

ASMA Instruction Status

Table of Contents

Notices.....	1
Introduction.....	1
Change History.....	2
SA22-7832-11 – September, 2017.....	3
New General Instructions – Chapter 7.....	3
New Control Instructions – Chapter 10.....	4
New Vector Floating Point Instructions – Chapter 24.....	4
SA22-7832-12 – September, 2019.....	5
New General Instructions – Chapter 7.....	5
SA22-7832-13 – May, 2022.....	6
New Control Instructions – Chapter 10.....	6

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Notices

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Introduction

ASMA is somewhat behind in instruction implementation. This document describes the plan for the immediate future and generally going beyond that. Over time this document will be updated with the implementation status and next set of planned changes.

In general, ASMA supports all machine instructions for all mainframe architectures starting with S/360 models through the systems defined by the SA22-7832-11 version of the *IBM® z/Architecture® Principles of Operation* released in September, 2017.

Extended Mnemonics are more restrictive. See below where within the plan extended mnemonics using any bits of the instruction beyond bit 15 are addressed. Any missing extended mnemonic using only bits 8-15 should be reported as a bug.

Because ASMA instructions are defined by the MSL files (see the `asma/msl` directory), this is largely a plan for MSL. The last features implemented in `s390x-inst.msl` are those instructions added by the PoO manual SA22-7832-11, released in September, 2017.

The next version of the PoO manual was -12, released in September, 2019. The latest PoO manual, -13, was released in May, 2022. This makes ASMA instruction support three years

ASMA Instruction Status

behind. Most, but not all, new instructions are in the area of new floating point instructions and vector instructions. Of most interest by the users of ASMA are support for new instructions that are of more general use. "General use" includes privileged instructions for bare-metal programs.

This table documents the general status of instruction development for the -11, -12, and -13 PoO manuals by chapter.

Instructions	Chapter	-11 Status	-12 Status	-13 Status
General	7	Implemented	Implementing	No change
Decimal	8	No change	No change	No change
Control	10	Implemented	No change	Implementing
I/O	14	No change	No change	No change
Vector FP	24	Implemented	?	?

Following implementation of the new instructions, the Machine Specification Language enhancements required for many of the new extended mnemonics using bits beyond 15 will be made. The **plan** for the actual extended mnemonics and the implementation of the new floating point and vector instructions will be addressed in the future.

In the tables in the following sections, instructions, MSL formats, and programming notes in **bold** text require implementation. As implementation occurs, the bold text font will be changed to normal text font.

Change History

Change	Date	Description
1	4 Sep 2022	Initial release.
2	5 Sep 2022	-11 PoO fully supported with addition of two instructions that rename instructions released in the -10 PoO, chapter 24.
3	6 Sep 2022	Completed research for -12 and -13 PoO versions of chapters 7, 8, 10, and 14 instruction changes. Ready for implementation.

ASMA Instruction Status

SA22-7832-11 – September, 2017

No new decimal instructions, Chapter 8, nor new I/O Instructions, Chapter 14, were added. Instructions that operate upon decimal floating point data, Chapter 20, and decimal data acted upon by vector instructions, Chapter 25 were added. Those additions have been implemented in ASMA.

New vector instructions were added as documented in Chapters 21-25.

Upon inspection of the actual MSL files, nearly all new instructions **WERE** already added to the MSL files for the -11 version of the PoO manual except for the mnemonic change for two instructions in Chapter 24.

By incorporating the mnemonic name changes, ASMA is current with the -11 version of the PoO manual for machine instructions. At this point ASMA is now requiring enhancements for -12, released in September, 2019 and -13, released in May, 2022. ASMA is now three years behind.

New General Instructions – Chapter 7

Mnemonic	Page #	Prog. Notes	MSL Format	Implemented	Other Notes
AGH	7-28	31	RXYA	yes	Research Extended Mnemonics
BIC	7-39	31	RXYB	yes	
KMA	7-78	33	RRFB3	yes	
CLT	7-155	26	RSYB	yes	
CLGT	7-155	26	RSYB	yes	
LGG	7-274	32	RXYA	yes	
LGSC	7-275	32	RXYA	yes	
LLGFSG	7-274	32	RXYA	yes	
MG	7-304	31	RXYA	yes	
MGRK	7-304	31	RRFA1	yes	
MGH	7-305	31	RXYA	yes	
MSC	7-307	31	RXYA	yes	
MSRKC	7-307	31	RRFA1	yes	
MSGC	7-307	31	RXYA	yes	
MSGRKC	7-307	31	RRFA1	yes	
PRNO	7-346	29	RRE	yes	
RISBGN	7-363	26	RIEF	yes	
STGSC	7-383	32	RXYA	yes	
SGH	7-388	31	RXYA	yes	

Programming Notes

Note #	Description
26	Miscellaneous-Instruction Extensions Facility 1
29	Message-Security-Assist Extension 5

ASMA Instruction Status

Note #	Description
31	Miscellaneous-Instruction Extensions Facility 2
32	Guarded Storage Facility
33	Message-Security-Assist Extension 8

New Control Instructions – Chapter 10

Mnemonic	Page #	Prog. Notes	MSL Format	Implemented	Notes
IRBM	10-30	11	RRE	yes	
TPEI	10-169	12	RRE	yes	

Programming Notes

Note #	Description
11	Insert-Reference-Bits-Multiple Facility
12	Test Pending External Interruption Facility

New Vector Floating Point Instructions – Chapter 24

Mnemonic	Page #	Prog. Notes	MSL Format	Implemented	Notes
VFLL	24-25		VRRA4	yes	Changed Mnemonic from VLDE
VFLR	24-26		VRRA	yes	Changed Mnemonic from VLED

ASMA Instruction Status

SA22-7832-12 – September, 2019

No new instructions were added to Chapters 8, 10, or 14.

Chapters 17-26 require future research.

New General Instructions – Chapter 7

Mnemonic	Page #	Prog. Notes	MSL Format	Implemented	Notes
NCRK	7-34	34	RRFA1	?	
NCGRK	7-34	34	RRFA1	?	
MVCRL	7-300	34	SSE2	?	
NNRK	7-308	34	RRFA1	?	
NNGRK	7-308	34	RRFA1	?	
NORK	7-311	34	RRFA1	?	
NOGRK	7-311	34	RRFA1	?	
NXRK	7-311	34	RRFA1	?	
NXGRK	7-311	34	RRFA1	?	
OCRK	7-314	34	RRFA1	?	
OCGRK	7-314	34	RRFA1	?	
POPCNT	7-365	34	RRFC	?	
SELR	7-376	34	RRFA2	?	
SELGR	7-376	34	RRFA2	?	
SELFHR	7-376	34	RRFA2	?	

Programming Notes

Note #	Description
34	Miscellaneous-Instruction-Extension Facility 3

ASMA Instruction Status

SA22-7832-13 – May, 2022

No new instructions were added to chapters 7, 8, or 14.

Chapters 17-26 require future research.

New Control Instructions – Chapter 10

Mnemonic	Page #	Prog. Notes	MSL Format	Implemented	Notes
LBEAR	10-51	13	S0 (zero)	?	
LPSWEY	10-57	13	SIY0 (zero)	?	
QPACI	10-123	15	S0 (zero)	?	
RDP	10-124	14	RRFB2	?	
STBEAR	10-145	13	S0 (zero)	?	

Programming Notes

Note #	Description
13	BEAR-Enhancement Facility
14	Reset DAT-Protection Facility
15	Processor-Activity-Instrumentation Facility