Chapter 27

VES

27.1 Emulex Prom/option cross reference table

This section by Vic Taylor ...

This is a table of emulex options and the PROM numbers used for each possible emulation. It can be very useful if you need to find out what option you have and what it is emulating.

Table 27–1: PROM cross reference table

Controller	PROM type	First PROM	Last PROM	EMULEX no	Location	Digital part no
CS01-H2	ADDRESS	18		CC1111701	U81	29-81589
CS01-H2	EMULATION	648	659	CC0111701		29-81577
CS01-H2	ADDRESS	19		CC1111702	U82	29-81588
CS01-H2	ALT ADDR (1)	797		CC1111727	U82	29-81584
CS01-H2	ALT ADDR (2)	D00		CC0111702	U82	29-81578
CS02-H1	ADDRESS	997		CC0211702	U124	29-81580
CS02-H1	ADDRESS	998		CC0211703	U125	29-81581
CS02-H1	EMULATION	966	971	CC0211701		
CS04	PAL	H26		CC0411703		
CS04	PAL	H27		CC0411704		
CS11-F1	ALT ADDR (1)	786		CC1111722	U59B	
CS11-F1	ADDRESS	784		CC1111720	U59A	
CS11-F1	ALT ADDR (3)	788		CC1111724	U59B	
CS11-F1	EMULATION	736	747	CC1111719		29-81586
CS11-F1	ALT ADDR (2)	787		CC1111723	U59B	
CS11-F1	ALT ADDR (4)	789		CC1111725	U59B	29-81593
CS11-H2	ADDRESS	18	N/A	CC1111701	U59A	29-81589
CS11-H2	EMULATION	300	311	CC1111714		29-81587
CS11-H2	BEST DATA	387		CC1111716	U59A	
CS11-H2	BEST DATA	386		CC1111715	U59A	
CS11-H2	ALT ADDR (1)	797		CC1111727	U59B	29-81584
CS11-H2	ADDRESS	19		CU1111702	U58B	
CS11-HO	ADDRESS	18		CC1111701	U59A	29-81589
CS11-HO	ADDRESS	19		CU1111702	U59B	
CS11-HO	SPECIAL	600	611	CU1111717		
CS11-MH	ADDRESS	18		CC1111701	U59A	29-81589
CS11-MH	ADDRESS	19		CU1111702	U59B	
CS11-MH	ALT ADDR (1)	797	N/A	CC1111727	U59B	29-81584
CS11-MH	EMULATION	860	871	CC1111728		29-81590

Table 27–1 (Cont.): PROM cross reference table

Controller	PROM type	First PROM	Last PROM	EMULEX no	Location	Digital part no
CS11-MU	ADDRESS	593		CC1111718	U59B	29-81595
CS11-MU	ADDRESS	297		CC1111705	U59A	29-81594
CS11-MU	EMULATION	872	883	CC1111729		29-81582
CS11-U2	EMULATION	360	371	CC1111713		29-81585
CS11-U2	ALT ADDR (1)	291		CC1111712	U59B	29-81596
CS11-U2	ADDRESS	593		CC1111718	U59A	29-81595
CS11-U2	ADDRESS	297		CC1111705	U59A	29-81594
CS11-U2	ALT ADDR (2)	298		CC1111706	U59B	
CS11-V1	ADDRESS	196		CC1111708	U59A	29-81597
CS11-V1	EMULATION	168	179	CC1111707		29-81583
CS11-V1	CRC TABLES	198	199	CC1111710		29-81592
CS11-V1	ADDRESS	197		CC1111709	U59B	29-81591
CS11-V2	ADDRESS	196		CC1111708	U59A	29-81597
CS11-V2	ADDRESS	197		CC1111709	U59B	29-81591
CS11-V2	EMULATION	E31	E42	CC1111730		
CS11-V2	ALT ADDR (1)	786		CC1111722	U110	
CS21-F	ADDRESS	785		CC1111721	U110	
CS21-F	ADDRESS	792		CC2111725	U111	29-81616
CS21-F	ALT ADDR (4)	789		CC1111725	U110	29-81593
CS21-F	ALT ADDR (2)	787		CC1111723	U110	
CS21-F	ALT ADDR (3)	788		CC1111724	U110	
CS21-F1	EMULATION	848	859	CC2111724		29-81598
CS21-F2	EMULATION	A13	A24	CC2111727		
CS21-H2	ADDRESS	285		CC2111702	U110	29-81605
CS21-H2	ADDRESS	284		CC2111701	U111	29-81604
CS21-H2	BEST DATA	393		CC2111711	U110	
CS21-H2	BEST DATA	392		CC2111710	U111	
CS21-H2	EMULATION	412	423	CC2111713		29-81599
CS21-HL	ADDRESS	785		CC1111721	U110	
CS21-HL	EMULATION	884	895	CC2111726		
CS21-HL	ADDRESS	792		CC2111725	U111	29-81616
CS21-MH	EMULATION	448	459	CC2111719		29-81600
CS21-MH	ADDRESS	587		CC2111716	U111	29-81611
CS21-MH	ADDRESS	586		CC2111715	U110	29-81610
CS21-MU	EMULATION	536	547	CC2111720		29-81601
CS21-MU	ADDRESS	588		CC2111717	U110	29-81612
CS21-MU	ADDRESS	589		CC2111718	U111	29-81613
CS21-MZ	EMULATION	672	683	CC2111721		29-81602
CS21-MZ	ADDRESS	594		CC2111722	U110	29-81614
CS21-MZ	ADDRESS	595	N/A	CC2111723	U111	29-81615
CS21-U2	EMULATION	424	435	CC2111714		
CS21-U2	ALT ADDR (1)	397		CC2111712	U110	29-81607
CS21-U2	ADDRESS	290		CC2111706	U110	
CS21-V2	ADDRESS	289		CC2111705	U111	29-81606
CS21-Z1	ADDRESS	388		CC2111707	U110	29-81608
CS21-Z1	ALT ADDR (1)	D14		CC2111728	U110	
CS21-Z1	EMULATION	324	335	CC2111709		29-81603
CS21-Z1	ADDRESS	389		CC2111708	U111	29-81609
CS23	PAL	H28	H30	CC3211702		
CS32-F1	EMULATION	930	935	CC3211702		
CS32-MF	EMULATION	906	911	CC3211701		29-81576
CS40-FX	PAL	P05		CC4011705		
CS40-FX	PAL	P04		CC4011704		

Table 27–1 (Cont.): PROM cross reference table

Controller	PROM type	First PROM	Last PROM	EMULEX no	Location	Digital part no
CS40-FX	PAL	P03		CC4011703		
CS40-FX	EMULATION	A39	A44	CC4011706		
CS40-FX	PAL	P02		CC4011702		
CS41-F1	PAL	P58		CC4111704		
CS41-F1	PAL	P76	P98	CC4111703		
CS41-F1	PAL	P23	P51	CC4111705		
CS41-F1	PAL	P59		CC4222706		
IB01	EMULATION	A07		HA0111701		
MD01	EMULATION	A10		MD0111701		
MD21	EMULATION	A96	A97	MD2111701		
MD23	PAL	H25		MD2311702		
MS51	EMULATION	A48	A49	MS5111701		
MT01	EMULATION	A08	MT011	MT0111701		
MT02	EMULATION	A08		MT0111701		
MT03	EMULATION	A25		MT0311701		
MXV11	BOOT PROM	395	396	SC0111725		
QD01	EMULATION	A62		QD0111703		
QD21	EMULATION	P95		QD2111704		
QD32	EMULATION	A63		QD3211701		
REV11	BOOT PROM	1076	1079	SC0111720		
SC01-A1	EMULATION	760	771	SC0111701		29-81460
SC01-A2	EMULATION	772	783	SC0111706		29-81461
SC01-A3	EMULATION	784	795	SC0111708		29-81463
SC01-A4	EMULATION	796	807	SC0111702		29-81462
SC01-A6	EMULATION	724	735	SC0111717		29-81464
SC01-A7	EMULATION	556	567	SC0111715		29-81465
SC01-A8	EMULATION	1040	1051	SC0111719		29-81466
SC01-A9	EMULATION	00	11	SC0111722		29-81467
SC01-AR	EMULATION	459	470	SC0111714		
SC01-B1	ADDRESS	585		SC0111727	U74	
SC01-B1	EMULATION	844	855	SC0111713		29-81468
SC01-B2	ADDRESS	585		SC0111727	U74	
SC01-B2	EMULATION	856	867	SC0111716		29-81469
SC01-B3	EMULATION	60	71	SC0111723		29-81470
SC01-B3	ADDRESS	585		SC0111727	U74	
SC01-BM	ADDRESS	585		SC0111727	U74	
SC01-BM	EMULATION	336	347	SC0111724		29-81471
SC01-C1	EMULATION	1028	1039	SC0111718		29-81472
SC01-E2	ADDRESS	585		SC0111727	U74	
SC01-E2	EMULATION	484	495	SC0111726		
SC02-AX	EMULATION	156	167	SC0211701		29-81474
SC02-AX	ALT BOOT ROM	B04	B05	SC0311710		
SC02-AX	CONFIGURATION	584		SC0211703	U64	29-81479
SC02-AX	ALT ADDR (1)	292		SC0211707	U104	29-81481
SC02-AX	BOOT PROM	B02	B03	SC0311709		29-81488
SC02-AX	ADDRESS	13		SC0211705	U104	29-81478
SC02-AX	BOOT PROM	14	15	SC0211706		29-81483
SC02-AX	ALT BOOT ROM	384	385	SC0211708		29-81477
SC02-CX	BOOT PROM	B02	B03	SC0311709		29-81488
SC02-CX	CONFIGURATION	194		SC0211704		29-81480
SC02-CX	EMULATION	132	143	SC0211702		29-81475
SC02-CX	ALT ADDR (1)	292		SC0211707	U104	29-81481
SC02-CX	ALT BOOT ROM	B04	B05	SC0311710		

