ARIX Corporation

Diagnostic Shell User Document

Rev 0.1

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DOCUMENT REVISION RECORD

This page will contain a short description of each revision made to this document in the order they were made. Each entry on this page will start with the revision number and brief comments on the revision made.

0.1   Initial working document for review

1. DOCUMENT OVERVIEW

This document describes the usage of the diagnostic shell for the ARIX System90. The diagnostic shell is the common part of spm_exec (or called spm shell before) . pm_exec. iopm_exec, and the executive of new processors.

spm_exec - resides in SPM local memory, and runs the board level tests for the components of the CSS (Computational SubSystem).

pm_exec - resides in first memory board run by all the Processing Modules, and runs the system level tests for the S90 system exercise. The text & data section of pm_exec and its tests are shared by all the PM's.

iopm_exec - resides in IOPM local memory, and runs the board level tests for the device boards inferfaced with an IOPM.

The diagnostic shell is said to be diag shell for short.

2. DIAGNOSTIC SHELL DESCRIPTION

The diagnostic shell is both a command language and a programming language that provides an interface to the diagnostic system. The diagnostic system software is menu driven, it provides help screens for major commands and tests, it allows to run individual test and all tests, it can loop on some tests or all tests, it may stop on error or loop on error.

The diagnostic shell may be used to read and execute commands from console or a macro buffer. For example,

> (1) **mac.e 103c000**

calls the diag shell to read commands from a buffer addressed at 0x103c000.

> (2) **mac.e**   –

calls the diag shell to read commands from the default buffer "macbuf". The default buffer is limited to 2K bytes of memory space.

The macro buffer may be filled from console during macro entry mode, or it may be filled by downloading through serial port from host. Also it may be filled from other external devices such as floppy disk, hard disk or tape.

2.1 Default Base Number

Unless otherwise noted all numbers in this document. input to or output from the diag shell, are in hexadecimal base number format.

3. PROGRAM LOADING

The programs can be loaded via SIO or from a floppy device (or disk/tape later). For the CSS component tests, we need to load spm_exec and the component tests. Since the SPM

local memory has 256K only (addressed from 1000000 to 103ffff), the spm_exec occupies (1000000-1023fff), and 103e000-103ffff is reserved for stack space,the test code space is only restricted to 1024000-103dffff. Each CSS component test is overlaid in that area. If some test is too big, then it needs to be splitted into several subtests. For example, the IOA test is splitted into ioastspm and ioadtspm. After finish a test, before load another test, make sure to use "clrtest" command to clear the old test entry and to allow the overlay of new test entry. For the iopm device board tests, we need to load spm_exec then iopm_exec then the iopm device board tests. For the system level tests, we need to load spm_exec then pm_exec then the system level tests.

3.1 Loading program via SIO

The loading process for loading program from SIO requires two steps. First the type of load command is entered (followed by two CRs) to initiate the loading and follow by the SIO download via the umod function (followed by control-z).

3.1.1 The procedure for loading program via SIO

1. Reset hardware (S90 system).
2. Enter "sd<CR><CR>" to download SPM exec (or called SPM shell).
3. Login to Jade and points to directory /s90/image.
4. Enter "umod <spm_exec>" and control-z to start the down load.

A. For the CSS component tests:

A5. Enter "load -ssio -dspmm<CR><CR>" to download the IOM diagnostics.
A6. Enter "umod spm_iom<CR>" and control-z to start the down load.
A7. Here is ready to run the iom diagnostics.
A8. When finish the IOM test, Enter "clrtest" to clear the IOM test.
A9. Repeat A5-A8 for other tests (such as spm_ioas, spm_ioad, spm_pm..).

B. For the PM system level tests:

B5. Enter "load -ssio<CR><CR>" to download the PM exec.
B6. Enter "umod pm_exec<CR>" and control-z to start the down load.
B7. Enter "load -ssio<CR><CR>" to download the edt system test.
B8. Enter "umod pm_edt<CR>" and control-z to start the down load.
B9. Enter "load -ssio<CR><CR>" to download the mmu system test.
Ba. Enter "umod pm_mmu<CR>" and control-z to start the down load.

