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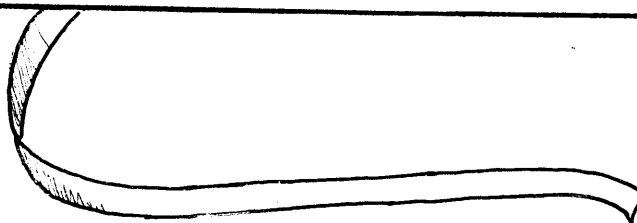
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PROGRAM DESIGN SPECIFICATION FOR  
 THE ASSEMBLE MASTER COMPOOL PROGRAM (JAMCZ)  
 A SUB-PROGRAM OF THE JOVIAL INTERPRETER SYSTEM



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INTRODUCTION

The principal device for facilitating both human and computer use of a common set of data terms in the SACCS System will be the dictionary of references known as the Compool (Communication Tag Pool).

Basically, a Compool consists of tables of all information which is (or may be) utilized by two or more programs in a system. These tables are usually available in computer storage during an assembly process, but as is envisaged for full SACCS operation, will be available for program use during system operation whenever common information is needed.

The data stored in the Compool must be derived from system needs and programmer design. Prior to assembling a Compool, many administrative and clerical decisions are involved. This includes such items as tagging conventions, avoidance of duplicate symbols, and optimum choice of material for Compool inclusion.

Once these decisions are made and administrative procedures established, the Assemble Compool Program and possibly supplementary programs can aid greatly in monitoring inputs as to legality and consistency; they can also provide various hard copy outputs for use in logic checking and in updating later Compool mods.

The Assemble Master Compool Program (hereinafter referred to as JAMCZ) was written to produce tables, items, and parameter (constant) references with information identical to that definable in a JOVIAL program. Thus, references to the basic documents on the use of the JOVIAL language will accurately describe the content of the Compool.

Assembly operation begins with input cards in the direct reader, or normally, with records on a prestored tape. The cards for a Compool are processed one at a time, including numerous legality checks. Errors found are logged on a delayed output tape. When all the cards are read, final processing is done, including a summary listing of the tables, items, and parameters in the Compool.

Finally, indicators set during the card processing are checked, and if no errors were discovered, the completed Compool is transferred to a buffer tape. Should errors be found, the Compool may still be transferred to tape. In this case, the tape records will include an error table plus the partially completed Compools.

Certain errors are presently considered uncorrectable and, if found, no tape transfer will result. In all cases an appropriate comment will appear on the printer as well as on the Delayed Output Tape describing any tape transfer (or reason for failure to complete transfer).

In this manner up to three different Compoools may be assembled for one JAMCZ operation.

Should the assembly of one or more Compoools result in a tape output which includes at least one error table, JAMCZ may be run in the Reassemble Mode; input to the program in this mode is the tape with one or more error tables and correction cards in the direct reader. These cards must exactly match the error table, or a new error table will be created for repeating the corrective process. For successful reassembly, the output is the same as for the Assemble Mode: one to three complete Compoools on a buffer tape.

#### ENVIRONMENT

Only the Test Control Program, with its associated input-output functions, (Helpful Package), are in JAMCZ's environment.

INPUT

Input to the Assemble Mode consists of an Assemble Master Compool Control Card plus a deck of cards in direct reader or on a prestored tape.

Input to the Reassemble Mode will consist of an Assemble Master Compool Control Card, a binary tape, and correction cards in the direct reader. The binary tape will contain one to three compools, at least one of which contains a table of comtags of entries to be corrected. The correction cards in the reader must maintain a one to one correspondence to the comtags in error. They will be identical in format to the input to the Assemble Mode. Format for all inputs is described below.

Card Formats

Assemble Master Compool Control Card.

Columns 1-5	JAMCZ
Columns 7-12	Ident of first compool
Columns 13-13	Ident of second compool
Columns 19-24	Ident of third compool
Column 25	Blank for Assemble Mode
	1-7 refers to which compools, if any, have revisions in the card reader for the Reassemble Mode
	1 - card revisions to first compool
	2 - card revisions to second compool
	3 - card revisions to first and second compools
	4 - card revisions to third compool
	5 - card revisions to first and third compools
	6 - card revisions to second and third compools
	7 - card revisions to all three compools

Ident Card (See Figure 1) - This card will be used to assign an identification to the compool.

Column 3	C
Column 7	Subsystem - This is a letter designation assigned according to the method of assigning subsystem designation as documented in FN-LO-71-1.

Column 8 C (Compool)  
Columns 9-10 Model and Version Number. These are assigned according to the method of assigning models and versions as documented in FN-LO-71-1.  
Columns 11-12 Modification Number. This is updated following each assembly of the Compool.

Item Card (See Figure 2) - This card is used to put item entries into the Compool.

Columns 1-2 Collate Number. This will facilitate documentation. It will be used to help arrange the cards prior to their being printed out.

