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# Inventory

ID	Model	Assembled/Location	Comments	Measured
Sune	9813KB	Returned to Sune	Lent by Sune Jakobsen for measuring the SER	Yes
7505	9813KB	No. In "RCA Box" with label "Bad"	<ul style="list-style-type: none"> <li>• Sticker with "Ugly Signal"</li> <li>• It seems to be discharging. Even with no light we see pulses which are indistinguishable from the pulses with light</li> </ul>	Yes
7337	9813KB	No. In "Lyreco Box"	Sticker with "Low Eff"	Yes
7980	XP2262	No	Sticker with "T9"	Yes
6810	XP2020	No. In "RCA Box" with label "XP2020"	Sticker with "T6"	Yes
8919	9813KB	No. In "Lyreco Box"		Yes
7481	9813KB	No. In "Lyreco Box"		Yes
7497	9813KB	No. In "Lyreco Box"		Yes
7379	9813KB	No. In "RCA Box" with label "Bad"	<ul style="list-style-type: none"> <li>• Sticker with "Discharges?"</li> <li>• It does indeed seem to be discharging</li> </ul>	Yes
7340	9813KB	No. In "RCA Box" with label "Bad"	<ul style="list-style-type: none"> <li>• Sticker with "Low Eff"</li> <li>• In fact, the PM seems to be discharging: we see significant pulses even with no light source</li> </ul>	Yes
8885	9813KB	No. In own tube	<ul style="list-style-type: none"> <li>• Sticker with "Noisy"</li> <li>• There does seem to be a small amount of noise/discharge. But not significant.</li> </ul>	Yes
17248	XP2020		Sticker with "T7"	Yes

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		No. In "RCA Box" with label "XP2020"		
7516	9813KB	Partially in base B6	Noise inside, like something was loose. i.e. It rattles	No
17809	? (Same as PM 6810?)	Partially in base B5	The PM seems to be discharging: we see significant pulses even with no light source	Yes
15598	9813KB	Partially in base B8	Sticker with "T5"	Yes
?	?	Yes, in scintillator S1		No
?	?	Yes, in scintillator S4		No
?	?	Yes, in scintillator S3		No
39607	56DVP03	Yes, in scintillator S2		No
?	?	Yes, in scintillator S7		No
?	9813QKB (check)	Yes, in scintillator SCMu0		No
6094	9813QKB	Yes, in scintillator SCMu1		Yes
27821	Mullard 56 AVP	Yes, in scintillator SCL1		Yes
?	?	Yes, in scintillator SCL2		No
15697	9813KB	Yes, in scintillator SCL3	Sticker with "T4"	Yes
8882	9813KB	No	Sticker with "Probably radioactive photocathode, check in one month. 16/7/74"	No
7487	9813KB	No		No
23710	Phillips 53 AVP 03	No		No
7342	9813KB	No		No
8865	9813KB	No		No
7405	9813KB	No		No
7469	9813KB	No		No
7541	9813KB	No		No
8657	9813KB	No		No
8966	9813KB	No	Seems to discharge	Yes
7485	9813KB	No. In "Lyreco Box"		Yes
17208	Phillips 56 AVP	No		Yes
17183	Phillips 56 AVP	No		No
9050	9813KB	No		No
11518	Dario 56 AVP	No		No
11261	Phillips 56 AVP	No		No
8141	XP2020	No. In "RCA Box" with label "XP2020"		Yes
19644	RCA 8575	No	<ul style="list-style-type: none"> <li>• Sticker with "R18"</li> <li>• Sticker with "Noisy"</li> <li>• Sticker with "Sr<sup>{90}</sup> 400mV 24/5/78 at 2400V s/n~20"</li> </ul>	No
8301	RCA 8575	No		No

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			<ul style="list-style-type: none"> <li>• Sticker with "R5"</li> <li>• Sticker with "Sr<sup>{90}</sup> 420mV 24/5/78 at 2300V s/n~70"</li> </ul>	
12054	RCA 8575	No	<ul style="list-style-type: none"> <li>• Sticker with "R11"</li> <li>• Sticker with "Noisy"</li> <li>• Sticker with "Sr<sup>{90}</sup> 400mV 24/5/78 at 2100V s/n~15"</li> </ul>	No
Z03912	RCA 8575	No	<ul style="list-style-type: none"> <li>• Sticker with "F11"</li> <li>• Sticker with "Sr<sup>{90}</sup> 400mV 24/5/78 at 2300V s/n&gt;=80"</li> </ul>	No

