

# **Model TVM-101 TV AURAL MODULATION MONITOR**

## **Guide to Operations**

2/00

©11/88



**BELAR ELECTRONICS LABORATORY, INC.**

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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.

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### **NOTICE**

The Belar TVM-101 has the same performance and much of the same circuitry as the Belar TVM-100. The main differences are as follows:

The TVM-101 does not have quasi-parallel mode of operation.

The TVM-101 does not have a digital peak meter.

The TVM-101 (with optional SAP & PRO Injection Board) can not directly read SAP and PRO injection levels.

The TVM-101 has the same stereo performance as the TVM-100 and it can be switched to mono.

### **PRODUCT REGISTRATION**

Thank you for purchasing the TVM-101 Aural Modulation Monitor from Belar. Although the monitor is simple to operate, it has so many features and capabilities that a few minutes spent with this Guide will enable you to get the most out of your purchase.

We also ask that you take a moment now to fill out and return the enclosed product registration form. It will allow us to keep you informed of future product developments at Belar.

**PLEASE FILL OUT AND RETURN THE FORM TODAY!!!**

(If you can't find the form, just send us a note with your name, company, address, and phone and FAX numbers. Also, be sure to tell us your unit model and serial numbers.)

# **1 General Information**

## **1-1 General Description**

The Belar Model TVM-101 Precision TV Aural Monitor is a wide-band TV aural modulation monitor designed to measure the total modulation characteristics of monaural as well as multi-channel television transmitters.

The TVM-101 is also used as a low-distortion, low-noise main channel demodulator for driving audio monitor amplifiers and audio distortion analyzers. Wide-band outputs are provided for Stereo, SAP, PRO, and SCA monitors.

Designed to conform with the latest EIA/NTSC recommendations, the TVM-101 features a highly accurate modulation calibrator for mono and stereo modes, along with a digital frequency deviation display. Built-in noise measurement capability allows direct measurement of FM and AM signal-to-noise ratios as well as noise due to transmitter ICPM.

## **1-2 Physical Description**

The TVM-101 is constructed on a standard 5¼ X 19 inch EIA rack mount panel. Factory adjustments are located within the shielded compartment of the monitor. The AC power input, RF and IF inputs and monitor outputs are located on the rear of the TVM-101 chassis on individual BNC connectors and on a card edge connector.

## **1-3 Electrical Description**

The TVM-101 is a solid state, low sensitivity, crystal controlled, superheterodyne TV receiver incorporating a highly linear and stable digital pulse counting discriminator to demodulate the TV aural signal. Various metering and test provisions are contained within the monitor to measure transmitter output characteristics. These provisions include a selectable true-peak or FCC defined semi-peak modulation meter and thumb wheel controlled peak modulation indicator, both switchable to positive, negative or independent modulation polarity; LED indicating circuits to set the incoming RF level; a precision deviation and zero deviation calibration oscillator to check monitor calibration and permit a signal-to-noise test of the monitor and provisions for measurement of AM and FM noise. A carrier alarm and fixed 100% peak modulation indicator are also provided.

Outputs obtained from the monitor include two composite wideband outputs for stereo and SAP monitoring; a de-emphasized audio output; balanced and unbalanced audio monitor outputs; remote modulation meter output, 100% peak indicator, adjustable peak indicator and carrier alarm indicator.

## **2 Installation**

### **2-1 Initial Inspection**

Check the shipping carton for external damage. If the carton exhibits evidence of abuse in handling (holes, broken corners, etc.) ask the carrier's agent to be present when the unit is unpacked. Carefully unpack the unit to avoid damaging the equipment through use of careless procedures. Inspect all equipment for physical damage immediately after unpacking. Bent or broken parts, dents and scratches should be noted. If damage is found, refer to Paragraph 2-2 for the recommended claim procedure. Keep all packing material for proof of damage claim or for possible future use.

The TVM-101 is shipped with an instruction book, three wire line cord, four beige rack-mount screws with integral non-marring washers, and a 10 position, dual readout remote connector.

### **2-2 Claims**

If the unit has been damaged, notify the carrier immediately. File a claim with the carrier or transportation company and advise Belar of such action to arrange the repair or replacement of the unit without waiting for a claim to be settled with the carrier.

### **2-3 Repacking for Shipment**

If the unit is to be returned to Belar, attach a tag to it showing owner, owner's address, and phone number. A description of the service required should be included on the tag. The original shipping carton and packaging materials should be used for reshipment. If they are not available or reusable, the unit should be repackaged in the following manner:

- a. Use a double-walled carton with a minimum test strength of 275 pounds.
- b. Use heavy paper or sheets of cardboard to protect all surfaces.
- c. Use at least 4 inches of tightly packed, industry approved, shock absorbing material such as extra firm polyurethane foam or rubberized hair. NEWSPAPER IS NOT SUFFICIENT FOR CUSHIONING MATERIAL.
- d. Use heavy duty shipping tape to secure the outside of the carton.
- e. Use large FRAGILE labels on each surface.
- f. Return the unit, freight prepaid. Be sure to insure the unit for full value.

## 2-4 Preparation for Use

The TVM-101 Modulation Monitor is designed to be mounted in a standard 19-inch rack. When mounted in a rack, a slight air space should be provided above and below the unit. When the monitor is mounted above high heat generating equipment such as power amplifiers, consideration should be given to cooling requirements which allow a free movement of cooler air through and around the TVM-101. In no instance should the ambient chassis temperature be allowed to rise above 50 degrees C (122 degrees F). Mount the TVM-101 to the rack using the screws provided.

### *Units beginning with serial number 230271:*

These units can be operated from a 100 to 240 Vac, single phase, 50-60 Hz power source with no user adjustments. The fuse should be a 5 mm x 20 mm type GMA-3, 3 AMP-250 V (UL/CSA) or T3.15 A-250 V (IEC) fuse only. A spare fuse is stored in the removable fuse compartment.

### *Units with serial number 230066 to 230270:*

These units can be operated from either a 105 to 125 Vac or 210 to 250 Vac single phase, 50 to 400 Hz power source. Make sure the unit is set for the proper voltage as follows: Unplug the line cord. Open the fuse compartment door and pull lever to remove fuse. Using needlenose pliers, pull the voltage select board straight out of the power entry module. While facing the rear of the unit, orient the voltage select board so the desired line voltage is face up and reads correctly ("120" for 115 Vac operation, "240" for 230 Vac operation. The "100" and "220" positions on the bottom of the board are not used.) Reinsert the board into the power entry module, install the proper fuse ( $\frac{1}{2}$ A 250 V for 115 Vac,  $\frac{1}{4}$ A 250 V for 230 Vac), close the fuse door, and plug the line cord back in.

### *Units prior to serial number 230066:*

These units can be operated from either a 105 to 125 Vac or 210 to 250 Vac single phase, 50 to 400 Hz power source. Make sure the unit is set for the proper voltage as follows: Unplug the line cord. Slide the line voltage selector switch (S1) to the 115 V or 230 V position. Ensure that the fuse (F1) is the proper current rating for selected voltage ( $\frac{1}{2}$  A 250 V for 115 Vac,  $\frac{1}{4}$  A 250 V for 230 Vac). Plug the line cord back in.

Connect the three wire grounded line cord provided, or if a substitute line cord is used, be sure that the ground lead is connected to "G" on the line cord receptacle.

Set the Aural IF Frequency Switch (S2) to **41** and the Aural IF Selector switch (S3) to **INT**.

Connect a 50 ohm coaxial cable (RG-58) between the monitor probe on the transmitter and the RF input connector on top of the attenuator module.

**CAUTION: DO NOT APPLY MORE THAN 3 VOLTS RF TO THE MONITOR. EXCESSIVE RF INPUT CAN CAUSE DAMAGE NOT COVERED UNDER THE WARRANTY. (Read Section 3-1, step 5 before applying rf to this input.)**

If desired, connect an external aural monitoring amplifier to pins 4 and 5 on the remote connector. This is a balanced 600 ohm output.

A remote total modulation meter may be connected to pin 6 on the remote connector, with a total loop resistance of 7500 ohms. Pins 9, 8 and 7 may be connected to LED's to remotely indicate carrier level alarm, adjustable peak modulation and 100% peak modulation respectively. A current limiting resistor, typically 160 ohms, should be connected in series with the LED's. A +5 Vdc source is available on pin 10. Ground is available on pins A thru L.

The remote connector may be used to connect the optional MP-11 Remote Meter Panel to the TVM-101. The meter panel displays total modulation on an analog modulation meter. Three LED's provide indications for carrier alarm, adjustable peak modulation and 100% peak modulation.

## **2-5 Interconnections**

### **MODEL TVM-101 REAR PANEL JACKS**

| JACK | Function                                                                                 |
|------|------------------------------------------------------------------------------------------|
| RF   | RF Input: (Read Section 3-1, step 5 before applying rf to this input.)                   |
| J2   | 1.46 Vrms @ 75 ohms, unbalanced, composite wideband output to stereo or SAP/PRO monitor. |
| J3   | 1.46 Vrms @ 75 ohms, unbalanced, composite wideband output to stereo or SAP/PRO monitor. |
| J4   | IF input                                                                                 |

## MODEL TVM-101 REMOTE CONNECTOR

| Pin      | Function                                          |
|----------|---------------------------------------------------|
| 1        | Remote CAL mute                                   |
| 2        | Remote SAP offset                                 |
| 3        | Remote PRO offset                                 |
| 4        | Audio out, 600 ohms, balanced (de-emphasized) (-) |
| 5        | Audio out, 600 ohms, balanced (de-emphasized) (+) |
| 6        | Remote total modulation meter                     |
| 7        | Remote 100% peak LED                              |
| 8        | Remote Adjustable peak LED                        |
| 9        | Remote Carrier alarm LED                          |
| 10       | +5 Vdc                                            |
| A thru L | Ground                                            |

### 3 Operation

#### 3-1 Initial Operation

1. Ensure that the rear panel IF selector switches are set to 41 and INTERNAL positions, and remove the 4 screws from the input attenuator module cover and remove cover. Make certain that the mechanical meter zero is set properly.
2. Depress the SEMI switch.
3. Depress the ZERO switch and allow at least a 15 minute warm up.
4. Depress the CAL switch and check for a 100% reading.
5. Depress MONO for monaural or MTS for multi-channel sound.
6. Depress the RF LEVEL switch to indicate rf level.
7. Apply the RF input to the RF input jack and adjust the input attenuator to a level that both LED lamps go out. **Note that the attenuator plugs must be moved in pairs!** The LEDs are visible through the top two holes of the back cover. These holes are to the left of the input jack of the attenuator module. The left LED indicates low RF level and the right LED indicates high RF level. When both lights are out, the RF level is in the center of the AGC range and the meter will indicate 100%. The TVM-101 will operate with as little as 30% RF level, but a 100% level (as indicated on the front panel) is required to calibrate the AM noise measurement.
8. Depress the OPERate switch and the SEMI switch and the TVM-101 is now ready for operation.

### **3-2 Normal Operation**

For normal operation, leave the TVM-101 in OPERate position. Changes in RF level will not affect the accuracy of modulation measurements.

The PEAK MOD thumb wheel switch is usually set to the maximum allowable peak modulation according to the services being transmitted, and the PEAK MOD LED will flash at this preset level or greater.

The CARRIER ALARM LED will illuminate when the carrier falls below 30% of the meter carrier level reading.

### **3-3 Functions**

1. OPERATE SWITCH - When depressed, places the unit into operation. In this mode, the modulation meter as well as the PEAK MOD and 100% modulation indicators are independent of modulation polarity.
2. PLUS - When depressed, places the unit into operation. The modulation meter, PEAK MOD and 100% indicators measure positive modulation excursions.
3. MINUS - When depressed, places the unit into operation. The modulation meter, PEAK MOD and 100% indicators measure negative modulation excursions.
4. ZERO - When depressed, applies a zero deviation calibration oscillator to the monitor. This function permits a signal-to-noise ratio test of the monitor.
5. CAL - When depressed, applies a standard 73 kHz deviation to the monitor to check modulation calibration.
6. RF LEVEL - When depressed, measures the IF level applied to the monitor. When the RF reads 100%, the AM NOISE function is correctly calibrated.
7. PEAK - When depressed, places the meter into a true peak reading mode by introducing a sample-hold circuit into the metering circuit.
8. SEMI - When depressed, returns the metering circuit to a semi-peak mode that conforms to the FCC modulation meter requirements.
9. FM NOISE - When depressed, inserts a 40 dB gain , de-emphasized , metering amplifier into the circuit so that with an unmodulated carrier applied to the monitor, a monaural signal-to-noise ratio measurement can be made. Note that a 100% (0 dB) reading is now -40 dB and a -20 dB reading is now -60 dB. Thus the algebraic sum of the meter

reading and -40 dB is the noise reading. A 100% meter reading now corresponds to 0.73 kHz deviation for modulating frequencies under approximately 400 Hz.

10. AM NOISE - When depressed, applies the 40 dB gain, de-emphasized, metering amplifier to the AM noise detector and amplifier so that an AM noise measurement can be made. When the RF level is set to 100%, the circuit is calibrated to read AM noise directly, with a 100% (0 dB) meter reading representing -40 dB. Again the algebraic sum of the meter reading and -40 dB is the noise reading. A 100% meter reading now corresponds to 1% amplitude modulation for modulating frequencies under approximately 400 Hz.
11. MTS - When depressed, the unit reads 73 kHz deviation as 100%.
12. MONO - When depressed, the normalization of the unit is changed to read 25 kHz deviation as 100%.
13. MODULATION METER - Measures modulation, RF level, FM noise, or AM noise, depending on the function selected.
14. PEAK MOD THUMB WHEEL - Pre-sets, in 1% increments, the PEAK MODulation indicator to light at or above the indicated modulation setting. This circuit follows the modulation polarity set by the function switch.
15. CARRIER ALARM INDICATOR - Indicates when the carrier level falls to 30% or less of the RF level as shown on the meter.
16. PEAK MOD INDICATOR - Indicates when the modulation level equals or exceeds the level set by the PEAK MOD thumb wheel. This indicator follows the modulation polarity set by the function switch.
17. 100% MOD INDICATOR - Indicates when the modulation level equals or exceeds 100%. This indicator follows the modulation polarity set by the function switch.
18. AUDIO TEST - Provides a test audio output for monaural only. The output is 5 Vrms, 10k ohms unbalanced, de-emphasized.

### **3-4 Transmitter Measurements**

Normal transmitter proof-of-performance measurements may be made with the TVM-101. Distortion measurements may be made through the audio test jack on the front panel. Five volts rms is available at 100% modulation, 25 kHz deviation monaural, so that most distortion analyzers may be used. The audio test output and the remote audio outputs are

de-emphasized according to the standard 75  $\mu$ sec curve, while the modulation meter has a flat frequency response characteristic.

### **3-5 Accessories**

*Option 01* SAP & PRO Injection Board removes the SAP and PRO from the total modulation reading when in mono mode. When used with the TVM-200 TV Stereo Modulation Monitor, it removes the SAP & PRO from the composite reading of the TVM-220.

*Option 03* Peak Weighting Module (PWM-1) adds peak weighting capability to the Peak Mod and 100% Peak lights. Five time constants are available, selectable with a rotary switch on the rear of the unit.

## 4 Diagrams, Schematics and Parts Lists

**Replaceable Parts.** This page contains information for ordering replaceable parts for the monitor. The tables that follow list the parts in alphanumeric order by reference designation and provide a description of the part with the Belar part number.

**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.*

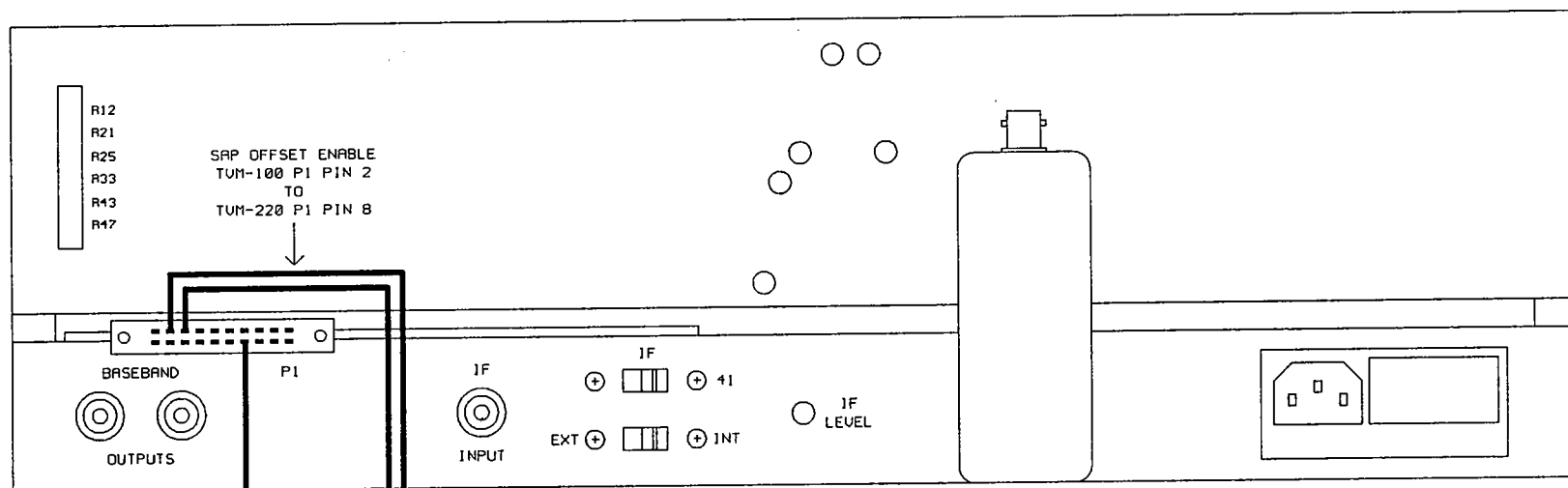
Orders may also be taken over the telephone. Parts orders can be put on your VISA, MasterCard, or American Express card, or we can ship them COD.

