IBM

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International Business Machines Corporation

February 19, 1965

MEMORANDUM TO: Users of IBM 1620/1311 LINEAR PROGRAMMING SYSTEM 1620-CO-04X

SUBJECT: Version 1, Modification Level 1

This modification has been prepared to correct all items included in APAR Response (APAR APS-301) concerning 1620/1311 LP sent on 1/21/65. In addition, this modification improves other phases of this program and consists of the following:

1. Modification update procedure (Standard) - one page.
2. Modification update procedure (Non-standard) - one page.
3. Description of program changes and listing of source changes - two pages.
4. Corrected replacement page to Application Directory - one page.
5. Five replacement decks preceded by a header card.
   - Deck number one (1) disk label routine - 13 cards
   - Deck number two (2) - 94 cards
   - Deck number three (3) - 82 cards
   - Deck number four (4) - 86 cards
   - Deck number five (5) - 87 cards

Any discrepancy between the material received and the list above, as well as any errors in card reproduction, should be directed to: Manager of DP Program Information, IBM Corporation, 112 East Post Road, White Plains, New York.

We appreciate your cooperation in making the enclosed changes and request the continued use of the Authorized Programming Analysis Report (APAR), submitted through your local IBM Systems Engineer, in reporting difficulties concerning this program. APARs for this program should be sent to: APAR Processing, DP Application Programming Standards, 112 East Post Road, White Plains, New York: 10601.

PROGRAM INFORMATION DEPARTMENT

cc: SE Managers
(No enclosures with
Branch Office copies)

```
          REVMAT
           CORRECTS LOOP AND DIAGNOSTIC MESSAGE FAILURE
           FOR ELEMENT CARD COLUMN NAME NOT IN MATRIX FILE.
PA54   RDERTN TFM   GET9+P,RDCD,,ERROR RETURN INITIALIZATION  02950 16 03340 03346
PA72   GETNXT C     STORR+5,-ADLGR,,CHECK END OF MATRIX FILE  03142 24 08487 07680
PA725         BE    CKL1ST,,,CHECK IF LAST IS FIRST GROUP     03154 46 05578 01200
PA73   GTNEXT GET   STODSK                                     3166 10 00565 03189
                                                               3178 49 00566 08497
PA88   RDCD   WACD  CARD                                       3346 37 07735 00500
PA885         TFM   GET9+P,ROWOK,,BYPASS WACD TIL COL FOUND   03358 16 03340 03578
PB12          BE    AAA                                       3638 46 03762 01200
PB15          BE    CCC                                       3674 46 03822 01200
PB23    AAA   TF    TLAST,STORR+5,,RESET LAST TO CURRENT      03762 26 08017 08487
PB24          TFM   GET9+P,RDCD,,RESTORE WACD FOR NEXT CARD   03774 16 03340 03346
PB25          B     COLOK                                     3798 49 04078 00000
PB29          B7    DDD                                       3834 49 03990 00000
PB33          NOP                                             3890 41 00000 00000
PB35          TF    STORR+5,SAVE2,,SET READ FOR NEXT GROUP    03914 26 08487 08031
PB36          NOP                                             3926 41 00000 00000
PB37          B      GETNXT                                   3938 49 03142 00000
PB42   DDD    C     TLAST,SAVE2,,CHECK IF LAST GROUP HAS BEEN SEARCHED
                                                               3990 24 08017 08031
PB43          TF    STORR+5,SAVE2,,SET TO READ NEXT RECORD    04002 26 08487 08031
PB44          BE    NTINMT,,,INCORRECT COL NAME               04014 46 05530 01200
PC75          TFM    ERORB+P,RDERTN                           05554 16 05288 03142
PC76          B     ERRORA                                    05566 49 05222 00000
PC77   CKL1ST C     TLAST,-ADFGR,,IS LAST SEARCH RECORD FIRST IN FILE
                                                               5578 24 08017 07670
PC78          TF    STORR+5,-ADFGR,,SEARCH IS COMPLETE        05590 26 08487 07670
PC79          BE    NTINMT,,,COLUMN NAME NOT IN FILE.         05602 46 05530 01200
PC80          B     GTNEXT,,,IF SEARCH NOT COMPLETE, CONTINUE 05614 49 03154 00000


          REVFST
           CORRECTS LOOP AND DIAGNOSTIC MESSAGE FAILURE
           FOR FIRSTB/NEXT.B NAME NOT IN R-H-S FILE.
           CORRECTS FAILURE TO INDICATE ROW LOWER LIMIT REVISION
           WHEN REVISEING A BLANK SAVED POSITION.
RA55   RA55   TF    CARDIM,COMTAB+15                          02974 26 07370 07305
RA78   GETNXT C     STORR+5,-ADLSB,,CHECK END OF RHS FILE     03226 24 08011 07344
RA785         BE    RB33                                      3238 46 03898 01200
RB05          B     AAA                                       3562 49 03874 00000
RB29   OUT    BD    RB39,WRITE,,BRANCH IF RECORD REVISED      03850 43 03970 07548
RB30          B     RB40,,,NO. DO NOT WRITE RECORD            03862 49 03886 00000
RB31   AAA    TF    TLAST,STORR+5,,RESET LAST ADDR FOR NEXT   03874 26 07563 08011
RB32          B     RDCD,,,          RHS REVISION             03886 49 03418 00000
RB33   RB33   C     TLAST,-ADFSB,,RE-SEARCH FROM 1ST RECORD   03898 24 07563 0734-
RB34          TF    STORR+5,-ADFSB,, IF SEARCH COMPLETE-      03910 26 08011 0734-
RB35          BE    NTINB,,,ERROR EXIT -- NOT FOUND IN FILE.  03922 46 05290 01200
RB36          B     GTNEXT                                    3934 49 03226 00000
RB39   RB39   PUT   STODSK                                     3970 10 00505 -3993
RB40   RB40   C     TLAST,SAVE2,, SET TO SEARCH NEXT RECORD   03994 24 07563 07578
RB42          TF    STORR+5,SAVE2                             04018 26 08011 07578
RB43          BE    NTINB,,,ERROR EXIT IF SEARCH FAILS        04030 46 05290 01200
RB44          B     RB51                                      4042 49 04126 00000
RB45   RRR    C     CARD+4,FIRST+4,,CHECK FOR                 04054 24 07377 07593
RB46          BE    XXX,,,           FIRSTB OR                04066 46 04162 01200
RB47          C     CARD+4,NEXT+4,, NEXT.B CARD               04078 24 07377 07599
RB48          BE    XXX,,,           IF EITHER,CONTINUE       04090 46 04162 01200
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RB49            B     COMPLT,,,        IF NEITHER,REVFST COMPLT  04102 49 05410 00000
RB51   RB51     TFM   GET9+P,ROWIN                                04126 16 03412 -3682
RB54   XXX      TF    COMMON+322,CARD+22,,SIMULATE                04162 26 07109 07395
RB55            B     RA55,,,REVFST ENTRY FROM REVISE             04174 49 02974 00000
RC16   STOR     TF    CARD+86,ZERO3,,LOWER LIMIT IN FLT PT FORM   04906 26 07455 07652
RC17            AM    SAVE1,15,10,  INDICATE PRESENCE             04918 11 07573 000J5
RC18            TF    -SAVE1,K,,  BRANCH TO STORE LIMIT           04930 26 0757L 07614
RC19            SF    -SAVE1,,,   SUBROUTINE                      04942 32 0757L 00000
RC20            B     STORE,,, WITH LOW LIM CARD FIELD CLEARED.   04954 49 04510 00000
RC48            TF    TLAST,-ADLSB                                05302 26 07563 0734N
RC50            TFM    ERORB+P,RRR                                05326 16 05128 -4054
RC53            TF    STORR+5,-ADFSB                              05350 26 08011 0734-
RC54   RC54     WACD  CARDIM,,,BYPASS DATA AND COMMENTS            05362 37 07373 00500
RC55            CM    CARDIM,14,10,                               05374 14 07373 000J4
RC56            BI    ERORA,1100,,WRITE ERROR MESSAGE             06386 46 05062 01100
RC57            B     RC54                                         5398 49 05362 00000


        INV002
         CORRECTS RANGE CONSTRAINT ERROR WHEN RHS ENTRIES ARE NEGATIVE
         AND MANTISSA LENGTH IS GREATER THAN 10
0A93   TFM      TFM   0A95+6,BND+10,,INIT MANT MOVE OF RHS ENT1  03406 16 03436 -6298
0A94            S     0A95+6,MANSA                                03418 22 03436 14107
0A95   0A95     TF    BND+10-MANSA,-AUPNO,,MOVE MANTISSA RHS E1   03430 26 0780R 0652M
0A96            MF    BND,-0A95-6,,              SIGN             03442 71 06288 03430
0A97            TF    BNDEX,-AUPEX               EXPONENT         03454 26 06290 0652R
0A98            TFM   0B00+6,WK18+10,,INIT MANT MOVE OF ENTRY2    03466 16 03496 -6364
0A99            S     0B00+6,MANSA,,                              03478 22 03496 14107
0B00   0B00     TF    WK18+10-MANSA,-ALONO,,MOVE MANTISSA         03490 26 0775L 0653R
0B01            MF    WK18,-0B00-6,,              SIGN            03502 71 06354 03490
0B02            TF    WK18EX,-ALOEX,,             EXPONENT        03514 26 06356 0654M


        INV003
         CORRECTS UPPER BOUND = 0
         WHEN LOWER BOUND NEGATIVE
1B36 *INITIALIZE 10 DIGIT TO MANTISSA CONVERSION SUBR
1B37   AROUND TFM   109MM+6,109                                   03574 16 03688 -0109
1B38            S     109MM+6,MANSA                               03586 22 03688 14107
1B39 *CONVERT UPPER BOUND TO MANTISSA LENGTH
1B40            TFM   MSIZE+6,HLDUBX                              03598 16 03712 -6613
1B41            BT    10TOM,ALFEX                                 03610 27 03658 06510
1B42 *CONVERT LOWER BOUND TO MANTISSA LENGTH
1B43            TFM   MSIZE+6,HLDLBX                              03622 16 03712 -6633
1B44            BT    10TOM,AVAEX                                 03634 27 03658 06540
1B45            B     1B56,,,Q ADDR=10TOM FROMFACTOR ADDRESS      03646 49 03742 00000
1B46 *10 DIGIT TO MANTISSA CONVERSION SUBR. FROMFAC=10TOM-1,TOFAC=MSIZE+6
1B47   10TOM   TF    -MSIZE-6,-10TOM+1,,MOVE EXPONENT            03658 26 0371K 0365P
1B48            SM    10TOM-1,2,,MANTISSA ADDR OF FROMFAC         03670 12 03657 -0002
1B49   109MM   LD    109-MANSA,-10TOM+1,,CONVERT MANSA SIZE      03682 28 1399Q 0365P
1B50            SM     MSIZE+6,2,,MANTISSA ADDR OF TOFAC          03694 12 03712 -0002
1B51   MSIZE   TF    -MSIZE-6,99,,MOVE CONVERTED MANTISSA        03706 26 0371K 00099
1B52            TFM   104,0,2,RESTORE MULTIPLY TABLE              03718 16 -0104 00000
1B53            BB    ,,,SUBROUTINE EXIT                          03730 42 00000 00000
1B56    1B56    FS    HLDUBX,HLDLBX
```

