

| d i g i t a l |

| uNOTE # 043 |

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Originator: JACK TOTO	Page 1 of 14

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This MicroNote contains a collection of data and charts which will allow users to match the correct RD/RX controller and firmware revision to his system/CPU, as well as compatibility of disk formatting software. All chart compatibilities were developed using the latest versions of operating system software available as of the date posted on this MicroNote. The MicroNote is divided into 4 sections, one for each of the controllers as outlined below.

CPU Upgrades

2. System Upgrade Examples

This MicroNote contains a collection of data and charts which will allow Users to match the correct RD/RX controller and firmware revision to his system/CPU, as well as compatibility of disk formatting software. All chart compatibilities were developed using the latest versions of MicroNote. The MicroNote is divided into 4 sections, one for each of the controllers as outlined below.

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## I. RQDX1 HISTORY:

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The first version of RQDX1 micro-code (version 7.0) had incompatibilities with RX50 diskettes/drives transported from one machine to another, this was noted and changed with ECO (Engineering Change Order) M8639-ML002 dated June 1984. The new ROM micro-code became known as Version 8.0.

When the RD52 was announced, the same controller was to be used with these drives, but the firmware obviously needed to be changed in order to recognize this new drive. The new micro-code for the RD52s became known as version 9.0, and was documented in ECO M8639-ML004.

The RQDX1 later underwent another ECO that allowed it to be resident in any Q-bus slot after the CPU. This ECO involved changes in etch work, micro-code and nomenclature. The controller name and module number changed from the RQDX1 with module number M8639-YA stamped on the handles, to the RQDX2 with module number M8639-YB stamped on the handle. The firmware revision became known as version 9.4E, and was compatible with the RX50 and RD5n (n = 1, 2, 3) series devices.

## RQDX1 FIRMWARE:

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The RQDX1 has had three revisions to its firmware. The ROM part numbers for the RQDX1 controller are listed below. The two ROM part numbers represent the low and high byte pieces of micro-code, and both parts are needed when upgrading a system from one level to the next. The low byte ROM is installed in socket E106 and the high byte ROM is installed in socket E105. Refer to the RQDX1 maintenance prints (PN MP-01731-01) for the location of those sockets.

Version 7.0 ROMs For RQDX1 Support of The RX50 and RD51:  
23-238E4-00 for the low byte ROM.  
23-239E4-00 for the high byte ROM.

Version 8.0 ROMs For RQDX1 Support of The RX50 and RD51:  
23-264E4-00 for the low byte ROM.  
23-265E4-00 for the high byte ROM.

Version 9.0 ROMs For RQDX1 Support of The RX50 and RD51/52:  
23-042E5-00 for the low byte ROM.  
23-043E5-00 for the high byte ROM.

RQDX1 COMPATIBILITY  
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CONTROLLER/CPU UPGRADES:  
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It is important to note that when upgrading either the CPU or the RX/RD controller, that you change the firmware on both of the modules. For example if your current system is a MicroPDP-11/23 with version 8.0 firmware on both the CPU and the controller, your system will successfully boot an RD51 as a fixed device in the system. If you wish to upgrade your system to allow for the usage of a larger fixed disk (RD52), you will need to upgrade the ROMs on the RQDX1 from version 8.0 to version 9.0 (see RQDX1 HISTORY for actual part numbers). However due to some timing considerations the ROMs on the CPU card should also be changed to version 9.0 (this will change the CPU from a KDF11-BE to a KDF11-BF). Further the formatter used with the newer micro-code will not be the same as the one used for the older micro-code. To obtain the proper formatter file name, refer to the chart below.

SYSTEM UPGRADE EXAMPLES:  
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VERSION 7.0/8.0 SYSTEM  
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CPU ROMs: (KDF11-BE)	RQDX1 ROMs:	
23-158E4-00	23-238E4-00	{version 7.0}
23-159E4-00	23-239E4-00	
	-- OR --	
	23-264E5-00	{version 8.0}
	23-265E5-00	

VERSION 9.0/9.4E SYSTEM  
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CPU ROMs: (KDF11-BF)	RQDX1 ROMs	
23-183E4-00	23-042E5-00	{version 9.0}
23-184E4-00	23-043E5-00	{RQDX1 }
	-- OR --	
	23-172E5-00	{version 9.4E}
	23-173E5-00	{RQDX2 }

## II. RQDX2 HISTORY:

As mentioned above, the RQDX1 controller became the RQDX2 with an ECO to the board itself and a change to the firmware allowing it to support the latest mass storage devices on MicroPDP-11s and MicroVAX I's (RD52s). The announcement day (MicroVAX II) ROMs (version 10.0D) were available to be used with the RD53s, and have been upgraded once, to the version 10.0E micro-code. These two versions of the firmware will boot any of the RD devices available for the MicroPDP-11s or the MicroVAXs.

