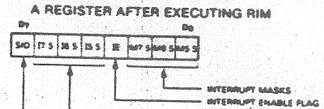
RESTART TABLE

Name	Code	Restart Address
RST 0	C7	0000_{16}
RST 1	CF	0008_{16}
RST 2	D7	0010_{16}
RST 3	DF	0018_{16}
RST 4	E7	0020_{16}
TRAP	Hardware* Function	0024_{16}
RST 5	EF	0028_{16}
RST 5.5	Hardware* Function	$002C_{16}$
RST 6	F7	0030_{16}
RST 6.5	Hardware* Function	0034_{16}
RST 7	FF	0038_{16}
RST 7.5	Hardware* Function	$003C_{16}$

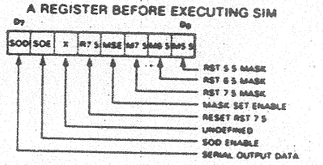
*NOTE: The hardware functions refer to the on-chip interrupt feature of the 8085 only.

USE OF THE A REGISTER BY RIM AND SIM INSTRUCTIONS (8085 ONLY)

A REGISTER AFTER EXECUTING RIM



A REGISTER BEFORE EXECUTING SIM



00	NOP		28	DCX	H	56	MOV	D,M
01	LXI	B,dble	2C	INR	L	57	MOV	D,A
02	STAX	B	2D	DCR	L	58	MOV	E,B
03	INX	B	2E	MVI	L,byte	59	MOV	E,C
04	INR	B	2F	CMA		5A	MOV	E,D
05	DCR	B	30	SIM*		5B	MOV	E,E
06	MVI	B,byte	31	LXI	SP,dble	5C	MOV	E,H
07	RLC		32	STA	adr	5D	MOV	E,L
08	---		33	INX	SP	5E	MOV	E,M
09	DAD	B	34	INR	M	5F	MOV	E,A
0A	LDAX	B	35	DCR	M	60	MOV	H,B
0B	DCX	B	36	MVI	M,byte	61	MOV	H,C
0C	INR	C	37	STC		62	MOV	H,D
0D	DCR	C	38	---		63	MOV	H,E
0E	MVI	C,byte	39	DAD	SP	64	MOV	H,H
0F	RRC		3A	LDA	adr	65	MOV	H,L
10	---		3B	DCX	SP	66	MOV	H,M
11	LXI	D,dble	3C	INR	A	67	MOV	H,A
12	STAX	D	3D	DCR	A	68	MOV	L,B
13	INX	D	3E	MVI	A,byte	69	MOV	L,C
14	INR	D	3F	CMC		6A	MOV	L,D
15	DCR	D	40	MOV	B,B	6B	MOV	L,E
16	MVI	D,byte	41	MOV	B,C	6C	MOV	L,H
17	RAL		42	MOV	B,D	6D	MOV	L,L
18	---		43	MOV	B,E	6E	MOV	L,M
19	DAD	D	44	MOV	B,H	6F	MOV	L,A
1A	LDAX	D	45	MOV	B,L	70	MOV	M,B
1B	DCX	D	46	MOV	B,M	71	MOV	M,C
1C	INR	E	47	MOV	B,A	72	MOV	M,D
1D	DCR	E	48	MOV	C,B	73	MOV	M,E
1E	MVI	E,byte	49	MOV	C,C	74	MOV	M,H
1F	RAR		4A	MOV	C,D	75	MOV	M,L
20	RIM*		4B	MOV	C,E	76	HLT	
21	LXI	H,dble	4C	MOV	C,H	77	MOV	M,A
22	SHLD	adr	4D	MOV	C,L	78	MOV	A,B
23	INX	H	4E	MOV	C,M	79	MOV	A,C
24	INR	H	4F	MOV	C,A	7A	MOV	A,D
25	DCR	H	50	MOV	D,B	7B	MOV	A,E
26	MVI	H,byte	51	MOV	D,C	7C	MOV	A,H
27	DAA		52	MOV	D,D	7D	MOV	A,L
28	---		53	MOV	D,E	7E	MOV	A,M
29	DAD	H	54	MOV	D,H	7F	MOV	A,A
2A	LHLD	adr	55	MOV	D,L	80	ADD	B

