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FEDERAL INSTITUTE OF INDUSTRIAL RESEARCH
OSHODI, LAGOS

SI/NIR/93/801

FEDERAL REPUBLIC OF NIGERIA

Technical report: First mission in computer maintenance and repair*

Prepared for the Government of Nigeria
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of Günter Fischler,
consultant in computer maintenance and repair

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United Nations Industrial Development Organization
Vienna

* This document has not been edited.

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Explanatory Notes

Value of the local currency "NAIRA"

1 US \$ = 47 NAIRA (February 1994)

Abbreviations

CTA	Chief Technical Adviser
DTP	Desktop publishing
FD	Floppy Disk
FIIRO	Federal Institute of Industrial Research Oshodi
HD	Hard Disk
I/O	Input/Output
kB	Kilobyte
LCD	Liquid Crystal Display
MB	Megabyte
PC	Personal Computer ⁷
RAM	Random Access Memory
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
UPS	Uninterruptable Power Supply

ABSTRACT

Fischler Günter, Consultant in Computer Maintenance and Repair

Project title : High Level Advisory Mission to Federal Institute of Industrial
Research Oshodi, Lagos

Project number : SI/NIR/93/801

This report presents results of the first mission undertaken by the Consultant over the period 31/01 - 08/02 1994, to the Federal Institute of Industrial Research Oshodi (FIIRO). in Lagos.

The main tasks of the mission were:

To specify the equipment required for testing, repairing and training purposes

As a result of the mission it is recommended, among others :

- (a) Renovation of locality and cabling structure (220V), as well as creation of a workspace for the mentioned technician.
- (b) Absorption of knowledge respectively training on the current state of technic and measurement devices.

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Introduction

The consultant was attached to the Federal Institute of Industrial Research Oshodi (FIIRO).in Lagos-Nigeria. The mission lasted from January 31 through February 8 1994.

The main tasks of the mission were:

- a: Prepare a list of computer spare part to be purchased
- b: Specify testing and measuring equipment
- c: Specify training programme and in cooperation with the national counterpart nominate FIIRO specialists for study tours.

CONCLUSIONS AND RECOMMENDATIONS

The FIIRO computers are based on an outdated system. The latest DTP system cannot be used on it. The investment for a new single machine, at least 486 systems. includes a considerable extension of spare parts to guarantee an operating system for at least three to five years. Spare parts would be needed for the old as well as for the new system. The damaged systems are part of the first and second generation (Type XT 8088 and AT 286/12). Computer technology at the moment is out of the fifth generation (Type 586).

To replace the old systems by the more powerful and rather cheap 486 DX systems is not only functional but necessary. The logical consequence - the damaged old systems will serve as a source of spare parts for the old, still functioning system. Further it is recommended to buy a fourth complete system, as a source of spare parts. (The complete system is cheaper then single spare parts and, very important, the trader does not provide garantee for the single parts, but does for the kit!)

A simmlar problem was indentified with FIIRO's PC network infrastructure. The used network cabling system is very susceptible to trouble and all network cards are malfunctioning. A less sensitive cabling system and corresponding network cards, such

as ETHERNET, products of an up-to-date technology - will guarantee a save functioning as well as protection of the network cards (e.g. voltage peaks).

It is not recommended to repair the laserprinter Type Epson GQ3500. Too many parts cannot be exchanged (Drum- and Collectorunit and Toner) In view of this the purchase of a new laser printer is justified. In this case recommended are new Hewlet Packard Printers (HP 4/L). Their service life is about two to three times longer then those of the other products (Collector- and Drum Unit); they are also more robust and easier to operate. (To replace the old machines three of those new printers have already been ordered. Any additional printers are not necessary.)

For service and maintenance problems, an Oscilloscope would be of an advantage. Due to the bad power supply (220V) based on large voltage fluctuations, and the low technical demand on the measuring device, it would be, however, sufficient and functional to purchase simple battery - powered Multimeter with integrated Oscilloscope (LCD Display).

In agreement with FIRO experts, it would be preferred to install the "ALDUS PAGEMAKER" (based on Windows System) for the DTP user. The necessary base program "Windows for Workgroups" for the DTP software "ALDUS PAGEMAKER", includes a supplementary advantage as it allows the creation of a Peer to Peer Net. The operating system of the company Digital Research "DR-DOS" starting with version 7, enables the integration of the less powerful old PC's. The Package includes the network software "NOVELL LIGHT".

