Peak Weighting Module
Model PWM-1

Revision A

for the Belar FMM-2
FM Modulation Monitor

(effective beginning S/N 162190)

Guide to Operations

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WARRANTY AND ASSISTANCE

All Belar products are warranted against defects in materials and workmanship. This warranty applies for one year from the date of delivery, FOB factory or, in the case of certain major components listed in the instruction manual, for the specified period. Belar will repair or replace products which prove to be defective during the warranty period provided that they are returned to Belar prepaid. No other warranty is expressed or implied. Belar is not liable for consequential damages.

For any assistance, contact your Belar Sales Representative or Customer Engineering Service at the Belar factory.

BELAR PWM-1 PEAK WEIGHTING MODULE
Operation Guide

The Belar PWM-1 Peak Weighting Module adds peak weighting to the Peak Mod and 100% Peak lights of your Belar FMM-2 FM Modulation Monitor. It will generally result in your peak lights lighting less frequently for a given modulation level. It does not affect the operation or reading of the modulation meter.

BYPASS   The PWM-1 is completely bypassed. The monitor will function exactly as it would without the option installed.

3 CYCLES   The monitor peak lights will ignore any peak shorter than 3 cycles (of a 10kHz tone burst).

5 CYCLES   The monitor peak lights will ignore any peak shorter than 5 cycles (of a 10kHz tone burst).

9 CYCLES   The monitor peak lights will ignore any peak shorter than 9 cycles (of a 10kHz tone burst).

15 CYCLES   The monitor peak lights will ignore any peak shorter than 15 cycles (of a 10kHz tone burst).

20 CYCLES   The monitor peak lights will ignore any peak shorter than 20 cycles (of a 10kHz tone burst).

By changing the peak weighting constants and noting the effect on your peak lights, you can better understand the composition of your total modulation. For example, if your program material is highly processed with little dynamic range (and you have no subcarriers), peak weighting will cause almost no change in your monitor readings. If your program has little processing, you will see more effect from the peak weighting.

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Instructions for installing the
BELAR PWM-1 PEAK WEIGHTING MODULE
(Revision A)
in your Belar FMM-2 FM Modulation Monitor
(S/N 162190 & later)

Before proceeding, please:

- Read all the way through these instructions before beginning the actual installation.

- Ensure that your PWM-1 kit is complete. Contents include:
    PWM-1 circuit board (with rotary switch and ribbon cable attached)
    Knob for rotary switch
    Allen wrench for tightening set screws on knob
    4-40 X 1/4" pan head Phillips screws (4)
    #4 internal tooth lockwashers (4)
    PWM-1 foil label for back of unit (with switch mounting hole prepunched)
    Instruction book

Overview: The PWM-1 is installed in the back of the cover of your FMM-2. The installation procedure
                involves removing the cover, applying the foil label, installing the switch (with attached circuit
                board), making the electrical connections, and reinstalling the cover.

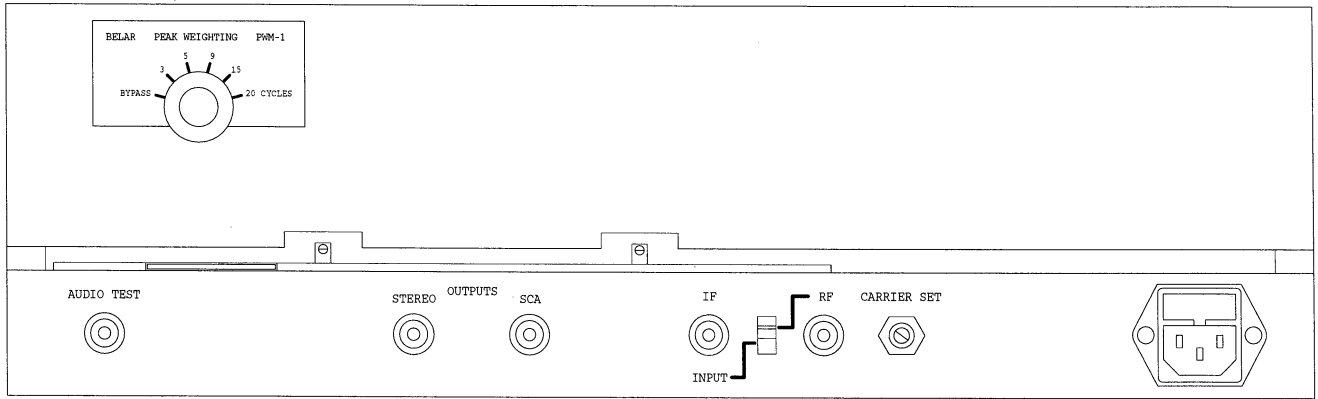   Tools required:

