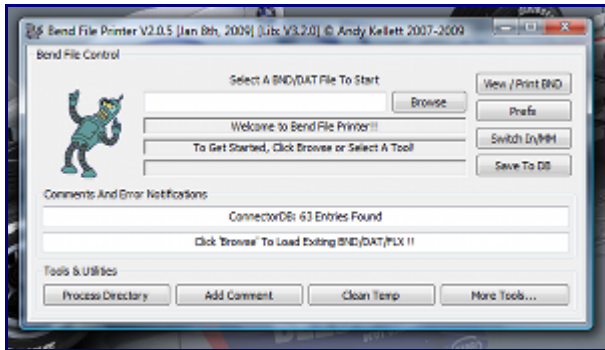


What Is Bend File Printer / FlexIO ?



Bend File Printer is a small tool I wrote to assist with cable manufacture at work. It started off as a very small application, and over the years has evolved into a very useful & innovative engineering tool. The tool will analyze BND / DAT / FLX files and report any problems, issues or warnings. It also produces a printable report detailing the entire cable design including connector & cut length information, which is then attached to cable work orders before they hit the production floor. The tool has saved many hours of un-necessary work, as well as saving thousands of feet of waste cable by being able to

detect major issues before a single piece is even cut. Engineers can correct the most common cable design errors at their desk, without having to worry about running into an issue after the cable has been cut and partially built!

FlexIO takes the process even further, and will actually bend the cable design. Extra tools make cable manufacturing much faster and simpler. The applications makes use of several databases to retrieve the information it needs. These databases are continually updated as needed to keep the program up to date.

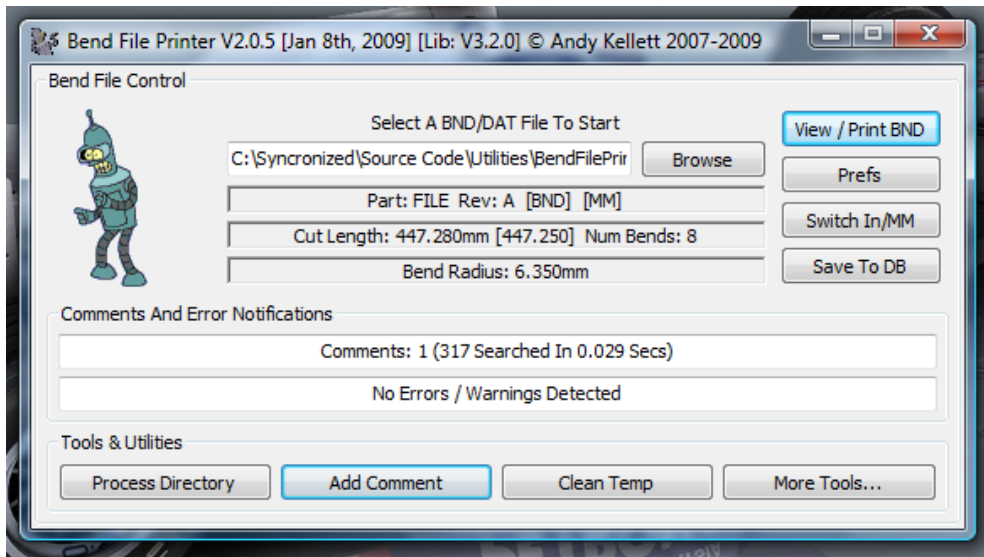
Program Features

Here is a small handful of features that are present in the programs:

