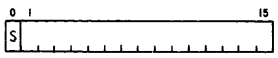
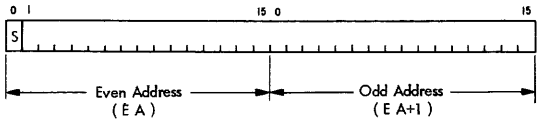
IBM 1130 Reference Card

Form X26-3566-3
Printed in U. S. A.

Single Precision Data Word Format



Double Precision Data Word Format

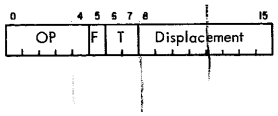


Effective Address Computation

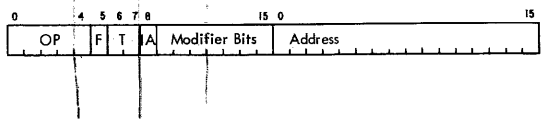
Tag Bits	F = 0 (Direct Addressing)	F = 1, IA = 0 (Direct Addressing)	F = 1, IA = 1 (Indirect Addressing)
T = 00	EA = Disp + IAR	EA = Add	EA = C/Add
T = 01	EA = Disp + XR1	EA = Add + XR1	EA = C/ (Add + XR1)
T = 10	EA = Disp + XR2	EA = Add + XR2	EA = C/ (Add + XR2)
T = 11	EA = Disp + XR3	EA = Add + XR3	EA = C/ (Add + XR3)

Disp = Contents of Displacement field of instuction.
Add = Contents of Address field of instruction.
C = Contents of Location specified by Add or Add + XR.

Short Instruction Format



Long Instruction Format



Instruction Codes and Execution Times

Instruction	Mnemonic	Binary OP Code	Execution Times (in microseconds) for 3.6 μsec Core Storage								Execution Times (in microseconds) for 2.2 μsec Core Storage							
			Single Word (F = 0)				Double Word (F = 1)				Single Word (F = 0)				Double Word (F = 1)			
			T = 00		T = 01, 10, or 11		T = 00		T = 01, 10, or 11		T = 00		T = 01, 10, or 11		T = 00		T = 01, 10, or 11	
			Avg.	Max.	Avg.	Max.	Avg.①	Max.①	Avg.①	Max.①	Avg.	Max.	Avg.	Max.	Avg.①	Max.①	Avg.①	Max.①
Load and Store																		
Load ACC	LD	11000	7.6	-	11.2	-	10.8	-	14.8	-	4.6	-	6.8	-	6.6	-	9.0	-
Load Double	LDD	11001	11.2	-	14.9	-	14.4	-	18.0	-	6.8	-	9.1	-	8.8	-	11.0	-
Store ACC	STO	11010	7.6	-	11.2	-	10.8	-	14.8	-	4.6	-	6.8	-	6.6	-	9.0	-
Store Double	STD	11011	11.2	-	14.9	-	14.4	-	18.0	-	6.8	-	9.1	-	8.8	-	11.0	-
Load Index	LDX	01100	4.5	-	7.2	-	7.2	-	11.8	-	2.7	-	4.4	-	4.4	-	7.2	-
Store Index	STX	01101	7.6	-	11.2	-	11.8	-	15.4	-	4.6	-	6.8	-	7.2	-	9.4	-
Load Status*	LDS ⑦	00100	3.6	-	3.6	-	-	-	-	-	2.2	-	2.2	-	-	-	-	-
