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Systems Reference Library

**Custom Features for
IBM 1401, 1440, and 1460 Data Processing Systems**

This manual contains brief descriptions of some of the custom features available for the IBM 1401, 1440, or 1460 Data Processing Systems. Availability of these features can be determined by requesting a price quotation from IBM.

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PREFACE

Custom features are designed to meet special application requirements beyond the capabilities of the standard or special features available with the system. These custom features are developed as a result of the submission of a Request for Price Quotation (RPQ) through an IBM sales representative. The number assigned to the RPQ when originally submitted becomes a reference for future requests for this function.

This brochure lists, alphabetically, the RPQ's applicable to the IBM 1401 alone (Section 1) and those applicable to the IBM 1401 or the IBM 1440 or the IBM 1460 (Section 2). An index is provided by RPQ number at the end of the publication.

In considering these custom features, give special consideration to the prerequisites necessary for the proper operation of the RPQ. For further details and advice on custom features, consult your IBM sales representative.

CUSTOM FEATURES FOR
IBM 1401, 1440, and 1460 DATA PROCESSING SYSTEMS
SECTION 1

IBM 1401 CUSTOM FEATURES

Additional Index Registers M01912
1401 Model B, C, E, or F

This device permits three additional index registers for the 1401. Addresses assigned to the new index locations are:

location 4	storage 187-189	address 189
location 5	storage 192-194	address 194
location 6	storage 197-199	address 199

Normal tens-position tagging remains the same. Index locations 4, 5, and 6 are chosen by tagging the units position with a word mark. The word mark must be placed after a normal tagging operation. The word mark is automatically removed during the indexing operation.

location 4	tens position A-bit, no B-bit, units-position WM
location 5	tens position B-bit, no A-bit, units-position WM
location 6	tens position A-bit, B-bit, units- position WM

Normal address modifications are not affected.

Prerequisite: Advance Programming.

Audible Stop Signal W94783
1401 Model A, B, C, D, E, F, or G

This feature sounds an alarm when delta process turns off and I/O operations are complete. The signal can be heard for a distance of 25 feet. A switch is provided to permit manual disabling of the signal.

Branch On Column Binary E02364
1401 Model B, C, E, or F

A 9-7 combination in column one at the first read station indicates a column-binary card. The branch-on-column-binary instruction tests this condition and sets the reading at the second read station accordingly. This device permits intermix of column-binary and normal cards with validity checking on normal cards.

Branch End of Forms W03462
1401 Model A, B, C, D, E, or F

This device makes available a branch instruction that causes the 1401 to branch on a 1403 end-of-forms condition.

Branch End of Forms, Second Printer W04100
1401 Model A, B, C, D, E, or F

This device adds the circuitry to accept a branch on end-of-form instruction for the second printer in a dual 1403 system.

Prerequisite: W03462 on the 1401, and 815064 on the 1924-43.

Branch End of Form 815064
1924-43

This feature provides for recognition of a branch end-of-form instruction for the second printer in a dual 1403 system.

Prerequisite: RPQ W04100 on the 1401.

Branch on Inquiry—Special F93019
1401 Model C, D, E, F

This feature allows for a program-test of a single foreign inquiry-request signal by providing a branch-on-inquiry instruction with a d-modifier. The request signal should be a minus N-signal at least two microseconds long through the tape connector.

Branch Non-Numeric Op Code M02955
1401 Model A, B, C, D, E, or F

This feature adds a special d-character to be used with the standard V(I)(B)d branch operation. It allows branching if the character at B contains any zone bits, blanks, 8-4, or 8-2-1 bit combinations.

Branch on Paper Tape Reader Busy M94255
1401 Model B, C, D, E, or F

This feature provides for first branch on paper tape reader busy operation. The instruction format \$ III d causes a program to branch to the I-address if the paper tape reader is busy. Otherwise the program continues sequentially.

Prerequisite: RPQ 891050.

Branch Paper Tape Reader Busy—Additional 893043
1401 Model B, C, D, E, or F

This feature provides an additional branch on paper tape reader busy instruction. The instruction format is the same as on RPQ M94255 except that a different d-modifier is assigned to each reader.

Prerequisite: RPQ 891050 for second reader adapter.
RPQ M94255 for first branch reader busy.

Branch Printer Not Ready E17300
1401 Model B, C, D, E, or F

This RPQ furnishes a special d-character to be used with a branch operation to branch on printer-not-ready in the first printer of a dual printer system. Printer-not-ready consists of end-of-forms, forms check, carriage tape brushes up, T-casting open, clutch light (that is, when the clutch is not in one of the four positions), or blown fuse. If branch-printer-not-ready is desired for second printer, 1924-43 must have RPQ 811155.

Branch Printer Not Ready—Second Printer 811155
1924-43 Dual Printer Adapter

This feature furnishes circuitry in the 1924-43 to allow branch-printer-not-ready to be operative with the second printer in a dual printer system.

