

STANDARD TEMPEST COMPUTERS COME OF AGE

Ever since TEMPEST requirements were openly discussed in the 1950's, the availability of commercially produced, easily optioned computer systems to meet the multiplicity of TEMPEST application needs has been a goal of the TEMPEST community.

The whole concept of TEMPEST suppression of computers began with the initial government product regulation during the 1950's. Until the late sixties, only limited packages were available in TEMPEST computer equipment. With the introduction of microprocessors and personal computers came the influx of entrepreneuring TEMPEST supply houses. TEMPEST users began by the latter half of the 1970's to encourage commercial suppliers to provide state-of-the-art, TEMPEST-accredited computer equipment to closely parallel the technology available in the commercial marketplace.

The resulting custom designed equipment and computers-in-a-box built at great expense by military supply houses were the first step toward TEMPEST computer workstations. By 1983, complete, easily optioned computer workstations have become available in TEMPEST configurations without the limitations and expense of the earlier custom-designed systems.

There are several ways in which computers can be designed to meet the TEMPEST requirements. There are those products which have been 'ruggedized' or manufactured in such a manner as to address some physical aspects of the TEMPEST requirements. This type of manufacturing was prevalent until the inception of the Industrial TEMPEST Program (ITP). The introduction of the ITP provided the commercial manufacturer with the ability to produce TEMPEST accredited offerings.

The second design method for TEMPEST computers is used for those devices which have met with the approval of the U.S. Government. This approval implies that the equipment has met the requirements of the appropriate national TEMPEST standard. Once the stringent testing for TEMPEST has been successfully completed and approval has been granted, a listing assignment is made on the U.S. Government's Preferred Products List (PPL). The PPL provides the TEMPEST user with the assurance that the listed equipment has been TEMPEST accredited. NACSIM 5100A is the current version of the national TEMPEST test standard for electromagnetics.

In some instances a TEMPEST user may encounter a vendor whose computer product is not PPL-listed, but which has been designed to meet the national standard criteria. This third type of TEMPEST product will require the user to submit the

equipment for testing after its delivery. Because this process is both costly and time consuming, the interest level for this class of product is low.

Throughout the evolution of the TEMPEST marketplace, the need for the required technology has been the driving force behind the trend toward generic computer systems over custom-designed systems. Application areas have developed in mapping, signal analysis, language processing, and presentation graphics. These expanding application areas have continued to dictate the need for increased flexibility not only from computer to computer, but also in the ability to upgrade individual systems without the need for re-accreditation.

The aesthetic aspects of TEMPEST computers have also improved dramatically as the understanding of workstation ergonomics and the desire for computer graphics in the TEMPEST environment have increased. TEMPEST accreditation now generally includes some consideration of the appearance and field service aspects of the equipment.

New technologies, such as high-resolution color graphics, as illustrated in Figure 1, have found direct applications within the TEMPEST marketplace. This new technology has created some accreditation complexities. The testing cycles have expanded because the enclosures had to be designed around the characteristics of the system electronics as well as aesthetic viewing factors. Color graphic technology also requires consideration of unique computer features such as a color look-up table which provides the millions of color variations now available in computer graphics, bit mapped screens, overlay character cell memories, and 16/32 bit microprocessors, as well as the usual operating systems and mass storage devices of engineering computer workstations.

An area of increasing importance to the TEMPEST community has been that of interfacing systems and peripheral devices. The ability to print a color graph or to project images on a large overhead screen for briefing scenarios, while still maintaining TEMPEST security, is an area which has received considerable attention as high-resolution color graphic computers have been TEMPEST accredited.

Other TEMPEST applications utilize mainframe systems and mini-computers to perform pre- and post processing of data while concurrently allowing the user to view intermediate results on a microprocessor-based display device. This use of workstation capability raises additional challenges when applied in the TEMPEST environment.

