APPROVED BY
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IDENTIFICATION

Variable Column Integer Print, MU PRI1

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PURPOSE

To print, via the 716 on-line printer, one to five fixed point integers, I_i, in from one to five columns with a five digit integer line label.

RESTRICTIONS

The MURA PRINTER BOARD 1 is required. See attached sheet for wiring diagram.

METHOD

Accuracy: Exact

Range: $-(2^{35} - 1) \leq I_i \leq 2^{35} - 1$

USAGE

Calling Sequence:

UA SAP		MURASS	
Loc.	Instruction	Loc.	Instruction
α	TSX PRI1, 4	α	BTSX A 4
$\alpha + 1$	(prefix) B, 0, C	$\alpha + 1$	C N B 0 C
$\alpha + 2$	return	$\alpha + 2$	return

where

(prefix) = N = the number of integers, $1 \leq N \leq 5$
B = integer label to identify line of print
C = location of first fraction, with successive fractions in C + 1, C + 2, etc..

On entry to this subroutine the fixed point integers $I_0, I_1, \ldots, I_{N-1}$, in memory locations C, C + 1, . . . , C + N - 1, respectively, will be printed via the 716 printer as 11 digit decimal integers. The integers will appear in order $I_0, I_1, \ldots, I_{N-1}$, from left to right in N columns on one line. Positive integers are printed without sign, negative integers with sign. The decimal point is

not printed and is assumed to be immediately to the right of the least significant digit of the integer. To the left of the N columns, on the same line, a five digit integer, B, will be printed, to serve as a line label. At the very left of the line the letter I will appear to indicate that the numbers printed are integers.

If prefix is PZE, that is N = 0, and C is the location of any positive number, then just the label B is printed.

Space Required:

	UA SAP	MURASS
82 words program at:	PRI1	A
21 words temporary at:	COMMON	T

CODING INFORMATION

Timing: 514 + 4.4N ms. is the average time if the printer is not in motion upon entry. The printer will be kept running at full speed (150 lines per minute) if the time between exit and successive entry to this program does not exceed 108 - 4.4N ms..

```
       REM PRI1 MURA VARIABLE COLUMN INTEGER PRINT                    MU   PRI1
PRI1   SXD COMMON,1      SAVE IR1                                    PRI1  0001
       SXD COMMON+1,2    SAVE IR2                                    PRI1  0002
       SXD COMMON+2,4    SAVE IR4                                    PRI1  0003
       PXD 11            CLEAR AC                                    PRI1  0004
       LDQ 1,4           PROGRAM PARAMETERS INTO MQ                  PRI1  0005
       LGL 3             SHIFT N INTO AC                             PRI1  0006
       STO COMMON+3      N INTO TEMP STORAGE                         PRI1  0007
       ADD PRI1+4                                                    PRI1  0008
       STO COMMON+4      N+1 AS ADDRESS INTO TEMP.                   PRI1  0009
       LGL 15            FORM INTEGER CALL ADDRESS                   PRI1  0010
       ADD COMMON+3                                                  PRI1  0011
       STA PRI1+26       PLANT INTEGER CALL ADDRESS                  PRI1  0012
       STA PRI1+38       PLANT INTEGER CALL ADDRESS                  PRI1  0013
       RQL 18            LABEL INTO ADDRESS OF MQ                    PRI1  0014
       LXA PRI1+3,1      SET IR1 EQUAL TO 11                         PRI1  0015
       CLA COMMON+3      N INTO AC                                   PRI1  0016
       ALS 2             4N IN AC                                    PRI1  0017
       STA PRI1+19       PLANT SHIFT ADDRESS                         PRI1  0018
       CAL PRI1+80                                                   PRI1  0019
       ARS               SET UP NUMBER BANK                          PRI1  0020
       STO COMMON+21,1   FOR FIRST ENTRY                             PRI1  0021
       TIX PRI1+20,1,1   LOOP, OUT AFTER 11 PASSES                   PRI1  0022
       LXA COMMON+4,4    SET IR4 EQUAL TO N+1                        PRI1  0023
       LXA PRI1+4,2      SET IR2 EQUAL TO 1                          PRI1  0024
       TRA PRI1+27                                                   PRI1  0025
       LXA PRI1+4,2      SET IR2=1                                   PRI1  0026
       LDQ 0,4           INTEGER INTO MQ, ADDRESS PLANTED            PRI1  0027
       PXD 6             CLEAR AC                                    PRI1  0028
       DVP PRI1+81       DIVIDE BY 10                                PRI1  0029
       ALS 29,1          POSITION REMAINDER                          PRI1  0030
       ORS COMMON+21,2   DIGIT INTO NUMBER BANK                      PRI1  0031
       TXI PRI1+32,2,1   STEP IR2 BY + 1                             PRI1  0032
       TXL PRI1+27,2,11  LOOP, OUT AFTER 11 PASSES                   PRI1  0033
       TXI PRI1+34,1,4   STEP IR1 BY + 4                             PRI1  0034
       TIX PRI1+25,4,1   LOOP, OUT AFTER N+1 PASSES                  PRI1  0035
       WPR               SELECT PRINTER                              PRI1  0036
       PSE 248           PULSE HUB 8 FOR I                           PRI1  0037
       LXA COMMON+3,1    SET IR1 EQUAL TO N                          PRI1  0038
       CLA 0,1           INTEGER INTO AC, ADDRESS PLANTED            PRI1  0039
