start a new game and get the board ready for white's first move. Load the game using *Tools > PGN > Load PGN file* and you will see the moves in the game panel. Move to the beginning of the game and enable the board. You can now play through the game using the right-arrow key, with the board's LEDs showing the moves. You can also arrow through a set of moves and then make them all on the board.

If you want to enter a variation just make a different move from the one in the file and play through the moves you want. To return to the main line take back the moves in the variation and you can then continue playing through the game.

6.6 Training with a book

The option *Train > Opening > Training with a book* allows you to practise your opening repertoire. Load the opening book (a polyglot file with .bin extension) and enable the board. You can then make the moves from the book, and if you get a move wrong then the board will highlight your error. Use the *Reinit* button to start again from the beginning.

7. Use with Shredder

7.1 Playing an engine

When you select *File > New Game* you can select the strength of the opponent or you can use *Levels* to set the strength and time controls.

To activate the board use *Mode > External Board > DGT Board*:

Set up the configuration details in my driver if required, and then play the first move as white. If you want to play black select *Commands > Compute / Switch Sides* and the computer will make its move.

To start a new game either select *File > New Game* or return all the pieces to the starting position on the board. Or use *File > Edit Position* (or the *Edit Position* button) to set up a new starting position.

As with the other GUIs it is a good idea to deactivate the board before quitting the GUI.

7.2 Different starting positions

There are two ways to set up a position to start playing from. Shredder only sends and receives piece positions not more detailed game information, so if your position includes restricted castling rights even though the king and rooks are in the correct positions then you should use the Edit Position method.

Edit position
> You can use *File > Edit Position* (or the *Edit Position* button) to set up a new starting position. Make sure the board is activated first as the new position is sent to the board when you click OK. You should see the 'New Position' screen in my driver. Then you must also check that the correct side to move is indicated on my screen. If not use the button on the screen to change it:

Using the board
> On the board remove both kings to put my driver into Setup mode and follow the instructions given in *General Information* above.

7.3 Take back moves

If you want to take back a move wait until it is your turn to play and then take back the moves you want on the board. The screen in Shredder will automatically be updated. When you then make your amended move Shredder will ask if this is a new variation or if the old moves should be overwritten.

Note that with my driver when you take back a move the Shredder clock is also rewound to the correct time. This doesn't happen if you play with Shredder on your screen and use the Take Back button.

7.4 Analysing a game

You can use the *Mode > Analysis* option to allow you to make multiple moves on the board with the engine analysing the positions. You can also make take back moves and create new variations, or if you want to continue playing against the engine from the current position use *Mode > Play against Computer*.

7.5 Replaying a game

You can play through the moves of a saved game but unfortunately Shredder doesn't send the move information to the board, so you need to follow the moves on the screen too. But you can still add and analyse variations. Get the board ready for a new game, load the PGN file you want using *File > Load Game* and put Shredder into Analysis mode. You can now go through the moves using the right-arrow key while making the moves on the board.

To enter a variation just make a different move to the one in the game. Unfortunately, to return to the main line you need to manually take back the moves in the variation before you can then continue the game.

8. Use as a UCI or Winboard engine

For GUIs that don't support the DLL version of my driver I have also created an engine version. This can be used in an engine vs engine game to allow you to use your board for playing games. Some of the disadvantages of playing like this are:

- ♟ You are not allowed to take back moves in engine matches
- ♟ You can't play "rated" games
- ♟ Opening book options might be limited
- ♟ Time control options are often limited (it isn't always possible to give one engine more time than the other)

The engine supports both the Winboard and UCI protocols.

My DLL driver and Winboard engine both use an INI file to store the settings, which gave me a choice for the UCI engine. I decided to keep it the same as the other two, so the configuration of the driver in UCI mode is controlled by the *Config* tab of my screen rather than the UCI engine configuration in the GUI.

8.1 Installation

My Setup program will ask you where to install the engine file. I recommend that you create a main folder for holding any of my eBoard engines that you want to load and that when you "install" them into each GUI that you link to them from that folder. If you load them separately into each GUI you will need to manually copy the files again each time I issue an update. It also means that the eBoard will use the same INI file settings across all of the GUIs you use.

The process of installing the engine into the GUI depends on each GUI, but in general you will need to give the engine a name and identify where the EXE file is.

8.2 Playing an engine

How you create an engine vs engine match also depends on how the GUI works. You might find that some GUIs also start the engine during the match setup in which case my driver screen will appear quite early.

Also, some GUIs don't close the engine when an engine match is finished so you might need to either start a different match or use the "Close engine" option in the GUI to close my driver screen.

9. Use with SCIDvsPC

Although SCIDvsPC uses the UCI engine version of my driver it has been amended to allow for take back moves and so on. It is used by adding it as a secondary Analysis engine rather than the main engine in a computer vs computer match.

