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November 1, 1979

To: MPC79.distribution

From: The MPC79 Organizers

Subject: **MPC79 Informational Message #3**

Filed on: [MAXC]<Conway>MPC79.memo3

This is MPC79 informational message #3, which describes the procedures that project-lab coordinators should use to submit student design files for inclusion in MPC79 and to check the status of submitted designs. We hope the information and examples in this message are sufficient to serve as a "system user's guide" for the coordinators (sorry the msg is so long, but a bunch of examples are included for completeness; future info msgs will be much shorter).

1. OVERVIEW

MPC79 is being used to test some ideas, operational procedures, and prototype software which simulate an automated "VLSI IMPLEMENTATION SYSTEM". Such systems might in the future reside as servers on the ARPAnet or other networks, queuing up requests for implementation of VLSI designs, packing designs into mask sets, generating a mask specification file when a mask set is fully packed, coordinating and tracking the later mask-fab-packaging steps, routing the packaged chips and associated information back to the designers, and then billing the appropriate accounts.

Designer's interactions with such servers could be kept very simple, being analogous to sending electronically created documents to be hardcopied on a centralized printing server in a computer network: when the document (design) is complete, one merely ships the file to the printer (implementation system) and issues the command HARDCOPY (IMPLEMENT); if the document (design) sits in the printer's (implementation system's)input queue for a while, and an error is found in the meantime, one might issue a command to replace the queued entry with a revised entry, etc.

Due to some practical constraints (number of MAXC accounts, security, etc.), we aren't set up to provide all individual designers direct interactions with the MPC79 system. Instead, most designers at each school will have their interactions handled for them by their project-lab coordinators.

Thus the coordinators carry a heavy responsibility for tracking the progress of the student projects, for promptly sending design files and commands to MPC79 as projects near completion, and for keeping the students informed of the status of their designs in MPC79.

However, coordinator interactions with MPC79 should be simple and straightforward, using very simple requests for service via very concise messages; the messages will be easily constructed in response to the usual message system prompting. At most schools, coordinators will simply send a batch of requests every few days, and check on the status of these requests every few days, mainly during the final weeks before the deadlines. We suggest that each coordinator keep in close touch with their student designers via the electronic message system on the computing facilities used for design support at their school.

Here at PARC the MPC79 organizers will initiate responses to coordinator messages, and will·

service the requests in those messages, by simply filling in or moving around text entries in "electronic forms" displayed on our ALTOs. In some cases, the message responses and command actions will be automated, but most will require manual keyboard-display interactions on our part. We now expect to receive and process about 60 to 100 projects from about 8 to 10 different schools; thus the need for simple interactions by formal messages.

The following sections describe the types of requests, and give examples to clarify the request message formats and the effects of request servicing by the system.

Some basic ideas and terms used in the following sections are: (i) each project will be given a unique name (ID); (ii) there are only a few request types, encoded by KEYWORDs; (iii) most requests for service need be only one line of text within a message from the coordinator to MPC79@PARC-MAXC of the form: "KEYWORD: ID"; (iv) when the MPC79 system notices and services a request, it will send a message back to the coordinator, indicating a positive (ACK) or negative (NACK) acknowledgement to that request; (v) as nearly-completed designs having valid CIF code and of acceptable sizes are submitted for implementation and ACKed, they will be entered into a PROJECT PENDING QUEUE (PPQ)in order of date/time first ACKed; (vi) space will be firmly allocated to projects in the PPQ in order of entry; (vii) under certain conditions, projects in the PPQ may lose their ACK status - they must regain it by the cutoff date in order to get into MPC79; (viii) a STATUS FILE will be maintained for each school on MAXC showing the current status of that schools projects.

NOTE: Coordinators should keep their MAXC accounts as free as possible of unused files, to avoid excessive use of MAXC file space and to avoid confusion. Think of MAXC as a temporary place for files in transit into MPC79, rather than as a file repository. Just to be safe, we will periodically run a program (DELVER) that deletes old versions of files from the university-VLSI directories, so that only the two most recent versions of any file are retained.

2. THE TYPES OF REQUESTS:

There are five types of requests for service by the MPC79 system that can be made by the university project-lab coordinators: (a) OPEN a project ID; (b) request that an ID's design file be CHECKed; (c) request that an ID's design file be IMPLEMENTed; (d) DELETE a project ID; (e) message an informal QUESTION/COMMENT/ANSWER about a project.

(a) An OPEN causes the MPC79 system to generate a unique ID for a project, and provides the system information for use when responding to messages related to that ID. The OPEN also conveys a brief project description and estimate of project size - this information will be used for setting a preliminary space division in MPC79 among the various universities. (Note: All lengths used for physical space allocation purposes in MPC79 will be given in physical units of microns, rather than in relative units of Lambdas). Once a project is "OPENed", it will be listed in the STATUS FILE. We will begin processing OPENs starting 8 Nov 79. Schools should supply OPENs for projects ASAP after 8 Nov, in order to get an appropriate piece of the available space.

