

TECHNICAL NOTE #2605

Author: 2200 Development Group
Date: March 26, 1979
Subject: 2280 Disk Drives

Several things make the 2280 different than previous 2200 disks.

- (1) More than 32768 sectors.
- (2) More than 2 platters per drive.
- (3) Device type D.
- (4) Incompatibility with B, C, T series CPU.

These points are interrelated, but it is important that they be understood.

I. The CPU and the Disk Controller.

The 2280 disk drive will work with the 2200VP Release 1.9 or later, and with the 2200MVP Release 1.7 or later. It will not work properly with earlier releases, nor with a 2200 B, C, S, or T CPU.

In addition, the system bootstrap (which loads the operating system from disk) must be at least version R1 (ECN 9772) in order to be able to load from the 2280. One easy way to tell if an older machine has this bootstrap is to watch the screen while loading a system file. The older bootstrap displays the function key number on the top line, while the newer bootstrap displays the file name and device address. The system bootstrap can only load the operating system from the removable or 1st fixed platter of a 2280.

The drive needs to be cabled to the CPU via a 22C11 dual printer/disk or a 22C03 single disk controller. The present triple controller (22C31) should not be used, and the 2230 MXA is not supported at the present time. If an older 22C03 is used, a check should be made that it has the ECN 8051 made for the MVP, even if the 2280 will be used with a VP.

II. The Platter Size.

Floppy and hard disk platters that were created on a B, C, S, or T may not in general be COPYed to the 2280 and used. The MOVE statement or its software equivalent should always be used for the initial transfer. The same precautions may apply when transferrring data from a platter on which the index was created or modified by DATASAVE BA statements.

The potential problem occurs because on all previous drives, the '8000' bit of all sector addresses in the index was ignored. This gave a 15 bit sector address which sufficed until the 2280, larger which has a platter size. When a platter is MOVEd from another disk to the 2280, the operating system will reconstruct the high order bit to conform to the 16 bit structure of the 2280.

In addition to platter transfer, two similar or other potential problems can arise from software that uses DATASAVE BA and DATALOAD BA. On the 2280, for the first time, the high order bit of the two byte alpha sector address actually is used as part of the 16 bit sector address. It is conceivable, but not likely, that some software may assume otherwise. A more likely problem is existing utilities (including Wang's ISS) that deal directly with index sectors will deliberately strip off the highest order bit of each sector address before using it. These utilities must be changed before being used on the 2280. ISS Release 5.0 is 2280 compatible.

III. Device Type D

The 2280 is our first drive with more than 2 platters at a single address. (The triple floppy was accommodated by treating the 3rd platter as a single platter of a secondary drive). For this reason the concept of 3XX, BXX to address the two surfaces had to be extended. Device type D has been defined, and will normally be used for all 2280 operations. For all disk statements, if type D is specified, then a new meaning is assigned to the other two digits. The controller for the 2280 should be set at either 10, 20 or 30 and D10, D20 or D30 is the address to use to specify the removable platter of the drive. If the low order digit of a type D device address is non zero, it does not refer to the hardware (switch selectable) address, but to a specific platter. Thus the six platters of a 2280 at address 10 are referred to as D10, D11, D12, D13, D14, and D15. Note that a separate device (normally a printer) may be at 215 with no conflict at all since, for example, /D15 enables device 10 not 15. If two drives are daisy chained together the second may be address by D50, D51, D52, D53, D54, and D55. Note also that the F and R parameters may not be used when type D is selected; T must be used. For a more complete description of 2280 platter addressing refer to the "Model 2280 Disk Drive User Manual".

For disk controllers set to address 10, 20, or 30 the following device addresses are equivalent:

/310 ↔ /D11	/320 ↔ /D21	/330 ↔ /D31
/B10 ↔ /D10	/B20 ↔ /D20	/B30 ↔ /D30

for any 2200 disk on a 2200VP or MVP.

The biggest impact this has on existing software is that the choice of possible platter addresses has been greatly expanded. It is primarily for this reason that a new variation of the SELECT statement has been introduced:

```
SELECT #n < A$ >
```

which allows the device address to be specified as the value of an alpha variable.

For details see the release memo for VP Release 1.9 or MVP Release 1.7 or the new reference manual.

If \$GIO is used with an external address of type D, the same interpretation is made. Thus SELECT TAPE/D12:\$GIO (...) and SELECT #3/D14:\$GIO #3 (...) and \$GIO/D11 (...) will all enable the disk controller at address 10. The \$GIO address commands 71xx and 73x0, when used with the 2280, must use the physical addresses 10, 20, 30, 50, 60 or 70 since there is no device type available to indicate that the low 4-bits specify a platter. The effects of any previously tried sequences can not be guaranteed at this time. Wang does not support any \$GIO sequences to the 2280 except \$GIO hog and unhog, and that should be replaced by a \$OPEN whenever possible. If and when it becomes advisable to support other sequences, they will be published as specific to the 2280.

WANG

LABORATORIES, INC.

MEMO TO: BOB KOLK, NORMAN LOURIE
FROM: JOHN THIBAUT
SUBJECT: 2280 MULTIPLEXER
DATE: JANUARY 4, 1980

The following outlines requirements for development of 2280 Disk Multiplexer:

Introduction

Over the past 18 months, the 2280 Disk Drive has been, without a doubt, the single most dramatic new product announcement for the 2200 Series product line. Since its release in September 1978, almost 1000 2280 Disk Drives have been sold to date. The 2280 is also responsible for increasing the average VP/MVP system price approximately 25 percent. The past 8 months have shown a heavy increase in 2280 sales that have averaged over 100 units per month. Past 2260 model disk sales indicate that 20-25 percent of all disk units sold are multiplexed in some fashion. The ability to multiplex the 2280 has been one of the most frequently requested products from field personnel worldwide.

Forcasts indicate that 30 percent of all 2280 units sold would require the multiplexing ability. This demand indicates that this product requires a high priority for both development and field announcement.

