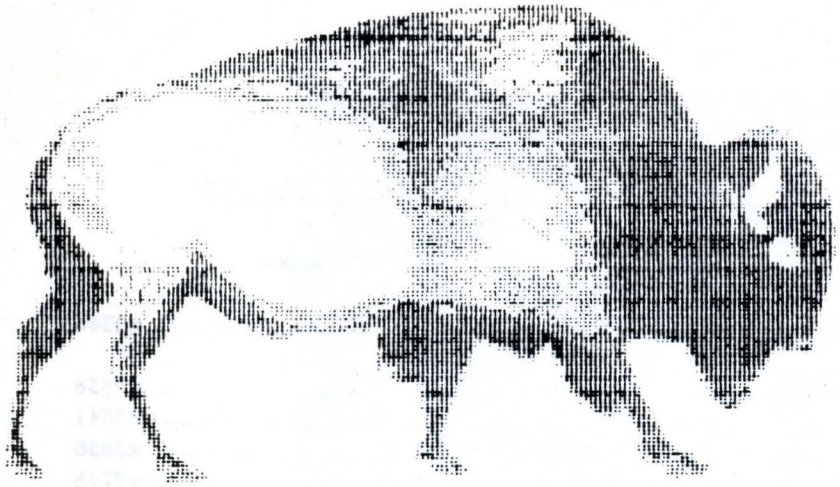

Fermilab Computing Division Newsletter

October - November, 1989 Vol. XVII, No. 7

GUIDE TO COMPUTING DIVISION SERVICES

TELEPHONE: (708)840-xxxx FTS: 370-xxxx

CENTRAL FACILITY CONSULTING	WH8E	x2345
CENTRAL FACILITY OPERATIONS	Eugene Dentino	x3838
Cyber	WH7W	x3841
IBM, I/O	WH7W	x3856
Amdahl	FCC	x2748
VAX	FCC	x2747
IBM, ACP	FCC	x2746
I/O	FCC	x2745
Operations Information	FCC	x2755
Data Entry	WH7NW	x4270
DATA COMMUNICATIONS		
Trouble Reporting		x3239
BITNET, TYMNET, DECNET Consulting	Phil DeMar	x3678
Defender Accounts	Clif Horvath	x2954
DATA ACQUISITION SOFTWARE		
Trouble Reporting	Liaison Person, WH8E	x3205
DATA ACQUISITION HARDWARE		
Trouble Reporting	Carolyn Merkler	x4373
Technical Questions	Rich Knowles	x3331
	Jim Meadows	x4063
Field Service	Marc Haibeck	x4189
In-House Maintenance	Dick Adamo	x3180
DIVISION HEAD	Tom Nash	x3203
ASSOCIATE DIVISION HEADS	Joel Butler	x3148
	Irwin Gaines	x4022
	Jack Pfister	x3926
NEW ACCOUNTS	WH8N	x3205
COMPUTING DIVISION LIBRARIAN	Sue McNamara, WH8NE	x3934
NEWSLETTER EDITOR	Lauri Loebel	x2214

COMPUTER DIAL-UP NUMBERS:

300-1200 baud Vadic/Bell	406-1200
1200 baud Vadic	840-4757
2400 baud MNP5	406-1667
300-1200 baud Defender II pulse dial	879-7666
2400 baud Defender II pulse dial	840-3270
Defender II touch tone	840-3806

PORT SELECTOR CLASS CODES:

CYBER, 110 to 300 baud	CDCLOW
CYBER, 600 to 9600 baud	CDC
VAX Cluster	VC
Amdahl	FNCCF
SLAC 2400 baud	SLAC
Weather 1200/9600 baud	WX
Emulex Terminal Server--	
FNAL VAX Cluster	EMU
FNALD VAX Cluster	V5

GENERAL

A Note from the Head of the New Computing Division

As I write this, the new Computing Division has been in place for 38 days. For the last 20 of those days I have been berated by the Editors of this newsletter (there seem to be dozens of them) to prepare some pearly prose explaining what is going on. In July, at John People's request, I drafted a mission statement which was sent to all persons transferred to the new division. Most of the following is adapted from that document. I am delighted that after these crazy first five weeks, I don't feel like tearing it up. It was written, I must admit, in the sunshine under the influence of good California food and wine and the Silicon Valley style of doing business. If I am discouraged by the budget situation, I am greatly encouraged by the enthusiasm and extraordinary hard work of so many people in the new Division. They are struggling to get ready to take data in the upcoming run, and to handle the enormous amounts of data we already have and are expecting to get. There clearly is a spirit that we have entered a new era of computing at Fermilab.