Table 27–1 (Cont.): PROM cross reference table

Controller	PROM type	First PROM	Last PROM	EMULEX no	Location	Digital part no
SC02-CX	BOOT PROM	14	15	SC0211706		29-81483
SC02-CX	ALT BOOT ROM	384	385	SC0211708		29-81477
SC02-LX	CONFIGURATION	584	SC021	SC0211711	U64	29-81482
SC02-LX	ALT BOOT PROM	B04	B05	SC0311710		
SC02-LX	EMULATION	512	523	SC0211710		29-81476
SC02-LX	BOOT PROM	B02	B03	SC0311709		29-81488
SC02-LX	ALT BOOT ROM	384	385	SC0211708		29-81477
SC02-LX	BOOT PROM	14	15	SC0211706		29-81483
SC02-LX	ADDRESS	398		SC0211709	U104	29-81484
SC03-BX	ALT BOOT ROM	984	985	SC0311706		29-81485
SC03-BX	ALT BOOT ROM	B04	B05	SC0311710		
SC03-BX	ADDRESS	696		SC0311704	U124	29-81491
SC03-BX	ALT CONFIG	C04	N/A	SC0311711	U126	N/A
SC03-BX	BOOT PROM	B02	B03	SC0311709		29-81488
SC03-BX	BOOT PROM	794	795	SC0311705		29-81489
SC03-BX	CONFIGURATION	899		SC0311707	U126	29-81486
SC03-BX	EMULATION	912	917	SC0311708		29-81490
SC03-MS	ALT BOOT ROM	B04	B05	SC0311710		
SC03-MS	EMULATION	E12	E17	SC0311712		29-81695
SC03-MS	ALT ADDR (1)	D09		SC0311716	U124	
SC03-MS	ADDRESS	D08		SC0311715	U124	
SC03-MS	CONFIGURATION	C05		SC0311713	U126	
SC03-MS	BOOT PROM	B02	B03	SC0311709		29-81488
SC04-CX	ADDRESS	13		SC0211705	U104	29-81478
SC04-CX	CONFIGURATION	390		SC0411702	U64	29-81492
SC04-CX	EMULATION	348	359	SC0411701		29-81494
SC04-LX	EMULATION	472	483	SC0411703		29-81495
SC04-LX	CONFIGURATION	399		SC0411704	U64	29-81493
SC04-LX	ADDRESS	398		SC0211709	U104	29-81484
SC11-A1	EMULATION	291	302	SC1111701		29-81498
SC11-A2	EMULATION	736	747	SC1111702		29-81499
SC11-A3	EMULATION	243	254	SC1111717		29-81500
SC11-A4	EMULATION	495	506	SC1111723		29-81501
SC11-A6	EMULATION	1194	1205	SC1111734		29-81502
SC11-A7	EMULATION	519	530	SC1111729		29-81503
SC11-A8	EMULATION	712	723	SC1111730		29-81504
SC11-AR	EMULATION	483	494	SC1111728		
SC11-B1	EMULATION	892	903	SC1111707		29-81505
SC11-B2	EMULATION	932	943	SC1111703		29-81506
SC11-B3	EMULATION	1104	1115	SC1111731		29-81507
SC11-B4	EMULATION	1130	1141	SC1111733		29-81508
SC11-C1	EMULATION	1016	1027	SC1111732		29-81509
SC12-AX	ADDRESS	295		SC1211702	U127	29-81513
SC12-AX	CONFIGURATION	195		SC0211702	U64	29-81479
SC12-AX	EMULATION	436	447	SC1211703		29-81514
SC12-CX	CONFIGURATION	194		SC0211704	U64	29-81480
SC12-CX	ADDRESS	295		SC1211702	U127	29-81513
SC12-CX	EMULATION	272	283	SC1211701		29-81516
SC12-LX	CONFIGURATION	584		SC0211711	U64	29-81482
SC12-LX	ADDRESS	D03		SC1211707	U127	29-81515
SC12-LX	EMULATION	A27	A38	SC1211706		29-81512
SC12-V1	ADDRESS	295		SC1211702	U127	29-81513
SC12-V1	CONFIGURATION	598		SC1211705	U64	29-81511

Table 27–1 (Cont.): PROM cross reference table

Controller	PROM type	First PROM	Last PROM	EMULEX no	Location	Digital part no
SC12-V1	EMULATION	694	695	SC1211704		29-81510
SC21-B1	ALT ADDR (2)	793		SC2111717	U130	
SC21-B1	ADDRESS	192		SC2111703	U130	29-81523
SC21-B1	CONFIGURATION	12		SC2111705	U129	29-81528
SC21-B1	ALT CONFIG	898	SC211	SC2111719	U125	
SC21-B1	EMULATION	200	211	SC2111702		29-81518
SC21-B1	ALT ADDR (1)	597		SC2111715	U130	
SC21-B2	ALT ADDR (1)	597		SC2111715	U130	
SC21-B2	ADDRESS	192		SC2111703	U130	29-81523
SC21-B2	CONFIGURATION	296		SC2111706	U129	29-81517
SC21-B2	ALT ADDR (2)	793		SC2111717	U130	
SC21-B2	EMULATION	180		SC2111708		29-81520
SC21-BE	EMULATION	1222	1233	SC2111709		29-81529
SC21-BE	CONFIGURATION	12		SC2111705	U129	29-81528
SC21-BE	ADDRESS	192		SC2111703	U130	29-81523
SC21-BE	ALT ADDR (2)	793		SC2111717	U130	
SC21-BE	ALT CONFIG	898	SC211	SC2111719	U125	
SC21-BE	ALT ADDR (1)	597		SC2111715	U130	
SC21-BF	EMULATION	772	783	SC2111701		29-81525
SC21-BF	CONFIGURATION	1145		SC2111707	U129	29-81524
SC21-BF	ADDRESS	192		SC2111703	U130	29-81523
SC21-BF	ALTADDR (1)	597		SC2111715	U130	
SC21-BF	ALT ADDR (2)	793		SC2111717	U130	
SC21-BM	EMULATION	108	119	SC2111713		29-81522
SC21-BM	CONFIGURATION	286		SC2111712	U129	29-81530
SC21-BM	ADDRESS	793		SC2111717	U130	
SC21-BM	ALT CONFIG	987		SC2111721	U125	29-81519
SC21-BM	ALT ADDR (1)	597		SC2111715	U130	
SC21-BT	CONFIGURATION	1234		SC2111711	U129	
SC21-BT	EMULATION	1222	1233	SC2111709		29-81529
SC21-BT	ADDRESS	192		SC2111703	U130	29-81523
SC21-BT	ALT ADDR (1)	597		SC2111715	U130	
SC21-BT	ALT ADDR (2)	793		SC2111717	U130	N/A
SC21-BU	EMULATION	1222	1233	SC2111709		29-81529
SC21-BU	CONFIGURATION	596		SC2111716	U129	29-81526
SC21-BU	ADDRESS	192		SC2111703	U130	29-81523
SC21-BU	ALT ADDR (1)	597		SC2111715	U130	
SC21-BX	ADDRESS	798		SC3111703	U129	
SC21-C1	ADDRESS	192		SC2111703	U130	29-81523
SC21-C1	EMULATION	260	271	SC2111710		29-81521
SC21-V1	BOOT PROM	287		SC2111714		
SC21-V1	ADDRESS	192		SC2111703	U130	29-81523
SC21-V1	ALT ADDR (2)	793		SC2111717	U130	
SC21-V1	EMULATION	144	155	SC2111704		
SC21-V1	ALT ADDR	597		SC2111715	U130	
SC21-V1	CONFIGURATION	12		SC2111705	U129	29-81528
SC21-V1	ALT CONFIG	986		SC2111720	U125	29-81527
SC31-BX	AUTO INCRE-MENT	896		SC3111704	U135	
SC31-BX	CONFIGURATION	897		SC3111705	U128	29-81531
SC31-BX	EMULATION	900	905	SC3111701		29-81533
SC31-BX	ALT CONFIG	C03		SC3111706	U124	
SC41-MS	ADDRESS	D04		SC4111716		

Table 27–1 (Cont.): PROM cross reference table

Controller	PROM type	First PROM	Last PROM	EMULEX no	Location	Digital part no
SC41-MS	EMULATION	A56	A61	SC4111714		
SC41-MS	CONFIGURATION	C02		SC4111715		
SC41-MS	ALT ADDR (1)	D12		SC4111717		
SC70-B3	EMULATION	212	223	SC7011703		
SC70-B4	EMULATION	24	35	SC7011704		29-81535
SC7000	INTER-VECTOR	996		SC7511711		
SC7000	BOOT PROM	497		SC7511703		
SC7000	CONFIGURATON	994		SC7511709	U19	
SC7000	EMULATION	960	965	SC7511708		29-81403
SC7000	AUTO INCRE-MENT	995		SC7511710		
SC7002	EMULATION	960	965	SC7511708		29-81403
SC7002	CONFIGURATION	994		SC7511709	U19	
SC71-B1	CONFIGURATION	299		SC7111703	U50	
SC71-B1	EMULATION	36	47	SC7111701		29-81540
SC71-B2	CONFIGURATION	296		SC7111706	U50	29-81537
SC71-B2	EMULATION	48	59	SC7111702		29-81538
SC71-BM	EMULATION	372	383	SC7111704		29-81541
SC71-BM	CONFIGURATION	394		SC7111705	U50	29-81539
SC72-BX	CONFIGURATION	897		SC3111705	U71	29-81531
SC72-BX	AUTO INCRE-MENT	896		SC3111704	U49	
SC72-BX	EMULATION	948	953	SC7211701		
SC72-BX	ADDRESS	992		SC7211703	U94	
SC72-BX	CONFIGURATION	C00		SC7211706	U71	
SC72-BX	ALT CONFIG	C03		SC3111706	U71	
SC72-TX	EMULATION	A50	A55	SC7211707		
SC750-B1	ALT CONFIG	C01		SC7511712	U23	29-81542
SC750-B1	EMULATION	400	411	SC7511701		29-80071
SC750-B1	CONFIGURATION	496		SC7511702	U23	
SC750-B1	BOOT PROM	497		SC7511703	U169	29-81545
SC750-B2	CONFIGURATION	498		SC7511705	U23	29-81404
SC750-B2	EMULATION	548	559	SC7511704		29-81544
SC750-B2	BOOT PROM	497		SC7511703	U169	29-81545
SC750-B3	CONFIGURATION	496		SC7511702	U23	
SC750-B3	BOOT PROM	497		SC7511703	U169	29-81545
SC750-B3	ALT CONFIG	C01		SC7511712		29-81542
SC750-B3	EMULATION	824	835	SC7511706		29-81543
SC758-B1	BOOT PROM	497		SC75111703	U55	29-81545
SC758-B1	EMULATION	812	823	SC7511707		29-81546
SC758-B1	CONFIGURATION	790		SC7811708	U23	29-81460
SC780	BUS INTERFACE	591	592	SC7811170		
SC780-B1	CONFIGURATION	496		SC7511702	U23	
SC780-B1	EMULATION	460	461	SC7811702		29-81547
SC780-B1	ALT CONFIG	C01		SC7511712		29-81542
SC780-B2	CONFIGURATION	498		SC7511705	U23	29-81404
SC780-B2	EMULATION	572	583	SC7811703		29-81405
SC780-B3	EMULATION	748	759	SC7811706		
SC780-B3	CONFIGURATON	496		SC7511702	U23	
SC780-B3	ALT CONFIG	C01		SC7511712	U23	29-81542
SC788-B1	EMULATION	760	771	SC7811707		29-81399
SC788-B1	CONFIGURATION	790		SC7811708	U23	29-81400
SW44	CONFIGURATION	990	991	SW4411701		

Table 27–1 (Cont.): PROM cross reference table

Controller	PROM type	First PROM	Last PROM	EMULEX no	Location	Digital part no
TC01	EMULATION	660	671	TC0111702		
TC01	EMULATION	84	95	TC0111701		
TC02-FS	EMULATION	724	735	TC0211703		
TC02-FS	ADDRESS	499	499	TC1211703	U81	
TC03-FS	EMULATION	A80	A85	TC0311701		
TC03-FS	AUTO INCRE-MENT	B00		TC1311702		
TC03-FS	ADDRESS	499		TC1211703	U93	
TC05-SX	EMULATION	924	929	TC0511701		
TC05-SX	ADDRESS	988		TC0511702	U76	
TC11	EMULATION	96	107	TC1111701		
TC11	SPECIAL	800	811	TC1111703		
TC11	ADDRESS	699		TC1111704		
TC12-FS	ADDRESS	499		TC1211703	U80	
TC12-FS	EMULATION	712	723	TC1211704		
TC13-FS	EMULATION	A00	A05	TC1311701		
TC13-FS	AUTO INCRE-MENT	B00		TC1311702		
TC13-FS	ADDRESS	499		TC1211703	U93	
TC15-SX	ADDRESS	988		TC0511702	U76	
TC15-SX	EMULATION	954	959	TC1511701		
TC7000	EMULATION	972	977	TC7511701		29-81394
TC7000	AUTO INCRE-MENT	993		TC7511702	U14	
UC01-CX	BOOT PROM	B02	B03	SC0311709		29-81488
UC01-LX	BOOT PROM	14	15	SC0211706		29-81483
UC01-LX	ALT BOOT ROM	B04	B05	SC0311710		
UC01-LX	EMULATION	836	847	UC0111701		29-81550
UC01-LX	ADDRESS	599		UC0111703	U104	29-81548
UC01-LX	CONFIGURATION	791		UC0111702	U64	29-81549
UC02	FPLA	F01	F08	UC0211702		
UC02	EMULATION	A06		UC0211701	U3	
UC03-FP	EMULATION	E66		UC0311706	U3	
UC03-MX	FPLA	F21	F26	UC0311702		29-81552
UC03-MX	EMULATION	A09		UC0311701	U3	29-81551
UC12-SX	EMULATION	A06		UC0211701	U3	
UC12-SX	FPLA	F11	F20	UC1211702		
UC13-FP	EMULATION	E66	UC031	UC0311706	U3	
UC13-MX	EMULATION	A09		UC0311701	U3	29-81551
UC13-MX	FPLA	F27	F34	UC1311701		

27.2 Emulex communications options

This section by Barry Lowry ...

