Appendix D

Est. Values of HF Stds HF_Rval2.doc hph 3/24/94, **11/12/94, 12/21/94**
NIST-1 Mar 1994, NIST-2 August 1994, Q corrected for 900-WO capacitance

25 Ohms Only NIST measurements on a 20 ohm 1442 at180 MHz in 1968.
Rs Change at 1 MHz: Neg. change in Rs at 1MHz. **Rp = Rs(1+Q^2) (added).**
Q at 1MHz:

Resistor	hp4284-A	1687	Calculated	Estimated	Tolerance
DW25-1	.002165	-----	.001755	.0019	±.0002
DW25-2	.002024	.0017	.001755	.0018	.0002
DW25-3	---	.0020	.001755	.0020	.0003
20+5	.004065	---	.004030	**.0040**	.0003
CM-4	.006227	---	?	**.0060**	.0004

374 Ohms
Rp Change at 1 MHz: NIST measured changes at 1MHz of -.005% for DW-1 and -.0123% for CM-3 with uncertainties of ±.014%.
200+200 combo had calculated change of about -.0018% at 1 MHz.
Q at 1MHz: NIST-C is NIST value with .172 pF subtracted see footnote.

Resistor	hp	1687	NIST-1*	NIST-2*	Calc	Est	Tol
DW374-1	-.007995	-----	-.00781	-.00792	-.00746	-.0079	±.0002
DW374-2	-.008473	.0080	----	-----	"	-.0082	.0003
DW374-3	----	.0082	----	----	"	-.0084	.0004
200+200	-.010075	----	-.00997	-----	-.00985	-.0099	.0002
CM-3	-.008412	----	-.00820	-.00831	-----	-.0083	.0002

Probably epoxy increases capacitance slightly so calculated value of DW units is probably low. Series 200+200 close to calculated value.
Note that NIST doesn't make short-circuit zero calibration.

5.9 kohms
Rp Change at 1MHz: HP must be wrong, change can not be positive.

Resistor	hp	hp-.019	NIST-1	NIST-2	Est	Tol
DW59-1:	-.1462%	-.1652%	-.1705%	-.1773	-.175%	±.02%
DW59-2	-.1215%	-.1405%	-----	-----	-.14%	.03%
CM-2	-.0082%	-.0272%	-.0223%	-.0302%	-.027	.02%
X-3 10k	**+.0190%**	0	-----	-----	-.01	.02%

Q at 1MHz:

Resistor	Hp	1687	NIST-1*	NIST-2*	Calcul	Est	Tol
DW59-1	-.1259	---	-.1245	-.1251	-.1197	-.125	±.002
DW59-2	-.1235	-.1233	---	----	"	-.123	.002
DW59-3	-----	-.1290	----	----	"	-.128	.003
X-3 10k	-.1503	----	----	----	-.202	-.150	.003
CM-2 Vishay	-.14148	----	-.1427	-.1426	---	-.143	.002

Epoxy in DW units increases capacitance and causes large change in Rp.

95 kohms ***** changed 11/12/94**
Rp Change at 100kHz: First NIST measurements wrong, change in Rp can't be positive!

Resistor	hp	NIST-1	NIST-2	Est	Tol
DW95-1	-.2260%	-.2004%	----	-.260%***	±.04%***
X1-100k	-.0099%	**+.0251%**	-.0441***	-.045%***	.03%***
X2-Vishay	-.0442%	-.0147%	-----	-.075%***	.04%***

Q at 100kHz:

Resistor	hp	1689	NIST-1*	NIST-2**	Est	Tol
DW95-1	-.1937	-.1937	-.1936	-----	-.1936	±.001
DW95-2	-.213	---	----	----	-.213	.003
X-1 100k	-.1431	-.1438	-.1436	-----	-.1436**	.001
X-1 Reversed**	--	-----	----	-.1368	-.1368**	.001
X2 Vishay	-.1933	-.1927	-.2028	-.1925	-.1927	.001

- * 0.172 pF subtracted from NIST capacitance measurements.
  ** Q depends on orientation, .0007 difference measured at 10kHz.

Jerry: note 2 values of Q!

143
136
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