### RQDX2 FIRMWARE:

The RQDX2 has had three revisions to its firmware. The ROM part numbers for the RQDX2 controller are listed below. The two ROM part numbers represent the low and high byte pieces of micro-code, and both parts are needed when upgrading a system from one level to the next. The low byte ROM is installed in socket E106 and the high byte ROM is installed in socket E105. Refer to the RQDX2 maintenance prints (PN MP-01731-01) for the location of those sockets.

Version 9.4E ROMs For RQDX2 Support With The RX50 and RD51/52:  
23-172E5-00 for the low byte ROM.  
23-173E5-00 for the high byte ROM.

Version 10.0D ROMs For RQDX2 Support With The RX50 and RD51/52/53:  
23-178E5-00 for the low byte ROM.  
23-179E5-00 for the high byte ROM.

Version 10.0E ROMs For RQDX2 Support With The RX50 and RD51/52/53:  
23-188E5-00 for the low byte ROM.  
23-189E5-00 for the high byte ROM.

### RQDX2 COMPATIBILITY

#### CONTROLLER/CPU UPGRADES:

It is important to note that when upgrading either the CPU or the RX/RD controller, that you change the firmware on both of the modules. For example if your current system is a MicroPDP-11/23 with version 9.0 or firmware on the CPU and version 9.0 or 9.4E firmware on the controller, your system will successfully boot an RD52 as a fixed device in the system. If you wish to upgrade your system to allow for the usage of a larger fixed disk (RD53), you will need to upgrade the ROMs on the RQDX2 from whatever version you currently have to version 10.0D. This change will further require that the CPU be able to boot the RD53. If your system is a MicroPDP-11, the user will need install the KDF11-B3 ROM set installed on the CPU. If the user's system is a MicroVAX II the system ROMs on the KA630 CPU module will boot the RD53. Finally, the formatter

used with the newer/upgraded micro-code will not be the same as the one used for the older micro-code. To obtain the correct formatter filename, refer to the chart below.

SYSTEM UPGRADE EXAMPLES:  
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VERSION 9.0/9.4E SYSTEM  
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CPU ROMs: (KDF11-BF)	RQDX1/2 ROMs:	
23-183E4-00	23-042E4-00	{version 9.0}
23-184E4-00	23-043E4-00	{RQDX1 }

-- OR --

	23-172E5-00	{version 9.4E}
	23-173E5-00	{RQDX2 }

VERSION 10.0D/10.0E SYSTEM  
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CPU ROMs: (KDF11-BH)	RQDX2 ROMs	
23-380E4-00	23-178E5-00	{version 10.0D}
23-381E4-00	23-179E5-00	{RQDX2 }

-- OR --

	23-188E5-00	{version 10.0E}
	23-189E5-00	{RQDX2 }

III. RQDX3 HISTORY:  
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The RQDX3 is the enhanced version of the RQDX family of MSCP RX/RD device controllers. Disks previously formatted on RQDX1/2 controllers will not be compatible with the RQDX3 controller. The RQDX1/2 stores the disk geometry information in ROM while the RQDX3 stores the data on the disk itself and reads in the track that contains this information during the power up sequence. Further the RQDX3 uses a 17 sector per track format while the RQDX1/2 uses an 18 sector per track format. There are also a few performance enhancements to the RQDX3 that add to its preference as a disk controller over the older versions, those being a 1:1 disk interleaving versus 3:1 interleaving for the earlier controllers, an elevator seek reordering algorithm is used as well as an algorithm to handle overlapped seeks when multiple RD5ns are resident in a system. Further the problem that existed with the RQDX2 hold-off timer has been fixed on the RQDX3 by increasing the length of the timer so as not to steal DMA grants from a second RX/RD controller or other DMA devices in the system.

