

# PDP11

REMOTE DIAG EXER  
CZKCIBO

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IDENTIFICATION

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PRODUCT CODE: AC-F404B-MC  
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MAINTAINER: MDCPG DIAGNOSTIC GROUP

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## 1.0 ABSTRACT

THIS PROGRAM PERFORMS ON LINE REMOTE DIAGNOSTIC TESTS, BY STARTING THE INTERNAL DIAGNOSTICS IN SELECTED RT801, 803, OR 805 TERMINALS, CONNECTED TO THE SERIAL BUS FOR THE DPM SYSTEM. WITHIN THE PROGRAM, PROVISION IS MADE TO REPORT ALL ERRORS GENERATED BY EACH TERMINAL. STRUCTURALLY, THE PROGRAM CONSISTS OF ONE MAIN TEST, AND IS ORGANIZED WITH RESPECT TO THAT TEST.

## 2.0 HARDWARE REQUIREMENTS

PDP11 FAMILY OF COMPUTERS, EXCEPT THE LSI-11  
CONSOLE TELETYPE  
16K MEMORY  
;SB11A (SERIAL BUS CONTROLLER)  
SERIAL BUS  
1-63 FACTORY DATA COLLECTION, DPM01, OR DPM50 TERMINALS

### 3.0 SOFTWARE REQUIREMENTS

RSX-11M DISK BASED REAL TIME OPERATING SYSTEM  
THE DPM - "DISTRIBUTED PLANT MANAGEMENT" SOFTWARE PACKAGE

#### 3.1 RSX-11M OPERATING SYSTEM

THE RSX-11M IS A SMALL TO MEDIUM SIZED REAL TIME MULTIPROGRAMMING SYSTEM WHICH UTILIZES 16K TO 124K WORDS OF MEMORY, OR 128K TO 1024K WORDS OF PDP-11/70 MEMORY. THE 16K SYSTEM ALLOWS 8K FOR USER TASKS AND INCLUDES A SUBSET MACRO PACKAGE. A MINIMUM OF 24K WORDS ARE REQUIRED FOR FULL MACRO SUPPORT, CONCURRENT PROGRAM DEVELOPMENT AND APPLICATION TASKS EXECUTION, OR MEMORY MANAGEMENT SUPPORT.

#### 4.0 PROGRAM GENERATION

THE FILE TO BE LOADED AND RUN IN SYSTEM'S MEMORY IS THE TASK FILE DZKCI.TSK. IT IS GENERATED FROM THE SOURCE FILE DZKCI.MAC BY USING RSX-11M INDIRECT FILES. AN INDIRECT FILE DZKCI.CMD CONTAINS A LIST OF MCR COMMANDS, AND IS INVOKED BY TYPING:

```
"@DZKCI"
```

UPON WHICH THE CONSOLE WILL PRINT THE FOLLOWING:

```
MAC DZKCI.OBJ,DZKCI.LST=DIAGSUPER/ML,DZKCI.MAC
```

```
TKB @TKBDZKCI  
DZKCI.TSK,DZKCI.MAP=DZKCI.OBJ,DIAGSUPER  
/  
UNITS=200  
STACK=512  
//
```

THE FOLLOWING IS AN EXPLANATION OF THE CONSOLE PRINTOUT:

```
DZKCI.OBJ,DZKCI.LST=DIAGSUPER/ML,DZKCI.MAC
```

THIS ASSEMBLES THE SOURCE FILE DZKCI.MAC WITH THE DIAGNOSTIC SUPERVISOR MACRO PACKAGE DIAGSUPER/ML, INTO AN OBJECT FILE DZKCI.OBJ FOR TASK BUILDING BY THE RSX11-M TASK BUILDER. THE SWITCH /ML ON THE FILE DIAGSUPER SPECIFIES THE FILE AS A USER'S MACRO LIBRARY. THE PDP-11 DIAGNOSTIC SUPERVISOR IS NEEDED FOR ASSEMBLING THE PROGRAM, AND IS DESCRIBED IN 4.1

```
DZKCI.TSK,DZKCI.MAP=DZKCI.OBJ,DIAGSUPER
```

THIS TASK-BUILDS THE OBJECT FILE DZKCI.OBJ WITH THE DIAGNOSTIC SUPERVISOR OBJECT LIBRARY DIAGSUPER, INTO A TASK IMAGE DZKCI.TSK TO BE

RUN IN SYSTEM'S MEMORY. DZKCI.MAP IS A FILE WHICH CONTAINS THE MEMORY ALLOCATION MAP. THE TASK BUILDER SWITCHES /, UNITS=75, STACK=512, //, ARE NOT PRINTED OUT ON THE CONSOLE, BUT ARE CONTAINED IN THE INDIRECT COMMAND FILE "TKBDZKCI.CMD" AND ARE DESCRIBED IN THE RSX-11M TASK BUILDER REFERENCE MANUAL. RSX-11M TASK BUILDER REFERENCE MANUAL.