Column 3 I  
Columns 7-12 Item Tag  
Columns 14-18 Table Reference. This is the table in which the item is located.  
Columns 20-21 Item Coding. The following designations for the codes are used:

- FP Floating Point (All Floating Point coded items are assumed to be signed and of maximum machine register length.)
- FI Fixed Integer
- BH Hollerith
- MX Mixed Number
- ST Status
- AD Address

Column 23 Signed/Unsigned. For all Fixed Integer and Mixed Number coded items, this Column will have an "S" if Signed or a "U" if Unsigned.

Columns 25-26 Number of Bits. This is the number of bits including the sign bit, if any. No figure will be found for Status or Floating Point coded items.

Columns 28-29 Number of Fractional Bits. This is for all Mixed Number coded items.

Columns 52-63 Units. Units are entered here for the convenience of documentation. They will not be used in assembling the Compool. Abbreviations can be used.

Columns 65-70 Card Number  
Columns 75-80 See Ident Card

Parameter Item Card (See Figure 3) - This card is used to put parameter values into the Compool.

Columns 1-2	Collate Number
Column 3	V
Columns 7-12	Item Tag
Columns 20-21	Item Coding (See Item Card)
Column 23	Signed/Unsigned
Columns 25-26	Number of Bits (See Item Card)
Columns 28-29	Number of Fractional Bits (See Item Card)
Columns 31-50	Parameter Value. This is entered starting in Column 31 according to the form specified in FN-LO-75, Section 2.5.
Columns 52-63	Units (See Item Card)
Columns 65-70	Card Number
Columns 75-80	See Ident Card

Table Card (See Figure 4) - This card is used to put table entries into the Compool.

Columns 1-2	Collate Number
Column 3	T
Columns 7-11	Table Tag. This tag begins in Column 7 for four and five character tags.
Columns 13-16	Maximum number of entries in Table.
Column 18	Table Type. If a table has a variable number of entries, enter "V". If it has a fixed number of entries, enter "R".

Status Card (See Figure 5) - This card is used to reference statuses to the proper status items. Each status item card in the Assemble Compool Deck is followed by one or more status cards containing the alphanumeric designations for the item's statuses.

Columns 1-2	Collate Number
Column 3	S
Columns 7-12	Item Tag
Columns 14-63	Item Status Symbology. Starting in Column 14, each alphanumeric designation of the Item Status is listed in the order in which it will appear in the Compool. The status symbols are separated from each other by a blank column. There may be more than one Status Card for a status item depending upon the total number of statuses for this item.

Columns 65-72	Card Number. The first six numbers will be the numbers appearing on the Item Cards. The last two numbers will vary.
Columns 75-80	See Ident Card

End Card - This card is used to describe the end of the Assemble Compool Deck.

Columns 3-5                      END

Assemble Mode Input Structure

- A. If all input is in the direct reader.
  - 1. AMC Control Card
  - 2. Compool Ident Card
  - 3. Mixed deck of item, table, parameter and status cards. (The order is not fixed except that status cards must follow the item they refer to.)
  - 4. End Card
  
- B. If input is prestored
  - 1. AMC Control Card
  - 2. A prestored tape containing the cards in "A" 2, 3 and 4 above.

Reassemble Mode Input Structure

- A. Binary input tape on C-3 containing Compool(s) to be corrected.
- B. Cards in the direct reader.
  - 1. AMC Control Card
  - 2. Correction Cards
  - 3. End Card



FIG 1 IDENT CARD

3	Card Type "C"
7	Subsystem
8	"C" Compool ID.
9	Model
10	Version
11-12	Mod. No.

FIG 2 ITEM CARD

1-3	Collate No.
3	Card Type "I"
7-12	Item Tag
14	Table Ref.
18	Item Coding
20-21	Sig/Unsigned
23	No. of Bits
25-26	No. of Fractional bits
28-29	
52-63	Units
65	Card No.
70	Subsystem
75-76	Model "C"
77	Model
77	Version
77-80	Mod. No.

FIG. 3 PARAMETER ITEM CARD

1-2, 3	Collate No.
7-12	Item Tag
20-21	Item Coding
23	Sig/Unsigned
25-26	No. of Bits
28-29	No. of Fractional Bits
38	Parameter Value
50	Units
65-70	Card No.
75-76, 77, 78, 79, 80	Mod. No. Version Model "C" Subsystem

FIG. 4 TABLE CARD

1-2, 3	Collate No.
7-11	Table Tag
13-16	Max. No. of Entries
18	Table Type
25-26	No. of Bits
28-29	No. of Fractional Bits
38	Parameter Value
50	Units
65-70	Card No.
75-76, 77, 78, 79, 80	Mod. No. Version Model "C" Subsystem

FIG. 5 STATUS CARD

75-76-1778-79-80	Mod. No.
	Version
	Model
	"C"
	Subsystem
65-70	Card No.
63	Item Status Symbology
14	
7-12	Item Tag
1-2-3	Card Type
	Collate No.

