

DATE 2 Octob r 1963

SHEET 1 OF 10

TMC SPECIFICATION NO. S-376

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COMPILED

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CHECKED

TITLE:

APPROVED

*BP*

TRC-3500-70/600 TEST PROCEDURE

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TITLE: TRC-3500-70/600 TEST PROCEDURE

APPROVED

I. TEST EQUIPMENT REQUIRED

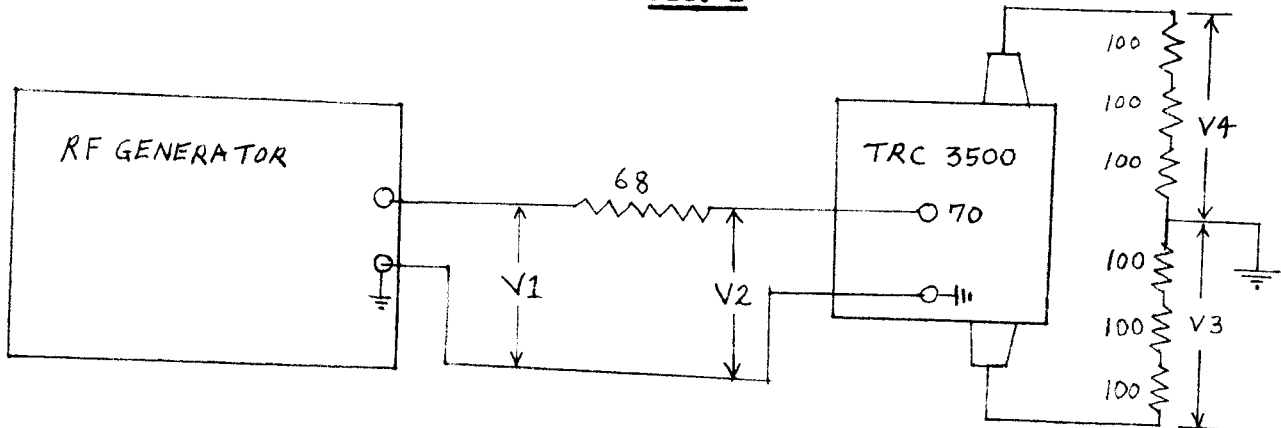
- 1 - VTVM Hewlett-Packard Model 410B or equivalent.
- 1 - RF Generator, Measurements Model 82 or equivalent.
- 1 - Transmitter, TMC GPT-750, GPT-10K or equivalent.
- 1 - RF Bridge, General Radio Model 916A or equivalent.
- 1 - GPR-92 Receiver (TMC) or equivalent.
- 1 - RF Ammeter 0-10 amps.
- 1 - 68 ohms, 1/2 watt, 5% carbon resistor.
- 6 - 100 ohms, 1/2 watt, 5% carbon resistor. (Connect 100 ohms resistors in series to form load. Interconnecting leads should be very short. Do not cut the end leads.)

II. FREQUENCY RESPONSE

1. Test Set-up

- a) Connect instruments as per Fig. 1. Leads between RF generator and TRC to be as short as possible. Check TRC as per Chart A.

FIG. 1



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CHART A

TYPICAL TEST DATA

FR 5Q	V1	V2	V3	V4
2	1.0 volt	0.58	0.70	0.70
4	1.0 volt	.60	.72	.72
8	1.0 volt	.58	.73	.73
16	1.0 volt	.52	.72	.76
24	1.0 volt	.48	.68	.74
30	1.0 volt	.53	.64	.69

V2, V3 and V4 should be within  $\pm 10\%$ .

RECORD ON TEST DATA SHEET

III. IMPEDANCE MEASUREMENTS

1. Test Set-up

- a) Connect instruments as per Fig. 2.
- b) The RF Generator output is connected to the GEN connector on the bridge through coax cable.
- c) The Receiver input is connected to the DET connector on the bridge through a coax cable.
- d) The VTVM to the diode load terminals of the receiver (remove jumper on terminals).
- e) The 600 ohm load is connected across the 600 ohm terminals of the TRC, with as short a lead as possible. Ground the TRC to the bridge ground post with as short a lead as possible.
- f) Set L-C switch on bridge to "L" position.