#### 4.1 DIAGNOSTIC SUPERVISOR

##### GENERAL-----

THE PDP-11 DIAGNOSTIC SUPERVISOR IS A MODULARIZED DIAGNOSTIC MONITOR WHICH SERVES THE PDP-11 FAMILY OF COMPUTERS BY PROVIDING RUN-TIME SUPPORT FOR FUNCTIONAL OR REPAIR LEVEL DIAGNOSTICS. THE DIAGNOSTICS ARE DESIGNED FOR SUPERVISOR COMPATIBILITY, AND CREATED FOR DESIGN ENGINEERING, MANUFACTURING, OR FIELD ENGINEERING USAGE. FUNCTION LEVEL PROGRAMS PROVIDE FOR ERROR DIAGNOSIS AT A HARDWARE FUNCTION LEVEL, WHILE REPAIR LEVEL DIAGNOSTICS PROVIDE FOR REPAIR AT A MODULE LEVEL; AS SUCH, THEY EXERCISE, DIAGNOSE, OR TEST INDIVIDUAL PERIPHERALS, MEMORY SUBSYSTEMS, PROCESSOR OPTIONS, OR ENTIRE SYSTEMS.

SEPARATE STAND ALONE (OFF LINE) AND USER MODE (ON LINE) VERSIONS OF THE SUPERVISOR COMMONLY PROVIDE NON-DIAGNOSTIC SERVICES FOR A SINGLE PROGRAM, OR A SCRIPT OF PROGRAMS, THAT HAVE BEEN PREVIOUSLY ASSEMBLED. IN A STAND ALONE ENVIRONMENT THE SUPERVISOR SHARES RESIDENCY WITH THE DIAGNOSTIC(S) ONLY, WHILE IN USER MODE THE SUPERVISOR AND THE DIAGNOSTIC(S) RESIDE WITH BOTH AN OPERATING SYSTEM AND THE USER PROGRAM(S). HOWEVER, IN EITHER ENVIRONMENT, SUPERVISOR SERVICES ARE ELICITED BY A RESIDENT DIAGNOSTIC VIA THE GENERATION OF UNIQUE MACRO CALLS TO THE SUPERVISOR. IN THIS MANNER THE FOLLOWING NON-DIAGNOSTIC SERVICES CAN BE INITIATED FOR A PROGRAM.

- . THE EXECUTION OF EACH SECTION OF A DIAGNOSTIC.
- . THE LOOPING OF TEST PROGRAMS.
- . THE REPORTING OF HARDWARE ERRORS.
- . THE REPORTING OF UNEXPECTED INTERRUPTS.
- . THE PRINTING OF MESSAGES.

FUNCTION LEVEL PROGRAMS CAN OPERATE IN EITHER A STAND ALONE OR A USER MODE ENVIRONMENT WITHOUT SOURCE CODE MODIFICATION. HOWEVER, REPAIR LEVEL PROGRAMS MUST OPERATE IN A STAND ALONE ENVIRONMENT ONLY.

ONCE THE SUPERVISOR IS LOADED A STANDARDIZED OPERATOR INTERFACE IS ESTABLISHED, PROVIDING A COMMUNICATIONS PATH THROUGH WHICH AN OPERATOR CAN DIRECT THE SUPERVISOR TO INITIATE THE LOADING AND EXECUTION OF A DIAGNOSTIC PROGRAM. INTERFACE DIALOGUE ALSO ALLOWS AN OPERATOR TO EXAMINE AND/OR MODIFY THE CONTENT OF THE GENERAL REGISTERS, AND THE CONTENTS OF THE MEMORY LOCATIONS UTILIZED BY THE DIAGNOSTIC(S). IN ADDITION, THE INTERFACE ALLOWS AN OPERATOR TO ACCESS SEPARATE UTILITY

PROGRAMS THAT ARE ALSO LOCATED ON THE DIAGNOSTIC LOAD MEDIA, AND ARE ASSOCIATED WITH THE SUPERVISOR PACKAGE. THE UTILITY PROGRAMS PERMIT AN OPERATOR TO INSTALL FIELD CHANGES TO A DIAGNOSTIC, AND TO BUILD OR MODIFY SCRIPT AND CONFIGURATION FILES.

THE SERVICING OF FUNCTIONAL OR REPAIR LEVEL PROGRAMS OPERATING UNDER THE CONTROL OF A STAND ALONE VERSION OF THE SUPERVISOR, CAN BE INDIRECTLY CONTROLLED FROM A SEPARATE COMPUTER BY A LOCAL OR REMOTE DIAGNOSTIC MONITOR, SUCH AS THE AUTOMATED PRODUCT TEST (APT/APT-RD). UNDER INDIRECT CONTROL, AN OPERATOR INTERFACE IS ESTABLISHED WITH THE LOCAL (E.G. APT) OR REMOTE (E.G. APT-RD) MONITOR AND THE SUPERVISOR IS DIRECTED TO LOAD AND EXECUTE PROGRAMS VIA MONITOR COMMANDS.