The new Fermilab Computing Division will bring together computer related activities that support the immediate and long term needs of high energy physics. Fermilab has been widely recognized for its successes in supporting its experimental program with accessible central computing, data acquisition tools and capabilities, and forward thinking computer developments. It is often forgotten in the furor of battle that the quick criticism and shrill debate demonstrate that Fermilab's is probably the most vibrant computing community in high energy physics. The new organization is to build on Fermilab's successes with the people that make up this dynamic community. Its driving goal is to establish a major center of excellence in the operation and development of computing and data acquisition for high energy physics. This is a key pillar of Fermilab's long term future.

The operational and developmental missions of the new Division are intertwined. The nature of fundamental science demands that the latest technological tools be brought to bear in the struggle to extract an understanding of the universe. Yet, the scale of the activity requires that this be done in an operationally smooth manner. This apparent contradiction is the challenge that brings many of us to the business. To resolve this ongoing contradiction requires continuing communication between those with operational and developmental concerns and, most important, between Division efforts and experiment, engineering, and other client activities.

Communication is the third principal mission of the Division and was spelled out in the mission plan as follows. We must provide an environment which encourages extensive communication both within the Division and between the Division and its clients. Some examples of what needs to be communicated are: experiment (and other client) requirements; technological and Division capabilities and limitations (including those defined by personnel, budgets, and bureaucracy); operational and developmental project requirements and priorities, specifications, designs, schedules, delays, and capabilities. Everyone must be involved in the communication, sometimes as transmitter, sometimes as receiver of information: clients - particularly experiment users, Division organization leaders, project leaders, other divisions and sections and the Directorate. Everything should be open except personnel and other legally confidential material.

The communication mission will be supported with an expanded liaison group attached to the Division Office and with an efficient and complete program of operational and developmental project reviews. The liaison group will be known as All Computing Consulting and Experiment Support Services (ACCESS). [A prize for a better name with this acronym.] Through the extensive liaison and collaboration the experimenters (and other clients) will find that they are, in effect, running the Division. They will also find, as a result of the two-way communication, that the Division will have influenced their thinking about what is possible and most reasonable for their needs. ACCESS will provide consulting and some direct support to experiments. It will coor-

dinate experiment Memoranda of Understanding for the Division and track and monitor commitments that have been made. Joel Butler is head of ACCESS; Vicky White is Division MOU Coordinator; Paul LeBrun and Judy Nicholls are associate heads of ACCESS.

The three associate division heads will be responsible for maintaining wide open communication channels, with emphasis on those reaching outside the Division. They will work with me, appropriate people from the various departments, and key user representatives in several Strategy Management Teams. These teams will determine a coordinated direction for the various interrelated activities of the Division. They will be the primary management mechanism in the Division defining the scope and direction of operational and developmental projects. The strategy teams, chaired by the associate division heads, will spawn working groups on specific issues with heavy user participation. The associate division heads and their general areas of responsibility are:

Jack Pfister will lead the important effort to track technology and to identify relevant advanced system and collaborative R&D opportunities in industry and computer science and coordinate them with the activities of the Departments. Jack will have responsibility for all relations with industry, computer science, and other laboratories, and will be a contact person with the government. Jack will chair the Technology Tracking/Computer R&D Strategy meetings. He will also coordinate Computer R&D activities.

Joel Butler will act as head of the ACCESS Liaison Group and lead the broad based effort to open communication channels with experimenters and other Division clients. He will also coordinate the activities of the Central and Distributed Computing Departments, chairing Off line Computing Strategy meetings.

Irwin Gaines will coordinate the Division Management Teams and the project review process. With Jack, he will be a contact person with the government and will manage government mandated procedures. Irwin will manage the budget process, and Division administrative matters. He will also coordinate Data Acquisition R&D Activities and chair the Data Acquisition Strategy meetings.

There are now five departments. Their current activities are as follows:

1) Central Computing Department (CCD) [Peter Cooper, Head; Gerry Bellendir, Associate Head]: Operation of Fermilab's major shared central computing resources, including the central Amdahl and IBM complexes, ACP I farms, the Cybers, as well as any future Unix based centralized production systems.

