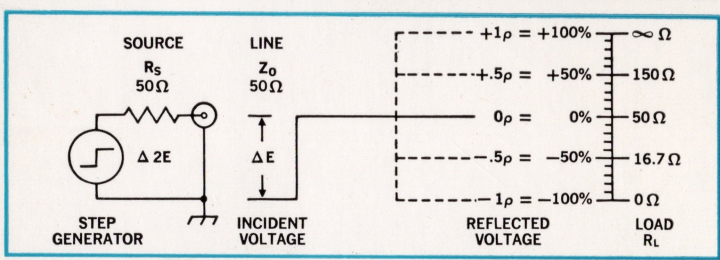


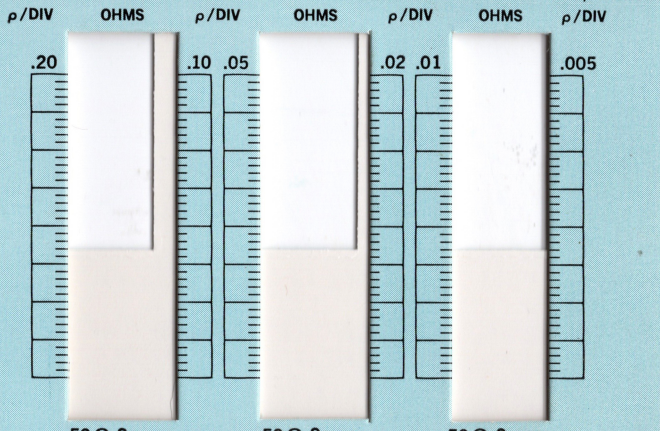


# TIME DOMAIN REFLECTOMETRY

## PULSE ECHO TESTING OF ELECTRICAL TRANSMISSION LINES



### ρ = REFLECTION COEFFICIENT



50 Ω Source      50 Ω Source      50 Ω Source

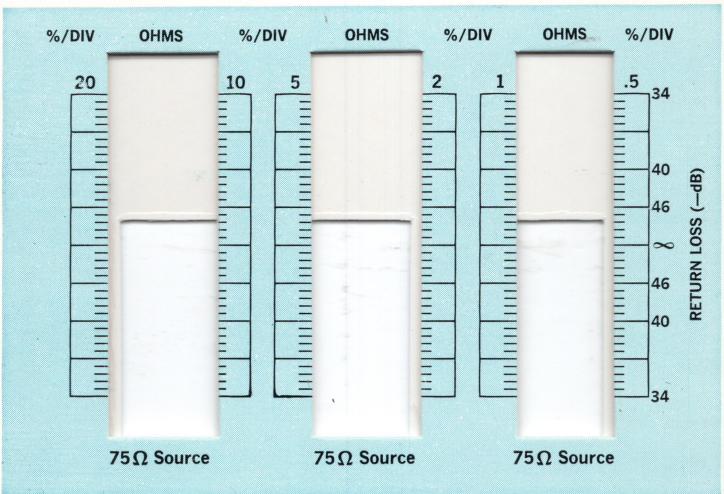
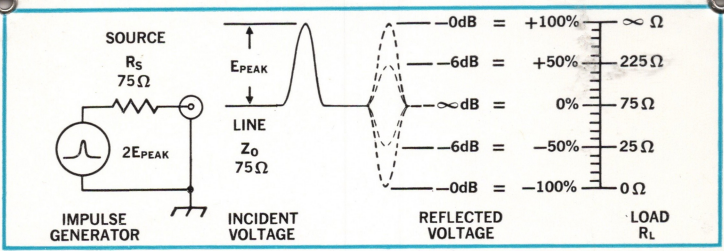
The risetime or amplitude of received reflections may be significantly degraded or attenuated by two-way losses of the line.



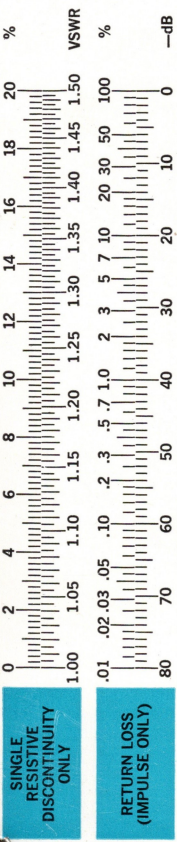
$$VELOCITY \propto 1/\sqrt{\text{DIELECTRIC CONSTANT}}$$

