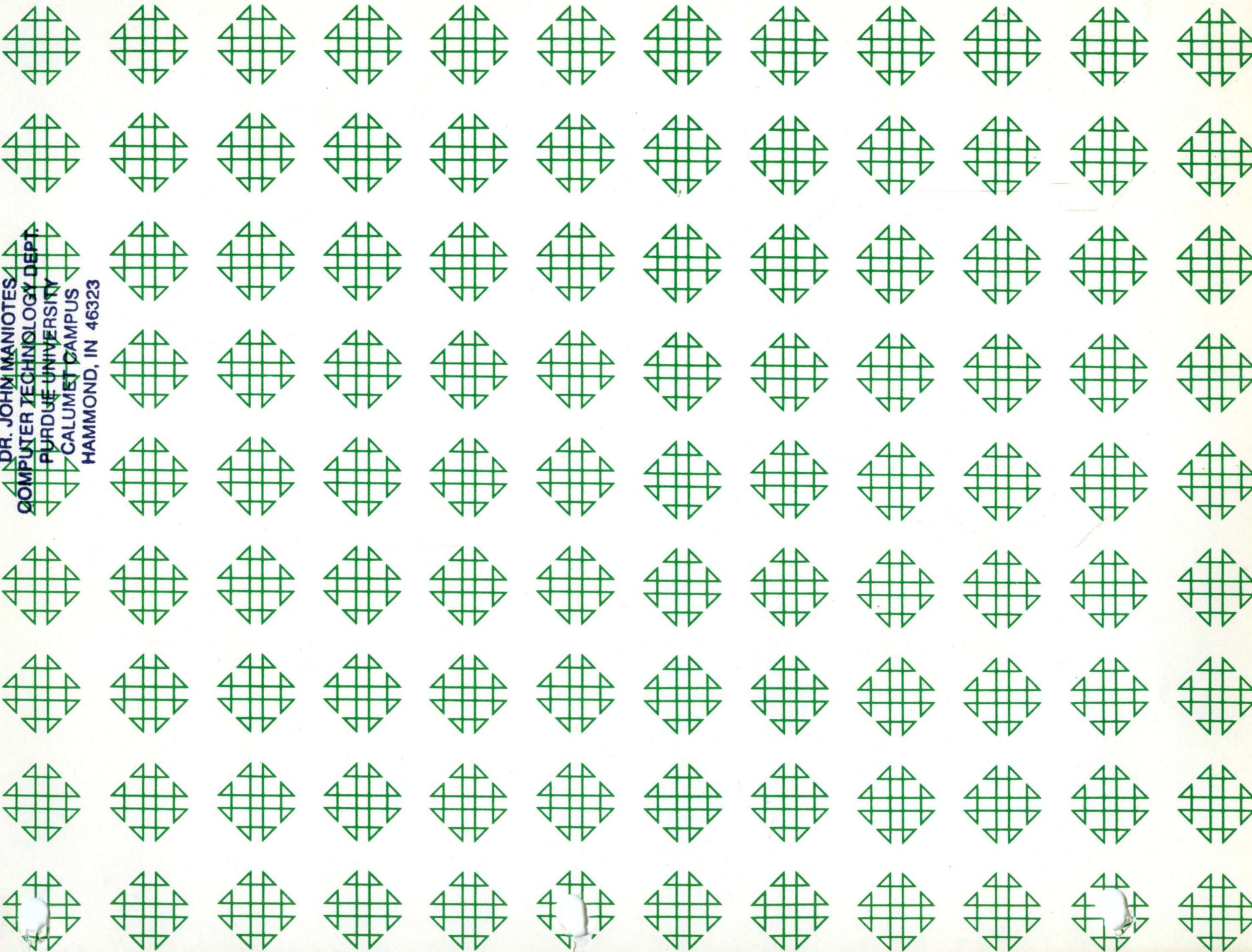


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CARD HASH TOTAL

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MARQUETTE UNIVERSITY
COMPUTING CENTER
SUBROUTINE MANUAL
FOR THE IBM 1620

Program: CARD HASH TOTAL

Date: October 10, 1961

Programmer: Mr. William G. Weideman, (revised by James H. Van Nuland)

Description: CARD HASH TOTAL is a card routine designed to afford a means of rapidly verifying the identity of a card deck by comparison of a derived total with a standard deck. The total so derived is punched on a card in the form suitable to be used as first card of the deck.