                    small Phillips screwdriver
                    IC removal tool (or small flat screwdriver)
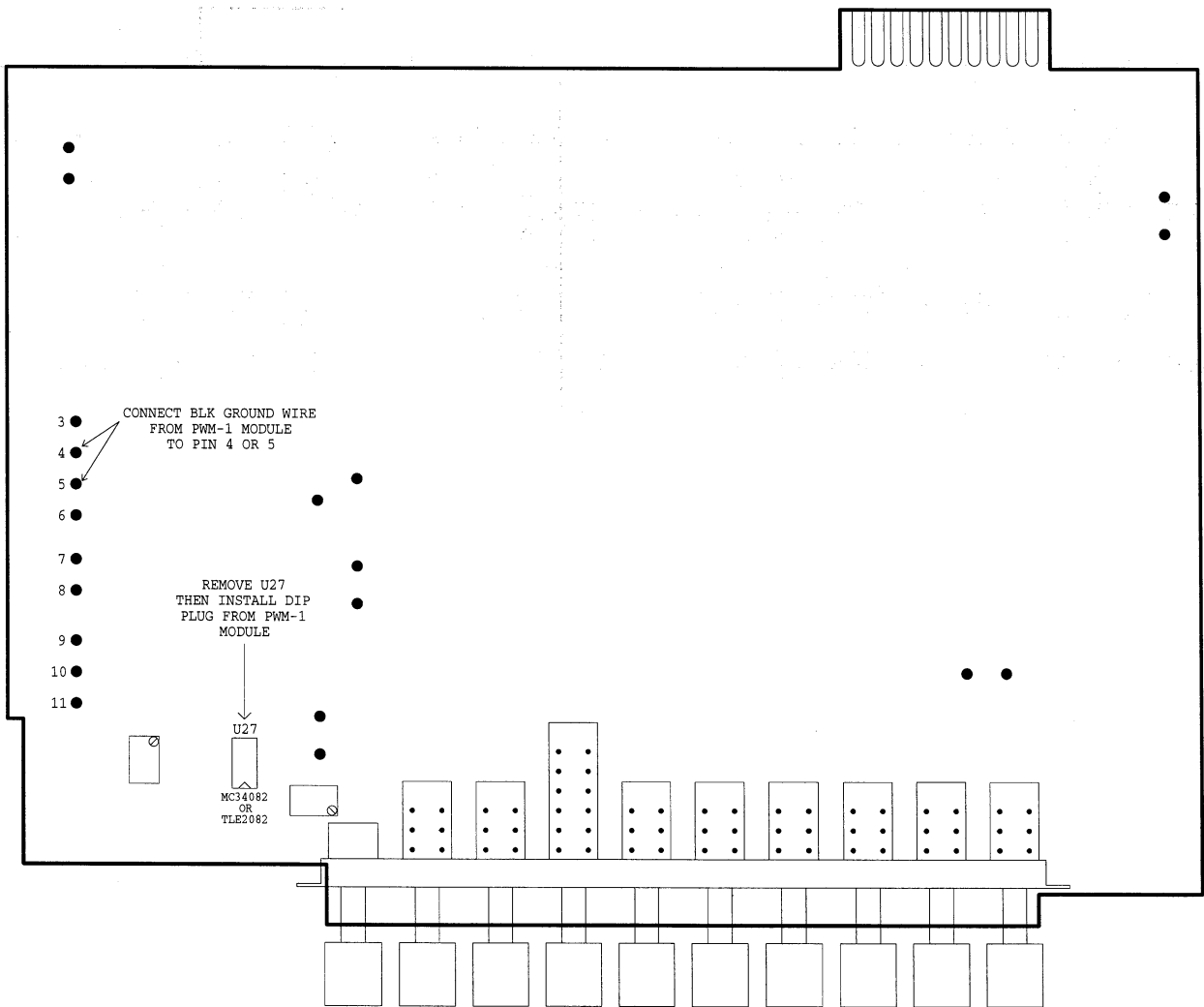   3/8" open end wrench (or small adjustable open-end wrench)

