CONTROLS REQUIREMENTS FOR NuMI

20-Oct-03

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
	Ordering of System / Device:	Power Supplies, Trim Supplies, Instrumentation, Vacuum, Water, Special, Timing, Digital I/O, MADC, Beam Perm							
	MI-60 Service Building - South " 60S"								Existing Controls Infra
1	Single Turn Extraction Kicker	I:KPS6N	466	5			2A 1D	CC $63 N7	PS in South PS Room Equipment F
2	Main Injector Performance Parameters								Alberto is the Lead H C
2-1	Main Injector Low Level RF System Nominal Operation						1D		To Be Defined. T Frequency and Rad
2-2	P-Bar Production Beam Not Present Before NuMI Extraction				1		1D or 1A		To Be Derived Fro
2-3	P-Bar Extraction Through P150 Line Not Exceptionally Lossy				1		1A		Information from a S Monitor. Dave Johnso Picking a
2-4	Longitudinal Bunch Length Nominal Before NuMI Extraction				1		1A		
2-5	Other Reasonably Derived Qualifications				?		A or D		
3	Flourinert Cooling System with Local PID Controller					6	1A		Skid in South P
4	Clock Event Scaler		333					CC $63 N17	Events of Interest: $A5 $53 After $19,
5	MIBS Timing Channel Ref $74		479					CC $63 N20	Actually Fires the Kick Pulse Output
5-1	Internal Fire Kicker 479 Timing Pulse ANDed with Beam Permit False and Stretched by One-Shot						1D		To Record the Loss o $74 Has
6	TCLK Timer: MIBS $74 Request, Ref $A5	I:MINX	377					CC $94 N2 A5	Channel Alread
7	TCLK Timer		377					CC $63 N19	May Not Be Needed I
8	Digital In - Digital Out Facility		284					CC $63 N1	Potential for Contr Systems. May Be Ne Sy
9	MADC Facility - Existing in Rack MI60124	MADC #65	290					CC $63 N23	14 Bit Resolution MAD Already Installed. Current
10	NuMI Beam Permit		200					CC $63 N22	This Location is the "Loop". Location of Bu

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
10-1	Radiation Safety System Beam Permit Input						1D		Best Location for Co S
11	Beam Permit Process Channel Interface and Controller		204	Connects to MADC #65			1D	CC $63 N21	Output to Local 20
12	Ethernet Connectivity								Already Exist
13	VME with Connection to Ethernet								Already Exist
14	ACNET Console X Terminal								Already Exist
	MI-60 Service Bldg - North "60N"								Existing Controls Infra M
1	Lambertson Power Supply for LAM60	I:LAM60	468	6 **			3A 1D	CC $73 N2-3	500 kW PEI in North Output Filter. Rar
2	Lambertson Power Supply for LAM61A and LAM61B	I:LAM61	468	6 ***			3A 1D	CC $73 N4-5	500 kW PEI in North Output Filter. Rar
3	C Magnet Power Supply	E:V100	468	6 **			3A 1D	CC $73 N6-7	500 kW PEI in North Output Fi
4	EPB Dipole String (6)	E:HV101	468	13 ****			3A 1D	CC $73 N8-9	Three Series 500 kW Gallery with Output F **D**
4-1	Local PLC for Extended Power Supply Status								Status Supplied to
5	Quadrupole Power Supply (3Q120)	E:Q101	216 or 466	3 *			2A	CC $73 N10	20 kW PEI. In North E Decision by S
6	Quadrupole Power Supply (3Q120)	E:Q102	216	3 *			2A	CC $73 N11	20 kW PEI. In No
7	Quadrupole Power Supply (3Q120)	E:Q103	216	3 *			2A	CC $73 N12	20 kW PEI. In No
8	Quadrupole Power Supply (3Q60)	E:Q104	216 or 466	3 *			2A	CC $73 N13	20 kW PEI. In North E Decision by S
9	Quadrupole Power Supply (3Q120)	E:Q105	216	3 *			2A	CC $73 N14	20 kW PEI. In No

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
10	Quadrupole Power Supply (3Q120)	E:Q106	216	3 *			2A	CC $73 N15	20 kW PEI. In No
11	Horizontal 200 Turn Trim Dipole	E:H104	466	3 *			2A	CC $73 N16	20 kW PEI. In North E Decision by S
*	MADC #38 Monitors for Q101 thru Q106 and H104	Current Reference (F), Current Out, and Voltage Out (V). First Two Analog Monitors Exam							
**	MADC #38 Monitors for LAM60 and V100	Current Reference (F), Current Out, Current Error (E), Unfiltered Voltage Out (U), and Filtered Voltage Out (V) Permit. "In Regulation" Digital Status Also to Beam Permit.							
***	MADC #38 Monitors for LAM61	Current Reference (F), Current Out, Current Error (E), Plus Volts to Gnd (P), Neg Volts to Gnd (N), and Filter Examined by Beam Permit. "In Regulation" Digital Status Also to Beam P							
****	MADC #38 Monitors for HV101	3 x Current Reference (AF, BF & CF), Current Out, 3 x Current Error (AE, BE & CE), Plus Volts to Gnd (P), Neg and 3 x Unfiltered Voltage Out (AU, BU & CU). First Seven Monitors Examined by Beam Permit. "In Regula							
12	**Trim Element Regulators (10)**		The CAMAC 453 Slot Assignments Reflect a Reordering Suggested by Leon Bartelson to Align Controls Modules with Regulator Placement.						These Trims Element MI Regulator Sys Equipment
12-1	Horizontal Trim Element #1 Located Upstream of HV101-1 EPB Dipole	E:HT102	.25 x 453	4 *			No	CC $74 N12-13	Individual Re Plan to Ramp to K
12-2	Vertical Trim Element #2 Located Upstream of Q103	E:VT103	.25 x 453	4 *			No	CC $74 N12-13	Individual Re Plan to Ramp to K
12-3	Horizontal Trim Element #3 Located Downstream of Q105	E:HT105	.25 x 453	4 *			No	CC $74 N12-13	Individual Re Plan to Ramp to K
12-4	Vertical Trim Element #4 Located Downstream of Q106	E:VT106	.25 x 453	4 *			No	CC $74 N12-13	Individual Re Plan to Ramp to K
12-5	Horizontal Trim Element #5 Located Downstream of Q107	E:HT107	.25 x 453	4 *			No	CC $74 N14-15	Individual Re Plan to Ramp to K
12-6	Vertical Trim Element #6 Located Upstream of Q108	E:VT108	.25 x 453	4 *			No	CC $74 N14-15	Individual Re Plan to Ramp to K
12-7	Horizontal Trim Element #7 Located Upstream of Q109	E:HT109	.25 x 453	4 *			No	CC $74 N14-15	Individual Re Plan to Ramp to K
12-8	Vertical Trim Element #8 Located Upstream of Q110	E:VT110	.25 x 453	4 *			No	CC $74 N14-15	Individual Re Plan to Ramp to K
12-9	Vertical Trim Element #9 Located Upstream of Q111	E:VT111	.25 x 453	4 *			No	CC $74 N16-17	Individual Re Plan to Ramp to K
12-10	Horizontal Trim Element #10 Located Upstream of Q112	E:HT112	.25 x 453	4 *			No	CC $74 N16-17	Individual Re Plan to Ramp to K
12-11	Spare Channel		.25 x 453					CC $74 N16-17	
12-12	Spare Channel		.25 x 453					CC $74 N16-17	
*	MADC Monitors for Trim Elements	All MADC Monitors Wire Directly to MADC #77 in Rack MI60205. Analog Monitors Include: Vref, Vout, I out, Available for Examination by Beam Permit. Installation of 204/PCI Not Viewed Favorably. Consider an ACNET Problem.							

