

GRINCH PMT table sorted by groups of 10.

8 tubes per HV channel plus two spares

Groups of 10 are chosen to have

the same gain for their given HV

Final As Installed 24-Jul-2017

Group #	HV (V)	Tube #	Row	Column	Values from JMU
1		777	0	0	Adjusted Values: HV [V]= 1000 1 p.e. [mV] = 13.3976 Avg. gain = 1.53126e+07
		754	0	1	
		512	0	2	
		508	0	3	
		633	0	4	
		2038	0	5	
		1956	0	6	
		598	0	7	
		1609	spare	spare	
		1453	spare	spare	
2		1108	1	0	Adjusted Values: HV [V]= 1001.12 1 p.e. [mV] = 13.3976 Avg. gain = 1.5114e+07
		1989	1	1	
		1982	1	2	
		2011	1	3	
		1005	1	4	
		736	1	5	
		742	1	6	
		624	1	7	
		1610	spare	spare	
		666	spare	spare	
3		628	1	8	Adjusted Values: HV [V]= 1022.81 1 p.e. [mV] = 13.3976 Avg. gain = 1.38573e+07
		495	2	0	
		567	2	1	
		680	2	2	
		1591	2	3	
		682	2	4	
		671	2	5	
		612	2	6	
		511	spare	spare	
		621	spare	spare	

Group #	HV (V)	Tube #	Row	Column	Values from JMU
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4		501	2	7	
		1599	3	0	Adjusted Values:
		1963	3	1	HV [V]= 1039.02
		1583	3	2	1 p.e. [mV] = 13.3976
		1564	3	3	Avg. gain = 1.63525e+07
		617	3	4	
		555	3	5	
		1132	3	6	
		1127	spare	spare	
		629	spare	spare	

5		983	3	7	
		1126	3	8	Adjusted Values:
		615	4	0	HV [V]= 1054.2
		547	4	1	1 p.e. [mV] = 13.3976
		2173	4	2	Avg. gain = 1.5057e+07
		1590	4	3	
		521	4	4	
		601	4	5	
		1110	spare	spare	
		761	spare	spare	

6		620	4	6	
		2216	4	7	Adjusted Values:
		2109	5	0	HV [V]= 1054.74
		553	5	1	1 p.e. [mV] = 13.3976
		683	5	2	Avg. gain = 1.5182e+07
		1581	5	3	
		2005	5	4	
		569	5	5	
		2034	spare	spare	
		667	spare	spare	

7		690	5	6	
		692	5	7	Adjusted Values:
		552	5	8	HV [V]= 1067.76
		2200	6	0	1 p.e. [mV] = 13.3976
		2199	6	1	Avg. gain = 1.53652e+07
		626	6	2	
		1489	6	3	
		1021	6	4	

Group #	HV (V)	Tube #	Row	Column	Values from JMU
		751	spare	spare	
		1104	spare	spare	

8		541	6	5	
		1984	6	6	Adjusted Values:
		2054	6	7	HV [V]= 1078.7
		1945	7	0	1 p.e. [mV] = 13.3976
		759	7	1	Avg. gain = 1.55958e+07
		2189	7	2	
		2163	7	3	
		2184	7	4	
		2213	spare	spare	
		733	spare	spare	

9		716	7	5	
		531	7	6	Adjusted Values:
		2023	7	7	HV [V]= 1070.31
		2207	7	8	1 p.e. [mV] = 13.3976
		1968	8	0	Avg. gain = 1.53878e+07
		551	8	1	
		602	8	2	
		2062	8	3	
		2168	spare	spare	
		535	spare	spare	

10		1111	8	4	
		640	8	5	Adjusted Values:
		685	8	6	HV [V]= 1079.62
		1595	8	7	1 p.e. [mV] = 13.3976
		1480	9	0	Avg. gain = 1.52409e+07
		579	9	1	
		1608	9	2	
		2041	9	3	
		678	spare	spare	
		1586	spare	spare	

