

1. INTRODUCTION

THE DIAGNOSTIC SYSTEM IS A SET OF:

- COMPONENTS
- PROCEDURES
- MEDIAS
- DOCUMENTATION

TO ALLOW THE FAILURES DETECTION AND LOCALIZATION OF THE WHOLE SGM2 SYSTEM.

THE DIAGNOSTIC SYSTEM FUNCTIONALITIES MUST ALLOW TO REACH THE MAINTAINABILITY OBJECTIVES.

MOREOVER, THE DIAGNOSTIC SYSTEM IS USED IN MFG FOR THE FINAL TEST OF THE SYSTEM BEFORE THEIR SHIPMENT, AND IN THE REPAIR-CENTERS AFTER THE REPAIRING PHASE.

2. OBJECTIVES

2.1 MAINTAINABILITY OBJECTIVES

THE SGM2 SYSTEM MUST BE:

- DESIGNED
- PRODUCED
- SHIPPED
- ASSEMBLED

IN ORDER TO BE MAINTAINED BY END USER.

TAKING IN ACCOUNT THE CHARACTERISTICS OF THE SYSTEM, NO SPECIFIC ELECTRO-MECHANICAL KNOW-HOW IS REQUIRED TO PERFORM DIAGNOSIS AND REPAIRING BY END USER.

THE DIAGNOSTIC SYSTEM IS DESIGNED IN ORDER TO ALLOW AS FOLLOWS:

- TO SOLVE THE PROBLEMS BY ONESELF END USER, FOR 90% OF CASES
- TO SOLVE THE PROBLEMS BY END USER WITH PHONE HELP BY TECHNICAL ASSISTANCE CENTER, FOR 9% OF CASES
- TO SOLVE THE PROBLEMS BY LOCAL ^{C S D} (D.A.C.) INTERVENTION, FOR 1% OF CASES

THE SGM2 SYSTEM IS COMPOSED BY MODULES, CONNECTABLE BETWEEN THEMSELVES, NAMED CRU'S (CUSTOMER REPLACEABLE UNITS); THEY HAVE THE FOLLOWING CHARACTERISTICS:

- THE FAILURE INTO THE SYSTEM MUST BE LOCALIZED AT CRU LEVEL BY DIAGNOSTIC SYSTEM
- THE CRU'S MUST BE SUBSTITUTED BY END USER BY MEANS VERY SIMPLE TOOLS

2.2 DIAGNOSTIC SYSTEM OBJECTIVES

THEY ARE AS FOLLOWS:

- VERY EASY TO USE

A SYSTEM TESTING GUIDE IS NECESSARY AND SUFFICIENT TO DIAGNOSE THE WHOLE SYSTEM AND TO LOCALIZE THE FAILED CRU

- SHORT TIME TO EXECUTE DIAGNOSIS AND TO SUBSTITUTE THE FAILED CRU

NORMALLY FEW MINUTES, MAXIMUM HALF HOUR

- HIGH COMPREHENSIVENESS

FAILURE ISOLATION, AS PERCENTAGE OF TOTAL DETECTED FAILURES

. SINGLE CRU 93% (*)

. DOUBLE CRU 97% (*)

(*) MEANINGFULL VALUES FOR:

- WHOLE BASIC CABINET
- WHOLE ADDITIONAL CABINET
- PERIPHERALS
- POWER SUPPLY

3. COMPONENTS OF T&D SYSTEM

THE T&D SYSTEM IS COMPOSED BY SEVERAL TYPES OF ITEMS:

- EPROM EACH CONTROLLER BOARD HAS AN EPROM CONTAINING DIAGNOSTIC ROUTINES, TO LOCALIZE BOARD FAILURES AT INITIALIZATION TIME.

- DISKETTE THERE ARE TWO TYPES OF DISKETTE:
 - DIAGX2 IT CONTAINS STAND-ALONE MONITOR AND ALL THE DIAGNOSTIC PROCESSES RUNNING UNDER ITS CONTROL

 - DD2WRK IT'S A WORK MEDIA USED BY DIAGNOSTIC PROCESSES UNDER STANDARD OPERATING SYSTEM

- DISK FILES ON SYSTEM DISK THERE ARE RESERVED FILES TO CONTAIN DIAGNOSTIC MONITOR UNDER O.S., AND ALL THE DIAGNOSTIC PROCESSES RUNNING UNDER ITS CONTROL.

- DOCUMENTS THE FOLLOWING DOCUMENTS ARE AVAILABLE:
 - A78139167 EPS / DIAGNOSTIC SYSTEM
 - A78139169 DIAGNOSTIC MANUAL
 - A78138958 SYSTEM TESTING GUIDE
 - A78138954 GUIDA ALLA DIAGNOSI DEL SISTEMA

