

Proj Ctl#:

Asy#: 21095792 Desc1: SCSI I/O CONTROLLER Stat: 0 Rev: AA Last Modified: 04/01/1992 By: ART Last Auto Update: 00/00/0000 Assy Level: 1
 Desc2:

Component Item/ Description	Item Status	No-Mang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	COVL Ind	Value Type	Ref From	Desg To
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11095792 SCSI I/O CONTROLLER	0		1.0000	EA	1	5	R&D	N			@0000001
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Proj Ctl#:

Asy#: 11095792 Desc1: SCSI I/O CONTROLLER Stat: 0 Rev: AA Last Modified: 04/01/1992 By: ART Last Auto Update: 00/00/0000 Assy Level: 2
 Desc2:

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref Desg From	Ref Desg To
20995792 SCSI I/O CONTROLLER	0		1.0000	EA	1	5	R&D	N		@0000001	
3504506 CON SHUNT JUMPER ASSY 2P	2		1.0000	EA	1	1	R&D	0 3		JP1	
3775603 PLCC 80286 16 BIT MPU	2		1.0000	EA	1	1	R&D	R 7		L3	
3789551RA 22C11-SCSI #1	1		1.0000	EA	1	5	R&D	N		L7	
3789552RA 22C11-SCSI #2	1		1.0000	EA	1	5	R&D	N		L14	

Proj Ctl#:

Assy#: 20995792 Desc1: SCSI I/O CONTROLLER Stat: 0 Rev: AA Last Modified: 04/01/1992 By: ART Last Auto Update: 00/00/0000
 Desc2:

Assy Level: 3

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref Desg From	Ref Desg To
3001833 CAP .1 UF 50V +80-20% Z5U	2		13.0000	EA	1	1	R&D	0 3		C1 C5 C13 C19 C25 C32 C45 C59	
3001966 CAP .047UF 50V+80-20% Z5U	2		45.0000	EA	1	1	R&D	0 3		C2 C6 C15 C20 C27 C35 C47	C3 C12 C18 C24 C31 C44 C58
3002650 CAP .47 UF 50V 20% Z5U CE	2		1.0000	EA	1	1	R&D	0 3		C4	
3004022 CAP 15 UF 20V 10% TANTALU	2		4.0000	EA	1	1	R&D	0 1		C61	C64
3004066 CAP 22 UF 20V 10% TANTALU	2		1.0000	EA	1	1	R&D	0 1		C14	
3211003 CLK OSC 25.0 MHZ .01% TTL	2		1.0000	EA	1	1	R&D	0 3		Y1	
3251514 SW DIP SLIDE SPST 4 POS	2		1.0000	EA	1	1	R&D	0 1		SW1	
3301034 RES 33 OHM 1/4W 5% METAL	2		1.0000	EA	1	1	R&D	0 1		R2	
3301092 RES 91 OHM 1/4W 5% METAL	2		9.0000	EA	1	1	R&D	0 1		R11	R19
3303023 RES 2.2K OHM 1/4W 5% META	2		1.0000	EA	1	1	R&D	0 1		R20	

Proj Ctl#:

Assy#: 20995792 Desc1: SCSI I/O CONTROLLER Stat: 0 Rev: AA Last Modified: 04/01/1992 By: ART Last Auto Update: 00/00/0000
 Desc2: Assy Level: 3

Component Item/Description	Item Status	No-Mang Ind	Qty Per Assy	U M	Qty Comp Type	ECO Number	CQVL Ind	Value Type	Ref Desg From	Ref Desg To
3303048 RES 4.7K OHM 1/4W 5% META	2		1.0000	EA	1 1	R&D	0 1		R1	
3330874 RES NET 33 OHM TYPE: 10/0	2		7.0000	EA	1 1	R&D	0 1		R3 R4 R6 R10	
3330929 RES NET 3.3K OHM TYPE	2		1.0000	EA	1 1	R&D	0 3		R5	
3505300 CON BRK-WY HDR 2P .1C	2		1.0000	EA	1 1	R&D	0 3		JP1	
3506348 CON BOX RCPT 60P .1C 180	2		1.0000	EA	1 1	R&D	0 3		J1	
3760611 IC 74F244 OCT BFR W/T-S	2		1.0000	EA	1 1	R&D	0 3		L17	
3760634 IC 74F174 HEX D-TYPE FF	2		2.0000	EA	1 1	R&D	0 1		L9 L44	
3760682 IC 74F74 DL D FF POS-EDG-	2		2.0000	EA	1 1	R&D	0 1		L16 L37	
3760704 IC 74HC14 HEX ST INVERTER	2		1.0000	EA	1 1	R&D	0 3		L6	
3760710 IC 74F245 OCT BI-DIR XCVR	2		6.0000	EA	1 1	R&D	0 1		L1 L2 L10 L13	
3760743 IC 74ALS00 2-INP POS-NAND	2		1.0000	EA	1 1	R&D	0 3		L5	
3760980 IC 74F260 DL 5-INP NOR	2		1.0000	EA	1 1	R&D	0 1		L4	
3761154 IC 74ALS259 8B ADRES LCH	2		2.0000	EA	1 1	R&D	0 3		L28	L29
3761263 IC 74F543 NON-INVT XCVR	2		4.0000	EA	1 1	R&D	0 3		L40 L47 L41 L48	

Proj Ctl#:

Assy#: 20995792 Desc1: SCSI I/O CONTROLLER Stat: 0 Rev: AA Assy Level: 3
 Desc2: Last Modified: 04/01/1992 By: ART Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Comp Type	ECO Number	CQVL Ind	Value Type	Ref Desg Ref Desg From To
3761266 IC 74F574 OCT D FF T-S 20	2		6.0000	EA	1 1	R&D	0 3		L8 L15 L35 L39 L46
3761374 IC 74F21 4-IN POS AND	2		1.0000	EA	1 1	R&D	0 3		L26
3761408 IC 74F368 HEX INVR BUF/	2		1.0000	EA	1 1	R&D	0 3		L32
3761414 IC 74ACT86 2-IN X-OR GATE	2		1.0000	EA	1 1	R&D	0 3		L20
3769015 SKT IC DIP 14-14P .6/.1C	2		2.0000	EA	1 1	R&D	0 1		L7 L14
3769070 SKT PLCC 68P .1/.05C SLDR	2		1.0000	EA	1 1	R&D	0 1		L3
3770779 IC 32KX8 SRAM CMOS 100NS	2		8.0000	EA	1 1	R&D	R 7		L21 L30 L42 L49 L50
3777119R1 BOARD SELECT	2		1.0000	EA	1 5	R&D	N		L45
3777120R1 SM SEQUENCER	2		1.0000	EA	1 5	R&D	N		L24
3777121R2 ARBITOR	2		1.0000	EA	1 5	R&D	N		L19
3777122R1 LOCAL BUS CONTROL	2		1.0000	EA	1 5	R&D	N		L18
3777123R1 UPPER INTERRUPT	2		1.0000	EA	1 5	R&D	N		L34

Proj Ctl#:

Assy#: 20995792 Desc1: SCSI I/O CONTROLLER Stat: 0 Rev: AA Last Modified: 04/01/1992 By: ART Last Auto Update: 00/00/0000
 Desc2:

Assy Level: 3

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref Desg From	Ref Desg To
3777124R1 WRITE ENABLE	2		1.0000	EA	1	5	R&D	N		L25	
3777125R1 GLOBAL I/O	2		1.0000	EA	1	5	R&D	N		L27	
3777126R1 LOWER INTERRUPT	2		1.0000	EA	1	5	R&D	N		L33	
3777127R1 RESET GEN CONTROL	2		1.0000	EA	1	5	R&D	N		L23	
3777128R1 INTERRUPT 386	2		1.0000	EA	1	5	R&D	N		L38	
3801014 DIO SIG 75V 150MA 4NS	2		1.0000	EA	1	1	R&D	0		D1	
5109579 386 MASTER I/O CONTROLLER	2		1.0000	EA	1	1	R&D	0		@0000001	
6152318 LABEL, BARCODE	2		1.0000	EA	1	1	R&D	0		BC1	

Proj Ctl#:

Assy#: 3789551RA Desc1: 22C11-SCSI #1 Desc2: Stat: 1 Rev: AA Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000 Assy Level: 3

Component Item/ Description Item Status No-Wang Ind Qty Per Assy U M Qty Comp Type Type ECO Number CQVL Ind Value Type Ref Desg Ref Desg From To

3770905
 IC 32KX8 CMOS EPROM 120NS

1.0000

EA 1 1

N/B

0
 3

Proj Ctl#:

Assy#: 3789552RA Desc1: 22C11-SCSI #2 Stat: 1 Rev: AA Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000 Assy Level: 3

Component Item/ No-Wang Qty Per Assy U M Qty Comp ECO Number CQVL Value Type Ref Desg Ref Desg
 Description Status Ind Ind Type Type Type Ind Ind From To

3770905 2
 IC 32KX8 CMOS EPROM 120NS

1.0000 EA 1 1 N/B 0 3

END OF REPORT

Proj Ctl#:

Assy#: 2109579A Desc1: 386 MASTER I/O CONTROLLER Stat: 2 Rev: AD Assy Level: 1
 Desc2: Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
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1109579A	2		1.0000	EA	1	5	R&D	N		@0000001	
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386 MASTER I/O CONTROLLER

Proj Ctl#:

Assy#: 1109579A Desc1: 386 MASTER I/O CONTROLLER Stat: 2 Rev: AK Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000
 Desc2: Assy Level: 2

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
2099579 386 MASTER I/O CONTROLLER	2		1.0000	EA	1	5	R&D	N		@0000001	
3504506 CON SHUNT JUMPER ASSY 2P	2		1.0000	EA	1	1	R&D	0 3		JP1	
3775603 PLCC 80286 16 BIT MPU	2		1.0000	EA	1	1	R&D	R 7		L3	
3789510R3 CS TURBO 2236MXF	2		1.0000	EA	1	5	59911	N		L14	
3789511R3 CS TURBO 2236MXF	2		1.0000	EA	1	5	59911	N		L7	

Proj Ctl#:

Assy#: 3789510R3 Desc1: CS TURBO 2236MXF Stat: 2 Rev: AA Assy Level: 3
 Desc2: Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Flag Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
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3770905 IC 32KX8 CMOS EPROM 120NS	2		1.0000	EA	1	1	N/B	0			
								3			

Proj Ctl#:

Assy#: 3789511R3 Desc1: CS TURBO 2236MXF Desc2: Stat: 2 Rev: AA Last Modified: 00/00/0000 By: CQVL Ind Value Type Ref Desg Ref Desg To
 Last Auto Update: 00/00/0000 Assy Level: 3

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value From	Type	Ref Desg From	Ref Desg To
3770905 IC 32KX8 CMOS EPROM 120NS	2		1.0000	EA	1	1	N/B	0 3				

END OF REPORT

Proj Ct1#:

Assy#: 1773550 Desc1: CS/386-1600N 16MB CS/386 Stat: 2 Rev: AE Assy Level: 1
 Desc2: TURBO CPU Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Mang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
2129721 CS/386-1600N CPU W/16MEG	2		1.0000	EA	1	1	R&D	N			
2790873 CABINET ASSY CS-DIN	2		1.0000	EA	1	1	R&D	N			
2900685 SHPG PKG BOM: CS-D-2200-	2		0.0000	EA	3	5	R&D	0 3			
290068502 SHPG PKG BOM, MFG	2		1.0000	EA	1	5	R&D	0 3			
4490702 HANDLE CHASSIS	2		1.0000	EA	1	1	R&D	0 3			
4585026 COVER, PANEL, REAR (WELD)	2		1.0000	EA	1	1	R&D	0 3			
6152029 LABEL WARNING VOLTAGE SET	2		1.0000	EA	1	1	R&D	0 3			
6152265 LBL DOCK MERGE ID 8X3	2		1.0000	EA	1	1	R&D	0 3			
6153872 CORP SERIAL NO	2		1.0000	EA	1	1	R&D	0 3			
6154282 LABEL, MODEL NO.	2		1.0000	EA	1	1	R&D	0 3			
6155051 LABEL, CS/ND CONFIGURATION	2		1.0000	EA	1	1	R&D	0 3			
6503200 SCR 6-32 5/8L PAN PHL SST	2		2.0000	EA	1	1	R&D	0 1			
6504120 SCR 8-32 3/8L PAN PHL SEM	2		2.0000	EA	1	1	R&D	0 1			
6560145 SHLD GSKT RECT .13 X .19	2		3.5000	FT	1	1	R&D	0 3			

Proj Ctl#:

Assy#: 2790873 Desc1: CABINET ASSY CS-DIN Stat: 2 Rev: AH Last Auto Update: 00/00/0000 By: Last Auto Update: 00/00/0000
 Desc2:

Component Description	Item Status	No-Wang Ind	Qty	U M	Per Assy	QTY	Comp Type	ECO Number	CQVL Ind	Value	Type	Ref From	Desg To
2109578 CS386 II MOTHER BOARD	2		1	EA	1.0000	1	1	59830	N				
2202057 2 TW PR 4POS PLUG-FASTONS	2		1	EA	1.0000	1	1	53492	0 3				
2202849 INDICATOR CABLE	2		1	EA	1.0000	1	1	N/B	0 3				
2202850 POWER HARNESS (1)	2		1	EA	1.0000	1	1	N/B	0 3				
2202851 POWER HARNESS (2)	2		1	EA	1.0000	1	1	N/B	0 3				
2202852 POWER EXTENSION CABLE	2		1	EA	1.0000	1	1	N/B	0 3				
2203707 TAPE DRIVE CABLE	2		1	EA	1.0000	1	1	52509D	0 3				
2203708 FLOPPY DRIVE CABLE	2		1	EA	1.0000	1	1	N/B	0 3				
2203709 WINCHESTER CONTROL CABLE	2		1	EA	1.0000	1	1	N/B	0 3				
27008901 SPS 255 ASSEMBLY	2		1	EA	1.0000	1	1	52509D	N				
2703483 DC FAN (1049) ASSY	2		1	EA	2.0000	1	1	N/B	0 3				
2790921 CS-D/N CAB SUB ASSY (VEN)	2		1	EA	1.0000	1	1	N/B	N				
3250105 SW ROCKER DPST 1-0 25AMP/	2		1	EA	1.0000	1	1	N/B	0 3				
4491274 PANEL, BLANK	2		1	EA	2.0000	1	1	N/B	0 3				

Proj Ctl#:

Assy#: 2790873 Desc1: CABINET ASSY CS-DIN Desc2: Stat: 2 Rev: AH Assy Level: 1
 Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Description	Item Status	No-Wang Ind	Qty Per Assy	U M	QTY Type	Comp Type	ECO Number	CQVL Ind	Value	Type	Ref From	Desg To
4491577 BEZEL, FRONT	2		1.0000	EA	1	1	N/B	0				
4550093 BLANK BRACKET	2		7.0000	EA	1	1	N/B	0				
4550104 BRACKET, SWITCH	2		1.0000	EA	1	1	N/B	0				
4582252 SUPPORT, POWER SUPPLY	2		1.0000	EA	1	1	N/B	0				
4582275 HOOK, BRACKET	2		2.0000	EA	1	1	N/B	0				
6051004 CABLE TIE 4.0"LG 7/8"MAX	2		1.0000	EA	1	1	53492	0				
6154004 LABEL, DPU BOARD/LOGIC	2		1.0000	EA	1	1	52509D	0				
6502160 SCR 4-40 1/2L PAN PHL SEM	2		6.0000	EA	1	1	53492	0				
6503080 SCR 6-32 1/4L PAN PHL SEM	2		9.0000	EA	1	1	53492	0				
6503524 SCR 6-32 1-7/8L PAN PHL S	2		8.0000	EA	1	1	53492	0				
6504120 SCR 8-32 3/8L PAN PHL SEM	2		16.0000	EA	1	1	53492	0				
6510021 SCR #8-18 1/2L SLFTPG TY-	2		4.0000	EA	1	1	N/B	0				
6510039 SCR #8-18 1/2L SLFTPG TY-	2		2.0000	EA	1	1	53492	0				
6510329 FSTNR TREE-LK MINI .31 HO	2		2.0000	EA	1	1	N/B	0				

Proj Ct1#:

Assy#: 2790873 Desc1: CABINET ASSY CS-DIN Stat: 2 Rev: AH Last Auto Update: 00/00/0000 By: Assy Level: 1
 Desc2: Last Modified: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	QTY Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
6533000 WSHR FLAT 6 .149 .312 .03	2		14.0000	EA	1	1	59893	0 3			
6533003 WSHR SPLTLK 6 .141 .253 .	2		8.0000	EA	1	1	53492	0 3			
6541204 GROMMET RUBBER 3/16"PNL H	2		2.0000	EA	1	1	N/B	0 3			
6541274 CABLE CLAMP .375"DIA NYLO	2		3.0000	EA	1	1	53492	0 3			
6541286 CABLE CLAMP FLAT CABLE PV	2		2.0000	EA	1	1	N/B	0 1			
6541288 BUSHING SNAP 1/2"ID NYLON	2		1.0000	EA	1	1	N/B	0 3			
6541296 CABLE CLAMP MOUNT W/ADHES	2		1.0000	EA	1	1	53492	0 3			
6550072 APPLIANCE GLIDE 1-1/2" B	2		4.0000	EA	1	1	N/B	0 1			
6560145 SHLD GSKT RECT .13 X .19	2		1.1600	FT	1	1	60809	0 3			

***** END OF REPORT *****

Proj Ct1#:

Assy#: 1773551 Desc1: CS/386-3200 32MB CS/386 Stat: 2 Rev: AE Assy Level: 1
 Desc2: TURBO CPU Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	QTY Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
2129722 CS/386-3200 CPU W/32MEG	2		1.0000	EA	1	1	R&D	N			
2790873 CABINET ASSY CS-DIN	2		1.0000	EA	1	1	R&D	N			
2900685 SHPG PKG BOM: CS-D-2200-	2		0.0000	EA	3	5	R&D	0 3			
290068502 SHPG PKG BOM, MFG	2		1.0000	EA	1	5	R&D	0 3			
4490702 HANDLE CHASSIS	2		1.0000	EA	1	1	R&D	0 3			
4585026 COVER, PANEL, REAR (WELD)	2		1.0000	EA	1	1	R&D	0 3			
6152029 LABEL WARNING VOLTAGE SET	2		1.0000	EA	1	1	R&D	0 3			
6152265 LBL DOCK MERGE ID 8X3	2		1.0000	EA	1	1	R&D	0 3			
6153872 CORP SERIAL NO	2		1.0000	EA	1	1	R&D	0 3			
6154282 LABEL, MODEL NO.	2		1.0000	EA	1	1	R&D	0 3			
6155051 LABEL, CS/ND CONFIGURATION	2		1.0000	EA	1	1	R&D	0 3			
6503200 SCR 6-32 5/8L PAN PHL SST	2		2.0000	EA	1	1	R&D	0 1			
6504120 SCR 8-32 3/8L PAN PHL SEM	2		2.0000	EA	1	1	R&D	0 1			
6560145 SHLD GSKT RECT .13 X .19	2		3.5000	FT	1	1	R&D	0 3			

Proj Ctl#:

Assy#: 2006006 Desc1: MICROVP-TURBO TURBO UPG Stat: 2 Rev: AA Assy Level: 1
 Desc2: FOR MICROVP SYSTEM Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value	Type	Ref From	Desg To
2109583 CS TURBO I/O MOTHER BD	2		1.0000	EA	1	1	R&D	N				
2129719 CS/386-400N CPU W/4MEG	2		1.0000	EA	1	1	R&D	N				
2900892 SHPG PKG BOM:UPGRADE-2200	2		1.0000	EA	1	5	R&D	0 3				
4512781 RAIL, TOP & BOTTOM	2		2.0000	EA	1	1	R&D	0 3				
4512782 RAIL, MOUNTING	2		2.0000	EA	1	1	R&D	0 3				
4520830 PLATE, SHIELD	2		2.0000	EA	1	1	R&D	0 3				
4550290 BRACKET, SIDE	2		1.0000	EA	1	1	R&D	0 3				
6152265 LBL DOCK MERGE ID 8X3	2		1.0000	EA	1	1	R&D	0 3				
6155051 LABEL,CS/ND CONFIGURATION	2		1.0000	EA	1	1	R&D	0 3				
6980082 LABEL, CONTENTS	2		1.0000	EA	1	1	R&D	0 3				

END OF REPORT

Proj Ct1#:

Assy#: 2006008 Desc1: CS-N-TURBO TURBO UPGRADE Stat: 2 Rev: AA Assy Level: 1
 Desc2: FOR CS-N SYSTEM Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
2109578 CS386 II MOTHER BOARD	2		1.0000	EA	1	1	R&D	N			
2129719 CS/386-400N CPU W/4MEG	2		1.0000	EA	1	1	R&D	N			
2900892 SHIPG PKG BOM:UPGRADE-2200	2		1.0000	EA	1	5	R&D	0 3			
4585026 COVER, PANEL, REAR (WELD)	2		1.0000	EA	1	1	R&D	0 3			
6152265 LBL DOCK MERGE ID 8X3	2		1.0000	EA	1	1	R&D	0 3			
6155051 LABEL,CS/ND CONFIGURATION	2		1.0000	EA	1	1	R&D	0 3			
6980082 LABEL, CONTENTS	2		1.0000	EA	1	1	R&D	0 3			

***** END OF REPORT *****

Proj Ct1#:

Assy#: 2006007 Desc1: CS-D-TURBO TURBO UPGRADE Stat: 2 Rev: AA Assy Level: 1
 Desc2: FOR CS-D SYSTEM Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
2109578 CS386 II MOTHER BOARD	2		1.0000	EA	1	1	R&D	N			
2129719 CS/386-400N CPU W/4MEG	2		1.0000	EA	1	1	R&D	N			
2900892 SHPG PKG BOM: UPGRADE-2200	2		1.0000	EA	1	5	R&D	0 3			
4585026 COVER, PANEL, REAR (WELD)	2		1.0000	EA	1	1	R&D	0 3			
6152265 LBL DOCK MERGE ID 8X3	2		1.0000	EA	1	1	R&D	0 3			
6155051 LABEL, CS/ND CONFIGURATION	2		1.0000	EA	1	1	R&D	0 3			
6980082 LABEL, CONTENTS	2		1.0000	EA	1	1	R&D	0 3			

***** END OF REPORT *****

Proj Ct1#:

Assy#: 2006009 Desc1: CS-TURBO TURBO UPGRADE Stat: 2 Rev: AB Assy Level: 1
 Desc2: FOR CS SYSTEM Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
2109583 CS TURBO I/O MOTHER BD	2		1.0000	EA	1	1	R&D	N			
2129719 CS/386-400N CPU W/4MEG	2		1.0000	EA	1	1	R&D	N			
2900892 SHPG PKG BOM: UPGRADE-2200	2		1.0000	EA	1	5	R&D	0 3			
4512782 RAIL, MOUNTING	2		2.0000	EA	1	1	R&D	0 3			
4520830 PLATE, SHIELD	2		2.0000	EA	1	1	R&D	0 3			
4585194 COVER PANEL REAR	2		1.0000	EA	1	1	59841	0 3			
6152265 LBL DOCK MERGE ID 8X3	2		1.0000	EA	1	1	R&D	0 3			
6155051 LABEL,CS/ND CONFIGURATION	2		1.0000	EA	1	1	R&D	0 3			
6980082 LABEL, CONTENTS	2		1.0000	EA	1	1	R&D	0 3			

***** END OF REPORT *****

Proj Ctl#:

Assy#: 1773548 Desc1: CS/386-400N 4MB CS/386 Stat: 2 Rev: AE Assy Level: 1
 Desc2: TURBO CPU Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value	Type	Ref From	Desg To
2129719 CS/386-400N CPU W/4MEG	2		1.0000	EA	1	1	R&D	N				
2790873 CABINET ASSY CS-DIN	2		1.0000	EA	1	1	R&D	N				
2900685 SHPG PKG BOM: CS-D-2200-	2		0.0000	EA	3	5	R&D	0				
290068502 SHPG PKG BOM, MFG	2		1.0000	EA	1	5	R&D	0				
4490702 HANDLE CHASSIS	2		1.0000	EA	1	1	R&D	0				
4585026 COVER, PANEL, REAR (WELD)	2		1.0000	EA	1	1	R&D	0				
6152029 LABEL WARNING VOLTAGE SET	2		1.0000	EA	1	1	R&D	0				
6152265 LBL DOCK MERGE ID 8X3	2		1.0000	EA	1	1	R&D	0				
6153872 CORP SERIAL NO	2		1.0000	EA	1	1	R&D	0				
6154282 LABEL, MODEL NO.	2		1.0000	EA	1	1	R&D	0				
6155051 LABEL,CS/ND CONFIGURATION	2		1.0000	EA	1	1	R&D	0				
6503200 SCR 6-32 5/8L PAN PHL SST	2		2.0000	EA	1	1	R&D	0				
6504120 SCR 8-32 3/8L PAN PHL SEM	2		2.0000	EA	1	1	R&D	0				
6560145 SHLD GSKT RECT .13 X .19	2		3.5000	FT	1	1	R&D	0				

Proj Ct1#:

Assy#: 1773549 Desc1: CS/386-800N 8MB CS/386 Stat: 2 Rev: AE Assy Level: 1
 Desc2: TURBO CPU Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value	Type	Ref From	Desg To
2129720 CS/386-800N CPU W/8MEG	2		1.0000	EA	1	1	R&D	N				
2790873 CABINET ASSY CS-DIN	2		1.0000	EA	1	1	R&D	N				
2900685 SHPG PKG BOM: CS-D-2200-	2		0.0000	EA	3	5	R&D	0 3				
290068502 SHPG PKG BOM, MFG	2		1.0000	EA	1	5	R&D	0 3				
4490702 HANDLE CHASSIS	2		1.0000	EA	1	1	R&D	0 3				
4585026 COVER, PANEL, REAR (WELD)	2		1.0000	EA	1	1	R&D	0 3				
6152029 LABEL WARNING VOLTAGE SET	2		1.0000	EA	1	1	R&D	0 3				
6152265 LBL DOCK MERGE ID 8X3	2		1.0000	EA	1	1	R&D	0 3				
6153872 CORP SERIAL NO	2		1.0000	EA	1	1	R&D	0 3				
6154282 LABEL, MODEL NO.	2		1.0000	EA	1	1	R&D	0 3				
6155051 LABEL,CS/ND CONFIGURATION	2		1.0000	EA	1	1	R&D	0 3				
6503200 SCR 6-32 5/8L PAN PHL SST	2		2.0000	EA	1	1	R&D	0 1				
6504120 SCR 8-32 3/8L PAN PHL SEM	2		2.0000	EA	1	1	R&D	0 1				
6560145 SHLD GSCKT RECT .13 X .19	2		3.5000	FT	1	1	R&D	0 3				

COUNTRY KIT PRE-SUBMISSION FORM

(8 wk) Expected
 Date: _____ Release Date: _____ FCS Date _____

Product Manager (please print): _____ Ext. _____

Parent Model Number(s): _____
 Parent Description(s): _____

- * Country Kit Model Number Series: _____
- * Country Kit CEI Number Series: _____
- * Country Kit MEI (Tempest Only) Number Series: _____

S/W and Documentation To Be Translated ___ Yes ___ No (U.S. English Only)

Languages
 ___ Dutch ___ French ___ German ___ Italian ___ Spanish
 ___ Swedish ___ U.K. English ___ Other (Specify) _____

Country Kit Contents

___ Keyboard
 Keyboard Part No.(s): _____ Qty each kit: _____
 Description: _____

** ___ Auto Enclosure Part No.(s): _____
 Contents (Use additional sheet if necessary)

P/N: _____	Desc. _____	Qty _____
P/N: _____	Desc. _____	Qty _____
P/N: _____	Desc. _____	Qty _____
P/N: _____	Desc. _____	Qty _____
P/N: _____	Desc. _____	Qty _____
P/N: _____	Desc. _____	Qty _____
P/N: _____	Desc. _____	Qty _____

___ Power Cord
 U.S. Part No. _____ Qty _____
 ___ Other

P/N: _____	Desc. _____	Qty _____
P/N: _____	Desc. _____	Qty _____
P/N: _____	Desc. _____	Qty _____

Comments: _____

- * Fields will be filled in by Configuration Management.
- ** If requesting new Auto Enclosure, please include Auto Enclosure Pre-submission Worksheet.

2200/CS Product Development

22C11-II

Introduction

The 22C11-II is a new disk controller that works with CS/386-II high speed I/O channel. The controller has an Intel 80X86 MPU in it, 128K RAM (or more) and two parallel ports to external devices. One disk unit (or DS) and one system printer can connect to the system through 22C11-II. The controller won't fit on existing 2200/CS mother board, it can only be plug in new designed CS/386-II mother board which equipped with high speed channel connector. The detail of system MPU and 22C11-II MPU protocol and handshaking control flow will be described in Functional/Design Specification.

Goals

- 1 To improve data transfer rate between disk controller and system MPU.
- 2 To offload the system MPU workload in terms of physical access control and handshaking.

There's one more topic can be studied and explored in this design:

- 3 To offload the system MPU workload in terms of logical file services.

Product Description

The 22C11-II may be a two-boards card set, one Intel 80X86 MPU controls data and command flows from/to system MPU and devices. The memory requirement of this design will be 256KB. There's one segment of memory that is accessible by system MPU which serves as mailbox of information exchanging. A 64K PROM is used to provide diagnostic and initial loading function. After system start up, the microcode of the controller will be loaded in RAM.

System Microprocessor

A 12MHz 286 provides computing power, operates in real address mode. In most of the time, 286 is served as an slave processor of system MPU. System MPU has the privilege to hold the 286 processing when system MPU has to. The memory access from system MPU, if possible; can be 32-bit wide.

Memory System

256K Static RAM is used to offer better performance. The memory are all accessible by system MPU in a cycle stealing mode. A controller ID code is hardware on board to allow system MPU to distinguish what type of controller it is. The memory address of 256K RAM are fixed and selectable from

Disk/Printer Port Control

All the current disk unit, printer and DS can be connected through this port without any modification.

Interrupt System

In order to provide more efficient system throughput, all the disk operation is overlap as much as possible. When a disk request is issue by system, 22C11-II accept disk command from system MPU, monitor disk command progress and prepare result/status for system MPU. 22C11-II MPU notify system MPU by means of interrupt, whenever; there's something come out from external devices that connects to it. The system MPU is relieved from polling and checking disk status; when interrupt by 22C11, system MPU can decides a immediate service or keep for next time slot.

Operation Concern

Some \$G10 command of existing BASIC2 program is no longer function exactly as it used to be. Only the logical disk operations are simulated in this design. Since 22C11-II now takes care the low level I/O function for system MPU, system MPU can't be real-time responsesed the error condition that happen in the middle of I/O operation. Thus, error reporting timing and pricipile has to be changed.

2200/CS Product Development

High Speed I/O Primer

Definition

In order to describe the I/O operation on High Speed Channel, CP is used to refer system MPU and IOP is used to refer I/O Controller MPU. Two terms of control data, that passed between CP and IOP to control the I/O operation; the I/O command word (IOCW) and I/O status words (IOSW). Each device has individual IOCW and IOSW to simplify the identification process.

To initiate the data transfer operation, the CP check corresponding IOSW to see if device is ready for operation: if yes, IOCW is filled up with information such as command, data location and data count etc. Once the IOCW is found by IOP, IOP will start execute the command, report device progress and result in IOSW and inform CP by interrupt.

The IOCW specifies the command to be executed. It consists of a 6-byte general section and a variable-length device dependent section. The device-dependant section is fixed for each device. The IOCW shown as follows:

byte	1	Command code
byte	2-5	Data address
byte	6-7	Data count
byte	8	Device-dependant section

Where

- Command code - Specify the operation to be performed and indicates command words status.
- Data address - Specify the beginning of the data area for the operation.
- Data count - Specify the number of byte to be send or received between CP and IOP.

The IOSW contains the information from IO devices to the system. Each device has its own IOSW, the content of IOSW is filled when the associated I/O interrupt is granted. The format of IOSW is shown as:

byte	1	General status
byte	2	Error status
byte	3-4	Device dependant
byte	5-6	Residual byte count
byte	7-8	Device dependant (extend)

Where

General status has following definition:

bit	1	Intervention required
bit	2	Normal completion
bit	3	Error completion
bit	4	Unsolicited
bit	5	Device ready
bit	6	Data area early release
bit	7-8	Reserved

Error status has following definition:

bit	1	Invalid command
bit	2	Memory parity error
bit	3	Memory address error
bit	4	Device malfunction
bit	5	Memory or device damage
bit	6	Incorrect length
bit	7-8	Reserved

Residual byte count indicates the byte count remaining at the time of I/O completion. If the field with non-zero value, illegal length should have indication.

Initiation of I/O Operation

When initiating I/O operation, CP locates the appropriate IOSW by means of physical device address mapping. The ready/busy status is checked prior to the execution of I/O statement. If the device is available for next command then the corresponding data is placed in device's mailbox (a fixed location in I/O controller) and an IOCW is placed in appropriate location.

Receipt of I/O Command by I/O Processor

IOP is polling for IOCW when it's free to process. When IOP receives an IOCW, it ascertains the status of the device addressed by the command. There are four possible device status:

- 1 No previous command is active at the device and no interrupt signaled by this device is outstanding. A device in this state is considered available. The HALT command is ignored.
- 2 The device is busy with a previous command and has not yet signaled a completion interrupt. A device in this status is considered busy. A HALT command is allowed to force termination of I/O operation in progress.
- 3 The device has signaled an interrupt; the IOP has stored an IOSW for this interrupt and has informed CP. A device in this status is considered available. The HALT command is ignored.
- 4 The device is signaled an unsolicited interrupt for which the IOP has not yet pre-stored an IOSW. The device is unable to receive any command in this status, until IOP successfully informs CP.

Whenever, IOP takes command from IOCW; the corresponding IOSW status shall be set as busy by IOP to prevent command overrun.

I/O Termination

An I/O operation lasts until one of the following events occurs:

- 1 The device completes the operation.
- 2 A HALT operation forces completion.
- 3 The device malfunctions.
- 4 System initialization.

I/O Interruption

I/O interruption provides a means for the system to change its state in response to conditions that occur in I/O device and IOP. More than one IOP might interrupt CP at the same time, priority among IOP is pre-determined by system designer.

Interrupt Processing

An IOP interrupt is granted, after CP has already saved its current IO address, IO memory mapping and IO operation progress. The corresponding IOSW is examined for causes, necessary housekeeping is processed for that interrupt. Task manager decides whether task switching is necessary. The transition between current breakpoint processing principle and interrupt processing should be investigated carefully.

Terminal IOCW

The terminal IOCW consists of a command, a data address and a data count, as shown below.

byte	1	Command code
byte	2-5	Data address
byte	6-7	Data count

Where the most significant bit (80H) is used as command status bit to flag if current command has been taken by IOP or not. When 80H bit set means command is outstanding for IOP attention, reset means command has been accepted by IOP. The remaining 7 bits defines the code of individual functional requests are listed as:

Code	Description
----	-----
01	Power on
02	Initialize Terminal
03	Delete current line request
04	Keyboard ready check
05	Keyin poll request
06	Keyin line request
07	Request line
08	Prefill request line
09	Refill line request
0A	End of line request sequence
0B	Query line request
0C	Accept line request
0D	Request CRT buffer
0E	Request PRT buffer
0F	Error line request
10	Terminate line request
70	Write CRT data
40	Write PRT data
20	Query terminal status
7F	HALT (abort previous command, e.g. no return information is needed for CP)

Data address points to the first byte of the output data go with commands.

Data count specifies the number of bytes in the data area.

Terminal IOSW

The IOSW is shown as,

byte	1	General status
byte	2	Error status
byte	3-4	Extend status

Where each status byte has following possible values.

General status byte

Bit	Description
---	-----
1	Reserved
2	Normal completion
3	Error completion
4	Reserved
5	Device ready
6-8	Reserved

Error status byte

Bit	Description
---	-----
1	Invalid command
2	Memory parity error
3	Memory address error
4-5	Reserved
6	Illegal data length
7-8	Reserved

Extend status byte

Bit	Description
---	-----
1	RESET key pressed
2	HALT/STEP key pressed
3	KBD buffer empty
4	Reserved
5	Line request complete
6	CRT buffer empty
7	PRT buffer empty
8	ENDI (end of input)
9-16	Reserved

Disk IOCW

The disk IOCW consists of a command, a data address and a data count. as shown below.

byte	1	Command code
byte	2-5	Data address
byte	6-7	Data count

Where the most significant bit (80H) is used as command status bit to flag if current command has been taken by IOP or not. When 80H bit set means command is outstanding for IOP attention, reset means command has been accepted by IOP. The remaining 7 bits defines the code of individual functional requests are listed as:

Code	Description
01	Read sector
02	Write sector
03	Compare sector
04	Format platter
05	Copy sectors
06	Verify sectors
07	Format track
08	Diagnostic
7F	HALT (abort previous command, e.g. no return information is needed for CP)

Data address points to the first byte of the output data go with commands.

Data count specifies the number of bytes in the data area.

Disk IOSW

The IOSW is shown as,

byte	1	General status
byte	2	Error status
byte	3-4	Extend status

Where each status byte has following possible values,

General status byte

Bit	Description
1	Reserved
2	Normal completion
3	Error completion
4	Reserved
5	Device ready
6-8	Reserved

Error status byte

Bit	Description
1	Invalid command
2	Memory parity error
3	Memory address error
4-5	Reserved
6	Illegal data length
7-8	Reserved

Extend status byte'

Bit	Description
1	Disk not respond to start operation (190)
2	Disk hardware error (191)
3	Disk has no response (192)
4	Format error (193)
5	Seek error (195)
6	CRC error (196)
7	LRC error (197)
8	Invalid sector address (198)
9	Read after write error (199)
10-16	Reserved

Printer IOCW

To be defined later

Printer IOSW

To be defined later

Break-Point Processing

There must be some differences in Break-Point routine, we use polling scheme as bases for all kind of task switching. High Speed I/O deserves real time response for better system throughput. There're following issues needs to be clarified before real-time response can be achieved:

- 1 Most of the action routines (BASIC2 statment execution routine) are not re-entrent. Current policy examines other tasks activities when active task has completed a action routine or reach certain point that the necessary data structure can be clearly idtified to save once the task switching is required.
- 2 The High Speed I/O is not the only resource for I/O operations. The existing I/O controllers are also supported at the same time. Old I/O controllers needs polling service from system.

The simplest way of making High Speed I/O work with current Bus is to adapt the mixture of I/O polling and interrupt handling. The interrupt from HSIO is handled in a minimum conditions, that is:

- 1 The result or status of I/O operation is recognized and kept for following process.
- 2 The device is available for next request.

Above minimum criterias give the OS enough information to improve its job scheduling and balance its system throughput. However, OS should have several concerns to make all the good things work; such as when interrupt happen can current processing be terminated as soon as possible? How far will system goes until it can make use of the available I/O resource? Again, back to simplest solution, when interrupt been kept, system continues current task till it gone to breakpoint processing, HSIO pending interrupt is served first before any other I/O is checked for completion. This certainly give HSIO better chance of sevice, but still base on polling; system performace will rely on how good the action routine is orgnized.

Disk Operations

The other controversial topic is disk operation on HSIO, the 22C11-11. Currently, all the disk operation is directly handled by OS on system MPU: to have a new I/O channel on HSIO won't improve too much. The fact is data transfer takes less than 10% of total disk operation time. The advantage of providing HSIO is recognized only when new controller takes more responsibilities from system MPU.

Two approaches can have HSIO worth to invest on disk side:

- 1 Share the load of disk statement processing from system MPU, if the active device is HSIO disk drive.
- 2 Provide the a new file system for OS.

In order to achieve the first goal, OS has to carefully revised on certain areas, especially when error happen or waiting for device ready, etc. The simplest separation of current OS function between system MPU and IOP is divided by logical and physical boundary. When a statement been scanned, knowing which address, what command, etc: system MPU pass necessary information to IOP, ask IOP to take care the detail until result is back. Conceptually, on each disk operation system MPU can save considerable amount of time while doing handshaking.

Diagnostic Program Document

Documentation Releas:
Documentation Part No.:
Package Number:

Software Release:
ECO Number:

PROM Part Numbers: 378-9512 and 378-9513

Program Name : 22C11-HS Disk Controller BIT

Originator : Milton Chen

Date : March 14, 1991

Table of Contents

- 1.0 Reference Documentation
- 2.0 Configuration Requirements
- 3.0 Program Description
- 4.0 Load Procedure
- 5.0 Operating Instruction
- 6.0 Miscellaneous
- 7.0 Program Revision History

Appendix A: Test Description and Error Table
Appendix B: Program Listing

Engineering Service Department
Wang Computer (Taiwan) Ltd.
2, Science-Based Industrial Park
Hsinchu, Taiwan, R.O.C

1.0 REFERENCE DOCUMENTATION

22C11-HS Disk Interface Hardware Design Specification
High Speed I/O Controller Hardware Design Specification
8255 Programmable Peripheral Interface Data Sheet

2.0 CONFIGURATION REQUIREMENTS

2.1 Hardware

Minimum required configuration for the BIT diagnostic must reside at 22C11-HS mother board (210-9579-1A).and insert in the high speed channel board.

Printer - if burn-in mode printer test is to be performed.

2.2 Software

Two 64K PROMs loaded with the latest release of the firmware located at L07(even) and L14(odd) on the 210-9579-1A 22C11-HS mother board.

3.0 PROGRAM DESCRIPTION

3.1 Applications

To test hardware located on the 22C11-HS board and clear a path for the 2200 Operating System. There is also a board repair diagnostic included in the PROM code, it provided QC pretest of Manufacturing production and CE field repair.

3.2 User interface

The user interface in the customer environment is though the use of LED that is located on the daughter board. Build In Test is in operation, LED will be turned on. Upon completion of BIT the LED is turned off. Any test fails, the LED is going to flash. If looping (Run-in test) is a function selected then upon completion of diagnostic test pass the LED will turn off about one second and then turned on again as the diagnostic test begins.

The ICE286 (In Circuit Emulator) may be halted on an error and viewing of registers will contain specific fault isolation information.

3.3 Hardware tested

The hardware on the board consists of 80286 CPU, two 64K PROMs, 256K SRAM, 8255 PPI.

3.4 Tests in The Program

<u>Name of Test</u>	<u>Hardware Tested</u>
1. LED test	LED on/off test
2. 80286 CPU test	Test 80286 CPU
3. SRAM Size Test	detect SRAM size
4. 4K Bytes Semaphore Area Test	First 4K memory test
5. SRAM Data Bus Test	SRAM data bus test
6. SRAM IMA Test	SRAM address line test
7. SRAM Write/Read Test	Test SRAM W/R
8. Printer Test	8255 PPI port test

4.0 LOAD PROCEDURES

Upon power on the program is automatically running.

5.0 OPERATING INSTRUCTIONS

There is two types of diagnostic employed by the 22C11/II PROM: Normal power-up mode and Burn-in mode.

When power is applied to the unit, Normal power-up mode will be entered.

5.1 Normal power-up

After power-up the LED located on the 22C11-HS daughter board, will be turn on. Until had finished diagnostic test program. LED will be turned off.

Any test error occurence, the LED is going to flash.

5.2 Burn-in mode

In order to perform the Run-in test, the 22C11-HS daughter board of DIP switch (SW2), must set OFF ('00').

Printer test will be performed in the Run-in mode. If connect printer, it will print five lines of following message:

```
Copyright, Wang Laboratories, Inc . 1990  Rev.5070
*** 22C11-II Run-in and Print Test ***
```

Upon completion of diagnostic test pass the LED will be turned off and turned on again as the next diagnostic test begin.

6.0 MISCELLANEOUS

The SWITCH on the 22C11 mother board (210-9581) is setting ID control card. If DIP switch setting is as follows:

SW bit No.	1	2	3	4	
	OFF	ON	ON	ON	-- 1st 22C11-HS board
	ON	OFF	ON	ON	-- 2nd 22C11-HS board
	OFF	OFF	ON	ON	-- 3rd 22C11-HS board

7.0 PROGRAM REVISION HISTORY

50A0 Initial Release

APPENDIX A
TEST DISCRIPTION AND ERROR TABLE

A.1 TEST DESCRIPTION

[TEST-1] LED Test

Purpose: LED turn on/off to indicate diagnostic test condition.

[TEST-2] 80286 CPU Test

Purpose: Verify flags reg ,conditional jmp and read/write general and segment register.

[TEST-3] SRAM Size Test

Purpose: To detect memory size.

```
BEGIN
  FOR DX = 0000 TO 4000H ( DX:Seg. )
    FOR DI = 0 TO FFFFH ( DI:offset )
      WRITE memory flood 4K byte
      READ verify content data
      IF equal THEN next bank
      ELSE detect memory size
    ENDIF
  NEXT DI ( next 4K unit )
NEXT DX ( next bank )
END ( BP regs. save memory size )
```

[TEST-4] First 4K Semaphore Area Test

Purpose: First 4K bytes test for system semaphore area.

```
BEGIN
  FOR J=4 ( four patterns: 55AA,AA55,C3D6,0000 )
    WRITE memory flood 2K words
    READ verify content data
  NEXT J ( next pattern )
END.
```

[TEST-5] SRAM Data Bus Test

Purpose: Data bus short or open test

```
BEGIN
  FOR DX:= Memory size seg.
    FOR I:= 2 ( two pattern: 0000-8000, FFFF-7FFF )
      FOR SI:=0001
        FOR CX:=16 times
          BX: current test pattern, AX: next pattern
          XCHG DS:SI, test pattern
          NEXT CX ( next pattern )
        NEXT SI ( next address )
      NEXT I
    NEXT DX ( next 64K bank )
  END.
```

[TEST-6] SRAM Invalid Memory Address (IMA) Detection

Purpose: Check SRAM address bus

```
BEGIN
  FOR I=4k bank
    Flood background data '55' to bank
    write a data 'C3' at address ( 0100:003C )
    FOR J=11 ( 100:0001, 100:0002, 0004, 0008 ..
              4000, 8000 )
      read/verify content of current address
      if not equal 55H then occur error
    NEXT J ( next addr.)
  NEXT I ( next bank )
  END
```

[TEST-7] SRAM Write/Read TEST

Purpose: SRAM write and read diverse pattern test.

```
BEGIN
  FOR I ( 4K bytes bank)
    FOR J=7 ( seven patterns : 0000,FFFF,55AA,C3D6 )
      WRITE memory flood 2K words
      READ verify content data
    NEXT J ( next pattern )
  NEXT I ( next bank )
  END.
```

[TEST-8] Printer Test

Purpose: This test is performed under Run-in mode. If test ok, will print five lines of following message:

Copyright, Wang Laboratories, Inc. 1990 Rev. 5070
*** 22C11-II Run-in and Print Test ***

A.2 ERROR TABLE

When LED flash is meaning to error occurrence, it can be using ICE (In Circuit Emulator) to find which test is failure.

The register BP will save error code, it aids manufacturing field to isolate fault information.

[Error code 01]

Definition: CPU 80286 contional jmp, general register and segment error.

[Error code 02]

Definition: First 4K byte test error result from memory fail.

[Error code 03]

Definition: SRAM data bus error, cause memory data bus error.

[Error code 04]

Definition: SRAM Invalid Memory Address line, cause memory addressing error.

[Error code 05]

Definition: SRAM memory cell defect cause write/read error.

APPENDIX B
PROGRAM LISTING

182

WANG ECO

CONTROL NO 59498

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 3
DATE: 09/25/91

M/S: 014-690

EXT: 70524

DEPT:

ORIGINATOR: Michael Riley

DISPOSITION CODES:

1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock	WIP	Next Order
5	5	5	5	5	5	5

EFFECTIVITY DATE: 10-11-91
 CONFORMANCE DATE: 10-18-91

REMARKS: None in production

P/N DESCRIPTION:
CS Turbo CPU

DWG(S) AFFECTED:
9576

DESCRIPTION OF CHANGE:

DELETE 666-1016 from 210-9576A BOM.

OCT 09 1991

REASON/SYMPOM FOR CHANGE:

Battery is not needed for the CPU clock unit

CURRENT BUILD SITE INFORMATION	PB	PKWD	ME	WPR
	IR	TAI	AU	MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON *[Signature]* 10-5-91

PROGRAM MGR. *[Signature]*

DESIGN ENG. Michael Riley

COMPLIANCE ENG. *[Signature]* 10/2/91

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST *[Signature]* 9/27/91

OTHER

ECO #10 59498

SHT 2 OF 3

CHANGE DOCUMENT

ITEM STATUS	DWO # 004926	DWO: 004700	DWO: 008285	DWO: 008760	DWO: 008537	ECO 59498
CONFIGURATION REVISION	0	1	2	2	3	4
E-REV	0	1	1	1	1	1
SCHMATIC	0	1	1	1	1	1
210 ASSEMBLY DRAWING	0	1	1	1	1	1
110 ASSEMBLY DRAWING	0	1	1	1	1	1
510 FAB DRAWING	0	1	1	1	1	1
ARTWORK LAYERS	0	1	1	1	1	1
DRILL/ROUTING DATA	0	1	1	1	1	1
MECHANICAL OUTLINE	0	0	0	0	0	0
REWORK INSTRUCTION	NO	NO	NO	NO	NO	NO
CORP. BOM EFFECT. DATE						10/11/91

PCA CONFIGURATION DOCUMENT

PCA PART NUMBER

210-9576 A

(WANG)

LABORATORIES, INC.

PAGE 1 OF

ITEM MASTER DESCRIPTION CS 386 CPU TURBO (4 MFC)

Proj Ctl#:

Assy#: 2109576A Desc1: CS386 CPU TURBO 4 MEG Stat: 1 Rev: AD Assy Level: 1
 Desc2: Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U	M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value	Type	Ref From	Desg To
1109576A CS386 CPU TURBO 4 MEG	1		1.0000	EA	1	5	R&D		N			00000001	
2109577A CS386 DUAGHTER BOARD	1		1.0000	EA	1	1	R&D		N			A1	
4550205 BRACKET CPU BOARD	1		1.0000	EA	1	1	R&D		R			M22	
4620596 SPCR 6-32 M/F .355L .25HX	2		5.0000	EA	1	1	R&D		0			M23	M27
6503061 SCR 6-32 3/16L PAN PHL SE	2		3.0000	EA	1	1	R&D		0			M19	M21
6503080 SCR 6-32 1/4L PAN PHL SEM	2		5.0000	EA	1	1	R&D		0			M14	M18
6520034 NUT CLNCH FOR PCB'S 6-32	2		8.0000	EA	1	1	R&D		0			M2	M9
6661016 +6.0V LITHIUM/MANGANESE	2		1.0000	EA	1	1	R&D		0			00000002	

ECO NO 59498

SHT 3 OF 3

152

WANG ECO

CONTROL NO 59351

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

ORIGINATOR: Michael Riley DEPT: EXT: 70524 M/S: 690 SHEET 1 OF 4 DATE: 08/05/81

PAR(S) AFFECTED: 220-0447	P/N DESCRIPTION: 2200 Terminal Cable
MODEL(S) AFFECTED: CS, CS-D	DWG(S) AFFECTED: C 064821603
DESCRIPTION OF CHANGE: Add 2 each 410-1055 Ferrite Beads; One to each end of the cable two inches down the connector...	

DISPOSITION CODES:
1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks
Cust. Field Fin. Goods Next Order
Units Spare Ret. Stock WIP
1 2 1 2 2 2 4

EFFECTIVITY DATE 10/11/91 CONFORMANCE DATE 10/21/91

REMARKS:
Change 220-0447 BOM as follows:
Add: 410-1055- FERRITE BEAD - Qty. 2 - U/M - EA.

CURRENT BUILD SITE INFORMATION	PB X	PKWD ME	WPR
	IR	TAI AU	MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON *John D. ... 9-10-91*

PROGRAM MGR. *William C. ... 8/23/91*

DESIGN ENG. Michael Riley *[Signature]*

COMPLIANCE ENG. *[Signature]*

SECURE SYSTEMS

ORIGINATOR Michael Riley *[Signature]*

ECO ANALYST E. J. ... 8/31/91

OTHER

SEP 19 1991

REASON/SYMPATOM FOR CHANGE:
To pass FCC for the CS, CS-D, and Turbo Systems....

DRAWING # 6482-1603

ADD 2 ea 410-1055 ITEM 9

C 64821603

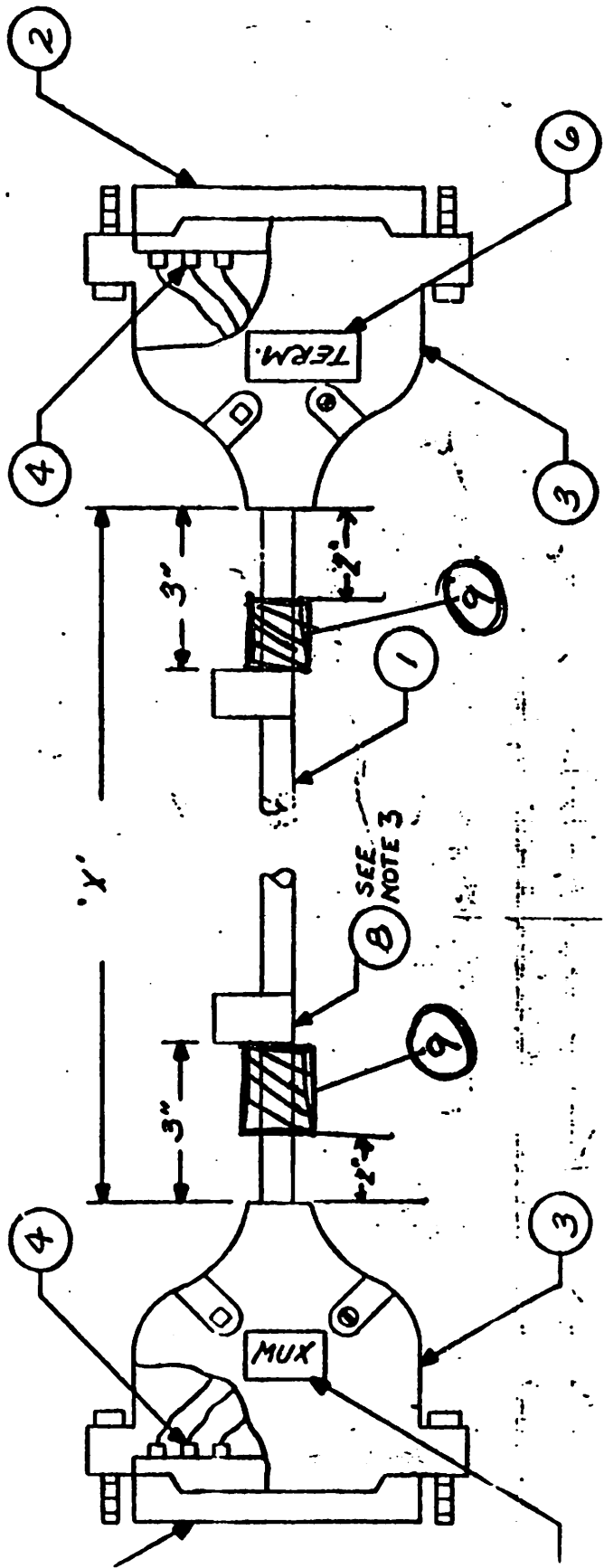
1 REV & TO REV 1 "L"

DO NOT SCALE

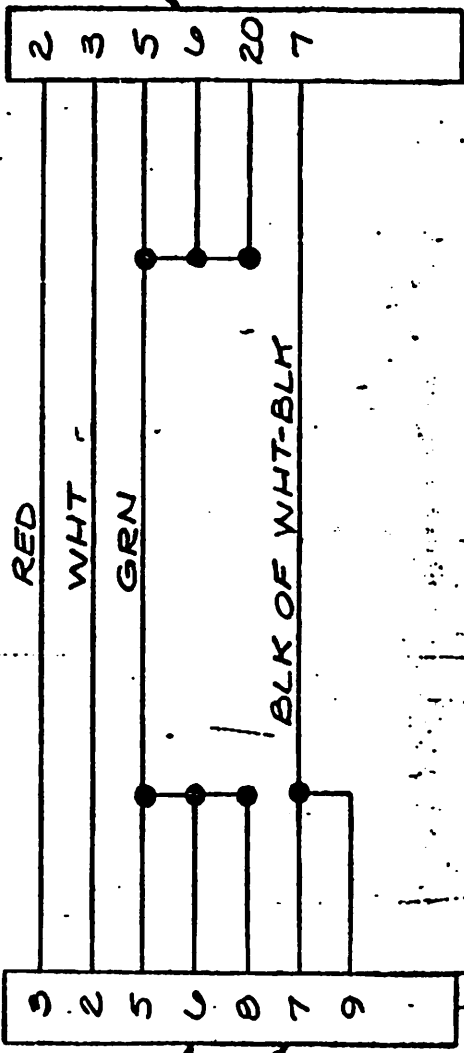
3

2

1



TERMINAL SEE NOTE 4



RED

WHT

GRN

BLK OF WHT-BLK

SEE NOTE 4

3/4"

WHT 1/0 1"

E

D

ECO NO 59351

SHT 2 OF 4

"1" "5"

MANUFACTURING ECO IMPACT
 TOTAL MANUFACTURING SUMMARY
 REQUESTED EFFECTIVITY DATE

ECO NO. 59351
 TOTAL MANUFACTURING SUMMARY DATE 09/18/91
 REQUESTED CONFORMANCE DATE 00/00/00
 APPROVED EFFECTIVITY DATE 10/11/91
 APPROVED CONFORMANCE DATE 10/21/91
 DOLLAR SUMMARY: SITE: 07


SAVINGS:	EXPENSE	SAVINGS	EXPENSE	TOTAL
B.O.M. CHANGE SAVINGS (EXP)		\$ 0	\$ 0	\$ 0
ENG IMPLEMENT SAVINGS (EXP)		0	0	0
TOTAL SAVINGS (EXPENSE)		\$ 0	\$ 0	\$ 0
EXPENSE:				
REWORK/SALVAGE - IN HOUSE	557-	\$ 0	\$ 0	\$ 557-
REWORK AT OUTSIDE VENDORS	0	0	0	0
SCRAP/OBSO COSTS	0	0	0	0
CANCEL. CHARGES - VENDORS	0	0	0	0
TOTAL (EXPENSE)	557-	\$ 0	\$ 0	\$ 557-
NET SAVINGS (EXPENSE)	557-	\$ 0	\$ 0	\$ 557-

MATERIAL CONFORMANCE:

ALL SITES	SPECIFIC SITE(S)	PART No.	DIST	FINAL ASSY	SUB ASSY	STK WHS
RAW MATERIAL						
WIP						
FINISHED GOODS						
IN-TRANSIT						
OUTSIDE VENDOR						
ACTION CODES: 1 - USE AS IS 2 - REMK/SALVAGE 3 - SCRAP 4 - NEXT ORDER 5 - OBSOLETE 6 - REDISTRIBUTE (*) 7 - OTHER (*) SEE REMARKS						

REMARKS:

ECO IMPACT REVIEW BOARD:

PREPARED BY:  TEL# DATE 00/00/00

NAME: SIGNATURE TEL# DATE 09/18



**ENGINEERING CHANGE ORDER
CUSTOMER ENGINEERING IMPACT SHEET**

ECO NO. **59351**
SHEET **4** OF **4**

ALL UNITS	<input type="checkbox"/>
PROB ONLY	<input checked="" type="checkbox"/>
INFO	<input type="checkbox"/>
FCO REQUIRED	<input type="checkbox"/>
IMMED	<input type="checkbox"/>
NEXT CALL	<input type="checkbox"/>
IS A MUB REQUIRED FOR FSC REWORK	<input type="checkbox"/>

IMPACT COMMENTS

*Purge stock (H.O.)
Rework spares.*

	DOMESTIC	INTER-NATIONAL
EST. UNIT POP	—	
EST. SPARE POP	184	
TOTAL	184	

EST. COST IMPACT	APPROVALS	DATE
MATERIAL	TECH OPS	
LABOR	LOGISTICS <i>D. O. Murphy</i>	9.17.91
TOTAL	FSC SUPPORT	
IMPLEMENTATION PERIOD	FINAL <i>Phorby</i>	9/18/91
ANNUAL COST	OTHER	

GENERAL COMMENTS

152

WANG ECO

CONTROL NO 59357

PRIORITY 1
PHASE-IN 2 **X**
DOCUMENTATION 3

ORIGINATOR: Michael Riley

DEPT: EXT: 70524

M/S: 014-690

SHEET 1 OF 5
DATE: 08/05/91

PART(S) AFFECTED:
458-5026

P/N DESCRIPTION:
COVER PANEL, REAR

MODEL(S) AFFECTED:
CS-D

DWG(S) AFFECTED:
458-5026

DESCRIPTION OF CHANGE:

Update Rear door assembly by adding Strip, Ground
458-7075...

DISPOSITION CODES:

1-Use As is	2-Rework	3-Scrap	4-Next Order	5-See Remarks
Cust. Units	Field Spare	Field Ret.	Field Goods	Fin. WIP
1	1	1	1	2
				2
				9
				Next Order

EFFECTIVITY DATE: 10/4/91

CONFORMANCE DATE: 10/14/91

REMARKS:

CURRENT BUILD SITE INFORMATION

PB X	PKWD ME	WPR
TR	TAI AU	MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON

[Signature] 8/16/91

PROGRAM MGR.

[Signature] 8/26/91

DESIGN ENG. K.C. Yang

[Signature] 8/27/91

COMPLIANCE ENG.