### REFERENCE DESIGNATORS

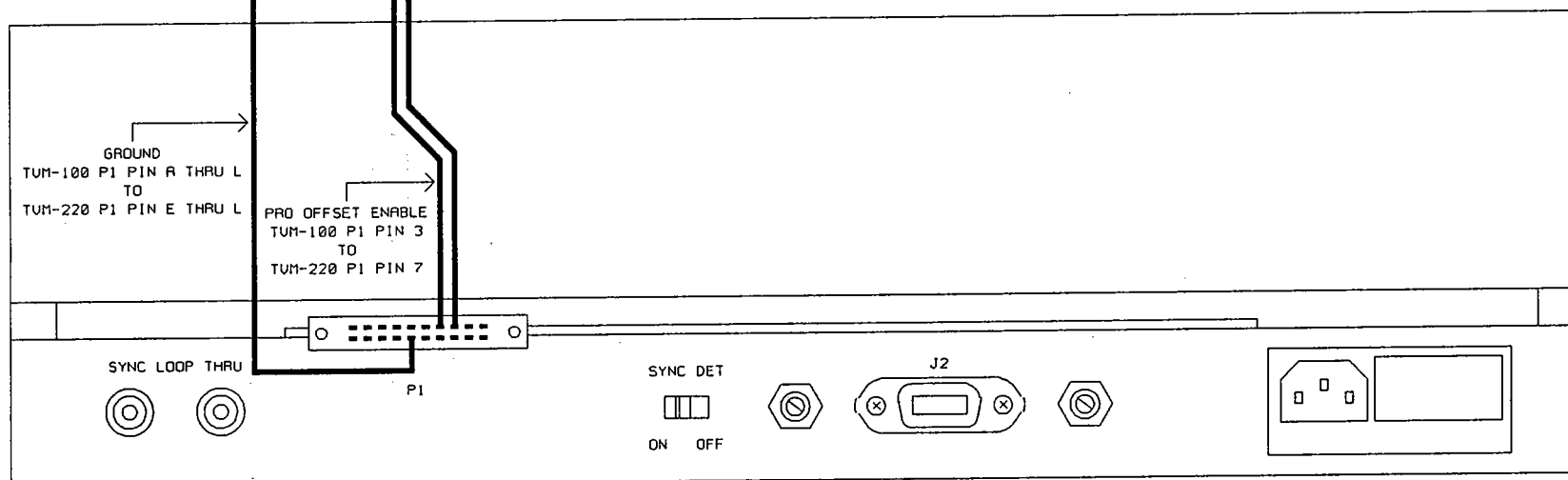
|     |                    |    |                    |    |                      |
|-----|--------------------|----|--------------------|----|----------------------|
| A   | = assembly         | J  | = jack             | S  | = switch             |
| BR  | = diode bridge     | L  | = inductor         | T  | = transformer        |
| C   | = capacitor        | M  | = meter            | TB | = terminal block     |
| CR  | = diode or LED     | P  | = plug             | U  | = integrated circuit |
| DS  | = display or lamp  | Q  | = transistor       | W  | = cable              |
| F   | = fuse             | R  | = resistor         | X  | = socket             |
| FL  | = filter           | RL | = relay            | Y  | = crystal            |
| HDR | = header connector | RN | = resistor network |    |                      |

### ABBREVIATIONS

|      |                               |         |                        |
|------|-------------------------------|---------|------------------------|
| ADC  | = analog-to-digital converter | pF      | = picofarads           |
| BCD  | = binary coded decimal        | PIV     | = peak inverse voltage |
| CER  | = ceramic                     | POLY    | = polystyrene          |
| COMP | = composition                 | PORC    | = porcelain            |
| CONN | = connector                   | POT     | = potentiometer        |
| DAC  | = digital-to-analog converter | SEMICON | = semiconductor        |
| DPM  | = digital panel meter         | SI      | = silicon              |
| ELEC | = electrolytic                | TANT    | = tantalum             |
| GE   | = germanium                   | uF      | = microfarads          |
| IC   | = integrated circuit          | V       | = volt                 |
| k    | = kilo = 1,000                | VAR     | = variable             |
| M    | = meg = 1,000,000             | VDCW    | = dc working volts     |
| MOD  | = modulation                  | W       | = watts                |
| MY   | = Mylar                       | WW      | = wirewound            |
| PC   | = printed circuit             |         |                        |

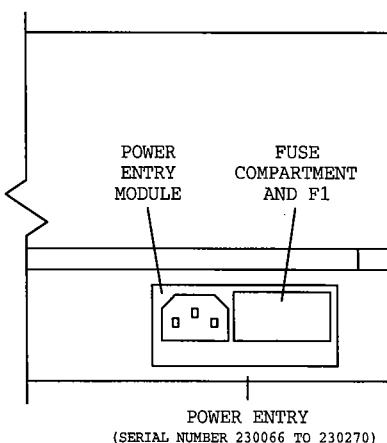
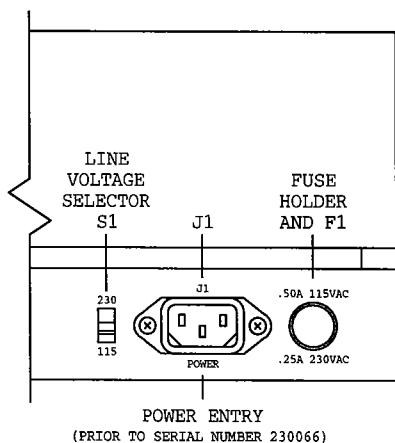
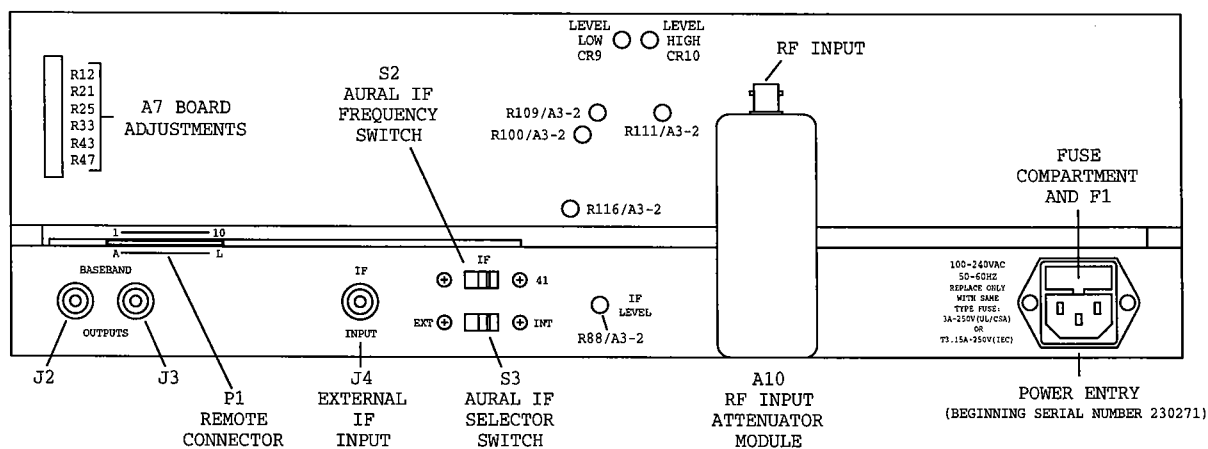
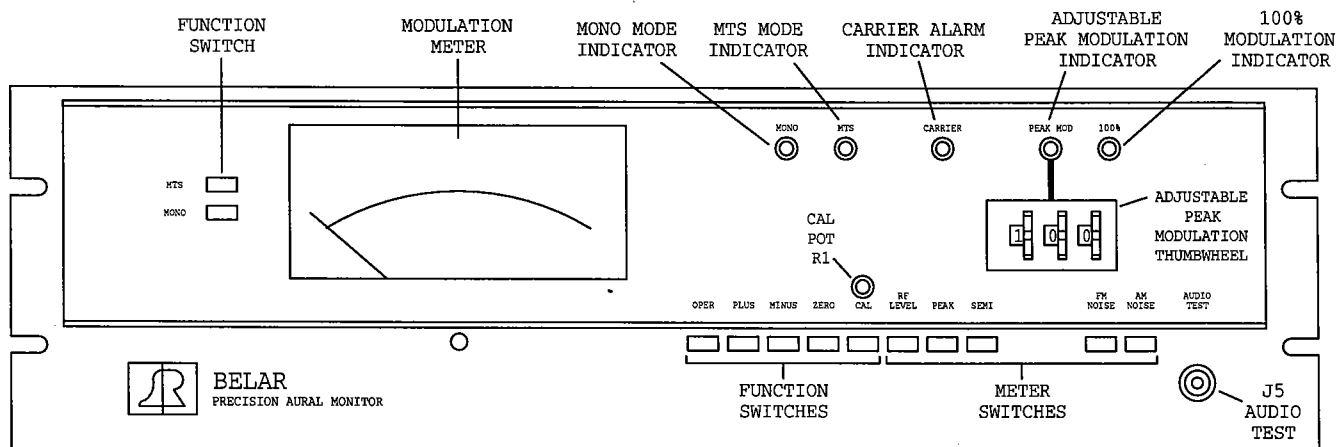


TUM-100(101) CHASSIS REAR VIEW



TUM-220 CHASSIS REAR VIEW

TUM-100(101)/TUM-220  
SAP & PRO INTERCONNECTIONS  
BELAR ELECTRONICS  
11-25-91



TVM-101 FRONT AND REAR VIEW  
BELAR ELECTRONICS  
1-11-00

# MAIN CHASSIS TVM-101

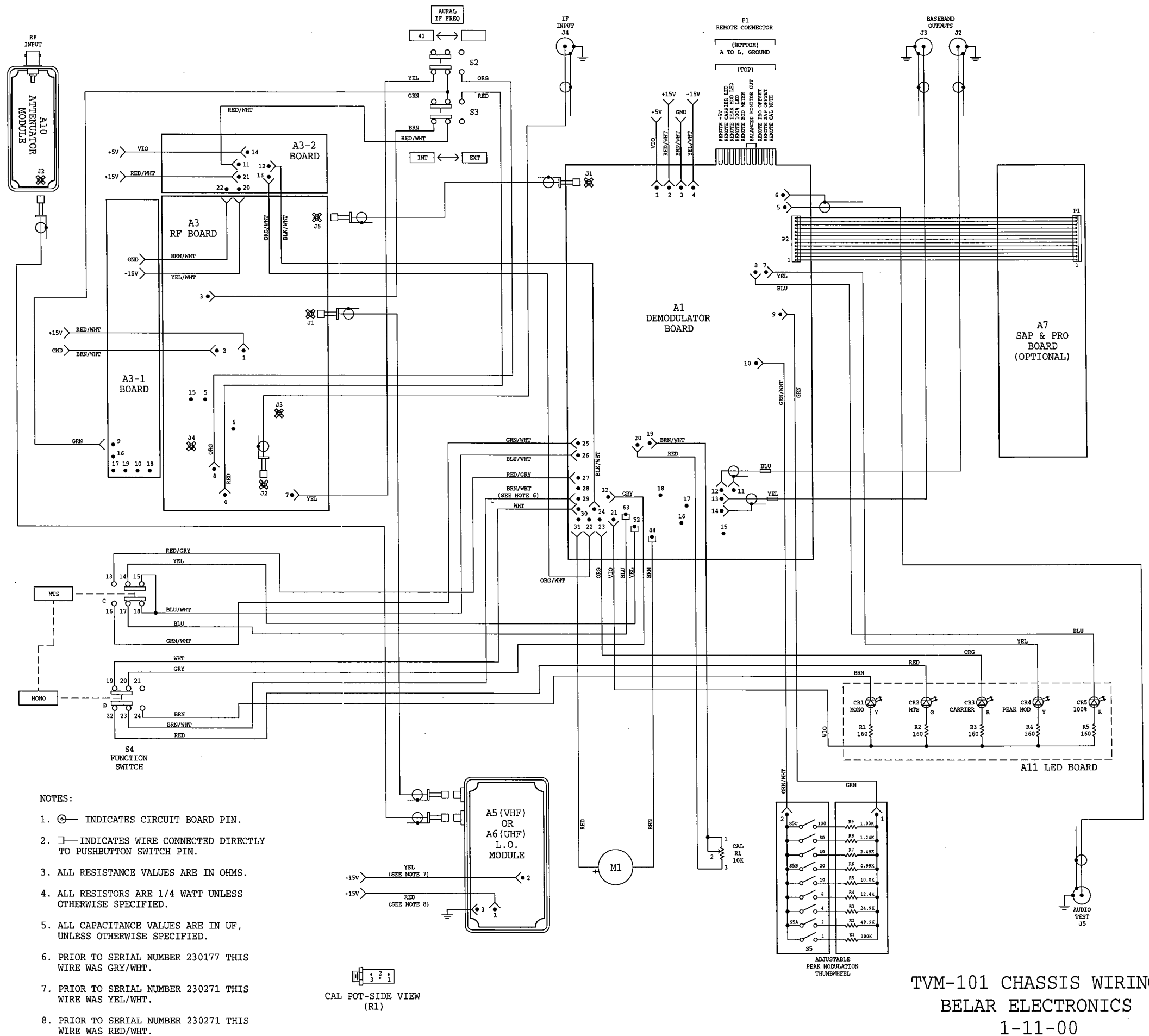
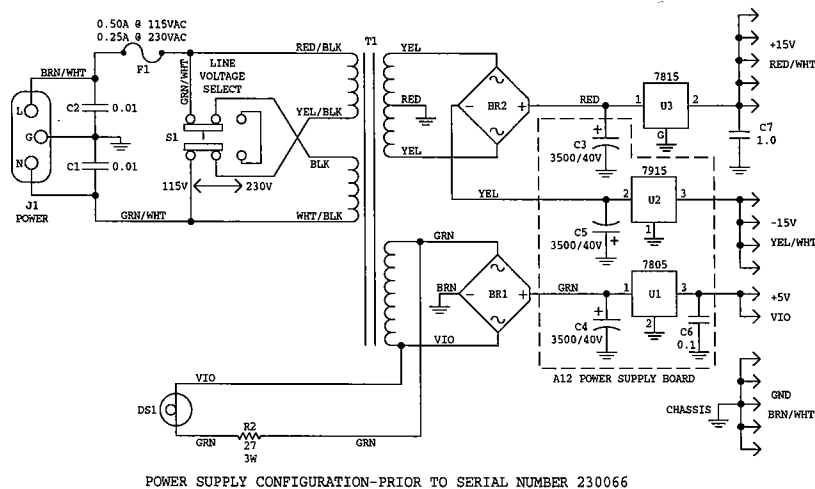
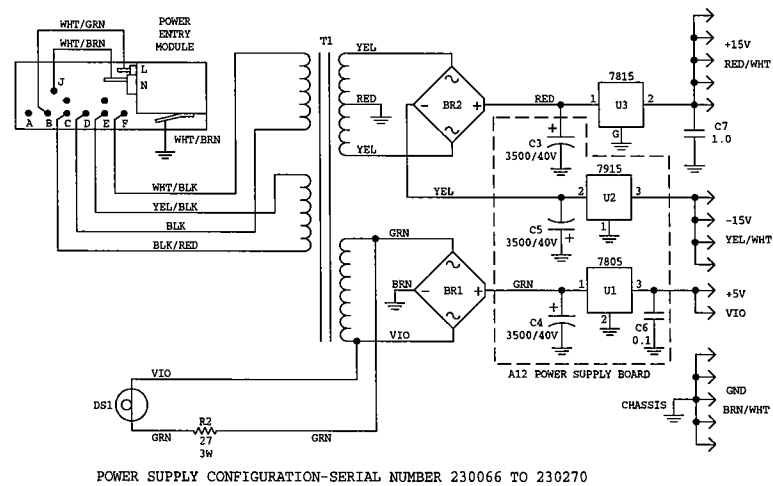
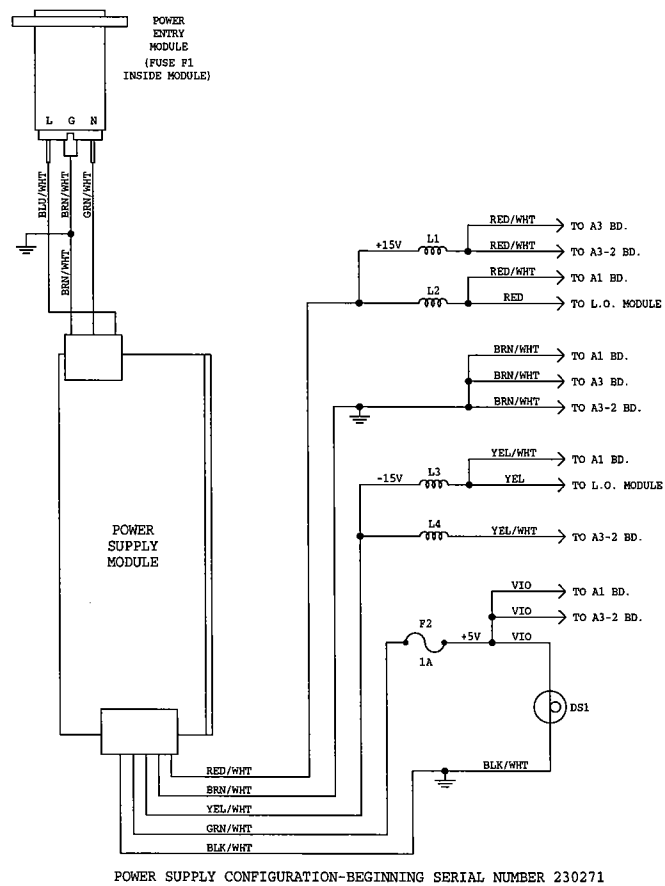
| Reference Designation | Description                                                     | Part Number         |
|-----------------------|-----------------------------------------------------------------|---------------------|
| --                    | POWER SUPPLY MODULE:                                            | (NOTE 4) 4005-0020A |
| BR1,BR2               | DIODE: BRIDGE KBPC602 GI                                        | (NOTE 3) 1900-0025  |
| C1,C2                 | C: FIXED CERAMIC 0.01uF 1.4kV                                   | (NOTE 1) 0151-0010  |
| C7                    | C: FIXED CERAMIC 1.0uF 50V                                      | (NOTE 3) 0151-0008  |
| CR1                   | LED: YELLOW MV5353                                              | 1910-0002           |
| CR2                   | LED: GREEN MV5253                                               | 1910-0003           |
| CR3                   | LED: RED MV5053                                                 | 1910-0001           |
| CR4                   | LED: YELLOW MV5353                                              | 1910-0002           |
| CR5                   | LED: RED MV5053                                                 | 1910-0001           |
| DS1                   | LAMP: 755                                                       | 2140-0005           |
| --                    | SOCKET: LAMP                                                    | 1450-0012           |
| F1                    | FUSE: GMA-3A 250V(UL/CSA)<br>or T3.15A-250V(IEC)                | (NOTE 4) 2110-0009  |
| --                    | FUSE HOLDER: CHASSIS MOUNT                                      | (NOTE 4) 2110-0010  |
| F1                    | FUSE: AGC 1/2A 250V (115 Vac line)                              | (NOTE 3) 2110-0001  |
| --                    | AGC 1/4A 250V (230 Vac line)                                    | (NOTE 3) 2110-0002  |
| --                    | FUSEHOLDER:                                                     | (NOTE 1) 2110-0003  |
| F2                    | FUSE: AGC-1A 250V                                               | (NOTE 4) 2110-0004  |
| J1                    | POWER ENTRY MODULE: 6EGG1-1                                     | (NOTE 4) 0360-0021  |
| J1                    | POWER ENTRY MODULE: 6J4                                         | (NOTE 2) 0360-0020  |
| J1                    | JACK: POWER                                                     | (NOTE 1) 0360-0010  |
| J2 thru J5            | JACK: BNC                                                       | 0360-0005           |
| L1 thru L4            | CHOKE: RF                                                       | (NOTE 4) 9140-0011  |
| M1                    | METER: MOD 0-133%                                               | 1120-0012           |
| P1,P2                 | PLUG: 13 POSITION (OPTIONAL A7 MODULE)                          | 0365-0040           |
| R1                    | R: VAR COMP 10k, 10 TURN                                        | 2100-0018           |
| R2                    | R: WIREWOUND 27 5% 3W                                           | (NOTE 3) 0811-0019  |
| S1                    | SWITCH: SLIDE 115/230V SELECTOR                                 | (NOTE 1) 3102-0002  |
| S2,S3                 | SWITCH: SLIDE                                                   | 3102-0001           |
| S4                    | SWITCH: PUSHBUTTON (2 BUTTON)                                   | 3101-0033           |
| S5                    | SWITCH ASSY: 3 DIGIT BCD THUMBWHEEL                             | 3103-0002A          |
| T1                    | TRANSFORMER: POWER                                              | (NOTE 3) 9100-0017  |
| U3                    | IC: 7815AK                                                      | (NOTE 3) 1826-0039  |
| --                    | LINE CORD (115 Vac line voltage)                                | 8120-0002           |
| --                    | LINE CORD (230 Vac line voltage)                                | 8120-0004           |
| --                    | CONNECTOR: CARD EDGE, 20 PIN<br>(CINCH 50-20SN-9 or equivalent) | 0365-0023           |

