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PROGRAMMING COMPUTER  
(LASER CUTTING)

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# ISI KANDUNGAN

	M/S
PENGHARGAAN	1
INTRODUCTION	2
LASER CUTTING MACHINE	4
Basic Types of Laser Cutting	4
Energy	6
Mass Removal	8
Cutting Systems	9
Pulsed Laser Cutting	11
Three Dimensional Cutting	13
Proses Monitoring And Control	15
HIGH SPEED LASER CUTTING MACHINE	16
COMPUTER PROGRAM	32

COMPUTER RESULT	33
DISCUSSION	50
KESIMPULAN	51
REFERENCE	52
LAMPIRAN	53

## PENGHARGAAN

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Wassalam

## Introduction

The laser is now approaching the end of its second decade. During the period, it has developed from what was once described as “an invention in search of an application” into one of the most important technological developments of this half-century. It has brought about a rebirth of the science and technology of optics and has led to the development of whole new industries. Viewed from almost any perspective, the laser is a remarkable device. Consider:

- A laser time standard accurate to small fraction of a second per year.
- Laser beams so directional it can easily be seen from the moon or reflected back to earth and detected here.
- A glass bead supported in air only by a shaft of green light from a laser.
- Laser based measuring systems so accurate that they determine the altitude of earth – orbiting satellites to within several meter, the surface deformations of vibrating objects to 0.05 nanometer (billion of a meter)
- Focused laser beams so intense that they initiate nuclear reactions.
- Huge industrial lasers with many thousands of watts of output in beams the diameter of one finger.

The variety of lasers and the wealth of laser applications developed since 1960 are enormous.

### Short history of the laser

Until 1917, no one conceived that there was a basic process that would allow light to be amplified as it is in a laser. In that year, Albert Einstein showed that the process of stimulated emission must exist, and from that time the invention of the laser was possible. During the 1920's, 30's, and 40's, physicist were preoccupied with the new discoveries of quantum mechanics, particle physics and nuclear physics. For the most part, the possibility of laser action lay dormant, although the needs of science and technology for such a device grew. Beside the science fiction writer, they're where others who conceived of uses for a high power, highly directional light beam. Telecommunications engineers envisioned highly directional, line of sight communication systems where the information was carried on light beam. Ophthalmologists needed intense beams of light that could be focused onto small areas at the back of the eyeball to weld detached and torn retinas. Experience gains in the development of radar during World War II and the continuation of such work at higher microwave frequencies prompted scientists to explore the conditions that were necessary for laser action to be achieved. In the early 1950's, a group at Columbia University headed by Charles H. Townes operated a microwave device that amplified radiation by the stimulated emission process. The device was termed a MASER, an acronym for Microwave Amplification by Stimulated Emission of Radiation. During the remainder of the fifties, the maser principle was employed in many materials in 1958; Townes and Arthur L. Schawlow published an important paper in which they