

NCR

CIRCUIT NEWS

Field Engineering Division

CONFIDENTIAL MATERIAL FOR THE EXCLUSIVE USE OF NCR

Published by the Field Engineering Division of the National Cash Register Company
Edition No. 2, 1974 - Editor Les Ball. Head Office.

INTERNATIONAL EDUCATION CENTRE :: DUNDEE

The new location of the international Education Centre is situated on a small industrial estate some four miles from the City Centre, in Dunsinane Ave. A quiet and pleasant part of Dundee providing an ideal setting for educational instruction, and certainly in contrast to those previously experienced at Brent on the North Circular Road.

Understandably, with the move, some changes of the Teaching Personnel became necessary. To update you with the current position, an analysis of the Education Structure is given, together with the equipment each instructor teaches. In the instances where a new appointment has taken place, a brief summary of their previous job environment is given.

Mr. D. G. TRIGGS, Divisional Director directly responsible for the International Education Centre.

BUSINESS MACHINES

JACK FOWLER. MANAGER.

JOHNNY CLAYDON. Senior Instructor, 299-230-BCC-42-450-482-461-411.
GERRY RUSHTON. 230-474-5-Retail. Taking BCC later in the year.
BOB LOUDEN. 299-446-Electronic Peripherals.
Ex Line trained Field Engineer, Dundee Area.
BILL GIBSON. 280-723-BCC. Taking 250 later in the year.
Ex Newcastle, Middlesbrough, and East Africa, Field Engineer.
LEN WHITTET. 31-32-33-461-411-440-Electronic Peripherals.
Ex. Field Engineer, Glasgow.
TOM EADINGTON. 31-32-33-ADD-160-16.
BILL SMITH. Complete Retail range including the Class 5.
Ex Field Engineer, Dundee Area.
KEITH PARRISH. BCC BETA*.

*The Beta course is now self study. Each student is issued with a kit of electronic parts together with explanatory manuals. An Instructor is on hand if required.

E.D.P.

TERRY MOZLEY. MANAGER.

BOB SUTHERLAND. Computer Room Practical Training.
Ex Senior Field Engineer Scottish Area covering Century 100-200.
FRED THIELE. Century 200 systems.
Ex Area Supervisor in Germany.
ALEX BRUCE. Class 400 extending to 399 later this year.
DAVID PULLEN. Century 100. Memory and Processor sections.
KEITH GRANT. Century 100. Covers the Disc Section.
BILL McGRUDDEN. Will shortly be taking 399.
Ex Dundee Mfg. Test floor experience with the 399 and 400.
JIM TORRANCE. Basic 400.
Ex Dundee Mfg. 399 and 400 line.
GEORGE SINCLAIR. Century 100. Magnetic Tape Units.
Ex Dundee Mfg. Century Line.
MALCOLM KERVELL. Century 200.
Ex EDP background.
ALAN REID. Shortly to undertake teaching the Century 200. Previous instruction experience.
MICHAEL QUEVERT. Century 100. Magnetic Tape Units.
Being a French native facilitates courses in the language if reqd.
ALAN TEVIOTDALE. Will undertake Century 100 later in the year.
Processor and Memory.
GEORGE CHALMERS. Century 100.
JOHN BARR. Currently conducting Instruction of Workshop Techniques.
Ex Dundee Mfg. Education Department.

Plans are in hand to become more involved in the Century 150 System courses during 1974.

ADMINISTRATIVE SUPPORT

RON CAMPBELL. Admin. Manager. I.E.C. for both FED and Marketing Divisions.
LAURA McNALLY. Secretary to Terry Mozley, EDP.
BRENDA PARRISH. Secretary to Jack Fowler, Business Machines.

Some 150 Students are undergoing training at any one time and obviously, careful planning is required with individual Travel arrangements, especially when dealing with the weekend trips to home, given to Engineers for each completed two weeks training of their course. This area has been improved recently with an Express Boyd representative in attendance three days of the week.

To date, the present power crisis has not directly affected the Schools, with normal light and heat available on all days of the week, allowing for programmes to continue as scheduled. Flexible working hours have been implemented to provide Students with a long weekend, mid-day Friday to mid-day Monday each fortnight, to coincide with their weekend at home.

THE Maypole restaurant located in the adjacent Dryburgh building is open from Monday-Friday, catering for Breakfasts, Dinners and High teas, offering a varied menu at reasonable prices. Vending machines are sited along the corridor from the classrooms providing a selection of Beverages, Rolls (or stovies as they are known over the border, and various other sundries.

Part two covering the accommodation and social outlets will appear in the next issue.

