

DO Upgrade Schedule  
 Muon Forward Trigger Detectors (Pixels)

ID	Task Name	Duration	Start	Finish	Predecessors	Constraint	WBS	Resource Names
1757	<b>MUON FORWARD TRIGGER DETECTORS</b>	223 w	8/1/96	2/6/01		As Soon As		
1758	<b>M3-Muon Forward Trigger Detector TDR Submitted</b>	0 w	12/2/97	12/2/97		Start No Ear		
1759	Develop Layout of the System and System Integration	135 w	8/1/96	4/28/99		Start No Ear	1.3.3.1	MEF133[0.2],DesF133[0.05]
1760	Specify Layout for Bar Counters	50 w	2/12/98	2/17/99		Start No Ear		MEF133[0.5],DesF133[0.5]
1761	<b>FABRICATE COUNTERS</b>	170.2 w	9/3/96	2/21/00		As Soon As		
1762	Design Counters	17 w	11/1/96	3/13/97	1759SS+13 w	As Soon As f		MEU133[0.25],DesU133[0.75]
1763	Design Calibration System	79 w	11/1/96	6/11/98	1759SS+13 w	As Soon As f		PhysU133,EEF133[0.5]
1764	Procure Scintillator	52 w	9/16/96	10/1/97		Start No Ear	1.3.3.2	k\$[4.3]
1765	Procure PMTs	32 w	9/3/96	4/28/97		Start No Ear	1.3.3.4.1	k\$[2.82]
1766	Procure WLS	18 w	9/30/97	2/17/98		Start No Ear	1.3.3.3	k\$[0.73],k\$[0.15]
1767	Procure PMT Base Parts FY96	18 w	9/3/96	1/20/97	1765SS	As Soon As f	1.3.3.4.2(0.1)	k\$[0.12]
1768	Procure PMT Base Parts FY97	24 w	4/11/97	9/30/97	1762FS+4 w	As Soon As f	1.3.3.4.2(0.8)	k\$[0.99]
1769	Procure PMT Base Parts FY99	0.2 w	6/1/99	6/1/99		Start No Ear	1.3.3.4.2(.1)	k\$[0.12]
1770	Procure Magnetic Shield Parts FY96	18 w	9/3/96	1/20/97	1765SS	As Soon As f	1.3.3.4.3(0.1)	k\$[0.2]
1771	Procure Magnetic Shield Parts FY97	24 w	4/11/97	9/30/97	1762FS+4 w	As Soon As f	1.3.3.4.3(0.8)	k\$[1.58]
1772	Procure Magnetic Shield Parts FY99	0.2 w	6/1/99	6/1/99		Start No Ear	1.3.3.4.3(.1)	k\$[0.2]
1773	Procure Counter Case Materials FY97,FY98	24 w	4/11/97	9/30/97	1762FS+4 w	As Soon As f	1.3.3.5.1,1.3.3.5.2,1.3.3.5.3	k\$[1.46],k\$[0.29]
1774	Procure Counter Case Materials FY98	0.2 w	10/1/97	10/1/97		Start No Ear		
1775	Machine Scintillator	52 w	7/1/98	7/21/99		Start No Ear		MTU133[4]
1776	Machine Magnetic Shielding Parts	52 w	4/15/97	5/1/98	1770SS+4 w	As Soon As f		MTU133[2]
1777	Fabricate and Test PMT Bases	52 w	4/15/97	5/1/98	1767SS+4 w	As Soon As f		ETU133[3]
1778	Fabricate Counter Cases	52 w	7/1/98	7/21/99	1775SS	As Soon As f		MTU133[3]
1779	Assemble Counters	52 w	7/30/98	8/18/99	1766SS+13 w,1775SS+4 w,1776	As Soon As f		MTU133[5],PhysU133[2]
1780	<b>Begin Counter Assembly</b>	0 w	7/30/98	7/30/98	1779SS	As Soon As		
1781	<b>M2-Muon Forward Trigger Counter Assembly 10% Complete</b>	0 w	10/12/98	10/12/98	1779SS+20 %	As Soon As		
1782	<b>Assembly Of 50% Of Counters Complete</b>	0 w	3/4/99	3/4/99	1779SS+55 %	As Soon As		
1783	Test Counters	52 w	8/13/98	9/1/99	1779SS+2 w	As Soon As f	1.3.3.10.1(.5)	PhysU133[3],MTU133[3],k\$[0.05],k\$[0.01]
1784	Shipping costs (MOU)	1.55 w	9/10/97	9/19/97		Start No Ear	1.3.3.10.2(0.55)	k\$[0.2],k\$[0.02]
