

DO Upgrade Schedule
Muon Forward Tracker (MDTs)

ID	Task Name	Duration	Start	Finish	Predecessors	Constraint	WBS	Resource Names
1654	MUON FORWARD TRACKING DETECTORS	218.2 w	8/1/96	1/3/01		As Soon As		
1655	<i>M3-Muon Forward Tracker TDR Submitted</i>	0 w	12/2/97	12/2/97		Start No Ear		
1656	Develop System Layout	135 w	8/1/96	4/28/99		Start No Ear	1.3.4.1	MEF134[0.15],DesF134[0.05],PhysF134[0.5]
1657	FABRICATION OF MDT MODULES	188.4 w	8/1/96	5/26/00		As Soon As		
1658	Prototype MDT's	69 w	8/1/96	12/18/97	1656SS	As Soon As f	1.3.4.2.(1)	PhysF134[0.1],PhysU134[3],k\$(0.57),k\$c[0.04]
1659	Design MDT 8-cell Tube Module	42 w	8/1/96	6/6/97	1656SS	As Soon As f		PhysU134,MEU134[0.25],DesU134[0.5],PhysF134[0.25]
1660	Procure Materials for MDT Production FY 97, FY98	75 w	7/22/97	2/3/99	1659FS+6 w	As Soon As f	1.3.4.2.(9)	PhysU134[0.25],k\$(5.13),k\$c[0.35]
1661	Assemble MDT Modules at Dubna	48 w	1/4/99	12/10/99		Start No Ear		MTU134[8],MEU134
1662	<i>Start Full Scale Assembly of MDTs</i>	0 w	1/4/99	1/4/99	1661SS	Start No Ear		
1663	Test for Gas Leaks	48 w	1/11/99	12/29/99	1661SS+1 w	As Soon As f		MTU134,PhysU134
1664	Test High Voltage	48 w	1/11/99	12/29/99	1661SS+1 w	As Soon As f		PhysU134[2]
1665	<i>M2-Muon Forward Tracker MDT Assembly 10% Complete</i>	0 w	1/29/99	1/29/99	1661SS+20 %	As Soon As		
1666	<i>M3-Muon Forward Tracker MDT Assembly 50% Complete</i>	0 w	9/17/99	9/17/99	1661SS+70 %	As Soon As		
1667	Obligate shipping funds for Dubna	0.2 w	7/22/97	7/22/97	1660SS	Start No Ear	1.3.4.7.2	k\$(0.2),k\$c[0.05]
1668	Ship A-Layer Modules to FNAL	6 w	6/24/99	8/5/99	1664SS+45 %	As Soon As f		MTU134,PhysU134,PhysF134[0.25]
1669	<i>Arrival Of A-Layer MDT Modules At FNAL</i>	0 w	8/5/99	8/5/99	1668	As Soon As		
1670	Ship C-Layer Modules to FNAL	4.6 w	10/4/99	11/3/99	1664SS+66 %	As Soon As f		
1671	<i>Arrival Of C-Layer MDT Modules At FNAL</i>	0 w	11/3/99	11/3/99	1670	As Soon As		
1672	Ship B-Layer Modules to FNAL	8.2 w	2/3/00	3/30/00	1664	Start No Ear		
1673	<i>Arrival Of B-Layer MDT Modules At FNAL</i>	0 w	3/30/00	3/30/00	1672	As Soon As		
1674	<i>M2-All Muon Forward Tracker MDT Modules At Fermilab</i>	0 w	3/30/00	3/30/00	1673	As Soon As		
1675	Test MDT Modules at FNAL	37.6 w	8/20/99	5/26/00	1669SS+2 w,1674FF+4 w	As Soon As f	1.3.4.7.1,1.3.4.7.3	PhysU134,PhysF134[0.25],k\$(0.15),k\$c[0.02]
1676	FABRICATION OF MDT OCTANTS	162.2 w	6/2/97	9/12/00		As Soon As		
1677	Prepare Engineering Drawings for Prototype Octant and Support	42 w	8/5/97	6/11/98	1656SS+50 w	As Soon As f		MEF134[0.5],DesF134,PhysF134[0.25]
1678	Procure Materials for Prototype Octant Frame	10 w	8/17/98	10/26/98		Start No Ear		
1679	Assemble Octant Frame	1 w	10/27/98	11/2/98	1677FS-2 w,1678	As Soon As f		MTF134[2],MEF134[0.1]
1680	Assemble and Evaluate Prototype Octant Frame	6 w	11/3/98	12/16/98	1679	As Soon As f		MTF134[0.5],PhysU134[2]