# TEKTRONIX, INC.

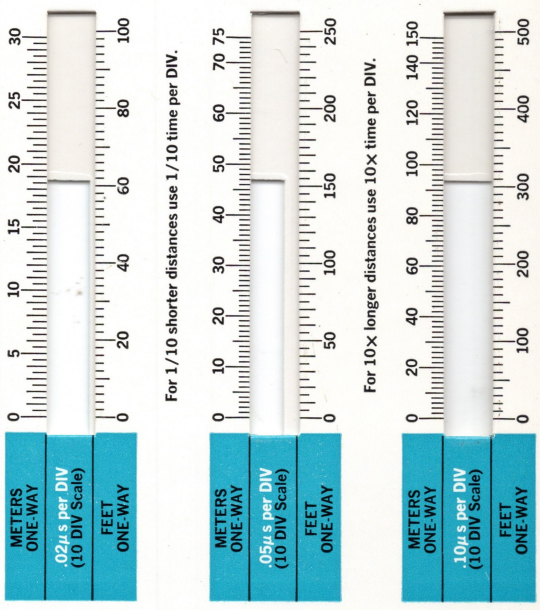
P.O. BOX 500, BEAVERTON, OREGON 97005, U.S.A.



**FREQUENCY DOMAIN CONVERSIONS**

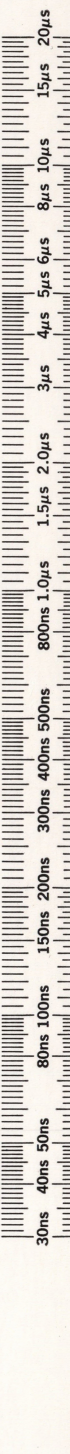
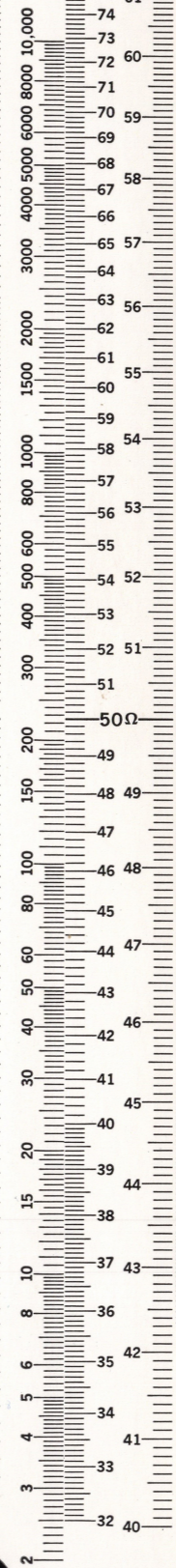
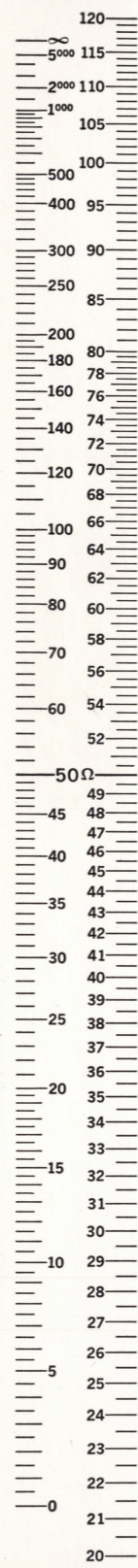
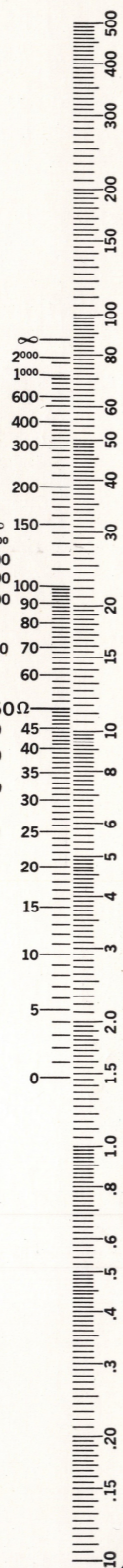
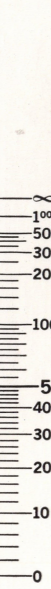