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III. IMPEDANCE MEASUREMENTS - cont'd

2. Procedure

a) Tune RF generator and receiver to 2 mc. Adjust level of generator and receiver for 40 VDC on VTVM.

b) Set "R" dial of bridge to zero and "X" dial to 500 on "L" scale.

c) Connect unknown terminal of bridge to 70 ohm terminal of TRC with as short a lead as possible.

d) Short 70 ohm terminal to ground, (close to the terminal) and balance the bridge using the "R" and "X" dials for a minimum reading on the VTVM.

e) To check for perfect balance, remove cable on bridge GEN connector. Seventy ohm terminal on TRC remains shorted to ground. The VTVM reading should remain the same. If not, rebalance bridge.

f) Re-connect RF generator cable. Remove short on TRC and proceed to check per Chart B. The +J readings are above 500 on the "X" dial and the -J readings are below 500. (Plot readings on test data sheet #2 as per method described in Step g.)

Example: "X" dial reading 580 at 2 MC	320 at 10 MC
$580 - 500 = 80$	$500 - 320 = 180$
$\frac{80}{2MC} = +J 40$	$\frac{180}{10 MC} = -J 18$

g) How to plot impedance measurements on Smith Chart (Chart B readings plotted on Sheet 6):

(1) The  $R/X_0$  coordinate of  $R_s = 85$  is 1.21 according to the conversion table.

(2) The  $+JX/Z_0$  coordinate of  $+J40$  is .57 according to the same table.

(3) The two coordinates are plotted on the Smith Chart and should intersect inside the circle. If  $X_s$  is a +J reading, the intersect will be on the inductive side of the chart. If it is a -J reading, it will intersect on the capacitive side.

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### III. IMPEDANCE MEASUREMENTS - Cont'd