There has been some confusion regarding EMULEX comms options part numbers. The confusion has been largely caused by some recent changes in maintenance strategy and by some changes in the types of distribution panels made by emulex.

27.2.1 Maintenance Strategy For Emulex Comms Options

27.2.1.1 Controllers

Diagnose to the failing controller board. Remove failing controller board from the system. Swap firmware from failing controller board to spare controller board. Install spare controller board in system. If firmware is diagnosed as the problem, P1 firmware using the DEC P/N contained in the table at the front of this chapter.

27.2.1.2 CP12 Distribution panel

Diagnose to the failing unit (ie: distribution assembly w/power supply, or left or right adapter panel). Replace the failing unit.

Note

From now on it is not possible to order:
29-80829 (CP12 8 line distr. panel) or
29-80830 (CP12 16 line distr. panel)
See later for new part numbers.

Emulex have phased out some of their distribution panels but spares and repairs support for the existing Emulex CS01, CS11, and CS21 controllers has been contracted with Emulex. It is therefore important to remember that Emulex CS01, CS11, and CS21 spares are for support of digital service customers and are not intended for resale.

Table 27–2: List of Part Numbers

Option	Digital	Emulex	Description
CS01	29-80837	CS0110201-NP CU0110401 U-CU0110401	CS01 controller (noproms)
CS01	See CP12	CP1220002-00	16 line distrib panel
CS01	See CP12	CP1220001-00	8 line distrib panel
CS02	29-81205	CS0210201-NP	CS02 controller (noproms)
CS02	29-81203	CP2410201	CP24 distribution panel
CS02	29-81204	CP2410202	CP24/B distribution panel
CS02	29-81210	CU2410201	CP24 wrap around con
CS02	29-81202	CU2210202	CP22 wrap around con
CS02	29-81211	CP2210202-02	CP22/B panel (directly replaces CP22 panel)
CS11	29-80828	CS1110201-NP CU1110401 U-CU1110401	CS11 controller (no proms)
CS11	See CP12	CP1220001-00	8 line distrib panel
CS11	See CP12	CP1220002-00	16 line distrib panel
CS21	29-80834	CS2110203-NP CU2110403 CU2110405 U-CU2110403 U-CU2110405	CS21 controller (noproms)
CS21	29-80836	CP2310201-02	CP23 distribution panel
CS21	29-80835	CP2210201-01	CP22 distribution panel
CS21	29-80839	CP2110201-01	CP21 dist panel for CS21/Z1
CS21	29-80838	CP2110201-00	CP21 dist. panel for CS21-H,U,F
CS32	29-81197	CS3210201-NP	CS32 controller (noproms)
CS32	29-81199	CP3210201	CP32 distribution panel
CS32	29-81200	CA3210201	CA32 line adaptor
CS32	29-81208	CU3210201	CP32 wraparound conn
CS32	29-81029	CU1110301	CP11 and CP12 wrap conn

Table 27–2 (Cont.): List of Part Numbers

Option	Digital	Emulex	Description
CS32	29-81196	CU110404	CP11/CP12 line term
CS32	29-81224	CP3430001	CP34 dist. panel
CS32	29-81225	CU3410404	CP34 dist panel
CS32	29-81195	CU1110404	CP32 data terminator
CS32	29-81201	CA3210202	CA32 line adaptor 8 RS232 (right side)
CP12		CP1220001-00	8 line dist panel
CP12		CP1220002-00	16 line dist panel
	29-81881	CA1210205	CA12 Current-Loop Adapter Panel (Left)
	29-81882	CA1210206	CA12 Current-Loop Adapter Panel (Right)
	29-81883	CA1210201	CA12 RS232 Adapter Panel (Left)
	29-81884	CA1210202	CA12 RS232 Adapter Panel (Right)
	29-81885	CA1210203	CA12 Synch/Asynch Adapter Panel (Left)
	29-81886	CA1210204	CA12 Synch/Asynch Adapter Panel (Right)
	29-81887	CP1210201	CP12 Distribution Panel without adapters
	29-81195	CU1110404	Data Terminator
CP21	29-80838	CP2110201-00	Dist.panel non-FCC (16) line RS232-C
CP21	29-80839	CP2110201-01	-Z1 vers. dist panel non-FCC
CP22	29-80835	CP2210201-01	CP22 dist panel
CP23	29-80836	CP2310201-02	dist panel FCC (20 mA. loop or RS232)
CP34	29-81225	CP3410404	CP34 terminator pack
CP34	29-81224	CP3420001	dist panel W/PS 51/4" VAX11/780

These numbers are used for the emulex parts that kept for maintenance only

Table 27–3: Part Numbers from the Local Parts List

Digital no	Description	Emuulex no
+L-42161-00	CP11 16line dist panel	CP11 RS232
+L-42195-00	CP11 16line dist panel	CP1120002
+L-42567-00	CP12 adapter panel	CU3210402
+L-42568-00	CS02-CS21 adapter panel	CU2111201
+L-42566-00	CS11 34W 8' cable	
+L-42564-00	CS11 8 chan L-adpt	
+L-42563-00	CS11 I-F (no proms)	
+L-41025-00	dist panel 8 line	CA3220002.00
+L-41023-00	distribution panel	CA11/H
+L-42420-00	lne adpt panel 20mA	CP12 20005
+L-41071-00	DEC number 29-81200-00	CA3210201B
+L-41070-00	29-81201-00	CA3210202B
+L-40620-00	29-80828-00	CS11/U
+L-42376-00	29-80836-00	CP2310201-02
+L-42399-00	29-81203-00	CP24
+L-41043-00	29-81205-00	CC02-H
+L-41067-00	pan adp 8 line L/H	CA 1210201-B
+L-41031-00	pan adp 8 line R/H	CA12102-02B
+L-40546-00	prom set	CC21/F1
+L-40547-00	prom set	CC21/Z
+L-40548-00	prom set	CC11/F1
+L-40549-00	prom set	CC21/H
+L-40550-00	prom set	CC11/H
+L-42333-00	prom set	CSM11-MU
+L-43447-00	34 way 1ft cable	CU1111201-01

Table 27–4: Which Distribution Panels Work With Which Controller

Option	Panel or Adapter	Emulex no	Description
CS01	CP12/HO	CP1220001-00	8-line RS232 panel
	CP12/CO	CP1220005-00	8-line 20mA current loop panel
	CP12/CC	CP1220006-00	16-line 20mA current loop panel
	CP34	CP3420001-00	16-line RS422/RS232 panel
	CP12/V[1]	CP1220007-00	8-line sync/async panel
	CP12/V[1]	CP1220008-00	16-line sync/async panel
CS02	CP22/B	CP2210201-02	16-line RS232 panel
	CP24	CP2410201-01	16-line RS232 panel (Micro Vax and MICRO PDP-11)
	CP24/B	CP2410202-00	4-line modem control panel (Requires CP24)
CS03	CP22/B	CP2210202-02	16-line RS232 panel
	CP24	CP2410201-01	16-line RS232 panel (Micro Vax and Micro PDP)
	CP24/B	CP2410202-00	4-line modem control panel
	CP25	CP2510201-02	16-line RS232/RS422 panel
CS11[2]	CP12	CP1220001-00	8-line RS232 panel
	CP12/CO	CP1220005-00	8-line 20mA current loop panel
	CP12/CC	CP1220006-00	16-line 20mA current loop panel
	CP34	CP3420001-00	16-line RS232/RS422 panel
	CP12/V[1]	CP1220007-00	8-line sync/async panel
	CP12/V[1]	CP1220008-00	16-line sync/async panel
CS11/F	CP12/HO	CP1220001-00	8-line RS232 panel
STATCON	CP12/HH	CP1220002-00	16-line RS232 panel
CS11/V	CP12/V	CP1220007-00	8-line sync/async panel
	CP12/V	CP1220008-00	16-line sync/async panel
CS21	CP22/B	CP2210202-02	filtered 16-line RS232 panel
	CP23/02	CP2310201-02	16-line unfiltered 20mA/RS232
	CP25	CP2510201-02	16-line unfiltered RS422/RS232
CS23	CP22/B	CP2210202-02	filtered 16-line RS232 panel
	CP23/02	CP2310201-02	16-line unfiltered 20mA/RS232
	CP25	CP2510201-02	16-line unfiltered RS422/RS232
	CP26		24-line unfiltered RS232 panel, full modem control
CS32	CP12/HO	CP1220001-00	8-line RS232 panel
	CP12/CO	CP1220005-00	8-line 20mA current loop panel
	CP12/CC	CP1220006-00	16-line 20mA current loop panel
	CP34	CP3420001-00	16-line RS232/RS422 panel
	CP12/V[1]	CP1220007-00	8-line sync/async panel
	CP12/V[1]	CP1220008-00	16-line sync/async panel

[1]Will rarely be used on these controllers.

[2]Except CS11/F, statcon 11 and CS11/V.

27.2.2 What Distribution Panels are Emulex still making

CP11 All models phased out and replaced by CP12/CO and CP12/CC. Emulex will maintain limited quantities of CA11/C for sparing purposes.
CP12/HO Will remain in production because there is no direct replacement.
CP12/HH Is replaced by the CP34 in most applications. Exceptions are for the CS11/F and STATCON 11 orders.
CP12/VO Replaced by CP12/V (8 and 16 line) panel.
CP12/VV Replaced by CP12/V (8 and 16 line) panel.
CP12/CO No replacement.
CP12/CC No replacement.
CP12/V2 No replacement.
CP332/XO Most are replaced by the CP34 panel.
CP32/XX Exception is for 24-line CS32.

CP34 Is Emulex current choice for most CS01/CS11, and CS32 applications. This is the only panel to fit properly into a DEC FCC cabinet.
CP21 Replaced by CP22.
CP22-02 Replaced by the CP22/B.
CP22-04 Replaced by the CP22/B.
CP22/B Filtered and unfiltered. These are the panels of choice for CSO2, CS21 (except Z), and CS23.
CP23-02 Filtered and unfiltered. Revision "B" is mandatory.
CP24 No current replacements.
CP24/B No current replacements.
CP25 No current replacements.
CP26 New 24-line panel with full modem control for CS23 mux.

27.3 The SMD bus

This section by Jim Egginton...
Section revised: October 1991

The SMD bus is an industry standard which was used originally on CDC drives and is used in a non industry standard way on the RM series drives. As a rule it uses "A Cables" to pass control signals that are **daisy chained,** and "B Cables" that pass data and index/sector signals, that are **radial,** i.e. there is one B cable for each drive, and one A cable to all drives from the QD3x.

