EK-MK4BR-MG-001

Barclays Branch Controller

Maintenance Guide (MK IV)

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BARCLAYS BRANCH CONTROLLER MKIV MAINTENANCE GUIDE

SECTION 1

INTRODUCTION

The MKIV Barclays Controller is a package of DEC equipment built into a BA123-A3 'World Box'. There is a core of options which may be varied according to the needs of the customer.

The common features in the MKIV Controller are:

The World Box
Power Supply
Diagnostics

The core options in a MKIV Controller are:

CPU	=	KDJ11-B (11/73)
MEM	=	MSV11-QA (1MB)
MASS	=	RQDX3 with 1 × RD53
STORAGE	=	TQK50 with TK50 STREAMER TAPE Drive
COMMS	=	2 × KMV11-B, 4 Lines

This Maintenance Guide gives notes about the core approach in Sections 1 to 9, with details of options that are, or may be found in a MKIV Controller, in appendices.

NOTE
When a Controller has to be changed on-site, the Engineer must remove any options from the defective unit, and return them to stores as individual options. This must be done separately from the return of the basic Controller, to satisfy the administration procedures.

Details of specific configurations can also be found in appendices.

In this document:

NOTE relates to guidelines and information
CAUTION relates to hazards to equipment
WARNING relates to hazards to persons.

SECTION 2

ALL YOU NEED TO KNOW ABOUT THE WORLD BOX

CLOSED VIEWS

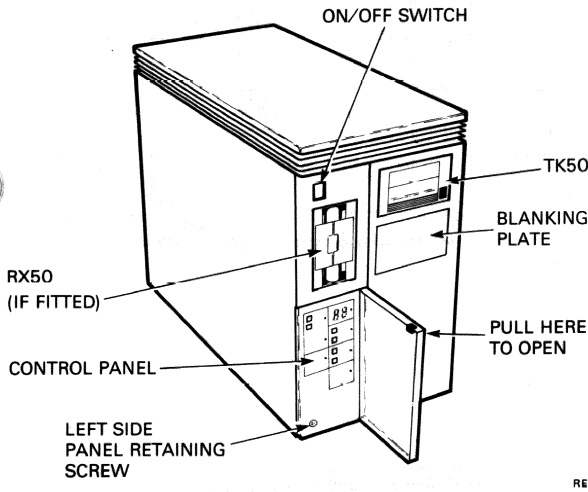

Figure 2-1 Front View

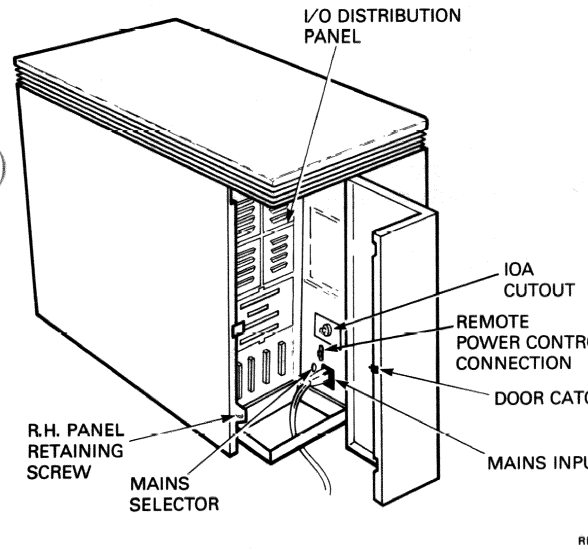

Figure 2-2 Rear View

OPEN VIEWS

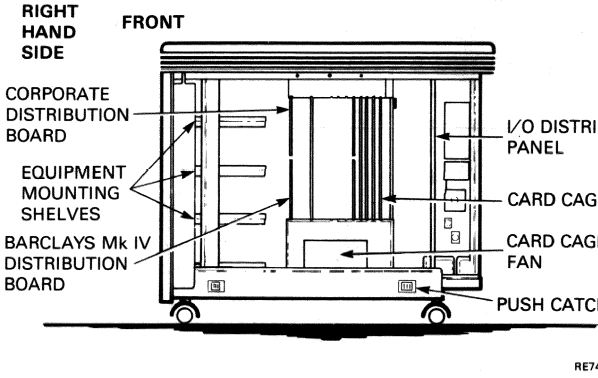

Figure 2-3 Right Hand Side

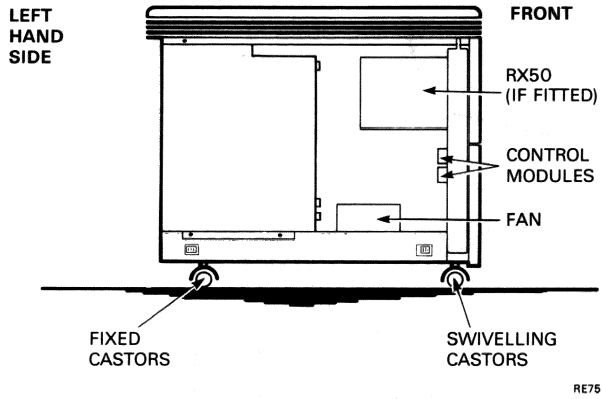

Figure 2-4 Left Hand Side

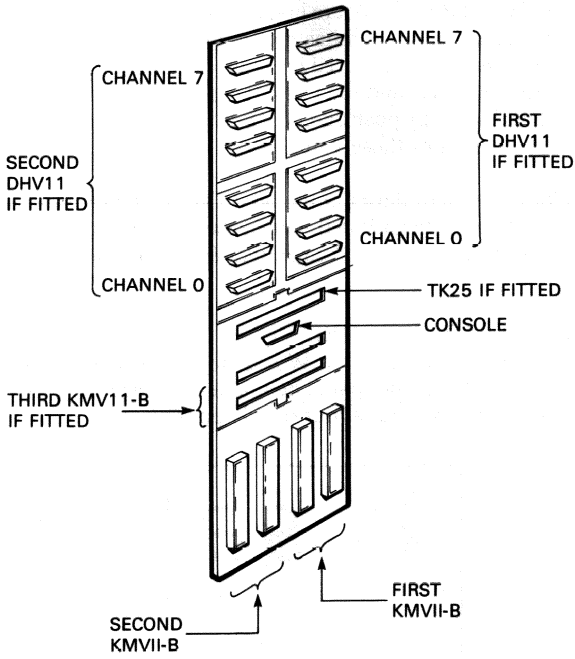

Figure 2-5 The I/O Distribution Panel

THE CONTROLS

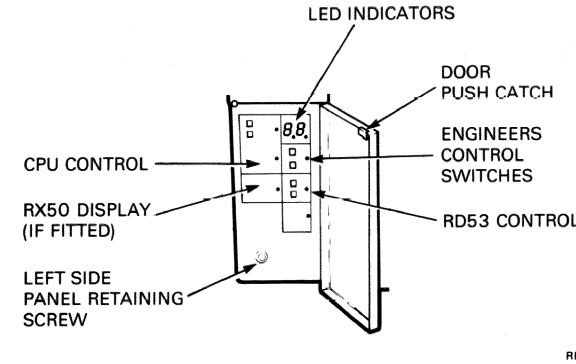

Figure 2-6 The Control Panel, General View

The World Box enclosure houses the power supply and backplane assembly and has space for five mass storage devices. The Box is covered by removable panels, on the right and left sides and the front. These are held onto the main framework by push catches. See Figures 2-3 and 2-4 for the location of these catches.

There are three doors in the box. One at the front, for access to the Control Panel, one at the back for access to the I/O Panel, and a card cage door inside the right side panel.

THE CONTROL PANEL

The control panel of the World Box is located at the bottom left of the front panel behind a small access door. Figure 2-7 shows the layout of this panel.

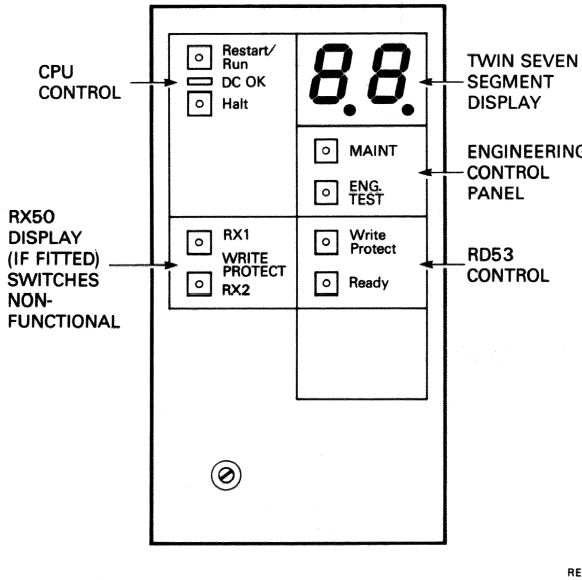

Figure 2-7 Control Panel

THE CPU CONSOLE BOARD

Figure 2-8 shows the CPU Console Board.

The RESTART switch is a momentary action push switch. Pushing this switch will BOOT the system, depending upon the position of the maintenance switch (see Section 3) . The LED in this switch is ON when the CPU is running.

The DCOK (green) LED is ON when the system is receiving stable voltages from the power supply.

Regulator A and B LEDs indicate which of the two regulators have failed if the DCOK indicator is OFF.

NOTE
There should be at least ONE module in both the ODD and EVEN-numbered slots of the backplane to draw enough current to start the regulators.

Make sure that both DIP switches on the Console board are OFF.