       TPL PRI1+41       TRANSFER IF INTEGER +                       PRI1  0040
       PSE 243,4         PULSE EXIT HUBS FOR -                       PRI1  0041
       TXI PRI1+42,4,-1  STEP IR4 BY -1                              PRI1  0042
       TIX PRI1+38,1,1   LOOP, OUT AFTER N PASSES                    PRI1  0043
       CAL PRI1+78       T EQUAL TO 10 INTO AC                       PRI1  0044
       ACL PRI1+79       REPLACE T BY T-1                            PRI1  0045
       SLW COMMON+5      STORE T-1 FIXED                             PRI1  0046
       SLW COMMON+6      STORE T-1 SHIFTING                          PRI1  0047
       CAL PRI1+79       EXTRACTOR INTO AC                           PRI1  0048
       SLW COMMON+7      STORE EXTRACTOR IN TEMP.                    PRI1  0049
       LXA PRI1+27,1     SET IR1 EQUAL TO 6                          PRI1  0050
       LXA PRI1+5,2      SET IR2 EQUAL TO 3                          PRI1  0051
       LXA PRI1+16,4     SET IR4 EQUAL TO 2                          PRI1  0052
       CAL COMMON+8,4    SHIFT T, EXTRACTOR                          PRI1  0053
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ARS 4              4 PLACES TO RIGHT                                PRI1  0054
SLW COMMON+8,4     FOR NEXT COLUMN.                                 PRI1  0055
TIX PRI1+52,4,1    LOOP, OUT AFTER 2 PASSES                         PRI1  0056
LXA PRI1+3,4       SET IR4 EQUAL TO 11                              PRI1  0057
CAL COMMON+21,4    DIGIT INTO AC                                    PRI1  0058
ANA COMMON+7       EXTRACT DIGIT                                    PRI1  0059
CAS COMMON+6       COMPARE WITH T                                   PRI1  0060
TRA PRI1+62        0 IMAGE BIT IF GREATER THAN T                    PRI1  0061
CLA PRI1+62        1 IMAGE BIT IF EQUAL TO T                        PRI1  0062
LRS 1              0 IMAGE BIT IF LESS THAN T                       PRI1  0063
TIX PRI1+57,4,1    LOOP, OUT AFTER 11 PASSES                        PRI1  0064
TNX PRI1+68,1,1    TRANSFER WHEN ALL DIGITS PROCESSED               PRI1  0065
TIX PRI1+51,2,1    LOOP, OUT AFTER 3 PASSES                         PRI1  0066
STQ COMMON+8       STORE LEFT IMAGE                                 PRI1  0067
TRA PRI1+50        RETURN FOR RIGHT IMAGE                           PRI1  0068
STQ COMMON+9       STORE RIGHT IMAGE                                PRI1  0069
CPY COMMON+8       COPY LEFT IMAGE                                  PRI1  0070
CPY COMMON+9       COPY RIGHT IMAGE                                 PRI1  0071
CAL COMMON+5       T INTO AC                                        PRI1  0072
ANA PRI1+79        CLEAN IT OFF                                     PRI1  0073
TNZ PRI1+44        TRANSFER IF T NOT ZERO                           PRI1  0074
LXD COMMON,1       RESTORE IR1                                      PRI1  0075
LXD COMMON+1,2     RESTORE IR2                                      PRI1  0076
LXD COMMON+2,4     RESTORE IR4                                      PRI1  0077
TRA 2,4            EXIT                                             PRI1  0078
OCT 500000000000 T EQUAL TO 10                                      PRI1  0079
OCT 740000000000 EXTRACTOR                                          PRI1  0080
OCT 001777777777 CONSTANT FOR INITIAL SET-UP OF NBR BANK            PRI1  0081
HTR 10             TEN FOR DECIMAL CONVERSION                       PRI1  0082
```
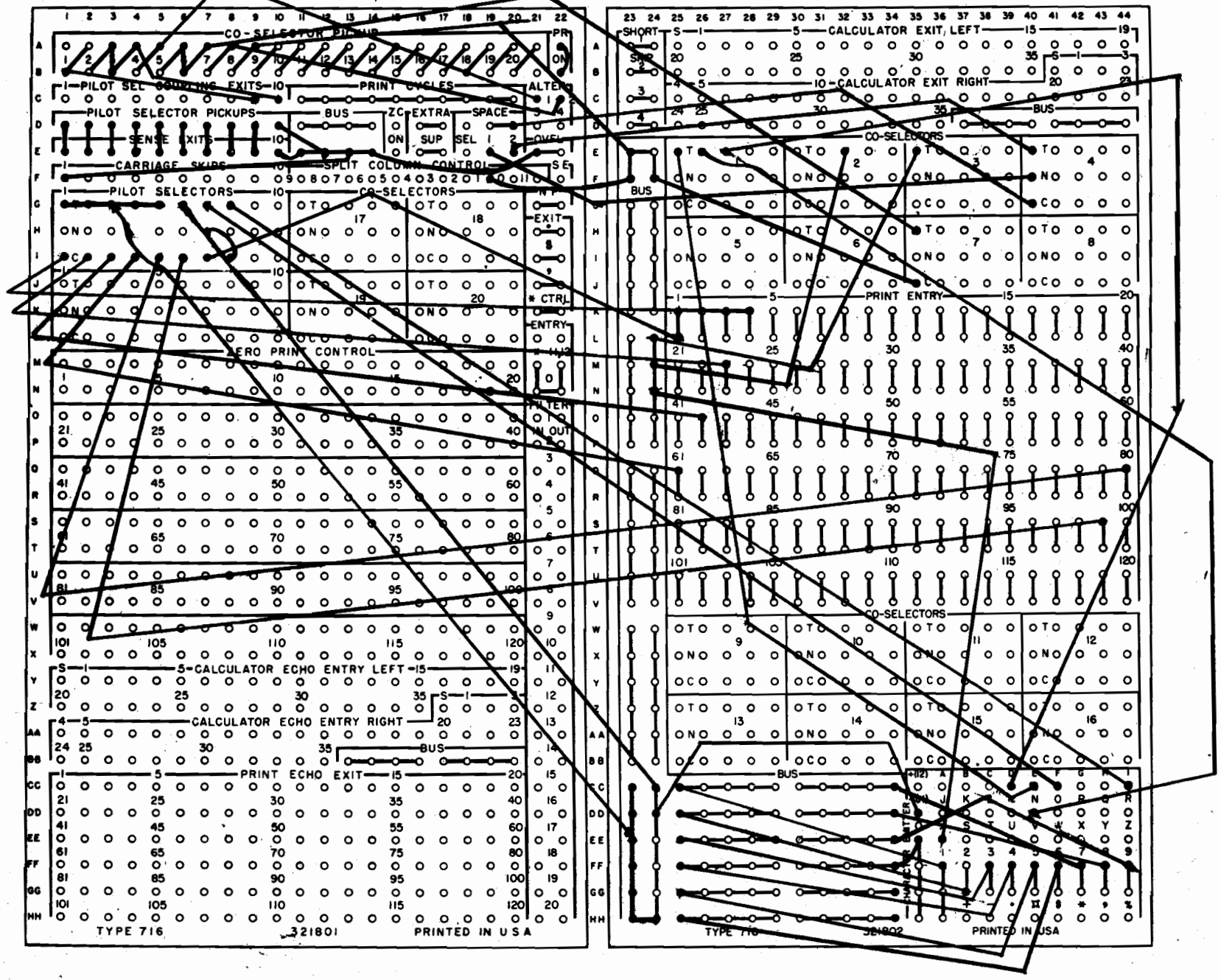

