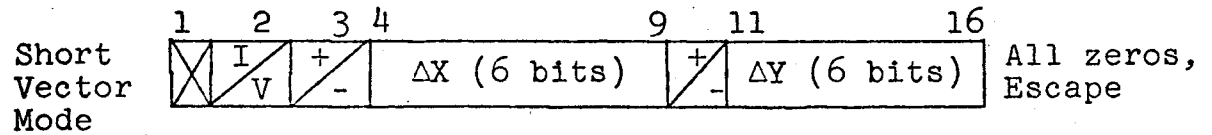
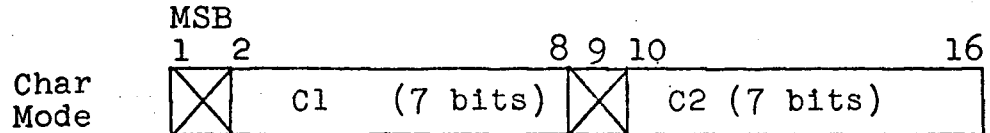


CODING FOR GLANCE "G" (Graphics)

List Memory (M1)

A. Display List Format (M1)



Control Mode	1												12	13			16
	Data (12 bits)												OP Code				
	Escape (all zeros)(Fetch next char.)												0	0	0	0	
	Jump & Sync to 60 Hz												0	0	0	1	
	Jump (within M1)												0	0	1	0	
	Short Vector Mode												0	0	1	1	
	+/-	Draw ΔX (I)										} Manhattan Vectors	0	1	0	0	
	+/-	Draw ΔY (I)											0	1	0	1	
	+/-	Draw ΔX (V)											0	1	1	0	
	+/-	Draw ΔY (V)											0	1	1	1	
	Set X (I)												1	0	0	0	
	Set Y (I)												1	0	0	1	
	Spare												1	0	1	0	
	Set Y (V)												1	0	1	1	
	Set Parameter Register												1	1	0	0	
	Wait (I)												1	1	0	1	
	Spare												1	1	1	0	
	Spare												1	1	1	1	

B. Communication Format

Node OP-Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
					Address of M3								Mask 4 bits				
WC	forces =>				M3 address to zero. The output of M3 selects the node and reads bits 5 through 12 from the communication interface to AR-3 (M3 address)												
WC	WD => AR1				0	0	0	0	0	0	0	0	1				
	WD => M1				0	0	0	0	0	0	0	1	0				
	WD => AR2				0	0	0	0	0	0	1	1					
	WD => M2				0	0	0	0	0	1	0	0					
	RD => M1				0	0	0	0	0	1	0	1					
	RD => M2				0	0	0	0	0	1	1	0					
	RD => K				0	0	0	0	0	1	1	1					
WC	Write data to M1 or M2 will increment the memory address AR1 or AR2 after the data is written into memory.																
RD	Read data from M1 or M2 will read the data to the communication interface and then increment AR1 or AR2.																
WC = write command WD = write data RD = read data																	

Character Memory (M2)A. Format of Character Look-Up Table (Addresses 000₈ to 177₈)

	1	12	13	16				
	Data (12 bits)			OP Code				
Character	Pointer to Character Set			1	1	1	0	
NUL	Fetch next ASCII Char. from List			0	0	0	0	*
DC1 [⊕]	Go to M1 Control			0	0	0	1	*
Function	Go to M2 Control (Pointer to Control Set)			1	1	1	1	

B. Format of Character Set (Address 200₈ to 1777₈)

1	16
2 bit Glance code for ASCII character in question, ending with end of character (EOC) code. → 0001	