11		677	9	4	
		523	9	5	Adjusted Values:
		2188	9	6	HV [V]= 1098.62
		1947	9	7	1 p.e. [mV] = 13.3976
		769	9	8	Avg. gain = 1.52322e+07
		669	10	0	

Group #	HV (V)	Tube #	Row	Column	Values from JMU
		1497	10	1	
		985	10	2	
		1476	spare	spare	
		2112	spare	spare	

12		558	10	3	
		590	10	4	Adjusted Values:
		591	10	5	HV [V]= 1095.34
		2197	10	6	1 p.e. [mV] = 13.3976
		689	10	7	Avg. gain = 1.50137e+07
		542	11	0	
		2175	11	1	
		2185	11	2	
		520	spare	spare	
		1931	spare	spare	

13		2039	11	3	
		564	11	4	Adjusted Values:
		1136	11	5	HV [V]= 1094.12
		600	11	6	1 p.e. [mV] = 13.3976
		2013	11	7	Avg. gain = 1.48663e+07
		1455	11	8	
		1614	12	0	
		507	12	1	
		670	spare	spare	
		780	spare	spare	

14		722	12	2	
		2138	12	3	Adjusted Values:
		584	12	4	HV [V]= 1108.54
		525	12	5	1 p.e. [mV] = 13.3976
		1948	12	6	Avg. gain = 1.51939e+07
		1565	12	7	
		1088	13	0	
		2056	13	1	
		1465	spare	spare	
		2195	spare	spare	

15		752	13	2	
		9	13	3	Adjusted Values:
		1993	13	4	HV [V]= 1113.87
		1575	13	5	1 p.e. [mV] = 13.3976

Group #	HV (V)	Tube #	Row	Column	Values from JMU
		2190	13	6	Avg. gain = 1.51118e+07
		1456	13	7	
		731	13	8	
		997	14	0	
		650	spare	spare	
		603	spare	spare	

16		494	14	1	Adjusted Values: HV [V]= 1110.44 1 p.e. [mV] = 13.3976 Avg. gain = 1.49705e+07
		1116	14	2	
		1086	14	3	
		1463	14	4	
		1469	14	5	
		1611	14	6	
		726	14	7	
		1594	15	0	
		982	spare	spare	
		2167	spare	spare	

17		2160	15	1	Adjusted Values: HV [V]= 1112.26 1 p.e. [mV] = 13.3976 Avg. gain = 1.4834e+07
		648	15	2	
		2012	15	3	
		2048	15	4	
		697	15	5	
		699	15	6	
		2196	15	7	
		2111	15	8	
		1995	spare	spare	
		599	spare	spare	

18		715	16	0	Adjusted Values: HV [V]= 1111.96 1 p.e. [mV] = 13.3976 Avg. gain = 1.56083e+07
		2128	16	1	
		599	16	2	
		1498	16	3	
		723	16	4	
		556	16	5	
		757	16	6	
		1964	16	7	
		1957	spare	spare	
		1966	spare	spare	

19		534	17	0	Adjusted Values:
		554	17	1	

Group #	HV (V)	Tube #	Row	Column	Values from JMU
		2110	17	2	HV [V]= 1117.34
		2205	17	3	1 p.e. [mV] = 13.3976
		732	17	4	Avg. gain = 1.54266e+07
		696	17	5	
		619	17	6	
		1618	17	7	
		513	spare	spare	
		1467	spare	spare	

20		2164	17	8	
		1572	18	0	Adjusted Values:
		775	18	1	HV [V]= 1134.37
		1933	18	2	1 p.e. [mV] = 13.3976
		588	18	3	Avg. gain = 1.4629e+07
		2118	18	4	
		559	18	5	
		2052	18	6	
		618	spare	spare	
		606	spare	spare	

21		1567	18	7	
		539	19	0	Adjusted Values:
		2181	19	1	HV [V]= 1139.78
		1932	19	2	1 p.e. [mV] = 13.3976
		695	19	3	Avg. gain = 1.47795e+07
		1617	19	4	
		981	19	5	
		607	19	6	
		708	spare	spare	
		2208	spare	spare	