*8085 Only

81	ADD	C	AC	XRA	H	D7	RST	2
82	ADD	D	AD	XRA	L	D8	RC	
83	ADD	E	AE	XRA	M	D9	---	
84	ADD	H	AF	XRA	A	DA	JC	adr
85	ADD	L	B0	ORA	B	DB	IN	byte
86	ADD	M	B1	ORA	C	DC	CC	adr
87	ADD	A	B2	ORA	D	DD	---	
88	ADC	B	B3	ORA	E	DE	SBI	byte
89	ADC	C	B4	ORA	H	DF	RST	3
8A	ADC	D	B5	ORA	L	E0	RPO	
8B	ADC	E	B6	ORA	M	E1	POP	H
8C	ADC	H	B7	ORA	A	E2	JPO	adr
8D	ADC	L	B8	CMP	B	E3	XTHL	
8E	ADC	M	B9	CMP	C	E4	CPO	adr
8F	ADC	A	BA	CMP	D	E5	PUSH	H
90	SUB	B	BB	CMP	E	E6	ANI	byte
91	SUB	C	BC	CMP	H	E7	RST	4
92	SUB	D	BD	CMP	L	E8	RPE	
93	SUB	E	BE	CMP	M	E9	PCHL	
94	SUB	H	BF	CMP	A	EA	JPE	adr
95	SUB	L	C0	RNZ		EB	XCHG	
96	SUB	M	C1	POP	B	EC	CPE	adr
97	SUB	A	C2	JNZ	adr	ED	---	
98	SBB	B	C3	JMP	adr	EE	XRI	byte
99	SBB	C	C4	CNZ	adr	EF	RST	5
9A	SBB	D	C5	PUSH	B	F0	RP	
9B	SBB	E	C6	ADI	byte	F1	POP	PSW
9C	SBB	H	C7	RST	0	F2	JP	adr
9D	SBB	L	C8	RZ		F3	DI	
9E	SBB	M	C9	RET		F4	CP	adr
9F	SBB	A	CA	JZ	adr	F5	PUSH	PSW
A0	ANA	B	CB	---		F6	ORI	byte
A1	ANA	C	CC	CZ	adr	F7	RST	6
A2	ANA	D	CD	CALL	adr	F8	RM	
A3	ANA	E	CE	ACI	byte	F9	SPHL	
A4	ANA	H	CF	RST	1	FA	JM	adr
A5	ANA	L	D0	RNC		FB	EI	
A6	ANA	M	D1	POP	D	FC	CM	adr
A7	ANA	A	D2	JNC	adr	FD	---	
A8	XRA	B	D3	OUT	byte	FE	CPI	byte
A9	XRA	C	D4	CNC	adr	FF	RST	7
AA	XRA	D	D5	PUSH	D			
AB	XRA	E	D6	SUI	byte			