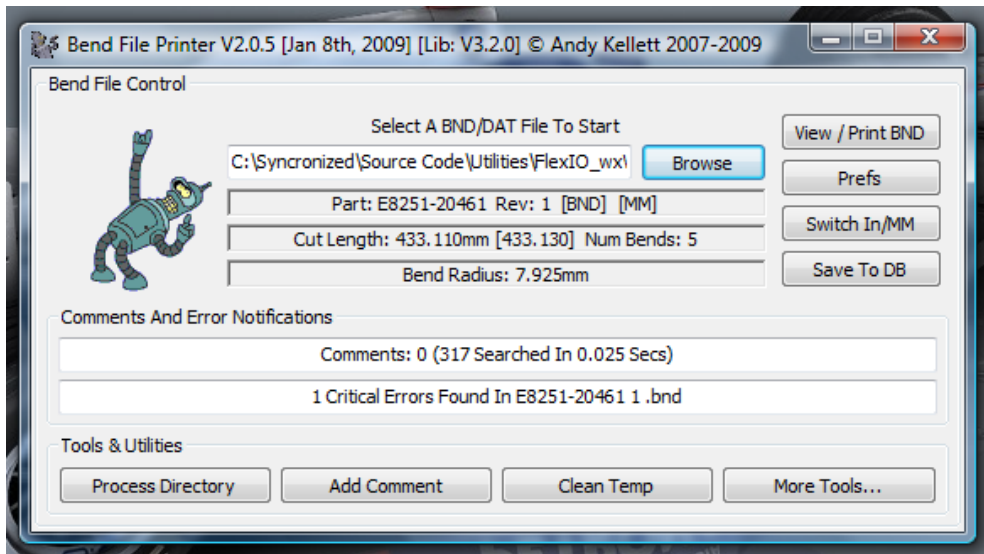
- Program uses shared BenderLib V3 Project, to maximize on the amount of shared code between itself & FlexIO. As new features are added to the library, they are automatically made available without having to do the work twice!.
- FlexIO uses increased motor resolution, increasing accuracy on a motor-level by 30% It also makes use of partial degree bends & rotation, something the existing benders never did (they always rounded to the nearest whole degree).
- Fully intuitive GUI makes navigating around the program and it's preferences very simple.
- Support for BND & DAT files, in both new and old formats. Conversion from BND to DAT for editing is also supported.
- Automatic line ending conversions, so the file doesn't have to have to be saved in Windows or Unix format in order to work, it will just convert as needed.
- Automatic data conversion between Inches & Millimetres. Display reports in your preferred format.
- Report files generated by the program are created in both HTML and Plain Text, so they can be attached to emails etc. Simple naming convention allows for easy location of these files in your specified directories.
- Loaded files are ran through more than 10 different integrity checks, ranging from whether connectors will fit onto the cable, to mangled bend angles, compounded bending and more. All errors and warnings appear in the printed report so they can be evaluated by an engineer.
- Program supports Min/Max bender carriage length, and will warn you if your cable design is too long to be built on your CNC bender. This will avoid you having to experience a carriage crash by learning the hard way.
- When analyzing new BND/DAT files for errors and problems, you can select individual files to check, or entire directories of files which are then put into a table, detailing which of the files contained errors etc.

- Program makes use of a comment database system, which can be applied on a per-revision basis, allowing you to leave messages, special work instructions and more which will appear on the printed report. These instructions can then be seen by the appropriate departments that need them. BendFilePrinter has an easy to use window to add comments to an already-loaded file.
- Cable reports can display real measured segments for first/last segments, depending on the angles. What you see on the page, is what you should get with your ruler.
- All database and preference files use a plain-text format, so they can be changed outside of the program without any problems.

