Performance Assessment Tests of Multi-anode Photomultiplier Tube at Jefferson Lab

by

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Abstract

Performance Assessment Tests of Multi-anode Photomultiplier Tubes at Jefferson Lab, by *Jessica N.A. Campbell*, submitted on May 30, 2013:

In nuclear physics, photomultiplier tubes (PMTs) are used to detect scintillation light resulting from high-energy reaction products for collision events passing through detector materials. The Thomas Jefferson National Accelerator Facility (JLab) in Newport News, VA received six hundred and two (602), 16-channel, Multi-Anode PMTs from Fermilab's decommissioned CDF experiment. These PMTs are being incorporated into the design and construction of a new Coordinate Detector to be located in Hall A. Of the PMTs received, one hundred and eighty six (186) were HAMAMATSU H8711 tubes, and four hundred and sixteen (416) were HAMAMATSU R5900-00-M16 tubes. To identify the best-performing PMTs, each tube was tested using a LED light source to analyze the signal response (ADC spectrum) of each of its sixteen pixels. The ADC spectrum in the absence of light, known as noise or dark current, was also characterized for every pixel in each of the PMTs. A statistical analysis algorithm was then used to fit single and double Gaussian distributions to each ADC spectrum, with the double Gaussians needed to account for cases in which the LED spectra exhibited both signal and noise responses superimposed (due to some inherent inefficiency). These fits determined the mean and standard deviation for all of the dark current (noise) and signal (LED) measurements. With this information, the actual

signal response of each pixel, the average gain of each tube, and the relative responses for the 16 pixels associated with all 602 PMTs were evaluated. These results were then used to classify the overall performance of the tubes. A total of 347 PMTs were found to have uniform performance with no bad pixels, and the majority of these were found to be operating with average to high gains. Furthermore, another 107 PMTs were assessed as having non-uniform performance with at most a single bad pixel that exhibited a similar range of operational performance as the uniform tubes. These two groups of PMTs represent over 75% of the available PMTs. An additional 120 PMTs were found to have non-uniform performance with at most two to three bad pixels and exhibited average to below average operating performances. The remaining 28 PMTs had five to sixteen defective pixels, were non-uniform, and performed poorly.

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Chapter 1

Introduction

In experimental nuclear and particle physics, particle (or radiation) detectors are used to detect and/or track high-energy subatomic particles that are emitted from induced reactions. The Thomas Jefferson National Accelerator Facility (JLab) in Virginia, USA, utilizes a high energy electron beam up to 12 GeV to probe the internal structure of protons.

1.1 JLab: Hall A's Super BigBite Spectrometer and Coordinate Detector

A research project has been proposed to develop a detector required for an approved experiment (E12-07-109) at JLab's experimental Hall A: "Large Acceptance Proton Form Factor Ratio Measurements at 13 to 15 (GeV/c^2)". This experiment will use the Super BigBite Spectrometer (SBS) detector facility [1]. A portion of this large project involves the design, development, construction, and testing of a new component for a Coordinate Detector (CDet) that will perform vertical-position electron detection to supplement the detection of scattered protons by the SBS. In this experiment, the angular correlation between an elastic proton and the associated scattered electron allows for the correct proton track to be identified, even in the presence of high background rates. The CDet allows for the measurement of the electron's vertical

scattering angle with high precision in order to provide a co-planarity test with the scattered protons detected in coincidence. The new component will enhance the CDet's capability to operate at high luminosities because of its fast response time, while also improving the precision of the reconstructed electron scattering angles.

The initial design of the CDet involves the use of two gas electron multipliers (GEM). The GEMs are gaseous ionization detectors that will be located directly in front of an electromagnetic calorimeter. However, an improvement to this design has been proposed by the SBS Collaboration which involves adding an additional plane of scintillating bars in front of the GEMs as a third plane of the CDet. The scintillating bars will be 5 mm wide, and 3 cm thick, with wavelength shifting fibers inserted through the center of each to collect and direct each bar's light output to the pixels of a 16-channel multi-anode PMT. This 3rd plane will cover the full active detection area of the 104 cm x 416 cm CDet frame, and will enhance performance via improvements in resolution and response time that scintillation bars afford.

The international SBS Collaboration team responsible for the CDet includes scientists from JLab, Idaho State University, and the College of William & Mary with the design, construction, and testing of the 3rd CDet plane being planned as Saint Mary's University's contribution. This project is scheduled to be completed by 2015 when the CDet detector will be installed in Hall A at JLab.

The first step in delivering on this project requires that 602 (16-pixel) used photomultipier tubes be assessed as to their operational performance and usability as components in the construction of the CDet detector. This report outlines the experimental setup, data collection process, and subsequent analysis used to achieve this

goal.

1.1.1 General Thesis Goals

The general goal of this thesis is to experimentally measure and determine the performance of 602 previously used PMTs. The results of this experiment will be part of Saint Mary's University's contribution to the design and construction of the CDet for JLab in Virginia, USA.

Designing an appropriate experimental setup and methodology for testing and analyzing the pixel responses of each PMT will be required to determine individual characteristics and suitability for use in the construction of the CDet detector.

1.2 Photomultiplier Tubes: General Information

A photomultiplier tube (PMT) is a sensitive detector of photons that will be used in the CDet's planned 3rd detection plane to collect and measure the output of scintillating light guided via wavelength shifting fibers to the PMT. To understand how this will be achieved, some understanding of the performance characteristics of PMTs, and how they work, are required to appreciate the role they play in the CDet design.

1.2.1 How Photomultiplier Tubes Work

A PMT is a vacuum tube that detects sources of light using the photoelectric effect and amplification to convert light into an electric current. PMTs admit photons through an input window, and output a signal that is proportional to the number

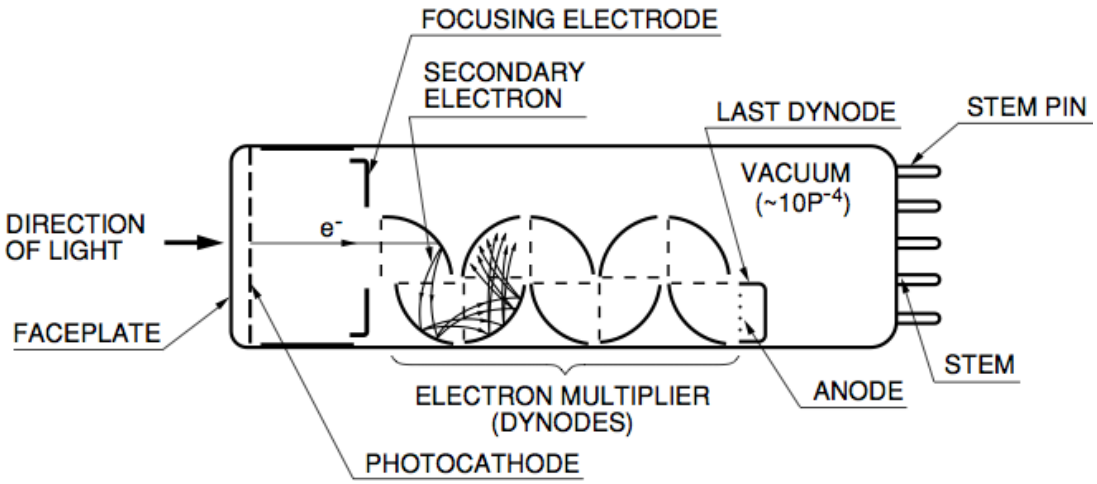

Figure 1.1: Photomultiplier Tube Operation (Drawing adopted from [2]).

of incident photons that collide with the photocathode. These photons transfer energy to the photocathode and release electrons through the photoelectric effect. The photoelectrons are focused by a focusing electrode which then directs the electrons to a series of dynodes. These dynodes provide the signal amplification known as the multiplication stage. The initial photoelectrons are accelerated to the first dynode due to the positive potential difference that exists between all of the dynodes [2]. At each dynode, the incident electrons are multiplied due to secondary emissions that occur due to the release of electrons from the dynode material. This process continues successively as the electrons accelerate from one dynode to the next as depicted in Figure 1.1. All electrons produced in the multiplication stage are collected by the anode, which produces an electric current that can be measured and analysed.

The first part of this amplification process involves the focussing of photoelectrons and the movement of electrons through the PMT and is key to its overall performance.

1.2.2 Electron Optical Input System and Electron Trajectory

In order for the collection of the electrons to occur efficiently in the PMT, the optical input system and the electron trajectory in the vacuum of the tube are essential to its performance. The electrons released from the photocathode must be focused and collected onto the first dynode of the PMT. This focusing process is done by the electron optical input system using an electric field to force electrons to follow a specific path from the photocathode to the first dynode. These tubes are designed so that their supply voltage and focusing electrodes are tuned to provide the PMT with electron trajectories that optimize the amplification process. This means that all of the electrodes including the photocathode, the anode, and the dynodes of a PMT are designed to achieve the collection and amplification of the initial photoelectrons resulting from the incident photons on the tube [3]. If the trajectory of the electrons to the first dynode are effected by external factors, such as electric or magnetic fields, the collection efficiency will be compromised, along with the performance of the tube. Therefore, the overall performance of a PMT is largely determined by the electron trajectory and collection efficiency of the tube's first dynode that starts the initial amplification process within the PMT.

1.2.3 Electron Multiplication

The electron multiplier section of a PMT amplifies a weak primary photocurrent by using multiple dynodes to produce a measurable current at the anode of the PMT [4]. The dynodes are commonly made from nickel, stainless steel, or copper-

beryllium alloy that allow secondary emissions to occur via the photoelectric effect. The source of these secondary emissions are from the materials that are used to coat the dynodes. Alkali anti-monide, beryllium oxide, and magnesium oxide are some of these coatings. The secondary electrons must then travel to subsequent dynodes where they can stimulate additional secondary emissions of their own. However, the overall amplification of these electrons depends on the materials used to construct the dynodes, the total number of dynodes used in the tube, along with their geometric arrangement, and the potential difference used between the dynodes [3].

1.2.4 High Voltage Power Supply and Voltage Divider Circuit

Photomultiplier tubes require stable high voltage power supplies in order to operate properly. It is important that the tube's amplification remain constant in order to guarantee consistency of response, but high currents in the tube can result in loss of amplification. The PMTs can operate on either negative or positive high voltage power, as long as the potential difference between the dynodes is negative relative to the photocathode [4]. In order to properly regulate the voltage applied to the dynodes, the photomultiplier tube uses a voltage divider circuit to prevent the occurrence of large potential variations between the dynodes that can occur due to changing currents in the tube.

1.3 Photomultiplier Tubes: Characteristics

An individual PMT's operational performance varies based on a number of specific characteristics associated with the tube. The performance of the tube is influenced by the material used in its construction and by environmental influences. This includes the materials used for the photocathode and the input window. The tube's spectral response, the structure of its dynodes, its timing characteristics, its dark current/noise, and its signal-to-noise ratio/gain are all factors that need to be considered when selecting a PMT.

1.3.1 Photocathode and Photocathode Material

The photocathode structure of a PMT is covered in a photosensitive material that reacts to incoming photons by way of the photoelectric effect and can be damaged if exposed to excessive amounts of light. The efficiency with which the photocathode converts light into electrons determines whether or not the PMT is useful for a specific application [5]. Some photocathode materials include: Cs-Te, Cs-I, Ag-O-Cs, Bialkali, and Multialkali. The PMTs used in this project use a Bialkali material consisting of Sb - Rb - Cs and Sb - K - Cs, which is commonly used with scintillating materials to detect ionizing radiation.

1.3.2 Input Window Material

Incoming photons detected by the PMT pass through the input window of the tube. These windows are commonly constructed from borosilicate glass, ultraviolet glass,

and magnesium fluoride. The HAMAMATSU[1] PMTs supplied for this project use a borosilicate glass for their windows. This glass does not allow the transmittance of wavelengths shorter than 300 nm. It is extremely important to keep these windows clean in order to avoid a loss of optical transmittance because of the subsequent loss in the PMT's detection performance [6].

1.3.3 Spectral Response

The spectral response of a PMT relates to how the photocathode responds to incident photons based upon their wavelength. The wavelength determines how well the photocathode converts its energy into electrons via the photoelectric effect. The PMTs used for this project have a spectral response in the range of 300 - 650 nm with a peak wavelength of 420 nm. The spectral range is determined by the photocathode's material on the long-wavelength side, and by the window material on the short-wavelength [7]. Typically, the spectral response of a PMT is described by its radiant sensitivity and quantum efficiency. The radiant sensitivity is the photocathode's photoelectric current divided by the incident radiant power at a specific wavelength; whereas, its quantum efficiency is the ratio of the number of photoelectrons released to the number of incident photons on the cathode [4].

[1]Hamamatsu Photonics K.K. is a world leader in the manufacture of photomultiplier tubes located in Hamamatsu City, Japan. For the interested reader, a complete list of technical data on their products are available on the company's website: http://www.hamamatsu.com.

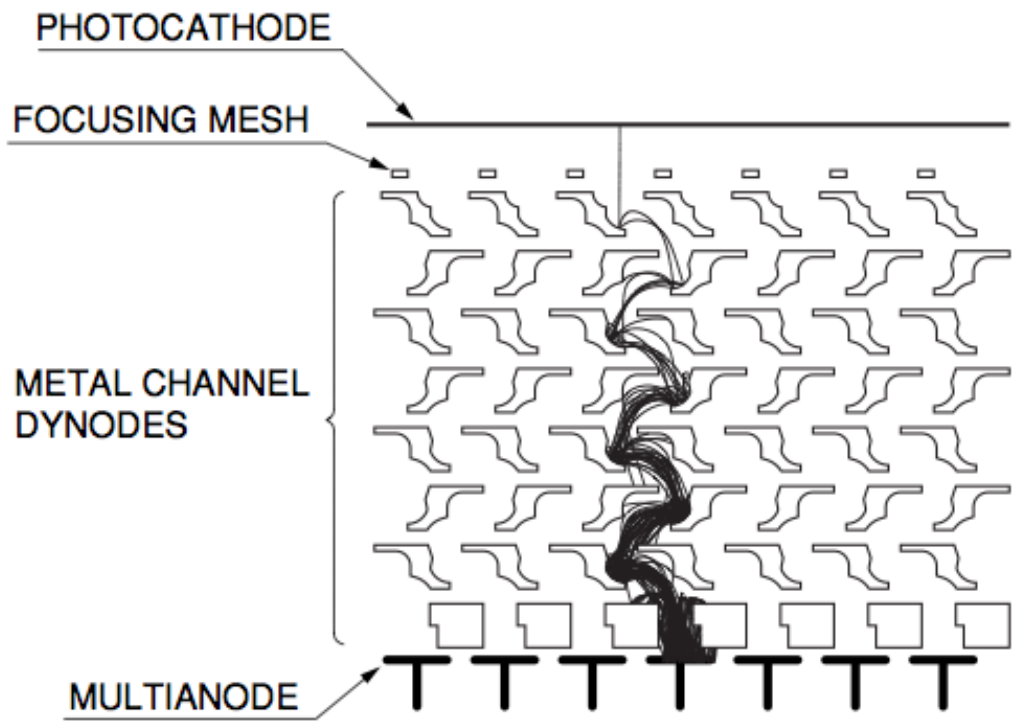

Figure 1.2: Metal Channel Dynode Structure (Drawing adopted from [2]).

1.3.4 Dynode Structure

The structure of a PMT's dynode affects it's gain, time response, and its collection efficiency. The HAMAMATSU PMTs supplied for this project have a metal-channel dynode structure that are extremely compact and work at high speeds. In particular, they use twelve consecutive dynodes in the multiplication process as seen in Figure 1.2.

The thin structure of the dynodes allows them to be within a close proximity of one another. This small distance between adjacent dynodes allows the multiplication process to occur rapidly, which can also be made more efficient with an increase in the supply voltage. The metal-channel structure reduces the probability of crosstalk during the secondary emission stages of electron multiplication [2]. Crosstalk occurs when detected photons on the photocathode are amplified broadly through the

structure of the dynodes and are received by multiple anodes not spatially aligned with their incidence. This broad flow of electrons is inhibited by the close stature of these dynodes. Multi-anode PMTs containing the metal-channel dynode structure are classified into two distinct groups: 1) the matrix multi-anode PMT and 2) the linear multi-anode PMT. For this project, the matrix multi-anode PMTs are used that have a 4 x 4 matrix face representing sixteen different anodes (or pixels) that operate extremely well in the presence of magnetic fields due to the electrode spacing and the metal packaging used in their construction.

1.3.5 Time Characteristics

PMTs are typically designed for fast response times in order to measure high-speed signals. The time response of a PMT is dependent on the dynode type, as well as the supply voltage used, and is a measure of how fast a detection can be made. That is, how fast a signal generated by a photon incident on the photocathode is received at the anode relative to the initial photon's arrival time.

A specific factor associated with the timing response of a PMT is a measure of variations in the transit time of the photoelectrons. The spread in transit time results from the difference in path lengths traveled by the electrons emitted from different locations along the photocathode [2]. As a result, electrons incident upon the middle or ends of the photocathode will travel different distances before reaching the first dynode. In order to reduce the spread in the transit time, the number and speed of photoelectrons must be increased. This can be achieved by increasing the electric field or the high voltage power supply to the tube.

1.3.6 Dark Current and Noise

PMTs are sensitive detectors of light; however, in the absence of light a current is still present in the tube. This current is known as dark current, and when operating a PMT it should be kept to a minimum. It has many sources and it is a form of noise. This current is caused by cosmic rays, ionization current from residual gas, leakage current between the anode and electrodes of the tube, photocurrent produced by scintillation, and thermionic emissions from the photocathode [2]. The most common reason for an increase in dark current is related to thermionic emissions because the materials used in the photocathode and the dynodes have very low work functions that emit thermionic electrons even at room temperature [7].

Another source of noise within a PMT is related to statistical noise, and is known as shot noise. This noise arises when a tube is exposed to a constant intense source of light, and the number of incident and secondary photoelectrons fluctuate in time, resulting in fluctuations of current at the anode.

Another thing to consider when operating a PMT is that dark current increases with increases in the high voltage supply. However, it does not increase at a constant rate and cannot be reliably predicted, so PMTs should be stored in a dark light-tight place prior to use to ensure that the dark current is minimized. Typically, the dark current should not exceed a few nano-Amperes.

1.3.7 Signal-to-Noise Ratio

Typically “signals” are measures that provide information about an event of interest; whereas, “noise” is either random fluctuations, or is an unwanted signal that corrupts

the signal being measured. Thus, the output signal of a PMT is associated with two types of noise: dark current and unwanted light signals that contaminate the signal of interest. The ratio of the output signal to the noise is called the signal-to-noise ratio. This ratio tells us how much noise is present in our measurements. In order to obtain the best performance, one should use a PMT with high quantum efficiency or produce a setup where light is directed to the PMT with minimal loss to achieve a high gain [6].

1.3.8 Gain

The gain of a PMT is its ability to amplify a signal between the input and output stages. It is the ratio of the anode output current to the photoelectric current from the photocathode [7]. The gain of a PMT is directly dependent upon the high voltage power supply used and the number of dynodes used in the multiplication stage of the tube. Ideally, the amplification process provides a constant gain to all of the fixed energy electrons that enter the dynode system. However, this is not usually the case because electrons of the same energy can produce different numbers of secondary emissions that result in gain fluctuations. On average, each electron will produce three-to-four additional electrons at each dynode [8]. The gain of a PMT can usually be increased somewhat with increased supply voltage. The fact is that the higher the PMT's gain, the better able it is to differentiate between the signal and noise present in the measurements. For this reason, high gain PMTs are preferred over low gain tubes. But the gain is not the only factor that must be considered when looking at a tube's overall performance.

1.3.9 Environmental Effects

The environment in which experiments are performed using PMTs may affect the outcomes due to a number of factors. Temperature, magnetic fields, radiation, exposure to helium, etc., can all have adverse effects on PMT performance. These devices are sensitive and perform best in temperature-controlled environments. Temperature fluctuations affect the dark current and gain of the PMT. Increased temperature increases the amount of dark current due to thermionic emissions that degrades the signal-to-noise ratio, thus making it more difficult to measure the signals of interest. However, as the temperature decreases the signal-to-noise ratio improves as the dark current is reduced. It is therefore recommended that a PMT be stored at, or below, ambient temperature [2]. For this project, the PMTs were tested at ambient temperature and stored between 0°C to 50°C.

The PMT's efficiency can be further affected if the path of the electrons are deflected by the presence of stray magnetic fields. The electron collection system is the most sensitive part of PMT with respect to magnetic fields. For example, a PMT with a long path from the photocathode to the first dynode is very sensitive because the electrons may be deflected so that they never reach the first dynode [7]. Furthermore, the presence of a magnetic field may also alter the PMT's gain. For best results, it is critical to try and avoid the influences associated with these fields. This may necessitate wrapping a μ-metal screen around the PMT to shield it, but a gap is needed between the tube and the shield. In addition, the shield should extend at least one shield diameter beyond the photocathode [8]. For strong magnetic fields, a soft iron shield around the μ-metal screen may also be necessary.

When a PMT is in the presence of external electric fields, glass scintillation may occur. This is the result of deflected electrons that are released and hit the glass walls of the PMT. Also, an increase to the electric potential with respect to the cathode can increase the dark current, as can the metal shield that covers the PMT. However, these affects may be decreased if sufficient distance between the conductive shield and the tube are maintained. In addition, PMTs should not be used in high helium environments since the gas can permeate the tube and increase the noise as well.

Finally, a PMT's function will also be affected if it is exposed to high levels of radiation because many of the materials will begin to deteriorate including the metals, insulators, and glass used in their construction. Other factors need also be considered when selecting a PMT; some of these are discussed next.

1.3.10 Photomultiplier Tube Selection Factors

Photomultiplier tubes are used in applications that span many areas of science including medical diagnosis, biotechnology, and high-energy physics. There are many different types of photomultiplier tubes designed to serve specific tasks. Choosing the right PMT depends on many factors that might include consideration of the incident light wavelength, the light intensity being detected, and the size and area illuminated by incident light [2]. The spectral response may be used as an initial starting point for choosing the proper PMT; however, the radiant sensitivity should ultimately determine which tube is best for the application being considered [5].

1.3.11 Properties This Thesis Will Focus On

The work carried out to complete this thesis required that the output of 602 used PMTs be analyzed in order to assess their individual performances. To that effect, the performance indicators focused on the dark current, gain, and signal-to-noise ratio of the tubes, as well as controlling environmental factors within our control. The tests were performed at room temperature away from known stray fields, and the experimental setup mitigated stray signal sources by enclosing the test rig in a light-tight box.

1.4 Specific Thesis Goals

This thesis project requires that the functionality of each PMT be characterized in terms of its relative gain and the noise levels associated with its individual pixels. These measurements establish the overall performance of each PMT and were used to determine the suitability of these tubes for use in the construction of the SBS CDet's 3rd detection frame.

Chapter 2

Experimental Set-up and Procedure

The testing of each PMT requires a standardized methodology in order to collect data suitable for assessing the performance of each tube. The data acquisition system was designed to collect both the pedestal ("noise") and signal data for each PMT being evaluated. These measurements consisted of measuring the output-current response spectrum (digitalized, to give an Analog-to-Digital-ADC-spectrum) for each tube that were recorded by the data acquisition system during two separate tests. The actual procedures for the two tests only differed in that the light source was turned off for one test (and the test was performed for a shorter duration) to acquire the pedestal data. The equipment setup and the test procedures are described in Sections 2.1 and 2.2.

2.1 Equipment Setup

A block diagram illustrating the experimental setup for testing the PMTs is provided in Figure 2.1. This diagram shows the arrangement and interconnections between the individual pieces of equipment used. The following provides an explanation of how each of the individual components in this figure were utilized to support the data acquisition process.