FUNCTIONS

1. Process Control Card; set mode indicator, obtain Compool identifications, make legality checks.
2. Compare identification values on Ident Card with those of Control Card.
3. Perform initial housekeeping.
4. Read and process Compool input cards; Table cards, Item cards, Parameter cards, Status cards.
5. Set up Main Tables; Table A, consisting of an alphabetical list of all Table, Item, and Parameter Entries; Table B, consisting of a list of statuses giving the values for all status-coded items in Table A.
6. Perform error checks on all cards processed.
7. Construct I/O Tables for transferring completed Compool to tape.
8. Transfer completed Compool or Compools to buffer tape.
9. If a correctable error has been discovered; print card, column counter, and set up error table for eventual tape transfer and Reassemble Mode processing.
10. Transfer completed Compools (including those with correctable errors) to a buffer tape.
11. Print out a description of all important functions as they occur.

OUTPUT

Table A

This is the main Compool table. It consists of table, item, and parameter entries intermixed in alphabetical order. The first register in Table A, called the Control Register, will contain in the address portion the number of words in the table (including the control register) and, in the decrement, the number of entries in the table. All entries are three words in length.

1. Table Entries

- a. Register  $\emptyset$  contains the Hollerith COMTAG - left-justified with trailing blanks.
- b. Register 1

Bits 5-1	Type of entry indicator $\emptyset$ = Item 1 = Table 2 = Parameter
Bit 2	Table Type $\emptyset$ = Fixed length 1 = Variable length
Bits 3-17	Number of words per entry
Bits 18-35	Number of entries

- c. Register 2 is not used in the Master Compool.

2. Item Entries

- a. Register  $\emptyset$  contains the item Hollerith COMTAG - left-justified.  
(If less than six characters, blanks will be substituted for zeros.)
- b. Register 1

Bits 5-1	Type of entry $\emptyset$ = Item 1 = Table 2 = Parameter
Bit 2	Sign-needed indicator $\emptyset$ = Unsigned 1 = Signed
Bits 14-17	Item codes $\emptyset$ = Status 1 = Floating Point 2 = Fixed 3 = Hollerith 4 = Address 5 = Mixed
Bits 18-29	Number of bits to the right of the binary point or, for status-coded items, the address of the first status for this item in Table B.

Bits 30-35            Number of significant bits or, for  
                         status items, the number of statuses  
                         in Table B for this item.

c. Register 2

Bits 0-17            The relative address in Table A of the  
                         table associated with this item.

### Table B

Register 0 in Table B contains the total number of registers in Table B. Subsequent registers in Table B contain Hollerith-coded information, one to six Bits long, left-justified; each register defines a status for a particular status item.

### Error Table

Should correctable errors be detected during the assembly process, the Compool will be processed to completion in the regular fashion, with the addition of a table of errors. This table will consist of:

1. A control register containing the number of registers in the error table.
2. A register for each error discovered containing the COMTAG found on the mispunched card.

### Communication to Test Control Program

When the Assemble Compool Program has performed all of its functions, it indicates to the Test Control Program success or failure by zero in the accumulator for success and non-zero in the accumulator for an unsuccessful assembly.

### Tape Formats

Diagrams B and C (See below) show the tape format of JAMCZ output for no errors, and correctable errors, respectively.