Store Status	STS	00101	7.6	-	11.2	-	10.8	-	14.8	-	4.6	-	6.8	-	6.6	-	9.0	-
Arithmetic																		
Add	A	10000	8.0	13.0	11.7	16.6	11.2	16.2	15.3	20.3	4.9	7.9	7.1	10.1	6.8	9.9	9.4	12.4
Add Double	AD	10001	12.2	22.0	15.8	25.6	15.3	25.2	19.3	29.5	7.5	13.4	9.6	15.6	9.4	15.4	11.8	18.0
Subtract	S	10010	8.0	13.0	11.7	16.6	11.2	16.2	15.3	20.3	4.9	7.9	7.1	10.1	6.8	9.9	9.4	12.4
Subtract Double	SD	10011	12.2	22.0	15.8	25.6	15.3	25.2	19.3	29.5	7.5	13.4	9.6	15.6	9.4	15.4	20.1	18.0
Multiply	M	10100	25.7	40.0	29.3	43.6	29.3	43.6	32.9	47.2	15.7	24.4	17.9	26.6	17.9	26.6	11.8	28.8
Divide	D	10101	76.0	150.8	79.6	154.4	79.6	154.4	83.2	150.0	46.4	92.1	48.6	94.4	48.6	94.4	50.8	91.6
And	AND	11100	7.6	-	11.2	-	10.8	-	14.8	-	4.6	-	6.8	-	6.6	-	9.0	-
Or	OR	11101	7.6	-	11.2	-	10.8	-	14.8	-	4.6	-	6.8	-	6.6	-	9.0	-
Exclusive Or	EOR	11110	7.6	-	11.2	-	10.8	-	14.8	-	4.6	-	6.8	-	6.6	-	9.0	-
Shift Left* Modifier Bits 8 & 9:																		
Shift Left ACC 00	SLA ⑦	00010																
Shift Left ACC and EXT 10	SLT ⑦	00010																
Shift Left and Count ACC 01	⑧ SLCA ⑦	00010																
Shift Left and Count ACC and EXT 11	⑧ SLC ⑦	00010	③	-	④	-	-	-	-	-	③	-	④	-	-	-	-	-
Shift Right* Modifier Bits 8 & 9:																		
Shift Right ACC 00 or 01	SRA ⑦	00011																
Shift Right ACC and EXT 10	SRT ⑦	00011																
Rotate Right 11	RTE ⑦	00011	⑤		⑥						⑤		⑥					
Branch																		
Branch and Store IAR	BSI	01000	7.6	-	11.2	-	10.8②	-	14.8	-	4.6	-	6.8	-	6.6②	-	9.0	-
Branch or Skip on Condition	BSC	01001	3.6	-	3.6	-	7.2②	-	11.2	-	2.2	-	2.2	-	4.4②	-	6.8	-
Modify Index and Skip	MDX	01110	4.5	9.9	11.2	16.2	18.5	23.4	18.5	23.4	2.7	6.0	6.8	9.9	11.3	14.3	11.3	14.3
Wait*	WAIT ⑦	00110 ⑨	3.6	-	3.6	-	-	-	-	-	2.2	-	2.2	-	-	-	-	-
Input/Output																		
Execute I/O	XIO ⑩	00001	11.2	-	14.8	-	14.8	-	18.4	-	6.8	-	9.0	-	9.0	-	11.2	-