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
13	**Beam Position Detectors (13 Total)**								Located Here at MI-60 Using 3/8" Andrew H Suggest Positioni MI
13-1	Vertical BPM Downstream of Q101	E:VP101	VME Ethrnt				No		Four BPMs
13-2	Horizontal BPM Downstream of Q101	E:HP101	VME Ethrnt				No		
13-3	Horizontal BPM Downstream of Q102	E:HP102	VME Ethrnt				No		
13-4	Vertical BPM Downstream of Q103	E:VP103	VME Ethrnt				No		
13-5	Horizontal BPM Upstream of Q104	E:HP104	VME Ethrnt				No		Four BPMs
13-6	Horizontal BPM Upstream of Q105	E:HP105	VME Ethrnt				No		
13-7	Vertical BPM Upstream of Q106	E:VP106	VME Ethrnt				No		
13-8	Horizontal BPM Upstream of Q107	E:HP107	VME Ethrnt				No		
13-9	Vertical BPM Upstream of Q108	E:VP108	VME Ethrnt				No		Four BPMs
13-10	Horizontal BPM Downstream of Q109	E:HP109	VME Ethrnt				No		
13-11	Vertical BPM Downstream of Q110	E:VP110	VME Ethrnt				No		
13-12	Vertical BPM Downstream of Q111	E:VP111	VME Ethrnt				No		
13-13	Horizontal BPM Downstream of Q112	E:HP112	VME Ethrnt				No		Four BPMs
14	**Beam Profile Monitors - Multiwires (6 Total)**			Two Styles Under Consideration: Traditional Fermilab and UTA (Kopp). Fermi Styl Multiwire with Attendant Requirements for Motor Drive Hardware and Digital Beam Requires Less Complicated Drive and High Voltage Supplies for Clear					
				Equipment Mostly in Rack MI60218.					
14-1	Multiwire Downstream of Q101	E:PM101	ARCNET VME Ethrnt				No		
14-2	Multiwire Upstream of Q105	E:PM105	ARCNET VME Ethrnt				No		
14-3	Multiwire Upstream of Q107	E:PM107	ARCNET VME Ethrnt				No		

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
14-4	Multiwire Upstream of Q108	E:PM108	ARCNET VME Ethrnt				No		
14-5	Target Multiwire Upstream of Q111	E:PM111	ARCNET VME Ethrnt				1D		Traditional Motor Dr Beam Permit Only If M In B
14-6	Multiwire Downstream of Q112	E:PM112	ARCNET VME Ethrnt				No		
14-7	Clearing Voltage PS for PM101	E:PM101V	.25 x 052			1	No	CC $70 N7 A0	PS is Half of PREP 052 Provides R
14-8	Clearing Voltage PS for PM105	E:PM105V	.25 x 052			1	No	CC $70 N7 A1	PS is Half of PREP 052 Provides R
14-9	Clearing Voltage PS for PM107	E:PM107V	.25 x 052			1	No	CC $70 N7 A2	PS is Half of PREP 052 Provides R
14-10	Clearing Voltage PS for PM108	E:PM108V	.25 x 052			1	No	CC $70 N7 A3	PS is Half of PREP 052 Provides R
14-11	Clearing Voltage PS for PM112	E:PM112V	.25 x 052			1	No	CC $70 N8 A0	PS is Half of PREP 052 Provides R
Existing NIM Bin in Rack MI60219 Accommodates Above Clearing Voltage Power Supplies.									
15	**Loss Monitors (Chassis #1)**								Reg Loss Monitor E Channels in One C Located in Rack MI60 MA
15-1	Regular Loss Monitor HV Supply Output Chassis #1	E:LMHV1O				1	1A		
15-2	Regular Loss Monitor HV Supply Return Chassis #1	E:LMHV1R				1	1A		
15-3	Loss Monitor #1 at KM602A	I:LMNKMA				1	1A		
15-4	Loss Monitor #2 at KM602B	I:LMNKMB				1	1A		
15-5	Loss Monitor #3 at KM602C	I:LMNKMC				1	1A		
15-6	Loss Monitor #4 at LAM60	I:LML60				1	1A		
15-7	Loss Monitor #5 at LAM61A	I:LML61A				1	1A		
15-8	Loss Monitor #6 at LAM61B	I:LML61B				1	1A		
15-9	Loss Monitor #7 at V100	E:LMV100				1	1A		