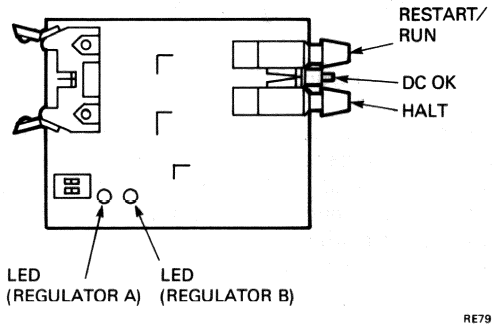

Figure 2-8 The CPU Console Board

AIR CIRCULATION

Three fans cool the World Box. Figure 2-9 shows the location of the cooling fans and the air flow through the box.

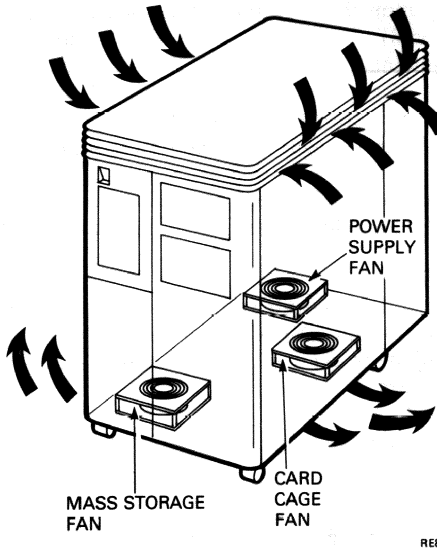

Figure 2-9 Air Flow

A PCB mounted above the card cage regulates the flow of air by sensing the temperature in the box. One circuit increases the speed of the card cage fan when the temperature rises above a minimum level, the other shuts down the system when a high operating temperature is reached. The system also shuts down if the card cage fan stops.

Figure 2-10 shows the location of the Temperature Sensor PCB.

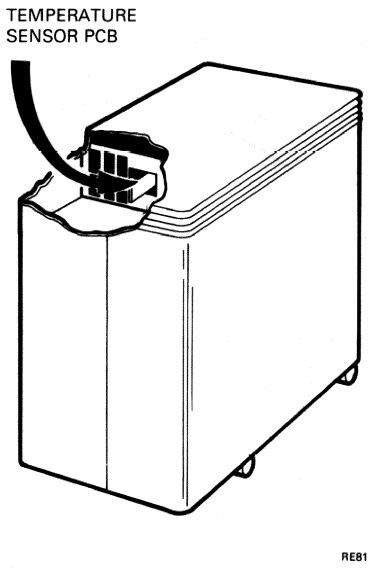

Figure 2-10 Location of the Temperature Sensor PCB

OPENING THE WORLD BOX

The World Box should be opened in the following order:

1. Side Panels
2. Front Panel

See Table 2-1 for a general sequence of access to FRUs.

Figure 2-11 shows the removable panels of the World Box.

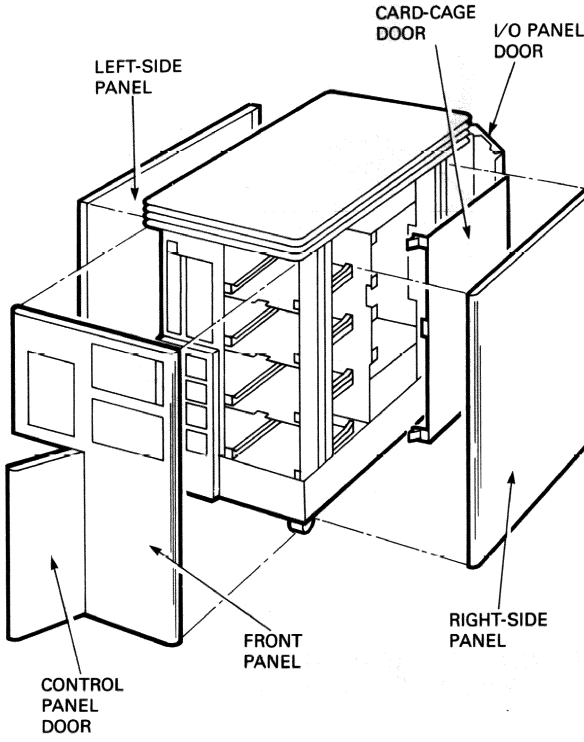

Figure 2-11 The Removable Panels of the World Box

1. Removing the Side Panels

Refer to Figures 2-3 and 2-4 as appropriate.

1. Open the front door (left panel), or the rear door (right panel).
2. Using a medium sized slot screwdriver or a coin remove the side panel locking screw.
3. Keep the screw in a safe place.
4. Using the tips of the fingers placed near the side panel push-catches, pull the bottom edge of the panel outwards until it comes free from the framework.

5. Lift the panel so that the top edge comes free from the framework.

6. Store the panel in a safe place.

2. Removing the Front Panel

CAUTION
Trying to remove the front panel BEFORE removing the side panels can cause the tabs on the front panel to break.

When both side panels have been removed:

1. With the fingertips positioned near each of the bottom push fit catches, pull the panel outwards until it is free of the framework.

2. Repeat the above process for the upper push fit catches.

3. The panel is now free of the framework and can be stored in a safe place.

3. Replacing the Side and Front Panels

Replacement of the panels of the World Box is a simple reversal of the above procedures.

- Replace the front panel first.

- At all times apply closing pressure directly over the push fit catches.

4. Removing the Card Cage Door

NOTE
When this door is removed the air flow around the modules is reduced. A switch has been incorporated to detect the absence of the door and to increase the speed of the cooling fan to maintain the cooling level.

1. Remove the right hand side panel.

2. Locate the card cage door snap catches, undo them and open the door.

3. Lift the door away from the framework by gently working the bent metal tabs free from their retaining slots. The door is located by means of a ninety degree 'joggle', pressed into the entire length of the door. The joggle is in turn located in a slot in the frame and this arrangement acts as the hinge. It is important therefore that removal is done by manipulating the door rather than forcing it.

4. Store the door in a safe place.

5. Replacing the Card Cage Door

Reverse the above process, taking care not to snag any cables.

6. Replacement of Fans

NOTE
The power supply fan is replaced by changing the power supply.

1. Isolate the power.
2. Gain access to the fan by removing the appropriate side panel.
3. Disconnect the fan supply voltage connector.
4. Unscrew the fan retaining screws, and remove the fan.
5. Position the new fan and screw it firmly into place.
6. Connect the fan supply voltage connector.
7. Replace the panel(s).
8. Restore the power.

Table 2-1 Sequence of Access to FRUs

FRU	Rear Access Door	Front Access Door	R.H. Side Panel	Card Cage Door	L.H. Side Panel	Front Panel
PCBs/cables	1		2	3		
Module box	1		2	3		
30-23616-01 PSU		1			2	
Disk drives	1	3	2		4	5
Distribution PCB	1		2			
Disk subsystem cables	1		2	3		
Fan, Card cage	1	1	2		2	
Fan, Disk space		1			2	

SECTION 3

TESTING – THE USE OF THE DIAGNOSTICS

NOTE
The MKIV diagnostics are NOT usable on the MKIII series Controllers.

INDICATORS

The indicators are used by the system to show when various activities are being performed by the CPU. The LEDs also include indicators to show when the CSS Diagnostics are being run and the completion of a pass.

If the CSS diagnostics LED is lit the codes are generated by the CSS diagnostic software (see Table 3.2). If the CSS diagnostics LED is **not** lit the codes are generated by the normal software.

Figure 3-1 shows the layout of the LEDs.

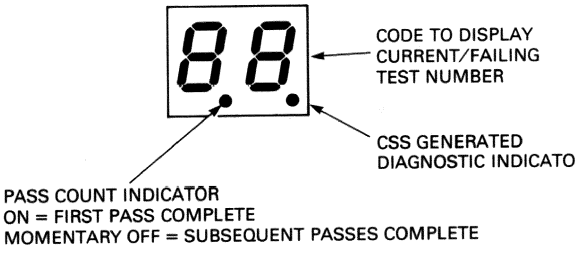

Figure 3-1 LED Test/Error Code Indicator

KDJ11-B PROMs

There are three diagnostic PROMS on the KDJ11-B:

- **Diagnostic PROMS (High and Low Byte)**
  These contain the standard Corporate tests for the CPU and memory. They produce LED codes 00 to 77, without any leading or trailing points. There is NO engineering access to these PROMS.

- **Configuration EEPROM**
  This holds information used by the Corporate PROMS and the configuration table used by the MKIV Diagnostic System.

  The device table in the EEPROM can be accessed to control the testing sequence or to change the options in the test routine.

  To make changes to this table, connect an LA12 console to the Console Connector on the KDJ11-B.

THE BASIC DIAGNOSTIC ROUTINE

When powering ON or performing a RESTART the Corporate PROM will test the CPU and memory. If OK, and the MAINT switch is **not** ON, the Barclays system will be booted from RD53 drive 0. If the MAINT switch is ON, it will attempt to boot the Diagnostic System from TK50 drive 0, RX50 drive 0 or 1 in that order. If none of these is available the CPU will enter an internal loop.

The flowchart in Figure 3-2 shows the general scheme of the diagnostics.