SECURE SYSTEMS

[Signature]

ORIGINATOR Michael Riley

ECO ANALYST E. Daigneault 8/21/91

OTHER

SEP 19 1991

REASON/SYMPOM FOR CHANGE:

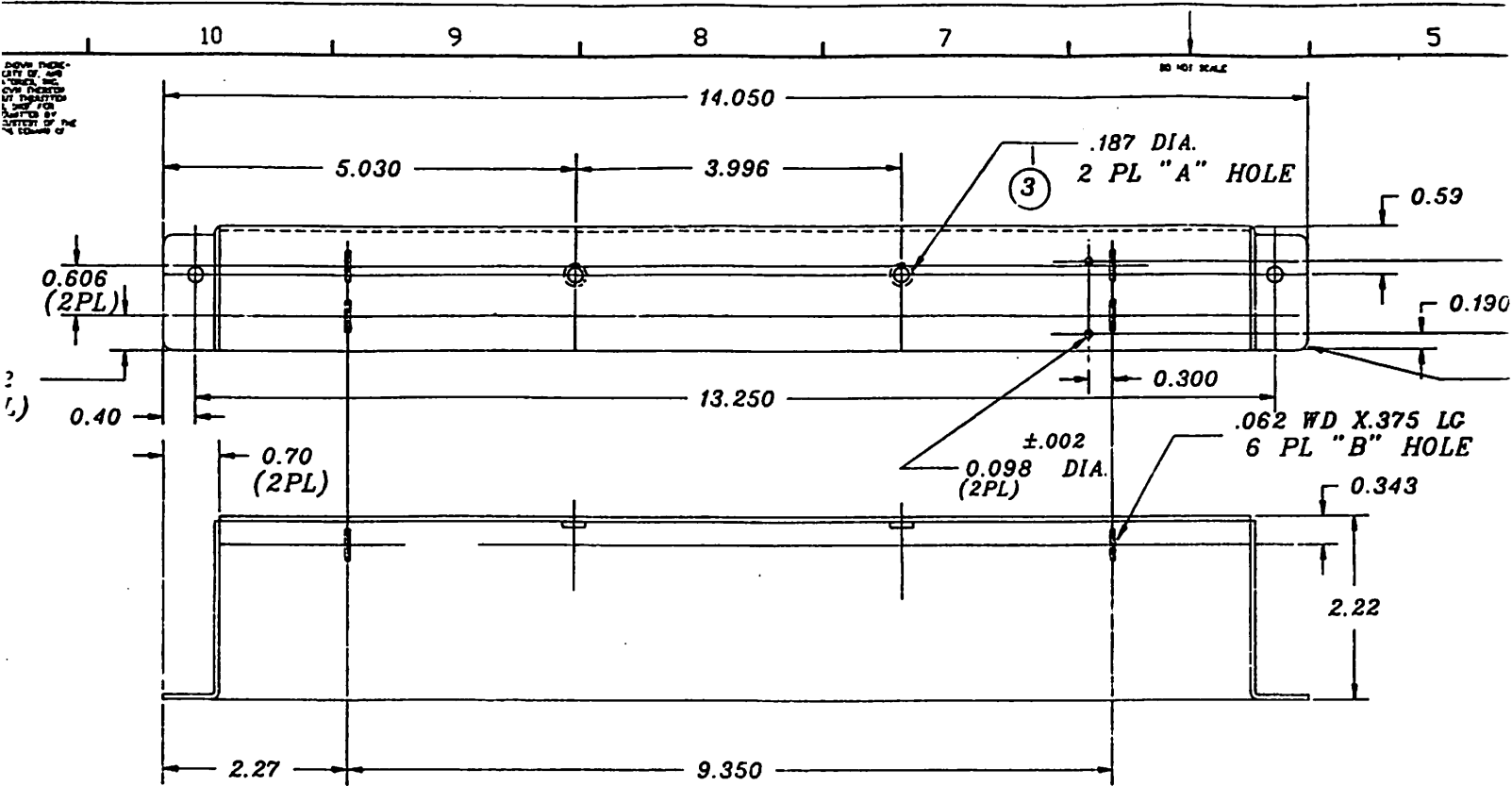
This ECO is needed to pass FCC for the new Turbo System... Release date for the system is 09/01/91

DRAWING # 458-5026 Rev 1

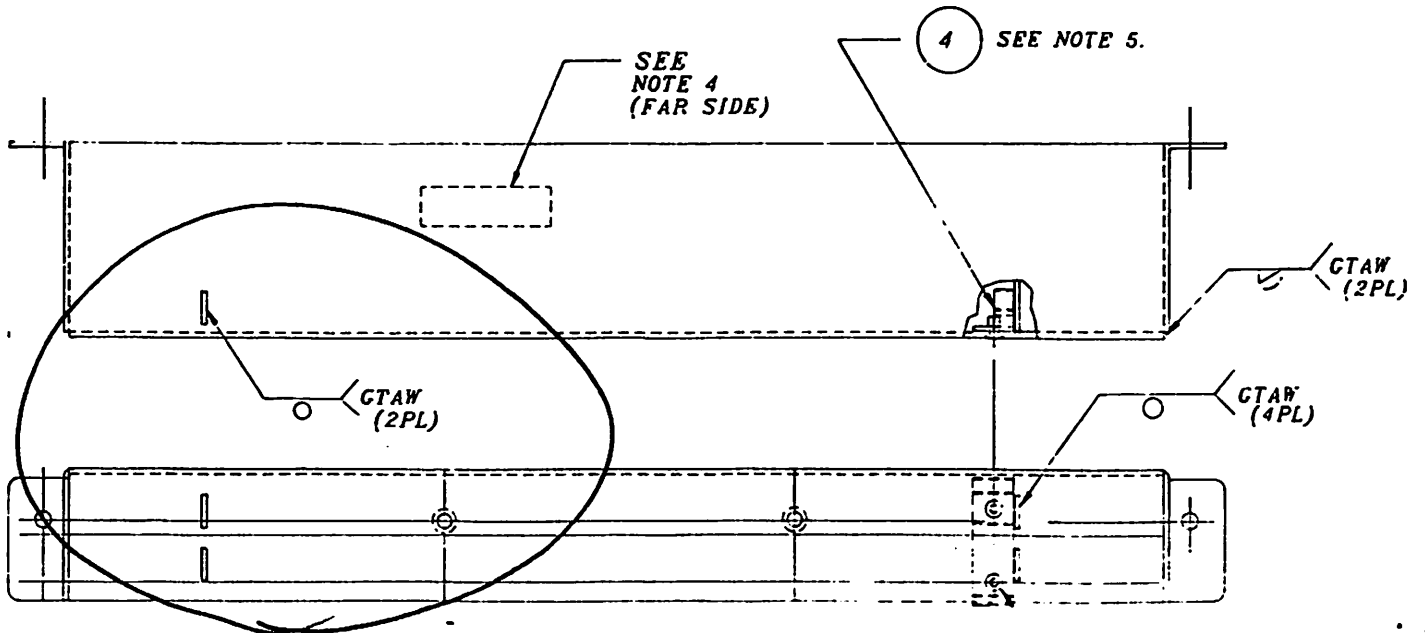
CHANGE
FROM

ECO NO 59357

SHT 2 OF 5



ITEM : (1) MAT ' L : .06 THK. C. R. S. 1010 /1018



26	E	CO	5
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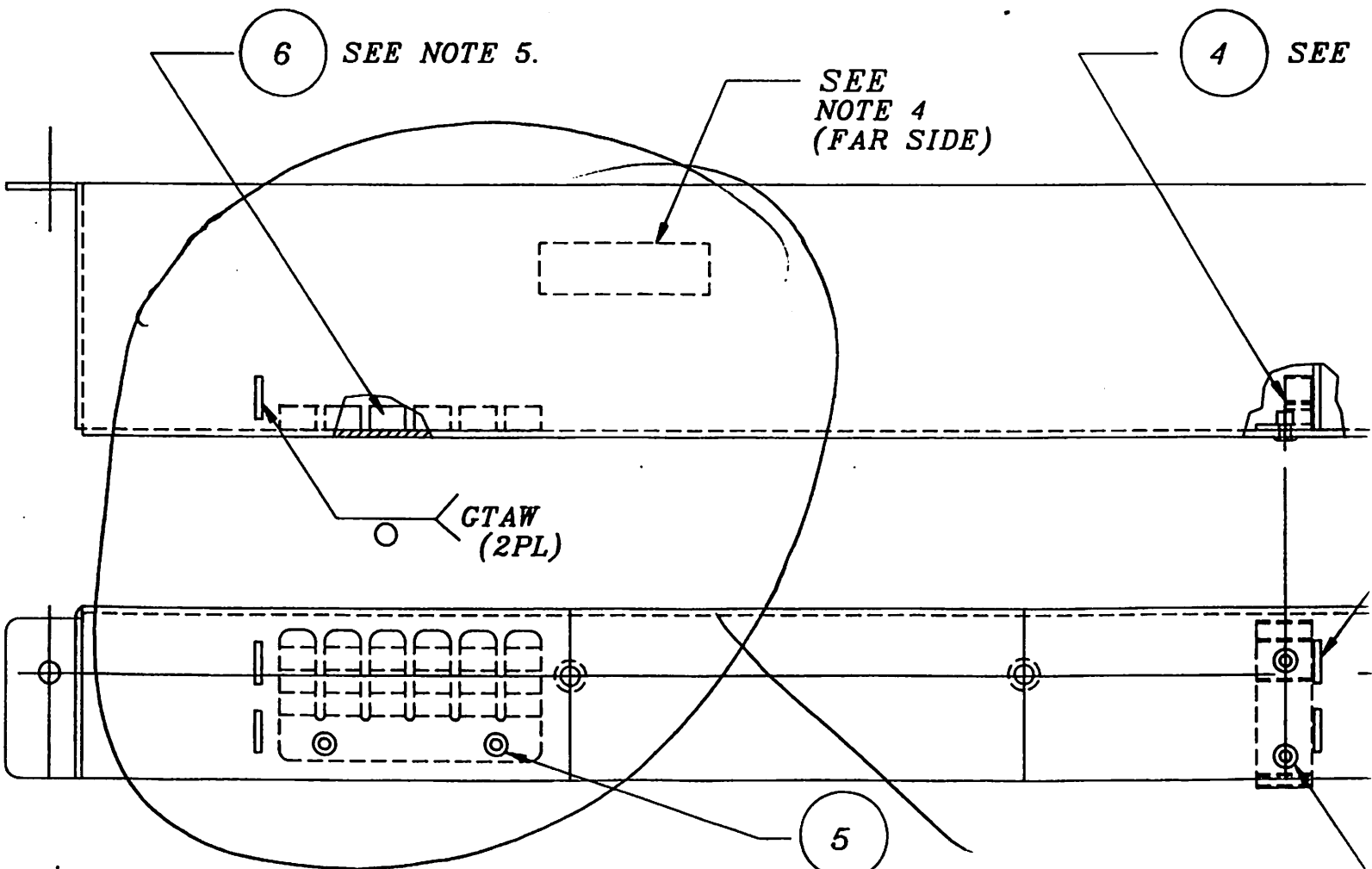
ECO NO. 2786D

SHT. 3 OF 5

2.27

9.350

ITEM : (1) MAT ' L : .06 THK. C. R. S. 1010 /1018



0-6-88	IM. CHANGE	ER ECO	2786D	K. C. YANG	2-6-88
	EV. PER ECO	3492		C. YANG	3-10-'89
	D. ITEM 4 .5	ER ECO	264	C. YANG	-31-89
	DD ITEM 5.6	ER ECO		C. YANG	4-10-91

CHANGE
TO
DRAWING # 458-5026
REV 2

MANUFACTURING ECO IMPACT
TOTAL MANUFACTURING SUMMARY

ECO No. 59357

Page 5

TOTAL MANUFACTURING SUMMARY DATE 09/18/91

REQUESTED EFFECTIVITY DATE 00/00/00

REQUESTED CONFORMANCE DATE 00/00/00

APPROVED EFFECTIVITY DATE 10/4/91

APPROVED CONFORMANCE DATE 10/14/91

DOLLAR SUMMARY:

SITE: 07 SITE: SITE: SITE: TOTAL

SAVINGS:
B.O.M. CHANGE SAVINGS (EXP) \$ 0 \$ 0 \$ 0 \$ 0 \$ 0 \$ 0
ENG IMPLEMENT SAVINGS (EXP) 0 0 0 0 0 0 0

TOTAL SAVINGS (EXPENSE) \$ 0 \$ 0 \$ 0 \$ 0 \$ 0 \$ 0

EXPENSE:
REWORK/SALVAGE - IN HOUSE \$ 261- \$ 0 \$ 0 \$ 0 \$ 0 \$ 261-
REWORK AT OUTSIDE VENDORS 0 0 0 0 0 0
SCRAP/OBSO COSTS 0 0 0 0 0 0
CANCEL. CHARGES - VENDORS 0 0 0 0 0 0

TOTAL (EXPENSE) \$ 261- \$ 0 \$ 0 \$ 0 \$ 0 \$ 261-

NET SAVINGS (EXPENSE) \$ 261- \$ 0 \$ 0 \$ 0 \$ 0 \$ 261-

MATERIAL CONFORMANCE:

REMARKS:

ALL SITES SPECIFIC SITE(S)

PART No.

DIST FINAL ASSY SUB ASSY STK WHS

RAW MATERIAL
WIP
FINISHED GOODS
IN-TRANSIT
OUTSIDE VENDOR

ACTION CODES:

- 1 - USE AS IS
 - 2 - REW/SALVAGE
 - 3 - SCRAP
 - 4 - NEXT ORDER
 - 5 - OBSOLETE
 - 6 - REDISTRIBUTE(*)
 - 7 - OTHER(*)
- (*) SEE REMARKS

PREPARED BY:

ECO IMPACT REVIEW BOARD:

NAME:
SIGNATURE

TEL# DATE 00/00/00

NAME:
SIGNATURE

TEL# DATE

[Signature]

9/18/91



ENGINEERING CHANGE ORDER CUSTOMER ENGINEERING IMPACT SHEET

ECO NO. 59357
SHEET 5 OF 5

<input type="checkbox"/> ALL UNITS <input type="checkbox"/> PROB ONLY <input checked="" type="checkbox"/> INFO	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> FCO REQUIRED <input type="checkbox"/> IMMED <input type="checkbox"/> NEXT CALL	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> IS A MUB REQUIRED FOR FSC REWORK	<input type="checkbox"/>

IMPACT COMMENTS

	DOMESTIC	INTER-NATIONAL
EST. UNIT POP		
EST. SPARE POP		
TOTAL		

EST. COST IMPACT	APPROVALS	DATE
MATERIAL		
LABOR	TECH OPS	
TOTAL	LOGISTICS <i>D. Murphy</i>	9.10.91
IMPLEMENTATION PERIOD	FSC SUPPORT	
ANNUAL COST	FINAL <i>J. Kowalski</i>	9/14/91
	OTHER	

GENERAL COMMENTS

157 WANG DCO CONTROL NO 59332

PRIORITY 1
PHASE-IN 2
DOCUMENTATION 3 X

SHEET 1 OF 3
DATE: 08/05/91

ORIGINATOR: Michael Riley DEPT: 70524 EXT: 70524 W/S: 014-690

PART(S) AFFECTED: 615-4282
P/N DESCRIPTION: LABEL, MODEL NO.

MODEL(S) AFFECTED: CS 386-II
DWG(S) AFFECTED: 615-4282

DESCRIPTION OF CHANGE: Change the drawing per Rev. 1 updates....

DISPOSITION CODES:
1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock	WIP	Next Order
1	1	1	1	1	4	4

EFFECTIVITY DATE: N/A CONFORMANCE DATE: N/A

REMARKS:

CURRENT BUILD SITE INFORMATION	PB X IR	PKWD X TAI	ME AU	WPR MX
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APPROVALS SIGNATURE DATE

ECO CHAIRPERSON John Mayhew 9/18/91

PROGRAM MGR.

DESIGN ENG. K.C. Yang

COMPLIANCE ENG. AD 9/17/91

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST E. Cargeant 5/13/91

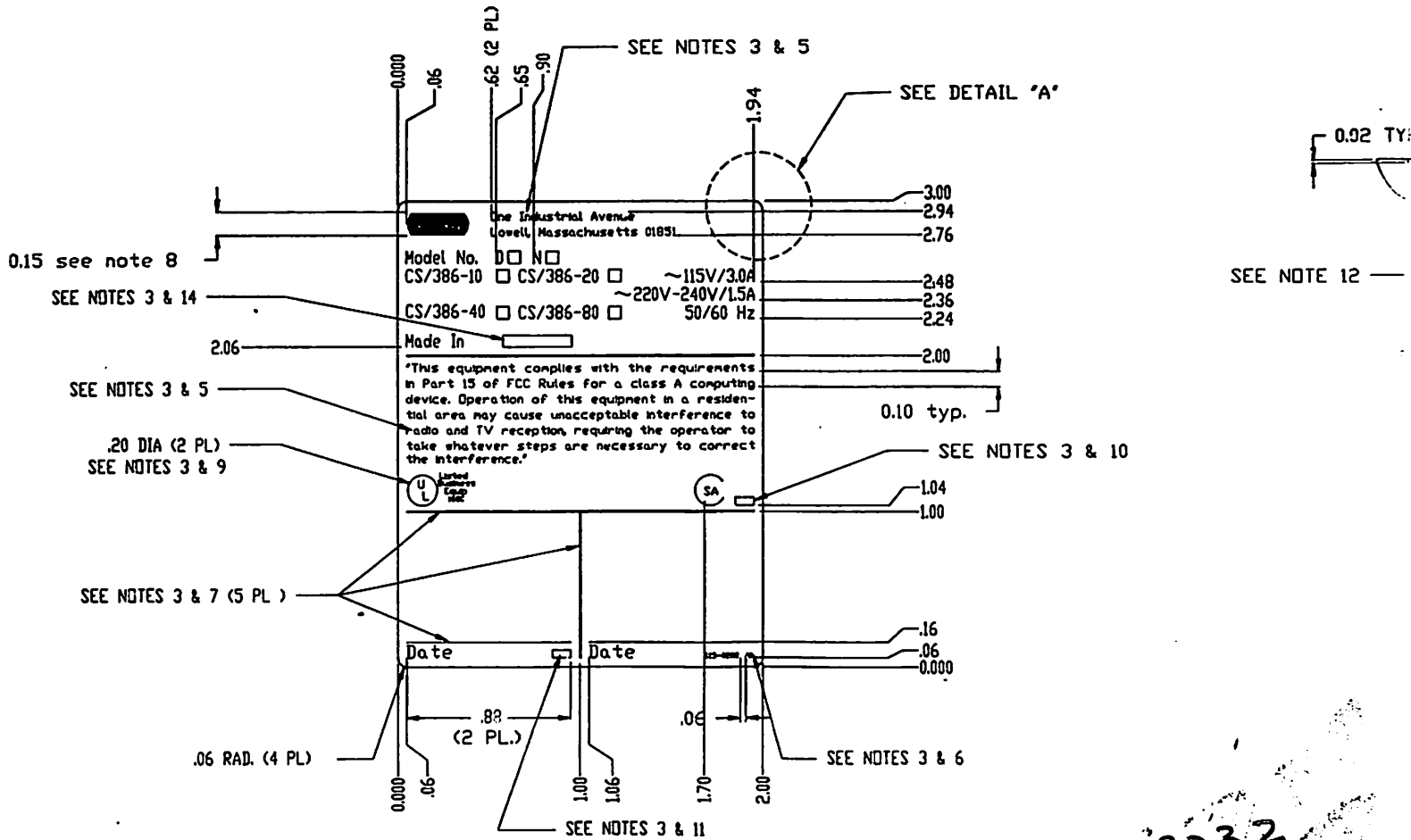
OTHER

SEP 10 1001

REASON/SYMPOM FOR CHANGE:
This label is required for release of the Turbo...
Proposed release date for Turbo System is 09/01/91

NOTES:

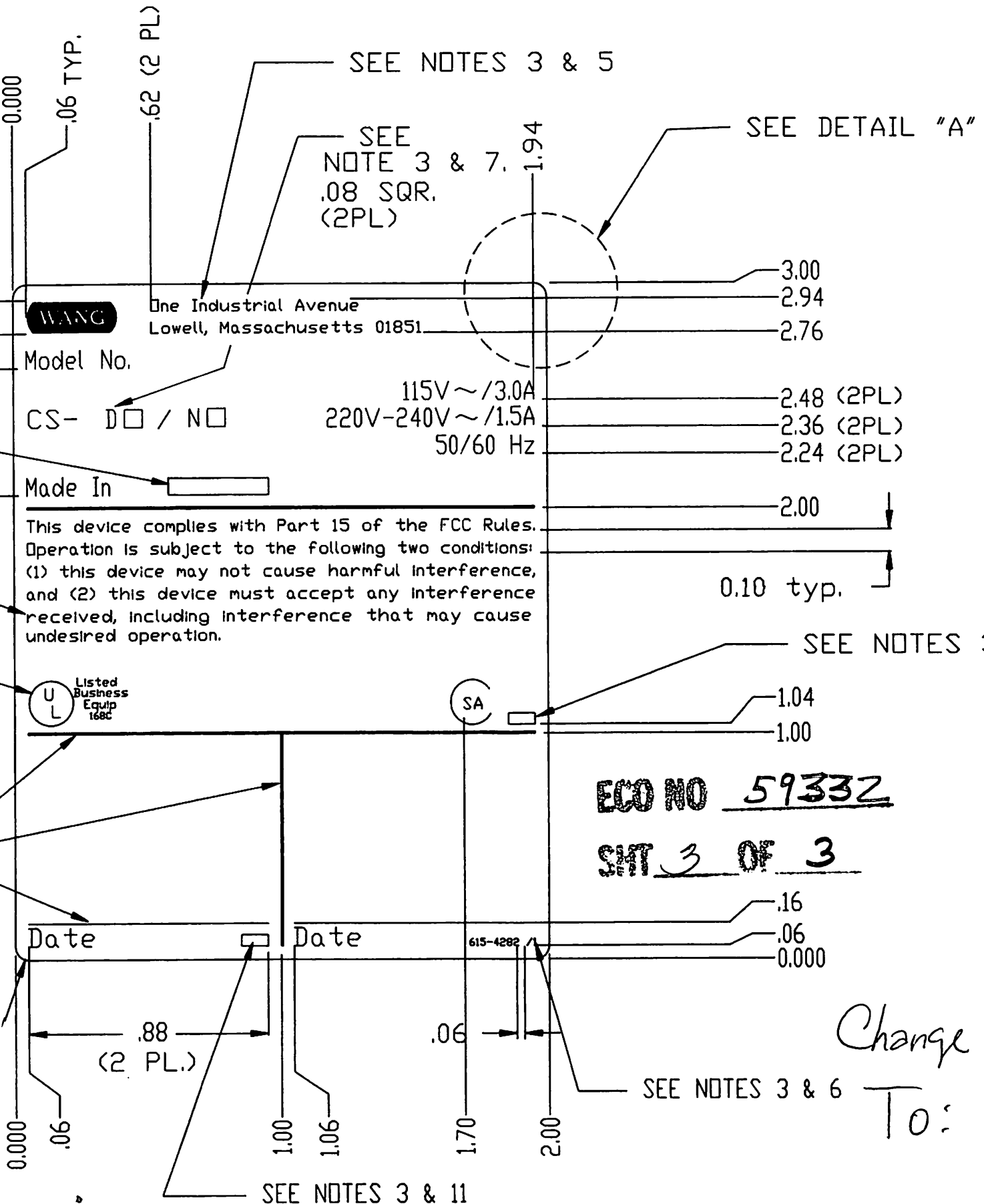
1. MAT'L: .002 THK 3M #7980 MATTE WHITE POLYESTER WITH 3M #300 SERIES PERMANENT ADHESIVE BACKSIDE WITH EASY REL TOP SURFACE TO BE LAMINATED WITH 3M #7881 COMPUTER IMPRINTABLE POLYESTER (OR EQUIV.).
2. BACKGROUND COLOR TO BE WANG OYSTER WHITE PER MUNSELL NO. 9.2Y 7.39/1.15
3. ALL NOMENCLATURE, LINEWORK & SYMBOLS TO BE WANG MEDIUM GRAY PER MUNSELL NO. 10Y 5.63/0.9.
4. UNLESS OTHERWISE SPECIFIED, NOMENCLATURE TO BE 8 PT. HELVETICA MEDIUM, UPPER AND LOWER CASE.
5. NOMENCLATURE INDICATED TO BE 6 PT. HELVETICA MEDIUM, UPPER AND LOWER CASE.
6. WANG PART NO. TO BE 4 PT. HELVETICA MEDIUM.
7. LINEWORK TO BE .015 THK UNLESS OTHERWISE SPECIFIED.
8. FOR WANG LOGO, REFER TO WANG DWG NO. C-6611-0481, SHTS. 1 & 2 AND REDUCE TO DIMENSION SHOWN. LOGO BACKGROUND TO BE MEDIUM GRAY.
9. LABEL TO BE SUPPLIED BY AN UNDERWRITERS LABORATORY RECOGNIZED AND CANADIAN STANDARD ASSOCIATION CERTIFIED S MUST BE APPROVED FOR USE ON METAL AND PLASTIC, GROUPS 6 & 9, REDUCE TO DIMENSION SHOWN.
10. VENDOR'S CSA CERTIFICATION MUST APPEAR WHERE INDICATED IN 4 PT. HELVETICA MEDIUM.
11. MANUFACTURING LOCATION TO BE 4 PT. HELVETICA MEDIUM. (U.S.A. ONLY).
12. KISS CUT SLITS IN FRONT SURFACE TO RELEASE LINER AS SHOWN IN DETAIL 'A' AROUND ENTIRE PERIMETER TO PROMOTE DESTRUCTIBILITY OF LABEL UPON REMOVAL.
13. PERFORATION REQUESTED BETWEEN EACH LABEL THROUGH MATERIAL AND LINER FOR EASY REMOVAL OF INDIVIDUAL PIECES.
14. COUNTRY OF ORIGIN TO BE DEFINED BY PURCHASING DEPT. (EXAMPLE: U.S.A., TAIWAN, ETC.).



CHANGE FROM 20

ECO NO 59332
SHT 2 OF 3

ITEM
MAT
FIN



W.P.N. 615-4282 Rev 1

FS=1

WANG ECO

CONTROL NO 59692

PRIORITY 1 X
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 3

ORIGINATOR: Michael Riley

DEPT: EXT:70524

M/S: 014-690

DATE: 11/13/91

PART(S) AFFECTED:
210-9583

P/N DESCRIPTION:

MODEL(S) AFFECTED:
CS Turbo

DWG(S) AFFECTED:
510-9583 -- 3

DESCRIPTION OF CHANGE:

CHANGE ARTWORK as following:
CUT trace between J13-89 and J13-90
CUT trace between J13-89 and J12-90
ADD jumper between J12-90 and J13-90

Update board to the Rev.1 MO
EDS has MO update information.

DISPOSITION CODES:

1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock WIP	Next Order
5	5	5	2	2	5

EFFECTIVITY DATE: N/A
CONFORMANCE DATE: 11-25-91

REMARKS: Pilot is the only location that has boards...

CURRENT BUILD SITE INFORMATION

PB	PKWD	ME	WPR
IR	X	TAI	AU
			MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON

John W. Hughes 11/9

PROGRAM MGR.

MJR 11/4/91

DESIGN ENG. Michael Riley

COMPLIANCE ENG. *A. February* 11/14/91

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST *P. Dugan* 11/14/91

OTHER

NOV 19 1991

REASON/SYMPATOM FOR CHANGE:

To fix artwork problem and mechanical problems on to Rev. 0 Board...

Relocating I/O connectors to correct alignment problems.

LCD NO 59692

SHT 2 OF 3

CHANGE DOCUMENT

ITEM STATUS	DWO: 8332	DWO: 008794	DWO: 008719	ECO 59644	ECO 59692	ALL PENDING				
ITEMS										
CONFIGURATION REVISION	0	1	2	3	4					
E-REV	-	0	0	0	0					
SCHEMATIC	A	0	0	0	0					
210 ASSEMBLY DRAWING	N/A	-	N/A	NA	NA					
110 ASSEMBLY DRAWING	A	0	0	1	1					
510 FAB DRAWING	A	0	0	0*	0*					
ARTWORK LAYERS	A	0	0	0*	0*					
DRILL/ROUTING DATA	A	0	0	0*	0*					
MECHANICAL OUTLINE	A	0	0	0	0					
REWORK INSTRUCTION	A	0	0	0	0*					
CORP. BOM EFFECT. DATE			NO	YES	YES					

PCA CONFIGURATION DOCUMENT

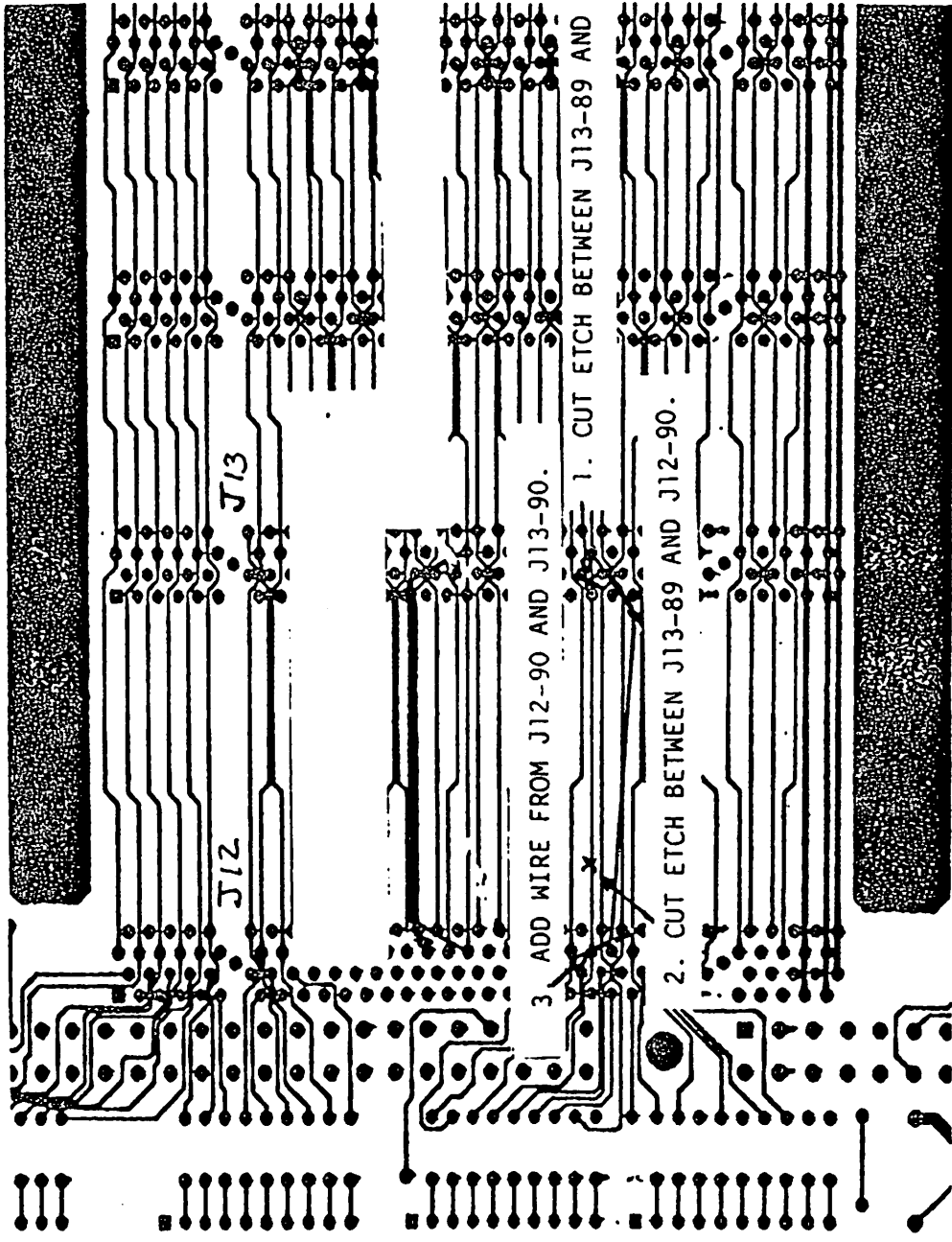
PCA PART NUMBER

210-9583

(WANG)

LABORATORIES, INC.

Matthew B. Turbo



3. ADD WIRE FROM J12-90 AND J13-90.

1. CUT ETCH BETWEEN J13-89 AND J13-90.

2. CUT ETCH BETWEEN J13-89 AND J12-90.

ECO NO 59692

REV 3

PAGE 2
ECO 59692
210-9583 - R0

ISJ

WANG ECO

CONTROL NO 5967A

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 3
DATE: 10/30/91

ORIGINATOR: Michael Riley DEPT: EXT: 70524 M/S: 014-690

DISPOSITION CODES:

1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock	WIP	Next Order
5	5	5	2	2	5	5

EFFECTIVITY DATE N/A CONFORMANCE DATE N/A

REMARKS:

Pilot is the only location that has boards..

CURRENT BUILD SITE INFORMATION	PB	PKWD	ME	WPR
	IR	TAI	AU	MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON [Signature] 11/4/91
PROGRAM MGR. [Signature] 11/4/91

DESIGN ENG. Michael Riley

COMPLIANCE ENG. [Signature] 11/1/91

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST [Signature] 11/1/91

OTHER

P/N DESCRIPTION:

PART(S) AFFECTED: 210-9583
MODEL(S) AFFECTED: CS Turbo
DWG(S) AFFECTED: 210-9583
110-9583

DESCRIPTION OF CHANGE:

CHANGE ARTWORK as following:
CUT trace between J13-65 and J13-66
CUT trace between J13-65 and J12-66
ADD jumper between J12-66 and J13-66

REASON/SYMPOM FOR CHANGE:

To fix artwork problem on Rev.0 board...

ECO NO 596454

SHT 2 OF 3

CHANGE DOCUMENT

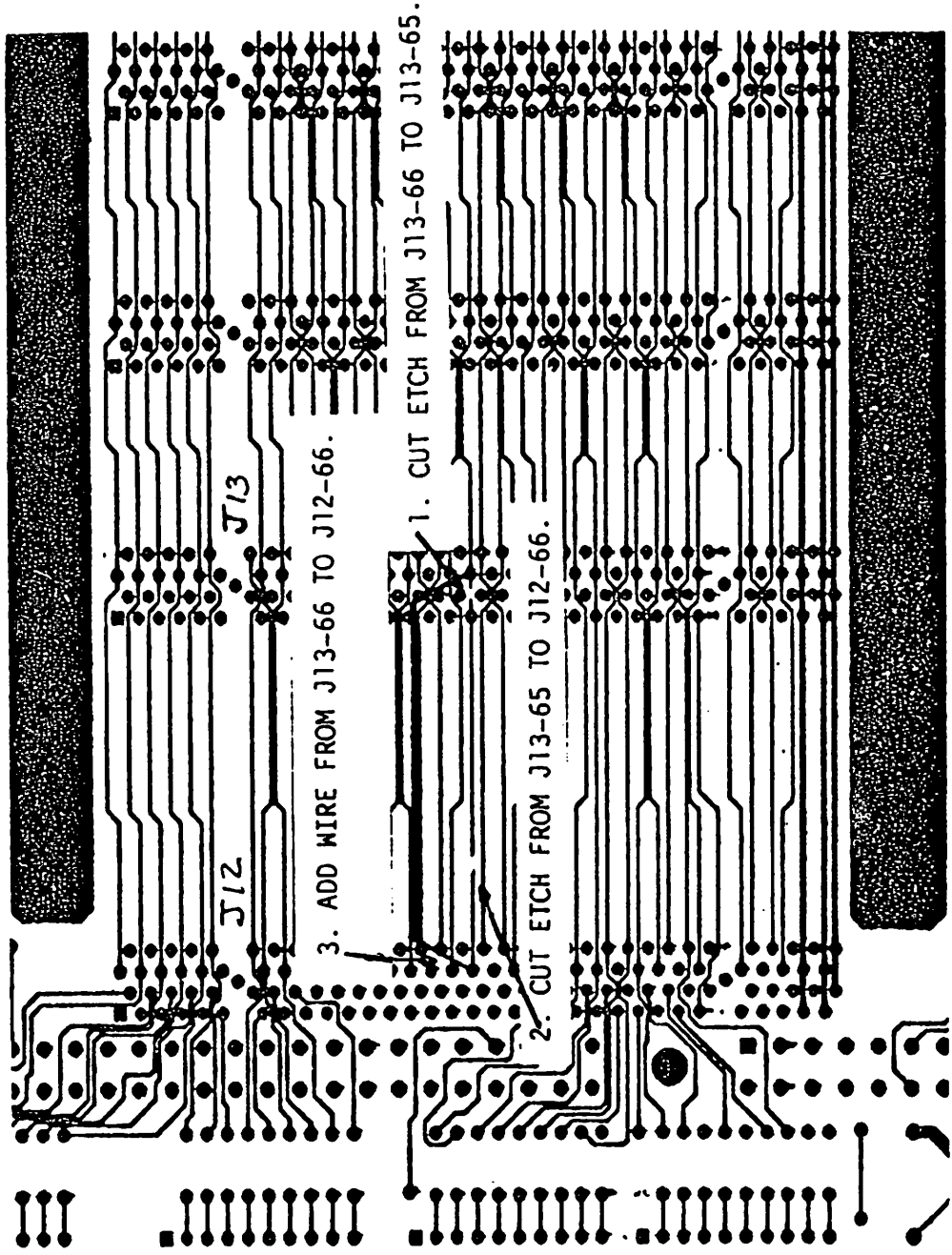
	DWO: 8332	DWO: 008794	DWO: 008719	ECO 59644	ALL PRINT
ITEM STATUS	Q	Q	T	T	
ITEMS					
CONFIGURATION REVISION	0	1	2	3	
E-REV	-	0	0	0	
SCHEMATIC	A	0	0	0	
210 ASSEMBLY DRAWING	N/A	-	N/A	N/A	
110 ASSEMBLY DRAWING	A	0	0	1	
510 FAB DRAWING	A	0	0	0*	
ARTWORK LAYERS	A	0	0	0*	
DRILL/ROUTING DATA	A	0	0	0*	
MECHANICAL OUTLINE	A	0	0	0	
REWORK INSTRUCTION	A	0	0	0	
CORP. BOM EFFECT. DATE					YES

PCA CONFIGURATION DOCUMENT

PCA PART NUMBER 210-9593

(WANG) LABORATORIES, INC.

Arthur Rd. Turbo



PAGE 2
CIRCUIT SIDE
ECO 59644
210-9583 - R0

ECO NO 59644

SAT 3 OF 3

IS=1

WANG ECO

CONTROL NO 59928

CLASS 1
CLASS 2 X
CLASS 3

ORIGINATOR: ~~Michael Riley~~

DEPT: EXT: 70524

M/S: ~~019-690~~

SHEET 1 OF 3
DATE: 01/28/92

PART(S) AFFECTED: 209-9577/210-9577A
P/N DESCRIPTION: CS386 Daughter Board
MODEL(S) AFFECTED: CS Turbo
DWG(S) AFFECTED: 210-9577

DESCRIPTION OF CHANGE:
Change 209-9577 BOM as follows:
DELETE 377-0575 1ea L5
ADD 377-1137 1ea L5
Change 210-9577 schematics per attached.

FEB 09 1992

REASON/SYMPTOM FOR CHANGE:
To correct BOM for manufacturing build

1-Use As is	PART(S) AFFECTED		DISPOSITION	
3-Scrap	4-Next Order	5-See Remarks	2-Rework	
Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock WIP
5	5	5	5	5
EFFECTIVITY DATE			CONFORMANCE DATE	
1-31-92			2-3-92	

REMARKS:
Existing stock has been updated.

CURRENT BUILD SITE INFORMATION	PB	PKWD	ME	WPR
	IR	TAI	AU	MX
APPROVALS	SIGNATURE		DATE	

ECO CHAIRPERSON *[Signature]* 1/30/92

PROGRAM MGR *[Signature]*

DESIGN ENG. Michael Riley

COMPLIANCE ENG. *[Signature]* 1/29/92

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST *[Signature]* 1/09/92

OTHER

NO NO 59728

SHT 2 OF 3

CHANGE DOCUMENT

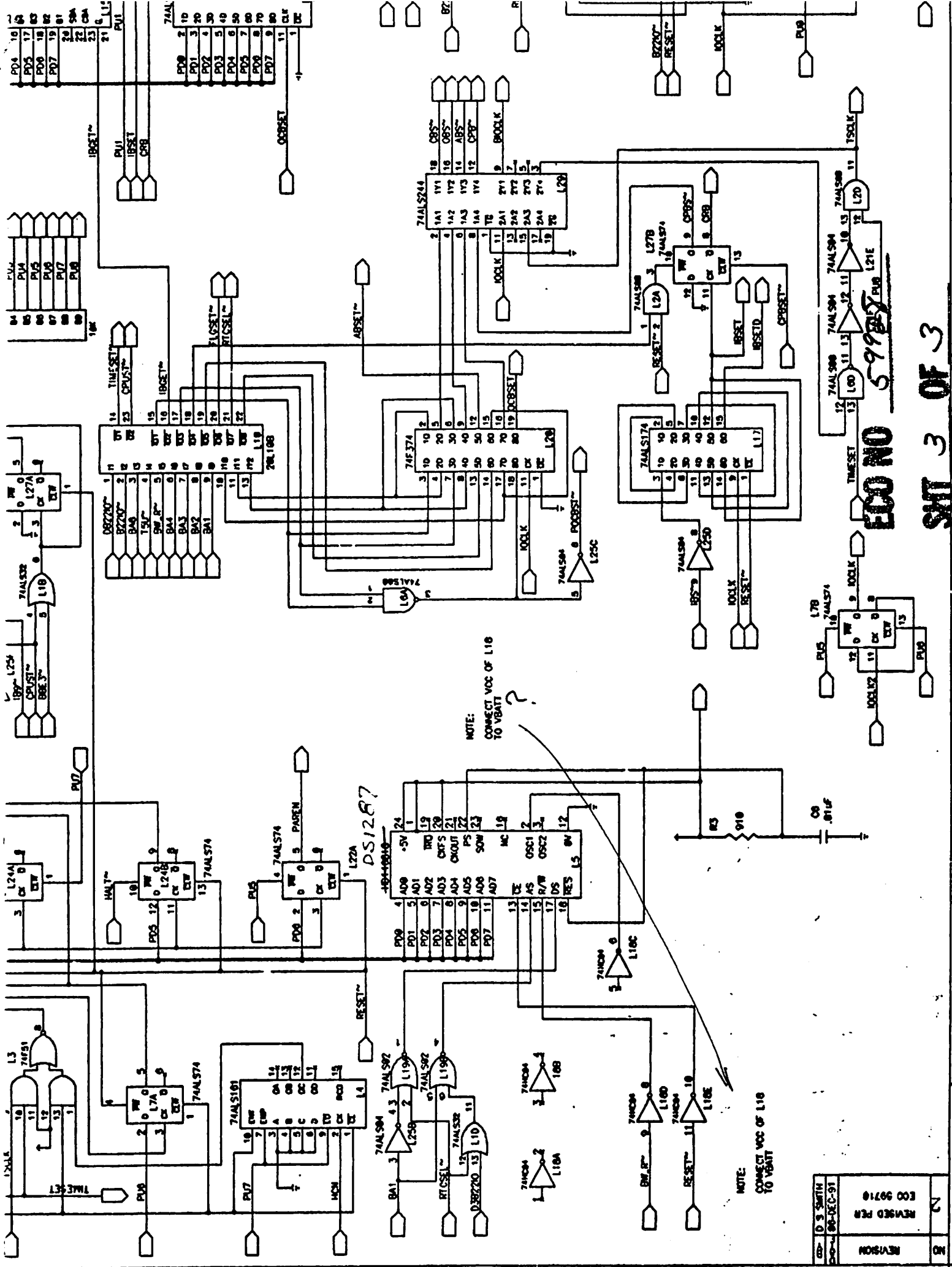
ITEM STATUS	ECO 59497	ECO 59710	ECO 59891	ECO 59928
ITEMS				
CONFIGURATION REVISION	1	3	2	7
E-REV	1	1	1	1
SCHEMATIC	1	1	2	3
210 ASSEMBLY DRAWING	N/A	N/A	NA	4
110 ASSEMBLY DRAWING	1	2	2	NA
510 FAB DRAWING	1	2	2	2
ARTWORK LAYERS	1	2	2	2
DRILL/ROUTING DATA	1	2	2	2
MECHANICAL OUTLINE	0	0	0	0
REWORK INSTRUCTION	NO	NO	NO	NO
CORP. BOM EFFECT. DATE	10/14/61	11-27-61	1-22-92	1/31/61

(WANG)
LABORATORIES, INC.

PCA
CONFIGURATION
DOCUMENT

PCA PART NUMBER
210-9577A

ITEM MASTER DESCRIPTION CS 386-11 DAUGHTER BD. PAGE -- OF -- 14-21562



NOTE:
CONNECT VCC OF L16
TO VBATT

NOTE:
CONNECT VCC OF L16
TO VBATT

ECO NO 59985

SHEET 3 OF 3

REV	15	REVISION
DESIGNED BY	08-DEC-81	ECO-9710
REVISED PER		
ECO NO		

WANG ECO

CONTROL NO 59497

PRIORITY 1 X
PHASE-IN 2 X
DOCUMENTATION 3

ORIGINATOR: Michael Riley

DEPT: EXT: 70524

M/S: 014-690

SHEET 1 OF 3
DATE: 09/25/91

PART(S) AFFECTED:
209-9577
210-9577 A

MODEL(S) AFFECTED:
CS Turbo

DESCRIPTION OF CHANGE:
Add 377-7198R0 1ea. L10
377-7199R0 1ea. L14

DISPOSITION CODES:

1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks
Cust. Field Fin. Stock WIP Next
Units Spare Ret. Goods Order
NA Na NA NA NA NA

EFFECTIVITY DATE: 10-14-91
CONFORMANCE DATE: 10-21-91

REMARKS:
None in production.

CURRENT BUILD SITE INFORMATION	PB	PKWD	ME	WPR
	IR	TAI	AU	MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON *[Signature]* 10-10-91

PROGRAM MGR. *[Signature]*

DESIGN ENG. Michael Riley

COMPLIANCE ENG. *[Signature]* 10/13/91

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST *[Signature]* 9/27/91

OTHER

OCT 10 1991

REASON/SYMPOM FOR CHANGE:
When the Rev. A Pals were deleted the Rev. 0 Pals did not get added to the BOM...

200 NO 59497

SHT 2 OF 3

CHANGE DOCUMENT

ITEM STATUS

ITEMS

CONFIGURATION REVISION

E-REV

SCHEMATIC

210 ASSEMBLY DRAWING

110 ASSEMBLY DRAWING

510 FAB DRAWING

ARTWORK LAYERS

DRILL/ROUTING DATA

MECHANICAL OUTLINE

REWORK INSTRUCTION

CORP. BOM EFFECT. DATE

~~DWG # 204727~~

~~DWG # 204699~~

~~DWG # 2008150~~

DWG: 008535

FC 059497

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N/A

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N/A

10/14/91

PCA CONFIGURATION DOCUMENT

PCA PART NUMBER

210-9577A

PAGE 1 OF 1

DAUGHTER BD.

CS 386-1

ITEM MASTER DESCRIPTION

14-26562

Proj Ctl#:

Assy#: 2099577 Desc1: CS386 DAUGHTER BOARD Stat: 1 Rev: AH Assy Level: 3
 Desc2: Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref Desg From	Ref Desg To
3760744 IC 74ALS08 2-INP POS-AND	2		1.0000	EA	1	1	R&D	0			L2
3760746 IC 74ALS30 8-INP POS-NAND	2		1.0000	EA	1	1	R&D	0			L13
3760747 IC 74ALS32 2-INP POS-OR	2		1.0000	EA	1	1	R&D	0			L1
3760749 IC HEX D-TYPE F/F W/CLEAR	2		1.0000	EA	1	1	R&D	0			L11
3760819 IC 74ALS174 HEX D FF	2		1.0000	EA	1	1	R&D	0			L17
3760979 IC 74F51 DL AND-OR-INV 2W	2		1.0000	EA	1	1	R&D	0			L3
3760998 IC 74ALS564 OCT D FF EDG	2		2.0000	EA	1	1	R&D	0			L23 L28
3761060 IC 74F269 8 BIT BIN CNTR	2		1.0000	EA	1	1	R&D	0			L8
3761135 IC 74ALS648 OCT BUS XCVR	2		1.0000	EA	1	1	R&D	0			L15
3770575 IC 146818 REAL TIME CLOC	2		1.0000	EA	1	1	R&D	0			L5
3801014 DIO SIG 75V 150MA 4MS	2		2.0000	EA	1	1	R&D	0			D1 D2
5109577 CS386 DAUGHTER	1		1.0000	EA	1	1	R&D	0			00000001
6152318 LABEL, BARCODE	2		1.0000	EA	1	1	R&D	0			BC1
<p>APD 377-7198 R-φ 377-7199 R-φ</p>											

 END OF
 ECO NO 57497

SHT 3 OF 3

WANG ECO

CONTROL NO 59603

PRIORITY 1 X
PHASE-IN 2 X
DOCUMENTATION 3

ORIGINATOR: Michael Riley DEPT: M/S: 014-690 EXT: 70524 SHEET 1 OF 1 DATE: 10/02/91

PART(S) AFFECTED:
SEE BELOW

DISPOSITION CODES:

1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

MODEL(S) AFFECTED:
CS-Turbo

Cust. Units	Field Spare	Field Ret.	Field Goods	Fin. Ret.	Stock	WIP	Next Order
5	5	5	5	5	5	5	5

EFFECTIVITY DATE

11/12/91

CONFORMANCE DATE

11/12/91

REMARKS:

Only boards are in Pilot and all have been reworked to have AMD devices.

CURRENT BUILD SITE INFORMATION

PB	PKWD	ME	WPR
IR	X	TAI	MX
IR	TAI	AU	MX

APPROVALS

SIGNATURE DATE

Change BOMs 377-7191-RO, 377-7192-RO, and 377-7193-RO as follows:

ECO CHAIRPERSON John P. ... 11/14/91
PROGRAM MGR. W. King 11/4/91
DESIGN ENG. Michael Riley

Delete: 377-1155 Qty: 1
Add: 377-1155-A Qty: 1

NOV 11 1991

REASON/SYMPOM FOR CHANGE:

AMD is the only vendor that has undershoot protection on their PALS. The 9576 requires this protection.

Without this change, CPU board will not pass power-up diagnostics.

ORIGINATOR Michael Riley

ECO ANALYST Judy Fuller 10/23/91

OTHER

ISI

WANG ECO

CONTROL NO 59643

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 5
DATE: 10/30/91

ORIGINATOR: Michael Riley DEPT: EXT: 70524 M/S: 014-690

PART(S) AFFECTED: 209-9579
P/N DESCRIPTION:
MODEL(S) AFFECTED: CS Turbo
DWG(S) AFFECTED: 210-9579A
210-9579-1A

DESCRIPTION OF CHANGE:
DELETE 377-7121R1, ADD 377-7121R2 1ea. L19 from BOM 209-9579

DISPOSITION CODES:
1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks
Cust. Field Fin. Stock WIP Next
Units Spare Ret. Goods Order
5 5 2 2 5

EFFECTIVITY DATE: 11-6-91
CONFORMANCE DATE: 11-11-91

REMARKS: Pilot is the only location that has boards..

CURRENT BUILD SITE INFORMATION
PB PKWD ME WPR
IR TAI AU MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON *John D. Riley* 11/4

PROGRAM MGR. *[Signature]* 11/4/91

DESIGN ENG. Michael Riley

COMPLIANCE ENG. *[Signature]* 11/1/91

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST *E. Raycraft* 11/01/91

OTHER

REASON/SYMPOM FOR CHANGE:

To fix a power up Diag. problem.

ECO NO 59643

SHT 2 OF 5

CHANGE DOCUMENT

ITEM STATUS

ITEMS

CONFIGURATION REVISION

E-REV

SCHEMATIC

2"Ø ASSEMBLY DRAWING

1"Ø ASSEMBLY DRAWING

5"Ø FAB DRAWING

ARTWORK LAYERS

DRILL/ROUTING DATA

MECHANICAL OUTLINE

REWORK INSTRUCTION

PROD. STD DEV. NOTICE

CORP. BOM EFFECT. DATE

Dwg: 010266

Dwg: 010882

Dwg: 010189

Dwg: 004270

Dwg: 010082

ECO59643

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N

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YES

N

N

N

11/6/91

PCA CONFIGURATION DOCUMENT



LABORATORIES, INC.

* CHANGE PENDING

PCA PART NUMBER

210-9579-1A

ITEM MASTER DESCRIPTION HI SPEED CHANNEL

PAGE

OF 1

1. I/O CONTROL MOTHER BD

ECO NO 59643

SHT 3 OF 5

CHANGE DOCUMENT

DWO # 004278	DWO # 012266	DWO # 012882	DWO: 010189	DWO: 010082	EC059643			
ITEM STATUS	Ø	Ø	Ø	1	1			
ITEMS								
CONFIGURATION REVISION	Ø	1	2	3	4	5		
E-REV	Ø	1	1	1	1	2		
SCHEMATIC	Ø	1	1	1	1	1		
210 ASSEMBLY DRAWING					NA	NA		
110 ASSEMBLY DRAWING		1	1	2	2	2		
510 FAB DRAWING	Ø	1	2	2	2	2		
ARTWORK LAYERS	Ø	1	1	1	1	1		
DRILL/ROUTING DATA	Ø	1	1	1	1	1		
MECHANICAL OUTLINE	Ø			0	0	0		
REWORK INSTRUCTION	N	N	NO	NO	NO	YES		
CORP. BOM EFFECT. DATE						11/6/91		

PCA CONFIGURATION DOCUMENT

(WANG)

LABORATORIES, INC.

HI-SPEED CHANNEL I/O CTRL. MOTHER BD

PCA PART NUMBER 210-9579A

Proj Ctl#:

Assy#: 2099579 Desc1: 386 MASTER I/O CONTROLLER Stat: 1 Rev: AF Assy Level: 1
 Desc2: Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

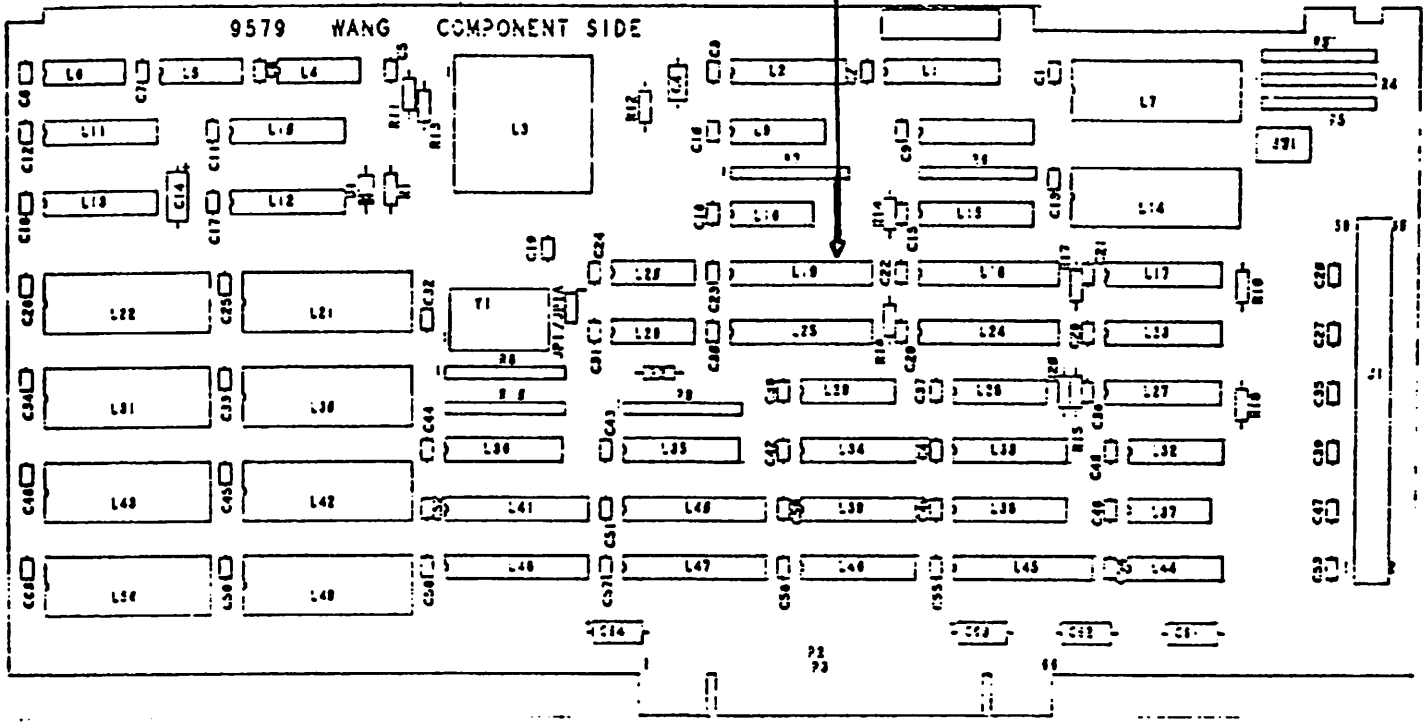
Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value	Type	Ref Desg From	Ref Desg To
3761266 IC 74F574 OCT D FF T-S 20	2		6.0000	EA	1	1	R&D	0 3			L8 L15 L35 L39 L46	L26 L32 L20
3761374 IC 74F21 4-IN POS AND	2		1.0000	EA	1	1	R&D	0 3			L7 L14	L20
3761408 IC 74F368 HEX INVR BUF/	2		1.0000	EA	1	1	R&D	0 3			L3	L22 L30 L42 L49 L50
3761414 IC 74ACT86 2-IN X-OR GATE	1		1.0000	EA	1	1	R&D	0 3				
3769015 SKT IC DIP 14-14P .6/.1C	2		2.0000	EA	1	1	R&D	0 1				
3769070 SKT PLCC 68P .1/.05C SLDR	2		1.0000	EA	1	1	R&D	0 1				
3770779 IC 32KX8 SRAM CHOS 100NS	2		8.0000	EA	1	1	R&D	R 7				
3777119R1 BOARD SELECT	1		1.0000	EA	1	5	R&D	N				
3777120R1 SM SEQUENCER	1		1.0000	EA	1	5	R&D	N				
3777121R1 R2 SM ARBITRATION	1		1.0000	EA	1	5	R&D	N				
3777122R1 LOCAL BUS CONTROL	1		1.0000	EA	1	5	R&D	N				
3777123R1 UPPER INTERRUPT	1		1.0000	EA	1	5	R&D	N				

ECO NO 59643
 SHIT 4 OF 5

ECO NO 59643

SMT 5 OF 5

1. REMOVE L19, REPLACE WITH 377-7121R2.



PAGE 2
ECO 59643
210-9579A/1A - R1

IS = 1

WANG ECO

CONTROL NO 59645

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 4
DATE: 10/30/91

M/S: 014-690

EXT: 70524

DEPT:

ORIGINATOR: Michael Riley

PART(S) AFFECTED:
110-9581

P/N DESCRIPTION:

MODEL(S) AFFECTED:
CS Turbo

DWG(S) AFFECTED:
210-9581

DESCRIPTION OF CHANGE:

DELETE 377-7122R1, ADD 377-7132R2.1ea. L19 from BOM 110-9581

DISPOSITION CODES:

1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock WIP	Next Order
5	5	5	2	2	5

EFFECTIVITY DATE 11-6-91

CONFORMANCE DATE 11-11-91

REMARKS:

Pilot is the only location that has boards..

CURRENT BUILD SITE INFORMATION

PB	PKWD	ME	WPR
TR	TAI	AU	MX

APPROVALS

SIGNATURE

DATE

ECO CHAIRPERSON

[Signature] 11/91

PROGRAM MGR.

[Signature] 11/91

DESIGN ENG. Michael Riley

COMPLIANCE ENG.

[Signature] 11/1/91

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST

[Signature] 11/1/91

OTHER

REASON/SYMPOM FOR CHANGE:

To fix a disk access problem ...

ECO NO 59645
SMT 2 **OF** 4

CHANGE DOCUMENT

ITEM STATUS	Dwg 083486	Dwg 019268	Dwg 010998	Dwg: 010084	ECO 59645
	X	X	Ø	1	1
ITEMS					
CONFIGURATION REVISION	Ø	1	2	3	4
E-REV	-	Ø	Ø	Ø	1
SCHEMATIC	A	Ø	Ø	Ø	Ø
210 ASSEMBLY DRAWING	A	Ø	1	1	Ø
110 ASSEMBLY DRAWING	A	Ø	Ø	Ø	Ø
510 FAB DRAWING	A	Ø	Ø	Ø	Ø
ARTWORK LAYERS	A	Ø	Ø	Ø	Ø
DRILL/ROUTING DATA	A	Ø	Ø	Ø	Ø
MECHANICAL OUTLINE	A	Ø	Ø	Ø	Ø
REWORK INSTRUCTION					
CORP. BOM EFFECT. DATE					YES 11/6/91

PCA CONFIGURATION DOCUMENT

PCA PART NUMBER
 210-9581

(WANG) LABORATORIES, INC.