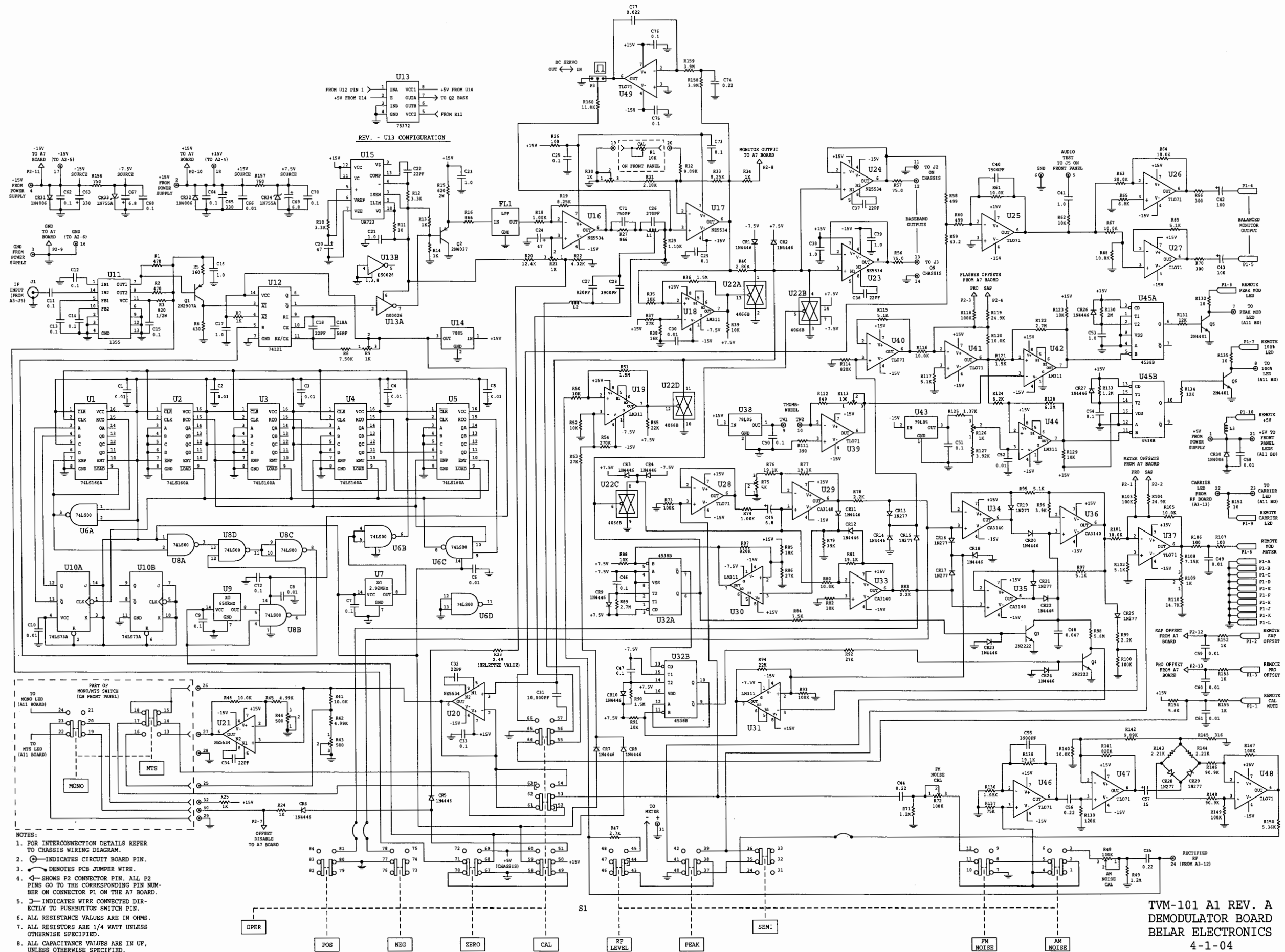
NOTE 1: Not used beginning serial number 230066.

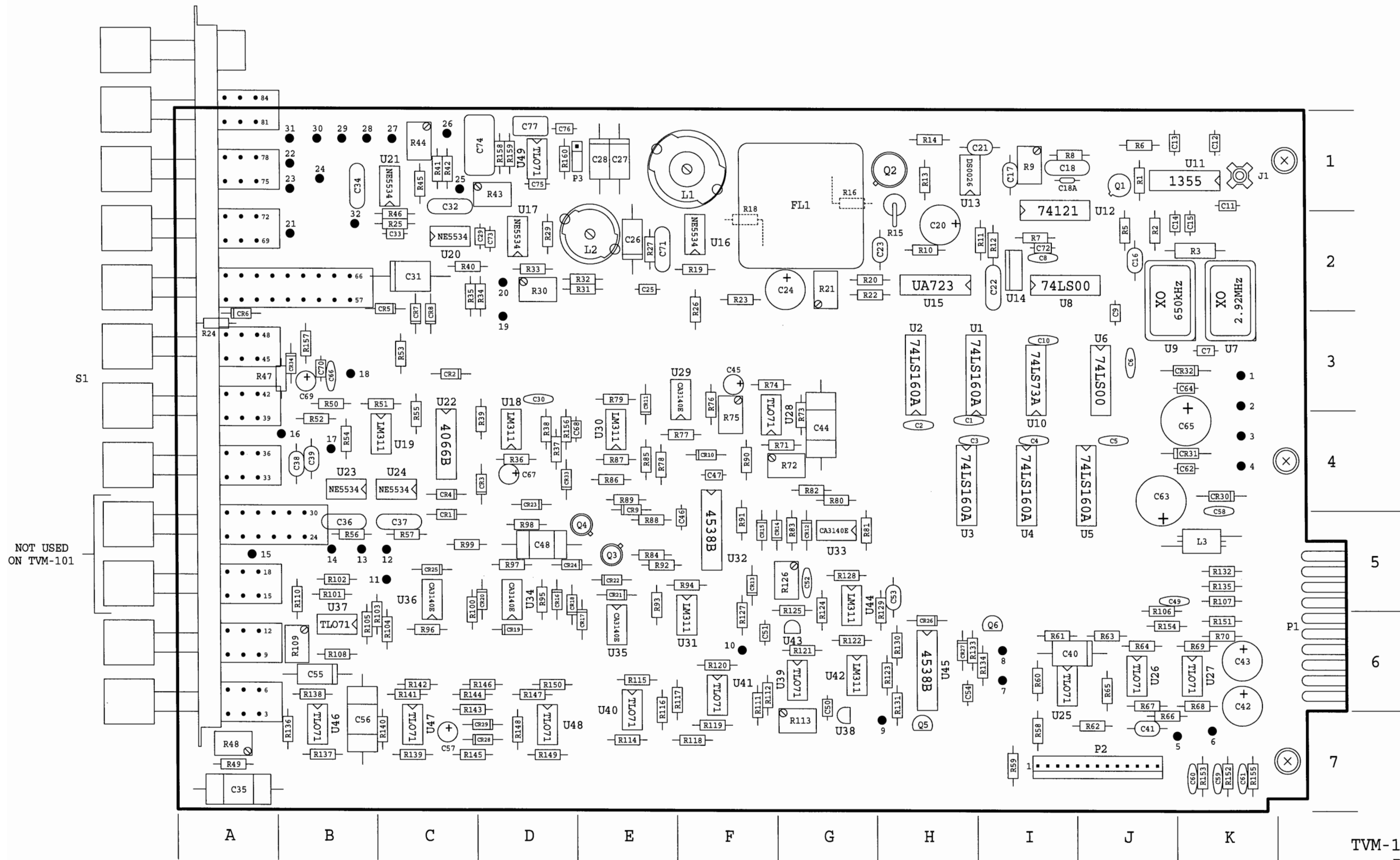
NOTE 2: This part was used from serial number 230066 to 230270.

NOTE 3: Not used beginning serial number 230271.

NOTE 4: Used beginning serial number 230271.







TVM-100/101 A1  
REV. A  
DEMODULATOR BOARD  
COMPONENT LAYOUT  
BELAR ELECTRONICS

TVM-100/101 A1 BOARD REV. A  
PART LOCATIONS

| <u>Desiq/Loc</u> | <u>Desiq/Loc</u> | <u>Desiq/Loc</u> | <u>Desiq/Loc</u> | <u>Desiq/Loc</u> | <u>Desiq/Loc</u> |
|------------------|------------------|------------------|------------------|------------------|------------------|
| C1 H4            | C54 H6           | CR30 K4          | R30 D2           | R84 E5           | R138 B6          |
| C2 H4            | C55 B6           | CR31 K4          | R31 E2           | R85 E4           | R139 C7          |
| C3 H4            | C56 B7           | CR32 K3          | R32 E2           | R86 E4           | R140 C7          |
| C4 I4            | C57 C7           | CR33 D4          | R33 D2           | R87 E4           | R141 C6          |
| C5 J4            | C58 K4           | CR34 B3          | R34 D2           | R88 E5           | R142 C6          |
| C6 J3            | C59 K7           |                  | R35 C2           | R89 E4           | R143 C6          |
| C7 K3            | C60 K7           | FL1 G1           | R36 D4           | R90 F4           | R144 C6          |
| C8 I2            | C61 K7           |                  | R37 D4           | R91 F5           | R145 C7          |
| C9 J3            | C62 K4           | J1 K1            | R38 D4           | R92 E5           | R146 D6          |
| C10 I3           | C63 J4           |                  | R39 D4           | R93 E5           | R147 D6          |
| C11 K1           | C64 K3           | L1 F1            | R40 C2           | R94 F5           | R148 D7          |
| C12 K1           | C65 K4           | L2 E2            | R41 C1           | R95 D5           | R149 D7          |
| C13 K1           | C66 B3           | L3 K5            | R42 C1           | R96 C6           | R150 D6          |
| C14 K2           | C67 D4           |                  | R43 D1           | R97 D5           | R151 K6          |
| C15 K2           | C68 E4           | P1 **            | R44 C1           | R98 D5           | R152 K7          |
| C16 J2           | C69 B3           | P2 J7            | R45 C1           | R99 C5           | R153 K7          |
| C17 I1           | C70 B3           | P3 E1            | R46 C2           | R100 C5          | R154 J6          |
| C18 I1           | C71 E2           |                  | R47 B3           | R101 B5          | R155 K7          |
| C18A I1          | C72 I2           | Q1 J1            | R48 A7           | R102 B5          | R156 D4          |
| C19 --           | C73 D2           | Q2 H1            | R49 A7           | R103 C6          | R157 B3          |
| C20 H2           | C74 D1           | Q3 E5            | R50 B3           | R104 C6          | R158 D1          |
| C21 I1           | C75 D1           | Q4 E5            | R51 C3           | R105 B6          | R159 D1          |
| C22 I2           | C76 D1           | Q5 H7            | R52 B4           | R106 J5          | R160 D1          |
| C23 H2           | C77 D1           | Q6 I6            | R53 C3           | R107 K5          |                  |
| C24 G2           |                  |                  | R54 B4           | R108 B6          | S1 A1            |
| C25 E2           | CR1 C5           | R1 J1            | R55 C4           | R109 B6          |                  |
| C26 E2           | CR2 C3           | R2 J2            | R56 B5           | R110 B5          | U1 I3            |
| C27 E1           | CR3 D4           | R3 K2            | R57 C5           | R111 F6          | U2 H3            |
| C28 E1           | CR4 C4           | R4 --            | R58 I7           | R112 F6          | U3 H4            |
| C29 D2           | CR5 C2           | R5 J2            | R59 I7           | R113 G7          | U4 I4            |
| C30 D3           | CR6 A3           | R6 J1            | R60 I6           | R114 E7          | U5 J4            |
| C31 C2           | CR7 C3           | R7 I2            | R61 I6           | R115 E6          | U6 J3            |
| C32 C1           | CR8 C3           | R8 I1            | R62 J7           | R116 E6          | U7 K2            |
| C33 C2           | CR9 E4           | R9 I1            | R63 J6           | R117 F6          | U8 I2            |
| C34 B1           | CR10 F4          | R10 H2           | R64 J6           | R118 F7          | U9 J2            |
| C35 A7           | CR11 E3          | R11 I2           | R65 J6           | R119 F7          | U10 I3           |
| C36 B5           | CR12 G5          | R12 I2           | R66 J7           | R120 F6          | U11 K1           |
| C37 C5           | CR13 F5          | R13 H1           | R67 J6           | R121 G6          | U12 I2           |
| C38 B4           | CR14 G5          | R14 H1           | R68 K6           | R122 G6          | U13 H1           |
| C39 B4           | CR15 F5          | R15 H1           | R69 K6           | R123 H6          | U14 I2           |
| C40 I6           | CR16 D5          | R16 G1*          | R70 K6           | R124 G5          | U15 H2           |
| C41 J7           | CR17 E6          | R17 --           | R71 G4           | R125 G5          | U16 F2           |
| C42 K6           | CR18 D5          | R18 F2*          | R72 G4           | R126 G5          | U17 D2           |
| C43 K6           | CR19 D6          | R19 F2           | R73 G4           | R127 F6          | U18 D4           |
| C44 G4           | CR20 D5          | R20 G2           | R74 F3           | R128 G5          | U19 C4           |
| C45 F3           | CR21 E5          | R21 G2           | R75 F4           | R129 H5          | U20 C2           |
| C46 F5           | CR22 E5          | R22 G2           | R76 F3           | R130 H6          | U21 C1           |
| C47 F4           | CR23 D4          | R23 F2           | R77 F4           | R131 H6          | U22 C4           |
| C48 D5           | CR24 D5          | R24 A3           | R78 E4           | R132 K5          | U23 B4           |
| C49 J5           | CR25 C5          | R25 C2           | R79 E3           | R133 H6          | U24 C4           |
| C50 G6           | CR26 H6          | R26 F2           | R80 G4           | R134 I6          | U25 I6           |
| C51 F6           | CR27 H6          | R27 E2           | R81 G5           | R135 K5          | U26 J6           |
| C52 G5           | CR28 D7          | R28 --           | R82 G4           | R136 B7          | U27 K6           |
| C53 H5           | CR29 D7          | R29 D2           | R83 G5           | R137 B7          |                  |

\* R16,& R18 ARE ON BOTTOM OF PCB

\*\* P1 IS CARD EDGE CONNECTOR FINGERS

-- C19, R4, R17 & R28 ARE NOT USED

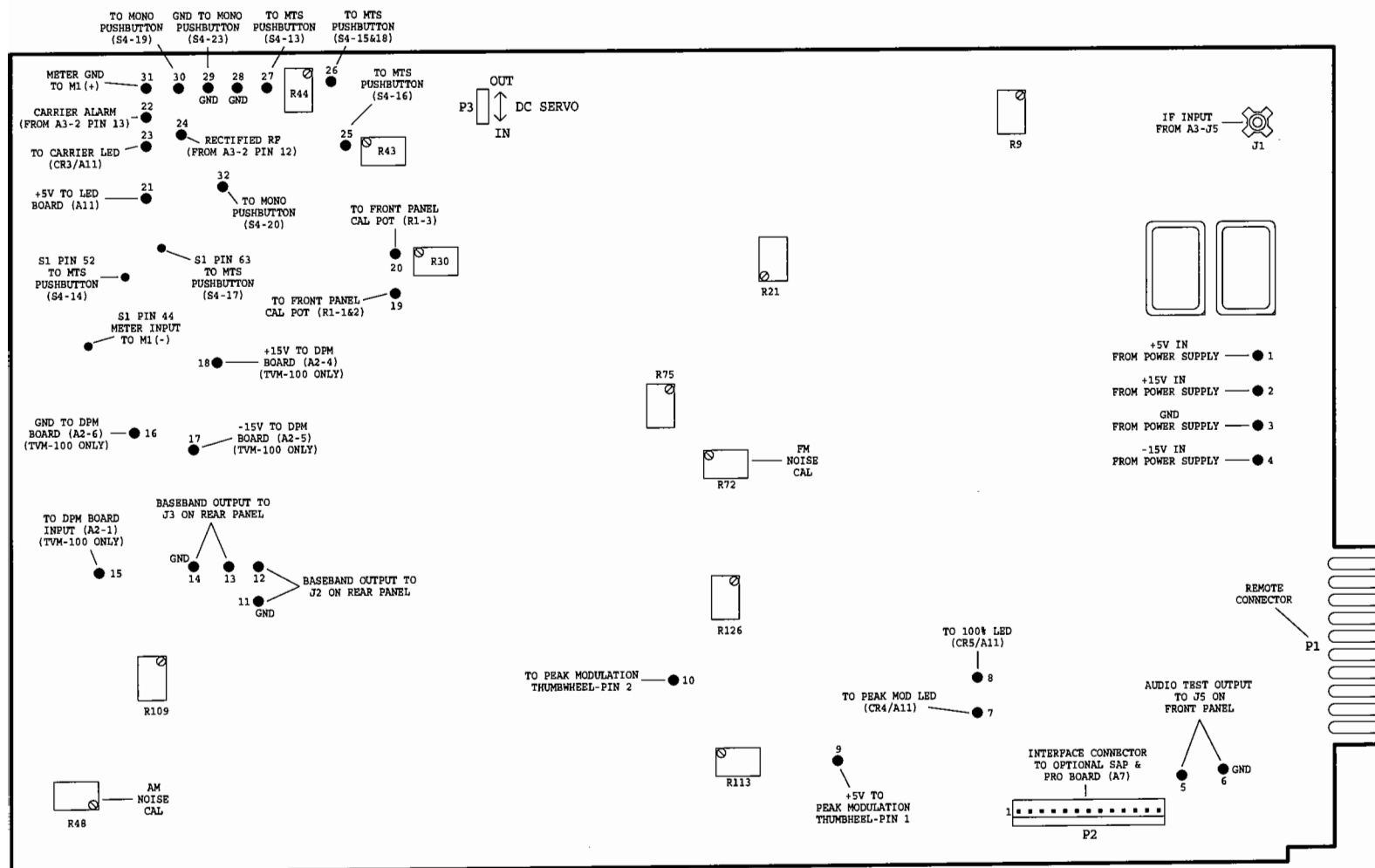
TVM-100/101 A1 BOARD REV. A  
PART LOCATIONS  
cont.

