| UNIT | MODULE REPLACED | UNIT(S) REQUIRING DESKEW |
|---|---|---|
| KL10-PV CPU | M8516 | ALL RH20 UNITS |
| | M8519 | ALL DMA20, MA20/MB20 |
| | M8526-YA | DMA20, MA20/MB20, ALL RH20 UNITS |
| CABLES | SBUS - BC20C | THE DMA20 OR MA/MB20 CONNECTED TO THAT SBUS |
| | E & C BUS - BC11 OR BC20C | ALL RH20 UNITS |
| MA20 | M8561 OR M8562 | THE MA20 IN WHICH THE MODULE WAS REPLACED |
| MB20 | M8565 OR M8568 | THE MB20IN WHICH THE MODULE WAS REPLACED |
| DMA20 | M8560 OR M8563 | DMA20 |
| RH20 | M8556 | THE RH20 IN WHICH THE MODULE WAS REPLACED |
| | M8559 | ALL RH20 UNITS |

| UNIT TO BE DESKEWED | REFERENCE DOCUMENTATION |
|---|---|
| DMA20 | A-SP-KL10-PV-6 |
| MA20, MB20 | D-BS-MB20-0-INS |
| RH20 | A-SP-RH20-0-SP |
| ALL OF THE ABOVE | EK-20XX-IN-001 |

| REVISIONS | CHANGE NO. | CHK |
|---|---|---|
| | | |

MANEPEACE P-1655

DEC FORM NO. DRC 100-C

QUANTITY & VARIATION

| DESCRIPTION | DWG./PART NO. | ITEM NO. |
|---|---|---|

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

| ANGLES ±0° 30' | CLASS OF ACCURACY (CHECK ONE) | NOMINAL DIMENSION RANGE INCHES | | | | | |
|---|---|---|---|---|---|---|---|
| | | OVER 0 TO .2 | OVER .2 TO 1.2 | OVER 1.2 TO 4.0 | OVER 4.0 TO 12.0 | OVER 12.0 TO 40.0 | OVER 40.0 TO 80.0 |
| SURFACE QUALITY IN ✓ MICROINCHES | MEDIUM ☐ | ±.004 | ±.008 | ±.012 | ±.016 | ±.024 | ±.04 |
| | PREFERRED ☐ | ±.012 | ±.016 | ±.025 | ±.04 | ±.063 | ±0.1 |

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG

MATERIAL

FINISH

| | | |
|---|---|---|
| DRN. | | 1977 |
| CHK'D | | |
| ENG. | | 12 APR '77 |
| PROG. ENG. | | 12 APR '77 |
| PROD. | | 12 APR 77 |

NEXT HIGHER ASSY. B-DD-KLIØ-PV

SCALE

SHEET 1 OF 1

FIRST USED ON KLIØ-PV

digital

TITLE

KLIØ DESKEW INFORMATION

| SIZE | CODE | NUMBER | REV. |
|---|---|---|---|
| C | SP | KLIØ-PV-7 | |

DIST.

| REV. | NUMBER | CODE | SIZE |
|---|---|---|---|
| | KLIØ-PV-7 | SP | C |

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

**ENGINEERING SPECIFICATION** DATE 24 MAR 77

TITLE DMA 20 SETUP PROCEDURE

REVISIONS

| REV | DESCRIPTION | CHG NO | ORIG | DATE | APPD BY | DATE |
|---|---|---|---|---|---|---|
| | | | | | | |

| ENG | APPD | SIZE | CODE | NUMBER | REV |
|---|---|---|---|---|---|
| | | A | SP | KL10-PV-6 | |

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DEC-16-(327)-1071-N971
DRA 107



This document specifies DMA20 Deskew procedure and setup for Data Warning Adjustment.

1.0 Adjustment procedure for deskewing the DMA20 clocks.

NOTES:
i. Use identical probes with short ground clips.
ii. This procedure must be performed when any of the following modules are changed:
M8526 or M8526-YA, M8519, SBUS Cables, M8563, M8560.

a. Attach a probe (either channel 3 or external sync) to "A CHANGE COMING L" 4E22P2. Set the sync for a negative edge.

b. Attach channel 1 probe to 4D33P1 (MTR CLOCK) Use .5V/cm and set scope such that the ground reference is 1.3V above the centerline.

c. Attach channel 2 to 1A02R2 (DMC2 CLK DESKEW POINT) Use .5V/cm and adjust scope such that the ground reference is 1.5V below the center line.

d. The Mbox clock which occurs after "A CHANGE COMING L" goes low is the "A" phase clock. The second clock tic after the "A" phase clock tic is the "B" phase clock tic. The second clock tic after the "B" phase clock tic is another "A" phase clock tic, etc.

e. Adjust DL2 on the M8560 in slot 1AF03 (it is the 4th delay from the top) until the clock on channel 2 which is affected by this adjustment crosses the centerline at the same time as the "A" phase clock on channel 1.

f. Adjust DL3 on the M8560 in slot 1AF03 (it is the top delay) until the clock which is affected by this adjustment crosses the centerline at the same time as the "B" phase Mbox clock which is on channel 1.

h. Connect channel 2 to 1D03F1 (DTR3 CLK 125 NS A H).

i. Adjust DL1 on the M8560 in slot 1AF03 (it is the bottom delay) until the clock on channel 2 which is affect by this adjustment crosses the centerline at the same time as the "A" phase clock on channel 1.

j. Connect channel 2 to 1D03L2 (DTR3 CLK 62 NS A H).

k. Adjust DL4 in slot 1AF03 (it is the second delay from the top) until the clock on channel 2 which is affected by this delay crosses the centerline at the same time as the "A" phase clock on channel 1.

l. Adjust DL5 in slot 1AF03 (it is the third delay from the top) until the clock on channel 2 which is affected by this delay crosses the centerline at the same time as the "B" phase clock on channel 1.

m. You have now completed the adjustments for clock deskew on the DMA20.





2.0 Adjustment procedure for setting up DATA WARNING when used with the DMA20.

**********

NOTES: 1. Use identical probes with short ground clips. This procedure uses 4-BUS mode, assuming the system has multiples of 4 memories. This general procedure will work in any bus mode.

2. The memory must be setup to return DATA WARNING SLOW and ADDRESS ACK (NT) only. No other combination is legal!!

**********

a. Set-up the DMA20 4-BUS mode doing a small loop which reads from only one memory on a given bus such as:

```
10/MOVE 0, 100   (200000 100)
11/MOVE 0, 101   (200000 101)
12/MOVE 0, 102   (200000 102)
13/MOVE 0, 103   (200000 103)
14/JRST 10       (254000 10)
```

b. Put channel 1 on KBUS"X" DATA WARNING.

```
KBUS0 1C05D1
KBUS1   1C07D1
KBUS2   1C09D1
KBUS3   1C11D1
```

c. Put channel 2 on KBUS"X" RD RS.

```
KBUS0   1C05J1
KBUS1   1C07J1
KBUS2   1C09J1
KBUS3   1C11J1
```

d. Sync on channel 1 going negative.

e. Adjust each memory such that DATA WARNING (on channel 1) occurs 260 NS prior to RD RS (on channel 2).

f. Modify program to set up the next four memories.



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