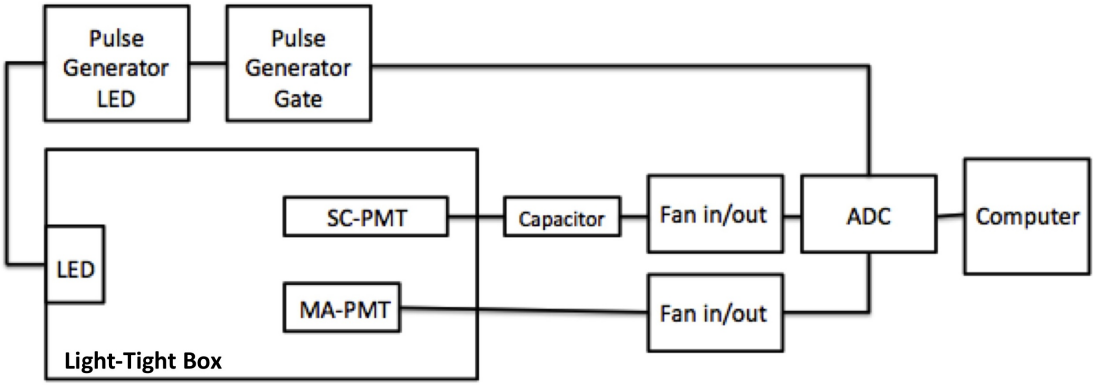

Figure 2.1: Experimental Setup

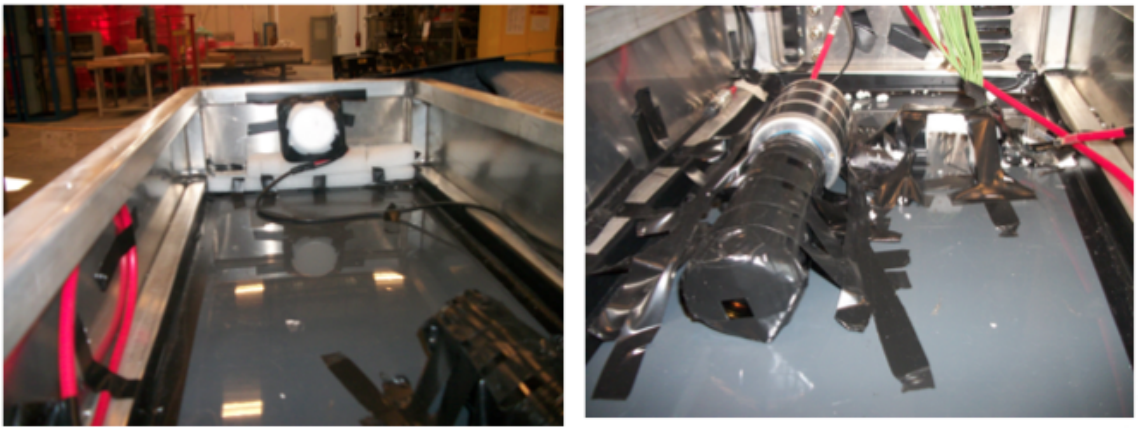

Figure 2.2: Experimental Setup Images

- The contents of the light-tight box (shown in Figure 2.1) are clearly visible in the two images presented in Figure 2.2. It contains the LED light source and two separate PMTs: 1) a single channel PMT (SC-PMT), and 2) a multi-anode PMT (MA-PMT). The SC-PMT was used for normalization purposes in order to provide a constant reference for the output of the second MA-PMT being tested.

- The LED light source was positioned at one end of the light-tight box and a semi-transparent white plastic plate was used to cover it. This was done to

reduce the LED's intensity when it flashed in order to not saturate the response of the tubes. The SC-PMT and MA-PMT were positioned opposite the LED so that their placement allowed them to easily collect the pulses of light being emitted by the LED.

- The LED light source was connected directly to the pulse generator shown in Figure 2.1. This pulse generator controlled the width, frequency, and amplitude of the pulses sent to the LED. For the duration of the testing, the amplitude of this pulsed signal was maintained at its maximum setting on the generator.

- There were two different types of HAMAMATSU MA-PMTs tested under this project. The H8711 and R5900-00-M16 models tested here are referred throughout this document as Type I and Type II PMTs, respectively.

- The LED pulse durations for the Type I and II tubes were respectively set to 30 ns and 60 ns. A longer pulse duration was required for the Type II tubes because their light collection efficiency was less than the other tubes because of their lower gain [1].

- A styrofoam support structure was used in the light-tight box to maintain the exact position and orientation of each MA-PMT being tested. An additional barrier was provided at the front of the styrofoam structure to ensure that each PMT was the same distance from the LED source when it was being tested.

[1] This became apparent at the initial testing of the Type II tubes; the change in the LED pulse length should not affect the comparison of Type I to Type II tubes because of the use of the SC-PMT to normalize all responses, as described later.

P1	P2	P3	P4	P5	P6	P7	P8
GND	GND	GND	GND	GND	GND	GND	GND

P9	P10	P11	P12	P13	P14	P15	P16
GND	GND	GND	GND	GND	GND	GND	GND

Figure 2.3: Type I MA-PMTs pinout connections (H8711)

- Next to the MA-PMT, a SC-PMT was fixed in place and used as a normalization tube. The face of this tube was quite large (2 inches in diameter) so a 1 cm x 1 cm square aperture was used to cover the face of the tube in order to limit the amount of incident light stricking the tube's face. This aperture reduced the SC-PMT output signal to a level roughly matching those signals being measured by the MA-PMTs under test.

- The MA-PMTs and SC-PMT were connected to separate high voltage power supplies using different connectors fitted to the light-tight box due to differences in the pinouts of their local connectors. Appropriate precautions were taken to ensure that these high voltage connections were safely engineered in order to avoid electrical shock.

- The pinout connections for Type I and Type II tubes are shown in Figures 2.3 and 2.4, respectively. The individual arrangements shown in these figures indicate the locations of each of the sixteen pixels and its associated ground that can be accessed to acquire these signals.

		GND	GND	GND	GND	GND	GND	GND
		P1	P2	P3	P4	P5	P6	P7
P8	P9	P10	P11	P12	P13	P14	P15	P16
GND	GND	GND	GND	GND	GND	GND	GND	GND

Figure 2.4: Type II MA-PMTs pinout connections (R5900-00-M16)

- In Figure 2.1, the output signal of the SC-PMT is coupled to a Fan in/out module via a 440 pF capacitor that was used as a high-pass filter to block out unwanted signals. In addition, the MA-PMT was also coupled directly to its own Fan in/out module. These modules were used to replicate the signals so that they can be passed to the analoge-to-digital converter (ADC) to measure the strength of the signal in a digital format on the computer. Both of these modules were setup identically to ensure that the measurements accurately captured the output of each tube during testing. The Fan in/out module was a LeCroy 428F Quad Linear Fan-In/Fan-Out NIM module; the ADC was a LeCroy 2249A 12 Channel Charge CAMAC module.

- In order to accurately capture the output signals of both tubes, the data acquisition process used the second pulse generator shown in Figure 2.1 to initiate the ADC readout process. It did this by sending a gate pulse to the ADC to initiate the acquisition process after it had received its command pulse from the LED pulse generator. In this way, the initiation of the LED light source and the acquisition process could be synchronized. The frequency of the gate pulse

used was 500 Hz and it had an acquisition width of 200 ns during which time the ADCs would integrate the signal response (i.e., integrate the total charge arriving at the PMTs anode during the 200 ns the ADC gate was "open" - which was synchronized with the time the LED was "on" for the signal tests).

- It should be understood that each of the sixteen channels of the MA-PMT and the single channel of the SC-PMT all passed through their own Fan in/out modules, as well as, individual ADC channels of the data acquisition system. Some care was taken to ensure that the cabling lengths between the MA-PMT in the light-tight box to the Fan in/out modules were all the same length so as not to introduce unwanted delays. Furthermore, the same care was taken with the cabling between the output of the Fan in/out modules to the bank of ADCs. This precaution ensures that all of the signals arrive at the ADC at the same time. This ensures that they are all captured during the time interval that the ADCs are gated by the second pulse generator.

- Finally, the computer shown in Figure 2.1 was used to start and stop the data acquisition process. This process measured seventeen ADC channels that were passed to the computer for storage on disk. The data for each individual pixel of the MA-PMT and the single pixel of the SC-PMT were stored in a single text file that contained all seventeen channels of data acquired during the 1204 individual runs initiated during this phase of the project (1 pedestal/LED-off run, and 1 signal/LED-on run for each of the 602 MA-PMTs evaluated).

2.2 Experimental Procedures

To ensure proper and consistent testing of all 602 PMTs a standardized procedure was developed and followed. Once the equipment was assembled as shown in Figure 2.1, it was important to ensured that a proper installation of the MA-PMT in the light-tight box was done prior to running the data acquisition system to acquire test data. In order to do this required that the test procedure consisting of the four steps listed below were followed when installing and testing each individual MA-PMT.

1. **MA-PMT placement in the light-tight box**:

    - Remove the MA-PMT from the storage box and unwrap it carefully.
    - Label the PMT with a unique number and record its serial number (see Appendix A).
    - Ensure all high voltage (HV) power supplies are turned off.
    - Connect the HV cable from the MA-PMT to the safe HV thumb connector.
    - Refer to Figure 2.3 to properly orient and connect the MA-PMT's two output connectors to the tube and to their associated Fan in/out modules.
    - Place the MA-PMT in the foam structure to secure it and check that its position and orientation in the box are correct.
    - Cover the light-tight box with the PVC plastic cover and place the metal support bars over the appropriate screw holes above the plastic.
    - Take care to avoid stripping the assembly screws by loosely screwing them into place where indicated, and once they are all in place, screw them down tightly without stripping them.

- Cover the light-tight box with a thick black blanket and tuck the edges underneath the box while taking care to ensure that it does not tilt to avoid disrupting the PMT placement.
- Place another large black blanket on top of the wrapped box allowing its edges to hang over the table but be sure to flatten the blanket to shield the equipment from all sources of external light.
- Ensure that the LED light source is turned off by disconnecting it from the pulse generator.
- Connect the SC-PMT to the pico-ammeter and set it to auto range so that light leakage can be monitored.
- Slowly increase the HV power supply for the SC-PMT to $-1800\ V$ in order to prevent damage to the tube.
- A reading on the pico-ammeter of $1\ \mu A$ or more indicated light leakage, requiring that all previous steps be repeated; otherwise, proceed.
- Record the pico-ammeter reading.
- Connect the SC-PMT to the capacitor.
- Finally, increase the HV power supply to the MA-PMT so that it corresponded to $5.40\ V$ on the digital multi-meter, which actually corresponded to $-810\ V$ applied to the MA-PMT tube.

2. **Acquisition of MA-PMT Pedestal Data**

- Ensure that the LED is turned off by unplugging its connection to the pulse generator.

- On the data acquisition and control computer run the program called '`pmttest`'.
- The program then prompted the user to provide a file name for the test data that will be stored to the computer's internal disk. The convention that was followed was to call this file `pmtped###`, where the three `#`'s corresponds to the tube's number assigned in the previous step. For example, the pedestal data measured for tube number `543` would be stored in disk file `pmtped543`.
- Lastly, the program prompts for the duration of the current test. For pedestal data, a duration of 30 seconds was chosen.

3. **Acquisition of MA-PMT Signal Data**

- First, ensure that the LED cable is connected to the pulse generator at the POS OUT terminal labeled 'LED.'
- Ensure that the amplitude of the LED pulse on the pulse generator is set to its maximum voltage (i.e., 5 V).
- Ensure that the LED pulse durations are set to 30 ns and 60 ns (using an oscilloscope) for the Type I and II PMTs, respectively.
- Disconnect the SC-PMT from the capacitor and connect it to the pico-ammeter set for auto ranging in order to check for light leakage. If leakage is evident, go back to Step 1 above. If not, record the pico-ammeter reading and reconnect the SC-PMT to the capacitor in order to continue with the test.

- Run the test using the same process used to acquire the pedestal data on the MA-PMT. However, when prompted for a file name we enter `pmt###`, where again the three `#`'s corresponds to the tube's number.
- Finally, a duration of 180 seconds was used to collect signal data on the tube being tested.

4. **Removing the MA-PMT from the light tight box**

   - Turn off the HV power supplies for both the SC-PMT and the MA-PMT before disconnecting the MA-PMT from its HV power supply.
   - Then take care removing the blankets from the box before carefully removing the screws, aluminum bars, and the PVC plastic cover.
   - Carefully disconnect the pin connector at the back of the MA-PMT by pulling on the plastic connecter without disturbing the connector's wires.
   - Lastly, carefully remove the MA-PMT from its mounting structure in the box and place it back in its original light-tight storage container. Then select the next MA-PMT tube to be tested by repeating the process above.

2.3 Data Acquisition System

The data acquisition system run on the computer shown in Figure 2.1 utilized a program called '`pmttest`.' This program controlled the acquisition process by acquiring the data directly from the ADC modules and writing that data to the file specified by the user. These data files are formatted with seventeen columns of data corresponding to each of the MA-PMT pixels and a single channel for the SC-PMT data. An

example of data collected for `PMT001` is provided in Figure 2.5. The top plot shows the pedestal data collected for the first pixel of the MA-PMT and SC-PMT calibration/normalization, while the bottom plot shows the same results when a signal was present (i.e., when the LED was actively being pulsed by the generator).

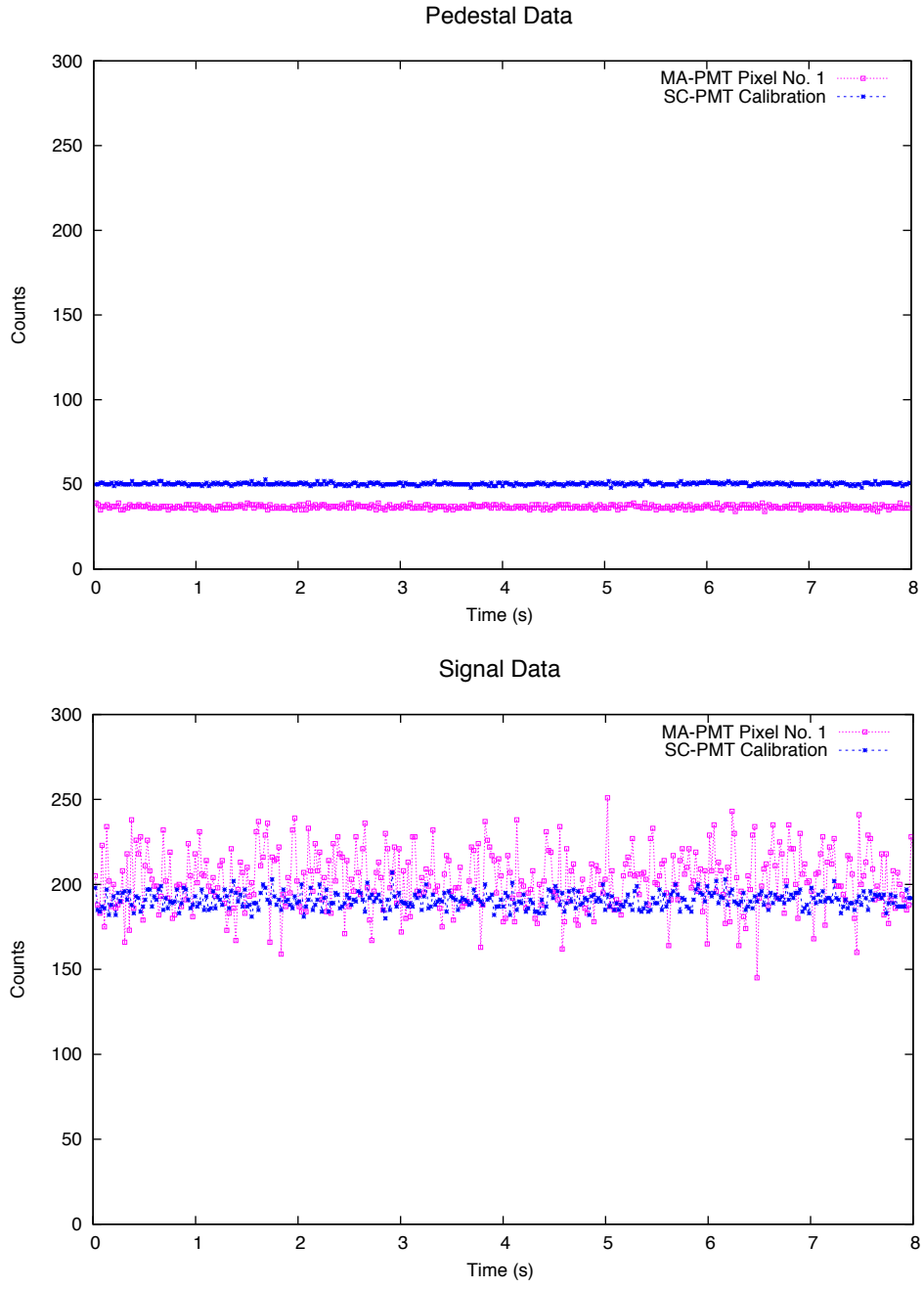

Figure 2.5: Four hundred raw data points collected by the data acquisition system at a sampling frequency of 50 Hz.

Chapter 3

Data Analysis

The raw data collected by the data acquisition system provides information for assessing each MA-PMT's performance. To do this, normalized histograms and basic statistics were generated from the raw data in order to provide the necessary inputs for generating higher level metrics. These metrics form the basis for conducting the overall analysis and producing the final assessment of the individual performance associated with each MA-PMT evaluated.

3.1 Signal and Pedestal Spectra

The initial data analysis looked at normalized distributions of the signal and pedestal data in order to characterize their behaviour statistically. In this report, the normalized distributions of the PMT data are referred to as their spectra. In addition, the means and standard deviations associated with these spectra were also calculated. These statistics and spectra were computed for each of the MA-PMT's pixels, as well as, for the single channel SC-PMT used for normalization purposes. These calculations were done for both the signal and pedestal data collected for each tube.

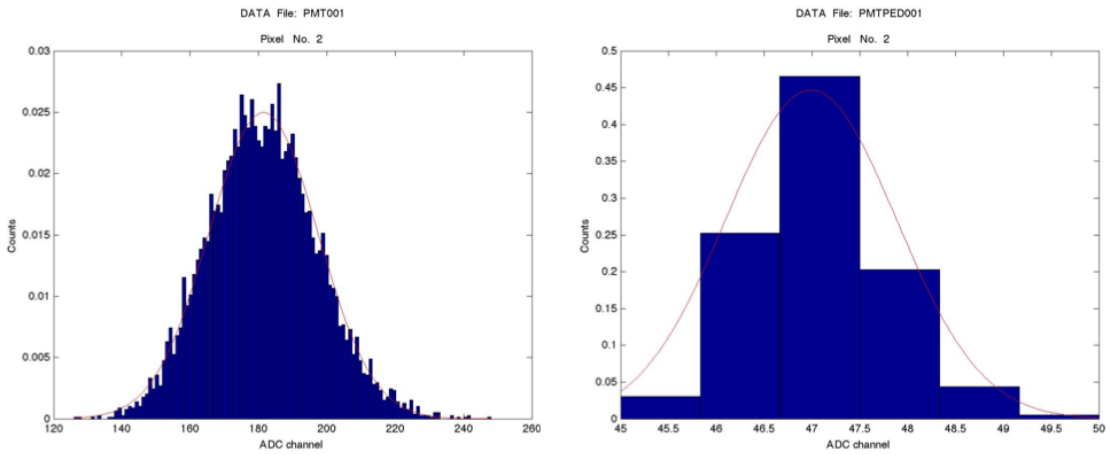

Figure 3.1: Signal and pedestal spectra for PMT001.

3.1.1 Abnormalities in the Spectra

Figure 3.1 illustrates the signal and pedestal spectra generated from the raw data associated with the second pixel of MA-PMT number `001`. Also seen in these plots are the gaussian distributions associated with a calculated function determined using the sample means and standard deviations derived from the raw data (shown in red). These illustrations make it clear that the signal and pedestal spectra are good approximations of gaussian distributions. Furthermore, it is noted that an "ideal response" is one that has a signal mean much higher than its associated pedestal mean, and should also have a relatively small standard deviation. These things are important because a large separation in the means (between pedestal and signal) and a narrow spread in the response spectrum make it very unlikely that the signal data will be corrupted by noise (i.e., pedestal data), and that the tube has low variation of response to a fixed amount of input light. However, this is not necessarily true for all of the tubes tested.

Examples of "abnormal" spectra are provided in Figure 3.2. The top plot shows

a case in which the signal and pedestal spectra dominate, but are well separated with relatively small standard deviations. However, the calculated gaussian function, derived through a simple determination of the sample mean and standard deviation for the full spectrum (shown in red), is a poor fit to the spectrum due to the presence of the "pedestal" data. Note that the presence of such a "no light" (or "noise", or "pedestal") response, superimposed on the actual "with LED light" measurements, is just reflecting an inefficiency of response that was occasionally causing signal readouts when no light-response was present. This predominately occurred with two of the data acquisition channel readouts and is most likely due to an idiosyncratic time-shifting of the signal arriving at the ADC (making it arrive sometimes out-of-time with the ADC gate - thus presenting "noise" to the readout). This problem was noted during the tests but unfortunately it was not possible to eliminate this behavior. Therefore, a subset of the data collected (unfortunately) contains this type of feature.

The middle plot of Figure 3.2 shows a signal spectrum that has two distinct peaks with little separation, indicative of a "broken pixel" due to the fact that the signal essentially overlaps the pedestal data range, indicating a very low (unusable) gain.

Finally, the bottom plot shows a pedestal spectra that is inclusive of the calculated gaussian function (from sample mean and standard deviation) in red, but it is clear that this gaussian function provides a poor fit to the pedestal data.

These results signify that a Gaussian function modelled using the sample mean and standard deviation may not provide a good description of the spectrum data for all cases. Therefore, it is necessary to devise an algorithm to more carefully identify the proper mean and standard deviation associated with the "response peak" that

can be uniquely identified in a spectrum as belonging to the signal component of the data.

3.1.2 Fitting Gaussian Models

In the last section, the conclusion was that the dominant peaks in the signal spectra need to be properly modelled. The fact that the majority of the signal and pedestal data look like the results shown in Figure 3.1 suggests that the peaks in these distributions can be appropriately and individually modelled by simple gaussian functions. To that end, a program was written to fit up to a maximum of two optimal gaussian curves to the spectral data. In order to do this, a total of three different methods were used to fit gaussian curves:

(a) Using the sample mean and standard deviation to fit a single gaussian curve;

(b) Using a peak fitting program to fit a single optimal gaussian curve; and

(c) Using a peak fitting program to fit two optimal gaussian curves.