NCR CENTURY

150

System



The N.C.R. Century 150 is the most recent addition to the Century family. Its Processor has been designed to be configured into many different systems covering a wide range in price. The 150 is modular in nature and ranges from below the Century 100 through to the basic Century 200. Certain characteristics are common with other Century systems. These are:

- EIGHT BIT CHARACTERS
- CHARACTER ADDRESSING
- BINARY ADDRESSING
- COMMON TRUNK INTERFACE
- REAL TIME CAPABILITY
- LOW COST SIMULTANETY
- SOFTWARE COMPATIBILITY WITH LARGER MEMBERS

Because of the 150's modular construction the processor is capable of accepting a variety of optional features including system peripherals, optional commands, common trunks, different memory sizes, and speeds.

The Century 150 has been designed for batch processing where low cost file capability is the prime consideration. It can also be used for modest real-time applications.

Available options provide several directions for the 150 Systems development. These include:

- LARGE FILE STORAGE.
- MULTIPLE LOCAL OR REMOTE TERMINALS.
- BATCH AND ONLINE COMBINATIONS.
- A FAIRLY LARGE RANDOM ACCESS SYSTEM.

MEMORY

The basic storage unit of memory is one byte, nine bits in length, eight data bits and one parity bit. Two bytes (18 bits) are accessed during each memory cycle. The types of memory are core with a 1.2 micro second cycle time, or alternatively MOS with 750 nano-second cycle time. Memory sizes are 16K-24K-32K-48K and 64K bytes. 16K (1K=1024 bytes) of memory are contained on one 11 inch x 14 inch module in the processor.

PROCESSOR

The Century 150 systems 615-101 processor responds to 34 basic and three optional hardware commands. Commands are in double and single address modes, with direct, indirect and incremental addressing. Sixty three index registers are reserved in memory for the address modification, it contains an Arithmetic Logic Unit (ALU) and an In Out Control (IOC) section. The ALU sets up and executes commands, addresses memory using live registers, and provides internal logic timing and control. It has a 16 bit parallel adder. The IOC selects common trunks, controls peripheral priorities, and controls data transfers. It also terminates I/O operations and stores status characters. The I/O operation operates on a cycle stealing principle, allows Input Output activity on each trunk while arithmetic and logic operations are being performed in the processor.

COMMON TRUNKS

Four common trunks are available to the processor, each with eight positions. These trunks are always installed in pairs, trunks 0 and 7, and trunks 1 and 6. Trunks 0 and 1 are low speeds, trunks 6 and 7 are high speed. The bandwidth (Character transfer rate) of the trunks are T0 = 120KB per second, T1 = 166KB, T6 = 276 KB, T7 = 416KB. A scanning feature has been added to trunk 0 of the 150. It scans activities of the necessary but slower peripherals which have been concentrated on this trunk. The result is a trunk which handles peripherals without being 'blocked' during the main period of such a peripherals apparent activity. Because of the rate that information can be put through these peripherals they do not tax the computer or the trunks, and their transmissions are interleaved on a priority basis, to provide a five-way effective simultaneity for the trunk.

PERIPHERALS

The Processor has the capability of using both integrated and common trunk peripherals. Each system normally has an integrated card or paper tape reader and a common trunk disc for software compatibility. Other integrated peripherals include printers, Input/Output writer, the new Thermal Input/Output writer and a communications interface. The common trunk positions accommodate any NCR Century freestanding peripheral or controller which do not exceed the bandwidth of the trunks. There are positions on the trunk for the Console, I/O Writers, Punch Card Units, Paper Tape Units, Printers, Magnetic Ink Character Reader (MICR), and Optical Character Reader (OCR), Magnetic Tape Encoders, Disc Units, CRAM Units, Remote Terminals, CRT Displays, Computer to Computer communications.

NEW PERIPHERALS

New peripherals released with the Century 150 are:

EMT3 Thermal Input/Output Writer
80 columns at 128 characters with a print rate of 30 characters per second.

649-300/200 Freestanding Line Printer

132 columns at 63 characters, with a print rate of 300 or 200 lines per minute (Alphanumeric). Transfer rate .8KB.

656-102 Disc Unit
Single Spindle, 1 removable and 1 fixed disc pack per unit, 1 controller for up to 4 Disc Packs, with a magnetic oxide plated surface. 4.98m bytes per pack. 512 bytes per sector, 12 sectors per track, 812 tracks per pack. Access time 47.5ms (includes latency). Transfer rate 312,500 characters per second. Data transfer rate from controller 312.5 KB.

Single or dual Spindle, each with a removable pack of 20 magnetic oxide plated surfaces. One spindle per draw with two draws per unit. Disc capacity (low density) 29.8 million bytes. 1 and 8 sectors per track, 7,461 and 812 bytes per sector. Access time 72.5ms (including latency). Transfer rate (low density) 315,000 characters per second.

A 625-201 Control unit supervises up to four 657 disc units (eight spindles). It is a low density unit with a data transfer rate of 315 KB when coupled to the 150 system.