Description

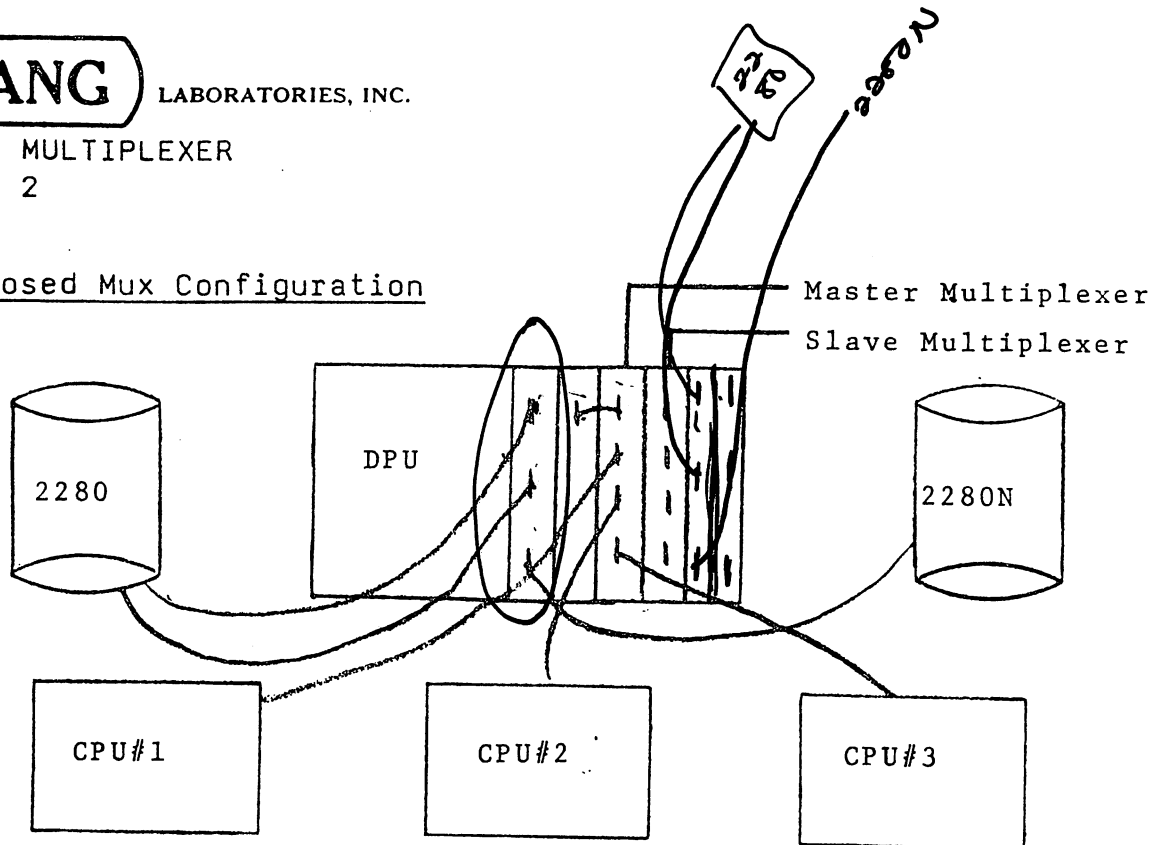
Since the installed base of 2280 units continues to grow, any modification to current hardware necessary to develop the multiplexer product should be kept to a minimum. The multiplexer must function on all products that currently support the 2280 (VP/MVP) and provisions to support the new product (LVP) are also required. Unlike past mux options offered, the 2280 Mux should be designed in a "star" configuration, such that CPU's will connect directly to the disk processing unit to optimize access times. Multiplexer controller boards must plug into the DPU to accomplish this, thus not using additional CPU I/O slots. Also, disk addressing must remain as currently defined. Cable lengths should be offered in 25, 50, 100, 250, 500, 750, 1000 foot increments.

WANG

LABORATORIES, INC.

2280 MULTIPLEXER

Page 2

Proposed Mux ConfigurationSpecifications

1. Multiplexer should allow for maximum of seven CPU's per DPU. Initial announcement would limit capability to three CPU's.
2. Maximum slave cable length will be 1000 feet.

Product Projections/Release

1. Announce tentatively March 1, 1980 with first deliveries to commence 90 days after order.
2. FY 80 - 200 Units.
FY 81 - 400 Units.
3. Prices to be set by Market Planning and Development

A product introduction plan indicating support unit distribution will be forthcoming.

John Thibault
John Thibault

JT:pn:2323A

cc: Fred Wang
Sam Gagliano

WORD PROCESSING SYSTEMS

TO DISTRIBUTION		PUBLICATION #	
FROM TINA CASTEN - 2200 SYSTEMS MARKETING		DATE APRIL 1980	
SUBJECT 2280 DISK MULTIPLEXOR		DISTRIBUTION	
SRM FILE #	S E C T	S U B	REORDER FROM:
THIS RELEASE SUPERSEDES:		DESTROY SUPERSEDED INFORMATION <input type="checkbox"/> YES <input type="checkbox"/> NO	

A STAR IS BORN!!

In response to popular demand, Wang Laboratories, Inc., is pleased to announce the 2280 Disk "Star" Multiplexor for the 2280 Disk Drive.

The 2280 MUX provides the ability to multiplex the 2280 Disk Drive for increased storage capacity at low, incremental cost.

The 2280 disk multiplexor matches the 2280 Phoenix disk drive in reliability and performance.

Unlike the "daisy-chain" type disk multiplexor of yesterday where multiple CPU's are "chained" together with connector cables, and the master CPU, (i.e., the CPU with the master board) is connected directly to the disk unit, the 2280 MUX is a star configuration.

In a star configuration, up to three VP or MVP CPU's are individually connected directly to the 2280 disk processing unit.

Benefits of a Star Configuration

- OPTIMAL DISK ACCESS TIME - because the individual central processing unit is directly connected to the disk processing unit physically located within the 2280 disk drive.
- INCREASED EXPANSION CAPABILITIES - because the multiplexor controller boards plug into the disk processing unit, the I/O slots in each CPU can be used for additional peripherals or communications options.
- OPTIMAL "UP" TIME - because each CPU is directly connected to the disk drive, if one CPU goes down, processing is not interrupted.
- FASTER THRUPUT - because the 2280 disk processing unit is intelligent, it monitors which CPU is requesting disk access and is therefore I/O independent.

Benefits to Sales Force

The 2280 Phoenix disk drive is responsible for increasing the average VP/MVP system price approximately 25%. The 2280 MUX capability increases the potential of higher sales revenues through the add-on value of additional CPU's and terminals. Remember, the disk is the most expensive component of a system. Since the 2280 MUX offers the capability of increasing disk capacity

at low, incremental cost, it's natural for a user to expand his system via CPU's and terminals to maximize the sharing of his system's storage resource.