RQDX3 FIRMWARE:  
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The RQDX3 has had only one firmware version to date. The ROM part numbers for the RQDX3 controller are listed below. The two ROM part numbers represent the low and high byte pieces of micro-code, and both parts are needed when upgrading a system from one level to the next. The low byte ROM is installed in socket E22 and the high byte ROM is installed in socket E21. Refer to the RQDX3 maintenance prints for the location of those sockets.

VERSION 1.10 ROMs 23-216E5-00 for the low byte ROM.  
23-217E5-00 for the high byte ROM.

RQDX3 COMPATIBILITY:  
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CONTROLLER/CPU UPGRADES:  
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It should be noted that whenever you upgrade your system by adding an RQDX3 controller in place of an RQDX1/2 that the disks (RD51/52/53) will have to be reformatted using the newest XXDP+ or MDM formatter. The disks are NOT forward compatible as they were when upgrading with the two earlier controllers. Along with this controller upgrade the user SHOULD upgrade his CPU. If your system is a MicroPDP-11, the user will need to install the KDF11-B3 ROM set on the CPU module. If the users system is a MicroVAX II the system ROMs on the KA630 CPU module will boot the RD53.

SYSTEM UPGRADES EXAMPLES:  
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VERSION 1.10 SYSTEM  
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CPU ROMs: (KDF11-BF)	RQDX3 ROMs:	
23-183E4-00	23-216E5-00	{version 1.10}
23-184E4-00	23-217E5-00	

-- OR --

CPU ROMs: (KDF11-BG)  
23-380E4-00  
23-381E4-00

#### IV. COMPATIBILITY CHART:

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When using any of the RQDX\* compatibility charts find the correct controller type (RQDX1/2/3) and revision level. Then follow any of the connected lines from that point, any of the devices that are on the line are compatible, any of the devices not connected by the lines are obviously not compatible. The formatters for PDP-11 systems can be found either in the XXDP+ diagnostics package or on the set of RX50s that ship with the system. It is the specific diagnostic routine that is listed in the column under formatter. The formatter for MicroVAX I's and II'S are found either in the MDM diagnostic package for MicroVAX II and on the RX50s that come with the MicroVAX I system. The RX50s that come with the MicroVAX II contain NO formatter and the MDM package must be obtained. It is possible to take the unformatted drive to Field Service and have them format the disk.

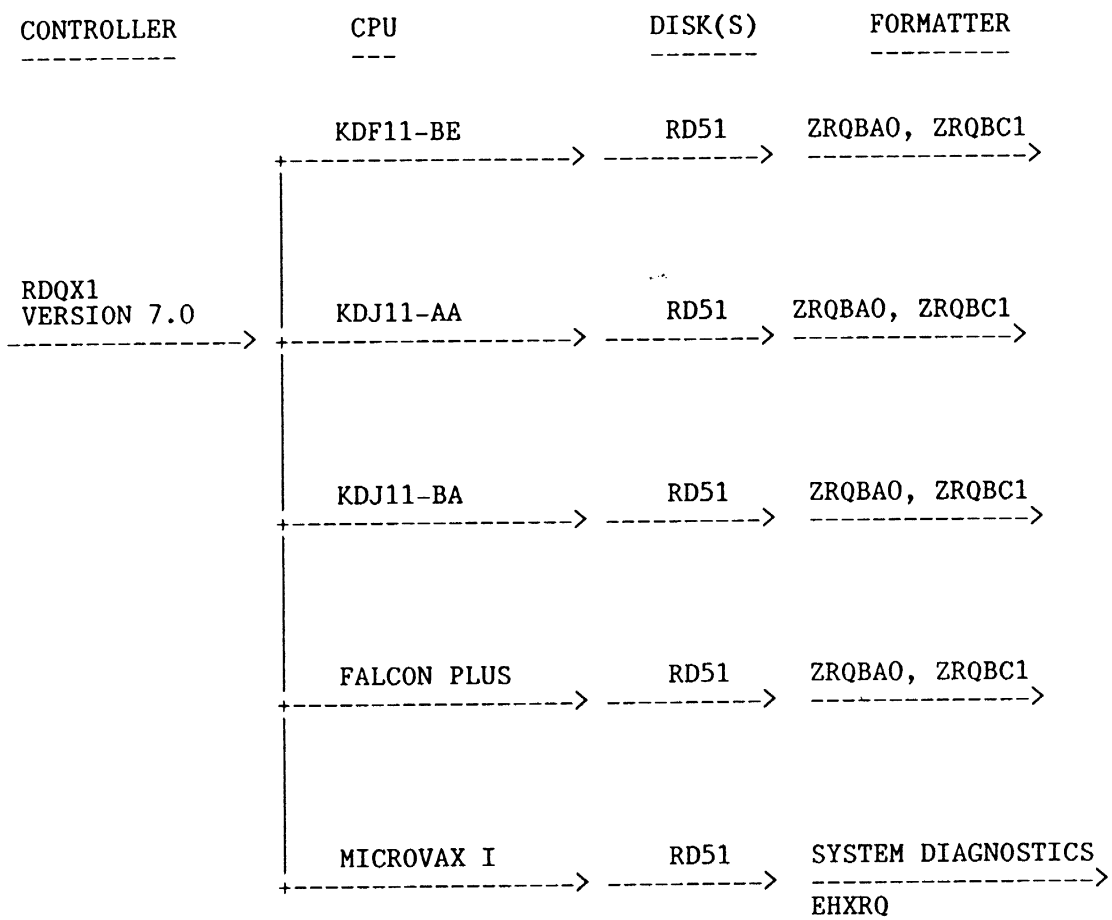
The charts are outlined as follows:

- A. RQDX1
  - 1. Version 7.0
  - 2. Version 8.0
  - 3. Version 9.0
- B. RQDX2
  - 1. Version 9.4E
  - 2. Version 10.0D
  - 3. Version 10.0E
- C. RQDX3
  - 1. Version 1.10

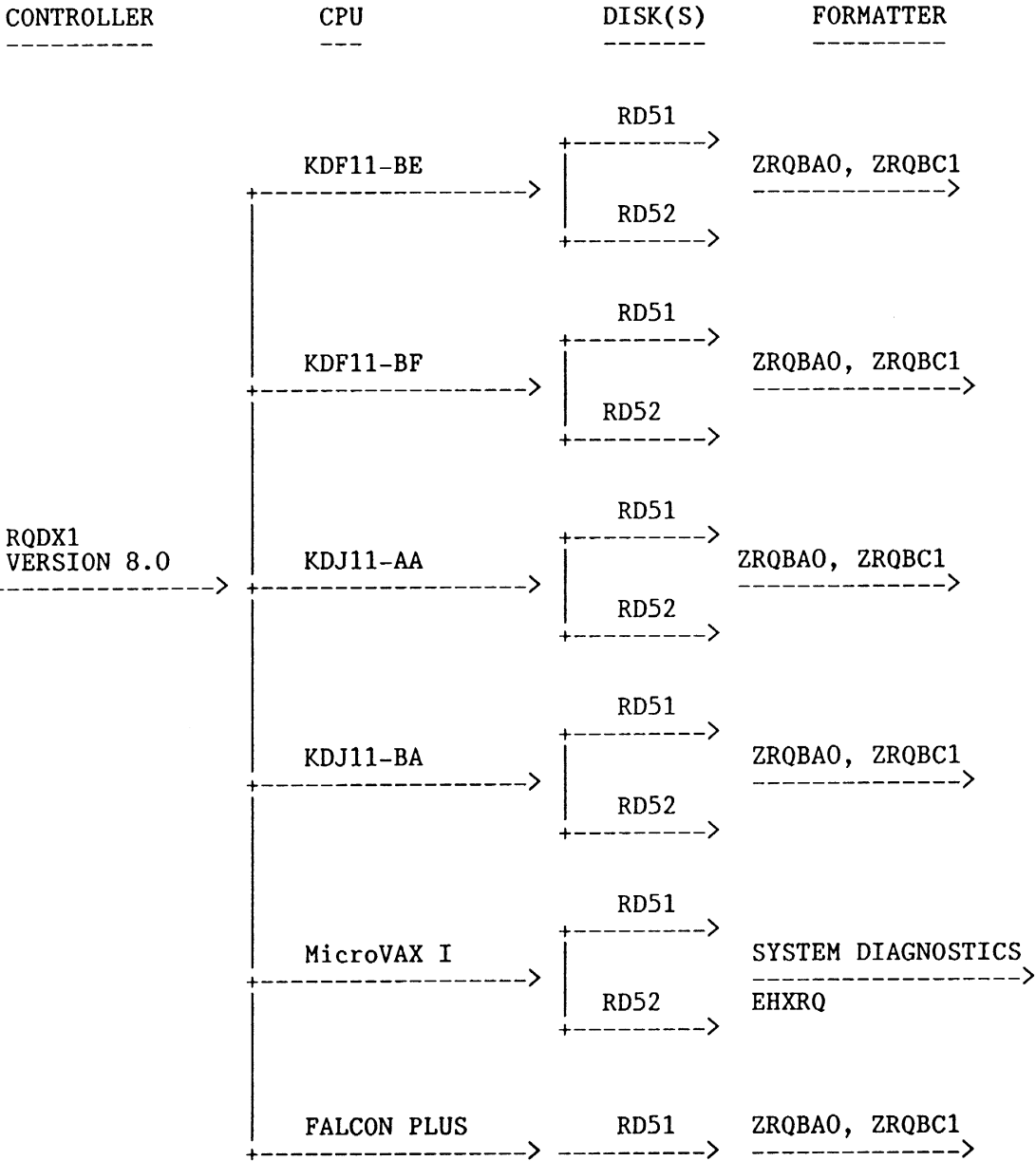
