

CIO

Control Input/Output

CIO

P851M
P852M
P856M
P857M

Syntax: [label] CIO r3, $\begin{Bmatrix} 0 \\ 1 \end{Bmatrix}$, dev

This instruction permits to start or to stop an I/O operation on a peripheral device, depending whether bit 9 is set (start) or reset (stop). During the execution of this instruction the contents of bit 10–15 are sent, via the bus, to the control unit addressed, together with the contents of the register r3, which contains additional information for the control unit. A survey of the information which may be given in r3 for each control unit is given on the following pages.

A start an I/O operation command is not accepted if the address specified is unknown or if the corresponding device is busy. The stop a data transfer command is always accepted.

Example:

Start an input operation: LDK A1,1
CIO A1,1,/10 start input on teletype
RB(NA) *-2 wait until accepted

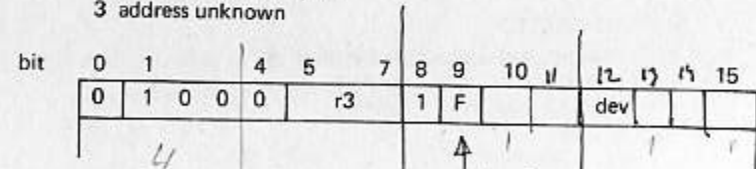
Start an output operation: LDK A1,0
CIO A1,1,/10 start output on teletype
RB(NA) *-2 wait until accepted

Stop the I/O operation: CIO A1,0,/10

Type	Syntax	
T8	CIO r3, 1, address	start input or output
T8	CIO r3, 0, address	stop I/O

Condition register:

CR = 0 command accepted
1 command not accepted
3 address unknown



Remark:
* r3 must be ≠ 0.
* This instruction may only be used in system mode.

Information which must be given in r3 and in the CIO instruction, if required:

ASR

bit 15 = 1 input
 0 output

PUNCHED TAPE READER

r3 not significant

TAPE PUNCH

r3 not significant

SERIAL CU

CIO READ

bit 10 = 1 echo mode
 0 no echo mode

bit 13 14
 1 1 7 data bits + parity bit (odd)
 1 0 7 data bits + parity bit (even)
 0 1 7 data bits, no parity
 0 0 8 data bits

bit 15 = 1

CIO WRITE

bit 13 14 see CIO READ

bit 15 = 0

CARD READER

r3 not significant

LINE PRINTER

r3 not significant

CASSETTE

In CIO instruction must be specified:

bit 10,11 drive no
bits 12 thru 15 address

In r3:

bit	12	13	14	15	
	0	0	0	0	unlock
	0	0	0	1	erase
	0	0	1	0	backspace
	0	1	0	1	write a block forward
	0	1	1	1	read a block forward
	1	0	0	0	rewind
	1	0	0	1	write tape mark
	1	0	1	0	search tape mark backward
	1	0	1	1	search tape mark forward

DK1215

In CIO instruction must be specified:

bit 10,11 disk no
bit 12 thru 15 address

In r3:

CIO SEEK

bit 4 thru 12 cylinder no. $0 \leq N \leq 203$

bit 14 = 1

bit 15 = 0

CIO SEEK TO ZERO

bit 14 = 1

bit 15 = 1

CIO WRITE A SECTOR

bit 9 thru 13 sector address from 0 to 31

bit 14 = 0

bit 15 = 1

CIO READ A SECTOR

bit 9 thru 13 sector address from 0 to 31

bit 14 = 0

bit 15 = 0

PROGRAMM. REAL TIME CLOCK

r3 specifies the interrupt rate selection

bit 0 = 0

bit 15 = 1	1 millisecond
bit 14 = 1	5 milliseconds
bit 13 = 1	10 milliseconds
bit 12 = 1	20 milliseconds

bit 0 = 1

bit 1 thru 15 the number of milliseconds

MAGNETIC TAPE

bit	10	11	12	13	14	15	
	0	0	0	0	1	1	write
	0	1	0	0	0	1	write file mark
	0	1	1	0	0	1	erase gap
	0	0	1	0	1	0	read one block
	0	0	0	0	1	0	read with check characters
	0	0	x	0	0	0	forward space block
	0	0	x	1	0	0	backward space block
	0	1	x	0	0	0	search file mark forward
	0	1	x	1	0	0	search file mark backward
	1	x	x	1	x	x	rewind
	1	x	x	0	x	x	off line
	1	x	1	1	x	x	load and on line (for 1600BPI)

(x = not significant)

SERIAL CU P851M

bit	12	13	
	x	0	no parity
	0	1	even parity
	1	1	odd parity
bit 15 =	0		output
	1		input

SALCU

bit 11 =	0		without echo
	1		with echo
bit 12	13		
	x	0	no parity
	0	1	even parity
	1	1	odd parity

Input is always on even address.