Desig/Loc

|     |    |
|-----|----|
| U28 | F4 |
| U29 | F3 |
| U30 | E4 |
| U31 | F6 |
| U32 | F5 |
| U33 | G5 |
| U34 | D5 |
| U35 | E6 |
| U36 | C5 |
| U37 | B6 |
| U38 | G7 |
| U39 | G6 |
| U40 | E6 |
| U41 | F6 |
| U42 | G6 |
| U43 | G6 |
| U44 | G5 |
| U45 | H6 |
| U46 | B7 |
| U47 | C7 |
| U48 | D7 |
| U49 | D1 |

pins

|    |    |
|----|----|
| 1  | K3 |
| 2  | K3 |
| 3  | K4 |
| 4  | K4 |
| 5  | K7 |
| 6  | K7 |
| 7  | I6 |
| 8  | I6 |
| 9  | H7 |
| 10 | F6 |
| 11 | C5 |
| 12 | C5 |
| 13 | B5 |
| 14 | B5 |
| 15 | A5 |
| 16 | B4 |
| 17 | B4 |
| 18 | B3 |
| 19 | D3 |
| 20 | D2 |
| 21 | B2 |
| 22 | B1 |
| 23 | B1 |
| 24 | B1 |
| 25 | C1 |
| 26 | C1 |
| 27 | C1 |
| 28 | B1 |
| 29 | B1 |
| 30 | B1 |
| 31 | B1 |
| 32 | B2 |



TVM-100/101 A1  
REV. A  
DEMODULATOR BOARD  
CONNECTIONS & ADJUSTMENTS  
BELAR ELECTRONICS

## A1 BOARD TVM-100/101 REV. A

| Reference<br>Designation | Description                      | Part Number |
|--------------------------|----------------------------------|-------------|
| C1 thru C6               | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C7                       | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C8                       | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C9                       | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C10                      | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C11 thru C15             | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C16,C17                  | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C18                      | C: FIXED MICA 22pF 5%            | 0140-2205   |
| C18A                     | C: FIXED CERAMIC 56pF 100V N750  | 0155-0005   |
| C19                      | not used                         |             |
| C20                      | C: FIXED ELEC 47uF 50V           | 0180-0017   |
| C21                      | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C22                      | C: FIXED MICA 22pF 5%            | 0140-2205   |
| C23                      | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C24                      | C: FIXED ELEC 47uF 50V           | 0180-0017   |
| C25                      | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C26                      | C: FIXED POLY 270pF 2.5% 160V    | 0130-2712   |
| C27                      | C: FIXED POLY 820pF 2.5% 160V    | 0130-8212   |
| C28                      | C: FIXED POLY 3900pF 2.5% 160V   | 0130-3922   |
| C29                      | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C30                      | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C31                      | C: FIXED POLY 10,000pF 2.5% 160V | 0130-1032   |
| C32                      | C: FIXED MICA 22pF 5%            | 0140-2205   |
| C33                      | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C34                      | C: FIXED MICA 22pF 5%            | 0140-2205   |
| C35                      | C: FIXED FILM 0.22uF 10% 80V     | 0120-2241   |
| C36,C37                  | C: FIXED MICA 22pF 5%            | 0140-2205   |
| C38,C39                  | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C40                      | C: FIXED POLY 7500pF 2.5% 160V   | 0130-7522   |
| C41                      | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C42,C43                  | C: FIXED ELEC 100uF 35V          | 0180-0018   |
| C44                      | C: FIXED FILM 0.22uF 10% 80V     | 0120-2241   |
| C45                      | C: FIXED TANT 6.8uF 25V          | 0185-0002   |
| C46,C47                  | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C48                      | C: FIXED FILM 0.047uF 10% 200V   | 0120-4731   |
| C49                      | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C50,C51                  | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C52                      | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C53                      | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C54                      | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C55                      | C: FIXED POLY 3900pF 2.5% 160V   | 0130-3922   |
| C56                      | C: FIXED FILM 0.22uF 10% 80V     | 0120-2241   |
| C57                      | C: FIXED TANT 15uF 15V           | 0185-0003   |
| C58 thru C61             | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C62                      | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C63                      | C: FIXED ELEC 330uF 20V          | 0180-0022   |
| C64                      | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C65                      | C: FIXED ELEC 330uF 20V          | 0180-0022   |
| C66                      | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C67                      | C: FIXED TANT 6.8uF 25V          | 0185-0002   |

A1 BOARD TVM-100/101 REV. A CONT.

| Reference<br>Designation | Description                    | Part Number |
|--------------------------|--------------------------------|-------------|
| C68                      | C: FIXED CERAMIC 0.1uF 50V     | 0151-0006   |
| C69                      | C: FIXED TANT 6.8uF 25V        | 0185-0002   |
| C70                      | C: FIXED CERAMIC 0.1uF 50V     | 0151-0006   |
| C71                      | C: FIXED MICA 750pF 5%         | 0140-7515   |
| C72,C73                  | C: FIXED CERAMIC 0.1uF 50V     | 0151-0006   |
| C74                      | C: FIXED FILM 0.22uF 10% 100V  | 0122-2241   |
| C75,C76                  | C: FIXED CERAMIC 0.1uF 50V     | 0151-0006   |
| C77                      | C: FIXED FILM 0.022uF 10% 100V | 0122-2231   |
| CR1 thru CR12            | DIODE: 1N4446                  | 1900-0002   |
| CR13                     | DIODE: 1N277 GERMANIUM         | 1900-0001   |
| CR14                     | DIODE: 1N4446                  | 1900-0002   |
| CR15 thru CR17           | DIODE: 1N277 GERMANIUM         | 1900-0001   |
| CR18                     | DIODE: 1N4446                  | 1900-0002   |
| CR19                     | DIODE: 1N277 GERMANIUM         | 1900-0001   |
| CR20                     | DIODE: 1N4446                  | 1900-0002   |
| CR21                     | DIODE: 1N277 GERMANIUM         | 1900-0001   |
| CR22 thru CR24           | DIODE: 1N4446                  | 1900-0002   |
| CR25                     | DIODE: 1N277 GERMANIUM         | 1900-0001   |
| CR26,CR27                | DIODE: 1N4446                  | 1900-0002   |
| CR28,CR29                | DIODE: 1N277 GERMANIUM         | 1900-0001   |
| CR30 thru CR32           | DIODE: 1N4006                  | 1900-0016   |
| CR33,CR34                | DIODE: 1N755A                  | 1900-0023   |
| FL1                      | FILTER: BELAR LPF              | 9120-0009   |
| J1                       | JACK: SMB, PC MOUNT            | 0360-0040   |
| L1                       | INDUCTOR: BELAR                | 9140-0039   |
| L2                       | INDUCTOR: BELAR                | 9140-0038   |
| L3                       | CHOKE: RF                      | 9140-0011   |
| P2                       | PLUG: 13 PIN, PC MOUNT         | 0365-0041   |
| P3                       | PLUG: 3 PIN, PC MOUNT          | 0365-0030   |
| --                       | JUMPER: 2 PIN (USED WITH P3)   | 0365-0028   |
| Q1                       | TRANSISTOR: 2N2907A            | 1850-0027   |
| Q2                       | TRANSISTOR: 2N4037             | 1850-0011   |
| Q3,Q4                    | TRANSISTOR: 2N2222             | 1850-0020   |
| Q5,Q6                    | TRANSISTOR: 2N4401             | 1850-0028   |
| R1,R2                    | R: METAL FILM 470 2% 1/4W      | 0751-4712   |
| R3                       | R: METAL FILM 820 2% 1/2W      | 0771-8212   |
| R4                       | not used                       |             |
| R5                       | R: METAL FILM 160 2% 1/4W      | 0751-1612   |
| R6                       | R: METAL FILM 430 2% 1/4W      | 0751-4312   |
| R7                       | R: METAL FILM 1k 2% 1/4W       | 0751-1022   |
| R8                       | R: METAL FILM 7.50k 1%         | 0721-7501   |
| R9                       | R: VAR COMP 1k, 10 TURN        | 2100-0021   |
| R10                      | R: METAL FILM 3.3k 2% 1/4W     | 0751-3322   |

## A1 BOARD TVM-100/101 REV. A CONT.

| Reference<br>Designation | Description                  | Part Number |
|--------------------------|------------------------------|-------------|
| R11                      | R: METAL FILM 10 2% 1/4W     | 0751-1002   |
| R12                      | R: METAL FILM 3.3k 2% 1/4W   | 0751-3322   |
| R13,R14                  | R: METAL FILM 1k 2% 1/4W     | 0751-1022   |
| R15                      | R: WIRE WOUND 620 5% 2W      | 0811-0012   |
| R16                      | R: METAL FILM 866 1%         | 0721-8660   |
| R17                      | not used                     |             |
| R18                      | R: METAL FILM 1.00k 1%       | 0721-1001   |
| R19                      | R: METAL FILM 8.25k 1%       | 0721-8251   |
| R20                      | R: METAL FILM 12.4k 1%       | 0721-1242   |
| R21                      | R: VAR COMP 1k, 10 TURN      | 2100-0021   |
| R22                      | R: METAL FILM 4.32k 1%       | 0721-4321   |
| R23                      | R: FIXED CARBON 2.4M 5% 1/4W | 0683-2455   |
| R24,R25                  | R: METAL FILM 1k 2% 1/4W     | 0751-1022   |
| R26                      | R: METAL FILM 100 2% 1/4W    | 0751-1012   |
| R27                      | R: METAL FILM 866 1%         | 0721-8660   |
| R28                      | not used                     |             |
| R29                      | R: METAL FILM 1.10k 1%       | 0721-1101   |
| R30                      | R: VAR COMP 1k, 10 TURN      | 2100-0021   |
| R31                      | R: METAL FILM 2.10k 1%       | 0721-2101   |
| R32                      | R: METAL FILM 9.09k 1%       | 0721-9091   |
| R33                      | R: METAL FILM 8.25k 1%       | 0721-8251   |
| R34                      | R: METAL FILM 1k 2% 1/4W     | 0751-1022   |
| R35                      | R: METAL FILM 10k 2% 1/4W    | 0751-1032   |
| R36                      | R: FIXED CARBON 1.5M 5% 1/4W | 0683-1555   |
| R37                      | R: METAL FILM 27k 2% 1/4W    | 0751-2732   |
| R38                      | R: METAL FILM 16k 2% 1/4W    | 0751-1632   |
| R39                      | R: METAL FILM 10k 2% 1/4W    | 0751-1032   |
| R40                      | R: METAL FILM 2.80k 1%       | 0721-2801   |
| R41                      | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R42                      | R: METAL FILM 4.99k 1%       | 0721-4991   |
| R43,R44                  | R: VAR COMP 500, 10 TURN     | 2100-0027   |
| R45                      | R: METAL FILM 4.99k 1%       | 0721-4991   |
| R46                      | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R47                      | R: METAL FILM 2.7k 2% 1/4W   | 0751-2722   |
| R48                      | R: VAR COMP 100k, 10 TURN    | 2100-0030   |
| R49                      | R: FIXED CARBON 1.2M 5% 1/4W | 0683-1255   |
| R50                      | R: METAL FILM 10k 2% 1/4W    | 0751-1032   |
| R51                      | R: FIXED CARBON 1.5M 5% 1/4W | 0683-1555   |
| R52                      | R: METAL FILM 10k 2% 1/4W    | 0751-1032   |
| R53                      | R: METAL FILM 27k 2% 1/4W    | 0751-2732   |
| R54                      | R: METAL FILM 270k 2% 1/4W   | 0751-2742   |
| R55                      | R: METAL FILM 22k 2% 1/4W    | 0751-2232   |
| R56,R57                  | R: METAL FILM 75.0 1%        | 0721-75R0   |
| R58                      | R: METAL FILM 499 1%         | 0721-4990   |
| R59                      | R: METAL FILM 43.2 1%        | 0721-43R2   |
| R60                      | R: METAL FILM 499 1%         | 0721-4990   |
| R61                      | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R62                      | R: METAL FILM 10k 2% 1/4W    | 0751-1032   |
| R63                      | R: METAL FILM 20.0k 1%       | 0721-2002   |
| R64                      | R: METAL FILM 10.0k 1%       | 0721-1002   |

A1 BOARD TVM-100/101 REV. A CONT.

| Reference<br>Designation | Description                  | Part Number |
|--------------------------|------------------------------|-------------|
| R65                      | R: METAL FILM 6.8k 2% 1/4W   | 0751-6822   |
| R66                      | R: METAL FILM 300 2% 1/4W    | 0751-3012   |
| R67,R68                  | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R69                      | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |
| R70                      | R: METAL FILM 300 2% 1/4W    | 0751-3012   |
| R71                      | R: FIXED CARBON 1.2M 5% 1/4W | 0683-1255   |
| R72                      | R: VAR COMP 100k, 10 TURN    | 2100-0030   |
| R73                      | R: METAL FILM 100k 2% 1/4W   | 0751-1042   |
| R74                      | R: METAL FILM 1.00k 1%       | 0721-1001   |
| R75                      | R: VAR COMP 5k, 10 TURN      | 2100-0020   |
| R76,R77                  | R: METAL FILM 19.1k 1%       | 0721-1912   |
| R78                      | R: METAL FILM 2.2k 2% 1/4W   | 0751-2222   |
| R79                      | R: METAL FILM 39k 2% 1/4W    | 0751-3932   |
| R80                      | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R81                      | R: METAL FILM 19.1k 1%       | 0721-1912   |
| R82                      | R: METAL FILM 18k 2% 1/4W    | 0751-1832   |
| R83                      | R: METAL FILM 2.2k 2% 1/4W   | 0751-2222   |
| R84                      | R: METAL FILM 7.5k 2% 1/4W   | 0751-7522   |
| R85                      | R: METAL FILM 18k 2% 1/4W    | 0751-1832   |
| R86                      | R: METAL FILM 27k 2% 1/4W    | 0751-2732   |
| R87                      | R: METAL FILM 820k 2% 1/4W   | 0751-8242   |
| R88                      | R: METAL FILM 10k 2% 1/4W    | 0751-1032   |
| R89                      | R: FIXED CARBON 2.7M 5% 1/4W | 0683-2755   |
| R90                      | R: FIXED CARBON 1.5M 5% 1/4W | 0683-1555   |
| R91                      | R: METAL FILM 10k 2% 1/4W    | 0751-1032   |
| R92                      | R: METAL FILM 27k 2% 1/4W    | 0751-2732   |
| R93                      | R: METAL FILM 100k 2% 1/4W   | 0751-1042   |
| R94                      | R: FIXED CARBON 22M 5% 1/4W  | 0683-2265   |
| R95                      | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |
| R96                      | R: METAL FILM 3.9k 2% 1/4W   | 0751-3922   |
| R97                      | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |
| R98                      | R: FIXED CARBON 5.6M 5% 1/4W | 0683-5655   |
| R99                      | R: METAL FILM 2.2k 2% 1/4W   | 0751-2222   |
| R100                     | R: METAL FILM 100k 2% 1/4W   | 0751-1042   |
| R101                     | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R102                     | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |
| R103                     | R: METAL FILM 100k 1%        | 0721-1003   |
| R104                     | R: METAL FILM 24.9k 1%       | 0721-2492   |
| R105                     | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R106,R107                | R: METAL FILM 100 2% 1/4W    | 0751-1012   |
| R108                     | R: METAL FILM 7.15k 1%       | 0721-7151   |
| R109                     | R: VAR COMP 1k, 10 TURN      | 2100-0021   |
| R110                     | R: METAL FILM 14.7k 1%       | 0721-1472   |
| R111                     | R: METAL FILM 390 2% 1/4W    | 0751-3912   |
| R112                     | R: METAL FILM 649 1%         | 0721-6490   |
| R113                     | R: VAR COMP 100, 10 TURN     | 2100-0022   |
| R114                     | R: METAL FILM 820k 2% 1/4W   | 0751-8242   |
| R115                     | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |
| R116                     | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R117                     | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |

## A1 BOARD TVM-100/101 REV. A CONT.

| Reference<br>Designation | Description                          | Part Number |
|--------------------------|--------------------------------------|-------------|
| R118                     | R: METAL FILM 100k 1%                | 0721-1003   |
| R119                     | R: METAL FILM 24.9k 1%               | 0721-2492   |
| R120                     | R: METAL FILM 10.0k 1%               | 0721-1002   |
| R121                     | R: METAL FILM 1.5k 2% 1/4W           | 0751-1522   |
| R122                     | R: FIXED CARBON 2.7M 5% 1/4W         | 0683-2755   |
| R123                     | R: METAL FILM 10k 2% 1/4W            | 0751-1032   |
| R124                     | R: METAL FILM 6.2k 2% 1/4W           | 0751-6222   |
| R125                     | R: METAL FILM 1.37k 1%               | 0721-1371   |
| R126                     | R: VAR COMP 1k, 10 TURN              | 2100-0021   |
| R127                     | R: METAL FILM 3.92k 1%               | 0721-3921   |
| R128                     | R: FIXED CARBON 6.2M 5% 1/4W         | 0683-6255   |
| R129                     | R: METAL FILM 10k 2% 1/4W            | 0751-1032   |
| R130                     | R: FIXED CARBON 2M 5% 1/4W           | 0683-2055   |
| R131                     | R: METAL FILM 12k 2% 1/4W            | 0751-1232   |
| R132                     | R: METAL FILM 10 2% 1/4W             | 0751-1002   |
| R133                     | R: FIXED CARBON 1.2M 5% 1/4W         | 0683-1255   |
| R134                     | R: METAL FILM 12k 2% 1/4W            | 0751-1232   |
| R135                     | R: METAL FILM 10 2% 1/4W             | 0751-1002   |
| R136                     | R: METAL FILM 1.00k 1%               | 0721-1001   |
| R137                     | R: METAL FILM 75k 2% 1/4W            | 0751-7532   |
| R138                     | R: METAL FILM 19.1k 1%               | 0721-1912   |
| R139                     | R: METAL FILM 120k 2% 1/4W           | 0751-1242   |
| R140                     | R: METAL FILM 10.0k 1%               | 0721-1002   |
| R141                     | R: METAL FILM 820k 2% 1/4W           | 0751-8242   |
| R142                     | R: METAL FILM 9.09k 1%               | 0721-9091   |
| R143,R144                | R: METAL FILM 2.21k 1%               | 0721-2211   |
| R145                     | R: METAL FILM 316 1%                 | 0721-3160   |
| R146                     | R: METAL FILM 90.9k 1%               | 0721-9092   |
| R147                     | R: METAL FILM 100k 1%                | 0721-1003   |
| R148                     | R: METAL FILM 90.9k 1%               | 0721-9092   |
| R149                     | R: METAL FILM 100k 1%                | 0721-1003   |
| R150                     | R: METAL FILM 5.36k 1%               | 0721-5361   |
| R151                     | R: METAL FILM 10 2% 1/4W             | 0751-1002   |
| R152,R153                | R: METAL FILM 1k 2% 1/4W             | 0751-1022   |
| R154                     | R: METAL FILM 5.6k 2% 1/4W           | 0751-5622   |
| R155                     | R: METAL FILM 1k 2% 1/4W             | 0751-1022   |
| R156,R157                | R: METAL FILM 750 2% 1/4W            | 0751-7512   |
| R158,R159                | R: FIXED CARBON 3.9M 5% 1/4W         | 0683-3955   |
| R160                     | R: METAL FILM 11.0k 1%               | 0721-1102   |
| S1                       | SWITCH:PUSHBUTTON(12 BUTTON:TVM-100) | 3101-0030   |
|                          | SWITCH:PUSHBUTTON(10 BUTTON:TVM-101) | 3101-0032   |
| U1 thru U5               | IC: 74LS160A                         | 1821-0031   |
| U6                       | IC: 74LS00                           | 1821-0029   |
| U7                       | IC: XO, 2.92MHz                      | 0415-0292   |
| U8                       | IC: 74LS00                           | 1821-0029   |
| U9                       | IC: XO, 650kHz                       | 0415-0065   |
| U10                      | IC: 74LS73A                          | 1821-0030   |
| U11                      | IC: 1355                             | 1826-0045   |

A1 BOARD TVM-100/101 REV. A CONT.

| Reference<br>Designation | Description | Part Number |
|--------------------------|-------------|-------------|
| U12                      | IC: 74121   | 1821-0014   |
| U13                      | IC: DS0026  | 1826-0021   |
| U14                      | IC: 7805CT  | 1826-0014   |
| U15                      | IC: UA723   | 1820-0012   |
| U16,U17                  | IC: NE5534  | 1826-0025   |
| U18,U19                  | IC: LM311   | 1826-0009   |
| U20,U21                  | IC: NE5534  | 1826-0025   |
| U22                      | IC: 4066B   | 1822-0018   |
| U23,U24                  | IC: NE5534  | 1826-0025   |
| U25 thru U28             | IC: TLO71   | 1826-0004   |
| U29                      | IC: CA3140E | 1826-0001   |
| U30,U31                  | IC: LM311   | 1826-0009   |
| U32                      | IC: 4538B   | 1822-0023   |
| U33 thru U36             | IC: CA3140E | 1826-0001   |
| U37                      | IC: TLO71   | 1826-0004   |
| U38                      | IC: 78L05CP | 1826-0012   |
| U39 thru U41             | IC: TLO71   | 1826-0004   |
| U42                      | IC: LM311   | 1826-0009   |
| U43                      | IC: 79L05CP | 1826-0017   |
| U44                      | IC: LM311   | 1826-0009   |
| U45                      | IC: 4538B   | 1822-0023   |
| U46 thru U49             | IC: TLO71   | 1826-0004   |