22		1083	19	7	
		483	19	8	Adjusted Values:
		1576	20	0	HV [V]= 1126.18
		713	20	1	1 p.e. [mV] = 13.3976
		724	20	2	Avg. gain = 1.48615e+07
		2020	20	3	
		1105	20	4	
		545	20	5	
		2031	spare	spare	
		544	spare	spare	

Group #	HV (V)	Tube #	Row	Column	Values from JMU
23		727	20	6	
		566	20	7	Adjusted Values:
		1979	21	0	HV [V]= 1138.41
		1571	21	1	1 p.e. [mV] = 13.3976
		980	21	2	Avg. gain = 1.50151e+07
		605	21	3	
		977	21	4	
		776	21	5	
		1563	spare	spare	
		687	spare	spare	

24		760	21	6	
		662	21	7	Adjusted Values:
		540	21	8	HV [V]= 1142.63
		2032	22	0	1 p.e. [mV] = 13.3976
		698	22	1	Avg. gain = 1.53108e+07
		1943	22	2	
		1462	22	3	
		1115	22	4	
		655	spare	spare	
		2037	spare	spare	

25		1470	22	5	
		1950	22	6	Adjusted Values:
		1012	22	7	HV [V]= 1153.1
		1451	23	0	1 p.e. [mV] = 13.3976
		2206	23	1	Avg. gain = 1.473e+07
		2204	23	2	
		1135	23	3	
		1092	23	4	
		1094	spare	spare	
		778	spare	spare	

26		665	23	5	
		749	23	6	Adjusted Values:
		2029	23	7	HV [V]= 1160.62
		753	23	8	1 p.e. [mV] = 13.3976
		2009	24	0	Avg. gain = 1.54785e+07
		765	24	1	
		764	24	2	
		2004	24	3	
		2046	spare	spare	

Group #	HV (V)	Tube #	Row	Column	Values from JMU
		1959	spare	spare	

27	974	24	4	
	550	24	5	Adjusted Values:
	1461	24	6	HV [V]= 1157.17
	1460	24	7	1 p.e. [mV] = 13.3976
	1944	25	0	Avg. gain = 1.50226e+07
	503	25	1	
	1951	25	2	
	1114	25	3	
	1119	spare	spare	
	686	spare	spare	

28	2017	25	4	
	526	25	5	Adjusted Values:
	2130	25	6	HV [V]= 1154.77
	1985	25	7	1 p.e. [mV] = 13.3976
	1596	25	8	Avg. gain = 1.50066e+07
	738	26	0	
	571	26	1	
	490	26	2	
	563	spare	spare	
	989	spare	spare	

29	704	26	3	
	1602	26	4	Adjusted Values:
	2114	26	5	HV [V]= 1162.35
	2000	26	6	1 p.e. [mV] = 13.3976
	1122	26	7	Avg. gain = 1.5086e+07
	2125	27	0	
	2179	27	1	
	2126	27	2	
	1118	spare		
	1117	spare		

30	594	27	3	
	2040	27	4	Adjusted Values:
	637	27	5	HV [V]= 1166.91
	1574	27	6	1 p.e. [mV] = 13.3976
	502	27	7	Avg. gain = 1.51604e+07
	2008	27	8	
	524	28	0	



Group #	HV (V)	Tube #	Row	Column	Values from JMU
		1452	28	1	
		1003	spare	spare	
		573	spare	spare	

31		568	28	2	
		1604	28	3	Adjusted Values:
		970	28	4	HV [V]= 1171.8
		1588	28	5	1 p.e. [mV] = 13.3976
		587	28	6	Avg. gain = 1.55202e+07
		649	28	7	
		1487	29	0	
		538	29	1	
		1962	spare	spare	
		2219	spare	spare	

32		1990	29	2	
		2210	29	3	Adjusted Values:
		2220	29	4	HV [V]= 1179.55
		2003	29	5	1 p.e. [mV] = 13.3976
		1582	29	6	Avg. gain = 1.51807e+07
		1986	29	7	
		2134	29	8	
		1597	30	0	
		1936	spare	spare	
		1500	spare	spare	