2) Distributed Computing Department (DCD) [Al Thomas, Head]: Operation of local and wide area networks and other communication. Operation of central farms configured for DST analysis and of the VAX clusters. Support for departmental clusters, workstations, networked PCs, and associated peripherals. Maintenance of VAX and Unix hardware and related software for these machines.

3 & 4) Data Acquisition Departments (DAD): Development and support of hardware and software tools for use in experiment DA systems.

DA Support Department [Vicky White, Head]. Includes PREP. (Presently responsible for on line and data acquisition systems for the forthcoming fixed target run.)

DA Electronics Department [Ed Barsotti, Head]. (Presently participating in silicon detector readout development and study of a high speed DAQ switch.)

5) Computing R&D Department (CRD) [Joe Biel, Head; Mark Fischler, Associate Head]. (Presently developing ACP II software and hardware and the ACPMAPS lattice gauge processor.)

Thomas Nash

AMDAHL

Amdahl Batch Service

The VMBATCH and VMTAPE products form the basis of the Amdahl batch environment. Initially these were set up with minimal scheduling, just enough to get the first users productive. Since then, enhancements and refinements had been made to adjust to increased demands. The following steps are part of the batch job scheduling project. Steps 1 through 5 are now complete and in production.

1. Partitioning the workload by resources consumed (CPU, tape, worker disk), i.e., by job class. Each job class has associated resource limits which can be changed to meet user needs. Thus, a class A job is right now limited to 10 minutes of CPU time, 64 Mbytes of memory, no tape drives, etc. Other classes have different resource limits and are explained in the Amdahl User's Guide. Partitioning the workload in this way allows us to apportion Amdahl resources among jobs of varying resource needs.
2. Specifying the maximum number (MAXJOB) of jobs executing in a class or range of classes. This is used to limit the total resources consumed by jobs in a class or range of classes.
3. Applying "fair share" constraints within job classes to prevent domination of a class by a single experiment. Thus, if the maximum number of jobs (MAXJOB) for class D is set to two or greater, and if experiment 1 had a job executing in class D and experiments 1 and 2 both had jobs waiting to execute in class D, the next job selected would be from experiment 2 provided that sufficient resources, such as tape drives, were available. If no jobs from experiment 2 could be started, then the jobs from experiment 1 would become candidates. The object is to provide as much fair share as possible but not to compromise resources at this point of job selection.
4. Applying an absolute limit (GMAX) to the number of jobs executing by one experiment in a job class. For example, if experiment 1 completely dominated class B because theirs were the only class B jobs in the system and experiment 2 submitted a class B job, this job would normally have to wait until a job from experiment 1 finished. However, if MAXJOB were set to 4 and GMAX were set to 2, then experiment 2's job would start, as long as resources were available, since 2 batch slots were effectively being reserved.
5. Reserving resources, such as tape drives, for a job class. In order to meet the turnaround objective for short jobs, we need to insure that resources are not all in use by long running jobs.
6. Allowing users to specify job selection priority (low, normal, high, etc.). Specification of high priority would be checked against an internal list of authorized experiments. This list as well as the accumulation of high priority usage would be periodically reviewed by laboratory management.
7. Instituting job aging. Within a priority system lower priority jobs will be held in abeyance as long as higher priority jobs exist or at least until no higher priority job can run within the available resources. One way to increase the likelihood that lower priority jobs will execute within a reasonable time is by adding a selection priority increment at regular intervals. The amount of increment and interval size will have to be determined based on experience.
8. Allowing all of an experiment's jobs to receive a selection priority increment at the time of submission in order to reflect the active status of an experiment. This would be based on a list provided by laboratory management and would be reviewed as needed.

9. Allowing the operator to dynamically designate a given job to have highest selection and/or execution priority. This would only be used on an emergency basis and require a high level of approval.

In the above steps there were references made to the ability for a job to run based on tape drive availability. Tape drives constitute an unshareable resource and are a source of processing bottlenecks, in that multiple jobs cannot use the same tape drive at the the same time. Some of the above steps attempt to minimize these bottlenecks. Another facility called tape staging has been developed with the primary objectives of increasing tape drive availability and reducing tape mounts. It allows us to quickly copy a tape or tape file to disk, thus freeing the tape drive while a program uses the disk copy. Also, if the staged data is accessed multiple times within a few day time span, keeping the disk copy intact for this period would eliminate tape remounts. The Computing Division is seeking candidates to help us test this facility. If you feel that your experiment is a candidate, please contact Judy Nicholls at x3989.