TVM-100/101 A1 BOARD  
PART LOCATIONS

| <u>Desig/Loc</u> |    | <u>Desig/Loc</u> |     | <u>Desig/Loc</u> |    | <u>Desig/Loc</u> |     | <u>Desig/Loc</u> |    | <u>Desig/Loc</u> |    |
|------------------|----|------------------|-----|------------------|----|------------------|-----|------------------|----|------------------|----|
| C1               | H4 | C44              | G4  | CR15             | F5 | R6               | J1  | R50              | B3 | R94              | F5 |
| C2               | H4 | C45              | F3  | CR16             | D5 | R7               | I2  | R51              | C3 | R95              | D5 |
| C3               | H4 | C46              | F5  | CR17             | E6 | R8               | I1  | R52              | B4 | R96              | C6 |
| C4               | I4 | C47              | F4  | CR18             | D5 | R9               | I1  | R53              | C3 | R97              | D5 |
| C5               | J4 | C48              | D5  | CR19             | D6 | R10              | H2  | R54              | B4 | R98              | D5 |
| C6               | J3 | C49              | J5  | CR20             | D5 | R11              | I2  | R55              | C4 | R99              | C5 |
| C7               | K3 | C50              | G6  | CR21             | E5 | R12              | I2  | R56              | B5 | R100             | C5 |
| C8               | I2 | C51              | F6  | CR22             | E5 | R13              | H1  | R57              | C5 | R101             | B5 |
| C9               | J2 | C52              | G5  | CR23             | D4 | R14              | H1  | R58              | I7 | R102             | B5 |
| C10              | I3 | C53              | H5  | CR24             | D5 | R15              | H1  | R59              | I7 | R103             | C6 |
| C11              | K1 | C54              | H6  | CR25             | C5 | R16              | G1* | R60              | I6 | R104             | C6 |
| C12              | K1 | C55              | B6  | CR26             | H6 | R17              | --  | R61              | I6 | R105             | B6 |
| C13              | K1 | C56              | B7  | CR27             | H6 | R18              | F2* | R62              | J7 | R106             | J5 |
| C14              | K2 | C57              | C7  | CR28             | D7 | R19              | F2  | R63              | J6 | R107             | K5 |
| C15              | K2 | C58              | K4  | CR29             | D7 | R20              | G2  | R64              | J6 | R108             | B6 |
| C16              | J2 | C59              | K7  | CR30             | K4 | R21              | G2  | R65              | J6 | R109             | B6 |
| C17              | I1 | C60              | K7  | CR31             | K4 | R22              | G2  | R66              | J7 | R110             | B5 |
| C18              | I1 | C61              | K7  | CR32             | K3 | R23              | F2  | R67              | J6 | R111             | F6 |
| C18A             | I1 | C62              | K4  | CR33             | D4 | R24              | A3  | R68              | K6 | R112             | F6 |
| C19              | H1 | C63              | J4  | CR34             | B3 | R25              | C2  | R69              | K6 | R113             | G7 |
| C20              | H2 | C64              | K3  |                  |    | R26              | F2  | R70              | K6 | R114             | E7 |
| C21              | H1 | C65              | K4  | FL1              | G1 | R27              | E2  | R71              | G4 | R115             | E6 |
| C22              | I2 | C66              | B3  |                  |    | R28              | --  | R72              | G4 | R116             | E6 |
| C23              | H2 | C67              | D4  | J1               | K1 | R29              | D1  | R73              | G4 | R117             | F6 |
| C24              | G2 | C68              | E4  |                  |    | R30              | D2  | R74              | F3 | R118             | F7 |
| C25              | E2 | C69              | B3  | L1               | F1 | R31              | D2  | R75              | F4 | R119             | F7 |
| C26              | E2 | C70              | B3  | L2               | E2 | R32              | D2  | R76              | F3 | R120             | F6 |
| C27              | E1 | C71              | E2  | L3               | K5 | R33              | D2  | R77              | F4 | R121             | G6 |
| C28              | E1 | C72              | I2* |                  |    | R34              | D2  | R78              | E4 | R122             | G6 |
| C29              | D1 |                  |     | P1               | ** | R35              | C2  | R79              | E3 | R123             | H6 |
| C30              | D3 | CR1              | C5  | P2               | J7 | R36              | D4  | R80              | G4 | R124             | G5 |
| C31              | C2 | CR2              | C3  |                  |    | R37              | D4  | R81              | G5 | R125             | G5 |
| C32              | C1 | CR3              | D4  | Q1               | J1 | R38              | D4  | R82              | G4 | R126             | G5 |
| C33              | C2 | CR4              | C4  | Q2               | H1 | R39              | D4  | R83              | G5 | R127             | F6 |
| C34              | B1 | CR5              | C2  | Q3               | E5 | R40              | C2  | R84              | E5 | R128             | G5 |
| C35              | A7 | CR6              | A3  | Q4               | E5 | R41              | D1  | R85              | E4 | R129             | H5 |
| C36              | B5 | CR7              | C3  | Q5               | H7 | R42              | D1  | R86              | E4 | R130             | H6 |
| C37              | C5 | CR8              | C3  | Q6               | I6 | R43              | D1  | R87              | E4 | R131             | H6 |
| C38              | B4 | CR9              | E4  |                  |    | R44              | C1  | R88              | E5 | R132             | K5 |
| C39              | B4 | CR10             | F4  | R1               | J1 | R45              | C1  | R89              | E4 | R133             | H6 |
| C40              | I6 | CR11             | E3  | R2               | J2 | R46              | C1  | R90              | F4 | R134             | I6 |
| C41              | J7 | CR12             | G5  | R3               | K2 | R47              | B3  | R91              | F5 | R135             | K5 |
| C42              | K6 | CR13             | F5  | R4               | -- | R48              | A7  | R92              | E5 | R136             | B7 |
| C43              | K6 | CR14             | G5  | R5               | J2 | R49              | A7  | R93              | E5 | R137             | B7 |

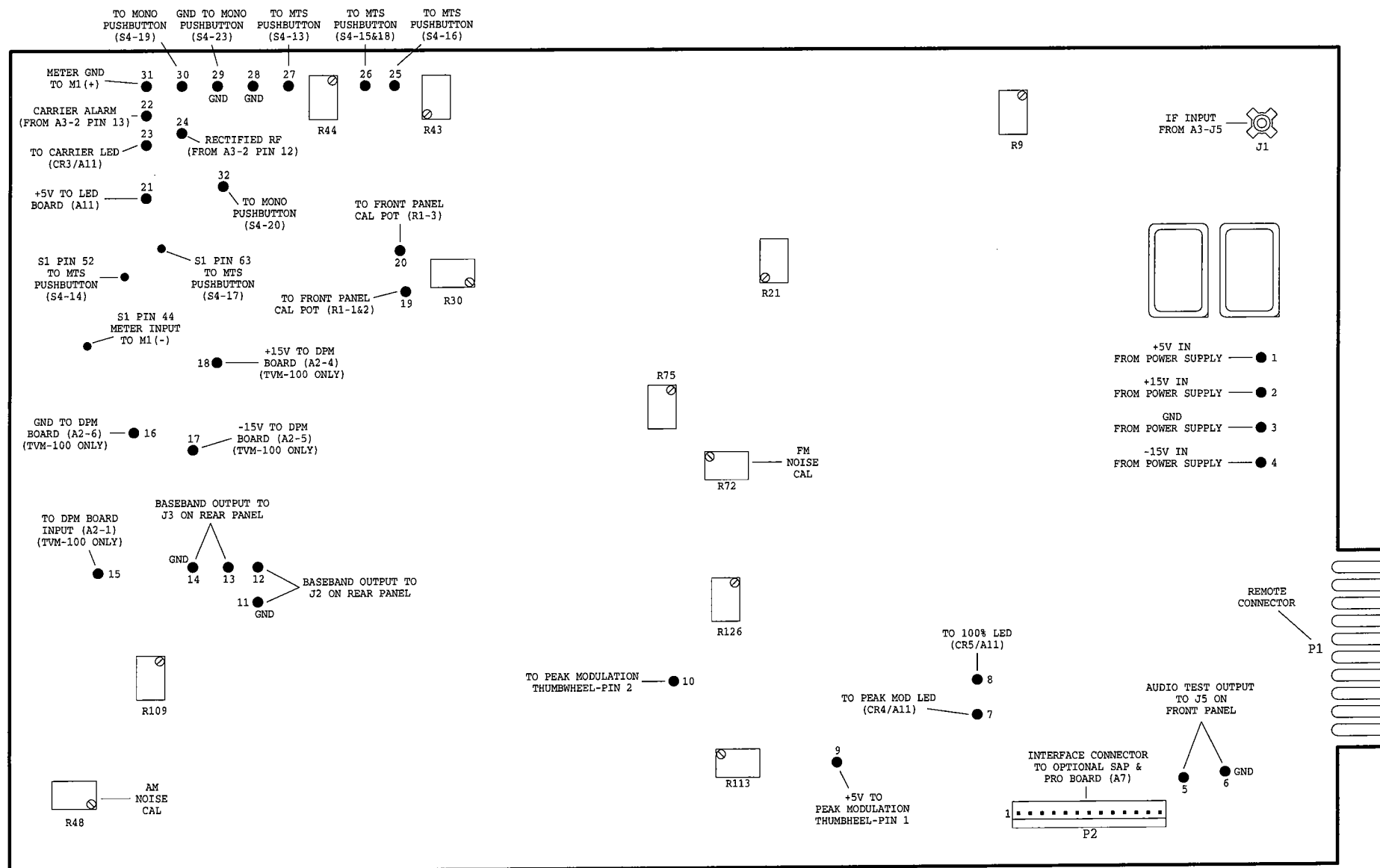
\* C72, R16, & R18 ARE ON BOTTOM OF PCB

\*\* P1 IS CARD EDGE CONNECTOR FINGERS

-- R4, R17 & R28 NOT USED

TVM-100/101 A1 BOARD  
PART LOCATIONS  
cont.

| <u>Desig/Loc</u> | <u>Desig/Loc</u> | <u>Desig/Loc</u> |
|------------------|------------------|------------------|
| R138             | B6               | U26 J6           |
| R139             | C7               | U27 K6           |
| R140             | C7               | U28 F4           |
| R141             | C6               | U29 F3           |
| R142             | C6               | U30 E4           |
| R143             | C6               | U31 F6           |
| R144             | C6               | U32 F5           |
| R145             | C7               | U33 G5           |
| R146             | D6               | U34 D5           |
| R147             | D6               | U35 E6           |
| R148             | D7               | U36 C5           |
| R149             | D7               | U37 B6           |
| R150             | D6               | U38 G7           |
| R151             | K6               | U39 G6           |
| R152             | K7               | U40 E6           |
| R153             | K7               | U41 F6           |
| R154             | J6               | U42 G6           |
| R155             | K7               | U43 G6           |
| R156             | D4               | U44 G5           |
| R157             | B3               | U45 H6           |
|                  |                  | U46 B7           |
| S1               | A1               | U47 C7           |
|                  |                  | U48 D7           |
| U1               | I3               |                  |
| U2               | H3               | <u>pins</u>      |
| U3               | H4               | 1 K3             |
| U4               | I4               | 2 K3             |
| U5               | J4               | 3 K4             |
| U6               | J3               | 4 K4             |
| U7               | K2               | 5 K7             |
| U8               | I2               | 6 K7             |
| U9               | J2               | 7 I6             |
| U10              | I3               | 8 I6             |
| U11              | K1               | 9 H7             |
| U12              | I1               | 10 F6            |
| U13              | H1               | 11 C5            |
| U14              | I2               | 12 C5            |
| U15              | H2               | 13 B5            |
| U16              | F2               | 14 B5            |
| U17              | D2               | 15 A5            |
| U18              | D4               | 16 B4            |
| U19              | C4               | 17 B4            |
| U20              | C2               | 18 B3            |
| U21              | C1               | 19 D3            |
| U22              | C4               | 20 D2            |
| U23              | B4               | 21 B2            |
| U24              | C4               | 22 B1            |
| U25              | I6               | 23 B1            |



TVM-100/101 A1  
DEMODULATOR BOARD  
CONNECTIONS & ADJUSTMENTS  
BELAR ELECTRONICS

## A1 BOARD TVM-100/101

| Reference Designation | Description                      | Part Number |
|-----------------------|----------------------------------|-------------|
| C1 thru C6            | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C7                    | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C8                    | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C9                    | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C10                   | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C11 thru C15          | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C16,C17               | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C18                   | C: FIXED MICA 22pF 5%            | 0140-2205   |
| C18A                  | C: FIXED CERAMIC 56pF 100V N750  | 0155-0005   |
| C19                   | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C20                   | C: FIXED ELEC 47uF 50V           | 0180-0017   |
| C21                   | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C22                   | C: FIXED MICA 22pF 5%            | 0140-2205   |
| C23                   | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C24                   | C: FIXED ELEC 47uF 50V           | 0180-0017   |
| C25                   | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C26                   | C: FIXED POLY 270pF 2.5% 160V    | 0130-2712   |
| C27                   | C: FIXED POLY 820pF 2.5% 160V    | 0130-8212   |
| C28                   | C: FIXED POLY 3900pF 2.5% 160V   | 0130-3922   |
| C29                   | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C30                   | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C31                   | C: FIXED POLY 10,000pF 2.5% 160V | 0130-1032   |
| C32                   | C: FIXED MICA 22pF 5%            | 0140-2205   |
| C33                   | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C34                   | C: FIXED MICA 22pF 5%            | 0140-2205   |
| C35                   | C: FIXED FILM 0.22uF 10% 80V     | 0120-2241   |
| C36,C37               | C: FIXED MICA 22pF 5%            | 0140-2205   |
| C38,C39               | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C40                   | C: FIXED POLY 7500pF 2.5% 160V   | 0130-7522   |
| C41                   | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C42,C43               | C: FIXED ELEC 100uF 35V          | 0180-0018   |
| C44                   | C: FIXED FILM 0.22uF 10% 80V     | 0120-2241   |
| C45                   | C: FIXED TANT 6.8uF 25V          | 0185-0002   |
| C46,C47               | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C48                   | C: FIXED FILM 0.047uF 10% 200V   | 0120-4731   |
| C49                   | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C50,C51               | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C52                   | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C53                   | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C54                   | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C55                   | C: FIXED POLY 3900pF 2.5% 160V   | 0130-3922   |
| C56                   | C: FIXED FILM 0.22uF 10% 80V     | 0120-2241   |
| C57                   | C: FIXED TANT 15uF 15V           | 0185-0003   |
| C58 thru C61          | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C62                   | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C63                   | C: FIXED ELEC 330uF 20V          | 0180-0022   |
| C64                   | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C65                   | C: FIXED ELEC 330uF 20V          | 0180-0022   |
| C66                   | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C67                   | C: FIXED TANT 6.8uF 25V          | 0185-0002   |

## A1 BOARD TVM-100/101 CONT.

| Reference Designation | Description                | Part Number |
|-----------------------|----------------------------|-------------|
| C68                   | C: FIXED CERAMIC 0.1uF 50V | 0151-0006   |
| C69                   | C: FIXED TANT 6.8uF 25V    | 0185-0002   |
| C70                   | C: FIXED CERAMIC 0.1uF 50V | 0151-0006   |
| C71                   | C: FIXED MICA 750pF 5%     | 0140-7515   |
| C72                   | C: FIXED CERAMIC 0.1uF 50V | 0151-0006   |
| CR1 thru CR12         | DIODE: 1N4446              | 1900-0002   |
| CR13                  | DIODE: 1N277 GERMANIUM     | 1900-0001   |
| CR14                  | DIODE: 1N4446              | 1900-0002   |
| CR15 thru CR17        | DIODE: 1N277 GERMANIUM     | 1900-0001   |
| CR18                  | DIODE: 1N4446              | 1900-0002   |
| CR19                  | DIODE: 1N277 GERMANIUM     | 1900-0001   |
| CR20                  | DIODE: 1N4446              | 1900-0002   |
| CR21                  | DIODE: 1N277 GERMANIUM     | 1900-0001   |
| CR22 thru CR24        | DIODE: 1N4446              | 1900-0002   |
| CR25                  | DIODE: 1N277 GERMANIUM     | 1900-0001   |
| CR26, CR27            | DIODE: 1N4446              | 1900-0002   |
| CR28, CR29            | DIODE: 1N277 GERMANIUM     | 1900-0001   |
| CR30 thru CR32        | DIODE: 1N4006              | 1900-0016   |
| CR33, CR34            | DIODE: 1N755A              | 1900-0023   |
| FL1                   | FILTER: BELAR LPF          | 9120-0009   |
| J1                    | JACK: SMB, PC MOUNT        | 0360-0040   |
| L1                    | INDUCTOR: BELAR            | 9140-0039   |
| L2                    | INDUCTOR: BELAR            | 9140-0038   |
| L3                    | CHOKE: RF                  | 9140-0011   |
| P2                    | PLUG: 13 PIN, PC MOUNT     | 0365-0041   |
| Q1                    | TRANSISTOR: 2N2907A        | 1850-0027   |
| Q2                    | TRANSISTOR: 2N4037         | 1850-0011   |
| Q3, Q4                | TRANSISTOR: 2N2222         | 1850-0020   |
| Q5, Q6                | TRANSISTOR: 2N4401         | 1850-0028   |
| R1, R2                | R: METAL FILM 470 2% 1/4W  | 0751-4712   |
| R3                    | R: METAL FILM 820 2% 1/2W  | 0771-8212   |
| R5                    | R: METAL FILM 160 2% 1/4W  | 0751-1612   |
| R6                    | R: METAL FILM 430 2% 1/4W  | 0751-4312   |
| R7                    | R: METAL FILM 1k 2% 1/4W   | 0751-1022   |
| R8                    | R: METAL FILM 7.50k 1%     | 0721-7501   |
| R9                    | R: VAR COMP 1k, 10 TURN    | 2100-0021   |
| R10                   | R: METAL FILM 3.3k 2% 1/4W | 0751-3322   |
| R11                   | R: METAL FILM 10 2% 1/4W   | 0751-1002   |
| R12                   | R: METAL FILM 3.3k 2% 1/4W | 0751-3322   |
| R13, R14              | R: METAL FILM 1k 2% 1/4W   | 0751-1022   |
| R15                   | R: WIRE WOUND 620 5% 2W    | 0811-0012   |
| R16                   | R: METAL FILM 866 1%       | 0721-8660   |
| R18                   | R: METAL FILM 1.00k 1%     | 0721-1001   |

