

TECHNICAL MANUAL
OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL
FOR
MICROWATTMETER, BOONTON MODEL 41BD WITH
POWER DETECTOR 41-4E
(NSN 6625-01-050-8800)

HEADQUARTERS, DEPARTMENT OF THE ARMY

AUGUST 1978



This manual contains copyright material reproduced by permission of Booton Electronics Corporation, Parsippany, New Jersey

**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL
FOR
MICROWATTMETER, BOONTON MODEL 42BD WITH
POWER DETECTOR 41-4E
(NSN 6625-01-050-8800)**

REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA Form 2028-2 located in the back of the manual. Simply tear out the self-addressed form, fill it out as shown on the sample, fold it where shown, and drop it in the mail.

If there are no blank DA Form 20282 in the back of your manual, use the standard DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forward to the Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL MA-Q, Fort Monmouth, New Jersey 07703.

In either case a reply will be furnished direct to you.

TABLE OF CONTENTS

Chapter		Page
0.	INTRODUCTION	
0.1	SCOPE	0.1
0.2	INDEXES OF PUBLICATIONS	0.1
0.3	FORMS AND RECORDS	0.1
0.4	REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)	0.2
0.5	ADMINISTRATIVE STORAGE	0.2
0.6	DESTRUCTION OF ARMY ELECTRONICS MATERIEL	0.2
I.	GENERAL INFORMATION	1
1.1	GENERAL	1
1.2	EQUIPMENT DESCRIPTION	2
1.2.1	Frequency Range	3
1.2.2	Power Range	3
1.2.3	Response	3
1.2.4	Noise	4
1.2.5	Zero Adjustment	4
1.2.6	Calibration Factor Adjustment	4
1.2.7	Analog Output	4
1.2.8	BCD Output	4
II.	SPECIFICATIONS	5
III.	OPERATION	9
3.1.	INSTALLATION	9
3.2.	OPERATION	11
3.2.1.	Initial Operating Procedure	11
3.2.2.	Connection Recommendations	12
3.2.3.	Low-Level Measurements	12
3.2.4.	High-Level Measurements	12
3.2.5.	High Frequency Measurements	13
3.2.6.	Temperature Effects	21
3.2.7.	VSWR Measurements	22
3.2.8.	Shielding Recommendations	23
3.2.9.	Over/Under Range Indication	24
3.2.10.	Analog Output	24
3.2.11.	BCD Output	25
3.2.12.	Programming	25
3.2.13.	Autorangeing Option (42BD-01)	25
3.2.14.	dBm/Power Readout Option (42BD-09)	25

			Page
Chapter IV.		THEORY OF OPERATION-----	26
	4.1.	GENERAL-----	26
		4.1.1 Power Detector-----	26
		4.1.2 Chopper and Chopper Driver-----	26
		4.1.3 Attenuator and Amplifiers-----	28
		4.1.4 Synchronous Detector-----	28
		4.1.5 Shaping Amplifier-----	28
		4.1.6 Digital Control-----	29
		4.1.7 Analog/Digital Converter-----	29
		4.1.8 Power Supply-----	29
		4.1.9 Programming-----	29
V.		MAINTENANCE-----	31
	5.1.	INTRODUCTION-----	31
	5.2.	TEST EQUIPMENT REQUIRED-----	31
	5.3.	CALIBRATION PRECAUTIONS-----	33
	5.4.	PERFORMANCE CHECKS (PWR)-----	33
		5.4.1. Performance Check Procedure (all ranges except 10 mW)-----	35
		5.4.2. Performance Check Procedure (10 mW range only)-----	35
		5.4.3. dBm Performance Checks-----	35
	5.5.	CALIBRATION PROCEDURES-----	39
	5.6.	TROUBLESHOOTING PROCEDURE-----	44
	5.7.	POWER DETECTOR REPAIR-----	49
VI.		INTERFACE INFORMATION-----	53
	6.1.	PROGRAMMING INPUTS-----	53
		6.1.1. Input Characteristics-----	55
		6.1.2. Input Pull-Up-----	55
		6.1.3. Triggering-----	55
	6.2.	DATA OUTPUTS-----	56
		6.2.1. Output Characteristics-----	57
		6.2.2. Analog Output-----	57
	6.2.	WAVEFORMS-----	57
		6.2.1. Output Characteristics-----	57
		6.2.2. Analog Output-----	57
	6.3.	WAVEFORMS-----	57
		6.3.1. Encode Trigger-----	57
		6.3.2. Data Output Timing-----	58

TABLE OF REPLACEABLE PARTS

		Amplifier P/C Board-----	59
		Chopper Driver P/C Board-----	61
		Rear and Sub Panels-----	63
		Shaping Amplifier-----	63
		Digital Control Board-----	65
		Counter P/C Board-----	66
		Display P/C Board-----	68
		A/D Converter P/C Board-----	68
		Serial/Parallel BCD Converter Option-----	70
APPENDIX	A.	REFERENCES-----	A-1
	B.	COMPONENTS OF END ITEM LIST-----	
Section	I.	Introduction-----	B-1
	II.	Integral Components of End Item-----	B-2
	III.	Basic Issue Items (Not applicable)-----	
APPENDIX	C.	ADDITIONAL AUTHORIZATION (Not applicable)-----	
	D.	MAINTENANCE ALLOCATION-----	
Section	I.	Introduction-----	D-1
	II.	Maintenance Allocation Chart for Microwattmeter, Boonton Model 42BD with Power Detector 41-4E.--	D-3
	III.	Tool and Test Equipment Requirement-----	D-4
	IV.	Remarks-----	D-5
APPENDIX	E.	EXPENDABLE SUPPLIES AND MATERIALS LIST (Not applicable)	

ILLUSTRATIONS

Figure No.		Page
1.	Uncertainty-Db-----	15
2.	Uncertainty-%-----	16

<i>Figure No.</i>		<i>Page</i>
3a.	Determination of Calibration Factor -----	19
3b.	Determination of Calibration Factor -----	19
3c.	Determination of Calibration Factor -----	19
4.	Determination of Effective Efficiency -----	20
5.	Typical Temperature Characteristic -----	21
6.	Typical Temperature Characteristic -----	22
7.	dB-VSWR Conversion Chart -----	23
8.	Block Diagram -----	27
9.	Connections -----	34
10.	Connections -----	34
11.	Location of P/C Boards and Test Points -----	37
12.	Power Detector -----	52
13.	External Connections -----	54

TABLES

<i>Table No.</i>		<i>Page</i>
1.	Test Equipment -----	31
2.	Performance Check -----	36
3.	Troubleshooting -----	44

CHAPTER 0

INTRODUCTION

0.1. Scope

This manual describes Microwattmeter, Boonton Model 42BD with Power Detector 41-4E and provides instructions for operation and maintenance. The manual includes a Components of End Item List (COEIL) (App B), and Maintenance Allocation Chart (MAC) (App D). Repair Parts and Special Tools Lists (RPSTL's) are included in TM 11-6625-2857-24P.

0.2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

0.3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A and DIAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.