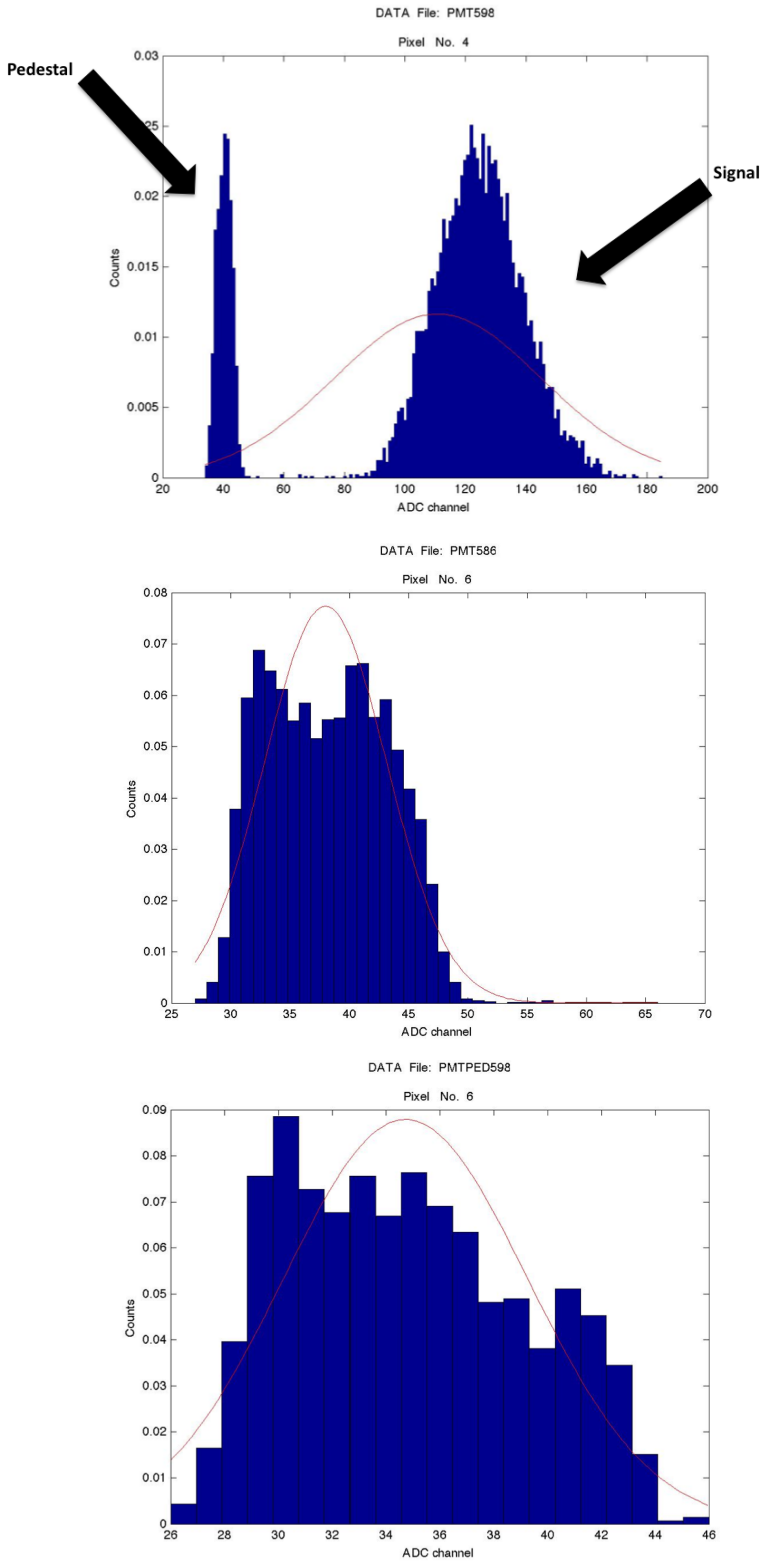

Figure 3.2: Abnormal signal and pedestal spectra.

3.1.3 Gaussian Curve Fitting Program

The first type of gaussian curve fitting is very simple: the sample mean ($\overline{x}$) and standard deviation (σ) of the data are input into the following model of a gaussian distribution in order to model the spectral components of the data $S(x)$:

$$S(x) = \frac{1}{\sqrt{2\pi\sigma^2}}\, e^{-(x-\overline{x})^2/2\sigma^2}\,. \tag{3.1}$$

The second approach required that an optimization program be used to fit either one or two gaussians of the form shown in Equation (3.1) to the spectral data that does not directly rely on the data's sample mean and standard deviation. The optimization parameters correspond to the means ($\overline{x}$) and standard deviations (σ) associated with either the signal response alone, or a combination of both signal response and noise present in the spectrum.

An analysis program for this project was written by the author in Matlab. This program uses a modified version of an optimization algorithm known as '`peakfit`' written by Dr. Tom O'Haver, a Professor from the University of Maryland [9]. The 'peakfit' algorithm allows the user to decompose a signal into a number of overlapping peaks modelled as gaussians. The peak fitting algorithm uses a non-linear optimization technique known as `fminsearch`[1] provided as a Matlab function.

[1]The documentation on `fminsearch` is provided as part of the Matlab documentation set, and Dr. O'Haver also provides examples and further explanation of how his algorithm uses this non-linear optimization technique [9].

The function `fminsearch` uses the Nelder-Mead simplex method, which is a series of transformations of a given simplex to find optimal solutions to non-linear multi-dimensional optimization problems. This optimization technique is used in the `peakfit` algorithm in the following manner:

1. For the number of peaks being fit, the routine `fminsearch` is passed initial guesses for the location of the means ($\overline{x}$) and widths (w) of the gaussian functions being fit to the spectral data[2].

2. The peak fitting process updates at each step by adjusting the parameters w and σ for each gaussian through a random selection process. At each step, the algorithm keeps the best parameters if they reduce the overall root-mean-square error of the fit. The algorithm performs ten steps before returning the best overall set of parameters found. Slight modifications were made to this algorithm in order to improve the results obtained for the PMT data sets analyzed by this code.[3]

3. The best single and double gaussian fits were then plotted along with the gaussian calculated using the sample means and standard deviations in the model given by Equation (3.1).

[2]The width of the gaussian distribution is taken as the full-width-at-half-maximun (FWHM): the distance between the two points where it is half of its maximum height; that is, where the width is given by $w = 2\sigma\sqrt{2\ln 2}$.

[3]The modifications made by this author to the `peakfit` algorithm are documented in the Matlab code written for this thesis.

Finally, an appropriate metric was required to assess the overall quality of the three fits produced by the analysis program. The metric chosen was to calculate a chi-square statistic χ^2 for each fit.

3.1.4 Reduced Chi-Squared χ^2_ν Metric

For each of the three methods used to fit gaussians to the PMT spectra, the analysis program calculates a reduced chi-squared statistic χ^2_ν using the following expression derived from Reference [10]:

$$\chi^2_\nu = \frac{N}{m-\nu} \sum_{i=1}^{m} \frac{[\tilde{S}(x_i) - S(x_i)]^2}{\tilde{S}(x_i)}\,, \tag{3.2}$$

where x_i is the value of the centre of the i^{th} bin associated with the estimated value of the PMT spectra at this location $\tilde{S}(x_i)$. The modelled value of this spectra $S(x_i)$ is obtained using Equation 3.1. In Equation 3.2, m is the total number of bins in the sample spectra $\tilde{S}(x_i)$, and N is the total number of observations taken to estimate this spectra[4]. The value of ν represents the number of constraints or parameters associated with the fitting process. The fact that each gaussian fit to the spectra requires two parameters, $\overline{x}_k$ and σ_k, tells us that $\nu = 2\,k$, where k represents the number of gaussians being fit to the data. For the PMT spectra being analyzed here, $k = 1$ or 2. From Equation 3.2, it is clear that the number of degrees of freedom 'V' associated with this fitting process is: $V = m - \nu$.

The reduced chi-squared χ^2_ν is a weighted average of the individual variances and its expectation has a value of one [10]. The implication of this is that the goodness-

[4]The value of N represents the total number of raw data samples collected by the data acquisition system for a particular PMT that is used to estimated the PMT's sample spectra $\tilde{S}(x_i)$.

of-fit can be assessed by how close the given fit's χ^2_ν is to this value, thus providing us with a useable metric for assessment. Now that a suitable metric for a goodness-of-fit has been developed, an appropriate algorithm using this metric must be developed in order to select the best fit candidate spectra for further processing and analysis. In particular, this algorithm must provide estimates of the signal and pedestal means and standard deviations required to complete the analysis and overall performance assessment.

3.1.5 Reduced Chi-Squared χ^2_ν Selection Algorithm

A logical algorithm was designed to choose the overall best fit to the PMT spectra using the reduced chi-squared χ^2_ν metric of Equation (3.2). For each pixel of each MA-PMT, signal and pedestal spectra were analyzed using the three different methods outlined in Section 3.1.2 for fitting gaussian curves to the data. The algorithm also tests for any overlap in the ranges of a PMT's signal and pedestal data to determine if a two peaked spectra needs to be considered because of the signal response exhibiting either a very low gain, or an "abnormal spectrum" that contains noise as well as signal reponse. The goal of the algorithm is to select the appropriate means and standard deviations for the signal and pedestal spectra under all conditions, including when the signal is contaminated with noise (i.e., pedestal/noise data is present in the signal response data). A block diagram of the algorithm is provided in Figure 3.3 and its explanation is as follows (making reference to the three fit methods designated as (a), (b), and (c) in Section 3.1.2):

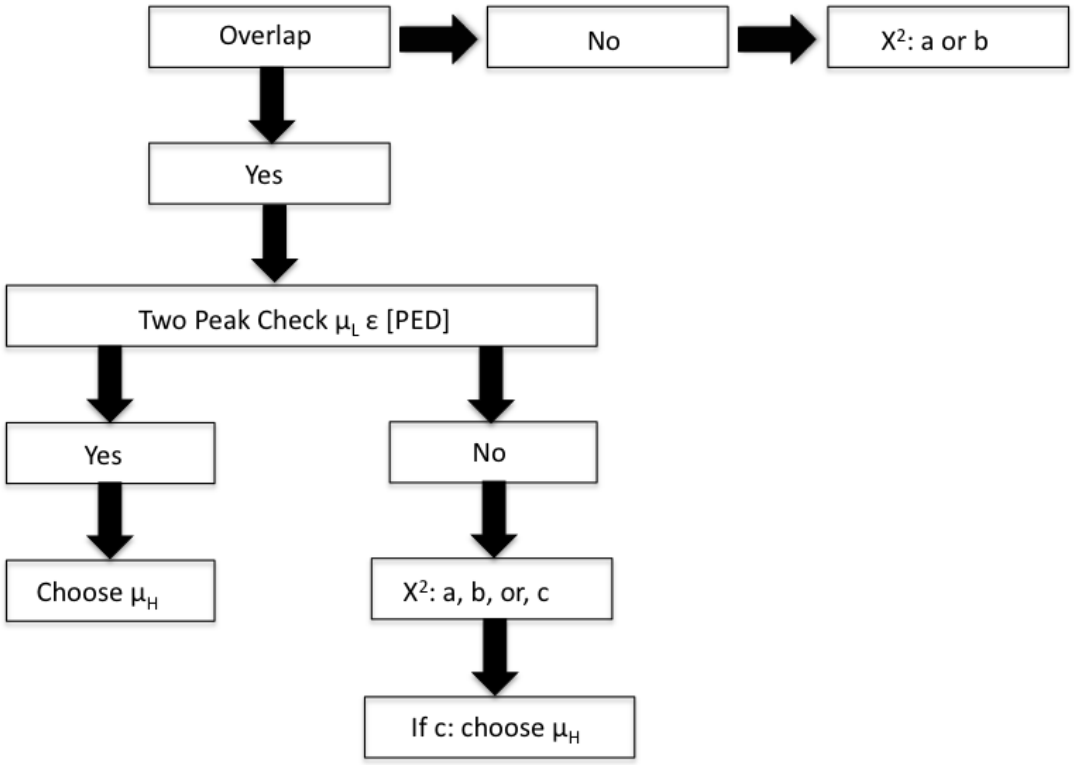

Figure 3.3: Block diagram of the reduced chi-squared χ^2_ν selection algorithm.

Step 1: The program initially checks for overlap between the ranges of the signal and pedestal spectra. If there is no overlap, the algorithm chooses either fit method (a) or (b) based upon which method has a reduced chi-squared χ^2_ν closest to one.

Step 2: If there is overlap between the ranges of the signal and pedestal spectra then a two-peak check occurs. This check first determines which of the two peaks fitted to the signal spectra has the lowest mean (μ_L). If μ_L does not fall in the range of the pedestal data, then one of the methods (a), (b), or (c) are chosen based upon the χ^2_ν criteria. If method (c) is chosen, then the peak with the higher mean μ_H is selected as belonging to the signal response.

Step 3: If the value of μ_L chosen in *Step 2* falls within the range of the pedestal data the algorithm assumes that "noise leakage" has occurred, so the higher mean μ_H from the previous step is selected to represent the mean of the signal response.

This algorithm is applied to both the signal and pedestal spectra. However, when the algorithm is applied to the pedestal spectra the roles of the means μ_L and μ_H are reversed; that is, instead of finding whether or not μ_L from the two-peak test falls within the pedestal data range, the algorithm checks to see if μ_H of the pedestal spectra falls within the range of the signal data. This accounts for the fact that the pedestal range lies below that of the signal range.

Figure 3.4 shows an example of input spectra that would be addressed by Step 1 of the algorithm. It should be noted that the plots of these figures indicate a percent error normalized to the maximum spectral peak (`Error`), a reduced chi-squared value (`ChiSQ`), and the number of degrees of freedom (`V`) associated with these fits[5]. The top two plots and the bottom two plots are signal and pedestal spectra, respectively. The top plot of each group shows the raw spectrum overlaid with its best fit calculated using method (a). The bottom plot of each group shows the raw spectrum as points overlaid with its best fit calculated using method (b). In this case, Step 1 would select method (a) for the signal spectrum and (b) for the pedestal spectrum based upon the χ^2_ν criteria established above. As a result of this selection process, the algorithm provides the appropriate means and standard deviations for the best fits associated with these spectra.

[5]The contents and information shown on these plots are more fully described by the author of the peak fitting algorithm used to generate these figures at Reference [9].

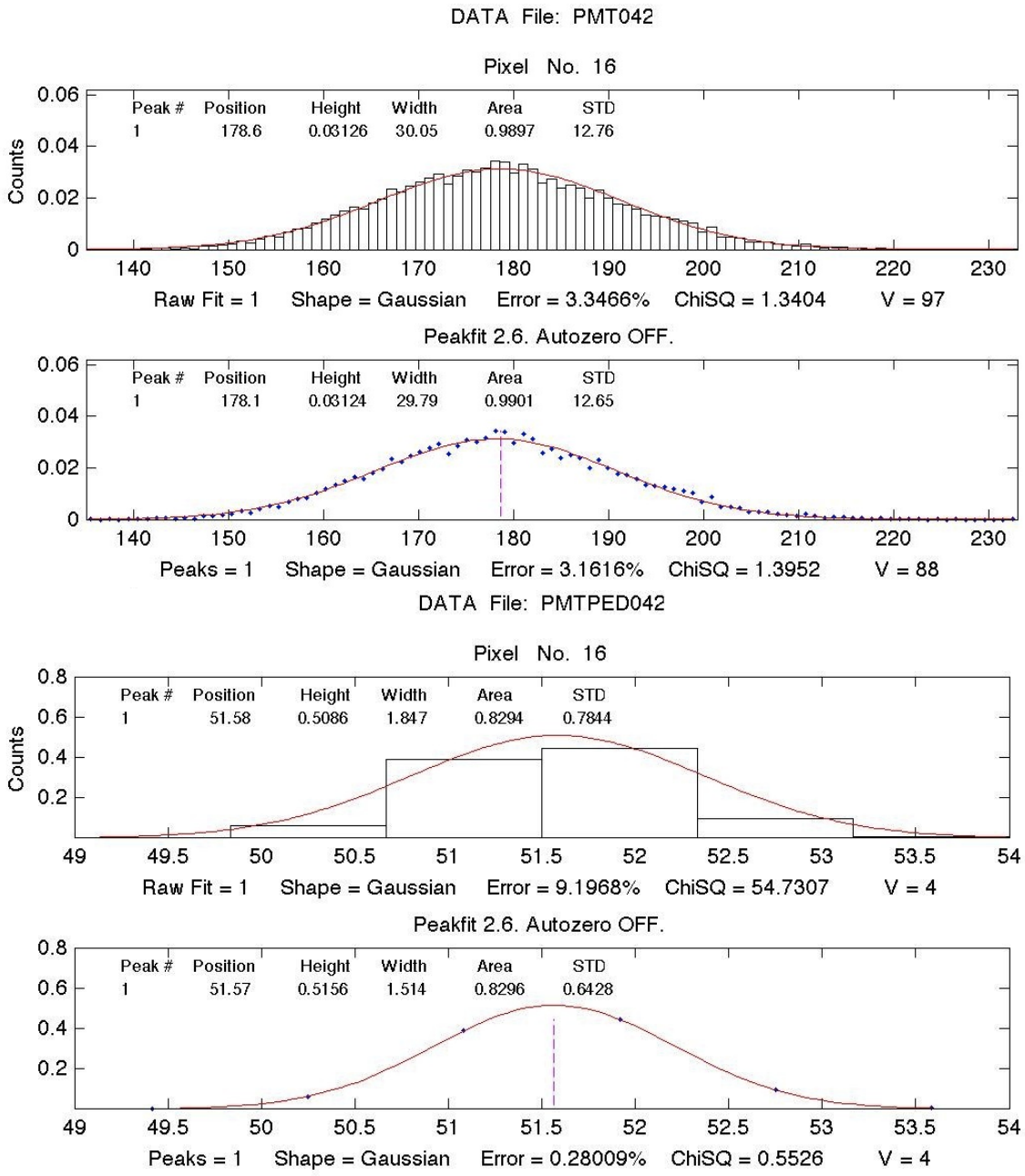

Figure 3.4: PMT 42 Pixel 16 spectra input to Step 1 of the χ^2_ν Algorithm.

Figure 3.5 shows a signal spectra that would be addressed by Step 2 of the algorithm when overlap exists between signal and pedestal ranges. In this figure, the three plots correspond to the fit methods (a), (b), and (c) from top to bottom, respectively. For this PMT, the algorithm would select method (a) based upon the χ^2_ν criteria (i.e., top plot selected). The vertical lines shown in the bottom two plots correspond to the best fit means. The bottom plot shows two vertical lines for the means/positions shown in the text above the curves. Also shown are the heights, widths, areas, and standard deviations for the two fits found by the peak fitting algorithm.

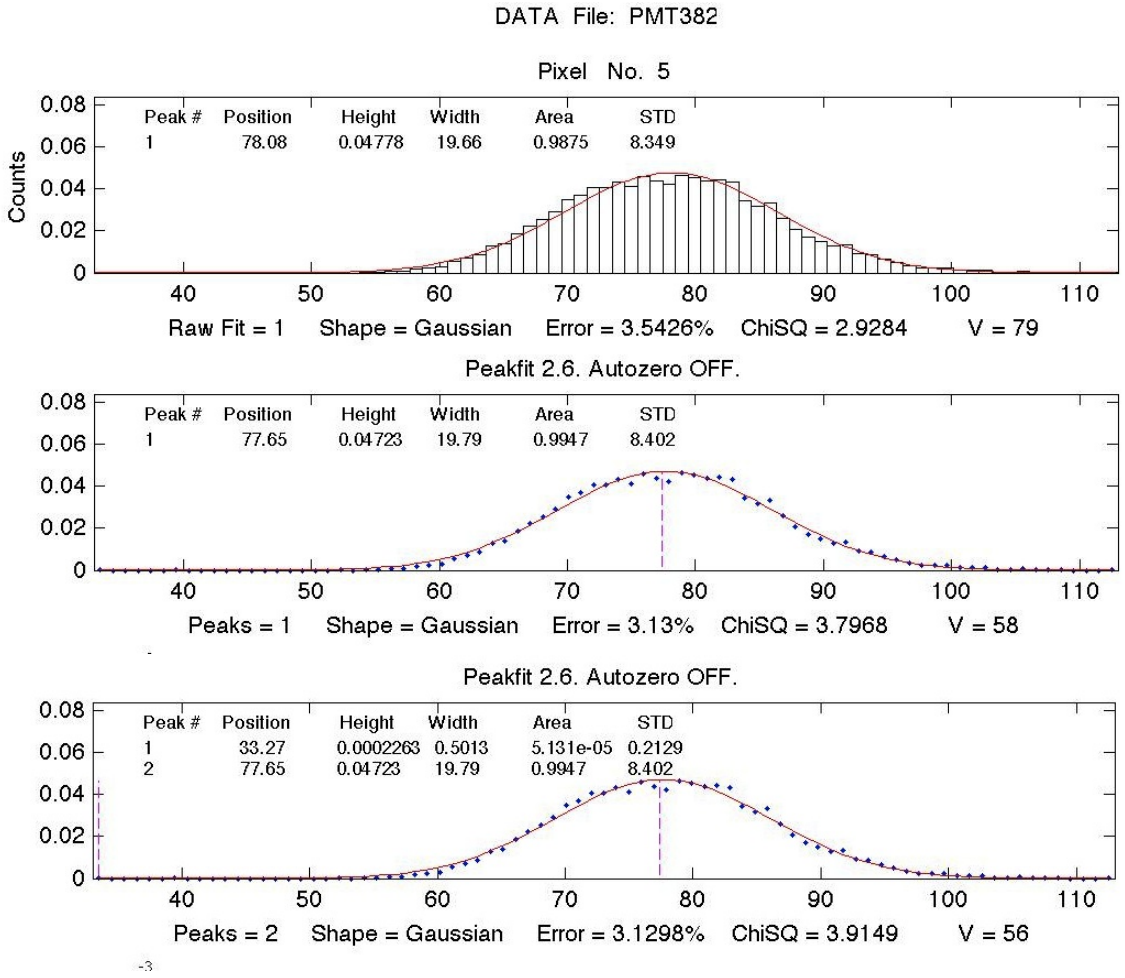

Figure 3.5: PMT 382 Pixel 5 spectra: Step 2 selects method (a) in top plot.

Figure 3.6 is a similar case to that shown in Figure 3.5, but here the algorithm chooses method (c), and assigns the higher mean of the two fits to the signal response in this case (i.e., the bottom plot is selected).

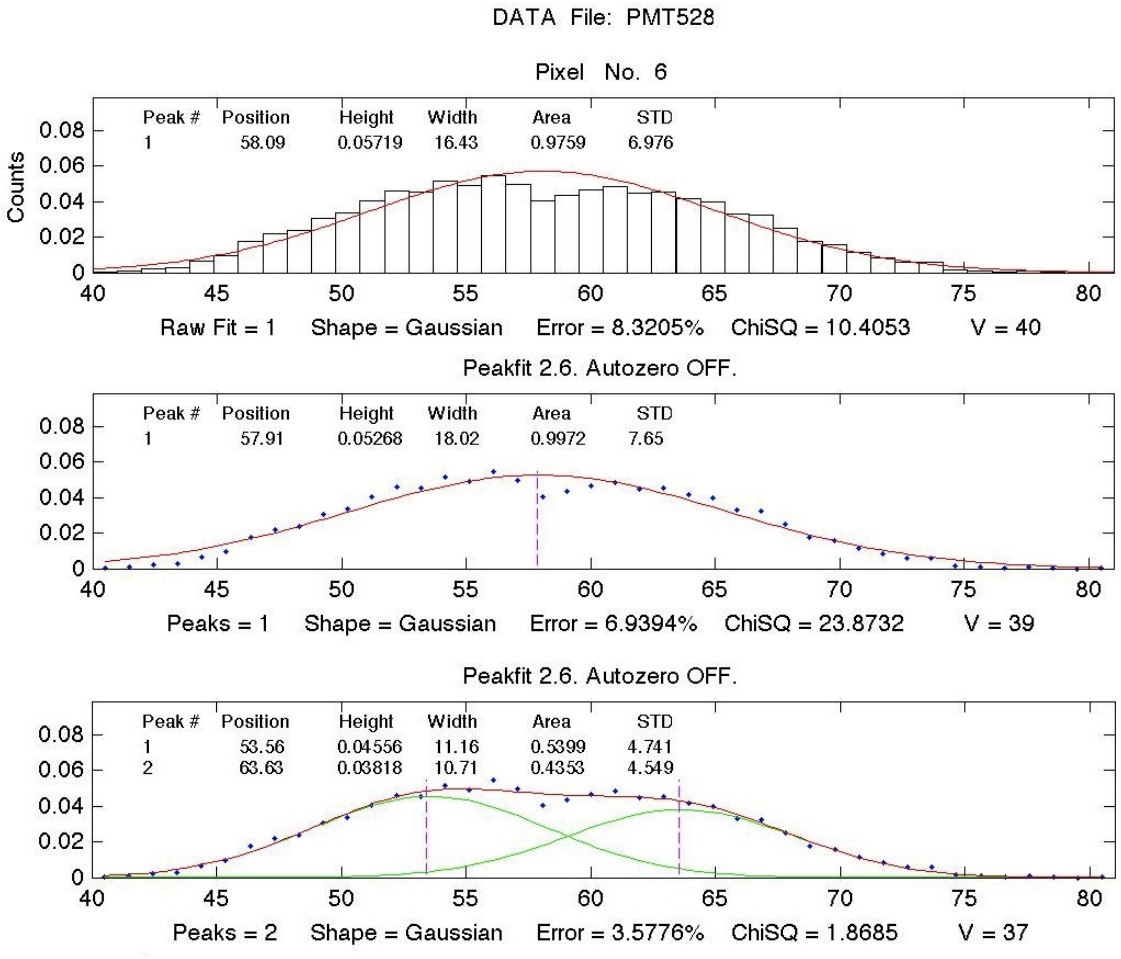

Figure 3.6: PMT 528 Pixel 06 spectra: Step 2 selects method (c) in bottom plot.