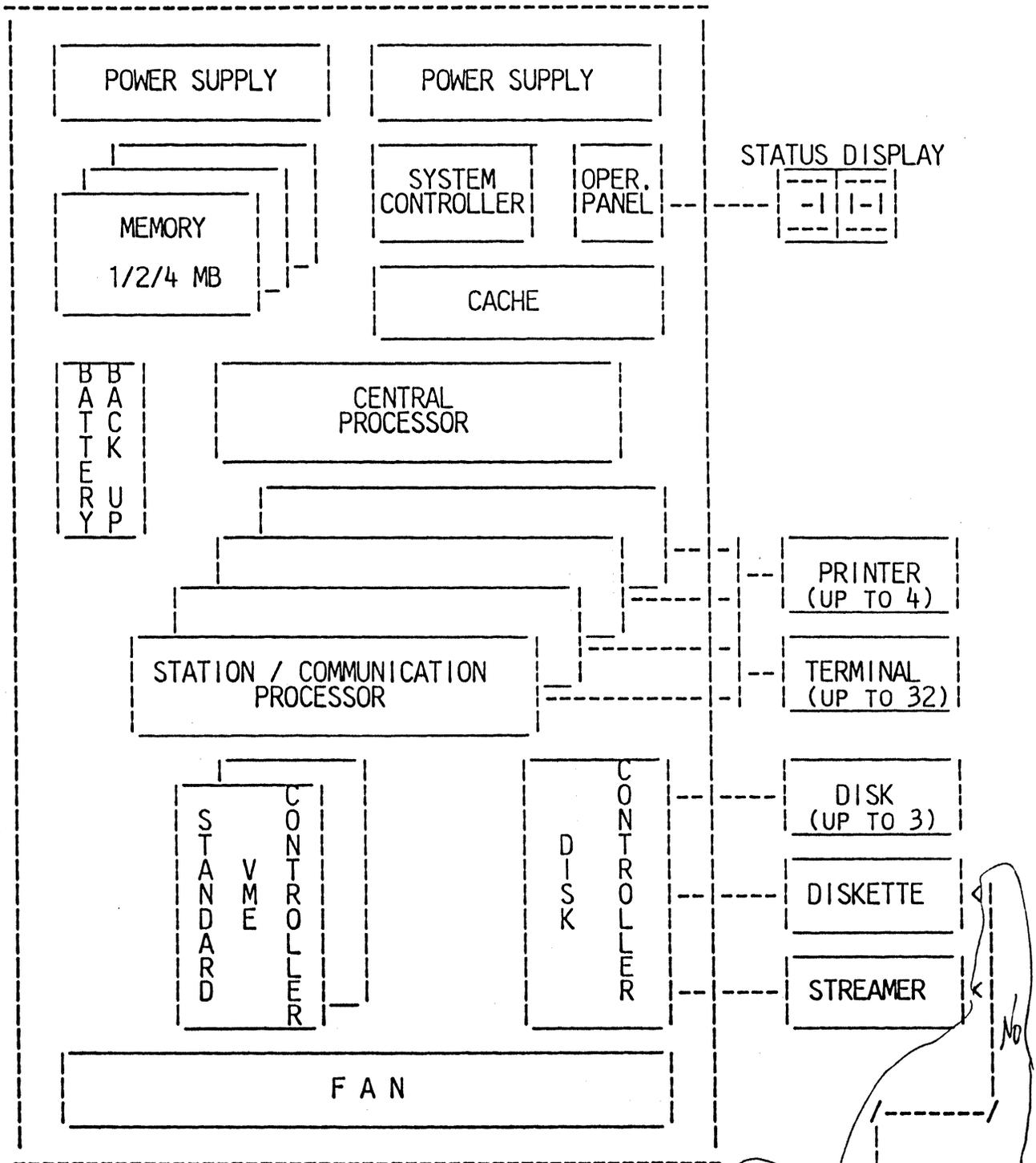
4. HARDWARE DESCRIPTION OF THE SYSTEM

4.1 SYSTEM CRU's LIST

THE FOLLOWING ARE CRU INTO SGM2 SYSTEM:

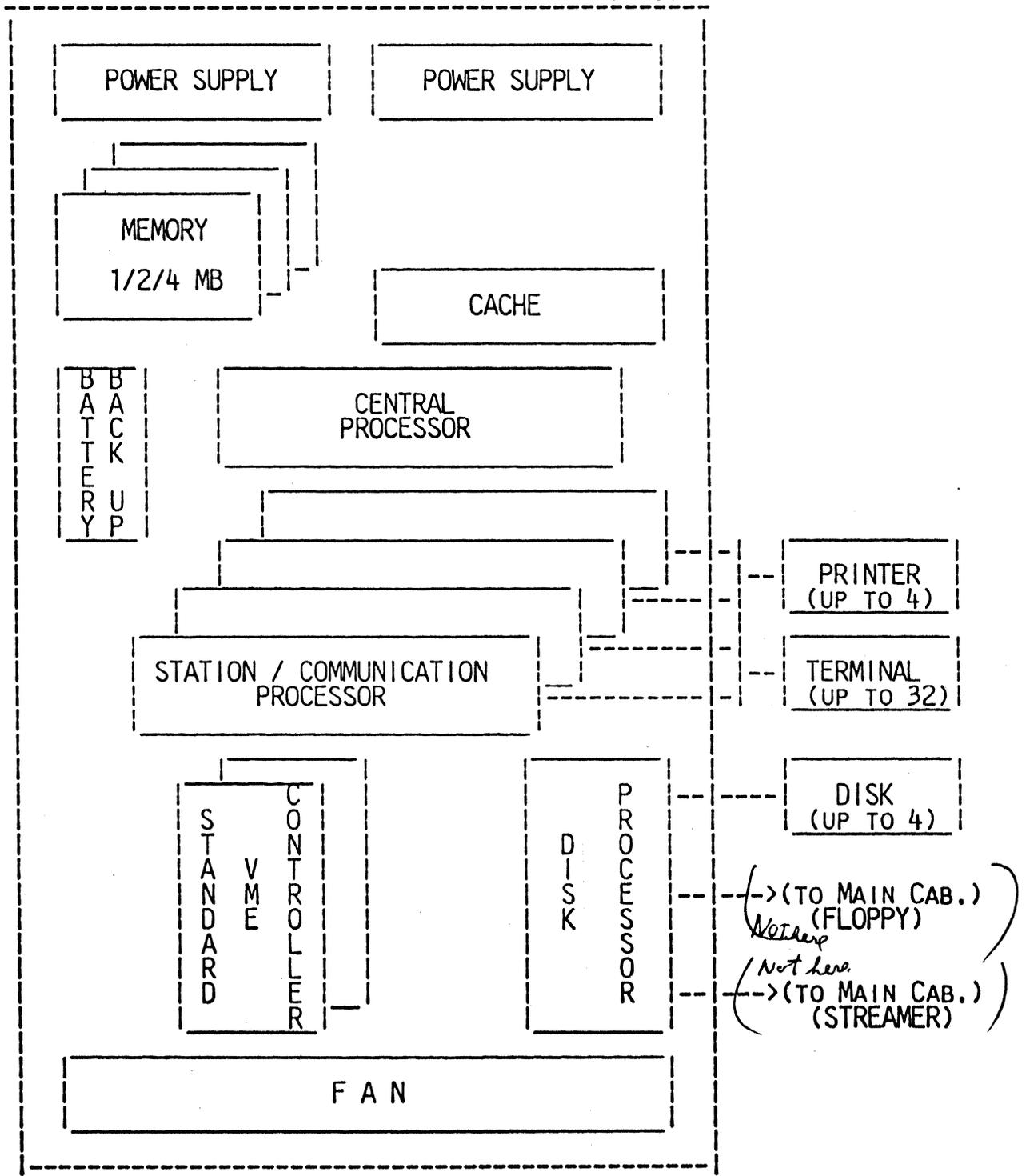
- POWER SUPPLY
- BATTERY BACK UP
- FAN
- OPERATOR PANEL
- MEMORY BOARD
- SYSTEM CONTROLLER BOARD
- CACHE BOARD
- CENTRAL PROCESSOR BOARD
- STATION PROCESSOR BOARD
- LINE PROCESSOR BOARD
- DISK CONTROLLER BOARD
- DISK PROCESSOR BOARD
- STANDARD VME CONTROLLER BOARD
- PRINTER DEVICE
- TERMINAL DEVICE
- DISK DEVICE
- DISKETTE DEVICE
- STREAMER DEVICE