Market Position

Forecasts indicate that 30% of all 2280 units sold would require the multiplexing capability of the 2280 MUX.

Based on a yearly sales averaging twelve hundred (1,200) 2280 Phoenix drives, we have the potential of selling 360 multiplexors. This figure represents well over a million dollars in additional revenue for the 2200.

The majority of multiplexed units have been installed in major accounts for use in distributed processing networks.

The high volume, multiple-user processing environment has a set of inherent problems. However, the design of the 2280 MUX effectively addresses these problems and, consequently, gives you the edge over competitive systems.

- . Multiterminal networks must use polling network control protocol - the 2280 MUX allocates disk time to multiple systems in a manner which enables all systems to have virtually concurrent access to the disk. Participating systems are sequentially "polled" on an "equal priority" basis, until one of the systems attempts to access the disk. At that point, control of the disk is passed to the inquiring system, which is permitted to execute a single disk statement or command. (Multi-sector transfers may be made by a single statement.) When execution of the single disk operation is completed, disk control reverts to the multiplexor, which resumes its sequential polling of the system.
- . Some disk operations, such as the on-line updating of a commonly shared file, require that one system have a period of exclusive and uninterrupted access to the disk. For such operations, the \$OPEN statement from Wang BASIC-2 should be used. In this mode of operation, one system temporarily monopolizes the disk, locking out all other systems. Critical file maintenance operations may then be carried out by the privileged system without fear of interruption.
- . Appropriate systems for networking - The 2200 family of products is unique in that all peripheral and communication options are supported throughout the product line; and programming languages, file structure, and software libraries are transportable throughout the product line which makes the 2200 series an appropriate system for networking.
- . Error control - The Model 2280 MUX multiplexor installs directly into a 2280 Disk Processing Unit (DPU) and contains the polling circuitry and disk processor interface which frees the CPU for error detection and correction.

Not only does the 2280 MUX effectively address problems inherent to a multiplexed environment, it also offers unparalleled expansion opportunities.

For example, storage capacity can be incrementally increased from 26 Mb of on-line storage to 480 Mb with three 2280-3/2280N-3 configurations daisy-chained together.

Questions and Answers

- Q. What type CPU supports the 2280 MUX?
- A. Only the VP and MVP CPU's support the 2280 MUX.
- Q. How many VP and MVP CPU's can share a 2280 disk drive via the 2280 disk multiplexor?
- A. The Model 2280 MUX "star" type disk multiplexor permits any combination of two or three 2200 VP, or 2200 MVP CPU's to share a Model 2280 disk drive or combination of 2280 disk drives (2280 and 2280N).
- Q. What do I need to order for a "star" multiplexor configuration?
- A. You need one 2280 MUX Multiplexor board, one 22C80 controller for each CPU, and one 12-foot connector cable for each CPU.
- Q. What is the maximum distance allowed from the disk to the CPU?
- A. The maximum distance between CPU and disk drive is 1,012 feet.
- Q. In what lengths are the connector cables available?
- A. Connector cables come in extensions of 25, 50, 100, 250, 500, 750, and 1,000 feet, or 7.6, 15.3, 30.5, 76, 153, 228, and 305 meters.

Documentation

2280 Disk Multiplexor Data Sheet

700-5931

Product Statistics

	<u>2280 MUX</u>	<u>22C80</u>
Part Number	177-2280X	177-2280C
Attaches To	2280 CPU/2280	2200VP/MVP
Release Date	April 2, 1980	April 2, 1980
Delivery	August 15, 1980	August 15, 1980
Warranty	Standard	Standard
Classification	Electrical	Electrical
Commission	5%	5%

<u>U.S. List:</u>	\$2,000.00	\$500.00
U.S. Monthly Maintenance	\$ 20.00	\$ 5.00

Canadian List:

FST & Duty Exempt	\$2,500.00	\$625.00
Duty Paid & FST Exempt	\$2,700.00	\$675.00
FST & Duty Paid	\$2,900.00	\$725.00
Canadian Maintenance	\$ 25.00	\$ 7.00

Extension Cables - U.S. List:

<u>Length</u>	<u>Part Number</u>	<u>Price</u>	<u>Length</u>	<u>Part Number</u>	<u>Price</u>
25'	120-228001	\$ 40.00	500'	120-228005	\$ 620.00
50'	120-228002	\$ 70.00	750'	120-228006	\$ 925.00
100'	120-228003	\$125.00	1000'	120-228007	\$1,200.00
250'	120-228004	\$315.00			

Extension Cables - Canadian List:

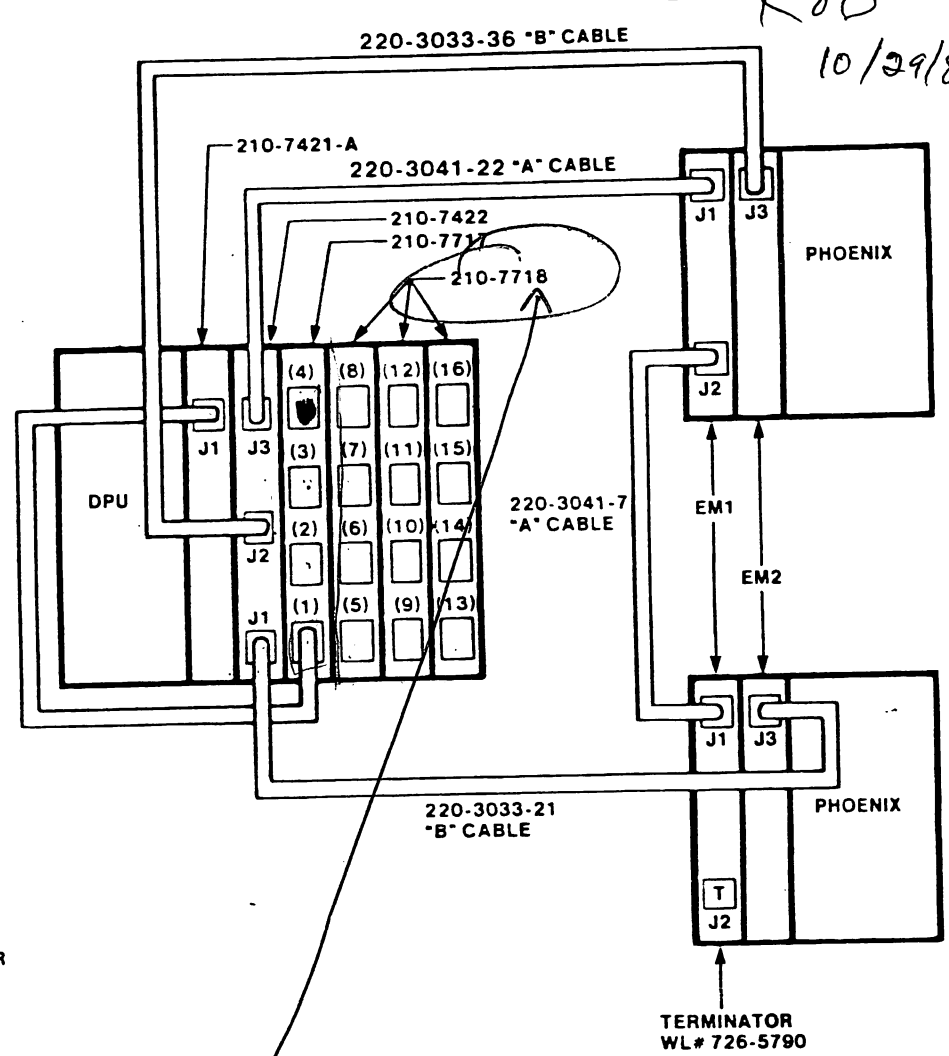
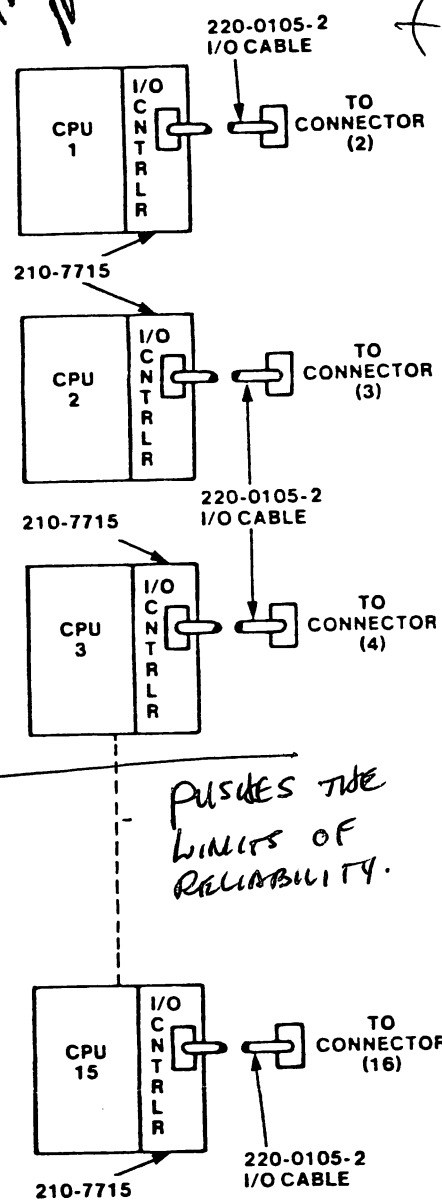
<u>Length</u>	<u>Part Number</u>	<u>FST & Duty Paid</u>
25'	120-228001	\$ 58.00
50'	120-228002	\$ 101.00
100'	120-228003	\$ 180.00
250'	120-228004	\$ 454.00
500'	120-228005	\$ 892.00
750'	120-228006	\$1,331.00
1000'	120-228007	\$1,726.00

Gene, please look into this

This could allow us to support up to 240 CRT'S on a system - How do we find out more about this

- Rob

10/29/83



PUSHES THE LIMITS OF RELIABILITY.

NOTE: UP TO 15 CPU'S CAN BE MUXED INTO THE DPU.

NEEDS THE BOARD

Rob would like to experiment with up to 5 CPUs!!

WANTS TO SUBMIT SPQR ASAP - PLEASE PROVIDE FORM AND PROCEDURE.

★ NEED SPQR

EXCESSIVE STATIC } PER GEN. MANTON BEYOND 3 CPU'S.

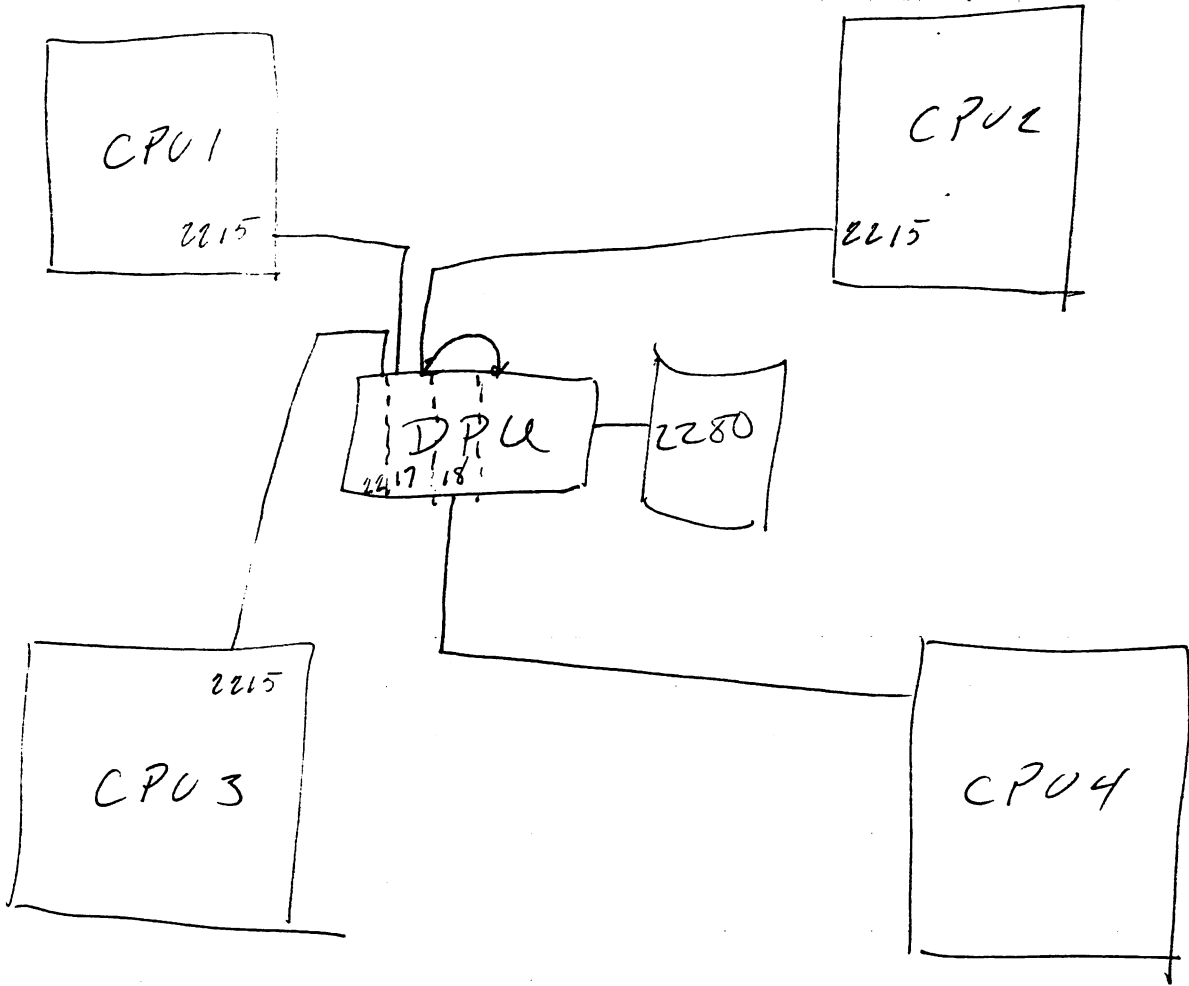
FIELD SERVICE WILL NOT SUPPORT BEYOND 3 CPUS/48WS.