In Figure 3.7, Step 3 of the algorithm would automatically select the higher mean μ_H shown in the bottom plot of this figure due to the fact that μ_L lies in the range of the pedestal spectrum. In this case, the algorithm has in fact picked the overall best fit based upon the χ^2_ν values shown in these plots.

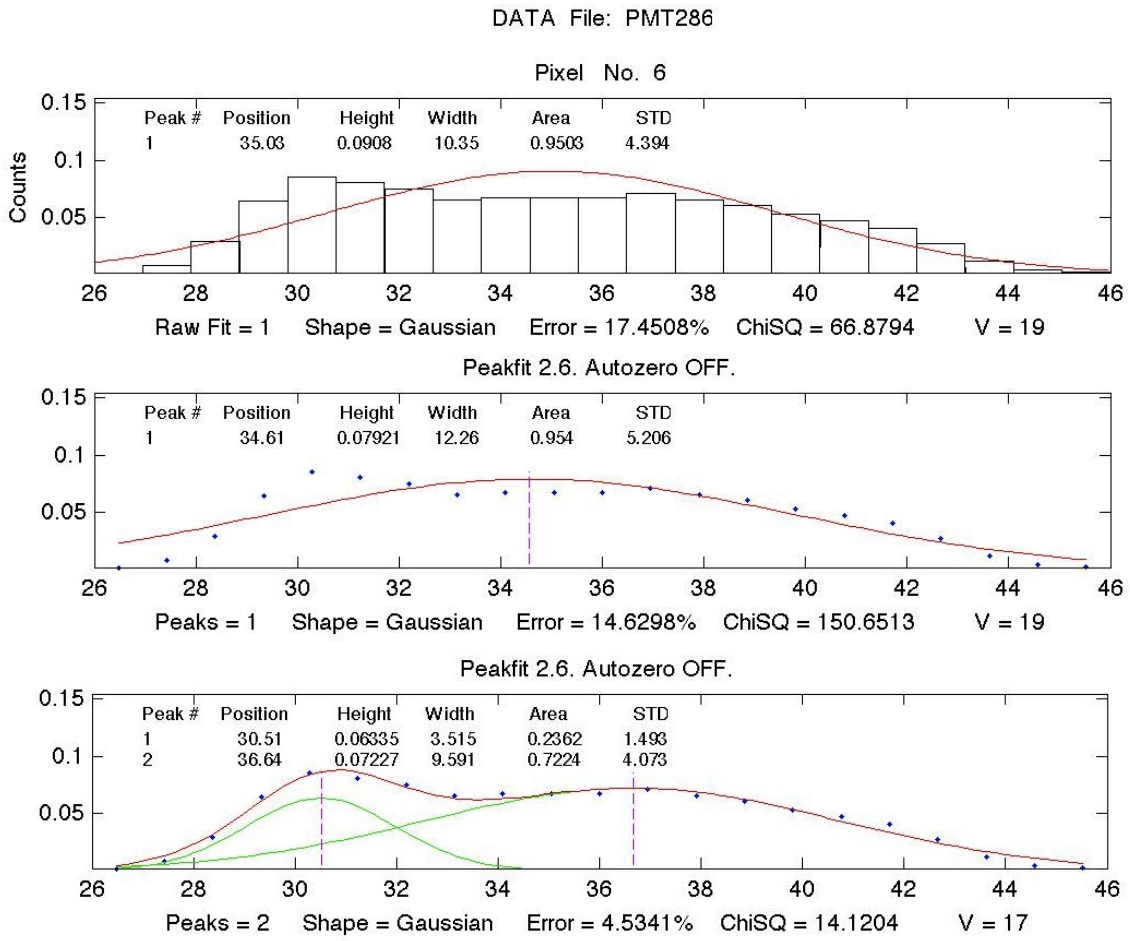

Figure 3.7: PMT 286 Pixel 06 spectra: Step 3 selects higher mean μ_H in bottom plot.

3.2 Performance Metrics

Characterizing the performances of each MA-PMT requires that appropriate criteria be developed that uses the best fit means and standard deviations found from the reduced chi-squared selection algorithm of Section 3.1.5. These values are how we described each PMT pixel's noise and signal responses, therefore, the metrics used to assess overall performance must use these results as inputs.

3.2.1 Measures

The first measure calculated for the i^{th} pixel of the n^{th} MA-PMT tube was its normalized signal response $S^R_{n,i}$ using the following expression:

$$S^R_{n,i} = \frac{\bar{S}^n_i - \bar{P}^n_i}{\bar{S}^n_{cal} - \bar{P}^n_{cal}}\,, \tag{3.3}$$

where $\bar{S}^n_i$ and $\bar{P}^n_i$ are the signal and pedestal means, while $\bar{S}^n_{cal}$ and $\bar{P}^n_{cal}$ are the signal and pedestal means associated with the SC-PMT calibration channel recorded when that particular PMT was being tested. The standard deviation of $S^R_{n,i}$ was taken to be that of the individual pixel signal response standard deviations (i.e., $\sigma_{S^R_{n,i}} = \sigma_{n,i}$). This measure provides a normalized signal across all pixels and all PMTs due to the use of the SC-PMT calibration channel to normalize the responses (thus accounting. for any light fluctuations from the LED). This allows for an equal comparison of all signals produced in this manner.

Next, the average gain $\bar{A}_n$ for the n^{th} tube was calculated by finding the average signal response of the tube's sixteen pixels:

$$\bar{A}_n = \frac{1}{16}\sum_{i=1}^{16} S^R_{n,i} \tag{3.4}$$

and assigned a standard deviation $\sigma_{\bar{A}_n}$ given as an average of the individual pixels' signal response standard deviations:

$$\sigma_{\bar{A}_n} = \frac{1}{16} \sum_{i=1}^{16} \sigma_{S^R_{n,i}} \,. \tag{3.5}$$

These quantities $(\bar{A}_n, \sigma_{\bar{A}_n})$ characterize the tube's overall ability to amplify signals that it is exposed to and the average resolution of the response.

Finally, the PMTs ability to respond to light uniformly over all pixels is important when evaluating its overall performance. To assist in evaluating uniformity, the relative response $R_{n,i}$ of the i^{th} pixel of the n^{th} tube is defined as the ratio of its signal response $S^R_{n,i}$ to its average gain of all pixels in the tube $\bar{A}_n$; that is,

$$R_{n,i} = \frac{S^R_{n,i}}{\bar{A}_n} \,. \tag{3.6}$$

This measure is, in effect, a normalized response across all of the pixels of the tube so that its expected value is one, if all pixels had identical responses. The distribution of this measure around the value of one characterizes how uniform the tube responds to a given signal, and can be used to classify the quality of all pixels relative to one another.

3.2.2 Average Gain and Relative Response Analysis

In Section 3.2.1, three measures were developed to help assess the overall performance of the MA-PMTs. Of these measures, the average gain of a tube and the relative responses of its pixels are good indicators of how well it operates.

In order to see this, a scatter plot of the standard deviation of the average gain $\sigma_{\bar{A}_n}$ was plotted against the average gain $\bar{A}_n$ for all tubes tested. These results are

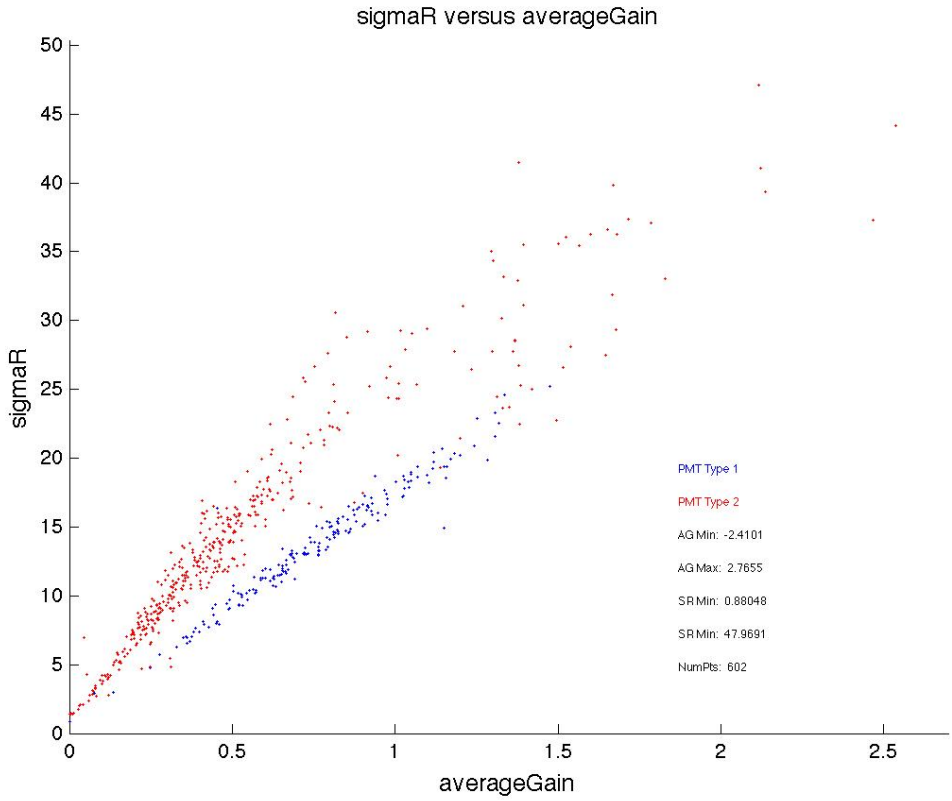

Figure 3.8: Relationship of MA-PMT average gain ($\hbar A_n$) with average resolution ($\sigma_{\bar{A}_n}$).

shown in Figure 3.8, where the Type I and II tubes were plotted in blue and red dots, respectively. It is noted that the Type II tubes have a trend towards having a higher variance (i.e., worse resolution) than the Type I tubes for a given value of average gain. This figure suggests that one could reasonably create a number of classification levels for a tube's performance based upon its overall average gain.

In order to classify each MA-PMT, the average gain range represented in Figure 3.8 was subdivided arbitrarily into four distinct regions. These four regions were further categorized as having subjective gain performances that were labelled "Poor", "Average", "Good", and "High". The selection of the sub-ranges for each of these

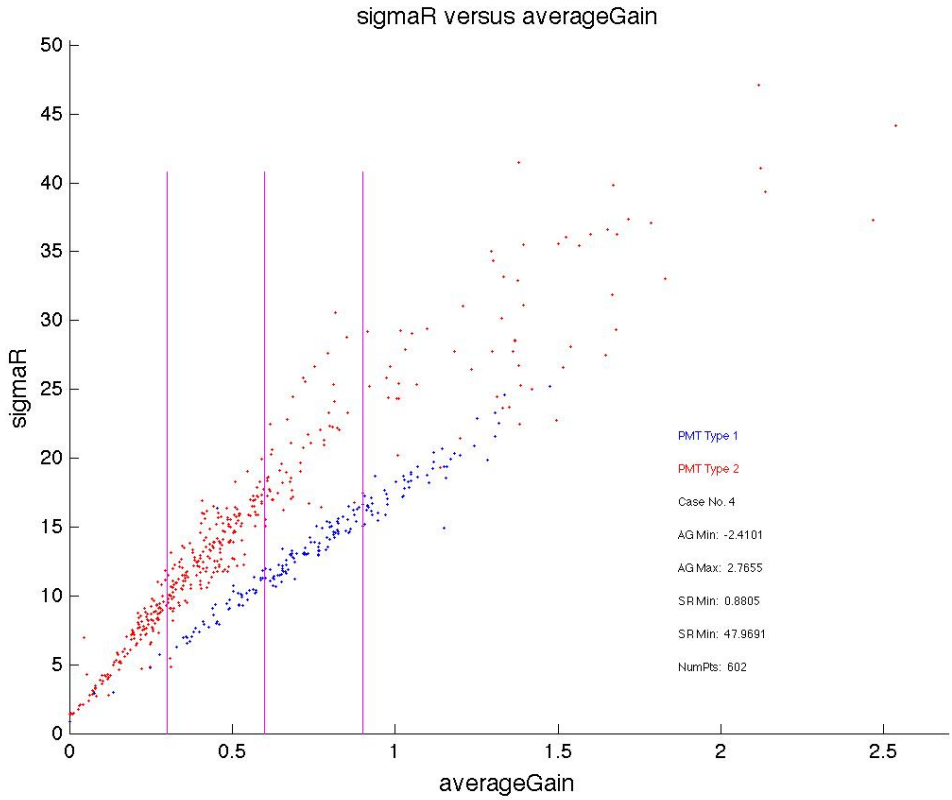

Figure 3.9: Demarcation of performance regions on $\sigma_{\bar{A}_n}$ vs. $\bar{A}_n$ plot.

categories was arbitrarily set to the following values:

- Region 1: Poor Gain Performance for $0.0 \leq \bar{A}_n < 0.3$,
- Region 2: Average Gain Performance for $0.3 \leq \bar{A}_n < 0.6$,
- Region 3: Good Gain Performance for $0.6 \leq \bar{A}_n < 0.9$, and
- Region 4: High Gain Performance for $\bar{A}_n \geq 0.9$.

These four performance regions are illustrated in Figure 3.9 by the vertical lines plotted in this figure.

Figures 3.8 and 3.9 highlight that the two types of tubes show distinct performance characteristics, which further suggests that MA-PMT performance should be

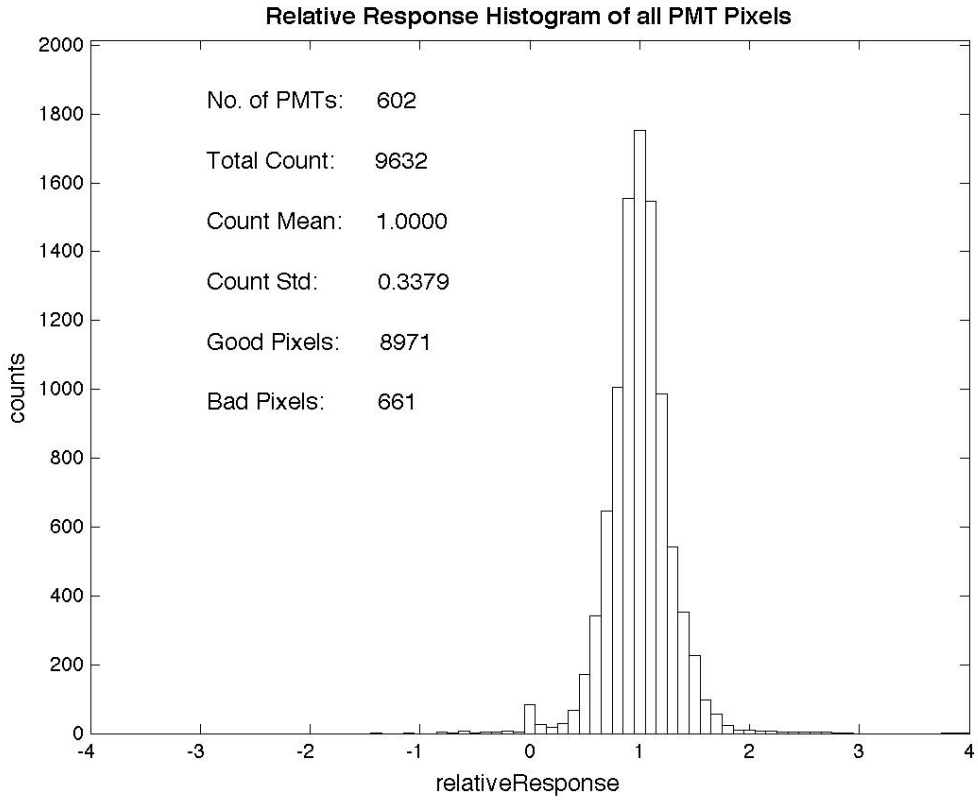

Figure 3.10: Relative Response Distribution of all Pixels ($R_{n,i}$)

evaluated by tube type as well. To do this, each region was further subdivided into two distinct "boxes" of PMTs for a total of eight boxes overall. The boxes designated by odd and even numbers contain Type I and Type II PMTs, respectively. This approach lets us sort all PMTs into one of the eight boxes based upon its value of average gain and its type. Once each PMT has been categorized into one of eight boxes, they can be further assessed according to uniformity of response over the tubes pixels.

In order to assess all of the PMTs on an equal footing, a histogram of all of the pixel's relative responses for all PMTs was plotted. This result is shown in Figure 3.10. The distribution shown in this figure appears to be symmetric and gaussian

by nature. It has a mean value of one, as expected, with a standard deviation of 0.3379, which is very close to the value of the average gain interval size used to create the four gain classifications used above. It should be expected that any pixels that have a very low or high relative response (far from unity) will negatively affect the overall uniformity of a PMT's performance. This suggests that such pixels should be identified for classification purposes. To do this, pixels that were outside of the distribution's mean value by more that ± 0.5 were classified as being "bad" (i.e., non-uniform), while those that fell within $0.5 \leq \sigma_{S^R_{n,i}} \leq 1.5$ were considered to be "good" (i.e., uniform). Furthermore, it was decided that any PMT with one or more "bad" pixels would be classified as having a non-uniform response.

The vertical lines shown in Figure 3.11 delineate the regions of "good" and "bad" pixels in terms of their relative responses. Approximately 86% of all pixels tested were considered to be "good" based upon this assessment process. Furthermore, when this criteria was applied to the eight gain-performance boxes, the results shown in Figure 3.12 were obtained. The upper plot represents the average number of bad pixels per PMT in each of the average gain boxes identified above. The lower plot represents the standard deviations of the relative responses of all PMT pixels classified as being in that box. It should be noted that the number located by each point in these graphs represents the number of PMTs in the box associated with that point.

Across all box numbers, the Type II PMTs have on average more bad pixels per PMT than the Type I tubes, and the variance of their relative responses are also worse. However, the performances improve with increased box number, which agrees with the four gain classifications used above. This figure suggests that the assessment

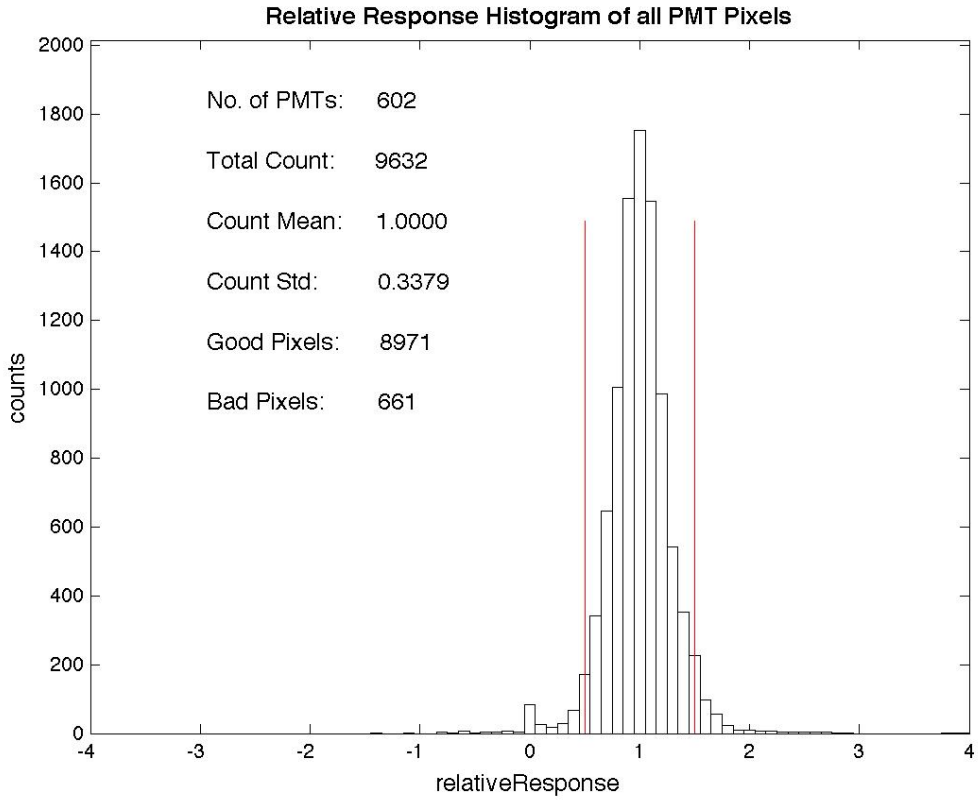

Figure 3.11: Relative Reponse Distribtuion of All Pixels with Desired Range

of the PMT performance from poor-to-high gain is a reasonable and valid approach to take.

Similar plots to that shown in Figure 3.11 have been provided in Figures 3.13 through 3.16 in order to assess the relative responses of the PMT pixels for PMTs falling into each of the eight gain boxes. The relative response histograms for the PMT pixels categorized into poor gain performance (Box 1 and 2) are shown in the plots of Figure 3.13. It is noted that there are a significant number of bad pixels in both Box 1 (39%) and 2 (15%), as indicated by the high variances associated with their distributions. A trend towards a reduction in the number of bad pixels is seen with increased gain performance, as evidenced by the decreasing variances seen in

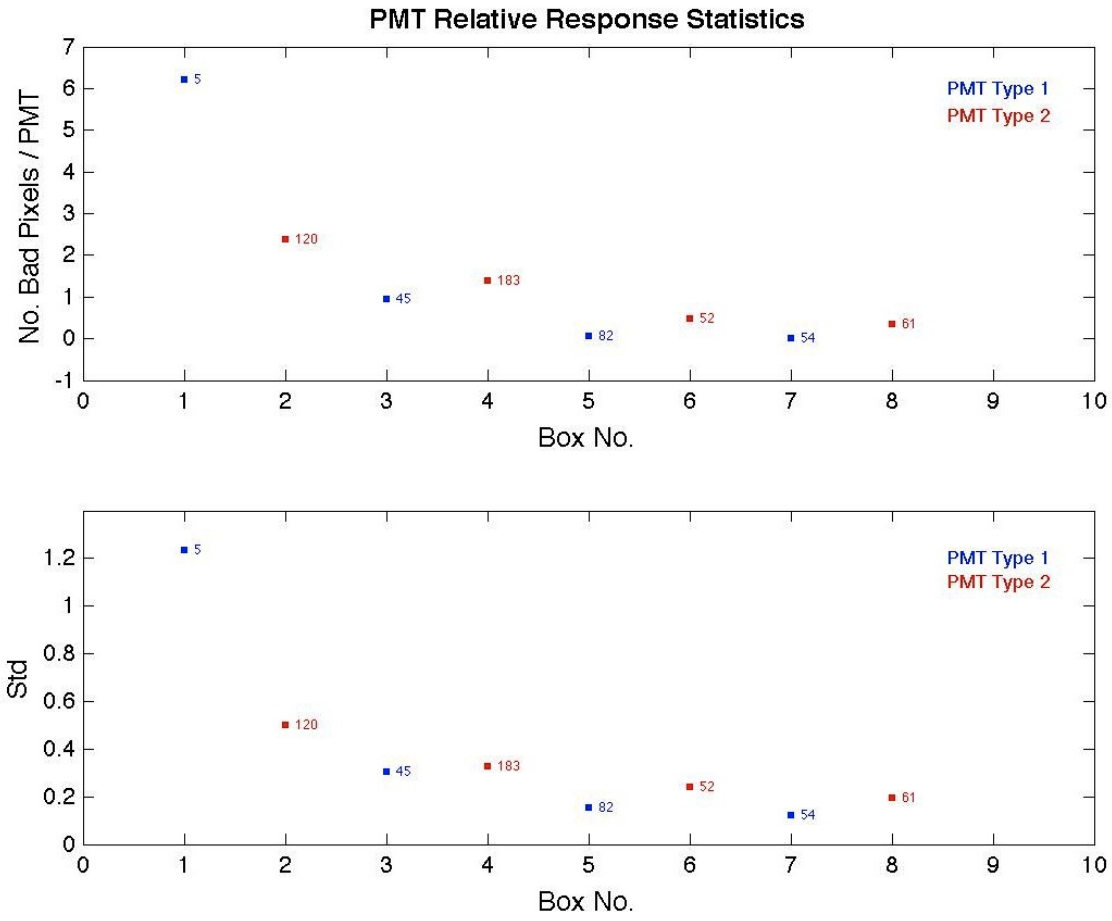

Figure 3.12: Relative Response Reasoning

these distributions.