#### NOTE

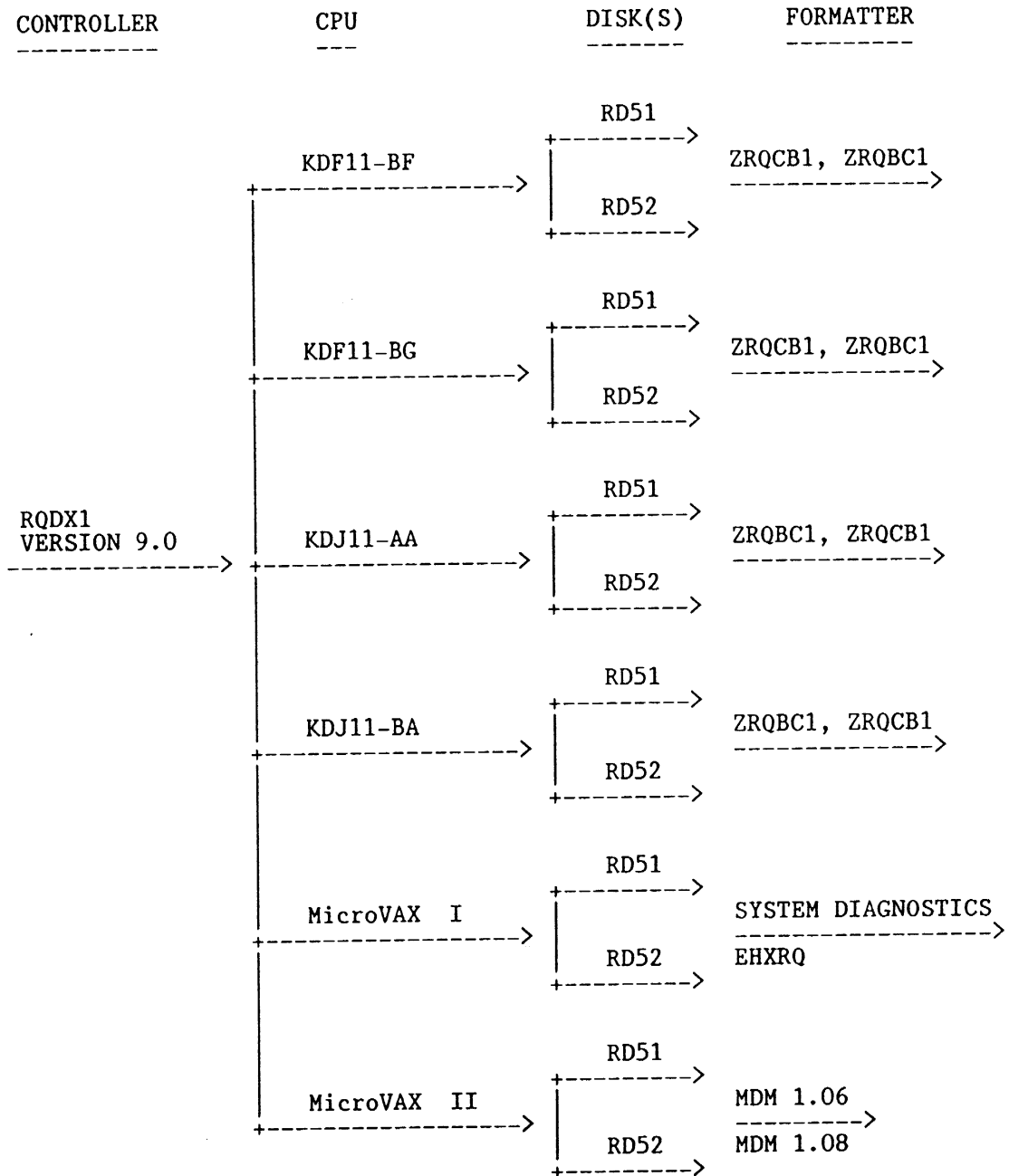
There are no diagnostics that are available for the RQDX3 on a MicroVAX I that is the only reason that the RQDX3 is not supported on a MicroVAX I.

