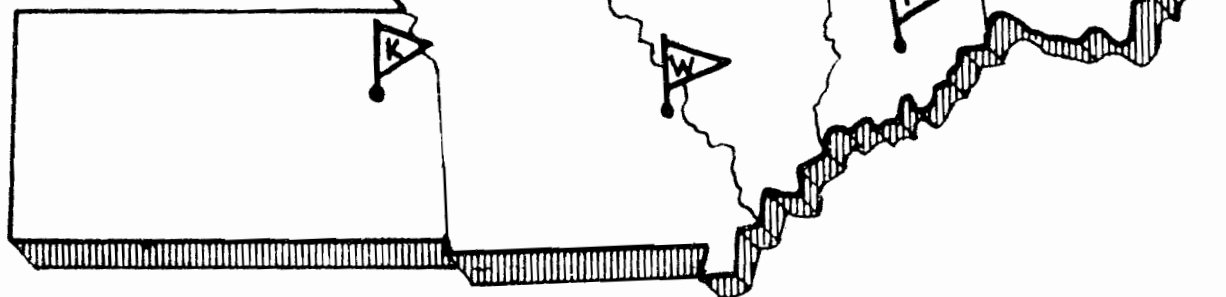


334



Internal
IBM

100-334

APPROVED BY

J. Snyder

IDENTIFICATION

Six Column Integer Cathode Ray Tube Display, MU SCP6

Richard King - May 17, 1957

Midwestern Universities Research Association, Madison, Wisconsin

PURPOSE

To display, by means of the Type 740 CRT Output Recorder, the six fixed-point integers $I_0, I_1, \dots, I_5$, located in magnetic core memory at $B, B + 1, \dots, B + 5$, in six columns on one line.

METHOD

Accuracy: Exact

Range: $-(2^{35} - 1) \leq I_i \leq (2^{35} - 1), i = 0, 1, \dots, 5$

USAGE

Calling Sequence:

Loc.	Instruction
α	TSX SCP6, 4
$\alpha + 1$	HTR B, C
$\alpha + 2$	normal return

Loc.	Instruction
α	BTSX A 4
$\alpha + 1$	BHTR B C
$\alpha + 2$	normal return

Here the integers to be scoped are in locations $B, B + 1, \dots, B + 5$. The parameter C has the following meaning: if $C = 0$, the integers are scoped on the line immediately following that line last scoped using MU SCP6; if $C = 1$, an extra space (line) is made before scoping; if $C = 2$, or at the end of a frame, the film frame is advanced and scoping is started on the second line. The user may thus insert the date, a title, or other information on the first line ($1010 \leq Y \leq 1023$) if he so desires. Integers are scoped with 11 decimal digits, with sign if negative, without sign if positive, and in order from left to right. The decimal point is not scoped but is assumed to be located immediately to the right of the last digit of the integer. At the left end of each line the letter I appears. Each character is 10 - by - 14 units plus spacing of 3 - by - 4 for a total of 13 - by - 18 units. Normally 55 lines are scoped per full frame, but another line may be added at the very bottom by inserting the order [NOP] at [SCP6 + 19] to replace [ACL SCP6 + 78].

Space Required:

93 words program at
7 words temporary at

UA SAP
SCP6
COMMON

MURASS
A
T

CODING INFORMATION

Timing: About 550 ms. per line, or 31 sec. per frame of 330 integers,
on the average.