Source Deck

The first five cards of each source deck are :

1 cold start card
2 ≠≠JOB
3 ≠≠SPS
4 * OUTPUT CARD
5 * PUNCH SYMBOL TABLE

These cards enable the user to assemble a program. The source decks are numbered as follows :

DECK # 1 Disk Label Routine Cards

DECK #2-35 Program Cards

DECK #	PROGRAM NAME	(Column 76) DECK ID Character
2	INPUT	A
3	ROW. ID	B
4	COL. ID	C
5	MATRIX	D
6	FIRSTB	E
7	BASIS	F
8	INPUTA	G
9	INPUTB	H
10	INPUTC	I
11	INPUTD	J
12	MTXDSK	L
13	REVISE	M
14	REVROW	N
15	REVCOL	Ø
16	REVMAT	P
17	REVSLK	Q
18	REVFST	R
19	REVBAS	S
20	SAVE. B	T
21	OUTPUT	U
22	DO. D/J	V
23	GETOFF	W
24	COST. R	X
25	CHECK	Y
26	INVRT1	Z
27	INV002	0
28	INV003	1
29	INV004	2
30	INV005	3
31	IVLAST	4
32	NEWRHS	5
33	LP1620	6
34	LP1621	7
35	IDUAL	8
36	SAMPLE PROBLEM	

PREPARATORY SYSTEM PROCEDURES

The 1620-1311 Linear Programming System is distributed as a deck of SPS-produced actual cards. It is expected that the user will want to keep the LP system on the disk semi-permanently.

The procedure for loading the system onto the disk is as follows :

1. Place the LP actual deck in the card reader.
2. Set all console sense switches to OFF and all machine check switches to PROGRAM.
3. Press RESET on the console.
4. Press LOAD on the card reader.

The first card of the deck is a Monitor cold start card, which calls in the Monitor program. Monitor program loads each routine onto the disk, and prints END OF JOB when the entire LP System has been loaded.

MOD UPDATE PROCEDURE - STANDARD

This procedure should not be followed if DIM numbers are not standard.

I. The 1620-1311 LINEAR PROGRAMMING SYSTEM is on disk.
   A. Place decks in card read hopper
   B. Put LP disk on drive 0. Turn disk drive on.
   C. Press reset on console.
   D. Press load on card reader
      The first deck will delete:
      1. REVMAT
      2. REVFST
      3. INV002
      4. INV003

      The second deck will load REVMAT.
      The third deck will load REVFST.
      The fourth deck will load INV002.
      The fifth deck will load INV003.

II. Replace 1620-1311 LINEAR PROGRAMMING SYSTEM object decks by MOD 1 object decks. The deck identification character (card column 76) of the replacement deck must exactly correspond to the original deck identification character.

1. Discard Mod Deck 1. Replace original object decks. As follows, deck identification number given in parenthesis:
2. Mod Deck 2 (P) replaces original deck 16
3. Mod Deck 3 (R) replaces original deck 18
4. Mod Deck 4 (zero) replaces original deck 27
5. Mod Deck 5 (1) replaces original deck 28

MOD UPDATE PROCEDURE (NON-STANDARD)

USE IF DECKS HAVE BEEN MODIFIED (DIM NUMBERS, ETC.)

Mod 1 Deck 2 cards replace original cards.

P009
P012
P015
P020
P022-P027
P052-P053

Where P is the Deck Identification Character in card column 76, the card number is in 78-80.

Mod 1 Deck 3 cards replace original cards.

R013-R014
R018
R023-R028
R038-R039
R044-R046

Mod 1 Deck 4 cards replace original cards.

0 019 - 0 021

Mod 1 Deck 5 cards replace original cards.

1 021 - 1 024

Use the modified decks as Mod Decks 2-5 and follow standard procedure.

IBM

40 Saw Mill River Road
Hawthorne, New York 10532
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International Business Machines Corporation

June 3, 1965

MEMORANDUM TO: Users of Linear Programming System
1620-CO-04X

SUBJECT: Version 1, Modification Level 2

This modification has been prepared to correct:

1. An error in the COST. R routine which erased the multiply and add tables for large problems on a 20K configuration.
2. An error in LP1621 routine which failed to modify the Monitor mantissa length if:
   - A. An inverse had been saved
   - B. Intervening operations or control return to Monitor
   - C. Input from disk of the saved problem with inverse
   - D. Revision of Matrix elements
   - E. Optimization

   In addition, this modification provides a new routine (SHIFT) to allow the user to shift assigned DIM numbers in object decks to be loaded to the 1311 disk under Monitor 1 or 2. This routine must be used to prepare a loading deck for Monitor 2 loading, or for Monitor 1 loading if user programs have been assigned DIM numbers in the range of 0170 to 0212.
   Changes have been made to the Sample Problem input deck so that it uses only the work area. This will allow the Sample Problem to be run if there are programs on the disk in sectors above 07999.
   Changes have also been made to object decks REVCOL and REVBAS to allow them to operate under Monitor 2.
   This modification consists of the following:
   1. Modification update procedure - one page.
   2. Revised pages to APPLICATION DIRECTORY - eight pages.

Revision	Pages
Table of contents	Contents, 0.05.01
Deck list	0.10.01, 0.10.02
Source deck, PREPARATORY SYSTEM PROCEDURES	0.10.05, 0.15.01, to 0.15.08
Questions and answers (new)	0.30.01, 0.35.01

   3. Source program changes - eleven pages.
      Please discard the source change listing from Modification Level 1, because the enclosed lists have been corrected and updated to include all source changes in Modification Levels 1 and 2.

a. Pages 1 thru 7.
Sections of corrected source decks from Modification Levels 1 and 2 have been assembled and listed in such a way that user program lists may be updated by inserting the corrected sections.

b. Pages 8 thru 11.
List of all source changes from Modification Levels 1 and 2. This list contains only the changed instructions, and may be used for keypunching source cards. These cards may then be used to update the source decks by properly substituting them in Page and Line sequence.
Note - in a few cases, two MOD cards, suitably identified, replace a single original card.
Page 11 also contains a list of the five object patch cards, MOD Deck 2, below.

4. Object list of SHIFT - 1 page.
5. Assembly listing of SHIFT - 4 pages.
6. Replacement and new Deck.

MOD Deck 1 - Disk delete deck	13 cards
MOD Deck 2 - Object patch cards for REVCOL, REVBAS, COST.R, and LP1621	5 cards
MOD Deck 3 - Revised Sample Problem	179 cards
MOD Deck 4 - SHIFT object deck (new)	35 cards
MOD Deck 5 - SHIFT source deck (new)	181 cards

Recipients of this program subsequent to the date of this letter will not receive MOD Decks 1 and 2. The five object patch cards (Deck 2 above) will be included in the updated object decks. In addition, the Sample Problem deck, and all source decks, will be updated thru Modification Level 2.

Any discrepancy between the material received and the list above, as well as any errors in card reproduction, should be directed to: Manager of DP Program Information, IBM Corporation, 112 East Post Road, White Plains, New York, 10601.

We appreciate your cooperation in making the enclosed changes and request the continued use of the Authorized Programming Analysis Report (APAR), submitted through your local IBM Systems Engineer, in reporting difficulties concerning this program. APAR's for this programming system should be sent to: APAR Processing, DP Application Programming Standards, 112 East Post Road, White Plains, New York, 10601.

PROGRAM INFORMATION DEPARTMENT

cc: SE Managers
(No Enclosures with Branch Office Copies)

MODIFICATION UPDATE PROCEDURE

I. The 1620-1311 Linear Programming System is on disk.

A. Update the four object decks (below) by substituting the five patch cards (MOD Deck 2) according to the Deck Identification Character in columns 76 and the card sequence number in columns 78-80.

	Deck Name	Deck ID	Sequence #
1.	REVCOL	Ø	023
2.	REVBAS	S	033, 034
3.	COST. R	X	107
4.	LP1621	7	097

B. Place these corrected object decks, preceded by the 13 card Disk Delete Deck (MOD Deck 1) in the card reader.

C. Put LP disk on drive 0. Turn disk drive on.

D. Press reset on console.

E. Press load on card reader.

The first deck will delete REVCOL, REVBAS, COST. R, and LP1621.
The second deck will load the updated object deck REVCOL.
The third deck will load the updated object deck REVBAS.
The fourth deck will load the updated object deck COST. R.
The fifth deck will load the updated object deck LP1621.

II. Discard the 13 card Disk Delete Deck, (MOD Deck 1). Return the four corrected object decks to storage.

Users who have compiled their source decks to obtain object decks should recompile all changed decks, then *DELET the changed decks and *DLOAD the new decks.

IBM 1620-1311 Linear Programming System

APPLICATION DIRECTORY

CONTENTS

*This section should be used to load the system onto the disk. Obsoletes page 106 of 1620/1311 Linear Programming System Program Reference Manual (H20-0106-0) LOADING THE SYSTEM.

Revised-Version 1, Mod Level 2

CONTENTS

Program Reference Manual

DECK LIST

Program Deck

The IBM 1620-1311 Linear Programming System is supplied to the user in the form of a card deck. The first card of the deck, a Monitor cold start card, calls in the Monitor program, which loads the LP system onto disk.

The program deck consists of a series of object decks for the individual routines comprising the 1620-1311 LP System. The first three cards of each object deck are:

Monitor	JOB 5 card
Monitor	DUP card
Monitor	*DLOAD card

The object deck card counts do not include these three (3) Monitor cards at the beginning of each deck. Each deck is seperated by a blank card.