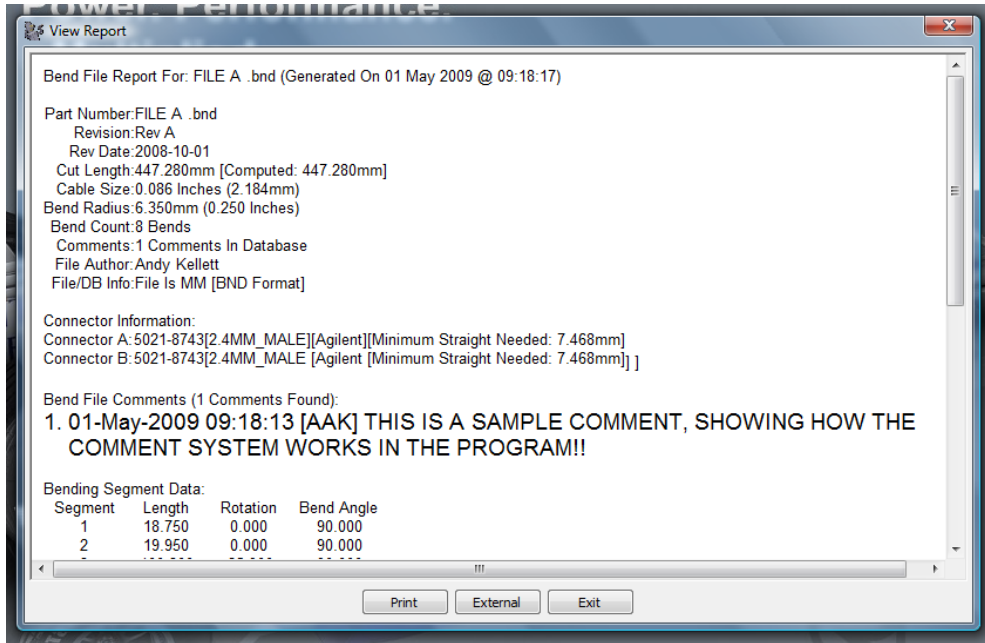
Bend File Printer Screenshots



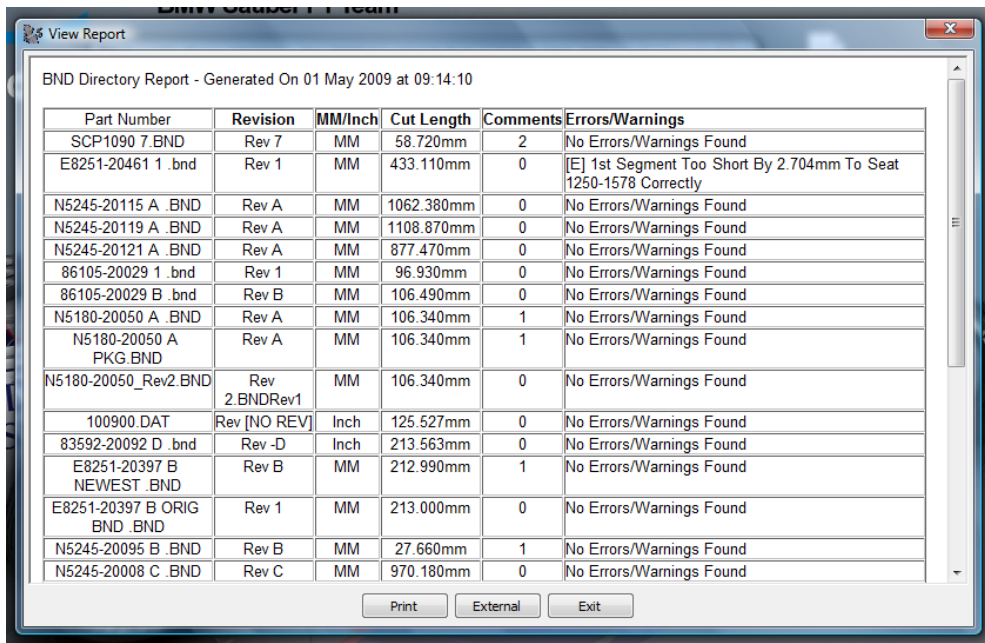
Shows the interface screen after a single BND file has been loaded. On this particular example, no errors or warnings were found. 1 comment was found in the comments database.