FINALLY, IN ADDITION TO THE OFF AND ON LINE VERSIONS OF THE SUPERVISOR, THERE IS A SPECIAL VERSION DEFINED AS A PROGRAM DEVELOPMENT SYSTEM(PDS). THE PDS VERSION INCLUDES BOTH DEBUG AND UPDATE UTILITIES AS CORE RESIDENT FEATURES AND IS ESSENTIALLY A SUPER SUBSET OF THE BASIC STAND ALONE VERSION.



## 5.0 PROGRAM CONSIDERATIONS

THIS IS A FUNCTION LEVEL PROGRAM, DESIGNED FOR RSX-11M AND SUPERVISOR COMPATIBILITY, AND CREATED FOR DESIGN ENGINEERING, MANUFACTURING, OR FIELD ENGINEERING USAGE. AS A FUNCTION LEVEL PROGRAM, IT STARTS TERMINAL DIAGNOSTICS ON LINE, AND REPORTS ALL DIAGNOSTIC ERRORS, FOR EACH TERMINAL ON THE SERIAL BUS SYSTEM.

### 5.1 FUNCTION LEVEL DIAGNOSTIC PROGRAMS

FUNCTIONAL LEVEL PROGRAMS ARE FIRST LEVEL DIAGNOSTICS THAT ARE SIMILAR TO USER MODE LEVEL-2 PROGRAMS IN THAT THEY REQUIRE THE TOTAL DEDICATION OF THE DEVICE UNDER TEST WHILE DIRECT ACCESS TO THE DEVICE REGISTERS IS NOT PERMITTED. HOWEVER, DATA CAN BE EXCHANGED WITH A DEVICE VIA THE IMPLEMENTATION OF I/O ROUTINES SUCH AS THOSE ENGENDERED BY THE QIOS DIRECTIVES USED IN RSX-11M. IT SHOULD BE NOTED, HOWEVER, THAT RUNNING UNDER OPERATING SYSTEM CONTROL, STABLE PROGRAM LOOPS CANNOT BE GAURANTEED FOR FUNCTION LEVEL PROGRAMS.

5.1.1 REPAIR LEVEL DIAGNOSTIC PROGRAMS - REPAIR LEVEL PROGRAMS ARE SECOND LEVEL DIAGNOSTICS THAT ARE SIMILAR TO USER MODE LEVEL-3 PROGRAMS IN THAT THEY REQUIRE THE TOTAL DEDICATION OF THE DEVICE UNDER TEST, AND DIRECT ACCESS TO DEVICE REGISTERS IS ALLOWED. IN ADDITION, SINCE REPAIR LEVEL DIAGNOSTICS CANNOT BE RESIGNED TO A USER MODE (ON LINE) ENVIRONMENT, PROGRAM LOOPS ARE APPLICABLE.

## 6.0 TESTING PREREQUISITES

BEFORE RUNNING THIS PROGRAM, THE FOLLOWING TESTS SHOULD BE SUCCESSFULLY RUN IN THE FOLLOWING ORDER:

1. ALL APPLICABLE PDP-11 CPU TESTS
2. ISB11A STANDALONE DIAGNOSTICS:
  1. DZKCC
  2. DZKCD
  3. DZKCA
  4. DZKCE
  5. DZKCF
  6. DZKCI (SERIAL BUS EXERCISER)

7. FOLLOWING THESE STANDALONE TESTS, THE ISB11A SHOULD BE REMAINED CONNECTED TO THE SERIAL BUS, WITH 1-63 RT801, 803, OR 805 TERMINALS, AND THE REMOTE TERMINAL EXERCISOR SHOULD BE RUN.

#### 7.0 XXDP.

THE PROGRAM RUNS ON LINE TO THE OPERATING SYSTEM RSX-11M, AND THEREFORE WILL NOT RUN UNDER XXDP.

#### 8.0 ACT/APT

THE PROGRAM IS NEITHER ACT NOR APT COMPATIBLE.

#### 9.0 MEMORY MANAGEMENT

THE PROGRAM DOES NOT DIRECTLY UTILIZE OR TEST MEMORY MANAGEMENT.

#### 10.0 SWITCH REGISTER FUNCTIONS

NO EXPLICIT SWITCH REGISTER SETTINGS WILL BE RECOGNIZED BY THE PROGRAM, SO AS TO FACILITATE INTEGRATION UNDER RSX-11M AND THE PDP-11 DIAGNOSTIC SUPERVISOR.