The entire deck is arranged as follows:

Monitor Cold Start Card

DECK#1 Disk Label Routine Cards (3 cards)

DECK #	PROGRAM	DECK ID	cards
2	INPUT	A	79
3	ROW. ID	B	47
4	COL. ID	C	39
5	MATRIX	D	153
6	FIRSTB	E	112
7	BASIS	F	66
8	INPUTA	G	87
9	INPUTB	H	55
10	INPUTC	I	47
11	INPUTD	J	76
12	MTXDSK	L	106
13	REVISE	M	47
14	REVROW	N	35
15	REVCOL	Ø	27
16	REVMAT	P	94
17	REVSLK	Q	26
18	REVFST	R	82
19	REVBAS	S	40
20	SAVE. B	T	65

DECK ID

Each program has a unique identification character. Object deck identification characters are punched in column 76.

Version 1, Mod level 2

21	OUTPUT	U	172
22	DO. D/J	V	111
23	GETOFF	W	34
24	COST. R	X	174
25	CHECK	Y	192
26	INVRT1	Z	43
27	INV002	0	86
28	INV003	1	87
29	INV004	2	104
30	INV005	3	40
31	IVLAST	4	29
32	NEWRHS	5	123
33	LP1620	6	21
34	LP1621	7	164
35	IDUAL	8	277
36	Monitor ‡‡‡‡ card		
37	SAMPLE PROBLEM (described below)		
38	SHIFT	9	31 (object)
39	SHIFT	9	181 (source)

36 Sample Problem Deck

Following the program deck is a sample problem deck which the user may use 1) to be sure that the 1620-1311 LP System has been loaded correctly, and 2) to become familiar with the format of the various agenda and data input cards.

The deck of 179 cards is arranged as follows:

Monitor cold start card
Monitor JOB 5 card
Monitor XEQ LP1620 card
INPUT. C card
ROW. ID card
9 data cards
MATRIX card
55 data cards
FIRST. B card
7 data cards
ENDATA card
ASSIGN card
MIN... card
SAVE. B card
OUTPUT card
CHECK. card
COST. R card

Source Deck

The first five cards of each source deck are:

1 cold start card
2 ≠≠JOB
3 ≠≠SPS
4 * OUTPUT CARD
5 * PUNCH SYMBOL TABLE

These cards enable the user to assemble a program. The source decks are numbered as follows:

Deck #	Program
1	INPUT
2	ROW.ID
3	COL.ID
4	MATRIX
5	FIRSTB
6	BASIS
7	INPUTA
8	INPUTB
9	INPUTC
10	INPUTD
11	MTXDSK
12	REVISE
13	REVROW
14	REVCOL
15	REVMAT
16	REVSLK
17	REVFST
18	REVBAS
19	SAVE.B
20	OUTPUT
21	DO.D/J
22	GETOFF
23	COST.R
24	CHECK
25	INVRT1
26	INV002
27	INV003
28	INV004
29	INV005
30	IVLAST
31	NEWRHS
32	LP1620
33	LP1621
34	IDUAL

PREPARATORY SYSTEM PROCEDURES

This modification obsoletes page 106 of 1620/1311 Linear Programming System (1620-CO-04X) Program Reference Manual (H20-0106-0) for the section beginning:

OPERATING INSTRUCTIONS

LOADING THE SYSTEM

The 1620/1311 Linear Programming System is distributed as a deck of SPS-produced object cards. The object cards have been modified to provide a unique identification (in columns 76-80) for each card. The source cards can be obtained as optional material. It is expected that the user will want to keep the LP System on the disk semi-permanently.

The source language is SPS-II D. All references to LP System programs in source language is by symbolic program name. The SPS-II D assembles absolute object DIM (See MONITOR 1 or MONITOR 2 Reference Manual) numbers from source symbolic program references. The LP programs, as assembled and distributed, require DIM numbers 0170 to 0212 inclusive.

A routine is provided to shift the LP System DIM numbers to avoid conflict with previously assigned DIM numbers.

To load the system onto the disk:

- The user may use the distributed decks as loading decks - if and only if the operating system is Monitor I and there are no user programs currently assigned DIM numbers 0170 to 0212 inclusive. Otherwise the user must use the SHIFT routine to obtain a usable loading deck from the distributed deck. The SHIFT routine purpose, usage and operating procedure, output description, timing and program description are given in the APPLICATION DIRECTORY page 0.15.04.

- The operator should mark the Deck Identification Character (0.10.01) on the loading decks to simplify modification and maintenance. A blank card separates each deck. Place MONITOR disk on disk drive 0 and press start on disk drive 0.

- Place the LP loading decks - the DLABL deck followed by loading decks A through 8 - in the card reader.
- Press RELEASE on console.
- Press RESET on console.
- Press LOAD on card reader.
- The message "DUP*TURN ON WRITE ADDRESS KEY, START" will be typed.
- Press WRITE ADDRESS on the disk drive. The key should be lit after pressing.
- Press START on console.
- The message "DUP*TURN OFF WRITE ADDRESS KEY, START" will be typed.
- Press WRITE ADDRESS on the disk drive. The key should be unlit after pressing.
- Press START on console.
- The following message sequence must appear as each program is loaded:

```
"** JOB"
"** DUP"
"*DLOADnnnnnn     dddd  ........  i  C"
"DK LOADED nnnnnn  dddd  ......"
"END OF JOB"
```

Where: nnnnnn is the program name, ex: "INPUT. ", "1DUAL"
dddd is the program DIM number, ex: 0177, 0172
i is the program identification character, ex: A, 8

If this message sequence does not appear for some program or programs of the system, consult the MONITOR reference manual for the cause.

If a program is assigned a different DIM number (by MONITOR) due to a conflict with a previously assigned DIM number, the LP System will probably fail to operate. The user must delete all correctly and incorrectly loaded LP programs by the DIM numbers assigned by MONITOR. The user should then use the SHIFT routine to obtain a valid loading deck.

- The last program to be loaded is 1DUAL.
- The user should run the SAMPLE PROBLEM to verify correct loading.

SHIFT ROUTINE

PURPOSE

To operate with MONITOR II and to operate with MONITOR I if user programs are on the disk with DIM numbers in the range 0170 to 0212.

USAGE AND OPERATING PROCEDURE

- The user must determine 43 consecutive, unassigned DIM numbers, see MONITOR Reference Manual, Disk Utility Program, DDUMP.

- Prepare a SHIFT card

  Format:

cc 1-5	SHIFT	
cc 6-9	nnnn -	lowest of the 43 unassigned DIM numbers.
cc 10-17	MONITOR2 -	if and only if the operating system is Monitor 2.
or		
cc 10-17	- blank -	if and only if the operating system is not Monitor 2.
cc 18-80	not used	

  Examples

  S H I F T 0 3 0 0 M O N I T O R 2

  The LP program DIM numbers are to be shifted to 0300 to 0342.
  The operating system is MONITOR 2.
  Note - This card is currently the last card of the SHIFT routine. Replace this card by an appropriate SHIFT card if required.

  S H I F T 0 3 5 0

  The LP program DIM numbers are to be shifted to 0350 to 0392.
  The operating system is MONITOR I.

Version 1, Mod Level 2
Addition

- Place the prepared SHIFT card at the end of the SHIFT deck, replacing the sample SHIFT card distributed.

- Place MONITOR disk on disk drive 0. Press start on disk drive 0.

- Place the SHIFT deck including SHIFT card in the card reader.

- Press RELEASE on console.

- Press RESET on console.

- Press LOAD on card reader.

- Press READER START on card reader to read last cards.

- The message " NEW LP1620 DIM RANGE WILL BE nnnn to mmmm. " will be typed out if the SHIFT card has the correct format. The message "INVALID SHIFT CARD" will be typed out to indicate a format error in the SHIFT card. If this message occurs, prepare a valid SHIFT card and repeat the previous step after pressing START on console.

- The message "ENVIRONMENT-MONITOR2" should be typed out if and only if the operating system used is MONITOR 2.

- Processing halts, allowing the operator to determine that the new DIM range will not conflict with currently assigned DIM numbers and that the correct operating system is specified. If there are any conflicts, operating system or DIM range, the user must begin the operating procedure from the beginning. If there are no conflicts, continue.

- Place the distributed object decks beginning with the DLABL deck to and including the deck 1DUAL (all except SAMPLE PROBLEM and SHIFT routine which were the last 2 decks) in the card reader. Place 3 blank cards following the last card of 1DUAL to ensure that the last object deck card (identified by 8 blank K77 in cc 76-80) is punched.

- Press START on the card reader and the card punch.

- Press START on console.
- The READER NO FEED light will remain on when the last card has been processed.

OUTPUT DESCRIPTION

SHIFT output is loading decks for the LP System with modified DIM numbers.

- "*DLOAD" cards will have shifted DIM numbers.
- Object cards, with DIM numbers, will have shifted DIM numbers. The object cards in which the units position of a DIM number appears will have an S (0-2 punch) in card column 77.
- "*DELET" cards will have shifted DIM numbers (for program maintenance).
- Card 6b015 of program deck LP1620 of the LP decks card column 18 has been changed to 7 if and only if "ENVIRONMENT-MONITOR2".
- Remove the blank card(s) and program identification card that precede the Monitor cold start card.
- This deck is now the LP loading deck to be used in loading the system. Once the system has been loaded and checked out, the distributed object decks can be discarded except for the SHIFT routine and SAMPLE PROBLEM. The SHIFT routine and SHIFT card must be retained to maintain the LP System. The SAMPLE PROBLEM should be retained to verify correct modification.

TIMING

The SHIFT routine will operate at card punch speed on an IBM 1620 MODEL 2, it will operate at approximately 100 cards per minute on an IBM 1620 MODEL 1.

PROGRAM DESCRIPTION

The SHIFT routine will process one or more SPS-II object decks.

INITIALIZATION

A SHIFT card is read. This card is checked for format errors. The displacement to the assembled DIM numbers is calculated from the SHIFT card; Displacement = SHIFT - 170.

PROCESSING NON-OBJECT CARDS

Read cards are tested for a record mark in column 1. The previous card image (old card) is punched and the card read (card) is moved to the previous card image when the non-object card has a record mark in column 1 (JOB or DUP cards) or is a blank card (program separator card) or is a *DLABL card. *DLOAD and *DELET cards are detected and their DIM numbers are modified; DIM=DIM+Displacement prior to punching out the previous card image and moving the card read to the previous image area.