Missing at the moment is a service place for the technician to guarantee the functioning and especially the maintenance of the PC's.

Humidity, dust highly influence the functioning of the PC's and often cause their damage. It is unavoidable to adapt the working space in order to make it suitable for the operation of computers (renovation of working spaces! wet- or vacuumcleaning!, feather dusting is not sufficient.) In addition to a renovation it would be recommended to improve the electric infrastructure (cabling system) not only for the take of clarity but mainly to divide stabilized and unstabilized electric current

I. ACTIVITIES

- Checking of spare part list with FIRO technician Mr Lampejo (Respecting the demands indicated by FIRO)
- Assessment of the knowledge of nominated technicians in view of the training demands (1 Technician and 1 DTP user).
- Review of the training programme

II. OUTPUT

- List of computer hardware to be purchased (see Annex 3)
- Elaborated and updated training programme :
- In cooperation with the FIRO management the following staff members have been identified and nominated for the training :
Mr AKINRINMABE Somers Frederick,
Mr LAMPEJO Samuel and
Mr SUNMONU Olatunde)
- Offer of a computer hardware from a Nigerian vendor has been obtained.

Annex 1. Persons Contacted

EIRO

ENGR. S. C. O. ONYEKWELU

Assistant Director

R. O. SODIPE

UNDP

A. DALLALAH
Floris L. MERISON

Programme Officer
Programme Officer

Computer Vendor

RESOURCERY LTD
Victoria Island LAGOS/NIGERIA

Annex 2. Training Programme

It is recommended to handle the training programme for computer and DTP specialists partly in common and partly divided. Some of the basic problems are of essential interest for both of them.

1st Part - Common for both specialists :

General information about Network topologies & Systems
(special ETHERNET IPX/NETX),
basic information about Computer parts such as Displays, scanners, printers,
controllers, memory and so on,
installing operating system (DOS 6.x),
memory drivers (HIMEM, EMM386), HD caching, "DOUBLESPEACE",
Installing "Windows for Workgroups" (network)
Introduction in the network system (access rights, device sharing)

2nd Part - DTP specialist :

"ALDUS PAGEMAKER" for Windows (last Version)

2nd Part - Computer specialist :

reading original circuit diagrams
setup procedure at 486 systems (NEAT CHIP SETUP)
hardware development of add-on cards
I/O - devices
video cards : systems, programming, character-sets,
memory occupation under DOS
HD, FD : types, controllers...
POWER SUPPLIES
wave shape and timing measurement (Oscilloscope)
ETHERNET IPX/NETX system : characteristics, cabling systems ...
DRIVERS : network, windows; installing, possible problems, conflicts ...

Proposed duration of training : 3-4 weeks (2-3 weeks for the 2nd Part)

Proposed country of training : Austria (Vienna)

Language : English

Annex 3. Spare parts and tools needed to upgrade computer units

- 4 x PC 486/33 DX Desktop or Minitower case with one free 5¼" bay
 - 8 MB RAM
 - 300 MB Harddisk
 - 3½" (1,44 MB) FD
 - VGA 1024x768
 - MOUSE (serial preferred)
 - VGA Color Monitor 1024x768 14" or 15"
 - Keyboard (engl)
- 2 x Internal 250 MB Backup Tape 5¼", QIC 80
- 20 x Tape Cartridge 250MB QIC 80
- 3 x HP 4/L Laserprinter
- 2 x Hand-Scanner (Software included)

- 10 x PC AT/XT Ethernet Card (8 Bit, Novell 3.x compatible, RJ45)
- 10 x T-Adaptor (male/2x female) - Ethernet
- 10 x Wall unit (crimp version) - 2x RG58 50 Ohm - wall side mounted
- 4 x Termination plug 50 Ohm
- 40 x BNC plug, crimpversion for cable (50 Ohm)
- 1 x 300m Thin Ethernet-coax cable Impedance 50 Ohm
- 1 x Cable Stripper for coax with different diameters & Substitute cutter
- 1 x Hand Crimping tool for BNC connectors (RG58)

