INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications	Typesetting
Type of Industry	Newspaper
Name of User	St. Petersburg Times and Evening Independent St. Petersburg, Florida

Equipment Used	Honeywell H-200 Computer
	Honeywell Model 209 Paper Tape Reader
	Honeywell Model 210 Paper Tape Punch
	Honeywell Model H-270-1 Random Access Drum

Synopsis

The St. Petersburg Times and Evening Independent is using a Honeywell H-200 computer to justify and hyphenate type for news and classified advertising.

The STET (Specialized Technique for Efficient Typesetting) system used by the Times and Evening Independent was developed by Honeywell. This system consists of general purpose, modular routines which are modified to fit a particular user's need.

In the future it is expected that the present system will be extended into more sophisticated areas such as an integrated system of advertising scheduling.

At the St. Petersburg Times and Evening Independent a Honeywell 200 is being used to improve and speed up production. The system is used to justify and hyphenate type for both news and classified advertising. (In addition, all existing accounting applications such as payroll, accounts receivable, accounts payable, general ledger, etc., are performed on a second Honeywell H-200 16K computer.

The Honeywell 200 computer is also used for a home locator service that provides a list of homes in selected areas to prospective buyers. The computer also handles a calendar of cultural events which is published monthly, weekly and daily. The computer adds, deletes and keeps in chronological order those activities which are to be published.

The system consists of a 20,000-character central processing unit, a 2.6 million-character memory drum, a high speed paper tape punch (120 characters a second), and a high speed paper tape reader (600 characters a second).

The STET system (Specialized Technique for Efficient Typesetting) employed by the St. Petersburg Times and Evening Independent was developed by Honeywell.

Computer systems are particularly well suited to set type automatically, in that justification and hyphenation routines require a great deal of processing. If a dictionary is used for hyphenation, fast random access is also required. In order to meet deadlines, rapid over-all processing is an essential requirement for any newspaper system.

The input to a typesetting system is usually an unjustified, unhyphenated tape which is fed into the computer. Editing directions and corrections to amend the original copy are perforated in a separate operation. Format controls introduced at this time consist of codes such as "begin paragraph," "upper/lower case," etc.
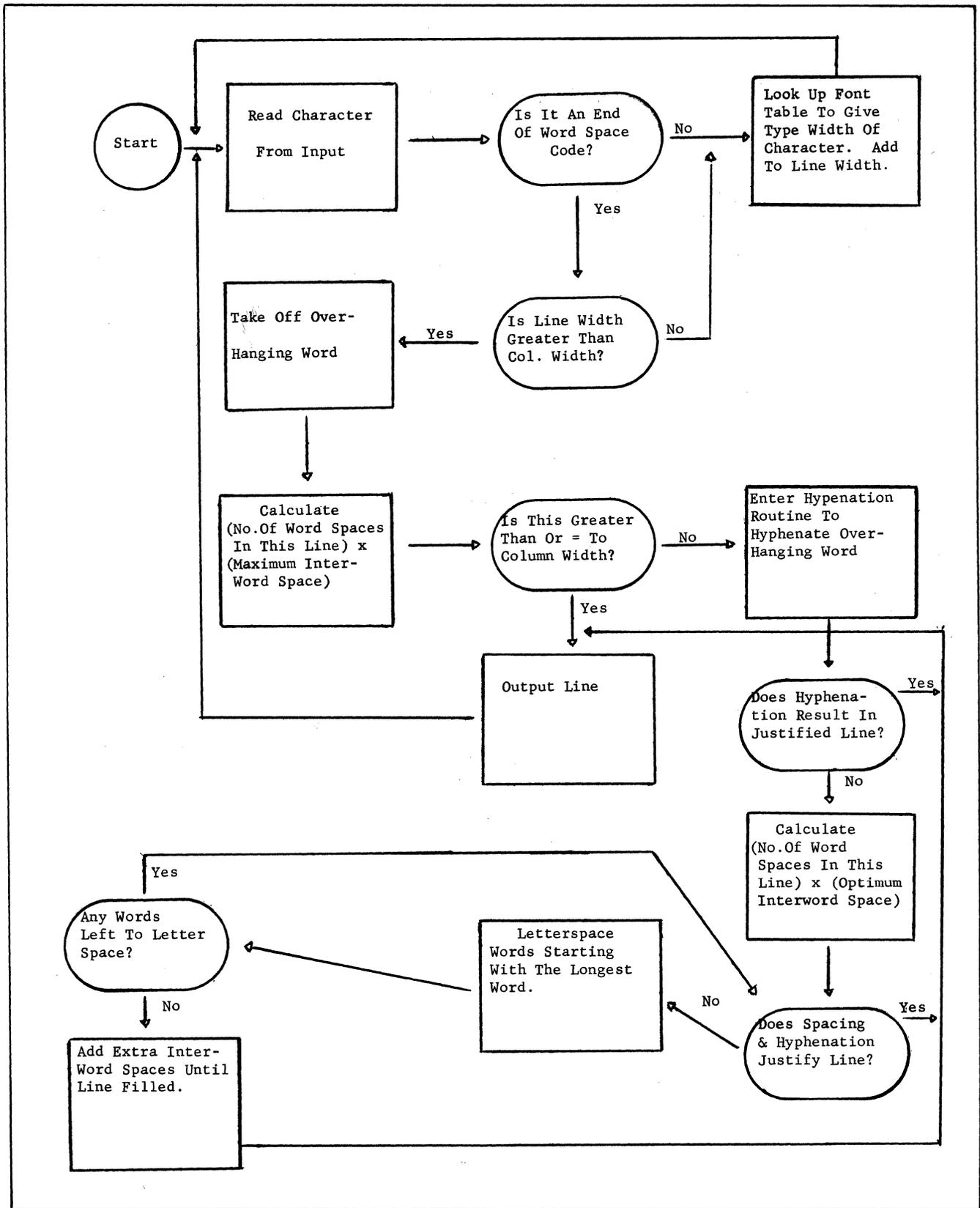
The computer program, after selecting the correct font tables for this section of the run, proceeds with the justifying and, where necessary, hyphenating of the copy. The justified copy can be produced directly as punched paper tape or placed in computer storage for further processing before printing. Normally, a "take" or section of a complete article is punched and the paper tape torn off and delivered to a linecaster. The separate "takes" making up an article are assembled in the composing room.