386 Disk SLAVE

ITEM MASTER DESCRIPTION

PAGE OF

Proj Ct1#:

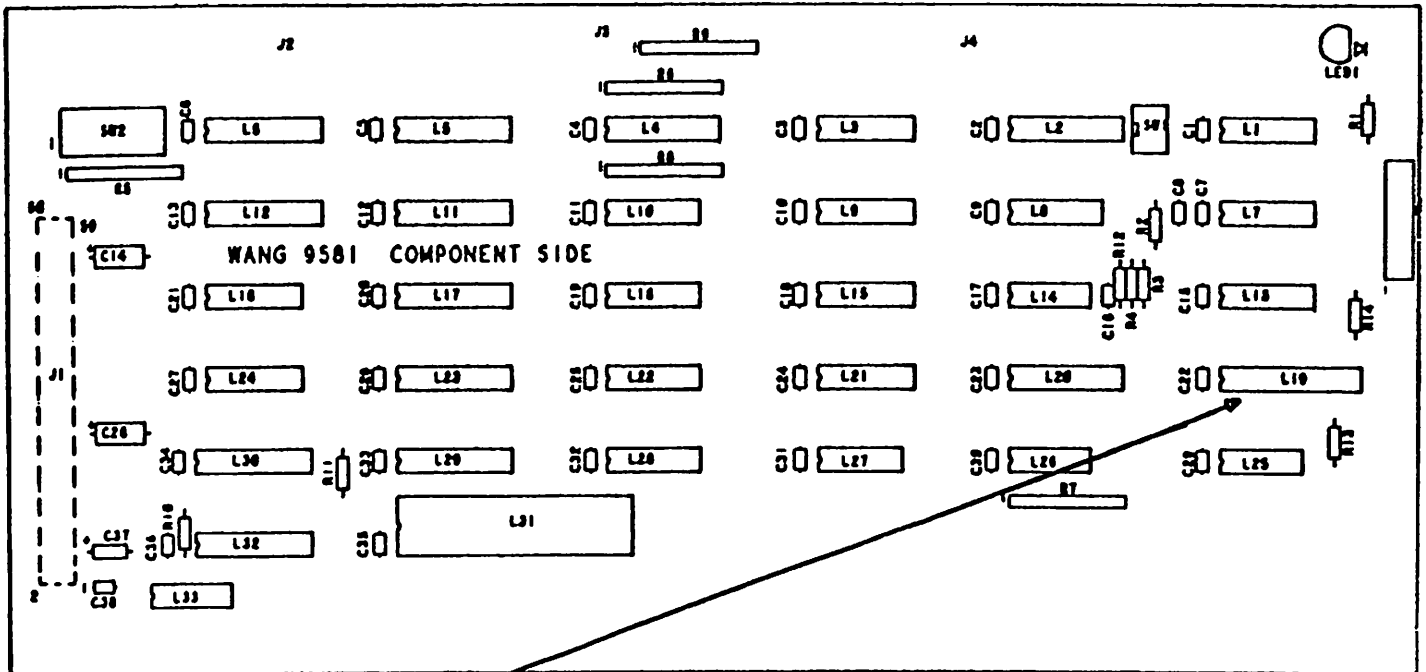
Assy#: 1109581 Desc1: 386 DISK SLAVE Stat: 1 Rev: AI Assy Level: 1
 Desc2: Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	QTY Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
3760715 IC 74ALS123 MV RTRGBL	2		1.0000	EA	1	1	R&D	0 3			L7
3760730 IC 74ALS244 BFR/LN DRVR	2		2.0000	EA	1	1	R&D	0 3			L11 L32
3760736 IC 74ALS240 BFR/LN DRVR	2		5.0000	EA	1	1	R&D	0 3			L5 L12 L17 L29
3760819 IC 74ALS174 HEX D FF	2		2.0000	EA	1	1	R&D	0 3			L16 L28
3760842 IC 74F164 8BIT SHF RGTR	2		1.0000	EA	1	1	R&D	0 1			L27
3760894 IC 74F161 4BIT BIN CNTR	2		1.0000	EA	1	1	R&D	0 3			L8
3761154 IC 74ALS259 8B ADRES LCH	2		1.0000	EA	1	1	R&D	0 3			L21
3761211 IC 74ALS158 DATA SEL/MUX	2		1.0000	EA	1	1	R&D	0 3			L24
3761239 IC 74ALS14 HEX INV W/ ST	2		1.0000	EA	1	1	R&D	0 5			L14
3770380 IC 8255A PRGMABLE PERIPHE	2		1.0000	EA	1	1	R&D	0 3			L31
377131R1 I/O DECODERONTROL	1		1.0000	EA	1	5	R&D	N			L30
377132R1 DISK STATUS CONTROL	1		1.0000	EA	1	5	R&D	N			L19
377133R1 STROBE & ACKNOWLEDGE	1		1.0000	EA	1	5	R&D	N			L20

ECO NO 59645
 SHIT 3 OF 4

ECO NO 59645

SHT 4 OF 4



1. REMOVE L19, REPLACE WITH 377-7132R2.

FS 1

WANG ECO

CONTROL NO 59710

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 7

ORIGINATOR: Michael Riley

M/S: 014-690

DATE: 09/03/91

EXT: 70524

DEPT:

P/N DESCRIPTION:

CS 386 daughter board

PART(S) AFFECTED:

110-9577A 210-9577A

MODEL(S) AFFECTED:

CS Turbo

DWG(S) AFFECTED:

110-9577

DESCRIPTION OF CHANGE:

Delete the following from the 110 Assembly Drawing
Y1, C5, R1, J3, D1, D2, Q1, Q2, R2, R4, R5, C7, J2

Rework assembly as following:
Add Jumper wire to Q2 Emitter to Collector
Add: Jumper wire to L5 pin 1 to pin 24
Update 210-9577 schematics per attached.
Update 209-9577 Workbench BOM per attached.

Change 110 assembly to 210 assembly drawing.

NOV 26 1991

REASON/SYMPOM FOR CHANGE:

Update board for new clock chip with battery included.

DISPOSITION CODES:

1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock	WIP	Next Order
5	5	5	5	5	5	5

EFFECTIVITY DATE

11-27-91

CONFORMANCE DATE

12-2-91

REMARKS:

none in production

CURRENT BUILD SITE INFORMATION

PB	PKWD	ME	WPR
TR	X	AU	MX

APPROVALS

SIGNATURE

DATE

ECO CHAIRPERSON

[Signature] 11-25-91

PROGRAM MGR.

DESIGN ENG. Michael Riley

COMPLIANCE ENG.

[Signature] 11/21/91

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST *[Signature]* 11/20/91

OTHER

LOG NO 59710

SHEET 2 OF 7

CHANGE DOCUMENT

ITEM STATUS

ITEMS

CONFIGURATION REVISION

E-REV

SCHEMATIC

210 ASSEMBLY DRAWING

110 ASSEMBLY DRAWING

510 FAB DRAWING

ARTWORK LAYERS

DRILL/ROUTING DATA

MECHANICAL OUTLINE

REWORK INSTRUCTION

CORP. BOM EFFECT. DATE

~~DWD 04727~~

~~DWD 04699~~

~~DWD 008150~~

DWD: 008535

ECO 59497

ECO 59710

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YES

NO

10/14/91

11-27-91



LABORATORIES, INC.

PCA CONFIGURATION DOCUMENT

PCA PART NUMBER

210-9577A

ITEM MASTER DESCRIPTION CS 386-1 DAUGHTER BD.

PAGE -- OF --

14-26562

Proj Ct1#:

Assy#: 2099577 Desc1: CS386 DAUGHTER BOARD Stat: 1 Rev: AI Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000 Assy Level: 3

Component Description	Item Status	No-Wang Ind	Qty Per Assy	U M	QTY Type	Comp Type	ECO Number	COVL Ind	Value	Type	Ref From	Desg To
3001988 CAP 27 PF 100V 10% NPO CE	2		1.0000	EA	1	1	R&D	0			X	
3001930 CAP .1 UF 50V +80-20% Z5U	2		2.0000 1.0000	EA	1	1	R&D	R			C6	X
3001966 CAP .047UF 50V+80-20% Z5U	2		29.0000	EA	1	1	R&D	0			C1	C4
3004024 CAP 33 UF 10V 5% TANTALUM	2		3.0000	EA	1	1	R&D	0			C15	C14
3210060 CRYSTAL MINIATURE 32.768	2		1.0000	EA	1	1	R&D	0			X	C24
3302025 RES 240 OHM 1/4W 5% METAL	2		1.0000	EA	1	1	R&D	0			R6	C25
3302092 RES 910 OHM 1/4W 5% METAL	2		1.0000	EA	1	1	R&D	0			R3	C26
3304009 RES 11K OHM 1/4W 5% METAL	2		1.0000	EA	1	1	R&D	0			X	
3304011 RES 10K OHM 1/4W 5% METAL	2		1.0000	EA	1	1	R&D	0			X	
3304057 RES 56K OHM 1/4W 5% METAL	2		1.0000	EA	1	1	R&D	0			X	
3305021 RES 2.0M OHM 1/4W 5% METAL	2		1.0000	EA	1	1	R&D	0			X	
3309972 RES NET 2.2K OHM TYPE 10/	2		1.0000	EA	1	1	R&D	0			R7	
3500203 GOM BRK WY HDR 2P 1C	2		2.0000	EA	1	1	R&D	0			X	J4

5/10/91

ECO NO 57710
 CUT 3 OF 7

Proj Ctl#:

Assy#: 2099577 Desc1: CS386 DAUGHTER BOARD Stat: 1 Rev: AI Assy Level: 3
 Desc2: Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	COVL Ind	Value Type	Ref From	Desg To
3500499 CON_HDR	2 2P .1C		1.0000	EA	1	1	R&D	0		JX	
3506337	2		1.0000	EA	1	1	R&D	0		J1	
3700027	2		1.0000	EA	1	1	R&D	0		LED1	
3751080	2		1.0000	EA	1	1	R&D	0		X	
XSTR-NPW-T0-92-3T0M4 QUV	2		1.0000	EA	1	1	R&D	3		X	
3751148	2		1.0000	EA	1	1	R&D	0		X	
XSTR-NPW-T0-92-6Z5M4 QUV	2		1.0000	EA	1	1	R&D	3		X	
3760614	2		1.0000	EA	1	1	R&D	0		L20	
IC 74F374 OCT D FF W/T-S			1.0000	EA	1	1	R&D	1		L18	
3760693	2		1.0000	EA	1	1	R&D	0		L4	
IC 74HC04 HEX INV 14 PIN			1.0000	EA	1	1	R&D	3		L9	L16
3760726	2		1.0000	EA	1	1	R&D	0		L29	
IC 74ALS161 CNTR SYN 4BIT			3.0000	EA	1	1	R&D	3		L19	
3760730	2		1.0000	EA	1	1	R&D	0		L7	L12
IC 74ALS244 BFR/LN DRVR			1.0000	EA	1	1	R&D	3		L22	L24
3760732	2		6.0000	EA	1	1	R&D	0		L26	L27
IC 74ALS02 2-INP POS-NDR			2.0000	EA	1	1	R&D	3		L21	L25
3760737	2		1.0000	EA	1	1	R&D	0		L6	
IC 74ALS74 DL D FF POS-			1.0000	EA	1	1	R&D	3			
3760738	2		1.0000	EA	1	1	R&D	0			
IC 74ALS04 HEX INV 14 PIN			1.0000	EA	1	1	R&D	3			
3760743	2		1.0000	EA	1	1	R&D	0			
IC 74ALS00 2-INP POS-NAND			1.0000	EA	1	1	R&D	3			

ECO NO 52710

SHT 4 OF 7

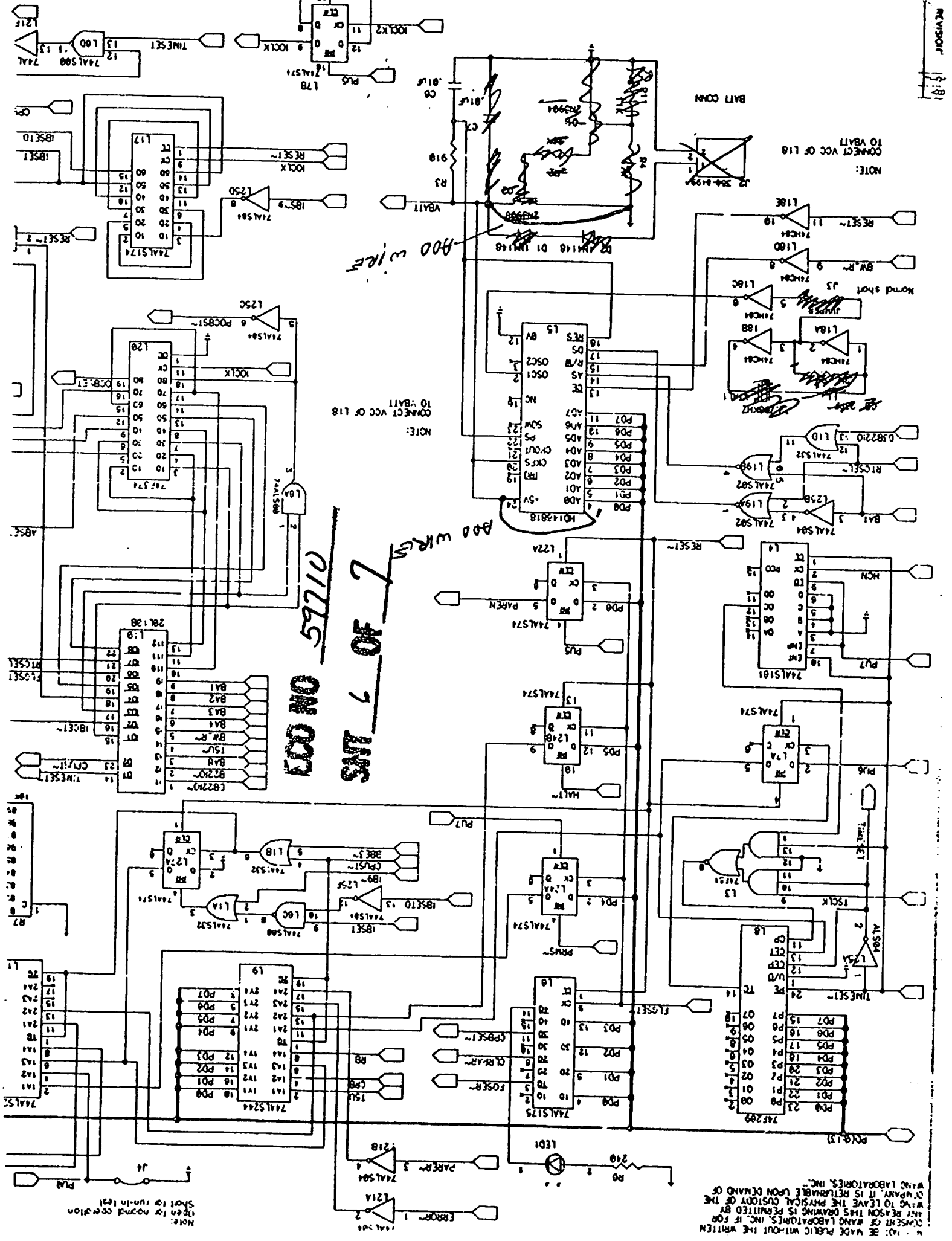
Proj Ctl#:

Assy#: 2099577 Desc1: CS386 DAUGHTER BOARD Desc2: Stat: 1 Rev: AI Assy Level: 3
 Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref Desg From	Ref Desg To
3760744 IC 74ALS08 2-INP POS-AND	2		1.0000	EA	1	1	R&D	0 3		L2	
3760746 IC 74ALS30 8-INP POS-NAND	2		1.0000	EA	1	1	R&D	0 3		L13	
3760747 IC 74ALS32 2-INP POS-OR	2		1.0000	EA	1	1	R&D	0 3		L1	
3760749 IC HEX D-TYPE F/F W/CLEAR	2		1.0000	EA	1	1	R&D	0 3		L11	
3760819 IC 74ALS174 HEX D FF	2		1.0000	EA	1	1	R&D	0 3		L17	
3760979 IC 74F51 DL AND-OR-INV 2W	2		1.0000	EA	1	1	R&D	0 1		L3	
3760998 IC 74ALS564 OCT D FF EDG	2		2.0000	EA	1	1	R&D	0 3		L23 L28	
3761060 IC 74F269 8 BIT BIN CNTR	2		1.0000	EA	1	1	R&D	0 3		L8	
3761135 IC 74ALS648 OCT BUS XCVR	2		1.0000	EA	1	1	R&D	0 3		L15	
3770575 IC 146818 REAL TIME CLOC	2		1.0000	EA	1	1	R&D	0 3		L5	
3777198R0 2200BUS I/O	2		1.0000	EA	1	5	59497	N		L10	
3777199R0 TIMER 5US	2		1.0000	EA	1	5	59497	N		L14	
3801014 810-216-75V-150MA-ANS	2		2.0000	EA	1	1	R&D	0 1		X	X
5109577 CS386 DAUGHTER	1		1.0000	EA	1	1	R&D	0 3		@0000001	

ECO NO 59710

SHT 5 OF 7

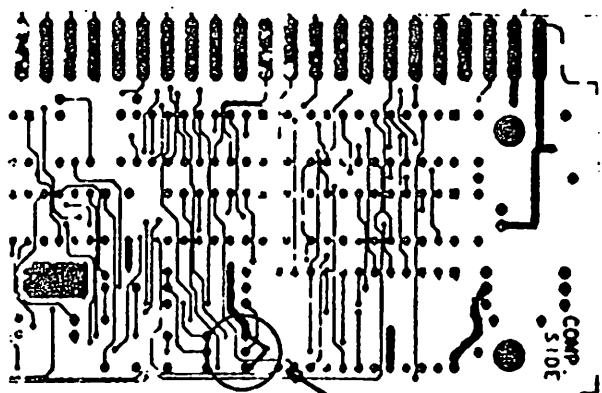


COMMENT OF WANG LABORATORIES, INC. IS PERMITTED BY
 ANY REASON THIS DRAWING IS PERMITTED BY
 WANG LABORATORIES, INC. TO BE MADE PUBLIC WITHOUT THE WRITTEN
 CONSENT OF WANG LABORATORIES, INC. IF FOR
 ANY REASON THIS DRAWING IS PERMITTED BY
 WANG LABORATORIES, INC. TO BE MADE PUBLIC WITHOUT THE WRITTEN
 CONSENT OF WANG LABORATORIES, INC.

NOTE: SHORT FOR NORMAL OPERATION
 FROM THE FUNCTIONAL TEST

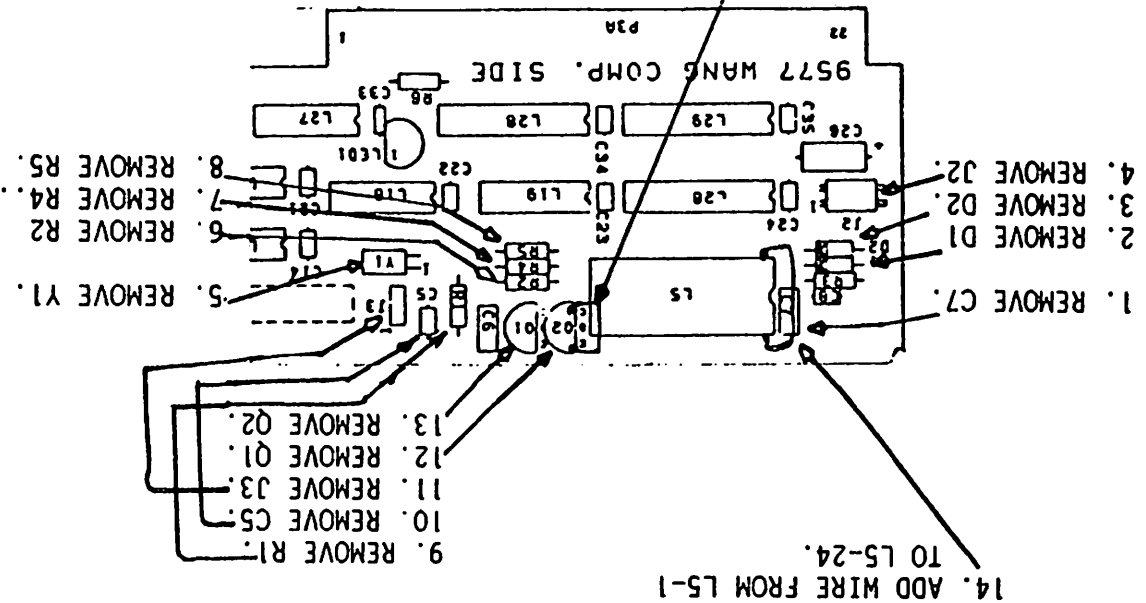
59710
 7 OF 7

PAGE 2
 ECO 59710
 210-9577A - R2



REFERENCE

15. ADD WIRE FROM Q2 COLLECTOR HOLE TO Q2 EMITTER HOLE.



751

WANG ECO

CONTROL NO 59811

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 3
DATE: 12/10/91

M/S: 014-690

EXT: 70524

DEPT:

ORIGINATOR: Michael Riley

PART(S) AFFECTED: 110-9576A

P/N DESCRIPTION: CS 386 Turbo CPU

MODEL(S) AFFECTED: CS Turbo CPU
DWG(S) AFFECTED: 210-9576A

DESCRIPTION OF CHANGE:

Change 110-9676A BOM as follows:
DELETE

378-9508R1	1 ea	L64
378-9509R1	1 ea	L50
378-9508R2	1 ea	L64
378-9509R2	1 ea	L50

EREV 1 to 2.

DEC 19 1991

REASON/SYMPOM FOR CHANGE:

To fix a power up Diag. problem.

DISPOSITION CODES:

1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock	WIP	Next Order
5	5	5	2	2	2	5

EFFECTIVITY DATE: 12/23/91

CONFORMANCE DATE: 1/6/92

REMARKS:

Pilot is the only location that has boards..

CURRENT BUILD SITE INFORMATION	PB	PKWD	ME	WPR
	IR	TAI	AU	MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON [Signature] 12/15/91

PROGRAM MGR. [Signature] 12/16/91

DESIGN ENG. Michael Riley

COMPLIANCE ENG. [Signature] 12/16/91

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST E. Dwyer 12/16/91

OTHER

EW NO 59811

SHT 2 OF 3

CHANGE DOCUMENT

ITEM STATUS	DWO # 004926	DWO: 004700	DWO: 008285	DWO: 00876d	DWO: 008537	FCO 59498	FCO 59811
	0	0	0	0	1	1	1
ITEMS							
CONFIGURATION REVISION	0	1	2	2	3	4	5
E-REV	0	1	1	1	1	1	2
SCHEMATIC	0	1	1	1	1	1	1
210 ASSEMBLY DRAWING	0	0	1	1	1	1	1
110 ASSEMBLY DRAWING	0	1	1	1	1	1	1
510 FAB DRAWING	0	1	1	1	1	1	1
ARTWORK LAYERS	0	1	1	1	1	1	1
DRILL/ROUTING DATA	0	1	1	1	1	1	1
MECHANICAL OUTLINE	0	0	0	0	0	0	0
REWORK INSTRUCTION	NO		NO	NO	NO	NO	NO
CORP. BOM EFFECT. DATE							

PCA
 CONFIGURATION
 DOCUMENT

PCA PART NUMBER
 210-9576 A

(WANG)
 LABORATORIES, INC.

Proj Ctl#:

Assy#: 1109576A Desc1: CS386 CPU TURBO 4 MEG Stat: 1 Rev: AE Assy Level: 2
 Desc2: Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

Component Item/ Description	Item Status	No-Wang Ind	Qty Per Assy	U M	Qty Type	Comp Type	ECO Number	CQVL Ind	Value Type	Ref From	Desg To
2099576 CS386 CPU TURBO	1		1.0000	EA	1	5	R&D	N		00000001	
3504506 CON SHUNT JUMPER ASSY 2P	2		3.0000	EA	1	1	R&D	0 3		P5	P7
3775335 PGA 80386 32BIT UPRSCR	2		1.0000	EA	1	1	R&D	0 1		L31	
3775336 PGA 82385 32BIT CACHE	2		1.0000	EA	1	1	R&D	0 3		L32	
3789508P1 R2 CS/386-II MICROCODE ODD	2		1.0000	EA	1	5	R&D	N		L64	
3789509P1 R2 CS/386-II MICROCODE EVEN	2		1.0000	EA	1	5	R&D	N		L50	

ECO NO 59811
 SMT 3 OF 3

ISI

WANG ECO

CONTROL NO 59812

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 3
DATE: 12/11/91

EXT: 70524

M/S: 014-690

ORIGINATOR: Michael Riley

DEPT:

PART(S) AFFECTED:
421-0181

P/N DESCRIPTION:

MODEL(S) AFFECTED:
CS Turbo 2236MXF Cable

DWG(S) AFFECTED:
8200-0152

DESCRIPTION OF CHANGE: Change BOM as follows: 421-0181
DELETE 350-4250 2ea Item 5
ADD 350-4336 2 ea Item 5

ADD to Note:

5. Put lockwasher (653-2007) next to Standoff(462-0548)

DISPOSITION CODES:

1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock WIP	Next Order
5	5	5	2	2	5

EFFECTIVITY DATE: 12-23-91

CONFORMANCE DATE: 1-6-92

REMARKS:

Pilot is the only location that has cables..

CURRENT BUILD SITE INFORMATION

PB	PKWD	ME	WPR
IR	X	TAI	MX

APPROVALS

SIGNATURE

DATE

ECO CHAIRPERSON

Michael Riley 12/11/91
PROGRAM MGR. *[Signature]* 12/16/91

DESIGN ENG. Michael Riley

COMPLIANCE ENG. *[Signature]* 12/17/91

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST *E. Dugreant* 12/16/91

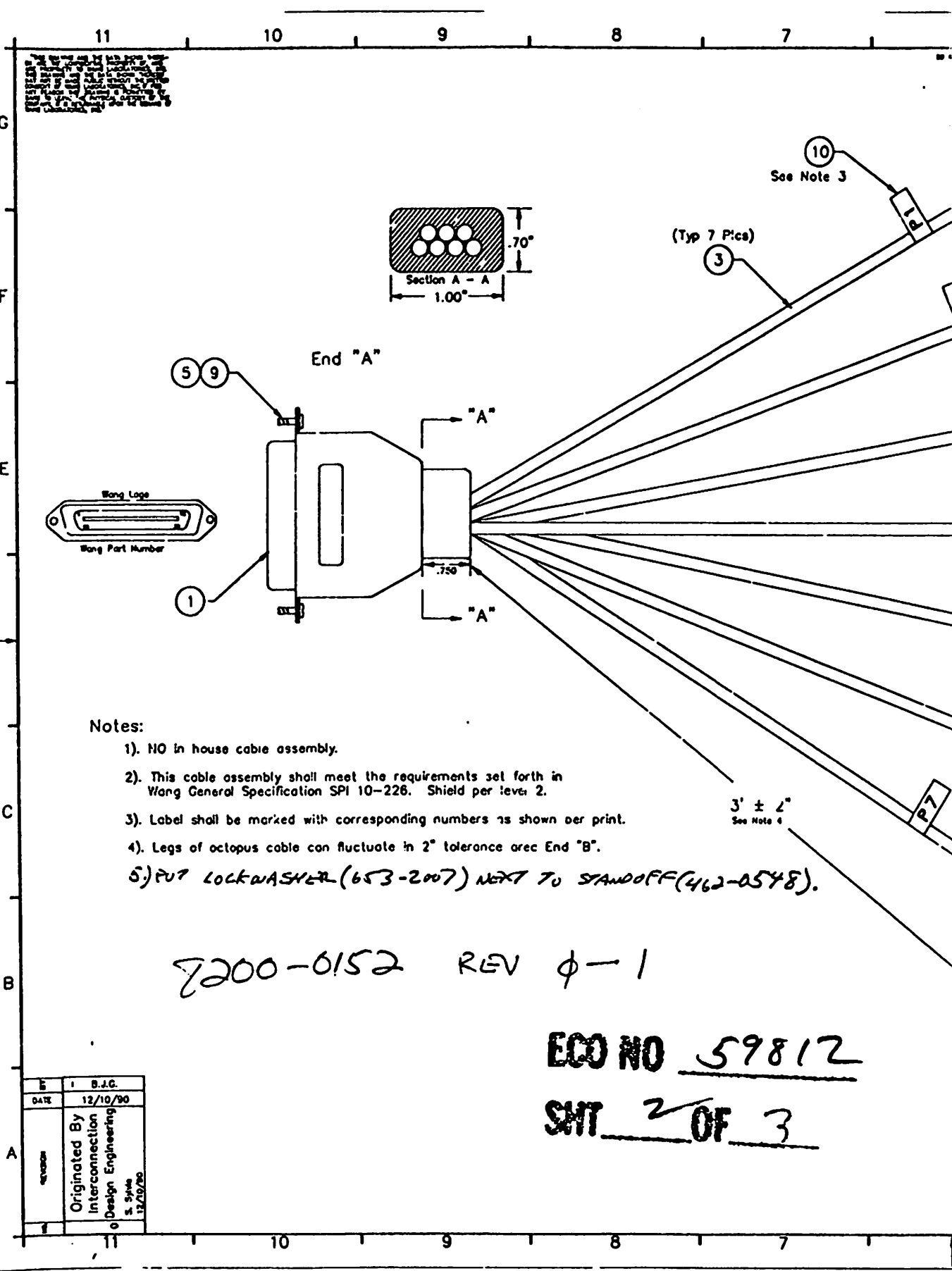
OTHER

DEC 18 1991

REASON/SYMP TOM FOR CHANGE:

To fix drawing problem with cable screws to short

27
 11
 11
 11
 8.5"
 11"
 17"
 22"



Notes:

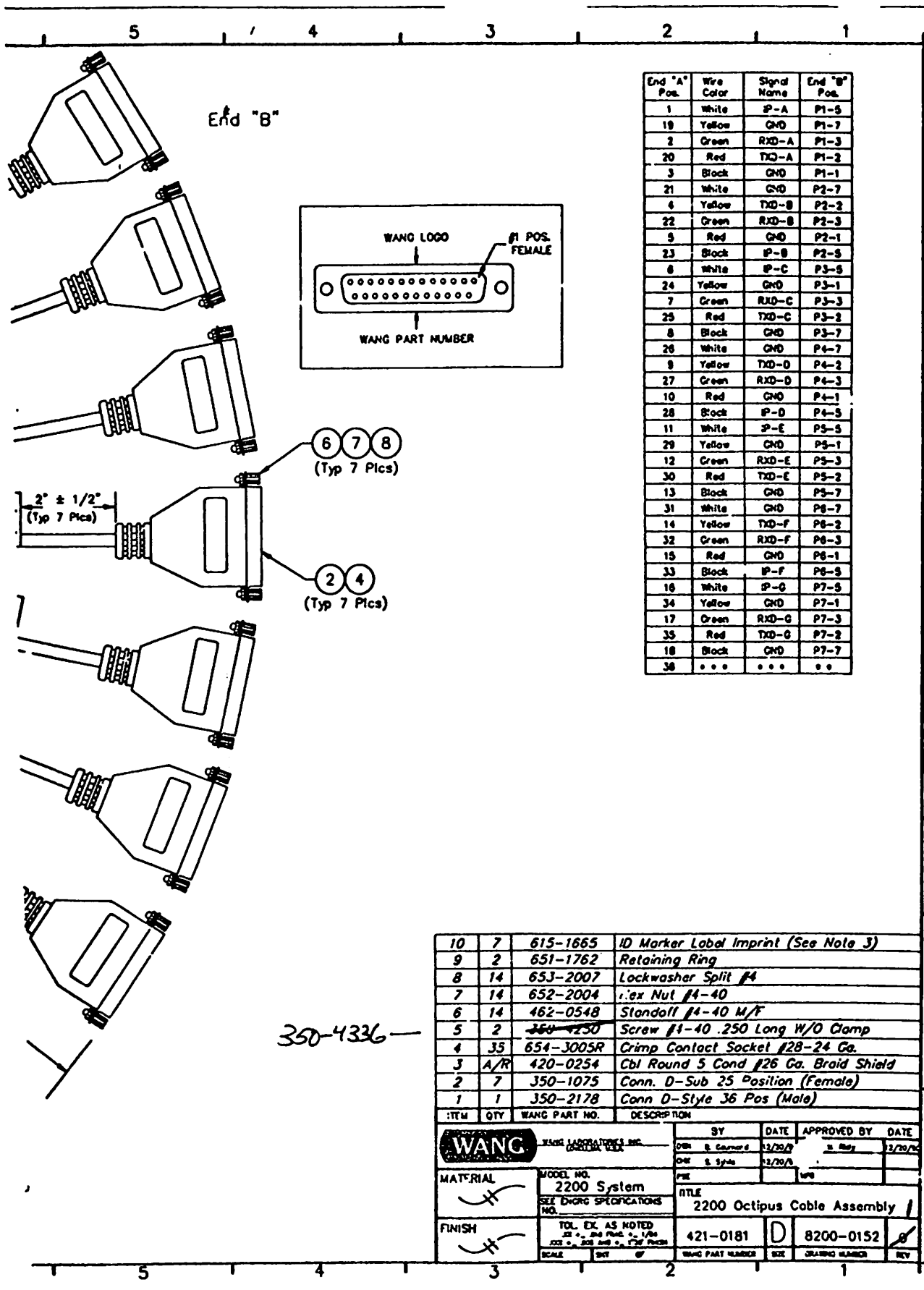
- 1). NO in house cable assembly.
- 2). This cable assembly shall meet the requirements set forth in Wang General Specification SPI 10-226. Shield per level 2.
- 3). Label shall be marked with corresponding numbers as shown per print.
- 4). Legs of octopus cable can fluctuate in 2" tolerance area End "B".
- 5). PUT LOCKWASHER (653-2007) NEXT TO STANDOFF (462-0548).

7200-0152 REV φ-1

ECO NO 59812

SHT 2 OF 3

REV	DATE	BY	D.C.
	12/10/90		
Originated By Interconnection Design Engineering S. Sykes 12/29/90			



End "A" Pos.	Wire Color	Signal Name	End "B" Pos.
1	White	P-A	P1-6
18	Yellow	GND	P1-7
2	Green	RXD-A	P1-3
20	Red	TXD-A	P1-2
3	Black	GND	P1-1
21	White	GND	P2-7
4	Yellow	TXD-B	P2-2
22	Green	RXD-B	P2-3
5	Red	GND	P2-1
23	Black	P-B	P2-5
6	White	P-C	P3-5
24	Yellow	GND	P3-1
7	Green	RXD-C	P3-3
25	Red	TXD-C	P3-2
8	Black	GND	P3-7
26	White	GND	P4-7
9	Yellow	TXD-D	P4-2
27	Green	RXD-D	P4-3
10	Red	GND	P4-1
28	Black	P-D	P4-5
11	White	P-E	P5-5
29	Yellow	GND	P5-1
12	Green	RXD-E	P5-3
30	Red	TXD-E	P5-2
13	Black	GND	P5-7
31	White	GND	P6-7
14	Yellow	TXD-F	P6-2
32	Green	RXD-F	P6-3
15	Red	GND	P6-1
33	Black	P-F	P6-5
16	White	P-G	P7-5
34	Yellow	GND	P7-1
17	Green	RXD-G	P7-3
35	Red	TXD-G	P7-2
18	Black	GND	P7-7
36

10	7	615-1665	ID Marker Label Imprint (See Note 3)
9	2	651-1762	Retaining Ring
8	14	653-2007	Lockwasher Split #4
7	14	652-2004	Hex Nut #4-40
6	14	462-0548	Standoff #4-40 M/F
5	2	350-2150	Screw #4-40 .250 Long W/O Clamp
4	35	654-3005R	Crimp Contact Socket #28-24 Ga.
3	A/R	420-0254	Cbl Round 5 Cond #26 Ga. Braid Shield
2	7	350-1075	Conn. D-Sub 25 Position (Female)
1	1	350-2178	Conn. D-Style 36 Pos (Male)

350-4336

ITEM	QTY	WANG PART NO.	DESCRIPTION																																				
<table border="1"> <tr> <td>WANG</td> <td>WANG LABORATORIES INC. CORPORATE TEL.</td> <td>SY</td> <td>DATE</td> <td>APPROVED BY</td> <td>DATE</td> </tr> <tr> <td>MATERIAL</td> <td>MODEL NO. 2200 System SEE DRAWING SPECIFICATIONS NO.</td> <td>DRN. B. Gorman</td> <td>3/29/68</td> <td>B. May</td> <td>3/29/68</td> </tr> <tr> <td>FINISH</td> <td>TOL. EX. AS NOTED 22 ± .004 PRACT. ± .004 200 ± .004 PRACT. ± .004</td> <td>DRN. S. Spahn</td> <td>3/29/68</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>REV</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>421-0181</td> <td>D</td> <td>8200-0152</td> <td></td> </tr> <tr> <td></td> <td></td> <td>SCALE</td> <td>REV</td> <td></td> <td></td> </tr> </table>				WANG	WANG LABORATORIES INC. CORPORATE TEL.	SY	DATE	APPROVED BY	DATE	MATERIAL	MODEL NO. 2200 System SEE DRAWING SPECIFICATIONS NO.	DRN. B. Gorman	3/29/68	B. May	3/29/68	FINISH	TOL. EX. AS NOTED 22 ± .004 PRACT. ± .004 200 ± .004 PRACT. ± .004	DRN. S. Spahn	3/29/68					REV						421-0181	D	8200-0152				SCALE	REV		
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		421-0181	D	8200-0152																																			
		SCALE	REV																																				
		421-0181	D	8200-0152																																			
		SCALE	REV																																				

22
 17
 11
 8.5
 11
 17
 22

ECO NO 59812
 SHIT 3 OF 3

ISI/ISI/ISI

WANG ECO

CONTROL NO 59817

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

ORIGINATOR: Michael Riley

DEPT: EXT:70524

M/S: 014-690

SHEET 1 OF 7
DATE: 12/11/91

PART(S) AFFECTED:
Per BELOW

P/N DESCRIPTION:

MODEL(S) AFFECTED:
MICROVP-TURBO TURBO UPG

DWG(S) AFFECTED: 455-0290
451-2781, 451-2782, 452-0830

DESCRIPTION OF CHANGE:

- On Drawings 451-2781, 452-0830, 455-0290
- 1. Change the material thickness To .19 From .20
- 2. Change material finish To Clear Cromate From Clear Anodize

JAN 23 1992

REASON/SYMPOM FOR CHANGE:

To fix Material Thickness and Finish problems.

DISPOSITION CODES:

- 1-Use As is
- 2-Rework
- 3-Scrap
- 4-Next Order
- 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock	WIP	Next Order
5	5	5	5	5	5	5

EFFECTIVITY DATE

CONFORMANCE DATE

N/A

2/10/92

REMARKS:

No existing rev 0 stock.

CURRENT BUILD SITE INFORMATION

PB	PKWD	ME	WPR
IR	X	TAI	MX

APPROVALS SIGNATURE

DATE

ECO CHAIRPERSON

Signature: Michael Riley 1/23/92

PROGRAM MGR.

Signature: Michael Riley 1/23/92

DESIGN ENG. Michael Ritey

COMPLIANCE ENG.

Signature: Michael Ritey 1/6/92

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST S. Jayaraman

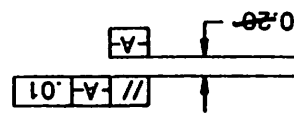
Signature: S. Jayaraman 12/15/91

OTHER

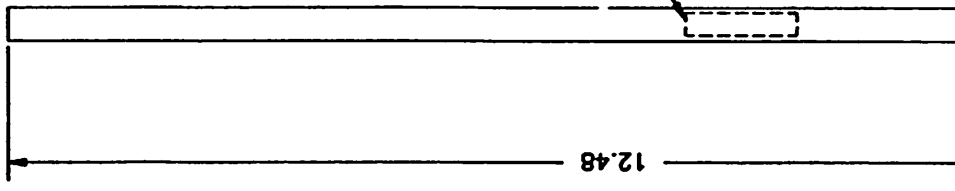
SCALE 1/1	DR 1	REV	452-0830	452-0830	452-0830	452-0830	452-0830
TOL. EX. AS NOTED	SEE ENG'G SPECIFICATIONS	CS/MVP	MODEL NO.	DATE	APPROVED BY	DATE	APPROVED BY
FINISH	MATERIAL	CS/MVP	WANG LABRATORIES, INC.	5-24-91	DMN K. C. YANG	5-24-91	DMN K. C. YANG
				5-24-91	DMN K. C. YANG	5-24-91	DMN K. C. YANG
				5-14-91	DMN K. C. YANG	5-14-91	DMN K. C. YANG

ECO NO 59817
SHT 2 OF 2

SCALE: 2/1
ETAL . B .
1.00 REF.
ADHESIVE WITH EASY
RELEASE LINER



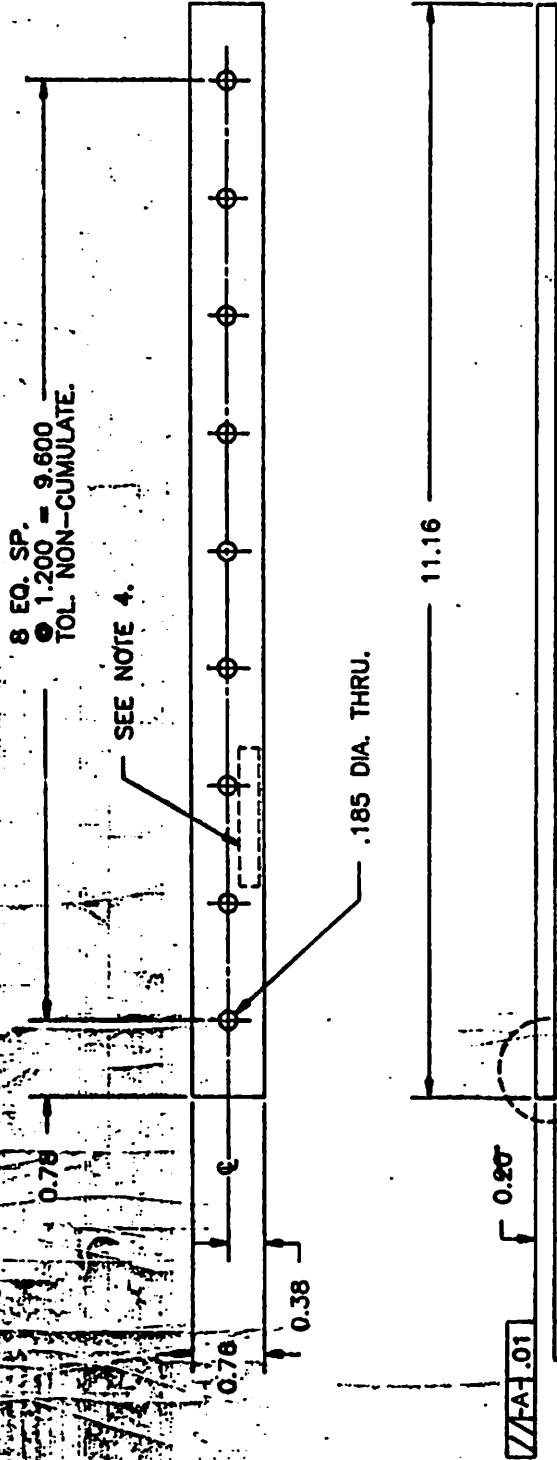
SEE NOTE 4.



- NOTES :
1. DEBURR AND BREAK ALL SHARP EDGES.
 2. MATL : AL 5052-H32.
 3. FINISH : CLEAR ANODIZE.
 4. MARK WANG PART NO, REV. AND VENDOR I. D. APPROX. WHERE SHOWN PER WANG SPEC. SP.10-527.

NOTES :

1. DEBURR AND BREAK ALL SHARP EDGES.
2. MAT'L : AL 5052-H32
3. FINISH : CLEAR ANODIZE.
4. MARK WANG PART NO., REV. AND VENDOR I. D. APPROX. WHERE SHOWN PER WANG SPEC SPI, 10-527.



SEE DETAIL "B"
(BOTH END.)

DETAIL : " B "
(SCALE : 2/1)

ECO NO 52817
SHT 2 OF 2

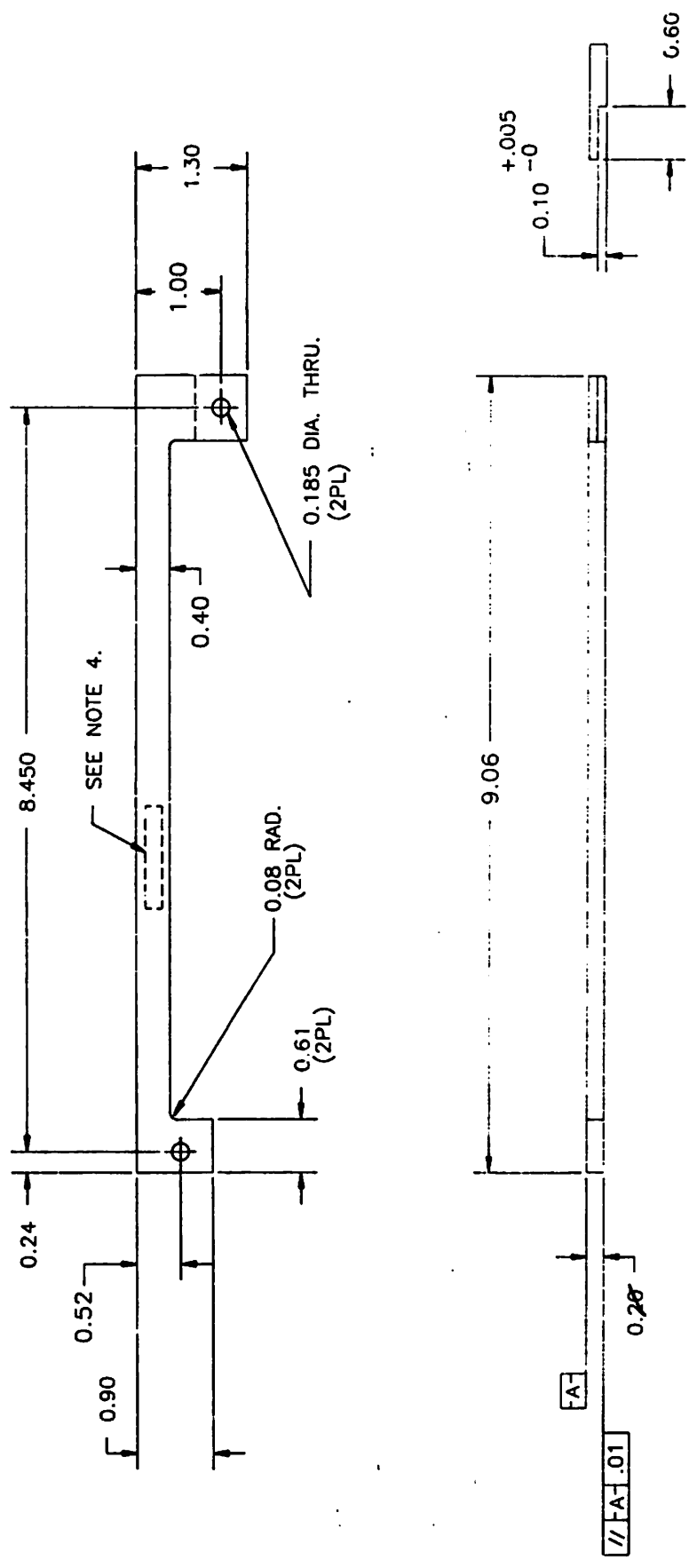
REV	DATE	REVISION
1	5-24-91	K. C. YANG
2	6-14-91	K. C. YANG

ITEM	QTY	WANG PART NO.	DESCRIPTION	BY	DATE	APPROVED BY	DATE
		WANG LABS. INC.		DOR K. C. YANG	5-24-91	DLEC	
		WANG LABS. INC.		CHK K. C. YANG	5-24-91	RECH K. C. YANG	5-14-91
		WANG LABS. INC.					
MODEL NO. CS/MVP				TITLE RAIL MOUNTING 1			
SEE ENGINE SPECIFICATIONS				WANG PART NUMBER 451-2782			
TOL. EX. AS NOTED				DRAWING NUMBER 451-2782			
SCALE 1/1				SITE			

1 2 3 4 5 6 7

This drawing and the data shown thereon are the confidential property of Wang Laboratories, Inc. and shall remain the confidential property of Wang Laboratories, Inc. and shall not be made public without the written consent of Wang Laboratories, Inc. If any and shall not be made public without the written consent of Wang Laboratories, Inc. If any and shall not be made public without the written consent of Wang Laboratories, Inc. If any and shall not be made public without the written consent of Wang Laboratories, Inc.

- NOTES :
1. DEBURR AND BREAK ALL SHARP EDGES.
 2. MAT'L : AL. 5052-H32
 3. FINISH : CLEAR ANODIZE.
 4. MARK WANG P/N & VENDOR I.D. AND REV. APPROX. WHERE SHOWN PER WANG SPEC. SPI. 10-527.



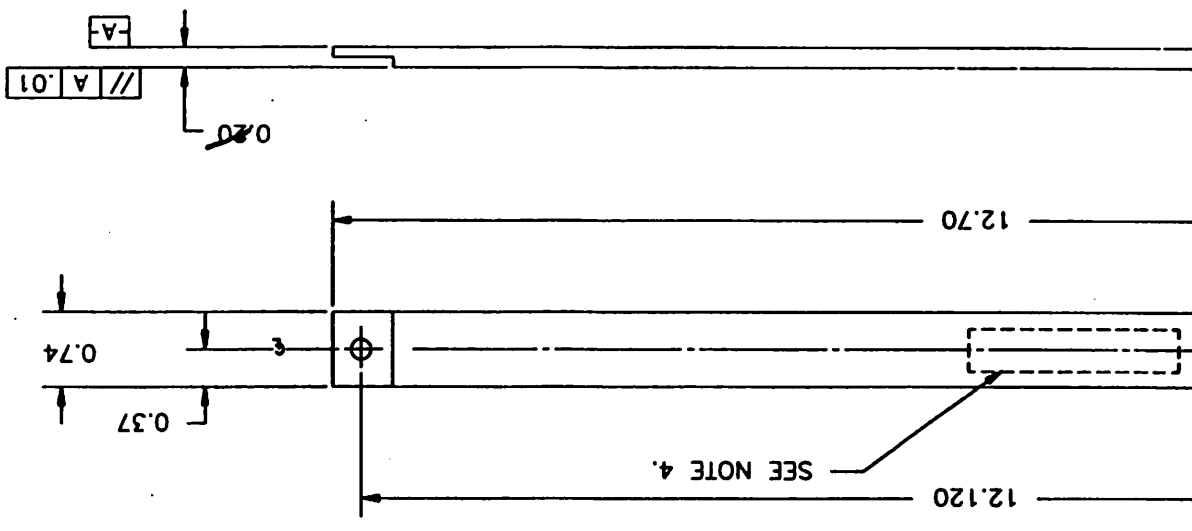
REV	DATE	DESCRIPTION
2	5-23-91	PER DWR M1135
1	6-14-91	RELEASE DRAWING

ECO NO 59817
 SHT 4 OF 7

ITEM	QTY	WANG PART NO.	DESCRIPTION	DATE	APPROVED BY
WANG			WANG LABORATORIES INC.	5-23-91	WANG
MATERIAL			CS/MVP	5-23-91	WANG
FINISH			SEE ENG. SPECIFICATIONS	5-23-91	WANG
TITLE			RAIL, TOP AND BOTTOM	5-23-91	WANG
SCALE			1/1	5-23-91	WANG
TOL. EX. AS NOTED				5-23-91	WANG
SEE ENGR. SPEC. FOR FINISH				5-23-91	WANG
SCALE 1/1				5-23-91	WANG
ECO NO			59817	5-23-91	WANG
SHEET NO			4	5-23-91	WANG
TOTAL SHEETS			7	5-23-91	WANG

ECO NO 59817
SHT 5 OF 7

ITEM	QTY	WANG PART NO.	DESCRIPTION
BY	DATE	APPROVED BY	DATE
OK K. C. YANG	5-23-91	ELEC	
OK K. C. YANG	5-24-91	MECH	K. C. YANG
6-14-91			
MODEL NO.	CS/MVP	SEE ENG'G SPECIFICATIONS	NO. 55-1001
TOL. EX. AS NOTED	FOR .0005 AND .0010	FOR .0005 AND .0010	
SCALE 1/1	DRW 1	OF 1	
WANG PART NUMBER	455-0290	SIZE	D
DRAWING NUMBER	455-0290	REV	0



- NOTES :
1. DEBURR AND BREAK ALL SHARP EDGES.
 2. MATL : AL 5052-H32
 3. FINISH : CLEAR ANODIZE.
 4. MARK WANG PART NO. REYAND VENDOR I.D. APPROX. WHERE SHOWN PER WANG SPEC. SPL. 10-527.

17
11
8.5
B
C
5.8
11
D
17
E
22

MANUFACTURING ECO IMPACT
TOTAL MANUFACTURING SUMMARY

ECO No. 59817

CLASS: I (II)

SHEET 6 OF 7

DESCRIPTION

REQUESTED EFFECTIVITY DATE

REQUESTED CONFORMANCE DATE

APPROVED EFFECTIVITY DATE

APPROVED CONFORMANCE DATE

N/A

2/10/92

DOLLAR SUMMARY:

SITE: 07 SITE: 13 SITE: 14 SITE: 15 SITE: 25 TOTAL

SAVINGS:

B.O.M. CHANGE SAVINGS (EXPENSE) +

ENG IMPLEMENT SAVINGS (EXPENSE) +

TOTAL SAVINGS (EXPENSE)

EXPENSE:

REWORK/SALVAGE - IN HOUSE

REWORK AT OUTSIDE VENDORS

SCRAP/OBSO COSTS

CANCELLATION CHARGES - VENDORS +

TOTAL (EXPENSE)

NET SAVINGS (EXPENSE)

MATERIAL CONFORMANCE:

ACTION CODES: REMARKS:

- 1 - USE AS IS
- 2 - REWK/SALVAGE
- 3 - SCRAP
- 4 - NEXT ORDER
- 5 - OBSOLETE
- 6 - REDISTRIBUTE
- 7 - OTHER (See (Remarks))

RAW MATERIAL

WIP

FINISHED GOODS

IN-TRANSIT

OUTSIDE VENDOR

DIST	FINAL ASSY	SUB ASSY	STK WHS

PREPARED BY:

N I I I



ENGINEERING CHANGE ORDER CUSTOMER ENGINEERING IMPACT SHEET

ECO NO. 59817
SHEET 7 OF 7

<input type="checkbox"/> ALL UNITS <input type="checkbox"/> PROB ONLY <input checked="" type="checkbox"/> INFO	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> FCO REQUIRED <input type="checkbox"/> IMMED <input type="checkbox"/> NEXT CALL	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> IS A MUB REQUIRED FOR FSC REWORK	<input type="checkbox"/>

IMPACT COMMENTS

	DOMESTIC	INTER-NATIONAL
EST. UNIT POP		
EST. SPARE POP		
TOTAL		

EST. COST IMPACT	APPROVALS	DATE
MATERIAL		
LABOR	<i>D. Murphy</i>	1-14-92
TOTAL	<i>[Signature]</i>	
IMPLEMENTATION PERIOD	<i>[Signature]</i>	1/14/92
ANNUAL COST	OTHER	

GENERAL COMMENTS

752 1/5

WANG ECO

CONTROL NO 59909

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 5
DATE: 01/22/92

M/S: 015-690

DEPT: 008 EXT: 70524

ORIGINATOR: Michael Riley

DISPOSITION CODES:
 1-Use As is 2-Rework
 3-Scrap 4-Next Order 5-See Remarks

Cust. Field	Field	Fin.	Stock	WIP	Next
Units	Spare	Ret.	Goods		Order
1	1	1	1	2	2

EFFECTIVITY DATE: 1/30/92
 CONFORMANCE DATE: 1/31/92

REMARKS:

CURRENT BUILD SITE INFORMATION	PB	PKWD	ME	WPR
	IR	TAI	AU	MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON *Michael Riley* 1/25/92

PROGRAM MGR. *Michael Riley* 1/27/92

DESIGN ENG. Michael Riley

COMPLIANCE ENG. *Michael Riley* 1/27/92

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST *P. Bayne* 1/24/92

OTHER

PART(S) AFFECTED: 110-9578 & 110-9583	P/N DESCRIPTION:
MODEL(S) AFFECTED: CS Turbo	DWG(S) AFFECTED: 110-9578 & 110-9583

DESCRIPTION OF CHANGE:
Change 110-9578 BOM as follows:

- DELETE 654-1192 5 ea TP1, TP2, TP3, TP4, TP5
- ADD 654-1191 5 ea TP1, TP2, TP3, TP4, TP5

Change 110-9583 BOM as follows:

- DELETE 654-1192 5 ea TP1, TP2, TP3, TP4, TP5
- ADD 654-1191 5 ea TP1, TP2, TP3, TP4, TP5

FEB 06 1992

REASON/SYMPOM FOR CHANGE:

To change Test Points for Customer Engineering

ECU NO 59909

SHT 2 OF 5

CHANGE DOCUMENT

	DWO # 04269	DWO # 010270	DWO: 008286	DWO: 010081	ECU 59830	ECU 69909		
ITEM STATUS	Ø	Ø	Ø	1	2	2		
ITEMS								
CONFIGURATION REVISION	Ø	1	2	3	1	4		
E-REV	Ø	1	1	1	2	1		
SCHEMATIC	Ø	1	1	2	2	2		
210 ASSEMBLY DRAWING		Ø	1	1	1	1		
110 ASSEMBLY DRAWING		1	1	2	2	2		
510 FAB DRAWING	Ø	1	1	1	2	1		
ARTWORK LAYERS	Ø	1	1	1	1	1		
DRILL/ROUTING DATA	Ø	1	1	1	1	1		
MECHANICAL OUTLINE	Ø	Ø	Ø	Ø	Ø	Ø		
REWORK INSTRUCTION	N		NO	Y	N	N		
CORP. BOM EFFECT. DATE						1/30/92		

PCA CONFIGURATION DOCUMENT

PCA PART NUMBER

210-9578

(WANG)

LABORATORIES, INC.

ECO NO 59909

SHT 3 OF 5

CHANGE DOCUMENT

ITEM STATUS	DWO: 8332	DWO: 008794	DWO: 008719	ECO 59644 All Pending	ECO 59692	ECO 59644 Restricted Release	ECO 59909
CONFIGURATION REVISION	0	1	2	3	4	5	6
E-REV	-	0	0	0	0	0	0
SCHEMATIC	A	0	0	0	0	0	0
210 ASSEMBLY DRAWING	NA	-	NA	NA	NA	2	2
110 ASSEMBLY DRAWING	A	0	0	1	0*	1	1
510 FAB DRAWING	A	0	0	0*	0*	1	1
ARTWORK LAYERS	A	0	0	0*	0*	1	1
DRILL/ROUTING DATA	A	0	0	0*	0*	1	1
MECHANICAL OUTLINE	A	0	0	0	0*	1	1
REWORK INSTRUCTION	A	0	0	0	0*	1	1
CORP. BOM EFFECT. DATE			NO	YES		NO	NO

PCA CONFIGURATION DOCUMENT

FOR PART NUMBER 210-9513



LABORATORIES, INC.

Franklin Rd. Turbo

MANUFACTURING ECO IMPACT
TOTAL MANUFACTURING SUMMARY

ECO No. 59909
CLASS: I ①
SHEET 4 OF 5

DESCRIPTION

REQUESTED CONFORMANCE DATE

APPROVED CONFORMANCE DATE

REQUESTED EFFECTIVITY DATE

APPROVED EFFECTIVITY DATE

DOLLAR SUMMARY: SITE: 07 SITE: 13 SITE: _____ SITE: _____ TOTAL

SAVINGS:									
B.O.M. CHANGE SAVINGS (EXPENSE)									
ENG IMPLEMENT SAVINGS (EXPENSE)	+								
TOTAL SAVINGS (EXPENSE)									
EXPENSE:									
REWORK/SALVAGE - IN HOUSE									
REWORK AT OUTSIDE VENDORS	+								
SCRAP/OBSO COSTS	+								
CANCELLATION CHARGES - VENDORS	+								
TOTAL (EXPENSE)									
NET SAVINGS (EXPENSE)									

MATERIAL CONFORMANCE:

ACTION CODES:

REMARKS:

	DIST	FINAL ASSY	SUB ASSY	STK WHS	
RAW MATERIAL					1 - USE AS IS
WIP					2 - REWK/SALVAGE
FINISHED GOODS					3 - SCRAP
IN-TRANSIT					4 - NEXT ORDER
OUTSIDE VENDOR					5 - OBSOLETE
					6 - REDISTRIBUTE
					(See Remarks)
					7 - OTHER (See Remarks)

Handwritten signature/initials



ENGINEERING CHANGE ORDER CUSTOMER ENGINEERING IMPACT SHEET

ECO NO. 59909
SHEET 2 OF 5

<input type="checkbox"/> ALL UNITS <input type="checkbox"/> PROB ONLY <input checked="" type="checkbox"/> INFO	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> FC0 REQUIRED <input type="checkbox"/> IMMED <input type="checkbox"/> NEXT CALL	<input type="checkbox"/>
<input type="checkbox"/> IS A MUB REQUIRED FOR FSC REWORK	<input type="checkbox"/>

IMPACT COMMENTS

	DOMESTIC	INTER-NATIONAL
EST. UNIT POP		
EST. SPARE POP		
TOTAL		

EST. COST IMPACT	APPROVALS	DATE
MATERIAL		
LABOR	<i>P. Murphy</i>	1/25/92
TOTAL		
IMPLEMENTATION PERIOD		
ANNUAL COST	<i>P. Murphy</i>	1/29/92

GENERAL COMMENTS

ISI

WANG ECO

CONTROL NO 59910

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 5
DATE: 01/22/92

ORIGINATOR: Michael Riley DEPT: 008 EXT: 70524 M/S: 015-690

PART(S) AFFECTED: 210-9580A & 210-9581	P/N DESCRIPTION:	
MODEL(S) AFFECTED: CS Turbo	DWG(S) AFFECTED: 210-9580A & 210-9581	

DESCRIPTION OF CHANGE:
Change 210-9580A BOM as follows:

DELETE	QTY.	REF.	DES.
461-3140	2 ea	@0000005,	@0000006
650-9529	2 ea	@0000005,	@0000006

Change 210-9581 BOM as follows:

DELETE	461-3140	2 ea	@0000014,	@0000015
ADD	650-9529	2 ea	@0000014,	@0000015

CHANGE 210-9580A, AND 210-9581 ASSEMBLY DRAWINGS PER ATTACHED.