⊕ DC1 must be LSC of list word; if MSC, then LSC will be lost

* The data field for these OP codes is irrelevant

C. Format of Control Set (Addresses 200₈ to 1777₈)

1		12	13	LSB 16		
Data (12 bits)		OP Code (4)				
Char. Mode (Fetch next ASCII from List)		0	0	0	0	*
Go to M1 Control		0	0	0	1	*
Jump (within M2)		0	0	1	0	
Short Vector Mode		0	0	1	1	*
+ / -	Manhattan Vector ΔX (I)	0	1	0	0	
+ / -	Manhattan Vector ΔY (I)	0	1	0	1	
+ / -	Manhattan Vector ΔX (V)	0	1	1	0	
+ / -	Manhattan Vector ΔY (V)	0	1	1	1	
Set X (I)		1	0	0	0	
Set Y (I)		1	0	0	1	
Spare		1	0	1	0	
Set Y (V)		1	0	1	1	
Set Parameter Reg. (SaSb, Blink, etc.)		1	1	0	0	
Wait (I)		1	1	0	1	
Char. Mode; (Point to Char. Set)		1	1	1	0	
Go to M2 Control (ASCII Function; Point. to Char. Set)		1	1	1	1	

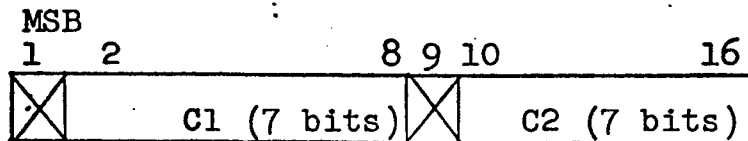
* The data field for these OP codes is irrelevant

CODING FOR GLANCE "G" (Graphics)

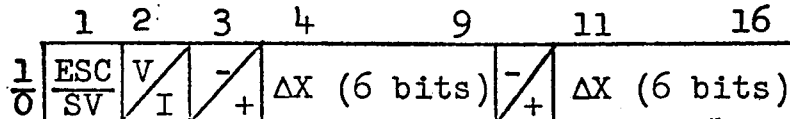
List Memory (ML)

A. Display List Format (ML)

CHARACTER MODE



SHORT VECTOR MODE



FUNCTION

CONTROL MODE

ESCAPE (FETCH NEXT CHAR)
 JUMP & SYNC TO 60 Hz
 JUMP IMMEDIATE
 GO TO SHORT VECTOR MODE

MANHATTAN
 VECTORS

LOAD X, Y
 REGISTERS
 (ABSOLUTE)

SET PARAMETER REGISTER*

WAIT { 250ns/bit }
 COMMANDS { 500μs max }

	1						12	13	16	
	Data (12 bits)						OP Code			
	(NOP)						0 0 0 0			
	JUMP ADDRESS						0 0 0 1			
	JUMP ADDRESS						0 0 1 0			
	(NOP)						0 0 1 1			
1 0	- +	ΔX (I)					0 1 0 0			
	- +	ΔY (I)					0 1 0 1			
	- +	ΔX (V)					0 1 1 0			
	- +	ΔY (V)					0 1 1 1			
	X (I)						1 0 0 0			
	Y (I)						1 0 0 1			
	Spare						1 0 1 0			
	Y (V)						1 0 1 1			
	BRIGHTNESS (3 bits)		SCALING (4 bits)		BLINK (3 bits)		⊗ ⊗		1 1 0 0	
	WAIT (I)						1 1 0 1			
	WAIT (V)						1 1 1 0			
	Spare						1 1 1 1			

* 8 LEVELS OF BRIGHTNESS; ALL ONES = MAX
 15 SCALE COMMANDS; ALL ONES = MAX; ALL ZEROS BLANKS BEAM
 3 BLINK COMMANDS; ALL ZEROS = NO BLINK

GLANCE "G"

COMMUNICATION FORMAT: TSS-516 TO SCOPE

WRITE COMMANDS		INTERRUPTS													
MSB (12 BITS)		S	R	W	A										
AR1	ADDRESS	0	1	0	X	WRITE M1 (FOLLOW WITH W)									
AR2	ADDRESS	0	1	1	X	WRITE M2 (FOLLOW WITH W)									
AR1	ADDRESS	1	1	0	X	READ M1 (FOLLOW WITH R)									
AR2	ADDRESS	1	1	1	X	READ M2 (FOLLOW WITH R)									
0	0	0	0	0	0	0	1	0	0	1	X	0	X	X	START DISPLAY

s

- .M1 = LIST MEMORY (1024, 16 BIT WORDS) } EXPANDABLE
.M2 = CHARACTER MEMORY (1024, 16 BIT WORDS) } TO 2048 WORDS
AR1 = ADDRESS REGISTER FOR MEMORY 1
AR2 = ADDRESS REGISTER FOR MEMORY 2
W = WRITE DATA
R = READ DATA

Address registers are automatically incremented after each "WRITE DATA" or "READ DATA" command.