The Unit number is not set by the "B Cable" port but by switches set on the drive. By changing round the B Cables and unit numbers, cable/drive/interface problems can sometimes be quickly isolated.

The Emulex QD3x series and the Dilog 2xx series use the SMD bus. It is some times termed the ESMD and HSMD bus, which are the same electrically but strobed at higher speeds. All controllers should cope with these derivatives.

Table 27–5: SMD Cable details

Cable	No ways	Part No	Length	Comments
A Cable	60 way	FD-14288-01 and +L-44401	12 foot	
A Cable	60 way	29-80507	6 foot	
A Cable	60 way	29-80509	6 + 2 foot	3 fem plugs one transistional
B Cable	26 way	FD-14290-01	12 foot	
B Cable	26 way	29-80508	6 foot	

If cables with 3 connectors (one half way down the cable) of different lengths, are required, or any of this type of cables in general can be made up with the cable making kit (kept here at Welwyn) or the part numbers for the lengths looked up on various EPSPs, but this is laborious and awkward.

27.4 EMULEX DISK CONTROLLERS

27.4.1 General notes on the QD32, QD33, QD34, QD35 and QD21

All these are MSCP controllers for VES disk drive systems control the SMD bus, except the QD21 which is for the ESDI bus. They support up to 2 disk drives, (the QD35 can do 4 drives) that can be numbered 0 through3. The only difference to the engineer between the QD32 and QD33 appears to be the PCB etch.

The following information therefore to generally applies to all these drives in as much as they all have the same firmware and cabling arrangements and therefore the same drive parameters. PCB etch information, like jumpers switches etc, will be different. The QD32/3 has been especially picked out as they are much more common.

Servicing the QD32/3 requires the engineer to set up the NOVRAM. This is a non volatile RAM on the PCB, that contains information about the disks connected to it. If the settings in the NOVRAM are incorrect the disk may not be seen, or such messages as "home block not found" will be returned consistent with the disk being in the wrong format for its controller.

An alternative to changing the NOVRAM settings is to **swap the NOVRAMs between the old and the new QD32/3**, but beware of the only fault being a corrupted NOVRAM. See diagrams later in this section for location of the NOVRAMs.

The NOVRAM is updated is through the console for the CPU. Various deposits and examines are done from the console prompt to bring up the "Firmware Resident Diagnostics" or **"FRD"**. Once this is up the method is straight forward from a menu driven system, except that the parameters for the particular disk must be known.

This section should be enough to set up the QD32/3 on both VAX and PDP, though the QD32/3 manual is a great help and should be referred to if possible.

27.4.2 Bringing up the FRD on a MicroVax

The procedure and commands are the same for both QD32 above Rev E and QD33, for MVAX2 and CVAX based Qbus CPUs. See firmware Section 27.4.8

There are tapes, with diagnostics called QXMX8 for PDP or FVD32M for MVAX, that will boot and use the FRD, but beware, **these use a different set of values**. Refer to the documentation with the program used.

It is recommended to use the process below which involves loading the FRD code from the QD32/3 firmware into main memory and starting it.

The >>>E? commands (Examine) do not need to be done, they are a check all is well so far.

Table 27–6: Commands for a microvax

Step	Command	Response	Comments
1	>>>I		Bus Init
2	>>>D/P/W 20001F40 20		Enable memory
3	>>>D/P/L 20088000 80000000		Setup Map 0
4	>>>D/P/L 20088004 80000001		Setup Map 1
5	>>>D/P/W 2000xxxx 1		Init controller
6	>>>E/P/W 2000yyyy	900 or B00	Step one fm QD32/3
7	>>>D/P/W 2000yyyy 3003		Enable special mode
8	>>>E/P/W 2000yyyy	0100	Acknol special mode
9	>>>D/P/W 2000yyyy 4401		**Up load driver**
10	>>>E/P/W 2000yyyy	0400	Check that Up load done
11	>>>S 80	Menu	Start driver at Loc 80
or 11	>>>S 82	Menu	Start for GPX monitor sys

Values xxxx and yyyy can be worked out as follows:

a. Take the lower 13 bits of the CSR

b. For the standard address of 172150 this is 12150

c. Convert this octal number to hex = 1468 **this is xxxx**

d. Add 2 to this in hex = 146A **this is yyyy**

The QD32 can only be configured for 8 addresses, the QD33 for 16.

Table 27–7: Microvax xxxx and yyyy values

MSCP Adse	xxxx	yyyy	TMSCP Adse	xxxx	yyyy
772150	1468	146A	774500	1940	1942
772154	146C	146E	760404	0104	0106
760334	00DC	00DE	760410	0108	010A
760340	00E0	00E2	760414	010C	010E
etc					

27.4.3 Bringing up FRD on PDP systems

This is simpler, and once again involves accessing the CSRs. For a standard CSR of 172150, with the second MSCP register at 172152:

Table 27–8: FRD boot of PDP

@17772150/000000 1	
@17772152/004400 or 005400 030003	
@/000400 42000	!This reads the next location
@17772152/002000	!This reads this location - but cannot be left out
@200G	

27.4.4 Parameter Values

Table 27–9: Drive Configuration Parameter Values Firmware Rev E plus for FUJI SMD Drives

Param	M2321/2	M2322	M2333	M2351A	M2361A	M2249	M2312	M2344/M2372
Mbytes	84/168	At ICL[1]	337	474	689	389	84	690 /823
Type	1	1	1	1	1	1	1	1 /1
Units	1	2	1	1	1	1	1	1 /1
Sectors	34	34	68	48	68	34	34	67 /68
heads	5/10	10	10	20	20	7	7	27 /27
cylinders	823	823	823	842	842	589	589	622 /745
Spare sect/trk	1	1	1	1	1	1	1	1 /1
Spare cyldrs	2	2	2	2	2	2	2	2 /3
Config bits	6	6	6	6	6	6	6	6 /0
Split code	0	2	0	0	0/2[1]	0	0	0 /0
Head offset[4]	-	9	-	-	-/10	0	-	- /-
Cly offset	-	1	-	-	-/?	-	-	- /-
Removable disk	0	0	0	0	0	0	0	0 /0
Gap 0	259	259	259	259	259	259	259	259 /259
Gap 1	4112	4112	4112	4112	4112	4112	4112	4112 /4112
Gap 2	780	268	780	780	780	780	780	780 /780
Spiral Offset	1	1	1	0	1	1	1	1 /1
Bytes/sect[2]	586	586	587	587[3]	594	586	?	? /?

[1]The customer can have his disk partitioned differently, if he wants, whereby split code 2 and head offset 10 is used

[2]This question is not asked but is useful for an overall check and to see how much of the disk is used

[3] Some books say this should be 594 which is wrong (after GEC Chelmsford DEC 90)

[4] This is not asked if split code is entered as zero

Table 27–10: Drive Configuration Parameter Values Firmware Rev E plus for ESDI Drives

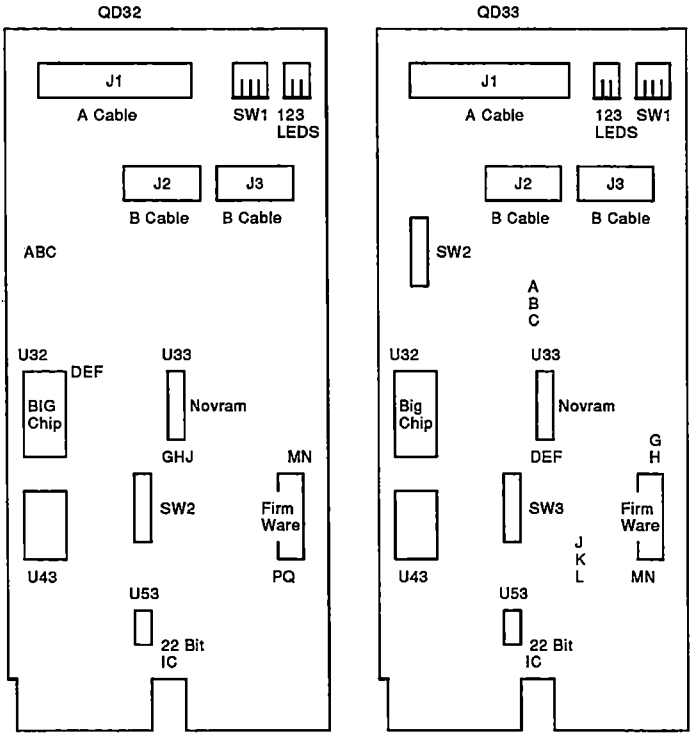
Param	XT8760	XT4380	M2263E[1]	M2246
Type	1	1	1	1
Units	1	1	1 or 2	1
Sectors	53	34	53	35
heads	15	15	15	10
cylinders	1632	1223	1658	823
Spare sect/trk	1	1	1	1
Spare cyldrs	2	2	2	2
Config bits	4	13	4	4
Split code	0	0	0	0
Head offset	-	-	-	-
Cly offset	-	-	-	-
Removable disk	0	0	0	0
Gap 0	4374	3086	4117	2318
Gap 1	6168	6682	3084	3084
Gap 2	534	3095	522	522
Spiral Offset	1	1	0	0
format time mins			35	
verify time mins			240	

[1]These are also for the 4380E. These are not the settings as in the manual, but as recommended by Emulex at National Childrens Home. Note also the drive type at format time MUST BE SET TO SOFT SECTORING. Remove jumper 31 on the ECM.

For **Rev D and below firmware** the parameters are similar except that the clyinders and sectors are entered minus the spare ones, i.e. for the M2312 sectors would be 33 and cylinders 587.

27.4.5 PCB Layout

Figure 27–1: QD32/3 PCB Layout



27.4.6 Switch and jumper settings

Table 27–11: SW1 QD32 and QD33

Switch	OFF	ON	Factory setting
SW1-1	Run	Reset/halted	OFF
SW1-2		MSCP device number LSB	OFF
SW1-3		MSCP device number	OFF
SW1-4		MSCP device number MSB	OFF

Notes on the unit number settings in SW1

If the Auto Boot switch on SW2 or SW3 is on, and the standard bus address 772150 is chosen, then these switches decide which device number the QD boots.
If all switches are off, then unit 0 is chosen.

The unit number chosen is the base address. (See section on the SMD bus) e.g. If SW1 is set at unit 2, and drives are set at unit 2, they will respond to unit number 4.

Table 27–12: SW2 and SW3 QD33 only

Switch	OFF	ON	Factory setting	Switch function
SW2-1	18 bit Qbus	22 bit Qbus	OFF	
SW2-2-3-4		Not used	OFF	
SW3-1	Disable	Enable	OFF	Loop on self test error
SW3-2	4 usec	8 usec	OFF	DMA burst delay
SW3-3	Enable	Disable	OFF[1]	Adaptive DMA/Default Burst
SW3-4	Enable	Disable	OFF	Auto Boot
SW3-5-8	-	-	OFF	LSI Bus Address Table 27–14
SW3-9	B Cable	A Cable	OFF	Index/Sector Sigs
SW3-10		Not Used		

[1]Emulex recommend SW3-3 is ON see DMA switch settings in the next para.