1681	<i>Prototype MDT Octant Assembled</i>	0 w	12/16/98	12/16/98	1680	As Soon As		
1682	Develop Frame and Test	28 w	8/3/98	3/3/99		Start No Ear		MEF134[0.5],PhysF134[0.25],MTF134
1683	Design and Prepare Drawings for Final Prototype Octant	4 w	12/17/98	1/27/99	1680	Start No Ear		MEF134[0.25],DesF134[0.5]
1684	Fabricate and Evaluate Final Prototype Octant Frame	7.6 w	1/28/99	3/22/99	1683	As Soon As f		MTF134[1.5]
1685	Design and Prepare Drawings for MDT Holders	26 w	9/1/98	3/18/99		Start No Ear		MEF134[0.13]
1686	Procure MDT Holders	26 w	2/9/99	8/11/99		Start No Ear	1.3.4.3.1(.75)	k\$(0.4),k\$c[0.04]
1687	Design and Prepare Drawings for Hole-Drilling Fixture	8 w	1/25/99	3/19/99		Start No Ear		MEF134[0.25],DesF134[0.5]
1688	Procure Hole-Drilling Fixture	22 w	3/22/99	8/24/99	1687	As Soon As f	1.3.4.3.1(.25)	k\$(0.13),k\$c[0.01]
1689	Design and Prepare Drawings for A-Layer Octant Frames	31.2 w	2/11/99	9/21/99	1683FS+2 w	As Soon As f		MEF134,DesF134[1.5]
1690	Safety Review	2 w	3/27/00	4/7/00	1689FS-4 w	Start No Ear		
1691	Procure Materials for A-Layer Octant Frames	16 w	6/11/99	10/4/99	1689SS+50 %	As Soon As f	1.3.4.3.2.(33)	k\$(0.46),k\$c[0.09]
1692	Design and Prepare Drawings for C-Layer Octant Frames	17.2 w	9/22/99	2/4/00	1689	As Soon As f		MEF134,DesF134[1.5]
1693	Procure Materials for C-Layer Octant Frames	12 w	1/11/00	4/4/00	1692SS+75 %	As Soon As f	1.3.4.3.2.(33)	k\$(0.46),k\$c[0.09]
1694	Design and Prepare Drawings for B-Layer Octant Frames	6 w	2/7/00	3/17/00	1692	As Soon As f		MEF134,DesF134[1.5]
1695	Procure Materials for B-Layer Octant Frames	14 w	3/8/00	6/15/00	1694SS+75 %	As Soon As f	1.3.4.3.2.(34)	k\$(0.47),k\$c[0.09]
1696	Design and prepare drawings for A-Layer octant supports	16 w	9/22/99	1/27/00	1680,1689	As Soon As f		MEF134,DesF134[0.75]
1697	Fabricate A-layer octant supports	2.6 w	1/28/00	2/15/00	1696	As Soon As f	1.3.4.3.3(.67)	MEF134[0.25],k\$(0.66),k\$c[0.13]
1698	Design and prepare drawings for C-Layer octant supports	18 w	1/28/00	6/2/00	1696	As Soon As f		MEF134,DesF134[0.75]
1699	Fabricate/install/load test C-layer octant supports	6 w	6/5/00	7/17/00	1698	As Soon As f	1.3.4.3.3(.33)	k\$(0.32),k\$c[0.06],MEF134[0.25]
1700	Design and prepare drawings for B-layer MDT octant supports	8 w	6/5/00	7/31/00	1698	As Soon As f		
1701	Fabricate/install/load test B-layer octant supports	6 w	8/1/00	9/12/00	1700	As Soon As f		
1702	Procure Signal Cables FY97	26 w	9/2/97	3/17/98		Start No Ear	1.3.4.5.3,1.3.4.5.4	k\$(0.69),k\$c[0.1]
1703	Procure Signal Cables FY98	26 w	1/22/98	7/24/98		Start No Ear	1.3.4.5.1,1.3.4.5.2	k\$(0.36),k\$c[0.04]
1704	Obligate HV Distribution Funds to Dubna	2 w	6/2/97	6/13/97		Start No Ear	1.3.4.6.1	k\$(0.65),k\$c[0.1]
1705	Procure HV Distribution Boards	6.8 w	9/22/99	11/8/99	1689	As Soon As f		
1706	Procure HV Cables and Connectors	19.2 w	9/22/99	2/18/00	1689	As Soon As f	1.3.4.6.2,1.3.4.6.3	k\$(0.97),k\$c[0.15]
