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ITU-T

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TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

MAN-MACHINE LANGUAGE

INTRODUCTION TO THE CCITT
MAN-MACHINE LANGUAGE

ITU-T Recommendation Z.301

(Extract from the *Blue Book*)

NOTES

1   ITU-T Recommendation Z.301 was published in Fascicle X.7 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2   In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation Z.301

INTRODUCTION TO THE CCITT MAN-MACHINE LANGUAGE

1   Field of application

The man-machine language (CCITT MML) can be used to facilitate operation and maintenance functions of Stored Program Control SPC systems of different types. Depending upon national requirements, CCITT MML can also be used to facilitate installation and acceptance testing of such systems.

In many cases, SPC systems will be supported by auxiliary systems, e.g., in operation and maintenance centres and/or centres for other purposes such as sales, subscribers' complaints, etc., to carry out functions in cooperation with the SPC system. Different types of communication may be required for this cooperation. To clarify where the CCITT MML is intended to be used, a configuration is shown in Figure 1/Z.301 which illustrates the case of three separate systems. Local and remote man-machine terminals may be used. The configuration of systems in a network may vary, but this does not alter the principles governing the field of application of the MML.

The CCITT MML is intended to handle the functions required at the interface marked 1 while other methods may be required for the interface marked 2. Interface 2 is not considered. Since interface 1 is the interface of interest, it should be stressed that no assumptions are made concerning the physical location of any supporting software or whether, indeed, that software is entirely resident in any one place rather than distributed.

Although telephone signalling and switching has been considered the primary application area for the MML, these Recommendations accommodate the extension of the MML into other areas such as data switching, ISDN operations and maintenance, and software development environments.

In the Recommendations of this Part, the term *man* is used in the sense of *user*, and the terms *machine* and *system* are used interchangeably.

2   Man-machine communication model

Man-machine communication, the means of exchanging information between users and systems, can be represented by a layered model in which each layer defines features that support such communication. In their entirety, these features offer users an appropriate man- machine interface. The model is shown in Figure 2/Z.301 where higher layers are based upon features offered by the lower layers. The man-machine interface, for any given system, represented by the highest layer of the model, is based on the repertoire of inputs, outputs, special actions and man-machine interaction mechanisms, including dialogue procedures made available by the layers below.

These features are, in turn, supported by the lower layers in which the semantics associated with each MML function (actions, objects, information entities and their interrelationships) and the MML syntax are defined. The lowest layer of the model is identified in the set of system functions to be controlled and in the capabilities available in the man-machine terminals connected to the system.
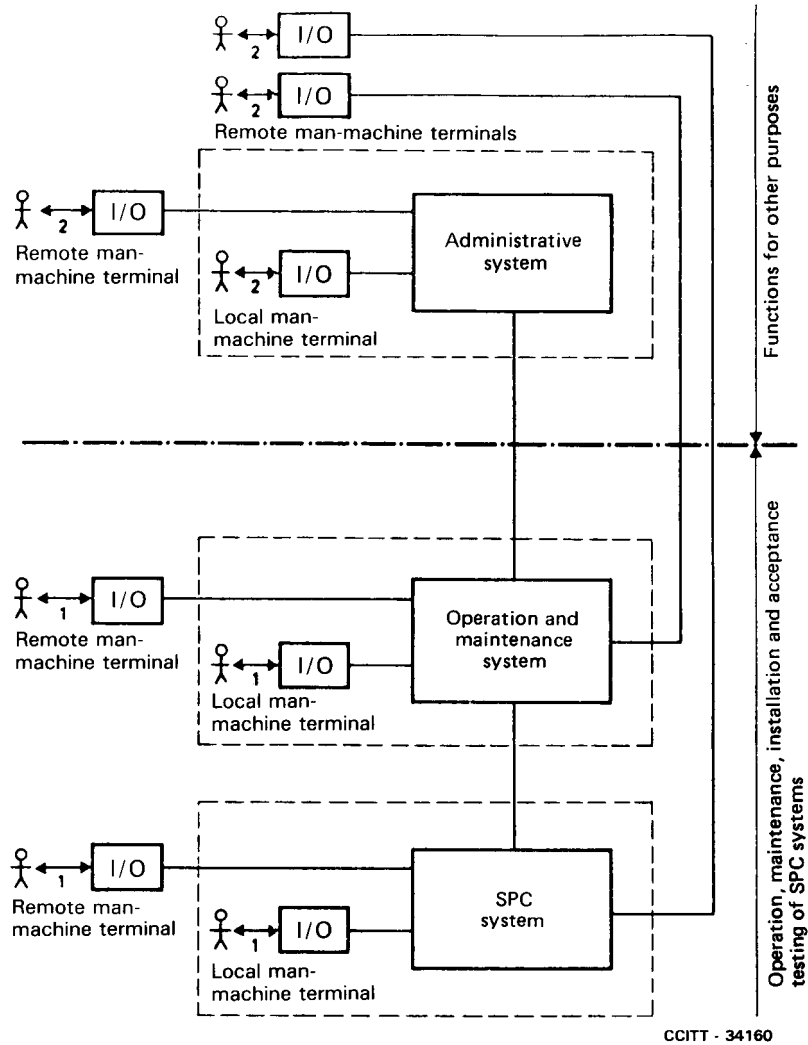
1   Man-machine terminals where CCITT MML is recommended to be used.
2   Man-machine terminals where the use of CCITT MML is not considered.
I/O   Input/output.