Table 27–13: SW2 QD32 only

Switch	OFF	ON	Factory setting	Switch function
SW2-1	Disable	Enable	OFF	Loop on Self Test Error
SW2-2	Disable	Enable	OFF	Auto Boot
SW2-3-5	-	-	OFF	LSI QBus AddressTable 27–14
SW2-6	18 bit	22 bit	OFF	QBus addressing
SW2-7	4 usec	8 usec	OFF	DMA burst delay
SW2-8	Enable	Disable	OFF[1]	Adaptive DMA/Default burst
SW2-9	B Cable	A Cable	OFF	Index and Sector Sig
SW2-10		Not Used		

[1]Emulex recommend SW2-8 is ON see section dma switch settings in the next para

Table 27–14: Address Switches

QD32	SW2-3	SW2-4	SW2-5	Not App
QD33	SW3-5	SW3-6	SW3-7	SW3-8
772150	off	off	off	off
772154	on	off	off	off
760334	off	on	off	off
760340	on	on	off	off
			etc through to	
760360	on	on	on	off
			and then	
760420[1]	on	on	on	on

[1]This address cannot be used with QD32 Max address is 760360

27.4.6.1 DMA Switch

Emulex recommend that this switch is ON for heavily loaded buses. If it is left OFF then the operating software may be OK, but the FRD may well come up with "DMA Errors", when running Option 5, the data integrity test.

27.4.6.2 jumpers

All jumpers are factory set with the exception of one, this is the jumper that denotes the size of the firmware. For Rev E and above firmware the jumper should be in. For REV A modules the jumper pins have not been put in, though the PCB pads are there. When updating Rev A modules then to Rev E and higher this link must be soldered in.

Table 27–15: Jumpers

Jumper	QD32	QD33
A-B	out	in
B-C	out	out
D-E	out	out
E-F	out	in
G-H	out	**FIRMWARE**
H-J	in	not applic
J-K	not applic	in
K-L	not applic	out
M-N	**FIRMWARE**	out
P-Q	out	not applic

27.4.7 LEDs

Basically if any LED is ON there is a fault, the exception being between self test finishing and init at boot time, when LED 3 is on (See PCB layout for position of LEDs). If a failure occurs during self test at switch on then the LEDs define the error. If an error occurs during normal running, all three LEDs come on and the SA register contains the specific error. The SA register is the base address + 2.

If the LEDs are not off, except LED 3 on its own after switch on, then there is a fault on the QD32/3. If the LEDs come on during running, the fault could be in the system/Qbus/memory a drive or the QD32/3 itself.

27.4.8 Firmware Revisions

The revision level is indicated on the firmware chip. See PCB layout.

Table 27–16: Firmware Revisions

Rev D and below	FRD does not work. NOVRAM can be updated through the console, but this is a long and tedious job, use the diag tape available from logistics. 16Kb so link is out. See Table 27–15
Rev E and above	Use the FRD. 32Kb so link is in. See Table 27–15
Rev F and above	Support for VMS Ver 5 added. Diag tape no longer supported.

27.4.9 Emulex UC06, UC07, UC08, UC17, UC18 Controllers

27.4.9.1 No SCSI Inquire

At power up or boot the UC07/8 series controllers do not do a scsi inquire. Tables are built from settings gained during the NOVRAM set ups of the FRD. These can be built by a scsi inquire (autoconfigure) or put in manually (by saying no to the autoconfigure question), whilst running the FRD.

At power on, for a given type of disk drive, the device will be sized. i.e. it will ask for certain pages from the devices scsi tables, so if the device has been changed for the same type the FRD need not be run, but otherwise **EVERY TIME THE SCSI CONFIGURATION IS CHANGED THE NOVRAM SHOULD BE UPDATED.** Problems may occur if the UC07/8 tries to use a device that is different from that in its device tables. It may corrupt the device straight away. This could be done by simply swapping round the id's of two disks.

27.4.9.2 Offset values

After the Autoconfigure has run, offset values are asked for, this has a somewhat odd interpretation.

If an offset value of zero is put in, it makes the devices on the scsi bus numbers 0, 1, 2, etc in the order of the scsi ids with no recourse to the numbers themselves.
i.e. scsi ids 2, 4, 5 would show up as DUA0, DUA1, and DUA2.

Hence you cannot tell what scsi ids you have on the scsi bus necessarilly from the console

An offset of zero is the default.

27.4.9.3 SCSI Bus Parity

It is very important to have SCSI parity especially on NON-Digital SCSI buses with different and sometimes locally built scsi cables.

SCSI parity if set on the controller must be set on every device on the scsi bus

The UC08 by default and as a result of doing an auto-configure sets SCSI parity OFF. So it is necessary to change it after the auto configure is complete.

27.4.9.4 LED Codes

LED			
1	2	3	ERROR DESCRIPTION
0	0	1	CPU CHIP TEST FAILED
0	1	0	SCSI CHIP TEST FAILED
1	0	0	CONTROLLER IDLE, WAITING FOR INITIALIZATION
0	1	1	BUFFER CONTROLLER OR EXT MEM TEST FAILED
1	0	1	HAC TEST FAILED
1	1	0	EMULATION EPROM CHECKSUM TEST FAILED
0	0	0	SELF-DIAGNOSTIC COMPLETE WITHOUT ERRORS
1	1	1	REFER TO TABLE 6-2 {SEE NOTE}

{NOTE} This error is a Fatal Error code, and is posted in the low byte of the SA register, a full description of these codes may be found in the Technical Manual - Troubleshooting section (6.5)

Table 27–17: Part Nos etc

DEC Part	Vendor PN	FS Code	Description
TBA	UC0610201-02	FS-EMU74-KF	UC06 dual ht one scsi
FD-15065-01	UC0710201-02	FS-EMU74-KA	UC07 quad ht one scsi
TBA	UC0710205-02	FS-EMU74-KD	UC07D differential scsi
FD-15066-01	UC0810201-02	FS-EMU74-KB	UC08 quad ht two scsi
FD-15067-01	UC0710201-04	FS-EMU74-KC	UC07-III for BA2xx/BA4xx Boxes
FD-15113-01	UC0810201-04	FS-EMU74-KD	UC08-III for BA2xx/BA4xx Boxes
TBA	UC1710201-02	FS-EMU57-AE	UC17 as UC07 Unibus
TBA	UC1810201-02	FS-EMU57-AF	UC18 as UC08 Unibus
FD-15068-01	UC0710203-00		DISTRIBUTION PANEL
FD-14594-01	QT1420102-00		GAP FILLER PANEL
FD-15069-01	CKU07-15.		ROUND SHIELDED Cable BA2xx/BA4xx
FD-15070-01	MUO111201-02		FLAT RIBBON CABLE BA2xx/BA4xx
FD-15071-01	MU0111201-03		CONTROLLER/DEVICE Cable MVAX-2

Latest revision of Firmware is Rev R

		UC06	UC07	UC08	UC17	UC18	
DC Voltage	(V)	+5V	+5V	+5V	+5V	+5V	
Current		3.0A	2.3A	4.5A	2.3A	4.5A	
Bus Load	AC	2.5	2.5	2.5	2.5	2.5	
	DC	1.0	1.0	1.0	1.0	1.0	

27.4.9.5 Switches

The UC08 is just a double UC07, i.e. the UC07 is a half populated board with one scsi controller. Hence the UC08 has 2 Front edge switch packs and 2 of 10 posn switch packs, for the CSRs etc.

The switches on the edge of the PCB (front of the board) should all be off.

Of the 10 posn switch

Sw 1 thro 4 set the CSR -
Sw 5 - OFF for TMSCP - ON for MSCP
Sw 6 - ON for autoboot - Leave off normally
Sw 7 thrò 10 - do nothing - Leave off

Table 27–18: CSR switches 1 thro 4

Address in MSCP	Address in TMSCP	SW 1	Sw 2	Sw 3	Sw 4
17772150	17774500	Off	Off	Off	Off
17772154	17760404	On	Off	Off	Off
17760334	17760410	Off	On	Off	Off
17760340	17760414	On	On	Off	Off
17760344	17760420	Off	Off	On	Off
177...	177...			etc	

There are no vector address switches, they are software set.

BR levels are set by jmprs.

BR4 - P to R and L to M for 2nd UC08 scsi
BR5 - R to S and M to N

27.4.9.6 Firing up FRD

Same as for other Emulex controllers, see Table 27–6

27.5 DILOG DISK CONTROLLERS

27.5.1 Parameters

The DQ2xx series controllers support the SMD bus, and the DQ6xx controllers support the ESDI bus. There are 20 or more different flavours in the field (see the VES lists in this chapter). For the SMD bus, once the FRD is up (see Emulex chapter for explanation of FRD) then drive parameters are chosen by choosing a drive type from several different menus. In the case of one not on the menu, parameters have to be put entered individually, however they are not so fiddly as Emulex parameters.

In the case of ESDI drives parameters are derived from UIT tables off the disk drive itself.

27.5.2 Bringing up FRD on a Vax

These use different procedures to Emulex for the FRD which Dilog calls the Formatter. On early versions a terminal can be plugged into the PCB itself and set to 9600 baud 8 bit no parity. On later versions the console can be used by doing:
>>>B/8 DUx9:
i.e. by booting device 9 with boot flag 8 set (e.g. >>>B/8 DUB9:). Alternately a noddy to boot can be used as follows:

```
>>>D/P/L 20088004 80000001
>>>D/P/W 20001f40 20
>>>D/P/W 2000xxxx 3FFF
>>>E/P/W 2000xxxx !. should return 800D
>>>S 200 !. for an ordinary console
>>>S 218 !. for a VCB style console
```

xxxx depends on the Dilog address for 20001469 enter 2000146A
for 200000DD enter 200000DE. See the table below.

27.5.3 Bringing up FRD on a PDP

For PDP this is different. First the Dilog on board boot is invoked to get the star prompt then boot device FT. i.e.

@773000G
*FT

27.5.4 Switches

Switches are different on the various controllers but do bear some similarity.

Table 27–19: DQ6xx SW1-1-2-3 and DQ2xx SW2-1-2-3

SW1/2-1	SW1/2-2	SW1/2-3	Vax Adse	PDP Adse
Off	Off	Off	20001469	772150
On	Off	Off	200000DD	760334
Off	On	Off	200000E1	760340
On	On	Off	200000E5	760344
etc				

For a DQ696 (the current MSCP controller)

Table 27–20: DQ696 rest of SW1

Switch	State	MVax	PDP
SW1-4	Off	Console term is a VT100 type	Boot Adse 773000
SW1-4	On	Console term is a VCB type	Boot Adse 775000
SW1-5	Off	Must be off	Disable LSI Boot
SW1-6	On	Enable B/8 DUA9	Boot DU0 on power up
SW1-6	Off	Disable B/8 DUA9	AutoBoot Disabled
SW1-7	On	Extended Dwell Time on QBus	Ext Dwell time by 12.8 usecs
SW1-7	Off	No Ext Dwell Time	Normal Dwell Time
SW1-8	On	QBus parity enable	Checks and report par to host
SW1-8	Off	disable	Parity disabled

27.6 CMD Controllers

CMD controllers CQD 220 series do a scsi inquire at switch on. So typical the engineer can get away with changing them and altering the configuration on the scsi without firing up the FRD.

However if there are any problems or any of the numerous default settings need altering, or it is required to ensure default settings are in place, then invoke the FRD.

27.6.1 Bringing up the FRD

This is fraught with difficulties for the VAX, most of which come about by engineers not following the procedure exactly. The CPU must be switched on/off between tries at bringing up the FRD. Doing an init and unjam is not enough.