# Useful Information

RCA was the original manufacturer of photomultiplier tubes:

- First demonstration of working PM: early 1934 (single stage design)
- Multistage conceived by inventor J. Slepian in 1919
- September 1934, RCA's Vladimir Zworykin was shown the first multiple-dynode photomultiplier, achieving gains of 1000x or more when demonstrated in June 1934
- First electrostatic PMs in 1937
- first mass-produced photomultiplier, the Type 931

In the late 1980s, RCA was acquired by General Electric. RCA's photomultiplier business was divested and continued as an independent company. Burle Industries, the successor to the RCA Corporation, carried the RCA photomultiplier business forward after 1986. In 2005 Burle Industries was acquired by Photonis. On 9 March 2009 Photonis announced that it would cease all production of photomultipliers.

Hamamatsu Photonics (also known as Hamamatsu) has emerged since the 1950s as a leader in the photomultiplier industry.

Some documents that might be interesting to read:

- The RCA PMT manual: <http://www.decadecounter.com/vta/pdf/RCAPMT.pdf>
- [https://psec.uchicago.edu/links/Photomultiplier\\_Handbook.pdf](https://psec.uchicago.edu/links/Photomultiplier_Handbook.pdf)

Other people measuring PMTs:

- <https://www.nevis.columbia.edu/reu/2006/hannahntalk.pdf>

## Model 8575

The photomultipliers we have of this model are all labeled RCA, meaning they were produced before the acquisition by GE. Finding the datasheet corresponding to RCA has been challenging, however the datasheet for the 8575 photomultiplier from Burle is easily found and is made available here (taken from [http://123.physics.ucdavis.edu/shot\\_files/Burle\\_8575PMT.pdf](http://123.physics.ucdavis.edu/shot_files/Burle_8575PMT.pdf)).

## Model XP2020

The manufacturer of our XP2020 tubes was not clearly indicated.

The Photonis datasheet for this tube is XP2020.pdf (taken from <https://my.et-enterprises.com/pdf/XP2020.pdf>)

The Phillips datasheet for this tube is Philips\_XP2020.pdf (taken from [https://wwwusers.ts.infn.it/~rui/univ/Acquisizione\\_Dati/Manuals/Philips%20XP2020.pdf](https://wwwusers.ts.infn.it/~rui/univ/Acquisizione_Dati/Manuals/Philips%20XP2020.pdf))

## Model XP2262

The Photonis datasheet for this tube is XP2262.pdf (taken from <https://my.et-enterprises.com/pdf/XP2262.pdf>)

## Model 56 AVP

Finding information for these PMTs is not easy. Some relevant links that give datasheet-like information:

- <http://www.coseti.org/56avppmt.htm>
- <https://www.hofstragroup.com/product/ampere-56avp-high-speed-photomultiplier-tube/>

The Amperex catalog has the most comprehensive and detailed information we could find: AMP09.pdf (taken from <https://frank.pocnet.net/other/Amperex/hafo/AMP09.pdf>).

## Model 53 AVP 03

Same as above.

The Amperex catalog has the most comprehensive and detailed information we could find: AMP09.pdf (taken from <https://frank.pocnet.net/other/Amperex/hafo/AMP09.pdf>).

## Model 9813KB

Most of the tubes have a label with EMI 9813KB.

The datasheet we have comes from ET Enterprises: 9813B.pdf (taken from <https://my.et-enterprises.com/pdf/9813B.pdf>)

## Model 6810

At one point we believed one of our photomultipliers was of this kind of model although it was clear it was not a perfect match. We later learned that the PMT was in fact an XP2020, but we leave here the information for reference.

Datasheet: 6810.pdf (taken from <https://frank.pocnet.net/sheets/049/6/6810.pdf>)

Other info: <http://lampes-et-tubes.info/pm/pm114.php?l=d>

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-- CristovaoDaCruzESilva - 2018-06-13

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