RQDX1:

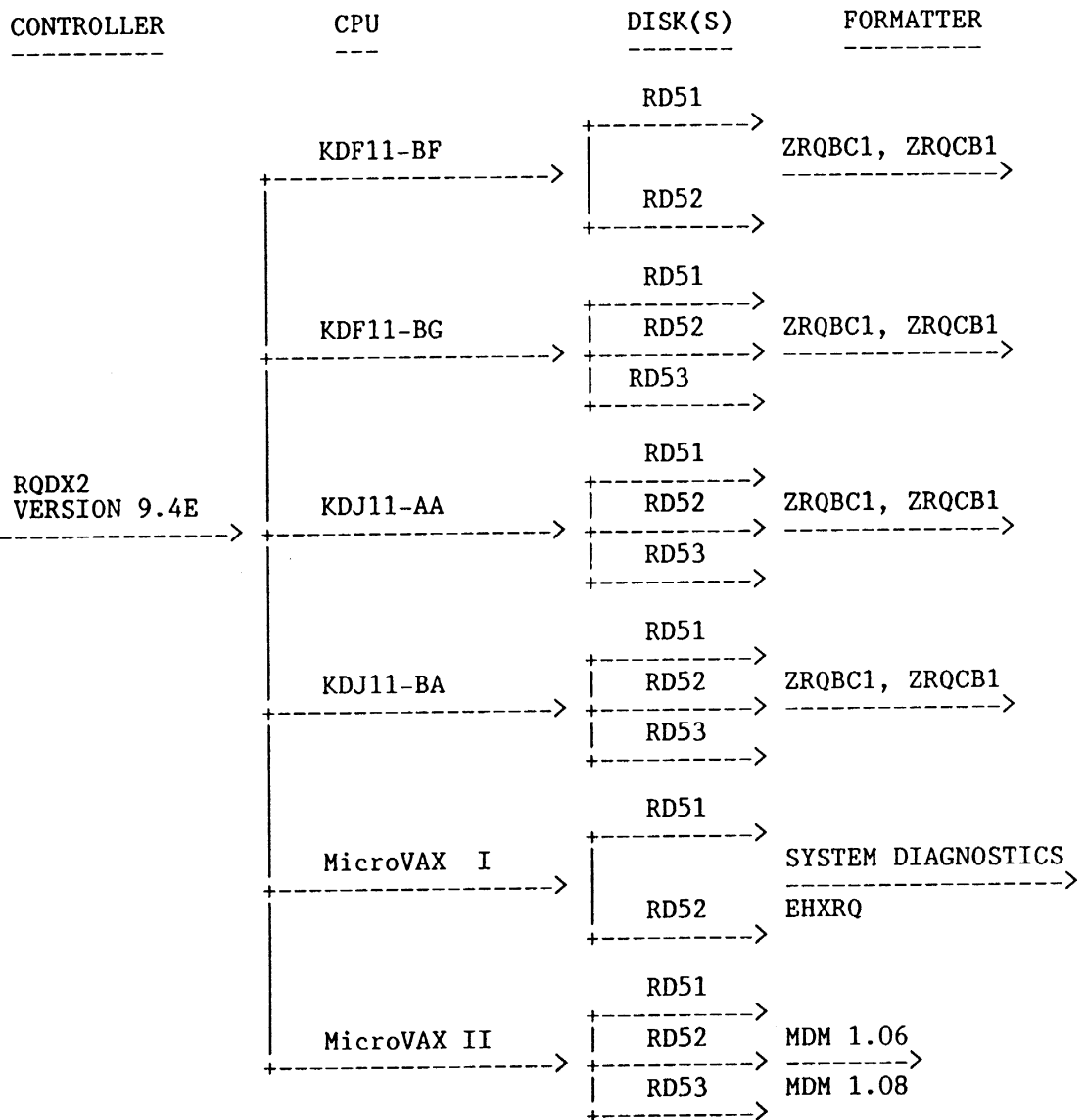


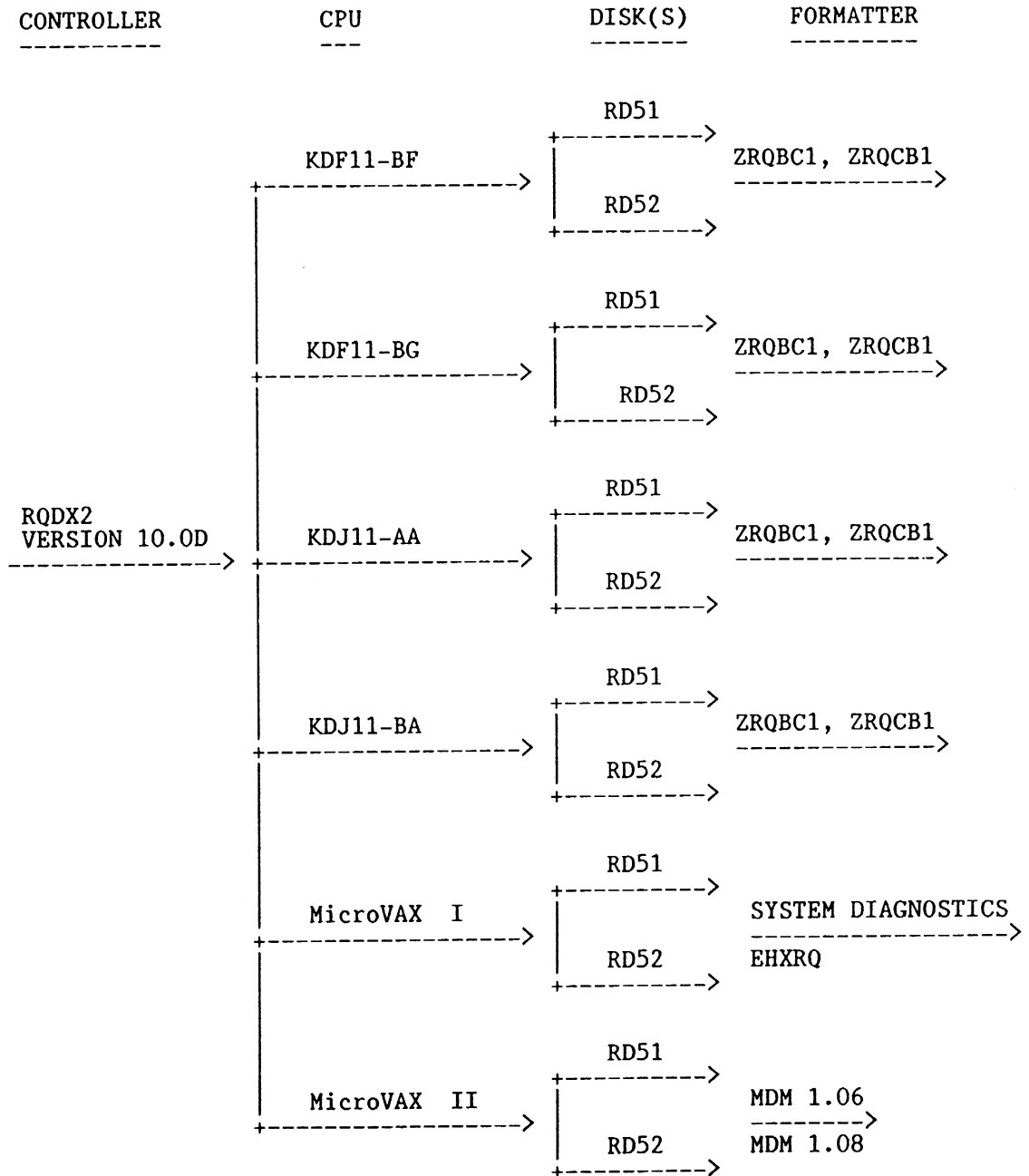