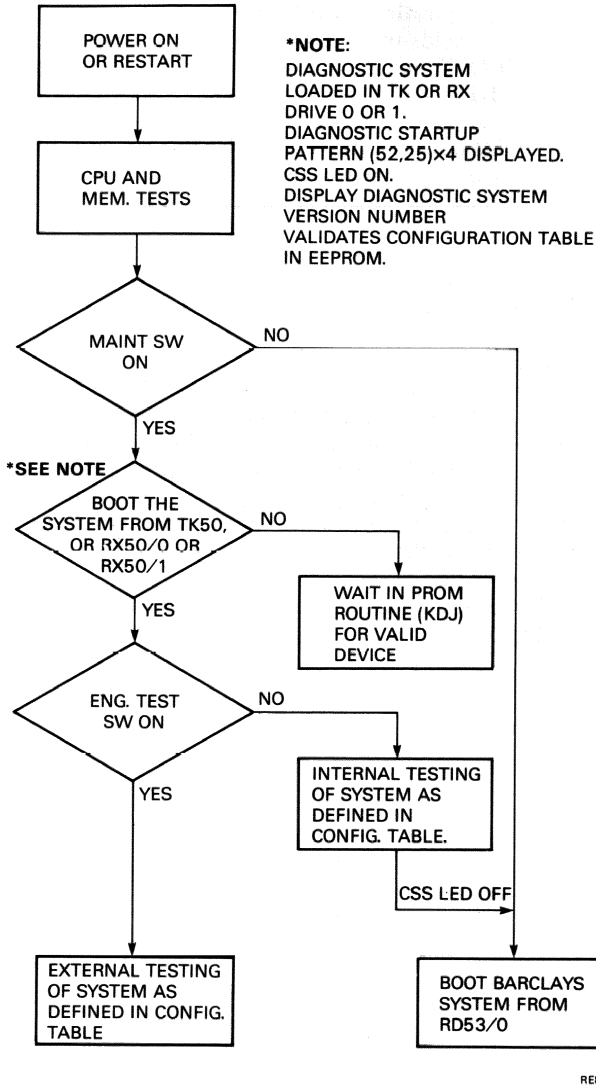

Figure 3-2 Barclays Controller Diagnostic Flowchart

CONTROLLING THE DIAGNOSTICS

1. Fault Finding

Diagnostic testing is controlled by three front panel switches; RESTART, MAINT., and ENG.TEST.

- RESTART
  Operation of this PUSH switch restarts the system from the same point as a POWER UP. The built-in LED is ON when the CPU is running.

- MAINT.
  A PUSH ON/PUSH OFF switch.
  OUT = Corporate CPU and memory diagnostics only.
  System will boot from RD53/0.
  IN = Corporate CPU and memory diagnostics will run.
  Diagnostic System will boot and run from either TK50/0, RX50/0 or RX50/1
  Diagnostics will run in accordance with the setting of the ENG TEST switch.
  The trailing point LED will be lit.
  The built in LED is ON when the MAINT. switch is ON.

- ENG TEST
  A PUSH ON/PUSH OFF switch.
  OUT = Internal testing only.
  System configuration derived from CSS EEPROM
  System will boot from RD0.

  IN = External testing.
  LOOPBACK connectors and SCRATCH media are assumed to be in place. **The diagnostic will not overwrite System media in the booted device.**
  System configuration is derived from the CSS EEPROM
  Tests will repeat indefinitely.
  Leading point LED will be ON after the first pass and flash OFF/ON at the end of each subsequent pass.

2. Installation

Control of the EEPROM Configuration table will be needed when a new EEPROM is installed or when a new option is added to the system.

The following notes show the method used to modify the EEPROM contents.

A Configuration Table Facility is included in the Diagnostic System. If both MAINT and ENG TEST switches are ON, the Facility will be invoked by two conditions:

1. If the EEPROM validation check in the CSS Diagnostic System routine produces an error.

NOTE
If the EEPROM Validation Check finds a fault when the ENG TEST switch is OFF the CPU is halted. Code 6, 'Invalid EEPROM contents detected', is displayed.

2. If a character input is detected when an LA12 console is connected to the KDJ11-B, the message 'Break request, Y/N' will be displayed. Type 'YES'.

These conditions will cause the prompt,

'EEPROM Configuration Facility'

to be printed, followed by a list of the allowable responses, and the Facility prompt,

'COM>'

Type in the command needed and answer the Facility messages.

When using this routine to alter a Configuration Table entry the complete set of fields within the entry must be examined and terminated with <RETURN> to write the new data into the EEPROM.

User input can be deleted by:

1. Delete key.
   The Facility will echo the deleted characters in upper case and enclosed in backslashes.

2. Control U
   Deletes the complete input line. 'Repeat input>' will be displayed.

Control Z will abort an entry amendment. The EEPROM contents will not be changed.

Table 3-1 KDJ11 Code Identification

Octal Code	Definition
77	CPU hung or Halt switch on at power up or restart
76	CPU pre-tests, MMU register tests
75	Turn MMU on and run MMU tests and CPU tests
74	For UNIBUS systems turn on PMI to look at the UBA reboot bit
73	Power up to ODT
72	Power up to 24/26
71	EEPROM checksum tests
70	CPU ROM checksum and PCR test
67	Misc CPU tests and EIS test
66	SLU test1 – Check for each register's response
65	SLU test2 – Xmit and receive data in maintenance mode
64	SLU test3 – Check interrupts and errors in maintenance mode
63	Test MMU aborts
62	Samode CPU cache tests
61	Clock test
60	FPP test
57	CIS test
56	Samode exit – Check location 17760000 for timeout
55	UBA register response test, check UNIBUS through DDR for hung lines
54	Memory size routine
53	Check memory present at location 0
52	0-4 kw memory test
51	Cache test using memory
50	Memory test 1 – Data tests/byte tests
47	Memory Parity/ECC tests
46	Memory address/shorts test
45	UBA ROM response test
44	UBA MAP registers data path test
43	UBA unmapped diagnostic cycles test

Table 3-1 KDJ11 Code Identification (Cont)

Octal Code	Definition
42	UBA mapped diagnostic cycles test
41	UBA floating address/data tests using mapped diagnostic cycles
40	UBA address overflow test
37	UBA cache data test
36	UBA cache LRU test
35	UBA cache floating address test in tag store
34	UBA cache parity error detection test
33	UNIBUS memory data path test
32	UNIBUS memory parity logic test
31	UNIBUS memory address/shorts test
30	Test exit routine
27	spare – not used
26	spare – not used
25	spare – not used
24	DECNET boot (DLV11-E/F or DUV11) waiting for a reply from host
23	XON not received after XOFF – To correct type CTRL Q at console
22	Xmit ready bit never sets
21	Drive error
20	Controller error
17	Boot device selection was invalid (i.e. AA)
16	Invalid unit number selected
15	Non existent drive
14	Non existent controller
13	No tape
12	No disk
11	Invalid boot block
10	Drive not ready
07	No bootable device found in automatic boot mode (sniffer)
06	Console disabled by switch 1 = On and no force dialog or APT break received and ROM code has entered ODT for APT
05	spare
04	Dialog mode
03	UBA ROM boot in progress
02	EEPROM boot in progress
01	CPU ROM boot in progress
00	Start boot with display blanked

Table 3-2 CSS Code Identification

Octal Code	Definition
77-52	Undefined
51	MSV11 no.4 addressing
50	MSV11 no.3 addressing
47	MSV11 no.2 addressing
46	MSV11 no.1 addressing
45	MSV11 no.4 memory
44	MSV11 no.3 memory
43	MSV11 no.2 memory
42	MSV11 no.1 memory
41	TK25 tape test
40	TK25 controller test
37	DLV11 no.2
36	DLV11 no.1
35	DHV11 no.2
34	DHV11 no.1
33	TQK50 tape test
32	TQK50 controller test
31	KMV11 no.3 channel B
30	KMV11 no.3 channel A
27	KMV11 no.3
26	KMV11 no.2 channel B
25	KMV11 no.2 channel A
24	KMV11 no.2
23	KMV11 no.1 channel B
22	KMV11 no.1 channel A
21	KMV11 no.1
20	RQDX logical unit 3 disk test
17	RQDX logical unit 2 disk test
16	RQDX logical unit 1 disk test
15	RQDX logical unit 0 disk test
14	RQDX logical unit 3 drive test
13	RQDX logical unit 2 drive test
12	RQDX logical unit 1 drive test
11	RQDX logical unit 0 drive test
10	RQDX Controller test
7	'pass count' LED enable
6	EEPROM contents invalid
5	Console output timeout
4-2	Undefined
1	RQDX logical unit 0 boot
0	System Running

BOOT SELECTION CREATION

When a new EEPROM is installed the automatic boot configuration table must be created and written to it. This is done in the following way:

1. Plug the LA12 into the console port
2. Press the 'RESTART' button
3. Press <CTRL> and C together while the numbers 1 to 9 are being printed out; Dialogue Mode will be entered
4. Press S followed by <RET>; Set-up Mode will be entered
5. Select option 4; '4 – List/change the automatic boot selections in the Set-up table'
6. Alter the Set-up table to the following:

   Boot1 = DU1
   Boot2 = DU2
   Boot3 = MU0
   Boot4 = E0
   Boot5 = DU0
   Boot6 = DU0

7. Select option 9; '9 – Save the Set-up table in EEPROM'

This saves the altered Set-up table in the EEPROM.

SECTION 4

INSTALLATION AND DIAGNOSTIC SEQUENCE

The following sequence assumes that a representative of Barclays Management Service Department (MSD) is on site. If not, miss out steps 2 and 9.

1. Make contact with the bank manager's assistant.

2. Make contact with the MSD representative.

3. Unpack and check controller and installation materials.
   Install controller.
   Connect controller power cable to the power distribution panel at the rear of the controller (Do not connect to terminals or to the network).

4. Connect the LA12 to the console connector.

5. Set MAINT and ENG TEST switches to ON. Press RESTART/RUN switch. Check the configuration table (see Section 3.2).

6. Run diagnostics with loopback connectors in the communications connectors.

7. Swap KMV11 loopback connectors (see next page). Repeat the diagnostic.

8. Run DECX/11 (see next page).

9. If all tests OK, make connections to network and to terminals.

The MSD representative (if on site) will now load the Barclays software and will check that the controller works with the network.