REASON/SYMPOM FOR CHANGE:
To change Thumb Screws for Customer Engineering

FFR 06 1997

DISPOSITION CODES:

1-Use As Is	2-Rework	3-Scrap	4-Next Order	5-See Remarks
Cust. Units	Field Spare	Field Ret.	Field Goods	Stock WIP
1	1	1	1	2

EFFECTIVITY DATE: 1-29-92
CONFORMANCE DATE: 2-3-92

REMARKS:

CURRENT BUILD SITE INFORMATION	PB	PKWD	ME	WPR
	IR	TAI	AU	MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON: [Signature] 1/27/92
PROGRAM MGR.: [Signature] 1/27/92

DESIGN ENG. Michael Riley

COMPLIANCE ENG. Michael Riley 1/27/92

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST P. Raymond 1/24/92

OTHER

ECD NO 59910

EFF 2 OF 5

CHANGE DOCUMENT

	DWO#04271	DWO 018267	DWO:010189	DWO:010083	ECD 59910				
ITEM STATUS	∅	∅	∅	1	7				
ITEMS									
CONFIGURATION REVISION	∅	1	2	3	4				
E-REV	∅	1	1	1	1				
SCHEMATIC	∅	1	1	1	1				
210 ASSEMBLY DRAWING	∅	1	1	1	2				
110 ASSEMBLY DRAWING	∅	1	1	1	1				
510 FAB DRAWING	∅	1	1	1	1				
ARTWORK LAYERS	∅	1	1	1	1				
DRILL/ROUTING DATA	∅	1	1	1	1				
MECHANICAL OUTLINE	1	1	0	0	0				
REWORK INSTRUCTION	N	N	N	N	N				1/25/80
CORP. BOM EFFECT DATE									

PCA CONFIGURATION DOCUMENT

PCA PART NUMBER

210 9580-A



LABORATORIES, INC.

ITEM MASTER DESCRIPTION MXF 16-CH TERMINAL INTERFACE DAUGHTER. BD.

EPO NO 59910
 SHT 3 OF 5

CHANGE DOCUMENT

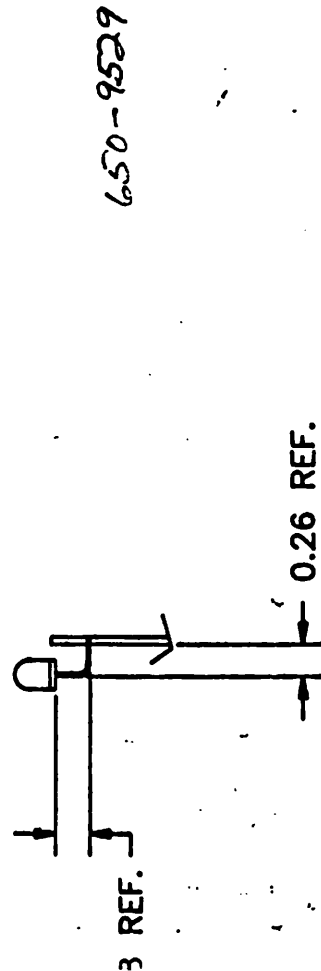
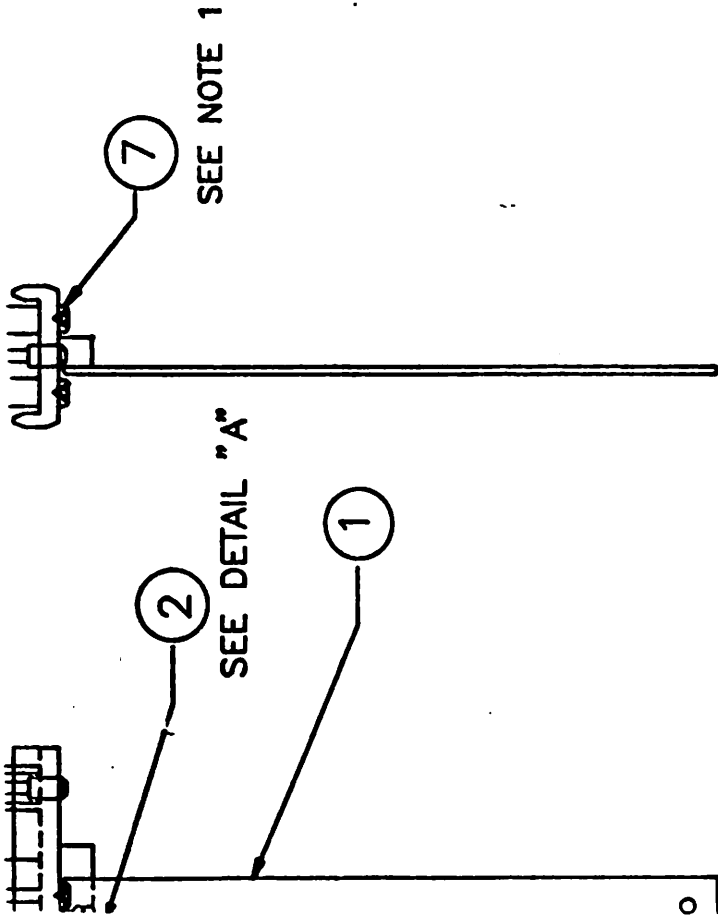
	DWO BR3486	DWO B1A268	DWO: 010998	DWO: 010084	EPO 59645	EPO 59910				
ITEM STATUS	X	X	X	Z	T	T				
ITEMS										
CONFIGURATION REVISION	0	1	2	3	4	5				
E-REV	-	0	0	0	1	1				
SCHEMATIC	A	X	X	1	0	0				
210 ASSEMBLY DRAWING	A	X	1	1	1	2				
110 ASSEMBLY DRAWING	A	X	0	0	0	0				
510 FAB DRAWING	A	X	0	0	0	0				
ARTWORK LAYERS	A	X	0	0	0	0				
DRILL/ROUTING DATA	A	X	0	0	0	0				
MECHANICAL OUTLINE										
REWORK INSTRUCTION										
CORP. BOM EFFECT. DATE					YES	NO	15/9/11	1/29/81		

PCA
 CONFIGURATION
 DOCUMENT

(WANG)
 LABORATORIES, INC.

386 Disk SLAVE

PCA PART NUMBER
 210-9581



DETAIL "A"

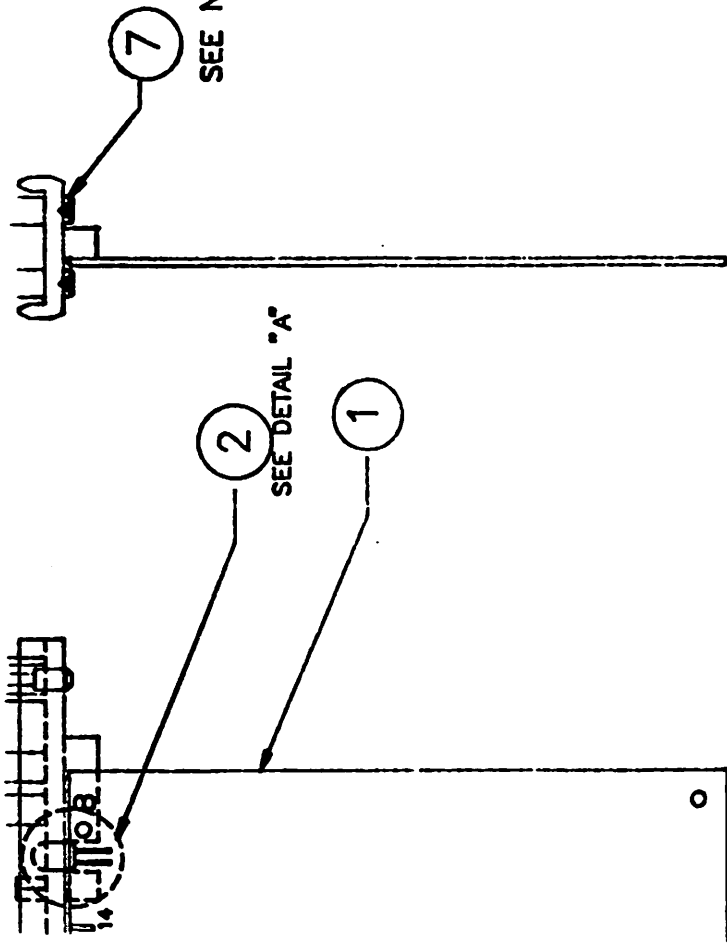
ECO NO 59910

SHT 4 OF 5

ITEM	QTY	WANG PART NO.	DESCRIPTION
10	1	615-4684	LABEL, FACE PLATE
9	6	462-0291	STANDOFF, M/F
8	3	350-2096	CONNECTOR, 36 PIN
7	4	651-0030	SCREW, SELF-THRD.
6	2	449-0247	HANDLE, FACE PLATE
5	2	461-3140	SCREW, CAP.
4	2	461-3141	HOUSING, THRD.
3	1	452-2870	FACE PLATE, MACHINING
2	1	370-0075	LED.
1	1	110-9581A	9581 PCA

BY	DATE	APPROVED BY	DATE
DR K. C. YANG	11-8-66	ELC	
CHK K. C. YANG	12-5-66	WEN K. C. YANG	12-5-66
PIC		WFS	

TITLE	WANG PART NUMBER	SIZE	DRAWING NUMBER	REV
ASSY DRAWING	210-9581A	D	210-9581A	1



650-9529

ECD NO 59910

SHT 5 OF 5

ITEM	QTY	VANG PART NO.	DESCRIPTION
12	1	615-4683	LABEL, FACE PLATE
11	4	462-0291	STANDOFF, M/F
10	2	350-2096	CONNECTOR, 36 PIN
9	4	462-0211	STANDOFF, M/F
8	2	350-1051	CONNECTOR, 25 PIN
7	4	651-0030	SCREW, SELF-THREADING, PAN HEAD
6	2	449-0247	HANDLE, FACE PLATE
5	2	461-3140	SCREW, CAP.
4	2	461-3141	HOUSING, THRD.
3	1	452-2871	FACE PLATE, MACHINING
2	1	370-0075	LED
1	1	110-9580A	386 TERMINAL SLAVE

BY	DATE	APPROVED BY	DATE
SHR K. C. YANG	11-8-80	OLE	
ONE K. C. YANG	12-3-80	MON K. C. YANG	12-3-80

TITLE	ASSY DRAWING	2
210-9580A	D	210-9580A
VANG PART NUMBER	SIZE	ISSUES NUMBER

WANG ECO

CONTROL NO 59911

PRIORITY 1
PHASE-IN 2 X
DOCUMENTATION 3

SHEET 1 OF 3
DATE: 01/22/92

ORIGINATOR: Michael Riley DEPT: 008 EXT: 70524 M/S: 015-690

P/N DESCRIPTION:

PART(S) AFFECTED:
110-9579A

MODEL(S) AFFECTED:
CS Turbo

DWG(S) AFFECTED:
110-9579A

DESCRIPTION OF CHANGE:

Change 110-9579A BOM as Follows:
DELETE

378-9510R2	1 ea	L14
378-9511R2	1 ea	L7
378-9510R3	1 ea	L14
378-9511R3	1 ea	L7

Change EREV from 2 to 3.

FEB 06 1997

REASON/SYMPOM FOR CHANGE:

To correct DTR problem

DISPOSITION CODES:

1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field	Field	Fin. Goods	Stock	WIP	Next Order
1	2	2	2	2	2	2

EFFECTIVITY DATE 1-30-92 CONFORMANCE DATE 2-3-92

REMARKS:

CURRENT BUILD SITE INFORMATION	PB	PKWD	ME	WPR
	IR	X	TAI	AU
				MX

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON *[Signature]* 1/29/92

PROGRAM MGR. *[Signature]* 1/27/92

DESIGN ENG. Michael Riley

COMPLIANCE ENG. *[Signature]* 1/27/92

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST *[Signature]* 1/24/92

OTHER

ECO NO 59911

SHT 2 OF 3

CHANGE DOCUMENT

DWO # 04278	DWO # 21366	DWO # 21889	DWO: 010189	DWO: 010082	EC059143	EC05911
ITEM STATUS	Ø	Ø	Ø	1	1	1
ITEMS						
CONFIGURATION REVISION	Ø	1	3	4	5	6
E-REV	Ø	1	1	1	2	3
SCHEMATIC	Ø	1	1	1	1	1
210 ASSEMBLY DRAWING				NA	NA	NA
110 ASSEMBLY DRAWING		1	2	2	2	2
510 FAB DRAWING	Ø	1	2	2	2	2
ARTWORK LAYERS	Ø	1	1	1	1	1
DRILL/ROUTING DATA	Ø	1	1	1	1	1
MECHANICAL OUTLINE	Ø	1	0	0	0	0
REWORK INSTRUCTION	N	N	NO	NO	YES	NO
CORP. BOM EFFECT. DATE					11/6/91	1-30-92

PCA
CONFIGURATION
DOCUMENT

PCA PART NUMBER
210-9579A

H1 - SPEED CHANNEL 1/0 CTRL. MOTHER BD

ITEM MASTER DESCRIPTION H1 - SPEED

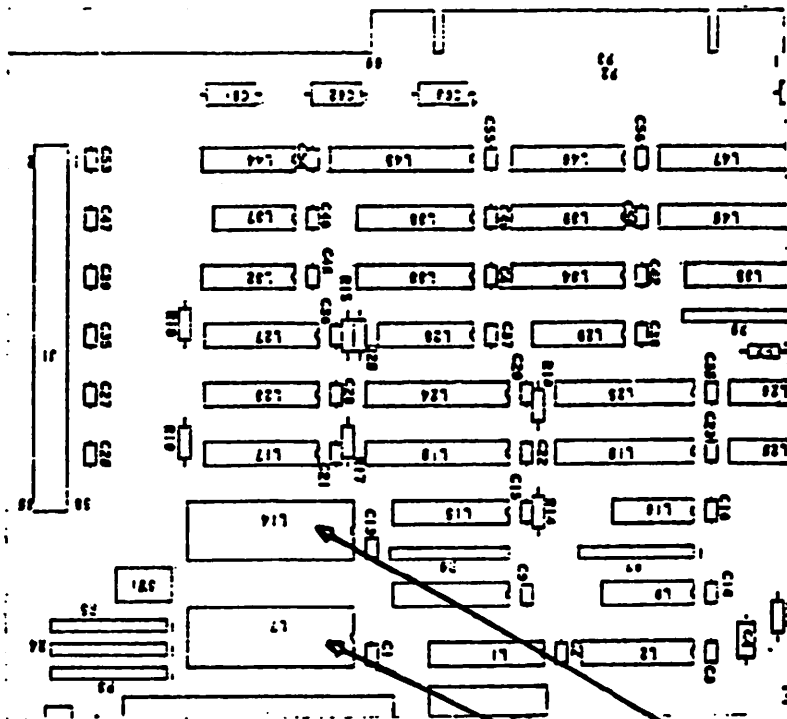
PAGE -- OF --

11-96669

PAGE 2
ECO 59911
210-9579A - R1

ECO NO 59911

SHT 3 OF 3



1. REMOVE L14, REPLACE WITH 378-9510R3.
2. REMOVE L7, REPLACE WITH 378-9511R3.



DCO

DCO NO.

57024

SHEET 1 OF 9

ORIGINATOR MIKE RILEY EXT. 70524 DATE 05/07/90

WRITTEN BY TODD MARSHALL EXT. 72287 DATE 05/07/90

PART NO. _____

DWG NO. N/A

MODEL NO. MANY

CLASS I (II) III

DESCRIPTION CS Uprev ECO

PEP # _____

Dept. No. _____

DESCRIPTION OF CHANGE

Change BOM's 200-5160-AE, 200-5160-AU, 200-5160-AZ, 200-5160-BF, 200-5160-FI, 200-5160-FL, 200-5160-GE, 200-5160-IC, 200-5160-IT, 200-5160-NL, 200-5160-NO, 200-5160-PO, 200-5160-SP, 200-5160-SW as follows:

WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete 289-1900-EU	CS/386-CK-EU	EA	1	1	1
Add: 289-1900-EU-A	CS/386-CK-EU	EA	1	1	1

Change BOM 200-5160-AS as follows:

WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete 289-1900-AS	CS/386-CK-AS	EA	1	1	1
Add: 289-1900-AS-A	CS/386-CK-AS	EA	1	1	1

MAY 16 1990

REASON/SYMPOM FOR CHANGE

To uprev country kits to latest revision of software.

SMS 6/8/90

W. H. H. 5/14/90

DOCUMENTS

DOCUMENTS	FROM	REVISIONS TO
HISTORY SHIT. 510		
HISTORY SHIT. 210		
ARTWORK		
E-REV.		
ASSY DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH DWG.		
CBL DWG.		
SPI		
SPECIFICATION		

CONFORMING AREA	Q	RMFG	DST	FINAL ASSY AREA	SCB ASSY AREA	NEXT ORDER	INFO ONLY

CONFORMANCE DATE 6-15-90

APPROVALS

ECO CHAIRPERSON	DATE
<i>Paul Daniel 5/16</i>	
DES. ENGRG	
CUST. ENGRG	
MFG	
MIO	
IP&M	<i>5/18/90</i>
FCC	<i>5/16/90</i>
PROD. SAFETY	
SECURE SYS.	
ORIGINATOR	<i>5/8/90</i>
OTHER	<i>5/7/90</i>



**ENGINEERING CHANGE ORDER
CONTINUATION SHEET**

DOCUMENT TITLE:
CS Uprev

THIS ECO SHT. WHEN ATTACHED TO DOCUMENT OF
PREVIOUS REV CONSTITUTES THE LATEST DOC.

DOCUMENT NO.

ECO NO.

OLD REV

SHT

NEW REV

OF

57024

2

9

DESCRIPTION OF CHANGE:

Change BOM 200-5160-DA as follows:

	<u>WLI No.</u>	<u>DESCRIPTION</u>	<u>UM</u>	<u>COMP</u>	<u>QTY</u>	<u>TYPE</u>	<u>QTY</u>	<u>TYPE</u>
Delete	289-1900-DA	CS/386-CK-DA	EA	1	1	EA	1	1
Add:	289-1900-DA-A	CS/386-CK-DA	EA	1	1	EA	1	1

Change BOM 200-5160-HK as follows:

	<u>WLI No.</u>	<u>DESCRIPTION</u>	<u>UM</u>	<u>COMP</u>	<u>QTY</u>	<u>TYPE</u>	<u>QTY</u>	<u>TYPE</u>
Delete	289-1900-HK	CS/386-CK-HK	EA	1	1	EA	1	1
Add:	289-1900-HK-A	CS/386-CK-HK	EA	1	1	EA	1	1

Change BOM's 200-5160-SL, 200-5160-TU, 200-5160-UV as follows:

	<u>WLI No.</u>	<u>DESCRIPTION</u>	<u>UM</u>	<u>COMP</u>	<u>QTY</u>	<u>TYPE</u>	<u>QTY</u>	<u>TYPE</u>
Delete	289-1900-UV	CS/386-CK-UV	EA	1	1	EA	1	1
Add:	289-1900-UV-A	CS/386-CK-UV	EA	1	1	EA	1	1

Change BOM's 200-5160-SF, 200-5160-SG, 200-5160-SI as follows:

	<u>WLI No.</u>	<u>DESCRIPTION</u>	<u>UM</u>	<u>COMP</u>	<u>QTY</u>	<u>TYPE</u>	<u>QTY</u>	<u>TYPE</u>
Delete	289-1900-SF	CS/386-CK-SF	EA	1	1	EA	1	1
Add:	289-1900-SF-A	CS/386-CK-SF	EA	1	1	EA	1	1

Change BOM 200-5160-UK as follows:

	<u>WLI No.</u>	<u>DESCRIPTION</u>	<u>UM</u>	<u>COMP</u>	<u>QTY</u>	<u>TYPE</u>	<u>QTY</u>	<u>TYPE</u>
Delete	289-1900-UK	CS/386-CK-UK	EA	1	1	EA	1	1
Add:	289-1900-UK-A	CS/386-CK-UK	EA	1	1	EA	1	1



**ENGINEERING CHANGE ORDER
CONTINUATION SHEET**

DOCUMENT NO.	OLD REV	NEW REV
ECO NO. 57024	SHT 3	OF 9

THIS ECO SHT, WHEN ATTACHED TO DOCUMENT OF
PREVIOUS REV CONSTITUTES THE LATEST DOC.

DOCUMENT TITLE:
CS Uprev

DESCRIPTION OF CHANGE:

Change BOM's 200-5160-AG, 200-5160-CA, 200-5160-CF, 200-5160-US as follows:

	WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete	289-1900-US	CS/386-CK-US	EA	1	1	1
Add:	289-1900-US-A	CS/386-CK-US	EA	1	1	1

Change BOM's 200-5119-AE, 200-5119-AU, 200-5119-BF, 200-5119-FI, 200-5119-FL, 200-5119-GE, 200-5119-IC, 200-5119-IT, 200-5119-NL, 200-5119-NO, 200-5119-PO, 200-5119-SP, 200-5119-SW as follows:

	WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete	289-1707-EU	CS-N-CK-EU	EA	1	1	1
Add:	289-1707-EU-A	CS-N-CK-EU	EA	1	1	1

Change BOM 200-5119-AS as follows:

	WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete	289-1707-AS	CS-N-CK-AS	EA	1	1	1
Add:	289-1707-AS-A	CS-N-CK-AS	EA	1	1	1

Change BOM 200-5119-DA as follows:

	WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete	289-1707-DA	CS-N-CK-DA	EA	1	1	1
Add:	289-1707-DA-A	CS-N-CK-DA	EA	1	1	1

Change BOM 200-5119-HK as follows:

	WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete	289-1707-HK	CS-N-CK-HK	EA	1	1	1
Add:	289-1707-HK-A	CS-N-CK-HK	EA	1	1	1



**ENGINEERING CHANGE ORDER
CONTINUATION SHEET**

DOCUMENT NO.	OLD REV	NEW REV
ECO NO. 57024	SHT 4	OF 9

THIS ECO SHT, WHEN ATTACHED TO DOCUMENT OF PREVIOUS REV CONSTITUTES THE LATEST DOC.

DOCUMENT TITLE:
CS Uprev

DESCRIPTION OF CHANGE:

Change BOM's 200-5119-SL, 200-5119-TU, 200-5119-UV as follows:

WLI No.	DESCRIPTION	UM	COMP	QTY	QTY	TYPE	TYPE
Delete	289-1707-UV	EA	1	1	1	1	1
Add:	289-1707-UV-A	EA	1	1	1	1	1

Change BOM's 200-5119-SF, 200-5119-SG, 200-5119-SI as follows:

WLI No.	DESCRIPTION	UM	COMP	QTY	QTY	TYPE	TYPE
Delete	289-1707-SF	EA	1	1	1	1	1
Add:	289-1707-SF-A	EA	1	1	1	1	1

Change BOM 200-5119-UK as follows:

WLI No.	DESCRIPTION	UM	COMP	QTY	QTY	TYPE	TYPE
Delete	289-1707-UK	EA	1	1	1	1	1
Add:	289-1707-UK-A	EA	1	1	1	1	1

Change BOM's 200-5119-AG, 200-5119-CA, 200-5119-CF, 200-5119-US as follows:

WLI No.	DESCRIPTION	UM	COMP	QTY	QTY	TYPE	TYPE
Delete	289-1707-US	EA	1	1	1	1	1
Add:	289-1707-US-A	EA	1	1	1	1	1

Change BOM's 200-5120-AE, 200-5120-AU, 200-5120-AZ, 200-5120-BF, 200-5120-FI, 200-5120-FL, 200-5120-GE, 200-5120-IC, 200-5120-IT, 200-5120-NL, 200-5120-NO, 200-5120-PO, 200-5120-SP, 200-5120-SW as follows:

WLI No.	DESCRIPTION	UM	COMP	QTY	QTY	TYPE	TYPE
Delete	289-1708-EU	EA	1	1	1	1	1
Add:	289-1708-EU-A	EA	1	1	1	1	1



**ENGINEERING CHANGE ORDER
CONTINUATION SHEET**

DOCUMENT TITLE:
CS Uprev

THIS ECO SHIT, WHEN ATTACHED TO DOCUMENT OF
PREVIOUS REV CONSTITUTES THE LATEST DOC.

DESCRIPTION OF CHANGE:

Change BOM 200-5120-AS as follows:

WLI No.	DESCRIPTION	UM	COMP	QTY
289-1708-AS	CS-D-CK-AS	EA	1	1
289-1708-AS-A	CS-D-CK-AS	EA	1	1

Change BOM 200-5120-DA as follows:

WLI No.	DESCRIPTION	UM	COMP	QTY
289-1708-DA	CS-D-CK-DA	EA	1	1
289-1708-DA-A	CS-D-CK-DA	EA	1	1

Change BOM 200-5120-HK as follows:

WLI No.	DESCRIPTION	UM	COMP	QTY
289-1708-HK	CS-D-CK-HK	EA	1	1
289-1708-HK-A	CS-D-CK-HK	EA	1	1

Change BOM's 200-5120-SL, 200-5120-TU, 200-5120-UV as follows:

WLI No.	DESCRIPTION	UM	COMP	QTY
289-1708-UV	CS-D-CK-UV	EA	1	1
289-1708-UV-A	CS-D-CK-UV	EA	1	1

Change BOM's 200-5120-SF, 200-5120-SG, 200-5120-SI as follows:

WLI No.	DESCRIPTION	UM	COMP	QTY
289-1708-SF	CS-D-CK-SF	EA	1	1
289-1708-SF-A	CS-D-CK-SF	EA	1	1

DOCUMENT NO.	OLD REV	NEW REV
ECO NO. 57024	SHIT 5	OF 9



ENGINEERING CHANGE ORDER
CONTINUATION SHEET

DOCUMENT TITLE:
CS Uprev

THIS ECO SHIT, WHEN ATTACHED TO DOCUMENT OF
PREVIOUS REV CONSTITUTES THE LATEST DOC.

DESCRIPTION OF CHANGE:

Change BOM 200-5120-UK as follows:

WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete 289-1708-UK	CS-D-CK-UK	EA	1	1	1
Add: 289-1708-UK-A	CS-D-CK-UK	EA	1	1	1

Change BOM's 200-5120-AG, 200-5120-CA, 200-5120-CF, 200-5120-US as follows:

WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete 289-1708-US	CS-D-CK-US	EA	1	1	1
Add: 289-1708-US-A	CS-D-CK-US	EA	1	1	1

Change BOM's 205-6048, 205-6049, 205-6050, 205-6051, 206-6048, 206-6049, 206-6050, 206-6051 as follows:

WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete 291-0808	A.E. 2200/CS OPER SYS	EA	1	1	1
Add: 291-0808-A	A.E. 2200/CS OPER SYS	EA	1	1	1

Change BOM's 205-5065, 205-5066, 205-5067, 205-5068, 205-5069, 205-5070, 205-5071, 205-5072, 206-5065, 206-5066, 206-5067, 206-5068, 206-5069, 206-5070, 206-5071, 206-5072 as follows:

WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete 291-0724-A	A.E. CS MEMORY UPGRADE	EA	1	1	1
Add: 291-0724-B	A.E. CS MEMORY UPGRADE	EA	1	1	1

Change BOM's 167-3512, 187-3512 as follows:

WLI No.	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete 291-0631-E	A.E. 2200 DATA STORAGE	EA	1	1	1
Add: 291-0631-F	A.E. 2200 DATA STORAGE	EA	1	1	1

DOCUMENT NO. 57024

BCO NO. 57024

OLD REV 6

NEW REV 9



**ENGINEERING CHANGE ORDER
CONTINUATION SHEET**

DOCUMENT TITLE:
CS Uprev

THIS ECO SHIT, WHEN ATTACHED TO DOCUMENT OF
PREVIOUS REV CONSTITUTES THE LATEST DOC.

DESCRIPTION OF CHANGE:

Change Item Master description as follows:

<u>WLI No.</u>	<u>DESCRIPTION</u>	<u>ITEM STATUS</u>
289-1900-AS	Line 2 From: COUNTRY KIT To: RPL 289-1900-AS-A	2 3
289-1900-DA	Line 2 From: COUNTRY KIT To: RPL 289-1900-DA-A	2 3
289-1900-EU	Line 2 From: COUNTRY KIT To: RPL 289-1900-EU-A	2 3
289-1900-HK	Line 2 From: COUNTRY KIT To: RPL 289-1900-HK-A	2 3
289-1900-SF	Line 2 From: COUNTRY KIT To: RPL 289-1900-SF-A	2 3
289-1900-UK	Line 2 From: COUNTRY KIT To: RPL 289-1900-UK-A	2 3
289-1900-US	Line 2 From: COUNTRY KIT To: RPL 289-1900-US-A	2 3
289-1900-JV	Line 2 From: COUNTRY KIT To: RPL 289-1900-JV-A	2 3
289-1707-AS	Line 2 From: COUNTRY KIT To: RPL 289-1707-AS-A	2 3
289-1707-DA	Line 2 From: COUNTRY KIT To: RPL 289-1707-DA-A	2 3

DOCUMENT NO. **57024**

OLD REV **7** NEW REV **9**

ECO NO. **57024**



**ENGINEERING CHANGE ORDER
CONTINUATION SHEET**

DOCUMENT TITLE:
CS Uprev

THIS ECO SHEET, WHEN ATTACHED TO DOCUMENT OF
PREVIOUS REV CONSTITUTES THE LATEST DOC.

DOCUMENT NO. 57024

OLD REV 8

NEW REV 9

DESCRIPTION OF CHANGE:

Change Item Master description as follows:

WLI No.	Line	DESCRIPTION	From:	To:	ITEM STATUS
289-1707-EU	Line 2	COUNTRY KIT RPL 289-1707-EU-A			2 3
289-1707-HK	Line 2	COUNTRY KIT RPL 289-1707-HK-A			2 3
289-1707-SF	Line 2	COUNTRY KIT RPL 289-1707-SF-A			2 3
289-1707-UK	Line 2	COUNTRY KIT RPL 289-1707-UK-A			2 3
289-1707-US	Line 2	COUNTRY KIT RPL 289-1707-US-A			2 3
289-1707-UV	Line 2	COUNTRY KIT RPL 289-1707-UV-A			2 3
289-1708-AS	Line 2	COUNTRY KIT RPL 289-1708-AS-A			2 3
289-1708-DA	Line 2	COUNTRY KIT RPL 289-1708-DA-A			2 3
289-1708-EU	Line 2	COUNTRY KIT RPL 289-1708-EU-A			2 3
289-1708-HK	Line 2	COUNTRY KIT RPL 289-1708-HK-A			2 3



**ENGINEERING CHANGE ORDER
CONTINUATION SHEET**

DOCUMENT TITLE:
CS Uprev

THIS ECO SHEET, WHEN ATTACHED TO DOCUMENT OF
PREVIOUS REV CONSTITUTES THE LATEST DQC.

DESCRIPTION OF CHANGE:

Change Item Master description as follows:

<u>WLI No.</u>	<u>DESCRIPTION</u>	<u>ITEM STATUS</u>
289-1708-SF	Line 2 From: COUNTRY KIT To: RPL 289-1708-SF-A	2 3
289-1708-UK	Line 2 From: COUNTRY KIT To: RPL 289-1708-UK-A	2 3
289-1708-US	Line 2 From: COUNTRY KIT To: RPL 289-1708-US-A	2 3
289-1708-UV	Line 2 From: COUNTRY KIT To: RPL 289-1708-UV-A	2 3
291-0621-C	Line 2 From: To: RPL 291-0621-D	2 3
291-0755	Line 2 From: To: RPL 291-0755-A	2 3
291-0631-E	Line 2 From: To: RPL 291-0631-F	2 3
291-0724-A	Line 2 From: To: RPL 291-0724-B	2 3

Change the Item Status of the following Part Numbers from 1 to 2:

289-1900-AS-A, 289-1900-DA-A, 289-1900-EU-A, 289-1900-HK-A, 289-1900-SF-A, 289-1900-UK-A,
289-1900-US-A, 289-1900-UV-A, 289-1707-AS-A, 289-1707-DA-A, 289-1707-EU-A, 289-1707-HK-A,
289-1707-SF-A, 289-1707-UK-A, 289-1707-US-A, 289-1707-UV-A, 289-1708-AS-A, 289-1708-DA-A,
289-1708-EU-A, 289-1708-HK-A, 289-1708-SF-A, 289-1708-UK-A, 289-1708-US-A, 289-1708-UV-A,
291-0621-D, 291-0631-F, 291-0755-A, 291-0724-B

DOCUMENT NO. **57024**

ECO NO. **9**

OLD REV **9** NEW REV **9**

03/23/90-(01)

A.E. 2200/CS386 OPER SYS

Manufacturing Part Number - 291-0808

PACKING LIST

The following items are included in this package:

Quantity	Part number	Description
1	284-0153-9	2200 CS/386 DISK PACKAGE
1	700-3231-G	2200 PROGRAMMING IN BASIC
1	700-4080-E	MJ BASIC-2 REFERENCE
1	700-4080-E0-1	CS MULTIUSER BASIC-2 LANG
1	700-4080-E0-2	REF MNL CS MULTIUSER
1	700-6855-A	BASIC-2 UTILITIES REF
1	700-6855-A0-1	BASIC-2 UTILITIES
1	700-6855-A0-2	CS BASIC-2 UTILITIES
1	700-6855-A0-3	REF MNL CS BASIC-2 UTIL
1	700-8098-A	ASYNCHRONOUS COMM
1	715-0739	2436 INTER TERM USER MAN
1	715-1213	CS INTRODUCTORY MANUAL
1	715-2364-01	U/G CS-D
1	715-2787	CSRN MULTIUSER BASIC-2/

VS OFFICE

Pittsburgh

Tuesday

11/12/91

08:31 am

To: Dale C. Johnson
From: Steve L. Welfle
Subject: CS/386 TURBO-RSVP

MS019-A8C/LWLL
Security: General
Date Received: 11/04/91

Dale,

I have one person trained on the CS/386 turbo in Pittsburgh-Ralph Pincek. He also has all of the documentation. Ralph communicates with Mike Bahia on a regular basis. I also have other people trained on 2200 but not updated on the CS. Ralph can assist if necessary.

----- Original Memo -----

To: Steve L. Welfle
Subject: CS/386 TURBO-RSVP

From: Dale C. Johnson
Date Sent: 11/01/91

RTM's: With the CS/386 Support Plan and the TSB as reference plus the training received in May (understanding May was a long time ago in terms of training info retention) we need to know the following:

Do you have enough information to install and service the CS/386 when it is rolled out (November-December timeframe) with no further training?

The thought process is that since the CS/386 is a board upgrade to a 2200 and we do have 2200 family expertise in the field we should be able to handle the CS/386 with the documentation provided. Understand that there will be good documentation with the hardware.

Please get back to me by 11/8/91 (Friday).

Dale Johnson

To: Dale C. Johnson
From: Steve L. Welfle
Subject: CS/386 TURBO-RSVP

MS019-A8C/LWLL
Security: General
Date Received: 11/04/91

Dale,

I have one person trained on the CS/386 turbo in Pittsburgh-Ralph Pincek. He also has all of the documentation. Ralph communicates with Mike Bahia on a regular basis. I also have other people trained on 2200 but not updated on the CS. Ralph can assist if necessary.

----- Original Memo -----

To: Steve L. Welfle
Subject: CS/386 TURBO-RSVP

From: Dale C. Johnson
Date Sent: 11/01/91

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The thought process is that since the CS/386 is a board upgrade to a 2200 and we do have 2200 family expertise in the field we should be able to handle the CS/386 with the documentation provided. Understand that there will be good documentation with the hardware.

Please get back to me by 11/8/91 (Friday).

Dale Johnson

VS OFFICE *Federal*

Tuesday 11/12/91 08:30 am

To: Dale C. Johnson
From: Jim Wilson
Subject: CS/386 TURBO-RSVP

MS019-A8C/LWLL
Security: Limited
Date Received: 11/04/91

Federal can handle the upgrade provided the documentation is good and that R&D will help us if we run into trouble

jim

----- Original Memo -----

To: Jim Wilson
Subject: CS/386 TURBO-RSVP

From: Dale C. Johnson
Date Sent: 11/01/91

RTM's: With the CS/386 Support Plan and the TSB as reference plus the training received in May (understanding May was a long time ago in terms of training info retention) we need to know the following:

Do you have enough information to install and service the CS/386 when it is rolled out (November-December timeframe) with no further training?

The thought process is that since the CS/386 is a board upgrade to a 2200 and we do have 2200 family expertise in the field we should be able to handle the CS/386 with the documentation provided. Understand that there will be good documentation with the hardware.

Please get back to me by 11/8/91 (Friday).

Dale Johnson

VS OFFICE

Tuesday 11/12/91 08:29 am

To: Dale C. Johnson
From: Jason Monas
Subject: CS/386 TURBO-RSVP

MS019-A8C/LWLL
Security: Limited
Date Received: 11/05/91

Dale,

Regarding your question to Pat Mabey about whether we felt the CS/386 training was sufficient for Canada.

Yes, it was sufficient.

Regards, Jason Monas

c.c. Pat Mabey

Canada

To: Dale C. Johnson
From: Rocco Tricroce
Subject: CS/386 TURBO-RSVP

MS019-A8C/LWLL
Security: Limited
Date Received: 11/05/91

Dale Johnson:

Per your request regarding the CS/386 TURBO, The responses from the Central Region Branch Manager is as follows.

1. The BMs would need Documentation to support the product.
2. As far as Training, they feel that if the right Documentation is given out they will be able to handle the product and training would not be needed at this time.
3. If any type of training would be needed perhaps a Training VIDEO.
4. Insure that the right parts on in the field along with the needed Documentation.

If there are any other questions please contact me.
Rocco Tricroce

----- Original Memo -----

To: Rocco Tricroce
Subject: CS/386 TURBO-RSVP

From: Dale C. Johnson
Date Sent: 11/01/91

RTM's: With the CS/386 Support Plan and the TSB as reference plus the training received in May (understanding May was a long time ago in terms of training info retention) we need to know the following:

Do you have enough information to install and service the CS/386 when it is rolled out (November-December timeframe) with no further training?

The thought process is that since the CS/386 is a board upgrade to a 2200 and we do have 2200 family expertise in the field we should be able to handle the CS/386 with the documentation provided. Understand that there will be good documentation with the hardware.

Please get back to me by 11/8/91 (Friday).

Dale Johnson

To: Dale C. Johnson
From: Steve Taveau
Subject: CS/386 TURBO-RSVP

MS019-A8C/LWLL
Security: General
Date Received: 11/07/91

DALE, WE SHOULD HAVE THE EXPERTISE, GIVEN GOOD DOCUMENTATION.

THANKS, STEVE

----- Original Memo -----

To: Steve Taveau
Subject: CS/386 TURBO-RSVP

From: Dale C. Johnson
Date Sent: 11/01/91

RTM's: With the CS/386 Support Plan and the TSB as reference plus the training received in May (understanding May was a long time ago in terms of training info retention) we need to know the following:

Do you have enough information to install and service the CS/386 when it is rolled out (November-December timeframe) with no further training?

The thought process is that since the CS/386 is a board upgrade to a 2200 and we do have 2200 family expertise in the field we should be able to handle the CS/386 with the documentation provided. Understand that there will be good documentation with the hardware.

Please get back to me by 11/8/91 (Friday).

Dale Johnson

Johnson
To: Dale C. Johnson
From: Mary Patterson
Subject: CS/386 TURBO-RSVP

MS019-ABC/LWLL
Security: General
Date Received: 11/07/91

Dale, should be ok with just the doc provided it is detailed.

mary

----- Original Memo -----

To: Mary Patterson
Subject: CS/386 TURBO-RSVP

From: Dale C. Johnson
Date Sent: 11/01/91

RTM's: With the CS/386 Support Plan and the TSB as reference plus the training received in May (understanding May was a long time ago in terms of training info retention) we need to know the following:

Do you have enough information to install and service the CS/386 when it is rolled out (November-December timeframe) with no further training?

The thought process is that since the CS/386 is a board upgrade to a 2200 and we do have 2200 family expertise in the field we should be able to handle the CS/386 with the documentation provided. Understand that there will be good documentation with the hardware.

Please get back to me by 11/8/91 (Friday).

Dale Johnson

To: Dale C. Johnson
From: Al Capua
Subject: CS/386 TURBO-RSVP

MS019-A8C/LWLL
Security: Confidential
Date Received: 11/01/91

Dale, 2200 expertise is there now but, I think a video and documentation should be released to the field prior to volume ship. This would alleviate any training issues that may come up in the future.

----- Original Memo -----

To: Al Capua
Subject: CS/386 TURBO-RSVP

From: Dale C. Johnson
Date Sent: 11/01/91

RTM's: With the CS/386 Support Plan and the TSB as reference plus the training received in May (understanding May was a long time ago in terms of training info retention) we need to know the following:

Do you have enough information to install and service the CS/386 when it is rolled out (November-December timeframe) with no further training?

The thought process is that since the CS/386 is a board upgrade to a 2200 and we do have 2200 family expertise in the field we should be able to handle the CS/386 with the documentation provided. Understand that there will be good documentation with the hardware.

Please get back to me by 11/8/91 (Friday).

Dale Johnson

VS OFFICE *Northwest*

Tuesday 11/12/91 08:30 am

To: Dale C. Johnson
From: John Bender
Subject: CS386 Turbo

(V) MS019-A8C/LWLL
Security: General
Date Received: 11/04/91

My answer for our readiness and or ability was meant to include the Steve Smith's part of the Northwest Region as well...jb

To: Dale C. Johnson MS019-A8C/LWLL
 From: John Bender (V) Security: General
 Subject: CS/386 TURBO-RSVP Date Received: 11/01/91

Dale, I feel we will be okay. Push comes to shove, being an old 2200 guy, I can support em...jb

----- Original Memo -----

To: John Bender (V) From: Dale C. Johnson
 Subject: CS/386 TURBO-RSVP Date Sent: 11/01/91

RTM's: With the CS/386 Support Plan and the TSB as reference plus the training received in May (understanding May was a long time ago in terms of training info retention) we need to know the following:

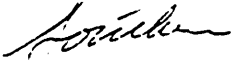
Do you have enough information to install and service the CS/386 when it is rolled out (November-December timeframe) with no further training?

The thought process is that since the CS/386 is a board upgrade to a 2200 and we do have 2200 family expertise in the field we should be able to handle the CS/386 with the documentation provided. Understand that there will be good documentation with the hardware.

Please get back to me by 11/8/91 (Friday).

Dale Johnson

VS OFFICE



Tuesday 11/12/91 08:32 am

To: Dale C. Johnson
From: Frank Chatigny
Subject: CS/386 TURBO-RSVP

MS019-A8C/LWLL
Security: Limited
Date Received: 11/01/91

Dale, the concensus is that we can. We have a substantial base of 2200s and an adequate number of trained and experienced CEs.

fdc

----- Original Memo -----

To: Frank Chatigny
Subject: CS/386 TURBO-RSVP

From: Dale C. Johnson
Date Sent: 11/01/91

RTM's: With the CS/386 Support Plan and the TSB as reference plus the training received in May (understanding May was a long time ago in terms of training info retention) we need to know the following:

Do you have enough information to install and service the CS/386 when it is rolled out (November-December timeframe) with no further training?

The thought process is that since the CS/386 is a board upgrade to a 2200 and we do have 2200 family expertise in the field we should be able to handle the CS/386 with the documentation provided. Understand that there will be good documentation with the hardware.

Please get back to me by 11/8/91 (Friday).

Dale Johnson

VS OFFICE

Loeber

Tuesday 11/12/91 08:29 am

To: Dale C. Johnson
From: Randy Hicks
Subject: CS/386 TURBO-RSVP

MS019-A8C/LWLL
Security: Limited
Date Received: 11/05/91

Dale:

I have polled my branch managers and all but one of six feel that with *GOOD* documentation, training will not be required. As usual though, there is always the exception. I would probably need one class slot if an "exception" class is held.

Please feel free to contact me should you have questions on this.

Regards,

Randy

P.S.: re: KURTA tablet. I have asked Bill Melvin to follow up with you on this as I am on the road visiting customers and doing reviews the rest of the week. THANKS for your help. -R.

----- Original Memo -----

To: Randy Hicks
Subject: CS/386 TURBO-RSVP

From: Dale C. Johnson
Date Sent: 11/01/91

RTM's: With the CS/386 Support Plan and the TSB as reference plus the training received in May (understanding May was a long time ago in terms of training info retention) we need to know the following:

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The thought process is that since the CS/386 is a board upgrade to a 2200 and we do have 2200 family expertise in the field we should be able to handle the CS/386 with the documentation provided. Understand that there will be good documentation with the hardware.

Please get back to me by 11/8/91 (Friday).

Dale Johnson

VS OFFICE *[Signature]* (179) Tuesday 11/12/91 08:31 am

To: Dale C. Johnson MS019-A8C/LWLL
From: Dave Smith Security: Limited
Subject: CS/386 TURBO-RSVP Date Received: 11/04/91

NO ADDITIONAL TRAINING APPEARS TO BE NECESSARY

----- Original Memo -----
To: Dave Smith From: Dale C. Johnson
Subject: CS/386 TURBO-RSVP Date Sent: 11/01/91

RTM's: With the CS/386 Support Plan and the TSB as reference plus the training received in May (understanding May was a long time ago in terms of training info retention) we need to know the following:

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Please get back to me by 11/8/91 (Friday).

Dale Johnson

WANG TEST SITE AGREEMENT



USER Name and Address:

JGB ENTERPRISES INC
115 METROPOLITAN DRIVE
LIVERPOOL, NEW YORK 13088

Date 11/14/91

Test Period _____

Test Product:

8 MB TURBO CPU, 22C11-HS,
2236MXF, 2 OCTOPUS CABLES

USER Contacts:

- (1) JAY BERNHART
- (2) _____
- (3) _____

This Agreement sets forth the terms and conditions under which USER will assist Wang Laboratories, Inc. ("WANG") in testing and evaluating the Test Product as follows:

1. USER will have a non-transferable right to use the Test Product, including any related computer programs and documentation ("Software"), experimentally during the Test Period at no charge. The Test Period will begin when the Test Product is installed at USER's premises and will continue for the period specified above unless terminated in accordance with paragraph 8 or extended by mutual agreement of the parties. At the conclusion of the Test Period, USER agrees to surrender the Test Product and all copies of the Software to WANG unless USER has entered into a separate agreement with WANG to purchase or lease the Test Product.
2. USER agrees to assist WANG in testing and evaluating the Test Product for WANG's benefit by fully implementing all of the applications and features supplied and by maintaining for WANG a written record of USER's evaluation, including the defects and deficiencies discovered by USER during the Test Period. USER's evaluation may be used in the development of this or other WANG products so all submissions regarding the Test Product will become the property of WANG.
3. USER agrees, for the purpose of evaluating the Test Product, to permit WANG representatives access to the Test Product during normal business hours and to permit WANG representatives to meet during normal business hours with the USER Contacts identified above who will perform the testing and evaluation.
4. No title to or ownership of the Test Product or any Software is transferred hereby. WANG retains the right during the Test Period to modify, revise or remove the Test Product and any Software furnished to USER hereunder from USER's premises.

5. USER acknowledges that WANG may file applications for patents relating to the Test Product. USER agrees during the Test Period to keep the Test Product and any Software in confidence and not to permit any third parties to examine, inspect, copy or use the Test Product or any Software without the prior written consent of WANG. USER may make up to two (2) copies of any Software for back-up purposes if WANG's copyright and proprietary legend are reproduced on each copy.

6. USER acknowledges that the Test Product is still under development and that it may contain defects, errors and omissions. USER agrees that it will not rely upon the Test Product for business applications during the Test Period and that USER is solely responsible for the protection and back-up of any USER data and software used in conjunction with the Test Product. USER understands that the Test Product may never be released as a product by WANG.

7. WANG MAKES NO REPRESENTATIONS OR WARRANTIES REGARDING THE TEST PRODUCT, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES AS TO MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL WANG BE LIABLE FOR ANY DAMAGES, INCLUDING INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, THE PERFORMANCE, OR THE USE OF THE TEST PRODUCT.

8. USER may terminate the Test Period and the license granted hereunder at any time upon ten (10) days written notice and the surrender of the Test Product and all copies of Software to WANG. WANG may terminate the Test Period and the license granted hereunder immediately in the event that: (i) USER fails to perform any of its obligations hereunder; (ii) WANG elects to suspend development of the Test Product; or, (iii) USER attempts to assign this Agreement or if a receiver, trustee in bankruptcy or similar officer is appointed to take charge of all or part of USER's property.

9. USER understands that the Test Product has not been announced to the public. Accordingly, USER agrees to refrain from disclosing the terms and conditions of this Agreement or the nature and features of the Test Product until publicly announced by WANG.

10. This Agreement shall be construed in accordance with the laws of the Commonwealth of Massachusetts and sets forth the entire understanding of the parties with respect to the Test Product. It may be amended only in a writing signed by a duly authorized representative of each party.

USER

WANG LABORATORIES, INC.

By _____

By _____

Title _____

Title _____

Date _____

Date _____

FED XPRESS TO 15089673213
OVERNIGHT
1022594282

SHHHI

6410
DATE

AIR
BILL

JOHN FISHER
67531

JGB
enterprises, inc.
CS/386 TURBO SYSTEM UPGRADE QUOTATION



October 4, 1991

COMPONENT	DESCRIPTION	JGB PRICE	Mo Maint
PROCESSOR & I/O UPGRADE:			
CS-TURBO	CS To 4MB CS/386 Turbo	5000	13 add
UJ-6059	4MB CS/386 TURBO to 8MB Turbo Memory	1000	n/c
22C11-HS	High-Speed Printer & Disk Controller	700	10
2236MXF	16-Port Terminal I/O Controller (need 2 @ 1195	2390	20
200-2650	Cables for 2236MXF (2 @ 125)	<u>250</u>	n/c
	CPU UPGRADE PRICE	9340	

INSTALLATION, SET-UP AND PERFORMANCE TUNING:

INSTALL	SWAP OUT MOTHER BOARD & CPU BOARD AND RUN DIAGNOSTICS	280	
6 HOURS	SOFTWARE CONFIGURATION	750	
16 HOURS	FOLLOW-UP SYSTEM TUNING	<u>2000</u>	
	RECOMMENDED SUPPORT SERVICES	3030	
	TOTAL UPGRADE RECOMMENDATION	\$12,370	

WANG LABORATORIES, INC., 5792 WIDEWATERS PARKWAY, DEWITT, NY 13214 • TEL: 315/446-8070

November 7, 1991

WANG

Mr. Jay Bernhardt
President
J.G.B. Enterprises Inc.
115 Metropolitan Drive
Liverpool, New York 13088

Dear Jay,

J.G.B. Enterprises is a valued customer of Wang Laboratories and I personally thank you for J.G.B.'s business. Based on my conversation with Gene Schultz, Product Manager and as a follow-up to our conversation this morning regarding the CS/386 TURBO upgrade and services you ordered on October 4, 1991, below is an outline of some Points of Understanding:

- 1) Attached is a copy of the Order Letter, Product and Services J.G.B. has ordered from Wang Laboratories, Inc. Wang is the prime contractor for this upgrade project.
- 2) As of this morning, the plan and expectation is that your order will ship on Friday November 8, 1991 for delivery the following Monday. The special shipping arrangements will cost a few extra dollars and J.G.B. agrees to pay the additional costs.
- 3) Installation and set-up is planned for Monday based on specified times by John Snow and Jackie Fecco. Installation and Set-up will be completed by Wang Laboratories as the prime contractor. Costs for services after normal business hours (8am-5pm) will be billed at a cost of \$75 per hour above the normal rate on the October 4th quotation.
- 4) Shipment of the above product will be confirmed to you by the end of Friday November 8, 1991. In the event the product does not ship on 11/8/91, everything possible will be done to get you the product as soon as possible.
- 5) A complete back-up of the existing system must be done by J.G.B. before the upgrade can begin.
- 6) Before any product will be released for shipment, a copy of the Wang Sales Agreement you received from me a couple of weeks ago must be signed by you and received by me (faxing me a copy is fine).
- 7) The above upgrade is for State of the Art, brand new technology. Before the upgrade begins, John Snow and Jackie Fecco will agree on a Back-Up time. Meaning that if any problems are incurred during the upgrade, if the problems can not be rectified by the Back-Up time, further upgrade activity will cease and the system will be brought back to where it was before the upgrade began. As soon as possible (next business day) efforts to identify the problem and reschedule the upgrade will occur.
- 8) After the new CS/386 TURBO is installed, system tuning will be done to maximize the system performance. The system tuning will be completed within two weeks of the upgrade installation. As per the services purchased, the number of hours for system tuning will be up to (22) hours. Upon completion of system tuning, J.G.B. will sign a Customer Support Services Authorization (CSSA) acknowledging the amount of hours of services have been delivered. Additional services can be provided at Wang's normal rates if J.G.B. so chooses.

JOHN SNOW
315-446-9070

2200 386 TURBO

The 386 Turbo is the latest edition to the 2200 family. It consists of 4 major components, a new CPU motherboard, one version compatible to the CS-D and CS-N, a 2nd version compatible to the CS and MicroVP, a new 386 based CPU board, a new 16 port MXF terminal controller board, and a new printer/disk controller. Together this new hardware provides dramatic improvement in performance over existing 2200 hardware. Most hardware and software compatible to the 386 is 100% compatible to the 'Turbo'. Some of the disk drives such as the 2270A are still being evaluated to determine if they can be made to work with the Turbo. As for the software, changes may be necessary for those programs which reference a status byte in the O/S or the CPU ID number. There could also be problems with non-standard GIO commands. See TSB HWT 9640 due out in November 1991 or the updated CS Maintenance Manual, 741-1769A, which includes the Turbo for details under 'Compatibility'. Additionally, for maximum performance, programs must be in 'NEW' or '386' format. In conjunction with the new Operating System required by the 'Turbo' the following major enhancements have been made:

- supports up to 64 user partitions.
- supports up to 64 terminals. 32 is the recommended max currently.
- supports from 4 Meg to 32 Meg of memory.
- extended RAM Disk capabilities, all non-partitioned memory, address 340.
- CPU processing speed twice as fast as the 386, 4 to 6 times faster than the VLSI and MVP/LVPs.
- supports 3 byte addressing which will allow disk surfaces greater than the current 16 Meg restriction. Will only be supported on the DS with the next prom revision, R4, due out the end of the year and with the Turbo SCSI Controller due out the beginning of '92.
- new \$MOVE! command simplifies conversion of programs from 'OLD' to 'NEW' format.
- Disk I/O performance is up to 25% faster with existing drives. The percentage of improvement will vary according to the number of users on the system and amount of disk access. In the past, disk access was strictly a serial function. If the disk access time for a particular function was '5' seconds, then every user running that function would require '5' seconds. The new disk controller (22C11-2) is an intelligent controller and can handle disk I/O on it's own while the CPU does other tasks. This allows an improvement in performance that increases as the number of users increases. On a system of 1 to 3 users an improvement in disk performance may not be seen as basically the disk drives themselves are the slowest factor and not the interface. Some changes may be necessary with some software for maximum disk performance. Changing programs on disk to 386 or 'NEW' format is highly recommended.
- new SCSI Controller built for the Turbo provides 7-10 times the throughput of the DS. Due out beginning of '92.

'386' TURBO CARD SET

MOTHERBOARD: 210-9578 (mandatory) compatible to the CS-D/N only.
210-9583 (mandatory) compatible to the CS and MicroVP only
Switch settings - none

Jumpers - none

Test points - (for 9578) located underneath the 7th I/O slot
(for 9583) exact location to be determined
TP1 - -12V +/- .50 (not adjustable)
TP2 - +12V +/- .05 (pot located inside PS on left side front)
TP3 - +5V +/- .05 (pot located inside PS on left side rear)
TP4 - -5V +/- .05 (not adjustable)
TP5 - +/- 0V

Connectors

J34 - 4 pin connector to front panel LEDs (top left from rear)
unnecessary on the 9583.
J31 - 5 pin connector to PS (bottom right from rear)
J32 - 3 pin connector to PS (bottom right from rear)
J33 - 2 pin connector to PS (bottom right from rear)

CPU BOARD: 210-9576A (mandatory) consists of 210-9576 Mbrd & 210-9577 Dbrd
(comes with all SIMM Memory Modules rewmoved)

The board can be loaded for 4 different memory sizes:

<u>SIMM Part #</u>	<u>Memory Size</u>		<u>SIMM Modules</u>	<u>SW1 on 9576</u>
377-4533	4 Meg	4	1 Meg SIMMs in L3,L10,L18,L29	4 closed only
377-4533	8 Meg		8 1 Meg SIMMs	4 closed only
377-4535	16 Meg	4	4 Meg SIMMs in L3,L10,L18,L29	all open
377-4535	32 Meg		8 4 Meg SIMMs	all open

Jumpers - 210-9576 Motherboard

J4 - OUT (2 pin jumper in top rt corner - for Brd Repair)
J5 - 1-2 for 27C256 E Proms at L50/L64 (ctr of brd above J6)
2-3 for 27C512 E Proms at L50/L64
J6 - IN (2 pin jumper above L59 - for Brd Repair)
J7 - IN (2 pin jumper under rt corner of clk Y1 - for Brd Rpr)
J8 - OUT (2 pin jpr next to SW1 - for Brd Repair)

LED1 - 210-9576 Motherboard Diagnostic Indicator - comes on during
power up & goes out if passes diagnostics (lower right corner
of SIMMs)

Jumpers - 210-9577 Daughterboard

J3 - IN (2 pin jumper above L18 - for Board Repair)
J4 - OUT (2 pin jumper above L25 - for Brd Repair)

Connectors - 210-9577 Daughterboard

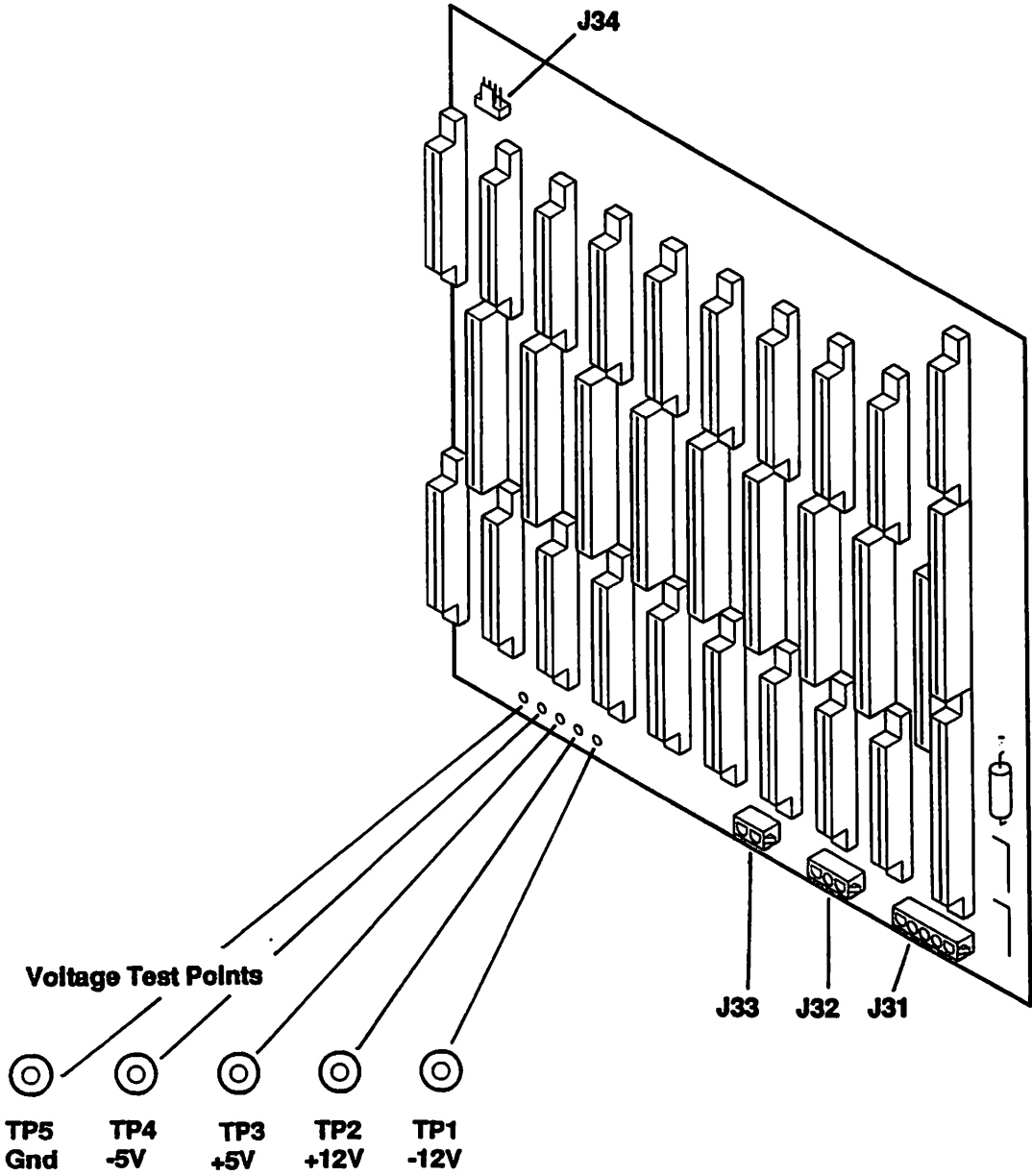
J2 - obsolete. 2 pin conn which was to be used for for Battery
(666-1016) Backup for clk. New real-time clock chip L5 with
built-in battery eliminates need for connector J2.