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor	
15-10	Loss Monitor #8 at Q101	E:LMQ101				1	1A			
15-11	Loss Monitor #9 at HV101-1	E:LM1011				1	1A			
15-12	Loss Monitor #10 at HV101-2	E:LM1012				1	1A			
15-13	Loss Monitor #11 - Spare	E:LM1C11				1 if Avail				
15-14	Loss Monitor #12 - Spare	E:LM1C12				1 if Avail				
16	**Loss Monitors (Chassis #2)**								Reg Loss Monitor E Channels in One C Located in Rack MI60 MA	
16-1	Regular Loss Monitor HV Supply Output Chassis #2	E:LMHV2O				1	1A			
16-2	Regular Loss Monitor HV Supply Return Chassis #2	E:LMHV2R				1	1A			
16-3	Loss Monitor #1 at Q102	E:LMQ102				1	1A			
16-4	Loss Monitor #2 at HV101-3	E:LM1013				1	1A			
16-5	Loss Monitor #3 at HV101-4	E:LM1014				1	1A			
16-6	Loss Monitor #4 at HV101-5	E:LM1015				1	1A			
16-7	Loss Monitor #5 at HV101-6	E:LM1016				1	1A			
16-8	Loss Monitor #6 at Q104	E:LMQ104				1	1A			
16-9	Loss Monitor #7 at H104	E:LMH104				1	1A			
16-10	Loss Monitor #8 at Q105	E:LMQ105				1	1A			
16-11	Loss Monitor #9 at Q106	E:LMQ106				1	1A			
16-12	Loss Monitor #10 at Q107	E:LMQ107				1	1A			
16-13	Loss Monitor #11 - Spare	E:LM2C11				1 if Avail				
16-14	Loss Monitor #12 - Spare	E:LM2C12				1 if Avail				

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
17	**Vacuum (MI System Additions)**		ARCNET VME Ethrnt						Existing CIA Crate L
17-1	40 L/sec Ion Pumps (Quantity 12)	I:IPxxxx					No		4 for Each of T
17-2	Pirani Gauges	I:PGxxxx					No		Proximate
17-3	Sector Isolation Valve	I:BVxxxx					1D		Downstream of Lamb NuMI
18	MIBS Timing Capability		479					CC $70 N17	Thought Useful
19	MADC Facility - Existing in Rack MI60219	MADC #38	290	55 Asgd for NuMI				CC $73 N23	14 Bit Resolution MAD Alread
20	MADC Facility - Existing in Rack MI60226	MADC #44	290			24 Asgd for NuMI		CC $70 N23	
21	MADC Facility - Existing in Rack MI60205	MADC #77	290		40 Asgd for NuMI			CC $74 N21	Dedicated t
22	NuMI Beam Permit		200					CC $73 N22	Alread
23	NuMI Beam Permit		200					CC $70 N19	Relocated Fr
24	Beam Permit Process Channel Interface and Controller		204	Connects to MADC #38			1D	CC $73 N21	Output to Local 200 Power Supply
25	Beam Permit Process Channel Interface and Controller		204	Connects to MADC #44			1D	CC $70 N18	Output to Local 200 Loss Mon
26	Ethernet Connectivity								Already Exist
27	VME with Connection to Ethernet								Already Exist
28	ACNET Console X Terminal								Already Exist
MI-62 Service Building "62SB"									Basic Controls Inf (MI62111-114) Hav These Will Support Va
1	B2 Dipole String (6)	E:V108	468	7 **			3A 1D	CC $6C N1-2	A Relocated Main Accommodate This Supp
2	Quadrupole Power Supply (3Q120)	E:Q107	216	3 *			2A	CC $6C N3	20 kW PEI In P

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
3	Quadrupole Power Supply (3Q120)	E:Q108	216	3 *			2A	CC $6C N4	20 kW PEI In P
4	Quadrupole Power Supply (3Q120)	E:Q109	216	3 *			2A	CC $6C N5	20 kW PEI In P
5	Quadrupole Power Supply (3Q60)	E:Q110	216 or 466	3 *			2A	CC $6C N6	20 kW PEI In Power Decision by S
6	Quadrupole Power Supply (3Q120)	E:Q111	216	3 *			2A	CC $6C N7	20 kW PEI In P
7	Quadrupole Power Supply (3Q120)	E:Q112	216	3 *			2A	CC $6C N8	20 kW PEI In P
*	MADC #79 Monitors for Q107 thru Q112	Current Reference (F), Current Out, and Voltage Out (V). First Two Analog Monitors Exam							
**	MADC #79 Monitors for V108	Current Reference (F), Current Out, Current Error (E), Unfiltered Voltage Out (U), Filtered Voltage Out (V), Plus First Three Monitors Examined by Beam Permit. "In Regulation" Digital Status Also							
8	**Loss Monitors (Chassis #3)**								Reg Loss Monitor E Channels in One C Located in Rack MI62
8-1	Regular Loss Monitor HV Supply Output Chassis #3	E:LMHV3O				1	1A	MADC #79	
8-2	Regular Loss Monitor HV Supply Return Chassis #3	E:LMHV3R				1	1A	MADC #79	
8-3	Loss Monitor #1 at Q108	E:LMQ108				1	1A	MADC #79	
8-4	Loss Monitor #2 at V108-1	E:LM1081				1	1A	MADC #79	
8-5	Loss Monitor #3 at V108-2	E:LM1082				1	1A	MADC #79	
8-6	Loss Monitor #4 at Q109	E:LMQ109				1	1A	MADC #79	
8-7	Loss Monitor #5 at V108-3	E:LM1083				1	1A	MADC #79	
8-8	Loss Monitor #6 at V108-4	E:LM1084				1	1A	MADC #79	
8-9	Loss Monitor #7 at Q110	E:LMQ110				1	1A	MADC #79	
8-10	Loss Monitor #8 at V108-5	E:LM1085				1	1A	MADC #79	
8-11	Loss Monitor #9 at V108-6	E:LM1086				1	1A	MADC #79	