9.1 Installation

Having installed the driver file using the Setup program (probably to a common folder for all GUIs to share) you must then install it as an engine in SCIDvsPC. Go to *Tools > Analysis engines*:
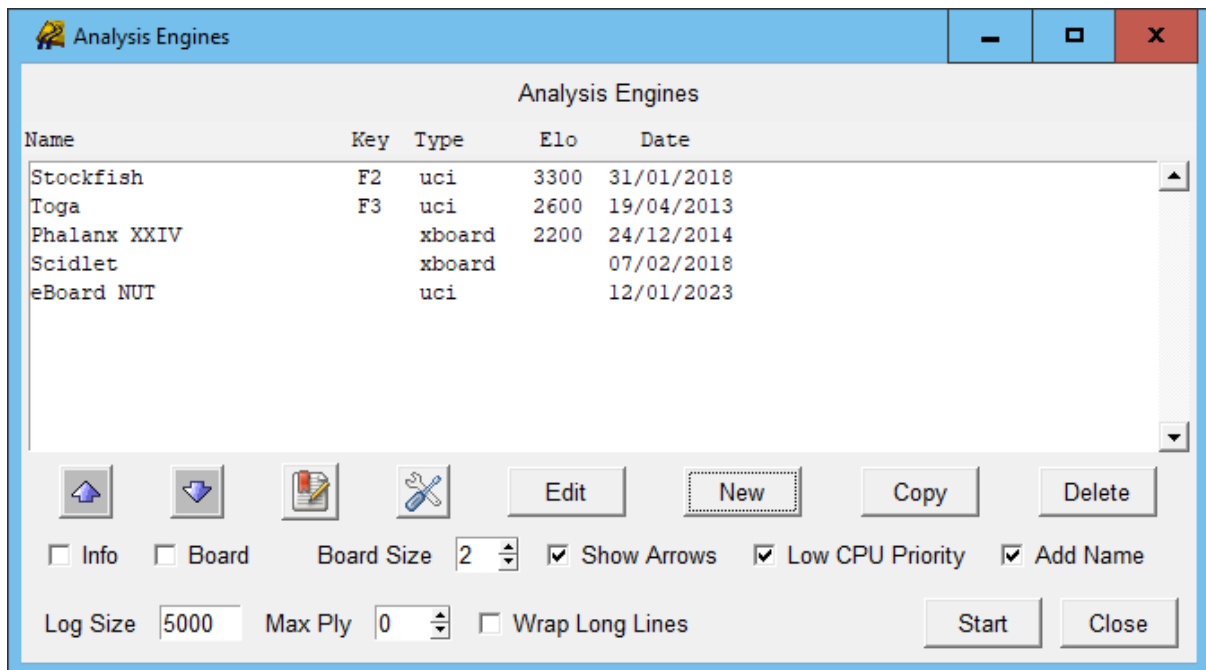
Use the *New* button to add an engine. Give it a name, select the engine file and make sure it is set to use UCI as the protocol:
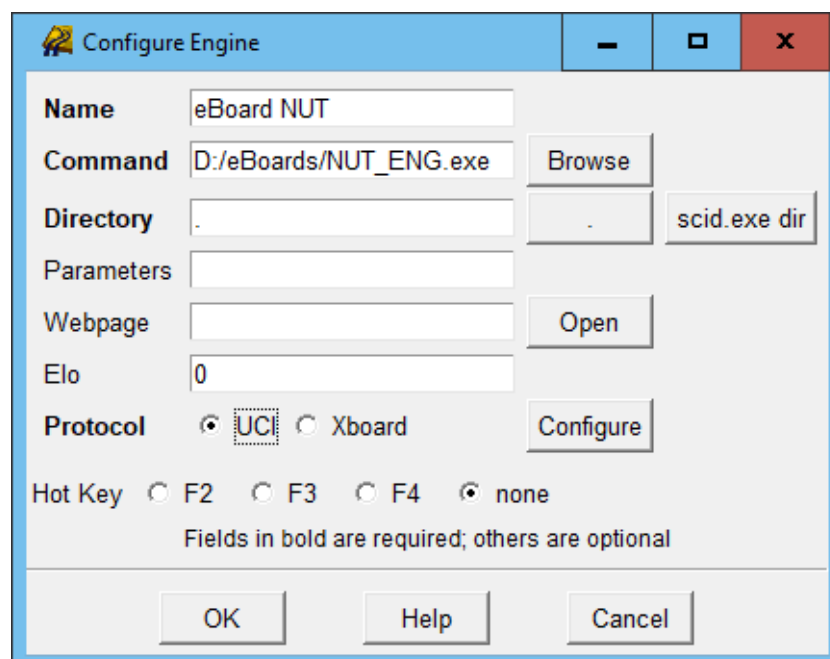
Click *Ok* when done.

9.2 Playing an engine

Before starting a game go into the Analysis engines screen (*Tools > Analysis engines*), select the eBoard you want and click *Start*. The driver will load and connect to your board.

Now you can start a normal game using *Play > Computer UCI engine* or *Play > Internet (FICS)*. To play black use the *Flip board* button. Moves made on the eBoard will automatically be made on the screen so that the engine can reply.

You can take back moves during a game. Wait until it is your turn to move then take back the computer's move and your own. When you have finished taking back moves click on the *Resume* button to continue playing.

You can also enter a game or record the moves of a human vs human game by using *Game > New game* and entering the moves on the eBoard.

10. Legal stuff

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