1785	Ship Counters to FNAL	44 w	9/25/98	8/18/99	1783SS+6 w	Start No Ear	1.3.3.10.2(0.45)	MTU133[2],k\$[0.16],k\$[0.02]
1786	<b>Arrival of A-Layer Pixel Counters at FNAL</b>	0 w	2/1/99	2/1/99	1785SS+33 %	As Soon As		
1787	<b>Arrival of C-Layer Pixel Counters at FNAL</b>	0 w	6/10/99	6/10/99	1785SS+66 %	As Soon As		
1788	<b>M3-All Muon Forward Trigger Detector Counters at Fermilab</b>	0 w	8/18/99	8/18/99	1785	As Soon As		
1789	Specify Fiber Readout Counters	4 w	7/19/99	8/13/99		Start No Ear		MEF133[0.25]
1790	Design and Prepare Drawings for Fiber Readout Counters	2 w	8/16/99	8/27/99	1789	As Soon As f		MEU133[0.5],DesU133[0.75]
1791	Fabricate and Test Fiber Readout Counters	10 w	8/23/99	11/1/99	1790SS+50 %	As Soon As f		MTU133[0.5]
1792	Test Counters at FNAL	66 w	10/9/98	2/21/00	1785SS+2 w	As Soon As f	1.3.3.10.1(.5),1.3.3.10.3	PhysU133,PhysF133[0.5],MTF133[0.1],k\$[0.1],k\$[0.01]
1793	<b>FABRICATE COUNTER PLANES</b>	201.4 w	8/1/96	8/29/00		As Soon As		
1794	Procure HV Cables	26 w	8/1/96	2/13/97		As Soon As f	1.3.3.8.1,1.3.3.8.2,1.3.3.8.3(.5)	k\$[0.7],k\$[0.01]
1795	Procure RG58 Signal Cables	26 w	8/1/96	2/13/97		As Soon As f	1.3.3.7	k\$[0.59]
1796	Assemble/Test HV and Signal Cables	35.6 w	2/26/99	11/5/99	1794FS+50 w,1795FS+50 w	Start No Ear		MTF133[0.5],PhysU133[0.25]
1797	Design and Prepare Drawings for First Pixel Octant	66 w	7/8/97	11/2/98	1762FS+16 w	As Soon As f		MEF133[0.5],MEU133,DesF133,PhysF133[0.25]
1798	Design and Prepare Drawings for First Pixel Holders	22 w	6/1/98	11/3/98		Start No Ear		MEF133[0.5],DesF133[0.5]
1799	Procure Materials for First Octant	6 w	11/4/98	12/17/98	1797,1798	As Soon As f	1.3.3.6.1(.04),1.3.3.6.3(.04)	k\$[0.11],k\$[0.01]
1800	Design and Prepare Drawings for Hole Drilling Fixture	13 w	11/16/98	3/2/99		Start No Ear		MEF133[0.1],DesF133[0.6]
1801	Assemble and Evaluate First Octant	2 w	12/18/98	1/14/99	1799,1800SS+4 w	As Soon As f		MTF133[2],PhysU133,PhysF133[0.25]
1802	<b>First Pixel Octant Assembled</b>	0 w	1/14/99	1/14/99	1801	As Soon As		
1803	Produce Drawings for A Layer Octant Frames	18 w	11/3/98	3/24/99	1797	Start No Ear		MEF133[0.15],DesF133[0.75]
1804	Procure A-Layer Octant Frames	17 w	1/28/99	5/27/99	1803SS+10 w	As Soon As f	1.3.3.6.1(.30)	k\$[0.65],k\$[0.03]
1805	Produce Drawings for C-Layer Octant Frames	13 w	3/25/99	6/24/99	1803	As Soon As f		MEF133[0.25],DesF133[1.5]
1806	Procure C-Layer Octant Frames	22 w	6/25/99	12/1/99	1805	As Soon As f	1.3.3.6.1(.33)	k\$[0.71],k\$[0.03],MEF133[0.25],DesF133[0.25]
1807	Produce Drawings for B-Layer Octant Frames	8 w	6/25/99	8/20/99	1805	As Soon As f		DesF133[1.7],MEF133
1808	Procure B-Layer Octant Frames	3 w	12/2/99	1/5/00	1806,1807	As Soon As f	1.3.3.6.1(.33)	k\$[0.71],k\$[0.03],MEF133[0.25],DesF133[0.25]