MURA PRINTER BOARD

Form 24-6127-0

TYPE 716 PRINTER



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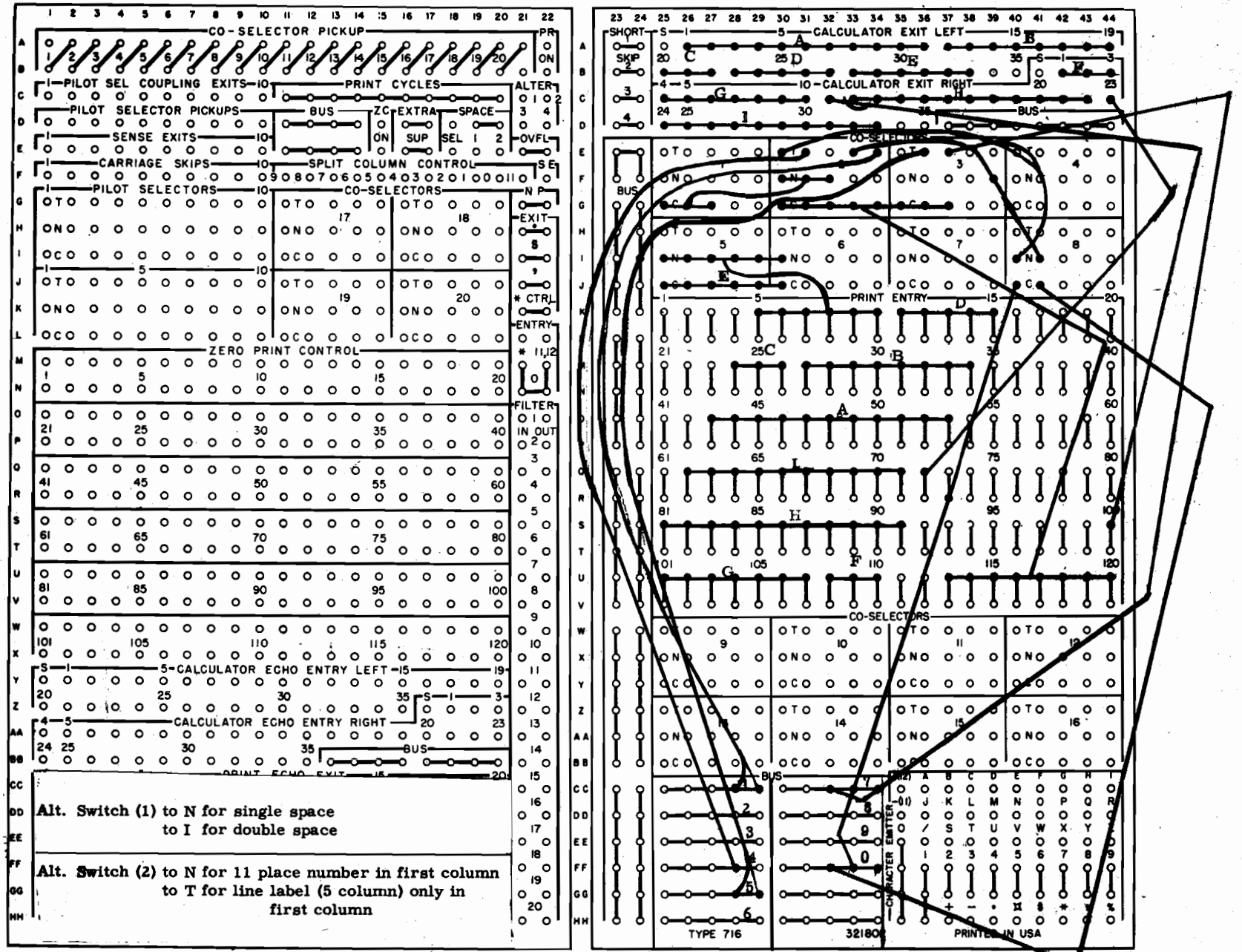

Alt. Switch (1) to N for single space
to I for double space

Alt. Switch (2) to N for 11 place number in first column
to T for line label (5 column) only in
first column

EXAMPLE DATE 04/01/57

MURA PRINTER BOARD

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