EXAMPLE:

<u>MEMORY</u>	<u>FUNCTION</u>	<u>FORMAT</u>
1	AT ADDRESS 0, WRITE 100000	C4 W100000
1	AT ADDRESS 1, WRITE 111111	W111111
1	AT ADDRESS 3, WRITE 133333	C64 W133333
1	READ DATA FROM ADDRESSES 0 & 1	C14 R R
1	READ DATA FROM ADDRESS 3	C74 R
	START DISPLAY	C220

Character Memory (M2)A. Format of Character Look-Up Table (Addresses 000₈ to 177₈)

<u>FUNCTION</u>	1	12 13	16
	Data (12 bits)		OP CODE
CHARACTER	POINTER TO CHARACTER SET		1 1 1 0
NUL-FETCH NEXT ASCII FROM LIST	(NOP)		0 0 0 0
DC1-GO TO MI CONTROL [⊕]	(NOP)		0 0 0 1
FUNCTION-GO TO M2 CONTROL	(POINTER TO CONTROL SET)		1 1 1 1

B. Format of Character Set (Address 200₈ to 1777₈)

1	16
2 bit Glance code for ASCII character in question, ending with end of character (EOC) code. → 0001	

[⊕] DC1 must be LSC of list word; if MSC, then LSC will be lost

Character Memory (M2, Cont'd.)

C. Format of Control Set (Addresses 200₈ to 1777₈)

(ESCAPE) FETCH NEXT ASCII (M1)
 GO TO M1 CONTROL
 SPARE
 SPARE

MANHATTAN
 VECTORS

LOAD X, Y
 REGISTERS
 (ABSOLUTE)

SET PARAMETER REGISTER*
 WAIT COMMAND
 CHARACTER MODE
 GO TO M2 CONTROL (ASCII FUNCTION)

1		12	13	16
Data (12 bits)		OP CODE		
(NOP)		0	0	0
(NOP)		0	0	1
		0	0	1
		0	0	1
$\frac{1}{0}$ - +	ΔX (I)	0	1	0
$\frac{1}{0}$ - +	ΔY (I)	0	1	0
$\frac{1}{0}$ - +	ΔX (V)	0	1	1
$\frac{1}{0}$ - +	ΔY (V)	0	1	1
X (I)		1	0	0
Y (I)		1	0	0
SPARE		1	0	1
Y (V)		1	0	1
BRIGHTNESS (3 bits)	SCALING (4 bits)	BLINK (3 bits)	XXX	
WAIT (I) (250ns/bit)		500 μ s max	1	1
POINTER ADDRESS		1	1	1
POINTER ADDRESS		1	1	1

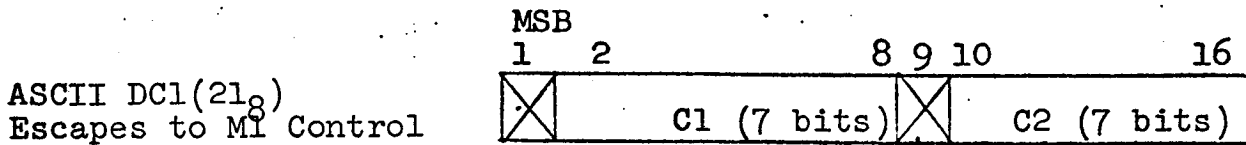
*
 8 LEVELS OF BRIGHTNESS; ALL ONES = MAX
 15 SCALE COMMANDS; ALL ONES = MAX; ALL ZEROS BLANKS BEAM
 3 BLINK COMMANDS; ALL ZEROS = NO BLINK