4.2 SGM2 MAIN CABINET BY DIAGNOSTIC SYSTEM POINT OF VIEW (CRU'S)



MAIN CABINET

4.3 SGM2 ADDITIONAL CAB. BY DIAGNOSTIC SYSTEM POINT OF VIEW (CRU'S)



ADDITIONAL CABINET

5. APPROACH

THE APPROACH IS BASED UPON SOME BASIC SOLUTIONS, BEHIND DESCRIBED, HAVING THE PURPOSE TO REACH THE REQUIRED OBJECTIVES.

- BIG QUANTITY AND QUALITY OF DIAGNOSTIC RESIDENT CODE, ABLE TO REACH HIGH VALUES OF DETECTION/LOCALIZATION, FOR CONTROLLER BOARDS

- THE DIAGNOSIS IS POSSIBLE EITHER FROM DISK OR DISKETTE, IN ORDER TO SEPARATE BOARDS/DISK/DISKETTE FAILURES

- DIAGNOSTIC PROCESSES RESIDENT ONTO DISKETTE, EXECUTED IN STAND-ALONE ENVIRONMENT FOR SPECIFIC FUNCTIONS, WHEN THE OPERATING SYSTEM DOESN'T START AND NO ERROR INFO IS AVAILABLE

- DIAGNOSTIC PROCESSES RUNNING UNDER OPERATING SYSTEM CONTROL, NOT IN CONCURRENCE WITH USER PROCESSES (*), HAVING THE PURPOSE TO STIMULATE THE SYSTEM IN SUCH WAY AS MUCH SIMILAR AS THE REAL BEHAVIOR

(*) IT MEANS THAT THE FUNCTIONALITY TO LAUNCH IN USER CONCURRENCE IS POSSIBLE, BUT THE OPERATING RULES INDICATE THE NON-CONCURRENCE USAGE, IN ORDER TO BE OPENED TO FUTURE DEVELOPMENTS

6. DIAGNOSIS LEVELS

6.1 LEVEL 1 (START)

THIS LEVEL OF DIAGNOSTIC IS EXECUTED DURING EACH SYSTEM INITIALIZATION PHASE.

IT'S OF THREE DIFFERENT TYPES, THAT ARE:

- INTEGRATED

THE DIAGNOSIS IS EXECUTED BY FIRMWARE ROUTINES INTEGRATED INTO STANDARD VME CONTROLLERS

- RESIDENT

THE DIAGNOSIS IS EXECUTED BY SOFTWARE ROUTINES (ASSEMBLER 68000) RESIDENT INTO EPROM ON EACH PROPRIETARY CONTROLLER BOARD, BEFORE THE BOOTSTRAP PHASE

- TRANSIENT

THE DIAGNOSIS IS EXECUTED BY SOFTWARE ROUTINES (ASSEMBLER 68000) RESIDENT ON DIAGNOSTIC DISKETTE, AFTER THE BOOTSTRAP PHASE. THIS TYPE OF DIAGNOSIS IS EXECUTED ONLY IF THE BOOTSTRAP IS MADE FROM THE DIAGNOSTIC DISKETTE

6.1.1 INTEGRATED DIAGNOSTIC ROUTINES (IDR)

THESE ROUTINES (ALSO CALLED SELFTEST) ARE CODED INTO EACH STANDARD VMEBUS CONTROLLERS' EPROM. THEY CHECK INTEGRITY OF H/W CHIPS ON THE BOARD, AND SUPPLY AN ERROR CODE IF ANY FAILURE IS FOUND.

THE RESULTS OF IDR'S TESTS ARE COLLECTED BY DIAGNOSTIC STAND-ALONE PROCESSES, THAT CHECK IF ERRORS HAVE BEEN FOUND DURING TEST EXECUTION ON THE BOARD.

6.1.2 RESIDENT DIAGNOSTIC ROUTINES (RDR)

THESE SOFTWARE ROUTINES HAVE BEEN DEVELOPED IN ORDER TO DETECT FAILURES INTO EACH PROPRIETARY CONTROLLER BOARD (CP0-DC0-SP0-LP0).

THEY ARE EXECUTED EVERY TIME THE SYSTEM IS SWITCHED ON OR RESET, ARE CODED IN EPROM AND WRITTEN IN MOTOROLA ASSEMBLER 68000.