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
8-12	Loss Monitor #10 at Q111	E:LMQ111				1	1A	MADC #79	
8-13	Loss Monitor #11 at Q112	E:LMQ112				1	1A	MADC #79	
8-14	Loss Monitor #12 - Spare	E:LM3C12				1 if Avail			
9	**Total Loss Monitors (4 Total)**								These TLMs Are Lik Loss Budget Monitor Location of Electro MI62113
9-1	Total Loss Monitor #1 for NuMI Stub and Peter's Porch	E:TLMNS			1		1A	MADC #79	Approximate
9-2	Total Loss Monitor #2 for Carrier Tunnel Upstream End	E:TLMCTU			1		1A	MADC #79	Approximate
9-3	Total Loss Monitor #3 for Carrier Tunnel Downstream End	E:TLMCTD			1		1A	MADC #79	Approximate
9-4	Total Loss Monitor #4 for Pre-Target Area	E:TLMPT			1		1A	MADC #79	Approximate
9-5	Total Loss Monitor High Voltage	E:TLMHV			1		1A	MADC #79 ?	Details Unknown. Ma Locate This Instrum T
9-6	Total Loss Monitor Gas Flow	E:TLMGF			1		1D or 1A		Details Unknown. Ma Locate This Instrum T
10	Beam Intensity Toroid #1	E:NIUP			1		No		
11	Beam Intensity Toroid #2	E:NIDN			1		No		Long Cable Run
12	Beam Intensity Toroid Difference Signal (Toroid #1 - Toroid #2)	E:NIDIFF			1		1A	MADC #79	This is **N**
13	**Vacuum (All of NuMI Beamline)**		ARCNET VME Ethrnt						New CIA Crate Al MI62112. Vacuum Eq Room Rack MI6
13-1	500 L/sec Ion Pumps (Quantity 4)	E:IPxxxx					No		2 Each at Either End Upstream Porti
13-2	40 L/sec Ion Pumps (Quantity 38)	E:IPxxxx					No		Distributed Throu Locations Rem
13-3	Pirani Gauges (Quantity 6)	E:PGxxxx					No		2 Gauges at Each En the NuMI V
	Sector Isolation Valve	E:BV100					1D		Between LAM61B ar NuMI Vac

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
13-4	Sector Isolation Valve	E:BV112					1D		At Upstream End of 12 Carri
	Sector Isolation Valve	E:BV113					1D		At Downstream End c RCP Ca
14	MI-62 LCW and Pond Water Systems		PLC Ethernet						PLC Hardware (Autor be Located in Rack Hoffman Style Enc Controls/Kicker Roo
14-1	Various NuMI LCW Control and Monitor Points	E:62Winn	PLC Ethernet				1D		Detailed
14-2	Various Pond Water Control and Monitor Points	E:62Pinn	PLC Ethernet				No		Detailed
15	MDAT Transmitter - NuMI Intensity	E:MDATxx	166					CC $6A N5	Likely the Sampled V Intensity M
16	MIBS Timing Capability		479					CC $6A N4	Likely Necessary
17	MADC Facility - Existing in Rack MI62107	MADC #79	290	25 Asgd for NuMI	9 Asgd for NuMI	13 Asgd for NuMI		CC $6C N23	14 Bit Resolution MAD Now
18	NuMI Beam Permit		200					CC $6C N22	Relocated
19	Beam Permit Process Channel Interface and Controller		204	Connects to MADC #79			1D	CC $6C N21	Output to Local 200 I Power Supply, 18 L Miscellaneous. Probal Equipment
20	Ethernet Connectivity								Already Exist
21	VME with Connection to Ethernet								Already Exist
22	ACNET Console X Terminal								Already Exist
MI-65 Service Bldg Electronics Rm "65SB"			**Beneficial Occupancy October 2003**						New Basic Controls I Existing Controls at Infrastructure in the Below. Room for 9
1	B2 Dipole String (4) in Pre-Target Area	E:V118	468	13 **			3A 1D	CC $E4 N1-2	Three Series 500 kW With Output
1-1	Local PLC for Extended Power Supply Status								Status Supplied to

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
2	Quadrupole Power Supply (3Q120)	E:Q113	216	3 *			2A	CC $E4 N3	Smaller PEI i
3	Quadrupole Power Supply (3Q120)	E:Q114	216	3 *			2A	CC $E4 N4	Smaller PEI i
4	Quadrupole Power Supply (3Q60)	E:Q115	216 or 466	3 *			2A	CC $E4 N5	Smaller PEI in Electric to Decide Ram
5	Quadrupole Power Supply (3Q120)	E:Q116	216	3 *			2A	CC $E4 N6	Smaller PEI i
6	Quadrupole Power Supply (3Q120)	E:Q117	216	3 *			2A	CC $E4 N7	Smaller PEI i
7	Quadrupole Power Supply (3Q120)	E:Q118	216	3 *			2A	CC $E4 N8	Smaller PEI i
8	Quadrupole Power Supply (3Q60)	E:Q119	216 or 466	3 *			2A	CC $E4 N9	Smaller PEI in Electric to Decide Ram
9	Quadrupole Power Supply (3Q120)	E:Q120	216	3 *			2A	CC $E4 N10	Smaller PEI i
10	Quadrupole Power Supply (3Q120)	E:Q121	216	3 *			2A	CC $E4 N11	Smaller PEI i
11	Horizontal 200 Turn Trim Dipole	E:H117	466	3 *			2A	CC $E4 N12	Smaller PEI i
*	MADC #85 Monitors for Q113 thru Q121 and H117	Current Reference (F), Current Out, and Voltage Out (V). First Two Analog Monitors Exam							
**	MADC #85 Monitors for V118	3 x Current Reference (AF, BF & CF), Current Out, 3 x Current Error (AE, BE & CE), Plus Volts to Gnd (P), Neg and 3 x Unfiltered Voltage Out (AU, BU & CU). First Seven Monitors Examined by Beam Permit. "In Regula							
12	**Trim Element Regulators (9)**								All Trim Elements Con System in E
12-1	Vertical Trim Element #1 Located Downstream of Q113	E:VT113	.25 x 453	4 *			No	CC $E5 N1-2	Individual Re Plan to Ramp to K
12-2	Horizontal Trim Element #2 Located Upstream of Q114	E:HT114	.25 x 453	4 *			No	CC $E5 N1-2	Individual Re Plan to Ramp to K
12-3	Horizontal Trim Element #3 Located Downstream of Q115	E:HT115	.25 x 453	4 *			No	CC $E5 N1-2	Individual Re Plan to Ramp to K
12-4	Vertical Trim Element #4 Located Downstream of Q116	E:VT116	.25 x 453	4 *			No	CC $E5 N1-2	Individual Re Plan to Ramp to K
12-5	Horizontal Trim Element #5 Located Downstream of Q117	E:HT117	.25 x 453	4 *			No	CC $E5 N3-4	Individual Re Plan to Ramp to K
12-6	Vertical Trim Element #6 Located Downstream of Q118	E:VT118	.25 x 453	4 *			No	CC $E5 N3-4	Individual Re Plan to Ramp to K
12-7	Horizontal Trim Element #7 Located Upstream of Q119	E:HT119	.25 x 453	4 *			No	CC $E5 N3-4	Individual Re Plan to Ramp to K

