

10/10/62
January 10, 1962

SUBJECT: Final Report - Processing Overlap Serviceability Committee

REFERENCE: Minutes of Meeting December 12, 1961 - JJ Ingram

The purpose of this report is to present those items which the Overlap Serviceability Committee has reviewed and would materially aid in reducing the length of time per call.

In further defining the complexity factor introduced by the Processing Overlap feature, the feature was divided into four generalized areas:

1. Overlap Register - Data Handling
2. Overlap STAR - Storage Addressing
3. Overlap Set up - Overlap Controls
4. Overlap Interlocks - I/O Interlocking System

The first three items were considered minor complexity factors as their implementation and approach did not deviate greatly from that of the basic 1401.

The fourth, Overlap Interlocking, is associated with the more difficult, Input/Output, diagnostic area of the basic machine. Overlap not only introduced new concepts of interruption of process operations but also various combinations of I/O devices operating concurrently.

These operations are:

1. Varying Read-Punch combinations while one or both may be in operation.
2. Read, Punch, Buffered or Non-buffered Printer while Tape or I/O attachment in operation.
3. Buffered or Non-buffered Printer while Read-Punch in operation.
4. Tape or I/O attachment while Read-Punch in operation.

5. Process check conditions while overlapped I/O device in operation.

Hardware

1. Disable Overlap Control - Development Eng.

Provide a switch on the C. E. console to allow the Customer Engineer or operator to run an overlap program in a non-overlapped mode by manual intervention. Action has been instituted on this item to provide 3 additional switch positions to disable;

- a. Tape or I/O overlap mode
- b. Read-Punch overlap mode
- c. Both overlap modes

2. Additional Indicators - Development Eng.

Action has been instituted to add four indicators to the C. E. console to aid in identification of status of overlap and Reader-Punch.

- a. R-P overlap mode "ON"
- b. Tape or I/O overlap mode "ON"
- c. Read operation not completed
- d. Punch operation not completed

Items c. and d. will be functional on non-overlapped systems.

An additional group has been proposed for a longer range study.

- a. Individual interlock condition display
- b. R-P interlock trigger "ON"
- c. Interlock Latch "ON"
- d. Column Binary operation
- e. Bill Feed operation
- f. Punch Feed Read operation

3. Remote Console - Product Engineering

Effort should be expedited on the remote console to provide the recycling and other features to be made available. Overlap diagnostic time would be most directly affected by proposed aids in the I/O areas.

4. Noise Study - Product Engineering

Previous noise studies should be reviewed or a new evaluation conducted in light of the overlap ability to be processing during periods previously not available. The possibility now exists of start-stop of Input/Output units while another is operating.

5. Frequency Variation - Product Engineering

This is presently being studied as an aid in locating intermittent problems on the basic 1401 and could aid in overlap.

6. Reader-Punch Area Address Check - Development Eng.

Provide the facility to check and indicate the addressing of the Read-Punch areas during processing if the Reader or Punch is in an overlapped operation.

7. C Register - Development Engineering

- a. Provide a parity check and check indication similar to other register checks.
- b. Display the C register.

8. Manual Entry - Development Engineering

Provide manual entry of the overlap Storage Address Register.

9. Single Cycle PAR - Development Engineering

Allow single cycling of Process and Overlap cycles in PAR mode. The present design allows the system to take one process and one overlap cycle with a single depression of the start key.

10. Rotate Inter Frame Connector 20° - Product Eng.

This recommendation is primarily to aid in field installation of overlap cabling but would also be advantageous in other field installations and checking IFC connections.

Software

1. Multiple I/O Diagnostic - Development Eng.

Action has been taken to provide, as part of the diagnostic program package, an extensive test of the interlocking system by programming the Input/Output devices in various combinations.

2. Diagnostic Material - Product Engineering

Provide additional material on how to use diagnostics as to machine area.

3. Applied Program Material - Product Eng.

Provide adequate descriptive material as to machine area, function, recycling and flow charts.

4. Intermediate Level Diagrams (ILD) - Product Eng.

- a. Insure up-to-date ILD's are with systems.
- b. Include sync point locations on ILD's.

5. Descriptive Material - Product Eng.

Provide descriptive material of individual logic blocks or CTDL circuit with existing logic diagrams. (SMS card index)

6. IFC Chart - Product Eng.

Provide chart based on Inter Frame connector locations.

7. Oscilloscope - Customer Engineering

We recommend that a 535 or equivalent oscilloscope be provided for Overlap systems.

C. E. Education - Customer Engineering

The committee requested that Customer Engineering Training provide a representative. As a result Mr. R. E. Hallman attended one meeting and the following was recommended.

1. The present course be extended to five days, one day devoted to overlap laboratory problems. This training to follow normal 1401 school and 2 weeks line experience.
2. One week of line experience on an overlap machine be added.
3. Place more emphasis on the interlock conditions.
4. Provisions should be made for specialist training at Endicott for those areas which could not provide the line experience.
5. C. E. forums to be conducted after the first few classes.

Diagnostic Concepts - Customer Engineering

1. Initiate immediate action to provide overlap information to be added to "1401 Service Information" manual.
 - a. Provide information of appropriate sync points throughout machine for trouble shooting aids.
 - b. Develop diagnostic procedures, flow charts, manual entry programs and program reduction techniques to be used in training as well as for dissemination to the field.

In conclusion the committee recommends that emphasis be placed on the following general areas:

1. The Input/Output area of the 1401 now contributes heavily to extended problems. A general review of this area to reduce C. E. time per call should

be initiated for inclusion per Item 3 - Hardware.

2. As a result of evaluation tests, it is evident that additional Programming training is essential to diagnosis of the more complex problems.

Responsible areas are requested to supply courses of action on individual items by January 19, 1962.

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