C. For the IOPM device board tests:

C5. Enter "load -ssio -diopm -n<slot#> <CR><CR>" to download IOPM exec.
C6. Enter "umod iopm_exec<CR>" and control-z to start the down load.
C7. Enter "load -ssio -diopm <CR><CR>" to download the WAN diagnostics.
C8. Enter "umod iopm_awan<CR>" and control-z to start the down load.

3.2 Loading program via Floppy Device

The loading process for loading program from the floppy device requires only one step.

Enter the load command and follows by one CR to initiate the loading process.

3.2.1 Examine the content of a floppy diskette

Issue "dirf" command for SPM PROM version 1.2 or under.

(**NOTE:** Issue "dir flp/" command for SPM PROM version 1.4 or above.)
Then the screen may display part of the following information:

spm_exec	Blk:xxxx: (executable)
spm_macro	Blk:xxxx:
spm_pm	Blk:xxxx: (executable)
spm_int	Blk:xxxx: (executable)
spm_iom	Blk:xxxx: (executable)
spm_ioas	Blk:xxxx: (executable)
spm_ioad	Blk:xxxx: (executable)
pm_exec	Blk:xxxx: (executable)
pm_macro	Blk:xxxx:
pm_edt	Blk:xxxx: (executable)
pm_mmu	Blk:xxxx: (executable)
iopm_exec	Blk:xxxx: (executable)
iopm_macro	Blk:xxxx:
iopm_acdb	Blk:xxxx: (executable)
iopm_scsi	Blk:xxxx: (executable)
iopm_alan	Blk:xxxx: (executable)
iopm_awan	Blk:xxxx: (executable)

Make sure the floppy has the files desired to be downloaded. The filename is in the form of pppp_bbbb, where pppp indicates what processor (spm, pm or iopm) will run it, and bbbb indicates either the exec or the test itself or a macro file.

3.2.2 The procedure for loading program via Floppy Device

1. Reset hardware (S90 system).
2. Insert the 1.2m floppy diskette which contains spm_exec into drive.
3. Enter "dirf<CR>" or "dir flp/<CR>" command to read the floppy.
4. Type "bf spm_exec<CR>" or "b flp/spm_exec<CR>" to download SPM exec.

        A. For the CSS component tests:
A5. Enter "load -dspmm spm_iom<CR>" to download the IOM diagnostics.

A6. Here is ready to run the iom diagnostics.

A7. When finish the IOM test, Enter "clrtest" to clear the IOM test.

A8. Repeat A5-A7 for other tests (such as spm_ioas, spm_ioad, spm_pm..).

B. For the **PM system level tests:**

B5. Enter "load pm_exec<CR>" to download the PM exec.

B6. Enter "load pm_edt<CR>" to download the edt system test.

B7. Enter "load pm_mmu<CR>" to download the mmu system test.

C. For the **IOPM device board tests:**

C5. Enter "load -diopm -n<slot#> iopm_exec<CR>" to download IOPM exec.

C6. Enter "load -diopm iopm_awan<CR>" to download the WAN diagnostics.

The diagnostic shell uses console in four modes.

(a)	- The terminal is used to communicate with spm exec.
(b)	- The terminal is used to communicate with pm exec.
(c)	- The terminal is used to talk with iopm exec.
(d)	- The terminal is used to talk with unix development system.

After the spm exec is booted, the terminal is controlled by it, then if the iopm exec or pm exec is loaded, the iopm exec or pm exec takes over the terminal immediately after the completion of loading. You may switch around the console mode by the following way:

spm	- Type "con<CR>".
spm	- Type "iopm [iopm_slot#]<CR>". (It refers to last iopm used if iopm_slot# is not given.)
spm	- Type "load -ssio -dspmm<CR> <CR>".
pm	- Type "^t". (^t means control-t.)
pm	- Type "load -ssio<CR> <CR>".
iopm	- Type "^t". (^t means control-t.)
iopm	- Type "load -ssio -diopm<CR> <CR>".
unix	- Type "^c". (^c means control-c.)

The direct switch for pm->iopm or iopm->pm is not supported, but you may use combinational switch commands to achieve it. For example, pm->iopm may be done by pm->spm then spm->iopm.