Figure 2-13. MUX System Interconnection Diagram

Chew.

22C80

CPU/DISK Controller



7717 3 CPUs
 1 DPU Port

210- 7718 4 CPUs Ports

2280 DPU MUX 1st 7717
 MAX Configuration 3rd 7718

CUSTOMER ENGINEERING
TECHNICAL ASSISTANCE CENTER
NEWSLETTER

#30614

4202

2200 SYSTEMS-INTERFACE-DISK MULTIPLEXER.

TOPIC: 2280 DPU/MUX CABLES

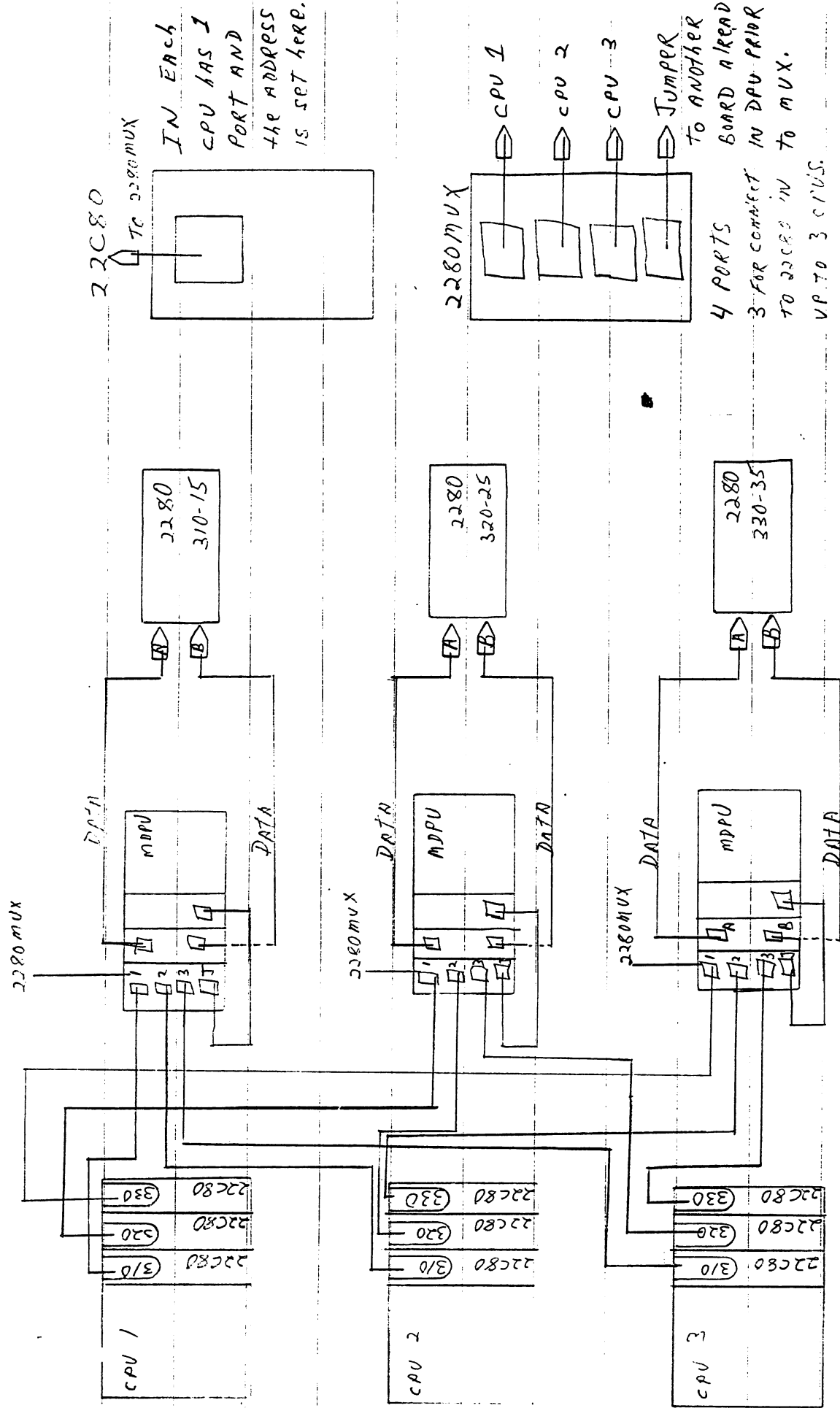
The question of maximum cable lengths has arisen for the cable between the 2280 DPU/MUX and the 2200 CPU. Below is a list of cables that are supported.

