

APPENDIX H

COMPUTER SOFTWARE APPLICATIONS

H-1. General

During the last decade, great advances have been made with the personal computer. From a hardware standpoint, memory capacities have increased, operating speeds have decreased, and costs have continued to decline. From a software standpoint, new programs continue to be developed. This new technology has become a very valuable tool to the electrical engineer.

H-2. Applications

Personal computer applications for the electrical engineer include computer-aided drafting and design (CADD), load analysis, lighting calculations, device scheduling, short-circuit calculations, and protective devices coordination. The personal computer is rapidly becoming a necessary engineering tool by extending the engineer's capabilities, improving the reliability of engineering designs, and reducing the time spent on a given project.

H-3. Costs

The cost of a personal computer and associated peripherals continues to decline. The cost is so low that any organization can now afford a personal computer. Software, however, can be very expensive, and a personal computer without software is of no value. Inexpensive engineering software programs are available, but are of little value.

H-4. Benefits

The benefits of a personal computer and sophisticated engineering software far outweigh the costs. In the past, electrical engineers were limited by the tedious, repetitive nature of engineering calculations. The personal computer has changed all that. Calculations that formerly took hours, or even days, to perform manually, now take only minutes. Not only can engineering calculations be completed in less time with the personal computer, but also with more accuracy. Advantages offered by the personal computer include:

- a. Improved engineering capabilities.
- b. Improved design reliability.
- c. Reduced project time and manhour costs.
- d. Improved accuracy.

- e. Vastly improved documentation.
- f. Improved project revision capabilities.

H-5. Future trends

The future will continue to offer faster computers, with larger memories, and more sophisticated engineering software. Manual or calculator-based engineering calculations are now obsolete. In the future, large electrical projects may be able to be designed completely by interfaced computer systems, with the final product generated by CADD technology. Engineers will never be replaced by computers, but computers will enable engineers to devote more of their time and energy to more creative projects, and less time to repetitive and tedious activities.

H-6. Protective devices coordination

There are many protective devices coordination programs available in the marketplace. These programs allow the designer to interactively coordinate protective devices at a personal computer workstation. With vast libraries of manufacturer's time-current characteristic curves and the flexibility and speed of a personal computer, the coordination problem can be solved more quickly and effectively than if done by hand. Most programs are capable of accepting user data for protective devices, and when used with a multi-colored pen plotter, the output from coordination software produces excellent documentation. The time-current characteristic curves included in this TM were prepared using protective devices coordination software. Furthermore, most software programs also plot a single-line diagram along with the final output. Since we are still in the developing stages of this emerging technology, some software programs still have "glitches" which can give erroneous results. Engineers should be aware of this fact and manually check output plots until they have confidence in the software package. Refinement of software packages is an ongoing effort of software manufacturers, which will eventually eliminate all the "glitches." Most manufacturers are very receptive to user-supplied changes and suggestions.