Procedure:

1   Unplug all cords from the FMM-2, and remove it from the equipment rack.

2   Remove the FMM-2 top cover.

3   Clean area on cover where the label will be installed with alcohol or similar solvent to make sure that
        the label will adhere properly. Carefully peel the label backing away from bottom of label, and fold it
        over so the prepunched mounting hole is exposed. Locate the label on the cover so that the holes
        in the cover and the label line up and the bottom edge of the label is parallel to the top of the cover,
        then carefully press the bottom of the label against the panel.

4   Slowly peel label backing from the bottom up, while pressing label against panel. This will avoid
        trapping air bubbles under label.

5   Roll label flat with a rubber roller, or rub the label backing over the surface of the label to flatten.

6   Remove the nut and lockwasher from the PWM-1 rotary switch, and the four #4 screws and
        lockwashers from the mounting standoffs.
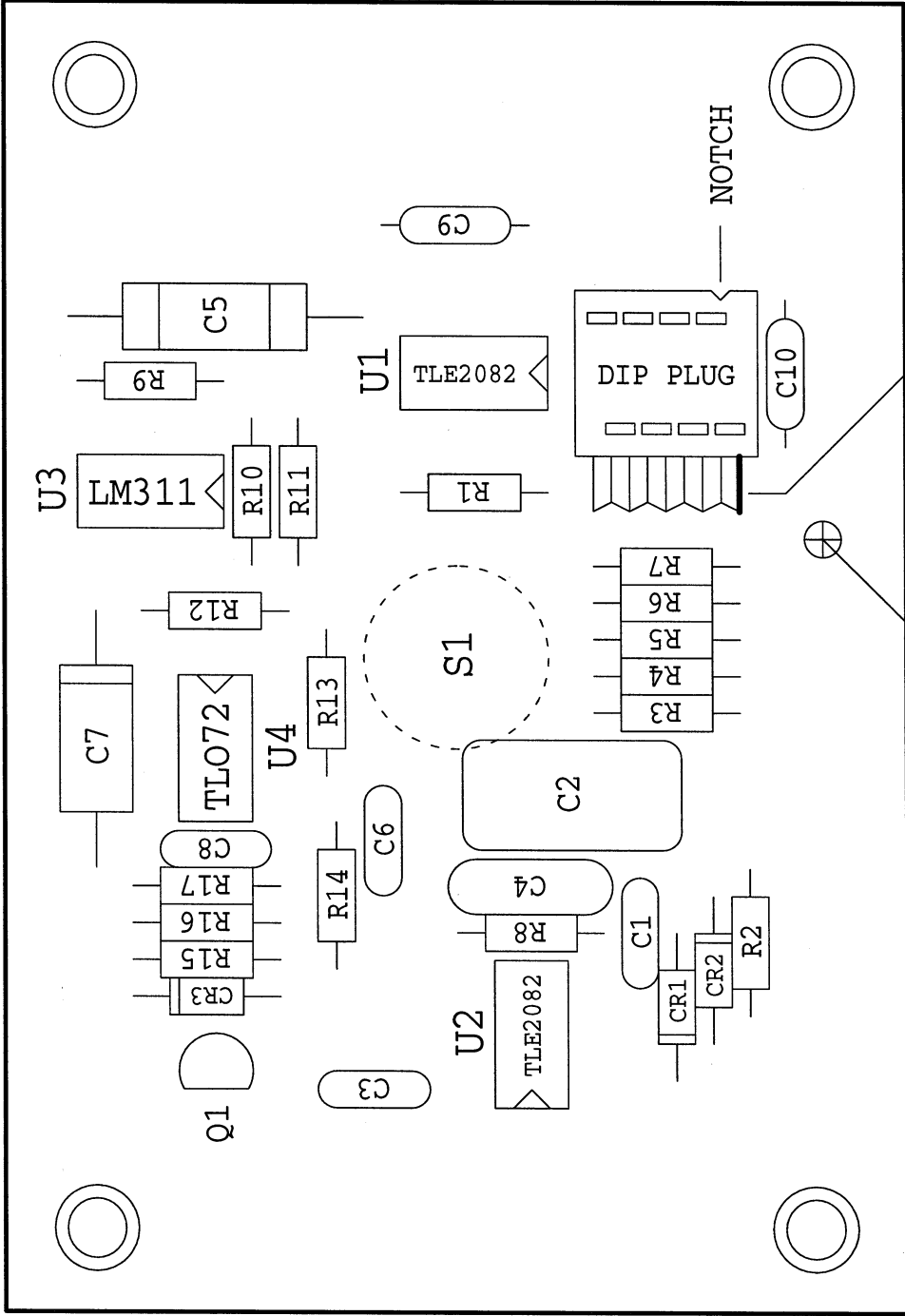
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7   Install the PWM-1 module on the inside rear of the FMM-2 top cover, with the black wire on the PWM-1 module toward the bottom of the cover. Install the four mounting screws and lock washers, then tighten. Mount the switch lockwasher and nut. Do not overtighten the switch nut since this could damage the switch.

