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COMPUTER SOFTWARE DOCUMENTATION

ATA 102 USER'S GUIDE

1st ISSUE NOV. 1984

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ALLEMAGNE - BELGIQUE - DANEMARK - ESPAGNE - FRANCE - ITALIE - PAYS-BAS - ROYAUME-UNI - SUÈDE

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1. - INTRODUCTION

1.1 - FOREWORD

This guide is issued at a time when software is starting to be widely used in airborne equipment. The experience of the authors of this guide is mainly based on knowledge gathered during development and certification phases. Therefore, the software documentation (and so this guide) may well be reworked in the light of future experience in the field of logistic support.

The terminology used here has not been standardized and may vary from one manufacturer to another.

1.2 - PURPOSE OF THE GUIDE

The purpose of this user's guide is to provide the necessary help to generate the software documentation by giving mainly :

- A recap on the basic notion of software,
- information, to those in charge, about the importance of this documentation,
- some clarification concerning the data to be provided to comply with ATA 102.

NOTE: The ATA 102-specification (Computer Software Manual) defines six levels for the software documentation. These six levels are not all necessary for a clear understanding. Only the first three are necessary, but require more detailed explanations. This is to be found in chapter 5 of the USER'S GUIDE.

The other three levels of ATA 102 form part of the documentation necessary for change to software. However additional information will also be necessary regarding tools, language, support software, technical certifications, etc. ...

1.3 - SOFTWARE DOCUMENTATION BASIS

The software documentation for the users is essentially derived from the data used to develop the software.

Those data are made following methods and rules which are standard state of the art for all software engineers, so readily understandable to all.

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The software documentation is complementary to the hardware documentation Component Maintenance Manual (CMM) and Aircraft Maintenance Manual (AMM) and where characteristics of software and hardware become closely entwined, suitable cross-references should exist.

This does not affect the requirement of the CMM to provide descriptive material for shop trouble-shooting, repair and test, nor preempt replacement of the requirement of the AMM to provide line maintenance information for returning malfunctioning aircraft systems to normal operation.



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2. - NOTION OF SOFTWARE

2.1 - BASIC NOTIONS RÉCAP (Fig. 2-1)

Software

It is a set of instructions to be performed by the equipment in a predetermined sequence.

These instructions are first formulated by man and written in an intelligible language: the source language.

This source language is understandable by a specialist but is not suitable for execution by a machine (computer).

To be used in the equipment this source software must be converted into an executable code, or object code, to become object software.

Two types of software can be defined: associated software and embedded software.

Associated Software

The software is called "Associated Software" when it is supplied on a specific data processing medium (card or magnetic disk, diskette, etc. ...). To be used, it has to be loaded into the computer. Management programs are examples of associated software.

Embedded Software

The software is called "Embedded Software" when it is supplied as an integral part of the hardware (known as programmed memories) into which it has been loaded. Identification and description rules for embedded software must be coherent with those concerning identification and description of the corresponding hardware. Most of the airborne computer-based equipment incorporates embedded software.

2.2 - SOFTWARE DESIGN (Fig. 2-2)

Organization

To facilitate its design the source software is broken down into small single elements which are individually converted into object code through Electronic Data Processing (E.D.P.) means.

These single elements are then linked together to form sequences of instructions executable by the airborne computer-based equipment.

Source Software

The software development process is conducted through successive steps:

- Establishment of the objectives to be met by the equipment software from the equipment specification document;
- Analysis of the function requirements in order to establish a functional specification defining the equipment functions which have to be accomplished in the software (software requirements).

Each major function is associated with an independent software entity known as Application Software.

A line-replaceable unit may contain one or several application softwares.

The specification of software objectives written for each application software give way to functional specifications. These latter give the breakdown of the function ensured by the application software into sub-functions and/or tasks performed by small, single, mutually exclusive software elements and known as a software functional unit.

Each functional unit of software has, with the detailed analysis of its specification, a design specification containing all the information required for the development of each software module independently of the other modules.