10. If all is OK, the installation is complete. Contact bank manager's assistant before leaving.

NOTE
The following options will perform their own self-test routines on power-up or re-start

DHV11
KMV11
RQDX
TK50

XXDP+ DIAGNOSTICS

The following is a recommended sequence of XXDP+ diagnostics for installation of the Barclays MKIV systems together with the minimum acceptable revision levels:

OKDAD0	–	KDJ11 tests
VMJAA0	–	MSV11 tests
VKMAB0†	–	KMV11 logic tests
VKMEB0†**	–	KMV11 line/loopback tests
ZRQAG0	–	RX50/RD53/RQDX1 tests
ZRQBC1***	–	Formatter for RD53
MARK4.BIN	–	DECX/11 exerciser
ZTKAB0	–	TK50 exerciser
ZTKBB0	–	TQK50 exerciser

† Run at least two passes. The first pass is a quick test which does not test the module completely.

** There are two types of loopback connector for KMV11 ports, EP-E155A-00 for RS-422 lines, and EP-156A-00 for RS-423/232-C lines. (Run the test for two passes with each type of connector in each KMV11 port. That is to say, two times two passes of VKME.)

*** This is a formatting program and should not be used on site. The RD53 which is to be installed, should be formatted at the Field Service Branch.

SECTION 5

BACKPLANE UTILIZATION

The backplane used in the MKIV Controller is a standard BA123 backplane.

The slots are numbered 1 to 12 from right to left when viewing the card cage from the right hand side of the controller.

The CPU module must be located in slot 1 with the memory next to it in slot 2.

Figure 5-1 shows the serpentine bus layout. The maximum system configuration is shown. You should refer to this diagram to decide upon the configuration required.

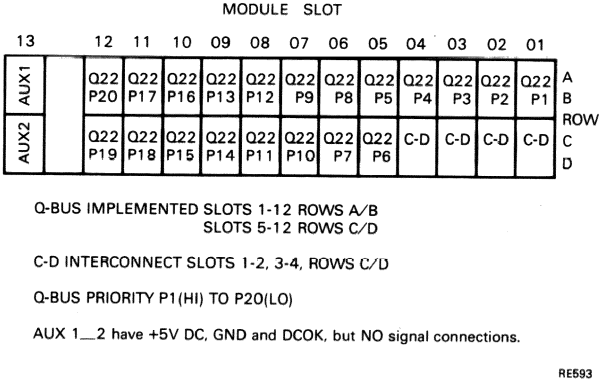

Figure 5-1 Suggested Module Layout

SECTION 6

LOADING BARCLAYS SOFTWARE

This information is not currently available; it will be issued as a supplement at a later date.

SECTION 7

THE 30-23616-01 POWER SUPPLY

INTRODUCTION

The 30-23616-01 is a double, Switched Mode Power Supply, contained in a box mounted on the left hand side of the World Box.

When the DC voltages are all correct the DCOK LED will be ON.

The low voltages drive the logic, the LEDs and the two cooling fans (which cool the card cage and the storage drives respectively).

Each regulator unit in the 30-23616-01 provides the same voltages to the card cage backplane. The distribution of these voltages is to alternate slots, that is 1,3,5,7 and so on from regulator A, and 2,4,6,8 and so on from regulator B.

CAUTION
Outputs A and B must not be mixed in use between the PSU's.

NOTE
These regulators need a minimum load to function correctly. A current drain of LESS THAN 4.5A @ 5V from either regulator will cause it to shut off and give a fault indication.

Figure 7-1 shows the physical location of the 30-23616-01.

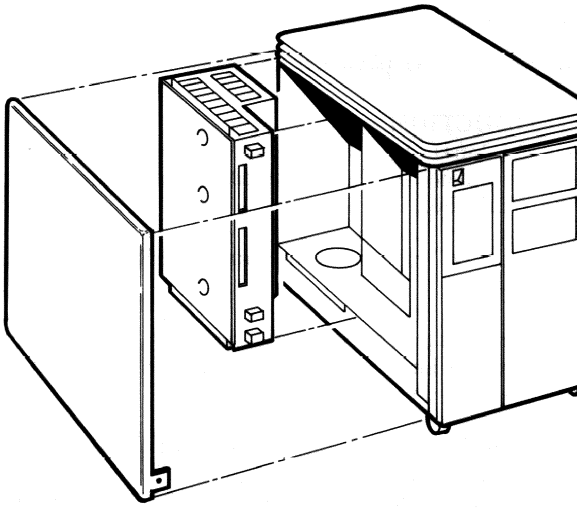

Figure 7-1 Physical Location of the 30-23616-01

Removing the 30-23616-01

Figure 7-1 shows the location and shape of the 30-23616-01 power supply.

1. Disconnect all cables to the 30-23616-01 (Figure 7-2.)

2. Unscrew the one upper and two lower retaining screws. To prevent the unit from dropping while doing this, hold it firmly in place.

3. Remove the 30-23616-01 PSU.

Replacing the 30-23616-01 PSU

Reverse the above procedure.

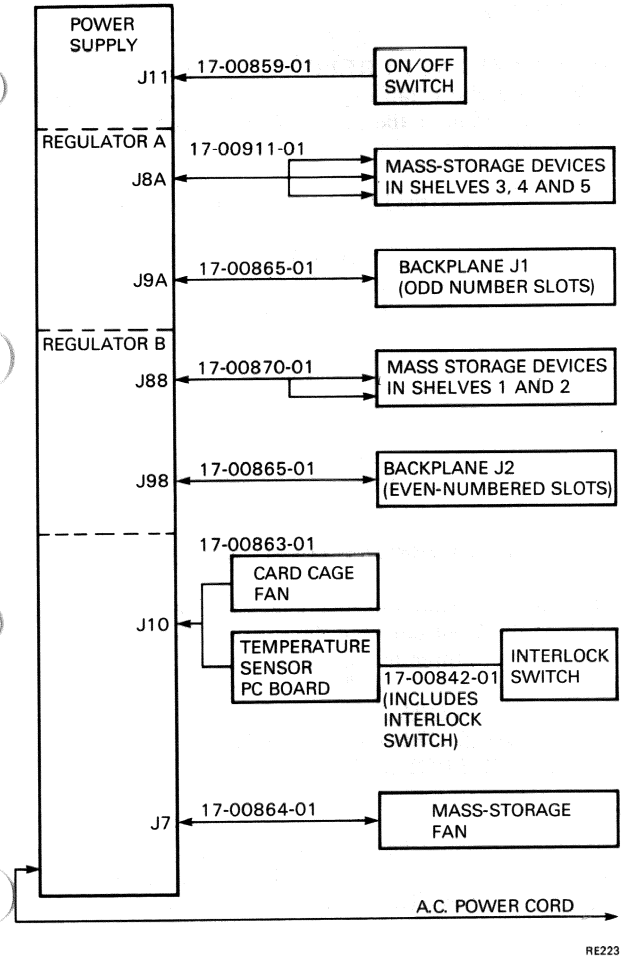

Figure 7-2 Power supply connections (30-23616-01)

SECTION 8

BARCLAYS FAULT REPORTING PROCEDURE

When Barclays staff experience operational problems or suspect a fault on the Back Office Controller Network their actions are:

1. Report to the LOCAL NETWORK CONTROL

   At: WYTHENSHAWE
   GLOUCESTER
   GREATER LONDON

Local Network Control will investigate possible Network problems, these will be cured, or, if none exist at this level:

2. Barclays Branch will contact MANAGEMENT SERVICES FAULT CONTROL DESK

   At: RADBROKE HALL, KNUTSFORD

Control desk staff will then check the fault indication status on the Controller Display Panel. The display will indicate one of three major failing areas:

The NETWORK
The BACK OFFICE TERMINALS
The CONTROLLER

Network

If it is still felt that there may be a Network problem, the Network will be re-checked by both the Control Desk and the Control Centre. They will look for possible failures in the following areas:

The CONTROL CENTRE
The BRITISH TELECOM LINE
The DCU MODEM

Back Office Terminals

If the Back Office Terminals are shown to be faulty, the Control Desk will perform further tests to find the type of fault. This will then be reported to either BURROUGHS or OLIVETTI as appropriate.

Controller

If the fault is thought to be in the Controller itself, Barclays Staff will be required to:

1. Record the fault

2. Load the TK50 based diagnostics

3. Initialize the Controller (by pressing the INIT button at the back of the Controller)

This will start the Internal Self-Test sequence. (For Mk I, II and III Controllers the diagnostics are PROM based internally requiring no further action from the Barclays Branch staff other than pressing the INIT button after recording the fault).

The diagnostics will stop running when they detect a fault, and this will be indicated on the front panel display.

4. When the failure has been diagnosed, the Barclays Branch staff will report their findings to BARCLAYS SUPPORT SERVICES, who will in turn log the fault with DIGITAL.

FAULT HANDLING PROCEDURES

On receipt of a fault call:

DIGITAL FIELD SERVICE must contact the Barclays Branch who have reported the fault:

1. To give Barclays Branch the expected time of arrival of the Engineer on site.

2. To inform Barclays Branch if an Option Swap and Hardware Support Kit will be arriving on site separately (by taxi or by local Logistics van).

Arrival on site:

When the Engineer arrives on site confirmation of arrival must be made by telephoning the BARCLAYS CONTROL DESK (Tel 0565 50381). The details of the fault call must also be checked.

On completion of the call:

When the Engineer has finished the fault call, the BARCLAYS CONTROL DESK must be contacted. A report of the fault found, and subsequent actions taken must be given.

The call should then be logged off with the Engineer's own Field Service Branch office.

NOTE

At all times during a fault situation, BARCLAYS MANAGEMENT SERVICES Control Desk should be kept aware of the situation on site, and of any problems encountered. THEY CAN BE OF GREAT HELP IF THEY ARE INVOLVED.

