

PROPOSED SCAMP I MAINTENANCE PHILOSOPHY

The following represents a preliminary "broad brush" set of goals and plans for servicing SCAMP I.

SCAMP I is to be composed of modular field replaceable units (FRU's). Specific FRU's include: modular power supply, CRT display, keyboard, tape cassette or disk memory unit, memory cards (8 - 2 wide, 3 high cards), palm controller (4W3H card), display card (4W3H card), attachment card (4W3H card), and as features a printer, acoustic coupler, printer interface card (2W3H card), and telecommunication adapter cards (2 - 2W3H cards).

A Maintenance Analysis Procedures (MAP) approach is to be taken as a director for a symptom oriented approach to FRU failure determination.

A "no scope" equipment philosophy is to be taken for SCAMP I error isolation. A Field Engineer logic probe or a second SCAMP I is to be employed in diagnosing FRU failures.

With the above approach, a goal of 100% effectiveness in diagnosing FRU errors in the lab is set where any created or observed failure will be considered legal.

The basic maintenance features to be included in the machine included the following:

Diagnostic Routines utilizing the monitor to display sources of errors.

A Timing Analysis Procedure (TAP) for analysis of machine and I/O timing possibly using the SCAMP I to display this timing.

An Error Detection & Logging Scheme for isolation of problems to a FRU and perhaps partitioning the error to the sub-FRU level.

An Intermittance Strategy to simulate capture of error data for evaluation and correction.

A Flat Down Strategy including an LED display for event indicators on power up and for error indicators occurring during run time. At a higher level, a single instruction key will be provided with a hexidecimal display of the contents of memory. Finally the documentation in the MAP will provide suggested probe points for error isolation.

For the owner/user of SCAMP I a subset of the MAP is to be included in the Operator Manual to become the user's director to error isolation. With this manual the established goal is 100% user isolation of any error to the category of operator error, hardware error or software error. Beyond this, isolation of a hardware error to a specific FRU is desired, while software errors will be isolated to a specific program module. For the user's convenience, error messages will be displayed on the monitor in plain English with further explanation as required in the Operator's Manual. In this way SCAMP I allows the user to do much of his own customer engineering. Finally programs will be supported on three levels - System Control Program support, Language support for the BASIC and APL languages and Applications support for special purpose program packages.

The actual maintenance approach to SCAMP I service may be given in terms of the following alternatives:

Factory Service Centers:

FRU's (or machines) would be serviced on a mail-in basis by factory technicians using SCAMP I to test and aid in repair of SCAMP I. Four regional service centers might be established with relatively large parts storage at each location.

Branch Office Service Centers:

Here FRU's (or machines) would be serviced on a mail-in or bring-in/pick-up basis by support level customer engineers again using SCAMP I as a diagnostic and service aid. One branch office service center might be established for every major metropolitan area each being

required to stock SCAMP I parts and have at least one SCAMP I machine for the service group.

Service provided in the Customer's Office:

Both product and support level customer engineers might be required to diagnose failures and return the machine to functioning condition at the customer's request. For this broader support parts would have to be more widely stocked, travel time costs would have to be considered, also the cost of training a larger group of customer engineers.

Finally combinations of two or all three of the above might serve as the general maintenance approach. The final decision as to the appropriate approach must be based on future studies with more complete information on service costs, projections on numbers of machines in the field, machine costs, the geographical distribution machines, etc.

The use of SCAMP I as a test vehicle for servicing SCAMP I is but one of the features of our versatile machine. SCAMP I might also be used as the educational medium to provide customer engineers with programmed instruction on the procedures for testing SCAMP I. (In this regard an audio output capability for SCAMP I may be a valuable feature.) Also in a somewhat unrelated area, SCAMP I might be used as the final test robot at the end of the SCAMP I manufacturing line. In this way the servicing diagnostic programs might be derived as a direct subset of the manufacturing test and evaluation programs hence resulting in a savings of time, money and effort.

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The above ideas and strategies were developed in meetings held with Red Ryles and Bob Riordan of Field Engineering in Rochester, Minnesota, July 19-20, 1973. A final general point which came from the meeting was the fact that Field Engineering must be brought into the design cycle as early as possible for the best IBM product. In this regard such things as the development of a Maintenance Approach Procedure and diagnostic aids must be considered early to insure the overall success of a product.

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