PROCESSING OBJECT CARDS

Card columns 9 through 75 are tested for a DIM number pattern. When a DIM number is detected, the DIM number is modified by DIM = DIM + Displacement and an S is moved to column 76. Card columns 71 to 75 of the previous card image are tested in conjunction with card columns 9 to 13 of the read card. The previous card is punched after column 13 of the read card is processed. The read card is moved to the previous card area after column 75 has been processed. When card column 76 to 80 of the previous card image correspond to 6 b $\bar{0}$1 5, card column 13 is changed to a 9 (if the environment is Monitor 1), or to a 7 (if the environment is Monitor 2) according to user environment specification.

MESSAGES

"INVALID SHIFT CARD"

"NEW LP1620 DIM RANGE WILL BE nnnn to mmmm"

"ENVIRONMENT - MONITOR 2"

Version 1, Mod. Level 2
Addition

STATEMENT OF MAINTENANCE PROCEDURE

This program will be maintained through the use of serially numbered modification letters. Any unmodified system is considered to be modification level 0. Each subsequent modification raises the modification level by 1. The initial availability of this program is version 1, modification level 0. Should the nature or quantity of changes make reassembly necessary, a new version will be distributed. Each reassembly raises the version number by 1; modification letters to a new version begin at 1.

Modification letters will be mailed to all previous recipients of the program. All modification letters will be supplied with the program. The change or alter cards will be included in the appropriate deck(s) to reflect the latest changes.

An Authorized Programming Analysis Report (APAR) should be submitted through your local IBM Systems Engineer to report any difficulties encountered in the use of this system (Form 120-0482-2). The APAR should be addressed to APAR Processing, IBM Application Programming Standards, 112 East Post Road, White Plains, New York.

QUESTIONS AND ANSWERS

1. Question: What are good mantissa length and tolerance settings? The program choses or goes to a large mantissa length and takes too much time.

   Answer: The following ASSIGN setting will usually yield correct results. Problems of a repetitive nature usually require several tries to minimize processing time.

Mantissa length	12
Element Tolerance	9
Pivot Tolerance	6
Feasibility Tolerance	3
Objective function tol.	4
Maximum Error tol.	2

   In addition, increasing the number of iterations between inversions to 30-50 (Standard is 15) will usually decrease processing time.

2. Question: How can a two disk drive system be used to reduce processing time?

   Answer: ASSIGN common computation address on second drive, i.e. 20000. ASSIGN sector address upper limit to 39999. This will put the most frequently accessed data on the outermost cylinders. On a one drive system, it is best to put the INPUT data above the programs and DIM table. The most efficient area should be used for the inverse (if it can fit below the DIM table).

3. Question: How can a program be added to the LP System?

   Answer: Any program on the disk can be called by the LP System by preparing an agendum card with the program name. If the user will read COMMON area (Sectors 1800 to 1804, primarily 1800 to 1802) into core, he may locate any data that has been read or computed since the preceding INPUT. The routine COST.R was added to the LP System in this fashion. Details are given in the System Reference Manual, available as optional material from PID.