Prerequisite: The 1401 must have RPQ E17300 installed.

Branch on Reader Punch Ready E01829
1401 Model A, B, or C

This feature provides two branch conditions to allow reader and punch operations to occur when the 1402 can accept the command. Stacker-switch or jam-bar troubles will prevent a branch. Hopper empty will also prevent a branch with two unprocessed cards left in the machine.

Branch on Tape Ready Op Code W94945
1401 Model C, D, E, or F

This feature provides a branch-on-tape-ready command B(I)d where d is a special character to test tape-unit status.

Limitation: For IBM 729 Magnetic Tape Units only.

Branch on Zero Indicator M97538
1401 Model B, C, D, E, or F

This feature provides a branch instruction to test a zero indicator that is set if the arithmetic result of an add or subtract operation is zero. Zero indicator is to be reset by the next add or subtract operation.

Character Insert on Card Error F91943
1401 Model A, B, C, E, or F

This feature inserts a specified character in storage in place of any character giving a validity check when read from a card in the 1402. The inserted character may be any character that includes zone bits in its configuration. The character must be specified with the order. Switch control for character insertion is in the 1401.

RPQ 812066 is required only if error card count is desired. This feature is not compatible with operation of Column Binary or Punch-Feed Read.

Clock Input Adapter -- Hours and M08400
Hundredths of Hours
1401 Model B, C, D, E, or F

This feature provides the adapter for connecting the 1998-35 continental clock (hours and hundredths of hours) to the 1401. The clock is addressable under instruction format I AAA R and is read out serially to the 1401 storage area specified by the A-address. Address modification is plus one. An interlock circuit is provided to interlock the 1401 in case a read-out is called for while the clock is advancing. Operation of this device is not permitted in process overlap mode. It cannot be used to calculate use time as outlined in the sales manual. The device is incompatible with any standard, optional, or special device using the operation code I.

Prerequisite: RPQ 813129.

Clock Input Adapter—Hours and Minutes F89070
1401 Model B, C, D, E, or F

This feature reads the same as M08400 except that the time is given in hours and minutes, and the 1998 Model 28 is used.

Prerequisite: RPQ 812135.

Collating Sequence 1401-7090 M99387
1401 Model B, C, or D

This feature provides, by switch control, a change in collating sequence between standard 1401 sequence and the 7090 sequence.

Prerequisite: High-low-equal compare feature.

Compare Digit Only Op Code F91221
1401 Model B, C, D, E, or F

This feature provides a special operation (Op) code to compare the digit portion of a character regardless of zone information bits.

Counter—1403 Line 811054
1401—All Models

This feature provides the 1401 adapter to control the 1403 line counter.

Counter—1403 Line E05304
1403 Model 1, 2, or 3

This feature provides a six-position, manual-reset counter for counting cumulatively the lines printed by a 1403 printer. The counter is mounted under the covers and in no way limits the standard machine.

Prerequisite: RPQ 811054 required on the 1401.

Count Error Cards 812066
1402 Model 1

This feature furnishes a counting device on the 1402 and circuitry in the 1401 to count cards that have produced a validity error. Switch control for the counter will be in the 1402. For use with the 1401 character insertion on card error device.

Counter—Read Feed M95147
1402 Model 1 or 2 (1401)

This feature consists of a six-position counter, switch-controlled, which counts cards that passed hole-count and validity check.

Eliminate A-bit Printing as Record Mark W97359
1401 Model A, B, C, D, or E

This feature changes the circuitry so that an A-bit only in memory or print buffer will print nothing. It presently converts to A-8-2 for printing a record mark.

Eliminate Validity Check 815031
1402 Model 1

This feature furnishes two switches for controlling validity checking by elimination of reading and/or punching the specified columns in the 1401.

Prerequisite: RPQ W92900 on the 1401.

Eliminate Validity Check Columns 41-80 W92900
1401 Model A, B, C, E, F, or G

This feature eliminates validity check by preventing reading and/or punching of columns 41-80 to permit processing of tumble cards. Read and punch switches are provided.

Prerequisite: RPQ 815031 on the 1402.

Expanded Alpha Special Systems
Feature Bulletin L24-3102

80- and 120-character-set printing for letter writing and other special printing jobs requiring more than the standard 48-character set. See Special Systems Feature Bulletin L24-3102 for description and ordering information.

Feed 59/80-Column Adapter 898074
1401 Model B, C, E, or F

This feature consists of the circuitry in the 1401 for interchangeably reading 59- and 80-column cards.

File Adapter 7631 and 1301 810099
1401 Model F

This feature provides the circuitry for attaching an IBM 7631 Model 1 File Control and as many as five IBM 1301 Model 1 or 2 Disk Storage units. Attachment circuitry in the 1401 replaces the 1405 attachment circuitry, and the system can be equipped with 1301 units only. Field installation is available on 1401 systems above serial number 25,000 only. The 1401 must have 8K or more storage and must have sense switches, Feature Code 7600.