HEX-ASCII TABLE

00	NUL	21	!	42	B	63	c
01	SOH	22	"	43	C	64	d
02	STX	23	#	44	D	65	e
03	ETX	24	$	45	E	66	f
04	EOT	25	%	46	F	67	g
05	ENQ	26	&	47	G	68	h
06	ACK	27	'	48	H	69	i
07	BEL	28	(	49	I	6A	j
08	BS	29	)	4A	J	6B	k
09	HT	2A	*	4B	K	6C	l
0A	LF	2B	+	4C	L	6D	m
0B	VT	2C	,	4D	M	6E	n
0C	FF	2D	-	4E	N	6F	o
0D	CR	2E	.	4F	O	70	p
0E	SO	2F	/	50	P	71	q
0F	SI	30	0	51	Q	72	r
10	DLE	31	1	52	R	73	s
11	DC1 (X-ON)	32	2	53	S	74	t
12	DC2 (TAPE)	33	3	54	T	75	u
13	DC3 (X-OFF)	34	4	55	U	76	v
14	DC4 (TAPE)	35	5	56	V	77	w
15	NAK	36	6	57	W	78	x
16	SYN	37	7	58	X	79	y
17	ETB	38	8	59	Y	7A	z
18	CAN	39	9	5A	Z	7B	{
19	EM	3A	:	5B	[	7C	|
1A	SUB	3B	;	5C	\	7D	}
1B	ESC	3C	<	5D	]		(ALT MODE)
1C	FS	3D	=	5E	^ (↑)	7E	~
1D	GS	3E	>	5F	_ (←)	7F	DEL (RUB OUT)
1E	RS	3F	?	60	`		
1F	US	40	@	61	a		
20	SP	41	A	62	b		

INTEL CORPORATION
3065 Bowers Avenue
Santa Clara, California 95051
Tel: (408) 987-8080**

INTEL INTERNATIONAL
Rue du Moulin a Papier
51-Boite 1
B-1160 Brussels, Belgium
Tel. (02) 660 30 10

INTEL JAPAN CORPORATION
Flower Hill-Shinmachi East Bldg.
1-23-9, Shinmachi, Setagaya-ku
Tokyo 154, Japan
Tel. (03) 426-9261

Printed in U.S.A./A348/0481/100K BL

intel

8085/8080 Assembly Language Reference Card

March 1979

9800438D

DATA TRANSFER GROUP

MOV: REG. INDIR. M4 reg.
MOV: IMPLIC. reg ← reg

Move

MOV	A,A	7F	
	A,B	78	
	A,C	79	
	A,D	7A	
	A,E	7B	
	A,H	7C	
	A,L	7D	
	A,M	7E	
MOV	B,A	47	
	B,B	40	
	B,C	41	
	B,D	42	
	B,E	43	
	B,H	44	
	B,L	45	
	B,M	46	
MOV	C,A	4F	
	C,B	48	
	C,C	49	
	C,D	4A	
	C,E	4B	
	C,H	4C	
	C,L	4D	
	C,M	4E	
MOV	D,A	57	
	D,B	50	
	D,C	51	
	D,D	52	
	D,E	53	
	D,H	54	
	D,L	55	
	D,M	56	

Move (cont)

MOV	E,A	5F	
	E,B	58	
	E,C	59	
	E,D	5A	
	E,E	5B	
	E,H	5C	
	E,L	5D	
	E,M	5E	
MOV	H,A	67	
	H,B	60	
	H,C	61	
	H,D	62	
	H,E	63	
	H,H	64	
	H,L	65	
	H,M	66	
MOV	L,A	6F	
	L,B	68	
	L,C	69	
	L,D	6A	
	L,E	6B	
	L,H	6C	
	L,L	6D	
	L,M	6E	
MOV	M,A	77	
	M,B	70	
	M,C	71	
	M,D	72	
	M,E	73	
	M,H	74	
	M,L	75	

XCHG EB

Move Immediate IMMED. ADDR.

MVI	A, byte	3E
	B, byte	06
	C, byte	0E
	D, byte	16
	E, byte	1E
	H, byte	26
	L, byte	2E
	M, byte	36

Load Immediate IM. ADDR.