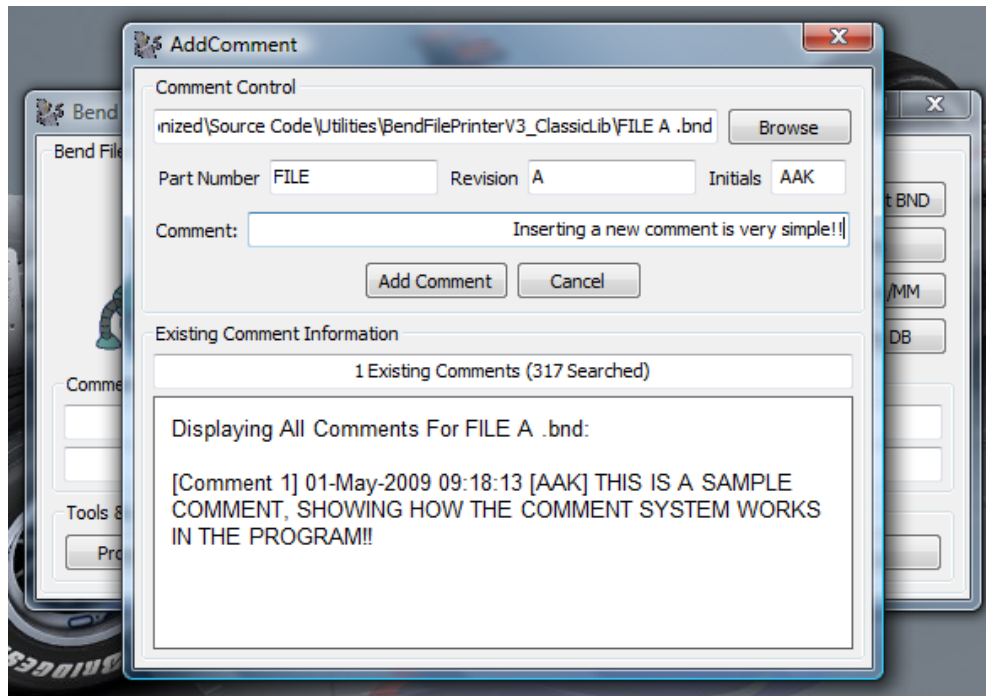
Same interface when a BND file is loaded that contains an error. The interface immediately informs you that an error was found, clicking View will bring up the report showing the detailed error message.



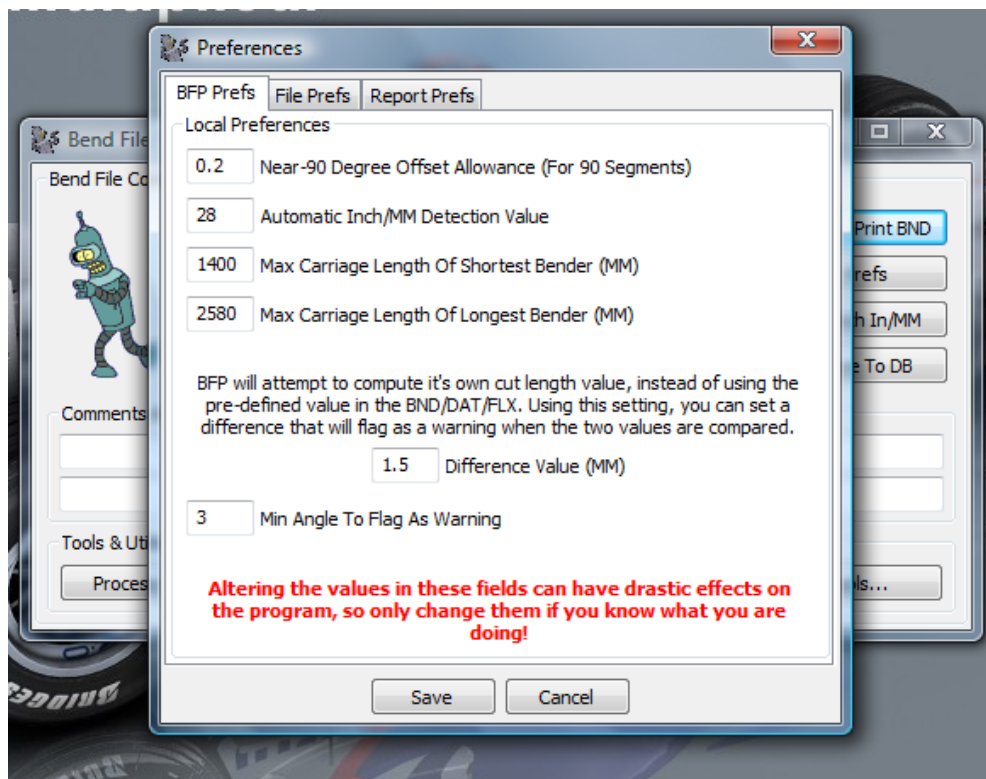
Viewing the single BND cable report. In this example, the comment is shown in bold uppercase letters. Errors found in the cable design are also shown in the same way to alert them to an operators attention.