File Interchange E03909
1401 Model F

This feature permits the interchange of one 1405 Model 1 or 2 between two 1401 systems. Both systems must have power off while interchange is made.

<u>Files, 2 or 3 1405's on 1401</u> <u>1401 Model F</u>	<u>F91232</u>	<u>Move Character Instruction</u> <u>1401 Model A, B, C, D, E, or F</u>	<u>F91530</u>
This feature modifies the first 1405 Model 1 or 2 unit to permit attaching one or two additional Model 1 or 2 units (maximum of three to a system).		This feature provides programming means for combining the functions of move numeric and move zone in a single instruction.	
<u>Four Additional Sense Switches</u> <u>1401 Model A, B, C, D, E, F, or G</u>	<u>E01142</u>	<u>Move Character with WM</u> <u>1401 Model A, B, C, D, E, F, or G</u>	<u>811115</u>
This feature gives as many as four additional sense switches beyond the seven available as standard features.		This feature allows modification of move-numeric and move-zone operation codes. A single operation takes place in which a move numeric, zone, and word mark occurs. A d-character with move Op code allows the special operation. The special move Op code can be chained.	
<u>Group Mark 12-5-8 or 12-7-8</u> <u>1401 Model A, B, C, E or F</u>	<u>M94618</u>	<u>Move Records -- With or Without WM</u> <u>1401 Models -- see description</u>	<u>M00732</u>
This feature provides reading and punching of group mark as 12-5-8 or 12-7-8 under switch control. If switch is in 12-5-8 mode, 12-7-8 is invalid and vice versa.		This feature supplies a programming means that permits records to be moved from the A-field to the B-field with or without transmission of A-field WM (word marks). The B-field WM will be lost when the A-field WM is inhibited with a d-character. Advance programming is a prerequisite, and this device can be installed on any 1401 model for which Advance Programming is available.	
<u>Hopper Extended Capacity</u> <u>1402 Model 1 or 2 (1401)</u>	<u>M03535</u>	<u>Paper Tape Input to 1401</u> <u>1903-2</u>	<u>E95528</u>
This feature extends the hopper side plates and back plate to allow insertion of about 2,000 joggled cards into the hopper instead of the standard 1,200.		This RPQ provides a special unit (IBM 1903 Paper Tape Reader Model 2). It is a 500-character-per-second reader with a 140-character core buffer. The control panel is pluggable for 5-channel telegraphic or IBM 8-channel coding. Order must specify 5- and/or 8-channel operation.	
<u>Magnetic Tape -- Check Point Write</u> <u>Instruction</u> 1401 Model C, D, E, or F	<u>E02881</u>	Prerequisite: RPQ 891050 Serial Input Adapter for 1401.	
This feature supplies a special write tape operation code that recognizes special character (undefined) to stop tape write. The standard group-mark with word-mark is ignored as a control character and is treated as any other character. No special read instruction is provided.		<u>Paper Tape Read Modify Operation,</u> <u>1011 to 1401</u> <u>1401 Model B, C, D, E, or F</u>	<u>W99246</u>
<u>Magnetic Tape Release</u> <u>1401 Model C or D</u>	<u>E98253</u>	This feature modifies the 1401 so that when paper tape read is terminated by a group-mark with word-mark in 1401 core storage, the first character of the next record is not lost. The group-mark with word-mark is lost but by programming, can be placed back in its proper location at the end of the read field before the next block of information is read from the 1011. This change does not affect the operation of magnetic tape.	
This feature provides for an operation like read and punch release. It allows processing during start time of a read or write magnetic-tape instruction.			
<u>Modify Address Op Code</u> <u>1401 Model B, C, D, or E</u>	<u>M98528</u>		
This RPQ provides a modify address instruction for models equipped with 4K or less core storage. This instruction operates and takes the same form as the modify address instruction provided on 1401's equipped with more than 4K of storage.			

Paper Tape Serial Input Adapter 891050
1401 Model B, C, D, E, or F

This feature provides the adapter in the 1401 to permit attachment of the 1903-2 paper tape input unit provided by RPQ E95528.

Plotter Attachment to 1407 W01372
1407 Model 1

This feature provides the circuitry to attach an IBM 1627 Plotter to the 1401 system through the 1407 Model 1.

Printer – Form Length Extended E01665
1403 Model 1, 2, or 3 (1401)

This feature modifies the 1403 carriage control to use a control tape as long as 40 inches. With a 40-inch tape, the following maximum form lengths can be used: *

- 40-inch form @ 6 LPI
- 30-inch form @ 8 LPI
- 24-inch form @ 10 LPI
- 16-inch form @ 15 LPI
- 15-inch form @ 16 LPI
- 12-inch form @ 20 LPI

* Prerequisite: None for standard 6 or 8 lines per inch.

