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To: FHP Product Development
From: G. Clancy, R. Gruner
Subject: FHP, SPRINT, VAX and Other Issues
Date: September 13, 1977

A Brief Discussion of FHP Objectives

A major product development effort should be planned and executed at three levels: objectives, strategy, tactics. The objectives of a major development effort are generally straightforward and simple which is in contrast to the strategy, and in particular, the tactics, of achieving those objectives. If one views project strategy as the major elements of the plan to meet the objectives, tactics represent those limited, short-term efforts necessary to maintain a reasonably steady platform upon which the strategic plan can be constructed.

The corporate objectives for FHP have always been rather straightforward, namely to develop a line of processing systems which will give Data General a significant and fundamental advantage in the marketplace. This, of course, is product differentiation, the key to increased market share and margins. This differentiation allows manufacturers to compete on substantial, fundamental issues which are to the long-term benefit of the customer, rather than relying exclusively on sales tactics, advertising, and pricing (usually at the expense of quality) which add no real value to the product.

The primary strategy by which the project objective is to be met is to develop an architecture which will give fundamental support to the problems and environment processing systems will be operating in throughout the 1980's. As many of you know, it is strongly felt within Data General that in the long-term our marketplace is technology driven. This will hold true until the marketplace and technology begin to mature, which obviously is still in the rather distant future. This is the reason there has been essentially no marketing involvement during the architectural phase of the project. The critical issues which processing systems must deal with during the product life of FHP systems can most reliably be extrapolated from technological trends.

*FHM vs Burray vs
tends to discredit FHM*

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Early in the project, a number of objectives were determined for the FHP architecture. Although some have received more emphasis than others, they have remained essentially unchanged since their original definition:

- To support the controlled sharing of information in a distributed processing environment.
- To provide an optimal environment for the development, execution and support of software systems developed in high-level languages.
- To provide high system availability, reliability, and maintainability.
- To allow future product growth, both upwards and downwards, based on the availability of anticipated technology.

"VAX," An Example of the Role of Marketing

Where marketing is essential is in the analysis of the current marketplace and competition, and the placement of products within that environment. In all honesty, the primary mistake FHP project management has made has been to not keep in closer touch with the developing marketplace and competition. The underlying assumption at the beginning of the project was that Eclipse products in development would be sufficient for dealing with competition over the development of FHP. For a number of reasons, this assumption appears to no longer hold.

- The supermini market (defined, say, at \$75K to \$250K system prices) has been growing in recent years at a phenomenal rate. Market share picked up now will generate eventual revenues proportional to the compounded market growth rate. (Assuming an average market growth rate of 35%, one dollar of revenues today will be generating about \$4.50 in five years, and about \$20.11 in ten years.) In a rapidly expanding market, this multiplier effect obviously makes tactical decisions very important.
- The rapid reduction in physical memory costs due to semiconductor memory have made large memory configurations realistic in the supermini

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market. This in turn has made the "32-bit" architectures available from Interdata, SEL and MODCOMP viable in that their wide addressing range can now be utilized.

- The minicomputer industry's recent exposure to the large corporate account has shown that the ability to grow within a product line is a major marketing issue. These accounts become "claustrophobic" if they cannot see a clear growth path for future applications.
- It has recently come to be perceived that the primary minicomputer vendors are in what has been described as a "meta-stable" state. Currently DEC, H-P, and Data General offer supermini's with essentially identical functionality: functionality which is rapidly becoming obsolete due to improvements in technology and competitive announcements. The meta-stable relationship between the three primary minicomputer vendors could be significantly altered upon the announcement of the first 32-bit machine by one of those vendors.
- DEC is about to announce "VAX," which we understand is a rather traditional 32-bit architecture with a multics-like protection system. VAX will be perceived by the marketplace, rightly so, as a significant increase in functionality over traditional supermini's. DEC will capitalize on this by preying on the claustrophobic fears this market has.

So there you have it. Data General must make a very important tactical decision to counter VAX. It has been presented with two alternatives, EGO and FHP.

EGO is an architecture which was defined in a remarkably short period of time by individuals in Westboro. A rather clean, simple architecture, it closely resembles what we understand VAX to be. From a tactical point of view, this has the very significant advantage of low short-term risk, and hence is very attractive as a "fighting machine" to VAX.