Initial input may be handled in a number of ways. After input the computer processes the copy, character by character. Functional codes such as "paragraph indent," etc., are analyzed when encountered. Letters and numbers are stored in core memory and a table of type dimensions for the particular type font being used is referenced to calculate the space occupied by each character. At each end-of-word, signified by an input word space, the space thus far taken is compared to the column width. If the line is over justified (i.e., overhangs the column), the last word is taken off. The program then examines the number of spaces in the line to determine if these can be expanded to a given maximum to justify the line. If the line cannot be justified by acceptable spacing, the hyphenation routine is entered. This routine attempts to split the overhanging word at a reasonable point. If this cannot be done, then a combination of spacing and hyphenation is tried.

THE SYSTEM

The computer system at the St. Petersburg Times and Evening Independent is operated in two shifts from 6:45 a.m. until midnight setting classified advertising, editorials and news copy with five fonts of type ranging from 5-1/2 to 10 points.

The STET 1 program used is stored on the magnetic drum and is loaded into memory at the start of the operation. When a "take" has been punched, the complete tape is loaded onto a high speed reader (Honeywell Model 209) and read into memory of the central processing unit.

Start

Read Character From Input

Is It An End Of Word Space Code?

No

Look Up Font Table To Give Type Width Of Character. Add To Line Width.

Yes

Take Off Over-Hanging Word

Yes

Is Line Width Greater Than Col. Width?

No

Calculate (No.Of Word Spaces In This Line) x (Maximum Inter-Word Space)

Is This Greater Than Or = To Column Width?

No

Enter Hypenation Routine To Hyphenate Over-Hanging Word

Yes

Output Line

Does Hyphena-tion Result In Justified Line?

Yes

No

Calculate (No.Of Word Spaces In This Line) x (Optimum Interword Space)

Yes

Any Words Left To Letter Space?

Letterspace Words Starting With The Longest Word.

No

Does Spacing & Hyphenation Justify Line?

Yes

No

Add Extra Inter-Word Spaces Until Line Filled.