* Valid in short format only

Notes:

1. Indirect addressing, where applicable, adds one storage cycle (2.2 or 3.6 μsec) to execution time
2. If branch is taken
3. One storage cycle + .45(N-4)
4. Two storage cycles + .45 (N-4)
5. N > 16: One storage cycle + .45(N-19)
   N < 16: One storage cycle + .45(N-4)
6. N > 16: Two storage cycles + .45(N-19)
   N < 16: Two storage cycles + .45(N-4)
   where N = number of positions shifted
7. Indirect addressing not allowed
8. If T = 00, functions as SLA or SLT
9. All unassigned OP codes are defined as Wait operations
10. If XIO Read or Write, add one storage cycle

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I/O Function Codes and Modifiers

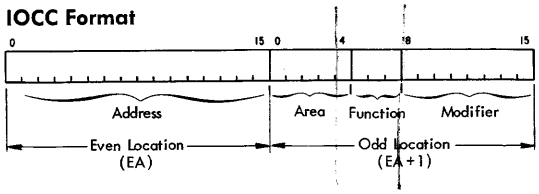
I/O Device (Code) Instructions	Function Code	Bit No.	Bit	Modifier Bits Function
Console Printer (00001)				
Write	001			
Sense Device	111	15	1	Reset int. level 4 ind.
Console Keyboard (00001)				
Read	010			
Control (interrupt)	100			
Sense Device	111	15	1	Reset int. level 4 ind.
1442 Card Read Punch (00010)				
Read	010			
Write	001			
Control	100	8	1	Stacker Select
		13	1	Start Read
		14	1	Feed Cycle
		15	1	Start Punch
Sense Device	111	14	1	Reset int. level 4 ind.
		15	1	Reset int. level 0 ind.
1134 Paper Tape Reader (00011)				
1055 Paper Tape Punch (00011)				
Read	010			
Write	001			
Control	100			
Sense Device	111	15	1	Reset int. level 4 ind.
Single Disk Storage (00100)				
2310 Disk Storage Drive 1 (10001)				
2310 Disk Storage Drive 2 (10010)				
2310 Disk Storage Drive 3 (10011)				
2310 Disk Storage Drive 4 (10100)				
Initiate Write	101	13-15		Sector Address
Initiate Read	110	13-15		Sector Address
		8	0	Read Operation
		8	1	Read-Check Operation
Control	100 *	13	0	Move access forward
		13	1	Move access backward
		2-15		Number of Cylinders
Sense Device	111	15	1	Reset int. level 2 ind.
1627 Plotter (00101)				
Write	001			
Sense Device	111	15	1	Reset int. level 3 ind.
1132 Printer (00110)				
Read Emitter	010			
Control	100	8	1	Start Printer
		9	1	Stop Printer
		13	1	Start Carriage
		14	1	Stop Carriage
		15	1	Space Carriage
Sense Device	111	15	1	Reset int. level 1 ind.
Console Entry Switches (00111)				
Read	010			
Sense Device	111			
1231 Optical Mark Page Reader (01000)				
Read	010			Read Operation
Control	100	13	1	Start Read
		14	1	I/O Disconnect
		8	1	Select Stacker
Sense Device	111	15	1	Reset int. level 4 ind.
2501 Card Reader (01001)				
Initiate Read	110			
Sense Device	111	15	1	Reset int. level 4 ind.
Synchronous Communications Adapter (01010)				
Initiate Write	101	9	0	Transmit Condition
		9	1	Adapter Reset
Initiate Read	110	All	0	Receive Condition
		14	1	Turn Off Send/Receive
		15	1	Turn On Send/Receive
Write	001	All	0	Load Buffer From Core
		13	1	Set Sync/Idle Register
		14	1	Turn On Audible Alarm
		15	1	Turn Off Audible Alarm
Read	010	All	0	Load Core From Buffer
		14	1	Diagnostic Read 2
		15	1	Diagnostic Read 1
Control	100	8	1	Enable
		9	1	Disable
		10	1	Start/Stop Timeout
		11	1	Synchronize
		12	1	Diagnostic Mode
		13	1	End Operation
		14	1	Set 6-bit Character Frame
		15	1	Set 7-bit Character Frame
Sense Device	111	15	1	Reset int. level 1 ind.
1403 Printer (10101)				
Initiate Write	101			
Control	100			Single Line Space
Write	001 *	4	1	Skip to Channel 1
		5	1	Skip to Channel 2
		6	1	Skip to Channel 3
		7	1	Skip to Channel 4
		8	1	Skip to Channel 5
		9	1	Skip to Channel 6
		10	1	Skip to Channel 7
		11	1	Skip to Channel 8
		12	1	Skip to Channel 9
		13	1	Skip to Channel 10
		14	1	Skip to Channel 11
		15	1	Skip to Channel 12
Sense Device	111	15	1	Reset int. level 4 ind.

*Modifier bits located in address word.

Value Ranges — Single Precision Word

Positive Binary Values	Powers of 2	Absolute Values		Negative Binary Values
Bit Positions 11 1111 0123 4567 8901 2345		Decimal Notation Base-10	Hexa-decimal Notation Base-16	Bit Positions 11 1111 0123 4567 8901 2345
0000 0000 0000 0000	-	0	0	No negative zero
0000 0000 0000 0001	0	1	1	1111 1111 1111 1111
0000 0000 0000 0010	1	2	2	1111 1111 1111 1110
0000 0000 0000 0100	2	4	4	1111 1111 1111 1100
0000 0000 0000 1000	3	8	8	1111 1111 1111 1000
0000 0000 0001 0000	4	16	10	1111 1111 1111 0000
0000 0000 0010 0000	5	32	20	1111 1111 1110 0000
0000 0000 0100 0000	6	64	40	1111 1111 1100 0000
0000 0000 1000 0000	7	128	80	1111 1111 1000 0000
0000 0001 0000 0000	8	256	100	1111 1111 0000 0000
0000 0010 0000 0000	9	512	200	1111 1110 0000 0000
0000 0100 0000 0000	10	1,024	400	1111 1100 0000 0000
0000 1000 0000 0000	11	2,048	800	1111 1000 0000 0000
0001 0000 0000 0000	12	4,096	1,000	1111 0000 0000 0000
0010 0000 0000 0000	13	8,192	2,000	1110 0000 0000 0000
0100 0000 0000 0000	14	16,384	4,000	1100 0000 0000 0000
0111 1111 1111 1111	-	32,767	7,FFF	1000 0000 0000 0001
No positive equivalent	15	32,768	8,000	1000 0000 0000 0000