SECTION 9

WORLD BOX FIELD-REPLACEABLE UNITS

SUB UNITS:

54-15836-01	Control/Indicator Panels

MODULES:

54-15832-01	Distribution Board

CABLES:

BC08R-01	12-inch KMV11 cable (*, **, ***)
BC08R-1F	18-inch KMV11 cable (*, **, ***)
70-20085-0C	12-inch console cable (***)
BC05W-02	24-inch RQDX1 cable
17-00282-01	20-way RD52 data cable (**, ***)
17-00285-02	34-way RX50 signal cable (**, ***)
17-00286-01	34-way RD52 signal cable (**, ***)
17-00859-01	AC Harness/Switch assembly (***)
17-00911-01	DC power to drives (***)
17-00870-01	DC power to drives (***)
17-00865-01	DC power to Backplane (***)
17-00863-01	DC power to Card-cage fan (***)
17-00864-01	DC power to Mass-Storage fan (***)
70-20064-00	Modem thick cable (**, ***)
70-20070-00	Loopback connector (**, ***)
70-20084-00	Modem thin cable (**, ***)
70-20069-00	Loopback connector (**, ***)
17-00862-01	Distribution board to front panel displays and control switch panel.
17-00867-01	Distribution board to RX50

DISTRIBUTION PCB:

54-15832-01

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* Items are common to Barclays Branch Controller Mk.I
** Items are common to Barclays Branch Controller Mk.II
*** Items are common to Barclays Branch Controller Mk.IV

CONTROL/DISPLAY:

54-15836-01	Diag/Maint and Rx Control PCB/ switch Assembly
54-15834-01	7-segment LED Display Assembly
54-16596-01	DC On/Halt/Restart PCB/switch Assembly

POWER SUPPLY:

30-23616-01

FANS:

12-22271-01	4.5 inch Fan
12-23395-01	5.0 inch Fan

PANELS:

70-21388-01	Panel, BA123 control welded (RX)
70-21388-02	Panel, BA123 control welded (Maint)

APPENDIX A

KDJ11-B (M8190)

REMOVAL/INSTALLATION

1. Power OFF
2. Gain access to the module by following the steps in Section 2
3. Remove the cable to the I/O distribution panel
4. Remove the PCB
5. Check new PCB jumper/switch positions (see Figure A-1)
6. Swap the EEPROM from the suspect KDJ11-B to the replacement PCB, and retain the 'new' EEPROM for future use (This swap is necessary because the original EEPROM contains system configuration data)
7. Fit new PCB and reconnect the cables
8. Run the CSS Diagnostics to check the replacement KDJ11-B. If a fault still exists, you must fit the EEPROM originally taken from the replacement KDJ11-B. This EEPROM must be set up by running the CSS Diagnostics (Refer to Section 3)
9. Refer to Section 2 for cover replacement.

BOARD LAYOUT AND ASSOCIATED INFORMATION

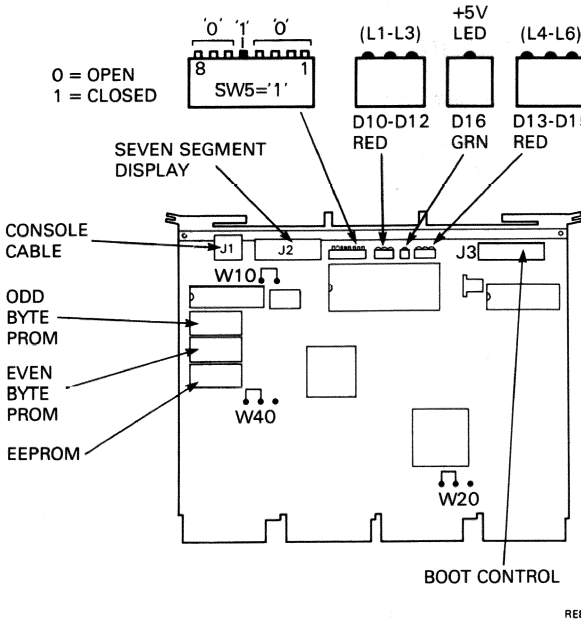

Figure A-1 M8190 Jumper and Switch Locations

CONFIGURATION INFORMATION

N/A

CABLES, SOURCES AND DESTINATIONS, PART NUMBERS

Part No.	Description
70-20085-0C	KDJ11 to I/O panel (LA12 console use)
70-21379-01	KDJ11 to Distribution panel (10 way)
70-21396-01	KDJ11 to Distribution panel (20 way)

FRUs

Part No.	Description
M8190	KDJ11-B PCB

FAULT CODES

See Table 3-1

OPERATION

This device has no external operating procedures.

TESTING

The KDJ11-B is tested at every POWER UP or RESTART. These tests reside in the Diagnostic/Boot ROM and give error codes as shown in Table 3-1.

If the KDJ11-B fails when both MAINT. and ENG TEST switches are OUT (LEDs OFF) refer to Table 3-1 and change the failing unit (CPU or MEM).

Note that the PCB LEDs are the binary code of the number shown on the 7 segment displays.

APPENDIX B

MSV11-QA (M7551-AA)

REMOVAL/INSTALLATION

1. Power OFF
2. Gain access to the module by following the steps in Section 2
3. Remove the PCB
4. Check new PCB jumper/switch positions (see Figure B-1)
5. Fit new PCB
6. Test the new module by running the tests
7. Refer to Section 2 for cover replacement.

BOARD LAYOUT AND ASSOCIATED INFORMATION

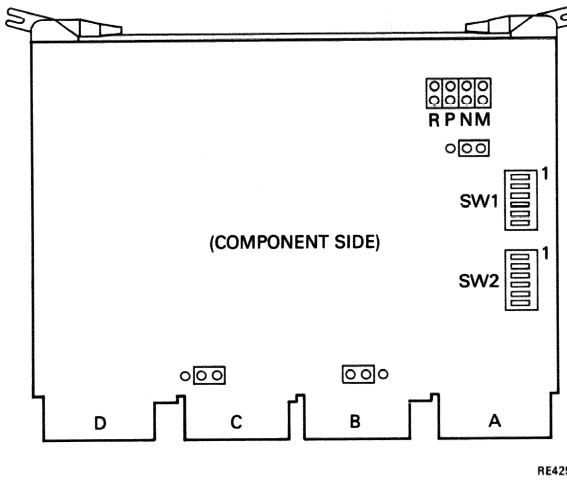

Figure B-1 M7551-AA Jumper and Switch Locations

CONFIGURATION INFORMATION

CSR Register Selection (R, P, N, M) Jumpers

The MSV11-QA can provide up to 16 CSR register address selections when the user installs or removes appropriate jumper blocks. Table B-1 shows the jumper positions and the corresponding CSR register addresses.

Table B-1 CSR Register Selection

	Jumper Position				
Number CSR Memory	**R**	**P**	**N**	**M**	**CSR Register Address**
1st	in	in	in	in	17772100
2nd	out	in	in	in	17772102
3rd	in	out	in	in	17772104
4th	out	out	in	in	17772106
5th	in	in	out	in	17772110
6th	out	in	out	in	17772112
7th	in	out	out	in	17772114
8th	out	out	out	in	17772116
9th	in	in	in	out	17772120
10th	out	in	in	out	17772122
11th	in	out	in	out	17772124
12th	out	out	in	out	17772126
13th	in	in	out	out	17772130
14th	out	in	out	out	17772132
15th	in	out	out	out	17772134
16th	out	out	out	out	17772136

If more than one CSR parity type of memory is installed in the system, use care to ensure that no two modules have the same address.

Table B-2 Starting and Ending Address Selection

Desired Starting Address	SW 1 Switch Position	SW 2 Switch Position	Desired Ending Address	SW 2 Switch Position
In Kbyte	1 2 3 4 5	6	In Kbyte	1 2 3 4 5
0	0 0 0 0 0	0	128	1 1 1 1 1
128	1 1 1 1 1	1	256	0 1 1 1 1
256	0 1 1 1 1	1	384	1 0 1 1 1
384	1 0 1 1 1	1	512	0 0 1 1 1
512	0 0 1 1 1	1	640	1 1 0 1 1
640	1 1 0 1 1	1	768	0 1 0 1 1
768	0 1 0 1 1	1	896	1 0 0 1 1
896	1 0 0 1 1	1	1024 (1MB)	0 0 0 1 1
1024 (1MB)	0 0 0 1 1	1	1152	1 1 1 0 1
1152	1 1 1 0 1	1	1280	0 1 1 0 1
1280	0 1 1 0 1	1	1408	1 0 1 0 1
1408	1 0 1 0 1	1	1536	0 0 1 0 1
1536	0 0 1 0 1	1	1664	1 1 0 0 1
1664	1 1 0 0 1	1	1792	0 1 0 0 1
1792	0 1 0 0 1	1	1920	1 0 0 0 1
1920	1 0 0 0 1	1	2048 (2MB)	0 0 0 0 1
2048 (2MB)	0 0 0 0 1	1	2176	1 1 1 1 0
2176	1 1 1 1 0	1	2304	0 1 1 1 0
2304	0 1 1 1 0	1	2432	1 0 1 1 0
2432	1 0 1 1 0	1	2560	0 0 1 1 0
2560	0 0 1 1 0	1	2688	1 1 0 1 0
2688	1 1 0 1 0	1	2816	0 1 0 1 0
2816	0 1 0 1 0	1	2944	1 0 0 1 0
2944	1 0 0 1 0	1	3072 (3MB)	0 0 0 1 0
3072 (3MB)	0 0 0 1 0	1	3200	1 1 1 0 0
3200	1 1 1 0 0	1	3328	0 1 1 0 0
3328	0 1 1 0 0	1	3456	1 0 1 0 0
3456	1 0 1 0 0	1	3584	0 0 1 0 0
3584	0 0 1 0 0	1	3712	1 1 0 0 0
3712	1 1 0 0 0	1	3840	0 1 0 0 0
3840	0 1 0 0 0	1	3968	1 0 0 0 0
3968	1 0 0 0 0	1	4096 (4MB)	0 0 0 0 0

1 = Off Position
0 = On Position

NOTE
Switch 6 of DIP switch 1 is not used. For a memory starting address of 0, switch 6 of DIP switch 2 should be set to 0 (ON). For all other starting addresses, switch 6 of DIP switch 2 should be set to 1 (OFF).