1809	Design and Prepare Drawings for B and C Layer Pixel Holders	16 w	3/25/99	7/16/99	1803	As Soon As f		MEF133,DesF133[0.25]
1810	Produce Pixel Holders at IHEP	44 w	1/15/99	11/23/99	1801	As Soon As f	1.3.3.6.3(.96)	k\$[0.62],k\$[0.12]
1811	Fabricate A-layer Hole Drilling Fixture	12 w	3/3/99	5/26/99	1800	As Soon As f		
1812	Assemble Octants	36.2 w	5/27/99	2/23/00	1792SS,1804SS+10 %,1811	As Soon As f		MTF133[3],PhysU133,PhysF133[0.25],MEF133,DesF133
1813	<b>M3-Muon Forward Trigger Detector Octant Assembly Begun</b>	0 w	5/27/99	5/27/99	1812SS	As Soon As		
1814	<b>A-Layer Pixel Octants Assembled</b>	0 w	9/2/99	9/2/99	1812SS+33 %	As Soon As		
1815	<b>C-Layer Pixel Octants Assembled</b>	0 w	12/13/99	12/13/99	1812SS+66 %	As Soon As		
1816	<b>B-Layer Pixel Octants Assembled</b>	0 w	2/23/00	2/23/00	1812	As Soon As		
1817	<b>All Pixel Octants Assembled</b>	0 w	2/23/00	2/23/00	1814,1815,1816	As Soon As		
1818	Test Assembled Octants	36 w	6/10/99	3/7/00	1812SS+2 w	As Soon As f		PhysU133[0.5],PhysF133[0.25]
1819	Design A-layer octant supports	20 w	1/17/00	6/5/00	1809FS+8 w	Start No Ear		MEF133,DesF133[0.5]
1820	Fabricate A-layer octant supports	5 w	6/6/00	7/11/00	1819	As Soon As f	1.3.3.6.2(.67)	k\$[0.47],k\$[0.09],MEF133[0.25]
1821	Design C-layer octant supports	6 w	5/3/00	6/14/00		Start No Ear		MEF133,DesF133[0.5]
1822	Fabricate and install C-layer octant supports	6 w	6/15/00	7/27/00	1821	As Soon As f	1.3.3.6.2(.33)	k\$[0.23],k\$[0.05],MEF133[0.25]
1823	Load test south C-layer pixel mounts	0.4 w	7/28/00	7/31/00	1822,2114	As Soon As f		
1824	Load test north C-layer pixel mounts	0.4 w	8/1/00	8/2/00	1823,1822	As Soon As f		
1825	Design B-layer pixel octant supports	5 w	6/6/00	7/11/00	1819	As Soon As f		MEF133,DesF133[0.5]
1826	Fabricate/install/load test B-layer octant supports	7 w	7/12/00	8/29/00	1825	As Soon As f		MEF133[0.25]
1827	Conduct Safety Review	6 w	5/8/00	6/19/00	1819FS-4 w	As Soon As f		MEF133[0.1],PhysF133[0.05]
1828	Procure HV Fanouts	22 w	10/15/97	4/1/98		Start No Ear	1.3.3.8.3(.5),1.3.3.8.4	PhysU133[0.5],MTU133[0.5],k\$[0.2],k\$[0.02]

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ID	Task Name	Duration	Start	Finish	Predecessors	Constraint	WBS	Resource Names
1829	Procure HV Power Supplies FY97	8 w	9/2/97	10/27/97		Start No Earl	1.3.3.8.5(0.2)	k\$[0.26],k\$c[0.01]
1830	Procure HV Power Supplies FY98	8 w	2/2/98	3/27/98		Start No Earl	1.3.3.8.5(0.2)	k\$[0.26],k\$c[0.01]
1831	Procure HV Power Supplies FY99	8 w	6/1/99	7/27/99		Start No Earl	1.3.3.8.5(,6)	k\$[0.78],k\$c[0.02]
1832	Procure Parts for Calibration System FY97	7 w	9/10/97	10/28/97	1763SS+42 w	As Soon As f	1.3.3.9.2.1.3.3.9.3(0.33)	PhysU133[0.5],k\$[0.42],k\$c[0.08]