LED1 - Diagnostic Indicator - comes on during power up & goes out
if passes diagnostics (beside L28)

386 TURBO

Controls and Indicators

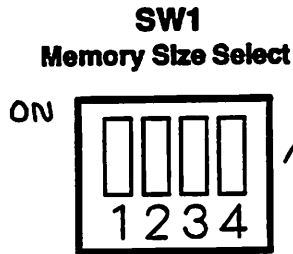
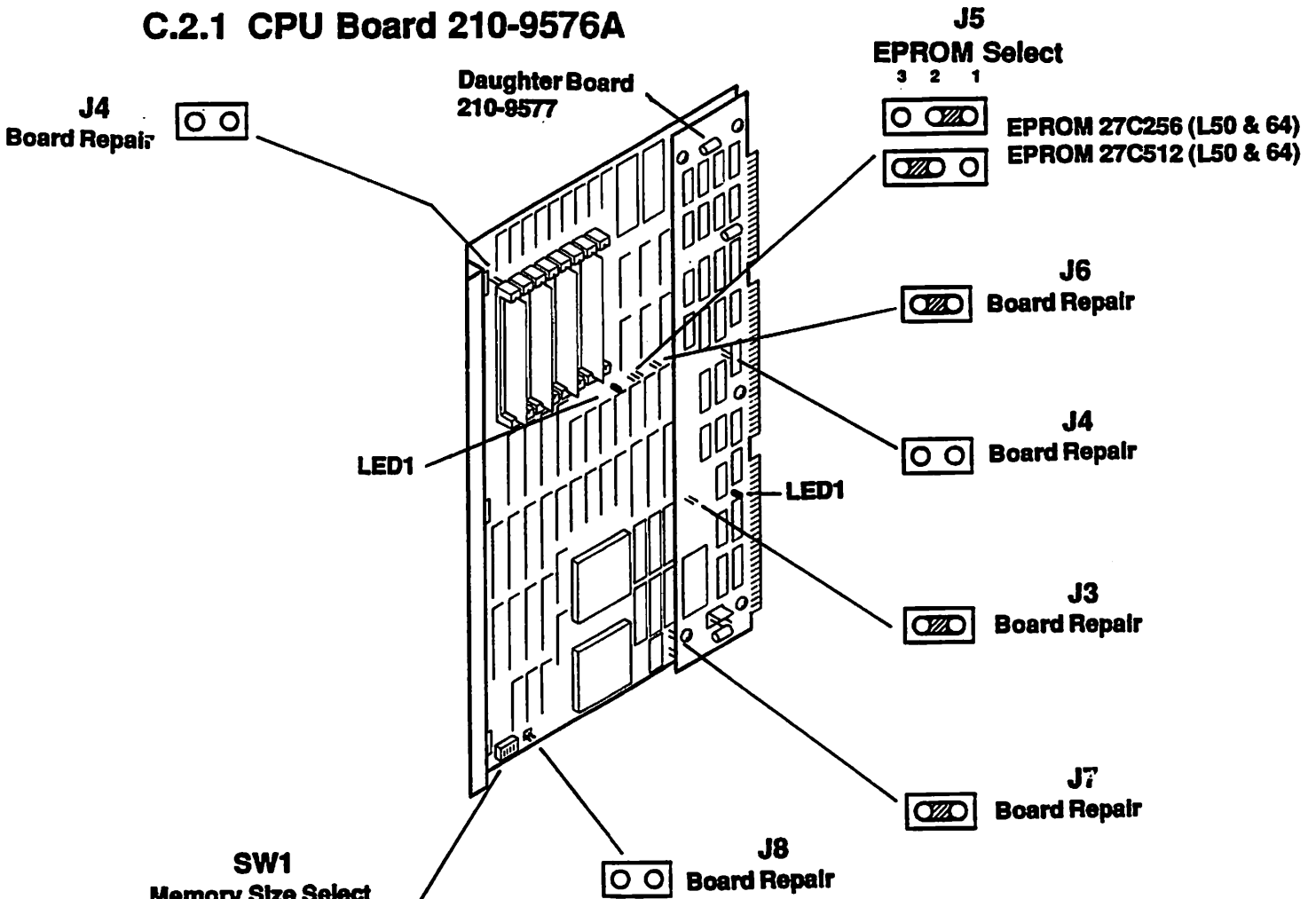
Motherboard 210-9578



386 TURBO

Settings

C.2.1 CPU Board 210-9576A



4MB - 4 1MB SIMMS (locations L3, L10, L18, L29) (210-9576-A)
8MB - 8 1MB SIMMS (All locations) (210-9576-B)



16MB - 4 4MB SIMMS (locations L3, L10, L18, L29) (210-9576-C)
31MB - 8 4MB SIMMS (All locations) (210-9576-D)

7411700-40.2.1

MXF 16 PORT TERMINAL CONTROLLER: 212-9717 (desirable for maximum performance)
 - consists of 210-9579A Hi Speed I/O Proc Brd & 210-9580 Term Cont Brd.
 - supports all workstations currently supported by the MXE and MXD.
 - maximum terminal configuration cannot exceed 64 terminals. Total number of terminal controller boards cannot exceed 4. With 3 MXF boards, you can use only 1 MXE/MXD, with 2 MXFs up to 2 MXE/MXDs, and so forth. In setting up terminal numbers always start with the MXFs first. In numbering the MXE/MXD board as set by it's 4/5 bank switch, count the MXFs as you would MXEs. That is if 1 MXF exists the 1st MXE or MXD would be set as board 2, with 2 MXFs it would be board 3, and with 3 MXFs it would be board 4. The switch settings for the MXE/MXD boards are set the same as they have always been.

External Connectors

- J5 - top connector, RS232 type, for term 1 (same as MXE/MXD)
- J4 - 2nd connector, RS232 type, for term 2 (same as MXE/MXD)
- J3 - 3rd connector, 36 pin Amphenol, for terminals 3 thru 9 (must use special Octopus Adapter Cable, 421-0181, with 36 pin male connector on 1 end and 7 female RS232 conn on other)
- J2 - 4th connector, 36 pin Amphenol, for terminals 10 thru 16 (must use special Octopus Adapter Cable, 421-0181, with 36 pin male connector on 1 end and 7 female RS232 conn on other)

LED1 - Self-Test Indicator - on during power up & goes out if passes

Switch Settings - 210-9579 High Speed I/O Processor Board

SW1 sets the MXF Board Number from 1st board to 4th board.
 1st MXF (term 1-16) - 1,2,4 ON only; 2nd MXF (term 17-32) - 2,4 ON only
 3rd MXF (term 33-48) - 1,4 ON only; 4th MXF (term 49-64) - 4 ON only

Switch Settings - 210-9580 Terminal Controller Board

SW1 thru SW8 control the baud rates for up to 16 terminals.

*** SW1 thru SW8, all sw's OFF - DIAGNOSTIC RUN-IN MODE.

RUN-IN Mode can be run on any MXF board with a terminal attached to port 1. The CPU is inoperable during this test. To run on the 1st MXF, the CPU board must be removed. A loopback connector is required for a channel to pass the test. The test will continually loop however without loopback connectors. The test is used to test the port and gives either a 'Pass or Fail' response. Some PCs or modems could hang the test because of the presence of a signal on a line normally unused by the standard Wang 2200 terminals. A signal on pin 8 would commonly do this.

Loopback Conn: J5/J4 2,3; J3/J2 2,20; 4,22; 7,25; 9,27; 12,30; 14;32; 17,35

PORT Assignments

Terminal #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
switches 1-4	SW1		SW2		SW3		SW4		SW5		SW6		SW7		SW8	
switches 5-8		SW1		SW2		SW3		SW4		SW5		SW6		SW7		SW8

BAUD Rate Settings

- 38400 = 2,3,4 or 5,6,7 ON only : 19200 = 1,3,4 or 5,7,8 ON only
- 9600 = 3,4 or 7,8 ON only : 7200 = 1,2,4 or 5,6,8 ON only
- 4800 = 2,4 or 6,8 ON only : 2400 = 4 or 8 ON only
- 1800 = 1,2,3 or 5,6,7 ON only : 1200 = 2,3 or 6,7 ON only
- 600 = 1,3 or 5,7 ON only : 300 = 3 or 7 ON only
- 200 = 1,2 or 5,6 ON only : 150 = 2 or 6 ON only
- 134.5 = 1 or 5 ON only : 110 = or ON only

*** Note: All unlisted Baud rates will default to 19200 except all OFF.

Jumpers

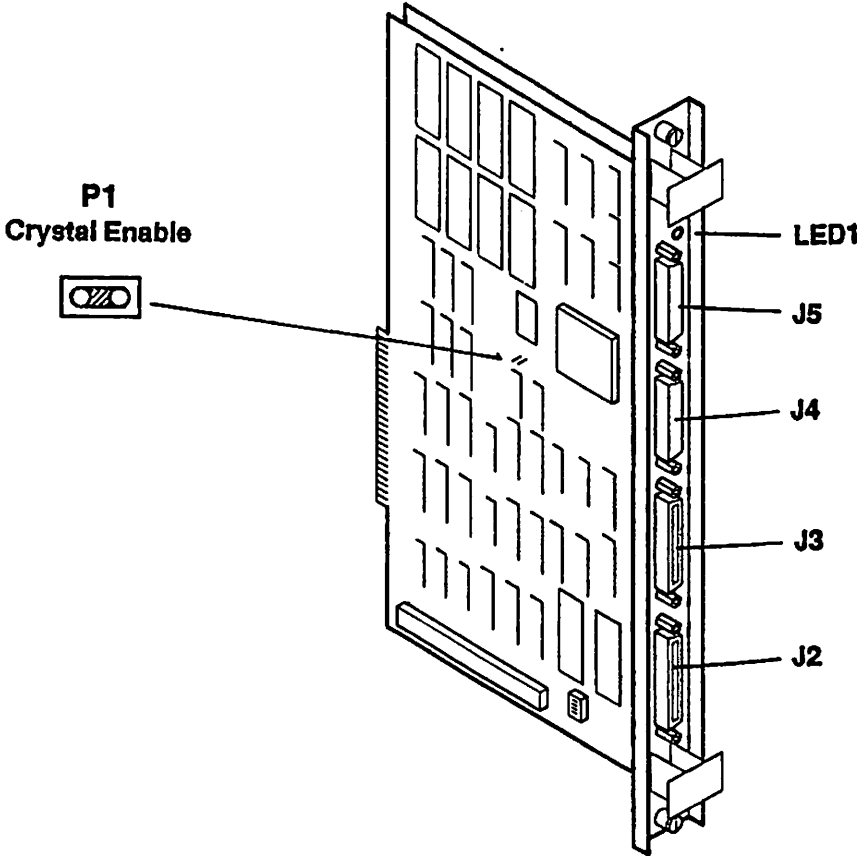
- P1 - IN (2 pin jumper on 9579 board next to clock Y1 for MFG)
- JP1 - IN (2 pin jumper on 9580 board next to clock Y1 for MFG)

386 TURBO

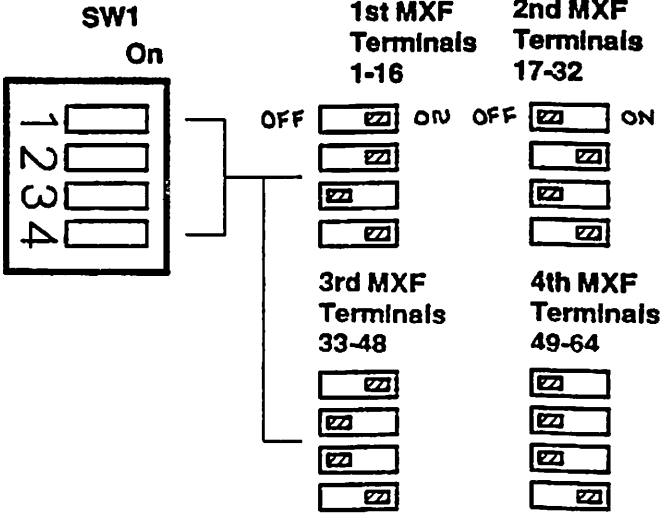
Settings

MXF 16-Port Terminal Controller (212-9717)

210-9579



741700-4C.2.5-1

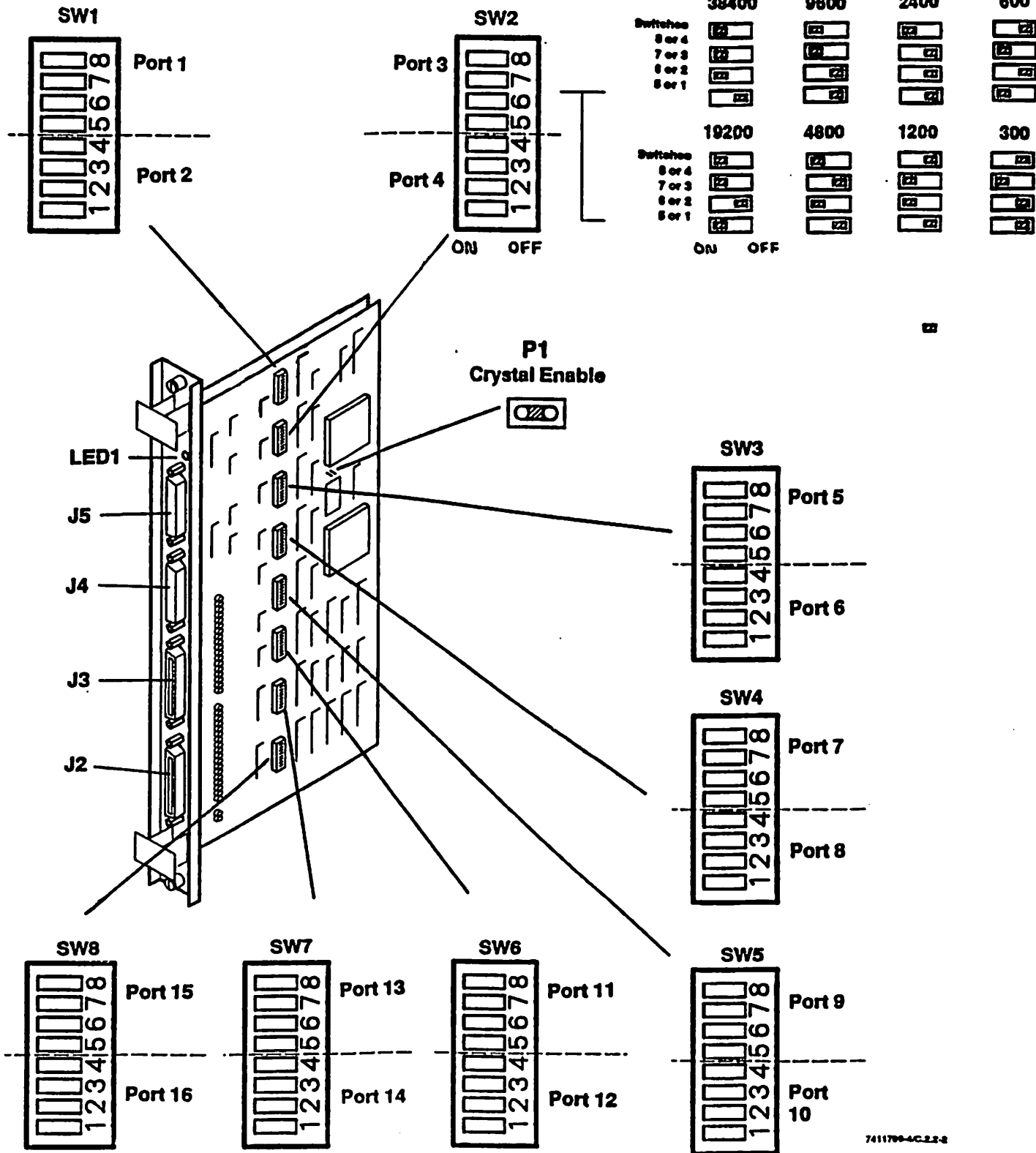


386 TURBO

Settings

MXF 16-Port Terminal Controller (212-9717)

210-9580



22C11-2 PRINTER/DISK (DUAL) CONTROLLER: 212-9718 (desirable for maximum performance. In some situations, some software changes may be required to take advantage of full performance capabilities. Contact the 2200 BASIC-2 Platform Group for further information.)

- consists of 210-9579 Hi Speed I/O Proc Brd & 210-9581 Periph Cont Brd.
- disk port supports all disk drives except SCSI.
- printer port supports all existing 2200 printers.
- mux port can be used as a 22C80 (210-7715) if the disk port is not used.

External Connectors

- J4 - Printer port (top connector, cabled directly to printer)
- J3 - Disk Mux port (middle connector, allows the controller to be used in place of a 22C80 (7715) which would cable to a CPU port on a 2275 MUX Master, MUX Extender, or similar brd.)
- J2 - Disk Port (bottom connector, cabled directly to disk)

NOTE: Only J3 or J2 can be used at 1 time as determined by SW1.

LED1 - Diagnostic Indicator - comes on during power up & goes out if passes diagnostics

Switch Settings - 210-9579 High Speed I/O Processor Board

SW1 sets the disk address for all access through this controller.

SW1 -	1	2	3	4	
	OFF	ON	ON	ON	= address 310 selected
	ON	OFF	ON	ON	= address 320 selected
	OFF	OFF	ON	ON	= address 330 selected

Switch Settings - 210-9581 Peripheral Controller Board

SW1 activates the Disk MUX port. If the MUX port is activated, the disk port is inactive. The MUX port is equivalent to a 22C80 (210-7715) controller. It therefore most often will connect to a 210-8824 2275 MUX Master CPU port to share access to the drive attached to the Disk port of the 2275 MUX Master.

SW1 -	1	2	
	OFF	OFF	= Disk Port J2 Active (MUX Inactive)
	OFF	ON	= MUX Port J3 Active (Disk port inactive)

SW2 sets the printer address.

SW2 -	1,3,5 ON only	= address 215
	2,3,5 ON only	= address 216
	1,2,3,5 ON only	= address 217

Jumpers

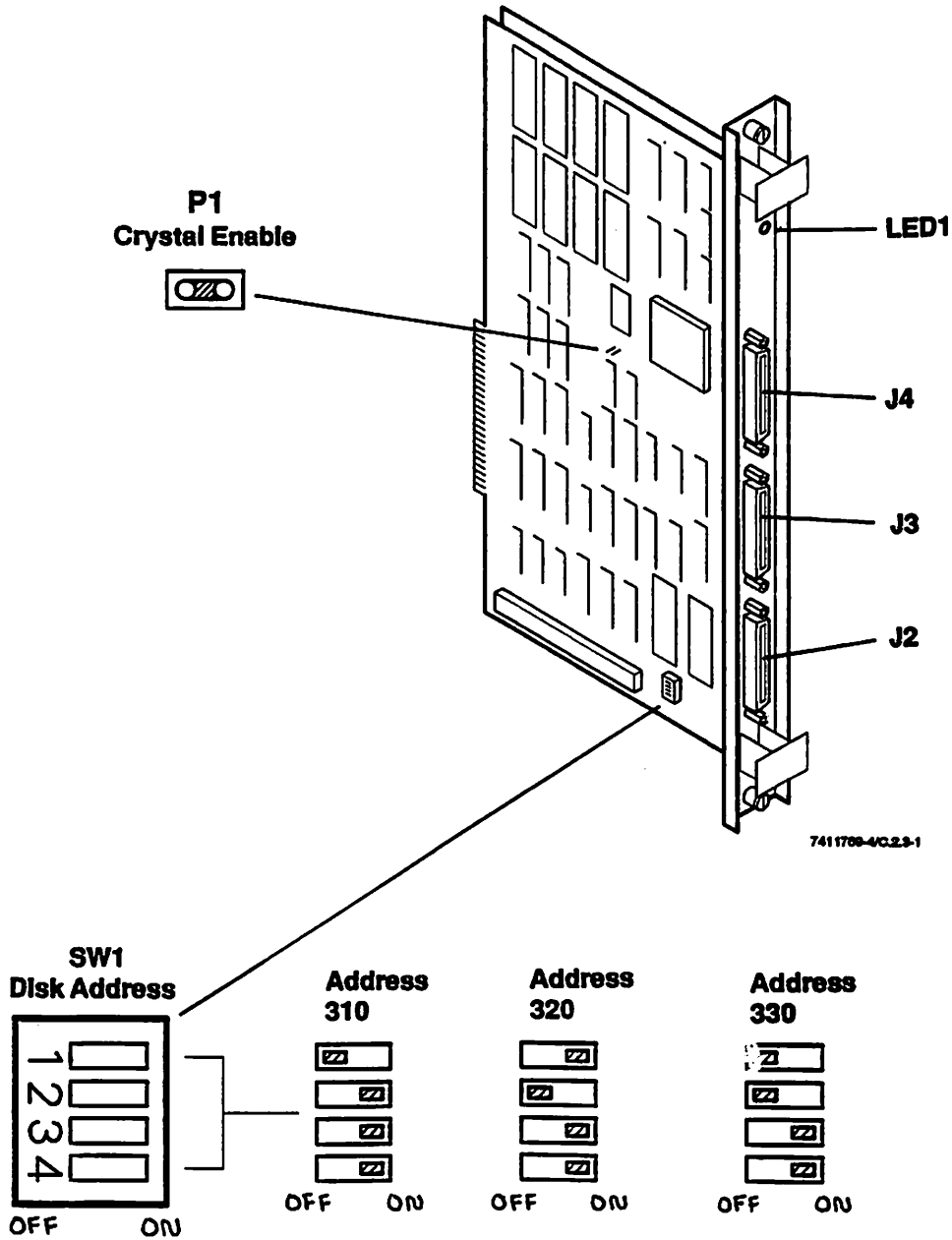
P1 - IN (2 pin jumper on 9579 board next to clock Y1 for MFG)

386 TURBO

Settings

Printer/Disk Dual Controller (212-9718)

210-9579

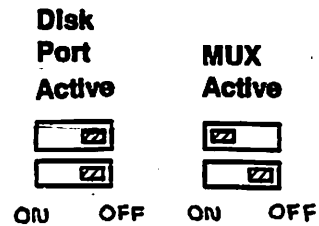
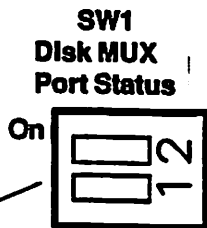
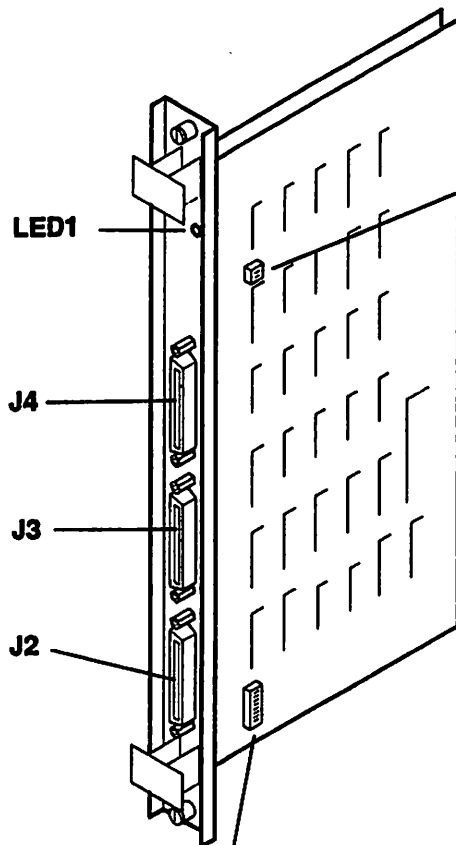


386 TURBO

Settings

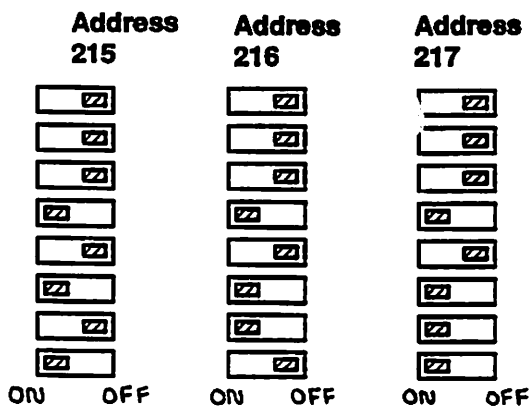
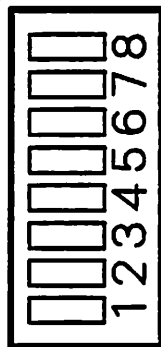
Printer/Disk Dual Controller (212-9718)

210-9581



SW2
Printer Address

On



2200 MODEL COMPARISON CHART

The following chart gives general product specifications for most of the 2200 models shipped since 1972. Maximums are expressed in practical installable limits.

FEATURE	A/B/C	T/S	PCS	VP	SVP	LVP	LVPC	MVP	MVPC	CS/ MICROVPS	CS-D/N	386	TURBO
	WCS									(VLSI CPUs)			
Memory	4- 16K	8K- 32K	8K- 32K	16K- 64K	16K- 128K	16K- 256K	32K- 512K	16K- 256K	32K- 512K	128K- 8M	128K- 8M	1M- 8M	4M- 32M
I/O Slots	3/6& 11	3/6& 9	1	9	1	3	7	9	7	9	9	9	9
Users	1	1	1	1	1-3	8	16	16	16	16	16	16	32*
Tasks	1	1	1	1	16	16	16	16	16	16	16	16	64
BASIC	X	X	X	-	-	-	-	-	-	-	-	-	-
BASIC-2	-	-	-	X	X	X	X	X	X	X	X	X**	X***
Control Memory	PROM	PROM	PROM	32K	32K	32K	32K	32K	32K	32K	32K	256K	256K
Field Upgrade	No	No	No	To MVP	OptW	To LVPC	No	No	No	386or Turbo	386or Turbo	To Turbo	??
Internal Tape Storage	-	-	80K some vers	-	-	-	-	-	-	-	150M CS-D only	150M CS-D only	150M CS-D only
Internal Diskette Storage	No	No	11K some vers	No	1.2M	1.2M	1.2M	No	No	No	1.2M CS-D only	1.2M CS-D only	1.2M CS-D only
Internal Disk Storage	No	No	No	No	2MB To 16MB	2MB To 16MB	2MB 32MB	No	No	No	20M- 140M CS-D only	20M- 140M CS-D only	20M- 140M CS-D only
External Storage	2260 2270 C only	2260 2270	some vers	2260 2270 2280 2275 DS	No	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 ?? 2280 2275 DS SCSI
TC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RAMdisk (CPU)	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes

* 32 recommended max with currently available hardware. 64 Users in future.

** requires CS/386 O/S

*** requires CS/386 Turbo O/S

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9640 REPLACES: _____ DATE: 10/15/91 PAGE 1 OF 7

MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

TITLE: 2200 Update - CS/386 TURBO Announcement

PURPOSE:

To inform the field of the new CS/386 TURBO CPU card set, and provide information on installing and testing.

EXPLANATION:

The CS/386 Turbo is the latest edition to the 2200 family of processors. It consists of 4 new major components; a motherboard (2 versions), a 386 based 33 Meg Hz CPU Board, and 2 new intelligent controllers; a 16 port MXF Terminal Controller, and a 22C11-HS Printer/Disk Controller. The 2 controllers have 286 processors that allow them to handle communication with the peripherals which in the past was handled by the CPU. This helps I/O performance by allowing the CPU to go on to other tasks until the Controller completes it's job and signals the CPU for attention. The new motherboards contains a 3rd 140 pin connector used by the CPU for all communication to the new controllers. This new communication path utilizes a 32 bit data bus as opposed to the 8 bit bus used with the older controllers. The Hi-Speed Printer/Disk Board includes a disk MUX port, J3, functionally equal to the 22C80 (210-7715), which can be used instead of the standard disk port. See page 7 for part #'s and board information.

This hardware along with the new Turbo O/S required provides the following enhancements over existing 2200s:

- partitions supported increased from 16 to 64.
- terminals supported up from 16 to 64. 32 is the current recommended max.
- up to 32 Meg memory. 4 memory sizes available, 4, 8, 16, and 32
- extended RAM Disk capabilities, all non-partitioned memory, address 340.
- CPU processing time twice as fast as the CS/386, up to 6 times faster than the VLSI and MVP/LVP CPUs.
- new \$MOVE! command simplifies converting programs to 'NEW' format.
- Disk I/O performance up to 25% faster dependent on the number of users.
- supports 3 byte addressing. Will require new prom in DS or new SCSI brd.

HARDWARE COMPATIBILITY

The Turbo Card Set can be installed in any CPU chassis built for a single board VLSI or 386 CPU. This would include the MicroVP, CS, CS-D, and

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 014-A3A

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9640 REPLACES: _____ DATE: 10/15/91 PAGE 2 OF 7

MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

TITLE: 2200 Update - CS/386 TURBO Announcement

EXPLANATION (cont'd):

CS-N. All I/O Controllers and all peripherals currently supported by these CPUs are expected to be supported by the Turbo. Some of the older disk drives such as the 2270A still need to be fully evaluated. The Turbo has the same I/O board restrictions found with current 2200 CPU's. There is still a legal limit of 4 terminal controllers total, 3 disk controllers (310, 320, and 330), and 3 printer controllers (215, 216, and 217). Terminal controllers can be of different types, MXFs, MXEs, MXDs, etc, but the MXFs should be addressed first. The new motherboards will support the VLSI & 386 CPU boards but these CPUs will not support the new controllers.

SOFTWARE COMPATIBILITY

'386' CPUs: The Turbo Operating System is based on the latest CS/386 O/S and has the look & feel of it's 2200 predecessors. As such, most programs now running on a 2200 '386' CPU should run without change. The exception would be programs that reference a status byte in the O/S or the CPU ID number. There could also be a problem with non-standard GIO commands. See item 12 on page 5 for more information. Although no additional memory is needed for programs when upgrading from a '386', there is additional overhead used by the operating system. With programs that come close to using the entire partition, a small amount of additional memory may be necessary. As with the '386', it is critical to have programs on disk in 'NEW' or '386' format for maximum disk I/O performance. See item 14, pg 5.

VLSI & older CPUs: Most software running on non-386 2200 CPUs will run on the Turbo, but there may be some changes needed to insure proper operation and maximum performance. Most of these changes are the same ones required when upgrading from a non-386 to the CS/386 CPU Board. The following is a list of things, both hardware and software, to be aware of to help insure a smooth installation:

1. Environment: Because of the increase in speed with the Turbo, it could be more sensitive to power, grounding, and static. If there are concerns about the environment, they should be followed up on, documented, and made known to the customer. Existing sites with environmental issues, even if not affecting the current system, can be especially critical as it gives the appearance the new hardware is at fault.

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 014-A3A

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9640 REPLACES: _____ DATE: 10/15/91 PAGE 3 OF 7

MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

TITLE: 2200 Update - CS/386 TURBO Announcement

EXPLANATION (cont'd):

2. E-Rev: The problem with having down rev boards is common, especially with sites not under Wang Maintenance. Although having the latest e-rev boards is preferable, the latest e-rev is not always needed. The following is a list of boards that require a minimum e-rev or prom revision for proper operation as known at this time.

Model #	Part #	Description	min E-Rev	Prom Revision
2275 MUX	210-8824	Master Mux Brd	4	n/a
22C80	210-7715	Slave Mux Brd	10	n/a
CS-D	212-7113	CS-D DPU Board		R3 FCO 1376 (728-0387)
DS	210-8826A	DS DPU Brd		R3 FCO 1375 (728-0386)
2536DW	210-9557	Term Cont Brd	3	R2 FCO 1411 (728-0421)

3. Existing Controllers: When upgrading, it is possible that marginal problems may exist with controllers currently on the system though it may be running error free. Because the Turbo is so much faster, if a marginal problem does exist with a controller, it is much more likely to occur. Do not assume the problem is the Turbo because the controllers worked before the upgrade. All controllers must be set for legal addresses; 310, 320, 330 for disk, 215, 216, 217 for printers. All sw's OFF or ON is not legal.

4. Upgrades: When installing the Turbo card set in an existing CPU, there are some important steps related to properly positioning the motherboard. Refer to the CS System Maint Mnl (741-1769A). A TSB will also follow.

Operating System

5. Partition size: When upgrading from a non-386 CPU, partition size must be increased about 80% as a general rule of thumb. This is because the 386 CPUs use a binary format and non-386 CPUs are in binary coded decimal, BCD. Some commands as well as variables require more space in binary. If inadequate partition size is set, A01 and A02 errors will occur. Partitions can be of any size as long as available memory is not exceeded.

6. Global Partitions: Any partition of any size may be global to any other partition. Bank partitions do not exist with the CS/386 and Turbo.

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 014-A3A

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NUMBER: HWT 9640 REPLACES: _____ DATE: 10/15/91 PAGE 4 OF 7

MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

TITLE: 2200 Update - CS/386 TURBO Announcement

EXPLANATION (cont'd):

7. Device Table: Within "@GENPART" only 1 entry may be made per disk controller address. There are only 3 supported disk controller addresses: /310, /320, & /330. For example, for controller address /310 make a single entry /310 in the device table and not 1 for every address or for the tape drive such as /D10, /D11, /D12, /D51, or /D5F etc. Additional entries could result in I92 errors if RESET is keyed while accessing disk or possibly in other unforeseen errors

Programming and Operational Problems and Concerns

8. Increasing the partition size for some programs can create a problem. Certain sort modules and possibly other programs may make a calculation based on partition size. One such program is part of KFAM and the ISS Utilities. In program "SORT.402A" line 4590 should be changed:
From: 4590 M1=INT(M*1024)-698 To: 4590 M1=INT(MIN(M,64)*1024)-698
These type changes should be made by the customer's software vendor.

9. For any program or software package that looks for CPU type, the partition status line byte 9 is coded as "T" for the Turbo, "W" for the CS/386, "M" for MVP/LVP/VLSI, and "V" for VP. Certain versions of TOM software utilize this bit and would need to be changed. In the ISS Utilities, program "ISS.000M" needs this change. In line 420, change the "M" to a "T":

420 A\$=\$PSTAT(#PART):IF STR(A\$,9,1)="M" THEN S3=4:...etc.

This problem may also occur running Multi-Disk, "MULTIDSK", where you see the message, "CPU SOFTWARE MUST BE UPGRADED TO RUN THIS PROGRAM". On the latest version, 69C1, this message is on line 175. On the previous line, 170 in this case, which begins as follows: 170 P\$=\$PSTAT(1):...etc. append to the end of the line: :IF STR(P\$,9,1)="T" THEN 180

Program FTU from the the same Magnetic Media Diagnostic Disk also must be revised. With the latest version of FTU, rev 8734, corrected for the CS/386, line 120 needs to be changed or a similar message to that shown above for MULTIDSK will be given. Line 120 begins as follows:

120 B\$=\$PSTAT(1): IF STR(B\$,9,1)..etc. After the first colon ':' insert:
IF STR(B\$,9,1)="T" THEN 125:

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 014-A3A

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

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MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

TITLE: 2200 Update - CS/386 TURBO Announcement

EXPLANATION (cont'd):

10. If the current 2200/VLSI software makes decisions using partition status line bytes 10 & 11, a change would be required to run on the Turbo or the "386" CPU. Under the non-386 multi-user operating systems, byte 10 denotes memory bank and byte 11 the amount of partition memory. On the Turbo and 386 bytes 10 and 11 signify partition size. There are no banks.

11. Floating Point mathematics on the Turbo & '386' insures accuracy to only 10 digits compared with 13 digits with earlier 2200 CPUs. This could cause the 9th through 13th numbers to the right of the decimal point to be slightly different after a calculation between these machines. Programs dependent on 13 digit accuracy may need to be altered by the programmer.

12. GIO commands are handled differently on the Turbo from both the CS/386 and non-386 CPUs. Each GIO command had to be recoded individually. The standard GIOs have all been done, but for those programmers who developed their own GIOs, there may be a problem. In this case, the problem should be escalated via a PTR to RDB 8760. In the PTR, provide the specific GIO with an exact explanation of its purpose. This will help to prevent delays in correcting. With non-386 CPUs, GIO commands could speed up processing because they directly addressed code in the O/S. With the Turbo and the 386 this is not the case and usually a GIO will be slower than the basic command it replaces. Customers may want to consider replacing GIOs with the applicable basic command where possible.

13. The first byte of a header record for a program on disk must be 40, 50, 60, or 70. If the 2nd digit is other than 0 an error A01 may occur. Older 2200 systems did not care about this bit and it was used by some programmers to protect their software.

14. For maximum disk performance, it is critical to have programs in 'NEW' or '386' format. As mentioned, the Turbo is coded in binary while non-386 2200s are in binary coded decimal, BCD. Programs in binary require more memory. When loading a program in 'OLD' format (BCD) on the Turbo it has to go through a conversion process which slows down disk I/O. If the

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MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

TITLE: 2200 Update - CS/386 TURBO Announcement

EXPLANATION (cont'd):

program is in a binary (NEW or 386) format this conversion process is eliminated. There are 2 Basic-2 commands to aid the user in making this conversion, 'SELECT NEW' and '\$MOVE!'. As mentioned, programs require more space when converted to 'NEW' format both in memory and on disk. Additionally any long program line of approximately 190 characters or more when converted to 'NEW' format could exceed the 256 character/line limit requiring the line to be split into 2 lines to enable the conversion. Noting that, if the 'SELECT NEW' command is executed, any program saved will be in the 'NEW' format. Any program in new format can be identified by a ' after the P for program when LISTing the disk, P'. The 'SELECT OLD' command allows you to change to 'OLD' or BCD format and is the default at boot time. The 'LIST SELECT' command can be used to identify if 'OLD' or 'NEW' format is currently selected. The '\$MOVE!' command is used to move an entire address from 'OLD' to 'NEW' format. It provides the ability to identify each program that cannot be MOVE'd and the 1st line number in that program needing a line split. '\$MOVE!' does this on the fly while converting all other programs and moving all other files. Non-386 CPUs cannot read programs in 'NEW' format. Data files are loaded as is with all CPU types and have no effect on performance. The conversion process should be done by a programmer or the system administrator and not by Wang.

ADDITIONAL INFORMATION:

Diagnostics: Both new I/O boards & the CPU have LEDs which light with power on and go out if built in self-tests pass, normally within 3 seconds. Future controllers planned may run tests that extend beyond 3 seconds. If an LED stays on it indicates a failure & the board should be replaced. After completing these self-tests, boot prom diagnostics begin on the system console testing memory and communication with the new controllers. Failures would readily point to one or more of the boards. On-line diagnostics remain the most viable way to test the system.

2200 Diagnostic Package Rev 2.00.00 195-2956-0

See item 9, page 4 for changes required to run Multi-Disk Diagnostics.

Maintenance Manual: 741-1769-A (this is an addendum to the CS Maint Mnl)

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MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

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ADDITIONAL INFORMATION (cont'd):

Part Numbers and Board Specific Technical Information:

210-9578	CS-D/N Motherboard	Testpts:	TP1	TP2	TP3	TP4	TP5
			-12V	12V	5V	-5V	0V
210-9583	MicroVP/CS Motherbd	Testpts:	TP1	TP2	TP3	TP4	TP5
			-12V	12V	5V	-5V	0V

210-9576A Turbo CPU w/out mem (consists of 210-9576 Mbd & 9577 Dbd)
Can be loaded with 4/8/16/32 Meg.

377-4533 1 Meg SIMMS (for 4 Meg use L3,L10,L18,L29, 8 Meg fully load)

377-4535 4 Meg SIMMS (for 16M use L3,L10,L18,L29, 32 Meg fully load)

Switches - 1M SIMMs SW1 = 4 ON only 4 Meg SIMMS SW1 = all OFF

Jumpers - 9576 Motherboard J6,J7 IN; J4,J8 OUT

J5 1-2 = 27C256 E Proms at L50/L64

J5 2-3 = 27C512 E Proms at L50/L64

9577 Daughterbrd J3 IN; J4 OUT

212-9717 MXF Ctlr (consists of 210-9579 I/O Proc & 9580 Term Cont)

421-0181 MXF 7 Port Octopus Cable (MXF has 2 RS232 ports/2 Oct ports)

Switches - 9579 I/O Proc SW1 sets MXF Brd #. Brd 1 - 3 OFF only;

Brd 2 - 2,4 ON only; Brd 3 - 1,4 ON only; Brd 4 - 4 ON only

Switches - 9580 Term Ctlr SW1-SW8 set baud rates for the 16 ports

From top - SW1 5-8 port 1, 1-4 port 2, SW2 5-8 port 3, etc.

Common baud rates: 38400 - 1 or 5 OFF only

19200 - 2 or 6 OFF only, 9600 - 3,4 or 7,8 ON only

2400 - 4 or 8 ON only, 1200 - 2,3 or 6,7 ON only

Jumpers: 210-9579 Mbrd - P1 IN; 210-9580 Dbrd - JP1 IN

212-9718 22C11-HS Prtr/Disk Ctlr (9579 I/O Proc & 9581 Periph Ctlr)

Switches - 9579 I/O Processor SW1 sets Disk Address

310=1 OFF only; 320=2 OFF only; 330=1,2 OFF only

Switches - 9581 Periph Controller SW1 selects Disk or Mux Port

1 ON only Disk Port J2 active; 2 ON only Mux Port J3 active

SW2 Printer Address

215=1,3,5 ON only; 216=2,3,5 ON only; 217=1,2,3,5 ON only

Jumpers: 210-9579 - P1 IN

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C U S T O M E R E N G I N E E R I N G

F I N A L

M A I N T E N A N C E P L A N

2200 NEW PRODUCTS

Revised

October 24, 1991

CS/386 Turbo

Model Numbers: CS/386-400N, CS/386-800N, CS/386-1600N, CS/386-3200N

Product Support Engineer
Mike Bahia

Product Line Manager
Gene Schulz

Product Line Director
Mike Runge

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APPENDICES

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I. PRODUCT DESCRIPTION

A. OVERVIEW OF THE PRODUCT

The 386 Turbo is the latest edition to the 2200 family. It consists of 4 major components, a new CPU motherboard (2 versions, 1 for the CS and MicroVP and 1 for the CS-D/N), a new 386 based CPU board, a new 16 port MXF terminal controller, and a new high-speed printer/disk controller. Together this new hardware in conjunction with the new Operating System required provides dramatic improvement in performance over existing 2200 hardware. Some of the major advantages include:

- partitions supported increased from 16 to 64.
- terminals supported increased from 16 to 64. 32 current recommended max.
- memory sizes from 4 to 32 Meg, up from the 8 Meg previous max.
- CPU processing speed twice as fast as the 386, 4 to 6 times faster than the VLSI and MVP/LVPs.
- Disk I/O performance is up to 25% faster. The percentage of improvement will vary according to the number of users on the system and amount of disk access. See 22C11-2 under 'Major Components' for further details.

B. SIMILARITIES/DIFFERENCES (with other WANG products)

1) Software:

All software compatible to the 386 is 100% compatible to the 'Turbo'. For maximum performance some minor software changes may be required. Though the Turbo has it's own operating system, much of it is based on the existing 386 O/S. The new Turbo O/S maintains the look and feel of the traditional 2200 while increasing the number of users and partitions to 64 each.

2) Hardware:

All hardware supported on existing CS/386 CPUs is expected to be supported on the Turbo. Any 2200 chassis built specifically for a single board CPU which includes the MicroVP, the CS, the CS-D/N, and the CS/386-D/N can be upgraded with a Turbo card set. Proper installation into a MicroVP or CS will additionally require rails to be added around the I/O section through which the I/O controllers will secure to the chassis. These rails fill in a space created by the higher motherboard connectors required by the new Turbo controllers and are required to pass FCC standards. MVP chassis' upgraded to support the single board VLSI CPU are not supported. This includes the MVP128/512 chassis' which has the old MVP motherboard with the connectors removed for all the old MVP CPU boards except the one slot used for the VLSI card.

3) Other:

Existing VLSI and 386 CPU boards will run in the new Turbo motherboard. The motherboard is however mandatory for use of the Turbo CPU and the 2 new controllers. The 2 Turbo controllers also cannot operate without the Turbo CPU board. There are 2 versions of the motherboard. One version is compatible to the CS-D/N boxes. A 2nd version is required for the CS and MicroVP boxes for proper alignment of boards.

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C. ANNOUNCE/FIRST CUSTOMER SHIPMENT DATE

- 1) Domestic: Announced: Oct 1, 1991 FCS: Nov 1, 1991
 Volume Ship: Nov 15, 1991
- 2) International: Announced: Oct 1, 1991 FCS: Nov 1, 1991
 Volume Ship: Nov 30, 1991

D. SERVICE OFFERINGS/WARRANTY

This product will be installed and maintained by Customer Engineering personnel for customers with On-Site service.

This product will be covered by the standard Wang 90 day warranty.

E. SPECIAL PROGRAM/PROCEDURES

N/A

F. MAJOR COMPONENTS

The CS/386 Turbo consists of 4 new boards and an operating system.

- 1) 210-9578 Motherbrd (CS-N/D); 210-9583 Motherbrd (CS & MicroVP):
The motherboard provides a 32 bit bus used by the Turbo CPU board to communicate with the new MXF Terminal Controller and the new High-Speed Disk/Printer Controller. This was done by adding a 3rd connector to each of the I/O slots offset and between the standard connectors currently used, and in-line with a new connector for the CPU board. The 9578 Motherboard is only compatible to the CS-N/D. The 9583 Motherboard is required for the CS and MicroVP.
- 2) 210-9576A CPU/Memory Board:
The Turbo CPU board consists of a 210-9576 motherboard and a 210-9577 daughterboard. It has a 33 MHz 386 based processor chip and can be loaded to 4 memory sizes, 4 Meg, 8 Meg, 16 Meg, and 32 Meg. It uses a 32 bit address and data memory bus. It also has a new real-time clock chip with a built-in battery at L5 of the daughterboard to keep time of day.
3. 212-9717 2236MXF Terminal Controller:
The MXF Controller is an intelligent controller which uses a 286 processor to support up to 16 terminals and communicates with the CPU via a 32 bit bus. The 286 processor allows the MXF to handle communication with the terminals on it's own enabling the CPU to do other tasks. The board consists of a 210-9579A I/O Processor Board and a 210-9580 Terminal Controller Board. There are 4 external connectors. The top 2 are RS232 connectors, identical to the RS232 ports on the existing MXE and MXD Controllers. They support the first 2 of the 16 ports. The bottom 2 connectors are standard 36 pin parallel connectors used to address 7 terminals each via the 421-0181 Octopus Cable. A maximum of 4 MXF Boards, 64 terminals, are supported per CPU. The turbo can be configured with a mix of MXF, MXE, and MXD Boards not to exceed 64 ports. See 'Configuration Requirements' for further details.

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4. 212-9718 22C11-2 High-Speed Printer/Disk (Dual) Controller:
The 22C11-2 is an intelligent controller with a 286 based processor. The board uses a 32 bit bus, 4 times the current bus size, through which it communicates with the CPU and is capable of handling disk I/O functions currently handled by the CPU board. By freeing up the CPU and handling the disk I/O on it's own, this new disk controller increases disk performance as the number of users increases. In the past, disk access was strictly a serial function. If the disk access time for a particular function was '5' seconds, then every user running that function would require '5' seconds. This is not the case with the 22C11-2. With 1 to 3 users accessing disk, performance will not change much, but as more users access disk and more work is off-loaded to the controller, improvements of up to 25% more throughput can be realized. Changes may be necessary with some software for maximum disk performance. Changing programs on disk to '386' or 'NEW' format is highly recommended. A new command, @MOVE!, is included in the Turbo operating system and can greatly simplify this process.
- The middle connector on this board is a disk Mux port activated by switch settings. If the disk port is not used, this board can be used like a 22C80 (210-7715) cabled to a CPU port on a 2275 MUX Master/Extender to access a Mux'd disk unit.
 - The top connector on the board is a printer port using the standard 2200 Centronics interface compatible with all current 2200 printers.
5. CS/386 Turbo Operating System Release 1.0:
The Turbo Operating System is based on the current CS/386 Operating System and functions similarly. Some of the enhancements built into this operating system include:
- support of 64 terminals and 64 partitions.
 - the \$MOVE! command which simplifies converting all programs on a surface from the old 2200 format to the 'NEW' 386 format.

G. CONFIGURATION REQUIREMENTS

Configuration requirements and restrictions are basically the same as the existing '386' CPUs except for the number of terminals and partitions. Both have been changed from 16 to 64. With the hardware available at the time of this plan, 32 terminals are the recommended max. Physically the maximum configuration of MXF, MXE, and MXD controllers would be 4 boards. You cannot have more than 4 total terminal controllers as is currently the case. All MXF boards are assigned first. Switch settings for the MXE/MXD boards are done the same way, but the MXF boards must be counted first. Example: with 2 MXF and 2 MXE boards, the 2 MXF boards are assigned terminals 1 to 32, the 1st MXE becomes board 3 (Sw 1 - 2 on only) 33 to 36, and the 2nd MXE board 4 (Sw 1 - 1,2 ON only) 37 to 40.

II. MAINTENANCE PHILOSOPHY

A. Maintenance Objectives

1) C.E. Level:

This product will operate in a similar way to existing 2200 systems. Effective maintenance of the Turbo system will require the following:

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- a) A working familiarity with the 2200 hardware and operating system.
- b) Skillful cause analysis at the system level.
- c) Knowledge of the diagnostics on the 2200 system.

2) Maintenance Procedures:

Maintenance on this product will be performed on-site by a Wang Customer Engineer. A working knowledge of the system along with built-in diagnostics in the hardware and operating system as well as existing on-line diagnostics will help the C.E. to isolate hardware failures to the board level. The CPU, MXF, and 22C11-2 boards all have LEDs that light during power up and go out if the boards pass built-in self tests. When a board failure occurs, that board will be replaced with a board from C.E. stock and the bad board will be returned through C.E. logistics channels for repair.

B. Types of contract to be offered

On-Site Maintenance Contracts will be offered.

C. P.M. requirements

1) Customer performed:

To insure proper operation of this product, the Customer should observe the Environmental, Power and Cabling, and Site Selection Considerations outlined in the CUSTOMER SITE PLANNING GUIDE (part # 700-5978).

2) WANG C.E. performed:

This product will not require scheduled preventive maintenance. However, a visual inspection of the cooling fans and cables and cleaning of the CPU cabinet would be appropriate on a 'next call' 'as needed basis'.

- a) Interval: N/A
- b) Parts/Consumables required: N/A
- c) Time to perform: N/A

D. Diagnostics required/available:

1) C.E. Level: 2200 Diagnostic Package (currently Rev 2.00.00, p/n 195-2956-0). This package includes diagnostics for:

- a) Printers/Plotters/Terminals p/n 732-0052B 5-1/4" DSDD
- b) Magnetic Media* p/n 732-8520A 5-1/4" DSDD
- c) Telecommunications p/n 732-0051 5-1/4" DSDD
- d) CPU/Memory Test (Some tests included in this group may not run on the Turbo) p/n 732-8521 5-1/4" DSDD

2) Customer Level: Machine level diagnostics are built into the O/S and will automatically run with power on. These diagnostics can also be continuously run by PF' key selection during boot. Customer Engineering should not depend on these diagnostics solely to identify problems. The first choice in diagnostics is to always use the on-line diagnostics included with the '2200 Diagnostic Pkg'.

* See TSB HWT 9640, page 4, item 9, due out 11/91 for changes needed.

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3) Built-in: The CPU, MXF, and 22C11-2 all have LEDs which light during power up self tests. If any of these LEDs stay on, the board has failed self-test and should be replaced.

III. TRAINING

A class was conducted by the 2200 Platform Group at the Lowell Education Center on May 21 through May 25, 1991. The CSO students are listed in Appendix A4.

Future training delivery is being evaluated.

A. CUSTOMER ENGINEER COURSE

1) **COURSE OBJECTIVE:**

The training course will provide information that will enable the Wang Customer Engineer to meet the Maintenance Objectives for this product. These Maintenance Objectives are detailed in section II of this plan.

2) **TIMETABLE and FORMAT:**

The 1st seminar on this product was given in MAY of 1991. C.E. Documentation has been given preliminary documentation and a card set and should be ready with the Maintenance Manual by November. If not ready for FCS, preliminary maintenance manuals will be provided on an as needed basis. A TSB, HWT 9640, due out in November will announce the product to the field and will provide basic information for installing and testing. It also provides a list hardware and software concerns that need to be considered when upgrading to the Turbo.

3) **PREREQUISITES:**

CS/386 Turbo Course prerequisites are:

a) 6 months field experience following New Hire Training.

b) Must be knowledgeable on the 2200 product line. Able to demonstrate proficiency in 2200 System Power Up and System Generation, familiar with 2200 peripheral device addressing, and able to run On-Line Diagnostics and/or write 2200 Basic routines to test peripherals.

B. SALES SUPPORT COURSE

1) **TIMETABLE and FORMAT**

The 2200 Product Line is normally sold through a close-knit VAR network highly familiar with the product, many of whom are in regular contact with the 2200 Group. These people will be generally familiar with the product through newsletters and marketing literature distributed by Wang and the User group and by their contacts with Wang and other VARs.

IV. SPECIAL TOOLS/TEST EQUIPMENT

No unique items required to service this product.

V. OPERATING ENVIRONMENT

A. TEMPERATURE RANGE

Storage (packaged) 0 to 120 deg F (-17 to 50 deg C)
Operating 60 to 90 deg F (16 to 28 deg C)

B. VOLTAGE RANGE

115 VAC +/- 12 VAC at 60 Hz +/- 0.5 Hz
230 VAC +/- 24 VAC at 50 Hz +/- 0.5 Hz

C. HUMIDITY RANGE

Storage (packaged) 10% to 90%
Operating 20% to 80%
Wet Bulb Temperature 75 deg F max (24.4 deg C)

D. PHYSICAL SPECIFICATIONS

Physical specifications will vary according to the CPU cabinet the card set is installed in. The physical dimensions of the CS-D/N which the 210-9578 motherboard is compatible to follows:

Height 23.9 inches 60.7 centimeters
Width 15 inches 38.1 centimeters
Depth 15.75 inches 40.0 centimeters

E. SERVICE SPACE REQUIREMENTS

Observe the service space requirements for the 2200 CPU in which the boards are installed. For the CS-D/N the space requirements are:

Front: 30" (91.4 cm)
Rear: 36" (76.2 cm)
Top: 20" (96.5 cm)

F. INPUT CURRENT

Observe the input current requirements for the 2200 CPU in which the boards are installed. For the CS-D/N these requirements are:
2.0 amps at 115 VAC 60 Hz (running)
1.0 amps at 230 VAC 50 Hz (running)

G. INPUT POWER

Input power drawn will be dictated by the 2200 CPU in which the boards are installed. For the CS-D/N the power drawn will be:
170 Watts
230 Voltamps

H. POWER FACTOR

The power factor of the system in which it is installed will be unchanged. For the CS-D/N the power factor is:
0.74 lagging

I. HEAT LOSS

The heat loss for the CPU in which the Turbo card set is installed will be virtually unchanged. For the CS-D/N: 581 BTU/hr (146.4 KgCal/hr.)

J. LEAKAGE CURRENT (grounding requirements)

The leakage current will be determined by the CPU in which the Turbo card set resides. For the CS-D/N: 0.2 Ampere at 115 VAC 60 Hz, 0.2 Ampere at 230 VAC 50 Hz

VI. POWER CORD DATA

A. PLUG TYPE

NEMA 5-15 120 VAC in all compatible domestic CPUs

B. LENGTH

Power cable length will be determined by the CPU in which the Turbo resides. For the CS-D/N: 6 feet (1.8 meters)

VII. DOCUMENTATION LIST

- A. PRINTS:.....210-9576
210-9577
210-9578
210-9579
210-9580
210-9581
210-9583
- B. MAINTENANCE MANUAL:.....741-1769-A Available 11/91
- C. VENDOR MANUALS:.....N/A
- D. DIAGNOSTIC ERROR LISTINGS:.....Included in Maintenance Manual
- E. P.M. PROCEDURES:.....N/A
- F. REPAIR PLAN:.....Rob Clark/Jim Riley
- G. SALES LITERATURE:.....Product Data Sheet by FCS
- H. OPERATORS' GUIDE/USER INFORMATION:...715-2364A Available by FCS

APPENDICES

MARKETING FORECAST

	Q2	Q3	Q4	Q1
	FY92	FY92	FY92	FY93
DOMESTIC	67	68	68	67
INTERNATIONAL	67	68	68	67
TOTAL	134	136	136	134

BETA SITES

Customer	Site Specifics
1. Wallaston Alloys Inc. Wood Road Braintree, MA Contact: Bill Hurley Tel: 617-848-3333	CPU Chassis: CS/N 16 Meg Memory 1 MFX Controller 2 Hi-Speed Disk Controller, 1 connected to a DS through a 2275MUX
2. Vectrocom Inc. 19 Donegani, Suite 707 Point Claire, Quebec Canada H9R2V6 Contact: Marc De Gagne Tel: 514-636-0743	CS or MicroVP supplied by Customer 210-9583 Motherboard CPU Board with 16 Meg Memory 1 MFX Controller with 2 Octopus Cables 1 High-Speed Printer/Disk Controller
3. Rader Companies P.O. Box 20128 Portland, Oregon 97220 Contact: Bill Chapin Tel: 503-255-5330	CPU Chassis: MicroVP to be supplied by cust. 210-9583 Motherboard CPU Board with 8 Meg Memory 2 MFX Controller with 4 Octopus Cables 1 Hi-Spd Disk Ctrler used w/ NED's RAM Disk
4. Northeast Digital Corp 124 Railroad Drive Northhampton Ind. Pk. Ivyland, PA. 18974	CPU Chassis: Customer's MicroVP 4 Meg Memory 1 MFX Controller 1 Hi-Spd Disk Ctrlr used w/diff drives including Px, 2275, & non-Wang

NOTES: All 4 sites to have a minimum of 1 complete card set. A set would include 1 motherboard, 1 CPU board, 1 MFX Terminal controller, and 1 Hi-Speed Disk controller.

PRODUCT MATURE PERFORMANCE PREDICTED

<u>Model Number</u>	<u>Product Description</u>	<u>Service Parameter</u>	<u>Rate per Year</u>	<u>Time (hours)</u>
CS/386 Turbo	2200 Computer System	Field Failures	.38	
		Calls	.77	
		MTTR		1.77
		Call Duration		2.82
		Installation Time		1.30
		PM Calls	0.00	
		PM MTTR		0.00
		FCO Calls	0.00	
		FCO MTTR		0.00
		Upgrades/Model	0.02	
	Upgrade Install Time		1.03	

PRODUCT ANALYSIS WITH GROWTHProduct Field Failures/Year and Calls/Year
by Month after InstallationModel Number: CS/386 TurboProduct Description: 2200 Computer System

	<u>Month after Installation</u>							
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8+</u>
Field Failures/Year	1.03	0.41	0.39	0.39	0.39	0.39	0.39	0.39
Calls/Year	2.13	1.31	0.86	0.77	0.77	0.77	0.77	0.77

NOTE:

Every effort has been made to include the most current information available but, these part numbers are subject to change.

Customer Service Logistics will provide updated, released part numbers through the normal RSL process.

