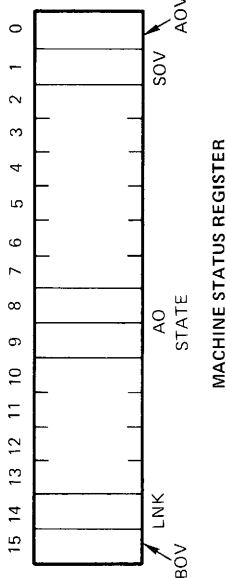
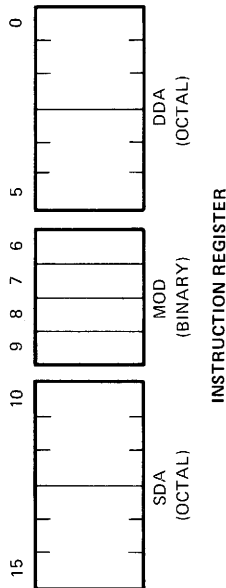


GRI Computer CORPORATION
 320 NEEDHAM STREET
 NEWTON, MASS. 02164

GRI-99 INSTRUCTION SUMMARY



CLASS	SDA	MOD BITS				DDA	EFFECT
		9	8	7	6		

I. REGISTER TRANSFERS	ANY EXCEPT 06, 02	0	0	0	0	ANY* EXCEPT 03, 06, 02	NONE
		0	1	-	0		INCREMENT
		1	0	-	0		LEFT ONE BIT
		1	1	-	0		RIGHT ONE BIT
		-	-	1	0		1's COMPL. BEFORE BITS 8, 9

II. MEMORY ** TRANSFERS	06	SAME AS CLASS I	0	0	ANY 06	DIRECT
	ANY		1	0		IMMEDIATE
	06		0	1		DEFERRED
			1	1		IMMEDIATE - DEFERRED

III. JUMPS (DATA TESTS)	ANY** EXCEPT 06, 02	0	0	1	-	03	ALWAYS JUMP
		0	1	0	-		ETZ
		0	1	1	-		NEZ
		1	0	0	-		LTZ
		1	0	1	-		GEZ
		1	1	0	-		LEZ
		1	1	1	-		GTZ
-	-	-	1	DEFERRED			

IV. SKIPS (FUNCTION TESTS)	00	0	0	1	-	02	BOV (BUS OVERFLOW)
		0	1	0	-		LNK
		1	0	0	-		POK (POWER OK)
	13	0	0	1	-		AOV (ARITH. OVERFLOW)
		0	1	0	-		SOV (SUM OVERFLOW)
	76 OR 77	1	0	0	-		IRDY
		0	0	1	-		ORDY
ANY	-	-	-	0	DEPENDS ON DEVICE		
-	-	-	1	SKIP IF ANY TESTS TRUE			
-	-	-	1	SKIP IF NO TESTS TRUE			

V. CONTROL SIGNALS (FUNCTION GENERATION)	02	0	0	0	1	00	CLL (CLEAR LINK)	
		0	0	1	0		STL (SET LINK)	
		0	1	0	0		HLT	
		0	0	1	1		CML (COMPLEMENT LINK)	
		0	0	0	0		13	ADD
		0	1	0	0			AND
		1	0	0	0			XOR
		1	1	0	0		OR	
		0	0	0	1		14	MULTIPLY
		0	0	1	0			DIVIDE
	0	0	1	1	ARITH. RT. SHIFT			
	0	1	0	0	04	NORMALIZE		
	0	0	0	1		ICF (INT. CONTROL OFF)		
	0	0	1	0		ICO (INT. CONTROL ON)		
	0	0	0	1	76 OR 77	STRT		
	1	0	0	0		CLIF (CLEAR IRDY)		
	0	0	1	0		CLOF (CLEAR ORDY)		
	-	-	-	-	***	ANY CONTROL FUNCTIONS		

- * IF 07 AND BIT 15 OF DATA IS SET, INDEXING WILL OCCUR
- ** IF BIT 15 OF SECOND WORD OF THE INSTRUCTION IS SET, INDEXING WILL OCCUR
- *** DEPENDS ON DDA