33		2192	30	1	
		527	30	2	Adjusted Values:
		543	30	3	HV [V]= 1180.95
		975	30	4	1 p.e. [mV] = 13.3976
		576	30	5	Avg. gain = 1.42059e+07
		580	30	6	
		492	30	7	
		684	31	0	
		625	spare	spare	
		748	spare	spare	

34		623	31	1	
		1000	31	2	Adjusted Values:
		725	31	3	HV [V]= 1192.3
		536	31	4	1 p.e. [mV] = 13.3976
		1937	31	5	Avg. gain = 1.56529e+07

Group #	HV (V)	Tube #	Row	Column	Values from JMU
		2165	31	6	
		1098	31	7	
		557	31	8	
		972	spare	spare	
		1009	spare	spare	

35		2025	32	0	
		706	32	1	Adjusted Values:
		976	32	2	HV [V]= 1191.56
		1570	32	3	1 p.e. [mV] = 13.3976
		673	32	4	Avg. gain = 1.4957e+07
		702	32	5	
		1615	32	6	
		2060	32	7	
		510	spare	spare	
		486	spare	spare	

36		499	33	0	
		1942	33	1	Adjusted Values:
		1949	33	2	HV [V]= 1188.64
		489	33	3	1 p.e. [mV] = 13.3976
		493	33	4	Avg. gain = 1.53923e+07
		1971	33	5	
		2131	33	6	
		746	33	7	
		1569	spare	spare	
		2127	spare	spare	

37		2120	33	8	
		2202	34	0	Adjusted Values:
		1578	34	1	HV [V]= 1189.34
		488	34	2	1 p.e. [mV] = 13.3976
		763	34	3	Avg. gain = 1.52105e+07
		622	34	4	
		487	34	5	
		730	34	6	
		711	spare	spare	
		546	spare	spare	

38		2194	34	7	
		574	35	0	Adjusted Values:
		1120	35	1	HV [V]= 1201.4

Group #	HV (V)	Tube #	Row	Column	Values from JMU
		1997	35	2	1 p.e. [mV] = 13.3976
		549	35	3	Avg. gain = 1.50886e+07
		1107	35	4	
		500	35	5	
		1607	35	6	
		963	spare	spare	
		1969	spare	spare	

39		1991	35	7	
		2027	35	8	Adjusted Values:
		758	36	0	HV [V]= 1201.78
		779	36	1	1 p.e. [mV] = 13.3976
		675	36	2	Avg. gain = 1.5176e+07
		2019	36	3	
		720	36	4	
		984	36	5	
		734	spare	spare	
		739	spare	spare	

40		1927	36	6	
		506	36	7	Adjusted Values:
		530	37	0	HV [V]= 1201.48
		532	37	1	1 p.e. [mV] = 13.3976
		1087	37	2	Avg. gain = 1.51073e+07
		1496	37	3	
		1095	37	4	
		2139	37	5	
		1562	spare	spare	
		609	spare	spare	

41		1458	37	6	
		979	37	7	Adjusted Values:
		1131	37	8	HV [V]= 1210.89
		2201	38	0	1 p.e. [mV] = 13.3976
		707	38	1	Avg. gain = 1.46655e+07
		718	38	2	
		537	38	3	
		497	38	4	
		740	spare	spare	
		496	spare	spare	

42		756	38	5	
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Group #	HV (V)	Tube #	Row	Column	Values from JMU
		1015	38	6	Adjusted Values: HV [V]= 1213.52 1 p.e. [mV] = 13.3976 Avg. gain = 1.4716e+07
		2051	38	7	
		1004	39	0	
		1014	39	1	
		1592	39	2	
		1601	39	3	
		2043	39	4	
		2182	spare	spare	
		2187	spare	spare	

43		962	39	5	Adjusted Values: HV [V]= 1221.85 1 p.e. [mV] = 13.3976 Avg. gain = 1.51512e+07
		1974	39	6	
		1987	39	7	
		2044	39	8	
		1123	40	0	
		1980	40	1	
		743	40	2	
		632	40	3	
		646	spare	spare	
		654	spare	spare	