IOCC Format



I/O Device Codes and Interrupt Levels

Device Code	I/O Device	Interrupt Level	Interrupt Core Storage Address	Interrupt Bits
00001	Console Keyboard and Printer	4	00012	1
00010	1442 Card Read/Punch	0	00008	0
		4	00012	2
00011	1134 Paper Tape Reader and 1055 Paper Tape Punch	4	00012	0
00100	Single Disk Storage	2	00010	0
00101	1627 Plotter	3	00011	0
00110	1132 Printer	1	00009	0
00111	Console Entry Switches and Program Stop Switch	4	00012	3
		5	00013	0
01000	1231 Optical Mark Page Reader	4	00012	5
01001	2501 Card Reader	4	00012	3
01010	Synchronous Communications Adapter	1	00009	1
10001	2310 Disk Storage Drive 1	2	00010	1
10010	2310 Disk Storage Drive 2	2	00010	2
10011	2310 Disk Storage Drive 3	2	00010	3
10100	2310 Disk Storage Drive 4	2	00010	4
10101	1403 Printer	4	00012	4
-----	Storage Access Channel	2	00010	5-15
-----	Storage Access Channel	3	00011	3-8,15
-----	Storage Access Channel	4	00012	6-7
-----	Storage Access Channel	5	00013	1-15
-----	Storage Access Channel II	2	00010	5-15
-----	Storage Access Channel II	3	00011	3-8,15
-----	Storage Access Channel II	4	00012	6-7
-----	Storage Access Channel II	5	00013	1-15

Cycle-Steal Priority

Cycle - Steal Priority		
Priority	Cycle-Steal Level	Device
1	0	Single Disk Storage
2	1	SAC, 2310 Disk Storage
3	2	1132 Printer
4	3	2501 Card Reader
5	-	1403, CPU

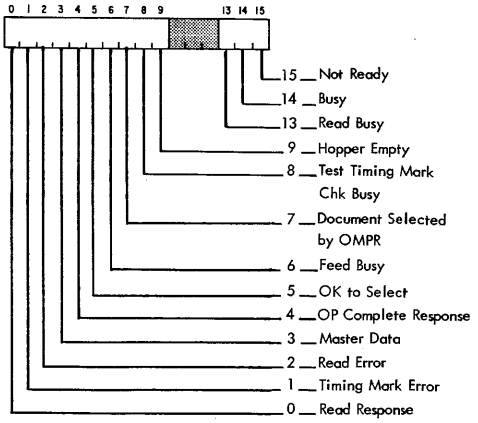
Reserved Core Storage Locations

Tag Bits	Core Storage Address	Description
00	--	Displacement
01	0001	Index Register 1
10	0002	Index Register 2
11	0003	Index Register 3
--	0008 - 0013	Interrupt Addresses
--	0032 - 0039	Printer Scan Field