1833	Procure Parts for Calibration System FY98	19 w	3/5/98	7/17/98	1832FS+16 w	As Soon As f	1.3.3.9.3(,67)	PhysU133[0.5],k\$[0.12],k\$c[0.01]
1834	Procure Parts for Calibration System FY99	8 w	6/1/99	7/27/99		Start No Earl	1.3.3.9.1(,6)	k\$[0.28],k\$c[0.06]
1835	Fabricate Calibration System FY99	57 w	1/15/99	3/9/00	1801	As Soon As f	1.3.3.9.1(,4)	PhysU133[0.5],MTF133[0.1],k\$[0.19],k\$c[0.04]
1836	<b>INSTALLATION AND HOOKUP</b>	<b>34.2 w</b>	<b>6/1/00</b>	<b>2/6/01</b>		<b>As Soon As</b>		
1837	Assemble A-Layer North pixel plane on shield wall	4 w	6/1/00	6/28/00		Start No Earl		
1838	Install/load test north A-Layer pixel mounts	1 w	8/29/00	9/5/00	1820,2151	As Soon As f		
1839	Mount A-Layer North pixel plane onto supports	1 w	9/6/00	9/12/00	1818SS+16 %,1725FS+1 w,213	As Soon As f		MTF133[2],PhysU133[0.25],MEF133,DesF133,Crane_Day,DAB_
1840	Connect to HV system	2 w	9/13/00	9/26/00	1839SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1841	Connect to Front End Electronics	2 w	9/13/00	9/26/00	1839SS+1 w,1988SS,1984SS	As Soon As f		PhysU133[0.25],MTF133[0.1]
1842	Survey A-layer North pixel plane	1 w	9/13/00	9/19/00	1839	As Soon As f		PhysF133[0.1],MEF133[0.1],Align_Day,DAB_Pit
1843	Assemble A-layer South pixel plane on shield wall	1 w	9/13/00	9/19/00	1839	As Soon As f		
1844	Install/load test south A-layer pixel mounts	1 w	9/14/00	9/20/00	1820,1009	As Soon As		
1845	Mount A-Layer South pixel plane onto supports	1 w	9/21/00	9/27/00	1818SS+33 %,1729FS+1 w,184	As Soon As		MTF133[2],MEF133,DesF133,PhysU133[0.25],Crane_Day,DAE
1846	Connect to HV system	2 w	9/28/00	10/11/00	1845SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1847	Connect to Front End Electronics	2 w	9/28/00	10/11/00	1845SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1848	Survey A-layer South Pixel Plane	1 w	9/28/00	10/4/00	1845	As Soon As f		PhysF133[0.1],MEF133[0.1],Align_Day,DAB_Pit
1849	<b>M3-Muon Forward Trigger Detector A-Layer Planes Installed</b>	<b>0 w</b>	<b>10/4/00</b>	<b>10/4/00</b>	<b>1842,1848</b>	<b>As Soon As</b>		
1850	Assemble C-layer North pixel plane on shield wall	1.4 w	10/9/00	10/17/00	1845,1735	As Soon As		
1851	Mount C-Layer North pixel plane onto supports	1 w	10/18/00	10/24/00	1818SS+50 %,1734FS+1 w,182	As Soon As		MTF133[2],PhysU133[0.25],MEF133,DesF133,Crane_Day,DAE
1852	Connect to HV system	1 w	10/25/00	10/31/00	1851SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1853	Connect to Front End Electronics	1 w	10/25/00	10/31/00	1851SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1854	Survey C-Layer North pixel plane	1 w	10/25/00	10/31/00	1851SS+1 w	As Soon As f		PhysF133[0.1],MEF133[0.1],Align_Day,DAB_HiBay[0.5]
1855	Assemble C-layer South pixel plane on shield wall	1 w	10/25/00	10/31/00	1851	As Soon As		