In the long-term however, there are two very important reasons why we believe EGO is not the proper response. First, EGO offers no significant product differentiation i.e. no

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The quality of software & reliability of the machine is more important

advantage over VAX. Competition with DEC would primarily be in the areas of product implementation, services, price and marketing ability -- areas where the larger company generally has the advantage. Secondly, the presence of EGO and FHP within Data General's product mix has the potential for causing confusion in the marketplace (to say nothing of within the Company), a large amount of duplication of effort, and serious product incompatibilities.

Clearly what we must do is to define an FHP product which meets the tactical requirements of a VAX fighting machine, the primary factor being the reduction of risk in a tight development schedule.

"SPRINT," Definition and Required Initial Efforts

We have begun to define a product, "SPRINT," which should be a very capable answer to VAX. A brief outline of SPRINT is:

"SPRINT" will provide a tactical answer to DEC's expected "VAX" system in the context of the FHP architecture.

As suggested by its name, SPRINT would be developed as a top priority project through an integrated hardware and software task force.

Product cost would be comparable to current large ECLIPSE systems, allowing system configurations priced in the \$75K to \$200K price range.

Packaging and circuit technology will be conservative, using E/250, E/500 and T²L technology, respectively.

A natural growth-path for current ECLIPSE users will be provided by incorporating ECLIPSE emulation into the product. As such, SPRINT will act as the "bridge" between ECLIPSE and FHP systems.

Design emphasis will be placed on risk reduction, availability/reliability/maintainability, cost, and real-time, interactive performance.

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The hardware design approach will be based upon a small, independent task force headed by Tom Jones.

Much of the design effort already devoted to FHP "STRIP" will be used in SPRINT, as well as many ECLIPSE subsystems as possible.

It is expected that sufficient resources are available to allow work to continue on FHP STRIP, allowing it to be announced perhaps nine to twelve months after SPRINT.

A resource bind on SPRINT, however, would draw upon the STRIP development group.

The development of SPRINT must consist of a range of efforts.

- FHP architecture must be consolidated and finalized to the point that a hardware design specification can be written.
- A project team must be assembled which can move into a "head down and run" mode as quickly as a product/project plan is in place.
- Corporate marketing must be educated as to the benefits of an FHP-class architecture over traditional approaches. At this point a detailed product plan must be put in place for FHP, with SPRINT being the first product entry.
- Mechanisms must be put in place whereby tactical considerations for SPRINT do not compromise the long-term objectives for FHP.

Decision Criteria for SPRINT Product Definition

As the project makes the transition from the architectural phase into implementation, it is necessary that the criteria used for decision making be altered to reflect the very different requirements of this phase of the project. The tight schedule and limited resources available to SPRINT dictate that risk reduction be a primary decision criteria. There should be a very good reason

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for incorporating a feature if it adds risk, technical or schedule, to the project. There is a time for architectural elegance, and there is a time for pragmatism. If SPRINT is to succeed, we must reduce risk to a minimum.

However, in assessing risk, we must be careful not to compromise the FHP architecture to the point that it no longer meets its primary objective of providing a fundamental product advantage. These will be difficult, often subjective, decisions, usually with insufficient data. Consequently, it is essential that discussions, and decisions that come out of them, be conducted in as objective a manner as possible. Emotional, ego-oriented arguments consume time, and generally confuse the issues.

Other important criteria in decisions relative to SPRINT are:

- Available resources. Does the decision require resources which are not available? Or does it complicate the utilization of resources? As Fred Brooks points out, risk goes up with required resources.
- Schedule. Can the decision realistically be implemented in the time-frame available to SPRINT?
- Cost. How much additional cost is added by the decision? Does the additional cost have as good, or better "return" as other factors which could be added to the system? SPRINT must be designed to a fixed cost budget, each feature added must eliminate another.
- FHP compatibility. It may be necessary to be expedient in certain aspects of the design, not allowing full FHP functionality to be incorporated. I/O is an example, for one. In these cases, care should be taken to compartmentalize the incompatibilities using well defined, high-level interfaces. This will allow future implementations to replace the short-term subsystem with its FHP counterpart.
- Market requirements. SPRINT is a tactical product. As such it must be a close fit with what the market perceives it needs, which incidentally is not always rational. Marketing objectives are being prepared,

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and should be available shortly. However, in the interim, the proper view of SPRINT is as an ECLIPSE that provides a bridge to FHP, rather than the other way around. SPRINT will be sold into the supermini marketplace.

If a decision is required where insufficient data is available, attempt to be very rigorous in your methodology. Define the issues and underlying assumptions on paper. Attempt to quantify factors where possible. A first-order cut is better than nothing. Try to build a decision tree, and then make a decision. The definition and design of SPRINT will require literally thousands of decisions to be made. We must begin immediately.