Version 1 Mod Level 2
Addition

```
*        MOD 1 CHANGES TO REVMAT
PA54  RDERTN TFM  GET9+P,RDCD,,ERROR RETURN INITIALIZATION  02950 16 03340 -3346
PA55         TF       TFIRST    ,-ADFGR                     02962 26 08012 07670
PA56         TF       TLAST     ,-ADLGR                     02974 26 08017 0768J
PA57         TDM      WRITE     ,0              ,     ,CLEAR WRITE IND
                                                             2986 15 08018 00000
PA58         TFM      MTMM      ,18000          ,7    ,SET MEM READ IN ADDR
                                                             2998 16 07732 J8000
PA59 *         CLEAR AND SET FLAGS IN READ IN AREA
PA60         CF       CARDA-1                               03010 33 07834 00000
PA61         SF        CARD+11                              03022 32 07746 00000
PA62         SF        CARD+23                              03034 32 07758 00000
PA63         SF        CARD+35                              03046 32 07770 00000
PA64         SF        CARD+59                              03058 32 07794 00000
PA65         SF        CARD+83                              03070 32 07818 00000
PA66         SF        CARD-1                               03082 32 07734 00000
PA67 *               READ A GROUP RECORD
PA68  RDAGRP TD       STORR     ,-MTRMK                     03094 25 08482 0771P
PA69         TF        STORR+5  ,-ADFGR                     03106 26 08487 07670
PA70         TF        STORR+8  ,-MTSC                      03118 26 08490 0772P
PA71         TF        STORR+13 ,MTMM                       03130 26 08495 07732
PA72  GETNXT C     STORR+5,-ADLGR,,CHECK END OF MATRIX FILE  03142 24 08487 0768J
PA725        BE    CKLIST,,,CHECK IF LAST IS FIRST GROUP     03154 46 05578 01200
PA73  GTNEXT GET   STODSK                                     3166 10 00565 -3189
                                                             3178 49 00566 -8497
PA74         BTM      CKSTOP    ,20003          ,7          03190 17 02408 K0003
PA75 *               PICK UP GROUP HEADER INFORMATION
PA76  HDR    TF        TEMP2    ,MTMM           ,     ,MEM ADDR A GRP
                                                             3202 26 08023 07732
PA77         AM        TEMP2    ,2              ,10         03214 11 08023 000-2
PA78         TF        NAJ      ,-TEMP2         ,     ,= AJS IN AGRP
                                                             3226 26 08026 0802L
PA79         AM        TEMP2    ,5              ,10         03238 11 08023 000-5
PA80         TF        SAVE2    ,-TEMP2         ,     ,NEXT DISK A GRP
                                                             3250 26 08031 0802L
PA81         AM        TEMP2    ,5              ,10         03262 11 08023 000-5
PA82         TF        SAVE1    ,-TEMP2         ,     ,ADDR FIRST AJ
                                                             3274 26 08036 0802L
PA83         A         SAVE1    ,MTMM           ,     ,MEM ADDR OF A GRP
                                                             3286 21 08036 07732
PA84         TF        SAVE3    ,SAVE1                       03298 26 08041 08036
PA85         TDM       WRITE    ,0              ,     ,CLEAR MATRIX WRITE INDIC
                                                             3310 15 08018 0000C
PA86         BTM      CKSTOP    ,20002          ,7          03322 17 02408 K0002
PA87  GET9   B         RDCD                                  03334 49 03346 0000C
PA88  RDCD   RACD  CARD                                      *3346 37 07735 0050C
PA885        TFM  GET9+P,ROWOK,,BYPASS WACD TIL COL FOUND    03358 16 03340 -3578
PA89         C         CARD     ,ASTER          ,     ,COMMENT CARD
                                                             3370 24 07735 0853
PA90         BE        RDCD     ,               ,     ,IGNORE COMMENT CARD
                                                             3382 46 03346 0120
PA91         C         CARD+4   ,ZERO           ,     ,DATA CARD
                                                             3394 24 07739 0804
PA92         BE        DTA                                   03406 46 03426 0120
PA93         B7        COMPLT                                03418 49 05634 0000
PA94  DTA    TFM       K        ,1              ,9    ,ROW    03426 16 08050 00-0
PA95         TFM       NAME     ,FILE-2         ,7    ,ROWID FILE ADDR
                                                             3438 16 08055 -854
PA96         TFM       TYPE     ,FILE           ,7          03450 16 08060 -854
PA97         C         CARD+34  ,ZEROA          ,     ,BOUND CHANGE
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                                                                    3462 24 07769 08072
PA98            BE          ROWOK                                  03474 46 03578 01200
PA99  X1        C          -NUMRW     ,K              ,     ,END OF ROW FILE
                                                                    3486 24 0769J 08050
PB00            BL          ERR8                                   03498 47 05358 01300
PB01            C           CARD+34    ,-NAME          ,     ,SEARCH ROW FILE
                                                                    3510 24 07769 0805N
PB02            BE          ROWOK                                  03522 46 03578 01200
PB03            AM          K          ,1              ,10   ,UPDATE ROW CTR
                                                                    3534 11 08050 000-1
PB04            AM          NAME       ,14             ,10   ,UPDATE FILE SEARCH
                                                                    3546 11 08055 000J4
PB05            AM          TYPE       ,14             ,10            03558 11 08060 000J4
PB06            B7          X1                                     03570 49 03486 00000
PB07  ROWOK     TFM         H          ,0              ,9    ,AJ CTR 03578 16 08075 00-00
PB08            TF          SAVE1      ,SAVE3          ,     ,RESET AJ SEARCH ADDR
                                                                    3590 26 08036 08041
PB09  NXTAJ     TF          NENT       ,-SAVE1                    03602 26 08078 08030
PB10            AM          SAVE1      ,12             ,10   ,GET VAR NAME
                                                                    3614 11 08036 000J2
PB11            C           CARD+22    ,-SAVE1         ,     ,CHECK FOR MATCH
                                                                    3626 24 07757 08030
PB12            BE    AAA                                           3638 46 03762 01200
PB13            AM          H          ,1              ,10   ,UPDATE AJ CTR
                                                                    3650 11 08075 000-1
PB14            C           NAJ        ,H              ,     ,LAST CHECK
                                                                    3662 24 08026 08075
PB15            BE    CCC                                           3674 46 03822 01200
PB16            MM          NENT       ,15             ,10   ,GO TO NEXT AJ IN A GRP
                                                                    3686 13 08078 000J5
PB17            A           SAVE1      ,00099                     03698 21 08036 00099
PB18            AM          SAVE1      ,3              ,10   ,SET TO NUMB ENT POS
                                                                    3710 11 08036 000-3
PB19            BTM        CKSTOP      ,10009          ,7             03722 17 02408 J0009
PB20            B7          NXTAJ                                  03734 49 03602 00000
PB21  OUT       BD          AAA        ,WRITE          ,     ,CHANGE LAST FOR NEW SRCH
                                                                    3742 43 03762 08018
PB22            B7          99999      ,               ,     ,NO REWRITE AGRP
                                                                    3754 49 99999 00000
PB23  AAA       TF    TLAST,STORR+5,,RESET LAST TO CURRENT           03762 26 08017 08487
PB24            TFM   GET9+P,RDCD,,RESTORE WACD FOR NEXT CARD        03774 16 03340 -3346
PB25            B     COLOK                                        03786 49 04078 00000
PB26            BE         XXX                                     03798 46 04058 01200
PB27            BTM       CKSTOP      ,30001          ,7             03810 17 02408 L0001
PB28  CCC       BD          YYY        ,WRITE          ,     ,CK WRITE MATRIX GRP
                                                                    3822 43 03842 08018
PB29            B7    DDD                                           3834 49 03990 00000
PB30  *                REWRITE A GRP RECORD
PB31  YYY       SEEK        STODSK                                 03842 10 00565 -3865
                                                                    3854 49 00554 -8497
PB32            PUT         STODSK                                 03866 10 00565 -3889
                                                                    3878 49 00532 -8497
PB33            NOP                                                3890 41 00000 00000
PB34            TDM         WRITE      ,0              ,     ,CLEAR WRITE IND
                                                                    3902 15 08018 00000
PB35            TF    STORR+5,SAVE2,,SET READ FOR NEXT GROUP         03914 26 08487 08031
PB36            NOP                                                3926 41 00000 00000
PB37            B      GETNXT                                      03938 49 03142 00000
PB38            B7          DDD                                    03950 49 03990 00000
PB39  RRR       TF          SAVE4      ,-ADFGR         ,     ,RESET TO PHYS BEG AGRPS
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                                                                    3958 26 08007 07670
PB40            B7          DDD                                     03970 49 03990 00000
PB41    ZZZ     TF          TFIRST    ,SAVE2          ,     ,NO WRITE - UPDATE SEARCH
                                                                    3978 26 08012 08031
PB42    DDD     C     TLAST,SAVE2,,CHECK IF LAST GROUP HAS BEEN SEARCHED
                                                                    3990 24 08017 08031
PB43            TF    STORR+5,SAVE2,,SET TO READ NEXT RECORD        04002 26 08487 08031
PB44            BE    NTINMT,,,INCORRECT COL NAME                   04014 46 05530 01200
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*      MOD 1 CHANGES TO REVFST
RA55   RA55    TF    CARDIM,COMTAB+15                                  02974 26 07370 07305
RA56           AM          CARDIM    ,14            ,10              02986 11 07370 000J4
RA57           SF         -CARDIM                                     02998 32 0737- 00000
RA58           AM          CARDIM    ,9             ,10              03010 11 07370 000-9
RA59           TF          BNAME     ,-CARDIM                        03022 26 07611 0737-
RA6U           BTM        CKSTOP     ,10003         ,7               03034 17 02408 J0003
RA61 *           HOUSEKEEP
RA62           CF         CARDA-1                                     03046 33 07472 00000
RA63           SF          CARD+13                                    03058 32 07386 00000
RA64           SF          CARD+23                                    03070 32 07396 00000
RA65           SF          CARD+35                                    03082 32 07408 00000
RA66           SF          CARD+59                                    03094 32 07432 00000
RA67           TDM         WRITE     ,0             ,     ,CLEAR WRITE IND
                                                                      3106 15 07548 00000
RA68           TFM        BEMM       ,16500         ,7    , B READ IN AREA
                                                                      3118 16 07335 J6500
RA69           TF          SAVE4     ,-ADFSB        ,     ,SET UP FILE SEARCH
                                                                      3130 26 07553 0734-
RA7U           TF          TFIRST    ,-ADFSB                         03142 26 07558 0734-
RA71           TF          TLAST     ,-ADLSB                         03154 26 07563 0734N
RA72 *           READ FIRST B GROUP RECORD
RA73           TD         STORR      ,-BERMK                         03166 25 08006 0732-
RA74           TF         STORR+5    ,-ADFSB                         03178 26 08011 0734-
RA75           TF         STORR+8    ,-BESC                          03190 26 08014 0733-
RA76           TF         STORR+13   ,BEMM                           03202 26 08019 07335
RA77           BTM        CKSTOP     ,20001         ,7               03214 17 02408 K0001
RA78   GETNXT  C     STORR+5,-ADLSB,,CHECK END OF RHS FILE           03226 24 08011 0734N
RA785          BE    RB33                                            *3238 46 03898 01200
RA79           GET         STODSK                                    03250 10 00565 -3273
                                                                      3262 49 00566 -8021
RA8U *                PICK UP B GROUP HEADER INFORMATION
RA81   HDR     TF          TEMP2     ,BEMM          ,     ,MEM ADDR B GRP
                                                                      3274 26 07568 07335
RA82           AM          TEMP2     ,2             ,10              03286 11 07568 000-2
RA83           TF          NMBEE     ,-TEMP2        ,     ,= BEES IN B GRP
                                                                      3298 26 07586 0756Q
RA84           AM          TEMP2     ,5             ,10              03310 11 07568 000-5
RA85           TF          SAVE2     ,-TEMP2        ,     ,NEXT DISK B GRP
                                                                      3322 26 07578 0756Q
RA86           AM          TEMP2     ,5             ,10              03334 11 07568 000-5
RA87           TF          SAVE1     ,-TEMP2        ,     ,ADDR OF FIRST B
                                                                      3346 26 07573 0756Q
RA88           A          SAVE1      ,BEMM                           03358 21 07573 07335
RA89           TF         SAVE3      ,SAVE1                          03370 26 07583 07573
RA9U           TDM         WRITE     ,0             ,     ,CLEAR B FILE WRITE INDIC
                                                                      3382 15 07548 00000
RA91           BTM        CKSTOP     ,20005         ,7               03394 17 02408 K0005
RA92   GET9    B           RDCD                                      03406 49 03418 00000
RA93 *           READ A CARD
RA94   RDCD    GET         CARDE                                     03418 10 00565 -3441
                                                                      3430 49 00566 -7532
RA95   BEG1    C           CARD      ,ASTER         ,     ,CHECK FOR COMMENT CARD
                                                                      3442 24 07373 08055
RA96           BE          RDCD      ,              ,     ,IGNORE 03454 46 03418 01200
RA97           C           CARD+4    ,FIRST+4       ,     ,FIRST B CARD
                                                                      3466 24 07377 07593
RA98           BE          NXDTA                                     03478 46 03550 01200
RA99           C           CARD+4    ,NEXT+4        ,     ,NEXT B CARD
                                                                      3490 24 07377 07599
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RB00          BE        NXDTA                                          03502 46 03550 01200
RB01          C         CARD+4    ,ZERO1-6          ,     ,CHECK FOR DATA CARD
                                                                       3514 24 07377 07658
RB02          BE        DTA                                            03526 46 03574 01200
RB03          B         COMPLT                                         03538 49 05410 00000
RB04  NXDTA   TF        BNAME     ,CARD+22          ,     ,PICK UP B NAME
                                                                       3550 26 07611 07395
RB05          B    AAA                                                 3562 49 03874 00000
RB06  DTA     TFM       K         ,1                ,9    ,ROW CTR
                                                                       3574 16 07614 00-01
RB07          TFM       NAME      ,FILE-2           ,7    ,ROW SEARCH
                                                                       3586 16 07619 -8067
RB08  DT      C        -NUMRW     ,K                             03598 24 0736N 07614
RB09          BNI       ERR8      ,1300             ,     ,ROW NOT IN FILE
                                                                       3610 47 05182 01300
RB10          C         CARD+34   ,-NAME                         03622 24 07407 0761R
RB11          BE        ROWIN                                          03634 46 03682 01200
RB12          AM        K         ,1                ,10           03646 11 07614 000-1
RB13          AM        NAME      ,14               ,10           03658 11 07619 000J4
RB14          B         DT                                             03670 49 03598 00000
RB15  ROWIN   TFM       H         ,0                ,9    ,= B CTR
                                                                       3682 16 07622 00-00
RB16          TF        SAVE1     ,SAVE3            ,     ,RESET B SEARCH ADDR
                                                                       3694 26 07573 07583
RB17          BTM      CKSTOP     ,10001            ,7             03706 17 02408 J0001
RB18  NXTB    TF        NENT      ,-SAVE1           ,     ,= ENTRIES IN B
                                                                       3718 26 07625 0757L
RB19          AM        SAVE1     ,12               ,10   ,GET B NAME FRAM B GRP
                                                                       3730 11 07573 000J2
RB20          C         BNAME     ,-SAVE1                        03742 24 07611 0757L
RB21          BE        MATCH                                          03754 46 04186 01200
RB22          AM        H         ,1                ,10   ,UPDATE B CTR
                                                                       3766 11 07622 000-1
RB23          C         NMBEE     ,H                ,     ,LAST B CHECK
                                                                       3778 24 07586 07622
RB24          BE        OUT       ,                 ,     ,GEXT NEXT B GRP
                                                                       3790 46 03850 01200
RB25          MM        NENT      ,30               ,10   ,GOT TO NEXT B IN GRP B
                                                                       3802 13 07625 000L0
RB26          A         SAVE1     ,00099                         03814 21 07573 00099
RB27          AM        SAVE1     ,3                ,10   ,SET TO NUMB ENT POS
                                                                       3826 11 07573 000-3
RB28          B         NXTB                                           03838 49 03718 00000
RB29  OUT     BD   RB39,WRITE,,BRANCH IF RECORD REVISED                03850 43 03970 07548
RB30          B    RB40,,,NO. DO NOT WRITE RECORD                     03862 49 03994 00000
RB31  AAA     TF   TLAST,STORR+5,,RESET LAST ADDR FOR NEXT            03874 26 07563 08011
RB32          B    RDCD,,,          RHS REVISION                      03886 49 03418 00000
RB33  RB33    C    TLAST,-ADFSB,,RE-SEARCH FROM 1ST RECORD            03898 24 07563 0734-
RB34          TF   STORR+5,-ADFSB,, IF SEARCH COMPLETE-               03910 26 08011 0734-
RB35          BE   NTINB,,,ERROR EXIT -- NOT FOUND IN FILE.           03922 46 05290 01200
RB36          B    GETNXT                                             *3934 49 03226 00000
RB37  *              REWRITE B GROUP
RB38  YYY     SEEK      STODSK                                        03946 10 00565 -3969
                                                                       3958 49 00554 -8021
RB39  RB39    PUT  STODSK                                            03970 10 00565 -3993
                                                                       3982 49 00532 -8021
RB40  RB40    C    TLAST,SAVE2,, SET TO SEARCH NEXT RECORD           03994 24 07563 07578
RB41          TDM       WRITE     ,0                ,     ,CLEAR WRITE IND
                                                                       4006 15 07548 00000
RB42          TF   STORR+5,SAVE2                                     04018 26 08011 07578
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RB43            BE    NTINB,,,ERROR EXIT IF SEARCH FAILS          04030 46 05290 01200
RB44            B     RB51                                        *4042 49 04126 00000
RB45  RRR       C     CARD+4,FIRST+4,,CHECK FOR                   04054 24 07377 07593
RB46            BE    XXX,,,          FIRSTB OR                   04066 46 04162 01200
RB47            C     CARD+4,NEXT+4,, NEXT.B CARD                 04078 24 07377 07599
RB48            BE    XXX,,,          IF EITHER,CONTINUE          04090 46 04162 01200
RB49            B     COMPLT,,,       IF NEITHER,REVFST COMPLT    04102 49 05410 00000
RB50            TF        STORR+5   ,SAVE2          ,     ,UPDATE FOR NEXT BGRP READ
                                                                   4114 26 08011 07578
RB51  RB51      TFM   GET9+P,ROWIN                                04126 16 03412 -3682
RB52            BTM       CKSTOP    ,20004          ,7          04138 17 02408 K0004
RB53            B          GETNXT   ,               ,     ,READ NEXT B GRP RECORD
                                                                   4150 49 03226 00000
RB54  XXX       TF    COMMON+322,CARD+22,,SIMULATE                04162 26 07109 07395
RB55            B     RA55,,,REVFST ENTRY FROM REVISE             04174 49 02974 00000


RC16  STOR      TF    CARD+86,ZERO3,,LOWER LIMIT IN FLT PT FORM   04906 26 07459 07652
RC17            AM    SAVE1,15,10,  INDICATE PRESENCE             04918 11 07573 000J5
RC18            TF    -SAVE1,K,,  BRANCH TO STORE LIMIT           04930 26 0757L 07614
RC19            SF    -SAVE1,,,   SUBROUTINE                      04942 32 0757L 00000
RC20            B     STORE,,, WITH LOW LIM CARD FIELD CLEARED.   04954 49 04510 00000


RC48            TF    TLAST,-ADLSB                                05302 26 07563 0734N
RC49            TFM         EROR+M   ,ER4           ,7            05314 16 05097 -7676
RC50            TFM    ERORB+P,RRR                                05326 16 05128 -4054
RC51            TFM   GET9+P,RDCD                                 05338 16 03412 -3418
RC52  *           RESET FILE SCAN ADDRESSES
RC53            TF    STORR+5,-ADFSB                              05350 26 08011 0734-
RC54  RC54      RACD   CARD  ,,,BYPASS DATA AND COMMENTS          05362 37 07373 00500
RC55            CM    CARD  ,14,10,                               05374 14 07373 000J4
RC56            BI    ERORA,1100,,WRITE ERROR MESSAGE             05386 46 05062 01100
RC57            B     RC54                                         5398 49 05362 00000
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*       MOD 1 CHANGES TO INV002
 A93    TFM     TFM   0A95+6,BND+10,,INIT MANT MOVE OF RHS ENT1 03406 16 03436 -6298
 A94            S     0A95+6,MANSA                              03418 22 03436 14107
 A95    0A95    TF    BND+10-MANSA,-AUPNO,,MOVE MANTISSA RHS E1 03430 26 0780R 0652M
 A96            MF    BND,-0A95-6,,              SIGN           03442 71 06288 03430
 A97            TF    BNDEX,-AUPEX,,             EXPONENT       03454 26 06290 0652R
 A98            TFM   0B00+6,WK18+10,,INIT MANT MOVE OF ENTRY2  03466 16 03496 -6364
 A99            S     0B00+6,MANSA,,                            03478 22 03496 14107
 B00    0B00    TF    WK18+10-MANSA,-ALONO,,MOVE MANTISSA       03490 26 0774L 0653R
 B01            MF    WK18,-0B00-6,,             SIGN           03502 71 06354 03490
 B02            TF    WK18EX,-ALOEX,,            EXPONENT       03514 26 06356 0654M



*       MOD 1  CHANGES TO INV003
1B36 *INITIALIZE 10 DIGIT TO MANTISSA CONVERSION SUBR
1B37  AROUND TFM   109MM+6,109                                  03574 16 03688 -0109
1B38         S     109MM+6,MANSA                                03586 22 03688 14107
1B39 *CONVERT UPPER BOUND TO MANTISSA LENGTH
1B40         TFM   MSIZE+6,HLDUBX                               03598 16 03712 -6613
1B41         BT    10TOM,ALFEX                                  03610 27 03658 06510
1B42 *CONVERT LOWER BOUND TO MANTISSA LENGTH
1B43         TFM   MSIZE+6,HLDLBX                               03622 16 03712 -6633
1B44         BT    10TOM,AVAEX                                  03634 27 03658 06540
1B45         B     1B56,,,Q ADDR=10TOM FROMFACTOR ADDRESS       03646 49 03742 00000
1B46 *10 DIGIT TO MANTISSA CONVERSION SUBR. FROMFAC=10TOM-1,TOFAC=MSIZE+6
1B47  10TOM  TF    -MSIZE-6,-10TOM+1,,MOVE EXPONENT             03658 26 0371K 0365P
1B48         SM    10TOM-1,2,,MANTISSA ADDR OF FROMFAC          03670 12 03657 -0002
1B49  109MM  LD    109-MANSA,-10TOM+1,,CONVERT MANSA SIZE       03682 28 1399Q 0365P
1B50         SM     MSIZE+6,2,,MANTISSA ADDR OF TOFAC           03694 12 03712 -0002
1B51  MSIZE  TF    -MSIZE-6,99,,MOVE CONVERTED MANTISSA         03706 26 0371K 00099
1B52         TFM   104,0,2,RESTORE MULTIPLY TABLE               03718 16 -0104 00000
1B53         BB    ,,,SUBROUTINE EXIT                           03730 42 00000 00000
1B54 *BOTH BOUNDS ARE NOW IN MANTISSA LENGTH
1B55 *SUBTRACT LOWER FROM UPPER
1B56  1B56   FS    HLDUBX,HLDLBX                                03742 10 02375 -3761
                                                                 3754 49 0235N 00000
                                                                 3761 00005 -6613
                                                                 3766 00005 -6633
                                                                 3771 00001 '

*       MOD 2 CHANGES TO COST.R
XK03         TFM   BNMPAR  , 14000                              10138 16 07195 J4000
XK05         TFM   PIPAR   , 15600                              10162 16 07069 J5600

*       MOD 2  CHANGE TO LP1621
7G48         BTM   MNMON,0,10,PUT MANSA TO MONITOR              08756 17 07724 00000
```