#### 11.0 PROGRAM CONTROL PROCEDURES

THE PROGRAM IS RUN ON LINE IN RSX-11M OPERATING ENVIRONMENT AND IS CONTROLLED BY RSX (MCR) OR DIAGNOSTIC SUPERVISOR MONITOR COMMAND LANGUAGE.

#### 11.1 COMMAND LANGUAGE

THIS SECTION DESCRIBES THE OPERATOR COMMANDS, THAT PROVIDES FOR THE LOADING AND MANIPULATION OF PROGRAMS BY RSX-11M AND THE DIAGNOSTIC SUPERVISOR.

### 11.1.1 RSX-11M COMMAND LANGUAGE -

RUN - THE RUN DIRECTIVE CAUSES A TASK TO BE REQUESTED.

CONTROL C - ACTIVATING CONTROL C GETS THE OPERATOR BACK TO MCR AND ABORTS THE PROGRAM.

#### 11.1.1.1 DIAGNOSTIC SUPERVISOR COMMAND LANGUAGE -

UPON PROGRAM EXECUTION, AND TO RETURN TO SUPERVISOR COMMAND MODE, THE OPERATOR SHOULD TYPE "CONTROL A". THE PROGRAM WILL RESPOND WITH THE PROMPT DCP-A>, WHEREIN ANY ONE OF THE DIAGNOSTIC SUPERVISOR COMMANDS CAN BE ENTERED. FOR EXAMPLE:

CONTROL A

DCP-A> STA

DCP-A>RES

DCP-A>CON

THESE DIAGNOSTIC SUPERVISOR COMMANDS ARE DESCRIBED BELOW.

START PROGRAM (STA) - THE START PROGRAM COMMAND INITIATES THE EXECUTION OF THE PROGRAM CURRENTLY CONTAINED IN MAIN MEMORY, INCLUDING THE DIALOGUE PORTIONS.

RESTART PROGRAM (RES) - THE RESTART PROGRAM COMMAND IS SIMILAR TO THE START PROGRAM COMMAND WITH THE EXCEPTION BEING THAT DIALOGUE PORTIONS OF THE PROGRAM CAN ONLY BE EXECUTED VIA AN APPROPRIATE OPERATOR RESPONSE TO A SUPERVISOR QUERY. HOWEVER IT IS ASSUMED THAT THE REQUIRED CONFIGURATION PARAMETERS HAVE BEEN LOADED, ALONG WITH THE PROGRAM, PRIOR TO THE ISSUANCE OF THIS COMMAND.

RETURN TO PROGRAM (CON) - THE RETURN TO PROGRAM COMMAND ALLOWS THE EXECUTION OF THE DIAGNOSTIC PROGRAM TO RESUME AT THE FIRST INSTRUCTION FOLLOWING THE CURRENT SUPERVISOR CALL. HOWEVER, IF DESIRED, NEW FLAG CONDITIONS MAY BE SPECIFIED.

RETURN TO SUPERVISOR (CONTROL A) - THE RETURN TO SUPERVISOR COMMAND INITIATES THE EXECUTION OF THE CLEANUP CODE, CONTAINED IN THE ACTIVE PROGRAM, AND PROVIDES AN EXIT TO THE SUPERVISOR COMMAND MODE.

## 12.0 LOADING

SINCE THE EXERCISER IS PART OF THE DPM SOFTWARE, IT IS REQUESTED AND LOADED BY THE RSX-11M COMMAND "RUN DZKCI" WHERE "DZKCI" IS THE PROGRAM RELEASED NAME. A PROMPT IS THEN ISSUED TO THE CONSOLE WHICH INITIATED THE PROGRAM. THE FOLLOWING IS A CONSOLE PRINTOUT OF AN EXAMPLE OF PROGRAM DIALOGUE. (NOTE: OPERATOR'S RESPONSE IS UNDERLINED).

```
>RUN DZKCI
-----
DCP-A>STA
---
```

```
# UNITS (D) ? 8
--
```

```
UNIT 1
ENTER CONTROLLER NUMBER : (0) 0 ?
--
ENTER TERMINALS ON THAT CONTROLLER : (D) 1 ? 1-4
-----
```

```
UNIT 5
ENTER CONTROLLER NUMBER : (0) 0 ? 1
-----
ENTER TERMINALS ON THAT CONTROLLER : (D) 4 ? 1,2,3,4
-----
```

```
UNIT 9
ENTER CONTROLLER NUMBER: (0) 2 ?
--
ENTER TERMINALS ON THAT CONTROLLER: (D) 8 ? 1,2,3-4
-----
```