1856	Mount C-Layer South pixel plane onto supports	0.6 w	11/1/00	11/3/00	1818SS+67 %,1738FS+1 w,182	As Soon As		MTF133[2],PhysU133[0.25],MEF133,DesF133,Crane_Day,DAE
1857	Connect to HV system	1 w	11/8/00	11/14/00	1856SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1858	Connect to Front End Electronics	1 w	11/8/00	11/14/00	1856SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1859	Survey C-Layer South pixel plane	1 w	11/6/00	11/10/00	1856	As Soon As f		PhysF133[0.1],MEF133[0.1],Align_Day,DAB_Pit,Sidewalk_North
1860	<b>M3-Muon Forward Trigger Detector C-Layer Planes Installed</b>	<b>0 w</b>	<b>11/10/00</b>	<b>11/10/00</b>	<b>1859,1854</b>	<b>As Soon As</b>		
1861	Assemble B-layer North pixel plane on shield wall	1.4 w	11/28/00	12/6/00	1856,1744,2159	As Soon As		
1862	Mount B-Layer North pixel octants onto supports	1 w	12/7/00	12/13/00	1818SS+83 %,1743FS+1 w,182	As Soon As		MTF133[2],PhysU133[0.25],MEF133,DesF133,Crane_Day,Sid
1863	Connect to HV system	1 w	12/14/00	12/20/00	1862SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1864	Connect to Front End Electronics	1 w	12/14/00	12/20/00	1862SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1865	Survey B-Layer North pixel plane	1 w	12/14/00	12/20/00	1862	As Soon As f		PhysF133[0.1],MEF133[0.1],Align_Day,Sidewalk_South
1866	Assemble B-layer South pixel plane on shield wall	1 w	12/14/00	12/20/00	1862	As Soon As		
1867	Mount B-Layer South pixel octants onto supports	1 w	12/21/00	1/2/01	1818,1747FS+1 w,1826,1866	As Soon As		MTF133[2],PhysU133[0.25],MEF133,DesF133,Crane_Day,Sid
1868	Connect to HV system	1 w	1/3/01	1/9/01	1867SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1869	Connect to Front End Electronics	1 w	1/3/01	1/9/01	1867SS+1 w	As Soon As f		PhysU133[0.25],MTF133[0.1]
1870	Survey B-Layer South pixel plane	1 w	1/3/01	1/9/01	1867	As Soon As		PhysF133[0.1],MEF133[0.1],Align_Day,Sidewalk_North
1871	<b>M3-Muon Forward Trigger Detector B-Layer Planes Installed</b>	<b>0 w</b>	<b>1/9/01</b>	<b>1/9/01</b>	<b>1865,1870</b>	<b>As Soon As</b>		
1872	<b>All Muon Forward Trigger Detector Planes Installed</b>	<b>0 w</b>	<b>1/9/01</b>	<b>1/9/01</b>	<b>1849,1860,1871</b>	<b>As Soon As</b>		
1873	Commission using cosmic rays	15 w	10/17/00	2/6/01	1849,1872FF+4 w	As Soon As f		PhysU133[2],PhysF133
1874	<b>Pixel Commissioning Complete</b>	<b>0 w</b>	<b>2/6/01</b>	<b>2/6/01</b>	<b>1873</b>	<b>As Soon As</b>		
1875	<b>SOFTWARE DEVELOPMENT</b>	<b>78 w</b>	<b>12/7/98</b>	<b>7/11/00</b>		<b>As Soon As</b>		
1876	Develop On-line Software	78 w	12/7/98	7/11/00		Start No Earl		PhysU133[0.5]
1877	Create Databases	78 w	12/7/98	7/11/00	1876SS	As Soon As f		PhysU133[0.25]
1878	Develop Slow Control and Monitoring Software	78 w	12/7/98	7/11/00	1876SS	As Soon As f		PhysU133[0.5]