

# From The Trenches

with Beth Hall & Rollie Cantu

March 1997

## Replacing the 50 $\mu$ A Meter Assembly in Portable Instruments

Some of you have been asking about the procedure for replacing the meter movements in portable instruments. Throughout the years, changes in technology have affected even the portable analog meter, with the upshot that what you need to do to replace the meter movement depends upon the vintage of the portable.

In early 1987, new portable instruments (beginning with serial number 46566) were fitted with a 1 mA meter movement instead of the 50  $\mu$ A meter movement that had been used. Instruments prior to S/N 46566 can be retrofitted with the new 1mA meter movement, *provided the main circuit board has integrated circuits (ICs)*.

The 1mA meter movement retrofit will **not** work in older portables that are **fully-transistorized** (that is, no ICs on the main circuit board). These fully-transistorized instruments have serial numbers less than approximately 9800. In this case, if a replacement is required, it should be done with the 50  $\mu$ A meter movement.

**NOTE:** The 50  $\mu$ A meter movement is still available as a replacement part (Part Number 15-8014). This must be specified when ordering a meter replacement.

Instructions for the modifications are described below. They are divided into 2 categories: electronic and mechanical. The serial number of the instrument to be modified will determine the extent of the changes required, as follows:

Instruments with serial numbers -

**less than approximately 9800** (fully-transistorized) cannot be modified for the 1mA meter movement.

**between approximately 9800 and 46566** require both electronic and mechanical changes.

**between 46566 and 69769** require only the mechanical changes.

**greater than 69769** normally require no change. See \*\* in the note for item B1.

### Instructions for retrofitting the 1 mA meter movement in instruments that currently have a 50 $\mu$ A meter movement (Model 3 used as an example):

#### A. ELECTRONIC - Resistor Replacement On Main Circuit Board

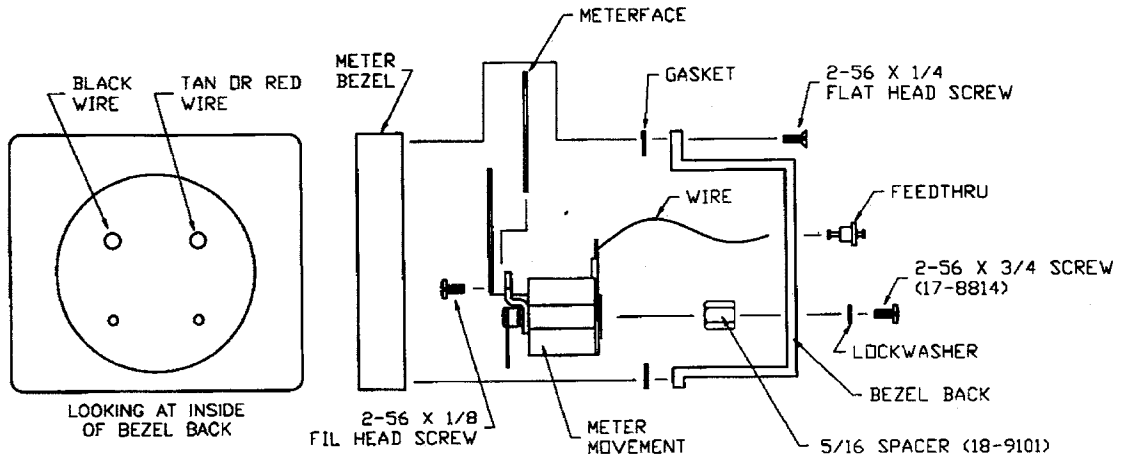
**NOTE:** Each portable model's main board layout is different, so these instructions will reference the resistors by function and by the Model 3 numbering system, as an example. Please call LMI if you are unsure about your particular model.

1. Replace the 22 K ohm resistor on the output of the voltage follower with a **270 ohm** resistor. In the Model 3, this is component R20.
2. Replace the "select-at-test" (SAT) resistor for the "BAT TEST" function. For the Model 3, this is component R41. The value for this resistor will vary somewhat, in order to make the meter read properly, but it is probably 62 k, as currently installed. Change it to a **2.2 K ohm** value, or something close to this value, as needed.

#### B. MECHANICAL MODIFICATIONS - Spacers, Screws, Meter Back Post

1. **NOTE: This step only applies to instruments that have serial numbers less than 69769.** After S/N 69769, the castings were changed to standardize the spacer size. \*\* However, if you find that the zero-adjust spiral roll pin is too short to engage the zero-adjust stem on the movement, a small spacer may be required and a longer screw. (LMI technicians use a 4-40 nut as a spacer.) If you do add a spacer, ensure that the meter needle moves freely and does not rub against the bezel glass.

Refer to the diagram "Assembly Instructions for Meter Assembly 40-1805 (S/N less than 69769)" for screw and spacer sizes and locations. The 40-1805 assembly uses the new movement and fits castings prior to S/N 69769.



2. **All Model 19s:** The post on the back of the new meter movement must be bent 90 degrees toward the meter face to clear the middle "feedthru."