TABLE FORMAT OF COMPOOL

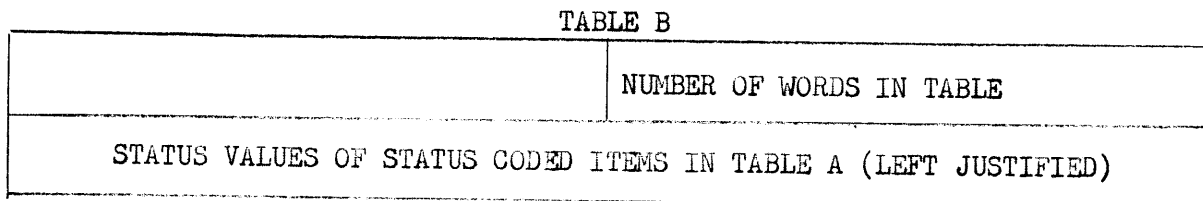
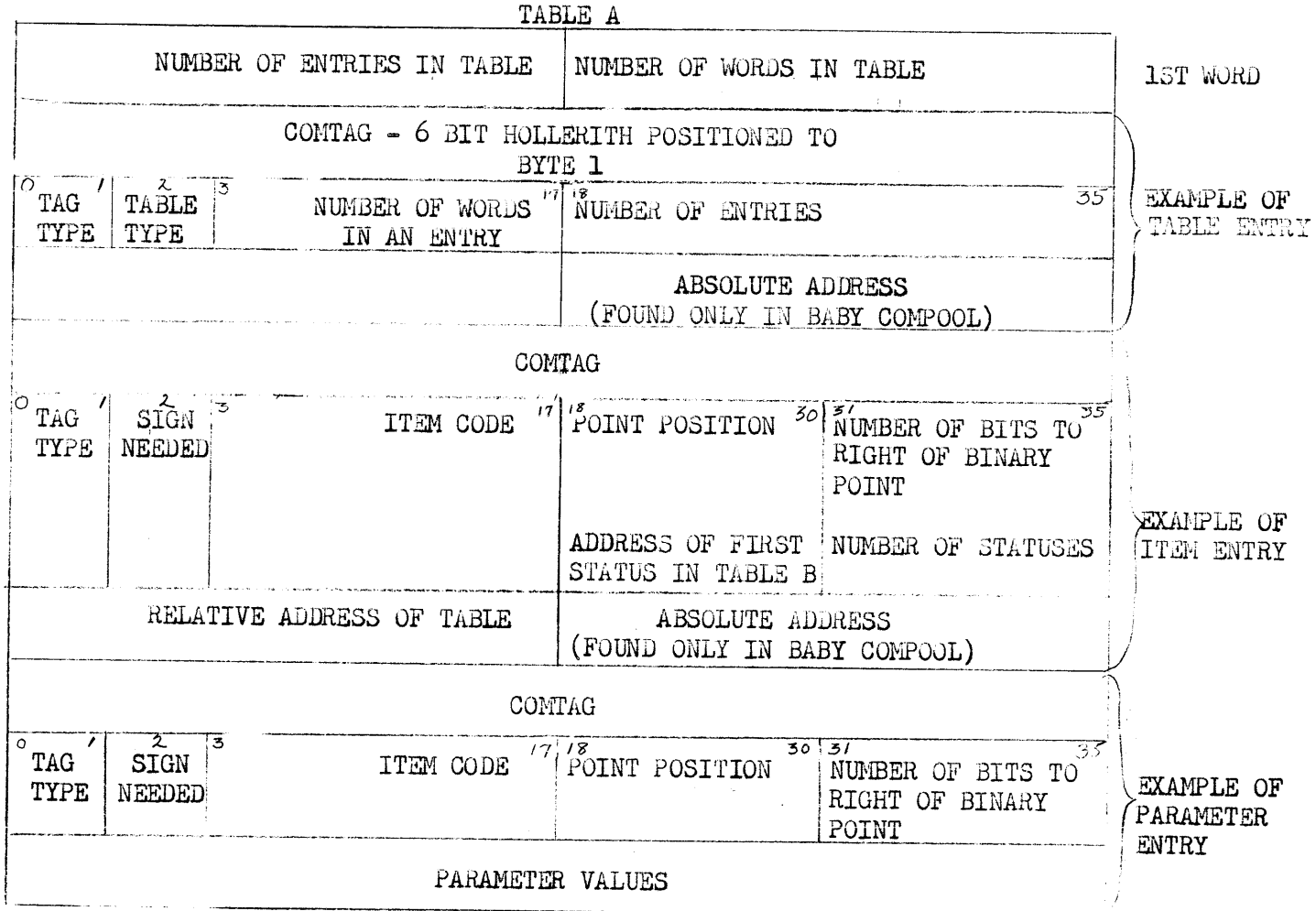


DIAGRAM A

ASSEMBLE MASTER COMPOOL TAPE FORMAT

(NO ERROR TABLE)

RECORD 1

IDENT  
RECORD

COMPOOL IDENT AS PUNCHED ON IDENT CARD	
	NUMBER OF WORDS IN RECORD 2 (A TABLE)
	NUMBER OF WORDS IN RECORD 3 (B TABLE)

RECORD 2

TABLE A

NUMBER OF ENTRIES IN "A" TABLE	NUMBER OF WORDS IN "A" TABLE
ALL "A" TABLE ENTRIES	

RECORD 3

TABLE B

	NUMBER OF WORDS IN B TABLE
STATUS VALUES FOR ALL STATUS-CODED ITEMS IN "A" TABLE	

DIAGRAM B



ASSEMBLE MASTER COMPOOL TAPE FORMAT  
 (WITH ERROR TABLE)

RECORD 1

ITEM  
 RECORD

COMPOOL IDENT AS PUNCHED ON IDENT CARD	
	NUMBER OF WORDS IN RECORD 3 (A' TABLE)
	NUMBER OF WORDS IN RECORD 4 (B' TABLE)
	NUMBER OF WORDS IN RECORD 2 (ERROR TABLE)

RECORD 2

ERROR  
 RECORD

	NUMBER OF WORDS IN ERROR TABLE
COMTAGS OF ENTRIES IN ERROR	

RECORD 3

TABLE A

NUMBER OF ENTRIES IN "A" TABLE	NUMBER OF WORDS IN "A" TABLE
ALL "A" TABLE ENTRIES	

RECORD 4

TABLE B

	NUMBER OF WORDS IN "B" TABLE
STATUS VALUES FOR ALL STATUS CODED ITEMS IN "A" TABLE	

MESSAGE PRINTOUTS

Compool Summary

The program will produce an alphabetical list of all tables followed by items belonging to the table. No detailed description is given in this output, as this would duplicate the processing accomplished using the Baby Compool. Following this table and item summary is an alphabetical list of all value items.

