

## MAINTENANCE

## TEST EQUIPMENT

- 1- VTVM
- 2- High frequency oscilloscope with 5" display
- 3- Linear modulator, output level of 5-10 volts  
RMS unmodulated\*
- 4- Low distortion oscillator

\*Note that the modulation meter and peak lights respond to peak values of modulation so that if there is distortion in the modulator, the peak indications will be the true peak values, i.e., the sum of fundamental and the harmonics or distortion products. The most common mistake made in calibrating AM monitors is to adjust the modulation level until carrier shut-off is reached. This is defined as 100% negative and, indeed, it is 100% negative, but the positive value is not necessarily 100%. If the distortion is 3% at this level (typical of many transmitters), the positive value of modulation may be anywhere from 97% to 103%, depending on the phase of the harmonics, and the monitor will read this. It is for this reason that we suggest the monitor be calibrated at just 100% negative on the negative indications and then to back off the modulation to 90% for the positive indications so they can be set in the region where the transmitter is more linear.

## MODULATION METER ALIGNMENT PROCEDURE

- 1- Turn power off and set mechanical zero on meters.
- 2- Turn power on and allow to warm up for 15 minutes.
- 3- With VTVM measure voltage at U5 Pin 7. Voltage should be +15 volts,  $\pm 0.5$  volt. Adjust R30 for correct reading.
- 4- With VTVM measure voltage at U5 Pin 4. Voltage should be -15 volts,  $\pm 0.5$  volt. Adjust R25 for correct reading.
- 5- Place Function Switch in ZERO position and Voltmeter at Pin 6 U5 and adjust R37 for Zero Volts.
- 6- Adjust R44 for Zero on Modulation Meter.
- 7- Apply an RF level of 5-10 volts to RF input, and adjust CARRIER SET to -0- Deviation on Carrier Meter. Connect Oscilloscope at RF INPUT, J2, of monitor.
- 8- Apply a 1 KHz tone to modulator and adjust level for just 100% negative modulation as observed on oscilloscope. Depress NEG on Function Switch of AMM-2A. Monitor should indicate 100% modulation. If not, adjust METER AMP, R41, for correct reading.\*

- 9- Reduce modulation level to 90% on AMM-2A. Place Function Switch in POS position. Monitor should indicate 90% modulation. If not, adjust NEG AMP, R36, for correct reading.\*
- 10- Place Function Switch in CAL position. Monitor should indicate 100%. If not, adjust CAL ADJ, R14, for correct reading.

#### PEAK INDICATOR ALIGNMENT PROCEDURE

- 1- CARRIER OFF INDICATOR  
Reduce CARRIER SET Potentiometer to -30% or less on CARRIER LEVEL Meter. CARRIER OFF Indicator should be on. This is a fixed comparator and no adjustment is provided.
- 2- -100% Peak Indicator  
Adjust CARRIER SET to -0- Deviation on CARRIER LEVEL Meter. Adjust modulation for 98% or greater. The -100% Indicator should be on. If not, adjust -100% R69, for correct indication.
- 3- PEAK MOD Indicator
  - a) Place Function Switch in POS position. Adjust modulation level for 90% on AMM-2A. Adjust PEAK MOD Potentiometer on front for 90%.\* If the PEAK MOD Potentiometer R1 reads in error, the knob may be slipped to correct reading by loosening the two set screws and retightening after adjusting.
  - b) The span of the PEAK MOD Potentiometer may be checked by applying a 1 KHz tone to the Modulator and adjusting the modulation to 90% on the AMM-2A. Adjust PEAK MOD Span Potentiometer, R60, so that the percentage difference on the PEAK MOD Potentiometer on the front panel is 50% when the modulation level is changed from 90% to 40%. Slip the knob as in step (a) above if it is necessary to correct the reading at 90% after the span has been adjusted.
- 4- +125% Peak Indicator  
Place Function Switch in CAL position. The +125% Indicator should be on. If not, adjust +125%, R65, for correct indication.

REPLACEABLE PARTS

INTRODUCTION

This section contains information for ordering replaceable parts for the monitor. The table lists the parts in alphabetical order of their reference designations and provides a description of the part with the manufacturers' number and the Belar part number. Those parts with only a Belar part number should be obtained directly from Belar.

ORDERING INFORMATION

To order a replacement part from Belar, address the order or inquiry to Belar and supply the following information:

- a. Model number and serial number of unit.
- b. Description of part including the reference designation and location.

To order a part from a manufacturer other than Belar, provide the complete part description and the manufacturer's part number from the table.