**NOTE:**

Part Number for 1 mA meter kit (includes bezel with glass)	P/N 4363-572 (for S/N > 69769)
Part Number for 1 mA meter assembly:	P/N 40-1805 (for S/N < 69769)
Part Number for 1 mA meter movement:	P/N 15-8030
Part Number for 50 µA meter assembly:	P/N 40-1802 (for S/N < 9800)
Part Number for 50 µA meter assembly:	P/N 40-1801 (for S/N 9800 - 46566)
Part Number for 50 µA meter movement:	P/N 15-8014

If you need more information or have questions, please call.

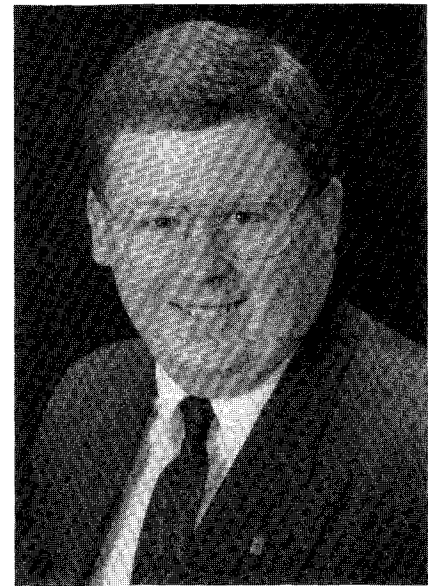
# Introducing

We would like to introduce to you one of our salesmen, Robert Ludlum. Robert joined the LMI Sales Department in November 1993. His duties include phone sales, customer service, and marketing. Robert plays a key role in the production of items such as: product catalog, catalog on disk, web page, and "new" product literature.

A graduate of Sweetwater High School in 1984, he attended Texas Tech University in Lubbock, Texas.

Robert and his wife Pam have two children, Jeff age 8 and Kevin age 3. Hobbies include card games, swimming, and watching movies. He also plays the trumpet in the Sweetwater Municipal Band.

Robert is also involved in the community, where he is an active member of the Rotary Club and serves on the local boards of the United Way and the American Heart Association.



**Robert Ludlum**



## "San Antonio 1997 Experience"

Have you made plans to attend the 42<sup>nd</sup> Annual Health Physics Society meeting in San Antonio, Texas? This meeting will be a most enjoyable one. Between the opening ceremony and the final session there will be many opportunities for social and family activities. Details and information on the upcoming meeting can be found on the South Texas Chapter's web page.

<http://www.stc-hp.org>

*March 1997*

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# Model 500-Series Pulse Generators

The repair and calibration of nuclear radiation detection instruments sometimes require the use of a pulse generator. The Model 500-Series pulsers provide an easy means of reading the survey meter or scaler instruments' high voltage (HV), pulse frequency, and input sensitivity.

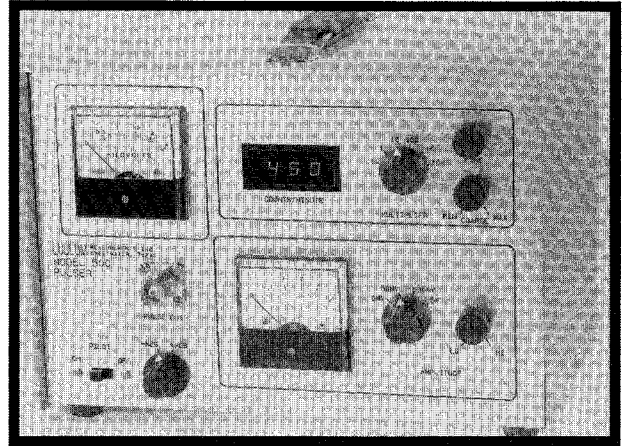
The HV, frequency and pulse amplitude provide the necessary information for determining accurate instrument response and performance specifications for the instruments. The pulsers produce either a positive or negative pulse with a 0.5 microsecond lead, a 1.5 microsecond width and a 5 microsecond tail, which is similar to a radiation pulse.

The high voltage readout is 0 - 2500 volts on pulsers with an analog readout and 0 - 1999 volts on digital readout versions. High voltage is measured by a high impedance voltmeter (2.5 x 2500 megohms ± 2%) on the pulse-out connector.

Pulse rate is displayed on a 3-digit LED readout and is determined by the position of the multiplier switch. Coarse and fine adjustments control easy selection of the desired frequency. Dividing the M500 cpm setting by 60 will provide calibration of an instrument whose scale is in counts per second (cps). The pulse rate range is 10 cpm to 9,900,000 cpm ± 2 % of reading.

The pulse amplitude readout can be either digital or analog, depending on the Model 500-Series pulser. The total range is 0 mV - 5 V (positive or negative polarity available).

Accessories included with the pulser are a 39" cable, "C" to BNC or "C" to MHV adapter, 8-ft power cord, and a voltage current convertor (a shielded 10k resistor with connectors).



	MODEL 500	MODEL 500-1	MODEL 500-2	MODEL 500-3	MODEL 500-5
HV READOUT	Analog	Digital			Analog
AMPLITUDE READOUT	Analog		Digital		
PULSE FREQUENCY READOUT	Digital				
PULSE WIDTH ADJUSTMENT	N/A			1 - 10 μs via a 1 turn potentiometer	N/A
PRICE	\$ 1150.00	\$ 1495.00	\$ 1450.00	\$ 2150.00	\$ 1500.00



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