This was an attempt to summarize for you some of the things done for the Amdahl batch environment and give you some indication of future possibilities. These plans are subject to change based on changing requirements to which we will respond accordingly and in a manner which minimizes disruption to your processing.

Gerry Bellendir, x3930

CYBER

Cyber Un-Users Meetings

At the Cyber Users Meeting held on September 28, it was requested that meetings be held for Cyber users to share information with us and with each other about their migration efforts -- something like the flip side of the monthly Amdahl Users Meetings. In response to this request, we have scheduled the Hornet's Nest at 2:30 on the first Wednesday of every month for this get-together. See you there!

Judith Nicholls
FNAL::NICHOLLS, x3989

Status of the Cyber System

The following hypothetical questions and answers about the Cyber decommissioning were presented to the Cyber users at the Cyber Users Meeting on September 28, 1989.

What has been decided so far?
The Cyber WILL NOT be running on October 1, 1990 or thereafter.

Why is it being decommissioned?
1. It costs $50K/month to operate, which makes it:
   - the highest $/user
   - the highest $/MIP
   - the highest absolute cost
2. Split operations between Wilson Hall and the Feynmann Computing Center are costing an additional $15K/month
3. It consumes human resources equivalent to 1/2 system person
4. It takes up one floor of the high rise
5. We told DOE it would be decommissioned!

Might it go away sooner?
Yes! The budget is always under pressure and all expenditures are constantly being reevaluated.

Can we replace the cycles/disks, etc?
Yes. That's what Central Computing Upgrade Project was/is all about.

What kind of help will the Computing Division provide?

1. Training on other facilities, user's guides, etc.
2. High-leverage programming projects
3. Consulting
4. Tools for conversion

What kind of help will the Computing Division NOT provide?
Code conversion/migration of user-written single-experiment or -group code.

Do we want to see all of the cycles used between now and Sept 30?
NO!! Just the opposite. The goal is ZERO utilization followed by earliest possible turnoff consistent with an orderly migration. Loads will be monitored to make sure that they don't increase unless by pre-arrangement in order to FINISH.

Do we get anything by leaving early?
It is anticipated that the dollars saved will be turned into extra resources on VAX/ Amdahl/ UNIX central systems.

Will the Computing Division help people arrange for outside consulting?
Sure, where it makes sense.

If there are certain tasks that can be completely finished, will the Computing Division tilt priorities toward getting them done?
Yes.

Should we all try to do this?
NO!!

1. It is impossible,
2. People should position themselves to have the ability to recover/reanalyze old data after the Cybers have been decommissioned.

Joel Butler
FNAL::BUTLER, x3148

DISTRIBUTED COMPUTING

The Distributed Software Group

The Group formerly known as the DEC Systems Group has changed its name to the Distributed Software Group. This change is made in response to the growing number of vendors whose computing platforms are in use at Fermilab. As part of the Distributed Computing Department, the Distributed Software Group's mission is the support of system software on distributed computing platforms running a variety of operating systems.

David Ritchie, x3940
FNAL::RITCHIE

Making Sure Your Printout goes to the Correct Printer:

Have you ever sent a document to the wrong printer? Have you ever typed "PRINT" inside MAIL and left off the /QUEUE specification by mistake?

If you didn't want the document or mail item widely distributed, you can end up racing around to some strange printer trying to get your document or mail item back.

You can lessen the occurrence of this by defining your own default print queue in your LOGIN.COM. To do this, insert the following line in your LOGIN.COM:

```
$ DEFINE SYS$PRINT <queue name>
```

For example,

```
$ DEFINE SYS$PRINT WH6X_PRINT
```

will make PRINT's with no /QUEUE specified go to WH6X_PRINT.

Then you no longer need to type /QUEUE=WH6X_PRINT on every print command or from within MAIL, thereby avoiding the chance of typing the wrong queue name and sending that fiery MAIL message off to just exactly the wrong location.

David Ritchie, x3940
FNAL::RITCHIE

The Field Maintenance Group, What We Can Do For You

The Field Maintenance Group is part of the Distributed Computing Department. The primary mission of the Field Maintenance Group is to provide hardware repair and installation service on DEC--based data acquisition (DA) systems at experiments. Because of our experience and expertise on DEC systems in general we also are well equipped to provide maintenance support on DEC systems outside of the DA realm. We provide the following services and support.