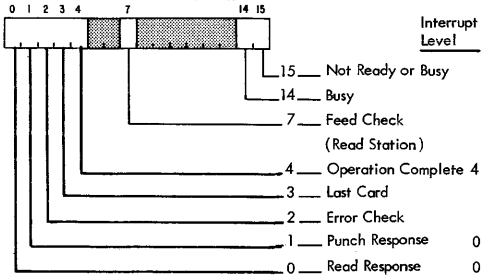
Value Ranges — Double Precision Word

Positive Binary Values Bit Positions 11 1111 1111 2222 2222 2233 0123 4567 8901 2345 6789 0123 4567 8901	Powers of 2	Absolute Values Decimal Notation Base - 10	Absolute Values Hexadecimal Notation Base - 16	Negative Binary Values Bit Positions 11 1111 1111 2222 2222 2233 0123 4567 8901 2345 6789 0123 4567 8901
0000 0000 0000 0000 0000 0000 0000 0000	-	0	0	No negative zero
0000 0000 0000 0000 0000 0000 0000 0001	0	1	1	1111 1111 1111 1111 1111 1111 1111 1111
0000 0000 0000 0000 0000 0000 0000 0010	1	2	2	1111 1111 1111 1111 1111 1111 1111 1110
0000 0000 0000 0000 0000 0000 0000 0100	2	4	4	1111 1111 1111 1111 1111 1111 1111 1100
0000 0000 0000 0000 0000 0000 0000 1000	3	8	8	1111 1111 1111 1111 1111 1111 1111 1000
0000 0000 0000 0000 0000 0000 0001 0000	4	16	10	1111 1111 1111 1111 1111 1111 1111 0000
0000 0000 0000 0000 0000 0000 0010 0000	5	32	20	1111 1111 1111 1111 1111 1111 1110 0000
0000 0000 0000 0000 0000 0000 0100 0000	6	64	40	1111 1111 1111 1111 1111 1111 1100 0000
0000 0000 0000 0000 0000 0000 1000 0000	7	128	80	1111 1111 1111 1111 1111 1111 1000 0000
0000 0000 0000 0000 0000 0001 0000 0000	8	256	100	1111 1111 1111 1111 1111 1111 0000 0000
0000 0000 0000 0000 0000 0010 0000 0000	9	512	200	1111 1111 1111 1111 1111 1110 0000 0000
0000 0000 0000 0000 0000 0100 0000 0000	10	1,024	400	1111 1111 1111 1111 1111 1100 0000 0000
0000 0000 0000 0000 0000 1000 0000 0000	11	2,048	800	1111 1111 1111 1111 1111 1000 0000 0000
0000 0000 0000 0000 0001 0000 0000 0000	12	4,096	1,000	1111 1111 1111 1111 1111 0000 0000 0000
0000 0000 0000 0000 0010 0000 0000 0000	13	8,192	2,000	1111 1111 1111 1111 1110 0000 0000 0000
0000 0000 0000 0000 0100 0000 0000 0000	14	16,384	4,000	1111 1111 1111 1111 1100 0000 0000 0000
0000 0000 0000 0000 1000 0000 0000 0000	15	32,768	8,000	1111 1111 1111 1111 1000 0000 0000 0000
0000 0000 0000 0001 0000 0000 0000 0000	16	65,536	10,000	1111 1111 1111 1111 0000 0000 0000 0000
0000 0000 0000 0010 0000 0000 0000 0000	17	131,072	20,000	1111 1111 1111 1110 0000 0000 0000 0000
0000 0000 0000 0100 0000 0000 0000 0000	18	262,144	40,000	1111 1111 1111 1100 0000 0000 0000 0000
0000 0000 0000 1000 0000 0000 0000 0000	19	524,288	80,000	1111 1111 1111 1000 0000 0000 0000 0000
0000 0000 0001 0000 0000 0000 0000 0000	20	1,048,576	100,000	1111 1111 1111 0000 0000 0000 0000 0000
0000 0000 0010 0000 0000 0000 0000 0000	21	2,097,152	200,000	1111 1111 1110 0000 0000 0000 0000 0000
0000 0000 0100 0000 0000 0000 0000 0000	22	4,194,304	400,000	1111 1111 1100 0000 0000 0000 0000 0000
0000 0000 1000 0000 0000 0000 0000 0000	23	8,388,608	800,000	1111 1111 1000 0000 0000 0000 0000 0000
0000 0001 0000 0000 0000 0000 0000 0000	24	16,777,216	1,000,000	1111 1111 0000 0000 0000 0000 0000 0000
0000 0010 0000 0000 0000 0000 0000 0000	25	33,554,432	2,000,000	1111 1110 0000 0000 0000 0000 0000 0000
0000 0100 0000 0000 0000 0000 0000 0000	26	67,108,864	4,000,000	1111 1100 0000 0000 0000 0000 0000 0000
0000 1000 0000 0000 0000 0000 0000 0000	27	134,217,728	8,000,000	1111 1000 0000 0000 0000 0000 0000 0000
0001 0000 0000 0000 0000 0000 0000 0000	28	268,435,456	10,000,000	1111 0000 0000 0000 0000 0000 0000 0000
0010 0000 0000 0000 0000 0000 0000 0000	29	536,870,912	20,000,000	1110 0000 0000 0000 0000 0000 0000 0000
0100 0000 0000 0000 0000 0000 0000 0000	30	1,073,741,824	40,000,000	1100 0000 0000 0000 0000 0000 0000 0000
0111 1111 1111 1111 1111 1111 1111 1111 No positive equivalent	- 31	2,147,483,647 2,147,483,648	7F,FFF,FFF 80,000,000	1000 0000 0000 0000 0000 0000 0000 0001 1000 0000 0000 0000 0000 0000 0000 0000