CODING FOR GLANCE "G" (Graphics)

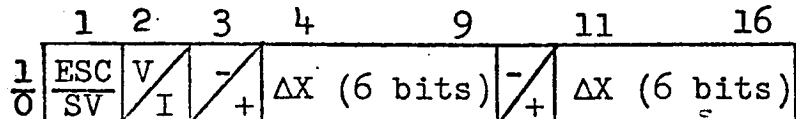
List Memory (M1)

A. Display List Format (M1)

CHARACTER MODE



SHORT VECTOR MODE



FUNCTION

CONTROL MODE

ESCAPE (FETCH NEXT CHAR)
JUMP & SYNC TO 60 Hz
JUMP IMMEDIATE
GO TO SHORT VECTOR MODE

MANHATTAN
VECTORS

LOAD X, Y
REGISTERS
(ABSOLUTE)

SET PARAMETER REGISTER*

WAIT { 250ns/bit }
COMMANDS { 500μs max }

	1						12	13	16			
	Data (12 bits)							OP Code				
	(NOP)							0 0 0 0				
	JUMP ADDRESS							0 0 0 1				
	JUMP ADDRESS							0 0 1 0				
	(NOP)							0 0 1 1				
$\frac{1}{0}$	- +	ΔX (I)					- +	0 1 0 0				
	- +	ΔY (I)					- +	0 1 0 1				
	- +	ΔX (V)					- +	0 1 1 0				
	- +	ΔY (V)					- +	0 1 1 1				
	X (I)							1 0 0 0				
	Y (I)							1 0 0 1				
	Spare							1 0 1 0				
	Y (V)							1 0 1 1				
	BRIGHTNESS (3 bits)			SCALING (4 bits)			BLINK (3 bits)			⊗ ⊗ ⊗		
	WAIT (I)							1 1 0 1				
	WAIT (V)							1 1 1 0				
	Spare							1 1 1 1				

* 8 LEVELS OF BRIGHTNESS; ALL ONES = MIN
15 SCALE COMMANDS; ALL ONES = MAX; ALL ZEROS BLANKS BEAM
3 BLINK COMMANDS; ALL ZEROS = NO BLINK

GLANCE "G"

COMMUNICATION FORMAT: TSS-516 TO SCOPE

WRITE COMMANDS

MASK BITS

MSB (12 BITS)	S	R	W	A
AR1 ADDRESS	0	1	0	X
AR2 ADDRESS	0	1	1	X
AR1 ADDRESS	1	1	0	X
AR2 ADDRESS	1	1	1	X
0 0 0 0 0 0 0 0 1 0 0 1	X	0	X	X

WRITE M1 (FOLLOW WITH W)

WRITE M2 (FOLLOW WITH W)

READ M1 (FOLLOW WITH R)

READ M2 (FOLLOW WITH R)

START DISPLAY

M1 = LIST MEMORY (1024, 16 BIT WORDS)

M2 = CHARACTER MEMORY (1024, 16 BIT WORDS) } EXPANDABLE TO 4096 WORDS

AR1 = ADDRESS REGISTER FOR MEMORY 1

AR2 = ADDRESS REGISTER FOR MEMORY 2

W = WRITE DATA

R = READ DATA

Address registers are automatically incremented after each "WRITE DATA" or "READ DATA" command.

EXAMPLE:

<u>MEMORY</u>	<u>FUNCTION</u>	<u>FORMAT</u>
1	AT ADDRESS 0, WRITE 100000	C4 W100000
1	AT ADDRESS 1, WRITE 111111	W111111
1	AT ADDRESS 3, WRITE 133333	C64 W133333
1	READ DATA FROM ADDRESSES 0 & 1	C14 R R
1	READ DATA FROM ADDRESS 3	C74 R
	START DISPLAY	C220

Character Memory (M2)A. Format of Character Look-Up Table (Addresses 000₈ to 177₈)