Non-error Printing

A. Assemble Mode

If a Compool has been successfully assembled and transferred to the buffer tape, the program will print:

COMPOOL (IDENT) WAS ASSEMBLED SUCCESSFULLY AND IS NOW ON THE BUFFER TAPE A3

B. Reassemble Mode

1. If the program finds a Compool without errors in the binary input tape it will print:

(IDENT) COPIED WITHOUT CHANGE AND IS NOW ON BUFFER TAPE A3

2. If a Compool has been corrected successfully, the program will print:

(IDENT) CORRECTED SUCCESSFULLY AND IS NOW ON BUFFER TAPE A3

Error Printouts

A. Assemble Mode

1. If a read check is encountered while reading binary tape, the program will print:

READ CHECK ON A2, PRESTORED INPUT

2. If a write check is encountered while writing on a binary tape, the program will print:

WRITE CHECK ON A3, COMPOOL OUTPUT TAPE

3. If an item tag does not follow the specification in FN-LO-71, the program will print:

(COMTAG) IS AN ILLEGAL ITEM TAG

The card with the illegal tag will be printed below.

4. If a table COMTAG does not follow the specification in FN-LO-71, the program will print:

TABLE TAG BELOW IS ILLEGAL

The card with the illegal tag will be printed below.

5. If an error is found on any card, the card will be printed and the value of the column counter will be indicated.
6. If more than one hundred cards are in error, assembly will be terminated and the program will print:

TOO MANY ERRORS TRY AGAIN LATER

7. If the first card does not have a "C" punched in column 3, the program will print:

NO IDENT CARD

8. If the Ident on the Ident card does not match the Ident on the Control Card, the program will print:

IDENTS PRINTED ON CARD BELOW DO NOT MATCH

A printout of both cards will follow.

9. If an item contains a table tag punched in columns 14 to 18, but this table has no defining card, the program will print:

NO DEFINING CARD FOR TABLE (COMTAG) IN ENTRY FOR ITEM (COMTAG)

10. If correctable errors were found during the assembly process and the Compool was transferred to the buffer tape, the program will print:

COMPOOL (IDENT) CONTAINS CORRECTABLE ERRORS AND IS NOW ON BUFFER TAPE

11. If errors are found which are not correctable for this mod of JAMCZ Reassemble Program, the program will print:

DECK FOR COMPOOL IDENT--MUST BE ASSEMBLED OVER FOR ERRORS LISTED ABOVE.  
NO TRANSFER TO TAPE

12. If a status item card contains no statuses and is not followed by a status card, the program will print:

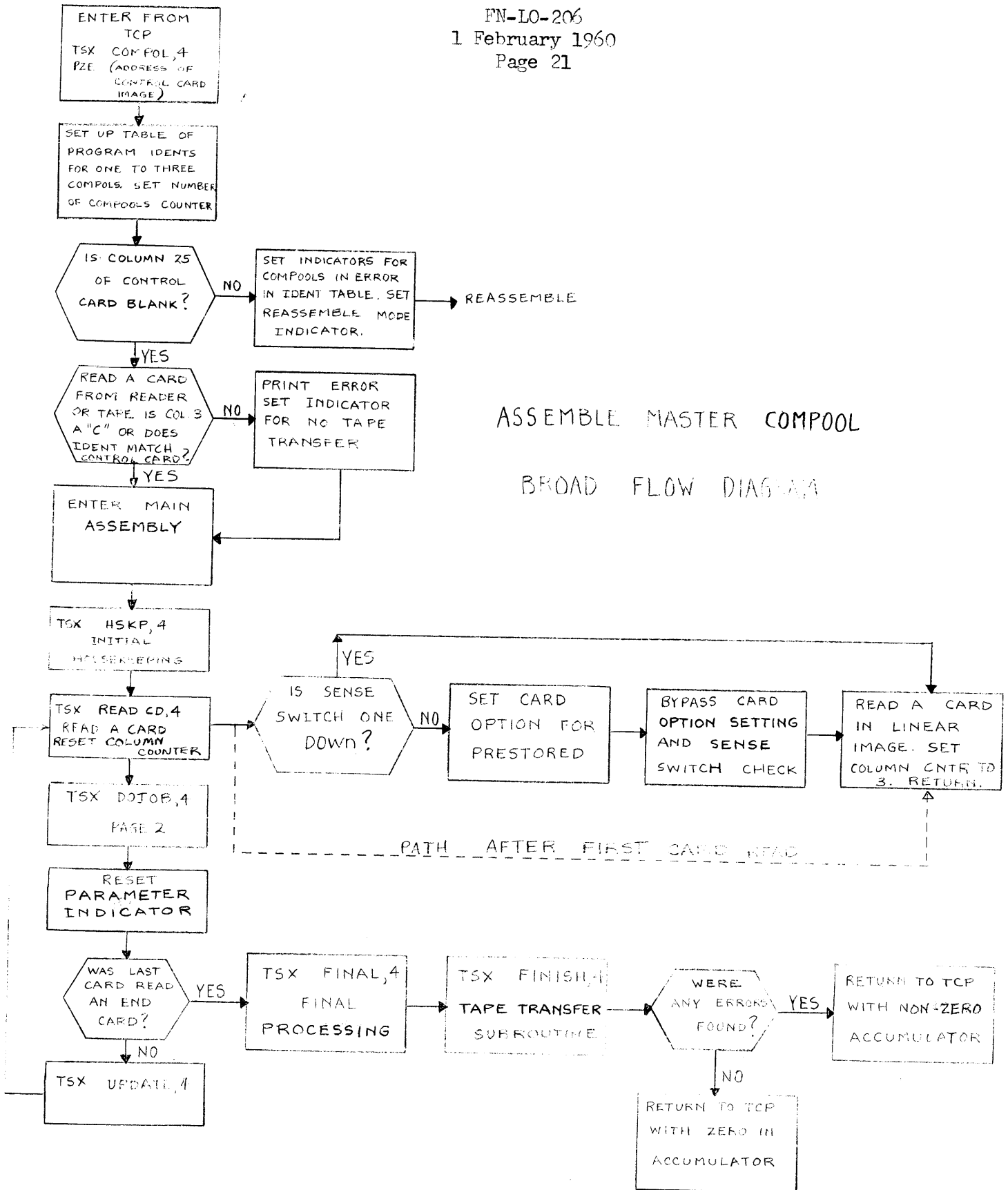
STATUS ITEM NOT FOLLOWED BY A STATUS ITEM CARD