THE RDR RESULTS ARE COLLECTED BY DIAGNOSTIC STAND-ALONE MONITOR. IF ERRORS HAVE BEEN FOUND DURING RDR EXECUTION, AN ERROR CODE IS SEND TO DISPLAY, GIVING THE POSSIBILITY TO LOCALIZE THE FAULTY CRU.

6.1.3 BOOTSTRAP

IN DEVELOPING THIS BOOTSTRAP SEQUENCE, ALSO CONTROLLER AND DEVICE OPERABILITY HAS BEEN TAKE IN ACCOUNT.

BEFORE STARTING THE PHYSICAL I/O OPERATION ON THE DEVICE, SELFTEST COMMAND IS GIVEN TO CONTROLLER, IN ORDER TO ASSURE THE CORRECT FUNCTIONALITY OF IMDC COMPONENT.

BOOTSTRAPPING TAKES PLACE TRYING TO OPERATE ON THE DEVICES SELECTED IN THE FOLLOWING SEQUENCE:

- DISKETTE (DIAGNOSTIC OR STANDARD O.S.)
- HARD DISK 0 (STANDARD O.S.)
- :
- :
- HARD DISK 6 (STANDARD O.S.)

THE FOLLOWING COMMAND SEQUENCE IS EXECUTED ON THE SELECTED DEVICE, IN ORDER TO ASSURE ITS CORRECT OPERABILITY:

- RECALIBRATE
- SEEK TO CYLINDER
- READ (SECTOR 0 - HEAD 0 - CYLINDER 0)

THE CONTENTS OF THE LOADED SECTOR ARE TESTED BY MEANS OF A PATTERN CONTROL, TO DETECT WHETHER THEY REALLY BELONG TO AN OPERATING SYSTEM LOAD MODULE.

6.2 LEVEL 2 (DIAG)

THIS LEVEL OF DIAGNOSTIC IS EXECUTED BY MEANS OF INITIALIZATION FROM SYSTEM DISK, USING THE SINGLE PROCESS NAMED DIAG AS A STANDARD PROCESS.

DIAG IS A TEST UNDER O.S. DESIGNED TO EXERCISE CENTRAL H/W FUNCTIONALITIES, PERIPHERALS AND OPERATING SYSTEM KERNEL, AS A USER APPLICATION, BUT MORE EXACTLY AND CONTROLLED.

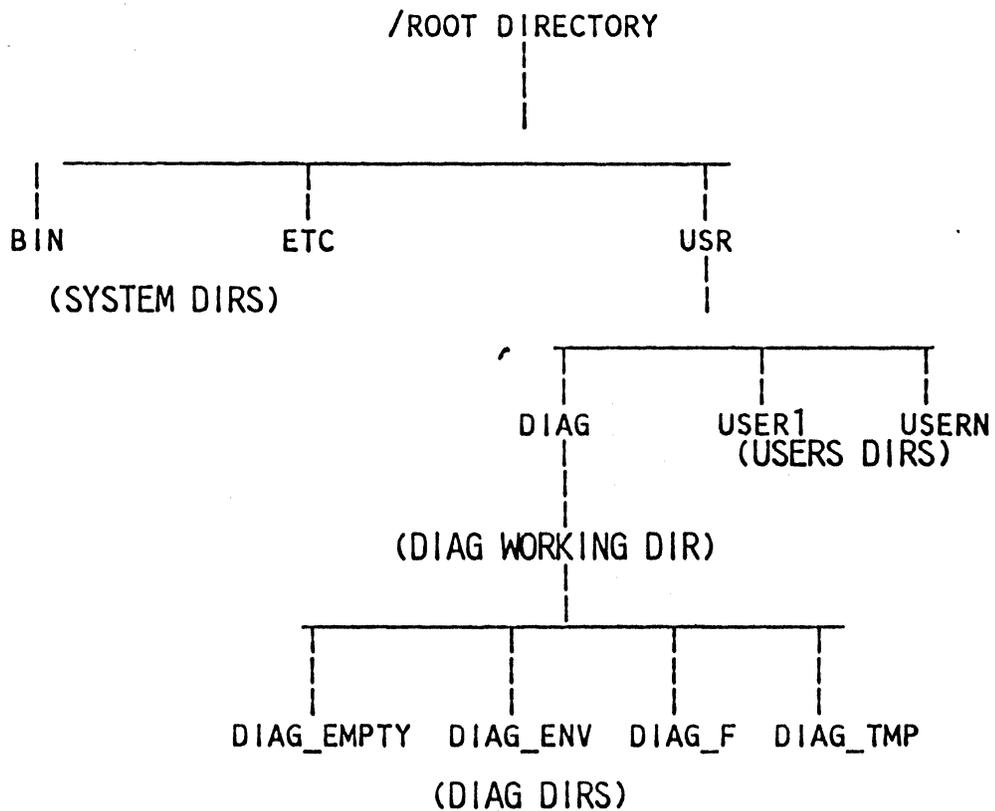
DIAG HANDS THE DIAGNOSTIC PROCESSES LAUNCH AND THE SYMPTOMS COLLECTION IN SUCH A WAY TO DECODIFY TO THE END USER IN TERMS OF LOCALIZATION.

ALL THE INFORMATIONS NEED BY TEST (ALSO ONES CONCERNING DEVICES OPERABILITY) ARE GIVED OR AS DATA INTO SUPPORT FILES, OR AUTOMATICALLY RESEARCHED INTO SYSTEM S/W AREAS USABLE BY USER PROGRAMS.

DIAG GOALS ARE TO ASSURE THE AFFIDABILITY OF ALL THE SYSTEM, IN USER WORK CONDITIONS, BY MEANS OF AUTOMATIC PROCEDURES (WHEN POSSIBLE) OR MANUAL PROCEDURES.