FIG. 2

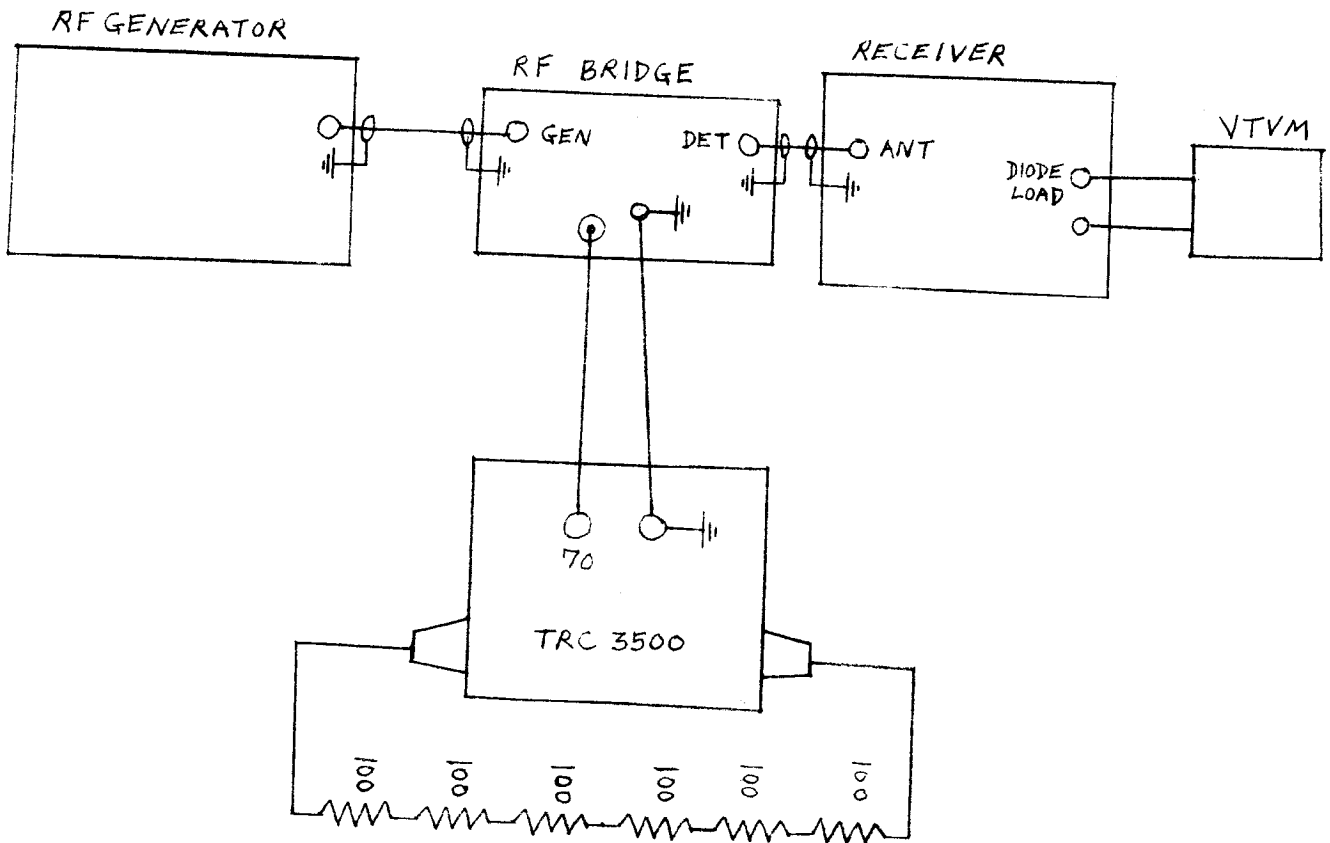


CHART B

#### TYPICAL TEST DATA

<u>MC</u>	<u>RS</u>	<u>XS</u>
2.0	85.0	+J40.0
10.0	89.8	-J3.6
15.0	77.5	-J6.14
20.0	66.4	+J2.53
25.0	59.2	+J15.4
30.0	56.6	+J32.9

RECORD ON TEST DATA SHEET

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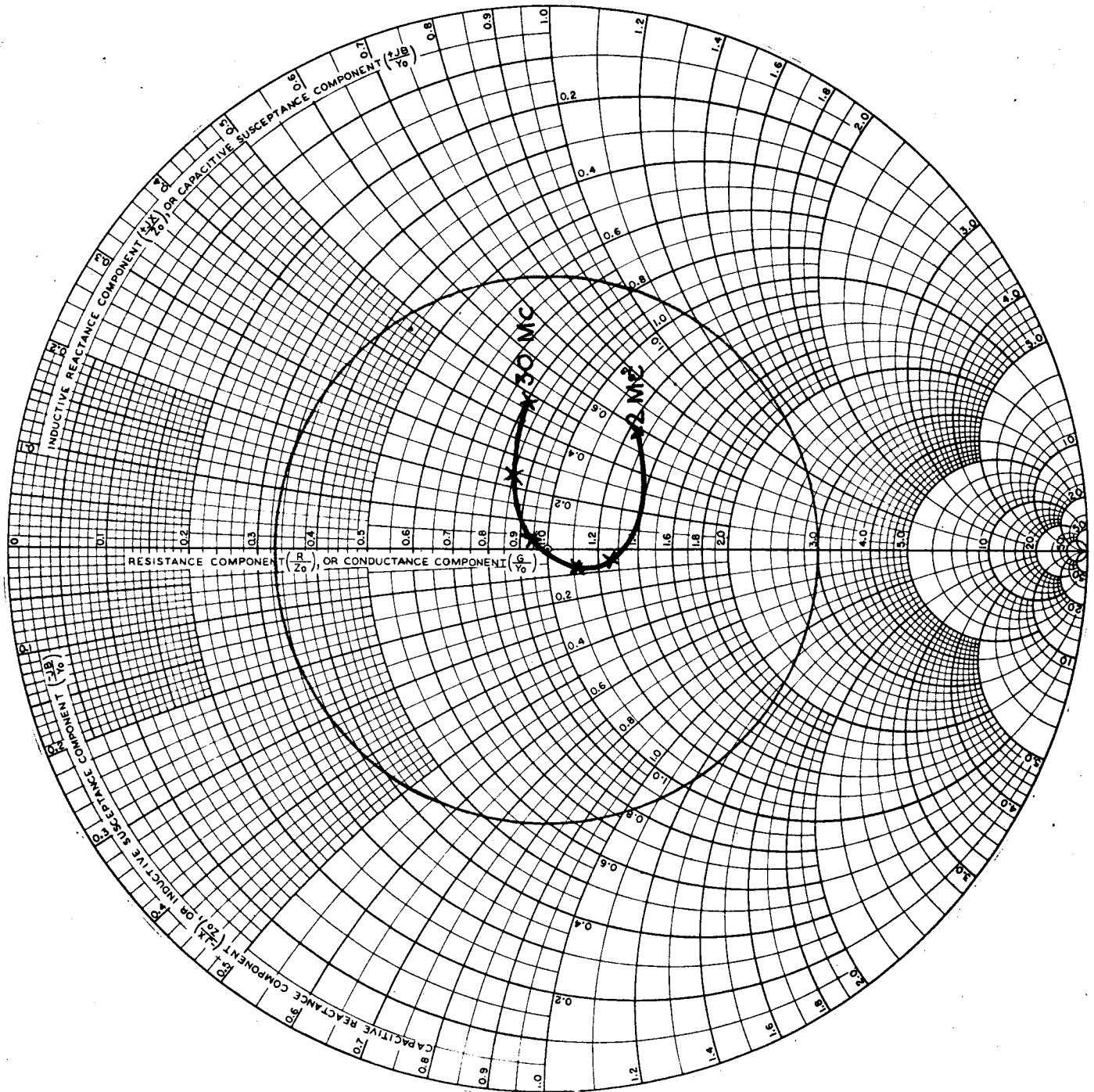
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(SMITH CHART)