FRUs, CRUs,

per CPU:		: stocking :						
Quantity:	PART #	DESCRIPTION	FRU:	CRU:	Unique:	B	A	H
		: location :						
1	:210-9576-A	: CPU/Memory PCB (no SIMMS)	: X	:	:	:	:	:
4 or 8	:377-4533	: 1 Meg SIMM Module	: X	:	:	:	:	:
4 or 8	:377-4535	: 4 Meg SIMM Module	: X	:	:	:	:	:
1 to 4	:212-9717	: MXF 16 Port Terminal Cntrlr:	X	:	:	:	:	:
1 to 3	:212-9718	: Hi Speed Printer/Disk Cntllr:	X	:	:	:	:	:
1	:210-9578	: Turbo Motherbrd (for CS-D/N):	X	:	:	:	:	:
1	:210-9583	: Turbo Mbd (for CS & MicroVP):	X	:	:	:	:	:
2 / MXF:	421-0181	: MXF 7 Port Octopus Cable	: X	:	:	:	:	:
1	:458-5026	: New CPU Dr Cover for CS-D/N	:	:	:	:	:	:
	:	: Rail Kit for CS	:	:	:	:	:	:
2	:451-2782	: Top/Bot Rails for I/O Brds	:	:	:	:	:	:
2	:452-0830	: Side Rails for I/O section	:	:	:	:	:	:
1	:458-5194	: New CPU Door Cover for CS	:	:	:	:	:	:
	:	: Rail Kit for MicroVP	:	:	:	:	:	:
2	:451-2782	: Top/Bot Rails for I/O Brds	:	:	:	:	:	:
1	:452-0830	: Side Rail for I/O section	:	:	:	:	:	:
2	:451-2781	: Top/Bot Rails for CP/PS Cvr:	:	:	:	:	:	:
1	:455-0290	: Outer Rail for CPU/PS Cover	:	:	:	:	:	:

PARTS LIST

Diagnostic Part Number: 195-2956-0

Parts required for P.M.: N/A

CS/386 Turbo Seminar Attendees

<u>NAME</u>	<u>HOME LOCATION</u>
J. Forbes	Boston
B. Weir	Boston/R.I.
T.F. Wong	New Jersey
D. Kelch	Philadelphia
E. Ratka	Philadelphia
M. Rettig	Bethesda
T. Taylor	Va./Washington DC
D. Amini	Va./Washington DC
R. Pincek	Pittsburgh
S. Cheatham	Chicago
B. Griffin	Chicago
S. Schuster	Denver
D. Liao	California
P. Stieger	Seattle
A. Damiano	Canada
W. Duclos	Canada

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C U S T O M E R E N G I N E E R I N G

P R E L I M I N A R Y

M A I N T E N A N C E P L A N

2200 NEW PRODUCTS

updated July 8, 1991

CS/386 Turbo 22C11-SCSI Controller

Product Support Engineer
Mike Bahia

Product Line Manager
Gene Roy

Product Line Director
Mike Runge

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I. PRODUCT DESCRIPTION

A. OVERVIEW OF THE PRODUCT

The 22C11-SCSI Controller is a new intelligent controller for use with the CS/386 Turbo CPU. It provides the Turbo with an industry standard SCSI interface capable of significant disk I/O performance beyond anything currently now available to the product line. The SCSI controller has 2 Meg of on-board cache dedicated to it. Taking full advantage of the potential of this controller may require some programming changes. With this controller and the drives tested, multiple sectors can be read as quickly as 1 sector. If only reading 1 sector per access, throughput will be minimized. The number of sectors to read for optimum performance may vary from drive to drive. Changing programs on disk to 386 or 'NEW' format is recommended. A new command operational with the Turbo system is available to greatly simplify this process (\$MOVE!). The board consists of a 210-9579 High Speed I/O Processor Board and a 210-9582 SCSI/Printer Controller Board. The 9579 I/O Processor Board is the same basic board used with the Turbo MXF Terminal Controller and the 22C11-HS Printer/Disk Controller. The 9582 board handles all communication to any attached device. It has 2 common SCSI connectors, J4 external on the bottom half of the outer rail, and J5 found on the board just behind J4. These connectors provide an A Cable connection for either a 50 pin shielded amphenol connector via J4, or a 50 pin ribbon cable via J5. The SCSI port is ANSI X3.131-1986 compatible. The SCSI bus can support 8 SCSI devices of which the controller itself will be one. The controller has it's own unique device number set via switches. At the top of the outer rail is a standard 2200 Centronics printer interface, J1. Because printing from this port uses a 256K cache buffer and is controlled by the 286 processor freeing the CPU to other tasks, it too can enhance performance.

B. SIMILARITIES/DIFFERENCES (with other WANG products)

1) Software:

Use of the 22C11-SCSI Controller requires at minimum Turbo General Release 1.10.00 or higher. All standard BASIC-2 disk commands compatible to the DS with the CS/386 or Turbo are 100% compatible to the 22C11-SCSI disks. There are also new commands to talk directly to the SCSI disk drives and tapes. Unlike current disk drives now used with the 2200 product line which are pre-configured through switches and prom based code, SCSI disk drives must be configured through software. This is done with a new utility program which will be included with the Turbo Operating System. New menu picks will include 'SCSI Configuration' and updated versions of the 'Tape Backup and Restore' programs which will work with both the DS and SCSI. The 'SCSI Configuration' menu pick steps the user through the processes needed to initially setup the drive for use including a low level SCSI format and configuring the hard disk drive/s for various platter sizes. Pre-release versions of this software allow from 1 to 15 master addresses (D11-D1F, D21-D2F, or D31-D3F) or from 1 to 14 slave addresses (D51-D5E, D61-D6E,

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or D71-D7E) per disk drive, with a maximum of 29 hard disk addresses per controller. The first master and slave addresses (D10, D20, D30, D50, D60, & D70)) will be reserved for floppy drives and the last slave address for tape (D5F, D6F, or D7F). Final version software is expected to allow from 1 to 28 addresses per disk drive and per controller to take better advantage of systems with one large drive. The final version utility is also expected to reserve the last master address (D1F, D2F, or D3F) for a 2nd optional tape unit. After configuring the drive/s, all surfaces should be formatted using the standard 2200 format (\$FORMATDISKT/Dxx). A 16 Meg surface can be formatted in a matter of seconds dependent on drive speed. This overwrites any code which may have been written to disk with the SCSI format which may create confusion for the system. Anytime a drive is to be reconfigured, both a low level SCSI format via the utility and a 2200 format should be done to insure all new surfaces are 100% clean. The 'Backup' & 'Restore' to SCSI Tape procedures are quite similar to the DS tape procedures. The main difference is you cannot append to a tape on 'Backup'. This is because the tape drives currently available write in a serial format and do not have the separate directory track used with the DS version tape drives. At this writing, if using a 5 1/4" SCSI floppy, only 1.2M 2200 diskettes formatted in DOS format (512 byte sectors) are compatible. A DOS format can be done on a 1.2M DS floppy by using the 'Format Disk Platter' menu pick from the main menu of the operating system. Once into the program, you enter the floppy address and you will be prompted to select either 'CS/2200 format' or 'DOS format'. Any 1.2M diskette formatted in DOS format written by a 1.2M DS floppy drive will be readable on the SCSI floppy. The SCSI floppy drive suggested by Wang will only write in 1.2M format. Properly created, these diskettes will be readable on the DS 1.2M floppy. Diskettes in standard 2200 format (256 byte sectors), both 360K and 1.2M, are expected to be supported with a future release of the O/S. All Turbo O/S disks are being created in DOS format for SCSI floppy compatibility. If set up properly, a boot can be done from the SCSI floppy before configuring the drives.

2) Hardware:

As stated, the controller consists of 2 boards and is supported only in a CS/386 Turbo CPU. The 210-9579 High-Speed I/O Processor Board is the same board used with the MXF and 22C11-HS but with it's own proms at location L7 and L14. The 210-9582 SCSI/Printer Controller is new. The printer port supports all existing 2200 printers. Multiplexing to multiple CPU's is not currently supported.

The SCSI port is compatible to the same SCSI devices supported on our VS systems which use the SSM-C SCSI Storage Module and the MDSC SCSI Mini Data Storage Cabinet. These 2 units will be the offered Wang devices for housing SCSI drives for the Turbo. As each SCSI device is handled by a transparent driver imbedded in microcode, some SCSI devices may not be compatible unless they comply with existing drivers for devices that have already been tested. R&D will add drivers for those SCSI devices which become popular. Current supported devices include:

see next page.

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CDC Magnetic Periph Model 94221	150MB HH Disk Drive	725-3822
Micropolis Model 1684	326MB HH Disk Drive	725-4895
Micropolis Model 1578	326MB FH Disk Drive	725-3814
Hewlitt Packard Model 97548S	647MB FH Disk Drive	725-4858
Archive Model 2150S	150MB HH Viper Tape Drive	725-3820
Archive Model 4320NT	1.2GB HH Python Tape Dr	see Appx A3
Teac FD-55GS 751-U	5 1/4" Floppy Drive (not avail from Wang)	

3) Other:

The normal procedure for powering disk units in the past has been to power the disk units up last after the CPU. With the SCSI devices currently being used, the SCSI unit must be powered on first and allowed to complete any self-test it may run. This normally takes just a few seconds and often completes with a clicking noise. None of the above listed devices on their own require more than 15 seconds. Multiple drives in a single cabinet may need more time. Once all drives within a unit complete self-tests the CPU can be turned on. After powering on the CPU, between 10 and 15 seconds, the CPU will go out and talk to the drive. Usually the drive LED will blink twice during this period. When booting the CPU, RESET should not be keyed until this communication takes place, otherwise the drive/s may not be recognized by the system. If the SCSI unit is to be powered off while the system is up and running, all existing accesses and all drive activity should be allowed to complete to prevent problems. The system should recognize any SCSI device which was operational before the unit was powered down. Any physical changes such as adding a device or changing a device ID # will require the system be rebooted.

C. ANNOUNCE/FIRST CUSTOMER SHIPMENT DATE

- | | | |
|-------------------|------------------------------|--------------------|
| 1) Domestic: | Announce: July 1, 1992 | FCS: July 31, 1992 |
| | Volume Ship: August 31, 1992 | |
| 2) International: | Announce: July 1, 1992 | FCS: July 31, 1992 |
| | Volume Ship: August 31, 1992 | |

D. SERVICE OFFERINGS/WARRANTY

This product will be installed and maintained by Customer Engineering personnel for customers with On-Site service.

This product will be covered by the standard Wang 90 day warranty.

E. SPECIAL PROGRAM/PROCEDURES

N/A

F. MAJOR COMPONENTS

- 1) 210-9579 High-Speed I/O Processor:

Contains a 286 processor which controls all I/O to any attached SCSI device or printer freeing the CPU to go off and handle other tasks. Communication to the CPU is handled via the 32 bit bus now present with the Turbo.
- 2) 210-9582 SCSI/Printer Controller Board:

The 9582 Controller Board was designed to maximize total system

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performance. It's major components include an NCR 53C90A SCSI Controller, an NCR 52C61 High Performance Memory Array Controller, a 16C452 2S/1P Serial/Parallel Controller, and a 2 Meg DRAM cache buffer.

G. CONFIGURATION REQUIREMENTS

Use of the 22C11-SCSI Controller requires the following:

1. Turbo CPU
 2. Turbo General Release 1.10.00 (beta test) 291-1001A
 3. New Disk/Tape Utilities for SCSI (included w/ future O/S's)
 4. SSM-C SCSI Storage Module or a MDSC Mini Data Storage Cabinet
 5. The following is a list of SCSI devices that have been tested. Devices other than those listed would need to be thoroughly tested to insure proper operation. Some may require a software driver be built and imbedded in microcode by R&D.
- All new drivers will be built at the discretion of Wang Labs.
- | | |
|--|-------------|
| CDC Magnetic Periph Model 94221 150MB HH Disk Drive | 725-3822 |
| Micropolis Model 1684 326MB HH Disk Drive | 725-4895 |
| Micropolis Model 1578 326MB FH Disk Drive | 725-3814 |
| Hewlett Packard Model 97548S 647MB FH Disk Drive | 725-4858 |
| Archive Model 2150S 150MB HH Viper Tape Drive | 725-3820 |
| Archive Model 4320NT 1.2GB HH Python Tape Dr | see Appx A3 |
| Teac FD-55GS 751-U 5 1/4" Floppy Drive (not avail from Wang) | |

II. MAINTENANCE PHILOSOPHY

A. Maintenance Objectives

1) C.E. Level:

This board will operate in a similar way to existing 2200 controllers. Effective maintenance of the 22C11-SCSI will require the following:

- a) A working familiarity with the 2200 hardware and O/S.
- b) Skillful cause analysis at the system level.
- c) Knowledge of the diagnostics on the 2200 system.
- d) A working knowledge of SCSI drives.

2) Maintenance Procedures:

Maintenance on this product will be performed on-site by a Wang Customer Engineer. A working knowledge of the system along with built-in diagnostics in the hardware and operating system as well as existing on-line diagnostics will help the C.E. to isolate hardware failures. The 22C11-SCSI board has an LED that lights during power up and goes out if the board passes built-in self test. When a board failure occurs, that board will be replaced with a board from C.E. stock and the bad board will be returned through C.E. logistics channels for repair.

B. Types of contract to be offered

On-Site Maintenance Contracts will be offered.

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C. P.M. requirements

1) Customer performed:

To insure proper operation of this product, the Customer should observe the Environmental, Power and Cabling, and Site Selection Considerations outlined in the CUSTOMER SITE PLANNING GUIDE (part # 700-5978).

2) WANG C.E. performed:

This product will not require scheduled preventive maintenance.

D. Diagnostics required/available:

1) C.E. Level:

Magnetic Media p/n 732-8520A 5-1/4" DSDD
This diagnostic disk is part of the 2200 Diagnostic Package (currently Rev 2.00.00, p/n 195-2956-0).

2) Customer Level: Machine level diagnostics built into the Operating System run a cursory test to all the Turbo specific controllers to check status during boot if RESET is not keyed. There are also similar tests that check communication between the controller and the CPU which can be selected by PF' key during boot. Customer Engineering should not depend on these diagnostics solely to identify problems. Problems especially of an intermittent nature will not likely fail with these tests.

3) Built-in: The 22C11-SCSI has a LED which will light during power up self tests. If the LED stays on, the board has failed self-test and should be replaced.

Note: On the pre-release SCSI beta boards the LED is not functioning and is on always. This does not affect normal operation.

III. TRAINING

There is no planned training on this product or the product line at this time. In response to a memo sent out by CSO in the fall of 1991, the domestic field offices indicated their personnel had enough experience on the product line where a formal training class was not deemed necessary. There will be an announcement TSB with technical information to support initial installations. An addendum to the Maintenance Manual, part number 741-1769A will follow.

A. CUSTOMER ENGINEER COURSE:

N/A

B. SALES SUPPORT COURSE

1) TIMETABLE and FORMAT

The 2200 Product Line is normally sold through a close-knit VAR network highly familiar with the product, many of whom are in regular contact with the 2200 Group. These people will be generally familiar with the product through newsletters and marketing literature distributed by Wang and the User group and by their contacts with Wang and other VARs.

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IV. SPECIAL TOOLS/TEST EQUIPMENT

No unique items required to service this product.

V. OPERATING ENVIRONMENT

A. TEMPERATURE RANGE

Storage (packaged) 0 to 120 deg F (-17 to 50 deg C)
Operating 60 to 90 deg F (16 to 28 deg C)

B. VOLTAGE RANGE

115 VAC +/- 12 VAC at 60 Hz +/- 0.5 Hz
230 VAC +/- 24 VAC at 50 Hz +/- 0.5 Hz

C. HUMIDITY RANGE

Storage (packaged) 10% to 90%
Operating 20% to 80%
Wet Bulb Temperature 75 deg F max (24.4 deg C)

D. PHYSICAL SPECIFICATIONS

The controller is a mother/daughter board setup using 1 CPU I/O slot.

Height 14.9 inches (35.3 centimeters)
Width 1.15 inches (2.9 centimeters)
Depth 8.32 inches (21.1 centimeters)

E. SERVICE SPACE REQUIREMENTS

Observe service space requirements for unit models involved.

F. INPUT CURRENT

Observe the input current requirements for the 2200 CPU in which the board is installed. For the CS-D/N these requirements are:
2.0 amps at 115 VAC 60 Hz (running)
1.0 amps at 230 VAC 50 Hz (running)

G. INPUT POWER

Input power drawn will be dictated by the 2200 CPU in which the boards are installed. For the CS-D/N the power drawn will be:
170 Watts
230 Voltamps

H. POWER FACTOR

The power factor of the system in which it is installed will be unchanged. For the CS-D/N the power factor is:
0.74 lagging

APPENDICES

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MARKETING FORECAST

	! Q1 !	! Q2 !	! Q3 !	! Q4 !
	! FY93 !	! FY93 !	! FY93 !	! FY93 !
DOMESTIC	! 25 !	! 25 !	! 25 !	! 25 !
INTERNATIONAL	! 25 !	! 25 !	! 25 !	! 25 !
TOTAL	! 50 !	! 50 !	! 50 !	! 50 !

PRODUCT MATURE PERFORMANCE PREDICTED

<u>Model Number</u>	<u>Product Description</u>	<u>Service Parameter</u>	<u>Rate per Year</u>	<u>Time (hours)</u>
22C11-SCSI	SCSI/Printer Contrlr	Field Failures	0.06	
		Calls	0.40	
		MTTR		1.77
		Call Duration		2.82
		Installation Time		1.30
		PM Calls	0.00	
		PM MTTR		0.00
		FCO Calls	0.00	
		FCO MTTR		0.00
		Upgrades/Model	0.02	
	Upgrade Install Time		1.03	

PRODUCT ANALYSIS WITH GROWTHProduct Field Failures/Year and Calls/Year
by Month after InstallationModel Number: 22C11-SCSIProduct Description: Turbo SCSI/Printer Controller

	<u>Month after Installation</u>							
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8+</u>
Field Failures/Year	0.18	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Calls/Year	0.36	0.19	0.14	0.13	0.13	0.13	0.13	0.13

NOTE:

Every effort has been made to include the most current information available, but these part numbers are subject to change.

Customer Service Logistics will provide updated, released part numbers through the normal RSL process.

PARTS LIST

FRUs, CRUs,

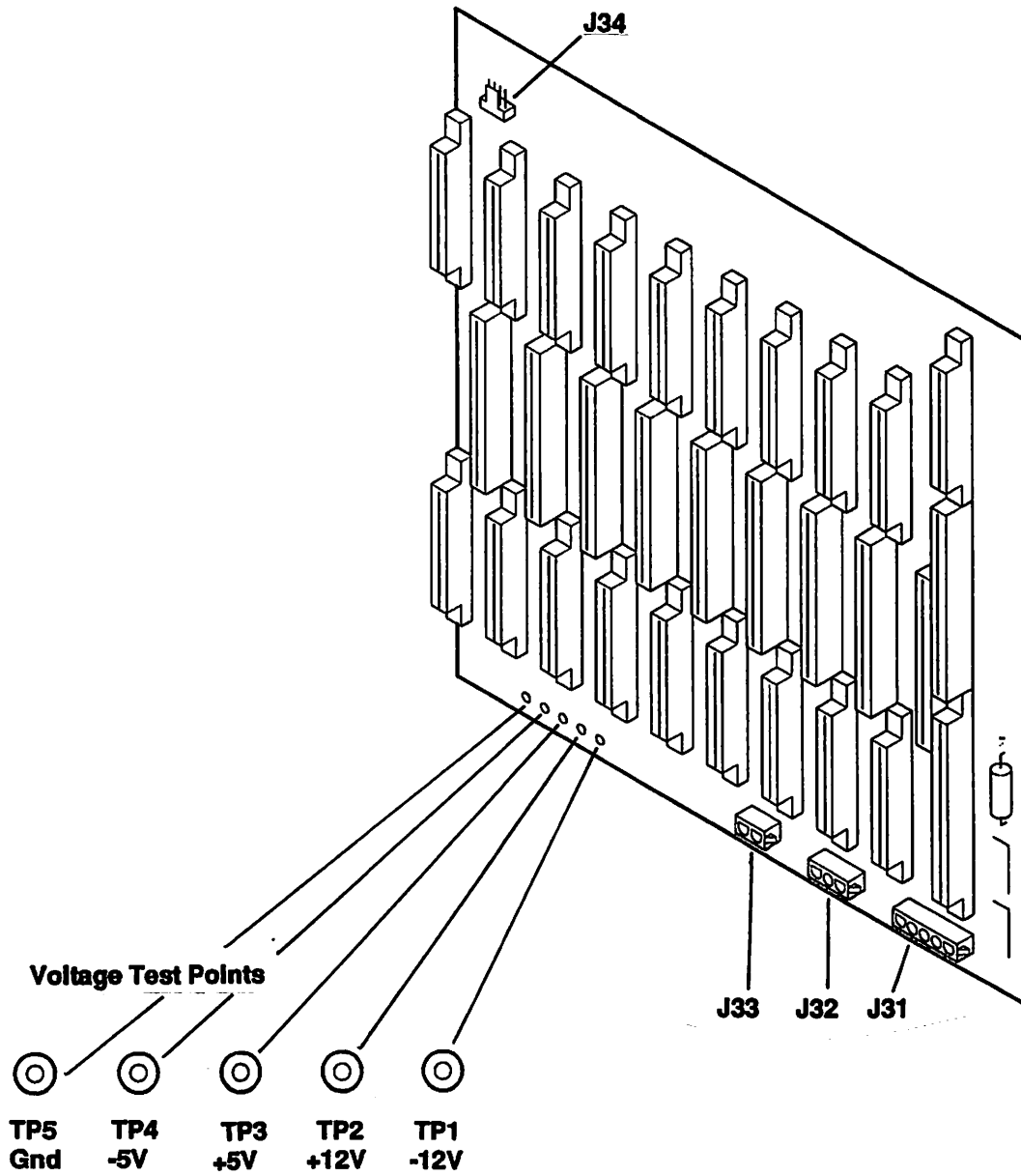
							: stocking :			
							: location :			
:PART #	:	DESCRIPTION	:	FRU:CRU:Unique:	B	A	H	:	:	:
:212-9727	:	22C11-SCSI Controller	:	X	:	:	:	:	:	:
Related hardware:										
:725-3822	:	Mag Periph 94221 150M HH Dsk	:	X	:	:	:	:	:	:
:725-4895	:	Micropolis 1684 326M HH Disk	:	X	:	:	:	:	:	:
:725-3814	:	Micropolis 1578 326M FH Disk	:	X	:	:	:	:	:	:
:725-4858	:	HP Model 97548S 647M FH Disk	:	X	:	:	:	:	:	:
:725-3820	:	Archive 2150S 150M HH Tape	:	X	:	:	:	:	:	:
:725-5981	:	Archive 4320NT 1.2G HH Tape	:	not avail at this writing:						
:421-0066	:	50 Pin I/O Cable-SSM & MDSC	:	X	:	:	:	:	:	:
:	:	50 Pin SCSI Ribbon Cable	:	not avail from Wang						
:725-4910	:	50 Pin SCSI Terminator w/LED	:	X	:	:	:	:	:	:
:725-7269	:	Term (repl'd by 725-4910)	:	X	:	:	:	:	:	:
:725-1294	:	600' Data Cart Tape/Arch 150	:	X	:	:	:	:	:	:
:725-9119	:	4mm Data Cart Tape/Arch 1.2G	:	X	:	:	:	:	:	:
:	:	TEAC FD-55GS 751-U 5 1/4" Dr	:	not avail from Wang						

Diagnostic Part Number: 195-2956-0

Parts required for P.M.: N/A

Controls and Indicators

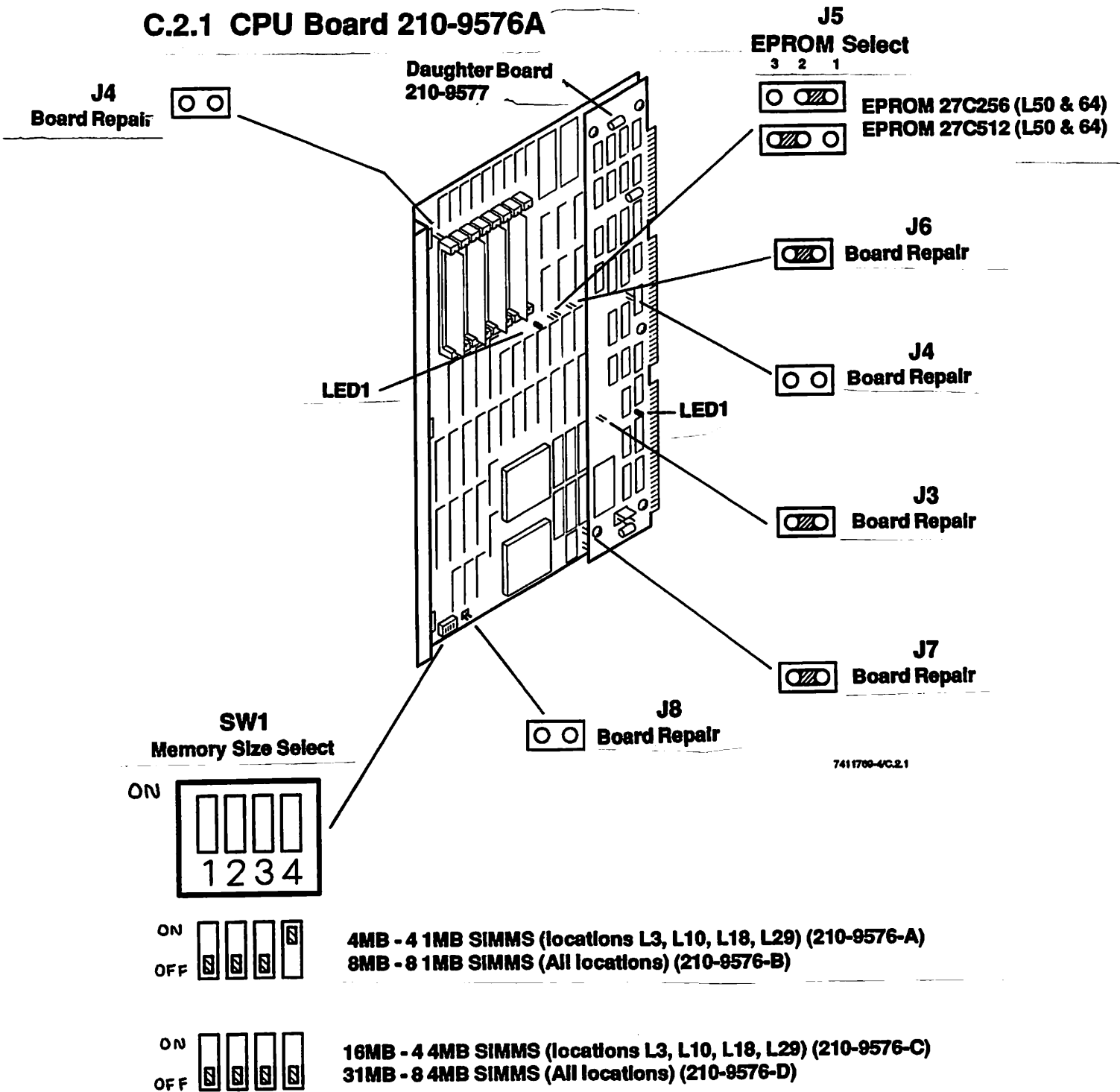
Motherboard 210-9578



386 TURBO

Settings

C.2.1 CPU Board 210-9576A



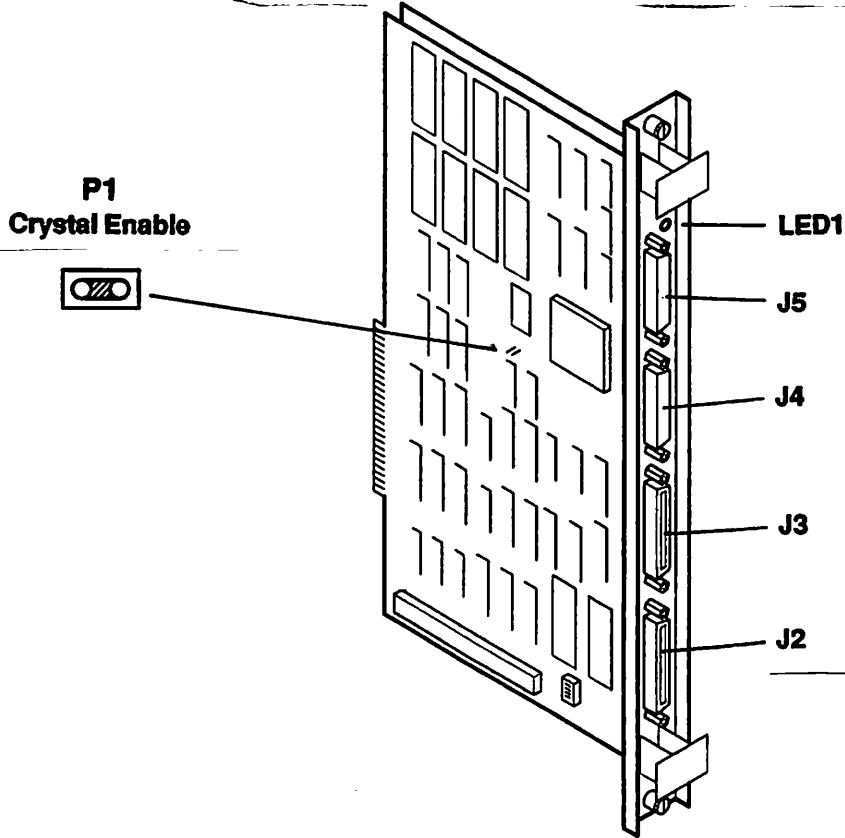
7411700-4C.2.1

386 TURBO

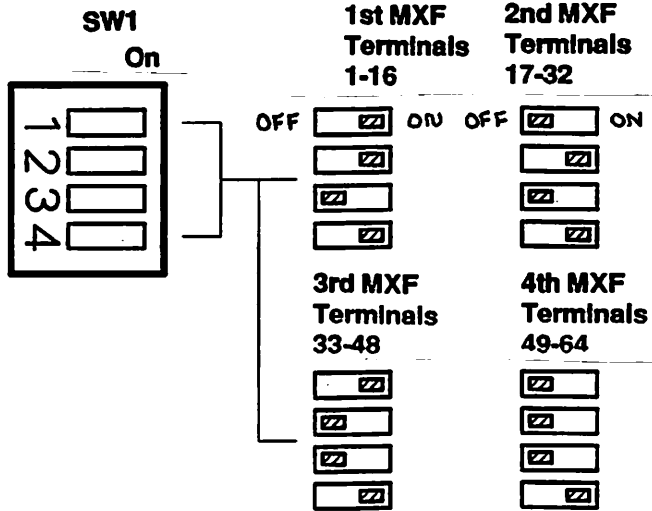
Settings

MXF 16-Port Terminal Controller (212-9717)

210-9579



7411769-4C.2.2-1

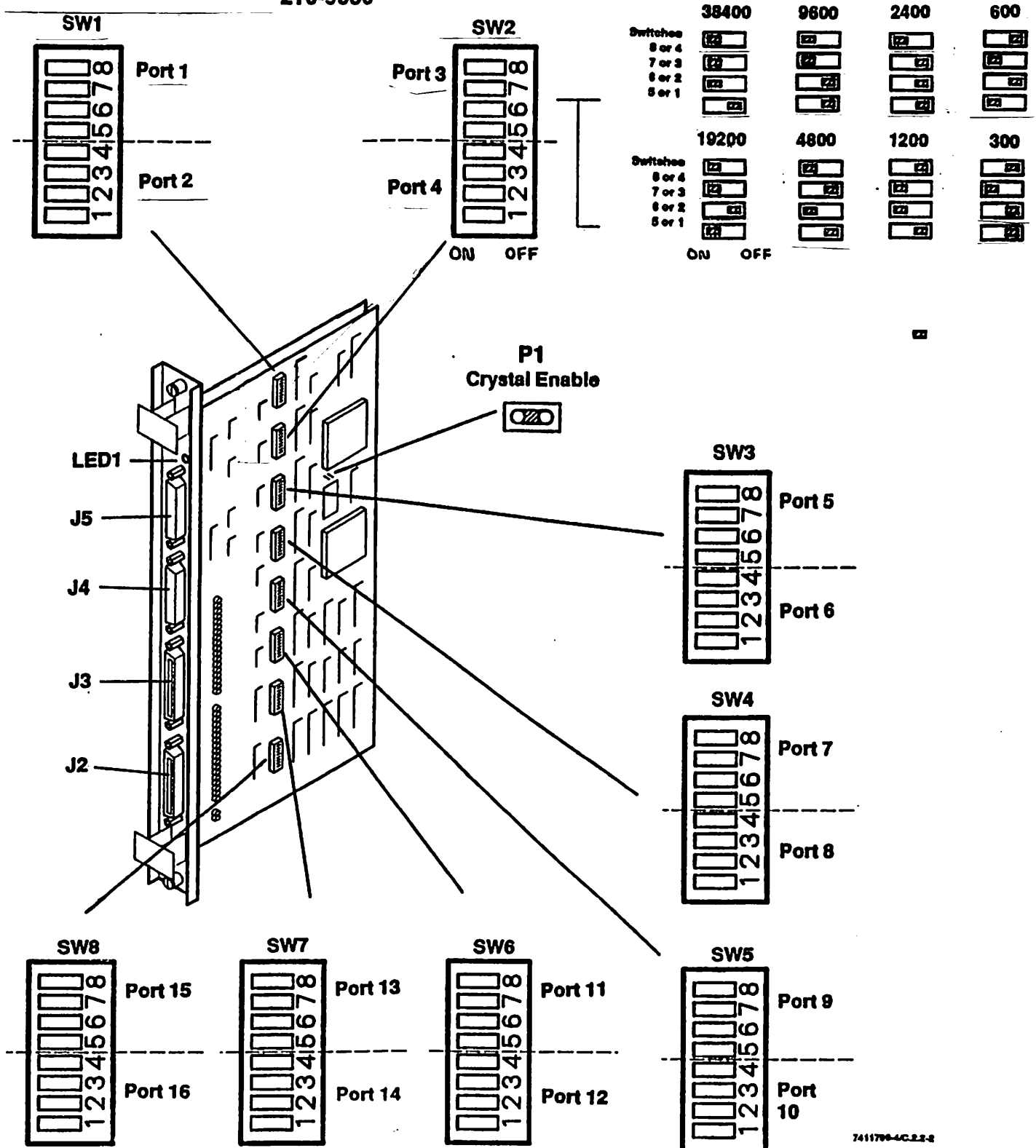


386 TURBO

Settings

MXF 16-Port Terminal Controller (212-9717)

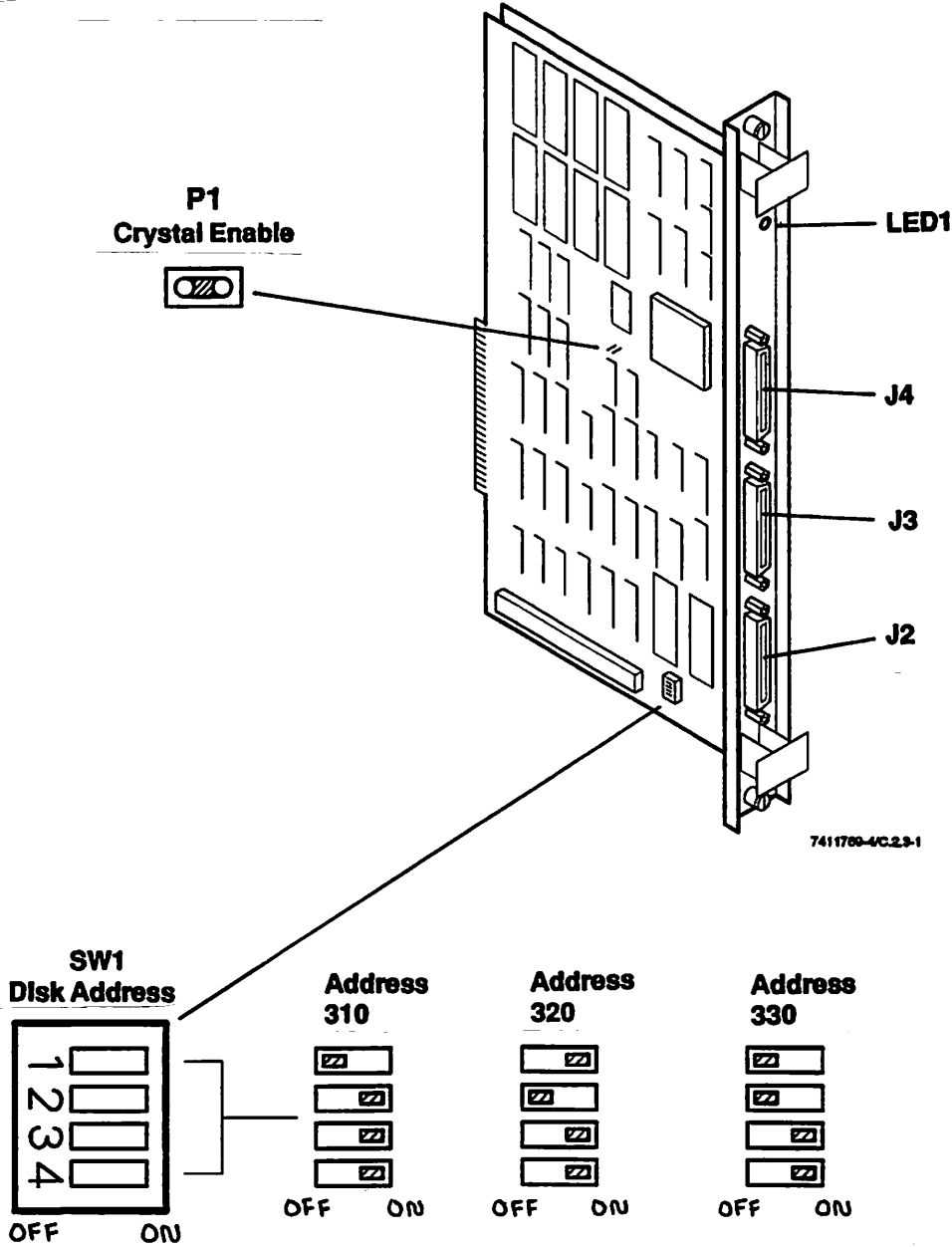
210-9580



Settings

Printer/Disk Dual Controller (212-9718)

210-9579



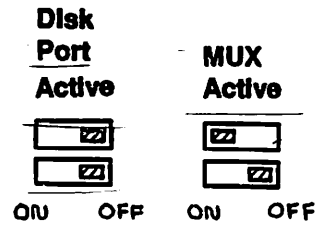
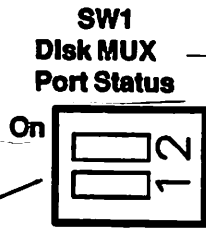
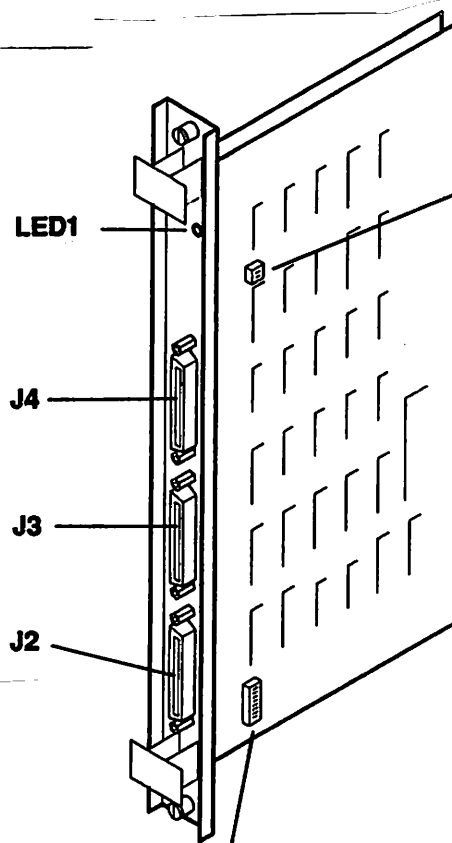
☑

386 TURBO

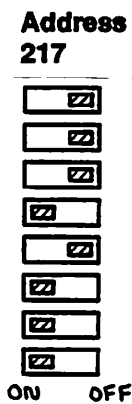
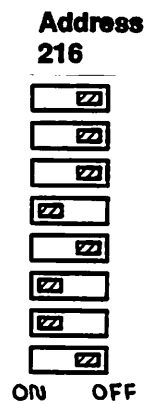
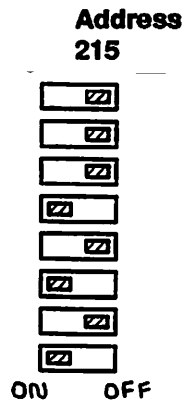
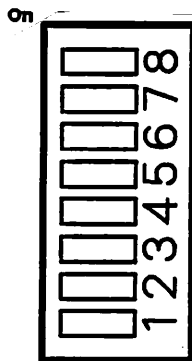
Settings

Printer/Disk Dual Controller (212-9718)

210-9581



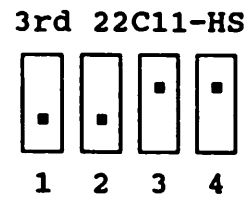
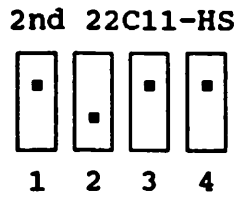
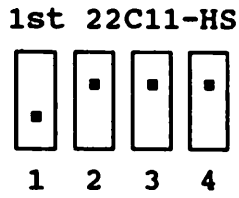
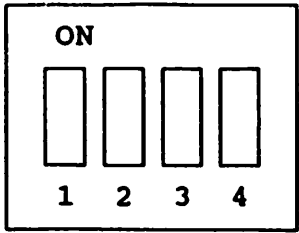
SW2
Printer Address



NEW 6/24/91

O.11
MXF
22C11-2

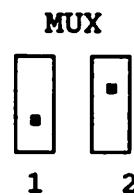
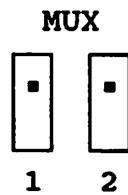
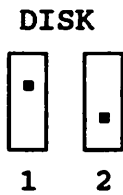
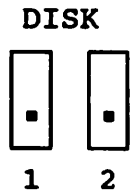
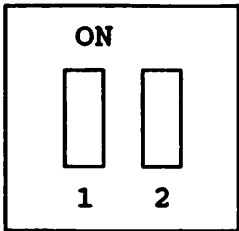
1. On 22C11-HS mother board (210-9579-1A) L:SW1 switch definition:



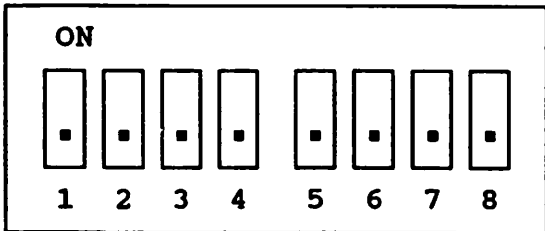
CAN WE REVERSE?

SW	4	3	2	1	Board Address
	0	0	0	1	No. 1 22C11-HS
	0	0	1	0	No. 2 22C11-HS
	0	0	1	1	No. 3 22C11-HS

2. Switch SW1 - MUX and Disk



3. On 22C11 daughter board (210-9581) L:SW2 - PRINTER Address Port

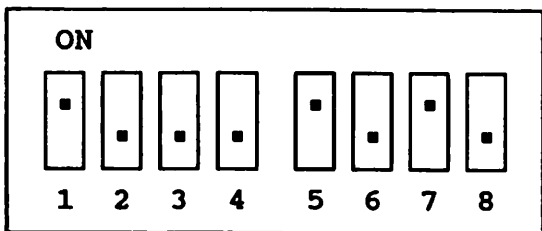


Setting 'OFF' that is Diagnostics " RUN-IN " mode.

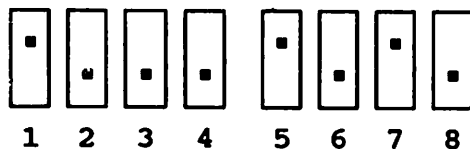
?

Printer Address Port Example:

If port address = 51H, the switch must setting as follows:

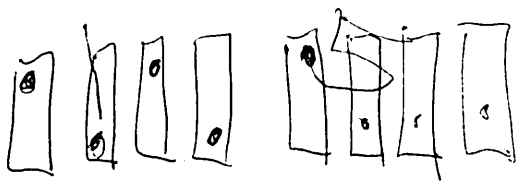


Low nibble High nibble

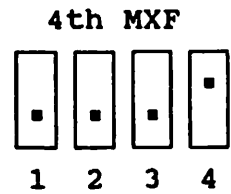
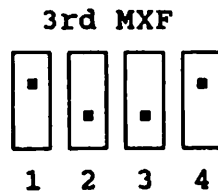
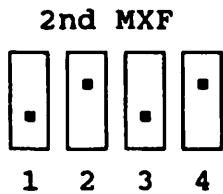
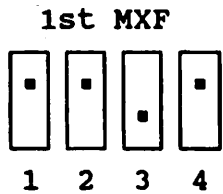
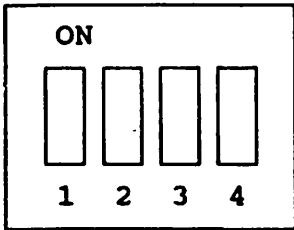


ON: 1
OFF: 0

15



1. On MXF mother board (210-9579A) L:SW1, switch setting:

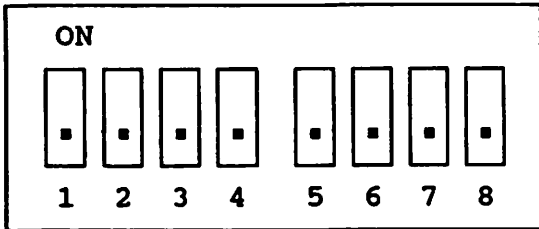


SW	4	3	2	1	Board Address	Terminal
	0	1	0	0	No. 1 MXF	No. 1 - 16
	0	1	0	1	No. 2 MXF	No. 17 - 32
	0	1	1	0	No. 3 MXF	No. 33 - 48
	0	1	1	1	No. 4 MXF	No. 49 - 64

CAN WE CHANGE TO SAME FORMAT AS MXD/MXF

ALL OFF
1 ON ONLY
2 ON ONLY
1 & 2 ON ONLY

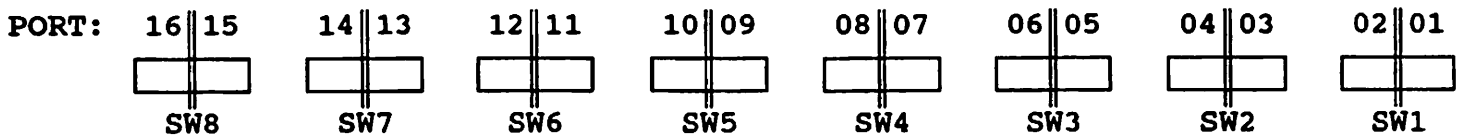
2. On MXF daughter board (210-9580) L:SW1-SW8, if all of switch (SW1-SW8)



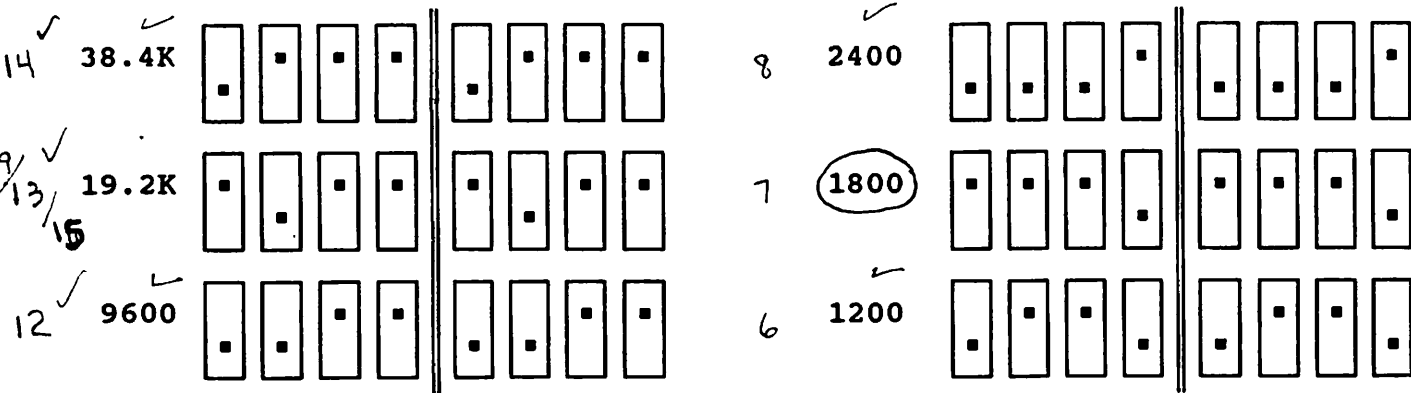
Setting 'OFF' that is Diagnostics

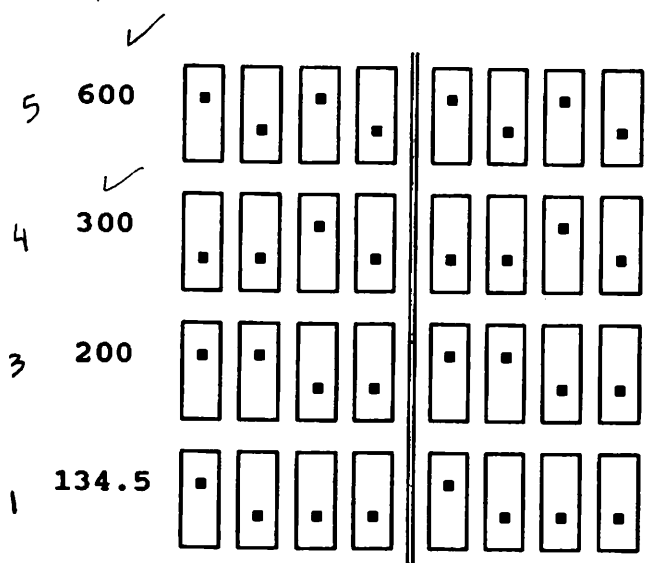
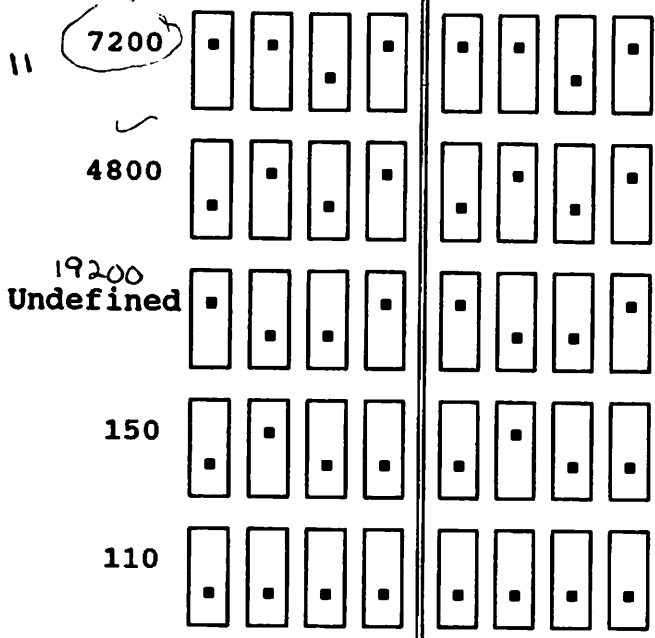
" RUN-IN " mode.

3. Nibble unit is defined as baud rate of each PORT.



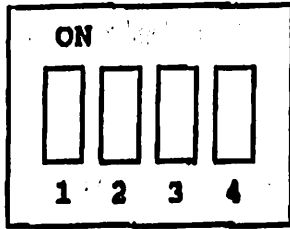
4. Baud rate setting :



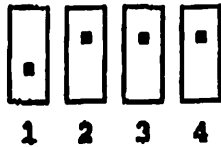


* Others SW position is defaulted " 19200 " bps.

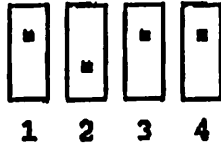
A. On 22C11-HS mother board (210-9579-1A) L:SW1 switch definition:



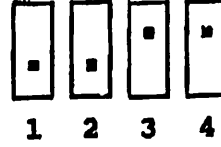
1st 22C11-HS



2nd 22C11-HS

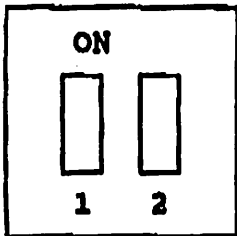


3rd 22C11-HS

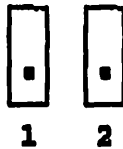


SW	4	3	2	1	Board Address
	0	0	0	1	No. 1 22C11-HS 310
	0	0	1	0	No. 2 22C11-HS 320
	0	0	1	1	No. 3 22C11-HS 330

B. Switch SW1 - MUX and Disk



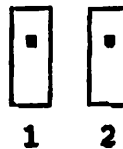
DISK



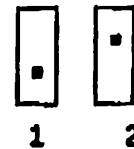
DISK



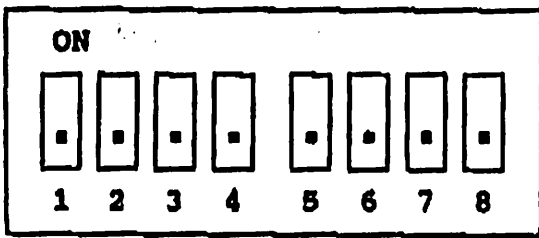
MUX



MUX



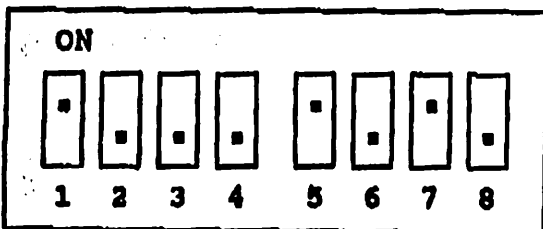
C. On 22C11 daughter board (210-9581) L:SW2 - PRINTER Address Port



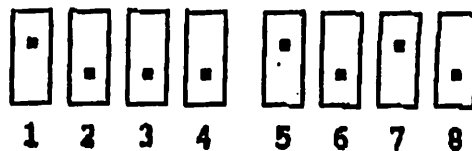
Setting 'OFF' that is Diagnostics " RUN-IN " mode.

Printer Address Port Example:

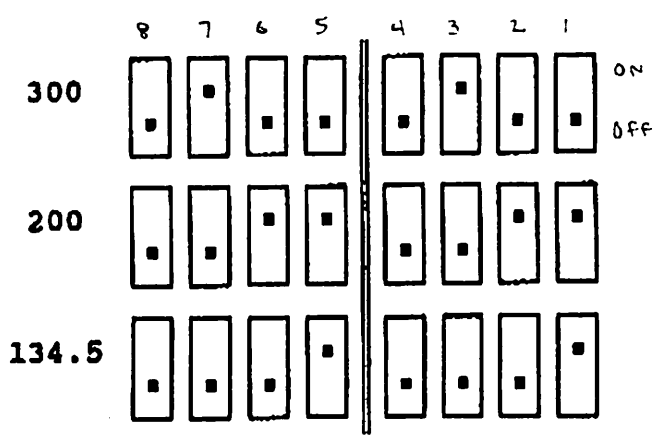
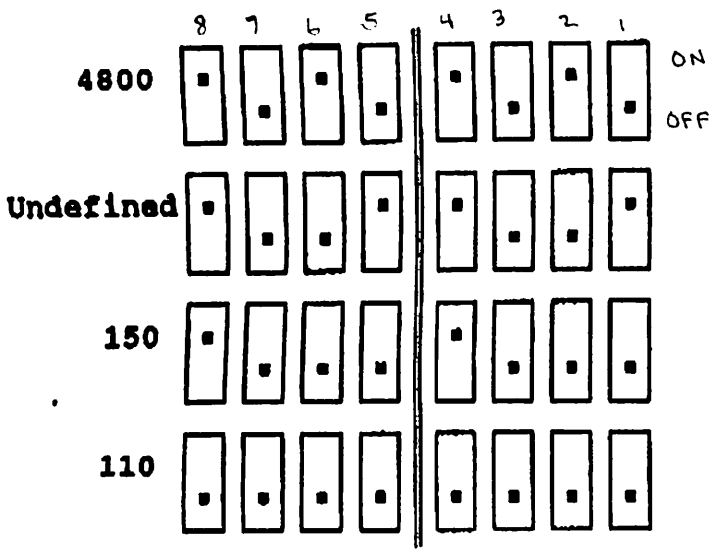
If port address = 51H, the switch must setting as follows:



Low nibble High nibble



ON: 1
OFF: 0



* Others SW position is defaulted
 " 19200 " bps.

TURBO UPGRADE

HARDWARE INSTALLATION PROCEDURE

Only CPUs specifically built for the single board 2200 CPU, VLSI or 386, can be upgraded to a Turbo. Those CPUs are the MicroVP, the CS, and the CS-D/N. Each chassis type has specific differences that affect installation. As such, there are 3 procedures determined by chassis type included within.

NOTE 1: 2200 '386' CPUs. Any programs running on a 386 based 2200 CPU board should run with little or no change on the Turbo. The exception would be programs that may reference status bytes in the O/S such as the CPU type or references to the CPU ID number. There could also be a problem with GIO commands. All GIO commands had to be recoded individually. All the standard GIOs were done. If a programmer created his own GIO there could be a problem. In that case a PTR should be opened through the RSC and escalated to RDB 8760. As with the 386 CPU Board, having programs in 'NEW' format is critical to reaching full performance potential. Please see the following TSB for additional information on 'NEW' or 386 format:

HWT 9640 Matrix 4103 11/xx/91 - CS/386 Turbo Announcement (pg 5, # 14)

NOTE 2: 2200 'VLSI' CPUs. VLSI, Very Large System Integration, refers to the technology that allowed Wang to take the multi-board MVP CPU and replace it with a single CPU board completely compatible to the multi-board units. Customers upgrading from a VLSI CPU must be aware that there are changes that may be required to their software to insure maximum performance and proper operation. Two of the more significant changes may be the additional memory required for partitions when upgrading from a VLSI or MVP CPU to the Turbo and the need for converting programs on disk to 'NEW' or '386' format. Simply, partitions should be made 80% larger. Included as part of the Turbo O/S is a new Basic command, \$MOVE!, which helps automate the conversion of programs from standard 2200 format to 'NEW' or '386' format. These changes are basically the same as those required when upgrading to the '386' Prom based CPU Board. Please see the following TSB's for more specific information:

HWT 9640 Matrix 4103 11/xx/91 - CS/386 Turbo Announcement

Before starting insure the customer has received all the necessary hardware and a Operating System. See page 7 for a breakdown of each of the Upgrade kits. Upgrades standardly come with 4 Meg of memory. Additional memory would be ordered through a 2nd Upgrade kit. The MXF and High Speed Disk Controllers are not included in the Turbo Upgrade Kits and must be ordered separately. The following checklist should help identify the needed hardware:

- Turbo Motherboard - 210-9583 for CS/MicroVP or 210-9578 for CS-D/N included in upgrade
- Turbo CPU Board - 210-9576A (comes with 4 Meg Memory) included
- Turbo Operating System Diskette included in upgrade
- Rail Kit for MicroVP - 6 pcs (see page 7) incl w/ MicroVP upgrade
- Rail Kit for CS - 4 Rails plus a new CPU Door Cover (see page 7) included with CS-TURBO Upgrade
- Additional Memory SIMMS - mem only, for 8/16/32M. ordered separately
- MXF Boards - 212-9717 - supports 16 terminals, comes with 1 octopus cable, 421-0181. A 2nd Octopus cable must be ordered separately to connect the 9th thru 16th terminals. This board is ordered individually.
- 22C11-HS Hi-Speed Printer/Disk Contlr - 212-9718 - ordered individually

Next, find out from the customer how the system should be configured. What addresses should be used with the High Speed Printer/Disk Controllers and what devices should be connected. Baud rates for the different terminal ports will have to be determined. The 2536DW W/S supports 38K Baud while older terminals support a max of 19200. A port for remote use would likely use a lower Baud.

MicroVP Upgrades: orders a MicroVP-Turbo, CEI # 200-6006, base package.

Removal:

1. Insure everyone is off the system and all jobs have completed. A complete back-up of all customer software should be done by the customer.
2. Power down the system, disk drives first, CPU last.
3. Unplug CPU power cable from wall.
4. Remove cover over CPU board and CPU board.
5. Remove all spacers over empty I/O slots and all I/O boards. Make note of all I/O board switch settings. If cables are disconnected from I/O boards please note orientation and location, and make note of the device address as set by the device switch on the controller.
6. Unplug all cables from the motherboard noting orientation and location.
7. Remove the existing motherboard by removing all screws.

Installation:

1. Install the 210-9583 Turbo Motherboard using the screws removed from the old motherboard. With some early version motherboards, some screw holes will not line up. In those instances secure the motherboard as follows:
 - a. Line up the screw holes for the CPU board connectors. Install screws in the top and bottom holes of the top (J1) and bottom (J21) connectors for the CPU board but leave the screws loose to allow the motherboard to move.
 - b. Install screws but do not tighten in the top and bottom I/O connectors for the furthest slot from the CPU board that lines up. Screws should line up for J8 and J28, third slot from the end. Do not force the screws in.
 - c. Install screws in the holes toward the middle of the top and bottom I/O connectors for the closest I/O slot to the CPU board that lines up. The 3rd slot in from the CPU, connectors J4 and J24 should line up. Do not force the screws.
 - d. Tighten all screws. Install any remaining screws in holes that line up in a balanced pattern from top to bottom and side to side. Do not over tighten the screws.
2. Connect the power supply cables disconnected in step 6 above.
3. Insure all SIMM Memory Modules ordered for the new Turbo CPU Board are installed in the correct locations (L3,L10,L18,L29 for 4 or 16 meg). Verify SW1 on the Turbo CPU board is set correctly as determined by the SIMM Module size. (4 ON only for 1M SIMMs, all OFF for 8M SIMMs)
4. Carefully install the new 210-9576A Turbo CPU Board visually lining up the contacts on the board with the contacts in the mating motherboard connectors. Verify the board is fully and evenly seated.
5. Clean the lip of the chassis above and below the I/O section where the controllers screw in. With the CPU on it's backside, place the Top and Bottom I/O Rails (451-2782) on the upper and lower lip of chassis I/O section lining up the holes with the holes for the I/O boards. See picture on last page. Peel back the protective tape from the ends of each rail and place the sticky side down lined up as before. Do not press down yet to allow some movement when seating the first few I/O Controllers.
6. Install all Turbo MXF Terminal Controllers verifying all switches are set properly to indicate board number (SW1 on the 9579) and correct Baud rates (SW1-SW8 on the 9580). See CS Maintenance Manual, 741-1769A, or TSB HWT 9640, 11/xx/91 for switch settings. Attach terminal cables.