Repair Service

While our primary area of responsibility is with DA systems, we also provide a single point service source for anyone who needs repair service on DEC systems. We administer several service contracts to provide service on equipment that is not associated with our primary mission. In those areas we provide screening and directing of service requests to the appropriate service provider. We have separate service contractors for large systems, workstations and Talaris laser printers. The service requester does not need to be concerned as to what the service source is. Requests are routed to the appropriate source and quality of the service is monitored and controlled. To request service call extension 4373. Before calling please have ready the Computing Division reference number that is often available on a tag on the system or the serial number located on the CPU of the system.

Installation Service

We provide installation or when appropriate, coordinate installation between the requester and the equipment manufacturer. For equipment that is DEC standard or supported by the Computing Division we will assure that the new equipment operates normally. For equipment that is unique or not supported by the Computing Division we will install the equipment if the user can provide installation documentation. We can not assure that equipment that is not officially supported by the Computing Division will meet the purchaser's operational requirements. If a non-Division supported device is purchased, the purchaser should have an agreement with the vendor that the vendor will provide support until the device meets operational expectations.

Coordination With The Field Maintenance Group When Purchasing New Equipment

When purchasing equipment, plans should be made for the maintenance needs of the equipment. The source and cost for repair service after the warranty period should be determined at the time of purchase. If the device is currently supported by the Computing Division, the Field Maintenance Group can provide repair support. If you need repair support you should send a memo outlining your needs to Marc Haibeck (MS368, FNAL::HAIBECK). If the device is not supported, alternative plans should be made. Some common alternative repair strategies are: per-call maintenance by the vendor, contract maintenance by the vendor, rapid exchange with the factory via package express, and purchasing your own spare unit.

What We Support

We support the following general equipment groups with spare parts and technical expertise.

- All DEC system devices associated with Computing Division DA systems.
- CPU's: PDP11's, DEC LSI systems, MicroVAX II, 2000, 3100, 3200 systems, VAX 11/780.

- Disk Subsystems: RD53, RD54, RX50, RA81, RA82, CDC Saber, CDC Wren V, Summus 442 SCSI controller, TD Systems Viking SCSI controller.

- Tape Subsystems: TK50, STC 1921, STC 2925, Exabyte and Gigatape 8mm, Summus 442 SCSI controller, TD Systems Viking SCSI controller.

- Over 100 other Fermi, DEC, and non-DEC devices. For a complete itemized list refer to HN-93.

Marc Haibeck, x4189
FNAL::HAIBECK

New Service Provider for Hardware Maintenance on MicroVAX's

We have a new service source for hardware repair service on some MicroVAX's. Control Data Corporation was the successful bidder on our DEC workstation RFQ.

We utilize a mix of Fermilab and contractor maintenance personnel to attain the best efficiency with our resources. MicroVAX systems that are used in more or less simple environments were chosen for the contract. In general the applications are workstations and process control systems.

All of the MicroVAX 2000 systems that are over a year old and therefore beyond warranty service are on the CDC contract. There are 121 such systems as of this date. In the future all other MicroVAX 2000 systems will go on the contract. Ten 3200 systems are initially on the contract. Over the next year the number of 3200's will grow to about 60 as they go off warranty. CDC will maintain all parts of the systems including 8mm tape drives and WREN disks. They will also be maintaining most of the 3100 systems. I will be monitoring CDC's performance to assure that they meet our quality expectations.

Computer users do not need to be concerned with who is the service supplier for their system. Service requests received at x4373 will be routed to the appropriate service source.

Service requesters will be seeing a new face associated with hardware repair. CDC has assigned Ernie Gruner as our primary service technician. He will be based on-site at Fermilab on WH8SE.

Marc Haibeck, x4189
FNAL::HAIBECK

DATA ACQUISITION COMPUTING

Software

VAX/VMS Software for Jorway 411 Branch Driver Enhanced

The VAX/VMS CAMAC List Processing software for the Jorway 411 branch driver has been extended. In addition, the "multi-user" feature where CAMAC operations can be executed in parallel through the standard routine interface while the list processing software is active, is now available.

CAMAC_JY411 V6.6 includes these new features as well as minor fixes to the EVD compiler.