- 1 x Multimeter with integrated LCD-Oscilloscope, 20 or 50 MHz
(e.g Philips - PM95 Scopemeter & RS 232 Interface & Probes(IC Adaptor))
- 2 x Vacuum Cleaner (for Computers)
- 10 x spare bags for Vacuum Cleaner
- 2 x Vice for soldering works
- 2 x Drilling Machine
- 4 x Drill-set for iron (1mm - 10mm)

- 10 x Printheads Type EPSON LQ850/LQ1050 (24 nails)
- 2 x HD for TOSHIBA LAPTOP T1200
Modell : PA70448E (HD Type : JD3824RROT1)
- 2 x FD for TOSHIBA LAPTOP T1200 (3½" 720kB)
- 2 x Drum unit for HP4/L
- 2 x Collector unit for HP4/L
- 10 x Toner for HP4/L
- 6 x Sets of UPS-Batteries : TOPAZ POWERSONIC PS/2280 QTY2
type Lead acid, maintenance free, 24V nominal (12V each).

- 1 x Microsoft DOS 6.2 (engl)
- 1 x Windows for Workgroups 3.11 (engl)
- 1 x ALDUS PAGEMAKER for Windows (engl) - last version
- 1 x DBASE iV (engl)
- 1 x Norton Commander IV (engl)
- 1 x Norton Utilities VI (or later version) (engl)
- 1 x PC-Commute ("PC Tools Ver 7.0") (engl)

Annex 4. Terms of Reference

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

JOB DESCRIPTION

Post title : Consultant in Computer Maintenance and Repair

Duration : 1.5 m/m (in two missions: 0.3 m/m and 1.2 m/m)

Date required : As soon as possible

Duty station : Lagos/Nigeria

Purpose of project : High-level advisory assistance to FIIRO in maintenance and repair of microcomputers and peripheral equipment, particularly on the component level, on "chip level" and in DTP.

Duties : The consultant will be attached to the Industrial Information Centre of FIIRO. His work will be co-ordinated by the Head of the Centre. The consultant will be expected:

1. To specify the equipment required for testing, repairing and training purposes.
2. To organize on-the-job training in maintenance and repair of microcomputers and peripherals, and in DTP.

The training will cover the following topics :

- reading original circuit diagrams/IC;
- neat sets (special setups)
- hardware development of add-on cards PC/AT (design)
- wave shape and timing measurement
- power supply
- hardware programming from add-on cards (VGA, EGA ...)
- hard disc controllers/floppy disc controllers
- character set programming.

The expert will also be expected to prepare a final report, setting out the findings of his mission and his recommendations to the FIIRO on further action which might be taken.

Qualifications: University degree or its equivalent in electrical engineering, with considerable experience in maintenance and repairs of microcomputers.

Language: English

**Background
Information**

Under the project DP/NIR/83/021 UNIDO has provided to the Federal Institute of Industrial Research (FIIRO) technical assistance. A considerable part of this assistance consisted of computer hardware and software. To enable the FIIRO to build up a self-reliance in maintaining and repairing the computer hardware, the training of three FIIRO technicians by a computer company in Austria was financed from the project. After this training it became apparent that an additional training of 2 - 3 Weeks on a "chip level" would be required.

**List of companies able to provide the necessary
training and equipment**

Training College :

SPC Computer Training Ges.m.b.H.
A-1190 WIEN, Nussdorfer Platz 8
Tel : 0222/371514 Fax : 0222/375034

ZEMA - Soft Handelsgesellschaft m. b. H.
Kirchengasse 1
A-1070 WIEN/Austria
Tel : 0222/961519 Fax : 0222/961521

Parts & elements

Network parts & cabeling systems :
ASSMANN Electronic GmbH
Innerhoferstr. 2
A-8045 GRAZ/AUSTRIA
Tel : 0316/693914-11 Fax : 0316/691309

HEWLETT PACKARD Ges.m.b.H.
Lieblgasse 1
P.O. Box 72
A-1222 WIEN/AUSTRIA
Tel : 0222/2500-0

Oscilloscopes
RS Components GesmbH
Schlossparkgasse 3, P.O. Box 79,
A-3950 Gmünd/Austria
Tel. : 02852/505 Fax : 02852/53223