- RPQ W91990 for 6 and 10 LPI
- RPQ M98638 for 6, 8 and 10 LPI
- RPQ W90494 for 6 and 15 LPI
- RPQ M08444 for 6 and 16 LPI
- RPQ W96131 for 6 and 20 LPI

Print Lozenge for GM and Lozenge E09787
1401 Models (see description)

This feature makes possible the printing of a lozenge for either BCD code CBA 84 or CBA 8421 in storage, which covers card codes 12-4-8, 12-5-8, or 12-7-8. If card code 12-5-8 is used, the 1401 must be equipped with RPQ M94618 Group Mark device. This feature is good for all models of 1401 that have a 1403 whose type arrangement is such that a lozenge is in the BCD location CBA 84.

Printer Space Control Circuit 815037
1401 All Models with 1403

This feature provides the circuits in the 1401 to allow the 1403 printer to operate at other than standard 6 or 8 LPI (lines per inch) spacing. Order must define which line-spacing RPQ is to be installed on the 1403.

Print Space Suppress 898172
1924-43

This feature is compatible with the space suppression feature in the 1401 system and requires the same Op code once the second 1403 is selected.

Printer Space 6-20 LPI W96131
1403 Model 1 or 2 (Factory Only)

This feature modifies the 1403 to provide 6- or 20-LPI spacing. Eight-LPI spacing is not available with this feature. Specify maximum form length to be used.

Prerequisite: RPQ 815037 on 1401.

Punch Binary and Standard IBM Card M95242
1401 Model A, B, C, E, or F

This device provides for the reading and punching of both binary and standard IBM card codes from and into the same cards.

Punch Buffer E97649
1924 Model 44

This feature provides a special punch buffer that can be ordered on single or dual 1402 basis. On single basis, the 1402 is attached to the 1401 through the 1924-44 box with the 1402 punch side buffered and the read side standard.

On the dual basis, the first 1402 is connected to the 1401 with read and punch operating normally. The second 1402 is connected to the 1401 through the 1924-44 with the punch side buffered and operable as required. The read side of the second 1402 is not usable at any time. Single or dual operation must be specified.

Prerequisite: RPQ 892031 is required on the 1401, which may be a Model B, C, E, or F.

Punch-Buffer Adapter 892031
1401 Model B, C, E, or F

This feature supplies the necessary adapter in the 1401 for the 1924-44 punch buffer.

Prerequisite: If the 1401 has process overlap feature, RPQ 810075 is also required.

Punch-Buffer Adapter Modification for 810075
Process Overlap
1401 Model B, C, E, or F

This feature provides for modification of the 1402 punch buffer adapter to work with the process overlap feature in the 1401 processing unit.

Punch Feed – Interchange 59/80- E98497
Column Cards
1402 Model 1

This feature provides an interchangeable punch feed so that either 59- or 80-column cards can be fed and punched in the 1402. The 59-column cards cannot be selected into the 8/2 pocket. RPQ 898074 is a prerequisite on the 1401.

Punch-Feed-Read, Last Card Indicator M97541
1401 Model B, C, E, or F

This feature provides a punch-feed-read last-card indicator under sense-switch control. Two sense-switch options are available; one must be specified.

Option A -- Sense-switch B used -- Instruction format B III B

Option B -- Sense-switch M used -- Instruction format B III M.

Prerequisites: Feature codes 7600 and 5895, sense switches and punch-feed-read control.

If option B is selected through RPQ E01142, additional sense switches are also a prerequisite.

RPQ 813134 is required on the 1402.

Punch-Feed-Read, Last-Card Indicator 813134
1402 Model 1 or 2

This feature consists of the circuitry to allow the end of file operation for the punch feed read feature.

Prerequisite: Feature Code 5890 – punch-feed read and RPQ M97541 on the 1401.

Punch 357 Instruction Code -- Switch- M09157
Controlled
1401 Model A, B, C, E, or F

This feature provides switch control of 1401 circuitry, so that with the switch ON, any list combination with B, A, and WM in the punch storage area causes

the 1402 to punch a 12, an 11, and the 0-9 digits in that column. When the switch is OFF, punching is normal.

Read Error Indicate Modification M93687
1401 Model A, B, C, E, or F

This feature installs a switch (on the 1401 panel) that controls the operation of the read error circuits as follows:

1. When I/O check stop switch is ON and this special switch is ON, only the validity errors are sensed when a branch-on-read-error-indicator-on is performed.
2. When either switch is OFF, the branch indicator operates normally.

Read Gapless Tape E08264
1401 Model C, D, E, or F

This feature provides the ability to read gapless tape. Tape density may be 200 or 556 bits per inch, but must be compatible in all work with IBM tape with the exception of the record gap.