(b) A CHECK request causes a project's design file to be processed by all MPC79 software up to but not including placement in the Project Pending Queue. A project needn't have had space allocated to it to be CHECKed. A CHECK will determine if a project design file was successfully transmitted to MPC79, and confirm that the project's CIF code is OK (to the extent of the MPC79 checking at that time). Requests for CHECKing may occur before a design is ready for IMPLEMENTation. We will begin processing CHECKs on 8 Nov 79. Remember the deadline: each school or other location must have placed a sample CIF design file on MAXC and mailed us a plot of that design by 13 Nov, so we can test the connection to that location. Use a CHECK request for this purpose; the ID can later be closed if the design isn't to be IMPLEMENTed.

(c) An IMPLEMENT request causes a project's design file to be processed by all MPC79 software, to be placed into the Project Pending Queue (if its CIF code is OK), and then to be given a FIRM Bounding Box Space Allocation (if space is available) for merging and implementation in MPC79. Even if the IMPLEMENT is successfully ACKed, the project designer should continue to look for errors (logic, design rule, etc.) in the design. If any are found, they should be fixed; the design file should then be replaced on MAXC, and another IMPLEMENT request issued; this may be done without risk of loss of the design's space allocation, so long as its Bounding Box doesn't increase in size. If the Bounding Box grows, the IMPLEMENT will probably be NACKed, especially late in the game as space is running out. If an IMPLEMENT is NACKed, the designer should be notified by the coordinator ASAP, so that another IMPLEMENT can be attempted. We will begin processing IMPLEMENT requests on 16 Nov 79.

(d) The DELETE request enables removal of an ID from the system by deleting all information from the system related to that ID. Some reasons for a DELETE: A student gets sick, and can't complete their design; a major error in a design is discovered too late to be fixed; the coordinator at a school may want to reallocate space from one big design to several small ones, or vice-versa.

(e) Since the system we're using to conduct MPC79 is an incompletely automated prototype system, and since there's a lot of new and incompletely tested software both here and in the universities, we need an "out" to cover contingencies, disasters, confusions, coordinator or organizer collapse, etc. So, coordinators may request an answer to a QUESTION or send us a COMMENT concerning an ID. We'll ACK these in the usual way (when we're able to get around to them). Similarly, WE may initiate a QUESTION/COMMENT/ANSWER interaction with a project coordinator. However, let's all try to keep this kind of informal interaction to a minimum, and see how far we can get with simple OPEN, CHECK, IMPLEMENT, and DELETE requests.

NOTE: By mid-November we'll process pending requests once every day or two, more frequently as the deadlines draw near. It's possible that multiple requests might be sent regarding one ID before any ACK/NACK is returned by MPC79. In such cases MPC79 will service ONLY the most recent request against the latest file version for that ID.

NOTE: We aren't able to provide users with a "full service". For example, there is no request type "CHECKPLOT" - - -

3. DETAILED DESCRIPTIONS & EXAMPLES OF REQUESTS

NOTE: Please identify requests using keywords followed by colons, as shown below. (In the following, some names & places are real. However, the events are fictitious!).

(a) OPEN:

To OPEN a project ID, the coordinator should send to MPC79@PARC-MAXC a message containing (i) a list of the fullname(s) of the designers of the project, (ii) the person(s) to whom we should send ACKs (usually the coordinator(s)), (iii) persons to copy on the ACKs (perhaps the designers if they have ARPANET mailboxes), (iv) a brief informal description of proposed project (a couple of sentences will do), and (v) a rough estimate of project size (Bounding Box, in microns, for space allocation purposes). Multiple ID OPENs may be requested in a single message; if this is done insert blank lines between the OPENs.

Example of an OPEN request:
- -
Date: 16 Nov 1979 at 0930 EST
To: MPC79@PARC-MAXC
From: REB@MIT-XX
Cc: REB@MIT-XX
Subject: REQUEST

OPEN:
Designer(s): Jim Smith, Jack Jones
ACKs to: REB@MIT-XX
Copies to: SMITH@MIT-AI
Description: This project is a 4-bit slice of an ALU
Est.BB: ~ 1600 X 2600 microns.

OPEN:
Designer(s): Bill White
ACKs to: REB@MIT-XX
Description: Project is a Writeable PLA
Est.BB: ~ 1800 X 2400 microns.
- -

On receiving an OPEN Request, the MPC79 system will (i) establish a "project ID", (ii) file the OPEN information for use when responding to further Requests, (iii) establish and maintain an entry for that ID in the STATUS FILE, and (iv) either Acknowledge the Request by returning the value of the project ID, or Negative Acknowledge the Request with a reason (for example, late in the game we may stop opening ID's). All OPEN REQs will be individually ACKed/NACKed.