Another observation that can be made by examining Figures 3.13 - 3.16 is that some of the Boxes have values of negative relative response. These negative values are a result of broken pixels that record nearly identical readings for signal data as they do for pedestal data during the test procedures. Such readings produce nearly identical histograms, with slight fluctuations, for both signal and pedestal runs and this can result in negative values for the signal response $S^R_{n,i}$ calculated using Equation 3.3, which leads to the negative relative response values seen in these figures.

PMT No.: 320																
Rating: Non-Uniform - High Gain - 3 Bad Pixel (s)																
In Box: 8 along with 61 other Type 2 PMTs																
RR: Mean,Std: [1.0000, 0.3083] Filter Range: [0.5000,1.5000]																
AveGain: Mean,Std: [1.6514,36.6323] Filter Range: [0.9000,2.7655]																
Pixel:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1

Table 3.1: Summary of Performance for PMT No. 320.

From the above analysis, a complete summary of each PMT's performance was produced. An example showing this summary is provided in Table 3.1. It provides the assigned test number associated with the PMT, as well as, its rating with regards to uniformity, gain, and the number and location of bad pixels. Furthermore, it identifies the box number that the PMT was assigned to and indicates how many other PMTs were also in this box. It also provides the means and standard deviations for the PMT's relative response and average gain, along with the filter ranges used in their assessment.

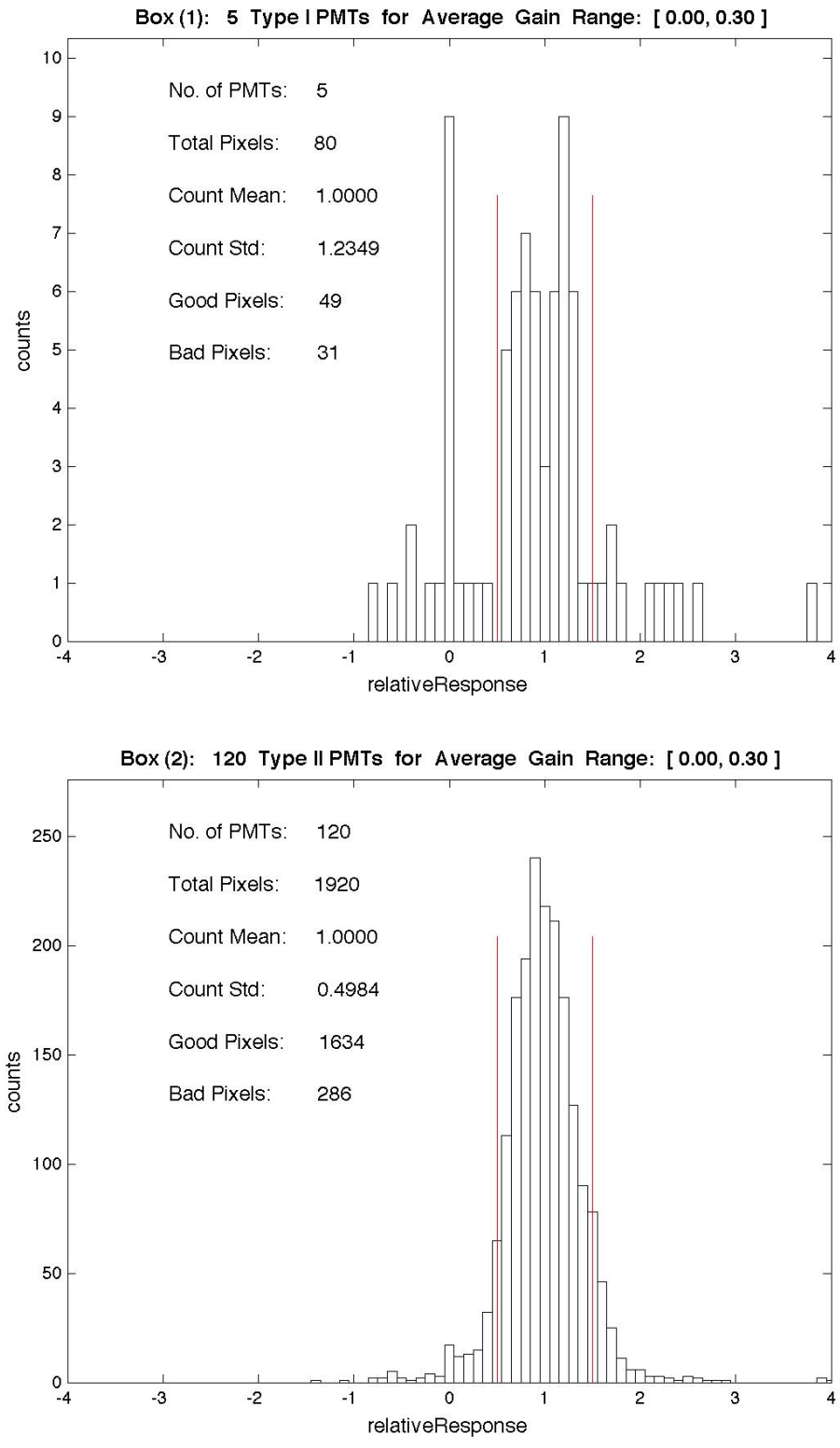

Figure 3.13: Relative Response PMT Box No. 1 and 2.

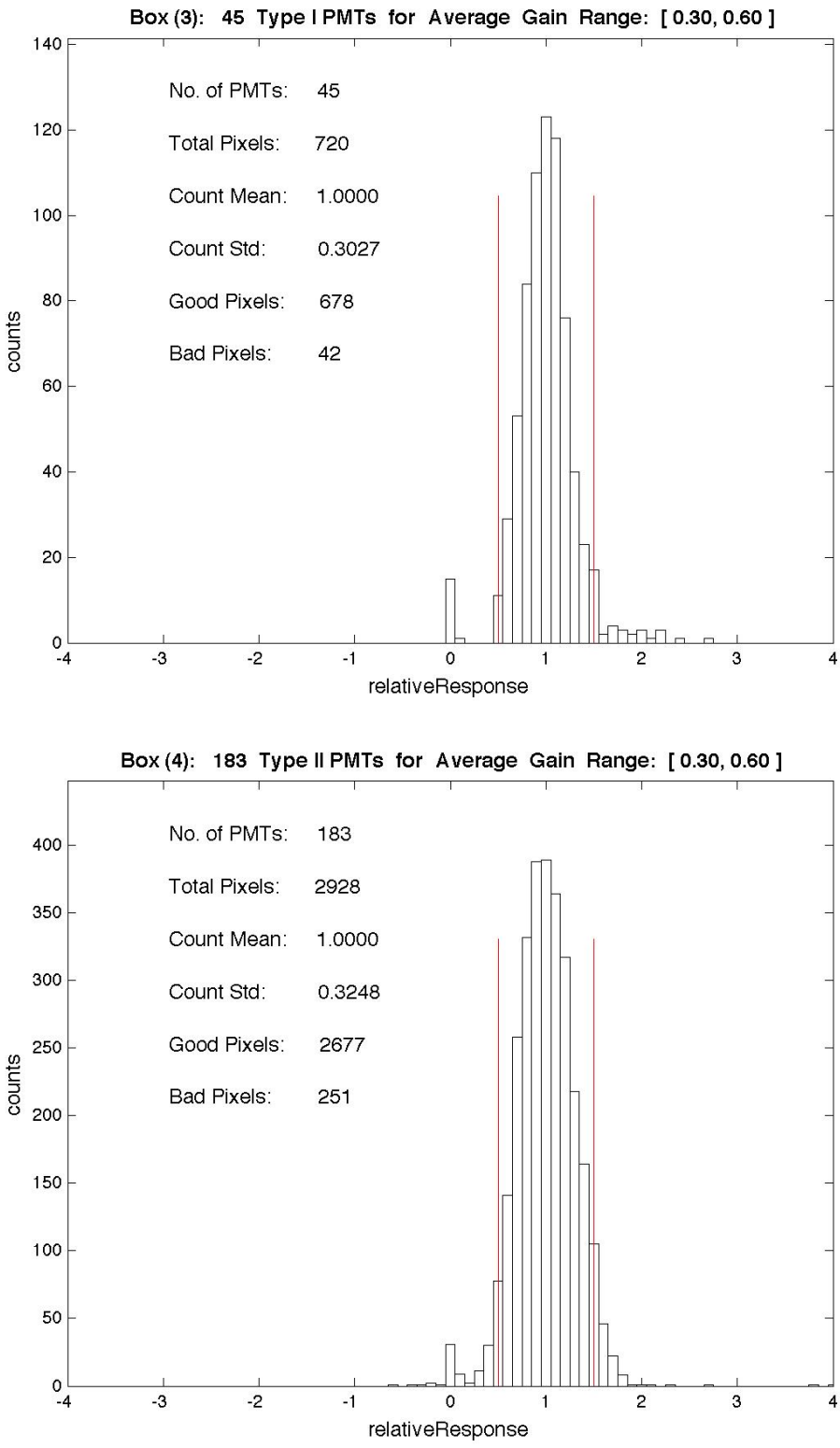

Figure 3.14: Relative Response PMT Box No. 3 and 4.

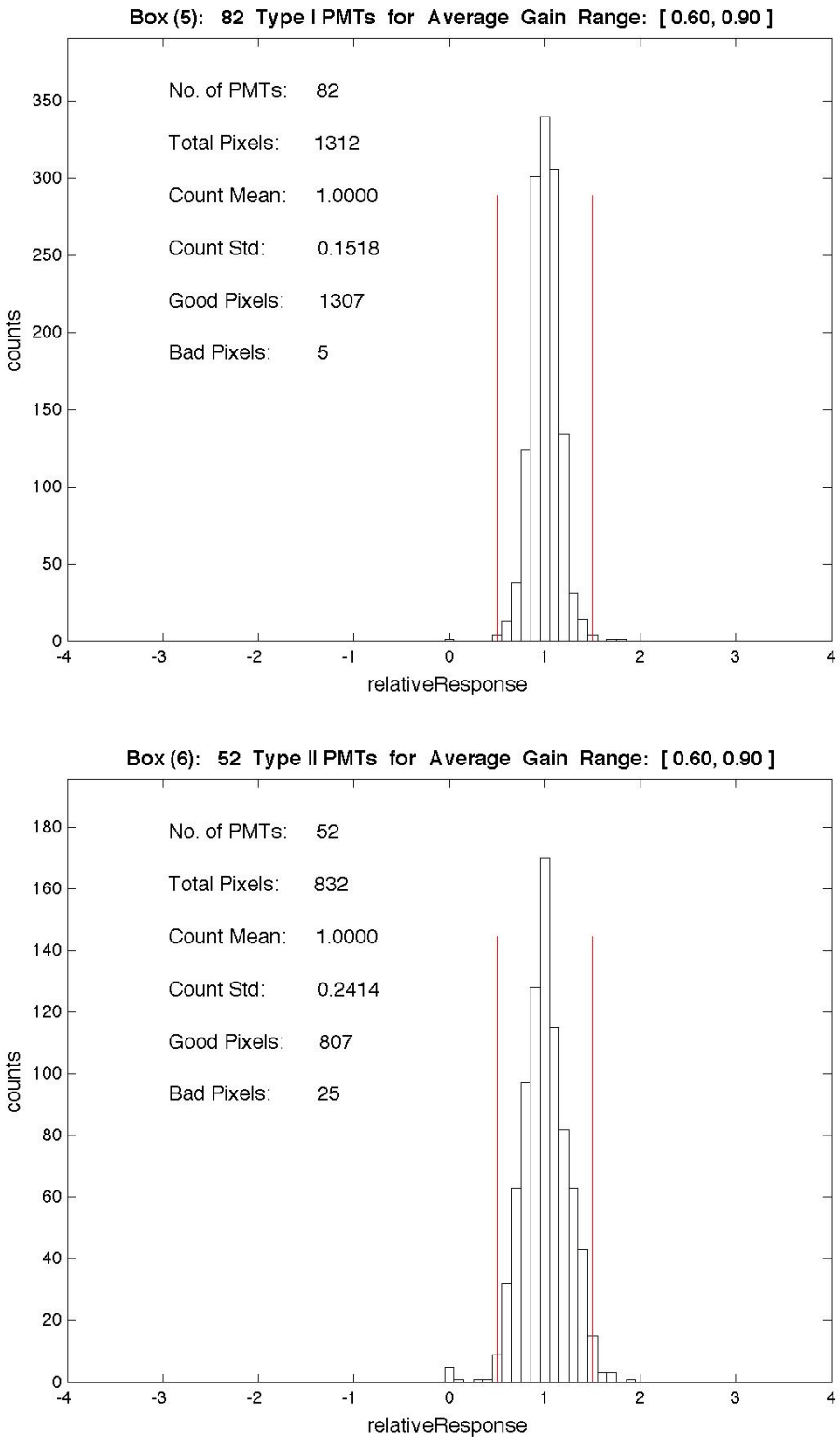

Figure 3.15: Relative Response PMT Box No. 5 and 6.

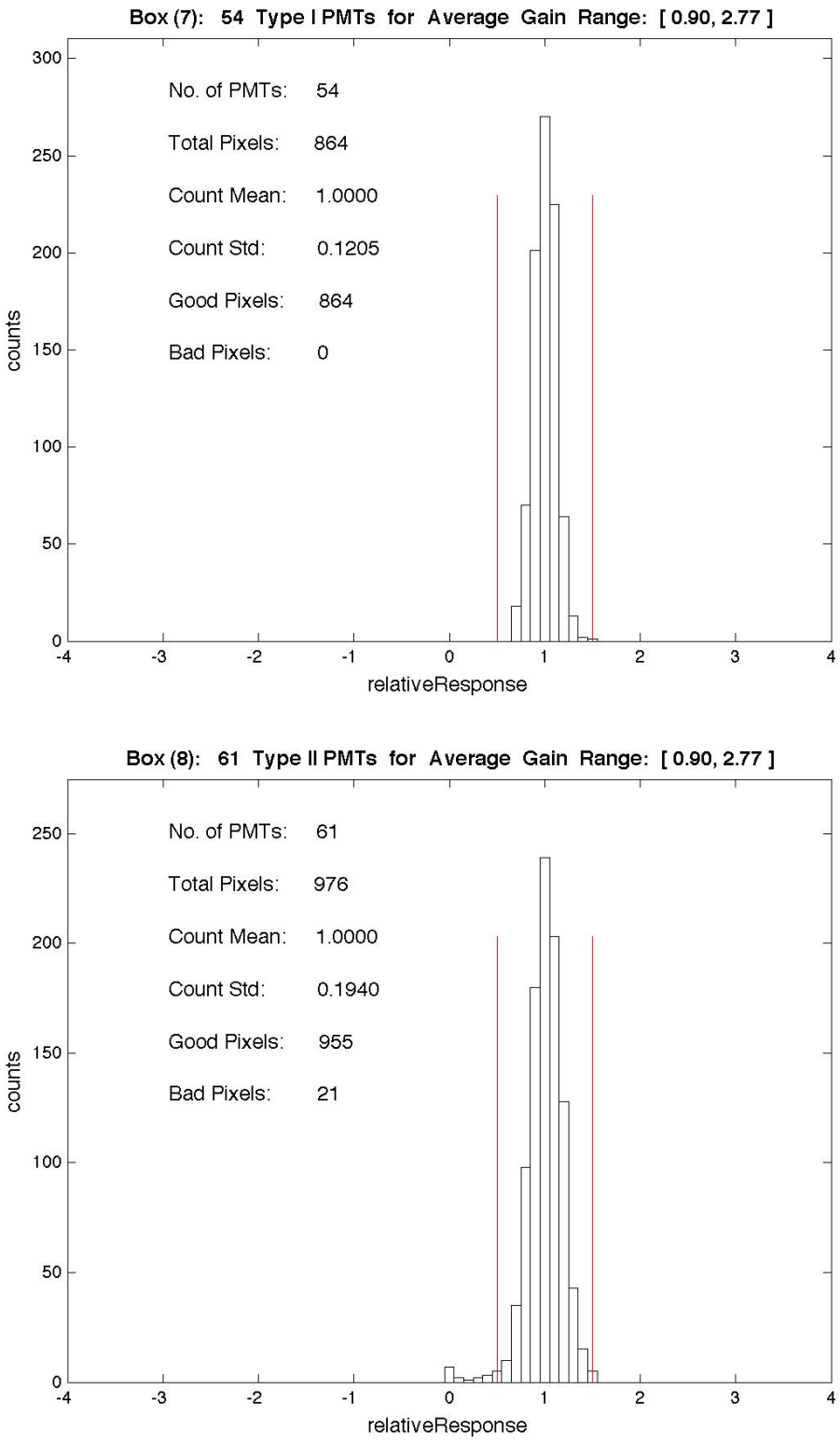

Figure 3.16: Relative Response PMT Box No. 7 and 8.

Chapter 4

Results

The main results of the performance analysis carried out on 602 MA-PMTs has been provided in Table 4. This table organizes the results by grouping all of the PMTs by how many bad pixels they have before sorting them by their type and gain classifications.

From Table 4, it can be seen that a total of 347 PMTs were found to have uniform performance with no bad pixels, and the majority of these were found to be operating with average to high gains. Furthermore, another 107 PMTs were assessed as having non-uniform performance with at most a single bad pixel that exhibited a similar range of operational performance as the uniform tubes. These two groups of PMTs represent over 75% of the available tubes. An additional 120 PMTs were found to have non-uniform performance with at most two to three bad pixels and exhibited average to below average operating performances. The remaining 28 PMTs had five to sixteen defective pixels, were non-uniform, and performed poorly.

Detailed information on each tube and its performance has been provided in the appendices. In particular, Appendix A of this report contains ten tables with cross reference data on each PMT tested that includes: its PMT Type, its assigned Test Number, and its unique Serial Number. Appendix B provides cross reference data as well on each PMT with regards to its performance. It lists the PMTs in the order of increasingly bad pixels and groups them according to their type and gain classifica-

tions. Finally, Appendix C contains detailed performance summaries as highlighted in Table 3.1. These summaries have been organized by increasing order of the assigned Test Numbers. All of these appendices allow the reader to access the performance results associated with each MA-PMT tested, analyzed, and reported within this document.

Number of Bad Pixels	PMT Type							
	Type 1 Gain				Type 2 Gain			
	Poor	Average	Good	High	Poor	Average	Good	High
0	2	36	79	54	27	68	34	47
1	-	5	1	-	32	45	13	11
2	-	1	2	-	26	33	4	-
3	-	1	-	-	11	22	-	2
4	1	-	-	-	7	8	1	1
5	-	-	-	-	4	4	-	-
6	-	-	-	-	3	2	-	-
7	-	-	-	-	1	-	-	-
8	-	-	-	-	3	-	-	-
9	-	-	-	-	-	-	-	-
10	-	-	-	-	1	1	-	-
11	-	-	-	-	1	-	-	-
12	1	-	-	-	2	-	-	-
13	-	-	-	-	1	-	-	-
14	-	-	-	-	1	-	-	-
15	1	-	-	-	-	-	-	-
16	-	2	-	-	-	-	-	-

Table 4.1: Summary of PMT Performance

Chapter 5

Conculsions

The work carried out under this activity was successful in that it developed and used a number of appropriate metrics and measures to analyze the operational performances of 602 MA-PMT tubes. The results obtained establish the overall performance of each PMT and should assist in the subsequent analysis and determination of how to use these tubes to support the construction of the CDet's 3rd detector frame. As a result of this effort, this report will be one of Saint Marys University's contributions to the design and construction of the CDet at JLab in Virginia, USA.

Appendix A

MA-PMT Identification Numbers

This appendix contains ten tables that identify the unique numbers associated with each MA-PMT tested as part of this thesis project. In particular, they provide the PMT Type, the number assigned to the PMT for test purposes, and its associated Serial Number for the reader's convenience. Type I and II tubes correspond to models H8711 and R5900-00-M16 PMTs manufactured by Hamamatsu Photonics K.K., respectively. The numbers assigned to these tubes ran from 1 to 603 with the exception that there is no tube for number 325 due to a mistake made during the numbering process. Consequently, there are only 602 tubes contained in these tables, not 603 as the numbering might suggest. Finally, detailed summaries of each tube's performance assessments are provided in Appendices B and C.

Type	No.	Serial No.	Type	No.	Serial No.	Type	No.	Serial No.
1	1	SA1515	1	23	SA1174	1	45	SA0610
1	2	SA0428	1	24	SA1517	1	46	SA1603
1	3	SA1173	1	25	SA0716	1	47	SA0932
1	4	SA0928	1	26	SA0490	1	48	SA1605
1	5	SA1614	1	27	SA1539	1	49	SA1624
1	6	SA1394	1	28	SA1598	1	50	SA1518
1	7	SA1659	1	29	SA1691	1	51	SA1520
1	8	SA1649	1	30	SA1567	1	52	SA1593
1	9	SA1516	1	31	SA1631	1	53	SA1613
1	10	SA1048	1	32	SA1604	1	54	SA1654
1	11	SA1657	1	33	SA1551	1	55	SA1616
1	12	SA1620	1	34	SA1464	1	56	SA1045
1	13	SA0446	1	35	SA1463	1	57	SA1643
1	14	SA1030	1	36	SA1514	1	58	SA1617
1	15	SA1634	1	37	SA0921	1	59	SA0465
1	16	SA1637	1	38	SA1430	1	60	SA0512
1	17	SA1049	1	39	SA1559	1	61	SA1589
1	18	SA1611	1	40	SA0023	1	62	SA1530
1	19	SA1608	1	41	SA1588	1	63	SA1596
1	20	SA0479	1	42	SA1572	1	64	SA0165
1	21	SA1607	1	43	SA1602	1	65	SA1561
1	22	SA0761	1	44	SA0273	1	66	SA0457

Table A.1: PMT Type, Test No., and Serial No. for tubes 1 to 66.

Type	No.	Serial No.	Type	No.	Serial No.	Type	No.	Serial No.
1	67	SA1606	1	89	SA1648	1	111	SA1619
1	68	SA1625	1	90	SA1557	1	112	SA1622
1	69	SA1419	1	91	SA1661	1	113	SA1479
1	70	SA1601	1	92	SA1647	1	114	SA1615
1	71	SA1597	1	93	SA1646	1	115	SA1618
1	72	SA1621	1	94	SA1658	1	116	SA1499
1	73	SA1645	1	95	SA1504	1	117	SA1532
1	74	SA1599	1	96	SA1476	1	118	SA1462
1	75	SA1485	1	97	SA1346	1	119	SA1465
1	76	SA1636	1	98	SA1346	1	120	SA1297
1	77	SA1489	1	99	SA1574	1	121	SA1587
1	78	SA1375	1	100	SA1467	1	122	SA0659
1	79	SA0567	1	101	SA1483	1	123	SA1490
1	80	SA0653	1	102	SA1478	1	124	SA1536
1	81	SA1508	1	103	SA1487	1	125	SA1461
1	82	SA1623	1	104	SA1480	1	126	SA1482
1	83	SA1612	1	105	SA1512	1	127	SA1505
1	84	SA1664	1	106	SA1511	1	128	SA1662
1	85	SA1522	1	107	SA1529	1	129	SA1477
1	86	SA1509	1	108	SA1474	1	130	SA1556
1	87	SA1660	1	109	SA1626	1	131	SA1475
1	88	SA1650	1	110	SA1655	1	132	SA1469

Table A.2: PMT Type, Test No., and Serial No. for tubes 67 to 132.

