lowed by four laser amplifier stages and a Faraday optical isolator. This approach of coupling amplifier stages to a commercial oscillator is advantageous since it is much cheaper to build up large aperture amplifier stages and their power supplies in the laboratory; it also provides easy maintanence of the laser chain, and flexibility of design. A microprocessor based control system for operation of this laser chain has been developed and tested.

Whereas the picosecond oscillator operates at a repetition rate of 1-10 Hz for a stable operation, large aperture amplifier stages are operated in a single shot or at a much lower frequency of one pulse in a few minutes. However, all the low peak power pulses from the oscillator, except the one to be amplified, should be blocked to avoid any damage or disturbance to the plasma target prior to the arrival of the amplified laser pulse. The control system generates charging and firing signals required for the picosecond oscillator, and also carries out charging and firing sequence of the various amplifier stages for single shot or repetitive modes of operation. It also controls a mechanical shutter to selectively pass a laser pulse from the oscillator stage into the amplifier chain.

The control system consists of 3 subsystems, viz a microcomputer, the control modules and the power supplies. The control modules contain the hardware logic required to control various operation of the power supplies, and they are mapped into the memory of the micro-computer. For operating the system, the data is entered through simple commands. The pico-second oscillator is operated at a frequency selectable between 1 to 10 Hz. For charging and firing other amplifiers, external switches are provided. A mechanical shutter, operated by a stepper motor is used to allow the beam to pass to the target when amplified laser pulse is being generated, and block all other oscillator pulses from reaching the target. After the laser shot is fired, data regarding leftover voltages, energy meter outputs etc. is displayed on the terminal. The system can be operated in single shot, or in repetitive mode with programmed number of shots and interval.

Operation of the above control system has been tested by firing the oscillator-amplifier system along with an amplifier stage of 15 mm aperture set up in the laboratory. Good synchronization is confirmed from the measurements of amplifier gain as a function of relative time delay in firing of different stages.

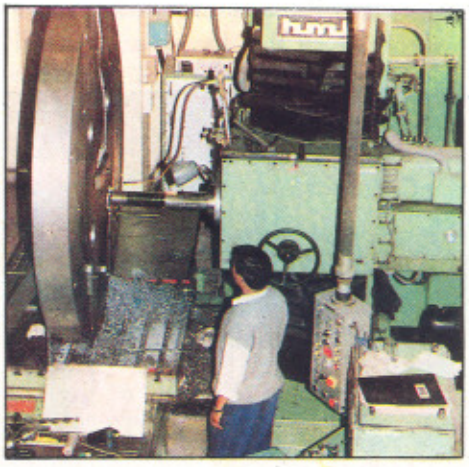
INFRASTRUCTURAL DEVELOPMENT

Computer facility

The computer network CATNET has been extended to Laser R&D Block - A, giving campus-wide connectivity between computers available at Palace, ADL, and A-Block. This facilitates availability of emails at individuals desk tops as well as provides access to the remote systems transparently to all users from their PCs. The network now has four segments in ADL with 22 nodes, 3 segments in A-Block with 7 nodes and single segment in palace with 15 nodes. The backbone (thick ethernet) has been commissioned between A-block and ADL with repeaters etc. The ADL network is connected to palace network through a serial line. The users can also access network by using DMKT phones distributed all over CAT. The email server has been shifted to ADL computer centre and is kept on round-the-clock.

Fabrication of large magnet for medical cyclotron

A large magnet assembly weighing nearly 27 tonnes was fabricated in the workshop for an 11 MeV Proton Cyclotron. The overall dimension of the assembly is 1868 mm dia and 1400 mm height. The major items of the magnet assembly fabricated, out of low carbon steel, in the workshop consist of four sectors and three supporting plates, each of diameter 1868 mm and thickness 173 mm. Each of these items weighs 3.7 tonnes. Further, four nos. of 54^{o} yoke blocks of height 587 mm with inner dia of 1420 mm and outer diameter of 1860 mm have also been fabricated. All the individual items have been machined within a tolerance $\pm$ 0.06 mm. This is the largest job fabricated in the workshop till now.



Supporting top plate during fabrication for medical cylcotron on CNC controlled horizental boring machine.