CABLES, SOURCES AND DESTINATIONS, PART NUMBERS

N/A

FRUs

Part No.	Description
M7551-AA	MSV11-QA PCB

FAULT CODES

See Table 3-1

OPERATION

This device has no external operating procedures.

TESTING

The MSV11-QA is tested at every POWER UP or RESTART. These tests reside in the Corporate ROM and give error codes as shown in Table 3-1.

If the MSV11-QA fails when both MAINT. and ENG TEST switches are OUT (LEDs OFF) refer to the table and change the failing unit (CPU or MEM).

APPENDIX C

(PROVISIONAL INFORMATION ONLY)

This section discusses the interface module M7555 only.

1. Power OFF
2. Gain access to the module by following the steps in Section 2
3. Remove the flat cable to the Barclays Controller distribution panel
4. Remove the PCB
5. Check new PCB jumper/switch positions (see Figure C-1)
6. Fit new PCB and reconnect the cable
7. Test the new module by running the tests
8. Refer to Section 2 for cover replacement.

BOARD LAYOUT AND ASSOCIATED INFORMATION

This information is not currently available; it will be issued as a supplement at a later date.

CONFIGURATION INFORMATION

CABLES, SOURCES AND DESTINATIONS, PART NUMBERS

Part No.	Description
17-00861-01	RQDX3 to Barclays Controller distribution panel.

FRUs

Part No.	Description
M7555	RQDX3 PCB

FAULT CODES

See Table 3-1

OPERATION

This device has no external operating procedures.

TESTING

See section 3 for details of the Diagnostic System.

The RQDX3 module is tested by the CSS written, Barclays Controller Diagnostic System. This is loaded from either the RX50 or TK50 and runs automatically when the MAINT. switch is ON. The ENG. TEST switch OFF will cause the controller module to be initialised and the units enabled by the device selection table in the EEPROM will be made ON LINE. A scan read of each will take place.

When the ENG.TEST switch is ON Write/read operations will be done to the diagnostic blocks.

A failure will cause a fault code to be displayed in the 7 segment LED indicators.

APPENDIX D

RQDX2 (M8639-YB)

REMOVAL/INSTALLATION

BOARD LAYOUT AND ASSOCIATED INFORMATION

1. Power OFF
2. Gain access to the module by following the steps in Section 2
3. Disconnect the cables and remove the PCB
4. Check the new PCB jumper/switch positions (Figure D-1)
5. Fit the new PCB
6. Connect the cables removed in 3
7. Reverse the steps 2 and 3.

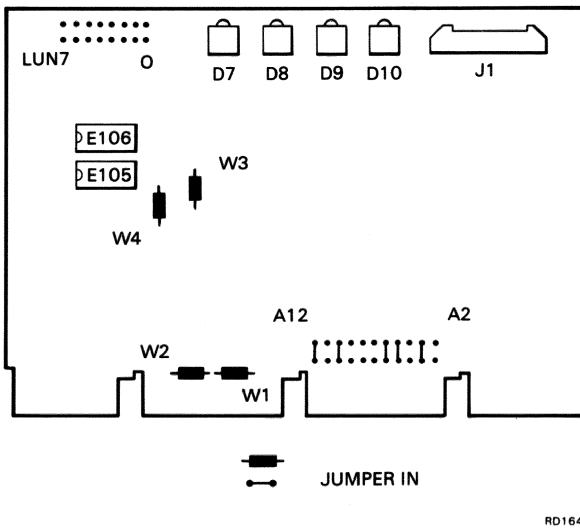

Figure D-1 M8639-YB Jumper and Switch Locations

APPENDIX E

RD53

75 Mbyte Winchester Disk Drive

REMOVAL/INSTALLATION

1. Power OFF
2. Gain access to the drive unit by using the instructions in Section 2
3. Remove the flat cable to the Barclays Controller distribution and the cable to the power supply from the drive unit
4. Locate and press down the retaining tab in the centre of the bottom edge of the drive
5. Remove the drive unit by pulling forward.
6. Check new drive unit for the correct jumper/ switch positions (see Figure E-1)
7. Fit new drive unit and reconnect the cables
8. Test the new drive by running the tests
9. Refer to Section 2 for cover replacement.

NOTE

1. **On BULLION systems, when an RD53 disc drive is replaced, the old unit MUST be left with the customer.**
2. **The new RD53 being installed must have been formatted on the same type of disc controller as used in the Barclays Branch Controller.**

BOARD LAYOUT AND ASSOCIATED INFORMATION

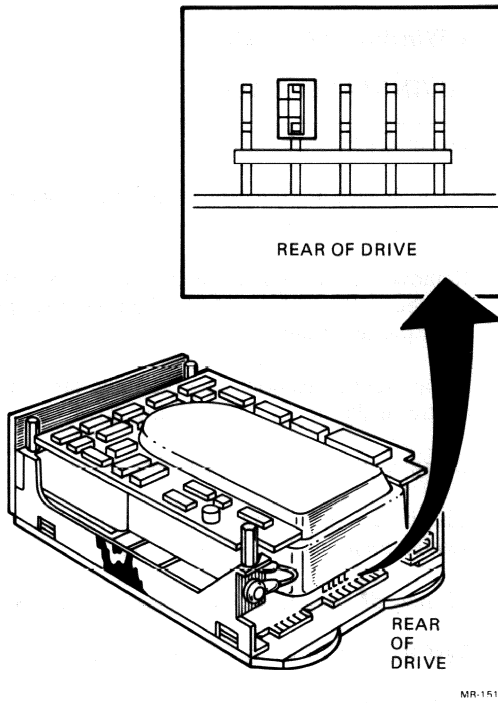

Figure E-1 Read/Write PCB jumper, DS3

CONFIGURATION INFORMATION

CABLES, SOURCES AND DESTINATIONS, PART NUMBERS

Part No.	Description
17-00282-01	RD53 to Barclays Controller distribution panel.

FRUs

Part No.	Description
ORD53-A	RD53 Drive Unit

FAULT CODES

See Table 3-2

OPERATION

This device has no external operating procedures.

TESTING

See Section 3 for details of the Diagnostic System.

The RD53 drive unit is tested by the CSS written, Barclays Controller Diagnostic System. This is loaded from the TK50 streamer tape and runs automatically when the MAINT. switch is ON. The ENG. TEST switch OFF will cause the controller module to be initialised and the drive units enabled by the device selection table in the EEPROM will be made ON LINE. A scan read of each will take place.

When the ENG.TEST switch is ON Write/read operations will be done to HIGH address blocks (beyond the space occupied by Barclays System).

A failure will cause a fault code to be displayed in the 7 segment LED displays. Refer to Table 4b to identify the failing unit/option.

APPENDIX F

TQK50 (M7546)

The TQK50 option includes the interface module and cable.

This section discusses the interface module M7546 only.

1. Power OFF
2. Gain access to the module by following the steps in Section 2
3. Remove the flat cable to the Barclays Controller distribution panel
4. Remove the PCB
5. Check new PCB jumper/switch positions (see Figure F-1). Refer to Table F-1 for the correct configuration

NOTE
It is important that the hardware revision level DIP-switch is set to the revision level stamped on the back of the module handle. The eight switches in the DIP-switch represent binary weighted numbers. Table F-1 gives the switch settings required for rev levels A-F.

6. Fit new PCB and reconnect the cable
7. Test the new module by running the tests (see Section 3)
8. Refer to Section 2 for cover replacement.

Table F-1 Revision Level Switch Settings

Revision Level	Switches 1 2 3 4 5 6 7 8
0	0 0 0 0 0 0 0 0
1(A)	1 0 0 0 0 0 0 0
2(B)	0 1 0 0 0 0 0 0
3(C)	1 1 0 0 0 0 0 0
4(D)	0 0 1 0 0 0 0 0
5(E)	1 0 1 0 0 0 0 0
6(F)	0 1 1 0 0 0 0 0

0 = Open 1 Closed
Switch 8 is nearest edge of the module

BOARD LAYOUT AND ASSOCIATED INFORMATION

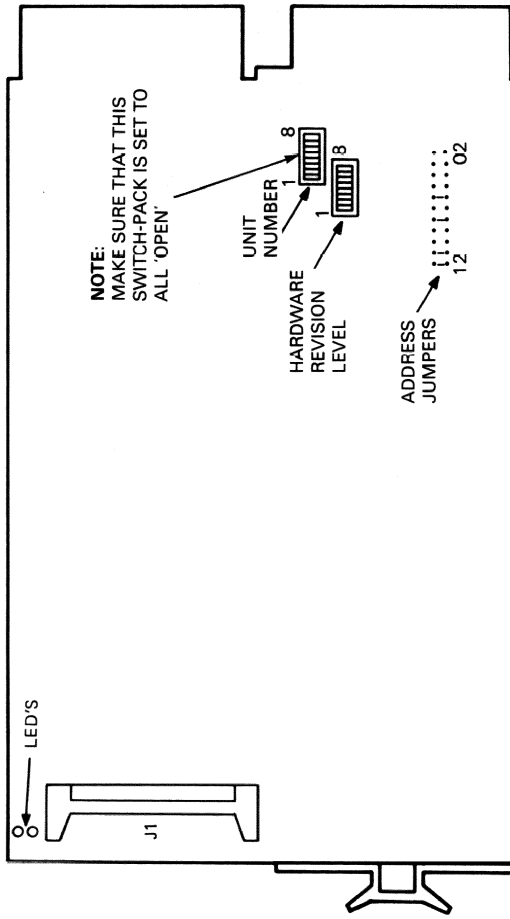

Figure F-1 M7546 Jumper and Switch Locations

CONFIGURATION INFORMATION

CABLES, SOURCES AND DESTINATIONS, PART NUMBERS

Part No.	Description
17-01047-01	TQK50 to Barclays Controller distribution panel.