Output is always on input address + 1.

HDLC

CIO Start input

bit	12	13	14	15	
	x	0	0	1	disconnect modem
	x	0	1	0	connect modem
	x	0	1	1	wait for call
	0	1	0	1	receive data (prog. chan)
	0	1	0	0	alarm receive data (prog. chan)
	1	1	0	1	receive data (I/O proc)
	1	1	0	0	alarm receive data (I/O proc)

CIO Start output

bit	4	5	6	7	12	13	14	15	
					0	0	1	0	transmit 4 wire (Prog. Chan)
					0	0	1	1	transmit 2 wire (Prog. Chan)
					1	0	1	0	transmit 4 wire (I/O Proc)
					1	0	1	1	transmit 2 wire (I/O Proc)
						1	0	0	idle "1"
						0	0	1	no "request to send"

FLOPPY DISK

In CIO instruction must be specified:

bit 10,11	drive number
bit 12 thru 15	control unit address

The r3 contents must be:

WRITE

bit 0, 1	n+1 records will be written successively
bit 2 thru 12	record number (from 0 to 2001)
bit 13 14 15	
	0 0 1

WRITE AND VERIFY

bit 0 thru 12	see WRITE
bit 13 14 15	
	1 0 1

WRITE WITH DELETED DATA ADDRESS MARKS

bit 0 thru 12	see WRITE
bit 13 14 15	
	0 1 0

WRITE WITH DELETED ADDRESS MARKS AND VERIFY

bit 0 thru 12	see WRITE
bit 13 14 15	
	1 1 0

READ

bit 0 thru 12	see WRITE
bit 13 14 15	
	0 0 0

SEARCH KEY

bit 0 thru 4	0
bit 5 thru 12	number of 8-bit characters of the key number = 1 to 128
bit 13 =	1 search with mask
	0 search without mask
bit 14 15	
	1 1

OTR

Output from register

OTR

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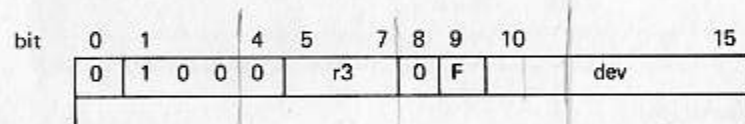
Syntax: [label] \square OTR \square r3, $\left\{ \begin{matrix} 0 \\ 1 \end{matrix} \right\}$, dev

When this instruction is accepted, only if the device control unit is in the exchange state, a data word or character is sent from the register specified by r3 to the peripheral device with address dev. During execution "F" and dev fields are sent to the device via the GP bus. Bit 9 (F) may be used to specify a particular output function which depends on the type of peripheral used.

Type Syntax
T8 OTR r3, 0, address
OTR r3, 1, address depending on control unit

Condition register:

CR = 0 command accepted
1 command not accepted
3 device address unknown



Remark:

- * r3 \neq 0.
- * This instruction may only be used in system mode.

SST

Send status

SST

P851M
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P856M
P857M

Syntax: [label] \square SST \square r3, dev

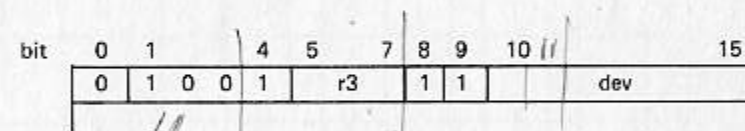
This instruction is used to know the status of the control unit addressed and should be programmed after an I/O sequence e.g. after CIO STOP. The instruction is accepted when the control unit addressed is in the Wait State, after which a status word is sent to the register r3. The following conditions are indicated by fixed bit positions (if significant for the control unit concerned) : see following pages.

After a not accepted SST instruction the contents of r3 is not significant. Note: For the programmable real time clock the SST is not significant.

Type Syntax
T8 SST r3, address

Condition register:

CR = 0 command accepted
1 command not accepted
3 device address unknown



Remark:

- * r3 must be \neq 0.
- * Address must be \neq 0.
- * This instruction may only be used in system mode.