Table 27–21: FRD boot of PDP

Halt the CPU /	
@17772152/005400 123456	!CSR base addse + 2
@17772152/001000 100	!Loads to memory
@5000G	

Table 27–22: Bringing up the FRD on VAX systems

Step	Command	Comments
1..		Power up and halt CPU
2..	>>>I	! Initialise
3..	>>>U	! Unjam QBus
4..	>>>D/P/W 20001F40 20	!Enable QBus mem access
5..	>>>D/L 20088008 80000002	!Set up QBus mem map
6..	>>>D/W 2000yyyy A72E	!Deposit to base CSR + 2
7..	>>>D * 100	!Load utility. A star here means shift 8
8..	>>>S 400	!Start

For addresses in xxxx see emulex QD controllers Table 27–7

Alternatively a terminal can be connected directly to the mmj plug provided. This needs to be set 9600 8 bit no parity. When connected you need to do power on, halt, restart, then menu appears on the screen.

27.6.2 Switches on board

Unfortuneately there are 2 different PCB designs that have different switch settings. They can be told apart by the ROM in U40 or a label saying CQD 220/TM or CQD 220/M

The disk and tape model CQD-220/TM supports only 7 tape and 7 disk CSRs.

The Disk only model CQD-220/M supports 29 disk CSRs.

Additionally there are old designs of CQD-220. i.e. a CQD-220/TM that supports only 3 disk and 3 tape CSRs, that has U40 P20010A.

Table 27–23: CSR jmprs for CQD-220/M - U40 - P22016B - 29 disk CSRs and P200011A - 8 disk CSRs

Addse	W6-2	W6-3	W6-4	W6-5	W6-6
20001468	in	in	in	out	out
200000DC	in	in	out	out	out
200000EC	in	out	in	out	out
200000FC	in	out	out	out	out
200000E0	out	in	in	out	out
200000..					etc
200000F4	in	in	in	in	out
200000..					etc

Table 27–24: CSR jmprs for CQD-220/T - U40 - P22017A - 31 Tape CSRs and P200012b - 30 tape CSRs

Addse	W6-3	W6-4	W6-5	W6-6	W6-7
20001940	out	out	in	in	in
20000104	out	out	in	in	out
20000124	out	out	in	out	in
20000144	out	out	in	out	out
20000164	out	out	out	in	in
20000..					etc

Table 27–25: CSR jmprs for CQD-220/TM - U40 - P22015A - 7 disk and 7 tape CSRs - and U40 - P20010A - 3 disk 3 tape CSRs

Addse	W6-2	W6-3	W6-4
20001468	in	in	in
200000DC	in	in	out
200000EC	in	out	in
200000FC	in	out	out

Table 27–25 (Cont.): CSR jmprs for CQD-220/TM - U40 - P22015A - 7 disk and 7 tape CSRs - and U40 - P20010A - 3 disk 3 tape CSRs

Addse	W6-2	W6-3	W6-4	
200000E0	out	in	in	
200000..				etc

Addse	W6-5	W6-6	W6-7	
20001940	in	in	in	
20000104	in	in	out	
20000124	in	out	in	
20000144	in	out	out	
20000164	out	in	in	
200000..				etc

SCSI term power W2 should be in.

On the \TM disk and tape controllers. Disks must have scsi ids 0 thro 3, and tapes scsi ids 4 thro 6, with the standard host id 7. These are set by W3-1, W3-2, W3-3, all in for id 7, W3-3 out for id 6.

Other Switches

W3-4 out- no fast tape search option
W3-5 in - for enabling disk format and tape monitor utilities - normally out
W3-6 out - Tape sync mode enabled
W3-7 out - Disk sync mode enabled

If you have only disks or only tapes on a CQD-223/TM, then it is best to switch off the non existant disks/tapes in the FRD as these non existant psuedo devices can cause trouble.

27.7 FUJITSU DEVICES

Table 27–26: Fujitsu Devices

Disk	Dia	Bus	Mbytes	+5v[2]	+12v[2]	FS-FUJ[3]	Part Nos/comments
M2227	5 1/4	ST506	51	.45	.42	-	
M2241	5 1/4	ST506	24				
M2242	5 1/4	ST506	55	1.8	1.6	20-AA	+L-42215
M2243	5 1/4	ST506	86	1.8	1.6	07-AA	29-81041 /+L-F2243
M2246e/s	5 1/4	ESDI/SCSI	172	1.8	1.6/2.0	16-AA	FD-11976-01
M2249e/s	5 1/4	ESDI/SCSI	389	1.8	1.6/2.0	49-TA/AA	FD-13413-01 /FD-13414-01
M2263e/s	5 1/4	ESDI/SCSI	778	1.6/1.8	1.6	09-RA/RB	FD-16800-01/FD-19500-01
M2266s/h	5 1/4	SCSI-1/2	1000	-	5.0	09-RH	TL-44563
M2280	14					80-AA	29-80787
M2284n[1]	14	SMD	168		Mains	84-AA	Many Parts/29-80763
M2311	8		49			11-AA	RSL
M2312[1]	8	SMD	84	12-AA	3.0	3.5	29-80494
M2321						UK324-AA	RSL
M2322k	8	SMD	169	3.5	3.0	22-AA	29-81080
M2333k/s	8	HSMD	337	4.5	3.5	05-AA	29-81297
M2343[1]	8	HSMD	690	3.5	3.5	07-RA	Obsolete
M2344k/s	8	HSMD	690	3.5	3.5	17-RA	FD-11945-01
M2350	19	MSMD	474		Mains		Eagle
M2351a[1]	19	MSMD	474		Mains	51-AA	Eagle 29-80427
M2360	19	HSMD	689		Mains		Super Eagle
M2361a	19	HSMD	689		Mains	61-AA	+L-F2361 Super Eagle
M2372k/s	8	MSMD	823	3.5	3.5	72-AA	FD-14472-01
M2380a	8	ESMD	1000		Mains		
M2382k	8	ESMD	1000	3.5	1.5	82-AA	FD-14477-01
M2392d/k	8	ESMD	1842/2027		Mains	39-RC/RB	+L-44431/+L-44430
M2611s/sa/sb	3 1/2	SCSI	45	.45	1.0	-	FD-19786/78/79-01
M2612s/sa/sb	3 1/2	SCSI	90	.45	1.0	-	FD-19787/80/81-01
M2613s/sa/sb	3 1/2	SCSI	136	.45	1.0	52-RB	FD-19788/82/83-01
M2614s/sa/sb	3 1/2	SCSI	182	.45	1.0	53-RB	FD-19789/84/85-01

Tape	Type	Bus	Mbytes	+5v	+12v	FS-FUJ	Part No/comments
M1016ad	IBM 3480	SCSI-2	-		Mains	54-RA	RSL 6xPCBs
M1016a	IBM 3480	SCSI-1	-		Mains	38-TB	RSL 6xPCBs
M2444	GCR	Pertec	140		Mains	19-AA	RSL/19 19 inch TU81 type
M2481	IBM 3480	SCSI	200	5.0	2.0		Drive FD-16798-01/ PS FD-16799-01

Printer		
M3040/1/2/3	300/600/900/1200 LPM	09-AD/A/B/C LARGE PRINTERS

[1] These drives are obsolete or being phased out

[2] Power is only really of interest to 5 1/4 form factor devices other sized devices may also use +24v, -5v and -12v

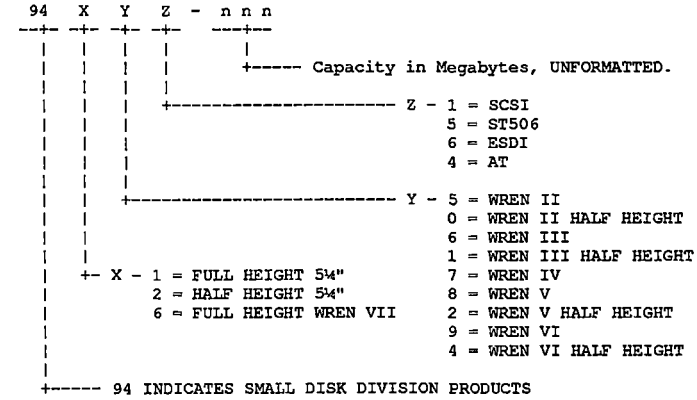
[3] This is the LARs code i.e. a 07-AA in this column means a code of FS-FUJ07-AA should be used

27.8 Seagate Wren Disk Drives

The following is from the Product Service Plan for Seagate Wren disk drives.

Due to a take-over of Imprimis Technology by Seagate Technology, the Wren model numbers have changed from a 94xxx-xx format to Seagate's STxxxx format. The original Imprimis Option ID codes (FS-IMPxx-xx) will remain unchanged due to the number of models involved. Any new Seagate models will receive (FS-SEAxx-xx) Option ID codes.

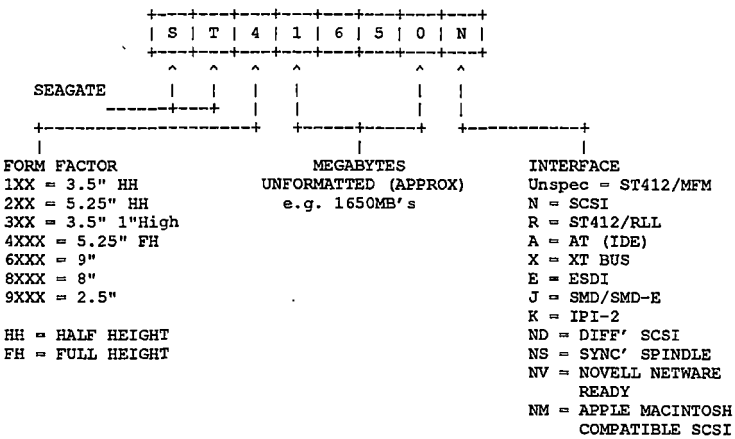
27.8.1 Make-up of the earlier IMPRIMIS WREN model numbers.



Some of the WREN model numbers end with either a "P", "H", "D", "G", "32K" or "HH" .....

- P = Pre-Compensated
- H = High Performance
- D = Differential
- G = Gigabyte
- 32K = Buffer Size
- HH = Half Height

27.8.2 SEAGATE model number break-down - current method



27.8.3 List of all drives and part numbers

Table 27–27: Table of all Drives

IMPRIMIS No	SEAGATE No	CDC No	Digital No	I/F	FS Code
	WREN 2				
94155-48	ST4048	77772509	FD-15929-07	ST506	FS-IMP05-RF
94155-57	ST4057	77772514	FD-15929-08	ST506	FS-IMP05-RE
94155-67	ST4067	77772507	FD-15929-09	ST506	FS-IMP05-RC
94155-85	ST4085	77772570	FD-15929-01	ST506	FS-IMP05-RB
94155-85P	ST4085	77772571	FD-15929-02	ST506	FS-IMP05-RL
94155-86	ST4086	77772501	FD-15929-03	ST506	FS-IMP05-RD
94155-96	ST4097	77772594	FD-15929-04	ST506	FS-IMP05-RA
94155-96P	ST4097P	77772573	FD-15929-05	ST506	FS-IMP05-RM
94155-135	ST4135R	77772601	FD-15929-06	ST506	FS-IMP05-RN
94156-48	ST4048E	77772508	FD-15930-02	ESDI	FS-IMP05-RP
94156-67	ST4067E	77772506	FD-15930-03	ESDI	FS-IMP05-RQ
94156-86	ST4086E	77772500	FD-15930-01	ESDI	FS-CDC08-AC
94205-51	ST253	77747201	FD-15932-01	ST506	FS-IMP05-RG
94205-71	ST279R	77747233	FD-15932-02	ST506	FS-IMP05-RJ
94204-71	ST280A	NA	TBA	AT	FS-SEA14-RE