When using unmuxed DPU to CPU (12' maximum) use:

220-0105-2	12'
220-0105-3	8'

When using DPU/MUX to CPU (2000' maximum) use:

220-0105-2	12'
220-0105-3	8'
120-2280-01	25'
120-2280-02	50'
120-2280-03	100'
120-2280-04	250'
120-2280-05	500'
120-2280-06	750'
120-2280-07	1000'



M E M O R A N D U M

To: 2200 Group
From: Bob Porter
Date: Feb. 9, 1982
Subject: 2280 MUX and Multiple CPU's

It was a cold January day, the kind that makes you sure the early coming of the next ice age is a sure bet. I had just hung up the phone after solving a major crisis in beautiful downtown Newark and was about to reward myself with a Milkyway and a grape soda when the phone rang again. Since working in Systems Support is no place to be if you like class I wasn't surprised by the question a fellow analyst blurted out. "Can you mux four CPU's to a Phoenix drive?". Calling upon my vast technical knowledge I answered without hesitation "No way, Jose". "But", came the voice, "A salesman told me there was a special product that can handle up to fifteen CPU's". I was taken aback and left agog. Could it be that a mere salesperson could know more than me? I told the caller I would research the problem and get back to him (A standard answer used in the trade). After exhaustive base-touching with the local talent I finally unlocked the mystery and put this case to bed. I have listed the facts of this paper chase below for your perusal.

Lo' and behold there is such a product. It involves the use of a 2280 MUX and something called a Port Expander Board (WL# 177-2280-XE or WL# 210-7718). A maximum of three Port Expanders can be used with a 2280 MUX (WL# 177-2280-X or WL# 210-7717). Each Port Expander can interface with four additional CPU's making a total of fifteen CPU's per configuration. While there are a few installations now being supported as beta-sites this product is not considered to be a viable solution as the performance is not what it should be. This should not be recommended to a customer. If a salesperson inquires about the availability of the Port Expander they should be directed to Product Marketing, Gene Mantoni (Ext. 4278).

MEMORANDUM

TO: Ken Mailloux
DEPT: Technical Support Center
M/S 1213 1-20-2571

FROM: Don Pauling
DEPT: Technical Assistance Center
M/S 8239T 1-43-310
DATE: April 27, 1983
SUBJ: 2280 MUX Configuration

I have reviewed the configuration drawing supplied by you. I found the drawing to be correct.

The following are positive and negative factors concerning the configurations.

Configuration # 1


- Pos. This configuration has two DPU's, two sets of cables, and two 22C80 controllers. With this configuration, you have a built-in backup system for these items. If any one of these items failed, systems users would still be able to continue limited system use. With the dual 22C80 controllers and DPU's, disk access would not be degraded to the same degree as with a daisy chained drive configuration.
- Neg. This configuration requires two DPU's, two sets of cables, and two 22C80 controllers. With the two controllers, you lose one I/O slot with the second 22C80 controller. For some customers, this may have a negative impact. With the second 22C80 controller, you also use a second disk address. When using the 2200 LVP CPU, the Winchester drive is usually set for 310, the first 22C80 controller would be set for 320, and the second 22C80 controller would be set for 330. If the customer wished to installed another disk drive (eg. 2270A or 2260), it would require a non-standard disk address.

Configuration # 2

Pos. This configuration has one DPU, one set of cables, and one 22C80 controller. The capital equipment expense would be lower for this configuration. With the one controller, you use only one I/O slot in the CPU. For some customers, this may have a positive impact. When using the 2200 LVP CPU, the Winchester drive is usually set for 310, and the 22C80 controller would be set for 320. If the customer wished to installed another disk drive (eg. 2270A or 2260), he could use disk address 330.

Neg. This configuration has one DPU, one set of cables, and one 22C80 controller. If any one of these items were to fail, it could require the system users to halt operations until that item was repaired/replaced. For some customers, this may have a very negative impact. With the single 22C80 controller and DPU, disk access could be degraded when the number of users accessing the disk is increased.

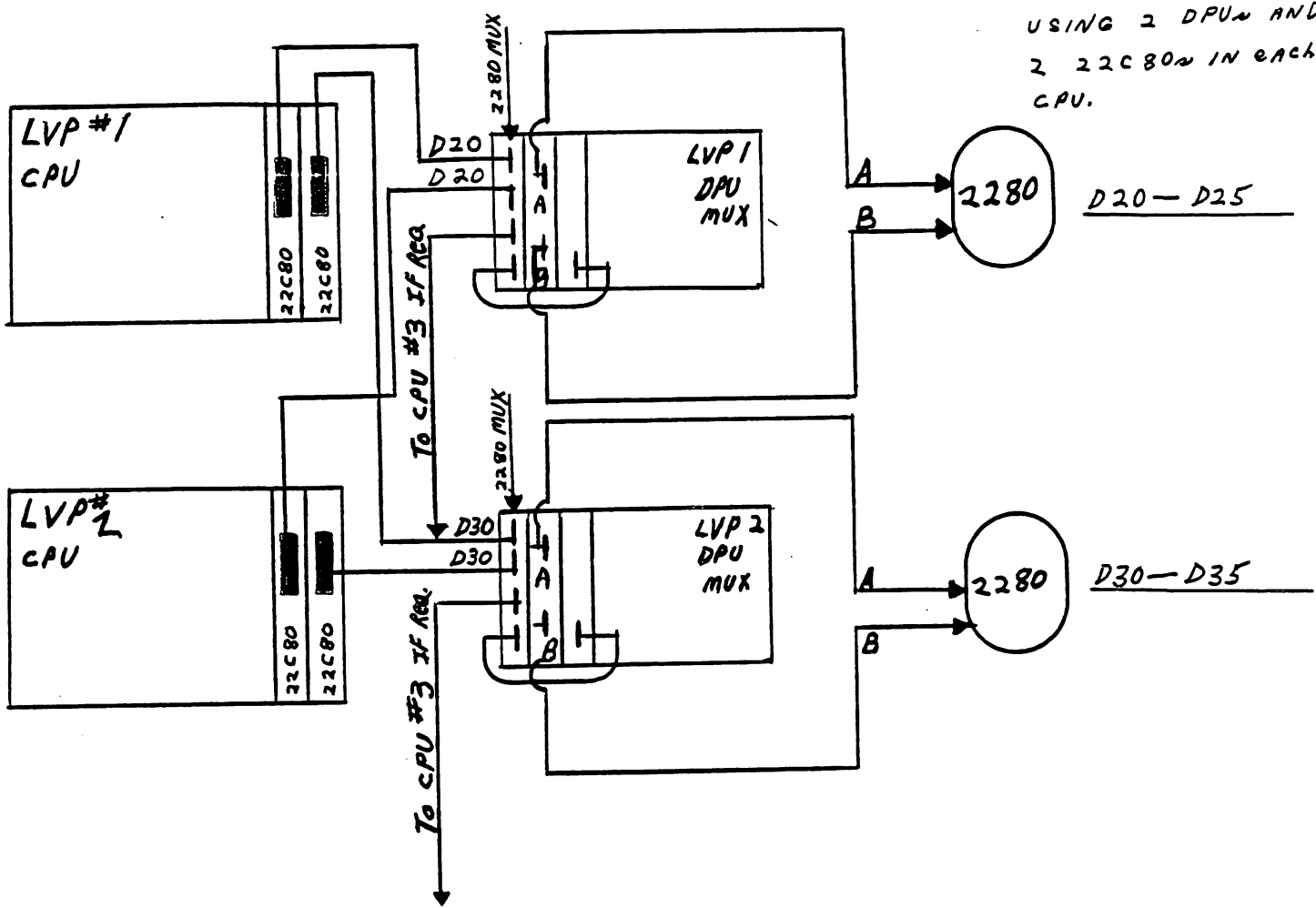
Please feel free to contact me for additional details on this memo.



