

NOP—No Operation

Opcode	Instruction	64-Bit Mode	Compat/ Leg Mode	Description
90	NOP	Valid	Valid	One byte no-operation instruction.
0F 1F /0	NOP r/m16	Valid	Valid	Multi-byte no-operation instruction.
0F 1F /0	NOP r/m32	Valid	Valid	Multi-byte no-operation instruction.

Description

This instruction performs no operation. It is a one-byte or multi-byte NOP that takes up space in the instruction stream but does not impact machine context, except for the EIP register.

The multi-byte form of NOP is available on processors with model encoding:

- CPUID.01H.EAX[Bytes 11:8] = 0110B or 1111B

The multi-byte NOP instruction does not alter the content of a register and will not issue a memory operation. The instruction's operation is the same in non-64-bit modes and 64-bit mode.

Operation

The one-byte NOP instruction is an alias mnemonic for the XCHG (E)AX, (E)AX instruction.

The multi-byte NOP instruction performs no operation on supported processors and generates undefined opcode exception on processors that do not support the multi-byte NOP instruction.

The memory operand form of the instruction allows software to create a byte sequence of "no operation" as one instruction. For situations where multiple-byte NOPs are needed, the recommended operations (32-bit mode and 64-bit mode) are:

Table 4-1. Recommended Multi-Byte Sequence of NOP Instruction

Length	Assembly	Byte Sequence
2 bytes	66 NOP	66 90H
3 bytes	NOP DWORD ptr [EAX]	0F 1F 00H
4 bytes	NOP DWORD ptr [EAX + 00H]	0F 1F 40 00H
5 bytes	NOP DWORD ptr [EAX + EAX*1 + 00H]	0F 1F 44 00 00H
6 bytes	66 NOP DWORD ptr [EAX + EAX*1 + 00H]	66 0F 1F 44 00 00H
7 bytes	NOP DWORD ptr [EAX + 00000000H]	0F 1F 80 00 00 00 00H

Table 4-1. Recommended Multi-Byte Sequence of NOP Instruction (Contd.)

Length	Assembly	Byte Sequence
8 bytes	NOP DWORD ptr [EAX + EAX*1 + 00000000H]	0F 1F 84 00 00 00 00 00H
9 bytes	66 NOP DWORD ptr [EAX + EAX*1 + 00000000H]	66 0F 1F 84 00 00 00 00 00H

Flags Affected

None.

Exceptions (All Operating Modes)

#UD If the LOCK prefix is used.