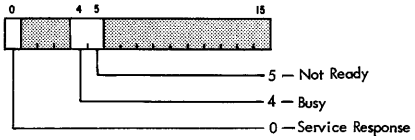
1231 Device Status Word



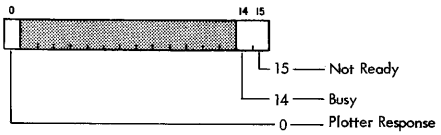
1442 Device Status Word



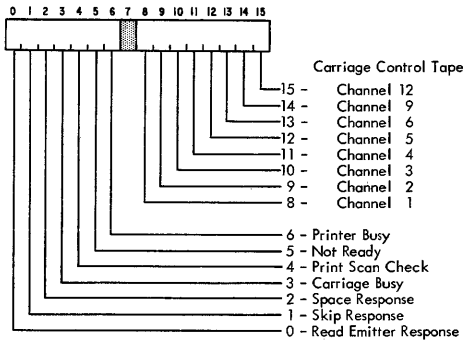
Console Printer Device Status Word



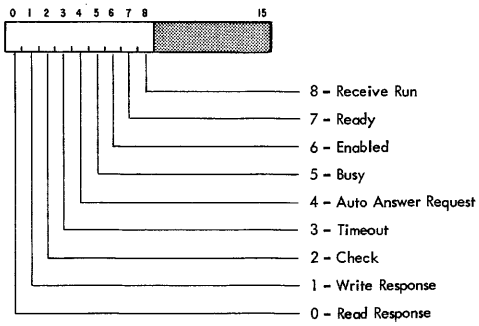
1627 Device Status Word



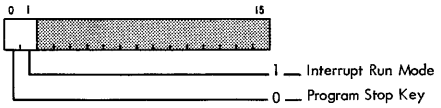
1132 Device Status Word



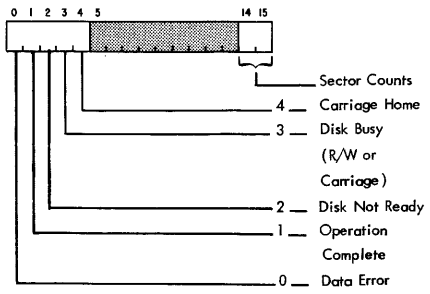
SCA Device Status Word



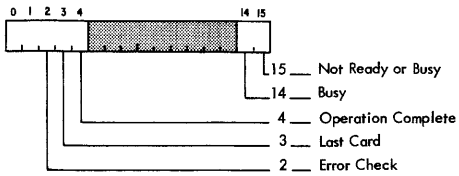
Program Stop Key and Interrupt Run Device Status Word