Twelve Century 150 Systems are already installed in the U.K. and our order books show many firm orders to date, indicating the system will be very popular in modern day businesses.

TECHNICAL EDUCATION

Technical training for the 150 is currently provided at the Central Technical Education Centre, Dayton. The basic course duration is 11 weeks, for Century trained 100,200 Engineers. There are also extended courses for non Century engineers which last for approximately 25 weeks. Training in Britain commenced on the 4th February 1974 at the International Education Centre Dundee. The first course being taken by Stan Catlin. Course duration is 9 weeks for trained Century 200 engineers, excluding the 645 printer. The basic courses do not include the 657 Disc Unit or the Communications interface.

Did you know F.E.D. was On-Call at the tenth British Commonwealth Games in N.Zealand thanks to Derek Cole of "C" Department, London Service Centre, 1000, and a member of the Thames Valley Harriers.

Derek was one of the two hundred competitors who flew out from London Airport aboard the British Airways Boeing 747 on its twenty nine hour journey to Christchurch via Bahrain, Singapore, and Melbourne.

Arriving at 0500 hours local time the team were surprised to find a large gathering of Maoris waiting to welcome them at such an early hour of the morning. After a welcoming ceremony they were transported to the accommodation complex where athletes from the competing Countries were housed in the University of Canterbury. Excellent facilities for pre-warm up training were available, even to the extent of indoor grass tracks, catering arrangements were

Technical Jargon

"REAL TIME". A computer may be employed in applications, such as controlling an individual process, or answering enquiries in a seat reservations system. The results provided by the computer have to be available in time to be useful in the application. This is known as real time working.

"SIMULTANEITY CAPABILITY". The ability of the processor and one or more peripherals to carry out independent operations simultaneously.

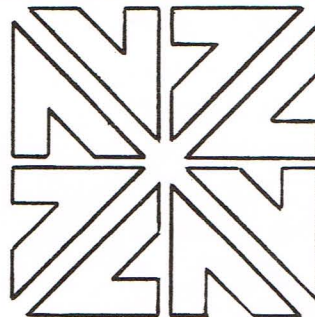
"COMMON TRUNK". A cable which carries data lines and control lines to and from peripherals. The same lines are connected to more than one peripheral.

"BATCH PROCESSING". A procedure where units of data are processed continuously in a pre-arranged sequence.

"LIVE REGISTER". A flip flop type register which stores a memory address.

"STATUS CHARACTER". A character transmitted to the processor to report the current state of a peripheral.

"CYCLE STEALING". A cycle is a single process in a computer operation. It requires several cycles for the processor to perform, for instance an ADD operation. If a peripheral requires service it will steal a cycle from the processor operation, then the processor continues.



first class and together with numerous beverages, were provided at no cost to the competitors.

The social outlets catered for everyone's tastes, both in and out of the camp, with many local residents inviting competitors to barbecues, various beach excursions and sheep shearing displays and contests

Derek, a member of the British team since 1972, would normally have participated in the Long Jump, however, recently he changed to

HELP!

To enable us to support reports sent to the factories of failure areas we request your assistance to ensure all defective parts removed from Guarantee machines of A/AMD, CRD, and VRC equipment be routed to Head Office for the attention of Fred Fowler, F.E.D. Superintendent.

The parts should be labelled and endorsed with the model and serial number of the machine, together with the date of installation if known.



In the previous issue we stressed the importance for clarity of the details on Repair Sheets. Albert Barden, our financial wizard, has requested your additional care in the Customers name and address area. Apparently, many thousands of pounds are lost annually because the names and addresses are incorrect, or insufficiently detailed. As we all benefit from the Division's profit I am sure we can look forward to your assistance in knocking this one on the head.



A limited number of Class 230 and 42 base boards are required by the Service Building. In the event you have these items in your Centre please telex Wally Smith, Estimating Department, 1000 for shipping instructions PRIOR to despatch.

sprint events and qualified to represent England in the 4x100 metres relay. The team successfully fought their way to the final but unfortunately did not reach the medal stakes, finishing sixth to Australia.

This in no way marred his enjoyment of the wonderful experience to compete at the Games, reaching a climax at the closing ceremony when the teams paraded before Her Majesty the Queen in any transport they could acquire, including bicycles, wheelbarrows, and even on the back of a human Guernsey cow. Farewell celebrations took place in the Christchurch Town Hall with six individual functions operating simultaneously in the two storey building, and definitely the time and place to relieve the pressures of the previous weeks.

Note: It is no good you writing to Derek offering to carry his bag on the next trip - The editor has reserved it.

Well Done

BURNLEY

Team effort certainly paid off in the Burnley area when an order for a Century 150 system was placed by the Marsden Building Society, Nelson, Lancs., after some twelve months negotiations.