8   Install the knob. The knob pointer should be opposite the flat on the switch shaft. Tighten the set screws on the knob with the Allen wrench supplied. Tighten the set screw which contacts the flat on the shaft first.

9   Remove integrated circuit U27 (MC34082 or TLE2082) from the FMM-2 A2 board. See diagram for U27 location. Note the position of pin 1.

10   Lay the FMM-2 top cover just behind the unit with the PWM-1 knob facing down. Rest the cover on the A2 board fingers.

11   Insert the 8 pin DIP plug from the module into U27's socket on the FMM-2 A2 board. The notch on the DIP plug denotes pin 1. This pin should be inserted closest to the dot on the A2 board next to U27's socket. If the DIP plug is inserted properly, the flat cable should exit the DIP plug on the side of the socket toward the unit power supply. Fold the flat cable across the top of the DIP plug.

12   Connect the black ground wire from the module to Pin 4 or Pin 5 (whichever pin is not used) on the FMM-2 A2 board. See diagram for pin 4 and 5 location.

13   Carefully rotate the top cover into position and secure it with its mounting screws.

14   Reinstall the FMM-2, and reconnect all cords. This completes the module installation.

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BELAR   PEAK WEIGHTING   PWM-1

3   5   9   15

BYPASS   20 CYCLES

AUDIO TEST   STEREO   OUTPUTS   SCA   IF   RF   CARRIER SET

INPUT

FMM-2 CHASSIS REAR VIEW
WITH PWM-1 INSTALLED
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3
4   CONNECT BLK GROUND WIRE
FROM PWM-1 MODULE
5   TO PIN 4 OR 5
6
7
8   REMOVE U27
THEN INSTALL DIP
PLUG FROM PWM-1
MODULE
9
10
11

U27

MC34082
OR
TLE2082

PWM-1 MODULE TO FMM-2 A2 BOARD
CONNECTION POINTS
(BOTH REV. A)
BELAR ELECTRONICS

PWM-1A BOARD
COMPONENT LAYOUT
BELAR ELECTRONICS

NOTCH

DIP PLUG TO
U27 SOCKET ON
FMM-2 A2
REV. A, BD.