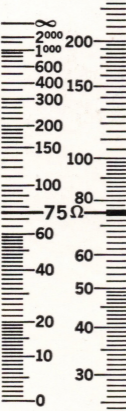
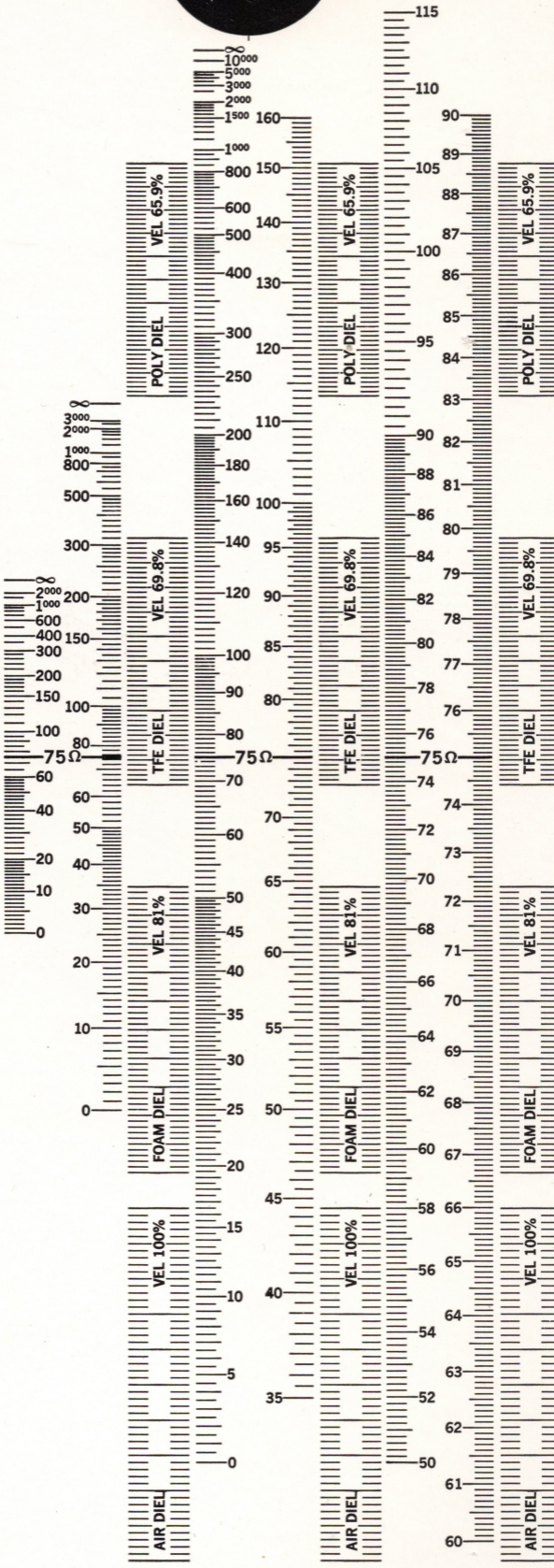
**TIME-TO-DISTANCE CONVERSIONS FOR LINES WITH COMMON DIELECTRICS**



**TEKTRONIX®**

committed to technical excellence





AIR DIELECTRIC  
 VEL 100%  
 FOAM DIELECTRIC  
 VEL 81%  
 TFE DIELECTRIC  
 VEL 69.8%  
 POLY DIELECTRIC  
 VEL 65.9%

AIR DIELECTRIC  
 VEL 100%  
 FOAM DIELECTRIC  
 VEL 81%  
 TFE DIELECTRIC  
 VEL 69.8%  
 POLY DIELECTRIC  
 VEL 65.9%

AIR DIELECTRIC  
 VEL 100%  
 FOAM DIELECTRIC  
 VEL 81%  
 TFE DIELECTRIC  
 VEL 69.8%  
 POLY DIELECTRIC  
 VEL 65.9%

115  
 110  
 90  
 89  
 105  
 88  
 87  
 100  
 86  
 85  
 95  
 84  
 83  
 90  
 82  
 88  
 81  
 86  
 80  
 84  
 79  
 82  
 78  
 80  
 77  
 78  
 76  
 75Ω  
 74  
 74  
 72  
 73  
 70  
 72  
 68  
 71  
 66  
 70  
 69  
 62  
 68  
 60  
 67  
 60  
 66  
 58  
 66  
 56  
 65  
 64  
 54  
 63  
 52  
 62  
 50  
 61  
 60

∞  
 10000  
 5000  
 3000  
 2000  
 1500  
 160  
 1000  
 800  
 150  
 600  
 500  
 140  
 400  
 300  
 120  
 250  
 110  
 200  
 180  
 160  
 100  
 140  
 95  
 120  
 90  
 85  
 100  
 80  
 85  
 80  
 75Ω  
 70  
 70  
 65  
 60  
 60  
 55  
 50  
 25  
 50  
 20  
 45  
 15  
 10  
 40  
 5  
 35  
 0