FRUs

Part No.	Description
M7546	TQK50 PCB

FAULT CODES

See Table 3-2

OPERATION

This device has no external operating procedures.

TESTING

See Section 3 for details of the Diagnostic System.

The TQK50 module is tested by the CSS written Barclays Controller Diagnostic System. This is loaded from the TK50 cartridge and runs automatically when the MAINT. switch is ON. The ENG. TEST switch OFF will cause the controller module to run its self test. Drive units enabled by the device selection table in the EEPROM will be made ON LINE.

When the ENG.TEST switch is ON, the above tests will be done, as well as Rewind and Read/write tests to HIGH address blocks.

A failure will cause a fault code to be displayed in the 7 segment LED indicators. See Table 3-2.

APPENDIX G

THE TK25

60Mbyte Streamer Tape Drive

REMOVAL/INSTALLATION

1. Remove the tape cartridge
2. Power OFF
3. Remove the data and power cables
4. Carefully lift the drive unit off the top of the World Box and place in a safe location
5. Carefully place the new drive unit on the top of the World Box and reconnect the cables
6. Test the new drive by running the tests.

CONFIGURATION INFORMATION

CABLES, SOURCES AND DESTINATIONS, PART NUMBERS

Part No.	Description
BC-18N-09	TK25 to I/O distribution panel.

FRUs

Part No.	Description
TK25-AA	TK25 Drive Unit
TK25-K	Tape Cartridge

FAULT CODES

See Table 3-1

OPERATION

Switch the power ON. Load the magnetic tape cartridge by placing it in the slot in the front of the drive. Allow 4 minutes for the tape to load, and when it is loaded place the drive on-line by pressing the ON-LINE switch.

TESTING

See Section 4 for details of the Diagnostic System.

The TK25 drive unit is tested by the CSS written, Barclays Controller Diagnostic System. This is loaded from the TK50 cartridge and runs automatically when the MAINT. switch is ON. The ENG. TEST switch OFF will cause the controller to run its self test. Drives enabled by the device selection table in the EEPROM will be made ON LINE.

When the ENG.TEST switch is ON, the above tests will be done, as well as Rewind and Read/write tests from B.O.T.

A failure will cause a fault code to be displayed in the 7 segment LED indicators. See Table 3-1.

APPENDIX H

TK50

93 Mbyte (max) Streamer Tape Drive

REMOVAL/INSTALLATION

1. Power OFF
2. Gain access to the drive unit by using the instructions in Section 2
3. Remove the flat cable to the Barclays Controller distribution panel and the cable to the power supply from the drive unit
4. Locate and press down the retaining tab in the centre of the bottom edge of the drive
5. Remove the drive unit by pulling forward
6. Fit new drive unit and reconnect the cables
7. Test the new drive by running the tests
8. Refer to Section 2 for cover replacement.

CONFIGURATION INFORMATION

CABLES, SOURCES AND DESTINATIONS, PART NUMBERS

FRUs

Part No.	Description
TK50-A	TK50 Drive Unit

FAULT CODES

See Table 3-2

OPERATION

When the red light of the Switch/Indicator is OFF, load the magnetic tape cartridge by placing it fully in the slot in the front of the drive. The red light of the Switch/Indicator will come ON, then close the flap, and the red light will go OFF. Finally push the Switch/Indicator to load the tape. The Switch/Indicator light should remain ON, if not there is a fault.

TESTING

See Section 3 for details of the Diagnostic System.

The TK50 drive unit is tested by the CSS written, Barclays Controller Diagnostic System. This is loaded from the TK50 tape and runs automatically when the MAINT. switch is ON. The ENG. TEST switch OFF will cause the controller module to run its self test. Drive units enabled by the device selection table in the EEPROM will be made ON LINE.

When the ENG.TEST switch is ON, the above tests will be done, as well as Rewind and Read/write tests to HIGH address blocks, (beyond the space occupied by CSS System Diagnostics).

A failure through diagnostics will cause a fault code to be displayed in the 7 segment LED indicators. See Table 3-2.

APPENDIX I

KMV11-B

REMOVAL/INSTALLATION

1. Power OFF
2. Gain access to the module by following the steps in Section 2
3. Remove the cables to the I/O distribution panel
4. Remove the PCB
5. Check new PCB jumper/switch positions for 1st and 2nd modules (see Figures I-1 and I-2 respectively)
6. Fit new PCB and reconnect the cables (See Figure I-3)
7. Test the new module by running the tests
8. Refer to Section 2 for cover replacement.

BOARD LAYOUT AND ASSOCIATED INFORMATION

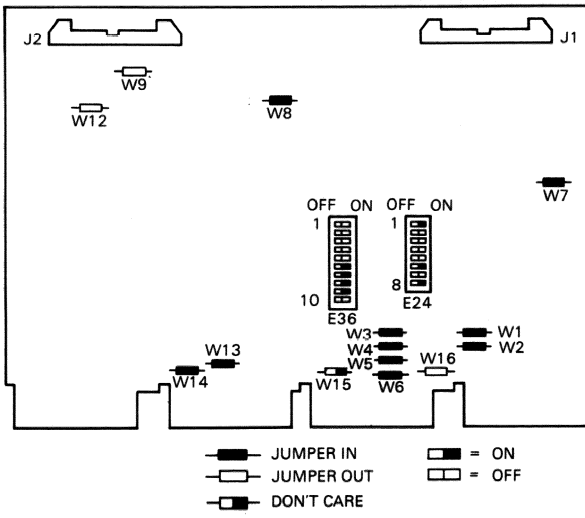

Figure I-1 M7501 Jumper and Switch Locations (first module)

BOARD LAYOUT AND ASSOCIATED INFORMATION

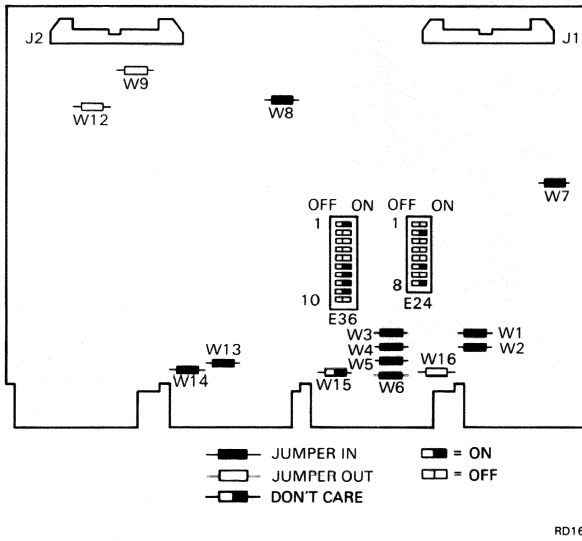

Figure I-2 M7501 Jumper and Switch Locations (second module)

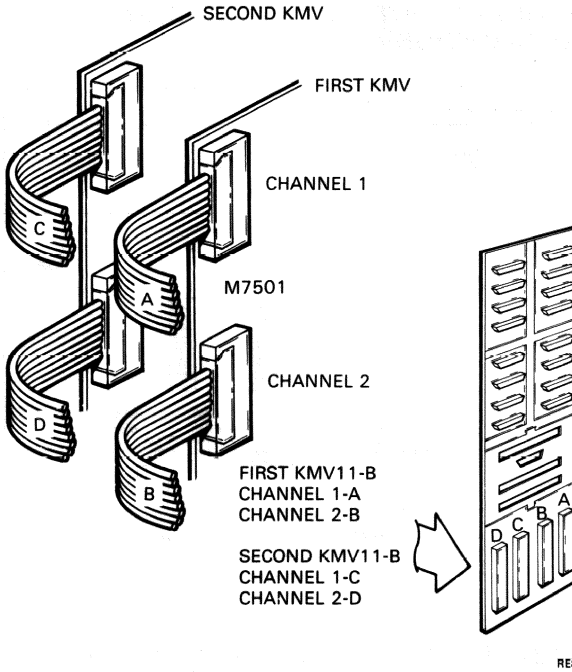

Figure I-3 KMV Cable Connections

CONFIGURATION INFORMATION

When a system has more than one KMV11-B module these should be located in adjacent slots and the group placed after the memory in the backplane.

CABLES, SOURCES AND DESTINATIONS, PART NUMBERS

Part No.	Description
BC08R-1F BC08R-01	BC08 KMV11-B to I/O panel

FRUs

Part No.	Description
M7501	KMV11-B PCB

FAULT CODES

See Table 3-1

OPERATION

This device has no external operating procedures.

TESTING

See Section 4 for details of the Diagnostic System.

The KMV11-B is tested by the CSS written, Barclays Controller Diagnostic System. This is loaded from either the RX50 or the TK50 and runs automatically when the MAINT. switch is ON. The ENG. TEST switch OFF will test the KMV11-B internally, that is, excluding the line drivers and cables.

When the ENG.TEST switch is ON, the KMV11-B is tested externally and the diagnostic expects the loopback connectors to be in place. This mode will test the lines and drivers on each channel in either RS423, or, RS422, but not both. To fully test all lines and drivers swap the loopback connectors over and repeat the external test. When a console is fitted, there is a quicker way to run the second pass tests, as follows:

Press ANY key to halt the diagnostics

You will get 'BREAK REQUEST ?' Type 'Y' <RETURN>

You will then get the prompt 'COM>'

Change the loopback connectors

Type 'R' <RETURN> and the test will now run.

A failure will cause a fault code to be displayed in the 7 segment LED indicators.