ASSIGNED DEVICE ADDRESSES

DEVICE ADDRESS	DEVICE	DEVICE ADDRESS	DEVICE
00	NULL	24	BYTE SWAP
01	INSTRUCTION REGISTER	25	BYTE PACK
02	FUNCTION GENERATOR	26	BYTE COMPARATOR (A)
03	DATA TEST	27	BYTE COMPARATOR (B)
04	INTERRUPT STATUS REG.	30-35	GENERAL PURPOSE REGISTERS
05	MEMORY ADDRESS REG.	50	BINARY INPUT MUX.
06	MEMORY BUFFER REG.	51	BINARY OUTPUT MUX
07	SEQUENCE COUNTER	60	WATCHDOG INTERVAL TIMER
10	CONSOLE SWITCH REG.	61	D/A CONVERTER
11	AX REGISTER	64	MULTIPLEXER
12	AY REGISTER	65	A/D CONVERTER
13	ARITHMETIC OPERATOR	66-70	DMA SELECTOR CHANNEL
14	EXTENDED MATH	71	LINE PRINTER
15	EXTERNAL DATA	73	CARD READER
16	EXTERNAL ADDRESS	74	GRI SETTE II
17	MACHINE STATUS REGISTER	75	REAL TIME CLOCK
22	INDEX REGISTER	76	HIGH SPEED READER/PUNCH
23	TRAP REGISTER	77	TELETYPE I/O

% RASX RELOCATABLE ASSEMBLER

RR[C]	device [,Mod], device
ZR[C]	[Mod,] device
RS[C]	device [,Mod]

RM[I] [D]	device [,Mod] [#] location
ZM[I] [D]	[Mod,] [#] location
MR[I] [D]	[#] location [,Mod] ,device
MS[I] [D]	[#] location [,Mod]

JC[D]	device, test, [#] location
JU[D]	[#] location

SF	device, [NOT] status [status. . .]
SFM	[NOT] status [status. . .]
SFA	[NOT] status [status. . .]

FO	pulse pulse. . . , device
FOM	pulse pulse. . .
FOA	pulse pulse. . .
FOI	pulse [pulse. . .]

symbol = e
 #
 ASC dc₁c₂c₃. . .d
 WRD e|,e. . .|
 PKB e₁,e₂
 OCTAL
 DECIM
 LOC e
 LOC .+n
 EOT
 END

CLASSES OF INSTRUCTIONS

I DATA TRANSFERS, REGISTERS

- register to register
- zero to register
- register to self

II DATA TRANSFERS, MEMORY

- register to memory
- zero to memory
- memory to register
- memory to self

III DATA TEST (JUMPS)

- general
- unconditional jump

IV FUNCTION TEST (SKIPS)

- general
- machine
- arithmetic operator

V FUNCTION GENERATE (CONTROLS)

- general
- machine
- arithmetic operator
- interrupt control

ASSEMBLER INSTRUCTIONS

- define parameter
- indexing
- define text
- define word values
- define packed bytes
- octal radix
- decimal radix
- set location
- reserve n words
- end tape segment
- end program

% RASX STANDARD SYMBOL TABLE

INTENDED CATEGORY	SYMBOL	VALUE	MEANING
Device Addresses	ISR	4	Interrupt Status Register
	TRP	23	Trap Register
	XR	22	Index Register
	SC	7	Sequence Counter
	SWR	10	Console Switch Register
	AX	11	Arithmetic Operator X-register
	AY	12	Arithmetic Operator Y-register
	AO	13	Arithmetic Operator
	MSR	17	Machine Status Register
	HSR	76	High-speed Reader
Status Test Codes	HSP	76	High-speed Punch
	TTI	77	Teletype Input
	TTO	77	Teletype Output
	AOV	2	Arithmetic Overflow
	SOV	4	Sum Overflow
	NOT	1	Negation of Test Results
	IRDY	10	Input-ready Flag
	ORDY	2	Output-ready Flag
	LNK	4	Bus Modifier Link
	BOV	2	Bus Overflow
Transmission Path Codes	POK	10	Power OK
	P1	1	Increment
	L1	2	Shift Left 1 Bit
Pulse Output Codes	R1	3	Shift Right 1 Bit
	CLL	1	Clear Link
	STL	2	Set Link
	CML	3	Complement Link
	HLT	4	Halt Machine
	ADD	0	Select AO "ADD"
	AND	4	Select AO "AND"
	OR	14	Select AO "OR"
	XOR	10	Select AO "XOR"
	STRT	1	Start Pulse
Data Test Codes	CLIF	10	Clear Input Flag
	CLOF	2	Clear Output Flag
	ICF	1	Interrupt Control OFF
	ICO	2	Interrupt Control ON
	ETZ	2	Equal to Zero
	NEZ	3	Not Equal to Zero
	GTZ	7	Greater than Zero
	GEZ	5	Greater than or Equal to Zero
	LTZ	4	Less than Zero
	LEZ	6	Less than or Equal to Zero