6.2.1 INTEGRATION INTO O.S. FILE SYSTEM

A DIRECTORIES ORGANIZATION AS FOLLOWS IS SUPPLIED FOR AN INTEGRATION MORE INDEPENDENT AS POSSIBLE BY O.S. FILE SYSTEM STRUCTURE:



6.2.2 FUNCTIONALITIES

DIAG IS COMPOSED BY FOLLOWING BASE MODULES:

- . MONITOR : FATHER OF ALL THE PROCESSES AND TESTS COORDINATOR
- . TESTS : THE GOALS OF THESE PROCESSES ARE TO CHECK HARDWARE AND SOFTWARE OF SGM2 SYSTEM
- . SERVICES: ARE THE PROCESSES COLLECTING EXTERNAL MONITOR REQUESTS
- . UTILITY : IS A UTILITY PROCESS, CALLED SGSYNTAX, ABLE TO EXEC THE SYNTAX ANALYSIS OF THE COMMAND FILE THAT IS TO BE SUPPLIED AT SGTST RUNNING TIME

NOTE:

AS A USER DEPENDING RESPONSABILITY, THE FOLLOWING MAY OCCUR:

- . "SWAPPER" SYSTEM PROCESS MAY START IF THERE ARE A GREAT NUMBER OF CONCURRENT PROCESSES, OR FOR USER MEMORY NEEDS;
- . UNPREDICTABLE SYSTEM WORK (PROCESSES NEVER EXECUTED, CONTINUOUS SWAPPING, ...) IF THERE ARE A GREAT NUMBER OF PROCESSES, OR IN CASE OF UNCORRECT TESTS PRIORITY USE.

6.2.3 COMMAND FILE FORMAT

SGTST IS RUNNED AS AN UNDER SHELL SINGLE COMMAND, ABLE TO READ A FILE GIVED AS A PARAMETER, EACH LINE OF THIS FILE DESCRIBES A TEST IN THE FORMAT REQUIRED BY SGTST.

"TEST" MEANS A SINGLE PROCESS OR A COLLECTION OF PROCESSES HAVING SIMILAR PARTICULARITIES, THAT HAVE THE GOAL TO EXERCISE SYSTEM FUNCTIONALITIES.

ALL THE PROCESSES GENERATED BY THE ANALISYS OF EACH COMMAND FILE LINE ARE EXECUTED CONCURRENTLY WITH THEIR "BROTHERS", AND CONCURRENTLY WITH ALL OTHERS PROCESSES GENERATED BY "FATHER" PROCESS. THE "FATHER" PROCESS IS THE MONITOR OF ALL THE RUNNED TESTS.

TEST INPUT IS A FILE, GENERABLE USING ANY UNIX TEXT EDITOR (EX.VI), CONTAINING THE COMMAND LINES RELATIVES TO TESTS TO BE RUNNED. THIS COMMAND FILE (SGCOM) IS AVAILABLE ON DISK FILE SYSTEM, AND REPRESENTS THE USER/O.S INTERFACE. THIS FILE IS FORMED BY N COMMAND LINES, EACH HAVING A STRUCTURE AS FOLLOWS:

NPROC PRIORITY TEST-TYPE TEST SPECIFIC INFORMATIONS

WHERE:

NPROC NUMBER OF CONCURRENTLY PROCESSES

PRIORITY PRIORITY OF THE PROCESSES (NICE).

TEST-TYPE ONE OF FOLLOWING :
SGCPU/SGSYS/SGIOB/SGIOC/SGTTYW/SGTTYR
SGPRTB/SGPRTC/SGFS.

THE LINES STARTING WITH # CHARACTER ARE IGNORED, TO PERMIT COMMENTS INSERTION.

THE FIELDS NPROC AND PRIORITY ARE COMMONS TO EVERY TEST DESCRIPTION LINE.

- NPROC MUST BE AN INTEGER NUMBER NOT MORE HIGH

- PRIORITY MAY ASSUME VALUES BETWEEN 0 AND 39 IF SGTST IS RUNNED BY SUPER-USER, ELSE BETWEEN 20 AND 39.

THE TOTAL PROCESS NUMBER MAY BE AT MAX. 18 IF SGTST IS RUNNED STARTING FROM A USER DIFFERENT FROM SUPER-USER.

6.2.4 COMMAND FILE EXAMPLE

```

##
## TEST N.1
##
## NPROC PRIORITY TEST-TYPE MEMSIZE
##      2      29      SGCPU      12K
##
## NPROC PRIORITY TEST-TYPE MEMSIZE
##      2      30      SGSYS      10000
##
## NPROC PRIORITY TEST-TYPE C/S DEVICE MODE DEVSIZ PATTERN
##      1      25      SGIOB      S /DEV/WD1 R 10000 I
##
## NPROC PRIORITY TEST-TYPE C/S DEVICE MODE DEVSIZ PATTERN
##      1      22      SGIOC      C /DEV/FD W 10 R
##
## NPROC PRIORITY TEST-TYPE DEVICE FILE-NAME
##      1      38      SGTTYW /DEV/TTY1 /DIAX-F/PATH
##
## NPROC PRIORITY TEST-TYPE DEVICE
##      1      32      SGTTYR /DEV/TTY2
##
## NPROC PRIORITY TEST-TYPE DEVICE FILE-NAME
##      1      32      SGPRT /DEV/LP /DIAX-F/PATH
##
## NPROC PRIORITY TEST-TYPE DIRECTORY
##      4      20      SGFS /USR/DIAX
##
## NPROC PRIORITY TEST-TYPE DEVICE
##      1      32      SGCOMM /DEV/TTY2

```

6.2.5 OPERATING RULES

USER REGISTRATION

AS USER_ID DIAG NEEDS OWN ENVIRONMENT HAVING FOLLOWING PARTICULARITIES:

- . LOGIN_ID : ROOT.
- . PASSWORD : NOT REQUIRED.
- . WORKING DIRECTORY : /USR/DIAG .

SGTST LAUNCH IS MADE USING A COMMAND AS FOLLOWS:

SGTST FILE NAME,TIME

WHERE:

FILE NAME	PATHNAME OF THE FILE CONTAINING THE COMMANDS.
TIME	EXECUTION TIME (IN SECONDS) OF TESTS CHAIN.