## A1 BOARD TVM-100/101 CONT.

| Reference<br>Designation | Description                                              | Part Number |
|--------------------------|----------------------------------------------------------|-------------|
| R19                      | R: METAL FILM 8.25k 1%                                   | 0721-8251   |
| R20                      | R: METAL FILM 12.4k 1%                                   | 0721-1242   |
| R21                      | R: VAR COMP 1k, 10 TURN                                  | 2100-0021   |
| R22                      | R: METAL FILM 4.32k 1%                                   | 0721-4321   |
| R23                      | R: FIXED CARBON 2.4M 5% 1/4W<br>(R23 SELECTED FOR VALUE) | 0683-2455   |
| R24, R25                 | R: METAL FILM 1k 2% 1/4W                                 | 0751-1022   |
| R26                      | R: METAL FILM 100 2% 1/4W                                | 0751-1012   |
| R27                      | R: METAL FILM 866 1%                                     | 0721-8660   |
| R29                      | R: METAL FILM 1.00k 1%                                   | 0721-1001   |
| R30                      | R: VAR COMP 1k, 10 TURN                                  | 2100-0021   |
| R31                      | R: METAL FILM 2.10k 1%                                   | 0721-2101   |
| R32                      | R: METAL FILM 9.09k 1%                                   | 0721-9091   |
| R33                      | R: METAL FILM 8.25k 1%                                   | 0721-8251   |
| R34                      | R: METAL FILM 1k 2% 1/4W                                 | 0751-1022   |
| R35                      | R: METAL FILM 10k 2% 1/4W                                | 0751-1032   |
| R36                      | R: FIXED CARBON 1.5M 5% 1/4W                             | 0683-1555   |
| R37                      | R: METAL FILM 27k 2% 1/4W                                | 0751-2732   |
| R38                      | R: METAL FILM 16k 2% 1/4W                                | 0751-1632   |
| R39                      | R: METAL FILM 10k 2% 1/4W                                | 0751-1032   |
| R40                      | R: METAL FILM 2.80k 1%                                   | 0721-2801   |
| R41                      | R: METAL FILM 10.0k 1%                                   | 0721-1002   |
| R42                      | R: METAL FILM 4.99k 1%                                   | 0721-4991   |
| R43, R44                 | R: VAR COMP 500, 10 TURN                                 | 2100-0027   |
| R45                      | R: METAL FILM 4.99k 1%                                   | 0721-4991   |
| R46                      | R: METAL FILM 10.0k 1%                                   | 0721-1002   |
| R47                      | R: METAL FILM 2.7k 2% 1/4W                               | 0751-2722   |
| R48                      | R: VAR COMP 100k, 10 TURN                                | 2100-0030   |
| R49                      | R: FIXED CARBON 1.2M 5% 1/4W                             | 0683-1255   |
| R50                      | R: METAL FILM 10k 2% 1/4W                                | 0751-1032   |
| R51                      | R: FIXED CARBON 1.5M 5% 1/4W                             | 0683-1555   |
| R52                      | R: METAL FILM 10k 2% 1/4W                                | 0751-1032   |
| R53                      | R: METAL FILM 27k 2% 1/4W                                | 0751-2732   |
| R54                      | R: METAL FILM 270k 2% 1/4W                               | 0751-2742   |
| R55                      | R: METAL FILM 22k 2% 1/4W                                | 0751-2232   |
| R56, R57                 | R: METAL FILM 75.0 1%                                    | 0721-75R0   |
| R58                      | R: METAL FILM 499 1%                                     | 0721-4990   |
| R59                      | R: METAL FILM 43.2 1%                                    | 0721-43R2   |
| R60                      | R: METAL FILM 499 1%                                     | 0721-4990   |
| R61                      | R: METAL FILM 10.0k 1%                                   | 0721-1002   |
| R62                      | R: METAL FILM 10k 2% 1/4W                                | 0751-1032   |
| R63                      | R: METAL FILM 20.0k 1%                                   | 0721-2002   |
| R64                      | R: METAL FILM 10.0k 1%                                   | 0721-1002   |
| R65                      | R: METAL FILM 6.8k 2% 1/4W                               | 0751-6822   |
| R66                      | R: METAL FILM 300 2% 1/4W                                | 0751-3012   |
| R67, R68                 | R: METAL FILM 10.0k 1%                                   | 0721-1002   |
| R69                      | R: METAL FILM 5.1k 2% 1/4W                               | 0751-5122   |
| R70                      | R: METAL FILM 300 2% 1/4W                                | 0751-3012   |
| R71                      | R: FIXED CARBON 1.2M 5% 1/4W                             | 0683-1255   |
| R72                      | R: VAR COMP 100k, 10 TURN                                | 2100-0030   |

## A1 BOARD TVM-100/101 CONT.

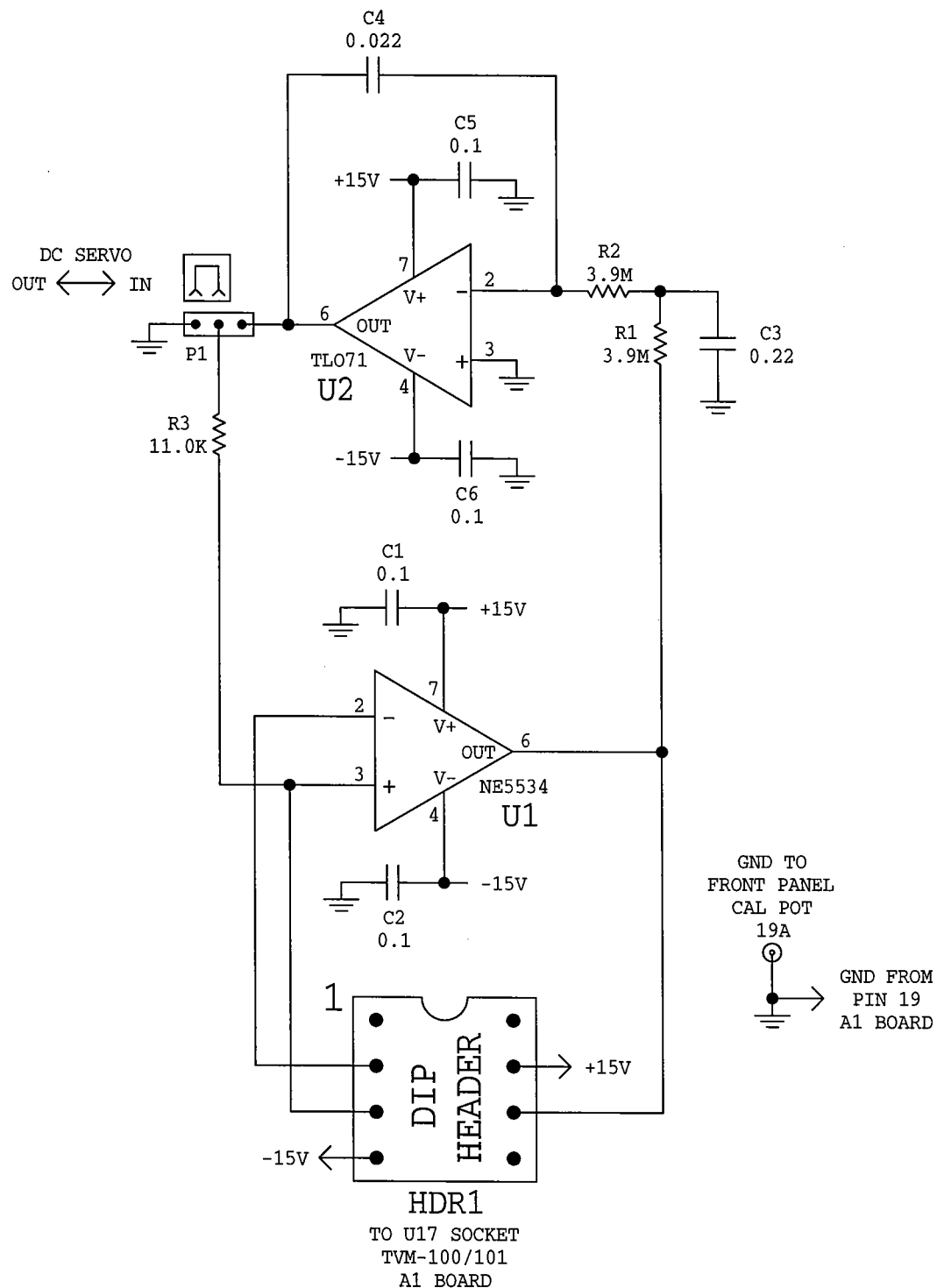
| Reference<br>Designation | Description                  | Part Number |
|--------------------------|------------------------------|-------------|
| R73                      | R: METAL FILM 100k 2% 1/4W   | 0751-1042   |
| R74                      | R: METAL FILM 1.00k 1%       | 0721-1001   |
| R75                      | R: VAR COMP 5k, 10 TURN      | 2100-0020   |
| R76, R77                 | R: METAL FILM 19.1k 1%       | 0721-1912   |
| R78                      | R: METAL FILM 2.2k 2% 1/4W   | 0751-2222   |
| R79                      | R: METAL FILM 39k 2% 1/4W    | 0751-3932   |
| R80                      | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R81                      | R: METAL FILM 19.1k 1%       | 0721-1912   |
| R82                      | R: METAL FILM 18k 2% 1/4W    | 0751-1832   |
| R83                      | R: METAL FILM 2.2k 2% 1/4W   | 0751-2222   |
| R84                      | R: METAL FILM 7.5k 2% 1/4W   | 0751-7522   |
| R85                      | R: METAL FILM 18k 2% 1/4W    | 0751-1832   |
| R86                      | R: METAL FILM 27k 2% 1/4W    | 0751-2732   |
| R87                      | R: METAL FILM 820k 2% 1/4W   | 0751-8242   |
| R88                      | R: METAL FILM 10k 2% 1/4W    | 0751-1032   |
| R89                      | R: FIXED CARBON 2.7M 5% 1/4W | 0683-2755   |
| R90                      | R: FIXED CARBON 1.5M 5% 1/4W | 0683-1555   |
| R91                      | R: METAL FILM 10k 2% 1/4W    | 0751-1032   |
| R92                      | R: METAL FILM 27k 2% 1/4W    | 0751-2732   |
| R93                      | R: METAL FILM 100k 2% 1/4W   | 0751-1042   |
| R94                      | R: FIXED CARBON 22M 5% 1/4W  | 0683-2265   |
| R95                      | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |
| R96                      | R: METAL FILM 3.9k 2% 1/4W   | 0751-3922   |
| R97                      | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |
| R98                      | R: FIXED CARBON 5.6M 5% 1/4W | 0683-5655   |
| R99                      | R: METAL FILM 2.2k 2% 1/4W   | 0751-2222   |
| R100                     | R: METAL FILM 100k 2% 1/4W   | 0751-1042   |
| R101                     | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R102                     | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |
| R103                     | R: METAL FILM 100k 1%        | 0721-1003   |
| R104                     | R: METAL FILM 24.9k 1%       | 0721-2492   |
| R105                     | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R106, R107               | R: METAL FILM 100 2% 1/4W    | 0751-1012   |
| R108                     | R: METAL FILM 7.15k 1%       | 0721-7151   |
| R109                     | R: VAR COMP 1k, 10 TURN      | 2100-0021   |
| R110                     | R: METAL FILM 14.7k 1%       | 0721-1472   |
| R111                     | R: METAL FILM 390 2% 1/4W    | 0751-3912   |
| R112                     | R: METAL FILM 649 1%         | 0721-6490   |
| R113                     | R: VAR COMP 100, 10 TURN     | 2100-0022   |
| R114                     | R: METAL FILM 820k 2% 1/4W   | 0751-8242   |
| R115                     | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |
| R116                     | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R117                     | R: METAL FILM 5.1k 2% 1/4W   | 0751-5122   |
| R118                     | R: METAL FILM 100k 1%        | 0721-1003   |
| R119                     | R: METAL FILM 24.9k 1%       | 0721-2492   |
| R120                     | R: METAL FILM 10.0k 1%       | 0721-1002   |
| R121                     | R: METAL FILM 1.5k 2% 1/4W   | 0751-1522   |
| R122                     | R: FIXED CARBON 2.7M 5% 1/4W | 0683-2755   |
| R123                     | R: METAL FILM 10k 2% 1/4W    | 0751-1032   |
| R124                     | R: METAL FILM 6.2k 2% 1/4W   | 0751-6222   |

## A1 BOARD TVM-100/101 CONT.

| Reference<br>Designation | Description                             | Part Number |
|--------------------------|-----------------------------------------|-------------|
| R125                     | R: METAL FILM 1.37k 1%                  | 0721-1371   |
| R126                     | R: VAR COMP 1k, 10 TURN                 | 2100-0021   |
| R127                     | R: METAL FILM 3.92k 1%                  | 0721-3921   |
| R128                     | R: FIXED CARBON 6.2M 5% 1/4W            | 0683-6255   |
| R129                     | R: METAL FILM 10k 2% 1/4W               | 0751-1032   |
| R130                     | R: FIXED CARBON 2M 5% 1/4W              | 0683-2055   |
| R131                     | R: METAL FILM 12k 2% 1/4W               | 0751-1232   |
| R132                     | R: METAL FILM 10 2% 1/4W                | 0751-1002   |
| R133                     | R: FIXED CARBON 1.2M 5% 1/4W            | 0683-1255   |
| R134                     | R: METAL FILM 12k 2% 1/4W               | 0751-1232   |
| R135                     | R: METAL FILM 10 2% 1/4W                | 0751-1002   |
| R136                     | R: METAL FILM 1.00k 1%                  | 0721-1001   |
| R137                     | R: METAL FILM 75k 2% 1/4W               | 0751-7532   |
| R138                     | R: METAL FILM 19.1k 1%                  | 0721-1912   |
| R139                     | R: METAL FILM 120k 2% 1/4W              | 0751-1242   |
| R140                     | R: METAL FILM 10.0k 1%                  | 0721-1002   |
| R141                     | R: METAL FILM 820k 2% 1/4W              | 0751-8242   |
| R142                     | R: METAL FILM 9.09k 1%                  | 0721-9091   |
| R143, R144               | R: METAL FILM 2.21k 1%                  | 0721-2211   |
| R145                     | R: METAL FILM 316 1%                    | 0721-3160   |
| R146                     | R: METAL FILM 90.9k 1%                  | 0721-9092   |
| R147                     | R: METAL FILM 100k 1%                   | 0721-1003   |
| R148                     | R: METAL FILM 90.9k 1%                  | 0721-9092   |
| R149                     | R: METAL FILM 100k 1%                   | 0721-1003   |
| R150                     | R: METAL FILM 5.36k 1%                  | 0721-5361   |
| R151                     | R: METAL FILM 10 2% 1/4W                | 0751-1002   |
| R152, R153               | R: METAL FILM 1k 2% 1/4W                | 0751-1022   |
| R154                     | R: METAL FILM 5.6k 2% 1/4W              | 0751-5622   |
| R155                     | R: METAL FILM 1k 2% 1/4W                | 0751-1022   |
| R156, R157               | R: METAL FILM 750 2% 1/4W               | 0751-7512   |
| S1                       | SWITCH: PUSHBUTTON (12 BUTTON: TVM-100) | 3101-0030   |
|                          | SWITCH: PUSHBUTTON (10 BUTTON: TVM-101) | 3101-0032   |
| U1 thru U5               | IC: 74LS160A                            | 1821-0031   |
| U6                       | IC: 74LS00                              | 1821-0029   |
| U7                       | IC: XO, 2.92MHz                         | 0415-0292   |
| U8                       | IC: 74LS00                              | 1821-0029   |
| U9                       | IC: XO, 650kHz                          | 0415-0065   |
| U10                      | IC: 74LS73A                             | 1821-0030   |
| U11                      | IC: 1355                                | 1826-0045   |
| U12                      | IC: 74121                               | 1821-0014   |
| U13                      | IC: 75372                               | 1823-0004   |
| U14                      | IC: 7805CT                              | 1826-0014   |
| U15                      | IC: UA723                               | 1820-0012   |
| U16, U17                 | IC: NE5534                              | 1826-0025   |
| U18, U19                 | IC: LM311                               | 1826-0009   |
| U20, U21                 | IC: NE5534                              | 1826-0025   |
| U22                      | IC: 4066B                               | 1822-0018   |
| U23, U24                 | IC: NE5534                              | 1826-0025   |

A1 BOARD TVM-100/101 CONT.

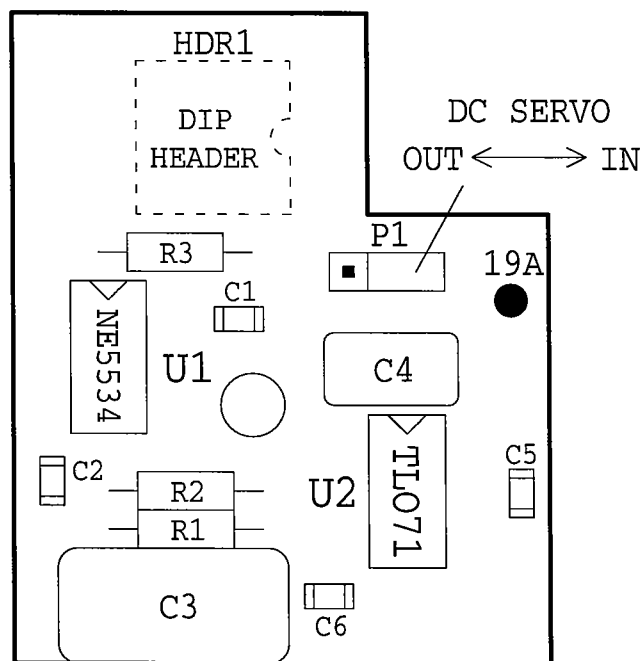
| Reference<br>Designation | Description | Part Number |
|--------------------------|-------------|-------------|
| U25 thru U28             | IC: TLO71   | 1826-0004   |
| U29                      | IC: CA3140E | 1826-0001   |
| U30,U31                  | IC: LM311   | 1826-0009   |
| U32                      | IC: 4538B   | 1822-0023   |
| U33 thru U36             | IC: CA3140E | 1826-0001   |
| U37                      | IC: TLO71   | 1826-0004   |
| U38                      | IC: 78L05CP | 1826-0012   |
| U39 thru U41             | IC: TLO71   | 1826-0004   |
| U42                      | IC: LM311   | 1826-0009   |
| U43                      | IC: 79L05CP | 1826-0017   |
| U44                      | IC: LM311   | 1826-0009   |
| U45                      | IC: 4538B   | 1822-0023   |
| U46 thru U48             | IC: TLO71   | 1826-0004   |



NOTE:

THE A1-1 DC SERVO BOARD HAS BEEN ADDED TO THE TVM-100 (BEGINNING S/N 200221) AND THE TVM-101 (BEGINNING S/N 230177) AS A DAUGHTER BOARD ON THE A1 DEMODULATOR BOARD. IN THESE UNITS, R29 ON THE A1 BOARD IS CHANGED TO A 1.10K AND U17 (NE5534) IS REMOVED AND REPLACED BY THE A1-1 DAUGHTER BOARD. (SEE THE A1-1 DAUGHTER BOARD LOCATION DRAWING FOR THE WIRE CONNECTIONS.)