Type	No.	Serial No.	Type	No.	Serial No.	Type	No.	Serial No.
1	133	SA1494	1	155	SA1568	1	177	SA0619
1	134	SA1506	1	156	SA1582	1	178	SA1521
1	135	SA1558	1	157	SA1577	1	179	SA1491
1	136	SA1481	1	158	SA1585	1	180	SA1583
1	137	SA1507	1	159	SA1573	1	181	SA1528
1	138	SA1415	1	160	SA1380	1	182	SA1581
1	139	SA1468	1	161	SA1563	1	183	SA1470
1	140	SA1566	1	162	SA1584	1	184	SA1580
1	141	SA0614	1	163	SA1586	1	185	SA1519
1	142	SA1562	1	164	SA1473	1	186	SA0487
1	143	SA1488	1	165	SA1510	2	187	5L06D4
1	144	SA1569	1	166	SA1578	2	188	5M18D4
1	145	SA1492	1	167	SA1576	2	189	6A08D1
1	146	SA1534	1	168	SA1540	2	190	5L02D3
1	147	SA1307	1	169	SA1466	2	191	6D12C1
1	148	SA1535	1	170	SA1377	2	192	6D04C5
1	149	SA1493	1	171	SA1575	2	193	6B19D3
1	150	SA1594	1	172	SA1542	2	194	6C08D3
1	151	SA1594	1	173	SA1471	2	195	6A31D1
1	152	SA1531	1	174	SA1428	2	196	5M11D5
1	153	SA1486	1	175	SA1570	2	197	6D03C4
1	154	SA1579	1	176	SA1500	2	198	5L28C7

Table A.3: PMT Type, Test No., and Serial No. for tubes 133 to 198.

Type	No.	Serial No.	Type	No.	Serial No.	Type	No.	Serial No.
2	199	6A25D2	2	221	5L06D5	2	243	5L27C6
2	200	6C27C1	2	222	5M18D3	2	244	5L09C1
2	201	7A10C2	2	223	5L10D7	2	245	5L02D6
2	202	5M01D4	2	224	5L10D5	2	246	6B15D7
2	203	6C15C2	2	225	5M28D5	2	247	5L08D3
2	204	6D01C2	2	226	5L06D3	2	248	6M13CA
2	205	6D11C6	2	227	5L09D1	2	249	5L08C4
2	206	5L08C1	2	228	6B13D8	2	250	6D23C1
2	207	5L16C4	2	229	5M07D6	2	251	6C26C2
2	208	6D11C7	2	230	7A09L6	2	252	6D08C8
2	209	6C27C8	2	231	5L08D7	2	253	7E16LC
2	210	6B15D3	2	232	5M11D1	2	254	6B16D5
2	211	6B07D3	2	233	5M04D5	2	255	6B06D2
2	212	5M20D7	2	234	6M17CF	2	256	6B27D1
2	213	6C01D2	2	235	6B16C1	2	257	5L30C9
2	214	5L10D4	2	236	5K30D6	2	258	6B28D7
2	215	6A12D4	2	237	6C01D1	2	259	5M18C1
2	216	5L10D4	2	238	6B01D7	2	260	6D08C1
2	217	5M14D7	2	239	6A12C1	2	261	6A18D6
2	218	7A10C5	2	240	5M21C6	2	262	6C14D3
2	219	6A08D5	2	241	6C26C1	2	263	6B13D4
2	220	6C13C3	2	242	6D12C7	2	264	5M28D2

Table A.4: PMT Type, Test No., and Serial No. for tubes 199 to 264.

Type	No.	Serial No.	Type	No.	Serial No.	Type	No.	Serial No.
2	265	6B20C1	2	287	6D11C4	2	309	6A16D6
2	266	BB23D5	2	288	6B20D3	2	310	6A16D5
2	267	6A12C2	2	289	6B19D1	2	311	6A17DB
2	268	6B02D4	2	290	6C19D3	2	312	6D23C2
2	269	6B06D1	2	291	6B07D5	2	313	6B01D1
2	270	6A26D3	2	292	6C01D6	2	314	5M04D2
2	271	6A11D3	2	293	6B01D3	2	315	6A29D2
2	272	5M19D2	2	294	6A25D5	2	316	7G14L2
2	273	6C27C3	2	295	6D22A1	2	317	6C27CA
2	274	5M19D1	2	296	6D03C2	2	318	6C13C8
2	275	5L28C1	2	297	6D22C5	2	319	6C22C4
2	276	5M21C1	2	298	5L16C6	2	320	6B08D5
2	277	6C01D7	2	299	6D11C8	2	321	5M01D6
2	278	6B27D5	2	300	5M04D4	2	322	6A22D3
2	279	5L09C2	2	301	6D04C3	2	323	6B27D3
2	280	5M21D9	2	302	6A30DA	2	324	5L16C5
2	281	6B19D2	2	303	6C27C9	2	326	6A18D7
2	282	6B27D2	2	304	5M20D8	2	327	5L21D5
2	283	5L10D1	2	305	5M27D9	2	328	6A29D1
2	284	7E16LD	2	306	6C21D8	2	329	5M22C2
2	285	6d12C8	2	307	6C11D2	2	330	5L02D4
2	286	6C27C4	2	308	5L24C4	2	331	6A16D7

Table A.5: PMT Type, Test No., and Serial No. for tubes 265 to 330.

Type	No.	Serial No.	Type	No.	Serial No.	Type	No.	Serial No.
2	332	6A31D3	2	354	5L30CA	2	376	5M04D7
2	333	5L22D6	2	355	6B15D4	2	377	6B28D1
2	334	5M22D2	2	356	6B20D8	2	378	5L27C5
2	335	6D24C9	2	357	6B19D4	2	379	7A08C2
2	336	6B07D8	2	358	6B28D6	2	380	5M14D4
2	337	6C11D3	2	359	6B16D1	2	381	6B23D3
2	338	6A17D3	2	360	6C01D4	2	382	6A29D5
2	339	5M06D4	2	361	6A12D6	2	383	SL13D3
2	340	6B23D6	2	362	6D08C2	2	384	6M16R7
2	341	6B15D6	2	363	SL22D5	2	385	5M20D1
2	342	7E20D2	2	364	5M15D9	2	386	6L29C2
2	343	6C15C6	2	365	6C05D4	2	387	5M21C2
2	344	6C11C4	2	366	6A09D8	2	388	6C14D8
2	345	6C19D7	2	367	6B02D5	2	389	6B20D4
2	346	6A12D8	2	368	5L29C9	2	390	5L10C5
2	347	5L10C7	2	369	6C15C5	2	391	5L27C1
2	348	6A30D2	2	370	6C19D4	2	392	5M20D2
2	349	6D18C2	2	371	6C05C4	2	393	6C14D2
2	350	5L16C9	2	372	6D15C8	2	394	6D23C5
2	351	6A11D6	2	373	6306C3	2	395	5M21DA
2	352	7E17LB	2	374	6C14D7	2	396	5M27D8
2	353	5M20C6	2	375	6A08D4	2	397	5M05C6

Table A.6: PMT Type, Test No., and Serial No. for tubes 332 to 397.

Type	No.	Serial No.	Type	No.	Serial No.	Type	No.	Serial No.
2	398	6D12CA	2	420	6C01D8	2	442	6D04C8
2	399	5L13D2	2	421	6M25RE	2	443	6C15C8
2	400	5M22DA	2	422	6D12C5	2	444	6C08D5
2	401	6B20DA	2	423	6A25C1	2	445	6A29D3
2	402	6A17D7	2	424	6D22CA	2	446	5M15D6
2	403	6D08C7	2	425	6D22C9	2	447	6A04C9
2	404	5L14C5	2	426	5M27D7	2	448	5M05C4
2	405	5M22D8	2	427	5M18D8	2	449	6D12C4
2	406	6A09D4	2	428	6B08D4	2	450	6D03C3
2	407	5L20CA	2	429	5M05D2	2	451	6D24C6
2	408	5M20C2	2	430	5M19D9	2	452	6B20D1
2	409	6A25D6	2	431	6B13D2	2	453	5M05D7
2	410	6C08D6	2	432	6A26D1	2	454	5M15D2
2	411	6A12D9	2	433	6B01D5	2	455	6A22D2
2	412	5M06D1	2	434	5L08C3	2	456	6B27D4
2	413	5M12D5	2	435	5M07D3	2	457	5M01D7
2	414	6C05D3	2	436	5L08D8	2	458	6B28D3
2	415	6A16D4	2	437	6D24C8	2	459	5L13C2
2	416	6A22D4	2	438	5M07D7	2	460	6C11C1
2	417	5M14D6	2	439	5M07D4	2	461	6A08D3
2	418	6A30D7	2	440	6C12D5	2	462	5L07D7
2	419	5M01D1	2	441	5L06D6	2	463	6A30D5

Table A.7: PMT Type, Test No., and Serial No. for tubes 398 to 463.

Type	No.	Serial No.	Type	No.	Serial No.	Type	No.	Serial No.
2	464	6A22D1	2	486	6M12C2	2	508	5M20D6
2	465	6D01C5	2	487	5M20D9	2	509	6A17DA
2	466	6A11D5	2	488	5M18D9	2	510	5M19D6
2	467	5M04D8	2	489	5M20C5	2	511	5L06D7
2	468	6D24C4	2	490	6B05CA	2	512	5M21D4
2	469	6B06D9	2	491	6C27C5	2	513	5L10C3
2	470	5M05C8	2	492	5L07C2	2	514	5L22D3
2	471	5M21D7	2	493	6C14D1	2	515	6C12D3
2	472	5L02D5	2	494	5L08D5	2	516	5M04D9
2	473	5M15D1	2	495	5M05D1	2	517	5M11D6
2	474	6A30D3	2	496	6D08D4	2	518	6C15C4
2	475	6A12D3	2	497	6A30D8	2	519	5M28D9
2	476	6C27C2	2	498	6A16D2	2	520	7E16L3
2	477	6A31D2	2	499	5M27D1	2	521	6B15D2
2	478	6B06C2	2	500	5L10C4	2	522	6B13D3
2	479	6C06D4	2	501	6B01D6	2	523	6B28D2
2	480	6C13C5	2	502	5M04D3	2	524	6M25R2
2	481	5M15DA	2	503	5L21D2	2	525	5M12D3
2	482	6D01CA	2	504	6A26D4	2	526	6M27LA
2	483	6A30D9	2	505	6A11D1	2	527	5M20D5
2	484	6D01C3	2	506	6A16D3	2	528	6B28C4
2	485	5L13C5	2	507	6C20C7	2	529	7A08C9

Table A.8: PMT Type, Test No., and Serial No. for tubes 464 to 529.

Type	No.	Serial No.	Type	No.	Serial No.	Type	No.	Serial No.
2	530	5M05C5	2	552	6B23D1	2	574	6C19D9
2	531	6E08C2	2	553	5L09C3	2	575	6A08D2
2	532	5L24C3	2	554	5M26D2	2	576	6M24C3
2	533	6B02D6	2	555	6B06C1	2	577	6C19D2
2	534	5M15D5	2	556	6M04D6	2	578	5M21D1
2	535	6B20D6	2	557	6A12D7	2	579	5M19DA
2	536	6M25R4	2	558	6B13D6	2	580	6D08D3
2	537	5M27D3	2	559	6B20D5	2	581	6A18D8
2	538	6B20D2	2	560	6E07C2	2	582	6M20R5
2	539	5M18D2	2	561	6C05C3	2	583	6C12D2
2	540	5L29C6	2	562	7E16L4	2	584	5L27C4
2	541	6B02D3	2	563	6B07D4	2	585	6B08D2
2	542	6C12D4	2	564	5M11D4	2	586	6C12D6
2	543	5L14C6	2	565	6E08CA	2	587	6B19D7
2	544	5L13C1	2	566	5M05C7	2	588	5M20C1
2	545	6D15C7	2	567	5M21C5	2	589	6A11D2
2	546	6D24C1	2	568	6E09D5	2	590	6B27D7
2	547	6A29D7	2	569	6C11C3	2	591	5M19D8
2	548	5L14C3	2	570	6B28D8	2	592	6A26D5
2	549	6D04C7	2	571	5L07C4	2	593	7G14L1
2	550	6M17CC	2	572	6D22C1	2	594	6B19D5
2	551	5M22C1	2	573	6C14D5	2	595	6C20C1

Table A.9: PMT Type, Test No., and Serial No. for tubes 530 to 595.

Type	No.	Serial No.	Type	No.	Serial No.	Type	No.	Serial No.
2	596	6B08D3						
2	597	6A22D6						
2	598	5M01D3						
2	599	5M21C4						
2	600	5M27D4						
2	601	6B28D5						
2	602	6D23C8						
2	603	6A24CA						

Table A.10: PMT Type, Test No., and Serial No. for tubes 596 to 603.

Appendix B

Summary of PMT Performances by Number of Bad Pixels

This appendix contains seven tables that provide cross reference data on each PMT with regards to its performance. It lists the PMTs based upon the number of bad pixels it has and groups them according to their type and gain classifications for the reader's convenience. The detailed performance summaries identified in these tables can be found in Appendix C by looking up their assigned test number in the tables provided.

```
   ---------------------------------------------------------
   --------------------- Uniform PMTs ----------------------
   ---------------------------------------------------------

>> 347 PMTs with  0 Bad Pixels:  171 Type I and 176 Type II <<

                  Type I PMTs

   High Gain:       1   5   7  12  17  18  21  24  27  28
                   32  33  38  50  52  53  54  58  62  68
                   72  73  81  84  86  87  90  92  95  98
                   99 106 109 110 111 112 114 115 124 125
                  128 130 134 137 144 146 148 150 152 172
                  174 175 181 185

   Good Gain:       2   3   8   9  11  16  19  20  22  23
                   29  35  36  37  39  41  42  44  47  49
                   51  56  57  59  60  61  65  66  67  71
                   74  75  76  82  83  85  88  89  93  94
                   96  97 100 104 105 107 108 113 116 117
                  118 119 127 129 131 132 135 136 139 140
                  142 145 149 153 154 155 160 163 165 166
                  168 170 173 176 178 179 180 182 184

   Average Gain:    4  13  15  25  26  30  31  34  40  43
                   45  46  48  55  70  77  78  80  91 101
                  102 103 120 122 123 126 133 138 151 157
                  159 162 164 169 183 186

   Poor Gain:       6 177

                  Type II PMTs

   High Gain:     210 228 230 238 248 253 254 255 284 291
                  313 316 332 341 342 355 357 373 386 393
                  428 431 433 469 477 478 479 486 490 501
                  520 521 522 524 526 536 550 555 558 561
                  562 563 576 582 585 594 596
```

Table B.1: PMT Performance Summary for tubes with 0 bad pixels.

```
   Good Gain:     193 203 211 220 237 246 266 269 285 289
                  294 302 312 336 337 345 374 387 408 409
                  410 440 444 489 497 510 533 541 544 551
                  573 592 595 602

   Average Gain:  190 192 195 199 223 240 249 250 262 276
                  290 293 308 310 315 329 331 334 335 340
                  349 364 370 375 388 389 392 395 398 400
                  401 402 403 420 422 425 427 445 446 448
                  449 450 453 454 456 459 466 471 474 476
                  484 492 498 514 516 517 519 532 537 539
                  552 559 579 584 589 591 600 603

   Poor Gain:     188 212 221 244 259 260 261 288 298 300
                  303 306 314 353 354 376 377 429 457 464
                  473 475 493 506 548 556 599

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>> 107 PMTs with  1 Bad Pixels:    6 Type I and 101 Type II <<

                  Type I PMTs

   Good Gain:     143

   Average Gain:  121 147 158 167 171

                  Type II PMTs

   High Gain:     201 218 234 338 352 365 367 379 384 507
                  529

   Good Gain:     263 318 344 369 380 390 451 480 545 546
                  567 574 583

   Average Gain:  189 191 194 206 213 219 222 227 242 264
                  270 273 274 278 280 297 305 317 319 330
                  351 360 362 378 385 396 406 407 423 435
                  458 481 491 499 527 547 549 564 570 575
                  580 588 590 598 601
```

Table B.2: PMT Performance Summary for tubes with 1 bad pixels.

```
   Poor Gain:     187 198 202 214 215 226 243 245 256 267
                  268 272 281 282 299 323 347 372 383 405
                  411 412 415 418 419 463 467 500 557 578
                  581 597

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>  66 PMTs with  2 Bad Pixels:    3 Type I and  63 Type II <<

                  Type I PMTs

   Good Gain:      64 161

   Average Gain:   69

                  Type II PMTs

   Good Gain:     414 434 531 560

   Average Gain:  196 197 204 216 225 232 251 258 277 287
                  296 301 309 328 363 366 382 394 404 424
                  426 430 437 443 465 488 523 540 542 543
                  554 565 568

   Poor Gain:     231 233 239 241 247 257 275 279 283 286
                  295 304 311 326 333 358 361 416 438 439
                  455 461 509 525 528 530

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>  36 PMTs with  3 Bad Pixels:    1 Type I and  35 Type II <<

                  Type I PMTs

   Average Gain:   10
```

Table B.3: PMT Performance Summary for tubes with 2 to 3 bad pixels.

```
                Type II PMTs

   High Gain:     320 421

   Average Gain:  200 208 217 224 292 307 343 368 371 381
                  436 452 470 485 495 496 504 513 515 535
                  553 569

   Poor Gain:     205 235 327 346 350 494 503 511 512 518
                  534

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs ------------------
   ------------------------------------------------------

>>  18 PMTs with  4 Bad Pixels:    1 Type I and  17 Type II <<

                Type I PMTs

   Poor Gain:     141

                Type II PMTs

   High Gain:     417

   Good Gain:     468

   Average Gain:  229 321 348 359 397 441 442 566

   Poor Gain:     207 209 324 391 413 462 571

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs ------------------
   ------------------------------------------------------

>>   8 PMTs with  5 Bad Pixels:    0 Type I and   8 Type II <<

                Type II PMTs

   Average Gain:  271 399 447 572

   Poor Gain:     236 339 508 586
```

Table B.4: PMT Performance Summary for tubes with 4 to 5 bad pixels.

```
   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>   5 PMTs with  6 Bad Pixels:    0 Type I and   5 Type II <<

                Type II PMTs

   Average Gain:  505 577

   Poor Gain:     472 502 538

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>   1 PMTs with  7 Bad Pixels:    0 Type I and   1 Type II <<

                Type II PMTs

   Poor Gain:     482

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>   3 PMTs with  8 Bad Pixels:    0 Type I and   3 Type II <<

                Type II PMTs

   Poor Gain:     322 356 487

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>   2 PMTs with 10 Bad Pixels:    0 Type I and   2 Type II <<

                Type II PMTs

   Average Gain:  587
```

Table B.5: PMT Performance Summary for tubes with 6 to 10 bad pixels.

```
   Poor Gain:     265

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>   1 PMTs with 11 Bad Pixels:    0 Type I and   1 Type II <<

                  Type II PMTs

   Poor Gain:     252

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>   3 PMTs with 12 Bad Pixels:    1 Type I and   2 Type II <<

                  Type I PMTs

   Poor Gain:      79

                  Type II PMTs

   Poor Gain:     483 593

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>   1 PMTs with 13 Bad Pixels:    0 Type I and   1 Type II <<

                  Type II PMTs

   Poor Gain:     460
```

Table B.6: PMT Performance Summary for tubes with 11 to 13 bad pixels.

```
   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>   1 PMTs with 14 Bad Pixels:    0 Type I and   1 Type II <<

                 Type II PMTs

   Poor Gain:     432

   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>   1 PMTs with 15 Bad Pixels:    1 Type I and   0 Type II <<

                 Type I PMTs

   Poor Gain:      14


   ------------------------------------------------------
   ------------------- Non-Uniform PMTs -----------------
   ------------------------------------------------------

>>   2 PMTs with 16 Bad Pixels:    2 Type I and   0 Type II <<

                 Type I PMTs

   Average Gain:   63 156
```

Table B.7: PMT Performance Summary for tubes with 14 to 16 bad pixels.

Appendix C

Summary of PMT Performances by their Assigned Test Number

This appendix provides seventy six tables that contain detailed performance summaries identical to the data highlighted in Table 3.1. A detailed description of the summaries provided can be found in Section 3 on page 64 of this report. Finally, the information in this appendix is organized by increasing order of the PMT's assigned test numbers for ease of access and the convenience of the reader.

```
-----------------------------------------------------------------------
PMT No.:   1
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0841]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0241,17.2503]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   2
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1848]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7236,13.5049]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   3
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1684]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7903,15.3800]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   4
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.3518]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5867,11.1376]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
-----------------------------------------------------------------------
PMT No.:   5
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0874]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0680,18.6231]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   6
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   1  along  with  5  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2044]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2780, 5.6966]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   7
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1161]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0417,17.8772]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   8
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0856]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8169,14.6016]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.1: PMT Performance Summary for tubes 1 to 8.

```
-----------------------------------------------------------------------
PMT No.:   9
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1400]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8220,15.4156]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  10
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.3589]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4829, 9.4689]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   1   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  11
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0887]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6820,13.1025]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  12
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1067]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3071,21.5583]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
-----------------------------------------------------------------------
PMT No.:  13
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1917]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4146, 7.9285]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  14
Rating:   Non-Uniform  -  Poor Gain  -  15  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   1  along  with  5  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 1.0961]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0775, 2.8897]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   1   1   1   1   0   1   1   1   1   1   1   1   1   1   1

-----------------------------------------------------------------------
PMT No.:  15
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2546]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4922, 9.6845]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  16
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0987]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6830,13.2514]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.2: PMT Performance Summary for tubes 9 to 16.

```
-----------------------------------------------------------------------
PMT No.:   17
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1984]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0984,18.7490]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   18
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2080]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9075,17.2577]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   19
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1678]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6415,12.2227]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   20
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1184]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6880,12.7052]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   21
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0786]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.2521,22.8871]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   22
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1708]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7219,13.0285]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   23
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2808]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7374,14.2621]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   24
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1097]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1141,19.2167]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.3: PMT Performance Summary for tubes 17 to 24.

```
----------------------------------------------------------------------
PMT No.:   25
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1630]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4886, 9.0411]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   26
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1577]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4495, 9.3566]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   27
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0840]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0237,17.1874]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   28
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1091]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9125,16.2428]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   29
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2161]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6468,11.5277]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   30
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2371]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3600, 6.9975]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   31
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1543]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4407, 9.1042]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   32
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1418]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1436,20.6799]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.4: PMT Performance Summary for tubes 25 to 32.

```
---------------------------------------------------------------------
PMT No.:   33
Rating:    Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:    7  along  with  54  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.1113]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 1.1989,20.2378]   Filter Range:  [0.9000,2.7655]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:   34
Rating:    Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:    3  along  with  45  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.1258]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.5925,11.2715]   Filter Range:  [0.3000,0.6000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:   35
Rating:    Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:    5  along  with  82  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.0862]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.8819,16.3032]   Filter Range:  [0.6000,0.9000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:   36
Rating:    Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:    5  along  with  82  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.1102]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.6156,11.8871]   Filter Range:  [0.6000,0.9000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
---------------------------------------------------------------------
PMT No.:   37
Rating:    Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:    5  along  with  82  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.1698]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.6522,11.5670]   Filter Range:  [0.6000,0.9000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:   38
Rating:    Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:    7  along  with  54  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.1170]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 1.0487,18.8573]   Filter Range:  [0.9000,2.7655]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:   39
Rating:    Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:    5  along  with  82  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.1203]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.8385,15.7503]   Filter Range:  [0.6000,0.9000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:   40
Rating:    Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:    3  along  with  45  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.1794]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.5211, 9.3714]   Filter Range:  [0.3000,0.6000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.5: PMT Performance Summary for tubes 33 to 40.

```
----------------------------------------------------------------------
PMT No.:  41
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1290]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7977,14.9687]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  42
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0695]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7635,13.5312]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  43
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2597]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3709, 6.7060]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  44
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1397]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6530,12.1744]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  45
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1707]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5188,10.2127]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  46
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1344]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4270, 7.7161]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  47
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2475]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8130,14.2584]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  48
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2466]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4534,16.3885]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.6: PMT Performance Summary for tubes 41 to 48.

```
----------------------------------------------------------------------
PMT No.:   49
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1996]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6711,11.9397]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   50
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0919]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9006,16.6342]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   51
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1321]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8804,15.3921]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   52
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1042]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9677,17.6942]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   53
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0993]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3352,24.5824]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   54
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0849]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1501,19.3776]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   55
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2493]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5706,10.1887]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   56
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1312]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6256,11.3155]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.7: PMT Performance Summary for tubes 49 to 56.

```
-----------------------------------------------------------------------
PMT No.:   57
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1082]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7763,14.9315]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   58
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1109]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0485,18.3364]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   59
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0974]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8249,15.2380]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   60
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1705]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6536,11.8062]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
-----------------------------------------------------------------------
PMT No.:   61
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0922]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7311,13.0721]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   62
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0484]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0682,19.3932]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:   63
Rating:   Non-Uniform  -  Average Gain  -  16  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 1.0343]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4920, 9.0638]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1

-----------------------------------------------------------------------
PMT No.:   64
Rating:   Non-Uniform  -  Good Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.4083]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6649,12.6248]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   1
```

Table C.8: PMT Performance Summary for tubes 57 to 64.