Don Pauling
Product Support Engineer

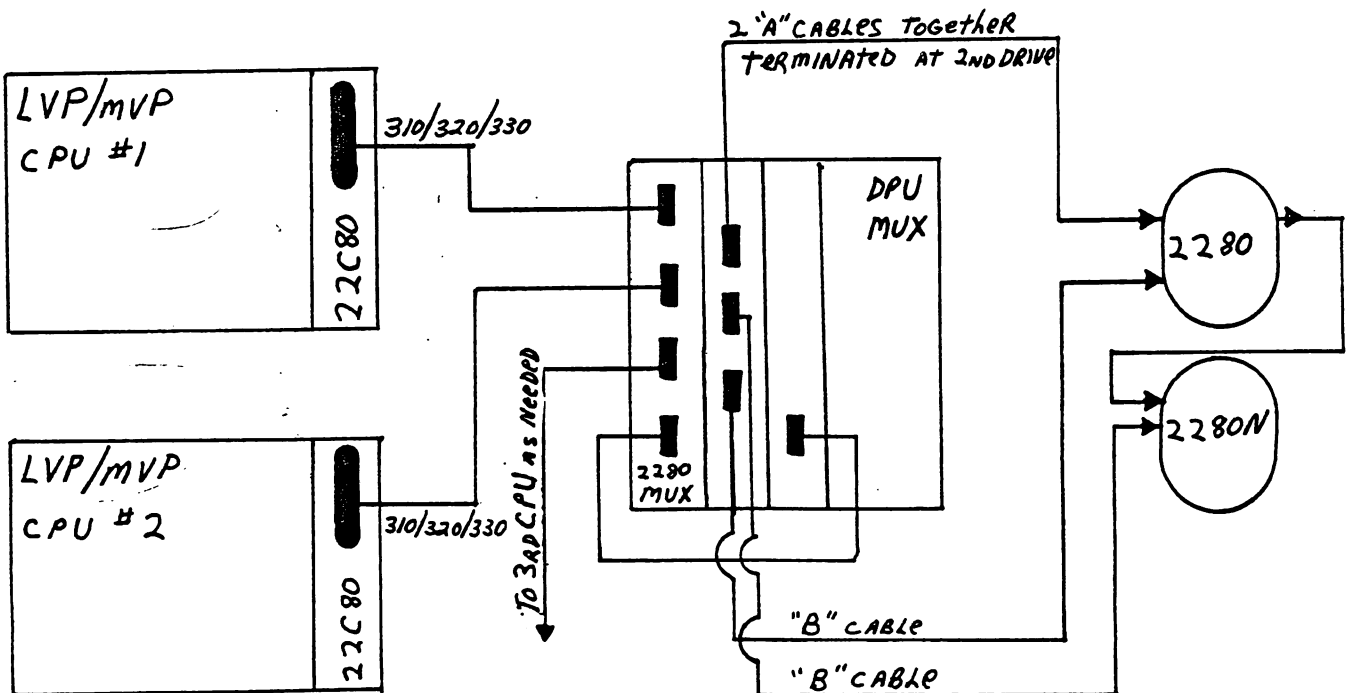
cc: F. Haggarty

VS/0007p



2

DAISY CHAIN CONFIGURATION AS SHOWN ON DATA SHEET



DAISY CHAINING WILL ADD A Hex (40) TO THE PRIMARY DEVICE ADDRESS. IF SET UP 310/320/330 THE 2ND DRIVE WOULD BE 350/360/370.



TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 5160 REPLACES: _____ DATE: 08/13/85 PAGE 1 OF 1
MATRIX ID. 3107 PRODUCT/RELEASE# 2200 Disk Function
TITLE: FCO 1168, 2280 DPU/MUX

PURPOSE:
To inform the field that FCO 1168 has been released.

EXPLANATION:
FCO 1168, released July 17, 1985, documents ECO 37156 and informs the field that FCO's 1086 and 1114 have been replaced by FCO 1168. Four EPROM's on the 210-7423-A PCB are changed. The reasons for the change are as follows.

1. Multi-sector writes that end on relocated alternate sectors can cause extra sectors to be written.
2. When the first operation of a DPU is multi-sector write, the DPU will return an I91 on this and all other subsequent requests. The I91 will be returned until a reset is issued followed immediately by a non-multisector write operation.
3. The DPU will hang if a data transmission error occurs during the "Compare" sequence of a "Read After Write" command.
4. Attempts to access the drive while it was seeking to track "0" during the power-up (or spin-up) sequence causes the drive to retry the seek. If this happens several times in a row, the drive will hang and have to be shut down to clear the condition.

The upgraded EPROM's in FCO Kit #728-0184 are designed to fix the problems cited in both FCO 1086 and FCO 1114.