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
12-8	Horizontal Trim Element #8 Located Downstream of Q121	E:HT121	.25 x 453	4 *			No	CC $E5 N3-4	Individual Re Plan to Ramp to K
12-9	Vertical Trim Element #9 Located Downstream of Q121	E:VT121	.25 x 453	4 *			No	CC $E5 N5-6	Individual Re Plan to Ramp to K
12-10	Spare Channel		.25 x 453					CC $E5 N5-6	
12-11	Spare Channel		.25 x 453					CC $E5 N5-6	
12-12	Spare Channel		.25 x 453					CC $E5 N5-6	
*	MADC Monitors for Trim Elements	All MADC Monitors Wire Directly to Local MADC #86. Analog Monitors Include: Vref, Vout, I out, I rms. "Trac Examination by Beam Permit. Installation of 204/PCI Not Viewed Favorably. Should Consider an ACNET S Problem.							
13	**Beam Position Detectors (11)**								Using 3/8" Andrew H
13-1	Vertical BPM Upstream of Q113	E:VP113	VME Ethrnt				No		Four BPMs
13-2	Horizontal BPM Downstream of Q114	E:HP114	VME Ethrnt				No		
13-3	Horizontal BPM Upstream of Q115	E:HP115	VME Ethrnt				No		
13-4	Vertical BPM Upstream of Q116	E:VP116	VME Ethrnt				No		
13-5	Horizontal BPM Upstream of Q117	E:HP117	VME Ethrnt				No		Four BPMs
13-6	Vertical BPM Upstream of Q118	E:VP118	VME Ethrnt				No		
13-7	Horizontal BPM Downstream of Q119	E:HP119	VME Ethrnt				No		
13-8	Horizontal BPM Downstream of Q121	E:HP121	VME Ethrnt				No		
13-9	Vertical BPM Downstream of Q121	E:VP121	VME Ethrnt				No		Four BPMs
13-10	Horizontal BPM Upstream of Target	E:HPTAR	VME Ethrnt				No		
13-11	Vertical BPM Upstream of Target	E:VPTAR	VME Ethrnt				No		
14	**Beam Profile Monitors - Multiwires (6 Total)**			Two Styles Under Consideration: Traditional Fermilab and UTA (Kopp). Fermi Styl Multiwire with Attendant Requirements for Motor Drive Hardware and Digital Beam Requires Less Complicated Drive and High Voltage Supplies for Clear					
14-1	Multiwire Downstream of Q114	E:PM114	ARCNET VME Ethrnt				No		
14-2	Multiwire Upstream of Q115	E:PM115	ARCNET VME Ethrnt				No		

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
14-3	Multiwire Upstream of Q117	E:PM117	ARCNET VME Ethrnt				No		
14-4	Target Multiwire Downstream of Q118	E:PM118	ARCNET VME Ethrnt				1D		Traditional Motor Dr Beam Permit Only If M In B
14-5	Multiwire Downstream of Q121	E:PM121	ARCNET VME Ethrnt				No		
14-6	Multiwire Upstream of Target	E:PMTGT	ARCNET VME Ethrnt				No		
14-7	Clearing Voltage PS for PM114	E:PM114V	.25 x 052			1	No	CC $E5 N7 A0	PS is Half of PREP 052 Provides R
14-8	Clearing Voltage PS for PM115	E:PM115V	.25 x 052			1	No	CC $E5 N7 A1	PS is Half of PREP 052 Provides R
14-9	Clearing Voltage PS for PM117	E:PM117V	.25 x 052			1	No	CC $E5 N7 A2	PS is Half of PREP 052 Provides R
14-10	Clearing Voltage PS for PM121	E:PM121V	.25 x 052			1	No	CC $E5 N7 A3	PS is Half of PREP 052 Provides R
14-11	Clearing Voltage PS for PMTAR	E:PMTGTV	.25 x 052			1	No	CC $E5 N8 A0	PS is Half of PREP 052 Provides R
15	TCLK Event Monitor and Fanout		178					CC $E5 N20	For Local Instrum
16	TCLK Timing Capability		377					CC $E5 N22	For Local I
17	MIBS Timing Capability		479					CC $E5 N21	For Local I
18	MADC Facility - Located in Rack MI65103	MADC #85	290	43 Assigned		5 Assigned		CC $E4 N23	14 Bit Resolution R Su
19	MADC Facility - Located in Rack MI65108	MADC #86	290		36 Direct for Trims			CC $E5 N23	Dedicated to 12 Bit Resolu
20	NuMI Beam Permit		200					CC $E4 N22	
21	Beam Permit Process Channel Interface and Controller		204	Connects to MADC #85				CC $E4 N21	Output to Local 200 I Power Supply C
22	Ethernet Connectivity								Needed for Interface C
23	VME with Connection to Ethernet								Needed for Interfa
24	ACNET Console X Terminal								Necessary