Coding Language: Card SPS

Input Format: Any card deck that can be read with a Read Alphanumeric (37) instruction.

Output Format: The single card contains, in cols. 1-19 and 61-20, machine instructions to read numeric into 00000 and branch to 00000. Cols. 30-49 contains the 20-digit Hash Total.

Restrictions: Any size deck may be used; the cards must contain valid 1620 punching, ie, can be read by a read alphabetic instruction (37).

Accuracy: Not exactly known, the probability of equal hash totals is probably less than 10^{-18} with non-identical decks. Incorrect sequence will affect the totals, as will blank cards or extra cards, etc. If two cards that should be a multiple of 99 apart in the deck are interchanged, the total will be un-affected. The odds on this, however, are extremely small.

Speed: Card input speed.

Equipment Required: Basic 20K storage 1620; Card I/O.

Operating Instructions: Before loading, set the switches as follows:



CARD HASH TOTAL

I/O; Parity switches, stop, Overflow, program.

Number 1: ON to type in check total.

Number 1: OFF to read check total from card.

Number 2: ON to omit punched output when not equal.

Number 2: OFF to punch total card if check total is not equal.

Number 3: ON to punch total card if check total is equal.

Number 3: OFF to omit punched output when equal.

*these
are
correct*

Press RESET, than load the 29 cards of Hash Total. Note that the first card (numbered 00000) is a hash total for the rest of the deck. It may be left in place.

Follow the program deck by your deck as follows:

If SW 1 is off, load the total card, or a blank card if check total is not known. Immediately following this, load your deck. Do not follow it by blank cards unless these are to be considered part of your deck. This program uses the last card indicator, so each deck to be checked is loaded separately, together with the appropriate total card. When the read hopper empties, press read start.

If SW 1 is on, the program will type:

ENTER CHECK TOTAL

If known, type the twenty digits of check total. Leave no spaces; flag only the low-order position. No record mark is needed. Load your deck without any total card or blank; read start; program start.

OUTPUT

The machine will compare the calculated total with the check total. If equal, the message EQUAL will be typed. **IF not** equal, the message NOT EQUAL will be typed, followed by the **hash total**.

If not equal, switch 2 will be tested to determine whether to punch the total. The program stops on a h8 halt instruction.

If equal, switch 3 will be tested to determine whether to punch the total. The program then stops on a h8 halt instruction.

If punched, the total card is followed by a blank card; this is done so that the punched card will be in the hopper, available for use without having to non-process runout.

Method:

A two-digit card count is kept. If it falls on 00, it is incremented an additional step. Each card is read alphabetically

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CARD HASH TOTAL

and the 160 digits are scanned to substitute a 9 for each record mark. The 160 digits is then multiplied by the card count and the 162 - digit product is added to a sum.

Following the last card, this sum is split into 20-digit fields and subtracted from 20-digit zero. The card count is added, and this is then the Hash Total.

Remarks:

Program may be restarted simply by pressing **start**.