CONVERSION TABLE

R or X	R or X
20	70
25	.29
30	.36
35	.43
40	.50
45	.57
50	.64
55	.71
60	.78
65	.86
70	.93
75	1.00
80	1.07
85	1.14
90	1.21
95	1.28
100	1.35
105	1.42
110	1.49
115	1.57
120	1.64
125	1.71
130	1.78
135	1.85
140	1.92
145	2.00
150	2.07
155	2.14
160	2.21
165	2.28
	2.35

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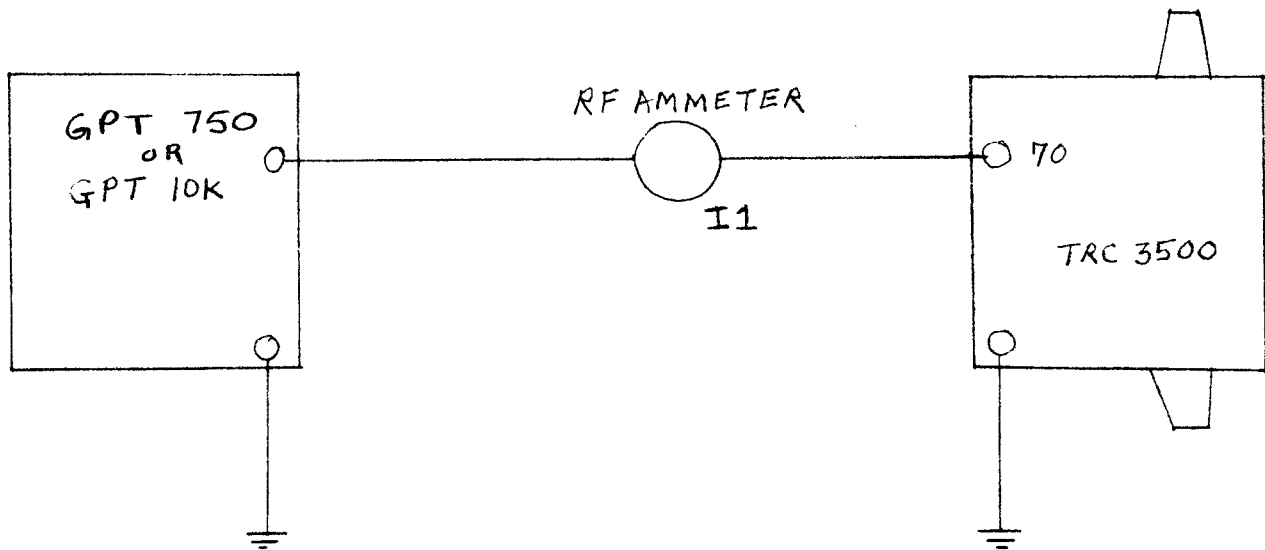
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IV. OPEN CIRCUIT TEST

1. Connect Test set-up as per Fig. 3.

FIG. 3



- a) Tune Transmitter for 2 MC
- b) Load transmitter until a 2.7A reading is obtained on I1.
- c) Allow equipment to operate for 5 minutes.