# SELECTED SERIAL LINE PORTS

UNIT	** CONTROLLER	** LOGICAL SB	** LUN	** TYPE
1	0	1	9	801
2	0	2	10	801
3	0	3	11	801
4	0	4	12	803
1	1	6	13	805
2	1	7	14	DPM50 -- PORT 0
3	1	8	15	DPM50 -- PORT 1
4	1	9	16	DPM01 -- PORT 0
1	2	11	17	DPM01 -- PORT 1
2	2	12	18	DPM01 -- PORT 2
3	2	13	19	DPM01 -- PORT 3
4	2	14	20	OFFLINE

## 12.1 EXPLANATION OF PRINTOUT

>'RUN DZKCI' CAUSES THE TASK TO BE REQUESTED, WHILE THE DIAGNOSTIC SUPERVISOR CONTROL PROGRAM -- REVISION-A (DCP-A), REQUESTS THE OPERATOR TO TYPE 'STA' TO START THE EXERCISER. EXAMPLE: DCP-A>STA

DESCRIPTION OF THE PRINTOUT IS CONTINUED IN 15.0

## 13.0 PROGRAM PARAMETER SELECTION

THE PROGRAM AT STARTUP ENTERS A DIALOGUE WITH THE OPERATOR TO DETERMINE WHICH UNITS ON WHAT CONTROLLERS ARE TO BE EXERCISED. THE OPERATOR AT THIS POINT IS INTERROGATED WITH:

'NUMBER UNITS (D)?'

WHICH MEANS, ENTER THE TOTAL NUMBER OF DEVICES THE OPERATOR WANTS TO EXERCISE (UP TO 63).

THE OPERATOR THEN ENTERS THE TOTAL NUMBER OF TERMINALS (ON THE SERIAL BUS SYSTEM) TO BE EXERCISED IN DECIMAL REPRESENTATION, FOLLOWED BY A CARRIAGE RETURN. NO DEFAULT IS PROVIDED.

EXAMPLE: NUMBER UNITS (D)? 12 <CR>

IN THE ABOVE EXAMPLE, THE OPERATOR WANTS A TOTAL OF TWELVE TERMINALS TO BE EXERCISED.

## 13.1 SELECTED CONTROLLER

THE PROGRAM CAN EXERCISE 8 CONTROLLERS (0-7), BUT THE LARGEST NUMBER OF CONTROLLERS PRESENTLY PLANNED FOR DPM SYSTEMS IS 4(0-3). THE OPERATOR CAN SELECT ANY OF ONE, OR ALL FOUR CONTROLLERS(0 THRU 3), IN ANY SEQUENCE ON THE SERIAL BUS. THE EXERCISER THEN BUILDS UP TO A 63 WORD TABLE FOR ALL SELECTED CONTROLLERS (MAX. OF 63 DEVICES PER CONTROLLER), PLACING EACH IN THE HIGH BYTE OF AN UP TO 63 WORD TABLE. HERE THE OPERATOR IS INTERROGATED WITH:

UNIT 1  
'ENTER CONTROLLER NUMBER (0) 0 ?'

OPERATOR'S RESPONSE IS TO TYPE IN THE CONTROLLER NUMBER TO BE EXERCISED, OR USE THE DEFAULT FOLLOWED BY A CARRIAGE RETURN. THE DEFAULT IS CONTROLLER NUMBER 0

UNIT 1  
EXAMPLE: ENTER CONTROLLER NUMBER (0)? <CR>  
WHERE <CR> MEANS CARRIAGE RETURN.

IN THE ABOVE EXAMPLE CONTROLLER NUMBER 0 HAS BEEN ENTERED TO THE PROGRAM.

### 13.2 SELECTED UNITS

FOR A GIVEN SELECTED CONTROLLER, OR CONTROLLERS, TERMINALS ON THAT SPECIFIC CONTROLLER CAN BE ENTERED INDIVIDUALLY, SEQUENTIALLY, OR IN ANY ORDER, EACH SEPERATED BY A COMMA. THE OPERATOR IS ALSO GIVEN THE FLEXIBILITY OF ENTERING ALL 63 TERMINALS SIMULTANEOUSLY. THE SYSTEM IS THEN MAPPED, ONLINE TERMINALS EXERCISED, OFFLINE TERMINALS REPORTED AS BEING OFFLINE, AND NON-EXISTENT TERMINALS REPORTED AS NOT SYSGENED. (A BRIEF DESCRIPTION OF SYSGEN IS GIVEN IN 1.1 OF THE SYSTEM GENERATION MANUAL). THE PROGRAM THEN EQUATES THOSE TERMINALS TO LOGICAL DEVICES, AS SYSGENED ON THE SYSTEM, STORES THEM IN THE SAME TABLE AS THE CONTROLLERS, WITH THE TERMINAL NUMBER IN THE LO-BYTE OF THE WORD. ONE TASK CAN EXERCISE 63 TERMINALS AT ONE TIME. IF A SYSTEM HAS MORE THAN 63 TERMINALS SPREAD OUT OVER MULTIPLE CONTROLLERS, MULTIPLE TASKS MUST BE RUN TO EXERCISE THOSE TERMINALS GREATER THAN 63. HOWEVER EACH TASK MUST BE INITIATED FROM DIFFERENT CONSOLE TERMINALS. INTERROGATION HERE CONTINUES WITH:

UNIT 1

'ENTER TERMINALS ON THAT CONTROLLER (0) 1 ? 1-4 ''

THE OPERATOR TYPES IN THE TERMINALS TO BE EXERCISED, ON THE SELECTED CONTROLLER (0). 1-4 MEANS 4 TERMINALS HAVE BEEN ENTERED ALL AT ONCE ON THE SELECTED CONTROLLER.

UNITS KEEPS A SEQUENTIAL COUNT OF THE NUMBER OF DEVICES ENTERED, AND POINTS TO THE NEXT SEQUENTIAL DEVICE. IT DOES NOT POINT TO THE PHYSICAL TERMINAL NUMBER. AT THIS POINT THE TOTAL 12 UNITS THE OPERATOR WANTED EXERCISED HAVE NOT BEEN ENTERED, THUS THE PROGRAM ASSUMES THE REMAINING DEVICES ARE ON DIFFERENT CONTROLLERS, AND SO CONTINUES WITH THE DIALOGUE.

UNIT 5

ENTER CONTROLLER NUMBER : (0) ) ? 1

THE PROGRAM ASKS WHAT OTHER CONTROLLER IS TO BE UTILIZED, THE OPERATOR SPECIFIES CONTROLLER NUMBER 1.

ENTER TERMINALS ON THAT CONTROLLER : (0) 4 ? 1,2,3,4

HERE THE PROGRAM INTERROGATES FOR TERMINALS TO BE ENTERED, AND THE OPERATOR ENTERS 4 TERMINALS ON CONTROLLER 1 IN SEQUENTIAL ORDER. NOT HAVING ENTERED THE TOTAL NUMBER OF TERMINALS (12) PREVIOUSLY ASKED FOR TO BE EXERCISED, THE PROGRAM AGAIN CONTINUES TO INTERROGATE THE OPERATOR.

UNIT 9

ENTER CONTROLLER NUMBER : (0) 1 ? 2

THE OPERATOR ENTERS CONTROLLER NUMBER 2 TO THE PROGRAM

ENTER TERMINALS ON THAT CONTROLLER : (D) 8 ? 1,2,3-4

AFTER THE PROGRAM ASKS FOR THE REMAINING 4 TERMINALS, THE OPERATOR ENTERS THEM IN SEQUENTIAL AND SIMULTANEOUS COMBINATIONS.

IN THE ABOVE EXAMPLE TERMINALS 1,2 ON THE PREVIOUSLY ENTERED CONTROLLER I.E (CONTROLLER 2) IS ENTERED TO THE PROGRAM TO BE EXERCISED. TERMINALS 3 AND 4 IS ALSO ENTERED, BUT AS 3 THROUGH 4, ALLOWING FOR TYPING FLEXIBILITY. HAVING COUNTED THE TOTAL UNITS ENTERED TO BE EXERCISED, IMMEDIATELY THE OPERATOR IS INFORMED OF THE NUMBER OF TERMINALS ENTERED, IN THE FOLLOWING FORMAT:

EXAMPLE: NUMBER OF ENTERED TERMINALS = 12  
WHERE 12 IS THE TOTAL NUMBER OF LEGAL DEVICES ENTERED TO THE PROGRAM.

\*\*UNITS\*\* \*\*CONTROLLER\*\* \*\*LOGICAL SB\*\* \*\*LUN\*\*

XX YY XX Z

WHERE XX IS THE PHYSICAL TERMINAL ENTERED ON CONTROLLER YY, ZZ IS THE LOGICAL SB UNIT NUMBER ASSIGNED TO EACH TERMINAL BY RSX DURING SYSGEN, AND Z IS THE LOGICAL UNIT NUMBER THE PROGRAM ASSIGNS TO EACH UNIT XX.

### 13.3 OPERATOR INTERFACE DIALOGUE

OTHER EXAMPLES OF OPERATOR AND PROGRAM DIALOGUE ARE LISTED BELOW.

THE OPERATOR CAN TYPE IN ALL 63 TERMINALS SIMULTANEOUSLY AS FOLLOWS:

```
>RUN DZKCI
DCP-A> STA
UNITS (D) ? 63
UNIT 1
ENTER CONTROLLER NUMBER : (0) ?
```

EXAMPLE: 'ENTER TERMINALS ON THAT CONTROLLER (1)?'1-63 <CR>

IN THE ABOVE EXAMPLE, ALL 63 TERMINALS ARE ENTERED INTO A 63 WORD TABLE, AND THE PROGRAM EXERCISES ALL 63 DEVICES IF THEY ARE ALL ON LINE. IT IS TO BE NOTED THAT ONLY ONE CONTROLLER NUMBER(0 THRU 7)AND UP TO 63 DEVICES ON ANY ONE CONTROLLER, CAN BE ENTERED AT ANY TIME, WHICH LIMITS THE PROGRAM TO EXERCISE A MAXIMUM OF 63 TERMINALS.