Description of Decks

Source Deck

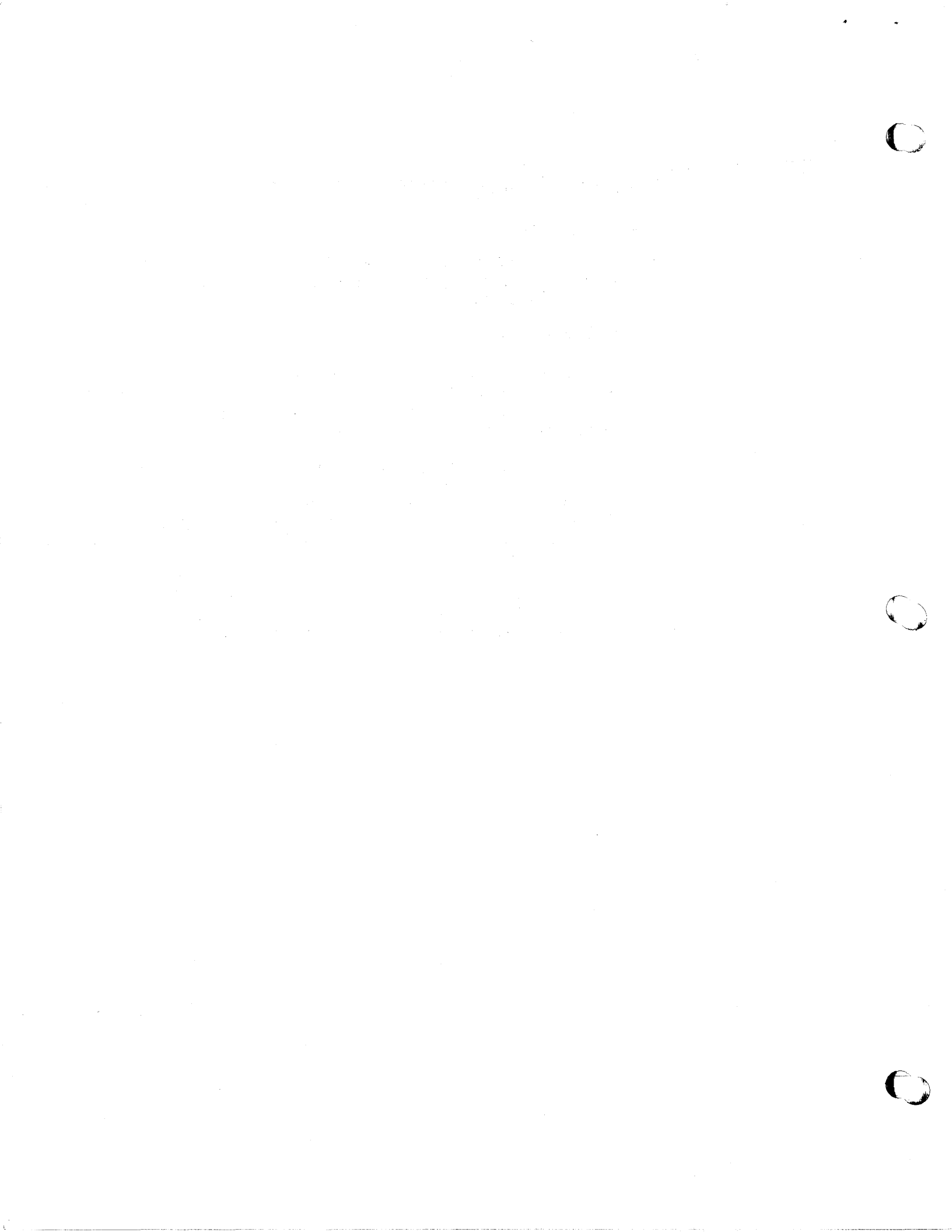
This deck is the source SPS Statement for the program. They are serially numbered in columns 1-5. Column 75 contains a zero.

Operating Deck

This is the smaller of the two decks. It is a reduced version of the machine-language program, numbered in columns 76-80. A Hash Total of the deck is in place as the first card, and may be left in place.

The deck was prepared as follows:

The source deck was assembled by SPS. The core was cleaned by transmitting numerical blanks throughout. The assembled SPS decks was loaded. Next, the contents of the core was punched into cards, (as much as needed) using a utility program, resulting in a self-loading deck. This was processed through a second utility program which replaced blank columns with numerical blanks. This deck was then Hash Totalled, and is the Operating Deck.