DIAG USE

AN EXAMPLE OF SHELL-PROCEDURE LAUNCH FOR TEST MODULES EXECUTION (SGTST) FOLLOWS:

```
# CD /USR/DIAG  
# DIAG
```

THE TESTS MENU WILL BE SHOWN ON CONSOLE, GIVING THE POSSIBILITY TO CHOOSE THE AREA TO BE TESTED AND THE TEST DURATION.

USER CAN MODIFY THE FILE SCRIPTS USING STANDARD EDITOR (VI()), TO CREATE OWN DIAGNOSTIC ENVIRONMENTS.

FRI MAY 4 10:23:07 GMT 1986

```
*****
*
*           DIAG - DIAGNOSTIC SYSTEM
*   REV.    . . . . . APRIL, 10 1986
* (C) COPYRIGHT HONEYWELL INFORMATION SYSTEMS ITALIA 1986
*
*****
```

SELECT:

- A AUTOMATIC SYSTEM TEST
- B TEST OF CPU
- C TEST OF DISK
- D TEST OF DISKETTE (*need work diskette*) *R/W*
- E TEST OF PRINTER
- F TEST OF FILE SYSTEM
- G TEST OF TERMINALS
- H TEST OF DISK AND/OR DISKETTE READ
- L TEST OF STREAMER
- M TEST OF VMEBUS CONTROLLERS
- Q END OF DIAG

ENTER SELECTION:

lower case

NOTE: IS ALSO POSSIBLE TO INTRODUCE THE FOLLOWING COMMANDS:

I TEST OF COMPUTER TO COMPUTER COMMUNICATION

R A LIST OF CURRENT ACTIVES PROCESSES IS SHOWN ON
CONSOLE

S ALL CURRENT PROCESSES ARE KILLED, AND DIAG MENU
IS SHOWN ON CONSOLE

H THE LIST OF AVAILABLE GHOST COMMANDS IS SHOWN ON
CONSOLE

REDE INFORMATIONS RELATIVE TO CURRENT DIAG RELEASE
ARE SHOWN ON CONSOLE

upper.

6.2.6 STATUS MESSAGES

AT THE END OF ALL THE PROCESS ACTIVATION, SGTST PRINT THE FOLLOWING MESSAGE:

"ACTIVATES # PROCESSES"

STARTING FROM NOW IS POSSIBLE TO OBTAIN A STATUS REPORT RELATIVES TO ALL THE ACTIVATED PROCESSES ENTERING FROM CONSOLE THE CHARACTER "R".

↵

THE OBTAINED STATUS REPORT WILL BE AS FOLLOWS:

F	S	UID	PID	PPID	C	PRI	NI	ADDR	SZ	WCHAN	TTY	TIME	COMD
1	S	0	35	1	0	26	20	1064	44	8145F8	C0	0:00	ERRDEMON
1	S	0	43	1	0	39	20	106F	48	FFF800	C0	0:05	CRON
1	S	0	161	49	0	30	20	106C	36	8166C8	C0	0:03	SH
1	S	0	191	161	0	30	20	106D	64	816740	C0	0:01	SGTST
1	R	0	192	191	4	62	20	1074	52		C0	0:29	SGIOB
1	S	0	193	191	0	30	20	1075	44	816830	C0	0:01	SGSERVIC
1	S	0	194	191	0	39	20	1087	28	FFF800	C0	0:00	SGTIMER
1	S	0	195	191	14	22	20	1092	52	81B394	C0	0:31	SGIOB
1	R	0	196	191	41	80	20	10A9	52		C0	0:33	SGIOB
1	S	0	199	193	0	30	20	10AA	28	816A10	C0	0:00	SH
1	R	0	200	199	0	60	20	10CC	96		C0	0:02	PS

F (L) FLAGS (OCTAL AND ADDITIVE) ASSOCIATED WITH THE PROCESS:

Ø1 IN CORE

Ø2 SYSTEM PROCESS

Ø4 LOCKED IN CORE (E.G., FOR PHYSICAL I/O)

1Ø BEING SWAPPED

2Ø BEING TRACED BY ANOTHER PROCESS

4Ø ANOTHER TRACING FLAG

S (L) THE STATE OF THE PROCESS:

Ø NON-EXISTENT

S SLEEPING

W WAITING

R RUNNING

I INTERMEDIATE

Z TERMINATED

T STOPPED

X GROWING

UID (F,L) THE USER ID NUMBER OF THE PROCESS OWNER;
 THE LOGIN NAME IS PRINTED UNDER THE -F
 OPTION

PID (ALL) THE PROCESS ID OF THE PROCESS; IT IS
 POSSIBLE TO KILL A PROCESS IF YOU KNOW
 THIS DATUM

PPID (F,L) THE PROCESS ID OF THE PARENT PROCESS

C (F,L) PROCESSOR UTILIZATION FOR SCHEDULING

STIME (F) STARTING TIME OF THE PROCESS

PRI (L) THE PRIORITY OF THE PROCESS; HIGHER
 NUMBERS MEAN LOWER PRIORITY

NI (L) NICE VALUE; USED IN PRIORITY COMPUTATION

ADDR (L) THE MEMORY ADDRESS OF THE PROCESS, IF
 RESIDENT; OTHERWISE, THE DISK ADDRESS

SZ (L) THE SIZE IN BLOCKS OF THE CORE IMAGE OF
 THE PROCESS

WCHAN (L) THE EVENT FOR WHICH THE PROCESS IS WAITING
 OR SLEEPING; IF BLANK, THE PROCESS IS
 RUNNING

TTY (ALL) THE CONTROLLING TERMINAL FOR THE PROCESS

TIME (ALL) THE CUMULATIVE EXECUTION TIME FOR THE
 PROCESS

CMD (ALL) THE COMMAND NAME; THE FULL COMMAND NAME
 AND ITS ARGUMENTS ARE PRINTED UNDER THE -F
 OPTION

6.2.7 ERROR MESSAGES

WHEN A PROCESS FINDS AN ERROR CONDITION, SEND A MESSAGE TO OUTPUT FILE (THE CONSOLE, AS DEFAULT) AND ENDS ITS EXECUTION (STATUS TERMINATED).