ANOTHER EXAMPLE IS GIVEN BELOW:

IF THE OPERATOR HAS 63 UNITS ON THE DPM SYSTEM, BUT 15 DEVICES ARE ARE ON CONTROLLER 0, 15 ON CONTROLLER 1, 15 ON CONTROLLER 2, AND 18 DEVICES ARE ON CONTROLLER 3 (A TOTAL OF 63 DEVICES), AND ALL DEVICES

ARE TO BE EXERCISED. THEN THE DIALOGUE IS AS FOLLOWS:

RUN DZKC1

DCP-A>STA

NUMBER UNITS (D)? : 63

ENTER CONTROLLER NUMBER (0)? : 0

UNIT 1

ENTER TERMINALS ON THAT CONTROLLER (1)? : 1-15

AT THIS POINT THE TOTAL 63 UNITS THE OPERATOR WANTED EXERCISED, HAVE NOT BEEN ENTERED, THUS THE PROGRAM ASSUMES THE REMAINING DEVICES ARE ON DIFFERENT CONTROLLERS, AND SO CONTINUES THE DIALOGUE:

ENTER CONTROLLER NUMBER (0)? : 1

UNIT 16

ENTER TERMINALS ON THAT CONTROLLER (1)? : 16-30

ENTER CONTROLLER NUMBER (1)? : 2

UNIT 31

ENTER TERMINALS ON THAT CONTROLLER (1)? : 31-45

ENTER CONTROLLER NUMBER (2)? : 3

UNIT 46

ENTER TERMINALS ON THAT CONTROLLER (1)? : 46-63

(WHERE UNITS KEEPS COUNT OF THE NUMBER OF DEVICES ENTERED, AND THE NUMBER IN THE BRACKETS ARE DEFAULTED DEVICE NUMBERS).

THE OPERATOR IS THEN INFORMED OF THE TOTAL NUMBER OF ENTERED TERMINALS AS EXPLAINED BEFORE IN THE FOLLOWING FORMAT:

NUMBER OF ENTERED TERMINALS = 63

E.T.C

E.T.C

AND THE PROGRAM GOES ON TO EXERCISE ALL 63 TERMINALS.

FOR TERMINALS THAT CANNOT BE ASSIGNED, OR ATTACHED, THE OPERATOR WILL BE INFORMED WITH:

"TERMINAL X CANNOT BE ASSIGNED-\$DSW=Y"

"TERMINAL X CANNOT BE ATTACHED-\$DSW=Y"

WHERE THE ERROR CODES Y ARE RETURNED BY DIRECTIVES IN THE DIRECTIVE STATUS WORD (\$DSW). FOR ADDITIONAL INFORMATION, REFER TO THE RSX-11M EXECUTIVE REFERENCE MANUAL, OR RSX-11M POCKET REFERENCE.

FOR NON-EXISTENCE SYSGENED CONTROLLERS AND/OR TERMINALS, THE OPERATOR



WILL BE INFORMED WITH:

"CONTROLLER X, TERMINAL Y IS NOT SYSGENED IN"  
PROGRAM IS ABORTED

#### 14.0 TEST DESCRIPTION

THE PROGRAM ESSENTIALLY CONSISTS OF ONE TEST, AND IS EXECUTED AS FOLLOWS:

AFTER INITIAL OPERATOR DIALOGUE, AND UPON TEST ENTRY, ALL ACTIVE F.D.C. TERMINALS ARE PLACED IN A [UP TO 63 WORD] TABLE, WITH THE CONTROLLER NUMBER IN THE HI-BYTE, AND THE TERMINAL NUMBER IN THE LO-BYTE OF THE WORD. DIAGNOSTICS ARE REQUESTED TO BEGIN, IN THE 1ST ACTIVE TERMINALS ON THE TABLE. THE PROGRAM THEN CHECKS FOR TERMINAL OFF LINE/ON LINE CONDITIONS, INFORMS THE OPERATOR OF THOSE CONDITIONS, LOGS THE CONDITIONS IN AN OFFLINE/ONLINE TABLE, CHECKS FOR DIAGNOSTIC ERRORS, AND THE PROCEDURE IS CONTINUED TO THE LAST TERMINAL. HAVING DONE THE LAST TERMINAL, A TWO MINUTE INTERVAL IS STARTED, THE 1ST ACTIVE TERMINAL IN THE TABLE IS CHECKED FOR OFFLINE/ONLINE CONDITIONS, AND A REQUEST IS ISSUED TO ONLINE TERMINALS. FOR TERMINALS RESPONDING WITHIN THE TWO MINUTE INTERVAL, DIAGNOSTIC ERRORS ARE CHECKED, LOGGED IN A TABLE, AND THE PROCEDURE IS CONTINUED TO THE LAST TERMINAL. IF THE TERMINAL DOES NOT RESPOND IN THE TWO MINUTE INTERVAL, IT IS LOGGED AS BEING OFFLINE, AND THE OPERATOR IS INFORMED THAT IT FAILED TO RETURN ON LINE FROM THE DIANOSTIC TESTS, AND THE PROCEDURE IS CONTINUED TO THE LAST TERMINAL. UPON COMPLETION OF THE LAST TERMINAL, THE ERROR TABLE IS CHECKED, ERRORS ARE REPORTED, AND THE 2 MINUTE INTERVAL IS CANCELLED IF NOT FINISHED. AN END OF PASS IS THEN RECORDED FOR ONLY ON-LINE TERMINALS, AND ANOTHER PASS IS STARTED.

#### 15.0 ERROR REPORTING

AT THE END OF EVERY PASS, MAJOR ERRORS SENSED, ARE THE DIAGNOSTIC ERRORS GENERATED BY THE TERMINALS, AND ARE REPORTED AS FOLLOWS:

##### 15.1 MAJOR ERRORS

EXAMPLE: "TERMINAL DIAGNOSTIC ERRORS ON PASS 1"

"SB"	TERMINAL-TYPE	FAILING-TEST
1	801	21

WHICH INDICATES DIAGNOSTIC ERRORS HAVE OCCURED DURING PASS 1, IN SB TERMINAL UNIT 1, OF TERMINAL-TYPE. RT-801 AND THE TEST WHICH FAILED IS TEST 21.

FOR ANY TERMINAL NOT RESPONDING ON LINE AT ANYTIME, THE OPERATOR IS INFORMED WITH:

"TERMINAL X IS NOT RESPONDING"

FOR ANY TERMINAL COMING BACK ON LINE, THE OPERATOR IS INFORMED WITH:

"TERMINAL X IS NOW RESPONDING"

FOR ANY TERMINAL GOING OFFLINE DURING DIAGNOSTIC TESTS, THE OPERATOR IS INFORMED WITH:

"TERMINAL X DID NOT COME BACK ON LINE FROM DIAGNOSTIC TESTS"

DPM50 ERRORS ARE REPORTED BY THE FOLLOWING MESSAGES:

SB#	TERMINAL TYPE	FAILING TEST
3	DPM50	HARDCORE
5	DPM50	SOFTCORE-- XX YY ZZ

WHERE XX = 01 IF FAILED SOFTCORE TEST 1 (Q-BUS INTERFACE TEST)  
YY = 02 IF FAILED SOFTCORE TEST 2 (MEMORY TEST)  
ZZ = 03 IF FAILED SOFTCORE TEST 3 (CPU TEST)

FOR ALL TERMINALS GOING OFFLINE, THE OPERATOR IS INFORMED WITH:

"NO ACTIVE TERMINALS ON THE BUS" !!!!

FOR AN END OF PASS REPORT, THE OPERATOR IS INFORMED WITH:

EXAMPLE: END OF PASS 1, TIME=8:15

THIS END OF PASS REPORT CAN BE INHIBITED BY TYPING THE THE FOLLOWING, UPON RECEIVING THE DCP-A> PROMPT.

DCP-A>STA/FLA:IXE

## 16.0 EXECUTION TIME

EXECUTION-TIME PER PASS VARIES. MAXIMUM TIME = 2 MINS. PASS-TIME DEPENDS ON EXECUTION TIME OF DIAGNOSTIC TESTS. ERROR FREE DIAGNOSTIC TESTS WILL BE EXECUTED QUICKLY (APPROX 15 SECS.). A TERMINAL WHICH GENERATES ERRORS, WILL RUN THE DIAGNOSTIC (AT MINIMUM) 90 SECS, AT WHICH TIME THE DEVICE WILL GO OFFLINE. THE PROGRAM THEN WAITS AN ADDED 30 SECS TO ENSURE THAT THE DEVICE IS BACK ON LINE, WHICH ACCOUNTS FOR A MAXIMUM PASS TIME OF 2 MINS.

## 17.0 PROGRAM TERMINATION

THE PROGRAM WILL CYCLE UNTIL A CONTROL C IS TYPED UPON THE CONSOLE WHICH INITIATED THE PROGRAM. AT THAT TIME THE PROGRAM WILL ABORT AND

EXIT TO THE MONITOR.

EXAMPLE: CONTROL C

MCR>

SEQ 0018