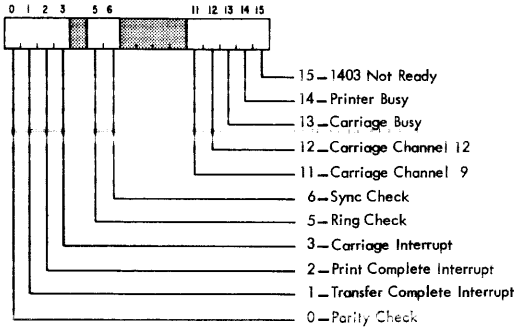
Disk Storage Device Status Word



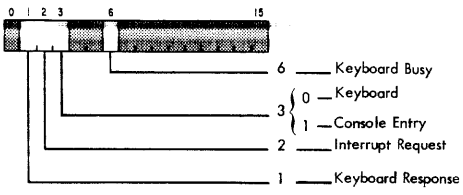
2501 Device Status Word



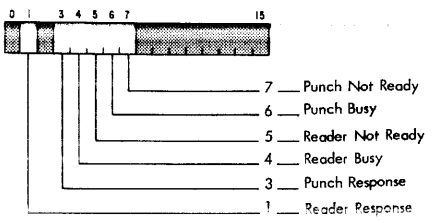
1403 Device Status Word



Console Keyboard Device Status Word



1134 and 1055 Device Status Word



1132 Printer Code

Character	Hex	I/O Bus Bits							
		0	1	2	3	4	5	6	7
A	C1	1	1	0	0	0	0	0	1
B	C2	1	1	0	0	0	0	1	0
C	C3	1	1	0	0	0	0	1	1
D	C4	1	1	0	0	0	1	0	0
E	C5	1	1	0	0	0	1	0	1
F	C6	1	1	0	0	0	1	1	0
G	C7	1	1	0	0	0	1	1	1
H	C8	1	1	0	0	1	0	0	0
I	C9	1	1	0	0	1	0	0	1
J	D1	1	1	0	1	0	0	0	1
K	D2	1	1	0	1	0	0	1	0
L	D3	1	1	0	1	0	0	1	1
M	D4	1	1	0	1	0	1	0	0
N	D5	1	1	0	1	0	1	0	1
O	D6	1	1	0	1	0	1	1	0
P	D7	1	1	0	1	0	1	1	1
Q	D8	1	1	0	1	1	0	0	0
R	D9	1	1	0	1	1	0	0	1
S	E2	1	1	1	0	0	0	1	0
T	E3	1	1	1	0	0	0	1	1
U	E4	1	1	1	0	0	1	0	0
V	E5	1	1	1	0	0	1	0	1
W	E6	1	1	1	0	0	1	1	0
X	E7	1	1	1	0	0	1	1	1
Y	E8	1	1	1	0	1	0	0	0
Z	E9	1	1	1	0	1	0	0	1
0	F0	1	1	1	1	0	0	0	0
1	F1	1	1	1	1	0	0	0	1
2	F2	1	1	1	1	0	0	1	0
3	F3	1	1	1	1	0	0	1	1
4	F4	1	1	1	1	0	1	0	0
5	F5	1	1	1	1	0	1	0	1
6	F6	1	1	1	1	0	1	1	0
7	F7	1	1	1	1	0	1	1	1
8	F8	1	1	1	1	1	0	0	0
9	F9	1	1	1	1	1	0	0	1
=	7E	0	1	1	1	1	1	1	0
$	5B	0	1	0	1	1	0	1	1
.	4B	0	1	0	0	1	0	1	1
'	7D	0	1	1	1	1	1	0	1
,	6B	0	1	1	0	1	0	1	1
(	4D	0	1	0	0	1	1	0	1
-	6D	0	1	1	0	1	1	0	1
)	5D	0	1	0	1	1	1	0	1
+	4E	0	1	0	0	1	1	1	0
/	61	0	1	1	0	0	0	0	1
*	5C	0	1	0	1	1	1	0	0
&	50	0	1	0	1	0	0	0	0

1403 Printer Code

Character	Hex	Bits							
		0	1	2	3	4	5	6	7
		8	9	10	11	12	13	14	15
A	64	0	1	1	0	0	1	0	0
B	25	0	0	1	0	0	1	0	1
C	26	0	0	1	0	0	1	1	0
D	67	0	1	1	0	0	1	1	1
E	68	0	1	1	0	1	0	0	0
F	29	0	0	1	0	1	0	0	1
G	2A	0	0	1	0	1	0	1	0
H	68	0	1	1	0	1	0	1	1
I	2C	0	0	1	0	1	1	0	0
J	58	0	1	0	1	1	0	0	0
K	19	0	0	0	1	1	0	0	1
L	1A	0	0	0	1	1	0	1	0
M	5B	0	1	0	1	1	0	1	1
N	1C	0	0	0	1	1	1	0	0
O	5D	0	1	0	1	1	1	0	1
P	5E	0	1	0	1	1	1	1	0
Q	1F	0	0	0	1	1	1	1	1
R	20	0	0	1	0	0	0	0	0
S	0D	0	0	0	0	1	1	0	1
T	0E	0	0	0	0	1	1	1	0
U	4F	0	1	0	0	1	1	1	1
V	10	0	0	0	1	0	0	0	0
W	51	0	1	0	1	0	0	0	1
X	52	0	1	0	1	0	0	1	0
Y	13	0	0	0	1	0	0	1	1
Z	54	0	1	0	1	0	1	0	0
0	49	0	1	0	0	1	0	0	1
1	40	0	1	0	0	0	0	0	0
2	01	0	0	0	0	0	0	0	1
3	02	0	0	0	0	0	0	1	0
4	43	0	1	0	0	0	0	1	1
5	04	0	0	0	0	0	1	0	0
6	45	0	1	0	0	0	1	0	1
7	46	0	1	0	0	0	1	1	0
8	07	0	0	0	0	0	1	1	1
9	08	0	0	0	0	1	0	0	0
=	4A	0	1	0	0	1	0	1	0
$	62	0	1	1	0	0	0	1	0
.	6E	0	1	1	0	1	1	1	0
'	0B	0	0	0	0	1	0	1	1
,	16	0	0	0	1	0	1	1	0
(	57	0	1	0	1	0	1	1	1
-	61	0	1	1	0	0	0	0	1
)	2F	0	0	1	0	1	1	1	1
+	6D	0	1	1	0	1	1	0	1
/	4C	0	1	0	0	1	1	0	0
*	23	0	0	1	0	0	0	1	1
&	15	0	0	0	1	0	1	0	1