Example of an OPEN Acknowledgement:
- -
Date: 16 Nov 1979 at 1820 PST
To: REB@MIT-XX
From: MPC79@PARC-MAXC
Cc: SMITH@MIT-AI
Subject: ACK to OPEN: 16 Nov 1979 at 0930 EST.

Design by Jim Smith, Jack Jones given project ID: SmiJonMIT
- -

(b) CHECK:

To CHECK a design file, the coordinator should (i) place the design file on [MAXC]<universityname-VLSI> using the filename ID.CIF, where ID is the value returned by MPC79 in the ACK to the OPEN for that project, and then (ii) send a message to MPC79@PARC-MAXC requesting "CHECK: ID", as illustrated in the following example. A project needn't have obtained space allocation in MPC79 in order to be CHECKed. For example, the design could be in preliminary form, and be entered for CHECKing in order to test the overall communication link from the university to the MPC79 system, or to test the compatibility of CIF software at both the university and the MPC79 system. Multiple CHECKS may be requested in one message; if this is done, insert blank lines between CHECKs.

Example of a CHECK Request:
- -
Date: 19 Nov 1979 at 1044 PST
To: MPC79@PARC-MAXC
From: ICL.ISL-ROB@SU-SCORE
Cc: ICL.ISL-ROB@SU-SCORE, ICL.ISL-NUKE@SU-SCORE
Subject: REQUEST

CHECK: RobMSU

CHECK: AndyBSU
- -

On receiving a CHECK Request, the MPC79 system will pass the design file ID.CIF through all stages of processing up to but not including insertion into the Project Pending Queue, and will either (i) send back an ACK for that ID, which indicates that no errors in the CIF code occurred, or (ii) send back a NACK, indicating an error, along with a brief text comment describing the error. All CHECK REQs will be individually ACKed/NACKed. The time of the CIF file's placement on MAXC and the project's Bounding Box size will be included in the ACK/NACK message.

Example of a NACK to a CHECK Request:
- -
Date: 20 Nov 1979 at 2018 PST
To: ICL.ISL-ROB@SU-SCORE
From: MPC79@PARC-MAXC
Cc: ICL.ISL-NUKE@SU-SCORE
Subject: NACK to CHECK:RobMSU

NACK to CHECK [MAXC]<SU-VLSI>RobMSU.CIF;1 created 1021/11-19-79.
BB 2200x3200 um.
CIF error: no END statement (did the whole file get to MAXC?)
- -

(c) IMPLEMENT:

To submit a design file for IMPLEMENTation, the coordinator should (i) place the design file on [MAXC]<universityname-VLSI> using the filename ID.CIF (where ID is the value returned by the MPC79 system in the ACK to the OPEN for that project), and then (ii) send a message to MPC79@PARC-MAXC requesting "IMPLEMENT: ID", as illustrated in the following example. Multiple CHECKs and IMPLEMENTs may be requested in a single message; if this is done, insert blank lines between requests.

Example of an IMPLEMENT Request:
- -
Date: 23 Nov 1979 at 1845 PST
To: MPC79@PARC-MAXC
From: ICL.ISL-ROB@SU-SCORE
Cc: ICL.ISL-ROB@SU-SCORE, ICL.ISL-NUKE@SU-SCORE
Subject: REQUEST

IMPLEMENT: RobMSU
- -

On receiving an IMPLEMENT request, the MPC79 system passes the design file ID.CIF through all stages of processing for CHECKing, inserts the design into the Project Pending Queue (if the CIF code is OK) and then allocates space (if space is available). It then either (i) sends back an ACK for that ID, which indicates that no errors in the CIF code occurred AND that space was allocated, or (ii) sends back a NACK along with a brief text comment describing the error or space allocation problem. All IMPLEMENT requests will be individually ACKed/NACKed, with the CIF file's time stamp of placement on MAXC and the BB size included in the message.

Example of an ACK to an IMPLEMENT request:
- -
Date: 24 Nov 1979 at 0700 PST
To: ICL.ISL-ROB@SU-SCORE
From: MPC79@PARC-MAXC
Cc: ICL.ISL-NUKE@SU-SCORE
Subject: ACK to IMPLEMENT:RobMSU

ACK to IMPLEMENT [MAXC]<SU-VLSI>RobMSU.CIF;4 created 1800/11-23-79.
BB 2200x3200 um. Space Allocated.
- -

Example of a NACK to a IMPLEMENT request:
- -
Date: 26 Nov 1979 at 0700 PST
To: ICL.ISL-ROB@SU-SCORE
From: MPC79@PARC-MAXC
Cc: ICL.ISL-NUKE@SU-SCORE
Subject: NACK to IMPLEMENT:RobMSU