44		548	40	4	Adjusted Values: HV [V]= 1221.69 1 p.e. [mV] = 13.3976 Avg. gain = 1.49895e+07
		661	40	5	
		668	40	6	
		1603	40	7	
		1587	41	0	
		705	41	1	
		701	41	2	
		990	41	3	
		688	spare	spare	
		1138	spare	spare	

45		1018	41	4	Adjusted Values: HV [V]= 1240.11 1 p.e. [mV] = 13.3976 Avg. gain = 1.57021e+07
		1973	41	5	
		2214	41	6	
		504	41	7	
		2133	41	8	
		581	42	0	
		582	42	1	
		2115	42	2	
		597	spare	spare	
		2064	spare	spare	

Group #	HV (V)	Tube #	Row	Column	Values from JMU
46		2053	42	3	Adjusted Values: HV [V]= 1244.9 1 p.e. [mV] = 13.3976 Avg. gain = 1.50014e+07
		1940	42	4	
		1928	42	5	
		1089	42	6	
		978	42	7	
		1612	43	0	
		1011	43	1	
		773	43	2	
		1934	spare	spare	
		988	spare	spare	
47		767	43	3	Adjusted Values: HV [V]= 1254.78 1 p.e. [mV] = 13.3976 Avg. gain = 1.50609e+07
		651	43	4	
		1975	43	5	
		1589	43	6	
		2106	43	7	
		1573	43	8	
		2122	44	0	
		1129	44	1	
		663	spare	spare	
		1561	spare	spare	
48		750	44	2	Adjusted Values: HV [V]= 1255.58 1 p.e. [mV] = 13.3976 Avg. gain = 1.52407e+07
		627	44	3	
		1954	44	4	
		729	44	5	
		8	44	6	
		2212	44	7	
		676	45	0	
		2217	45	1	
		2049	spare	spare	
		672	spare	spare	
49		1616	45	2	Adjusted Values: HV [V]= 1260.08 1 p.e. [mV] = 13.3976 Avg. gain = 1.52371e+07
		2015	45	3	
		2035	45	4	
		2045	45	5	
		1619	45	6	
		709	45	7	
		2026	45	8	
		772	46	0	

Group #	HV (V)	Tube #	Row	Column	Values from JMU
		2211	spare	spare	
		1996	spare	spare	

50		768	46	1	
		2137	46	2	Adjusted Values: HV [V]= 1269.43 1 p.e. [mV] = 13.3976 Avg. gain = 1.48009e+07
		1479	46	3	
		1929	46	4	
		703	46	5	
		509	46	6	
		967	46	7	
		514	47	0	
		1130	spare	spare	
		1490	spare	spare	

51		717	47	1	
		1084	47	2	Adjusted Values: HV [V]= 1276.39 1 p.e. [mV] = 13.3976 Avg. gain = 1.50475e+07
		770	47	3	
		2124	47	4	
		1125	47	5	
		1486	47	6	
		1994	47	7	
		991	47	8	
		1016	spare	spare	
		1128	spare	spare	

52		2174	48	0	
		747	48	1	Adjusted Values: HV [V]= 1281.47 1 p.e. [mV] = 13.3976 Avg. gain = 1.53322e+07
		614	48	2	
		693	48	3	
		766	48	4	
		593	48	5	
		561	48	6	
		1102	48	7	
		1020	spare	spare	
		744	spare	spare	

53		1109	49	0	
		1096	49	1	Adjusted Values: HV [V]= 1284.02 1 p.e. [mV] = 13.3976 Avg. gain = 1.51805e+07
		2129	49	2	
		1568	49	3	
		2016	49	4	
		1478	49	5	

Group #	HV (V)	Tube #	Row	Column	Values from JMU
		2198	49	6	
		2107	49	7	
		1961	spare	spare	
		613	spare	spare	