THE ERROR MESSAGES HAVE FOLLOWING INFORMATIONS:

PROC.ID	NLINEA	KEYWORD	MESSAGE TEXT
---------	--------	---------	--------------

ALL THE ERROR MESSAGES TEXT ARE INTO THE SAME FILE (SGERR), TO PERMIT THE TRANSLATION.

6.3 LEVEL 3 (STAL)

THIS LEVEL OF DIAGNOSTIC IS EXECUTED IF THE LEVEL 1 IS NOT ABLE TO DETECT A FAILURE, AND THE LEVEL 2 IS STOPPED BY A FAILURE WITHOUT GIVING A SYMPTOM.

THE DIAGNOSIS IS RUNNED STARTING FROM A DEDICATED DIAGNOSTIC DISKETTE, LABELLED DIAGX2, HAVING A STAND-ALONE MONITOR THAT MANAGES SYMPTOMS COLLECTION IN SUCH A WAY TO DECODIFY TO THE END USER IN TERMS OF LOCALIZATION.

THE STAL GOALS ARE THE COVERED AND THE LOCALIZATION OF FAILURES, AT CRU LEVEL, IN THE FOLLOWING AREAS:

- CPØ BOARD
- SCØ BOARD
- CHØ BOARD
- MEMORY BOARDS
- DCØ/DPØ CONTROLLER BOARD
- SPØ/LPØ CONTROLLER BOARD
- VMEBUS STANDARD CONTROLLER BOARDS
- DISK DEVICES
- FLOPPY DEVICE
- STREAMER DEVICE

no Printer, Terminal

6.3.1 STAL DIAGNOSTIC PROCESSES

THE FOLLOWING PROCESSES ARE RECORDED ON DIAGX2 FLOPPY:

- SGM2BT	PRIMARY BOOT FILE
- CPØMON	DIAGNOSTIC MONITOR (CPØ)
- SPØMON	" MONITOR (SPØ)
- LPØMON	" MONITOR (LPØ)
- SG2CPX	DIAGNOSTIC PROCESS OF CPØ
- SG2SCX	" " OF SCØ
- SG2CHX	" " OF CHØ
- SG2SPX	" " OF SPØ
- SG2LPØ	" " OF LPØ
- SG2MEM	" " " MEMORY
- SG2DSK	" " " DISK
- SG2FLP	" " " FLOPPY
- SG2STR	" " " STREAMER
- SG2VMX	" " " VMEBUS CNTR
- SG2TAP	P L U G T E S T F O R LINE/PRINTER/STREAMER
- SG2BDC	TEST TOOL FOR DISKS/FLOPPY
- SG2DFC	" " FOR W/D CONTROLLER

6.3.2 DIAGNOSTIC MONITOR

THE STAL DIAGNOSTIC MONITOR HANDS THE CONSOLE DIALOG WITH THE USER, LOADS AND PUTS IN EXECUTION THE DIAGNOSTIC PROCESSES, AND HANDS THE TESTS RESULTS.

STAL CONSOLE DIALOG WITH USER IS MADE IN ITALIAN OR ENGLISH LANGUAGE.

THE LANGUAGE SELECTION IS MADE AT INITIALIZATION TIME, USING CONSOLE LINE TESTING PHASE. USER IS REQUIRED TO INPUT FROM CONSOLE A CHARACTERS STRING: "ABCD" OR "DCBA".

- IF "ABCD" IS INTRODUCED, CONSOLE DIALOG WILL BE IN ITALIAN
- IF "DCBA" IS INTRODUCED, CONSOLE DIALOG WILL BE IN ENGLISH

THE DIAGNOSTIC MONITOR HAS ALSO SOME CONTROL KEYS, TO EDIT INPUT FROM CONSOLE. THEY ARE:

- BACKSPACE THE LAST CHARACTER ENTERED FROM CONSOLE IS DELETED
- BREAK ALL THE CURRENT RUNNING OPERATIONS ARE STOPPED, AND THE CONTROL RETURNS TO MONITOR

6.3.3 DIAGNOSTIC PROCESSES EXECUTION MODE

IS POSSIBLE TO RUN STAL DIAGNOSTIC PROCESSES IN TWO DIFFERENT MODES:

- AUTOMATIC MODE

- TECHNICAL MODE

6.3.4 AUTOMATIC MODE

THIS IS THE CUSTOMER USER LEVEL EXECUTION MODE. AUTOMATIC MODE IS ENTERED USING LOWER-CASE MONITOR COMMANDS, THAT ARE DISPLAYED ON CONSOLE AT THE END OF DIAGNOSTIC SYSTEM INITIALIZATION.

USING AUTOMATIC MODE, NO OTHER INPUTS FROM CONSOLE ARE REQUIRED: ALL THE EXECUTION PARAMETERS ARE AUTOMATICALLY SETTED.

THE SELECTED PROCESS IS EXECUTED IN RECYCLE MODE, UNTIL AN ERROR IS FOUND OR A "BREAK" IS SEND FROM CONSOLE.

IF AN ERROR IS FOUND, AN ERROR MESSAGE IS DISPLAYED ON CONSOLE, AND CONTROL RETURNS TO MONITOR, THAT DISPLAYS THE SYSTEM PROMPT "=". THE ERROR MESSAGE IS AS FOLLOWS:

*ERR:xxx CRU = UNIT YYY

WHERE: xxx = ERROR CODE
 yyy = CRU TO BE REPLACED

IF NO ERRORS ARE FOUND, AT THE END OF EACH PASS A PASS COUNT MESSAGE IS DISPLAYED ON CONSOLE, UNTIL A "BREAK" IS RECEIVED. AFTER "BREAK", THE CONTROL RETURNS TO MONITOR, THAT SENDS TO CONSOLE THE USER SELECTION MENU.