There are no source changes in this modification for REVCOL or REVBAS.

```
PA54 RDERTNTFM GET9+P,RDCD,,ERROR RETURN INITIALIZATION
PA72 GETNXTC   STORR+5,-ADLGR,,CHECK END OF MATRIX FILE
PA725      BE  CKLIST,,,CHECK IF LAST IS FIRST GROUP
PA73 GTNEXTGET STODSK
PA88 RDCD  RACD CARD
PA885      TFM GET9+P,ROWOK,,BYPASS WACD TIL COL FOUND
PB12       BE  AAA
PB15       BE  CCC
PB22       BT      99999    ,              ,     ,NO REWRITE AGRP
PB23 AAA   TF  TLAST,STORR+5,,RESET LAST TO CURRENT
PB24       TFM GET9+P,RDCD,,RESTORE WACD FOR NEXT CARD
PB25       B   COLOK
PB29       BT  DDD
PB33       NOP
PB35       TF  STORR+5,SAVE2,,SET READ FOR NEXT GROUP
PB36       NOP
PB37       B    GETNXT
PB42 DDD   C   TLAST,SAVE2,,CHECK IF LAST GROUP HAS BEEN SEARCHED
PB43       TF  STORR+5,SAVE2,,SET TO READ NEXT RECORD
PB44       BE  NTINMT,,,INCORRECT COL NAME
PC75       TFM  ERORB+P,RDERTN
PC76       B   ERORA
PC77 CKL1STC   TLAST,-ADFGR,,IS LAST SEARCH RECORD FIRST IN FILE
PC78       TF  STORR+5,-ADFGR,,SEARCH IS COMPLETE
PC79       BE  NTINMT,,,COLUMN NAME NOT IN FILE.
PC80       B    GTNEXT+12,,,IF SEARCH NOT COMPLETE,CONTINUE
RA55 RA55  TF  CARDIM,COMTAB+15
RA78 GETNXTC   STORR+5,-ADLSB,,CHECK END OF RHS FILE
RA785      BE  RB33
RB05       B   AAA
RB29 OUT   BD  RB39,WRITE,,BRANCH IF RECORD REVISED
```

```
RB30        B   RB40,,,NO. DO NOT WRITE RECORD
RB31 AAA    TF  TLAST,STORR+5,,RESET LAST ADDR FOR NEXT
RB32        B   RDCD,,,          RHS REVISION
RB33 RB33   C   TLAST,-ADFSB,,RE-SEARCH FROM 1ST RECORD
RB34        TF  STORR+5,-ADFSB,, IF SEARCH COMPLETE-
RB35        BE  NTINB,,,ERROR EXIT -- NOT FOUND IN FILE.
RB36        B   GETNXT
RB39 RB39   PUT STODSK
RB40 RB40   C   TLAST,SAVE2,, SET TO SEARCH NEXT RECORD
RB42        TF  STORR+5,SAVE2
RB43        BE  NTINB,,,ERROR EXIT IF SEARCH FAILS
RB44        B   RB51
RB45 RRR    C   CARD+4,FIRST+4,,CHECK FOR
RB46        BE  XXX,,,           FIRSTB OR
RB47        C   CARD+4,NEXT+4,, NEXT.B CARD
RB48        BE  XXX,,,           IF EITHER,CONTINUE
RB49        B   COMPLT,,,        IF NEITHER,REVFST COMPLT
RB51 RB51   TFM GET9+P,ROWIN
RB54 XXX    TF  COMMON+322,CARD+22,,SIMULATE
RB55        B   RA55,,,REVFST ENTRY FROM REVISE
RC16 STOR   TF  CARD+86,ZERO3,,LOWER LIMIT IN FLT PT FORM
RC17        AM  SAVE1,15,10,  INDICATE PRESENCE
RC18        TF  -SAVE1,K,,  BRANCH TO STORE LIMIT
RC19        SF  -SAVE1,,,   SUBROUTINE
RC20        B   STORE,,, WITH LOW LIM CARD FIELD CLEARED.
RC48        TF  TLAST,-ADLSB
RC50        TFM  ERORB+P,RRR
RC51        TFM GET9+P,RDCD
RC53        TF  STORR+5,-ADFSB
RC54 RC54   RACD CARD  ,,,BYPASS DATA AND COMMENTS
RC55        CM  CARD  ,14,10,
```

```
RC56        BI   ERORA,1100,,WRITE ERROR MESSAGE
RC57        B    RC54
 A93 TFM    TFM  0A95+6,BND+10,,INIT MANT MOVE OF RHS ENT1
 A94        S    0A95+6,MANSA
 A95 0A95   TF   BND+10-MANSA,-AUPNO,,MOVE MANTISSA RHS E1
 A96        MF   BND,-0A95-6,,              SIGN
 A97        TF   BNDEX,-AUPEX,,             EXPONENT
 A98        TFM  0B00+6,WK18+10,,INIT MANT MOVE OF ENTRY2
 A99        S    0B00+6,MANSA,,
 B00 0B00   TF   WK18+10-MANSA,-ALONO,,MOVE MANTISSA
 B01        MF   WK18,-0B00-6,,              SIGN
 B02        TF   WK18EX,-ALOEX,,             EXPONENT
1B36 *INITIALIZE 10 DIGIT TO MANTISSA CONVERSION SUBR
1B37 AROUNDTFM  109MM+6,109
1B38        S    109MM+6,MANSA
1B39 *CONVERT UPPER BOUND TO MANTISSA LENGTH
1B40        TFM  MSIZE+6,HLDUBX
1B41        BT   10TOM,ALFEX
1B42 *CONVERT LOWER BOUND TO MANTISSA LENGTH
1B43        TFM  MSIZE+6,HLDLBX
1B44        BT   10TOM,AVAEX
1B45        B    1B56,,,Q ADDR=10TOM FROMFACTOR ADDRESS
1B46 *10 DIGIT TO MANTISSA CONVERSION SUBR. FROMFAC=10TOM-1,TOFAC=MSIZE+6
1B47 10TOM  TF   -MSIZE-6,-10TOM+1,,MOVE EXPONENT
1B48        SM   10TOM-1,2,,MANTISSA ADDR OF FROMFAC
1B49 109MM  LD   109-MANSA,-10TOM+1,,CONVERT MANSA SIZE
1B50        SM    MSIZE+6,2,,MANTISSA ADDR OF TOFAC
1B51 MSIZE  TF   -MSIZE-6,99,,MOVE CONVERTED MANTISSA
1B52        TFM  104,0,2,RESTORE MULTIPLY TABLE
1B53        BB   ,,,SUBROUTINE EXIT
1B56 1B56   FS   HLDUBX,HLDLBX
```

```
XK03        TFM  BNMPAR  , 14000

XK05        TFM PIPAR  , 15600

7G48        BTM   MNMON,0,10,PUT MANSA TO MONITOR
```