1707	Assemble/Test Signal Cables	21 w	11/22/99	5/2/00	1689	Start No Ear		MTF134[0.25],PhysU134[0.25]
1708	Assemble MDT Octants	43 w	10/12/99	8/25/00	1675SS+2 w,1686,1688,1691FS	As Soon As f		MTF134[7],PhysU134,MEF134,DesF134
1709	<i>M3-Muon Forward Tracker Octant Assembly Begun</i>	0 w	10/12/99	10/12/99	1708SS	As Soon As		
1710	Connect Gas System and Test	43 w	10/19/99	9/1/00	1709SS+1 w	As Soon As f	1.3.4.4.1-1.3.4.4.3	MTF134[0.3],PhysU134[0.5],MEF134[0.25],k\$(0.51),k\$c[0.1]
1711	Connect High Voltage System and Test	43 w	10/19/99	9/1/00	1709SS+1 w	As Soon As f		PhysU134[0.5]
1712	Install ADB Electronics and Test Octants	43 w	10/19/99	9/1/00	1709SS+1 w	As Soon As f		PhysU134,PhysF134
1713	Survey Assembled Octants	43 w	10/19/99	9/1/00	1709SS+1 w	As Soon As f		PhysF134[0.25],Align_Day[0.3]
1714	<i>A-Layer Octants Assembled</i>	0 w	1/21/00	1/21/00	1713SS+33 %	As Soon As		
1715	<i>C-Layer Octants Assembled</i>	0 w	7/3/00	7/3/00	1713SS+80 %	As Soon As		
1716	<i>B-Layer Octants Assembled</i>	0 w	9/1/00	9/1/00	1713	As Soon As		
1717	<i>All MDT Octants Assembled</i>	0 w	9/1/00	9/1/00	1713	As Soon As		
1718	INSTALLATION AND HOOKUP	63 w	9/22/99	1/3/01		As Soon As		
1719	Design and Prepare Drawings for Octant Installation Fixtures	20 w	9/22/99	2/24/00	1689	As Soon As f		MEF134[0.5],DesF134[0.75]
1720	Fabricate and Test A-Layer Installation Fixtures	6 w	2/25/00	4/6/00	1719	As Soon As f		MTF134
1721	Install Gas System	26 w	3/13/00	9/13/00	1710SS+12 w	Start No Ear		MTF134[0.5],DAB_Gas_Plumbing[0.5]
1722	Mount A-Layer North MDT Octants Onto Supports	4 w	5/4/00	6/1/00	1697SS+50 %,1712SS+16 %,17	Start No Ear		MTF134[2],PhysU134[0.25],MEF134,DesF134[0.5],Crane_Day,C
1723	Connect to HV System	4 w	5/11/00	6/8/00	1705,1706,1722SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.4],DAB_Pit
1724	Connect to Front End Electronics	4 w	5/11/00	6/8/00	1703,1722SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.4]
1725	Survey A-Layer North MDT Planes	4 w	5/11/00	6/8/00	1722SS+1 w	As Soon As f		PhysF134[0.1],Align_Day,MEF134[0.1],DAB_Pit

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1726	Mount A-Layer South MDT Octants Onto Supports	4 w	5/11/00	6/8/00	1697,1712SS+33 %,1722SS+1 w	As Soon As f		MTF134[2],PhysU134[0.25],MEF134,DesF134,Crane_Day,DAB_
1727	Connect to HV System	4 w	5/18/00	6/15/00	1705,1706,1726SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.1]
1728	Connect to Front End Electronics	4 w	5/18/00	6/15/00	1703,1726SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.1]
1729	Survey A-Layer South MDT Planes	4 w	5/18/00	6/15/00	1726SS+1 w	As Soon As f		PhysF134[0.1],Align_Day,MEF134[0.1],DAB_Pit
1730	M3-Muon Forward Tracker A-Layer Planes Installed	0 w	6/15/00	6/15/00	1725,1729	As Soon As		