Table 27–27 (Cont.): Table of all Drives

IMPRIMIS No	SEAGATE No	CDC No	Digital No	I/F	FS Code
94204-74	ST274A	77747256	FD15931-01	AT	FS-IMP05-RI
94204-81	ST280A	77747254	FD-15931-02	AT	FS-IMP05-RH
	WREN 3				
94166-101	ST4101E	77774324	FD-15785-04	ESDI	FS-CDC05-AC
94166-141	ST4141E	77774322	FD-15785-05	ESDI	FS-CDC05-AB
94166-182	ST4182E	77774320	FD-14069-01	ESDI	FS-SEA21-RG
94161-101	ST4101N	77774624	FD-15786-01	SCSI	FS-IMP03-RN
94161-141	ST4141N	77774622	FD-15786-02	SCSI	FS-IMP03-RO
94161-182	ST4182N	77774620	FD-15786-04	SCSI	FS-IMP03-RP
94161-182/32K	ST4182N	77774632	FD-15786-05	SCSI	FS-IMP03-RI
94211-106	ST2106N	77765850	FD-15788-02	SCSI	FS-IMP03-RQ
94211-106/32K	ST2106N	77765857	FD-15788-03	SCSI	FS-IMP03-RQ
94216-106	ST2106E	77765707	FD-15787-01	ESDI	FS-IMP03-RH
	WREN RUNNER 2				
94601-767H	ST4767N			SCSI	
N/A	ST4767E			ESDI	
N/A	ST4769E			ESDI	
	WREN 4				
94171-350	ST4350N	77777000	FD-12546-05	SCSI	FS-IMP03-RK
94171-376	ST4376N		FD-28670-01	SCSI	FS-IMP03-RL
	WREN 5				
94186-383	ST4383E	77777720	FD-13641-03	ESDI	FS-IMP03-RC
94186-383H	ST4384E	77777650	FD-13641-01 /FE-STA41-QL	ESDI	FS-IMP03-RE
94186-442	ST4442E	77777600	FD-13641-04	ESDI	FS-IMP03-RA
94181-702	ST4702N	77777750	FD-22166-01	SCSI	FS-IMP03-RB
94181-702D	ST4702ND	77777755	FD-15241-05	SCSI	FS-IMP08-RB
94181-385H	ST4385N	77777801	FD-15241-03	SCSI	FS-IMP03-RF
94181-385HD	ST4385ND	77777803	FD-15241-04	SCSI	FS-IMP08-RA
94221-125	ST2125N			SCSI	
94221-209	ST2209N	77748202	FD-15933-01	SCSI	FS-IMP06-RA
			WREN 6		

Table 27–27 (Cont.): Table of all Drives

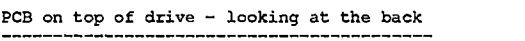
IMPRIMIS No	SEAGATE No	CDC No	Digital No	I/F	FS Code
94196-766	ST4766E	77703220	FD-18443-01 /FD-21207-01	ESDI	FS-IMP04-RB
94191-766	ST4766N	77703370	FD-15789-02 /FD-21208-01	SCSI	FS-IMP04-RA
94191-766D	ST4766ND	77703381	FD-15789-03	SCSI DIFF	FS-IMP09-RA
94246-182	ST2182E		TBA	ESDI	FS-SEA14-RD
94246-383	ST2383E	77746700	FD-15934-01 /FD-21076-01	ESDI	FS-IMP04-RC
94244-383	ST2383A	77746800	FD-16266-01	AT	FS-IMP07-RA
	WREN 7				
94601-1.2	ST41200N	77709450	FD-16267-01 /FD-24194-01	SCSI	FS-SEA21-RS
	WREN 8				
942002-002	ST41650N		+L-44988 /FE-STA47-QL	SCSI	FS-SEA21-RR
N/A	ST41650ND			SCSI	FS-SEA21-RY
N/A	ST41651N			SCSI	FS-SEA13-RE
N/A	ST41651ND			SCSI	FS-SEA21-RY
	WREN 9				
N/A	ST42100N		+L-46041	SCSI	FS-SEA24-RC
N/A	ST42100ND			SCSI	FS-SEA24-RF
N/A	ST42101N			SCSI	FS-SEA24-RD
N/A	ST42101ND			SCSI	FS-SEA24-RE
N/A	ST43400N		+L-46310		

Many of the above drives have two part numbers, either because of the Impiris and Seagate complication, or in the case of the WREN 8 a +L number has not been cycled out in favour or the permanent Digital number yet.

Table 27–28: Current taken by Seagate Full Height Drives

	+ 5	+12
Max Operating	1.1A	2.7A
Typical Idle	0.8A	2.0A
Max Starting	1.4A	4.5A

27.8.4 Jumper settings on WREN 8 drives




```
Jumpers 1 and 2

Jmpr 1 - IN - Term power is taken from the drive for the on board term packs
Jmpr 2 - IN - Term power is supplied to the SCSI bus.
Jmpr across 1 and 2 as below
            SCSI   . .
            FUSE   .__.    Term pow taken from SCSI bus for on board term packs

Jmpr 3 - IN - SCSI id 4
Jmpr 4 - IN - SCSI id 2
Jmpr 5 - IN - SCSI id 1
Jmpr 6 - IN - Enable motor start command
Jmpr 7 - IN - Enable Parity reporting
Jmpr 8 - IN - Enable delayed Motor Start
Jmpr 9 - IN - |
Jmpr 10 -IN - | 9 and 10 are plug sync spindle ref sig connectors - shud be out
```

Drives usually come with jumpers 1 and 10 in. This is wrong for nearly all configs. Normally should have 2 and 6 plus scsi id jmprs in.

e.g. For an id of 6 jmprs 3 and 4 will be in.

27.9 Using the CDC TB216 Disc Drive Tester

This article written by Vic Taylor ...

The TB216 tester is a very versatile and useful tester but to the uninitiated it at first seems very difficult to use and the manual is not very clear. So this cookbook is intended to make life easier with the TB216.

27.9.1 Cabling

Locating the cables at the tester end is easy because they are keyed,but the A cable is made up of two cables rather than the normal one. At the drive end locate the triangle mark on the connectors to pin 1 on the drive.

Note

YOU NEED A TERMINATOR IN THE
DRIVE FOR THE TESTER TO WORK

27.9.2 Initialising the tester and self test

After powering on the TB216 you can either just start to use it or run a self test to verify the tester is ok.

Power on the tester and then move the START/RESET and RUN/HALT switches to the START and RUN positions. Now all the status leds except I/O READY and UNIT RUN should be on. At this point you can start to use the tester or run the self test.

To start the self test put the ACCESS SEL SWITCH in the SELF TEST position and press the GO key. The RD/WR leds will flash and the self test will end with the RD led on and the DATA ERROR led out,if the DATA ERROR led is on the tester has failed its self test.

27.9.3 Unit Selection

First of all you have to work out the device code for your particular drive,to do this use the attached device code table then do the following :-

1. Set the DATA ENTRY switch to DEVICE TYPE.
2. Put the WR PROT switch up.
3. Press the CLR ENT key.
4. Enter the desired device code and press LOAD.
5. Press the SEL DRV key.

The I/O ready led and SELD led should come on,if the WR PROT led flashes it means you did not have the WR PROT switch up when you did the SEL DRV. The busy led may also flash at this point if the drive is not ready,but will stop flashing as soon as the drive becomes ready. At this point you can check to see if the drive is selected by pressing the RTZ key and seeing if the drive responds.

Table 27–29: Device Codes

Device Type	Device code index on B	Device code index on A
SMD Drive Family		
9760-40	0A05	0205
9762-80	0905	0105
9764-150	0A19	0219
9766-300	0919	0119
MMD Drive Family		
9710	0905	0105
9715-160	0910	0110
9715-340	0924	0124
9715-515	4924	4124
973X-12	0802	0002
973X-24	0804	0004
973X-80	0905	0105
973X-160	0910	0110
973X-2.5	0D04	0504
973X-5.0	0E04	0604
973X-10	0F04	0704
CMD Drive Family		
9448-32	8901	8101
9448-64	8903	8103
9448-96	8905	8105

Table 27–29 (Cont.): Device Codes

Device Type	Device code index on B	Device code index on A
FMD Drive Family		
9775	0B40	0340
LMD Drive Family		
9455	0904	0104

Note

IN THE MAIN THE CODE FOR INDEX ON THE A CABLE WILL BE THE ONE USED AS DRIVES THAT HAVE IT ON THE B CABLE USUALLY ALSO PUT IT ON THE A CABLE.

27.9.4 Seek Functions

Once the drive is selected as above you can perform seek operations on the drive. For example to do a direct seek do the following :-

1. Set the RD/WRT switch to ACCESS ONLY.
2. Set the ACCESS SELECT switch to DIRECT SEEK.
3. Set the DATA ENTRY switch to DESTINATION.
4. Press the CLR ENT key.
5. Enter the desired cylinder address in DECIMAL and press LOAD.
6. Press the GO key and the drive will do the seek.

27.9.5 Read/Write Functions

Before using the TB216 for read/write or format opeartions you have to enable R/W functions by entering a special code as follows.

1. Put the WR PROT switch up.
2. Set the DATA ENTRY switch to the B position.
3. Press the CLR ENT key.
4. Enter 5754 and press LOAD.
5. Set the DATA ENTRY switch to the E postion.
6. Press the DISP key.
7. Press BIT then 1 then LOAD.
8. Set the DATA ENTRY switch to the DATA PATTERN postion.

9. Press the CLR ENT key.

10. Enter B6B6 and press LOAD.

You are now ready to perform read write functions but the tester uses its own special format so if the pack has not been previously formatted on the tester then you will have to do a WRT FORMAT before doing any read/write functions.

Write format example :-

1. Set the RD/WRT switch to WRT FORMAT.
2. Set the ACCESS SELECT switch to SEQ FORWARD.
3. Set the HEAD and RECORD switches to SEQ.
4. Set the EOT STOP switch to on.
5. Set the WRITE PROT and WRITE FLAG switches to off.
6. Press the GO key.

You can monitor the progress of the format by setting the DATA ENTRY switch to STATUS BYTES and pressing 1 on the keypad,the current cylinder address will be displayed in the upper row of leds. Or if you press 2 the current head will be displayed.

Note

DO NOT FORGET THAT THE PACK WILL NEED
RE-FORMATTING BEFORE USE ON THE SYSTEM AGAIN.

27.9.6 Exercising a drive.

To exercise a drive and using reading and writing do the following :-

1. Format the pack as above.
2. Set the ACCESS SELECT switch to RANDOM SEEK.
3. Set the RD/WRT switch to WRT/RD.
4. Set the HEAD and RECORD switches to RAN.
5. Set the EOT STOP switch to off.
6. Set the DATA and ADDR error overrides to off.
7. Press the GO key.

Again to see what head or cylinder is currently being accessed set the DATA ENTRY switch to STATUS BYTES and press 1 on the keypad for the cylinder address or 2 on the keypad for the head address.

27.9.7 Head Alignment

You can either use the tester to just seek to the alignment cylinder and select heads and use a meter to actually do the alignment or you can use the led display on the tester to do the alignment. The procedure below is for using the tester leds to do the alignment.