<u>FUNCTION</u>	1	12 13	16
	Data (12 bits)		OP CODE
CHARACTER	POINTER TO CHARACTER SET		1 1 1 0
NUL-FETCH NEXT ASCII FROM LIST	(NOP)		0 0 0 0
DC1-GO TO MI CONTROL [⊕]	(NOP)		0 0 0 1
FUNCTION-GO TO M2 CONTROL	(POINTER TO CONTROL SET)		1 1 1 1

B. Format of Character Set (Address 200₈ to 1777₈)

1	16
2 bit Glance code for ASCII character in question, ending with end of character (EOC) code. → 0001	

[⊕] DC1 must be LSC of list word; if MSC, then LSC will be lost

Character Memory (M2, Cont'd.)C. Format of M2 Control Set (Addresses 200₈ to 1777₈)

(ESCAPE) FETCH NEXT ASCII (M1)

DO NOT USE

SPARE

SPARE

MANHATTAN
VECTORSLOAD X, Y
REGISTERS
(ABSOLUTE)

SET PARAMETER REGISTER*

WAIT COMMAND

DO NOT USE

DO NOT USE

1		12	13	16
Data (12 bits)		OP CODE		
(NOP)		0	0	0
DO NOT USE		0	0	1
		0	0	1
		0	0	1
$\frac{1}{0}$ -	ΔX (I)	0	1	0
$\frac{1}{0}$ +	ΔY (I)	0	1	0
$\frac{1}{0}$ -	ΔX (V)	0	1	0
$\frac{1}{0}$ +	ΔY (V)	0	1	1
X (I)		1	0	0
Y (I)		1	0	0
SPARE		1	0	1
Y (V)		1	0	1
BRIGHTNESS (3 bits)	SCALING (4 bits)	BLINK (3 bits)	X	X
WAIT(I)(250ns/bit)		500 μ s max	1	1
DO NOT USE		1	1	1
DO NOT USE		1	1	1

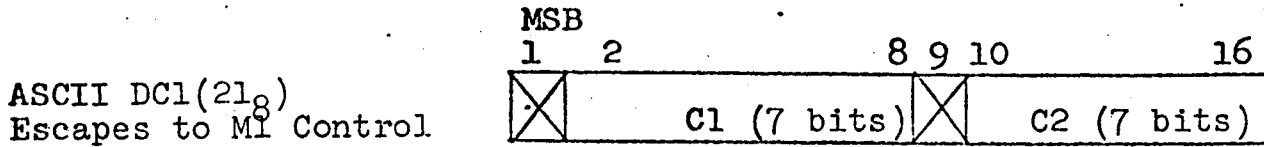
- *
 8 LEVELS OF BRIGHTNESS; ALL ONES = MIN
 15 SCALE COMMANDS; ALL ONES = MAX; ALL ZEROS BLANKS BEAM
 3 BLINK COMMANDS; ALL ZEROS = NO BLINK

CODING FOR GLANCE "G" (Graphics)

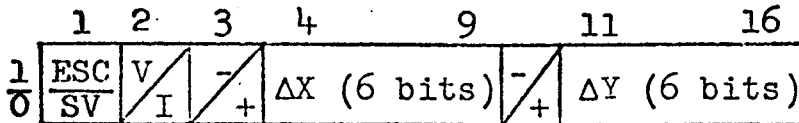
List Memory (M1)

A. Display List Format (M1)

CHARACTER MODE



SHORT VECTOR MODE



FUNCTION

CONTROL MODE

- ESCAPE (FETCH NEXT CHAR)
- JUMP & SYNC TO 60 Hz
- JUMP IMMEDIATE
- GO TO SHORT VECTOR MODE

MANHATTAN
VECTORS

LOAD X, Y
REGISTERS
(ABSOLUTE)