Read Stacker Select Delay W92210
1401 Model A, B, C, E, or F

This device allows additional time for stacker selection under control of the 1401. After being read at second read, a card is held until the next read-feed cycle. The information read from the card can be edited, and the card selected in the proper stacker on the next cycle.

Read Validity Check Elimination E12345
1401 Model A, B, C, E, or F

This feature allows elimination of read validity checking for specified card columns through program control. It does not operate with punch-feed-read feature. Any one or all of the 80 columns may be treated for validity eliminations.

Read Validity Check Elimination with E13739
Punch Feed Read
1401 Model A, B, C, E, or F

Same as E12345 but includes punch-feed read.

Read 52 Columns from 51-Column Card E03790
1401 Model B, C, E, or F

This feature modifies the 1401 to permit reading 52 columns from a 51-column card.

Limitations: Load key operation of the 1402 is not compatible with this feature. Cards with left-hand corner cut must have a 12-punch in column 0 of the 51-column card to prevent read check in the 1402. For factory installation, customer must furnish about 200 cards (punched for testing the feature) six weeks before shipping date.

Read and/or Punch 90-Column Cards 899285
1401 Model B, C, or E

This feature has the ability to translate alphameric 90-column coding. This is a basic feature that must be ordered whenever 90-column input or output with translation is requested. This feature will handle 39 characters: 26 alphabetic, 10 numeric, blank, minus zero, and asterisk.

Prerequisite: Columnbinary, Feature Code 1990. Companion RPQ 899286 or 899287 required on the 1402.

Reader/Punch Card Code 8-2 and 898148
A-Bit Compatibility
1401 Model A, B, C, E, or F

This feature provides A-bit compatibility between 1401 and 1410 systems. It reads 8-2 punching and translates to an A-bit in storage. An A-bit in storage punches out as an 8-2. It is not switch-controlled.

Search Backward for Tape Mark M97360
1401 Model C, D, E, or F

This feature allows the 1401 to be released for other programming as soon as the instruction cycle is completed. An instruction of the form U AAA D is used.

Second Printer Adapter (1403 on 1401) 891091
1401 Model B, C, D, E, or F

This feature modifies the 1401 to accept the 1924-43, which is required for dual printer operation.

Second Printer on 1401 E96450
1924-43 on 1401 Model B, C, D, E, or F

This RPQ provides a 1924-43 control for a second 1403 on a 1401 system. Standard printer and carriage control instructions are used, preceded by select-A or select-B printer selection instruction. Select-A remains effective until select-B is encountered and vice versa. Print assembly area for the second printer is main memory positions 601 to 732. During transfer from this area to the buffer,

the system remains interlocked for 12 microseconds per position. The first printer can be either alphabetic or numeric; second printer must be alphabetic. The first and second printer can have space suppress and each may be either Model 1 or 2.

Prerequisite: RPQ 891091 on 1401.

Limitations: Not for machines with Process Overlap feature.

Segment Mark Search Backward 891039
1401 Model C, D, E, or F

This feature consists of the circuitry for searching magnetic tape in a backward direction for a tape segment mark. The instruction format used is U %Ux X. The search does not stop for interrecord gaps.

Segment Mark Search Forward 891038
1401 Model C, D, E, or F

This feature consists of the circuitry for searching magnetic tape in a forward direction for a tape segment mark. The instruction format used is U %Ux P. The search does not stop for interrecord gaps.

Segment Mark Write E00629
1401 Model C, D, E, or F

This feature provides for writing a tape segment mark by the use of instruction format U %Ux G in a manner similar to the write-tape-mark instruction. This feature allows the blocking of groups of records already blocked by interrecord gaps.

This feature is good with or without process overlap and it does not count segments.

Paper Tape Serial Input Adapter 891050
1401 Model B, C, D, E, or F (Factory Only)

This feature provides the serial input adapter required on the 1401 to permit the attachment of the IBM 1903 Paper Tape Reader Model 2.

Set Bit, Clear Bit Op Codes M99413
1401 Model B, C, D, E, or F

This RPQ provides two special Op codes: Op code : (colon) AAA d for set bit, and \$ AAA d for clear bit. It operates similar to set or clear word mark. Depending on Op code, the d character 1, 2, 4, 8, A, or B clears or sets 1, 2, 4, 8, A, or B-bit respectively at AAA address position. Parity is maintained.

If required to be compatible with other features using an Op code \$, the clear bit changes to another Op code.

Set Density on Magnetic Tape -- E96769
Program Control
1401 Model C, D, or F

This feature supplies an instruction that sets density separately for each tape unit. Good only for systems with all 729-2/5's, 729-4/5's or 729-6/5's.

Space Control Circuit 898215
1924-43

This feature provides the circuitry in the 1924-43 to allow the second printer (1403) to operate at other than standard 6- or 8-line-per-inch spacing.