LXI	B, dble	01
	D, dble	11
	H, dble	21
	SP, dble	31

Load/Store

	LDAX B	0A
	LDAX D	1A
	LHLD adr	2A
	LDA adr	3A
	STAX B	02
	STAX D	12
	SHLD adr	22
	STA adr	32

reg. indir. dir. addr.

byte = constant, or logical arithmetic expression that evaluates to an 8-bit data quantity (Second byte of 2-byte instructions)
dble = constant, or logical arithmetic expression that evaluates to a 16-bit data quantity (Second and Third bytes of 3-byte instructions)
adr = 16-bit address (Second and Third bytes of 3-byte instructions)
* = all flags (C, Z, S, P, AC) affected
** = all flags except CARRY affected, (exception INX and DCX affect no flags)
† = only CARRY affected

ARITHMETIC AND LOGICAL GROUP

Add*

ADD	A	87
	B	80
	C	81
	D	82
	E	83
	H	84
	L	85
	M	86
ADC	A	8F
	B	88
	C	89
	D	8A
	E	8B
	H	8C
	L	8D
	M	8E

→ INDIR. ADDR.

Subtract*

SUB	A	97
	B	90
	C	91
	D	92
	E	93
	H	94
	L	95
	M	96
SBB	A	9F
	B	98
	C	99
	D	9A
	E	9B
	H	9C
	L	9D
	M	9E

Double Add†

DAD	B	09
	D	19
	H	29
	SP	39

Increment**

INR	A	3C
	B	04
	C	0C
	D	14
	E	1C
	H	24
	L	2C
	M	34
INX	B	03
	D	13
	H	23
	SP	33

NO FLAGS

Decrement**

DCR	A	3D
	B	05
	C	0D
	D	15
	E	1D
	H	25
	L	2D
	M	35
DCX	B	0B
	D	1B
	H	2B
	SP	3B

NO FLAGS

Specials

DAA*		27
CMA		2F
STC†		37
CMC†		3F

Rotate†

RLC		07
RRC		0F
RAL		17
RAR		1F

Logical*

ANA	A	A7
	B	A0
	C	A1
	D	A2
	E	A3
	H	A4
	L	A5
	M	A6
XRA	A	AF
	B	A8
	C	A9
	D	AA
	E	AB
	H	AC
	L	AD
	M	AE
ORA	A	B7
	B	B0
	C	B1
	D	B2
	E	B3
	H	B4
	L	B5
	M	B6
CMP	A	BF
	B	B8
	C	B9
	D	BA
	E	BB
	H	BC
	L	BD
	M	BE

Arith & Logical Immediate

	ADI byte	C6
	ACI byte	CE
	SUI byte	D6
	SBI byte	DE
	ANI byte	E6
	XRI byte	EE
	ORI byte	F6

IMM. ADDR.

BRANCH CONTROL GROUP

Jump

JMP adr	C3	
JNZ adr	C2	
JZ adr	CA	
JNC adr	D2	
JC adr	DA	
JPO adr	E2	
JPE adr	EA	
JP adr	F2	
JM adr	FA	
PCHL	E9	

Call

CALL adr	CD	
CNZ adr	C4	
CZ adr	CC	
CNC adr	D4	
CC adr	DC	
CPO adr	E4	
CPE adr	EC	
CP adr	F4	
CM adr	FC	

Return

RET	C9
RNZ	C0
RZ	C8
RNC	D0
RC	D8
RPO	E0
RPE	E8
RP	F0
RM	F8

Restart

RST	0	C7
	1	CF
	2	D7
	3	DF
	4	E7
	5	EF
	6	F7
	7	FF

I/O AND MACHINE CONTROL

Stack Ops

PUSH	B	C5
	D	D5
	H	E5
	PSW	F5
POP	B	C1
	D	D1
	H	E1
	PSW*	F1
XTHL		E3
SPHL		F9

Input/Output

OUT byte	D3
IN byte	DB

Control

DI	F3
EI	FB
NOP	00
HLT	76

New Instructions (8085 Only)

RIM	20
SIM	30

ASSEMBLER REFERENCE

Operators

NUL
LOW, HIGH
+ - , MOD, SHL, SHR
* /
NOT
AND
OR, XOR

ASSEMBLER REFERENCE (Cont.)