NACK to IMPLEMENT [MAXC]<SU-VLSI>RobMSU.CIF;6 created 1340/11-25-79.
CHECKs OK.
BB 2400x3200 um.
BB has grown from previous Allocated BB of 2200x3200 um.
Space not available. Resubmit to Allocated size.
- -

NOTE: We'll be taking a closer look at designs during the final week before 4 DEC, when they are supposedly in near-final form. It is possible that an IMPLEMENT request may receive an ACK from the MPC79 system, and then at a later time our further checking (for example plotting) reveals a fatal error in that design (for example, incorrect layer names throughout a design, gross design rule violations, etc.). If this occurs, the MPC79 system may generate a "Delayed NACK" of that design. So, although the design has achieved a space allocation, it can lose its ACK status at any time, and we reserve the right to do this. The designer must then update the design and the coordinator issue another IMPLEMENT request to try to regain ACK status for the design. The NACK must be replaced by an ACK before the design cutoff date (see item 4).

Example of a Delayed NACK to an IMPLEMENT Request:
- -
Date: 29 Nov 1979 at 2250 PST
To: FOSTER@CMUA
From: MPC79@PARC-MAXC
Cc: HT.KUNG@CMUA
Subject: NACK to IMPLEMENT:MFHTCMU

NACK to IMPLEMENT [MAXC]<CMU-VLSI>MFHTCMU.CIF;3 created 0700/11-25-79.
BB 2800x3000 um. Space Allocated.

Found a fatal error when plotting. Should be easy to fix.
VDD and GND short near logo. Please fix and reissue IMPLEMENT ASAP.
- -

(d) DELETE:

To DELETE an ID, simply send a REQUEST message containing DELETE: followed by the ID.
The DELETE will cause deletion of all information related to that ID from the MPC79 system, and
will be ACKed by the system when completed. If the reason for the DELETE is a decision to
reallocate space to other projects that are on the Project Pending Queue, give the details in the
message.

(e) QUESTIONS/COMMENTS/ANSWERS:

If it should become necessary to send a QUESTION or COMMENT, or to ACKnowledge a
QUESTION from MPC79 with an ANSWER, use informal messages formatted somewhat like the
above.

Example of a QUESTION Request:
- -
Date: 30 Nov 1979 at 1225 CST
To: MPC79@PARC-MAXC
From: FOSTER@CMUA
Cc: HT.KUNG@CMUA
Subject: REQUEST

QUESTION: MFHTCMU: Can't find the error mentioned in your NACK of 29 Nov at 2250.
Have you got a problem with your plotting software?
- -

3. READING THE STATUS OF THE PROJECTS

A file will be maintained for each university on the MPC79 account on MAXC containing the
STATUS of that university's projects.

These files will be named [MAXC]<MPC79>universityname.STATUS, where
universityname = "MIT"|"CMU"|"UOFR"|"SU"|"CALTECH"|"UCLA"|"OTHERS".

The project coordinators can read or retrieve these files at any time. For each project ID, the file
will contain: the designer name(s); BB in um; AREA in square mm's; if in ACK or NACK
STATUS; if project is in the Project Pending Queue; if SPACE is ALLOCATED; the time/date of
latest file creation; the time/date of first ACKed IMPLEMENT(sets priority); comments in
unformatted text including project decription, open questions, reason for a NACK status, etc.

We suggest that the coordinators retrieve, hardcopy, and post the STATUS file from time-to-time,
especially during the final weeks of MPC79, so that students can follow the action.

4. THE COMING SPACE WAR

The above message suggests the space allocation algorithm we'll be using: Basically, it is first-come first-served. While the service is free, participation is somewhat competitive. The PRELIMINARY space partitioning among schools will depend on early OPENs of interesting-sounding projects. (We may modify this partitioning later-on as events unfold). The actual FIRM space allocations among individuals (and the positions in the Project Pending Queue of designs without space allocation) will be prioritized by the first ACKed IMPLEMENT DATEs/TIMEs of individual designs in near final form.

Preliminary final versions of designs (i.e., valid CIF, BB firmly fixed and not to grow, appearance of nearly completed design if plotted) must have been placed by 27 November. Some of these designs may receive space allocations prior to the 27th, but on the 27th we will attempt to make a complete allocation, so that students will know whether or not they are certain to get in the chip set if they finish their designs.

On the design cutoff (5:00pm PST, 4 Dec), all projects having firm space allocation and ACK status will be merged into MPC79; those with firm allocations but in NACK status will be deleted; any remaining space will then be allocated to ACKed projects in the Project Pending Queue, in priority order. We'll send out more messages about space allocation later on as designs are filed on MAXC and we begin to get a feeling for the actual demand vs available space.

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1 November 1979
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