Start Switch -- 1401 from 1418 or 1428 817060
1401 Model B, C, D, E, F, or G

This feature provides the modification to accommodate an added auxiliary 1401 start switch mounted on the 1418 or 1428. RPQ Z30519 is required on the 1418 or 1428.

Start Switch -- 1401 from 1418 or 1428 Z30519
1418, 1428 Model 1, 2, or 3

This RPQ provides an auxiliary 1401 start switch mounted on the 1418 or 1428. The added switch is wired in parallel to the standard 1401 start switch. The added switch is not interlocked as to on-line or off-line operation. Thus the 1401 can be started from the added switch whenever the 1401 and 1418 or 1428 are turned on. RPQ 817060 is required on the 1401.

Switch Controlled Rewind Only E06187
1401 Model C

This feature modifies the rewind/unload tape instruction to only perform a rewind tape portion of the instruction. A toggle switch is provided for control. With the switch OFF, normal operation is resumed.

Switch Punch Checking -- 2 Columns M01333
1401 Model A, B, C, E, or F; or 1460

This feature provides two switches to eliminate punching and checking of two columns in the punch feed of a 1402. If four columns are required, this device can be ordered twice. Validity check and reading are crippled in the specified columns if the punch-feed-read device is installed.

Tape Error -- Character Insert 707712
1401 Model C, D, E, or F

This feature converts any tape character of incorrect parity to a specified character and enters it in storage in place of the invalid character. The feature is toggle-switch controlled.

Tape Load -- Modify Instruction M96340
1401 Model C, D, E, or F

This feature provides a special load Op code to read and write 7070 tape with delta. Converts deltas to word marks and vice-versa. Load Op code to take instruction format of L %Dx BBB R. Use D to signify load of 7070 tape.

Translate Move Op Code F93922
1401 Model B, C, D, E, or F

This feature provides an additional move operation that decodes any code using six bits or fewer, through character substitution from a stored table.

Validity Check, Reject Special Characters E00551
1401 Model A, B, C, D, E, or F

This feature allows a specified group of special characters to be invalidated by switch control. The following characters can be made invalid:

Slash -- 0, 1	Lozenge -- 12, 3, 8
Plus Zero -- 12, 0	Group Mark -- 12, 7, 8
Minus Zero -- 11, 0	Tape Mark -- 7, 8
Period -- 12, 3, 8	Asterisk -- 11, 4, 8
MLP -- 8, 9	Percent -- 0, 4, 8
Tape Seg Mark -- 0, 7, 8	Commercial A -- 4, 8
Dollar Sign -- 11, 3, 8	Record Mark -- 0, 2, 8
Comma -- 0, 3, 8	Model Change -- 11, 7, 8
Pound Sign -- 3, 8	WS -- 0, 5, 8

and the following undefined, special character codes:

12, 5, 8; 12, 6, 8; 11, 5, 8; 0, 6, 8; 5, 8; 6, 8; 11, 6, 8.

With this switch ON, characters are invalid -- with this switch OFF, the characters are valid. The selected group of characters must be in the above-mentioned group, and a minimum of ten and a maximum of seventeen can be selected. The characters to be invalidated must be specified.

Validity Error on 1401 with I/O Switch E07275
1401 Model A, B, C, E, or F

This feature allows the indication of a validity error when an error has occurred on reading a card from

the 1402. It allows normal I/O check stop switch operation.

Prerequisite: RPQ F91943.

Wide Hammers

E27363

1403 Models 1, 2, 4 or 5 (1401)

This RPQ provides a full set of wide hammers for use with wide type characters used in drawing diagrams, charts, and graphs with special type characters.

SECTION 2

IBM 1401, 1440, AND 1460 CUSTOM FEATURES

Clock Input -- Hours and Hundredths of Hours 813129
1998 Model 35

This is a special product (1998-35) continental clock to measure time in hours and hundredths of hours. The device is housed in a box approximately 8 x 8 x 7 inches and is suitable for table mounting (table not provided). Levers are provided for manual set and reset of the clock. The clock requires independent 115-volt ac power. A 9-foot power cord is supplied. This device cannot be used to calculate use time.

Prerequisite: RPQ 08400 on the 1401.
RPQ 812141 on the 1441 model A
or B.

Clock Input -- Hours and Minutes 812135
1998 Model 28

This RPQ reads the same as 813129 except that the time is given in hours and minutes, and the 1998-28 is used.

Prerequisite: F89070 on 1401.
812141 on 1441 A or B.

Clock Input -- Hours and Thousandths of Hours 812136
1998 Model 29

This is a special product (1998-29) continental clock to measure time in hours and thousandths of hours. The device is housed in a box approximately 8 x 8 x 7 inches. It is suitable for table mounting (table not provided). Levers are provided for manual set or reset of the clock. The clock requires independent 115-volt ac power. A 9-foot power cord is supplied. This device cannot be used to calculate use time as outlined in the sales manual.