00010*
00020*
00030*
00040*

HASH TOTAL FOR CARDS
FILE NUMBER 1.6.503
OCTOBER 25, 1961.

00050	DORG	402	00402			
00060	CF	T+12	00402	33	01830	00000
00070	START	TF	00414	26	02179	01609
00080	TFM	SM,ZSM	00426	16	02016	00000
00090	SF	CNT,,10	00438	32	01854	00000
00100	BLC	IN-1	00450	46	00462	00900
00110	BC1	*+12	00462	46	00510	00100
00120	RNCD	*+48	00474	36	01610	00500
00130	SF	HASHIN-48	00486	32	01639	00000
00140	B	HASHIN-19	00498	49	00570	00000
00150	WATY	READ-12	00510	39	01375	00100
00160	RCTY	MESS	00522	34	00000	00102
00170	RNTY	HASHIN-19	00534	36	01639	00100
00180	BC4	*-24	00546	46	00522	00400
00190	SF	HASHIN-19	00558	32	01639	00000
00200	BI	*+12,600	00570	46	00582	00600
00210	READ	RACD	00582	37	01855	00500
00220	BI	IN	00594	46	00606	01600
00230	BI	*+12,1600	00606	46	00618	01700
00240	BI	*+12,1700	00618	46	00630	00700
00250	BI	*+12,700	00630	46	01230	00600
00260	TFM	ER1,600	00642	16	00665	02013
00270	X	BNR	00654	45	00690	00000
00280	TF	X+11,IN+158	00666	26	00684	00665
00290	TDM	*+36	00678	15	00000	00009
00300	SM	*+18,X+11	00690	12	00665	00002
00310	CM	,9	00702	14	00665	01855
00320	BNL	X+11,2	00714	46	00654	01300
00330	AM	X	00726	11	02016	00001
00340	BZ	CNT,1,10	00738	46	00726	01200
00350	TF	*-12	00750	26	00080	01591
00360	M	80,ZSM-18	00762	23	02013	02016
00370	A	IN+158,CNT	00774	21	02179	00099
00380	BA	SM,99	00786	46	01290	01900
00390	BNLC	ER2	00798	47	00582	00900
00400	RCTY	READ	00810	34	00000	00102
00410	SF	SM	00822	32	02179	00000
00420	SF	SM- 19	00834	32	02160	00000
00430	SF	SM- 39	00846	32	02140	00000
00440	SF	SM- 59	00858	32	02120	00000
00450	SF	SM- 79	00870	32	02100	00000
00460	SF	SM- 99	00882	32	02080	00000
00470	SF	SM-119	00894	32	02060	00000
00480	SF	SM-139	00906	32	02040	00000
00490	SF	SM-159	00918	32	02020	00000
00500	TF	T,SM	00930	26	01818	02179





00980HASHIN DC 20,0
 000
 00990 DS 31
 01000 DNB 40
 @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
 01010BLK DNB 40
 @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
 01020CD1A TR 80,60
 01030 B 72
 01040 DORG *-4
 01050 DNB 10
 01060T DS 20
 01070 DNB 11
 01080 DC 12,5004900000@
 01090 RNCD 0
 01100IN DAS 80
 01110CNT DS 3
 01120SM DS 163
 01130 DEND START-12

01658 00020 000000000000000000
 01689 00031
 01729 00040 @@@@@@@@@@@@@@@@@@@@@@
 01769 00040 @@@@@@@@@@@@@@@@@@@@@@
 01770 31 00080 00060
 01782 49 00072 00000
 01789
 01798 00010 @@@@@@@@@@@@@@
 01818 00020
 01829 00011 @@@@@@@@@@@@@@
 01841 00012 05004900000#
 01842 36 00000 00500
 01855 00080X2
 02016 00003
 02179 00163
 00402

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