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DECUS NO.	8-374
TITLE	BINARY OR RIM CONSOLIDATOR
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SOURCE LANGUAGE	PAL-D

BINARY OR RIM CONSOLIDATOR

DECUS Program Library Write-up DECUS No. 8-374

Title: Binary or RIM Consolidator

Author: Garth Peterson

Date: 12 August 1970

Name: BRMC

Core requirement: 0-777, field 0

Starting address: 200 (manual)
201 (Monitor System)

Programming language: PAL-D

Abstract:

The Binary or RIM Consolidator program accepts input paper tapes in either binary or RIM format and punches them back out in binary format, in RIM format, or in a special RIM format compatible with the binary loader. Multiple input tapes, not necessarily all in the same format, may be combined into one output tape. Format conversions between binary and RIM may be made in either direction. The interrupt facility is used for efficiency.

Description:

The Binary or RIM Consolidator (BRMC) is a PDP-8 utility program which can consolidate paper tapes in either conventional binary or Read-In-Mode format. The program can also convert from one format to the other. The output tape may be punched in binary format or in one of three kinds of RIM format. The first of these RIM formats is the usual one and is referred to below as Type 1.

The manual starting (or restarting) address is 0200; however, 0201 should be used as the starting address when BRMC is saved on disk or DECtape. Location 0201 contains an initial halt which allows the operator to make the reader and punch ready after calling BRMC into core. (This is very desirable with teletype output.) Location 0201 is also the terminal halt; the program will stop there after finishing the output paper

tape. Between successive input tapes there is an intermediate halt at a higher address in core. This address will not be specified here because modification and reassembly of the program might shift it. At the beginning of execution the START key should be used in order to decrease the chance of an unwanted interrupt. After an intermediate halt either the START key or the CONTINUE key may be used.

Input and output options are specified by the switch register. Output option switches are checked once at the beginning of execution. Input switches are checked at the beginning of each input tape. Switch options are as follows:

Switch(es)	Value	Significance
0	0	Binary or Type 2 or 3 RIM input
	1	Type 1 RIM input
1 & 2	10	High-speed reader
	01	Teletype reader
	00	No more input
4 & 5	10	High-speed punch
	01	Teletype punch
	00	No output
10 & 11	00	Binary output
	01	Type 1 RIM output
	10	Type 2 RIM output
	11	Type 3 RIM output

Switches 1 and 2 are also checked at the end of each input tape. If both are off, the output tape will be terminated and the program will branch to 0201. The operator thus has two ways to terminate execution: He may turn off the input device switch during the reading of the last input tape, or he may wait until the intermediate halt after the last input tape and then turn off the input device switch and press the START key.

Type 2 RIM is a variation of standard RIM format in which the last four characters on the tape are repeated before the trailer is punched. This assures that a binary loader will read the last core word on the tape correctly, even though it will not generate a zero checksum display. A RIM loader, on the other hand, will simply load the last word into core twice. A Type 3 RIM tape is closer to being a true binary tape, for its last four characters consist of an origin and a checksum. The origin specifies an address, usually location 0000, where the RIM loader may dump the checksum. This dumping address may be changed by patching location 0007 in BRMC.

A checksum display is generated for each input tape. This display is the same as would be generated by a binary loader. When switch 0 is

on at the start of an input tape, BRMC treats the last two characters on the tape as a core word which must be included in the output, as is necessary for a Type 1 RIM input tape, but these last two characters are nevertheless treated as a punched checksum in the checksum display, regardless of the setting of switch 0. The checksum punched with a binary or Type 3 RIM output tape depends only on the characters previously punched and does not depend on the validity of the input checksums. If no output device is specified, the program will read one input tape and branch to the terminal halt with a checksum display in the accumulator and link.

To facilitate format conversion the input data is treated as a stream of 12-bit core words, each having an associated field status and 12-bit address. A field setting character is punched into the output tape only when there is a core word whose field status differs from the field status of the previous core word. The field status is initially set as "undefined," which is not the same as field 0. This forces the first input field setting character always to be punched out unless no core words follow it in the input stream. Once the first field setting character has been punched, any given field character identical to the last one before will be suppressed. Once a field character has been read, the program cannot return to undefined field status during the current run; tapes without field characters are controlled by the last field character in the previous input tapes. However, the program will completely reinitialize itself after a terminal halt (at 0201) or after a manual restart (at 0200). If no input tape has any field setting characters, none will be punched in the output tape. During binary output, origins in the input tape receive similar handling: No origin is punched in the output tape except where there are actual non-consecutive core words. (Addresses 7777 and 0000 are treated as non-consecutive in the output but as consecutive for interpreting input binary tapes.)

BRMC is an appropriate program to use to convert from binary to RIM format, but binary tapes to be converted should not normally contain field settings. If they do, field characters will be punched into the RIM output according to the rules given above. To avoid unusable output, BRMC will terminate the current RIM output tape, if any, and start a new RIM tape with the field setting as the first character. The RIM loader will ignore this character, but the operator can read the field from it and set the data field switches accordingly when starting the RIM loader.

The input device is buffered by the program, using the interrupt facility, but output buffering is limited to the hardware buffers. Characters from the input device will be loaded into a core buffer until trailer code is read or the buffer overflows. After buffer overflow, the teletype reader will start up as soon as space is available in the buffer, but the high-speed reader will not start again before the buffer is empty, to minimize starts and stops. BRMC contains interrupt service only for the four devices mentioned earlier. If the user's machine has other peripherals which are capable of generating unsolicited interrupts, flag-clearing commands may be patched into core in eight locations from 0600 to 0607, which normally contain NOP instructions.