

FileFixer for V8 breakthroughs revealed

CLEARWATER, FLORIDA, USA — Since its inception, Axiom has provided the Intergraph and (later) the MicroStation communities with independent and objective design file analysis and repair. Axiom's extensive researched on how file and element errors occur gave birth to *FileFixer*. *FileFixer* was introduced to ensure design file integrity. By popular demand, this tradition continues with *FileFixer* for V8.

Why do design files get corrupted?

Factors beyond Bentley's control can impact your files: acts of God, acts of Bill Gates, your operating system, your network software, your network hardware, your server, your CPU, your hard drives and your electric power company to name a few.

Like its V7 counterpart, *FileFixer* for V8 is evolving in response to analysis of customer files and from customer requests. What are the latest enhancements?

Sherlock Holmes and the Case of the Missing Level

V7 design files *always* have 63 levels available. That's not the case in V8. A V8 design file might only contain a definition for the "Default" level and no other level defi-

nitions.

If data in an element indicates the element resides on a level called "Foundation", but the level "Foundation" is not defined in that design file, MicroStation V8 users will experience trouble with that element. Level-related manipulations involving that element will be unsuccessful. For example, toggling the level's display on or off could exclude the element.

FileFixer for V8 can automatically repair elements on undefined levels by moving the element to an *existing* level or to a newly created level (user's choice).

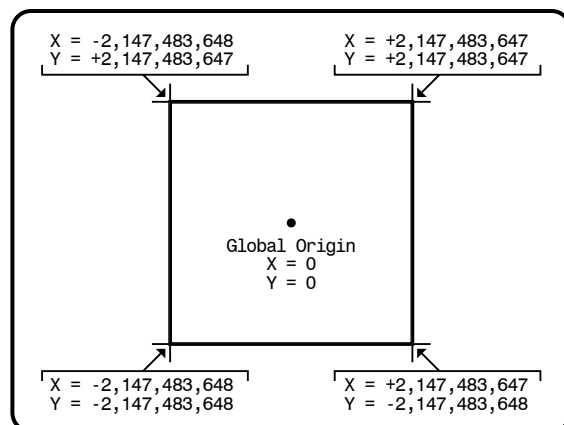


Figure 1.1: The extent of a MicroStation V7 design.

FileFixer returns elements to the known universe

FileFixer for V8 can now rescue elements, which have departed the known universe. Sometimes an element coordinate can be *outside* the edge of the V8 design plane (or design cube in 3D). This

error condition is entirely new to MicroStation V8.

Much to our chagrin, there isn't a concrete wall or force field that defines the "edge" of the design plane. The "edge" of the MicroStation design

plane (or cube) is constrained by the maximum and minimum coordinate values that can be stored in each element. This is true for V7 and V8.

Many MicroStation users know that 32 bits are allocated for each coordinate stored in a V7 element. 32 bits can rep-

resent values in the range 0 to 4,294,967,296 — this defines the V7 design plane "edge". MicroStation users often split this in half so that the design plane grid represents units of resolution (positional units) in the range -2,147,483,648 to +2,147,483,647 with 0, 0 conveniently right in the middle (see figure 1.1).

Quite a bit more in V8

MicroStation V8 allocates 64 bits for the storage of each element coordinate. These additional bits vastly increase the range of coordinate values available in V8 and, as a result, the "edge" of the V8 design plane (or cube) is vastly extended as well (see figure 1.2).

All of this leads to the following little-known fact: MicroStation V8 does not utilize the full range possible with 64

bits. And with good reason!

MicroStation uses the IEEE (Institute of Electrical and Electronics Engineers) 754 standard — which is the most common representation today for real numbers on computers — to read and write 64-bit coordinates. This IEEE standard allows 64 bits to represent *extremely* large ranges of numerical values, but there is one drawback: precision is not maintained for values exceeding $+4.5 \times$

10^{15} . For example, imagine sitting on Pluto viewing a V8 design of the entire solar system. Clearwater, Florida might be indistinguishable from Tampa, Florida because there simply aren't enough positional units available to represent that level of detail while also including Pluto (to scale) on the same map.

The perfect compromise

This is the perfect compromise — MicroStation

A single "bit" can store the binary values 0 and 1. Two bits can store the binary values 00, 01, 10 and 11 (also known as 0, 1, 2 and 3). Three bits can store the binary values 000, 001, 010, 011, 100, 101, 110 and 111 (also known as 0, 1, 2, 3, 4, 5, 6 and 7). When more bits are used, larger ranges of values can be represented.

V8 supports a design plane (or cube) that is two million times larger than the V7 design plane (in each dimension) while maintaining precision!

So what does this have to do with *FileFixer* for V8?

FileFixer automatic repair to the rescue

Axiom's analysis of cus-

See "*FileFixer* returns stray elements automatically." on page 4.

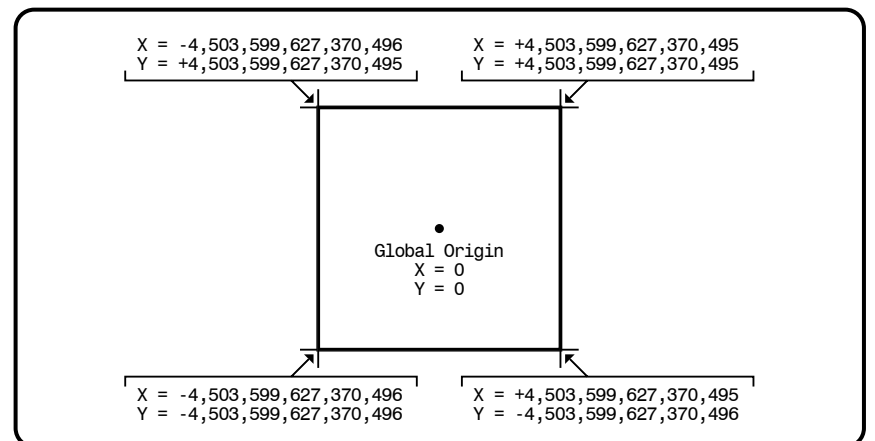


Figure 1.2: The extent of a MicroStation V8 design.

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