GROUND WIRE TO PIN 5
ON A2 BOARD

DIP PLUG

C9

C5

R9

U1   TLE2082

C10

U3   LM311

R10

R11

R1

R12

S1

R13

C7

TL072

U4

R3 R4 R5 R6 R7

C6

R14

C8

R17

R16

R15

CR3

Q1

C3

C2

C4

R8

C1

CR1

CR2

R2

U2   TLE2082

TO A2
PIN 5

-15V
SOURCE

C9
1.0

U1A
TLE2082

OUT
1

3 +
2 -

PIN 4 PIN 3 PIN 2 PIN 1

PIN 5 PIN 7 PIN 8

8 PIN DIP PLUG
TO U27 SOCKET
ON FMM-2 A2, REV. A, BOARD
TO FMM-2 A2, REV. A, BOARD

C10
1.0

+15V
SOURCE

U1B
TLE2082

6 -
5 +

OUT
7

R1
5.1K

-15V

C1
0.1

U2A
TLE2082

3 +
2 -

OUT
1

4

CR1
1N4446

CR2
1N4446

R2
4.7M
-15V

BYPASS
3 CYCLES
5 CYCLES
9 CYCLES
15 CYCLES
20 CYCLES

R7 R6 R5 R4 R3
13.0K 10.0K 5.62K 3.01K 1.91K

S1

13

14

C2
0.22

U2B
TLE2082

5 +
6 -

OUT
7

C3
0.1
+15V

8

R8
5.1K

C4
62PF

R9
22K

R10
220K

C5
0.01

U3
LM311

2 +
3 -

V+
V-
G

4
1

B1
B2

OUT
7

8
6
5

R11
220K
+15V

-15V

R12
10K
+15V

R13
470K

R14
470K

U4B
TLO72

5 +
6 -

OUT
7

C6
0.1
+15V

8

CR3
1N4446

R15
10K

2N4401
Q1

R16
10K

C7
1000PF

R17
10K

U4A
TLO72

3 +
2 -

OUT
1

4
-15V

C8
0.1

FMM-2 PWM-1A
PEAK WEIGHTING BOARD
BELAR ELECTRONICS
4-17-02

PWM-1A BOARD FMM-2
(For FMM-2s with the Rev. A A2 board.)

Reference Designation	Description	Part Number
C1	C: FIXED CERAMIC 0.1uF 50V	0151-0015
C2*	C: FIXED FILM 0.22 uF 10% 100V	0122-2241
	*C2 is factory selected	
C3	C: FIXED CERAMIC 0.1uF 50V	0151-0015
C4	C: FIXED MICA 62pF 5%	0140-6205
C5	C: FIXED FILM 0.01 uF 10% 200V	0120-1031
C6	C: FIXED CERAMIC 0.1uF 50V	0151-0015
C7	C: FIXED POLY 1000pF 2.5% 160V	0130-1022
C8	C: FIXED CERAMIC 0.1uF 50V	0151-0015
C9,C10	C: FIXED CERAMIC 1.0uF 50V	0151-0008
CR1 thru CR3	DIODE: 1N4446	1900-0002
Q1	TRANSISTOR: 2N4401	1850-0028
R1	R: METAL FILM 5.1k 2% 1/4W	0751-5122
R2	R: FIXED CARBON 4.7M 5% 1/4W	0683-4755
R3	R: METAL FILM 1.91k 1%	0721-1911
R4	R: METAL FILM 3.01k 1%	0721-3011
R5	R: METAL FILM 5.62k 1%	0721-5621
R6	R: METAL FILM 10.0k 1%	0721-1002
R7	R: METAL FILM 13.0k 1%	0721-1302
R8	R: METAL FILM 5.1k 2% 1/4W	0751-5122
R9	R: METAL FILM 22k 2% 1/4W	0751-2232
R10,R11	R: METAL FILM 220k 2% 1/4W	0751-2242
R12	R: METAL FILM 10k 2% 1/4W	0751-1032
R13,R14	R: METAL FILM 470k 2% 1/4W	0751-4742
R15 thru R17	R: METAL FILM 10k 2% 1/4W	0751-1032
S1	SWITCH: ROTARY - 2 POLE, 6 POS.	3100-0003
--	KNOB: 0F3B	0370-0005
U1,U2*	IC: TLE2082	1826-0069
	*(Previously U1 and U2 were the MC34082 IC. These IC's are interchangeable.)	
U3	IC: LM311	1826-0009
U4	IC: TLO72	1826-0038