LOGIC OF THE HYPHENATION/JUSTIFICATION PROCESS

The justification program processes the "take" according to the rules in the program. The program will hyphenate according to sense switch settings which allow for no hyphenation, logic hyphenation only, dictionary hyphenation only or a combination which provides dictionary hyphenation with words not found in the dictionary hyphenated logically. Parameters which are punched into the input tape control justification functions such as font, line width, indents, cut run-arounds and hanging paragraphs.

The keyboard operator punches two distinct variations of data into paper tape. There is the actual copy which will be printed in the newspaper, and there are the instructions for the computer on how to handle the copy. For example, the computer handles news material differently from classified advertising.

As an example of the operation, the steps involved in the processing of a news story are given here. When the keyboard operator takes the copy, instructions as to style and layout are marked on it. First the operator punches a message identifying himself. This enables the computer to accumulate the keystrokes for this take. The program counts the characters in each input tape and adds these to counters stored on the drum. At the end of the second shift another program reads these total and calculates the linage attributable to each operator. Daily and weekly reports on the total lineage for each operator are printed.

The operator then punches a message indicating that the copy is news. Then, if the take is to be in a single column format, the operator punches the actual copy straight through. The only other parameter codes which will appear are end-of-paragraph indentations.

If a portion of the take is to be set to a non-standard line measure or font, then the correct parameter message must be punched at the appropriate place in the copy. When the computer reaches this message, it will adjust its program to justify lines according to the different line measure. If a font change is called for, the program will change its font table so that a new table of matrix widths is used for counting the width of the characters making up the line.

In the system used at the St. Petersburg Times and Evening Independent, a smaller 16 K program is maintained in the event of a failure of the production system. This program does no letter-spacing and does not store operator linage totals on the drum. The Honeywell H-270-1 drum may be switched to the 16 K system so the backup program can use the dictionary. The drum is not necessary to the backup program which is loaded only from magnetic tape.

Logical Hyphenation

Before entering the full hyphenation logic, the program first tests if the word has any common suffixes or prefixes. If so, the suffix or prefix is split off and possible hyphenation points indicated. In general, the logic examines the sequence of vowels and consonants in the word, looking for key three-letter sequences in order to determine the syllables.

Having determined all possible hyphenation points, the program grades each one as acceptable or less acceptable before returning to the justification routine.

Dictionary Look-Up

At the St. Petersburg Times and Evening Independent, the dictionary, consisting of 22,000 words, is maintained and updated on magnetic tape. The dictionary is loaded on to the magnetic drum when connected to the data processing system. The correct hyphenation of local names or special words which have configurations preventing the hyphenation logic from handling them acceptably is stored in the dictionary.

A set of hyphenation rules is included to deal with words still not in the dictionary. The drum access time of 27 milliseconds results in a rapid look-up process.

Parameter Message Codes

On the six-level paper tape there are 64 distinct codes. Using certain master codes such as shift, upper case, etc., these 64 codes can be extended to 180 different printed characters.

In conjunction with a special key, certain codes are recognized as instructions. The table below lists these codes with the parameter message.

Code	TTS Character	Parameter Message
oo .	O	Operator Identity
. oo	A	Advertising Copy Follows
oo.	N	News Copy Follows
oo. o	F	Font Change
o .o o	Return	End Paragraph, End Line
o o.	H	Hang Paragraph
o.o o .o	IL	Indent Left
o.o o .o	IR	Indent Right
o.o oo.o	IC	Indent Center
oo.o	C	Cancel Indents
o . o	D	Delete
o .	T	End of Take
o .o	L	Line Measure Change
o o.o	P	Select Tabulation Format
. o	E	End of Story

RESULTS AND FUTURE PLANS

The Honeywell computer system at the St. Petersburg Times and Evening Independent, in addition to being used for typesetting, is also used for normal accounting functions. Plans are being made for the extension of the present system into more sophisticated areas such as an integrated system of advertising scheduling which would start with the salesman's order and end, ultimately, with billing to the customer, sales statistics to the advertising department and all the related functions in between. This can conceivably include initial positioning of the advertisements within the paper according to predetermined formating instructions.

HONEYWELL H-200 COMPUTER INSTALLATION AT THE ST. PETERSBURG TIMES AND EVENING INDEPENDENT

Plans for the use of future equipment include the use of additional paper tape readers and punches for multi-input multi-output capabilities.