REFERENCE DESIGNATORS

A	= assembly	J	= jack	S	= switch
C	= capacitor	L	= inductor	T	= transformer
DS	= device signaling (lamp)	P	= plug	W	= cable
F	= fuse	Q	= transistor	X	= oven
FL	= filter	R	= resistor	Y	= crystal

ABBREVIATIONS

CER	= ceramic	MEG	= meg	POT	= potentiometer
COMP	= composition	METFLM	= metal film	SEMICON	= semiconductor
CONN	= connector	MY	= mylar	SI	= silicon
ELEC	= electrolytic	PC	= printed circuits	U	= micro
F	= farads	PIV	= peak inverse voltage		
VDCW	= dc working volts	FXD	= fixed	POLY	= polystyrene
W	= watts	GE	= germanium	PORC	= porcelain
WW	= wirewound	K	= kilo = 1000		

ITEM: A1 CARD - AMM-2A

SYMBOL	DESCRIPTION	MFG & PART NO.
C1,C2	CAPACITOR: FXD MICA 1500PF 5% 500V	Elmenco DM19
C3,C22,C23	CAPACITOR: FXD CER 0.01UF GMV 100V	Sprague Z5U
C4,C13,C14	CAPACITOR: FXD CER 0.1UF 20% 50V	Sprague 5C50
C5	CAPACITOR: FXD MICA 270PF 5% 500V	Elmenco DM15
C6	CAPACITOR: FXD MICA 160PF 5% 500V	Elmenco DM15
C7	CAPACITOR: FXD MICA 27PF 5% 500V	Elmenco DM15
C8,C9,C18	CAPACITOR: FXD TANT 47UF 20% 35V	Sprague- 196D476X0035TE4
C10,C11	CAPACITOR: FXD CER .001UF GMV 1KV	Sprague X5D
C12,C15,C17,C24	CAPACITOR: FXD TANT 6.8UF 20% 25V	Sprague- 196D685X0025JA1
C16	CAPACITOR: FXD FLM 0.22UF 10% 80V	Sprague 192P
C19,C20,C21	CAPACITOR: FXD TANT 15UF 20% 15V	Sprague- 196DI56X0015JA1
CR1,CR4,CR5	DIODE: SI	1N4006
CR6,CR7,CR8	DIODE: SI	1N4006
CR9,CR10,CR11	DIODE: SI	1N4006
CR2	DIODE: SI	1N643
CR3,CR16,CR17	DIODE: SI	1N4446
CR18	DIODE: SI	1N4446
CR12,CR13,CR14	DIODE: GE	AA119
CR15	DIODE: GE	AA119
L1	INDUCTOR: FXD	Belar
L2	INDUCTOR: FXD	Belar
L3	INDUCTOR: FXD	Belar
Q1,Q5	TRANSISTOR: SI	2N4037
Q2,Q6,Q7,Q8	TRANSISTOR: SI	2N2222
Q3,Q4	TRANSISTOR: SI	2N3053
R1	RESISTOR: FXD COMP 20K 5% 1/2W	
R2	RESISTOR: FXD COMP 75K 5% 1/2W	
R3,R20,R26,R31	RESISTOR: FXD COMP 10K 5% 1/2W	
R33,R39,R51,R52	RESISTOR: FXD COMP 10K 5% 1/2W	
R54	RESISTOR: FXD COMP 10K 5% 1/2W	
R4	RESISTOR: FXD COMP 1K 5% 1/2W	
R5	RESISTOR: FXD COMP 4.7K 5% 1/2W	
R6,R15,R18,R34	RESISTOR: FXD FLM 10K 1% 1/8W	
R56,R58,R59	RESISTOR: FXD FLM 10K 1% 1/8W	
R68,R71	RESISTOR: FXD FLM 10K 1% 1/8W	
R7,R8,R9,R10	RESISTOR: FXD FLM 1K 1% 1/8W	
R11,R12,R48,R49	RESISTOR: FXD FLM 1K 1% 1/8W	
R13	RESISTOR: FXD FLM 499Ω 1% 1/8W	
R14,R36,R41	RESISTOR: VAR WW 3K 2W	CTS BE87776
R65,R69	RESISTOR: VAR WW 3K 2W	CTS BE87776
R16,R19,R47	RESISTOR: FXD FLM 5.11K 1% 1/8W	
R64,R66,R70	RESISTOR: FXD FLM 5.11K 1% 1/8W	
R21,R24,R46	RESISTOR: FXD COMP 2.2K 5% 1/2W	
R81,R82,R83	RESISTOR: FXD COMP 2.2K 5% 1/2W	
R22,R45,R75	RESISTOR: FXD COMP 1K 5% 1/2W	
R23	RESISTOR: FXD COMP 3.3K 5% 1/2W	
R25,R30	RESISTOR: VAR COMP 100K 20% 1/2W	CTS U201R104B
R27,R28	RESISTOR: FXD COMP 4.7Ω 5% 1/2W	
R29,R32	RESISTOR: FXD COMP 51Ω 5% 1/2W	
R35,R38,R67	RESISTOR: FXD FLM 9.09K 1% 1/8W	
R37,R44	RESISTOR: VAR FLM 10K 10% 3/4W	Allen-Bradley - RT5L103
R40	RESISTOR: FXD FLM 13.0K 1% 1/8W	