Sales Representative, P.Kilmartin, informs us one of the key factors of the sale was the first class service which has been given by Frank Ellison's Class 500 Field Engineers, Ian Ormerod and Clive Cosgrif, who maintain the customer's two Class 500's currently in use.

The complimentary comments made "Dedicated and skilful manner in which the systems have been maintained" - are certainly a credit.

BONHILL STREET

Like all businesses located in the Inner London area, NCR have been faced with pressures and problems to maintain an efficient service to our customers. However, it was pleasing to receive a letter from the Principal of the National Westminster Bank Limited, Lothbury Office, expressing appreciation of the service provided during the past year by Field Engineers Doug Baker and Ralph Harding, who maintain the Banks 40/Class 450 Proof Encoders in the area.

We extend our sincere thanks and appreciation for the excellent work carried out.

lucky escape

Stan Kennedy, Superintendent, and Joe Dodds, Supervisor, Northern Area certainly had a very lucky escape when their car was involved in an accident recently.

Whilst waiting at traffic lights in Hebden Bridge, Joe's car was hit in the rear and rammed forward onto the car in front. The impact fractured their petrol tank and the car burst into flames. Luckily both were able to scramble clear, and although shocked neither were injured. Apart from the car being a write-off the other loss was a pair of Stan's socks, which melted on him in the intense heat.

Suggestion Awards

BILL FEATHERSTONE, Manager, Field Engineering Centre, Lancaster. Awarded £160 for his idea to improve the performance of the Class 410 Change Dispenser. Bill was concerned with the number of SC101 Dispenser Holding Switches being replaced. His suggestion has resulted in the Manufacturing Company in Bulach adopting a new style micro switch and bracket assembly, and are now incorporated in all new dispensers.

Note: The assembly is interchangeable with old style switches and will shortly be available from the Repair Parts Stores. Part numbers are shown in the International Circular letter 030-023-1973 recently issued to the field.

JACK RIPPER, Assistant Manager, Depot Costing, has certainly had his thinking cap on during recent months by achieving three successful suggestion awards.

Faced with the problem of placing a quart into a pint pot due to present staff shortages Jack set about streamlining various duties his department carry out. Together with Mel Flood the recording of car/van mileages, running costs, etc. were updated and are now itemised on a control card for each vehicle. An award of £10 was shared between them.

Idea number two was to update the Bulletin of machine movements in and out of Depots to provide more information for Supervision. An award of £5 was made.

Finally, his third suggestion concerns tighter control of movements for A/AMD Commercial equipment. Details were given, in a recent Circular letter, of procedure that centres should implement. A further £5 was awarded.

F E D Appointments

MR. M.CLANCY, Appointed to head up the new Service Parts and Distribution Centre, Dundee.

Mike joined NCR Glasgow as a Junior Technician in May 1940. In 1942 he was called into the R.A.F. serving in the Middle and Far East. On his return to NCR he was trained on A/AMD equipment. In November 1960 he was promoted to Depot Manager at Glasgow and further promotion to Area Supervisor Scotland in June 1970.

MR. R.S.BROADWAY, Appointed Area Supervisor, Field Engineering Scottish Area.

Ron joined NCR as a Technician at Head Office in 1948 covering the East London territory. In 1950 he transferred to York Depot providing service to the Selby, Harrogate and Scarborough areas. He was promoted to Depot Manager, Canterbury in 1962 where for the past 12 years has operated a very successful Service Depot in the South East of England.

MRS. H.QUELCH, Appointed Section Head, CRD Maint. Records Dept.

Helen joined the Department in 1972 covering various clerical duties until her present promotion. The Section is responsible for the majority of Northern England and Welsh Service Centres.

MRS. N.JAMES, Appointed Section Head, CRD Maint. Records Dept.

Nellie started as a temporary Clerk during the Decimal period, and took up a permanent position in Maint. Records in 1971. Of recent she has been assistant to Joe Collega. The section covers the Scottish Area Centres.

We offer our congratulations to them in their new appointments.

Class

7 2

We have been advised by Dayton that it would not be economical to prepare and publish a Class 72 Parts Catalogue in view of the limited number of machines sold in the International Field.

However, to alleviate problems when ordering replacement parts we have issued copies of Drawings to those Field Engineering Centres where the density is greatest. These are:

BELFAST BIRMINGHAM BRENT

BRIGHTON	BRISTOL	CARDIFF
COVENTRY	CROYDON	DUBLIN
GLASGOW	GREENFORD	HULL
IPSWICH	LEEDS	LIVERPOOL
MAIDSTONE	MANCHESTER	NEWCASTLE
PETERBOROUGH	PLYMOUTH	ROMFORD
SHEFFIELD	STOKE	BONHILL ST.

Two copies are held in Service Building 1000.

For those not listed we suggest they contact the nearest Centre in the area for required info.