13. If a status card has no statuses punched, the program will print:  
STATUS CARD HAS NO STATUSES
14. If a status card is not preceded by a status card or a status-coded item card, the program will print:  
STATUS CARD NOT PRECEDED BY A STATUS ITEM CARD
15. If the item tag on the status card does not match the item tag on the item card, the program will print:  
ITEM TAG ON STATUS CARD DOES NOT MATCH ITEM

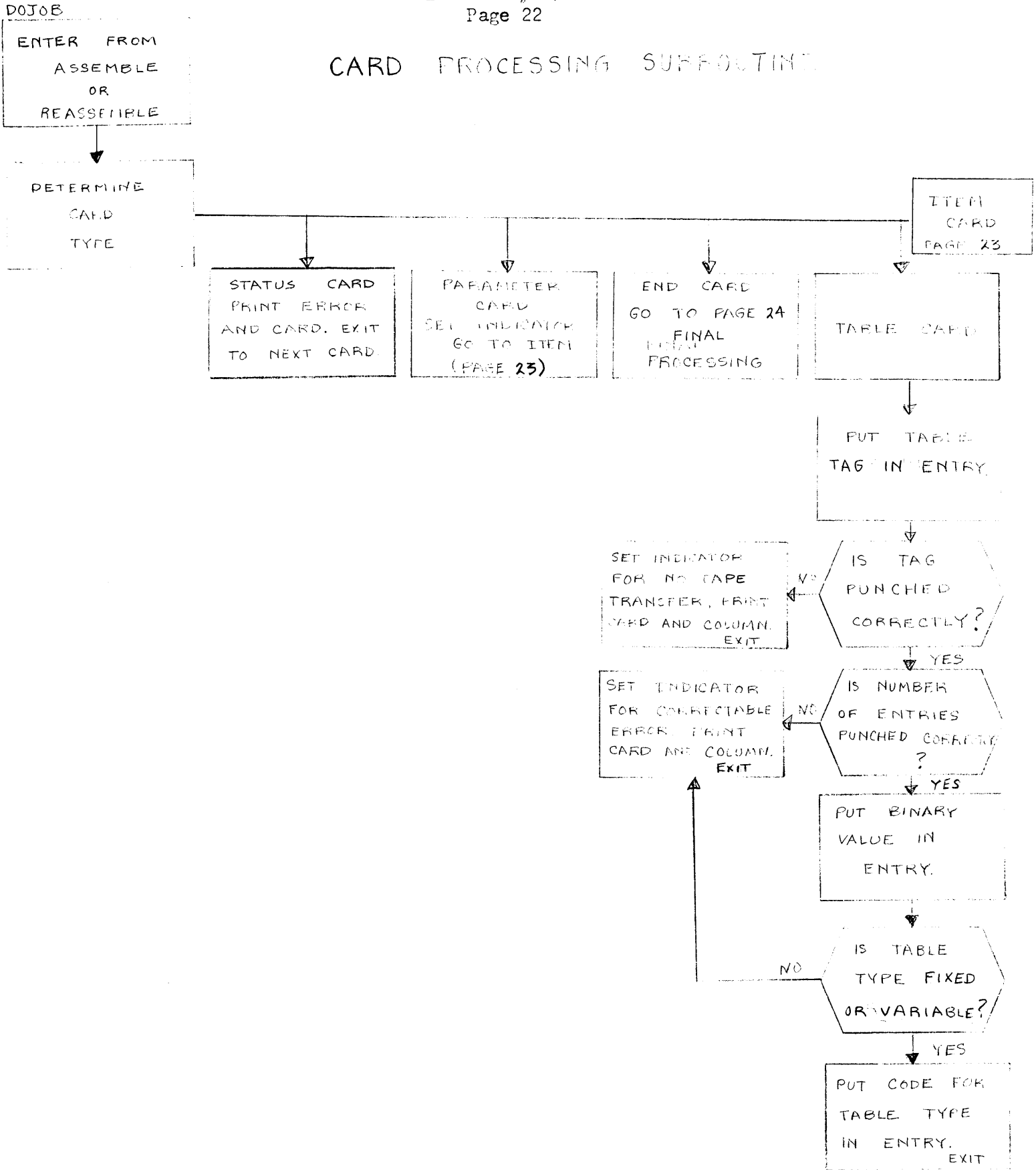
B. Reassemble Mode

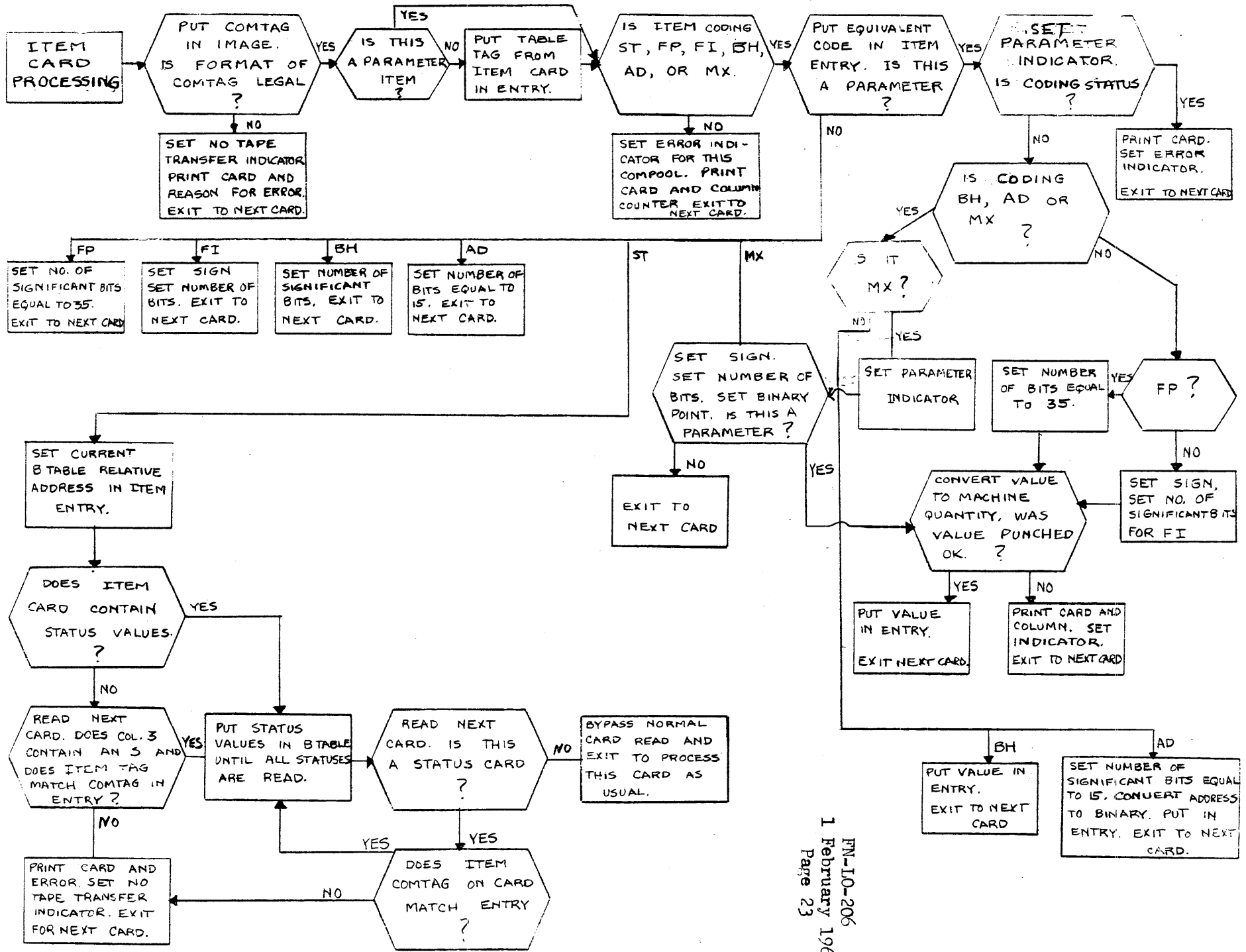
1. If a read check is encountered while reading the binary tape, the program will print:  
READ CHECK ON C3, COMPOOL INPUT TAPE
2. If a write check is encountered while writing on A3, the program will print:  
WRITE CHECK ON A3, COMPOOL OUTPUT TAPE
3. If the ident of the Compool on the input tape is different from the ident on the control card, the program will print:  
(IDENT)AND(IDENT) COMPOOL IDENTIS DO NOT MATCH. CHECK YOUR CONTROL CARD.
4. If a correction card does not match an entry in the Error Table, the program will print:  
(COMTAG) NOT IN THE ERROR TABLE
5. If an entry in the Error Table has not been corrected by a correction card, the program will print:  
(COMTAG) HAS NOT BEEN CORRECTED.
6. If any error is found during a reassembly attempt, the program will print the error - - (2,3,4 or 5 above) and also print:  
(IDENT) HAS NOT BEEN CORRECTED. PLEASE SAVE OLD BUFFER TAPE AND AFTER CORRECTING MISTAKE INDICATED START OVER AGAIN.

