SATK Macro Category - io

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Introduction

This manual describes a set of macros providing definition of various input/output related system structures, their creation, or modification.

The following macros found in the maclib macro library directory belong to the io category.

Macro	Description
IOFMT	Defines input/output structures
ORB	Creates an Operation Request Block
STCCWADR	Modifies the address field of a CCW independent of the CCW format
STCCWCNT	Modifies the count field of a CCW independent of the CCW format

These dummy sections may be created by the IOFMT macro depending upon the selected structure(s).

DSECT	Description
CCW0	Format 0 Channel Command Word structure
CCW1	Format 1 Channel Command Word structure
CSWFMT	Channel Status Word format
IRB	Interrupt Response Block format
ORB	Operation Request Block format
SCHIB	Subchannel Information Block format
SCSW	Subchannel Status Block

How to Use This Document

This document centralizes in one place the definition and required objects for performing input/output operations. The macros described are foundational for input/output, but do not initiate the operations themselves. This manual should be used in conjunction with `sync.odt` or `sync.pdf` where SATK provides support for synchronizing a program's use of input/output operations with the input/output subsystem.

IOFMT

Source file: maclib/IOFMT.mac

Macro Format:

```
IOFMT [DSECTS=[struct|(struct[,struct,...])]
```

IOFMT creates DSECTS for the requested structures. The following structure options may be selected:

Option	Levels	Description
ALL	1-9	All structures are defined
CCW	1-9	Format 0 and Format 1 Channel Command Word structures
CCW0	1-9	Format 0 Channel Command Word structure
CCW1	5-9	Format 1 Channel Command Word structure
CSW	1-4	Channel Status Word
IRB	5-9	Interrupt Response Block
ORB	5-9	Operation Request Block
SCHIB	5-9	Subchannel Information Block
SCSW	5-9	Subchannel Status Word

The structures are only defined once, regardless of being selected multiple times.

Assembly Considerations: None

Execution Considerations: None

Label Field Usage: Prohibited

Positional Parameters: None

Keyword Parameters:

Keyword	Default	Description
DSECTS	None	One structure option or multiple options in a sublist.

Programming Note:

All of the input/output structure definitions may be requested using the DSECTS macro

described in SATK.odt or SATK.pdf. IOFMT is used by DSECTS to create input/output structure definitions.

ORB

Source file: maclib/ORB.mac

Macro Format:

```
[label]   ORB    [CCW=[0|label]]
                 [,FLAG=flags]
                 [,I=[0|n]]
                 [,KEY=[0|n]
                 [,LPM=[255|n]
                 [,CSS=[0|n]
                 [,CU=[0|n]
                 [,MASK=[YES|NO]]
```

ORB assembles an Operation Request Block (ORB) or a validity mask. An ORB communicates to the channel subsystem how the input/output operation is to be performed and which features are being used.

Assembly Considerations:

- A preceding ARCHLVL macro is required to establish the architectural environment in which the macro is expected to operate.

Execution Considerations:

- MASK=NO required for input/output operation initiation.

Label Field Usage:

The label field, if present, defines an assembly label associated with the start of the ORB or the generated validity mask.

Positional Parameters: None

Keyword Parameters:

Keyword	Default	Description
CCW	0	The address of the first Channel Command Word.
CSS	0	Channel subsystem priority in an extended format ORB. A value in the range 0-255. Ignored if the ORB is not extended by an X flag.
CU	0	If flag X, extended CCW ORB – the control unit priority. If flab B, extended TCW ORB – a program reserved value.
FLAG	none	The flags to be set within the ORB as a string of flag characters. See the Programming

Keyword	Default	Description
		Note for details.
I	0	The I/O interruption parameter as a self-defining term or expression in the range X'00000000' – X'FFFFFFFF'.
KEY	0	A value in the range 0-15 specifying the storage key used by the channel subsystem when accessing memory by the channel command words.
LPM	255	Logical path mask for the input/output operation.
MASK	NO	• YES assembled a ORB validity mask. • NO assembles a ORB for input/output operation initiation.

Programming Note:

Each flag of the ORB may be set to 1 by specifying in the FLAG keyword parameter the character associated with the flag. The word and bit within the word where the flag is set is identified. The “FLAG” column provides the character associated with the flag. “Levels” identifies the architecture levels for which the flag being set is valid. By specifying the flag character, the corresponding flag is set to 1. By omitting the character, the flag is set to 0.

ORB Word	Word Bit	FLAG	Levels	Description
1	4	S	5-9	Suspend control
1	5	C	8,9	Streaming-mode control
1	6	M	8,9	Modification control
1	7	Y	8,9	Synchronization control
1	8	F	5-9	CCW-format control
1	9	P	5-9	Prefetch control
1	10	I	5-9	Initial-status interruption control
1	11	A	5-9	Address-limit-checking control
1	12	U	5-9	Suppress-suspended-interruption control
1	13	B	9	Channel-program-type control (0 – CCW, 1 – TCW)
1	14	H	8,9	Format-2 IDAW control
1	15	T	8,9	2K-IDAW control
1	24	L	5-9	Incorrect-length suppression control
1	25	D	9	Modified-Indirect-Data-Addressing control (MIDAW)
1	31	X	8,9	ORB-extension control

Refer to the appropriate Principles of Operation manual for details related to the meaning and use of the ORB flags.

STCCWADR

Source file: maclib/STCCWADR.mac

Macro Format:

```
[label]  STCCWADR reg,ccw
```

STCCWCNT stores the low-order 24 or 31 bits of a register into the address field of a CCW in storage independent of the CCW format. 24 bits are stored into a Format 0 CCW. 31 bits are stored into a Format 1 CCW

Assembly Considerations:

A preceding ARCHLVL macro is required to establish the architectural environment in which the macro is expected to operate and by inference the CCW format.

Execution Considerations:

- The source register is treated as a 32-bit register regardless of the architecture.
- The format of the CCW being modified is implied by the preceding ARCHLVL macro.

Label Field Usage:

The label field when present associates the label to the first instruction generated by the macro.

Positional Parameters:

1. The reg positional parameter identifies the source of the CCW address field being modified. reg is required.
2. The ccw parameter identifies the CCW whose address field in storage is being modified. ccw is required. ccw must not be a register.

Keyword Parameters: None.

STCCWCNT

Source file: maclib/STCCWCNT.mac

Macro Format:

```
[label]  STCCWCNT reg,ccw
```

STCCWCNT stores the low-order 16 bits of a register into the count field of a CCW in storage independent of the CCW format.

Assembly Considerations:

A preceding ARCHLVL macro is required to establish the architectural environment in which the macro is expected to operate and by inference the CCW format.

Execution Considerations:

- The source register is treated as a 32-bit register regardless of the architecture.
- The format of the CCW being modified is implied by the preceding ARCHLVL macro.

Label Field Usage:

The label field when present associates the label to the first instruction generated by the macro.

Positional Parameters:

1. The reg positional parameter identifies the source of the CCW count field being modified. reg is required.
2. The ccw parameter identifies the CCW whose count field in storage is being modified. ccw is required. ccw must not be a register.

Keyword Parameters: None.