Prerequisite: RPQ F94990 on the 1401, or
RPQ 812141 and RPQ E24954 on the
1441 Model A or B (1440, 1460).

Clock Input Adapter -- Hours and Thousandths of Hours F94990
1401 Model B, C, D, E, or F; 1440 or 1460

This feature consists of the circuitry for operation of a continental clock (time in hours and thousandths

of hours) with a 1401 system. The clock is addressable under the instruction format I AAA R and is serially read out to the 1401 storage location specified by the AAA address. Address modification is plus one. An interlock circuit is provided to interlock the 1401 in the event that a read-out is called for while the clock is advancing. Operation of this device is not permitted in process overlap mode. This feature cannot be used to calculate use time as outlined in the sales manual and is incompatible with any standard, optional, or special device utilizing the operational code I.

Prerequisite: RPQ 812136.

IBM 1401, 1460 CUSTOM FEATURES

Column Split -- Additional 813049
1402 Model 1, 2, or 3 (1401 or 1460)

This feature provides additional column splits to a maximum of ten columns. Columns must be specified.

Prerequisite: RPQ M01641 for first split.

Column Split -- Switch-Controlled M01641
1402 Model 1, 2, or 3 (1401 or 1460)

This feature provides a switch-controlled column split for the 1402. When the switch is ON, it prevents reading the 11- and 12-punches in the card column, or the split can be anywhere in the column between 9/8, 8/7, 7/6, etc. This RPQ covers the first column only, and the column must be specified. (For additional columns, as many as ten, see RPQ 813049).

Feed Port-A-Punch® Cards (first feed) W93189
1402 Model 1, 2, or 3 (1401 or 1460)

This device permits feeding of Port-A-Punch cards in either the punch or read feed by modifying three stackers. The capacity of the modified stacker is reduced to about 650 cards. Specify the feed to be modified. Port-A-Punch and standard cards may be intermixed. If both feeds must be modified, RPQ M97006 must be installed in addition to this RPQ.

Feed Port-A-Punch Cards (second feed) M97006
1402 Model 1, 2, or 3 (1401 or 1460)

This device permits feeding of intermixed standard and Port-A-Punch cards in the punch or read feed by

modifying two additional stackers. The capacity of the modified stacker is reduced to about 650 cards. RPQ W93189 is a prerequisite on the other feed.

Folded-Card Feeding E96513
1402 Model 1, 2, or 3 (1401 or 1460)

This feature permits feeding and punching folded cards in a 1402 punch feed. An operator-adjustable throat permits switching from folded to standard cards. Folded cards can be read only on the original pass through the 1402. Cards must be folded so the edge of master and stub are parallel within 0.015 inch. Minimum stub length is 6.375 inches.

Printer Space 6-10 LPI W91990
1403 Model 1, 2, or 3 (Model 1 or 2 on 1401)
(Model 1, 2, or 3 on 1460)

This feature modifies the 1403 to provide 6- or 10-LPI spacing. Eight-LPI spacing is available with this feature, but it does not provide for any type change, and some characters overlap between lines.

Prerequisite: RPQ 815037 for 1403 Model 1 or 2
on 1401
RPQ 815082 for 1403 Model 1, 2,
or 3 on 1460.

Printer Space 6-8-10 LPI M98638
1403 Model 1, 2, or 3

This feature modifies the 1403 to provide 6-, 8-, or 10-LPI spacing. Specify maximum form length to be used with this feature.

Prerequisite: RPQ 815037 on 1401.
RPQ 815082 on 1460.

Printer Space 6-15 LPI F90494
1403 Model 1 or 2

This feature modifies the 1403 to provide 6- or 15-LPI spacing. Eight-LPI spacing is not available with this feature. Specify maximum form length to be used with this feature.

Prerequisite: RPQ 815037 on 1401.
RPQ 815082 on 1460.

Printer Space 6-16 LPI M08444
1403 Model 1, 2, or 3

This feature modifies the 1403 to provide 6- or 16-LPI spacing. Eight-LPI is available by double spacing 16-LPI.

Specify maximum form length to be used with this feature.

Prerequisite: RPQ 815037 on the 1401.
RPQ 815082 on the 1460.

Read Column Switch Control – 1st Group E09313
6 Column
1402 Model 1, 2, or 3 (1401 or 1460)

This feature modifies the 1402 to prevent the reading of as many as six columns under control of one switch. The elimination of reading the columns will cause a C-bit to be entered in each storage position. Columns to be eliminated must be specified on the order.

Limitations: Read feed side only. If more than six columns are to be eliminated, check with IBM regional office. Refer to RPQ 811101 for additional groups of six columns up to 36 columns total. Refer to RPQ E12110 for four additional columns to make a total of 40 eliminated. These RPQ's (811101 and E12110) are subject to capacity check before quotation is made.