80 column list of five patch cards - MOD 2 deck

```
04257KL900000000000000000000000*000      -4129J0¤Z04301K080431106¤Z04310K02N90 02
04885KK900000000000000000000004747J0¤KK6054159025341000000497306¤K06049870S 03
04946K026¤K080502506¤K080506306¤K080512106¤KJ4N945654241620ZKJ2N556006541595 03
J0138KM81607195J40001608838J76001607069J560049102740000OZJ0182KJ04510238026X J0
08725KO772000002602823028832602833028711707724000003302872000001502755000017 09
```

```
-2402KO710005650242549005660366624036830384347024740120024036910385147026460000 1
-2469KO7012034000000010239025230010048000000000049024020000M955654153494400002
-2536KK4006248494663004341594402KM0N5456600535771767270004449540059415547450000 3
-2600KM6006649535300424500076767670063560007676767030ZKJ834000000010272036900004
-2664KO710385573026250385511038550004273026410385512038550021234000000010230000 5
-2731KO74000000010239025610010024037070436547028140120034000000010226043030000 6
-2798KO7430739043090010048000000000037038650050045028980386510005650287349000007
-2865KO7053204024260419104023490282600000240387104281470297001200720390304100008
-2932KO795210419503855730390304195490285000000240387104273470304201200720380000 9
-2999KO7950419521041950385573038950419549028500000024038710428946028500120000010
-3066KO7140386500000460285001200140386500OP34602850012002604211038793204170000 11
-3133KO7000002603879041811604216038681604221038822504222042 2J150423700000150001 2
-3200KJ00422J00000Z032090K01ZKM43104223042104503426042373204223000002204236000013
-3254KO7425124042310426047034260120043034260423343034260423521042360425172000014
-3321KO7423604264330426400000210426403855730423604264150422900005330422300000015
-3388KO7003104210042231504016000061504017000022504 22J042221104221000021104200016
-3455KO7160000214042160388047035940120032038680000026041810387932041820000000017
-3522KO7240419104299470355801200260406704303100056503581490053204024490317400018
-3589KO7000014042210401647031740120026038790421126041910402315041860000549000 19
-3656KJ80282600000036 75J0(KL4024849466 3N5555555N456554963565967Z03834K0302400020
-3837KK784946630000000600003865J0(KL7000000000000                              - 21
-3901KO7000000000000                    -                                      - 22
-3968KN600000000000                                                  Z03864K020000023
-3866KO7000000000000                                                           - 24
-3933KJ3000000000000Z04024K0804033J0(KL40000000000*                            - 25
-4066KO7000000000000-                          -                               - 26
-4133KO3000000000000-                                                        - R00000027
-4238KK7N3527050707070000000000000Z04266KL1J4444553J4445356J4445341P60050700028
-4297KN3175P779P777M5556549595655544555632054565549635659720ZKJ1N456554963500029
-4361KO565972Z04366000Z0000000000000                                           - 30
R9999Z00000000000 0                                                            - 31
```