SCP6	REM SCP6 MURA SIX COLUMN INTEGER CRT	MU	SCP6
SXD COMMON,1	SAVE IR1 IN COMMON	SCP6	0001
SXD COMMON+1,2	SAVE IR2 IN COMMON+1	SCP6	0002
SXD COMMON+2,4	SAVE IR4 IN COMMON+2	SCP6	0003
WTV 0	SELECT CRT	SCP6	0004
CAL 1,4		SCP6	0005
ACL SCP6+80		SCP6	0006
STA SCP6+30	PLANT INTEGER CALL ADDRESS B+6	SCP6	0007
ARS 15		SCP6	0008
ACL SCP6+9		SCP6	0009
STA SCP6+11	PLANT SPACING ADDR, SCP6+8 USES ADDR.	SCP6	0010
CAL SCP6+75	MARKER IN AC	SCP6	0011
TRA **	ADDRESS BY SCP6+9	SCP6	0012
TRA SCP6+17	SPACE FOR NEXT LINE, C IS 0	SCP6	0013
TRA SCP6+16	MAKE EXTRA SPACE, C IS 1	SCP6	0014
CFF 0	CHANGE FRAME, C IS 2	SCP6	0015
CAL SCP6+77	RESET Y FOR NEXT FRAME	SCP6	0016
ACL SCP6+78	SET Y FOR EXTRA SPACE	SCP6	0017
ACL SCP6+78	SET Y FOR SPACE	SCP6	0018
STA SCP6+75	PLANT Y IN MARKER	SCP6	0019
ACL SCP6+78		SCP6	0020
ARS 11		SCP6	0021
LBT 0	TEST FOR NEW FRAME (BIT 24 A ZERO)	SCP6	0022
TRA SCP6+14	IF YES, ADVANCE FILM AND START AT TOP	SCP6	0023
STD SCP6+75	SET X TO ZERO	SCP6	0024
CLA SCP6+81		SCP6	0025
TSX SCP6+52,4	SCOPE I	SCP6	0026
LXA SCP6+80,1	SET IR1 TO 6	SCP6	0027
CAL SCP6+77		SCP6	0028
STD SCP6+78	SAVE LOCATION OF CURRENT INTEGER	SCP6	0029
STD SCP6+75	SET MARKER FOR CURRENT INTEGER	SCP6	0030
CLA **,1	ADDRESS BY SCP6+6	SCP6	0031
STO COMMON+5	CURRENT INTEGER IN COMMON+5	SCP6	0032
LXA SCP6+20,2	SET IR2 TO 11	SCP6	0033
LRS 35		SCP6	0034
DVH SCP6+76	EXTRACT NEXT INTEGER DIGIT	SCP6	0035
STQ COMMON+5	SAVE INTEGER RESIDUE	SCP6	0036
ACL SCP6+43		SCP6	0037
STA SCP6+38	PLANT DIGIT ADDRESS	SCP6	0038
CLA **	ADDRESS BY SCP6+37	SCP6	0039
TSX SCP6+52,4	SCOPE NEXT DIGIT	SCP6	0040
CLA COMMON+5	INTEGER RESIDUE IN AC	SCP6	0041
TIX SCP6+33,2,1	LOOP, 11 PASSES	SCP6	0042
TPL SCP6+45	BLANK SIGN FOR POSITIVE INTEGER	SCP6	0043
CLA SCP6+83,2		SCP6	0044
TSX SCP6+52,4	SCOPE MINUS SIGN FOR NEGATIVE INTEGER	SCP6	0045
CAL SCP6+78		SCP6	0046
ACL SCP6+77	LOCATE NEXT INTEGER POSITION	SCP6	0047
TIX SCP6+28,1,1	LOOP, 6 PASSES	SCP6	0048
LXD COMMON,1	RESTORE IR1	SCP6	0049
LXD COMMON+1,2	RESTORE IR2	SCP6	0050
LXD COMMON+2,4	RESTORE IR4	SCP6	0051
TRA 2,4	NORMAL RETURN	SCP6	0052
SXD COMMON+3,1	CLOSED SCOPER HERE TO SCP6+73	SCP6	0053

SXD COMMON+4,2	SAVE IR1,2 IN COMMON+3,4,RESP.	SCP6 0054
LXA SCP6+76,1	SET IR1 TO 10, OR 2 TIMES 5	SCP6 0055
STO COMMON+6	KEY IN COMMON+6	SCP6 0056
LXA SCP6+74,2	SET IR2 TO 14, OR 2 TIMES 7	SCP6 0057
CLA COMMON+6		SCP6 0058
ALS 1		SCP6 0059
PBT 0	TEST FOR SCOPING CURRENT POINT	SCP6 0060
CPY SCP6+75	SCOPE POINT	SCP6 0061
STO COMMON+6	KEY RESIDUE IN COMMON+6	SCP6 0062
CAL SCP6+75		SCP6 0063
ACL SCP6+79		SCP6 0064
STA SCP6+75	ADVANCE MARKER TO NEXT POINT	SCP6 0065
TIX SCP6+57,2,2	LOOP, 7 PASSES	SCP6 0066
ACL SCP6+74		SCP6 0067
STO SCP6+75	ADVANCE MARKER TO NEXT COLUMN	SCP6 0068
TIX SCP6+56,1,2	LOOP, 5 PASSES	SCP6 0069
ACL SCP6+79		SCP6 0070
STD SCP6+75	SET MARKER FOR NEXT CHARACTER	SCP6 0071
LXD COMMON+3,1	RESTORE IR1	SCP6 0072
LXD COMMON+4,2	RESTORE IR2	SCP6 0073
TRA 1,4	LEAVE SCOPER	SCP6 0074
OCT 300030700016	CONSTANTS	SCP6 0075
HTR 3071,0,169	MARKER, BY SCP6+18,23,29,64,67,70	SCP6 0076
HTR 10		SCP6 0077
HTR 3089,0,169	INITIAL MARKER	SCP6 0078
HTR -18,0,**	LOCATOR, BY SCP6+28	SCP6 0079
HTR -2,0,-23		SCP6 0080
HTR 6,1		SCP6 0081
OCT 376760017577	KEYS FOR I	SCP6 0082
OCT 357677375767	MINUS SIGN	SCP6 0083
OCT 202763717501	ZERO	SCP6 0084
OCT 377360037577	ONE	SCP6 0085
OCT 270723315516	TWO	SCP6 0086
OCT 272763315511	THREE	SCP6 0087
OCT 347535540173	FOUR	SCP6 0088
OCT 372063315471	FIVE	SCP6 0089
OCT 303263335571	SIX	SCP6 0090
OCT 170733353637	SEVEN	SCP6 0091
OCT 222663315511	EIGHT	SCP6 0092
OCT 236673315303	NINE	SCP6 0093