THE PASS COUNT MESSAGE IS AS FOLLOWS:

SG2XXX: PASS YYYY - ERRORS 0000

WHERE: SG2XXX = PROCESS NAME
 YYYY = PASS COUNTER

```

*****
*
*          STAL - DIAGNOSTIC SYSTEM          *
* REVISION . . . ----- MAY, 23 1986      *
* (c) COPYRIGHT HONEYWELL INFORMATION SYSTEMS ITALIA 1986 *
*
*****

```

SELECT:

- A FULL SYSTEM TEST
(TEST EXECUTED BOTH FROM DISKETTE AND DISK) *reboot automatically & return after test*
- B AUTOMATIC SYSTEM TEST
(TEST PERFORMED FROM DISKETTE ONLY)
- C TEST OF UNIT CPØ
- D TEST OF UNIT SCØ
- E TEST OF UNIT MEMORY
- F TEST OF UNIT CHØ
- G TEST OF UNIT DISK
- H TEST OF UNIT DISKETTE
- I TEST OF UNIT STREAMER
- L TEST OF UNIT SPØ
- M TEST OF UNIT VMEBUS

HE gives Menu

6.3.5 TECHNICAL MODE

THIS MODE IS SELECTED ENTERING FROM CONSOLE THE NAME OF PROCESS TO BE EXECUTED.

THE FOLLOWING REQUEST IS MADE BY MONITOR:

* RECYCLE ON TEST ? (Y/N) *

THE ANSWER DEFINES THE EXECUTION MODE OF PROCESS (DEFAULT, ENTERING C/R, IS NO RECYCLE).

CONTROL IS NOW GIVED TO DIAGNOSTIC PROCESS, THAT DISPLAYS ON CONSOLE THE TESTS MENU. IN THIS MODE, IS POSSIBLE TO CHOOSE THE TYPE OF TEST TO BE RUNNED.

IN TECHNICAL MODE, ERROR REPORTING IS MORE COMPLETE THAN AUTOMATIC MODE: A DETAILED DESCRIPTION OF HAPPENED ERROR IS SUPPLIED.

AT THE END OF EXECUTION, CONTROL RETURNS TO MONITOR, THAT DISPLAYS USER SELECTION MENU ON CONSOLE.

7. PRODUCTIVITY TOOLS

SOME USEFUL TOOLS ARE CONTAINED INTO CPØ/SPØ/LPØ EPROM.

- . MEMORY DUMP
- . CONSOLE I/O MONITOR (*)
- . DEBUGGER (*)

(*) ONLY FOR SPØ/LPØ

7.1 MEMORY DUMP

AN EPROM RESIDENT, INTERACTIVE MEMORY DUMP TOOL IS AVAILABLE ON SGM2 SYSTEM.

THE START COMMAND FOR DUMP IS GIVEN USING TWO OPERATOR PANEL PUSHBUTTON:

- POWER ON
- RESET

REQUIREMENT FOR THIS TOOL ARE:

- . CONSOLE ON LINE #0 OF 1ST SP0
- . A PRINTER ON THE SAME PROCESSOR HAVING CONSOLE

DUMP STARTS PRINTING H/W REGISTERS AND MEMORY CONTENTS OF CONSOLE PROCESSOR, AND AFTER WAITING FOR COMMANDS FROM CONSOLE.

THE COMMAND IS AS FOLLOWS:

PR. TYPE ADDRESS LENGTH

WHERE: PR. TYPE = TYPE OF PROCESSOR (CP00, SP02, ...)
 ADDRESS = START ADDRESS OF DUMP
 LENGTH = LENGTH OF DUMP

7.2 CONSOLE I/O MONITOR

INTO SP0/LP0 EPROM ARE EMBEDDED THE GETC() PUTC() FUNCTIONALITIES, USABLE AT INITIALIZATION TIME BY CPU BEFORE STARTING A DOWNLOADED I/O DRIVER.

7.3 DEBUGGER

A PROCESSOR DEBUGGER IS RESIDENT INTO SP0/LP0 EPROM.

THIS TOOL GIVES THE POSSIBILITY TO DEBUG A DOWNLOADED I/O DRIVER, USING THE FOLLOWING UTILITIES:

- . 68000 REGISTERS DUMP/CHANGE
- . PROCESSOR MEMORY DUMP/CHANGE
- . SET BREAKPOINTS
- . INSTRUCTION TRACE

LINE #7 OF SP0/LP0 IS USED AS I/O CONSOLE LINE.

8. DOCUMENTATION

THE DOCUMENTATION FOR THE DIAGNOSTIC SYSTEM, IN PARTICULAR WAY RELATED TO THE USAGE, MUST BE VERY SIMPLE AND EASY TO USE, BUT IN THE SAME TIME VERY COMPLETE; SO IT MUST AGREE WITH TECHNIQUES AS HELP AND SELF-GUIDED FEATURES.

- END USER GUIDE

THE "SYSTEM TESTING GUIDE" AND THE EQUIVALENT ITALIAN VERSION "GUIDA ALLA DIAGNOSI DEL SISTEMA" CONTAINS ALL THE NEEDED INFORMATIONS IN ORDER TO EXECUTE THE DIAGNOSIS, THAT IS THE LOCALIZATION OF THE FAILED CRU AND ITS SUBSTITUTION.

THE GUIDE MUST BE VERY SIMPLE TO USE AND IT MUST HAVE SEVERAL EXPLANATORY PICTURES.

- D.A.C. MANUAL

THE "DIAGNOSTIC MANUAL" CONTAINS ALL THE NEEDED INFORMATIONS FOR D.A.C. TO SOLVE PARTICULAR PROBLEMS.