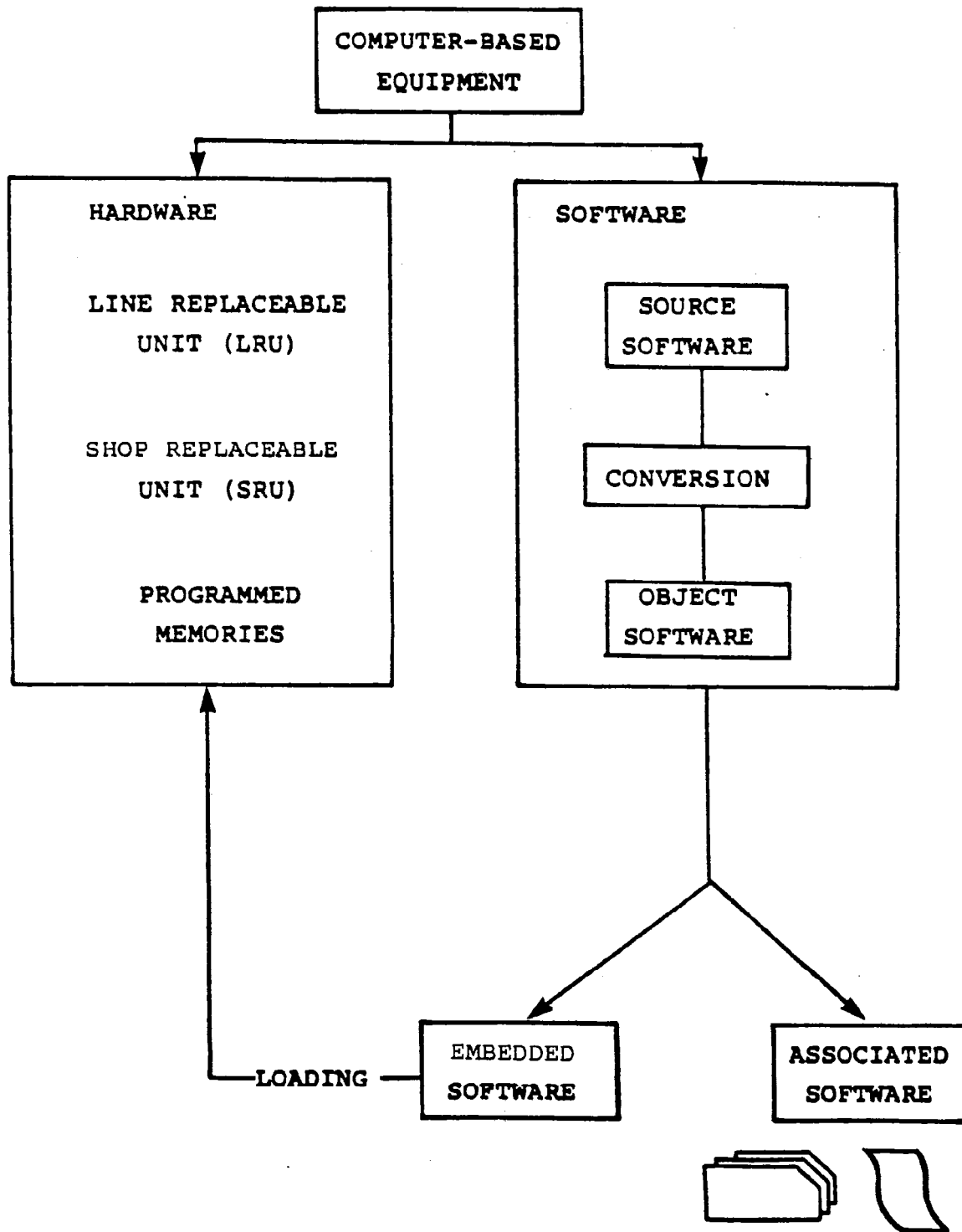
On the basis of these design specifications, each software module provides instructions expressed in source language. This is performed by the programming activity.

Finally, the source software is built as a set of software modules.

Object Software

In order to be used by the hardware, the source software must be transformed into object software. This transformation, using E.D.P. tools, is known as compilation or assemblage.

The translation is performed at the level of the software module.

B A S I C N O T I O N S

Basic Notions
Fig. 2.1