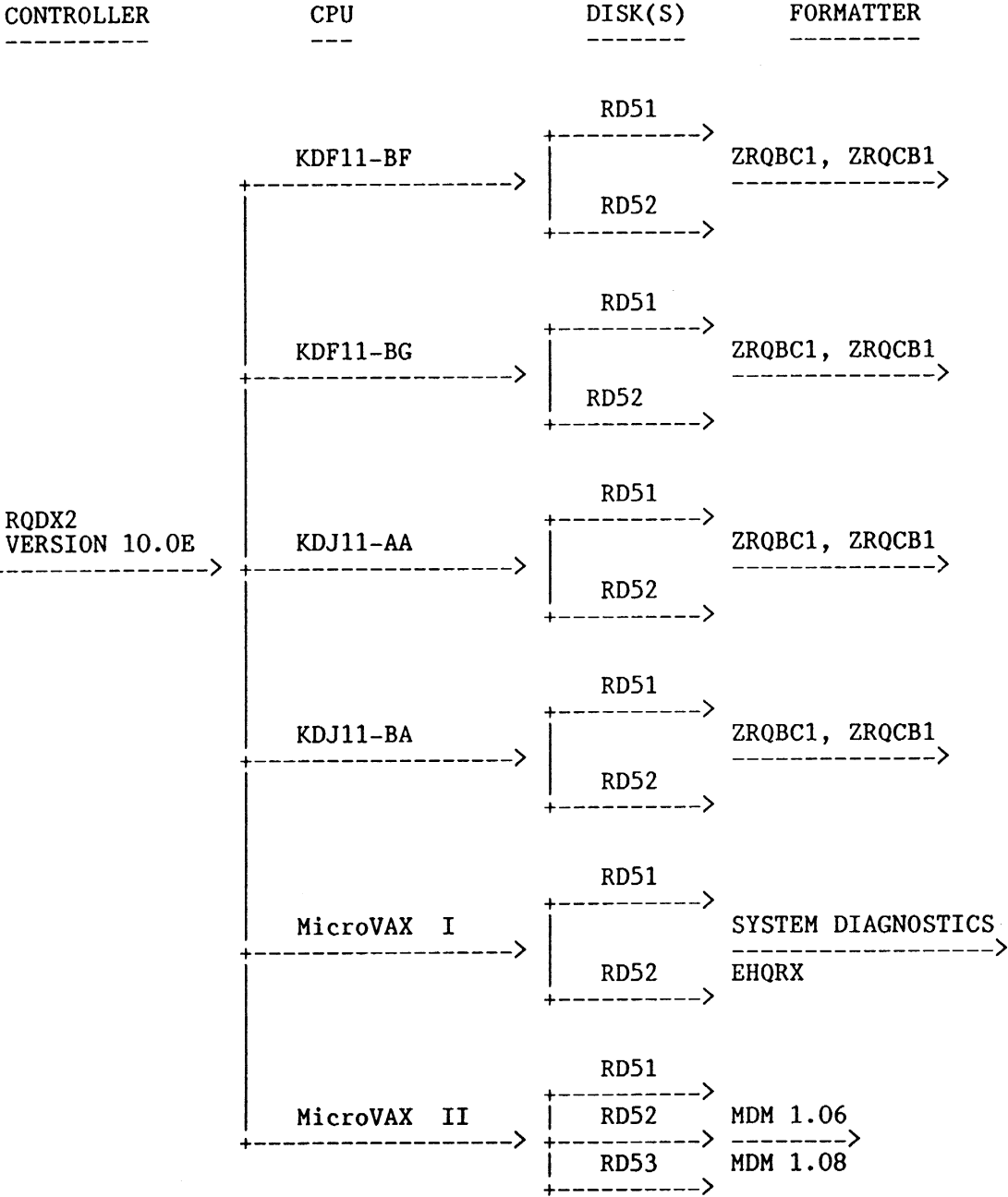




RQDX2:  
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RQDX3:  
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