The CAMAC Event Handler list processing language extensions include:

- Iterative Loop processing (DO/ENDDO)
- Conditional and unconditional branching (IF,JUMP)
- Arithmetic, Logical, and relational operators such as (e.g. +, -, /, *, shift, or, and, nand, .ne., .eq.)

- Software registers accessible to the user (X, Y, Z, CAMAC_DATA)
- Availability of the q response received from the last camac operation (in software register Q_STATUS)
- Specification of the word count (WC) for a DMA or the DATA/LABEL for a programmed data transfer as one of the software registers instead of inline data.
- Use of command line labels within the EVD file.
- Extensions to the header types to allow VAXONLINE TYPE_A headers to be added by the event handler and a header of user specified length, in addition to the previously supported CDF YBOS event headers.

See the document reference for detailed information on the syntax of the new commands.

Because the version number of the .EVL files created by the EVD compiler has changed existing .EVL files must be recreated by compiling the associated .EVD file. (Note that the interactive program for event list creation, MAKEEVL, is no longer supported and will be unavailable in all future releases of the software. Please contact your experiment liaison if this will cause you problems).

The "multiuser" version of the CAMAC driver, discussed above, is distributed as part of the new software. Note that using this option for data acquisition will increase the software overheads associated with event readout, as extra resource allocations must be made for each event trigger processed.

Reference: PN221
C. Moore, R. Pordes, J. Streets
DECnet : FNDAQ::MOORE
Bitnet : MOOREQFNDAQ

Hardware

CAMAC Smart Crate Controller Installation Help

When installing a CAMAC Smart Crate Controller the experimenter must be aware of how to connect the several I/O ports:

- the RS232 serial port,
- the output port to the particular data buffer being used - LeCroy 1892, LeCroy 4302, or VME RBUF,
- the trigger port,
- auxilliary crate controller or primary crate controller level adaptor.

Hardware document HN83, SCC Hardware Connection summary, details the cables, pin assignments and mating connectors needed for using the SCC.

With the exception of the RS232 cable, supplied by Prep with the modules, all other cables for SCC's and related modules must be supplied by the experimenter.

HN83 gives information for the I/O ports on the SCC, the SCC Level Adaptor, and VME Readout Buffer (RBUF) and LeCroy 1892, and reflects the experiences of experimenters and the Instrument Repair and Data Acquisition Software Groups.

The document is available from the Computing Department Library, WH8E, and the text portions from DOCDB on the VAX Cluster.

D. Slimmer, C. Andrle, M. Bernett
DECnet : BISON::SLIMMER
Bitnet : SLIMMERQFNDAQ

LeCroy 1885 Diagnostic on VAX/VMS

The LeCroy 1885 diagnostic, which runs on a PDP-11 RT-11 system accessing FASTBUS through the IORFI interface, has been converted to run under VAX/VMS using the LeCroy 1821 segment manager.

The diagnostic is written as an application using the FASTBUS Standard Routine library available for the LeCroy 1821. The diagnostic for the 1885, which is a 96 channel ADC consists of 5 parts:

- FASTBUS Reinitialization
- Parameter Setup
- Memory Tests (both CSR and DSR space)
- Charge, Noise and Pedestal Tests
- Auto-Range Tests

Besides the 1885 ADC, a LeCroy 1810 CAT (Calibration and Timing) module, a LeCroy 1821 FASTBUS Segment Interconnect and a VAX with a MDB MLSI-DR11-W to 1821/DEC FASTBUS interface are required.

PN406 gives further details of the hardware setup and a detailed analysis of the diagnostics. Also see HN-91 for detailed information on setting up a MDB MLSI-DR11-W to 1821/DEC interface.

PN406 is available from the Computing Department Library, WH8E, and from DOCDB on the, FNAL VAX Cluster.

K. Kaczar, R. Mahlum
DECnet : BISON::KACZAR
Bitnet : KACZAR@FNDAQ

DATA COMMUNICATIONS

Notice to Defender II System Users

On November 11 many greater Chicago area telephone area codes will be changed to 708. Since the Defender system's outdial lines will also have the new area code, most Defender users will not be effected. HOWEVER, if your area code will remain 312 your telephone number will be a long distance call from Fermilab, and the proper changes will have to be made to the Defender software to insure that your number is dialed correctly by the Defender system. IF YOUR AREA CODE WILL REMAIN 312, please notify Clif Horvath or Andy Lego, (FNAL::ANDYLEGO).

Clif Horvath, x3239
FNAL::HORVATH
