OFFICE MEMORANDUM

TO: All Engineers
FROM: Mike
SUBJECT: Data Electronics Correction in Formula
DATE: July 24, 1986

Several Delta Electronics instruction books for the Model OIB-3 impedance bridges contain an error in the formula for the resistance correction factor having large reactive component. The correct formula as per the graph (which has been verified with the manufacturer as correct*) is as follows:

$$C_R = xf(.009-.00013R)$$

Examples: (1) 31 +j200 at 1 mHz
$C_R = 0.994$
(2) 0 -j100 at 1 mHz
$C_R = -0.900$
(3) 60 +j160 at 1 mHz
$C_R = 0.192$
(4) 40 -j40 at 1 mHz
$C_R = -0.152$

* Manufacturer confusion indicated the graph was in error. They later corrected themselves by indicating a correction to the formula; hence, the above.

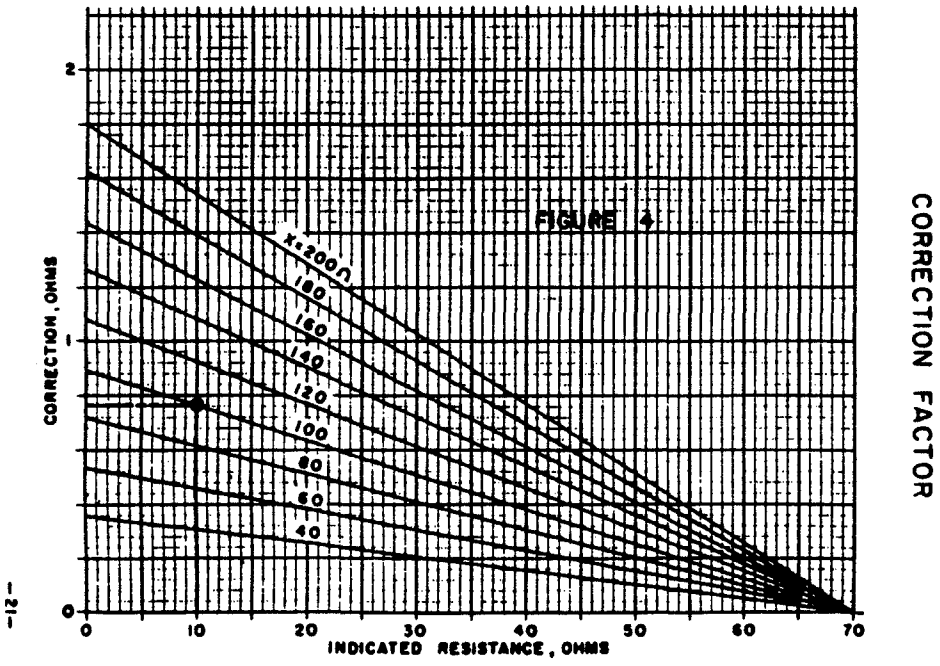

FIGURE 4

APPENDIX I.

Because of a light interaction between the resistance and reactance measuring components, a correction must be made to the resistance measurement of a high Q circuit (low resistance and high reactance). The correction factor C_R can be computed from the following equation:

$$C_R = xf\ (.009 - .00014R)$$

Where: X is dial reactance before frequency correction.

Bridge Dial Readings

Example: 10 -j100 at 680 kc (.68 mHz)

C_R = -100f [.009 - .00014 (10)]

= -100f [.009 - .00014]

= -100f [.0076] = -.76 f

Correcting for frequency

-.76 (.68) = -.52

True Resistance: 10 -.52 = 9.48

Note that the correction is negative for capacitor loads and positive for inductor loads.

The correction equation has been plotted for reactances reading up to 200 in Figure 4. The correction can be read directly from this figure. The example above is illustrated by the dotted lines on the graph. The correction read from the graph must be multiplied by the frequency in mHz. These corrections are usually not significant for resistances above about 50 ohms.

IV. MAINTENANCE

Due to the complexity of the RF distributed circuit and the interaction of all controls it is recommended that field maintenance not be attempted on this unit. If the unit is damaged or ceases to function, it should be returned to the factory for maintenance and calibration.

Note: A precision ceramet potentiometer is used as a variable standard resistance in this bridge. A relatively high contact resistance is a characteristic of precision potentiometers. For this reason, the user may notice an apparent "noise" when obtaining a deep null with an external detector. This is normal and does not affect the rated accuracy of the instrument.

DO NOT attempt to break the seal on the potentiometer for cleaning purposes.

The amplifier battery may be replaced by removing the two screws securing the small panel on the rear of the bridge case. Unplug the 9V transistor radio battery and replace it with a new one being carefull to orient it for correct polarity. A Mallory MN1604 Alcaline battery or equivalent is recommended.