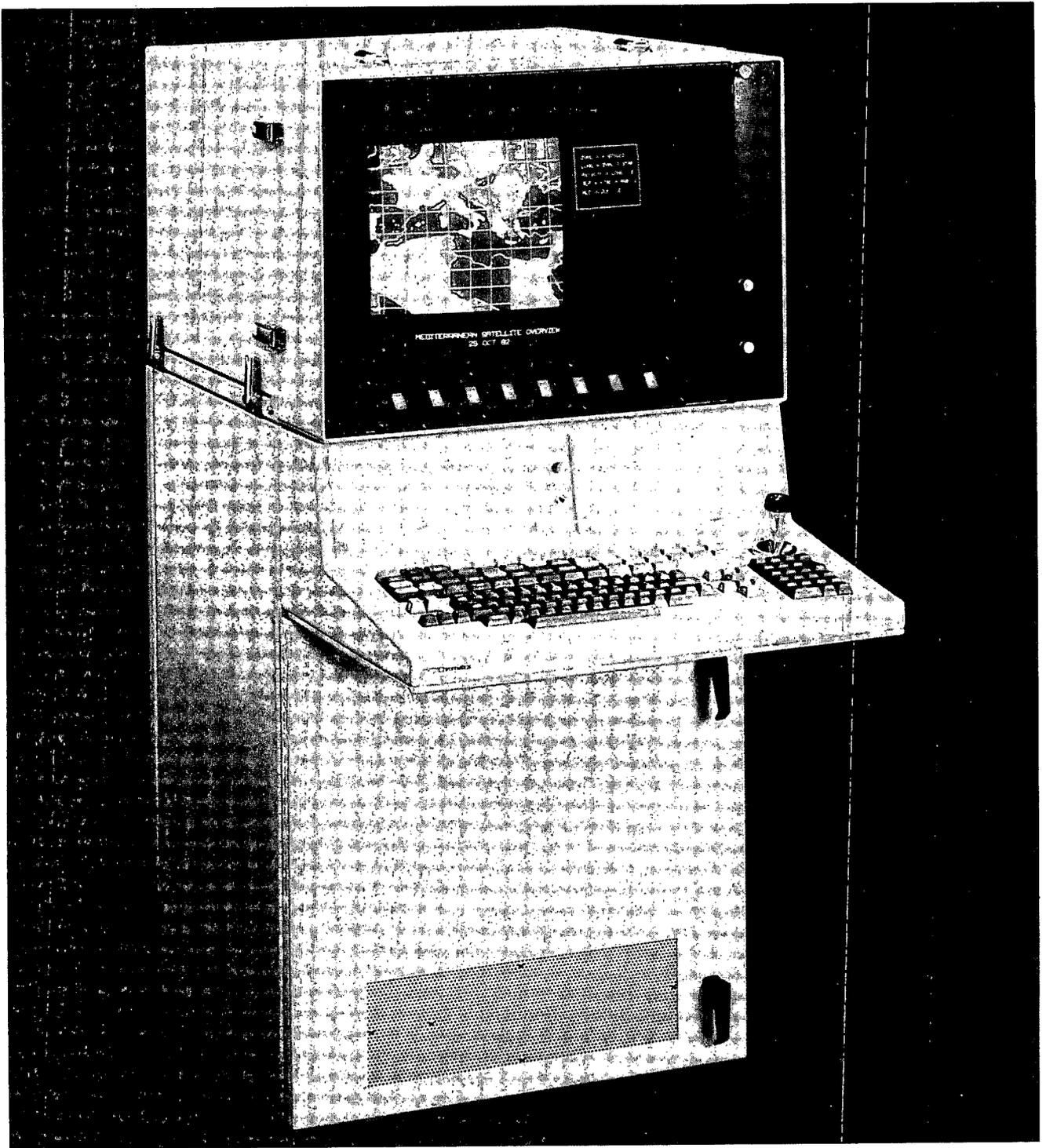


Figure 1. TEMPEST Color Graphic Computer.

The TEMPEST computer marketplace has evolved from simplistic 'ruggedized' equipment to sophisticated, universally applicable, standard computer systems. As the requirements of the TEMPEST community have grown to encompass all aspects of the exciting computer technology explosion, computer equipment suppliers have kept pace by providing generic,

easily optioned computer systems to accommodate new TEMPEST applications.

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