SET PARAMETER REGISTER*

WAIT { 250ns/bit }
COMMANDS { 500μs max }

	1	12	13	16
	Data (12 bits)			OP Code
	(NOP)			0 0 0 0
	JUMP ADDRESS			0 0 0 1
	JUMP ADDRESS			0 0 1 0
	(NOP)			0 0 1 1
1/0	- +	ΔX (I)		0 1 0 0
	- +	ΔY (I)		0 1 0 1
	- +	ΔX (V)		0 1 1 0
	- +	ΔY (V)		0 1 1 1
	X (I)			1 0 0 0
	Y (I)			1 0 0 1
	Spare			1 0 1 0
	Y (V)			1 0 1 1
	BRIGHTNESS (3 bits)	SCALING (4 bits)	BLINK (3 bits)	⊗ ⊗
	WAIT (I)			1 1 0 1
	WAIT (V)			1 1 1 0
	Spare			1 1 1 1

* 8 LEVELS OF BRIGHTNESS; ALL ONES = MIN
15 SCALE COMMANDS; ALL ONES = MAX; ALL ZEROS BLANKS BEAM
3 BLINK COMMANDS; ALL ZEROS = NO BLINK

GLANCE "G"

COMMUNICATION FORMAT: TSS-516 TO SCOPE

WRITE COMMANDS

MASK BITS

MSB (12 BITS)										S	R	W	A			
AR1	ADDRESS									0	1	0	X			
AR2	ADDRESS									0	1	1	X			
AR1	ADDRESS									1	1	0	X			
AR2	ADDRESS									1	1	1	X			
0	0	0	0	0	0	0	0	0	1	0	0	1	X	0	X	X

WRITE M1 (FOLLOW WITH W)
 WRITE M2 (FOLLOW WITH W)
 READ M1 (FOLLOW WITH R)
 READ M2 (FOLLOW WITH R)
 START DISPLAY

- M1 = LIST MEMORY (1024, 16 BIT WORDS)
 - M2 = CHARACTER MEMORY (1024, 16 BIT WORDS)
 - AR1 = ADDRESS REGISTER FOR MEMORY 1
 - AR2 = ADDRESS REGISTER FOR MEMORY 2
 - W = WRITE DATA
 - R = READ DATA
- } EXPANDABLE
 TO 4096 WORDS

Address registers are automatically incremented after each "WRITE DATA" or "READ DATA" command.

EXAMPLE:

<u>MEMORY</u>	<u>FUNCTION</u>	<u>FORMAT</u>
1	AT ADDRESS 0, WRITE 100000	C4 W100000
1	AT ADDRESS 1, WRITE 111111	W111111
1	AT ADDRESS 3, WRITE 133333	C64 W133333
1	READ DATA FROM ADDRESSES 0 & 1	C14 R R
1	READ DATA FROM ADDRESS 3	C74 R
	START DISPLAY	C220

Character Memory (M2, Cont'd.)C. Format of M2 Control Set (Addresses 200₈ to 1777₈)

(ESCAPE) FETCH NEXT ASCII (M1)

DO NOT USE

SPARE

SPARE

MANHATTAN
VECTORSLOAD X, Y
REGISTERS
(ABSOLUTE)

SET PARAMETER REGISTER*

WAIT COMMAND

DO NOT USE

DO NOT USE

1		12	13	1
Data (12 bits)		OP CCD		
(NOP)		0	0	0
DO NOT USE		0	0	0
		0	0	1
		0	0	1
$\frac{1}{0}$	$\frac{-}{+}$ ΔX (I)	0	1	0
	$\frac{-}{+}$ ΔY (I)	0	1	0
	$\frac{-}{+}$ ΔX (V)	0	1	1
	$\frac{-}{+}$ ΔY (V)	0	1	1
X (I)		1	0	0
Y (I)		1	0	0
SPARE		1	0	1
Y' (V)		1	0	1
BRIGHTNESS (3 bits)		SCALING (4 bits)	BLINK (3 bits)	1
X WAIT(I)(250ns/bit) 500 μ s max		1	1	0
DO NOT USE		1	1	1
DO NOT USE		1	1	1

- *
 8 LEVELS OF BRIGHTNESS; ALL ONES = MIN
 15 SCALE COMMANDS; ALL ONES = MAX; ALL ZEROS BLANKS BEAM
 3 BLINK COMMANDS; ALL ZEROS = NO BLINK