FCO Kit #728-0184 will be available August 5, 1985 and can be obtained by placing a routine order through the Logistics Order Processing system.

NOTE: FCO 1161, which adds two resistors to the 210-7422 PCB, must be done in conjunction with FCO 1168. Refer to FCO 1161 for further information.

GROUP: ECO Support Group MAIL STOP: 0139

CONFIDENTIAL

Wang Laboratories, Inc.



Computer
Communications:

services
modems
terminals
multiplexers

July 2, 1985

Mr. Paul Morin
Wang Laboratories, Inc.
M/S 0115
59 Electronics Avenue
Lowell, MA 01851

Dear Mr. Morin

The following is a description of the operation of our 2280 disk drive in conjunction with two 2200 MVPC CPUs multiplexed by a DPU recently upgraded to the latest firmware revision level. The CPU running the following subroutine has 11 partitions all of which are suspended except for the partition running this program.

to go into the 13:27
-0012 B=0
-0013 LIMITSR"@@",A,A,A,A: ERROR IF B=0THEN PRINT AT(X1,15,55);TAB(26);"Waiting
for disk ready "; B=1: #BREAK255: GOT013
0014 RETURN

The function of this subroutine is obvious. When the disk drive is deselected line 13 branches to itself upon having encountered the I91 error resulting from the disk hardware not being ready to allow reading from the disk catalog. When the disk drive becomes ready the LIMITS statement is performed successfully and the branch to 14 ends the routine. The problem is that the disk drive, although appearing to function normally up to the point where the platters are up to speed, does not become ready. The red LED indicator goes out instead of coming on steady.

This condition remains indefinitely until the operator deselects the drive. At which point it continues to sit there with the red LED out for approximately 5 minutes flashing once every 15 to 20 seconds (the drive is also making an unusual noise, a rhythmic humming sound). Suddenly the red LED begins blinking normally as the drive is coasting down and goes out when it comes to a stop.

During all this time line 13 continues to branch to itself as the drive has never become ready. Trying again only results in the same effect. The only solution is to HALT the loop and bring the drive up with the program suspended and press CTNUE RETURN after the drive has become ready.

If the #BREAK255 is eliminated from line 13 the same effect occurs except that the drive does eventually become ready after making a loud whining noise (which is enough to scare the poor operator half to death).

The solution I discovered is to replace the #BREAK255 statement with #GIO(HEX(75FF)). This slows the frequency of the loop on line 13 down to approximately 3 passes per second instead of 27 and apparently gives the drive time to do its normal processing.

I do not know if the above phenomenon is a fault in the DPU firmware or not but the original firmware never gave us any problems. I am satisfied with the microcode delay immediate solution and it is up to you whether or not you pursue it any further. Thanks for your help.

Sincerely,

David S. Alden

2200 HARDWARE DESIGN ISSUES

WANG

1. PROBLEM: Intermittent I90 errors after powering up the drive/s when running daisy-chained Phoenix drives using the R10 DPU proms. I90 is a disk hardware error caused by the disk drive not responding properly to the system.

CIRCUMVENTION: a. Have a DPU installed for each Phoenix drive.
b. Downgrade to R7 proms. R7 proms may present a data integrity problem on a surface with alternate sectors.
c. Power DPU on and off every time a drive is powered up.
d. Key reset on workstation.
e. Try an old CDC Terminator with the black chips or possibly one with the white chips. The newer terminators, especially from Wang seem to have a relationship to the problem.

R & D CONTACT: Mike Riley, S.K.Ho

STATUS: The fix to the Phoenix I/O boards has been dropped at this time. As these are not Wang boards and this drive is no longer made by CDC implementing this fix could be a major problem. An updated 210-7422 board was sent to Imperial Head Wear in early July. Problems were encountered with the slave drive on installation and the board was removed. Product Support was not called from site. The board was returned to the Home Office where it was tested without error continuously for several days.

A second board has been made up at our request. One of the 2 boards will be installed at either Imperial Head Wear in Denver or Hazen Paper in Holyoke, Ma, depending on how quickly compliance to certain criteria can be made in Denver. We have requested from the Western Region that all board and prom revisions for the DPU boards at Imperial Head Wear be sent to us and that a complete set of Phoenix and DPU boards be on site at time of installation. The action plan for installation will be developed with Mike Grove (RTS in Western Region) for Imperial Head Wear and Dan Sullivan (DTS in the Farmington, Ct) for Hazen Paper. Once we have a status from the first site a determination can be made on installing the second board. An action plan should be in place by Thursday, 8/7 and hopefully the first board installed by Thursday 8/14.

ACTIVE CALLS: ESCALATIONS:

	8/12	06164095	HAZEN PAPER
8/19	8/12	66170007	LUVAN
8/15	8/12	86007000	IMPERIAL HEAD WEAR
8/19	8/12	H6022004	NAVAL SEA SYSTEMS
8/19	8/12	P5343000	TAIWAN
8/19	8/12	P6083000	TESTRITE COMPANY, LTD

Tuesday 10/01/85 10:04 am
Page: 1

To: Paul Morin
Subject: OS error I91, yes R10

From: Duane Frunz
Date: 08/27/85

Paul,

Checked with Gerry Crawford about the I91 error from 2280 DPU.

Yes, the problem is fixed with level R10 (R -ten). There is a TSB (do not know number) and the proms are available. Gerry said if they have a pre-release ROA, ROB, etc. and think they have R-tens they should order new ones to be sure they have the correct ones.

Since Dave Alden's letter was dated 2 Jul, I doubt he has 'current' proms but I do not know the date.

When you find TSB number and date of prom, please let me know.

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 5133 REPLACES: N/A DATE: 07/02/85 PAGE 1 OF 1

MATRIX ID. 3106 PRODUCT/RELEASE# 2280/6580

TITLE: Phoenix Door Assembly Repair

PURPOSE:

To inform the field about repair of the Phoenix Door Assy, P/N 726-5835.

EXPLANATION:

A large percentage of the Door Assemblies (726-5835) that are replaced in the field are due to a broken latch. This latch is listed as a pawl (726-6914) in the parts listing.

Utilization of this part will greatly reduce the repair time of the disk drive, as well as save the cost of a new door assembly.

GROUP: Peripheral Hardware Support Group MAIL STOP: 0125

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