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
Target Hall Support Rooms (Below MI-65 Near Target Hall) "THSR"			**Beneficial Occupancy October 2003**						New Basic Controls I Existing Controls at MI in Po
1	**Horn Power Supply**		IRM and CAMAC						Two PEI 240KW and Control and Status for Already Been Success the IRM and Is Not ~205,000 A
1-1	PEI-A Power Supply	E:NHSA	468				1D	CC $E6 N1-2	PS ON Digital Status 2V Into
1-2	PEI-B Power Supply	E:NHSB	468				1D	CC $E6 N3-4	PS ON Digital Status 2V Into
1-3	E:NHSA Output Waveform Reference	E:NHSAR	(468)	1			1A	MADC #87	Local Selector Switc Waveforms as the Inpu E:NHSAR Is N
1-4	E:NHSB Output Waveform Reference	E:NHSBR	(468)	1			1A	MADC #87	
1-5	Waveform Reference to PEI-A After Slow Start Module	E:NHSASR	Slow Start Kluge	1			1A	MADC #87	These Monitors Expe Both Supplies Are Bein S
1-6	Waveform Reference to PEI-B After Slow Start Module	E:NHSBSR	Slow Start Kluge	1			1A	MADC #87	
1-7	Current Output of PEI-A Power Supply to Capacitor Bank	E:NHSAI		1			1A	MADC #87	
1-8	Current Output of PEI-B Power Supply to Capacitor Bank	E:NHSBI		1			1A	MADC #87	
1-9	Power Supply Interlock (Permit) From "Local Controls" Electronics		Mr. Biggs				1D		
1-10	Stripline Current for Horns (Horn 1 and Horn 2 in Series)	E:HSLI1 to E:HSLI4	(377)	4			1A	MADC #87/88	Stripline Current is Trig Before Bear
1-11	Peak Stripline Current for Horns (Horn 1 and Horn 2 in Series)	E:HSLIP1 to E:HSLIP4		4			1A	MADC #87/88	Sample ar
1-12	Integrated Stripline Current for Horns	E:HSLII1 to E:HSLII4	(377)	4			No	MADC #87/88	A Timing Channel I Int
2	**Loss Monitors (Chassis #4)**								Reg Loss Monitor E Channels in One C
2-1	Regular Loss Monitor HV Supply Output Chassis #4	E:LMHV4O				1	1A	MADC #87	
2-2	Regular Loss Monitor HV Supply Return Chassis #4	E:LMHV4R				1	1A	MADC #87	
2-3	Loss Monitor #1 at Q113	E:LMQ113				1	1A	MADC #87	

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
2-4	Loss Monitor #2 at Q114	E:LMQ114				1	1A	MADC #87	
2-5	Loss Monitor #3 at Q115	E:LMQ115				1	1A	MADC #87	
2-6	Loss Monitor #4 at Q116	E:LMQ116				1	1A	MADC #87	
2-7	Loss Monitor #5 at Q117	E:LMQ117				1	1A	MADC #87	
2-8	Loss Monitor #6 at H117	E:LMH117				1	1A	MADC #87	
2-9	Loss Monitor #7 at Q118	E:LMQ118				1	1A	MADC #87	
2-10	Loss Monitor #8 at V118-1	E:LM1181				1	1A	MADC #87	
2-11	Loss Monitor #9 at V118-2	E:LM1182				1	1A	MADC #87	
2-12	Loss Monitor #10 at Q119	E:LMQ119				1	1A	MADC #87	
2-13	Loss Monitor #11 - Spare	E:LM4C11				1 if Avail			
2-14	Loss Monitor #12 - Spare	E:LM4C12				1 if Avail			
3	**Loss Monitors (Chassis #5)**								Reg Loss Monitor E Channels in One C
3-1	Regular Loss Monitor HV Supply Output Chassis #5	E:LMHV5O				1	1A	MADC #88	
3-2	Regular Loss Monitor HV Supply Return Chassis #5	E:LMHV5R				1	1A	MADC #88	
3-3	Loss Monitor #1 at V118-3	E:LM1183				1	1A	MADC #88	
3-4	Loss Monitor #2 at V118-4	E:LM1184				1	1A	MADC #88	
3-5	Loss Monitor #3 at Q120	E:LMQ120				1	1A	MADC #88	
3-6	Loss Monitor #4 at Q121	E:LMQ121				1	1A	MADC #88	
3-7	Loss Monitor #5 - Spare	E:LM5C5				1 ?	No		Loss Monitor For Ho Assig
3-8	Loss Monitor #6 - Spare	E:LM5C6				1 ?	No		Loss Monitor For Ho Assig

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
3-9	Loss Monitor #7 - Spare	E:LM5C7				1 if Avail			
3-10	Loss Monitor #8 - Spare	E:LM5C8				1 if Avail			
3-11	Loss Monitor #9 - Spare	E:LM5C9				1 if Avail			
3-12	Loss Monitor #10 - Spare	E:LM5C10				1 if Avail			
3-13	Loss Monitor #11 - Spare	E:LM5C11				1 if Avail			
3-14	Loss Monitor #12 - Spare	E:LM5C12				1 if Avail			
4	Pre-Target Beam Position Monitor - X and Y Plus Intensity	E:NOTCHP	Custom	3					Electronics Indepe Sy
5	**Baffle and Target Instrumentation**								Anticipate Using A Ha
5-1	Baffle Thermocouples (2 + Spare)	E:BTHTnn	Custom	3			2A	MADC #87/88	Electronics In
5-2	Baffle/Target Carrier Thermocouples	E:BTHTnn	PLC Ethernet				No		2 C
5-3	Target Budal Monitor for X		Custom	2			No	MADC #87/88	Monitor Not S x100 Gain S
5-4	Target Budal Monitor for Y		Custom	2			No	MADC #87/88	Monitor Not S x100 Gain S
5-5	Target to Ground Impedance		Custom (?)	1			No	MADC #87/88	Monitor Not S
5-6	Target Vacuum Pirani Gauge	E:BTHVnn	PLC Ethrnt or Custom	1 ?			No		Details of Signa
5-7	Target Helium Pressure Gauge	E:BTHPnn	PLC Ethrnt or Custom	1 ?			No		Details of Signa
6	**Horn and Horn Stripline Iinstrumentation**								Anticipate Using A Ha
6-1	Custom Timing Module with 3 Analog Outputs	E:NOCLUE	Custom	3			No	MADC #87/88	Function Not
6-2	Horn 1 Magnetic Field Monitors B-Dot Coils		Custom	9			No	MADC #87/88	Associated
6-3	Horn 2 Magnetic Field Monitors B-Dot Coils		Custom	9			No	MADC #87/88	Associated
6-4	Horn 1 Module Support Thermocouples	E:BTHTnn	PLC Ethernet				No		4 C