CUT OUT ALONG THIS LINE

COVER TOP EDGE

COVER LEFT EDGE

DRILL 1/8" HOLE   DRILL 1/8" HOLE

DRILL 1/4" HOLE

MARK FOR LABEL   MARK FOR LABEL

DRILL 1/8" HOLE   DRILL 1/8" HOLE

CUT OUT ALONG THIS LINE

COVER TOP EDGE

COVER LEFT EDGE

DRILL 1/8" HOLE   DRILL 1/8" HOLE

DRILL 1/4" HOLE

MARK FOR LABEL   MARK FOR LABEL

DRILL 1/8" HOLE   DRILL 1/8" HOLE
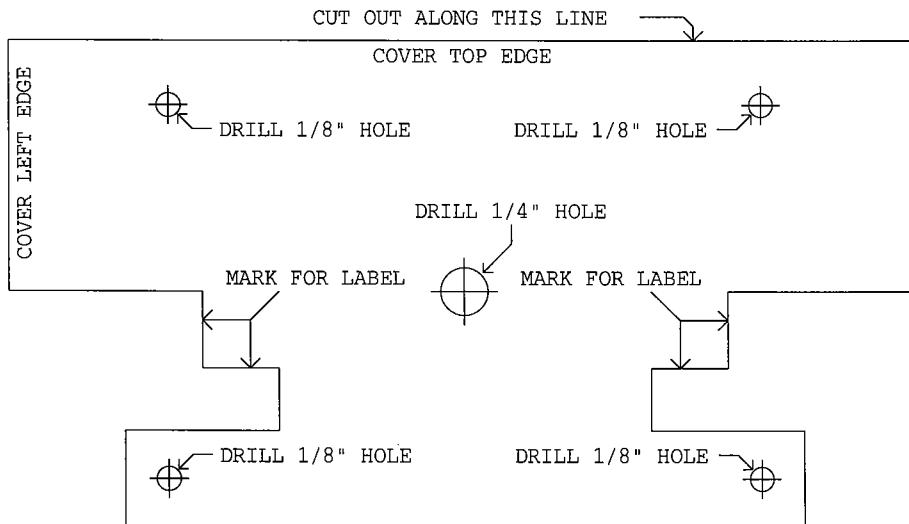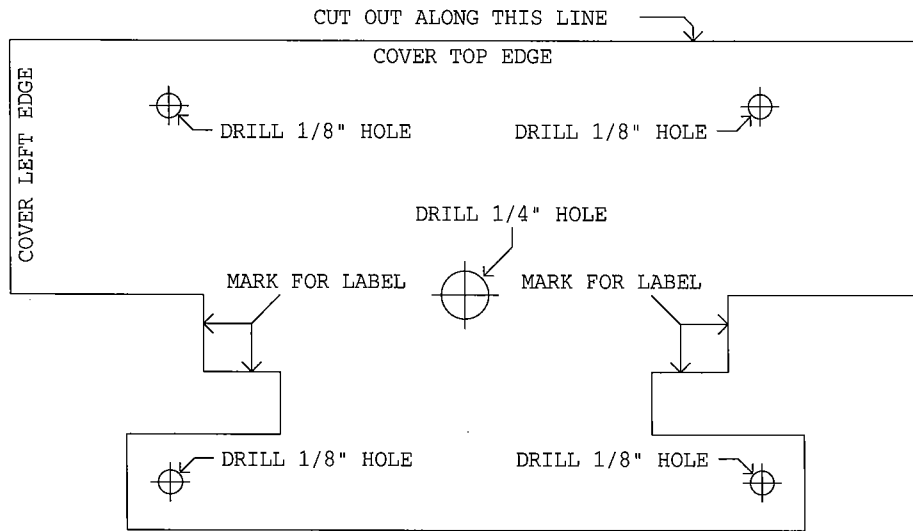
FMM-2 PWM-1A MOUNTING TEMPLATE
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