TVM-100/101  
A1-1  
SERVO BOARD  
2-11-99



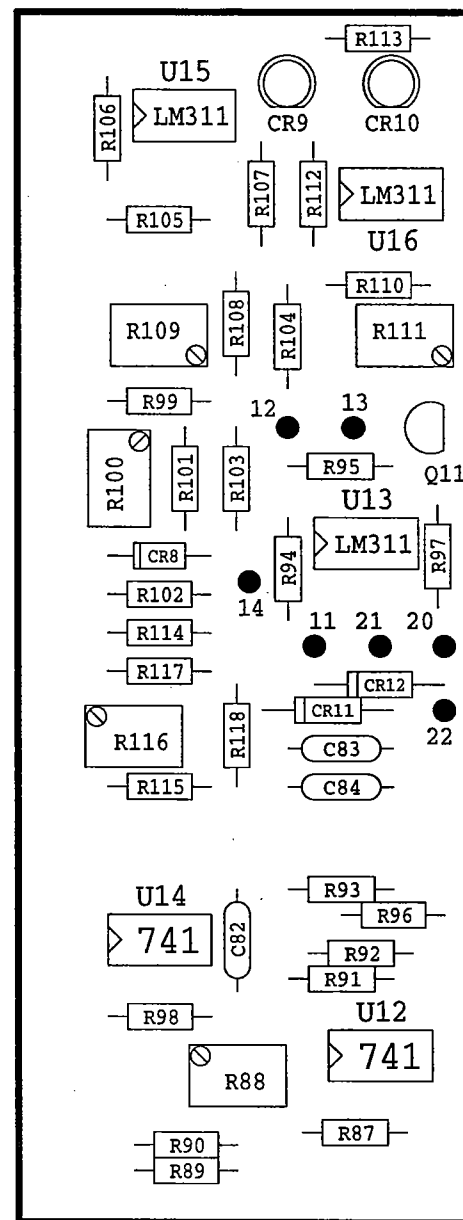
TVM-100/101  
A1-1 SERVO BOARD  
COMPONENT LAYOUT  
BELAR ELECTRONICS

# A1-1 BOARD TVM-100/101

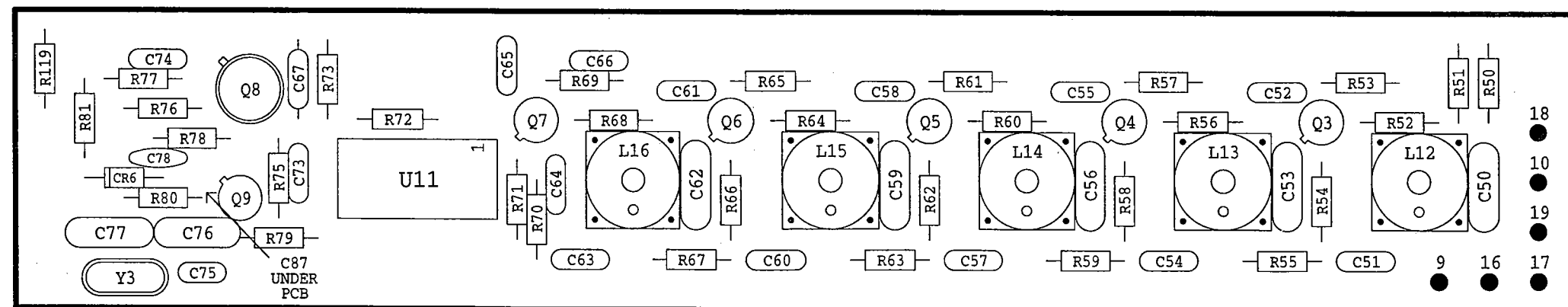
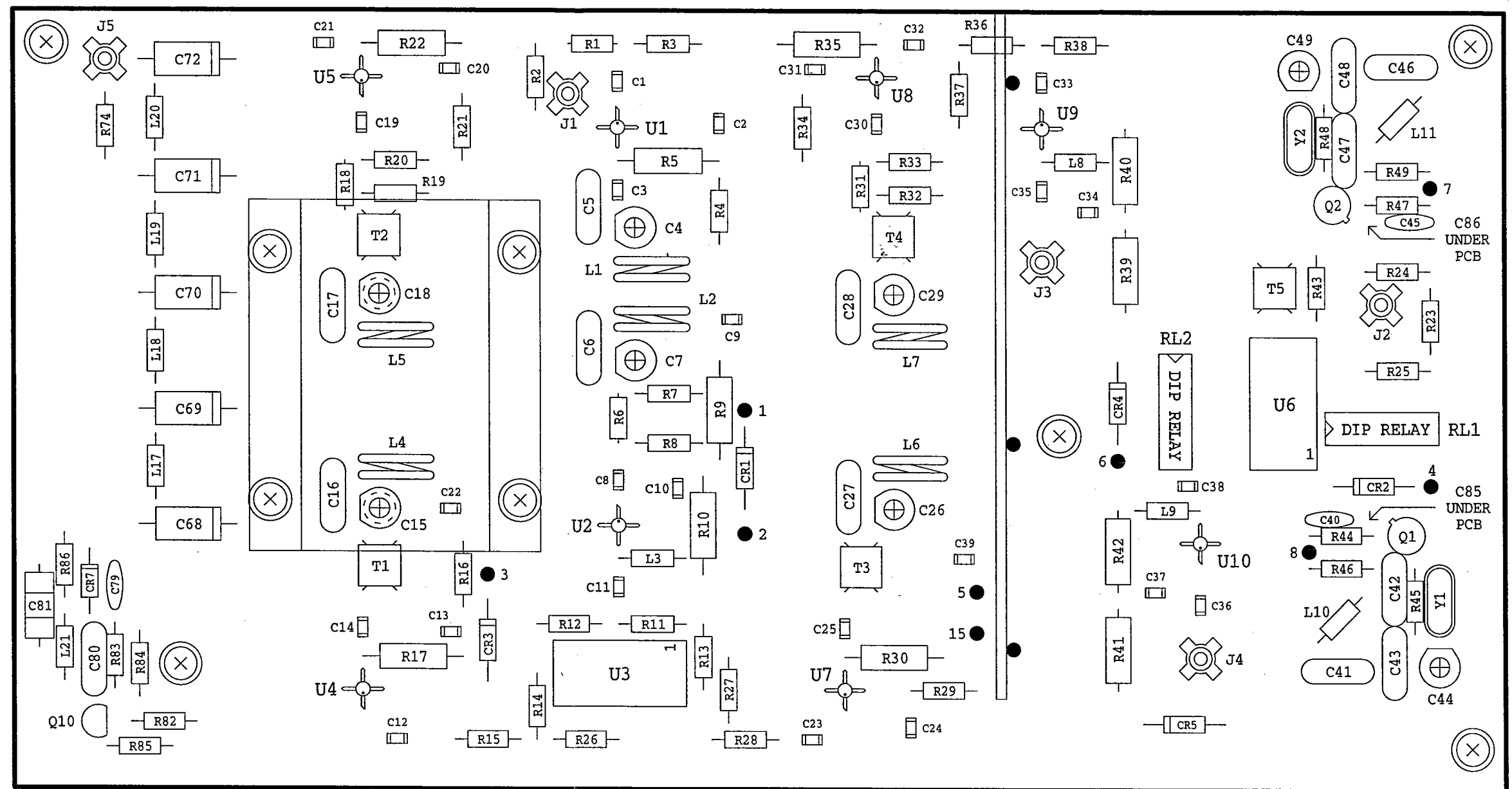
| Reference<br>Designation | Description                     | Part Number     |
|--------------------------|---------------------------------|-----------------|
| C1,C2                    | C: FIXED CERAMIC CHIP 0.1uF 50V | C1206 0151-0014 |
| C3                       | C: FIXED FILM 0.22uF 10% 100V   | 0122-2241       |
| C4                       | C: FIXED FILM 0.022uF 10% 100V  | 0122-2231       |
| C5,C6                    | C: FIXED CERAMIC CHIP 0.1uF 50V | C1206 0151-0014 |
| HDR1                     | DIP HEADER: 8 PIN               | 0363-0008       |
| P1                       | PLUG: 3 PIN, PC MOUNT           | 0365-0030       |
| --                       | JUMPER: 2 PIN (USED WITH P1)    | 0365-0028       |
| R1,R2                    | R: FIXED CARBON 3.9M 5% 1/4W    | 0683-3955       |
| R3                       | R: METAL FILM 11.0k 1%          | 0721-1102       |
| U1                       | IC: NE5534                      | 1826-0025       |
| U2                       | IC: TLO71                       | 1826-0004       |



A3-2

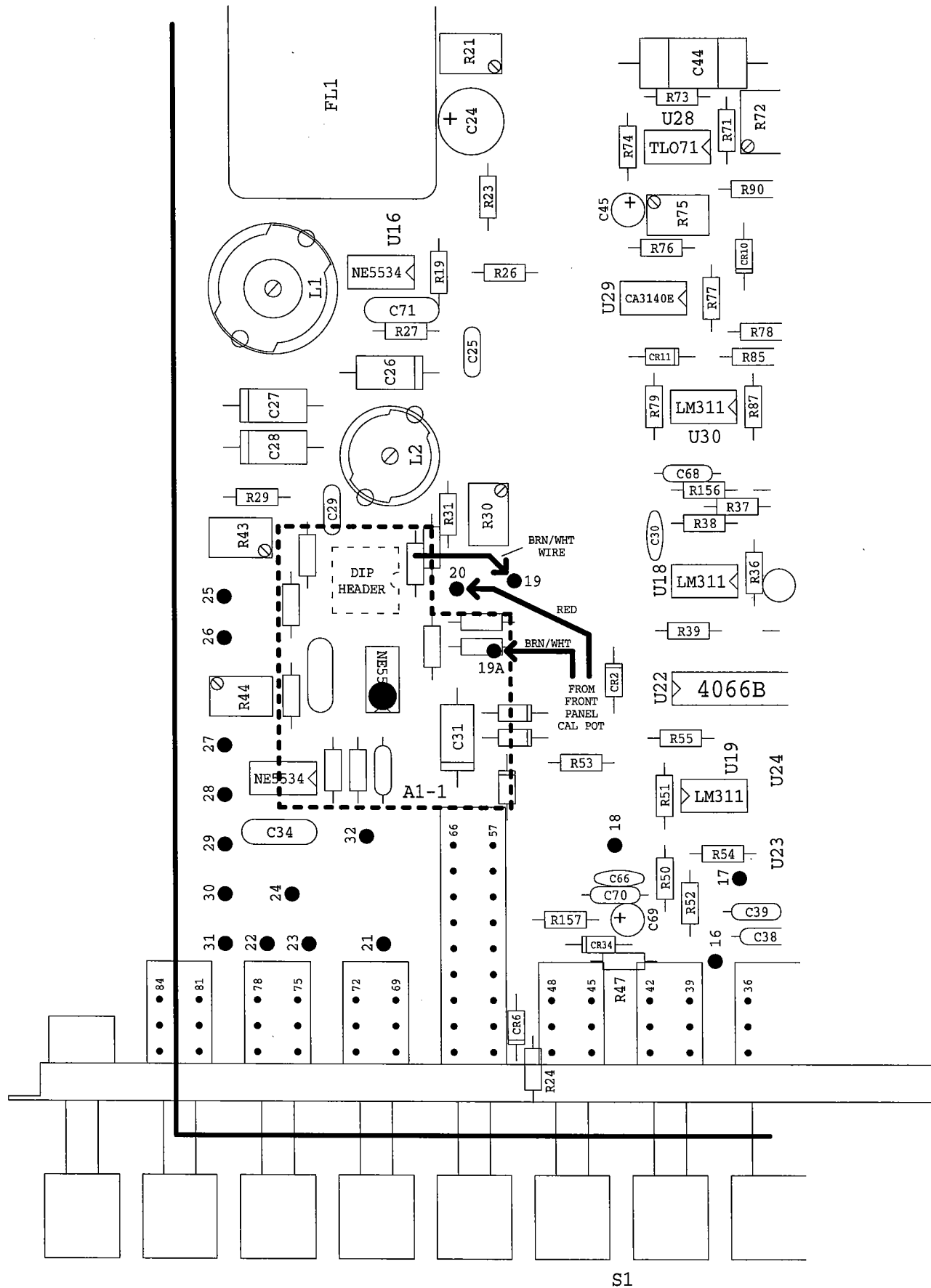


A3



A3-1

TVM-100/101 A3 BOARDS  
COMPONENT LAYOUTS  
BELAR ELECTRONICS



TVM-100/101  
A1-1 DAUGHTER BOARD LOCATION

## A3 MODULE TVM-100/101

## A3 BOARD

| Reference Designation | Description                     | Part Number |
|-----------------------|---------------------------------|-------------|
| C1 thru C3            | C: FIXED CERAMIC CHIP 0.1uF 50V | 0151-0014   |
| C4                    | C: VARIABLE CERAMIC 6-50pF      | 0121-0011   |
| C5,C6                 | C: FIXED MICA 250pF 5%          | 0140-2515   |
| C7                    | C: VARIABLE CERAMIC 6-50pF      | 0121-0011   |
| C8 thru C14           | C: FIXED CERAMIC CHIP 0.1uF 50V | 0151-0014   |
| C15                   | C: VARIABLE CERAMIC 6-50pF      | 0121-0011   |
| C16,C17               | C: FIXED MICA 270pF 5%          | 0140-2715   |
| C18                   | C: VARIABLE CERAMIC 6-50pF      | 0121-0011   |
| C19 thru C25          | C: FIXED CERAMIC CHIP 0.1uF 50V | 0151-0014   |
| C26                   | C: VARIABLE CERAMIC 6-50pF      | 0121-0011   |
| C27,C28               | C: FIXED MICA 270pF 5%          | 0140-2715   |
| C29                   | C: VARIABLE CERAMIC 6-50pF      | 0121-0011   |
| C30 thru C39          | C: FIXED CERAMIC CHIP 0.1uF 50V | 0151-0014   |
| C40                   | C: FIXED CERAMIC 0.01uF 100V    | 0151-0003   |
| C41                   | C: FIXED MICA 24pF 5%           | 0140-2405   |
| C42                   | C: FIXED MICA 75pF 5%           | 0140-7505   |
| C43                   | C: FIXED MICA 51pF 5%           | 0140-5105   |
| C44                   | C: VARIABLE CERAMIC 6-50pF      | 0121-0011   |
| C45                   | C: FIXED CERAMIC 0.01uF 100V    | 0151-0003   |
| C46                   | C: FIXED MICA 24pF 5%           | 0140-2405   |
| C47                   | C: FIXED MICA 75pF 5%           | 0140-7505   |
| C48                   | C: FIXED MICA 51pF 5%           | 0140-5105   |
| C49                   | C: VARIABLE CERAMIC 6-50pF      | 0121-0011   |
| C68                   | C: FIXED POLY 270pF 2.5% 160V   | 0130-2712   |
| C69                   | C: FIXED POLY 1200pF 2.5% 160V  | 0130-1222   |
| C70                   | C: FIXED POLY 1600pF 2.5% 160V  | 0130-1622   |
| C71                   | C: FIXED POLY 1200pF 2.5% 160V  | 0130-1222   |
| C72                   | C: FIXED POLY 270pF 2.5% 160V   | 0130-2712   |
| C79                   | C: FIXED CERAMIC 0.01uF 100V    | 0151-0003   |
| C80                   | C: FIXED MICA 750pF 5%          | 0140-7515   |
| C81                   | C: FIXED FILM 0.0022uF 10% 200V | 0120-2221   |
| C85,C86               | C: FIXED MICA 10pF 5%           | 0140-1005   |
|                       | (C85 & C86 ARE ON PCB BOTTOM)   |             |
| CR1 thru CR5          | DIODE: 1N4006                   | 1900-0016   |
| CR7                   | DIODE: 1N277, GERMANIUM         | 1900-0001   |
| J1 thru J5            | JACK: SMB, PC MOUNT             | 0360-0040   |
| L1                    | INDUCTOR:                       | Belar       |
| L2                    | INDUCTOR:                       | Belar       |
| L3                    | CHOKE: 18uH                     | 9141-0030   |
| L4                    | INDUCTOR:                       | Belar       |
| L5                    | INDUCTOR:                       | Belar       |
| L6                    | INDUCTOR:                       | Belar       |
| L7                    | INDUCTOR:                       | Belar       |
| L8,L9                 | CHOKE: 18uH                     | 9141-0030   |
| L10,L11               | CHOKE: 0.47uH                   | 9141-0006   |
| L17                   | CHOKE: 8.2uH                    | 9141-0015   |

## A3 BOARD TVM-100/101 CONT.

| Reference<br>Designation | Description                          | Part Number |
|--------------------------|--------------------------------------|-------------|
| L18,L19                  | CHOKE: 15uH                          | 9141-0025   |
| L20                      | CHOKE: 8.2uH                         | 9141-0015   |
| L21                      | CHOKE: 1000uH                        | 9141-0100   |
| Q1,Q2                    | TRANSISTOR: 2N5179                   | 1850-0023   |
| Q10                      | TRANSISTOR: 2N4401                   | 1850-0028   |
| R1                       | R: METAL FILM 17.8 1%                | 0721-17R8   |
| R2,R3                    | R: METAL FILM 294 1%                 | 0721-2940   |
| R4                       | R: METAL FILM 33 2% 1/4W             | 0751-3302   |
| R5                       | R: METAL FILM 680 2% 1/2W            | 0771-6812   |
| R6                       | R: METAL FILM 17.8 1% (VHF)          | 0721-17R8   |
|                          | R: METAL FILM 37.4 1% (UHF)          | 0721-37R4   |
| R7,R8                    | R: METAL FILM 294 1% (VHF)           | 0721-2940   |
|                          | R: METAL FILM 150 1% (UHF)           | 0721-1500   |
| R9,R10                   | R: METAL FILM 150 2% 1/2W            | 0771-1512   |
| R11*                     | R: METAL FILM 17.8 1%                | 0721-17R8   |
| R12*,R13*                | R: METAL FILM 294 1%                 | 0721-2940   |
|                          | *(R11,R12 AND R13 USED FOR UHF ONLY) |             |
| R14,R15                  | R: METAL FILM 16.5 1%                | 0721-16R5   |
| R16                      | R: METAL FILM 33 2% 1/4W             | 0751-3302   |
| R17                      | R: METAL FILM 680 2% 1/2W            | 0771-6812   |
| R18                      | R: METAL FILM 17.8 1%                | 0721-17R8   |
| R19,R20                  | R: METAL FILM 294 1%                 | 0721-2940   |
| R21                      | R: METAL FILM 33 2% 1/4W             | 0751-3302   |
| R22                      | R: METAL FILM 680 2% 1/2W            | 0771-6812   |
| R23                      | R: METAL FILM 37.4 1%                | 0721-37R4   |
| R24,R25                  | R: METAL FILM 150 1%                 | 0721-1500   |
| R26                      | R: METAL FILM 28.7 1%                | 0721-28R7   |
| R27                      | R: METAL FILM 100 2% 1/4W            | 0751-1012   |
| R28                      | R: METAL FILM 12 2% 1/4W             | 0751-1202   |
| R29                      | R: METAL FILM 33 2% 1/4W             | 0751-3302   |
| R30                      | R: METAL FILM 680 2% 1/2W            | 0771-6812   |
| R31                      | R: METAL FILM 37.4 1%                | 0721-37R4   |
| R32,R33                  | R: METAL FILM 150 1%                 | 0721-1500   |
| R34                      | R: METAL FILM 33 2% 1/4W             | 0751-3302   |
| R35                      | R: METAL FILM 680 2% 1/2W            | 0771-6812   |
| R36                      | R: METAL FILM 17.8 1%                | 0721-17R8   |
| R37,R38                  | R: METAL FILM 294 1%                 | 0721-2940   |
| R39 thru R42             | R: METAL FILM 150 2% 1/2W            | 0771-1512   |
| R43                      | R: METAL FILM 200 2% 1/4W            | 0751-2012   |
| R44                      | R: METAL FILM 510 2% 1/4W            | 0751-5112   |
| R45,R46                  | R: METAL FILM 5.1k 2% 1/4W           | 0751-5122   |
| R47                      | R: METAL FILM 510 2% 1/4W            | 0751-5112   |
| R48,R49                  | R: METAL FILM 5.1k 2% 1/4W           | 0751-5122   |
| R74                      | R: METAL FILM 100 1%                 | 0721-1000   |
| R82                      | R: METAL FILM 5.6k 2% 1/4W           | 0751-5622   |
| R83                      | R: METAL FILM 680 2% 1/4W            | 0751-6812   |
| R84                      | R: METAL FILM 39k 2% 1/4W            | 0751-3932   |
| R85                      | R: METAL FILM 220 2% 1/4W            | 0751-2212   |
| R86                      | R: METAL FILM 5.6k 2% 1/4W           | 0751-5622   |

## A3 BOARD TVM-100/101 CONT.

| Reference Designation | Description                                        | Part Number |
|-----------------------|----------------------------------------------------|-------------|
| RL1,RL2*              | RELAY: JWD-172-3<br>*(RL2 NOT USED IN TVM-101)     | 1600-0005   |
| T1 thru T5            | TRANSFORMER: RF                                    | Belar       |
| U1                    | IC: MAR-6                                          | 1845-0026   |
| U2                    | IC: MAR-3 (VHF)                                    | 1845-0023   |
|                       | MAR-8 (UHF)                                        | 1845-0028   |
| U3                    | IC: PAS-1                                          | 1845-0010   |
| U4,U5                 | IC: MAR-6                                          | 1845-0026   |
| U6                    | IC: SRA-1                                          | 1845-0001   |
| U7,U8                 | IC: MAR-6                                          | 1845-0026   |
| U9,U10                | IC: MAR-3                                          | 1845-0023   |
| Y1                    | XTAL: (FREQUENCY DEPENDS ON OPTIONAL IF FREQUENCY) |             |
| Y2                    | XTAL: 45.75MHz                                     | 0413-4575   |