APPENDIX J

THE BULLION SYSTEM D333B-DD

CONFIGURATION

The Bullion Systems are configured with the following options:

World Box	BA123-A3
CPU	KDJ11-B
MEM	1x MSV11-QA (1Mb memory)
MASS MEDIA	RQDX3 with 1x RD53 (1x 71 Mb Winchester disks) 1x RX50 (2x 400Kb floppy disk) TQK25 with 1x TK25 (1x 400Mb streamer tape, otpional) TQK50 with 1x TK50 (1x 93Mb streamer tape)
COMMS	2x KMV11-AB 1x DHV11
AUXILIARY OPTIONS	3x VT220 2x LA210

BLOCK SCHEMATIC DIAGRAM

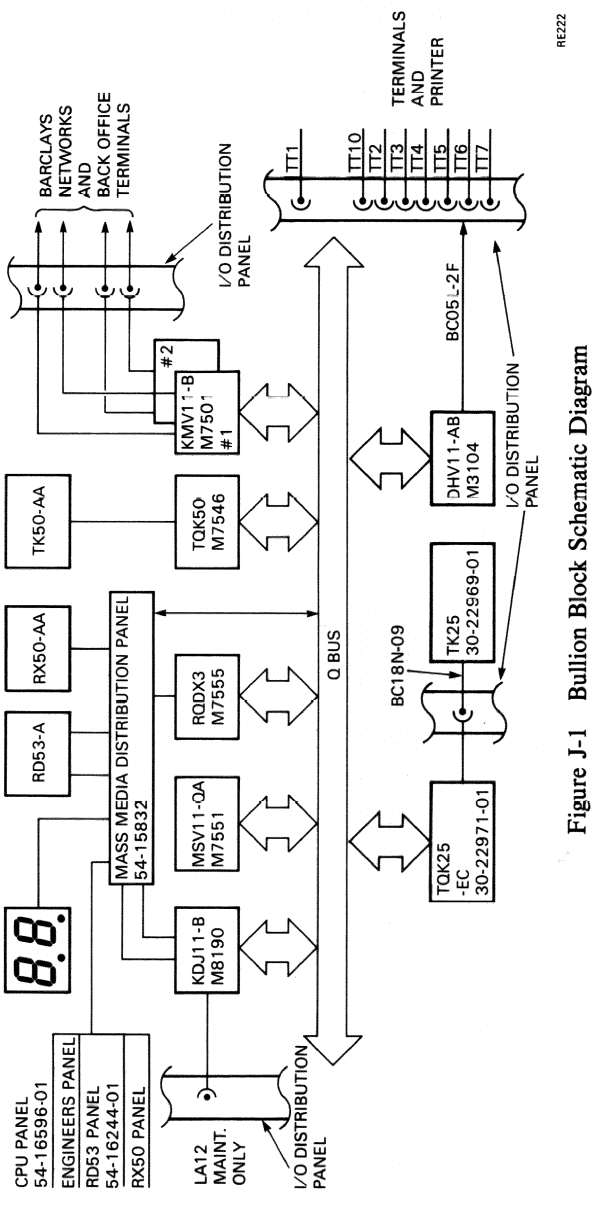

Figure J-1 Bullion Block Schematic Diagram

APPENDIX K

BARCLAYS CONTROLLER D333B-DB

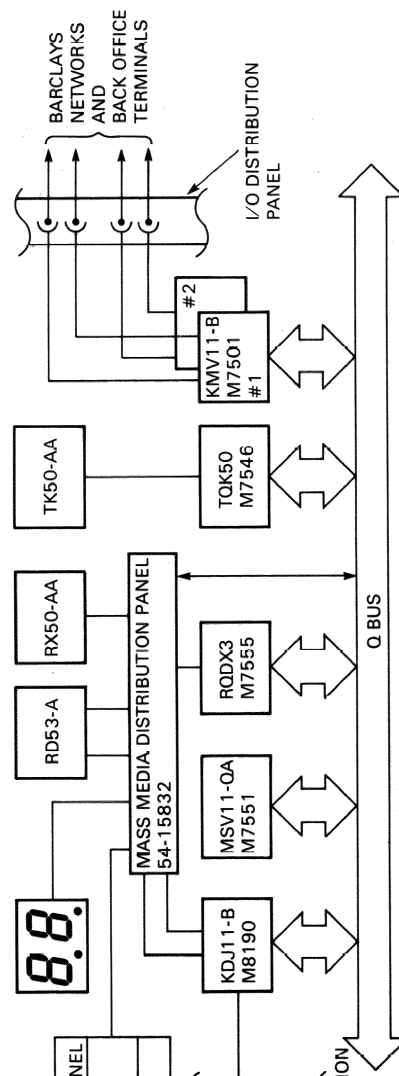

Figure K-1 Barclays Controller D333B-DB Configuration

APPENDIX L

BCIS D333B-DF

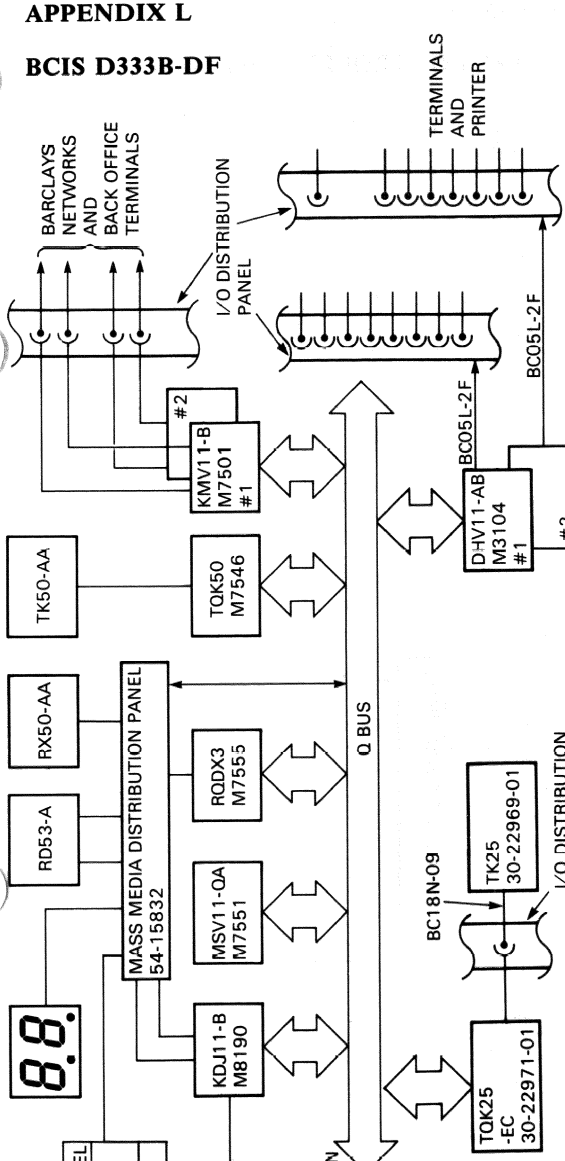

Figure L-1 BCIS Configuration

APPENDIX M

BARCLAYS CONTROLLER (Mk IV) D333B-DJ

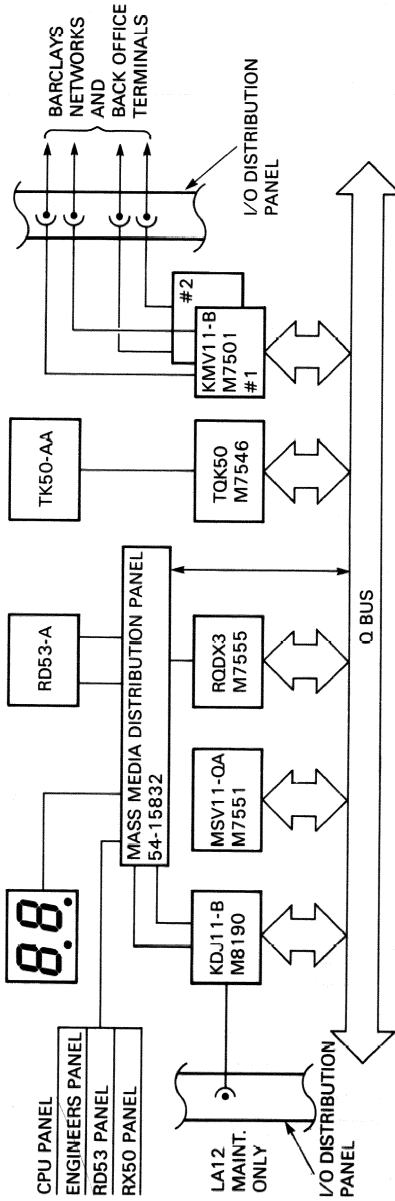

Figure M-1 Barclays Controller Mk IV Configuration

APPENDIX N

BARCLAYS DISTRIBUTION AND CONTROL BOARD

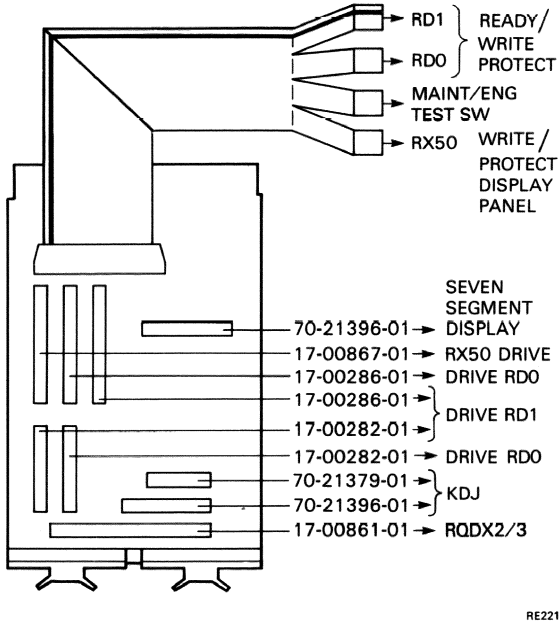

Figure N-1 Barclays Distribution and Control Board Layout