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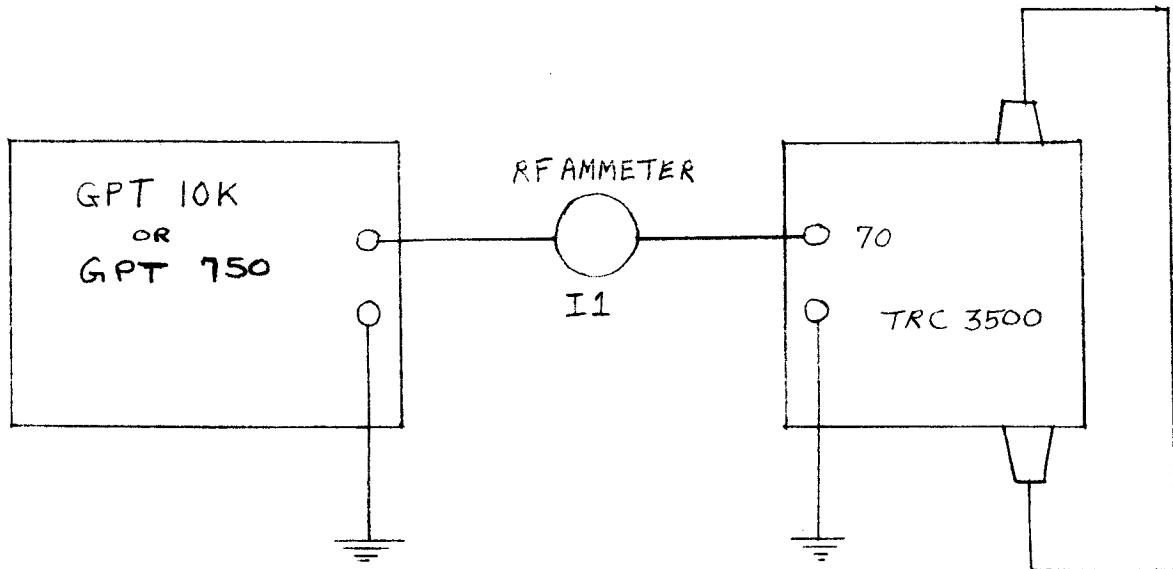
TITLE: TRC-3500-70/600 TEST PROCEDURE

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V. SHORT CIRCUIT TEST

1. Connect Test set-up as per Fig. 4.

FIG. 4



- a) Tune Transmitter for 2 MC.
- b) Load transmitter until a 6.8A indication is obtained at I1.
- c) There should be no breakdown of the TRC-3500.

RECORD ON TEST DATA SHEET



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APPROVED _____		

THE TECHNICAL MATERIEL CORPORATION  
MAMARONECK N.Y.

TRC-3500-70/600 TEST DATA SHEET # 1

SERIAL NO. \_\_\_\_\_  
MFG. NO. \_\_\_\_\_

**II. FREQUENCY RESPONSE**

FMCS	V1	V2	V3	V4	% OF UNBALANCE
2.0	1.0				
4.0	1.0				
8.0	1.0				
16.0	1.0				
24.0	1.0				
30.0	1.0				

The unbalance between V3 and V4 should be less than 10%.

**III. IMPEDANCE MEASUREMENTS**

Plot on test data sheet #2 as per method described on sheet 4.

IV. OPEN CIRCUIT TEST \_\_\_\_\_ OK

V. SHORT CIRCUIT TEST \_\_\_\_\_ OK

DATE \_\_\_\_\_  
TESTED BY \_\_\_\_\_

# REVISION SHEET

THE TECHNICAL MATERIEL CO.  
MAMARONECK  
NEW YORK

S-376

MODEL TRC-3500

PROJECT NO. \_\_\_\_\_

DATE	REV.	PAGE	EMN #	DESCRIPTION	CHK.	APP.
10/9/62	A	2&5	7448	Chg. Impedance Measurements from; 5.0. to 2.0		
10/2/63	B	ALL	10442	Revised ALL Sheets per EMN.		
12/2/64	C	2,3,7,8	13043	Revised shts. 2,3,7,8 per EMN		