Assembly listing of SHIFT

```
90010*READ DIM SHIFT DISPLACEMENT CARD
90020 A       GET   SHIFT                                        02402 10 00565 -2425
                                                                  2414 49 00566 -3666
90030*TEST FOR VALID ENTRY- CC01=SHIFT,CC06=NNNN
90040         C     S01,SHIFTT                                   02426 24 03683 03843
90050         BNE   BB                                           02438 47 02474 01200
90060         C     S06,4BLANK                                   02450 24 03691 03851
90070         BNE   B                                            02462 47 02646 01200
90080 BB      RCTY                                               02474 34 00000 00102
90090         WATY  ER1                                          02486 39 02523 00100
90100         H                                                  02498 48 00000 00000
90110         B     A                                            02510 49 02402 00000
90120 ER1     DAC   19,INVALID SHIFT CARD'                       02523 00038
90130*SHIFT CARD APPEARS VALID.
90140 ER3     DAC   29,NEW LP1620 DIM RANGE WILL BE ,            02561 00058
90150 LOW     DSAC  4 ,XXXX,                                     02625 00008
90160         DAC   4 , TO ,                                     02627 00008
90170 HIGH    DSAC  4 ,XXXX;                                     02641 00008
90180         DAC   2 ,.'                                        02643 00004
90210 B       RCTY                                               02646 34 00000 00102
90220         TNS   S06,SHIF                                     02658 72 03691 03855
90240         TNF   LOW,SHIF                                     02670 73 02625 03855
90250         AM    SHIF,42,8                                    02682 11 03855 0-042
90260         TNF   HIGH,SHIF                                    02694 73 02641 03855
90270         SM    SHIF,212,8                                   02706 12 03855 0-212
91010         RCTY                                               02718 34 00000 00102
91020         RCTY                                               02730 34 00000 00102
91030         WATY  ER3                                          02742 39 02561 00100
91040         C     S10,MONIT2                                   02754 24 03707 04365
91045         BNE   MONIT1                                       02766 47 02814 01200
91050         RCTY                                               02778 34 00000 00102
91053         TF    MON1X2,MON2                                  02790 26 04303 04307
91056         WATY  ER4                                          02802 39 04309 00100
91060 MONIT1  H                                                  02814 48 00000 00000
91070*AFTER NEW DIM RANGE MESSAGE-HALT,
91080*IF NEW RANGE IS ACCEPTABLE,PRESS START TO CONTINUE
91090*
91100*
91110*MAINLINE ROUTINE
91120*
91130*READ OBJECT DECK CARD
91140 READ    RACD  CC+2*1                                       02826 37 03865 00500
91150*TEST CARD TYPE
91160         BNR   DUP,CC+2*1                                   02838 45 02898 03865
91170*JOB,DUP OR *DLOAD CARD
91180 JOB     PUT   OCARD                                        02850 10 00565 -2873
                                                                  2862 49 00532 -4024
91190*MOVE NEW CARD TO OLD IMAGE AREA
91200         TF    OCC+2*80,CC+2*80                             02874 26 04191 04023
91210         B     READ                                         02886 49 02826 00000
93010*TEST FOR DLOAD CARD
93020 DUP     C     CC+4*2,DLOAD                                 02898 24 03871 04281
93030         BNE   DUP2                                         02910 47 02970 01200
93040*DLOAD CARD,SHIFT DIM NUMBER
93050         TNS   CC+2*20,DIM                                  02922 72 03903 04195
93060         A     DIM,SHIF                                     02934 21 04195 03855
93070         TNF   CC+2*20,DIM                                  02946 73 03903 04195
93080         B     JOB                                          02958 49 02850 00000
93081 DUP2    C     CC+4*2,DELET                                 02970 24 03871 04273
```

```
3082          BNE    DUP3                                    02982 47 03042 01200
3083          TNS    CC+2*16,DIM                             02994 72 03895 04195
3084          A      DIM,SHIF                                03006 21 04195 03855
3085          TNF    CC+2*16,DIM                             03018 73 03895 04195
3086          B      JOB                                     03030 49 02850 00000
3087 DUP3     C      CC+4*2,DLABL                            03042 24 03871 04289
3088          BE     JOB                                     03054 46 02850 01200
3090*TEST FOR BLANK AND COLD START CARD
3100 NORMAL   CM     CC+2*1,0,10                             03066 14 03865 000-0
3110          BE     JOB                                     03078 46 02850 01200
3120          CM     CC+2*1,73,10                            03090 14 03865 000P3
3130          BE     JOB                                     03102 46 02850 01200
3140*OBJECT CARD. BEGIN SEARCH FOR CALL LINK
3150*INITIALIZE
3160          TF     SAVE18,CC+2*8                           03114 26 04211 03879
3170          SF     OCC+2*70-1                              03126 32 04170 00000
3180          TF     CC+2*8,OCC+2*75                         03138 26 03879 04181
3190          TFM    CCI,CC+2*3-1                            03150 16 04216 -3868
3200          TFM    CCJ,CC+2*10-1                           03162 16 04221 -3882
4010*LOOP TO TEST CALL LINK DIM NUMBER IN OBJECT CARD
4020*
4030*SAVE ZONE COLUMN J
4040 LOOP     TD     SAVED,-CCJ                              03174 25 04222 0422J
4050*CLEAR RECORD MARK FOR INTERNAL RECORD MARK TEST
4060          TDM    FIELD+1,0,,                             03186 15 04237 00000
4070*LIMIT TEST TRANSMISSION TO 7 COLUMNS
4080          TDM   -CCJ,                                    03198 15 0422J 00000
4090          DC     1,',*                                   03209 00001
4100*MOVE  7 COLUMNS TO TEST AREA
4110          TR     FIELD-13,-CCI                           03210 31 04223 04210
4120*TEST FOR INTERNAL RECORD MARK.NO DIM NUMBER IF PRESENT.
4130          BNR    RESTR,FIELD+1                           03222 45 03426 04237
4140*TEST FIELD IS DIM NUMBER
4150          SF     FIELD-13                                03234 32 04223 00000
4160          S      FIELD,LKZRO                             03246 22 04236 04251
4170          C      FIELD-5,9ZRO                            03258 24 04231 04260
4180          BNZ    RESTR                                   03270 47 03426 01200
4190          BD     RESTR,FIELD-3                           03282 43 03426 04233
4200          BD     RESTR,FIELD-1                           03294 43 03426 04235
5010*YES.THIS FIELD TO BE SHIFTED.
5020*
5030*RESTORE ZONES
5040          A      FIELD,LKZRO                             03306 21 04236 04251
5050*STRIP DIM NUMBER
5060          TNS    FIELD,NDIM                              03318 72 04236 04264
5070*MODIFY DIM NUMBER
5075          CF     NDIM                                    03330 33 04264 00000
5080          A      NDIM,SHIF                               03342 21 04264 03855
5090*FILL SHIFTED DIM NO
5100          TNF    FIELD,NDIM                              03354 73 04236 04264
5110*MOVE SHIFTED DIM TO READ AREA
5120          TDM    FIELD-7,5                               03366 15 04229 00005
5125          CF     FIELD-13                                03378 33 04223 00000
5130          TR    -CCI,FIELD-13                            03390 31 04210 04223
5140*INDICATE SHIFTED DIM NO BY S IN COL 77
5150          TDM    CC+2*77-1,6                             03402 15 04016 00006
5160          TDM    CC+2*77,2                               03414 15 04017 00002
6010*RESTORE SAVED DIGIT,INDEX I AND J
6020 RESTR    TD    -CCJ,SAVED                               03426 25 0422J 04222
6030          AM     CCJ,2                                   03438 11 04221 -0002
```

```
96040          AM     CCI,2                                    03450 11 04216 -0002
96050*IS CCI EQUAL CC09
96060          CM     CCI,CC+2*9-1                             03462 14 04216 -3880
96070          BNE    LASTC                                    03474 47 03594 01200
96080*PUNCH OLD CARD IMAGE
96082          SF     CC+3*2-1                                 03486 32 03868 00000
96085          TF     OCC+2*75,CC+2*8                          03498 26 04181 03879
96086          SF     OCC+2*76-1                               03510 32 04182 00000
96087          C     OCC+2*80,6B015                            03522 24 04191 04299
96088          BNE    PUNCH                                    03534 47 03558 01200
96089          TF     OCC+2*18,MON1X2                          03546 26 04067 04303
96090 PUNCH    PUT    OCARD                                    03558 10 00565 -3581
                                                               3570 49 00532 -4024
96100          B      LOOP                                     03582 49 03174 00000
96110*IS CCJ EQUAL CC76
96120 LASTC    CM     CCJ,CC+2*77-1                            03594 14 04221 -4016
96130          BNE    LOOP                                     03606 47 03174 01200
96140*LAST CARD COLUMN PROCESSED.
96150*MOVE SAVED COLUMNS 01 TO 08 BACK TO CC01-08
96160          TF     CC+2*8,SAVE18                            03618 26 03879 04211
96170*MOVE NEW CARD TO OLD CARD
96180          TF     OCC+2*80,CC+2*80                         03630 26 04191 04023
96185          TDM    OCC+2*78-1,5                             03642 15 04186 00005
96190          B      READ                                     03654 49 02826 00000
97010 SHIFT    DCA    ,S                                       03666 00005 -3675
                                                               3671 00003 JOG
97020 S        DAS    80                                       03675 00160
97030 S01      DSAC   5,SHIFT,S+8                              03683 00010
97040 S06      DSAC   4,NNNN,S+16                              03691 00008
97045 S10      DSAC   8,MONITORX,S+32                          03707 00016
97050 SHIFTT   DSAC   5,SHIFT                                  03843 00010
97060 4BLANK   DSAC   4,    ,                                  03851 00008
97070 SHIF     DC     4,0                                      03855 00004
97080 CARD     DCA    ,CARDIM                                  03856 00005 -3865
                                                               3861 00003 JOG
                                                                 ,
97090 CC01     DAC     40,                                     3865 00080
                                                                 ,
97100          DAC     40,                                     3945 00080
                                                                 ,CC01,
97110 CARDIM   DAC    41,                                      3865 00082
97120 CC       DS     ,CC01-2                                  03863 00000
97130 OCARD    DCA    ,OCC01                                   04024 00005 -4033
                                                               4029 00003 JOG
                                                                 ,
97140 OCC01    DAC    40 ,                                     4033 00080
                                                                 ,
97150          DAC    40 ,                                     4113 00080
97160 OCC      DS     ,OCC01-2                                 04031 00000
97170 DIM      DC     4,0                                      04195 00004
97180 SAVE18   DS     16                                       04211 00016
97190 CCI      DS     5                                        04216 00005
97200 CCJ      DS     5                                        04221 00005
97210 SAVED    DS     1                                        04222 00001
97220 FIELD    DS     14                                       04236 00014
97230          DS     1                                        04237 00001
97240 LKZRO    DC     14,53527050707070                        04251 00014
97250 9ZRO     DC     9,0                                      04260 00009
97260 NDIM     DC     4,0                                      04264 00004
97270 DELET    DSAC   4,*DEL                                   04273 00008
```

```
97280 DLOAD   DSAC  4,*DLO                                  04281 00008
97290 DLABL   DSAC  4,*DLA                                  04289 00008
97300 6B015   DSAC  5,6 015,                                04299 00010
97310 MON1X2  DSAC  2,79                                    04303 00004
97320 MON2    DSAC  2,77                                    04307 00004
97330 ER4     DAC   21,ENVIRONMENT-MONITOR2'                04309 00042
97340 MONIT2  DSAC  8,MONITOR2                              04365 00016
98010         DEND  A                                       02402
```

IBM

40 Saw Mill River Road
Hawthorne, New York 10532
White Plains 9-1900 (Code 914)

International Business Machines Corporation

January 4, 1965

MEMORANDUM TO : Users of Linear Programming System 1620-CO-04X

SUBJECT : Version 1, Modification Level 3

This modification has been prepared to correct an error in the program NEWRHS. The program formerly would not properly correct the logical bound under the following conditions:

A change in RHS
Row R range in new RHS not equal
Row R range in old RHS
and
Row R Generated logical variable is in basis row T, where T is not equal to R.

This modification consists of the following:

1. Description of error, machine list of correct object card and corrected source card, list of control cards to be used in updating the system pack, and instructions for making the update run - one page
2. Corrected object patch card - one card

Any discrepancy between the material received and the list above, as well as any errors in card reproduction, should be directed to: Manager of DP Program Information, IBM Corporation, 40 Saw Mill River Road, Hawthorne, New York 10532.

We appreciate your cooperation in making the enclosed changes and request the continued use of the Authorized Programming Analysis Report (APAR), submitted through your local IBM Systems Engineer, in reporting difficulties concerning this program. APAR's for this programming system should be sent to: APAR Processing, DP Application Programming Standards, 112 East Post Road, White Plains, New York 10601.

PROGRAM INFORMATION DEPARTMENT

tm
cc: SE Managers
(No enclosures with Br/Office copies)

DESCRIPTION OF ERROR

PROGRAM NEWRHS

ERROR FAILURE TO OBTAIN CORRECT LOGICAL BOUND

OCCURANCE A CHANGE IN RHS

ROW R RANGE IN NEW RHS
NOT EQUAL
ROW R RANGE IN OLD RHS, AND

ROW R GENERATED LOGICAL VARIABLE IS IN BASIS ROW T,
WHERE T NOT EQUAL R.

Correction

SYMBOLIC
SOURCE DECK IDENTIFICATION CHARACTER 5, IN CC 1
SEQUENCE NUMBER I47, IN CC 2-4

```
5I47      TF   B1NWI       , BETFIL       ,, INIT SEARCH NAME ADDRESS
```

REPLACES SAME NUMBERED CARD

OBJECT
OBJECT DECK IDENTIFICATION CHARACTER 5, IN CC 76
SEQUENCE NUMBER J17, IN CC 78-80
CHANGE CC 22 TO NUMERIC ZERO

THE ALTERED CARD IS LISTED BELOW

```
-99J1KO765326099340490611099340001124099 3M0976Q461005201200210993405004121 05 J17
```

DISK

DELETE NEWRHS

```
ZZJOB
ZZDUP
*DELETNEWRHS
```

LOAD ALTERED OBJECT DECK

```
ZZJOB
ZZDUP
*DLOADNEWRHS    DETAILS OMITTED,
```

USE PID DISTRIBUTED DLOAD NEWRHS IF PID DISTRIBUTED DECK WAS LOADED.
USE SHIFT GENERATED DLOAD NEWRHS, IF SHIFT WAS USED TO OBTAIN A LOADING DECK.