*
*

7. Install any additional terminal controllers remembering the maximum number of terminal controller boards is still 4. When setting the board number for an MXE or MXD, count the MXF boards first as if they were MXEs. For example, if 2 MXF boards are installed, the first MXE/MXD would be board number 3. As in the past, if a 212-3012 Triple Controller is used the terminal port must always be the last terminal. Again count each MXF as 1 board as you would an MXE in setting the terminal port switch and insure the printer and disk address switches are set to legal addresses not used by any other boards to be installed. Legal disk addresses are 310, 320, 330. Legal printer addresses are 215, 216, 217. Attach cables as necessary.

8. Set the switches on all High Speed Printer/Disk Controllers to be installed. See CS Maint Mnl, 741-1769A, or TSB HWT 9640, 11/xx/91. The printer and disk address switches must be set to legal addresses not used by any other boards installed. Legal disk addresses are 310, 320, and 330. Legal printer addresses are 215, 216, and 217. Install the High Speed Printer/Disk Controllers and attach cables.

NOTE: This board has 2 disk options determined by SW1 on the 9581 board. It can be used as a straight disk controller (sw 1, both OFF) which uses the J2 disk port (bottom connector), or to access a drive being multiplexed via the middle connector, J3 (2 ON only). J3 is comparable to a 22C80 (210-7715) and would cable to a CPU port normally either on a 210-8824 2275 MUX Board or a 210-8825 MUX Extender Board.

9. Install all remaining I/O Controllers verifying all switch settings are set properly and have not been inadvertently changed. Reconnect any cables to these boards that may have been removed.

10. Install I/O spacer covers over any open I/O slots.

- * 11. Install remaining pieces of rail kit as follows: See last page.
- Remove the protective tape from the sticky surface at the ends of the Side Rail for the I/O Section (452-0830). Firmly press the rail with the sticky side down against the chassis lip centering it and butting it up against the last I/O board or spacer cover.
 - Remove the hex-shaped extension posts from the chassis used for the screws which hold down the CPU cover.
 - * - Lay the Top and Bottom Rails for the CPU Cover (451-2781) on the lip of the CPU lining up the screw holes as shown in the picture on last pg.
 - * - Lay the Outer Rail for the CPU Cover (455-0290) on the chassis lip between the top and bottom rails as shown on last page.
 - With the holes in the rails lined up with the holes in the chassis for the cover, reinstall the hex-shaped extension posts for the cover previously removed. Reinstall the CPU cover.
12. Reconnect power. Boot the system using the Turbo O/S and run CPU and disk diagnostics. Verify as much as possible all hardware is operational.

CS Upgrades: orders a CS-Turbo, CEI # 200-6009, base package.

Removal:

1. Insure everyone is off the system & all jobs have completed. A complete back-up of all customer software should be done by the customer.
2. Power down the system, disk drives first, CPU last.
3. Unplug CPU power cable from wall.
4. Remove door/cover over CPU board and CPU board.
5. Remove all spacers over empty I/O slots and all I/O boards. Make note of all I/O board switch settings. If cables are disconnected from I/O boards please note orientation and location, and make note of the device address as set by the device switch on the controller.

6. Unplug all cables from the motherboard noting orientation and location.

7. If a non-scratch type surface like a carpet is available, lay the CPU cabinet on the floor on it's front side to ease removal of the motherboard. Remove the existing motherboard by removing all screws.

Installation:

If a non-scratch type surface like a carpet is available, lay the CPU cabinet on the floor on it's front side to ease installation.

1. Install the 210-9583 Turbo Motherboard using the screws removed from the old motherboard. With some early version motherboards the screw holes for the last I/O slot of the motherboard do not line up properly and you will be unable to install these screws. Also, the screw in the top right corner above the CPU board cannot be installed as the hole is incorrectly positioned. The other 5 screws for the bottom connector of the CPU board, J21, the first I/O slot from the CPU, J2 and J22 and the middle I/O slot, J6 and J26 should line up and provide reasonable support. Do not tighten any of the 5 screws until all 5 are started. Do not force the screws or over tighten.

2. Connect the power supply cables disconnected in step 6 above.

3. Insure all SIMM Memory Modules ordered for the new Turbo CPU Board are installed in the correct locations (L3,L10,L18,L29 for 4 or 16 meg). Verify SW1 on the Turbo CPU board is set correctly as determined by the SIMM Module size. (4 ON only for 1M SIMMs, all OFF for 8M SIMMs)

4. Carefully install the new 210-9576A Turbo CPU Board visually lining up the contacts on the board with the contacts in the mating motherboard connectors. Verify the board is fully and evenly seated.

5. Clean the lip of the chassis above and below the I/O section where the controllers screw in. Place the Top and Bottom I/O Rails

(451-2782) on the upper and lower lip of chassis I/O section lining up the holes with the screw holes for the I/O boards. See picture on last page. Peel back the protective tape from the ends of each rail and place the sticky side against the chassis. If the chassis is in a upright position with the holes lined up, firmly press in place.

Otherwise apply light pressure as to allow some movement when seating the first few I/O Controllers.

6. Install all Turbo MXF Terminal Controllers verifying all switches are set properly to indicate board number (SW1 on the 9579) and correct Baud rates (SW1-SW8 on the 9580). See the CS Maint Mnl, 741-1769A, or TSB HWT 9640 from 11/xx/91 for switch settings. Attach terminal cables.

NOTE: When the MXF or any controller is fully seated, it's metal rail which is secured to the chassis by screws on either end, should be in contact with the I/O rails installed in step 5. If a gap exists between the board and rail please escalate the problem via PTR to the 2200 Support Group, RDB 8760, or call or Wang Office Mike Bahia, telephone 508-656-0256.

7. Install any additional terminal controllers remembering the maximum number of terminal controller boards is still 4. When setting the board number for an MXE or MXD, count the MXF boards first as if they were MXEs. For example, if 2 MXF boards are installed, the first MXE/MXD would be board number 3. As in the past, if a 212-3012 Triple Controller is used the terminal port must always be the last terminal. Again count each MXF as 1 board as you would an MXE in setting the terminal port switch and insure the printer and disk address switches are set to legal addresses not used by any other boards to be installed. Legal disk addresses are 310, 320, 330. Legal printer addresses are 215, 216, 217. Attach cables as necessary.

*

8. Set the switches on all High Speed Printer/Disk Controllers to be installed. See the CS Maint Mnl, 741-1769A, or TSB HWT 9640 from 11/xx/91 for switch settings. The printer and disk address switches must be set to legal addresses not used by any other boards installed in this unit. Legal disk addresses are 310, 320, and 330. Legal printer addresses are 215, 216, and 217. Install any High Speed Printer/Disk Controller and attach cables.

NOTE: This board has 2 disk options determined by SW1 on the 9581 board. It can be used as a straight disk controller (sw 1 both OFF) which uses the J2 disk port (bottom connector), or to access a drive being multiplexed via the middle connector, J3 (2 ON only). J3 is comparable to a 22C80 (210-7715) and would cable to a CPU port normally either on a 210-8824 2275 MUX Board or a 210-8825 MUX Extender Board.

9. Install all remaining I/O Controllers verifying all switch settings are set properly and have not been inadvertently changed. Reconnect any cables to these boards that may have been removed.

10. Install I/O spacer covers over any open I/O slots.

11. Install remaining pieces of rail kit and new door assembly as follows: Reference last page.

- Remove the protective tape from the sticky surface at the ends 1 of the 2 remaining Side Rails (452-0830). This piece will be used for the far end of the I/O Section. Make sure this area is clean. Firmly press the rail with the sticky side down against the chassis lip and butt it up against the last I/O board or spacer cover.

- Install the new door assembly (458-5194) over the CPU Board.

- Remove the protective tape from the sticky surface at the ends of the remaining Side Rail (452-0830). This piece will be used on the lip that divides the I/O and CPU sections. Place the rail with the sticky side down against the lip butting it up against the I/O Controller in the first slot and center it. Firmly press in place.

12. Reconnect power. Boot the system using the Turbo O/S and run CPU and disk diagnostics. Verify as much as possible all hardware is operational.

CS-D/N Upgrades: orders a CS-D-Turbo, CEI # 200-6009, or CS-N-Turbo, CEI # 200-6008, base package.

Removal:

1. Insure everyone is off the system & all jobs have completed. A complete back-up of all customer software should be done by the customer.

2. Power down the system, disk drives first, CPU last.

3. Unplug CPU power cable from wall.

4. Remove door/cover over CPU board and CPU board.

5. Remove all spacers over empty I/O slots and all I/O boards. Make note of all I/O board switch settings. If cables are disconnected from I/O boards please note orientation and location, and make note of the device address as set by the device switch on the controller.

6. Remove the top cover from the CPU by removing the 2 screws in the back and sliding back and lifting. Remove the front cover by loosening the 2 screws on top, sliding the cover forward until free from the screws and lifting. Remove the 2 side panels by lifting up and then back from the top.

7. Disconnect all cables from the motherboard noting orientation and location.

8. Remove the existing motherboard by removing the screws which hold the metal motherboard rails on the backside of the motherboard to the metal wall that divides the front and back of the cabinet. **DO NOT REMOVE THE 14 SCREWS THROUGH THE MOTHERBOARD THAT HOLD IT TO IT'S RAILS.**

Installation:

1. Install the 210-9578 Turbo Motherboard as follows:

NOTE: This procedure is critical to proper operation. If the motherboard is not aligned properly in the chassis, the I/O boards may not make proper contact. This is especially true with the new Turbo I/O Controllers which use the center I/O connector. This connector has 140 pins which are in a much tighter configuration than the older boards and if a board is askew at all there is a high probability of failure.

- Using the screws removed in step 8 above, install the new motherboard but leave the screws loose enough to allow the motherboard to freely move.

- To align the motherboard, 2 I/O controllers with hold-down screws on both ends are needed. Install the 2 boards in the first and last slots of the I/O section visually lining up the contacts on the board connectors with the pins in the I/O connectors when inserting. Insure both boards are fully and evenly seated.

- Slide the motherboard as necessary so as to line up the hold-down screws on the I/O boards with the mating holes on the chassis. Tighten down the 4 screws evenly a little at a time in a balanced procedure. All 4 should tighten without binding.

- Secure the screws to hold the motherboard to the metal partition separating the front and the back of the cabinet which were loosely in place.

- Remove the 2 I/O boards used to align the motherboard.

2. Reconnect the cables to the motherboard disconnected in step 7 above.

3. Insure all SIMM Memory Modules ordered for the new Turbo CPU Board are installed in the correct locations (L3,L10,L18,L29 for 4 or 16 meg). Verify SW1 on the Turbo CPU board is set correctly as determined by the SIMM Module size. (4 ON only for 1M SIMMs, all OFF for 8M SIMMs)

4. Carefully install the new 210-9576A Turbo CPU Board visually lining up the contacts on the board with the contacts in the mating motherboard connectors. Verify the board is fully and evenly seated.

5. Install all Turbo MXF Terminal Controllers verifying all switches are set properly to indicate board number (SW1 on the 9579) and correct Baud rates (SW1-SW8 on the 9580). See the CS Maint Mnl, 741-1769A, or TSB HWT 9640 from 11/xx/91 for switch settings. Attach terminal cables.

6. Install any additional terminal controllers remembering the maximum number of terminal controller boards is still 4. When setting the board number for an MXE or MXD, count the MXF boards first as if they were MXEs. For example, if 2 MXF boards are installed, the first MXE/MXD would be board number 3. As in the past, if a 212-3012 Triple Controller is used the terminal port must always be the last terminal. Again count each MXF as 1 board as you would an MXE in setting the terminal port switch and insure the printer and disk address switches are set to legal addresses not used by any other boards to be installed. Legal disk addresses are 310, 320, 330. Legal printer addresses are 215, 216, 217. Attach cables as necessary.

7. Set the switches on all High Speed Printer/Disk Controllers to be installed. See CS Maint Mnl, 741-1769A, or TSB HWT 9640 from 11/xx/91. The printer and disk address switches must be set to legal addresses not used by any other boards installed. Legal disk addresses are 310, 320, and 330. Legal printer addresses are 215, 216, and 217. Install all High Speed Printer/Disk Controllers and attach cables.

NOTE: This board has 2 disk options determined by SW1 on the 9581 board. It can be used as a straight disk controller (sw 1 both OFF) which uses the J2 disk port (bottom connector), or to access a drive being multiplexed via the middle connector, J3 (2 ON only). J3 is comparable to a 22C80 (210-7715) and would cable to a CPU port normally either on a 210-8824 2275 MUX Board or a 210-8825 MUX Extender Board.

8. Install all remaining I/O Controllers verifying all switch settings are set properly and have not been inadvertently changed. Reconnect any cables to these boards that may have been removed.
9. Install I/O spacer covers over any open I/O slots.
10. Install new CPU Rear Door Assembly (458-5026) required for FCC approval.
11. Reinstall Side, Front, and Top covers.
12. Reconnect power. Boot the system using the Turbo O/S and run CPU and disk diagnostics. Verify as much as possible all hardware is operational.

Turbo Upgrade Breakdown

CPU UPGRADES:

MicroVP-Turbo

CEI # 200-6006

description: upgrades any MicroVP CPU to a 4 Meg Turbo CPU.

contents:

- 210-9583 Turbo Motherbrd for a CS or MicroVP chassis
- 210-9576A 4 Meg Turbo CPU Brd
- MicroVP-Turbo Rail Kit
- 451-2782 (2 pcs) Top & Bottom Rails for I/O Boards
- 452-0830 Side Rail for I/O section
- 451-2781 (2 pcs) Top & Bottom Rails for CPU/PS Cover
- 455-0290 Outer Rail for CPU/PS Cover
- CS/386 Turbo Operating System
- Turbo Identification Sticker

installable in a: becomes a:
 MicroVP-1, MicroVP-2, MicroVP-TURBO

CS-Turbo

CEI # 200-6009

description: upgrades any CS to a 4 Meg Turbo CPU.

contents:

- 210-9583 Turbo Motherbrd for a CS or MicroVP chassis
- 210-9576A 4 Meg Turbo CPU Brd
- 458-5194 CPU Door Assembly
- CS-Turbo Rail Kit
- 451-2782 (2 pcs) Top & Bottom Rails for I/O Boards
- 452-0830 (2 pcs) Side Rails for I/O section
- CS/386 Turbo Operating System
- Turbo Identification Sticker

installable in a: becomes a:
 CS-2D, CS-5D, CS-10D,
 CS-20D, CS-40D, CS-80D: CS-TURBO

CS-N Turbo
CEI # 200-6008

description: upgrades any CS-N or CS/386-N to a 4 Meg Turbo CPU.

contents:

210-9578 Turbo Motherbrd for a CS-D/N chassis
210-9576A 4 Meg Turbo CPU Brd
458-5026 Rear Door Assembly to pass FCC requirements (ECO 59537)
CS/386 Turbo Operating System
Turbo Identification Sticker

installable in a: becomes a:

CS-2N, CS-5N, CS-10N,
CS-20N, CS-40N, CS-80N: CS-N TURBO
CS/386-10N, CS/386-20N,
CS/386-40N, CS/386-80N: CS-N TURBO

CS-D-Turbo
CEI # 200-6007

description: upgrades any CS-D or CS/386-D to a 4 Meg Turbo CPU.

contents:

210-9578 Turbo Motherbrd for a CS-D/N chassis
210-9576A 4 Meg Turbo CPU Brd
458-5026 Rear Door Assembly to pass FCC requirements (ECO 59537)
CS/386 Turbo Operating System
Turbo Identification Sticker

installable in a: becomes a:

CS-2D, CS-5D, CS-10D,
CS-20D, CS-40D, CS-80D: CS-D TURBO
CS/386-10D, CS/386-20D,
CS/386-40D, CS/386-80D: CS-D TURBO

NOTE: For memory sizes greater than 4 Meg ordered in conjunction with the initial Turbo upgrades list above see UJ-6059/60/61 on the next page.

INITIAL MEMORY UPGRADES:

NOTE: The following 3 Upgrade Kits are exclusively for initial Turbo upgrades when more than 4 Meg memory is wanted. Can only be purchased in conjunction with a Turbo Upgrade; MicroVP-Turbo, CS-Turbo, CS-N-Turbo, or CS-D-Turbo. For memory upgrades without the purchase of a Turbo Upgrade use UJ-6067/68/69/70/71/72.

UJ-6059 CEI # 206-6059
description: 4 Meg to 8 Meg Mem Upgrade if ordered with a Turbo Upgrade
contents:
4 377-4533 1 Meg SIMM Modules

UJ-6060 CEI # 206-6060
description: 4 Meg to 16 Meg Mem Upgrade if ordered with a Turbo Upgrade
contents:
4 377-4535 4 Meg SIMM Modules

UJ-6061 CEI # 206-6061
description: 4 Meg to 32 Meg Mem Upgrade if ordered with a Turbo Upgrade
contents:
8 377-4535 4 Meg SIMM Modules

TURBO I/O CONTROLLERS:

- 236MXF CEI # 200-2991
description: 16 Port Terminal I/O Controller
contents:
 212-9717 MXF 16 Port Terminal Controller
 1 421-0181 7 Port Octopus Cable (a 2nd Cable needed for the last 7
 ports must be ordered separately if required)
- 22C11-HS CEI # 200-2992
description: High Speed Printer/Disk Controller
contents:
 212-9718 High Speed Printer/Disk Controller
-

SUBSEQUENT FIELD MEMORY UPGRADES:

- UJ-6067 CEI # 205/206-6067
description: upgrades memory for any 4 Meg Turbo CPU board to 8 Meg
contents:
 4 377-4533 1 Meg SIMM Modules
- UJ-6068 CEI # 205/206-6068
description: upgrades memory for any 4 Meg Turbo CPU board to 16 Meg
contents:
 4 377-4535 4 Meg SIMM Modules
- UJ-6069 CEI # 206-6069
description: upgrades memory for any 4 Meg Turbo CPU board to 32 Meg
contents:
 8 377-4535 4 Meg SIMM Modules
- UJ-6070 CEI # 206-6070
description: upgrades memory for any 8 Meg Turbo CPU board to 16 Meg
contents:
 4 377-4535 4 Meg SIMM Modules
- UJ-6071 CEI # 206-6071
description: upgrades memory for any 8 Meg Turbo CPU board to 32 Meg
contents:
 8 377-4535 4 Meg SIMM Modules
- UJ-6072 CEI # 206-6072
description: upgrades memory for any 16 Meg Turbo CPU board to 32 Meg
contents:
 4 377-4535 4 Meg SIMM Modules

RAIL PLACEMENT

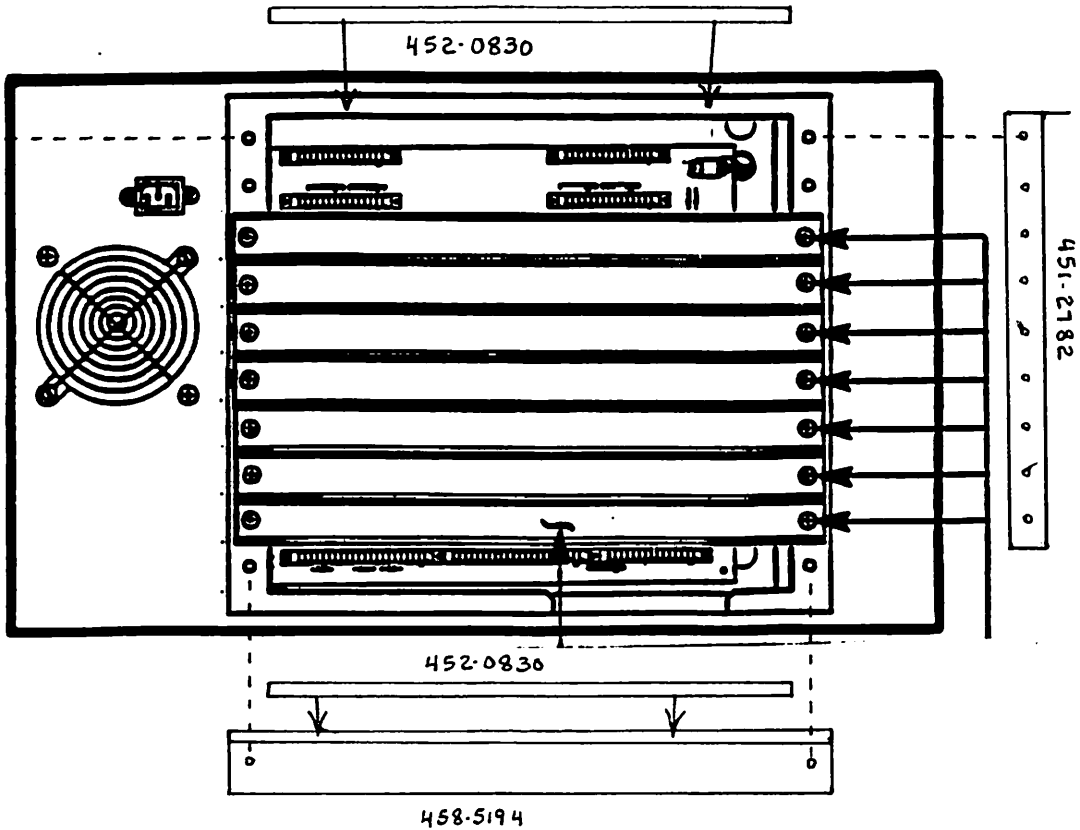
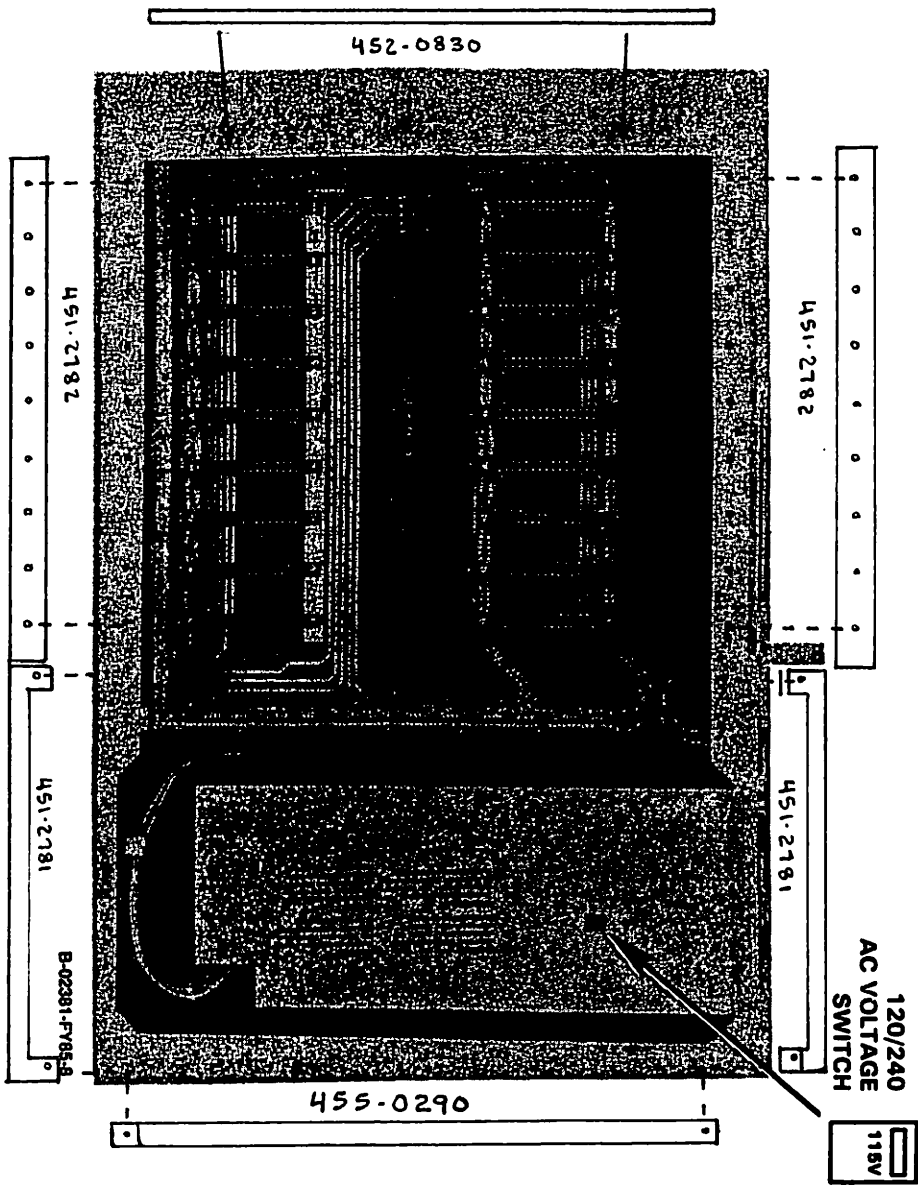


FIG. 1
REAR VIEW OF CHASSIS

451-2182

MEMO

To: Gene Schulz
From: Mike Bahia
Subject: TURBO Motherboard Problem and Related Concerns
Date: September 24, 1991

In testing done in the lab and at Wollaston Alloys in Braintree, a Turbo beta site, problems have been found with the current versions of the Turbo motherboards.

With the latest version of the 210-9583 Motherboard, rev 0, (made in Lowell, 34-91) there are problems with the screw holes lining up. This problem does not appear to be critical but should be corrected before going into mass production with the board. With a MicroVP the screws can be lined up for the CPU board but you then find the holes on either end of the I/O section are off toward the middle. Holes do line up in the middle of the I/O section & gradually go out of alignment toward each end. However, you can get screws in at I/O connectors up to 2 to 3 slots from either end and in the MicroVP this appears to provide adequate support. As the screw holes are off, the I/O boards toward each end begin to seat at slight angles to the motherboard. The screw holes are about a 3rd off, that is only the outer 2/3rds of the screw holes in the end I/O slots can be seen looking in through the holes of the connectors.

Using the same motherboard in a CS, the problem was slightly different. The CS has a limited number of holes where the MicroVP has them for every I/O connector. Of the 8 screws pulled out from the existing motherboard only 5 could be put back in. Six are used with the I/O section, at the top and bottom connectors of the 1st, last, and middle I/O slots. We were able to get the screws in for the 1st and middle I/O slots but the holes do not line up for the furthest I/O slot from the CPU board. The other 2 screws are used in the bottom connector for the CPU board and above the CPU board in the top right corner. The bottom screw is ok but the top right corner screw is not even close. The board however did appear to be secure enough, but obviously a correction needs to be made. On this particular chassis the frame to which the motherboard screws is too close to the lip where the I/O boards screw down. This resulted in the I/O boards, both old & new being 1/4" above the lip to which they should screw. The result being none of the boards we tried had long enough screws to bolt in. This needs to be checked on other chassis' & could likely happen to a customer upgrading a CS. If a customer does have this problem will we replace the chassis for them with a CS-N chassis?

These new motherboards have the 90 ohm resistor at R17 replacing a 180 ohm resistor. This change was done to correct a problem where there appeared to be a loss in signal with I/O boards in slots farthest from the CPU slot or when heavily loading the I/O section. This was most apparent when the terminal 1 controller was used in the last I/O slot and characters would be missing or changed in 'Mount System Platter, Press Reset' or during the boot procedure resulting in failure during boot. In the lab, 4 new 9583 motherboards were tested and problems were found on power up. When using the Turbo CPU with the MXF the problems were usually of 2 types; either the MXF LED failed to go out or most frequently went out after 5 to 10 seconds with the terminal 1 screen showing just a cursor. The following page represents my findings in the lab:

MORE

<u>Mbrd</u>	<u>* CPU Brd</u>	<u>* W/S 1 Brd (I/O slot)</u>	<u>* other I/O Brds</u>	<u>PASSED</u>	<u>FAILED</u>	
A	Turbo	MXF	1	none	0	10
"	"	"	5	"	0	5
"	"	"	7	"	0	5
"	"	"	9	"	0	5
			TOTALS	100% failures	0	25
A	Turbo	MXD	1	none	10	0
"	"	"	2	"	10	0
"	"	"	9	"	10	0
			TOTALS	0% failures	30	0
A	VLSI	MXD	1	none	6	4
"	"	"	7	"	3	7
"	"	"	8	"	7	3
"	"	"	9	"	5	5
			TOTALS	47.7% failures	21	19
B	Turbo	MXF	2	none	0	3
"	"	MXD	8	none	3	0
C	Turbo	MXF	3	none	0	3
X	VLSI	Triple Cont	1	none	10	0
"	"	"	2	"	10	0
"	"	"	3	"	8	2
"	"	"	4	"	10	0
"	"	"	5	"	10	0
"	"	"	6	"	9	1
"	"	"	7	"	6	4
"	"	"	8	"	6	4
"	"	"	9	"	10	0
			TOTALS	12.2% failures	79	11
X	VLSI	Triple #2	1	none	9	1
"	"	"	2	"	10	0
"	"	"	3	"	7	3
"	"	"	4	"	6	4
"	"	"	5	"	8	2
"	"	"	6	"	8	2
"	"	"	7	"	8	2
"	"	"	8	"	9	1
"	"	"	9	"	7	3
			TOTALS	20% failures	72	18
X	VLSI #2	Triple #2	2	none	6	4
"	"	"	3	"	8	2
"	"	"	8	"	8	2
"	"	"	9	"	9	1
			TOTALS	22.5% failures	31	9
X	VLSI	MXE	1	none	5	0
"	"	"	2	"	5	0
"	"	"	3	"	5	0
"	"	"	4	"	5	0
"	"	"	5	"	5	0
"	"	"	6	"	10	0
"	"	"	7	"	10	0
"	"	"	8	"	10	0
"	"	"	9	"	10	0
			TOTALS	0% failures	65	0
			MORE			

X	VLSI	MXD	1	none	5	5
"	"	"	2	"	3	7
"	"	"	3	"	5	5
"	"	"	4	"	6	4
"	"	"	5	"	9	1
"	"	"	6	"	7	3
"	"	"	7	"	8	2
"	"	"	8	"	4	6
"	"	"	9	"	7	3
				TOTALS	40% failures	54 36
X	VLSI #2	MXD	2	none	10	0
"	"	"	3	"	8	2
"	"	"	8	"	8	2
"	"	"	9	"	7	3
				TOTALS	20% failures	32 8
X	TURBO	MXD	2	none	10	0
"	"	"	3	"	10	0
"	"	"	4	"	10	0
"	"	"	8	"	10	0
"	"	"	9	"	10	0
				TOTALS	0% failures	50 0
X	TURBO	Triple #2	2	none	10	0
"	"	"	3	"	10	0
"	"	"	8	"	10	0
"	"	"	9	"	10	0
				TOTALS	0% failures	40 0

Test Conclusions:

1. MXF will not work with this motherboard. The board appears caught in self-test too long, 5-10 seconds, where when working it normally goes out in 3 seconds.
2. MXEs seem to power up ok with either the Turbo or VLSI.
3. MXDs & Triple Controllers work ok with Turbo CPUs but fail intermittently with a VLSI CPU board.

Testing still needs to be done under heavy I/O load conditions.

It is too early to tell at this time but a similar problem may exist with the 210-9578 Motherboard. Mike Riley has an updated board in his Turbo in the 6th floor lab which seems to power up fine under any load condition. However, an updated board with the 90 ohm resistor at R17 was brought out to Wollaston Alloys and problems existed at power up similar to those found in the lab. Intermittently the LED on the MXF would stay on from 5 to 9 seconds instead of 3 and when it did diagnostics would not start on the screen. All I/O boards were removed except the CPU and the MXF and the problem still existed. Fifty per cent of the time at least power up would fail. No problems using an MXD. The problem could be the MXF but 2 were tried and both showed similar results. At this time we are planning to update a 3rd motherboard and test for the problem in the lab with a known good MXF. If successful these boards will be brought out to the customer & tested on site.

Lastly, the test points for the voltages need to have dimples or holes so that a pointed test lead for measuring voltages can be held against the test point with 1 hand. Otherwise many CEs will have the same problem I had in the lab trying to adjust the voltages when only these type leads are available. This may seem very minor but can be critical to preventing shorts when leads slip and will also save a lot of frustration.

END

MICROVP

9/24

POWER ON TEST w/ MICROVP

POWERUP TEST

MOTHERBOARD

TURBO & 1 MXF MBRD A

0/10 WORKED SLOT 1

0/5 SLOT 5

0/5 SLOT 7

0/5 SLOT 9

MBRD C

TURBO & 1 MXF

0/3 SLOT 3

REPL MXF w/ MXD

3/3 SLOT 8

MBRD B

TURBO & MXF

0/3 SLOT 2

OLD MBRD (POWER CONNECTORS ON SIDE)

✓ LED STAYED BLANK 4,5,9 } SLOT 3
6,7,8,10 }

✓ 2,3,4,5,6,7,8,9,10 SLOT 1

✓ 9/10 } BLANK SLOT 2

8/10 } LED ON 1 } SLOT 8

LED ON

TURBO, MXF, HF, 2 MXD, DUAL

D82 ON CGENPART KYBRD DEAD

HUNG LOADING 0/5, DRIVE LED OUT

REMOVED 2ND MXD

LOOSING CHARACTERS

REMOVED 1ST MXD

LOOSING CHARACTERS

FAILS

Part	Time	Location / Notes	PC / Cable
1		TFAM0207	
PART 2	0/10	SETUP 1	
PART 3	0/6	OFFICE BEHIND RECEPT START 1	
PART 4	0/4	TOP OF STAIRS	SONY PC
PART 5	0/5	OFFICE NEXT TO CORNER	
PART 6	1/1	RECEIVING	SM CABLE
PART 7	0/5	2 OFFICES DOWN FROM BILL	
PART 8	1/5	BILL'S PC	
PART 9	0/20	NEXT	
PART 10	0/8	BEHIND VISITORS PARKING (FOUNDRY	
PART 11	0/4	UNDERSTAIRS	NEC PC
PART 12	0/5	RECEPTIONIST	
PART 13	0/2.1	OFFICE ACROSS FROM BILL	PC 240
PART 14	1/1	BACK OF FOUNDRY	SM CABLE
PART 15	0/10	TOP OF STAIRS	
PART 16	0/5	1 ST OFFICE TOP OF STAIRS	

SWAPPED PART 9 & 14 AT OCTOPUS
 → TERMINAL 8 (PART 9) FAILED 1ST TIME AS 14 ^{2 FAILS} FOR 2
 NEW OCTOPUS

POWERED 14 OFF DIED (USED OLD PART 14)
 MXF BAD MXF PART 14 (P5 ON 2ND OCTOPUS) TERM 13
 PARTITION 15 TESTED OK w/ PART 9 0/6

PART #

TERM #

- 1 2
- 3 4 5 6 7 8 9 10 = 11 12 13 14 15 16
- 1 2 3 4 5 6 7 8 9 10 = 11 12 13 14 15 16

FULL CABLE + RECONNECT SEEMS TO HBLR

CURRENTLY

WORKED
2/10

POWER UP

MICROVP	9 TH SLT	8 TH	7 TH	6 TH	5 TH	4 TH	3 RD	2 ND	1 ST
MBRD X ORIGINAL									
VLSI o/s				①			①	①	
TRIPLE 1	0/10	4/10	4/10	1/10	0/10	0/10	2/10	0/10	0/10
REPLACE TRIPLE w/ MXE									
MXE 1	0/10	0/10	0/10	0/10	0/5	0/5	0/5	0/5	0/5
REPLACE MXE w/ MXD									
MXD 1	BEOM 7/10	1 6/10	1 1/10	1 3/10	PELM 1/10	PELM 4/10	111 5/10	111 7/10	PELM 5/10
REPLACE MXD w/ TRIPLE II	BEOM 3/10	1 1/10	1 2/10	1 2/10	BEOM 2/10	1 4/10	111 KEY SF 3/10	111 0/10	111 1/10
TRIPLE II									
SCREWS	CPU SLOT TOP & BOTTOM, J23 TOP, J7 TOP, J27 TOP, J26 BOT								

SCRATCHED GROUND STRIPS FOR MORE CONTACT

SCREWS CPU SLOT TOP & BOT, J24 TOP, J4 BOT, J28 BOT, J8 TOP

MBRD X ORIG									
VLSI						1			
TRIPLE II	2/10					1/10	2/10		
REPLACE TRIPLE w/ MXD						111 3/10	1 PELM 4/10	111 6/10	1 5/10
MXD 1	6/10	3/10							
REPLACE VLSI w/ TURBO									
MXD 1	0/10	0/10				0/10	0/10	0/10	
REPL MXD w/ TRIPLE									
TRIPLE II	0/10	0/10					2 0/10	0/10	
REPL TURBO w/ VLSI n/s									
TRIPLE II	2 0/10	2 0/10					NN 0/10	NN 0/10	
REPL TRIPLE w/ MXD									
MXD 1	3/10	2/10					2/10	KEY SF 0/10	

REPLACE MBRD

MBRD A									
VLSI o/s									111 BEOM 1
MXD 1	5/10	PELM 1 3/10	1 PELM 1 7/10						4/10
REPL VLSI w/ TURBO									
MXD 1	0/10							0/10	0/10

WANG TEST SITE AGREEMENT

WANG

USER Name and Address:

RADER COMPANIES
6005 NORTHEAST 82ND AVENUE
PORTLAND, OREGON 97220

Date 10/28/91

Test Period 6 MONTHS

Test Product:

CS/386 TURBO 8 MEG CPU BRD,
2 MXF CONTROLLERS, 1 22C11-HS,
210-9583 MBRD, 4 OCTOPUS CABLES, TURBO 0/5 0.20

USER Contacts:

- (1) BILL CHAPIN
- (2) JIM SYMINGTON
- (3) _____

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2. USER agrees to assist WANG in testing and evaluating the Test Product for WANG's benefit by fully implementing all of the applications and features supplied and by maintaining for WANG a written record of USER's evaluation, including the defects and deficiencies discovered by USER during the Test Period. USER's evaluation may be used in the development of this or other WANG products so all submissions regarding the Test Product will become the property of WANG.

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5. USER acknowledges that WANG may file applications for patents relating to the Test Product. USER agrees during the Test Period to keep the Test Product and any Software in confidence and not to permit any third parties to examine, inspect, copy or use the Test Product or any Software without the prior written consent of WANG. USER may make up to two (2) copies of any Software for back-up purposes if WANG's copyright and proprietary legend are reproduced on each copy.

6. USER acknowledges that the Test Product is still under development and that it may contain defects, errors and omissions. USER agrees that it will not rely upon the Test Product for business applications during the Test Period and that USER is solely responsible for the protection and back-up of any USER data and software used in conjunction with the Test Product. USER understands that the Test Product may never be released as a product by WANG.

7. WANG MAKES NO REPRESENTATIONS OR WARRANTIES REGARDING THE TEST PRODUCT, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES AS TO MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL WANG BE LIABLE FOR ANY DAMAGES, INCLUDING INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, THE PERFORMANCE, OR THE USE OF THE TEST PRODUCT.

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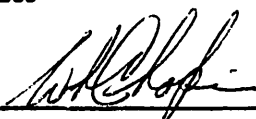
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USER

WANG LABORATORIES, INC.

By



By

Title

1791. Info. Systems

Title

Date

Nov 7/91

Date

ID:2522E

Revised (PRE)

11/12/86

WANG TEST SITE AGREEMENT



USER Name and Address:

VECTROCOM INC.

Date _____

19 DONEGAN, SUITE 707

Test Period 6 MONTHS

PONTE CLAIRE, QUEBEC, CANADA P6B1C1

USER Contacts:

Test Product:

(1) _____

CS/386 TURBO - 16 Mb CPU

(2) _____

1 MXF 1 22C11-2 210-9583 MB, 2 Octopus

(3) _____

CABLE, TURBO O/S .17

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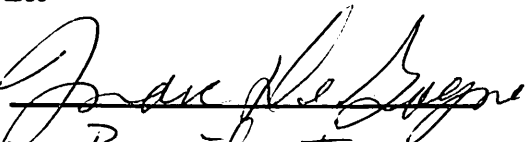
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USER

WANG LABORATORIES, INC.

By



By

Title

President

Title

Date

16 Sept. 1991

Date

ID:2522E
Revised (PRE)
11/12/86

8122

BILL OF LADING 354837

MSO 254280

WANG TEST SITE AGREEMENT



USER Name and Address:

VECTROCOM INC.

Date _____

19 DONEGAN, SUITE 707

Test Period 6 MONTHS

PONTE CLARE, QUEBEC, CANADA (GEBICI)

USER Contacts:

Test Product:

(1) _____

CS/386 TURBO - 16 MEG CPU

(2) _____

1 MXF 1 22011-2 210-3583 MB, 2.0 TOR

(3) _____

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USER

WANG LABORATORIES, INC.

By _____

By _____

Title _____

Title _____

Date _____

Date _____

ID:2522E
Revised (PRE)
11/12/86

WANG TEST SITE AGREEMENT



USER Name and Address:

BADER COMPANIES
6005 NORTHEAST PENN AVENUE
PORTLAND, OREGON 97220

Date _____

Test Period 6 MONTHS

Test Product:

CS/386 TURBO 8 MEG CPU BRD
2 MXF CONTROLLER 1 22C11-HS
210-9583 MBRD, 4 OCTOPUS CABLES, TURBO O/S 0.20

USER Contacts:

- (1) BILL CHAPIN
- (2) JIM SYMONSTON
- (3) _____

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2200 MODEL COMPARISON CHART

The following chart gives general product specifications for most of the 2200 models shipped since 1972. Maximums are expressed in practical installable limits.

FEATURE	A/B/C		T/S	PCS	VP	SVP	LVP	LVPC	MVP	MVPC	CS/ MICROVP		386	TURBO
	WCS										(VLSI CPUs)			
Memory	4- 16K	8K- 32K	8K- 32K	16K- 64K	16K- 128K	16K- 256K	32K- 512K	16K- 256K	32K- 512K	128K- 8M	128K- 8M	1M- 8M	4M- 32M	
I/O Slots	3/6& 11	3/6& 9	-	9	1-3	3	7	9	7	9	9	9	9	
Users	1	1	1	1	1-3	8	16	16	16	16	16	16	32*	
Tasks	1	1	1	1	16	16	16	16	16	16	16	16	64	
BASIC	X	X	X	-	-	-	-	-	-	-	-	-	-	
BASIC-2	-	-	-	X	X	X	X	X	X	X	X	X**	X***	
Control Memory	PROM	PROM	PROM	32K	32K	32K	32K	32K	32K	32K	32K	256K	256K	
Field Upgrade	No	No	No	To MVP	OptW	To LVPC	No	No	No	386or Turbo	386or Turbo	To Turbo	??	
Internal Tape Storage	-	-	80K some vers	-	-	-	-	-	-	-	150M CS-D only	150M CS-D only	150M CS-D only	
Internal Diskette Storage	No	No	11K some vers	No	1.2M	1.2M	1.2M	No	No	No	1.2M CS-D only	1.2M CS-D only	1.2M CS-D only	
Internal Disk Storage	No	No	No	No	2MB To 16MB	2MB To 16MB	2MB 32MB	No	No	No	20M- 140M CS-D only	20M- 140M CS-D only	20M- 140M CS-D only	
External Storage	2260 2270 C only	2260 2270	some vers	2260 2270 2280 2275 DS	No	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 ?? 2280 2275 SCSI	
TC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
RAMdisk (CPU)	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	

* 32 recommended max with currently available hardware. 64 Users in future.
 ** requires CS/386 O/S
 *** requires CS/386 Turbo O/S

CS / 386 TURBO

BETA TEST PLAN

Prepared By,
Mike Bahia
BASIC-2 Platform Group

BETA TEST CRITERIA

No major failures relating to hardware or software for a period of 30 days.

OBJECTIVES:

The beta test site is a controlled customer site of a pilot system, dedicated to testing applications for the purpose of evaluating a product's adherence to design specifications and performance criteria. It also is used to highlight reliability/maintainability problems experienced during installation and support of a 'live system' that would adversely impact the ability of Customer Engineering to properly support the product in the field. The product platform group has the overall responsibility, control, and monitoring function for the beta site(s). A representative of the platform group will be the focal point for the beta test site, documenting and communicating product and servicing concerns and recommendations to the platform group.

BETA SITE SELECTION CRITERIA:

The beta site is specifically selected to extensively test a product in a controlled customer environment prior to first customer shipment of that product. Products released to a customer not conforming to this plan prior to official product release will not be considered part of the beta test plan.

- The Beta Site must be a current user of Wang equipment.
- The Beta Site must not be a critical account.
- A Beta Site Agreement must be signed by the prospective Beta Site before the beta test cycle begins.
- The Customer must not expect or depend on the new product to fulfill production needs.
- The Beta Site should be within one to two hours travel time from the Home Office when possible.
- The proposed site must be within 25 miles of a Customer Engineering Branch Service Office.
- The Branch Service Office must have sufficient Field Engineering manpower to assign/provide primary hardware support by qualified individuals as necessary.
- A qualified Support Analyst must be assigned to the Beta Site to interface with the customer and provide direct software support.
- Duration of the Beta Site testing will not be less than 60 days.
- The test site configuration must exceed the average system size for that product, as projected by Marketing for shipment during the next fiscal year.

RESPONSIBILITIES OF THE BETA SITE CUSTOMER:

- Provide Wang Laboratories with a high level, technical contact to function as administrator for the Beta testing.
- Provide the technical support, close supervision, and analysis required by the Beta testing.
- Provide Wang with thorough, complete, and timely feedback on the product being tested, both in the area of problems encountered and suggestions for enhancements.
- Provide time for meetings with Wang representatives during normal business hours to discuss the progress and status of the testing.
- Review and comment on documentation and training materials being utilized.
- Realize that Beta testing may disrupt normal operations and Wang cannot be held liable for these disruptions.
- Provide Wang representatives with access to the equipment during normal business hours for software and hardware upgrades, fixes, etc., when necessary.
- Provide existing hardware as needed and agreed upon with Wang to adequately test the Beta product.
- Provide a reasonable office environment and the standard office equipment to support the operation of the Beta test equipment, i.e., electricity, phone lines, etc.

RESPONSIBILITIES OF WANG LABORATORIES:

C.E. Branch

- The Branch Manager will provide field personnel to survey the site prior to installation of the beta equipment.
- The local Branch Manager will assign a Customer Engineer familiar with the product to install, maintain, and monitor the Beta site on a daily basis for the duration of the beta test period.
- The assigned Customer Engineer will be the customer contact for support of all Beta Site hardware and will serve as the primary focal point for all hardware problems and questions.
- The Branch will co-ordinate the ordering and replacing of parts for standard released products at the site for hardware used in the Beta testing.
- After completion of the Beta test and acceptance by the Customer and Customer Engineering, full support of the product will be provided by local support personnel.

Home Office

- Provide the assigned site Customer Engineer with Home Office training and the necessary preliminary documentation and diagnostics.
- Provide Area Technical Support personnel with the necessary preliminary documentation.
- Provide appropriate training to all Support personnel at the Home Office and in the field.
- Provide hardware and software support for the product under test to the field as needed.
- Travel to the site as needed for problem solving.
- Maintain a problem tracking system (PTR).
- Keep Product Management and R&D informed in a timely manner on the status and progress made at the beta site/s.
- Provide input as to reliability and maintainability of the beta equipment.
- Provide a Beta Test Plan to all participants at least 30 days prior to the test cycle when possible.
- Provide tested spare boards to the site as needed to maintain the Beta equipment.

I. BETA SITES:

There are plans for 4 domestic Beta Test Sites at this time. All 4 sites will have a minimum of 1 complete card set. A set would include 1 motherbrd, 1 CPU brd, 1 MXF Terminal Controller, and 1 Hi-speed Disk Controller. Below is the proposed configurations requested.

<u>Beta Site Customers</u>	<u>Wang Contacts</u>	<u>Telephone</u>
1. Wollaston Alloys Inc. Wood Road Braintree, Ma Contact: Bill Hurley Tel: 617-848-3333	Area Mgr: Bill Moore ATSM: Al Capua ATS: John Forbes BM: Lynne Sibo CE: Brian Weir pager	617-556-3635 617-556-3612 617-556-3655 508-820-0360 508-238-7993 617-669-1991

Site Specifics:
CPU chassis: CS/N
16 Meg Memory
1 MXF Controller
1 Hi-Speed Disk Controller connected to a DS through a 2275MUX

2. Vectrocom Inc. 19 Donegani, Suite 707 Pointe Claire, Quebec Canada H9R2V6 Contact: Marc De Gagne Tim Onyszchuk Tel: 514-636-0743	Reg Mgr: Rick Gray Supp Mgr: Florent Coache DTS: Jacques Hamel BM: Florent Coache CE: Wayne DuClos PTR - C410007495	514-861-9571 514-861-9571 514-861-9571 514-861-9571
---	--	--

Site Specifics:
CPU chassis: CS or MicroVP supplied by customer
210-9583 Motherboard (ser # 00474369)
CPU Board with 16 Meg Memory (ser # 00899921 and 00899602)
1 MXF Controller (ser # 00484354 and 00409160) with 2 Octopus Cables
1 Hi-Speed Disk Ctrlr (ser # 00899892 and 00899529)

3. Rader Companies 6005 Northeast 82nd Avenue Portland, Oregon 97220 Contact: Bill Chapin Jim Symington Tel: 503-255-5330	Area Mgr: Jim Smith ASM: John Bender ATS: Paul Stieger BM: Rich Clyde CE: Carol Forsberg	206-340-6665 206-340-6663 503-624-1240 503-624-0268 503-624-0268
--	--	--

Site Specifics:
CPU chassis: MicroVP or CS supplied by customer
210-9583 Motherboard (ser # 00753044)
CPU Board with 8 Meg Memory (ser # 00899914 and 00320378)
2 MXF Brds (ser # 00484003/00409194 & 00899505/00381630) w/ 4 Oct Cables
1 Hi-Spd Disk Brd (ser # 00484383/00484268) to be used w/ NED's RAM Disk

4. Northeast Digital Corp. 124 Railroad Drive Northhampton Industrial Park Ivyland, PA 18974 Contact: Dan Collins Tel: 215-364-9644	Area Mgr: Bob Johnstone ASM: Ron Geyer ATS: Dieter Kelch BM: Joe Massanova CE: Ed Ratka pager	908-603-7021 215-651-8534 215-651-8544 215-564-6535 215-354-9200 215-899-7076
--	--	--

Site Specifics:
CPU chassis: customer's MicroVP
4 Meg Memory
1 MXF Controller
1 Hi-Spd Disk Ctrlr used w/ diff drives including Px, 2275, & non-Wang

II. Beta Site Home Office Contacts

<u>Home Office Support</u>	<u>Contact</u>	<u>Telephone</u>
R&D Beta Site Coordinator	Mike Bahia	508-656-0256
Beta Site Support Engineer	" "	" "
Additional Support Personnel	Mike Riley	508-967-0524
	Tyler Olsen	508-967-0339
Platform Manager	Gene Schulz	508-967-2790

III. Beta Site Spares

Due to the limited number of boards currently available, all spare boards will be controlled and distributed by the Beta Site Coordinator on an 'as needed basis'.

If a board failure occurs or is assumed to have occurred, the CE should attempt to call the Beta Site Support Engineer before going on-site. At that time actions to be taken will be determined to insure if a hardware problem does exist, R&D gets the information they need to quickly isolate the problem. Upon identifying a board as a problem the CE will call the Support Engineer again to determine if any additional steps should be taken to further identify the problem and to make arrangements for receiving a spare. The bad board will be returned to the Beta Site Coordinator with a completed Repair Tag attached detailing the problem including the error codes seen. The board should be shipped to arrive within 2-3 days maximum to the following address:

Wang Laboratories
1 Industrial Ave.
Lowell, Ma. 01851
Attention: Mike Bahia
MailStop 014-A3A

The Beta Site Support Engineer will then test the board to verify the problem and forward it to an R&D Engineer to identify the specific cause.

IV. Preparation

The assigned CE as identified by the Branch Manager will be provided documentation and training as necessary by R&D to install, monitor, and maintain the beta site for the duration of the test period.

The Beta Site Coordinator will contact the Beta sites to establish the hardware needs of each site and coordinate those needs with the available hardware. Once the hardware has been procured, the Coordinator will arrange with the Branch Manager for shipment of the hardware to the field. The Coordinator will also maintain a set of tested spares for support of the beta sites.

The Platform Manager will determine when the product is ready to go to beta test as determined by the full working status of the product in alpha test.

The Customer will be advised by the Beta Site Coordinator that the beta test equipment is for test purposes only and that Wang is not responsible for lost data or down time caused by the beta system. The Customer will be advised not to process non-recoverable data.

The Branch Manager will be responsible to have a Beta Test Site Agreement signed by the Customer prior to installation. The Agreement will be provided by the Platform Group if not already available at the Branch.

V. Implementation

Note: Hardware is already installed at Wollaston Alloys in Braintree, MA and Northeast Digital Corp. in Pennsylvania.

A Home Office Support Engineer will be on-site during the unpacking and installation of hardware if required.

The Branch Manager will coordinate installation of the beta equipment with the Customer.

Home Office Support will be readily available for phone support and technical back up for the Customer, the Customer Engineer, and any Support Personnel involved.

The Beta Site Coordinator will open a PTR at the appropriate time as a log for tracking problems and performance.

The Customer will call the Call Control Center to report any hardware problems. The Customer will have the option of calling the Call Control Center to contact the Branch or calling Beta Site Support directly for software support as determined locally by the Branch and the Customer.

The assigned CE will handle all first line hardware problems. Before going on site the CE will call the Beta Site Support Engineer to discuss what actions should be taken or leave an appropriate message if not available. After identifying the problem on site the CE again will call the Home Office Support Engineer to communicate the latest status and to determine if any additional actions may be required. Again if not available a message should be left.

The assigned CE will call the Customer on a weekly basis for a status update. That status will then be forwarded to the Beta Site Support Engineer either by telephone, Wang Office, or by an update to the PTR call.

Item Subject: CS386 Turbo Project

Gen

n bring back the 9579,9580,and Bus mother board to ED&D to start conversion to Rev. A boards... It will take ED&D three to four weeks to make us some PCBs to use for Alpha and Beta testing... The two CPU boards will be sent to me the end of the month to go in to ED&D...When Duncan team comes to home office I hope that I will have Rev. A Boards ready... I will have the latest BOM with me....

We spent untill 6AM last night trying to fix this 2536 bug.... For the last 7 work days (that is Saturday too) we have spent 2AM to 6AM each day on this bug... We have almost rewritten most of the micro-code in the 2536...I will not go to France untill Saturday now.... Duncan thinks that we are close to haveing this bug fixed.... Taiwan will not want me to come here any more if I couse them to work so many hours !!!!!

Michael Riley

----- Reply -----

To: Duncan Chou From: Eugene S. Schulz
Subject: CS386 Turbo Project Date Sent: 08/08/90

Is there anything you can bring back that we can run here? Has Duncan costed the new boards yet? If not, can I have BOMs so I can cost here?

----- Reply -----

To: Eugene S. Schulz From: Duncan Chou
Subject: CS386 Turbo Project Date Sent: 08/08/90

G
The plain I gave you should be real.... By the end of OCT. we can start showing the Turbo System to SELECT Customers... If we can get our documtation finished be first of Nov. we should be able to ship by the first of Jan...

Is this timeing to long ???

Michael Riley

----- Reply -----

To: Duncan Chou From: Eugene S. Schulz
Subject: CS386 Turbo Project Date Sent: 08/07/90

If we can't show this project as soon as possible, the market may not be there when it's ready.

----- Original Memo -----

To: Eugene S. Schulz From: Duncan Chou
Subject: CS386 Turbo Project Date Sent: 08/03/90

Gen

This is the projects we have plained for Rev.2 Of the CS386 O.S.

1. Old program type to new conversion statment...
2. DEFFIN numbers grater than 256 up to 4000
3. Program line numbers grater than 9999 up to 99999999

4. Alphanumeric A0\$ to A9\$ change to A00\$ to A99\$
 5. 3 byte disk addressing
 6. Print spooling
 7. PC DOS hard disk access to the CS386 (G.Dean needs changes to O.S.)
- Do you have any new enhancements that I do NOT have on this list ????
- This is the order that the projects will be completed... Do you have any questions or changes to the order... All will be completed by the end of Oct.

I have given S. Shoemith/ J.Dettmen memo on enhancements to Duncan and we will see how many of them we can put in to the new release....

Bad News

The CS386 33M CPU will NOT be ready until middle of Sep. and Duncan needs a month to get the software to work with it I would like to see Duncan's Software and hardware team to come to the home office the first of Oct. and work with home office ED&D people on the final changes to the system... This way we can pick up a month in testing and final changes to the software and hardware and still get this system out by the first of the year.....

Do you have any questions on this idea ????

Michael Riley

VS OFFICE

Monday

08/26/91

08:21 am

1

Package Subject: CS/386 Turbo Pricing

Item Title: Cover Memo

Pricing Approvals:

Bill Hsien

Mike Runge

Charlie Herman

Maintenance Pricing:

Bob Eastman

Pricing Data Base:

Jan Sheehan

International Transfer Pricing:

Paul Fitzpatrick

To: Michael Bahia
From: Eugene S. Schulz
Subject: CS/386 Turbo Release Date: 04/05/91

Distribution:

Not Requested

Mike and Mike,

We need to be added as part of the business plan (see rough draft):

- 1. Beta Site Plan - Riley/Bahia (APP 3a MAILED) 5/1
- 2. QA Plan - Riley
- 3. Technical Documentation Plan - Riley ^{REVISION}
- 4. CE Release Plan including CE manuals, CE training and spare parts - Bahia
- 5. MFG plan - ? We need to talk on this one.

REPAIR PLAN - LAB WORK, PLAN SHEET 5/15

HARRIS, we need a channel strategy plan, i.e., how we should sell, promote, advertise, programs, etc.

... need this by the end of next week. This is part of the new Miller new product introduction requirements. It doesn't have to be a big deal, just ... thought out.
Bill Hsien

BETA

MARK DÉGAGNE

514-636-0143

BUDGET

QUEBEC, CA

HR KELLER

DAVE BORMES

HARRIS

WIP 2.6

EUROPE

SCSI BRD

TURBO CARD SET

TURBO CLASS ANNOUNCED TO DISTRICTS FOR MID MAY

WIP 11/8 32

MAINT PLAN 202

TURBO MEMO 3935A

3935A

~~THE PUBLICATIONS~~
~~JOHN CAMPBELL~~

Jim,

The attached document outlines the upcoming class we are planning for the CS/386 Turbo. Please verify the dates are correct and if there are any problems or concerns get back to me or Mike Riley as soon as possible. I will be in a Training class in the Towers starting Monday 4/29 through Friday 5/10 but will be coming back to my office periodically to answer calls and mail. When training sends the memo out to the field announcing the class please have them copy me on the mailing.

Regards,
Mike

M E M O

To: Jim Wentworth
From: Mike Bahia
Mike Riley
Subject: CS/386 Turbo Course Outline
Date: April 24, 1991

This memo will provide you with a general outline for the planned 'CS/386 Turbo Class' currently planned to begin Tuesday, May 21st, at the CSO Training Center in the Interstate II building in Lowell. This is a general outline subject to change dependent on the needs of the class. The main topics to be discussed will include:

- the CS/386 Turbo
- a review of the changes and pitfalls that have accompanied the introduction of the CS/386 CPU (both hardware and software)
- new BASIC-2 commands introduced on the 386
- new commands being introduced with the Turbo and planned for in future releases
- the new R4 prom for the DS and it's impact to the field
- '3 byte addressing' (the removal of the 16 Meg platter restriction now existing)
- SCSI Drives on 2200
- the 2636DW Workstation

For the initial class we are planning for 16 students, mostly from U.S. domestic offices and a few possibly from the European theater. This class will be aimed basically toward Support Specialists and Senior Customer Engineers experienced with the product line.

Course Outline:

1. CS/386 Turbo Overview.
2. Service Policy/Business Support Plan
3. Standard System Configurations - outline of the H/W & S/W configurations concentrating on the differences with existing configurations and the changes allowed/required with the Turbo.
4. Detailed Board Specifics.
 - Boards required.
 - Switch & jumper settings for each board.
 - Memory & PAL loading.
5. Installation Considerations.
 - Environment.
 - Installing the Turbo Card Set.
6. Loading the Operating System Software.
 - Changes to the O/S.
7. Testing.
 - Off-line Diagnostics.
 - On-Line Diagnostics.
8. Troubleshooting hardware & software problems.
9. Known problems and potential problems. Things to beware of.

M O R E

10. Review of changes and pitfalls with the CS/386.
11. What's new with BASIC-2.
 - New BASIC-2 commands introduced on the 386.
 - New commands being introduced & planned for with forthcoming releases of the operating system.
12. Addressing Disk Performance and Restrictions.
 - 3 Byte Addressing.
 - New DS R4 Prom.
 - General discussion on ways to improve disk performance.
13. SCSI on 2200.
 - The 22C03-SCSI Controller.
 - Supported units and drives.
 - Sw, jumpering, & termination of each drive.
 - Cabling.
 - SCSI-II Controller.
14. The 2636DW Workstation.
 - Configuring, switch settings & setup information.
 - New features.
15. Escalating Problems and Obtaining Home Office assistance.

The preceding outline again is preliminary and subject to change. Please let us know if you have any concerns, questions, or suggestions. Thanks for your assistance with this class.