```
-----------------------------------------------------------------------
PMT No.:  65
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1181]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7669,13.2765]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  66
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0939]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8545,15.5316]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  67
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1538]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8757,15.8913]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  68
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1016]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1171,19.7578]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  69
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.3532]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5285, 9.9173]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   1   0   0   0

-----------------------------------------------------------------------
PMT No.:  70
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2290]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5256,10.1003]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  71
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1957]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8481,14.6933]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  72
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0951]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1167,20.3934]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.9: PMT Performance Summary for tubes 65 to 72.

```
----------------------------------------------------------------------
PMT No.:   73
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1106]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0496,18.9519]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   74
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2531]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6166,11.0718]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   75
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1511]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6781,13.0255]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   76
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2443]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6658,12.2757]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
----------------------------------------------------------------------
PMT No.:   77
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1939]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5653,10.4744]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   78
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1883]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3590, 7.0657]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   79
Rating:   Non-Uniform  -  Poor Gain  -  12  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   1  along  with  5  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 2.5667]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0029, 0.8805]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   0   1   1   0   0   1   1   1   1   1   1   1   1

----------------------------------------------------------------------
PMT No.:   80
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2542]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4105, 8.1004]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.10: PMT Performance Summary for tubes 73 to 80.

```
----------------------------------------------------------------------
PMT No.:   81
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1553]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9388,18.6792]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   82
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0839]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8886,16.4444]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   83
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1030]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6910,12.4304]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   84
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1788]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9287,16.7034]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   85
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1047]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7166,13.0591]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   86
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2272]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9718,17.4097]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   87
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1267]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0247,18.6944]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   88
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1308]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7400,13.9124]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.11: PMT Performance Summary for tubes 81 to 88.

```
----------------------------------------------------------------------
PMT No.:   89
Rating:    Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:    5  along  with  82  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.1068]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.7664,13.8270]   Filter Range:  [0.6000,0.9000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   90
Rating:    Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:    7  along  with  54  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.0961]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 1.3069,23.2651]   Filter Range:  [0.9000,2.7655]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   91
Rating:    Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:    3  along  with  45  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.2544]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.5719,10.2337]   Filter Range:  [0.3000,0.6000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   92
Rating:    Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:    7  along  with  54  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.1198]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.9259,16.1739]   Filter Range:  [0.9000,2.7655]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   93
Rating:    Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:    5  along  with  82  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.0680]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.8606,14.6456]   Filter Range:  [0.6000,0.9000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   94
Rating:    Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:    5  along  with  82  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.0788]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.6983,13.0552]   Filter Range:  [0.6000,0.9000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   95
Rating:    Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:    7  along  with  54  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.0820]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 1.0269,17.8284]   Filter Range:  [0.9000,2.7655]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:   96
Rating:    Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:    5  along  with  82  other  Type  I PMTs
RR:        Mean,Std:  [ 1.0000, 0.1409]   Filter Range:  [0.5000,1.5000]
AveGain:   Mean,Std:  [ 0.6384,11.5052]   Filter Range:  [0.6000,0.9000]
Pixel:     1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
           0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.12: PMT Performance Summary for tubes 89 to 96.

```
--------------------------------------------------------------------
PMT No.:   97
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1603]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6648,11.6361]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:   98
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0873]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.4753,25.2433]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:   99
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0738]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1513,14.9216]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  100
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1433]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6520,11.0392]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  101
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1093]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5860,11.2566]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  102
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1118]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4427, 8.6305]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  103
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2042]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5732,10.4181]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  104
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0969]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7204,13.0431]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.13: PMT Performance Summary for tubes 97 to 104.

```
-----------------------------------------------------------------------
PMT No.:  105
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1726]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7529,13.9046]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  106
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1906]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9172,16.4272]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  107
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1335]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7917,14.2722]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  108
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1400]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7222,13.1290]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  109
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1950]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.2837,19.8525]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  110
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2460]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9481,15.4808]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  111
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0873]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1552,18.5944]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  112
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0671]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0274,18.4163]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.14: PMT Performance Summary for tubes 105 to 112.

```
--------------------------------------------------------------------
PMT No.:  113
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1345]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6347,10.6417]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  114
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1511]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9707,15.9023]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  115
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1340]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0388,18.2750]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  116
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0844]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8265,14.6211]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  117
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0951]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8570,14.5987]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  118
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1066]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8643,14.8807]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  119
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1088]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6787,12.9182]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  120
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1222]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5283,10.0612]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.15: PMT Performance Summary for tubes 113 to 120.

```
---------------------------------------------------------------------
PMT No.:  121
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.3486]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5521,10.3997]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   1   0   0   0

---------------------------------------------------------------------
PMT No.:  122
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2276]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5437,10.2196]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  123
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2334]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3764, 7.0325]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  124
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0516]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9754,16.6715]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
---------------------------------------------------------------------
PMT No.:  125
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1244]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9747,17.0731]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  126
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2213]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3301, 6.2883]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  127
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0734]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8102,14.6290]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  128
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1198]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1823,20.3486]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.16: PMT Performance Summary for tubes 121 to 128.

```
-----------------------------------------------------------------------
PMT No.:  129
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1069]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8260,14.5186]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  130
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0796]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.2426,20.8967]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  131
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1015]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7987,14.1159]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  132
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1404]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6534,13.4040]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  133
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1828]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5196, 9.3094]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  134
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1173]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9148,16.5164]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  135
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1081]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7941,13.5371]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  136
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1146]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6871,12.7746]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.17: PMT Performance Summary for tubes 129 to 136.

```
------------------------------------------------------------------------
PMT No.:  137
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0738]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9146,16.5968]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  138
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1458]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3880, 7.6501]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  139
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1086]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8224,14.7794]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  140
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2101]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6923,11.2292]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
------------------------------------------------------------------------
PMT No.:  141
Rating:   Non-Uniform  -  Poor Gain  -  4  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   1  along  with  5  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.3866]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1350, 2.9724]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   1   0   0   0   0   0   1   0   0   1

------------------------------------------------------------------------
PMT No.:  142
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0948]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7862,13.3412]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  143
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2067]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6528,11.9644]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   1   0   0   0

------------------------------------------------------------------------
PMT No.:  144
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0795]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1027,18.2234]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.18: PMT Performance Summary for tubes 137 to 144.

```
-----------------------------------------------------------------------
PMT No.:  145
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1259]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6613,11.7832]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  146
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1351]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9073,15.1846]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  147
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.3049]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3982, 7.3584]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  148
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1313]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1577,19.3610]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
-----------------------------------------------------------------------
PMT No.:  149
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1952]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6010,11.2980]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  150
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0924]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0031,18.2745]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  151
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1638]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3503, 6.9501]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  152
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1384]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9482,16.0185]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.19: PMT Performance Summary for tubes 145 to 152.

```
----------------------------------------------------------------------
PMT No.:  153
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1710]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6285,11.2478]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  154
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1436]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8095,14.4408]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  155
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1450]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7257,12.9821]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  156
Rating:   Non-Uniform  -  Average Gain  -  16  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 1.0489]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3625, 6.5594]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
```

```
----------------------------------------------------------------------
PMT No.:  157
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2330]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5471, 9.7144]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  158
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2853]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4524, 7.9794]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

----------------------------------------------------------------------
PMT No.:  159
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0916]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4540, 8.1031]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  160
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1044]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7645,12.9021]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.20: PMT Performance Summary for tubes 153 to 160.

```
----------------------------------------------------------------------
PMT No.:  161
Rating:   Non-Uniform  -  Good Gain  -  2  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.3628]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6243,10.7190]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   1

----------------------------------------------------------------------
PMT No.:  162
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1726]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5313, 9.3231]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  163
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1122]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8557,16.5295]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  164
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2573]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5019,10.3425]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  165
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1282]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7591,15.0407]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  166
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1923]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7636,13.2985]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  167
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.3144]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3820, 7.3507]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

----------------------------------------------------------------------
PMT No.:  168
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1421]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8259,15.5975]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.21: PMT Performance Summary for tubes 161 to 168.

```
-----------------------------------------------------------------------
PMT No.:  169
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2611]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5674,11.3282]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  170
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1091]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8046,15.0310]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  171
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2492]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4584, 7.9501]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  172
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0922]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1714,19.9650]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  173
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1391]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7641,13.0119]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  174
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1308]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3175,22.5744]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  175
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.0894]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9003,15.0410]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  176
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1628]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6018,11.9512]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.22: PMT Performance Summary for tubes 169 to 176.

```
---------------------------------------------------------------------
PMT No.:  177
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   1  along  with  5  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2266]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2480, 4.7462]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  178
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1048]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8714,16.2437]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  179
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1912]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6575,11.7778]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  180
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2013]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6281,11.3933]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  181
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1251]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9297,15.8829]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  182
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1823]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6279,11.4246]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  183
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.2360]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5041,10.7234]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  184
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   5  along  with  82  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1810]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7989,15.3157]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.23: PMT Performance Summary for tubes 177 to 184.

```
------------------------------------------------------------------------
PMT No.:  185
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   7  along  with  54  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1243]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9272,17.0868]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  186
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   3  along  with  45  other  Type  I PMTs
RR:       Mean,Std:  [ 1.0000, 0.1242]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5941,11.8554]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  187
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2628]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1956, 7.2615]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

------------------------------------------------------------------------
PMT No.:  188
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2467]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1107, 4.1798]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  189
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2619]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4205,14.2135]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

------------------------------------------------------------------------
PMT No.:  190
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2143]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4818,16.3853]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  191
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2708]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5134,15.2988]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

------------------------------------------------------------------------
PMT No.:  192
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2578]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3110,10.0121]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.24: PMT Performance Summary for tubes 185 to 192.

```
---------------------------------------------------------------------
PMT No.:  193
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1474]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7242,25.5272]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  194
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2900]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3243,12.2824]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  195
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2208]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4144,14.0220]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  196
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3518]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3686,13.8487]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   1

---------------------------------------------------------------------
PMT No.:  197
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3262]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4024,11.0871]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  198
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3327]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2566, 8.1863]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  199
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2209]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3427,12.6900]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  200
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3480]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3346, 9.4904]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   0   0   0   0   0   1   1   0   0   0   0
```

Table C.25: PMT Performance Summary for tubes 193 to 200.

```
-----------------------------------------------------------------------
PMT No.:  201
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2550]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.2968,27.7766]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  202
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2439]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2840,10.8151]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  203
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1518]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6190,20.2456]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  204
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3097]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4276,10.9411]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   1   0   0

-----------------------------------------------------------------------
PMT No.:  205
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3431]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1472, 5.8337]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   1   1   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  206
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2041]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3254,10.9609]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  207
Rating:   Non-Uniform  -  Poor Gain  -  4  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3972]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1432, 5.3475]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   1   1   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  208
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4337]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5137,12.1474]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   1   1   0   0   0   0
```

Table C.26: PMT Performance Summary for tubes 201 to 208.

```
---------------------------------------------------------------------
PMT No.:  209
Rating:   Non-Uniform  -  Poor Gain  -  4  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3832]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2259, 7.5081]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   1   0   0   0   0   0   1   1   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  210
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1548]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9832,26.6748]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  211
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2057]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6228,20.6364]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  212
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2858]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1188, 4.3150]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  213
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2129]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4041,15.2847]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  214
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2497]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2108, 8.0870]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  215
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3650]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1959, 7.3671]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  216
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3464]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3454,13.6352]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   1   0   0   0   0
```

Table C.27: PMT Performance Summary for tubes 209 to 216.

```
------------------------------------------------------------------------
PMT No.:  217
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3825]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4859,15.5255]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   0   0   0   0   0   0   0   0   0   0   0   0   1   1

------------------------------------------------------------------------
PMT No.:  218
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2557]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1989,21.4583]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  219
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2654]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4519,15.1924]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

------------------------------------------------------------------------
PMT No.:  220
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2155]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7524,26.6269]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  221
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2845]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1705, 6.1349]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  222
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2335]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4652,15.7284]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

------------------------------------------------------------------------
PMT No.:  223
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2329]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5091,18.2819]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  224
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4058]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3037,11.4958]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   0   0   1   0   0   0   0   0   0   0   0   0   0
```

Table C.28: PMT Performance Summary for tubes 217 to 224.

```
------------------------------------------------------------------------
PMT No.:  225
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3047]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4572,16.0213]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   1   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  226
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2946]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0783, 3.3252]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

------------------------------------------------------------------------
PMT No.:  227
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3108]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4066,16.0399]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

------------------------------------------------------------------------
PMT No.:  228
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1698]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.2961,35.0252]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  229
Rating:   Non-Uniform  -  Average Gain  -  4  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3891]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3831,12.7771]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   0   0   1   0   0   0   0   0   0   0   0   0   1

------------------------------------------------------------------------
PMT No.:  230
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1635]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3674,28.5312]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  231
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3035]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2954,11.1549]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------------
PMT No.:  232
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
------------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4535]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3113,13.1511]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   1
```

Table C.29: PMT Performance Summary for tubes 225 to 232.

```
-------------------------------------------------------------------
PMT No.:  233
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
-------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2986]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2399, 8.7092]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0

-------------------------------------------------------------------
PMT No.:  234
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
-------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3079]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3949,31.1031]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-------------------------------------------------------------------
PMT No.:  235
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
-------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3729]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0134, 1.4617]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   1   0   0   0   0   0   0   0   0   1   0

-------------------------------------------------------------------
PMT No.:  236
Rating:   Non-Uniform  -  Poor Gain  -  5  Bad  Pixel (s)
-------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4672]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0265, 1.7694]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   1   0   0   0   1   1   1   0   0   0   0

-------------------------------------------------------------------
PMT No.:  237
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2058]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6671,22.8447]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-------------------------------------------------------------------
PMT No.:  238
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1647]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9779,24.4102]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-------------------------------------------------------------------
PMT No.:  239
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
-------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3271]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2716,11.0402]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0

-------------------------------------------------------------------
PMT No.:  240
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2147]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5455,19.0752]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.30: PMT Performance Summary for tubes 233 to 240.

```
--------------------------------------------------------------------
PMT No.:  241
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2680]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2181, 7.1494]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   1   0   0   0   0   0   0   0   0   0   1   0   0

--------------------------------------------------------------------
PMT No.:  242
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3362]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5044,13.9201]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  243
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2643]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2119, 7.9513]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

--------------------------------------------------------------------
PMT No.:  244
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2733]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2301, 7.5520]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  245
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3760]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2218, 8.1523]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  246
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2399]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7941,27.6042]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  247
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3876]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1769, 7.0605]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   1

--------------------------------------------------------------------
PMT No.:  248
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1168]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.8299,33.0392]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.31: PMT Performance Summary for tubes 241 to 248.

```
-----------------------------------------------------------------------
PMT No.:  249
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2288]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4306,13.7652]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  250
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2019]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4539,12.5029]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  251
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3072]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3174,10.2660]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   1   0   0   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  252
Rating:   Non-Uniform  -  Poor Gain  -  11  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 1.1253]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0447, 6.9715]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   1   0   1   0   0   0   0   1   1   1   1   1   1   1   1

-----------------------------------------------------------------------
PMT No.:  253
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1373]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 2.1374,39.3646]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  254
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1547]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9145,29.1667]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  255
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1299]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3933,35.5152]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  256
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2283]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2182, 8.5099]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0
```

Table C.32: PMT Performance Summary for tubes 249 to 256.

```
--------------------------------------------------------------------
PMT No.:  257
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3832]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0325, 2.0627]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0

--------------------------------------------------------------------
PMT No.:  258
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3522]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3181,11.9723]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0

--------------------------------------------------------------------
PMT No.:  259
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1671]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2672, 9.3564]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  260
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2472]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2354, 7.2572]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
--------------------------------------------------------------------
PMT No.:  261
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1881]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1905, 7.1750]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  262
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1798]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5915,19.9008]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  263
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2779]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7093,19.0701]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

--------------------------------------------------------------------
PMT No.:  264
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2160]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4027,14.5967]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0
```

Table C.33: PMT Performance Summary for tubes 257 to 264.

```
----------------------------------------------------------------------
PMT No.:  265
Rating:   Non-Uniform  -  Poor Gain  -  10  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 1.7696]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0015, 1.3943]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   1   1   1   1   0   1   0   0   1   1   1   1   1

----------------------------------------------------------------------
PMT No.:  266
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2184]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6167,22.4775]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  267
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3288]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1936, 7.4823]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  268
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3072]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1564, 5.2480]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0
```

```
----------------------------------------------------------------------
PMT No.:  269
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2239]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8502,28.7668]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  270
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3763]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4702,15.2961]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  271
Rating:   Non-Uniform  -  Average Gain  -  5  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 1.1385]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3100, 5.4816]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   1   1   1   1   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  272
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2607]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2501, 9.2523]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0
```

Table C.34: PMT Performance Summary for tubes 265 to 272.

```
---------------------------------------------------------------------
PMT No.:  273
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3425]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3818,12.1490]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  274
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3035]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4025,12.9539]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  275
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3504]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2133, 8.3835]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  276
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1802]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3479,12.0344]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  277
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3690]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4564,15.6916]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  278
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3412]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4080,16.9057]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  279
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3135]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2349, 8.8334]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  280
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3665]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3379,12.0913]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0
```

Table C.35: PMT Performance Summary for tubes 273 to 280.

```
---------------------------------------------------------------------
PMT No.:  281
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4018]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0415, 2.1179]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   1   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  282
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2276]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2292, 9.0816]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  283
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3906]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2595, 9.6676]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   1   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  284
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1770]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3783,26.7284]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
---------------------------------------------------------------------
PMT No.:  285
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2181]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6013,15.5509]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  286
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3690]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2724, 8.4130]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   1   0   0

---------------------------------------------------------------------
PMT No.:  287
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3317]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4634,13.4372]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  288
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2676]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1962, 7.3024]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.36: PMT Performance Summary for tubes 281 to 288.

```
----------------------------------------------------------------------
PMT No.:  289
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2365]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8173,30.5808]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  290
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2175]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3182,11.0661]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  291
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1662]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3011,34.3284]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  292
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4275]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4227,16.1383]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   1   0   0   0   1   0   0   0   0

----------------------------------------------------------------------
PMT No.:  293
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1763]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5718,15.8837]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  294
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1948]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6845,24.4533]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  295
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3868]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1367, 5.2108]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0

----------------------------------------------------------------------
PMT No.:  296
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3765]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4012,10.8036]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0
```

Table C.37: PMT Performance Summary for tubes 289 to 296.

```
-----------------------------------------------------------------------
PMT No.:  297
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2826]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3539, 9.6471]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  298
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2431]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2326, 7.1978]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  299
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3189]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2750, 9.1006]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  300
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2032]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2779, 9.1397]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  301
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3001]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4708,11.7565]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  302
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2449]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6398,17.4459]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  303
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2160]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2161, 7.7117]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  304
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2616]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1181, 3.9350]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   1   0   0   0   0   0   0   0   0   0   0   0
```

Table C.38: PMT Performance Summary for tubes 297 to 304.

```
-----------------------------------------------------------------------
PMT No.:  305
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3196]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5776,15.8974]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  306
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2471]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2495, 8.2596]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  307
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4082]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5608,16.4763]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   1   0   1   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  308
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2027]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5154,16.2672]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  309
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3426]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3108,10.6837]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  310
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2245]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3937,12.1722]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  311
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4220]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0631, 2.7927]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  312
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2145]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6869,17.1853]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.39: PMT Performance Summary for tubes 305 to 312.

```
-----------------------------------------------------------------------
PMT No.:  313
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2194]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3668,28.5563]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  314
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2443]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2525, 9.7467]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  315
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1399]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5055,14.7436]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  316
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1738]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0077,20.2172]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  317
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2570]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4762,11.9075]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  318
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2618]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8150,24.1325]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  319
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3620]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4664,12.6705]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  320
Rating:   Non-Uniform  -  High Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3083]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.6514,36.6323]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   1   1   1
```

Table C.40: PMT Performance Summary for tubes 313 to 320.

```
------------------------------------------------------------------
PMT No.:  321
Rating:   Non-Uniform  -  Average Gain  -  4  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4331]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3200, 9.8839]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   0   0   1   0   0   0   0   0   0   0   0   0   1

------------------------------------------------------------------
PMT No.:  322
Rating:   Non-Uniform  -  Poor Gain  -  8  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.5641]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2430, 8.1837]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   1   1   1   0   1   0   0   0   0   0   1   0   1   1   0

------------------------------------------------------------------
PMT No.:  323
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2246]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2954,11.8046]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

------------------------------------------------------------------
PMT No.:  324
Rating:   Non-Uniform  -  Poor Gain  -  4  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.5406]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2109, 8.7290]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   0   0   0   0   0   0   0   0   0   0   0   1   1

------------------------------------------------------------------
PMT No.:  326
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2637]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0744, 3.0561]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   0   0   0   0   0   0   1   0   0   0   0

------------------------------------------------------------------
PMT No.:  327
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3858]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2580, 7.6142]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   1   1   1

------------------------------------------------------------------
PMT No.:  328
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3137]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5902,17.3121]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   1

------------------------------------------------------------------
PMT No.:  329
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2597]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3428,10.5540]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.41: PMT Performance Summary for tubes 322 to 329.

```
---------------------------------------------------------------------
PMT No.:  330
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2795]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4193,11.7812]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  331
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2439]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5708,15.0696]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  332
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1274]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.2348,26.4497]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  333
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3512]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2486, 6.5035]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   0   0   0   1   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  334
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2284]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3911,11.4832]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  335
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1591]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5390,12.9990]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  336
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1630]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8216,22.1996]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  337
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2289]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7415,21.1151]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.42: PMT Performance Summary for tubes 330 to 337.

```
----------------------------------------------------------------------
PMT No.:  338
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2825]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1396,19.3124]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  339
Rating:   Non-Uniform  -  Poor Gain  -  5  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.7768]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1199, 2.7981]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   1   0   0   0   0   0   0   0   0   0   0   1   1

----------------------------------------------------------------------
PMT No.:  340
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1975]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4126,15.9356]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  341
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2078]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.6679,39.8452]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  342
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1221]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.5395,28.1063]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  343
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3354]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4425,16.5258]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   1   1   0   0   0   0

----------------------------------------------------------------------
PMT No.:  344
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2113]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6154,17.6299]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

----------------------------------------------------------------------
PMT No.:  345
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2650]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6815,18.5399]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.43: PMT Performance Summary for tubes 338 to 345.

```
--------------------------------------------------------------------
PMT No.:  346
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3503]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2577, 7.4720]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   1   0   0   0   0   0   0   1   1   0   0   0   0

--------------------------------------------------------------------
PMT No.:  347
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3262]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0722, 2.8587]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   1   0   0   0

--------------------------------------------------------------------
PMT No.:  348
Rating:   Non-Uniform  -  Average Gain  -  4  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3879]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4913,13.9357]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   1   0   0   1   1

--------------------------------------------------------------------
PMT No.:  349
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2461]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4854,11.7816]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
--------------------------------------------------------------------
PMT No.:  350
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4252]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2672, 8.3237]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   1   1

--------------------------------------------------------------------
PMT No.:  351
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3161]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3462,10.4903]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  352
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2976]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 2.4673,37.2999]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  353
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2749]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2702, 8.2661]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.44: PMT Performance Summary for tubes 346 to 353.

```
---------------------------------------------------------------------
PMT No.:  354
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2446]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1529, 4.6445]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  355
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1018]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 2.1227,41.0437]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  356
Rating:   Non-Uniform  -  Poor Gain  -  8  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4576]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1251, 4.1888]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   1   1   1   1   0   0   0   0   0   0   1   0   0   1   1

---------------------------------------------------------------------
PMT No.:  357
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1647]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0507,29.0336]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  358
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3791]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0290, 2.0448]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   1   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  359
Rating:   Non-Uniform  -  Average Gain  -  4  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3686]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3563,11.1151]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   1   0   0   0   0   0   0   1   0   0   0   1

---------------------------------------------------------------------
PMT No.:  360
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2158]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5671,16.4946]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

---------------------------------------------------------------------
PMT No.:  361
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3610]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1568, 5.1325]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1
```

Table C.45: PMT Performance Summary for tubes 354 to 361.