Pseudo Instruction

General:
ORG
END
EQU
SET
DS
DB
DW

Macros:
MACRO
ENDM
LOCAL
REPT
IRP
IRPC
EXITM

Relocation:

ASEG	NAME
DSEG	STKLN
CSEG	STACK
PUBLIC	MEMORY
EXTRN	

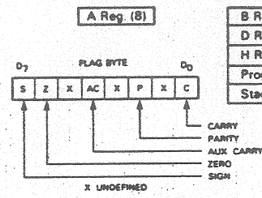
Conditional Assembly:
IF
ELSE
ENDIF

Constant Definition

0BDH, 1AH	Hex
105D, 105	Decimal
720, 720Q	Octal
11011B, 00110B	Binary
'TEST', 'A', 'B'	ASCII

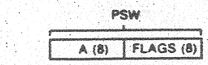
INTEL® 8080/8085 INSTRUCTION SET REFERENCE TABLES

INTERNAL REGISTER ORGANIZATION



B Reg. (8)	C Reg. (8)
D Reg. (8)	E Reg. (8)
H Reg. (8)	L Reg. (8)
Program Counter (16)	
Stack Pointer (16)	

REGISTER-PAIR ORGANIZATION



NOTE: Leftmost Byte is high-order byte for arithmetic operations and addressing. Left byte is pushed on stack first. Right byte is popped first.

B (B/C) (16)	
D (D/E) (16)	
H (H/L) (16)	
Prog. Ctr. (16)	
Stack Ptr. (16)	

BRANCH CONTROL INSTRUCTIONS

Flag Condition	Jump		Call		Return	
Zero=True	JZ	CA	CZ	CC	RZ	C8
Zero=False	JNZ	C2	CNZ	C4	RNZ	C0
Carry=True	JC	DA	CC	DC	RC	D8
Carry=False	JNC	D2	CNC	D4	RNC	D0
Sign=Positive	JP	F2	CP	F4	RP	F0
Sign=Negative	JM	FA	CM	FC	RM	F8
Parity=Even	JPE	EA	CPE	EC	RPE	E8
Parity=Odd	JPO	E2	CPO	E4	RPO	E0
Unconditional	JMP	C3	CALL	CD	RET	C9

ACCUMULATOR OPERATIONS

	Code	Function
XRA A	AF	Clear A and Clear Carry
ORA A	B7	Clear Carry
CMC	3F	Complement Carry
CMA	2F	Complement Accumulator
STC	37	Set Carry
RLC	07	Rotate Left
RRC	0F	Rotate Right
RAL	17	Rotate Left Thru Carry
RAR	1F	Rotate Right Thru Carry
DAA	27	Decimal Adjust Accum

REGISTER PAIR AND STACK OPERATIONS

	PSW (A/F)	B (B/C)	D (D/E)	H (H/L)	SP	PC	Function
			Register Pair				
INX		03	13	23	33		Increment Register Pair
DCX		0B	1B	2B	3B		Decrement Register Pair
LDAX		0A	1A	7E(1)			Load A Indirect (Reg. Pair holds Adrs)
STAX		02	12	77(2)			Store A Indirect (Reg. Pair holds Adrs)
LHLD				2A			Load H, L Direct (Bytes 2 and 3 hold Adrs)
SHLD				22			Store H, L Direct (Bytes 2 and 3 hold Adrs)
LXI		01	11	21	31	C3(3)	Load Reg. Pair Immediate (Bytes 2 and 3 hold immediate data)
PCHL						E9	Load PC with H, L (Branch to Adrs in H, L)
XCHG			EB				Exchange Reg. Pairs D, E and H, L
DAD		09	19	29	39		Add Reg. Pair to H/L
PUSH	F5	C5	D5	E5			Push Reg. Pair on Stack
POP	F1	C1	D1	E1			Pop Reg. Pair off Stack
XTHL				E3			Exchange H, L with Top of Stack
SPHL					F9		Load SP with H/L

1 = The MOV A,M 2 = The MOV M,A 3 = This is IMP