Meddelelser fra
NORSK INSTITUTT FOR SKOGFORSKNING
Reports of the Norwegian Forest Research Institute
38.13

Improvement of elderly annual ring measure equipment with an APPLE II micro computer

Forbedring av eldre årringmåleutstyr med en APPLE II micro datamaskin

Erik N. Mønness

Ås 1984

Norsk institutt for skogforskning (NISK)

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Abstract

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Medd. Nor. inst. skogforsk. *38*(13): 1—6.

With the APPLE II micro computer elderly ADDO annual ring measure desks have been improved, at a low cost, to a modern, reliable and easy operated system. Also, the APPLE itself is a stand-alone computer with many possibilities.

Key words: Annual ring measure equipment, ADDO, APPLE II, MACOME.

Utdrag

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Ved hjelp av en APPLE II micro datamaskin er eldre ADDO årringmåleutstyr forbedret, til en lav kostnad, til et moderne, driftssikkert og enkelt operert system. APPLE II kan i tillegg nyttes som en frittstående microdatamaskin.

Nøkkelord: Årringmåleutstyr, ADDO, APPLE II, MACOME.

ISBN 82-7169-315-8
ISSN 0332-5709

Preface

During the last years three sets of annual ring measure equipment have been under operation at NISK. The output devices were a listing and a paper tape. This kind of equipment is difficult to maintain and difficult to keep in operation. The measuring desk itself (that is, the moving truck holding the boring core and the microscope) is still functioning satisfactory.

Ronny Klæboe and Tor-Arne Gisvold (Programvarehuset, Oslo) have developed the ASSEMBLER programs and given support on APPLE problems. Oddvar Haga (Instrumenttjenensten/NLVF, Ås—NLH) has modified the hardware so as to fit together.

Ås, March 1983

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Contents

I. Improvement of the equipment

Two of the measure desks («ADDO», Eklund (1949) and further improvements) were supplied with APPLE II micro computers. The older desk was put in operation in 1960. Movement of the truck was read with a microscope and measured «analoge» with the rotation of a spindle (Lost motion was a problem). A magnet ruler (MACOME) was mounted on the truck and a pick-up measures its linear movement with precision 0.01 cm. The younger desk, installed in 1974, also has a microscope, a moving truck and an analogue measure through a spindle. The rotation of the spindle is digitalizised to light pulses which each count a movement of 0.001 cm. The output signals have been changed slighty to be read with an interface card in each APPLE. At this stage anything may be done with the proper programme: APPLE II has 48K core, BASIC with floating point arithmetic, diskettes, graphical device and so on. PASCAL, FORTRAN and advanced editors with a word processor may be supplied.

To-day, the equipment is controlled by a BASIC program with about 400 statements. Easy operation has been favoured so no action is irretrievable. Information is viewed on the screen through a fixed picture called a panel where each kind of information has its own place. An endless loop controls every action on the keyboard and on the measure desk. Identifying information conserning one boring core is kept on the screen ready for the next boring core, thus only changes must be typed. Also the last pith scrolls at the bottom of the screen to ease annual comparisons. On each record 120 bytes of identification and up to 3×300 bytes of annual ring information are allowed. Every piece of information is internally handled as character data, allowing for alteration of any byte at any time. (Full screen program). Also annual rings (normally raising from the measure desk) may be typed from the keyboard. A subroutine calculating site index is at hand. Different sounds signal acceptance/rejection of any action so the operator may consentrate on observing through the microscope. Each record is written on diskette. Today these files are transferred to an IBM computer for further calculations.

II. Further possible improvements

More calculations could be done on the APPLE and a graphical picture could be made of annual growth. The measure desk itself could be improved with a screen supplying the microscope. A single APPLE could, with loss of flexibility, control more than one measure unit.

III. Necessary equipment and prices (Norway 1981)

The «older» desk was supplied with an APPLE II (48K) (BASIC APPLESOFT is standard), diskette drive, 12" monitor, 80 coloumn card, interface card, an ASSEMBLER program reading the MACOME and the MACOME magnet ruler. Total cost about N kr 36 300.— plus 20 % vat. (fig. 1) (10 N kr $\approx$ 1 pound sterling).

The desk from 1974 was supplied with an equal APPLE configuration and an ASSEMBLER program to count pulses. Total cost about N kr 27 700.— plus 20 % vat. (fig. 2).

A complete description of the system (partly in norwegian) and programs are available at request.

Fig. 1. The older ADDO, the MACOME and the APPLE II.

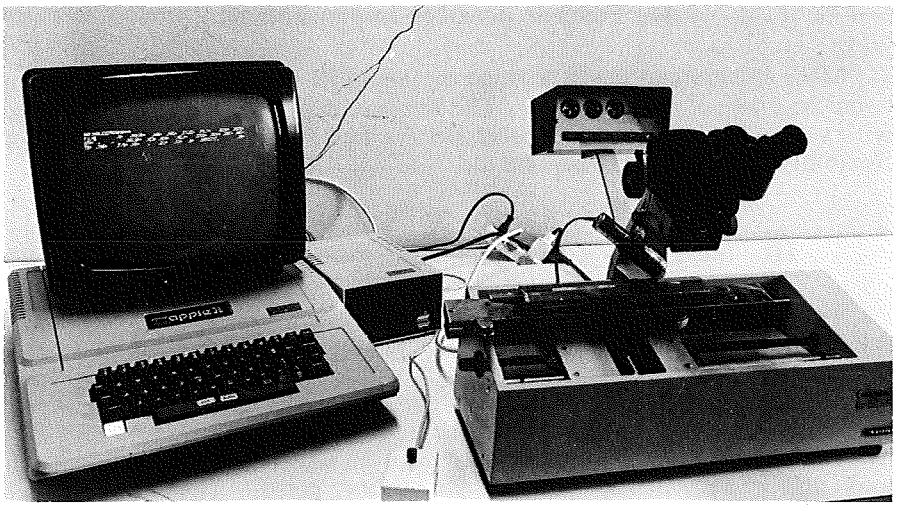

Fig. 2. The ADDO and the APPLE II.

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To «ADDO» årringmålebord har hver blitt utbygget med en APPLE II. Den eldste som var helt mekanisk, ble også påsatt en MACOME magnetlineal for lineær måling av borprøver. (fig. 1.) Det yngste bordet var originalt utstyrt med en digitaliseringsmekanisme og APPLE II kunne lese disse pulser direkte (fig. 2). Utstyret blir kontrollert av et BASIC program på ca. 400 setninger. Mesteparten av programmet kontrollerer kommunikasjonen med operatøren. Innen hver borprøve gir programmet en full-skjerm editor der all informasjon om prøven kan rettes når som helst via et panel. (1020 bytes informasjon vises samtidig med ledetekst.) Bonitet og husholdningsalder kan beregnes.

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ISBN 82-7169-315-8
ISSN 0332-5709

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