FIGURE 1/Z.301

Field of application of CCITT MML

Man-machine interface	
Inputs, outputs, special actions	Man-machine interaction mechanisms, including dialogue procedures
MML function semantics	MML syntax
System functions	Terminal capabilities

FIGURE 2/Z.301

Man-machine communication model

3   Organization of the MML Recommendations

The Recommendations on man-machine language are grouped in five sections:

1   General principles

2   Basic syntax and dialogue procedures

3   Extended MML for visual display terminals

4   Specification of the man-machine interface

5   Glossary of terms.

Section 1 gives an introduction to man-machine communication by the CCITT MML and contains information of a general nature. *Section 2* deals with syntax and dialogue procedures for terminals where no advantage is taken or can be taken of enhanced input and output facilities which are usually available on visual display terminals (VDTs). *Section 3* describes capabilities of VDTs and kinds of dialogue elements suitable for conveying the syntax of any application, including the syntax specified in Section 1, which can be applied to the operation and maintenance of SPC systems. As terminal technology advances and the theory of the man-machine interface evolves, greatly improved interfaces are possible. On the other hand, basic terminals will remain in use. Therefore this section provides a framework that accommodates interfaces possible on more sophisticated terminals and at the same time ensures that syntactic details presented at both sophisticated and basic terminals in a given application are consistent. *Section 4* identifies operation, maintenance, installation and acceptance testing functions to be controlled by the MML. A methodology is defined by which the semantics relating to MML functions may be generated and by which the inputs, outputs and special actions may be specified; specific Recommendations on Subscriber Administration, Routing Administration, Traffic Measurements Administration, and Network Management Administration are included. *Section 5* contains a summary of the terms used in Sections 1 to 4 together with short definitions to aid the reader seeking an explanation of a term.

4   Organization of Section 1

Section 1 consists of two Recommendations:

Z.301   Introduction to the CCITT man-machine language

Z.302   The meta-language for describing MML syntax and dialogue procedures.

Recommendation Z.302 enables the reader to interpret the diagrams used to specify MML syntax and dialogue procedures in Sections 2 and 3.

5   Basis of MML

The MML contains features which are sufficient to ensure that all relevant functions for the operation, maintenance, installation and acceptance testing of SPC systems can be performed.

The basic attributes of the language are summarized in the following:

a)   The MML provides a consistent interface which is easy to learn and easy to use by novices as well as by experts, making possible the input of commands and the interpretation of outputs in a way convenient to all users.

b)   The MML is flexible, allowing system design to be optimized according to the tasks to be performed. It offers a variety of input/output features including direct input, menus and forms.

c)   The MML is adaptable to different kinds of personnel and to different national languages and organizational requirements.

d)   The MML is structured to allow graceful incorporation of new technology.

The MML should be sufficiently flexible to meet Administrations' requirements for the organization of their operation and maintenance staff and for the security of their SPC systems; it should not restrict their selection of terminal types. The MML covers the man-machine interface including those functions that are initiated by the system and those that are initiated by the user. It should be implemented in such a way that errors in commands or control actions will not cause the system to stop, unduly alter the system configuration or take up undue resources.

6   Input/output

As indicated in Figure 1/Z.301, the interface being recommended is that between the user and an I/O device or devices. These devices must at least be capable of handling the code of the characters of the CCITT International Alphabet No. 5 both for input and for visual textual output to the user. Input will normally be from a keyboard device, but for bulk input of data and/or commands, some temporary storage medium such as paper tape, cassette, disc, etc., could be used. For output, a variety of device types is possible, including paper tape punches, teletypewriters, line printers, visual display terminals, etc.

7   Extensibility and sub-setting

The MML has an open-ended structure such that the addition of any new function or requirement will have no influence on the existing ones.

The language structure is such that sub-sets can be created. Sub-setting may be for various purposes, e.g., staff sub-sets, in which selection is done to meet the needs of certain sections of staff; application sub-sets, in which selection is made for convenience of application, etc.