1731	Mount C-Layer North MDT Octants Onto Supports	1.4 w	9/13/00	9/21/00	1712SS+50 %,1726,2149,1699,2	As Soon As f		MTF134[2],PhysU134[0.25],MEF134,DesF134,Crane_Day,DAB_
1732	Connect to HV system	1 w	9/20/00	9/26/00	1731SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.1]
1733	Connect to Front End Electronics	1 w	9/20/00	9/26/00	1731SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.1]
1734	Survey C-Layer North MDT Planes	1 w	9/20/00	9/26/00	1731SS+1 w	As Soon As f		PhysF134[0.1],Align_Day,MEF134[0.1],DAB_HiBay[0.5]
1735	Mount C-Layer South MDT Octants Onto Supports	1.4 w	9/28/00	10/6/00	1712SS+67 %,1731,2144,1699,2	As Soon As		MTF134[2],PhysU134[0.25],MEF134,DesF134,Crane_Day,DAF
1736	Connect to HV system	1 w	10/5/00	10/11/00	1735SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.1]
1737	Connect to Front End Electronics	1 w	10/5/00	10/11/00	1735SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.1]
1738	Survey C-Layer South MDT Planes	1 w	10/5/00	10/11/00	1735SS+1 w	As Soon As f		PhysF134[0.1],Align_Day,MEF134[0.1],DAB_Pit,Sidewalk_North
1739	M3-Muon Forward Tracker C-Layer Planes Installed	0 w	10/11/00	10/11/00	1738,1734	As Soon As		
1740	Mount B-Layer North MDT Octants Onto Supports	1.4 w	11/6/00	11/14/00	1712SS+83 %,1701,1856	Start No Ear		MTF134[2],PhysU134[0.25],MEF134,DesF134,Crane_Day,Sid
1741	Connect to HV system	1 w	11/13/00	11/17/00	1740SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.1]
1742	Connect to Front End Electronics	1 w	11/13/00	11/17/00	1740SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.1]
1743	Survey B-Layer North MDT Planes	1 w	11/13/00	11/17/00	1740SS+1 w	As Soon As f		PhysF134[0.1],Align_Day,MEF134[0.1],Sidewalk_South
1744	Mount B-Layer South MDT Octants Onto Supports	1.4 w	11/15/00	11/27/00	1712,1701,1740	As Soon As		MTF134[2],PhysU134[0.25],MEF134,DesF134,Crane_Day,Sid
1745	Connect to HV system	1 w	11/22/00	11/30/00	1744SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.1]
1746	Connect to Front End Electronics	1 w	11/22/00	11/30/00	1744SS+1 w	As Soon As f		PhysU134[0.25],MTF134[0.1]
1747	Survey B-Layer South MDT Planes	1 w	11/22/00	11/30/00	1744SS+1 w	As Soon As f		PhysF134[0.1],Align_Day[3],MEF134[0.1],Sidewalk_North
1748	Muon Forward Tracker B-Layer Planes Installed	0 w	11/30/00	11/30/00	1747,1743	As Soon As		
1749	All MDT Planes Installed	0 w	11/30/00	11/30/00	1730,1739,1748	As Soon As		
1750	Commission using cosmic rays	14 w	9/20/00	1/3/01	1730,1749FF+4 w	As Soon As f		PhysU134[2],PhysF134
1751	MDT Commissioning Complete	0 w	1/3/01	1/3/01	1750	As Soon As		
1752	SOFTWARE DEVELOPMENT	78 w	12/7/98	7/11/00		As Soon As		
1753	Develop On-line Software	78 w	12/7/98	7/11/00		Start No Earl		PhysU134[0.5]
1754	Create Databases	78 w	12/7/98	7/11/00	1753SS	As Soon As f		PhysU134[0.25],EEU134[0.1]
1755	Develop Slow Control System	78 w	12/7/98	7/11/00	1753SS	As Soon As f		PhysU134[0.5]