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
6-5	Horn 2 Module Support Thermocouples	E:BTHTnn	PLC Ethernet				No		4 C
6-6	Horn 1 Carriage Thermocouples	E:BTHTnn	PLC Ethernet				No		2 C
6-7	Horn 1 Body Thermocouples	E:BTHTnn	PLC Ethernet				No		6 C
6-8	Horn 2 Body Thermocouples	E:BTHTnn	PLC Ethernet				No		6 C
7	Decay Pipe Vacuum Controls		PLC Ethernet				1D		Anticipate Using A Hardware. Controls A Ab
7-1	Various Control and Monitor Points	E:DPVinn	PLC Ethrnt						Detailed
8	Target and Baffle RAW System		PLC Ethernet				1D		Anticipate Using A Ha
8-1	Various Control and Monitor Points	E:TBRinn	PLC Ethrnt						Detailed
9	Horn 1 RAW System		PLC Ethernet				1D		Anticipate Using A Ha
9-1	Various Control and Monitor Points	E:H1Rinn	PLC Ethrnt						Detailed
10	Horn 2 RAW System		PLC Ethernet				1D		Anticipate Using A Ha
10-1	Various Control and Monitor Points	E:H2Rinn	PLC Ethrnt						Detailed
11	Intermediate Water Cooling for Horn 1 and Horn 2 RAW Systems		PLC Ethernet				1D		Anticipate Using A Ha
11-1	Various Control and Monitor Points	E:HHIinn	PLC Ethrnt						Detailed
12	Decay Pipe Cooling RAW System - Upstream End		PLC Ethernet				1D		Anticipate Using A Ha
12-1	Various Control and Monitor Points	E:DURinn	PLC Ethrnt						Detailed
13	Target Pile Air Cooling System		PLC Ethernet				1D		Anticipate Using A Hardware. Primary Chiller, Reheater, F Monitor Points of Te Hu
13-1	Various Control and Monitor Points	E:TPCinn	PLC Ethrnt						Detailed
13-2	Fan Differential Pressure	E:TPCPnn	Custom	1			1A	MADC #87/88	Electronics In
13-3	Target Pile Air Supply Temperature	E:TPCTnn	Custom	1			1A	MADC #87/88	Electronics In

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
14	Target Positioning System		ARCNET VME Ethrnt				No		5 Motors an
15	Positioning System for Horn #1		ARCNET VME Ethrnt				No		4 Motors an
16	TCLK Event Monitor and Fanout		178					CC $E6 N15	For Local Instrum
17	TCLK Timing Capability		377					CC $E6 N17	Horn Timing and Also
18	MIBS Timing Capability (Ref $74)		479					CC $E6 N16	Horn Timing and Also
19	MADC Facility - Located in Rack THSR103	MADC #87	290					CC $E6 N23	14 Bit Resolut
20	MADC Facility - Located in Rack THSR104	MADC #88	290					CC $E6 N22	14 Bit Resolut
21	NuMI Beam Permit		200					CC $E6 N20	BP Input Panel Loc
22	NuMI Beam Permit		200					CC $E6 N21	BP Input Panel Loc
23	Beam Permit Process Channel Interface and Controller		204	Connects to MADC #87			1D	CC $E6 N19	Output to Local 20
24	Beam Permit Process Channel Interface and Controller		204	Connects to MADC #88			1D	CC $E6 N18	Output to Local 20
25	Ethernet Connectivity								Needed for Interface C
26	VME with Connection to Ethernet								Needed for Interf
27	ACNET Console X Terminal								Thought to Reside He Necessary Dur
MINOS Service Building (West of Lederman Science Center) "MSB"			**Beneficial Occupancy January 2004**						Little Controls Infrastru Main Purpose is to Signals Linking C Monitoring Antici
1	TCLK Event Monitor and Fanout		178					CC $E7 N20	Not Thought Neces Useful fo
2	Digital In - Digital Out Facility		184					CC $E7 N1	Potential for Contr Sy

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
3	MADC Facility - Located in Rack MSB101	MADC #89	290					CC $E7 N23	12 Bit Resolution Ade Monitor Critical S
4	NuMI Beam Permit Origin Module		201					CC $E7 N21	Most Distant Location Close the Loo
5	NuMI Beam Permit		200				None	CC $E7 N22	Useful for Diagnosti Permit Signal f
6	Ethernet Connectivity								Thought Necessary In
MINOS Near Detector Hall (350 Ft Below MINOS Service Bldg) "MND"			**Beneficial Occupancy January 2004**						New Controls Infras Above MINOS Buil Tunnel. Fiber Conn
1	Detector Magnet Power Supply		216				No	CC $E8 N1	150 kW PEI 150-5 v Expecte
2	MINOS LCW System		PLC Ethernet				No		Includes Analysis Mag and Detector Electro Controlling Heat Exc Cold S
2-1	Various Control and Monitor Points	E:MNWinn	PLC Ethrnt						Detailed
3	Area Temperature & Humidity Sensors						No		Likely to be Instrumen
4	TCLK Event Monitor and Fanout		178					CC $E8 N19	Diagnostics and
5	TCLK Timing Capability		377					CC $E8 N21	Diagnostics and
6	MIBS Timing Capability (Ref $74)		479					CC $E8 N20	Need Main Inject Experim
7	Digital In - Digital Out Facility		184					CC $E8 N2	Potential for Contr Systems in L
8	MADC Facility - Located in Rack MND101	MADC #90	290					CC $E8 N23	12 Bit Resolution
9	NuMI Beam Permit		200				None	CC $E8 N22	Status of Permit Loop No Inputs
10	Ethernet Connectivity								