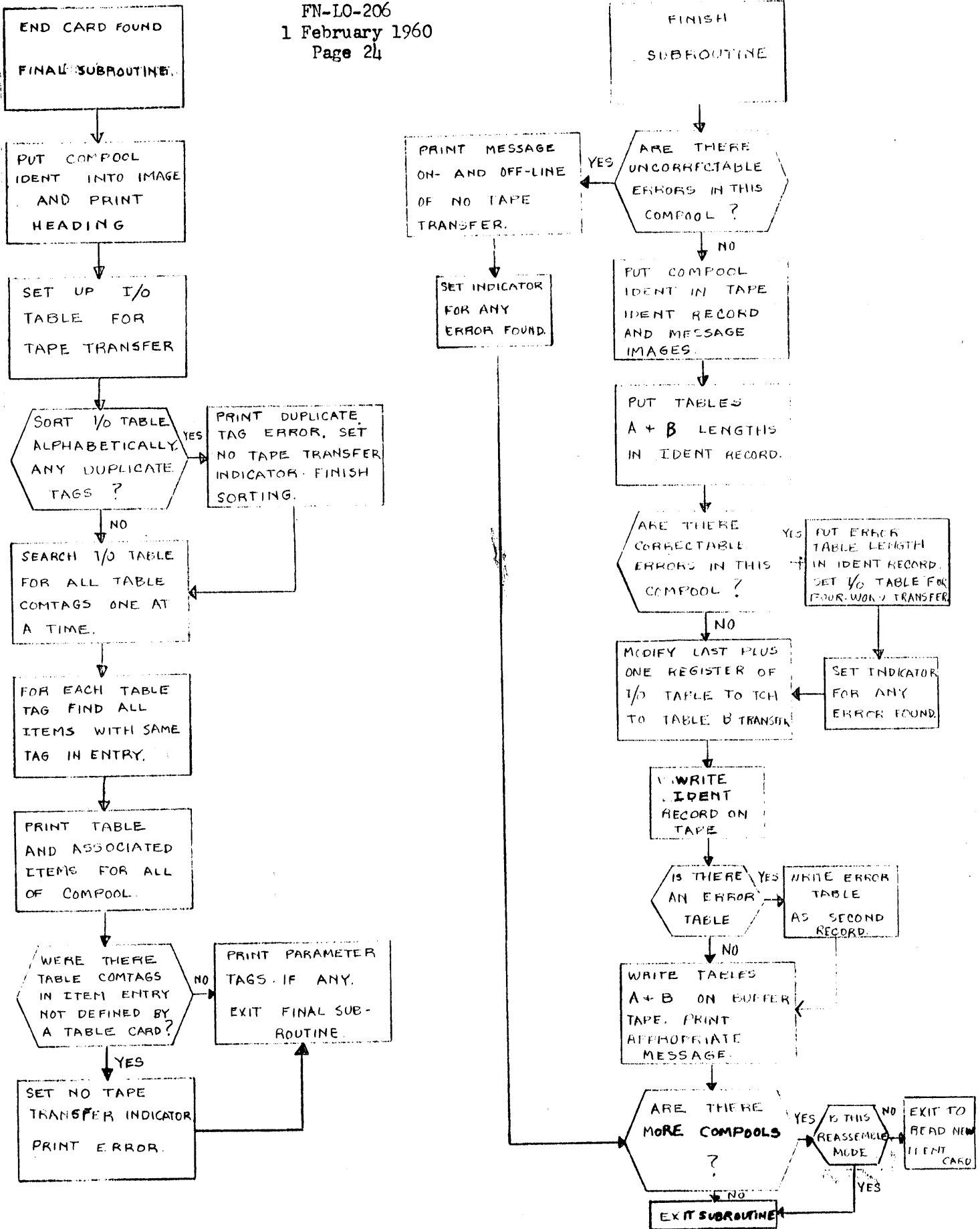
ASSEMBLE MASTER COMPOOL  
 BROAD FLOW DIAGRAM



# CARD PROCESSING SUBROUTINE









A listing of the program symbolic deck will be issued as the first supplement to this document (FN-10-206, S-1).

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