4. ON LINE HELP MENU

There are three commands related to help menu, they are "? [diag_command_name]", "h <shell_command_name>" and "l(ist)". If just type "?<CR>", the following information will be displayed:

The diag shell has a multiple level menu structure. To print this message type "?" followed by a carriage return (<CR>). To print the current menu, type 'l' or 'list' followed by <CR>.

On boot, The exec comes up in the top level menu.

To access one of the menus, type the key letter or letters for the command followed by <CR>. For example, the command:

u(tilities)   m   Utility Programs Menu

is executed by typing 'u' or 'utilities' followed by <CR>. The menu displayed would be the "Utilities Programs Menu". This is referred to as going "down" to a menu. To go "up" to the previous menu, press the escape key (<ESC>).

4.1 Shell Command Help Menu

Each of the SPM/IOPM/PM shell command has an individual HELP menu that an user can activate to review the command's syntex and it's usage. To view the help menu:

1. Enter "l<CR>" to list commands available at current active level.
2. Enter "h(elp) <command> <CR>" to view that command's help menu.

4.2 Diagnostic Command Help Menu

Many diagnostic tests supply help information that an user can activate to review the command's syntex and it's usage. To view the detailed help information:

1. Enter "di<CR>" if not in Diagnostic menu.
2. Enter "submenu 0<CR>" to switch to test submenu 0.
3. Enter "l<CR>" to list the content of the test submenu.
4. Enter "? <command> <CR>" to view that command's help menu.

5. PROGRAM EXECUTION

After the executive and the test code are downloaded, there are three ways to run the diagnostics.

5.1 Use submenu command

Issue a submenu command from di(agnostic) menu to switch to the desired submenu then run the desired test by typing that test command with necessary parameters. This is the method that the firmware or the diag image uses. This way allows user to have the variety of choices of command syntax. If we run system level test (in pm exec environment), the test is only initiated at the master pm (the pm with smallest slot#). For example.

a. Type "di<CR>" if not in diagnostic menu.
b. Type "submenu <number_or_name> <CR>" to switch to desired submenu.
c. Type "test1 [arg1 [arg2 [...]]]<CR>". (Depending on syntax)

will run test1 with given arguments just one time.

5.2 Use doall command

Use disable/enable commands with options to set up the desired tests, then type "doall<CR>" to start to run those tests in pre-set syntax and in pre-set sequential order. For example,

    a. Type "disable<CR>".
    b. Type "enable -l2<CR>".
    c. Type "enable -l5 test1<CR>".
    d. Type "enable -l8 test2<CR>".
    e. Type "doall<CR>".

will run test1 5 times then test2 8 times then test1 5 times then test2 8 times. But only allow to have one error in each test. If encounter an error in a test, then it quits from that test and continue to run next test.

5.3 Use run command

Use enable command with options to set up the desired test options, then type "run [test_name]<CR>" to start to run that test in pre-set syntax. For example,

    a. Type "enable -l5 -e3 test1<CR>".
    b. Type "run test1<CR>".

will run test1 5 times and allow to have at most of 3 errors.

This method has a side effect, it will disable all the tests not run.

6. COMMANDS

There are four types of command in diag shell.

    m - indicates a menu.
    c - indicates a non-diagnostics related command.
    t - indicates a diagnostics related command.
    l - special case of menu, need one argument related with test entry.

The submenu is only command to be 'l' type, it allowes to have twenty entries of test categories (or submenus). Each entry points to a menu combined of The commands in di(agnostic) menu use 'l' type struture for argument searching, parsing and execution.

When a command is issued, it always searches for global menu first, then the reserved keywords, then current menu, then searches the entire menus in pre-order form, but igoring the 'l' type. If the command is found, it is executed right away, if the command is not found, the diag shell will complain it. Since the submenu is 'l' type, if we are in di menu, then any command under submenu would not be able to be initiated. In order to initiate a command under "submenu", always need to switch to that submenu before issue the command.

The global menu and the reserved keywords are not able to be displayed from anywhere. The global menu includes the following commands:

    "?", "h(elp)", "l(ist)", "mac<.[ans]>".

The reserved keywords include if, then, else, endif, switch, case, ;;, endcase, while, do, done.

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