```
-----------------------------------------------------------------------
PMT No.:  362
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2216]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5051,12.6556]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  363
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3913]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3914,12.4881]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0

-----------------------------------------------------------------------
PMT No.:  364
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2160]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5959,17.7268]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  365
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2356]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0300,27.8624]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  366
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3177]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5037,14.5772]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   1   0   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  367
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3195]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9015,17.4733]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  368
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3172]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4095,11.9622]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   0   0   0   0   0   0   0   0   1   1   0

-----------------------------------------------------------------------
PMT No.:  369
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3299]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7827,20.9565]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0
```

Table C.46: PMT Performance Summary for tubes 362 to 369.

```
--------------------------------------------------------------------
PMT No.:  370
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1867]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4951,14.0057]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  371
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3600]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4439,12.5073]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   1   0   0   1   0

--------------------------------------------------------------------
PMT No.:  372
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3106]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2731, 7.2842]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0

--------------------------------------------------------------------
PMT No.:  373
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1692]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3796,41.5041]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  374
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2587]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6783,18.2659]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  375
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2302]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4638,13.1642]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  376
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2150]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1480, 5.7218]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  377
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2288]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2850, 8.9819]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.47: PMT Performance Summary for tubes 370 to 377.

```
-----------------------------------------------------------------------
PMT No.:  378
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2812]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3203,10.7835]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  379
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3486]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.6778,29.3355]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  380
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2708]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7713,22.0463]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  381
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3769]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5711,17.0045]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   1   1
```

```
-----------------------------------------------------------------------
PMT No.:  382
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3081]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3457,11.4995]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  383
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3121]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1979, 7.1535]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0

-----------------------------------------------------------------------
PMT No.:  384
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2947]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.4939,22.7528]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  385
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2919]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3967,12.5034]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1
```

Table C.48: PMT Performance Summary for tubes 378 to 385.

```
----------------------------------------------------------------------
PMT No.:  386
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1948]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3507,23.7231]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  387
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2323]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8269,22.0418]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  388
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2351]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5088,14.6360]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  389
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3030]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3027, 9.5138]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  390
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2965]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6207,16.9596]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  391
Rating:   Non-Uniform  -  Poor Gain  -  4  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4403]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0997, 3.6310]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   1   0   0   0   0   0   0   0   0   1   1

----------------------------------------------------------------------
PMT No.:  392
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1676]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4309,12.7436]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  393
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1586]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0667,25.3438]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.49: PMT Performance Summary for tubes 386 to 393.

```
-----------------------------------------------------------------
PMT No.:  394
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3512]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3728,10.4994]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   0   0   0   0   0   0   0   0   0   0   0   0   1   0

-----------------------------------------------------------------
PMT No.:  395
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2113]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4232,12.0693]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------
PMT No.:  396
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3307]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4897,13.9134]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------
PMT No.:  397
Rating:   Non-Uniform  -  Average Gain  -  4  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4544]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3086, 9.1166]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   1   0   0   0   0   0   0   0   1   1   0

-----------------------------------------------------------------
PMT No.:  398
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2150]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4100,12.4830]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------
PMT No.:  399
Rating:   Non-Uniform  -  Average Gain  -  5  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3744]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3509,11.0524]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   1   0   0   0   1   0   1   1   1

-----------------------------------------------------------------
PMT No.:  400
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2261]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3989,12.1183]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------
PMT No.:  401
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2054]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4174,15.5914]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.50: PMT Performance Summary for tubes 394 to 401.

```
----------------------------------------------------------------------
PMT No.:  402
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2122]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5346,12.2241]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  403
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2670]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3192, 9.0722]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  404
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3175]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3736,10.8266]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   1

----------------------------------------------------------------------
PMT No.:  405
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2251]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2766, 8.7509]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

----------------------------------------------------------------------
PMT No.:  406
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2505]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4634,13.8888]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

----------------------------------------------------------------------
PMT No.:  407
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2903]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4768,14.6357]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  408
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2829]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6663,18.9939]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  409
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1257]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7170,20.7695]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.51: PMT Performance Summary for tubes 402 to 409.

```
-----------------------------------------------------------------------
PMT No.:  410
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1902]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6807,21.0673]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  411
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2759]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1580, 5.1024]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  412
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2642]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2406, 8.2345]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  413
Rating:   Non-Uniform  -  Poor Gain  -  4  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 1.5674]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2213, 4.6813]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   1   0   0   0   0   0   0   0   1   0   0   1
```

```
-----------------------------------------------------------------------
PMT No.:  414
Rating:   Non-Uniform  -  Good Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3017]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6069,18.5788]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   1   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  415
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3763]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0942, 3.8777]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  416
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3667]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1356, 4.9751]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1

-----------------------------------------------------------------------
PMT No.:  417
Rating:   Non-Uniform  -  High Gain  -  4  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3919]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.7164,37.3455]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   0   0   1   1   1
```

Table C.52: PMT Performance Summary for tubes 410 to 417.

```
-----------------------------------------------------------------------
PMT No.:  418
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3251]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1708, 5.5745]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  419
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3094]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2351, 8.4761]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  420
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2127]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3523,13.4633]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  421
Rating:   Non-Uniform  -  High Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3566]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3121,24.4954]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   1   1   1
```

```
-----------------------------------------------------------------------
PMT No.:  422
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2188]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3377, 9.3179]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  423
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3287]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4722,14.6892]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  424
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3754]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3600, 9.5036]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  425
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1199]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5003,12.7354]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.53: PMT Performance Summary for tubes 418 to 425.

```
---------------------------------------------------------------------
PMT No.:  426
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3630]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3157, 9.7791]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   1   0   0

---------------------------------------------------------------------
PMT No.:  427
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2356]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5124,15.7545]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  428
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1485]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.2073,31.0740]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  429
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2095]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1983, 6.9239]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
---------------------------------------------------------------------
PMT No.:  430
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3770]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3259,10.4685]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1

---------------------------------------------------------------------
PMT No.:  431
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1565]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.5653,35.4676]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  432
Rating:   Non-Uniform  -  Poor Gain  -  14  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 1.4752]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0031, 1.4671]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   1   1   1   1   1   1   1   1   1   1   1   1   1

---------------------------------------------------------------------
PMT No.:  433
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1043]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.5995,36.2825]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.54: PMT Performance Summary for tubes 426 to 433.

```
-----------------------------------------------------------------
PMT No.:  434
Rating:   Non-Uniform  -  Good Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3600]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7177,25.8017]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1

-----------------------------------------------------------------
PMT No.:  435
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3200]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4302,13.3365]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------
PMT No.:  436
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3942]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5771,17.8970]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   1   1

-----------------------------------------------------------------
PMT No.:  437
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4005]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4492,12.0517]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   1   0

-----------------------------------------------------------------
PMT No.:  438
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3018]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2694, 9.2724]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   1   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------
PMT No.:  439
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3634]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0996, 4.2513]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------
PMT No.:  440
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2676]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8106,25.3312]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------
PMT No.:  441
Rating:   Non-Uniform  -  Average Gain  -  4  Bad  Pixel (s)
-----------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4381]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3652,11.3277]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   1   0   0   1   1
```

Table C.55: PMT Performance Summary for tubes 434 to 441.

```
--------------------------------------------------------------------
PMT No.:  442
Rating:   Non-Uniform  -  Average Gain  -  4  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3704]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4527,11.7433]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   1   0   0   0   0   0   0   0   0   0   1   1   0

--------------------------------------------------------------------
PMT No.:  443
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3798]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5556,15.8253]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0

--------------------------------------------------------------------
PMT No.:  444
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1750]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8544,23.2966]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  445
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2293]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4459,13.8945]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  446
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2123]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4933,15.5454]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  447
Rating:   Non-Uniform  -  Average Gain  -  5  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4150]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4211,10.5891]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   1   0   0   0   0   0   0   1   0   0   0   1   1

--------------------------------------------------------------------
PMT No.:  448
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2264]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3339,11.2267]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  449
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2416]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4892,12.0882]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.56: PMT Performance Summary for tubes 442 to 449.

```
---------------------------------------------------------------------
PMT No.:  450
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2978]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4040,10.5587]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
---------------------------------------------------------------------
PMT No.:  451
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3074]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6560,16.2519]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0
```

```
---------------------------------------------------------------------
PMT No.:  452
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3675]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5858,18.2906]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1
```

```
---------------------------------------------------------------------
PMT No.:  453
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1916]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4538,14.1827]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
---------------------------------------------------------------------
PMT No.:  454
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2113]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5632,16.8895]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
---------------------------------------------------------------------
PMT No.:  455
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3442]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2278, 7.7958]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   1   1   0
```

```
---------------------------------------------------------------------
PMT No.:  456
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2212]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4305,14.8746]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
---------------------------------------------------------------------
PMT No.:  457
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2116]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2105, 7.6260]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.57: PMT Performance Summary for tubes 450 to 457.

```
----------------------------------------------------------------------
PMT No.:  458
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2694]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3607,11.7481]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   1   0   0

----------------------------------------------------------------------
PMT No.:  459
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2280]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3829,12.6229]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  460
Rating:   Non-Uniform  -  Poor Gain  -  13  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 1.7066]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2508, 6.6514]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   0   0   1   1   1   1   1   1   1   1   1   1   1

----------------------------------------------------------------------
PMT No.:  461
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3523]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0583, 2.3905]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   1   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  462
Rating:   Non-Uniform  -  Poor Gain  -  4  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4616]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0793, 3.4971]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   1   0   0   0   0   0   0   0   0   1   1

----------------------------------------------------------------------
PMT No.:  463
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3589]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0804, 3.2600]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

----------------------------------------------------------------------
PMT No.:  464
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2806]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1899, 6.8274]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  465
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3025]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4364,11.3271]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   0   0   0   0   0   0   0   0   0   1   0
```

Table C.58: PMT Performance Summary for tubes 458 to 465.

```
------------------------------------------------------------------
PMT No.:  466
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2142]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5707,16.1172]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  467
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3515]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2758, 9.4571]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0

------------------------------------------------------------------
PMT No.:  468
Rating:   Non-Uniform  -  Good Gain  -  4  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4116]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6797,17.0527]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   1   0   0   0   0   0   1   0   0   0   1

------------------------------------------------------------------
PMT No.:  469
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1691]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.1829,27.7367]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  470
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3370]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3070,10.0265]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   1   0   1   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  471
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2406]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4883,15.2259]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  472
Rating:   Non-Uniform  -  Poor Gain  -  6  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.5532]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1542, 5.2702]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   1   1   0   0   0   0   0   0   1   1   1

------------------------------------------------------------------
PMT No.:  473
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2273]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2649, 8.9120]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.59: PMT Performance Summary for tubes 466 to 473.

```
----------------------------------------------------------------------
PMT No.:  474
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2070]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4710,14.1041]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  475
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3089]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2974, 9.3186]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  476
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2104]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4427,11.6890]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  477
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1349]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.6806,36.2769]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  478
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1464]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3757,32.8818]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  479
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2665]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9723,25.8414]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  480
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3126]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8081,22.2347]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

----------------------------------------------------------------------
PMT No.:  481
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3266]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4346,13.2800]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1
```

Table C.60: PMT Performance Summary for tubes 474 to 481.

```
--------------------------------------------------------------------
PMT No.:  482
Rating:   Non-Uniform  -  Poor Gain  -  7  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.5466]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0550, 4.2635]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   1   0   1   0   1   0   0   1   0   1   0   0   0

--------------------------------------------------------------------
PMT No.:  483
Rating:   Non-Uniform  -  Poor Gain  -  12  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 1.2632]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [-2.4101,12.5794]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   1   1   1   1   1   1   0   1   1   0   0   1   1   1

--------------------------------------------------------------------
PMT No.:  484
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2730]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5285,14.0517]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  485
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3886]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3292,10.9406]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   1   0   0   0   0   0   1   0   0   0   0

--------------------------------------------------------------------
PMT No.:  486
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1096]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3831,22.4760]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  487
Rating:   Non-Uniform  -  Poor Gain  -  8  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 1.8618]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2473, 4.8134]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   1   1   0   0   1   1   0   0   1   1   0   1

--------------------------------------------------------------------
PMT No.:  488
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3336]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5508,15.8953]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   1

--------------------------------------------------------------------
PMT No.:  489
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1754]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6089,17.2779]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.61: PMT Performance Summary for tubes 482 to 489.

```
-----------------------------------------------------------------------
PMT No.:  490
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1316]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0117,24.3600]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  491
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3399]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3172, 8.8991]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  492
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2972]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3509,10.7443]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  493
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1681]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2593, 8.8132]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  494
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3835]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2363, 7.6333]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   1   1   1

-----------------------------------------------------------------------
PMT No.:  495
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3561]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3934,12.4423]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   1   0   0   0   0   0   0   0   0   0   0   1   0

-----------------------------------------------------------------------
PMT No.:  496
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3944]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4592,12.0810]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   1   1   0

-----------------------------------------------------------------------
PMT No.:  497
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1893]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7334,21.7086]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.62: PMT Performance Summary for tubes 490 to 497.

```
-----------------------------------------------------------------------
PMT No.:  498
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1935]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4422,13.4591]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  499
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2740]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3025, 9.7446]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   1   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  500
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2786]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2626, 8.0017]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  501
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1463]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.7854,37.0913]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  502
Rating:   Non-Uniform  -  Poor Gain  -  6  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4443]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1096, 4.2450]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   1   0   0   0   0   0   1   0   1   1   1

-----------------------------------------------------------------------
PMT No.:  503
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3605]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2200, 6.8065]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   1   0   0   0   0   0   0   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  504
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4247]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5647,17.2634]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  505
Rating:   Non-Uniform  -  Average Gain  -  6  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.5044]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3189,10.2519]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   1   0   1   0   0   0   0   0   1   0   0   1   1
```

Table C.63: PMT Performance Summary for tubes 498 to 505.

```
---------------------------------------------------------------------
PMT No.:  506
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2403]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2810, 8.7841]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  507
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2556]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.9197,25.2523]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

---------------------------------------------------------------------
PMT No.:  508
Rating:   Non-Uniform  -  Poor Gain  -  5  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4503]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1785, 5.8239]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   1   0   0   0   0   0   1   0   0   1   1

---------------------------------------------------------------------
PMT No.:  509
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3347]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0706, 3.0930]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   0   0   0   0   0   0   0   0   0   0   1

---------------------------------------------------------------------
PMT No.:  510
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2785]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6140,17.7319]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  511
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3872]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2898, 9.6066]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   1   1

---------------------------------------------------------------------
PMT No.:  512
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4466]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2058, 6.4375]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   1   0   0   0   0   0   0   0   0   0   1

---------------------------------------------------------------------
PMT No.:  513
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3706]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3538,11.5168]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   1   0   0   0   0   0   0   0   0   0   1   0
```

Table C.64: PMT Performance Summary for tubes 506 to 513.

```
------------------------------------------------------------------
PMT No.:  514
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1626]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3594,11.5154]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  515
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4309]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4634,13.8049]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0

------------------------------------------------------------------
PMT No.:  516
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2811]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3553,11.2539]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  517
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1958]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5165,15.4586]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  518
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3721]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1526, 5.1840]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   1   1   1   0   0   0   0

------------------------------------------------------------------
PMT No.:  519
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3053]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5293,15.2805]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  520
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1015]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 2.5364,44.1597]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  521
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1102]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 2.1150,47.0765]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.65: PMT Performance Summary for tubes 514 to 521.

```
--------------------------------------------------------------------
PMT No.:  522
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1895]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3267,30.1426]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  523
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3068]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4092,13.2075]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   0   0   0   0   0   0   0   0   0   0   1

--------------------------------------------------------------------
PMT No.:  524
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1315]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.6653,31.8920]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  525
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3971]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2858, 9.9565]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   1   0   0

--------------------------------------------------------------------
PMT No.:  526
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1924]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.4195,24.9943]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  527
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2871]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3107, 9.0738]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  528
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3178]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1875, 6.0700]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   1

--------------------------------------------------------------------
PMT No.:  529
Rating:   Non-Uniform  -  High Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2823]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.5160,26.6233]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0
```

Table C.66: PMT Performance Summary for tubes 522 to 529.

```
---------------------------------------------------------------------
PMT No.:  530
Rating:   Non-Uniform  -  Poor Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3536]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2790, 9.0753]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0

---------------------------------------------------------------------
PMT No.:  531
Rating:   Non-Uniform  -  Good Gain  -  2  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3430]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6498,19.5860]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   1

---------------------------------------------------------------------
PMT No.:  532
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1952]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5100,16.4573]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  533
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1875]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.8734,16.8044]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  534
Rating:   Non-Uniform  -  Poor Gain  -  3  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4414]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1216, 4.0521]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   1   0   0   0   0   0   0   0   0   0   1   1

---------------------------------------------------------------------
PMT No.:  535
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4089]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4180,13.5462]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   1   0   0   1   0

---------------------------------------------------------------------
PMT No.:  536
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1719]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3309,23.6685]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  537
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2098]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5276,15.0540]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.67: PMT Performance Summary for tubes 530 to 537.

```
-----------------------------------------------------------------------
PMT No.:  538
Rating:   Non-Uniform  -  Poor Gain  -  6  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4605]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0103, 1.3815]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   1   1   0   1   0   0   0   0   0   1   1   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  539
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1849]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5753,17.2612]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  540
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3536]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3038, 9.8076]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0

-----------------------------------------------------------------------
PMT No.:  541
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1391]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7735,16.4167]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  542
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3089]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4892,15.0404]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  543
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3318]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4017,11.7300]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1

-----------------------------------------------------------------------
PMT No.:  544
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2197]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7817,21.2944]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  545
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3419]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6237,16.9851]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0
```

Table C.68: PMT Performance Summary for tubes 538 to 545.

```
------------------------------------------------------------------
PMT No.:  546
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2657]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6014,15.0629]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

------------------------------------------------------------------
PMT No.:  547
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2732]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4588,13.9954]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  548
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3049]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2722, 8.6585]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  549
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3160]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3169, 8.2337]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0
```

```
------------------------------------------------------------------
PMT No.:  550
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1200]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.6472,27.4494]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  551
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2296]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7090,19.6306]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  552
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2569]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3092,10.0318]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

------------------------------------------------------------------
PMT No.:  553
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4477]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3788,13.3199]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   1   0   0   0   0   0   0   0   1   0   0
```

Table C.69: PMT Performance Summary for tubes 546 to 553.

```
-----------------------------------------------------------------------
PMT No.:  554
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4080]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5891,16.7163]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  555
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1217]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3319,33.2012]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  556
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2250]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1640, 5.9682]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  557
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2752]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2535, 7.6886]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  558
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.0912]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.5012,35.5717]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  559
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2507]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5054,15.8875]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  560
Rating:   Non-Uniform  -  Good Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2660]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7358,16.7310]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  561
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2198]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0988,29.3931]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.70: PMT Performance Summary for tubes 554 to 561.

```
-----------------------------------------------------------------------
PMT No.:  562
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1065]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 2.7655,47.9691]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  563
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1732]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0111,25.4018]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  564
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3351]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5222,15.9741]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  565
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3866]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5217,15.9744]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   1

-----------------------------------------------------------------------
PMT No.:  566
Rating:   Non-Uniform  -  Average Gain  -  4  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4170]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4929,13.9059]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   1   0   0   0   0   0   0   0   0   0   1   1   0

-----------------------------------------------------------------------
PMT No.:  567
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2967]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6458,19.1258]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

-----------------------------------------------------------------------
PMT No.:  568
Rating:   Non-Uniform  -  Average Gain  -  2  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3543]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4855,15.6463]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1

-----------------------------------------------------------------------
PMT No.:  569
Rating:   Non-Uniform  -  Average Gain  -  3  Bad  Pixel (s)
-----------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3878]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4246,12.8875]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   1   0   0   0   0   0   0   0   0   0   1   0
```

Table C.71: PMT Performance Summary for tubes 562 to 569.

```
--------------------------------------------------------------------
PMT No.:  570
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3032]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5562,16.9495]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  571
Rating:   Non-Uniform  -  Poor Gain  -  4  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.9719]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0833, 2.6958]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   1   1   1   0   0   1   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  572
Rating:   Non-Uniform  -  Average Gain  -  5  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.5035]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3796,13.1605]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   1   0   0   1   0   0   0   1   0   0   0   0   1

--------------------------------------------------------------------
PMT No.:  573
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2470]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6067,18.3455]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  574
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2912]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7957,23.2734]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  575
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2337]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5902,16.8271]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

--------------------------------------------------------------------
PMT No.:  576
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1454]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3842,25.2552]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  577
Rating:   Non-Uniform  -  Average Gain  -  6  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.5770]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4412,13.9154]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   1   1   0   0   0   0   0   0   0   1   1   1
```

Table C.72: PMT Performance Summary for tubes 570 to 577.

```
---------------------------------------------------------------------
PMT No.:  578
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2278]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2732, 8.2897]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  579
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2458]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4680,13.6577]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  580
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3182]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4594,12.2417]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  581
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2722]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2410, 7.9380]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

---------------------------------------------------------------------
PMT No.:  582
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2056]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.3612,27.7817]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  583
Rating:   Non-Uniform  -  Good Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2888]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6106,18.6354]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  584
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2500]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3385,12.4332]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  585
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1465]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.5229,36.0438]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.73: PMT Performance Summary for tubes 578 to 585.

```
---------------------------------------------------------------------
PMT No.:  586
Rating:   Non-Uniform  -  Poor Gain  -  5  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.4316]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.1028, 3.8113]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   1   1   0   1   0   0   0   0   0   0   0   1   0   1

---------------------------------------------------------------------
PMT No.:  587
Rating:   Non-Uniform  -  Average Gain  -  10  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 1.4703]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3110, 4.8647]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          1   0   0   0   1   1   0   1   1   1   0   0   1   1   1   1

---------------------------------------------------------------------
PMT No.:  588
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2905]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3171,10.5712]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   1   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  589
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2012]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4399,13.6036]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
---------------------------------------------------------------------
PMT No.:  590
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3084]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5221,15.8468]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

---------------------------------------------------------------------
PMT No.:  591
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2242]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3592,11.6879]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  592
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2073]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.7978,22.3646]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  593
Rating:   Non-Uniform  -  Poor Gain  -  12  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.8936]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.0040, 1.3950]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   1   1   1   1   1   1   0   0   1   0   1   1   1   1   1
```

Table C.74: PMT Performance Summary for tubes 586 to 593.

```
---------------------------------------------------------------------
PMT No.:  594
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1459]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0161,29.2567]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  595
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1844]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6549,18.2009]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  596
Rating:   Uniform  -  High Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   8  along  with  61  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1505]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 1.0060,24.3355]   Filter Range:  [0.9000,2.7655]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  597
Rating:   Non-Uniform  -  Poor Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.3002]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2503, 8.6635]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

---------------------------------------------------------------------
PMT No.:  598
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2984]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4004,12.7411]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1

---------------------------------------------------------------------
PMT No.:  599
Rating:   Uniform  -  Poor Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   2  along  with  120  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2421]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.2073, 6.5567]   Filter Range:  [0.0000,0.3000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  600
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2208]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.4931,15.0019]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

---------------------------------------------------------------------
PMT No.:  601
Rating:   Non-Uniform  -  Average Gain  -  1  Bad  Pixel (s)
---------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2739]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.5784,17.2179]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1
```

Table C.75: PMT Performance Summary for tubes 594 to 601.

```
--------------------------------------------------------------------
PMT No.:  602
Rating:   Uniform  -  Good Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   6  along  with  52  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.1791]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.6830,17.6483]   Filter Range:  [0.6000,0.9000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

--------------------------------------------------------------------
PMT No.:  603
Rating:   Uniform  -  Average Gain  -  0  Bad  Pixel (s)
--------------------------------------------------------------------
In Box:   4  along  with  183  other  Type II PMTs
RR:       Mean,Std:  [ 1.0000, 0.2312]   Filter Range:  [0.5000,1.5000]
AveGain:  Mean,Std:  [ 0.3434,10.5185]   Filter Range:  [0.3000,0.6000]
Pixel:    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
          0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Table C.76: PMT Performance Summary for tubes 602 to 603.

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