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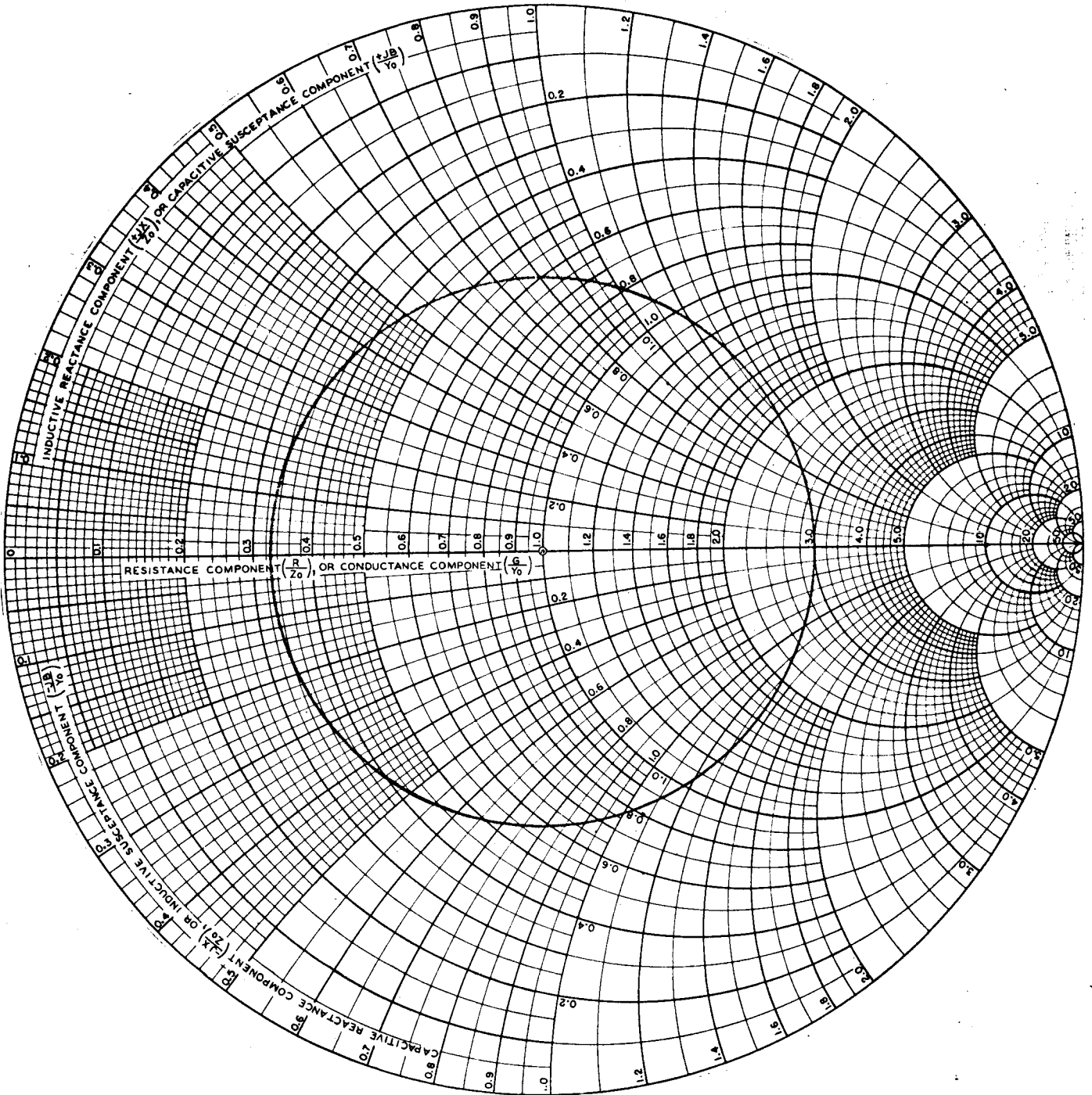
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TRC-3500-70/600 TEST DATA SHEET # 2



**CONVERSION TABLE**

R or X	R or X 70
20	.29
25	.36
30	.43
35	.50
40	.57
45	.64
50	.71
55	.78
60	.86
65	.93
70	1.00
75	1.07
80	1.14
85	1.21
90	1.28
95	1.35
100	1.42
105	1.49
110	1.57
115	1.64
120	1.71
125	1.78
130	1.85
135	1.92
140	2.00
145	2.07
150	2.14
155	2.21
160	2.28
165	2.35