54		999	49	8	
		986	50	0	Adjusted Values:
		2014	50	1	HV [V]= 1295.96
		1598	50	2	1 p.e. [mV] = 13.3976
		1566	50	3	Avg. gain = 1.69046e+07
		1960	50	4	
		762	50	5	
		741	50	6	
		583	spare	spare	
		1002	spare	spare	

55		2058	50	7	
		1580	51	0	Adjusted Values:
		2063	51	1	HV [V]= 1290.76
		653	51	2	1 p.e. [mV] = 13.3976
		2119	51	3	Avg. gain = 1.5174e+07
		616	51	4	
		735	51	5	
		2065	51	6	
		578	spare	spare	
		480	spare	spare	

56		1967	51	7	
		1488	51	8	Adjusted Values:
		1499	52	0	HV [V]= 1301.76
		2144	52	1	1 p.e. [mV] = 13.3976
		2215	52	2	Avg. gain = 1.51856e+07
		1953	52	3	
		1464	52	4	
		608	52	5	
		1999	spare	spare	
		533	spare	spare	

57		719	52	6	
		2123	52	7	Adjusted Values:
		2028	53	0	HV [V]= 1317.95
		987	53	1	1 p.e. [mV] = 13.3976

Group #	HV (V)	Tube #	Row	Column	Values from JMU
		1577	53	2	Avg. gain = 1.54458e+07
		1978	53	3	
		2132	53	4	
		528	53	5	
		1113	spare	spare	
		1483	spare	spare	

58		2166	53	6	Adjusted Values: HV [V]= 1334.53 1 p.e. [mV] = 13.3976 Avg. gain = 3.60827e+07
		482	53	7	
		2162	53	8	
		2180	54	0	
		1112	54	1	
		2057	54	2	
		1958	54	3	
		755	54	4	
		2135	spare	spare	
		1606	spare	spare	

59		2177	54	5	Adjusted Values: HV [V]= 1340.05 1 p.e. [mV] = 13.3976 Avg. gain = 1.51062e+07
		1935	54	6	
		1972	54	7	
		1121	55	0	
		2050	55	1	
		694	55	2	
		771	55	3	
		1106	55	4	
		1001	spare	spare	
		712	spare	spare	

**NEW GROUP FROM HERE!!**

60		1914	55	5	Adjusted Values: HV [V]= 1000 1 p.e. [mV] = 5.13737 Avg. gain = 1.04624e+07
		2306	55	6	
		243	55	7	
		1866	55	8	
		1857	56	0	
		2312	56	1	
		1849	56	2	
		2252	56	3	
		1885	spare	spare	
		2316	spare	spare	

61		1890	56	4	Adjusted Values:
		1869	56	5	



Group #	HV (V)	Tube #	Row	Column	Values from JMU
		2290	56	6	HV [V]= 992.109
		1924	56	7	1 p.e. [mV] = 5.13737
		1868	57	0	Avg. gain = 6.28964e+06
		1889	57	1	
		1874	57	2	
		1372	57	3	
		1374	spare	spare	
		1375	spare	spare	

62		2147	57	4	
		1876	57	5	Adjusted Values:
		1848	57	6	HV [V]= 1075.51
		1851	57	7	1 p.e. [mV] = 5.13737
		1854	57	8	Avg. gain = 6.03828e+06
		2310	58	0	
		249	58	1	
		1913	58	2	
		1371	spare	spare	
		1859	spare	spare	

63		2308	58	3	
		1883	58	4	Adjusted Values:
		1373	58	5	HV [V]= 1110.25
		250	58	6	1 p.e. [mV] = 5.13737
		2314	58	7	Avg. gain = 5.94756e+06
		1867	59	0	
		1877	59	1	
		2287	59	2	
		2313	spare	spare	
		2317	spare	spare	

64		1921	59	3	
		2286	59	4	Adjusted Values:
		1861	59	5	HV [V]= 1048.18
		245	59	6	1 p.e. [mV] = 5.13737
		1099	59	7	Avg. gain = 6.4385e+06
		1875	59	8	
		1361		MISSING	
		2319			
		1915	spare	spare	
		1880	spare	spare	