ITEM: A1 CARD - AMM-2A

SYMBOL	DESCRIPTION	MFG. & PART NO.
R42	RESISTOR: FXD COMP 1.5K 5% $\frac{1}{2}$ W	
R43	RESISTOR: FXD COMP 8.2M 5% $\frac{1}{2}$ W	
R53,R72,R73,R74	RESISTOR: FXD COMP 15K 5% $\frac{1}{2}$ W	
R55	RESISTOR: FXD COMP 620 $\Omega$ 5% $\frac{1}{2}$ W	
R57	RESISTOR: FXD FLM 2.49K 1% 1/8W	
R60	RESISTOR: VAR WW 1K 2W	CTS BE87775
R61	RESISTOR: FXD FLM 3.01K 1% 1/8W	
R62	RESISTOR: FXD FLM 1.1K 1% 1/8W	
R63	RESISTOR: FXD FLM 221 $\Omega$ 1% 1/8W	
R76,R77,R78	RESISTOR: FXD COMP 30K 5% $\frac{1}{2}$ W	
R79,R80	RESISTOR: FXD COMP 2.7K 5% $\frac{1}{2}$ W	
R84,R85,R86,R87	RESISTOR: FXD COMP 200 $\Omega$ 5% $\frac{1}{2}$ W	
U1,U2,U3,U5,U6	INTEGRATED CIRCUIT	MC1741CP1
U4	INTEGRATED CIRCUIT	MC1468L
U7	INTEGRATED CIRCUIT	CA3140S
U8	INTEGRATED CIRCUIT	MC1741SCP1
U9	NOT USED	
U10	INTEGRATED CIRCUIT	MC3302P
U11,U12,U13	INTEGRATED CIRCUIT	N74122A
U14	INTEGRATED CIRCUIT	MC7404P

ITEM: CHASSIS - AMM-2A

SYMBOL	DESCRIPTION	MFG & PART NO.
C1,C2	CAPACITOR: FXD CER 0.01UF 1KV	Auto Comp
C3,C4,C5	CAPACITOR: FXD ELECT 500UF @ 50V	Sprague TVL1330
C6 THRU C16	CAPACITOR: FXD CER .001UF 1KV	Sprague X5D
CR1	DIODE: LED YELLOW	Monsanto MV5353
CR2,CR3,CR4	DIODE: LED RED	Monsanto MV5053
DS1,DS2	LAMP: 6.3V 250MA	#44
F1	FUSE: CARTRIDGE 1/2A @ 250V	Littlefuse 3AG-1/2A
J1	CONNECTOR: POWER AC	Switchcraft EAC-301
J2,J3	CONNECTOR: RF BNC	UG-625B/U
M1	METER: CARRIER LEVEL	Modutec 842-142
M2	METER: MODULATION 0-133%	Modutec 841-529A
R1	RESISTOR: VAR WW 500 2W	RA20NASD501A
R2	RESISTOR: VAR COMP 1K 2W	RV4NAYSK102A
R3	RESISTOR: FXD COMP 7.5K 5% 1/2W	
R4	RESISTOR: FXD FLM 5.11K 1% 1/8W	
S1	SWITCH: SLIDE	Cont. Wirt- G326-0004
S2	SWITCH: PUSH BUTTON	CRL
T1	TRANSFORMER: POWER	CTC 3143
TB1	TERMINAL BLOCK: 12 Point	Cinch 12-140Y
U1	INTEGRATED CIRCUIT	MC7805CP
XDS1,XDS2	SOCKET: LAMP	Leecraft
XF1	FUSEHOLDER	Buss HKP
	LINE CORD	