Console Printer Code

Character Code Bits						U/L Case		Ctrl
B0	B1	B2	B3	B4	B5	B6=0 LC	B6=1 UC	B7
0	0	1	1	1	1	A	A	0
0	0	0	1	1	0	B	B	0
0	0	0	1	1	1	C	C	0
0	0	1	1	0	0	D	D	0
0	0	1	1	0	1	E	E	0
0	0	0	1	0	0	F	F	0
0	0	0	1	0	1	G	G	0
0	0	1	0	0	1	H	H	0
0	0	1	0	0	0	I	I	0
0	1	1	1	1	1	J	J	0
0	1	0	1	1	0	K	K	0
0	1	0	1	1	1	L	L	0
0	1	1	1	0	0	M	M	0
0	1	1	1	0	1	N	N	0
0	1	0	1	0	0	O	O	0
0	1	0	1	0	1	P	P	0
0	1	1	0	0	1	Q	Q	0
0	1	1	0	0	0	R	R	0
1	0	0	1	1	0	S	S	0
1	0	0	1	1	1	T	T	0
1	0	1	1	0	0	U	U	0
1	0	1	1	0	1	V	V	0
1	0	0	1	0	0	W	W	0
1	0	0	1	0	1	X	X	0
1	0	1	0	0	1	Y	Y	0
1	0	1	0	0	0	Z	Z	0
1	1	1	1	1	1	1	(	0
1	1	0	1	1	0	2	+	0
1	1	0	1	1	1	3	<	0
1	1	1	1	0	0	4	¬	0
1	1	1	1	0	1	5	)	0
1	1	0	1	0	0	6	;	0
1	1	0	1	0	1	7	*	0
1	1	1	0	0	1	8	'	0
1	1	1	0	0	0	9	"	0
1	1	0	0	0	1	0	|	0
1	1	0	0	0	0	#	=	0
1	0	1	1	1	1	/	_	0
1	0	0	0	0	1	-	?	0
1	0	0	0	0	0	,	:	0
0	1	0	0	0	1	&	>	0
0	1	0	0	0	0	$	;	0
0	0	0	0	0	1	@	%	0
0	0	0	0	0	0	.	¢	0

Console Printer Control Code

Function	0 1 2 3 4 5 6 7 8 15
Carrier Return	1 0 0 0 0 0 0 0 1
Tabulate	0 1 0 0 0 0 0 0 1
Space	0 0 1 0 0 0 0 0 1
Backspace	0 0 0 1 0 0 0 0 1
Shift to Red*	0 0 0 0 1 0 0 1
Shift to Black*	0 0 0 0 0 1 0 1
Line Feed	0 0 0 0 0 0 1 1

*May be done concurrently with any other function.

AND, OR, EOR Operations

Memory → ACC →	Results		
	AND	OR	EOR
0 → 0 →	0	0	0
0 → 1 →	0	1	1
1 → 0 →	0	1	1
1 → 1 →	1	1	0

Tag Bit Code

Instruction	Tag Bits	Register/Operation
Load Index	00	IAR
Store Index	01	XR1
	10	XR2
	11	XR3
Shift Left	00	Disp.
Shift Right	01	XR1
	10	XR2
	11	XR3
Modify Index and Skip		
F = 0	00	Disp. added to IAR
	01	Disp. added to XR1
	10	Disp. added to XR2
	11	Disp. added to XR3
F = 1; IA = 0	00	Disp. added to C
	01	Add. added to XR1
	10	Add. added to XR2
	11	Add. added to XR3
F = 1; IA = 1	00	Disp. added to C
	01	C added to XR1
	10	C added to XR2
	11	C added to XR3

Disp. = Contents of Displacement field of instruction

Add. = Contents of Address field of instruction

C = Contents of location specified by Add.

BSC Condition Code

Bit Position	Condition
10	ACC zero
11	ACC negative
12	ACC positive, not zero
13	ACC even
14	Carry Indicator OFF
15	Overflow Indicator OFF

Short Instruction
Skip if any one condition is true
No-Op if all bits are zero

Long Instruction
Branch if none of the conditions is true
Unconditional branch if all bits are zero

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