Read Column Switch Control (add'l group of 4) E12110
1402 Model 1 or 2 (Model 3 without 51/80
Interchangeable Feed) (1401 or 1460)

This device prevents reading of four additional card columns under control of the same switch provided by RPQ E09313, beyond those columns provided by RPQ E09313 and RPQ 811101, making a total of 40 columns. The elimination of reading the columns causes a C-bit to be entered in storage in each position (read feed only). If this RPQ is added to a 1402, no other RPQ or standard feature requiring relays would be available.

Prerequisite: RPQ E09313 and 811101.

Read Column Switch Control (add'l groups) 811101
1402 Model 1 or 2 (Model 3 without 51/80
Interchangeable Feed) (1401 or 1460)

This device prevents the reading of additional groups of five columns under control of the same switch provided by RPQ E09313 (read feed only). A maximum of five additional groups may be ordered. The elimination of reading the columns causes a C-bit to be entered in storage in each position.

Prerequisite: RPQ E09313.

Read 90-Column Cards -- Fixed 899286
1402 Model 1 or 3

This feature provides the 1402 with 45-column brushes for reading 90-column punched cards only. No code conversion is provided. Translation from 90-column code to 1460 or 1401 code is accomplished with special programming. Column-binary functions are required. This feature reads elongated verified cards.

Read 90-Column or 80-Column Cards 899287
1402 Model 1 or 3

This feature provides an additional set of 45-column brushes for reading 90- or 80-column coded cards interchangeably. No code conversion is provided. Translation from 90-column code to 1401 or 1460 code is accomplished by special programming. Column-binary functions are required. This feature reads elongated verified cards.

IBM 1440 CUSTOM FEATURES

Attach 1418 to 1440 M13260

This feature provides for the attachment of a 1418 to a 1440 system. The 1418 will not read the 1443 Printer output.

Attach 1419 to 1440 M13649

This feature provides for the attachment of a 1419 to a 1440 system.

IBM 1460 CUSTOM FEATURES

Printer Adapter - 1404 E23216
1460

This feature provides the circuitry in the 1461 Model 1, 2, or 3 to install a 1404 as the first printer for the system. Additional 1403 printers are available as stated in the sales manual.

Space Control Adapter 815082
1460

This feature provides the circuitry in the 1461 Model 1, 2, or 3 to allow special spacing on the 1403, Model 1, 2, or 3. An RPQ for the desired spacing is required on the 1403.

IBM 1440, 1460 CUSTOM FEATURES

Adapter 1903-2 for 1440 or 1460 Z20205

This feature provides the circuits in the 1441 for attaching a 1903-2 Paper Tape Reader.

Prerequisite: RPQ 810138 on 1903-2 and 817059 on the 1441.

Additional Reducers M01062
1903-2

This feature provides additional code reducer hubs on the IBM 1903 Paper Tape Reader Control-Panel, Model 2. Each hub reduces as many as four input codes to one output code. This RPQ is for each additional group of two reducers. A maximum of five groups can be added.

Attach 1903-2 Paper Tape Reader to 1440 810138
or 1460

This feature modifies the 1903-2 to make it compatible with a 1440 or 1460.

Prerequisite: RPQ Z20205 on the 1441.

Branch on Paper Tape Reader Busy for Z20204
1440 or 1460

This feature supplies an Op code to perform a branch on Paper Tape Reader Busy.

RPQ Z20205 is a prerequisite.

Branch on Zero Indicator for E22480
1440 or 1460

This feature provides a branch instruction to test a zero indicator that is set if the arithmetic result of an add or subtract operation is zero. The zero indicator will be reset by the next add or subtract operation.

Clock Input Adapter for 812141
1440 and 1460

This feature modifies the 1441 to provide adapter controls for attachment of a continental clock.

Prerequisites: RPQ 812135 for 1998-28 hours and minutes.
RPQ 812129 for 1998-35 hours and hundredths.
RPQ 812136 and RPQ E24954 for 1998-29 hours and thousandths.

Clock Input Adapter – Additional Position E24954
for 1440 or 1460

This feature provides an additional adapter position to permit attachment of an hours and thousandths hours clock. Prerequisite RPQ 812131 for the first four positions.

Second Serial I/O Adapter on 810091
1440 or 1460

This feature installs a second serial I/O adapter similar to the first I/O adapter (FC 7080) in the 1441.

The normal Op codes that operate devices on the first I/O adapter also operate similar devices on the second I/O adapter. Two new instructions are supplied to select which of the two adapters is to respond to the normal Op codes.

Prerequisites: FC 7080 for 1440 or 1460 or
FC 3845 on 1440.

Special Op Code Basic for 817059
1440 or 1460

This feature provides circuitry for developing a basic special Op code for serial input/output devices.

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