This is the same built-in report viewer, after selecting an entire directory for processing. Each file analyzed is listed, and any errors/warnings detected are listed in the table for easy viewing/printing. Non-compatible files such as CAD/PDF files are automatically skipped. These reports can be attached to emails as well.

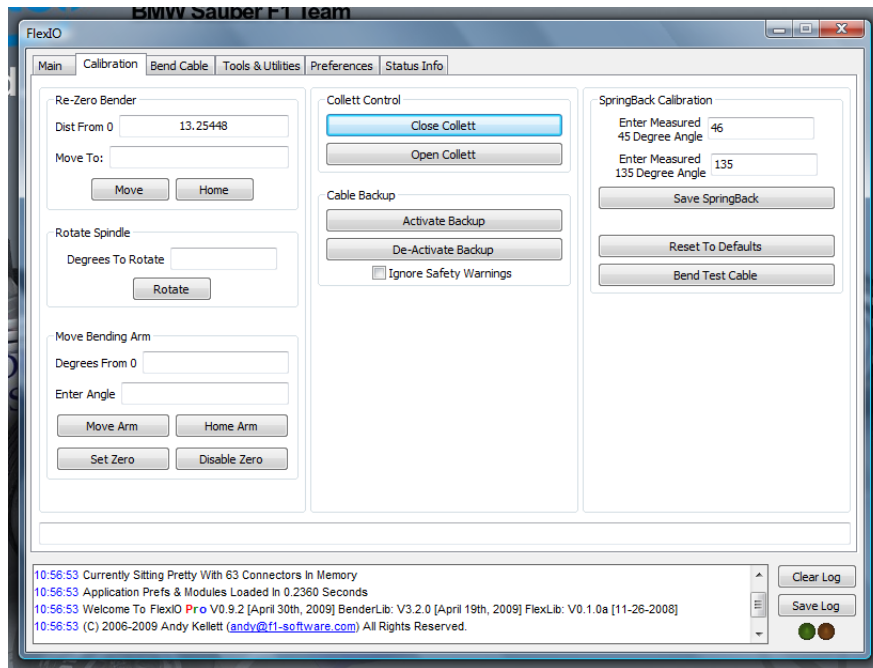


Inserting comments into the database is very simple. If an existing BND/DAT/FLX is loaded, most of the data is set up for you. Comments are stored on a per-revision basis unless the global wildcards are used. The screen also displays any existing comments, so you are not duplicating anything!



Intuitive preferences screen, in organized tabbed interface. Preferences are saved as XML files, and can also be edited outside of the program if needbe. All database paths have file browser buttons to ensure you link to the right files.

FlexIO Screenshots



Bender calibration screen in the new FlexIO Program.

Features Currently In Development

The program is constantly under development, here are but a few of the features that are currently being implemented, undergoing testing, or have been completed:

- **Improved BND Comparison** – Compare two BND files side by side and display their differences in a report file that can be printed.
- **LRA Conversion from BND Coordinates** – Convert the XYZ tables within a BND file directly to Length/Angle/Rotation values, without having to rely on the CableAdvisor to do the conversion for you. This will increase all accuracy to 6 decimal points (from 2 in the CableAdvisor).
- **Direct STEP/IGES Calculation** – Import a STEP/IGES model of a piece of a cable design, and convert it directly to LRA values, or XYZ points. This will make modelling of 3rd party cables a snap.
- **Real-Time Cable Preview** – See a preview of the designed shape in 3D before it's bent. Tweak your angles and rotations in realtime!

Got Questions?

If you have additional questions about the program, please contact the lead programmer, Andy Kellett, at akellett@f1-software.com