Regards,
Mike Bahia
2200 Product Support
(508)-656-0256

cc: John Baxi
Harris Gates
Al Grant
Bill Hsien
Tyler Olsen
Gene Schulz

3409A

April 24, 1991

1. CS/386 Turbo Overview.
2. Service Policy/Business Support Plan
3. Standard System Configurations - outline of the H/W & S/W configurations concentrating on the differences with existing configurations and the changes allowed/required with the Turbo.
4. Detailed Board Specifics.
 - Boards required.
 - Switch & jumper settings for each board.
 - Memory & PAL loading.
5. Installation Considerations.
 - Environment.
 - Installing the Turbo Card Set.
6. Loading the Operating System Software.
 - Changes to the O/S.
7. Testing.
 - Off-line Diagnostics.
 - On-Line Diagnostics.
8. Troubleshooting hardware & software problems.
9. Known problems and potential problems. Things to beware of.
10. Review of changes and pitfalls with the CS/386.
11. What's new with BASIC-2.
 - New BASIC-2 commands introduced on the 386.
 - New commands being introduced & planned for with forthcoming releases of the operating system.
 - DOS Utilities
12. Addressing Disk Performance and Restrictions.
 - 3 Byte Addressing.
 - New DS R4 Prom (Configuring the Winchester Drives).
 - General discussion on ways to improve disk performance.
13. SCSI on 2200.
 - The 22C03-SCSI Controller.
 - Supported units and drives.
 - Sw, jumpering, & termination of each drive.
 - Cabling.
 - SCSI-II Controller.
14. The 2636DW Workstation.
 - Configuring, switch settings & setup information.
 - New features.
15. Escalating Problems and Obtaining Home Office assistance.

MEMORANDUM

TO: *International Training Coordinators*
CSO Regional Training Coordinators

CC: *M. Bahia*
M. Riley
J. Wentworth
Regional Support Center Directors
Regional Technical Operations Managers

FROM: *Lauren R. Serio, Corporate Education*

DATE: *May 6, 1991*

SUBJ: *Special Offering - CS/386 Turbo Seminar*

Corporate Education and the R&D 2200 Support group are offering a seminar to update the field on the support considerations for the CS/386 Turbo and related products. This seminar is targeted at CSO Support Specialists and Customer Engineers who will be responsible for the rollout and support of the CS/386 Turbo. An abstract of the material covered in this seminar is attached.

Specific class information is as follows:

Course Name: CS/386 TURBO SEMINAR
Course Code: HWI310CS386
Class Number: 91001
Location: Interstate II Education Center
Class Dates: May 21-24, 1991
Class Length: 3.5 days
Class Max: 16
Housing: Westford Park Apartments, Lowell, MA
Transportation: Local transportation to be provided by Corporate Educaiton
Allocations: EA 2 WS 2
FC 2 CA 2
SO 2 CR 1
CE 2 WR 1
Europe 2
Enroll Deadline: Friday, May 10, 1991

Enrollments should be sent to Elaine Tellier, Registrar. After enrollment deadline, alternates will be moved into confirmed seats on a first-come first-served basis.

Questions concerning the seminar should be addressed to Make Bahia at (508)656-0256 or Mike Riley at (508)967-0524.

CS/386 TURBO SEMINAR

ABSTRACT:

The CS/386 Turbo is the latest addition to the 2200 product line offering increased performance and capacity. The R&D 2200 Support group is offering this seminar to update the field on the support considerations for the CS/386 Turbo and related products.

AUDIENCE:

CSO Support Specialists and Customer Engineers who will be responsible for the rollout and support of the CS/386 Turbo.

REQUIRED PREREQUISITES:

Formal training and/or extensive experience supporting the 2200 product line.

COURSE LENGTH:

3.5 days

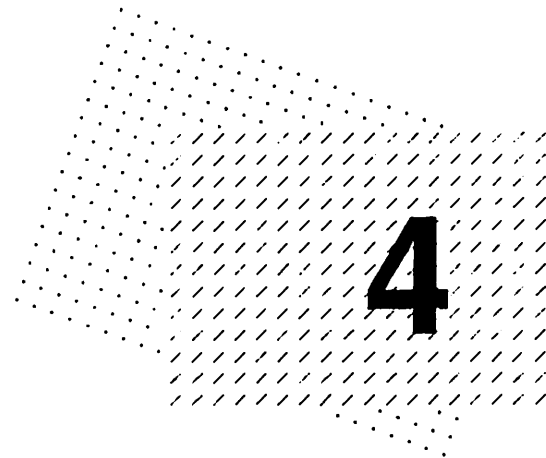
COURSE OBJECTIVES:

Upon successful completion of this course, the student will be able to:

- A. Articulate the capabilities of the CS/386 Turbo*
- B. Understand the support policy for the CS/386 Turbo and related devices*
- C. Configure a CS/386 Turbo system*
- D. Describe the functions of all CS/386 Turbo boards, configure and load memory, and set all switches and jumpers*
- E. Describe new BASIC 2 commands available for the CS/386 and application conversion considerations*
- F. Identify environmental preinstallation considerations*
- G. Install CS/386 Turbo hardware and load operating system*
- H. Install and support the 22C03-SCSI Controller*
- I. Install and support the 2636DW Workstation*
- J. Troubleshoot system using on-line and off-line diagnostics.*
- K. Discuss disk performance considerations*
- L. List known problems and support considerations*
- M. Properly document and escalate unresolved problems to Home Office for assistance*

EQUIPMENT/MODEL/SOFTWARE RELEASE LEVEL:

- 1. CS/386 Turbo*
- 2. BASIC 2 Operating System*
- 3. On-line & Off-line Diagnostics*
- 4. 22C03 SCSI Controller*
- 5. 2636DW Workstation*



DS Utilities

Overview

The DS Utilities screen is available from the Multiuser BASIC-2 System Utilities menu. The DS utilities provided with the CS-D/N enable you to manage the storage devices and RAMdisk of your system.

Note: When upgrading DS or CS-D/N units from R3 to R4 proms, all winchester addresses must be backed up to an external device, tape, or floppy prior to replacing the prom. Once the prom is replaced, the surfaces will be unreadable and must be configured and formatted for use. (Refer to the section "Configuration Utility" in this chapter for additional information.)

After you configure the CS-D/N, load the Utilities menu. Use the following two commands to display this menu:

1. SELECT DISK **xxx** (Press RETURN.)

The three-digit hexadecimal number (**xxx**) is the device address of the disk on which the system utilities reside.

2. LOADRUN (Press RETURN.)

The DS Utilities menu appears (see Figure 4-1). Utilities that require user-entered information display a series of prompts requesting this information. When prompted, type the necessary response and press RETURN. The utility requests additional information or performs the specified procedure.

The following sections discuss the Configuration utility and the Protect/Unprotect utility.

Select an item and press RUN/EXEC

```

DS Configuration
Protect/Unprotect CS-D Surfaces
RAMdisk Allocation
Cache Usage
Backup disk platters to Tape Cassette
Restore disk platters from Tape Cassette

```

Figure 4-1. DS Utilities Menu

Configuration Utility

The Configuration utility has two functions. The utility configures winchester drives into platter addresses (required when used with a Revision 4 PROM or greater). The utility is also used to list the addresses of the devices in the CS-D/N.

To run the Configuration utility, follow this procedure:

1. Select DS Configuration from the Utilities Menu (see Figure 4-1) and press RUN/EXEC.

```

DS Configuration

Base Address of DS unit (D10, D20, or D30): D10

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All rights reserved.

RETURN - Proceed
FN/TAB - Exit

```

Figure 4-2. DS Configuration Screen

The first prompt requests the base address of the DS or CS-D. (See Figure 4-2.)

2. Select the correct address and press RETURN. (If you are setting up a configuration, this address is used for the base disk address.)

The screen displays information on each device (including DS and DSPC RAMdisk, if configured) in the DS and CS-D. This information includes device addresses, device storage capacities, number of platters, and sectors per platter. Figure 4-3 is a sample configuration information screen.

D S C o n f i g u r a t i o n

Drive SELECT 3

```

Diskette Drive          1.2 MB with 4160 sectors
4160 on D10

64 MB Fixed Hard Disk   7 surfaces
65024 on D11   38912 on D12   4096 on D13   65024 on D14   65024 on D15
65024 on D16   38912 on D17

64 MB Fixed Hard Disk   2 surfaces
65024 on D18   38912 on D19

20 MB Fixed Hard Disk   2 surfaces
38912 on D51   38912 on D52

Streaming Cassette Tape Drive 150 MB tape drive
Address: D5F          Cassette is not in place

                        '15 - Start Setup
                        RUN - Expand display
DS PROM revision level: DD      RETURN - Restart
Protocol level: 1              FN/TAB - Exit
    
```

Figure 4-3. CS-D/N Sample Configuration Information Screen

3. To display expanded information on the storage devices, press RUN from the screen shown in Figure 4-3. The expanded information appears in Figure 4-4.

If the CS-D/N PROM level is 2.0 or greater, a surface-protect feature exists and the screen displays a Protect field. (See Figure 4-4.)

C u r r e n t P l a t t e r U s e

Disk Address	Index Size	Current End	Catalog Maximum	Protect	Disk Address	Index Size	Current End	Catalog Maximum	Protect
D10	9'	3767	4000	No					
D11	70'	24624	65023	No	D51	47&	11156	38911	No
D12	250	30980	38911	No	D52	50'	6120	38911	No
D13	49'	10472	65023	No					
D14	10	52977	65023	No					
D15	10'	64777	65023	No					
D16	100'	19746	65023	No					
D17	129'	61008	65023	No					
D18	129'	34267	65023	No					

RUN - Repeat Screen
 RETURN - Restart Program
 FN/TAB - Exit

Figure 4-4. CS-D/N Configuration Information Screen (Expanded Display)

The Protect field displays the surface protection status. The contents of the Protect field are:

Content	Description
No	The surface is unprotected; writing is possible.
Soft	The surface is soft protected; writing is not possible. Soft protect is a programmable surface-write inhibit.
Hard	The surface is hard protected; writing is not possible. To remove a hard protect-write inhibit, power down and power up the CS-D/N.
n/a	The CS-D/N does not have a PROM revision greater than 1. You cannot alter the Protect field.

4. If a new configuration is not needed, press RETURN to restart the program, or press FN/TAB to exit. To start a new configuration go to step 5.
5. To "start setup" of a new configuration of surface assignments, press SF key '15 from the screen shown in Figure 4-3. The surface assignments screen appears in Figure 4-5.

It is possible to reconfigure a single Winchester drive from one to a maximum of fourteen addressable disk surfaces.

Note: This utility requires DS Prom level 4.0 or greater within a Wang DS or CS/D cabinet.

```

Setup D.S. Disk Surface Assignments

3 Winchesters with sectors available
No. 1 = 260,096      No. 2 = 260,096      No. 3 = 77,824

Master Disk      Catalog      Slave Disk      Catalog
Address          Maximum      Address          Maximum

D11              0            D51              0
D12              0            D52              0
D13              0            D53              0
D14              0            D54              0
D15              0            D55              0
D16              0            D56              0
D17              0            D57              0
D18              0            D58              0
D19              0            D59              0
D1A              0            D5A              0
D1B              0            D5B              0
D1C              0            D5C              0
D1D              0            D5D              0
D1E              0            D5E              0

Use D.S defaults  Y

                               FN TAB - Exit

```

Figure 4-5. Setup D.S. Disk Surface Assignments

If you want to use the default disk surface assignments, type Y and press RETURN. The program calculates the default disk assignments and takes you to the configuration file name @DEFAULT. (See Figure 4-6.)

Note: DS defaults are:

*30 MB drive has 2 disk addresses with 10 MB each
 64 MB drive has 4 disk addresses with 16 MB each
 140 MB drive has 14 disk addresses with 10 MB each
 112 MB drive has 7 disk addresses with 16 MB each*

Setup D.S. Disk Surface Assignments

3 Winchester with sectors available
 No. 1 = 260,096 No. 2 = 260,096 No. 3 = 77,824

Master Disk Address	Catalog Maximum	Slave Disk Address	Catalog Maximum
D11	0	D51	0
D12	0	D52	0
D13	0	D53	0
D14	0	D54	0
D15	0	D55	0
D16	0	D56	0
D17	0	D57	0
D18	0	D58	0
D19	0	D59	0
D1A	0	D5A	0
D1B	0	D5B	0
D1C	0	D5C	0
D1D	0	D5D	0
D1E	0	D5E	0

Configuration file name @DEFAULT

FN/TAB - Exit

Figure 4-6. @DEFAULT Configuration

If you do not want to use the default disk surface assignments, type N and press RETURN. The program enables you to tailor a unique configuration. (See Figure 4-7.)

Setup D.S. Disk Surface Configured Assignments

3 Winchesters with sectors available
 No. 1 = 260,096 No. 2 = 260,096 No. 3 = 77,824

Master Disk Address	Catalog Maximum	Slave Disk Address	Catalog Maximum
D11	0	D51	0
D12	0	D52	0
D13	0	D53	0
D14	0	D54	0
D15	0	D55	0
D16	0	D56	0
D17	0	D57	0
D18	0	D58	0
D19	0	D59	0
D1A	0	D5A	0
D1B	0	D5B	0
D1C	0	D5C	0
D1D	0	D5D	0
D1E	0	D5E	0

Winchester **X** Master or Slave **M**
 B = 1.2 (4160) C = 10MB (38912) D = 16MB (65024) R = Remaining or Value
 Amount for surface D11 = 00260096

All entries made and acceptable? Y/N

FN/TAB - Exit

Figure 4-7. Setup D.S Disk Surface Configured Assignments

The surfaces on a single Winchester drive must be assigned to either the left "Master" or the right "Slave" column that is shown on the screen. Make your selection (M or S) and press RETURN.

You must also determine the amount of disk surface space you want on your drive. To do this, follow these steps:

5. Select B, C, or D for the standard platter size numeric value that you want and then press the RETURN key.
 or
6. Enter a numeric sector value and then press the RETURN key. The utility automatically assigns the platter size beginning with the first unused platter address and consecutively fills each platter.
7. Enter spaces or 0 and press RETURN to end the selection for the drive specified.
8. Select R and then press RETURN to choose the remainder of the drive's sectors.

If your entries are complete and you respond with a Y(yes) to accept the configuration, the program takes you to the Configuration file name @DEFAULT. You can change the configuration name at this time or you can use the name @DEFAULT. (See Figure 4-6.)

If your entries are not complete and you respond with a N (no), the program returns you to the "DS Configuration" screen (Figure 4-2).

Sample Configuration

The sample configuration of surface assignments shows a DS or CS-D cabinet with three Winchesters. Two 64 MB Winchesters have been assigned to the Master address columns and a 20 MB Winchester drive has been assigned to the Slave address with surface sizes varying from:

```
4160 = 1.2 MB image
38912 = 10 MB image
65024 = 16 MB image
```

Surfaces greater than 65024 sectors require both the 3 byte addressing of the DS Prom level 4 and the 386 Release 2.0 operating system. Surfaces greater than 65024 must be established with the type 2 (&) catalogued index area.

Note: The hashing algorithm for 3-byte addressing is available with the CS/386 operating system Release 2.0 or greater.

Type Index	Invoked By
0	SCRATCH DISK T /hhh
1	SCRATCH DISK ' T /hhh
2	SCRATCH DISK & T /hhh

Sample D.S. Disk Surface Assignments

3 Winchesters with sectors available
 No. 1 = 260,096 No. 2 = 260,096 No. 3 = 77,824

Master Disk Address	Index	Catalog Maximum	Slave Disk Address	Index	Catalog Maximum
D11	1	65024	D51	3	38912
D12	1	65024	D52	3	4160
D13	1	38912	D53	3	4160
D14	1	38912	D54	3	4160
D15	1	4160	D55	3	4160
D16	1	4160	D56	3	4160
D17	1	4160	D57	3	4160
D18	1	4160	D58	3	4160
D19	1	4160	D59	3	4160
D1A	1	4160	D5A	3	4160
D1B	1	27264	D5B	3	1472
D1C	2	150016	D5C		0
D1D	2	65024	D5D		0
D1E	2	45056	D5E		0

Winchester 3 Slave 0 Sectors remaining

All entries made and acceptable? Y/N

FIN TAB - Exit

Figure 4-8. Sample D. S. Surface Assignments

If your entries are complete and you respond with a Y(yes) to accept the configuration, the program takes you to the Configuration file name @DEFAULT. You can change the file name at this time or use the file name @DEFAULT. (See Figure 4-6.)

If your entries are not complete and you respond with a N (no), the program returns you to the "DS Configuration" screen (Figure 4-2).

Configuration File Name @DEFAULT

The configuration file name @DEFAULT stores your selection of surface configuration into a six sector file on the system surface.

```

Configuration FileName @DEFAULT
Configuration file name @DEFAULT
FN/TAB - Exit

```

Figure 4-9. Configuration FileName @DEFAULT

You can execute your disk assignments in the configuration file @DEFAULT from terminal 1 by following the steps listed below. You can create your disk surface configuration from any terminal.

1. Press RESET and then press SF key '10 to apply. (See Figure 4-9.)

If you did not use @DEFAULT go to step 2.

2. Enter the FileName of your choice and press RETURN.
3. Enter printer address 005 and press RETURN. (See Figure 4-10.)

```

Setup D.S. Disk Surface Configured Assignments

3 Winchesters with sectors available
No. 1 = 260,096    No. 2 = 260,096    No. 3 = 77,824

Master Disk      Catalog      Slave Disk      Catalog
Address          Maximum      Address          Maximum

D11              0            D51              0
D12              0            D52              0
D13              0            D53              0
D14              0            D54              0
D15              0            D55              0
D16              0            D56              0
D17              0            D57              0
D18              0            D58              0
D19              0            D59              0
D1A              0            D5A              0
D1B              0            D5B              0
D1C              0            D5C              0
D1D              0            D5D              0
D1E              0            D5E              0

```

Hard copy to printer 005

FN TAB - Exit

Figure 4-10. D.S. Surface Assignments

Note: DS Prom level 4 or greater is required in the cabinet. You can only apply changes from terminal 1.

4. Enter any remarks for the hard copy and press RETURN. (See Figure 4-11.)

Setup D.S. Disk Surface Configured Assignments

3 Winchesters with sectors available
 No. 1 = 260,096 No. 2 = 260,096 No. 3 = 77,824

Master Disk Address	Catalog Maximum	Slave Disk Address	Catalog Maximum
D11	0	D51	0
D12	0	D52	0
D13	0	D53	0
D14	0	D54	0
D15	0	D55	0
D16	0	D56	0
D17	0	D57	0
D18	0	D58	0
D19	0	D59	0
D1A	0	D5A	0
D1B	0	D5B	0
D1C	0	D5C	0
D1D	0	D5D	0
D1E	0	D5E	0

Hard copy to printer 005
 Remark for hard copy 890101

FN/TAB - Exit

Figure 4-11. DS Surface Assignments

5. Enter Y (yes) to execute the configuration or N (no) to go back to the screen shown in Figure 4-9 and press RETURN.

Proposed D.S. Disk Surface Assignments

3 Winchesters with sectors available
 No. 1 = 260,096 No. 2 = 260,096 No. 3 = 77,824

Master Disk Address		Catalog Maximum	Slave Disk Address		Catalog Maximum
D11	1	65024	D51	3	38912
D12	1	65024	D52	3	4160
D13	1	38912	D53	3	4160
D14	1	38912	D54	3	4160
D15	1	4160	D55	3	4160
D16	1	4160	D56	3	4160
D17	1	4160	D57	3	4160
D18	1	4160	D58	3	4160
D19	1	4160	D59	3	4160
D1A	1	4160	D5A	3	4160
D1B	1	27264	D5B	?	1472
D1C	2	150016	D5C		0
D1D	2	65024	D5D		0
D1E	2	45056	D5E		0

Apply Y or N

Figure 4-12. Proposed D.S. Surface Assignments

The program loops to the DS Configuration utility for visual verification.

Protect/Unprotect Surfaces Utility

The Protect/Unprotect Surfaces utility lets you write protect the surfaces of the storage devices in the CS-D/N. To run the Protect/Unprotect utility, follow these steps:

1. Select it on the Utilities Menu (Figure 4-1) and press RUN/EXEC.

The first prompt requests the base address of the CS-D/N unit.

2. Press RETURN.

The screen displays information on each device (including RAMdisk) in the DS or CS-D. This information includes device addresses, index size, sector end, the catalog maximum, and surface protection of each surface. Figure 4-13 is a sample Current Platter Use (DS surfaces) screen.

C u r r e n t P l a t t e r U s e									
D S S u r f a c e s									
Disk Address	Index Size	Current End	Catalog Maximum	Pro- tect	Disk Address	Index Size	Current End	Catalog Maximum	Pro- tect
D30	7	253	1231	No					
D31	24	6716	65000	No					
D32	24	6824	65000	No					
D33	24	4534	65000	No					
D34	24	7408	65000	No					
D35	24	9655	65000	No					

Valid keys to alter Protect
N to set 'No' to disable Soft Protect
S to Soft Protect; H to Hard Protect

RUN - Accept Screen?
RETURN - Restart Program
FN/TAB - Exit

Figure 4-13. Sample Current Platter Use (CS-D/N Surfaces) Screen

The screen shown in Figure 4-13 enables you to accept or change the surface protection values for platter surfaces.

3. Press RUN to accept the information and the surface protection values displayed on the screen.

The DS or CS-D positions the cursor on the first character of the Protect field for each surface. You can change the Protect value by keying the value N (no), S (soft protect), or H (hard protect).

4. Press RUN when you set all surfaces (refer to Figures 4-14 and 4-15).

C u r r e n t P l a t t e r U s e
D S S u r f a c e s

Disk Address	Index Size	Current End	Catalog Maximum	Pro- tect	Disk Address	Index Size	Current End	Catalog Maximum	Pro- tect
D30	7	253	1231	Soft	D70	5	8	200	No
D31	24	6716	65000	Soft					
D32	24	6824	65000	Soft					
D33	24	4534	65000	Soft					
D34	24	7408	65000	No					
D35	24	9655	65000	No					

Highlighted fields denote changes made

Do you wish to set new defaults (Y or N) N

RETURN - Proceed

FN/TAB - Exit

Figure 4-14. Current Platter Use (Applying Protection on CS-D/N Surfaces) Screen

5. Continue by pressing one of the following keys and then press RETURN:
 - Press N to return to the screen in Figure 4-14.
 - Press Y to set the new protection values.

You proceed to the screen in Figure 4-15.

C u r r e n t P l a t t e r U s e
D S S u r f a c e s

Disk Address	Index Size	Current End	Catalog Maximum	Pro- tect	Disk Address	Index Size	Current End	Catalog Maximum	Pro- tect
D30	7	253	1231	Soft	D70	5	8	200	No
D31	24	6716	65000	Soft					
D32	24	6824	65000	Soft					
D33	24	4534	65000	Soft					
D34	24	7408	65000	No					
D35	24	9655	65000	No					

Highlighted fields denote changes made
Desired Protection Applied

RETURN - Proceed

FN/TAB - Exit

Figure 4-15. Current Platter Use (Protection Applied on CS-D/N Surfaces) Screen

TURBO BUGS/PROBLEMS

MB If ^① BOOT OFF A 22C11-HS WITH A TURBO ^② WITH BOTH AN MXF AND EITHER A MXE OR MXD, IF ^③ POWER UP DIAGNOSTICS ARE ALLOWED TO COMPLETE, THE SYSTEM WILL CONSISTENTLY HANG WITH TERMINAL 1 GOING BLANK JUST BEFORE LOADING C GENPART. IF USING AN OLD BUS DISK PORT OR KEY RESET BEFORE SELF-TEST DIAGS COMPLETE, NO PROBLEM. FIXED W/ 1.07.

MB I/O CONTROLLER SCREWS TOO SHORT. NEW SCREWS 1/4" LONGER - 650-9529 ECO#

MB MOTHERBOARD Y TPs NEED TO BE CHANGED. NEED DIMPLE OR HOLE. ECO#

VICTOR N. TORBJORN MB

VERY INTERMITTENTLY RETURN KEY WILL NOT RESPOND WHEN LISTING A MULTI-SCREEN PROGRAM OR DISK INDEX & WHEN KEY RETURN AGAIN, SCREEN UPDATES TWICE.

~~ANDRE IF EDIT/RECALL NON-EXISTANT LINE TERMINAL WILL BEEP. IF BACKSPACE & CORRECT LINE # MUST KEY EDIT/RECALL TWICE BEFORE LINE WILL BE DISPLAYED. SAME AS VLSI + 386.~~

STEVE SHAGESMITH

IF TRY TO PRINT TO A LOCAL PRINTER (204) AND PRINTER DOES NOT EXIST, HANGS TERMINAL. RESET ONLY GIVES CURSOR. HAVE TO POWER OFF W/S OR DISCONNECT CABLE TO CLEAR. FIXED 1.13.

JIM DETTMAN

IBM 3270 CLUSTER COMMUNICATIONS INTERMITTENTLY FAILS W/ MXF USING MAINT REL 1.07. NO PROBLEM WITH MXE.

JIM DETTMAN

IF ON/005 TO DETERMINE IF PROGRAM IS IN BACKGROUND INTERMITTENTLY DOES NOT WORK.

JIM DETTMAN

PROBLEM DOING BACKUPS WITH > 32 PARTITIONS. FIXED 1.11

2/4 STEVE SHOESMITH

ON WARM BOOT SYSTEM MAY RUN SLOW. DOCUMENTED EVIDENCE THAT A PARTICULAR TEST TOOK 23 SEC AFTER WARM BOOT, 6 SECONDS AFTER COLD. CALLED BACK. APPEARS RELATED TO BIG PRINT JOBS. W/ 22C11:HS. OK WITH OLD CONTROLLER. I.D.7 WITH CGENPART. IN 'NEW' FORMAT HANGS ON BOOT LOADING CGENPART. FIXED 1.11.

2/6 DAN COLLINS

OLDER TERMINALS, 2236 & 2336, MUST HAVE PINS 5, 6, & 20 SHORTED TOGETHER IF USED WITH MXF OR TERMINALS MAY LOCK UP. MUST POWER OFF TERMINAL TO CLEAR. WAS USING NON-WANG CABLING WHICH WAS RUNNING WITH (6 & 20 OPEN.)?

2/6 DAN COLLINS

TERMINAL 21 HANGS WITH A PARTICULAR PRINT AT COMMAND. HAS 100K PARTITIONS. PROBLEM FOLLOWED TERMINAL. PROBLEM APPEARS DUPLICATABLE. CAN CLEAR WITH RESET. HAVE SEEN SIMILAR PROBLEM WITH TERM 21 (ALSO 22) WITH 3 OTHER CPU BOARDS. A & L AGRICULTURE, VA, RADER?, 3RD CPU CPU HEAT. PROB. ELO 60545

3/2 STEVE HARRIS 890-535-7291

TERMINALS INTERMITTENTLY HANG ON LINPUT COMMAND WITH 1.12. CAN HALT/STEP THROUGH & THEN OK ON KEY RESET. ALL OTHER KEYS ALSO INACTIVE. HAS 1 PC RUNNING PC2200 S/W THAT DOES NOT SEEM TO HAVE PROBLEM. WHEN A TERMINAL HANGS OTHER USERS ARE NOT AFFECTED.

3/2 ANDER

O/S 1.12. DSKIP FAILS WITH D87. IF END CATALOG = 65535. WHEN LIST DISK FILE USED FIELD = TO 1. CAN CIRCUMVENT BY READING FILE SEQUENTIALLY AND AT END OF FILE RESAVE END W/ DATASAVE DCT/Dxx, END. IF DSKIP STILL FAILS W/ D87, PLACE A DATASAVE DC OPEN, T/Dxx IMMEDIATELY IN FRONT OF THE DSKIP OR BACKSPACE?

3/6 MB

SELECT NEW RESET TO OLD AFTER A CLEAR. 1.07/1.15/1.18

3/8 MB

#IF OFF/215, LINE# LOOKS AT BUFFER NOT AT PRINTER. WILL HANG PARTITION IF SPACE AVAILABLE IN BUFFER IS SMALLER THAN INFO TO PRINT. 1.07/1.15

3/12 STEVE SHOESMITH

INTERMITTENTLY WHEN PROGRAM CALLS GLOBAL TO GET PAGE HEADER FOR A PRINTOUT, THEN RETURNS, A VARIABLE IS PASSED WHICH IS THE WRONG VALUE. 1.14

3/12 STEVE SHOESMITH

ON A MULTI-SECTOR WRITE USING A DATASAVE BM TO SAVE 16 SECTORS, SYSTEM SAVED 1ST 8 SECTORS TWICE. 1.14 FIXED 1.15

3/20 STEVE SHOESMITH

ONLY AUTOLOADS PROGRAMS INTO PARTITIONS 1 & 64. PARTITION 64 SEEMS TO LOCK UP THE DISK SO THAT OTHER USERS CANNOT ACCESS. UNABLE TO DUPE w/ MRTK

4/10 MB

1.16 PRINTER DRIVERS FOR 204 WILL NOT SHOW UP ON A CONTROLLER FOLLOWING AN MXE OR MXD. FIXED 1.18

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3/18	WANG AUSTRALIA			
JDBKE	STUART MEYERS	3/13 VIA WANG OFF, WILL GET TECH PEOPLE INVOLVED		
3/18	PANNEBAKSEFF & JONES	MIDDLETOWN, PA	717-944-1333	MARYANN ROSENBERG 4/6 1.07
SI2VM	CE LINDA COVER, BILL SMITH	DIETEL KELCH	215-354-9206	
3/20	WANG SWEDEN			
JDBNY	TORBJORN SAGNER (S)			
3/24	EQUITY INDUSTRIES	VIRGINIA BEACH, VA	804-595-5400	PROB TOM REESE 4/13 1.07
SI2BG	CE DAVE AMINI, MIKE IVIE		804-460-2483	LEE RIVERS
3/26	WANG SWEDEN			
JD7QB	TORBJORN SAGNER			
3/30	WANG PANAMA			
JCRGL	FERNANDO SEFERUS, CSO MGR, ISAIAS ROMERO, CSO			

TURBO SITES

SHIP	INST DATE	CUSTOMER	LOCATION	TEL	CONTACT	O/S	
12/6	12	ROY JONES DOG SHOWS	SOUTH BEND, IN	219-925-0525	KEN SLEEPER	1/28	1.07
SH50X		CE - JERRY STEPHENSON	PGR 219-481-8398				
12/6	2/11	A&L AGRICULTURAL LABS	RICHMOND, VA	804-743-9401	DAN TOWNSEND	2/11	1.07 360K
SG5LP		CE - ROBERT RAIKES	804-346-6462	DAVE AMINI	202-947-5289		
12/9	1/8	ALPHA COLOR	GARDENIA, CA	310-932-2532	RICK TROTTOLA	1/24	1.15 1.07
SH5TI		CE - DAVE LIAO	PGR 213-968-2959				
12/10		BOORUM & PEARSE	SYRACUSE, NY		JIM DETTMAN	1/24	1.15 1.13
SH50Y		CE - JOHN SNOW	PGR 315-592-5638				
12/12	12	ANDREA RUBIN MARKETING	NEW YORK, NY	212-983-0020	BEA BOLOGNA	2/20	1.11 1.15
SH5RP		CE - BROADUS VERHINE	212-623-1960	JOE DIAZ	PGR 212-461-9244		
12/13	1/3	COMPUTER MAINTENANCE	BATON ROUGE, LA	504-927-6463	DALB CRAFT	1/30	1.07
SG2UJ		CE - RICK GUNDORF	504-835-4881	ERROL BURCH			
1/14		SPECIALTY PROGRAM SERVICES	GRAND RAPIDS, MI	616-452-1111	JIM BOGER	1/28	1.07
SH6FB		CE - MARTY SCHARF					
1/16		ALLIED EXTRUDERS	LONG ISLAND CITY, NY	718-729-5500	HOWIE STERN	2/3	1.07
SH6LS		CE - CHRIS WATSON	516-364-8700				
1/21		BUNN COFFEE	VALLEY STREAM, NY	608-252-2677 / 215-364-9644	STEVE TRAPANI	1/30	1.15 1.07
SH7QJ		CE - CHRIS WATSON	516-364-8700				
2/5		FRANK HOLTAWAY	NO. PLAINFIELD, NJ	215-364-9644 / 603-352-2677	DAN COLLINS / JERRY JOYCE	1/30	1.0 1.07
SH7QJ							
2/7		WILSON PHARMACY	JOHNSON CITY, TN	901-784-5252	LB McLAREN	2/13	1.07
SH9YU		CE WILLIAM GODSEY					
2/10		WANG SWEDEN					
JDIWH		TORBJORN SAGNER					
2/19		BROWN MANAGEMENT SYSTEMS	CARSON, CA	310-420-7337	ROBT TAYLOR	3/6	1.07 360K
SH9BT		CE DAVE LIAO	PGR 213-968-2959				
2/20		BEFCO INC.	ROCKY MOUNT, NC	919-977-9920	ROCKY FLOWERS	4/3	1.07
SH8KA		CE GRAY CRAYTON					
2/20		TRIESTE CORP	METairie, LA	1-800-535-7291	STEVE HARRIS	3/6	1.07
SH9LF		CE RICK GUNDORF	504-835-4881	ERROL BURCH			
2/25		MEADOWS FOUNDATION INC.	DALLAS, TX		JOHN WAGNER	3/9	1.07 1.13
SH9AK		CE BRUCE PATTERSON					

2/26	WESTLAND INCORPORATED ^{3RD PARTY}	SCOTTSDALE, AZ	JIM LEMLEY JIM VACCARO	4/20 1.15
	SHTUE BM MARK STANLEY	602-220-0056		
2/27	WANG NETHERLANDS			
	JDIES 3/11 JOHN BAXI			
2/27	WESTLAND INCORPORATED ^{3RD PARTY} ②	SCOTTSDALE, AZ	JIM LEMLEY MIKE GAYLORD	4/20 1.15
	SIΦII BM MARK STANLEY ②	602-220-0056		
2/28	CONSTRUCTION DATA CORP	LAWRENCE, NJ 609-394-4800	TOM DEJAR TIM BELCHER	3/12 1.07
	SH60A CE FONG WONG 908-603-7035	DAVE BUCK		
2/28	WANG UK			
	JD5RU 3/11 JOHN BAXI			
2/29	FORTRESS MANUFACTURING	NEW BERLIN, WI 414-797-7520	MARK CLEMINS	4/3 1.07 ³³⁰⁰
	SH8KD CE Jim Rupp			
3/2	WANG TAIWAN			
	JDIFO			
3/2	WANG TAIWAN ②			
	JD4YV			
3/11	BROWN MANAGEMENT ②	CARSON, CA	310-420-7337 ROBERT TAYLOR	3/11 1.07
	SH8PM CE DAVE LIAO ③			
3/12	WANG SWEDEN			
	JD3EK CE TORBJORN SAGNER ②			
3/12	WANG TAIWAN ③			
	JD4YW			
3/12	TRIESTE CORP	METairie, LA 800-535-7291	STEVE HARRIS	3/6 1.07
	SI2JV CE RICK GUNDORF ③	504-835-4881	ERROL BURCH	
3/13	WANG SWEDEN			
	JD0QC CE TORBJORN SAGNER ③			
3/16	WANG GERMANY			
	JC9VR JOHN BAXI			
3/17	WANG SWEDEN			
	JD2QI TORBJORN SAGNER ④			
3/18	WANG NETHERLANDS ②			
	JD4HZ JOHN BAXI			
3/18	WANG GERMANY ②			
	JD6RL JOHN BAXI			

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4/26 3 360s (WESTLAND) SCOTTSDALE, AZ JEFF LEMLEY

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		PEDRO VERDU, CE YANES	CANARY ISLANDS	3	360s	
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"	6/19	DAVE LIAO, CE	(BAY CITY METALS)	1.2	DOS FORMAT	
1.18	7/31	DAVE LIAO, CE	(BAY CITY METALS)	1.2	Z56. FORMAT	JOHN KNEEN
		RICK GUNDRUF, CE	(TRIESTE)	1.2	DOS FORMAT	STEVE HARRIS
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1.18 + 1.18Q	4/9	TORBJORN SAGNER	SWEDEN	1.18	360	1.18Q 1.2M
1.181	5/5	TOM HENDRICKS	NETHERLANDS			VIA WANG OFFICE
1.18Q	6/25	PEDRO VERDU	CANARY ISLANDS		1.2M	
1.10	8/17		(COMPUTER MAINT)	BATON ROUGE, LA	DOS 360K	DALB CRAFT
1.18Q	9/24	MIKE HORBURY, FSS	ENGLAND			
1.18Q	8/31	LAMONT SMITH, CE	(NIXON UNIFORM)	WILMINGTON, DE	DOS 360	
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1.29.00	9/22	TOM HENDRICKS	NETHERLANDS			
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	10/5		(MIDWEST WHOLESALE FOODS)	FLINT, MI	DOS 360	RICH. KUGNIE
	10/19	TORBJORN SAGNER	SWEDEN			
	10/19		(SELECT MAILING LIST)	CRESSKILL, NJ	NO 360	ANDRE LANZETTA
	10/20	MIKE HORBURY, FSS	ENGLAND			
1.30.01	10/28		(SELECT MAILING LIST)	CRESSKILL, NJ	NO 360	ANDRE LANZETTA

1.30.01	10/28	(ALEC GMBH)	GERMANY	1 360 NO CD OR CBOT	WOLFGANG BORKE
1.1	11/29	(ALPA COLOR)	GARDENA, CA	1.2M	STEVE SHOESMITH
1.30.01	12/15	(FORTRESS MFG)	NEW BERLIN, WI	1 360 NO COMPACT	MARK CLEMENS
94	1/10	(BAY CITY METALS)	COMPTON, CA	1 360 NO CBOT	JOHN KNEEN
1.30.01	1/28	(DELL COFFEE)	NYC?	1 COMPL 1.2M 1 360 DIS 1 COMPL 1.2M 1 360 BOOT	
	2/3		AUSTRALIA	1 360 NO CBOT	
1.30.01	3/1		NETHERLANDS		
1.30.01 + 1.25	3/16	(WESTLANDS INC)	SCOTTSDALE, AZ	3 360s	JEFF LEMLEY
1.25.00	10/19	(GARDIN-WISE)	DENVER, CO	3 360s	STEVE WISE
1.30.01	1/12	(BUNN COFFEE)	NYC	1 360 360 w/ COMP + CD36MXF	
1.30.01	3/2	(WILSON PHARMACY)	JOHNSON CITY, TN	3 360s	
1.07 + 1.1	6/16	(CONSTRUCTION DATA)	NC	1 1.2M 360 DISK1	DREW SONJA GARY HOUSTON
1.30.01 + 1.1	6/21	(BEFCO)	NC	1 1.2M	
1.30.01	6/27	(GARDIN-WISE)	WICHITA, KS	1 1.2M	
1.30.01	10/11		BILLERICA, MA	1 1.2M	
1.25.00	1/18		DOMINICAN REPUBLIC	3 360Ks	ISRAEL ZONZINSKI
1.30.01	1/30	ANDREW BACKNER	SWEDEN	1 360K	
1.30.01	4/6	BROADUS VERHINE	(ADREA RUBIN)	1 1.2M 1 1.2M w/ 3.5, 386, 0 DRILLS	
1.25	4/19	MANUAL ORONA	(BUNN COFFEE)	1. 1.2M	DAN COLLINS
1.30.01	98 11/24	DAVE RICE	(GANN)	1.2M	

386 MAINTENANCE REL 1.1A

LARRY MARONI, CE, BALTIMORE, MD
STEVE HOBSON, CE, NEWCASTLE, DEL
ERWIN FINDT, PRC, GERMANY
WILLEM SLOEP, PRC, NETHERLANDS
N KELLY, SUPP, IRELAND
CHRIS GARVEY, SUPP, IRELAND
PHILIPPE DE LAULANIE, SUPP MGR, FRANCE
JIM PORTN, CE, PROVIDENCE, R.I.
SIMON CHUI
VICTOR LAU, HONG KONG
ERIC DE MAERTELAELE, BELGIUM

BALTIMORE SIGN
NIXON UNIFORM 524 INT

SIG, 520, 524
PLATTER HOG, DATALOAD w/ MIXED #

SIG w/ MOVE TO ^{CPY} RAM DISK FROM GLOBAL
SLAVE ADDRESS HOGGED WHEN HOG MAST

386 MAINTENANCE REL 1.1B (HOG PROBLEM STILL EXIST) 2270

PHILIPPE DE LAULANIE, SUPP MGR, FRANCE
ERWIN FINDT, PRC, GERMANY
GRANT
MILY MARSHALL / KIM HUMPHREYS SAN DIEGO
MANABU FUKAMACHI / WONG TAK LAM / SIMON CHUI C9/4346
RAJAE BISHAY, S PARAMARIBO / S CHUNG

386 MAINTENANCE REL 1.1C

WILLEM SLOEP
MICHEL DU MONGH C8/11061
PHILIPPE DE LAULANIE
VICTOR LAU C9/4435
STEVE HOBSON (NIXON UNIF) TRIPLE CONTROLLER
MANABU FUKAMACHI / WONG TAK LAM / SIMON CHUI
RAJAE BISHAY, DETROIT (JEFF MAYBERLY, STANDARD DIST)
JOHN FORBES, DTS 4/5/91
FONG WONG, DTS 4/8/91

Maint RBL 1.1M
Rick Rhodes/Dan Rooder Wisc

Maint RBL LIT

STEVE SHOESMITH, SOFTWORKS, CA

BILL DUNCAN, ASTERISK COMPUTER, MD

JAN CLARK, TULSA, OKLA

JOHN EFFRANK, ST LOUIS

TORBJORN SAGNER, SWEDEN

BRIAN WEIR

NEIL TOSTA, AUSTRALIA

BOB BAZZANO, GE CT

DENNIS WEAVER, COMPUTER CONSULTANTS, KY

Maint RBL 1.1Y

TOM MCGOR, CAMP HILL, PA

Wm SLERP, NETH

TOM HENDRIKS, NETH

MARIKO OKADA, JAPAN

T.L. WONG, JAPAN

Maint RBL 1.1Z

DEBLY STEPHANU

BILL DUNCAN MD

KEN DABBS JKA Columbia, S.C.

MARIKO OKADA

DICK NELSON, VERVE ENTERPRISES, WASHINGTON, IL

GERALD DOUGLAS, REG SUPP MGR, DALLAS

STEVE SHOESMITH, CA

Maint RBL 1.1Z

MARK DE GAINS, VECTROCOM, MONTREAL

DENNIS WEAVER, COMPUTER CONSULTANTS, KY

STEVE CHATHAM, CHIC.

ED BING, GUILFORD, MA

3/3/93 Tom O'Leary, IOP COMPUTER, SPRING CITY, PA

5/10/93 GEORGE ALLEN, SYSTEMS DESIGN, JERSEY C

7/30/93 MARCOLO DOWN FROM ROUTER, OR, LA

CREATING TURBO O/S ON 360K DISKETTES

1. FORMAT 3 360K DISKETTES IN DOS FORMAT USING FORMAT UTILITY FROM SYSTEM MENU.
2. SCRATCH DISKS
Disk 1 SCRATCHDISKT/Dxx, LS=1, END=1439
Disk 2 & 3 SCRATCHDISKT/Dxx, END=1439
3. MOVE CINSTALL FROM DISK 2 OF 3 OF 360K O/S SET TO A SCRATCHED SURFACE, /340.
4. USE CMOVEFIL TO MOVE ALL OTHER O/S FILES FROM A 1.2M COMPLETE O/S DISK TO THE SAME SCRATCHED SURFACE CREATED IN STEP 3. DO NOT OVERWRITE CINSTALL. IT IS DIFFERENT ON THE 2 VERSIONS, 360 + 1.2M.
5. USE THE CINSTALL FROM THE 360K DISKS, 2 OF 3, & INSTALL DISK 1 OF 3 FIRST. DISK 1 MUST HAVE A 1 SECTOR INDEX.

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CS/2200 O/S RELEASE 3.5 TEST SITES

- 10/12/92 JKA, 115 ATRIUM WAY, SUITE 212, COLUMBIA, SC 29223
KEN DABBS 803-736-0127 HAS NOT USED, WILL TALK W/ JOHN
- 3/3/93 TOP COMPUTER, 500 SOUTH MAIN ST, SUITE 501, SPRING CITY, PA 19475
Tom OLSER 215-948-5310 HAS NOT USED.
- 9/4/93 VERDE ENTERPRISES, 2271 ELM RIDGE DRIVE, NORTHBROOK, IL 60062
DICK NELSON 708-272-1189 SEEMS TO WORK FINE IN LIMITED USE

MAILINGS

- 7/29/93 MANUAL ORONA, CE, L.A.
ALAN POUTER, CE, L.A.
- 12/19/93 OLE JACOBSEN, WARREN, OHIO DISK 1 + 2
- 1/6/95 JIM BENA BELL PHARMACY, CROSSFIELD, TN 2 360s
- CRAIG LAVIS, CE, DEWITT, NY 2 360s + 8" DSDD
- VICTOR NAHIGIAN, SAS, AUBURNDALE, MA DISK 1 360
- 1/27/95 WAYNE OSBORN, CE, DEL 2 360s
- 2/14/95 JACK FANNON, TELESALERS BELSON TESTING LAB, CA 8" DSDD 3.5 + 8" DSDD 3.5
- 3/16/95 LEW BALSTER, SCOTCH GROVE, IOWA 1 1.2M
- 3/28/95 HY PAGLIA, CE, ALBUQUERQUE, N.M 8" DSDD FULL UTILS
- 5/11/95 AL GRANT, MIDWEAR TECHNOLOGIES, LAWRENCE, MA 1 1.2M w/ LATEST UTILS
- 6/27/95 JOHN MANSUR, CE, MA OR 1.2M w/ TURBO O/S
- 8/2/95 JOEL ROSENBLUM, AMERICAN CREDITORS LIFE INS, NEWPORT BEACH, CA 2 360K w/ LATEST UTILS
- 8/19/95 DENISE STAMPER, FAIRVIEW HOSPITAL, CLEVELAND, OHIO 1 1.2M w/ LATEST UTILS
- 9/2/95 JOE FLYNN, BRD REPAIR 1 1.2M w/ LATEST UTILS
- 2/20/96 DON EMERSON, TELESALERS MOORE CEMENTS, INS, VA KATH SEEKFORD 8" DSDD 3.5
- 2/29/96 DON BOOSTER, CE, IND 2 360s
- 4/1/96 DAN NEAL, CE, SACRAMENTO, CA 2 360s
- 6/6/96 MANUAL ORONA, CE, LOS ANGELES 1 1.2M w/ LATEST UTILS, 386 1.30, TURBO 1.30, 01
- 6/21/96 WILLIAM GODSEY, CE, TN 2 360s
- 9/5/96 CHUCK WOLF, CE, SPRINGFIELD, IL 2 360s
- 10/29/96 MASS TRUCK & BODY, CHELSEA, MA 1 1.2M w/ LATEST UTILS
- 2/11/97 JUNGERS, O'CONNELL, & BACHLEER, PHIL, PA 2 360s
- 3/3/97 JOHN LEPKOWSKI, CE, JACKSONVILLE, FL 1 1.2M w/ LATEST UTILS

11/26/97 JOHN McCORD, CE : Clovis, NM : 2 360K w/ NEW CLOCK FIXES
 12/16/97 SERGE LABOSSELE, CE, St Nicholas, QC 2 360K w/ NEW CLOCK FIXES
 2/25/98 MARTY DUSHARM, CE, Columbia, MD : 2 360K E.L. 8" DSDQ w/ CLK FIXES
 12/15/98 CHARLES MICKLES, CE, MA : 2 360K w/ CLK FIXES
 12/28/98 CARL LIBSMAN, CB, NJ : 2 360K w/ CLK FIXES
 3/30/99 CHUCK WALLACE, CE, SC : 2 360K w/ YR 2K FIXES

NEW DISK UTILITIES

11/24/92	MARVIN WALKER, CE	FARMINGTON HILLS, MI	KMART: FOR LATEST SSSI
12/3/92	ROGER TITZER	EVANSVILLE, IN	w/ PRELIM DOC HAD DS 1.0, FOR 150TAN
2/1/93		COMPTON, CA	w/ SSSI PRELIM DOC BAY CITY METALS, JOHN KINGEN
2/8/93	BARAL BRACHMANIS	MELBOURNE, AUSTRALIA	w/ PRELIM. DOC (UPDATES TO UTIL REF MAIL)
2/10/93		JACKSONVILLE, FL	SPRINGFIELD COMP KEITH BOGART ^{KMART}
3/3/93	Tom Olesier	SPRING CITY, PA	INCLUDED w/ 3.5 TOP COMPUTER Tom Olesier
3/4/93		NORTHBROOK, IL	INCLUDED w/ 1.1 + 3.5 VEROS ENTERPRISE Dick NELSON
3/22/93		MONTREAL, CANADA	VECTRA.COM MARC DEGAING
		TROY, MI	COMPLETE 1.18 ON D66 (SSSI) KMART GREG BELINSKY
3/30/93		COMPTON, CA	DISK UTIL w/ DOC BAY CITY METALS JOHN KINGEN
4/9/93	TORBJORN SAGNER	SOLNA, SWEDEN	ON 1.2M w/ 1.18Q
6/25/93	PEDRO VERDU	CANARY ISLANDS	ON 1.2M w/ 1.18Q
8/24/93	MIKE HORBURY	LEEDS, ENGLAND	VER 1.1
10/21/93		CRESSKILL, NJ	VER 1.1 9/17/93 SELECT MAILING LIST ANDRE L
10/28/93		GARDENA, CA	COMPLETE 4/1.30.01 ^{UTILS} 9/17/93 ALFA CLOR STEVE SHAW
	GENERAL REL 1.1	P/N 731-8015D	
3/22/94	WALT CARNEY	PALM BAY, FL	DISK UTIL 1.1 (2/2/94)
7/13/94	GAYLE WAGAMAN	ORLANDO, FL	DISK UTIL 1.1 (2/2/94)
8/15/94	GENE MELLON	WEXFORD, PA	DISK UTIL 1.1 (2/2/94)
9/23/94	ORVILLE TEDDER	FAYETTEVILLE, NC	" " " "
9/28/94	GEORGE WEEKS	KNOXVILLE, TN	" " " "
11/30/94	RANDY ADKINS	SALEM, OR	" " " "
1/6/95	CRAIG LAVIS	DEWITT, NY	INCLUDED w/ 3.5 O/S ON 2 360:
3/3/95	JERRY STEPHENSON	GARRETT, IN	ROY JONES DOC SHOWS
3/16/95	LES BALSTER	SCOTCH GROVE, IOWA	DISK UTIL 1.1 + w/ O/S 3.5 1.2. BALSTERS LES BALSTER
3/22/95	HY PAGLIA	ALBUQUERQUE, NM	ON 8" D5DD w/ O/S 3.5
5/11/95		LAWRENCE, MA	w/ 3.5 ON 1.2M ^{HAND CARRY} AL GRANT
6/16/95	GRAY CRAYTON	KINSTON, NC	w/ TURBO 1.07 + 1.1 ON 1.2 BEFCO
6/24/95	BILL GOODEN	WICHITA, KS	w/ TURBO 1.30.01 + 1.1 ON 1.2 GARDIN WISE
6/27/95	JOHN MANSUR	BILLERICA, MA	w/ TURBO 1.30.01 - MVP 3.5
8/2/95		NEWPORT BEACH	w/ 3.5 O/S AMER CRED WFT JANE WOOD
8/15/95		CLEVELAND, OHIO	w/ 3.5 O/S FAIRVIEW HOSP DENISE STAMER

OTHER SOFTWARE

	SOFTWARE	TO	WHERE	MEDIA
3/4/94	PRINT DRIVER EDITOR	JEFF MAYBERRY, VAR	GARDEN CITY, MICH	360K 5 1/4"
5/10/95	PRINT DRIVER EDITOR	STEVE JACOBS, VAR	DAYTON, OHIO	360K 5 1/4"
6/27/95	TOOL BOX	JOHN MANSUL, CE	BILBRICA, MA	360K 5 1/4"
8/2/95	2229 UTILITIES VER 2.0	JOEL ROSENBLUM, CUST	NEWPORT BEACH, CA	360K 5 1/4"
9/1/95	TOOL BOX 5/20/91	LES BALSTOL, CUST	SCOTCH GROVE, IL	360K 5 1/4"
9/5/95	TOOL BOX 5/20/91	CLAUDIO VISIGALLI, CSO	GENOVA, ITALY	360K 5 1/4"
4/1/96	CPU DIAGS	DAN NEAL	SACRAMENTO, CA	360K 5 1/4"

DISK UTILITIES (CONT.)

8/18/95		WAUKEGAN, IL	360K	STATEWIDE INS. CHRIS PAULSEN
9/2/95	JOE FLYNN	BEO REPAIR		
10/11/95		DOMINICAN REPUBLIC w/3	360K TURBO 1.30.01	ISRAEL ZONZINSKI
12/12/95	HY PAGWA	ALBUQUEQUE	DISK UTIL. 1.1	
1/5/96		WOODS HOLE, MA		GUS TOLLIOS
1/18/96	DARRYL MARSH	NYC, NY		
1/30/96	BROADUS VERHINE	NYC, NY	w/TURBO 1.30.01	
2/20/96	DON EMERSON, TELSMKTG	VA	8" D59D	MOORE CLEMENS INS. KATHA SEGERFORD
2/29/96	DON BOOSTER	INDIANAPOLIS, IN		
4/1/96	DAN NEAL	SACRAMENTO, CA	w/O/S 3.5	
5/24/96	TOM MCCOY	HARRISBURG, PA	w/386 O/S 1.30	
6/6/96	MANUAL ORONA	LOS ANGELES, CA	1.2M w/all 3 O/S	
6/21/96	ARON PHILLIPS	BIRMINGHAM, AL		
	WILLIAM GOSPEY	CHURCH HILL, TN	w/O/S 3.5	
9/5/96	CHUCK WOLF	SPRINGFIELD, IL		
10/29/96		CHESBA, MA		MATRUCK & BOOK, GAIL
1/23/97	ISRAEL ZONZINSKI	DOMINICAN REPUBLIC	w/R4 PERM	ISRAEL ZONZINSKI
2/11/97		PHILADELPHIA, PA		JUNGLES, O'CONNELL, & BACHELOR
3/7/97	JOHN LEPKOWSKI	JACKSONVILLE, FL	w/O/S 3.5 or 1.2	
6/19/97		BUNN GFF36	w/TURBO 1.25	DAN COLLINS, NED

CS/386 MAINTENANCE REL 1.29.01

8/5/93 JOHN PARDOE BALTIMORE, MD BALTIMORE SIGN
SOFTWARES STEVE SHOESMITH 11/12?

REL 1.30.00

9/15/93 TORBJORN SAGNER SWEDEN
9/17/93 VERDE SYSTEMS DICK NELSON 11/11 LM

~~9/21/93 BOB HENDRIKS A~~

9/22/93 BRIAN WEIR BOSTON MBTA POLICE ED MACBIOCH 11/21/93

9/29/93 JOHN PARDOE BALTIMORE, MD BALTIMORE SIGN STEVE MARNEY

10/1/93 SOFTWARES STEVE SHOESMITH 10/18 ✓ 11/16 ✓

10/20/93 HILTON HEAD, SC MANIS 1360 BILL KUECHLER 803-842-6047

SCOTTSDALE, ARIZ WESTLANDS 1360 JEFF LEMLEY

10/22/93 JOHN HOWSER RSC, ATLANTA 1360

1/10/94 K&R CUSTOM S/W 1360 TOM REESE

4/11/94 112M TYLER OLSEN

2/6/95 CRAIG LAVIS DEWITT, NY 1360K

1/5/96 WOODS HOLE, MA MARINE BIOLOGICAL LABS 2360 GUS TOLLIOS

1/18/96 DARREL MARSH NYC, NY 112M

5/23/96 TOM MCCOY HARRISBURG, PA 112M

6/6/96 MANUAL ORONA LOS ANGELES, CA 112M

DISK UTILITIES (CONT.)

11/26/97	JOHN McCARD	CLOVIS, N.M.	
12/16/97	SEBBS LABOSSIERE,	ST. NICHOLAS, QC	w/ O/S 3.5 2 360c
9/2/98	ANDY WOODS	BEVERLY POLICE	
11/24/98	DAVE RICE	CE, Columbia, MD	on 1,2 MB w/ TURBO. O/S.
12/15/98	CHARLES MICKLES	CE, MA	w/ 3.5 O/S
12/28/98	CARL HISSMAN	CE, NJ	w/ 3.5 O/S
3/30/99	CHUCK WALLACE	CE, SC	w/ 3.5 O/S

HANDY 2200 QUICK COMMAND REFERENCE

3/98	CHUCK WALLACE	CE, SC	11/30/98
4/17/98	HERB SHEPTAL		
5/7/98	JOHN HOWSER	RSC, GA	
	JEFF RINKER	RSC, GA	
5/27/98	RALPH PINZER	CE, PA	
7/31/98	DAN NEAL	CE, SACRAMENTO, CA	5/6/99
8/26/98	GABRIEL BRIAS	CE, CA	
11/19/98	DAVE RICE	CE, MD	
12/15/98	STEVE MAWTEL	CE, VA	
12/15/98	CHARLES MICKLES	CE, MA	
4/14/99	BOB STADNIK	CE, MD	
5/10/99	DAVE URELLA	CE, WORCESTER, MA	
6/7/99	KEN ALLEN	CE, DC.	
7/9/99	SIND PERRATONS	CE, NY	
8/11/99	KEN SALES	CE, NY	
8/11/99	BUD KIMBALL	BM, WENETA	
8/11/99	PAUL POCKOSKI	CE, MA	
9/9/99	BILLY WILKES	CE, NASHVILLE, TN	
10/7/99	THEO THORNTON	CE, CA	
11/8/99	DEXTER KIM	CE, AA	
1/18/00	HERB SHEPTAL	CE, NJ	
1/18/00	DARREL WESHAPHAL	CE, KS	
2/8/00	RANDY SHARP	CE, GA	

CS/386 TURBO

CPU (NEED RZ PARRY) ON 'KEY SF' MUST HIT KEY MORE THAN ONCE BEFORE RECOGNIZED. INTERMITTENT.

CPU (NEED RZ PARRY) W/ MXF, MXD, & TRIPLE CONT SETTING UP 21 TERMS/PARTS, ALL OLD BUS TERMINALS GET ERROR A09 (PROGRAM UNRESOLVED) ON ALMOST ANY COMMAND INCLUDING LIST, END, PRINT, CLEAR. MXF PORTS CAN ACCESS OLD & NEW BUS.

CPU BRD W/ ALL OLD CONTROLLERS, IF RUN RANDOM R/W TO A DS ADDRESS, THEN TRY TO LIST ANOTHER ADDRESS IN SAME DS, 2ND TERMINAL HANGS UNTIL 1ST PROGRAM HALTED.

CDSTAPEB DS UTILITY VER 3.0 HAS BUG IF USED WITH 45M TAPE DRIVE. IF CHANGE LINE 1035 MORE THAN 1 ADDRESS IS SAVED ON TAPE & 2ND ADDRESS STARTS BEYOND TRACK 1, WILL NOT BE ABLE TO RESTORE. APPEND TO 1035 :IF M9=45 THEN C# = C# AND HEX(0F FF FF)

PROGRAMS 1ST GETTING AN 'ERROR(01) NOT ENOUGH MEMORY' ON CONVERSION OF A HEADER BYTE IN NEW PROGRAM FROM 'OLD' TO 'NEW'. FIRST BYTE OF PROGRAM HEADER SECTOR 4D. HAD TO CHANGE TO 40 & THEN OK. A BAD PROGRAM WITH A SECTOR OUT OF FORMAT MAY ALSO CAUSE THIS. PROGRAM IN THIS CASE GAVE A D88 TRYING TO LOAD ON A VLSI.

ILLEGAL BACKSPACE Error (00) CONVERTING A PROGRAM, RTC, FROM 'OLD' TO 'NEW'. PROGRAM CONTAINED BACKSPACE COMMAND WHICH IS NOT LEGAL. S19 COMMAND IF TRY TO RUN A BACKSPACE. S11 ON A VLSI.

SF' KEYS WON'T 2236D TERMINALS DO NOT WORK PROPERLY ON THE MXF BOARD. RESPOND (PROPERLY) SF KEYS DO NOT RESPOND OR WILL RESPOND INCORRECTLY. WORK OK ON MXE OR MXD.

BOOT HANGS BEFORE SW SETTINGS ON MXF INCORRECT. CPU BRD 2 HAD WRONG SW OR BRD # SW.

LOADING CGENPART W/ SCREEN CLEARED

KEY SF TO BOOT MOTHERBOARD PROBLEM WITH LAST 5 I/O SLOTS, OLD BUS ONLY. IF & ACTS LIKE RESET PLACE MXE IS ONE OF LAST 5 SLOTS BOTH SF'2 & 3 ACCESS D21.

HANGS ON BOOT SCSI DRIVE NOT COMING UP TO SPEED. AT 10-15 SECONDS AFTER

JUST BEFORE LOADING CPU POWER ON LED ON DRIVE NORMALLY BLINKS TWICE. DOES NOT BLINK IN THIS CASE. MOLEX CONNECTOR FOR 5 + 12V MAKING POOR CONN.

CGENPART W/ - W/ SCSI DRIVE IN SAME CABINET AS CPU. DOES NOT HAVE ENOUGH TIME TO COMPLETE 332 MEG SARGATS DIAGS (NEEDS 13 SEC). TURBO INQUIRES AT 12 SECS & SEE ONLY HALF OF ONLY 169 MEG DRIVE WHICH COMPLETED DIAGS.

BAD SCSI

I91 IMMEDIATELY WHEN TRY TO BACKUP OR RESTORE TO SCSI ARCHIVE 150M TAPE. DRIVE SHOWS UP ON CONFIG SCREEN. I91 ON SC SITAPEREWINDT/Dx F. 1.18

UCDOS, NO TAPE, NO DRIVE

ON BOOT CHANGES AFTER LOADING O/S. BEFORE LOADING GENPART W/ BLANK SCREEN.

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