1. Set up drive for head alignment.
2. Connect head alignment meter leads into the +/- sockets on the tester.

3. Set the DATA ENTRY switch to DESTINATION.
4. Set the ACCESS SELECT switch to DIRECT SEEK.
5. Set the RD/WRT SELECT switch to ALIGNMENT.
6. Set the WRITE PROT switch to on.
7. Set the HEAD switch to MAN.
8. Press the CLR ENT key and then enter the alignment cylinder in DECIMAL (i.e 245 for 9762 drives) and press LOAD.
9. Then press the GO key and the drive will seek to the alignment cylinder.
10. Now to select heads put the DATA ENTRY switch to HEAD.
11. Press the CLR ENT key and then enter the head number and press LOAD.
12. Now press the BIT key and then the GO key.
13. Press the STOP key

Now row 2 leds will be displaying the alignment in millivolts. Going from right to left each LED is a 10mV step upto 100mV at the tenth LED from the right,then the next ones continue up in 100mV steps. The extreme left LED is the sign. So if the first and third from the right and the eleventh from the right leds were on then the head is 240mV out of alignment.

```
ROW 2  LEDS

*   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
+/- 600 500 400 300 200 100  90  80  70  60  50  40  30  20  10 mV
```

27.9.8 Hints and Tips

1. If the tester hangs up reset it by setting the RUN/HALT switch to halt and then press the STOP key and then put the RUN/HALT key back to run. You should be able to continue without having to reselect the drive.
2. Always press the CLR ENT key before entering data on the keypad.
3. Be careful when pressing the keypad keys as they are prone to contact bounce.
4. Do not forget you need a terminator in the drive to use the tester.

27.10 CIPHER TAPE DRIVES

27.10.1 LOGIC BOARD PART NUMBERS

Submitted by Brian Hailstone.

Table 27–30: Cipher logic board part numbers

Model	Cipher No	Digital No	Comments
F880-1	960757-001	29-24086	TS05
F880-2	960719-001		
M890-1	961019-004	29-80687	
M890-1	962235-001	29-81572	New layout PCB, downward compatible.

Table 27–30 (Cont.): Cipher logic board part numbers

Model	Cipher No	Digital No	Comments
M890-2	961018-004	29-80688	
M890-2	962234-001	29-81573	New layout PCB, downward compatible.
M891-1	961020-004	29-80689	
M891-1	962233-001	29-81574	New layout PCB, downward compatible.
M891-2	961017-004	29-80690	
M891-2	962236-001	29-81575	New layout PCB, downward compatible.

Table 27–31: ROM part numbers

PCB No	ROMS	Rev	Date	Comment
	F880-1			
960757-001	U6N 961634-004 U8N 961634-005 U10N 961634-006	F	JAN 85	Keeps blower on
	F880-2			
960719-001	U6N 961805-001 U8N 961805-002 U10N 961805-003	M	JAN 85	Keeps blower on
	M890-1			
	U3L 961935-001 U5L 961935-002	C	FEB 85	
961019-003				
	U3L 962080-001	D	APR 85	Error code 9 added
or	U5L 962080-002			
962235-001	U3L 962128-001 U5L 962128-002	E	MAY 85	
	U3L 962610-007 U5L 962610-008		AUG-86	(Oct 85 -001,002) (Feb 86 -005,006)
	M890-2			
	U5L 961931-002			
961018-004				
	U3L 962102-001	D	APR-85	Error code 9 added
or	U5L 962102-002			
962234-001	U3L 962124-001 U5L 962124-002	E	MAY 85	
	U3L 962602-007 U5L 962602-008		AUG-86	(Oct 85 -001,002) (Feb 86 -005,006)

Table 27–31 (Cont.): ROM part numbers

PCB No	ROMS	Rev	Date	Comment
	M891-1			
	U3L 961939-001	C	FEB 85	
	U5L 961939-002			
961020-003				
	U3L 962098-001	D	APR-85	Error code 9 added
or	U5L 962098-002			
962233-001	U3L 962132-001	E	MAY 85	
	U5L 962132-002			
	U3L 962622-007		AUG-86	(Oct 85 -001,002)
	U5L 962622-008			(Feb 86 -005,006)
	M891-2			
	U3L 961922-001	C	FEB 85	
	U5L 961922-002			
961017-004				
	U3L 962086-001	D	APR-85	Error code 9 added
or	U5L 962086-002			
962236-001	U3L 962120-001	E	MAY 85	
	U5L 962120-002			
	U3L 962618-007		AUG-86	(Oct 85 -001,002)
	U5L 962618-008			(Feb 86 -005,006)

27.11 Exabyte

This section is extracted from an articale written by John Ward @HHL....

There has been a high level of NFF/NPF with regard to the Exabyte tape drives. Here are some details about Exabyte tape drive's which you should know, if your customer has them on site or you're attending a fault call.

Exabyte has produced the 8200 (2.3Gbytes storage) and the 8500 (5Gbyte storage) tape drives. The 8200 has a two LED indicators vertically on the lefthand side and the eject button on the right hand side. The 8500 has the two LED indicators horizontally and the eject button is on its left.

The tape drives come with either a single ended or differential interface and are NOT interchangeable. Differntial tape drives are most reliably distinguished from single ended units by the part number. Fitting the wrong type of Exabyte tape drive may cause permanent damage to the equipment.

27.11.1 CLEANING

Cleaning the Exabyte tape drive is a CUSTOMER RESPONSIBILITY.

1. The customer should clean the Exabyte tape drive. This should be performed after 30 hours of use OR 30 GBytes of data transfered, which ever soonest.
2. There are two version of the EXATAPE cleaning (the use 3 times and the use 12 times) tapes. Cleaning tapes from Dixons (or other High Street stores) are not recommended. The cleaning tape should NEVER be rewound. The Exabyte part number is 727113-A000 (DEC p/n FD-16285-01).

3. Only use the customer's Exabyte (EXATAPE) cleaning tape and NEVER use Texpads or Video head cleaner.

27.11.1.1 Procedure for Cleaning

Remove any data tapes from the Exabyte tape drive. Place the cleaning tape in the unit and close the door. The rest of the cleaning process is automatic. When it is completed the tape will be automatically ejected by the unit. The average cleaning cycle is about 15 seconds. If the cleaning tape is ejected before 15 seconds, the cleaning tape has reached the end of its useful life and should be discarded. After use the cleaning tape should be labelled and stored for future use.

27.11.2 MEDIA

1. The customer should replace tape MEDIA after 1500 passes of ANY part of the tape that past the tape head. A VMS "INIT" causes approximately 15 passes of the Exabyte tape head. So for VMS Backup, the customer should replace the after 100 Backups, which is roughly equal to 2 years if used once a week.
2. They should use only EXATAPE (DEC p/n FD-21909-01) or SONY QG-112M tape media. This can be identified by the D8 Logo. Tapes of poorer quality will deteriorate earlier and may also contaminate the drive.
3. The customer should NOT use VMS incremental BACKUP command on the Exabyte tape drive. Also do NOT use the COPY command, unless its a TTI Exabyte (see TTI section).
4. If you insert a data tape in the Exabyte and it ejects the tape, then the Exabyte needs its tape heads cleaned. (On the TTI 85x0 tape drive it will give a LED display of "CL", which indicates that the tape drive needs to be cleaned).

27.11.3 ENCLOSURES

CLEARPOINT, TTI, TRIMM and LION external exabyte boxes (Shoe Boxes) are supported by us. All other shoe boxes are not supported and SHOULDN'T be put on contract with us. There are a large amount of these unsupported boxes in the field, so before you work on one, contact the Resource Controller. They will then tell you what actions to do next.

27.11.4 CABLE

The customer should be using shielded cable (ie. BC19J) and not fold/bend the cable if they have too much. You should advise the customer to obtain the minimum length to fit between the drive and the controller.
The maximum length of cable (including cable inside the CPU cabinet and in the Exabyte enclosure):-

4m for Single Ended SCSI on DEC interface (3m for FAST SCSI).
6m for Single Ended SCSI on NON DEC interface.
25m for Differential SCSI on NON DEC interface.

27.11.5 TERMINATION

The SCSI bus have signal lines and terminators are required to avoid electrical reflections that may produce unwanted signals. Only the first and last devices on the SCSI bus should be terminated. There are different termination plugs for single ended and differential SCSI.
NOTE: On the TTI Exabyte tape drives there are some termination resistors, these are NOT for the SCSI bus but for the drive's data bus. These resistor packs should not be removed. The exception to this concerns the TTI's CTS-8252 and CTS-8552, where the slave drives terminators are removed.

27.11.6 TTI

The TTI 82xx and TTI 85xx incorporates the Exabyte 8200 and 8500 respectively. TTI have added a personality module which uses a data buffer, increasing the read/write performance and enabled copy operations. The TTI Exabyte's is a complete FRU and should be replaced as one unit.

The model number gives a details of its size and the type of interface.

```
8 x x x
| | | |
| | | ---- 0/1 = One drive.  2 = Two drives.
| | ------ 1 = Single Ended. 2 = Differntial SCSI
| -------- 2 = 2.3 Gbytes    5 = 5.0 Gbytes
---------- 8 = 8mm Tape drive
```

The are 12 dip switches at the rear of the TTI Exabyte which need to be set up for various systems.

27.11.7 TROUBLESHOOTING

Tape will not eject

Power down the system and turn of the Exabyte Enclosure. Disconnect the SCSI cable from the enclosure and power on the Exabyte. Press the EJECT/RESET button on the front panel. The door should open and the tape should eject from the drive. If the tape still fails to eject see "Tape Stuck in Drive" , but DO NOT force the door.

Tape Stuck In Drive

Face the front of the tape drive. Rotate the drive CCW 90 degrees and view its left hand side. An aperture, to the right, reveals a white plastic gear wheel. To the left of this gear wheel, observe red and brown wires connected to two vertical metal strips. Follow the metal strips downwards to their bottom. Observe the white plastic lever mounted perpendicular to the metal strips. Move this lever to the front of the drive (ie to the right as viewed). The drive door should open for tape removal [NB. cutting the tape eases the tape removal.

Drive ejects tape/will not load

Press the EJECT/RESET button twice. Clean tape drive, power cycle tape drive and load a different tape.

VMS Error: FATAL PARITY ERROR

a. Clean the tape drive.

b. Power cycle tape drive and ensure that the controller and drive shares a common power and ground source.

VMS Error: FATAL DRIVE ERROR

a. Ensure that the controller is online by using the SHOW DEVICE command. The amber LED on the tape drive should flash periodically to indicate that the controller is polling the device.

b. Follow the procedure for Fatal Parity Error.

VMS Error: VOLUME/DEVICE NOT SOFTWARE ENABLED

a. Ensure the controller is ONLINE. Use the SHOW DEV PT command. If the controller is NOT online or the error count is greater than 1 run @SYS$SYSTEM:SHUTDOWN, Cycle power to the system.

b. Check/reseat cable connections.

VMS Error: HOST UNAVAILABLE

a. Controller is OFFLINE!!! Run @SYS$SYSTEM:SHUTDOWN, cycle power to the system.

b. Power off system. Reseat the controller, ensuring that it is correctly installed. Reboot the system.

VMS Error: FATAL CONTROLLER ERROR

a. Initialize tape (ie. $ INIT MUA0:/OVER=(O,A,E) followed by label).

b. Try a new tape.

No Display on unit front panel

a. Check/reseat cables.

Workstation will not boot or unable to see drive

a. Unit must have unique SCSI ID.

b. Check termination.

27.11.8 PART NUMBERS

27.11.9 REPAIR STRATEGY

Follow this procedure before swapping the Exabyte tape drive.

1. Replace Media (New tape).
2. Clean tape drive with customer's cleaning tape.
3. Check cables and power supply, making sure that it meets the points in the enclosure/cable sections.
4. Power cycle the system and Exabyte unit.