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
Absorber Access Tunnel (Near Absorber at End of Decay Pipe) "AAT"			**Beneficial Occupancy January 2004**						New Controls Infras MINOS Nea
1	Hadron Monitor Instrumentation		ARCNET VME Ethrnt				No		Detectors Installed Bet Absorber. Using SW Re
1-1	High Voltage Supply #1 for Hadron Monitor	E:HMHV1	.25 x 052			1	No	CC $E9 N1 A0	PS is Half of PREP 052 Provides R
1-2	High Voltage Supply #2 for Hadron Monitor	E:HMHV2	.25 x 052			1	No	CC $E9 N1 A1	PS is Half of PREP 052 Provides R
1-3	High Voltage Supply #3 for Hadron Monitor	E:HMHV3	.25 x 052			1	No	CC $E9 N1 A2	PS is Half of PREP 052 Provides R
1-4	High Voltage Supply #4 for Hadron Monitor	E:HMHV4	.25 x 052			1	No	CC $E9 N1 A3	PS is Half of PREP 052 Provides R
1-5	High Voltage Supply #5 for Hadron Monitor	E:HMHV5	.25 x 052			1	No	CC $E9 N2 A0	PS is Half of PREP 052 Provides R
1-6	High Voltage Supply #6 for Hadron Monitor	E:HMHV6	.25 x 052			1	No	CC $E9 N2 A1	PS is Half of PREP 052 Provides R
1-7	High Voltage Supply #7 for Hadron Monitor	E:HMHV7	.25 x 052			1	No	CC $E9 N2 A2	PS is Half of PREP 052 Provides R
2	Muon Monitor Instrumentation for Alcove 1		ARCNET VME Ethrnt				No		Detectors Installed a SWIC Scanner H Gas System
2-1	High Voltage Supply #1 for Muon Monitor in Alcove 1	E:MM1HV1	.25 x 052			1	No	CC $E9 N3 A0	PS is Half of PREP 052 Provides R
2-2	High Voltage Supply #2 for Muon Monitor in Alcove 1	E:MM1HV2	.25 x 052			1	No	CC $E9 N3 A1	PS is Half of PREP 052 Provides R
2-3	High Voltage Supply #3 for Muon Monitor in Alcove 1	E:MM1HV3	.25 x 052			1	No	CC $E9 N3 A2	PS is Half of PREP 052 Provides R
3	Muon Monitor Instrumentation for Alcove 2		ARCNET VME Ethrnt				No		Detectors Installed a SWIC Scanner H Gas System
3-1	High Voltage Supply #1 for Muon Monitor in Alcove 2	E:MM2HV1	.25 x 052			1	No	CC $E4 N4 A0	PS is Half of PREP 052 Provides R
3-2	High Voltage Supply #2 for Muon Monitor in Alcove 2	E:MM2HV2	.25 x 052			1	No	CC $E4 N4 A1	PS is Half of PREP 052 Provides R
3-3	High Voltage Supply #3 for Muon Monitor in Alcove 2	E:MM2HV3	.25 x 052			1	No	CC $E4 N4 A2	PS is Half of PREP 052 Provides R

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
4	Muon Monitor Instrumentation for Alcove 3		ARCNET VME Ethrnt				No		Detectors Installed a SWIC Scanner H Gas System
4-1	High Voltage Supply #1 for Muon Monitor in Alcove 3	E:MM3HV1	.25 x 052			1	No	CC $E9 N5 A0	PS is Half of PREP 052 Provides R
4-2	High Voltage Supply #2 for Muon Monitor in Alcove 3	E:MM3HV2	.25 x 052			1	No	CC $E9 N5 A1	PS is Half of PREP 052 Provides R
4-3	High Voltage Supply #3 for Muon Monitor in Alcove 3	E:MM3HV3	.25 x 052			1	No	CC $E9 N5 A2	PS is Half of PREP 052 Provides R
5	Absorber Instrumentation						1D		Anticipate Using A Hardware. Mostly The Se
5-1	Various Control and Monitor Points	E:ABSinn	PLC Ethrnt						Mostly Thermocoupl
6	Decay Pipe Vacuum System						1D		Anticipate Using A Hardware. Controls
6-1	Various Control and Monitor Points	E:DPVinn	PLC Ethrnt						Detailed Separately Pumps a
7	Absorber Cooling RAW System						1D		Anticipate Using A Ha
7-1	Various Control and Monitor Points	E:ABRinn	PLC Ethrnt						Detailed Separately. E at a M
8	Intermediate Water Cooling for Absorber RAW System						No		Anticipate Using A Ha
8-1	Various Control and Monitor Points	E:ABIinn	PLC Ethrnt						Detailed Separately P
9	Decay Pipe Cooling RAW System - Downstream End						1D		Anticipate Using A Ha
9-1	Various Control and Monitor Points	E:DDRinn	PLC Ethrnt						Detailed Separately P
10	TCLK Event Monitor and Fanout		178					CC $E9 N19	Needs Not Specific a Diag
11	TCLK Timing Capability		377					CC $E9 N21	Needs Not Specific a Diag
12	MIBS Timing Capability (Ref $74)		479					CC $E9 N20	Thought Necessary for Instru
13	MADC Facility - Located in Rack AAT103	MADC #91	290					CC $E9 N23	12 or 14
14	NuMI Beam Permit		200					CC $E9 N22	

Ref #	System / Device	Name	Controller	MADC Twinax	MADC BNC/TWIN	MADC BNC	Beam Permit	Controls Assignments	Cor
15	Ethernet Connectivity								
16	VME with Connection to Ethernet								For Hadron
17	ACNET Console X Terminal								May Not Reside Here Convenient Du