## A3-1 BOARD TVM-100/101

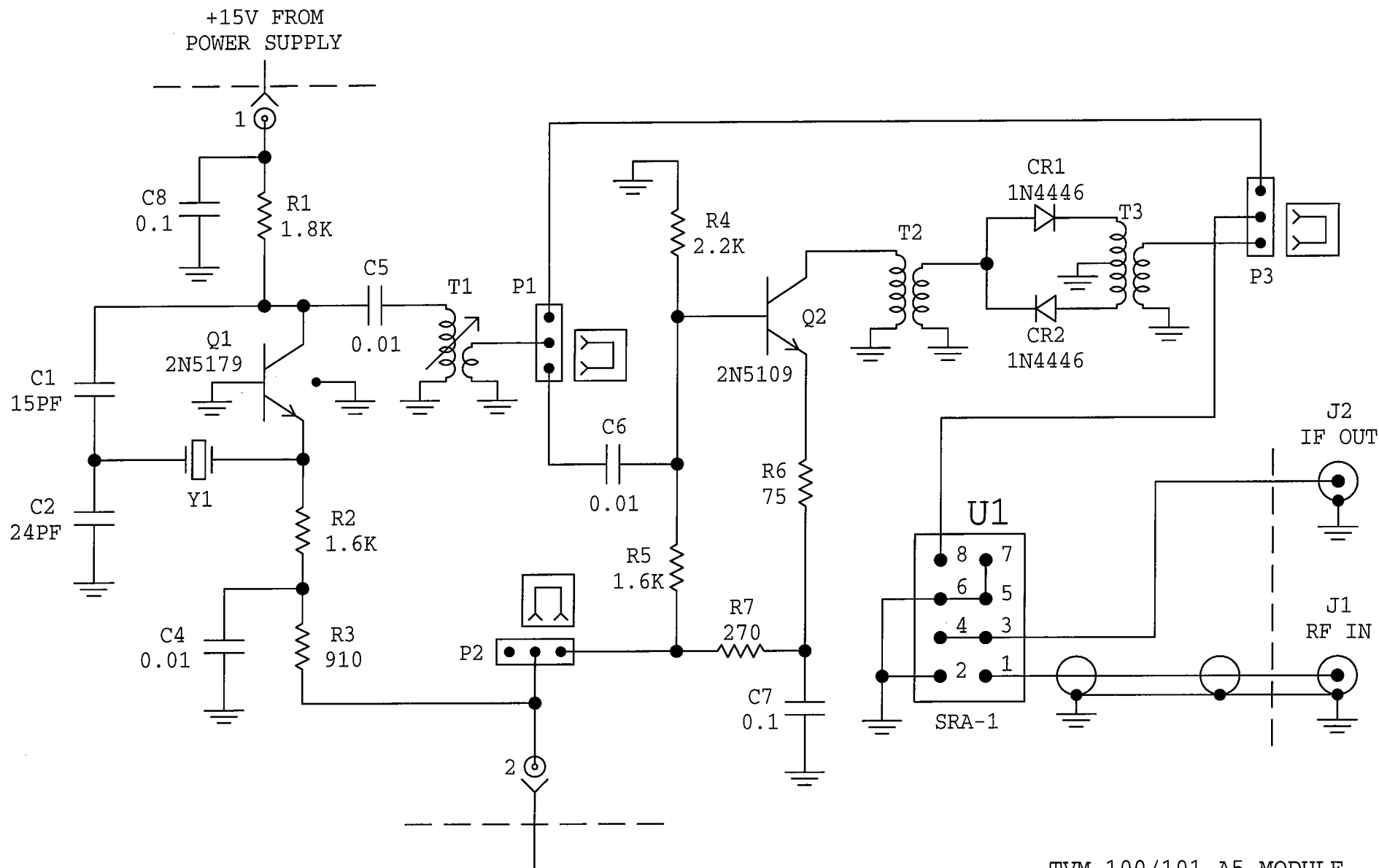
| Reference Designation | Description                                                          | Part Number |
|-----------------------|----------------------------------------------------------------------|-------------|
| C50*                  | C: FIXED MICA 470pF 2%<br>*C50 is in parallel with a 75pF mica cap.  | 0140-4712   |
| C51,C52               | C: FIXED CERAMIC 0.1uF 50V                                           | 0151-0006   |
| C53                   | C: FIXED MICA 560pF 2%                                               | 0140-5612   |
| C54,C55               | C: FIXED CERAMIC 0.1uF 50V                                           | 0151-0006   |
| C56**                 | C: FIXED MICA 500pF 2%<br>**C56 is in parallel with a 39pF mica cap. | 0140-5012   |
| C57,C58               | C: FIXED CERAMIC 0.1uF 50V                                           | 0151-0006   |
| C59**                 | C: FIXED MICA 470pF 2%<br>**C59 is in parallel with a 39pF mica cap. | 0140-4712   |
| C60,C61               | C: FIXED CERAMIC 0.1uF 50V                                           | 0151-0006   |
| C62**                 | C: FIXED MICA 470pF 2%<br>**C62 is in parallel with a 39pF mica cap. | 0140-4712   |
| C63 thru C67          | C: FIXED CERAMIC 0.1uF 50V                                           | 0151-0006   |
| C73                   | C: FIXED CERAMIC 1.0uF 50V                                           | 0151-0008   |
| C74                   | C: FIXED CERAMIC 0.1uF 50V                                           | 0151-0006   |
| C75                   | C: FIXED MICA 36pF 5%                                                | 0142-3605   |
| C76                   | C: FIXED MICA 360pF 5%                                               | 0140-3615   |
| C77                   | C: FIXED MICA 500pF 5%                                               | 0140-5015   |
| C78                   | C: FIXED CERAMIC 0.01uF 100V                                         | 0151-0003   |
| C87                   | C: FIXED MICA 10pF 5%<br>(C87 IS ON PCB BOTTOM)                      | 0142-1005   |
| CR6                   | DIODE: 1N4446                                                        | 1900-0002   |
| L12 thru L16          | INDUCTOR:                                                            | Belar       |

## A3-1 BOARD TVM-100/101 CONT.

| Reference<br>Designation | Description                                     | Part Number |
|--------------------------|-------------------------------------------------|-------------|
| Q3 thru Q7               | TRANSISTOR: 2N5179                              | 1850-0023   |
| Q8                       | TRANSISTOR: 2N3866                              | 1850-0014   |
| Q9                       | TRANSISTOR: 2N5179                              | 1850-0023   |
| R50                      | R: METAL FILM 49.9 1%                           | 0721-49R9   |
| R51                      | R: METAL FILM 576 1%                            | 0721-5760   |
| R52                      | R: METAL FILM 330 2% 1/4W                       | 0751-3312   |
| R53                      | R: METAL FILM 1.10k 1%                          | 0721-1101   |
| R54                      | R: METAL FILM 300 2% 1/4W                       | 0751-3012   |
| R55                      | R: METAL FILM 2k 2% 1/4W                        | 0751-2022   |
| R56                      | R: METAL FILM 330 2% 1/4W                       | 0751-3312   |
| R57                      | R: METAL FILM 1.10k 1%                          | 0721-1101   |
| R58                      | R: METAL FILM 300 2% 1/4W                       | 0751-3012   |
| R59                      | R: METAL FILM 2k 2% 1/4W                        | 0751-2022   |
| R60                      | R: METAL FILM 330 2% 1/4W                       | 0751-3312   |
| R61                      | R: METAL FILM 750 1%                            | 0721-7500   |
| R62                      | R: METAL FILM 200 2% 1/4W                       | 0751-2012   |
| R63                      | R: METAL FILM 2k 2% 1/4W                        | 0751-2022   |
| R64                      | R: METAL FILM 330 2% 1/4W                       | 0751-3312   |
| R65                      | R: METAL FILM 787 1%                            | 0721-7870   |
| R66                      | R: METAL FILM 200 2% 1/4W                       | 0751-2012   |
| R67                      | R: METAL FILM 2k 2% 1/4W                        | 0751-2022   |
| R68                      | R: METAL FILM 330 2% 1/4W                       | 0751-3312   |
| R69                      | R: METAL FILM 510 2% 1/4W                       | 0751-5112   |
| R70                      | R: METAL FILM 1k 2% 1/4W                        | 0751-1022   |
| R71                      | R: METAL FILM 43.2 1%                           | 0721-43R2   |
| R72, R73                 | R: METAL FILM 69.8 1%                           | 0721-69R8   |
| R75                      | R: METAL FILM 49.9 1%                           | 0721-49R9   |
| R76                      | R: METAL FILM 62 2% 1/4W                        | 0751-6202   |
| R77                      | R: METAL FILM 220 2% 1/4W                       | 0751-2212   |
| R78                      | R: METAL FILM 5.1k 2% 1/4W                      | 0751-5122   |
| R79                      | R: METAL FILM 2.4k 2% 1/4W                      | 0751-2422   |
| R80                      | R: METAL FILM 510 2% 1/4W                       | 0751-5112   |
| R81*                     | R: METAL FILM 360 2% 1/4W                       | 0751-3612   |
|                          | *(VALUE FACTORY SELECTED. NOMINAL VALUE SHOWN.) |             |
| R119                     | R: METAL FILM 1.3k 2% 1/4W                      | 0751-1322   |
| U11                      | IC: SRA-3                                       | 1845-0003   |
| Y3                       | XTAL: 5.15MHz                                   | 0413-0515   |

## A3-2 BOARD TVM-100/101

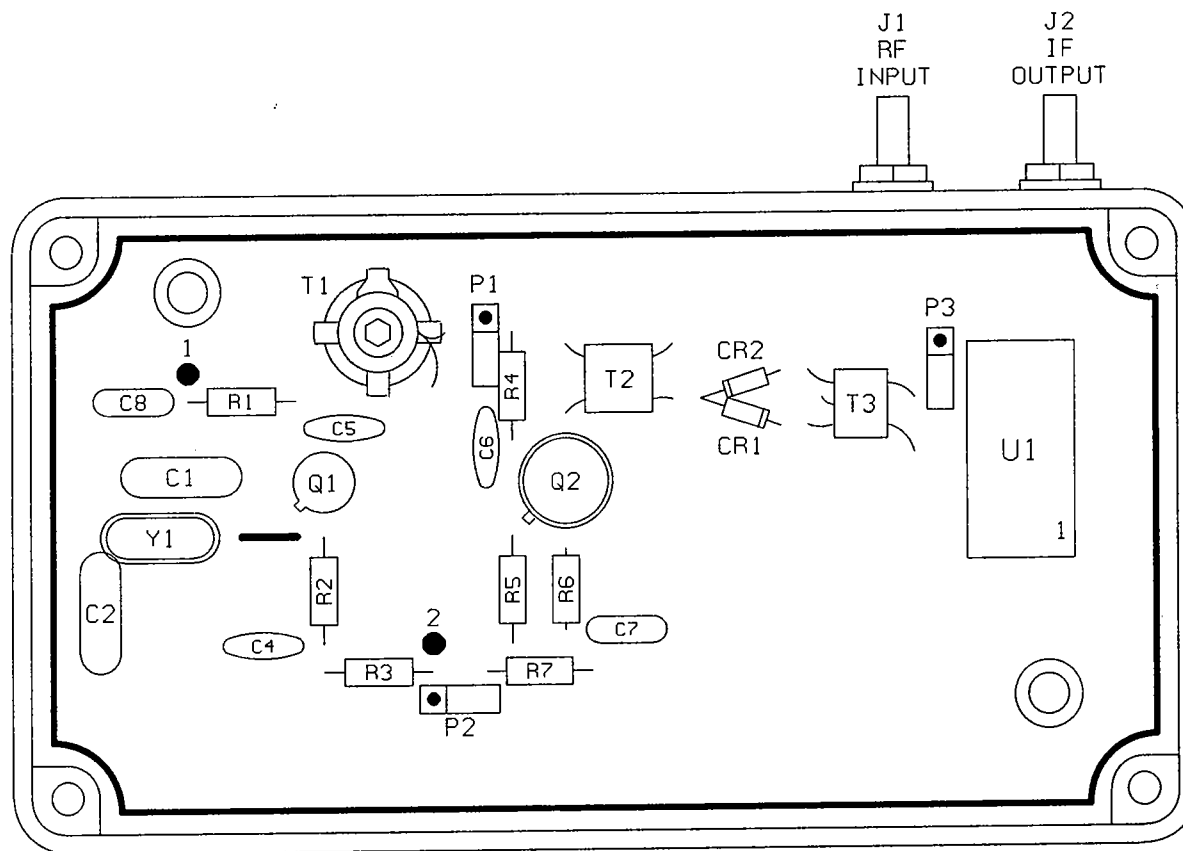
| Reference Designation | Description                               | Part Number |
|-----------------------|-------------------------------------------|-------------|
| C82                   | C: FIXED CERAMIC 1.0uF 50V                | 0151-0008   |
| C83, C84              | C: FIXED CERAMIC 0.1uF 50V                | 0151-0006   |
| CR8                   | DIODE: 1N4446                             | 1900-0002   |
| CR9, CR10             | LED: RED MV5053                           | 1910-0001   |
| CR11, CR12            | DIODE: 1N4006                             | 1900-0016   |
| Q11                   | TRANSISTOR: 2N4401                        | 1850-0028   |
| R87                   | R: METAL FILM 1k 2% 1/4W                  | 0751-1022   |
| R88                   | R: VAR COMP 10k 10 TURN                   | 2100-0024   |
| R89                   | R: METAL FILM 6.19k 1%                    | 0721-6191   |
| R90*                  | R: METAL FILM 1.69k 1%                    | 0721-1691   |
|                       | *(R90 ONLY USED FOR LARGE CARRIER RATIOS) |             |
| R91                   | R: METAL FILM 20k 2% 1/4W                 | 0751-2032   |
| R92                   | R: METAL FILM 270 2% 1/4W                 | 0751-2712   |
| R93                   | R: METAL FILM 18k 2% 1/4W                 | 0751-1832   |
| R94                   | R: METAL FILM 270k 2% 1/4W                | 0751-2742   |
| R95                   | R: METAL FILM 12k 2% 1/4W                 | 0751-1232   |
| R96                   | R: METAL FILM 1k 2% 1/4W                  | 0751-1022   |
| R97                   | R: METAL FILM 30k 2% 1/4W                 | 0751-3032   |
| R98                   | R: METAL FILM 22k 2% 1/4W                 | 0751-2232   |
| R99                   | R: METAL FILM 1k 2% 1/4W                  | 0751-1022   |
| R100                  | R: VAR COMP 5k 10 TURN                    | 2100-0020   |
| R101                  | R: METAL FILM 39k 2% 1/4W                 | 0751-3932   |
| R102                  | R: METAL FILM 1k 2% 1/4W                  | 0751-1022   |
| R103                  | R: METAL FILM 510 2% 1/4W                 | 0751-5112   |
| R104                  | R: METAL FILM 10k 2% 1/4W                 | 0751-1032   |
| R105                  | R: METAL FILM 47k 2% 1/4W                 | 0751-4732   |
| R106                  | R: FIXED CARBON 6.2M 5% 1/4W              | 0683-6255   |
| R107                  | R: METAL FILM 330 2% 1/4W                 | 0751-3312   |
| R108                  | R: METAL FILM 75 2% 1/4W                  | 0751-7502   |
| R109                  | R: VAR COMP 500 10 TURN                   | 2100-0027   |
| R110                  | R: METAL FILM 1.3k 2% 1/4W                | 0751-1322   |
| R111                  | R: VAR COMP 1k 10 TURN                    | 2100-0021   |
| R112                  | R: FIXED CARBON 1.2M 5% 1/4W              | 0683-1255   |
| R113                  | R: METAL FILM 330 2% 1/4W                 | 0751-3312   |
| R114, R115            | R: METAL FILM 63.4k 1%                    | 0721-6342   |
| R116                  | R: VAR COMP 500 10 TURN                   | 2100-0027   |
| R117, R118            | R: METAL FILM 43.2 1%                     | 0721-43R2   |
| U12                   | IC: MC1741                                | 1826-0006   |
| U13                   | IC: LM311                                 | 1826-0009   |
| U14                   | IC: MC1741                                | 1826-0006   |
| U15, U16              | IC: LM311                                 | 1826-0009   |



NOTE: J1 & J2 ARE  
MOUNTED ON CASE

-15V FROM  
POWER SUPPLY

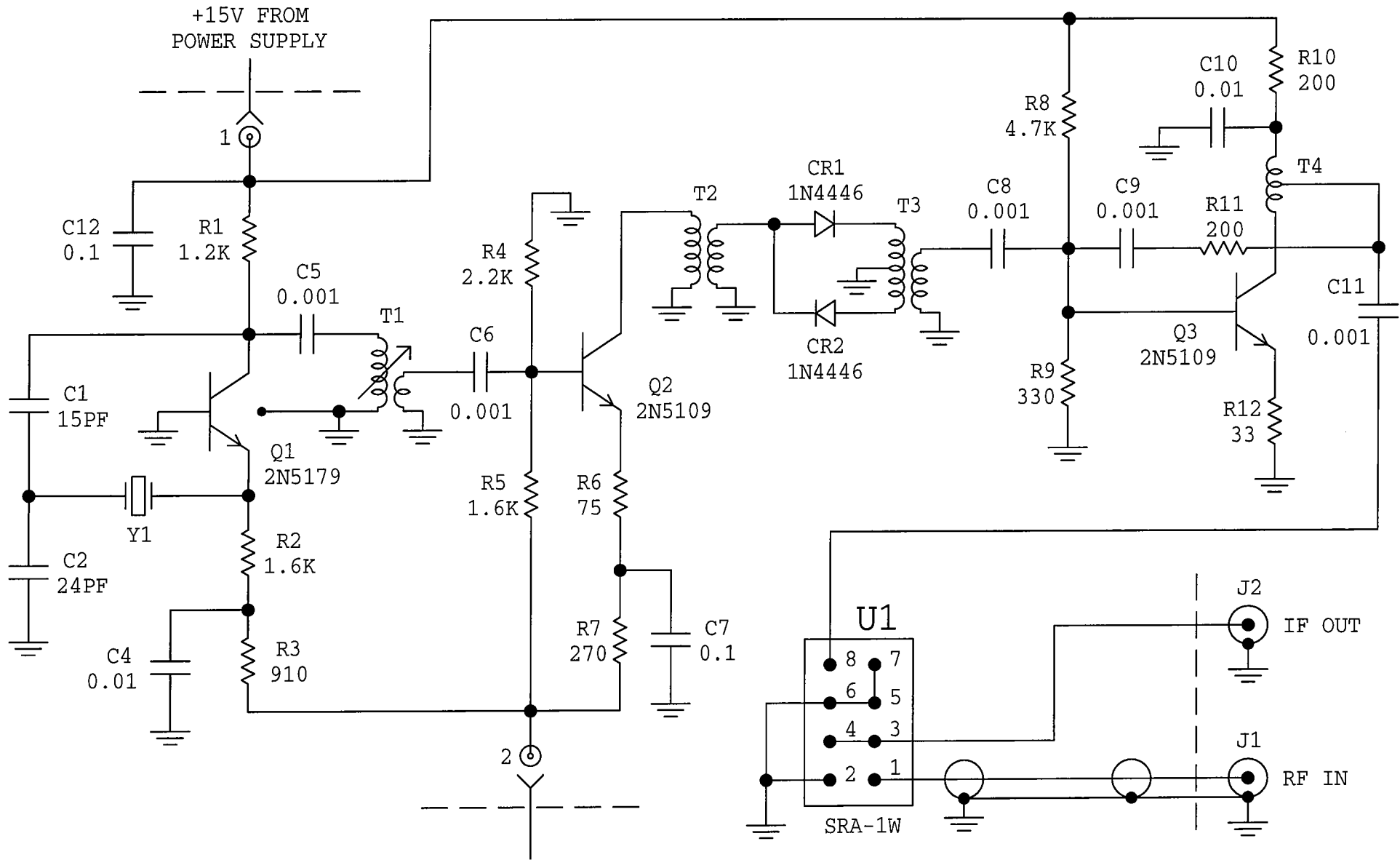
TVM-100/101 A5 MODULE  
VHF LOCAL OSCILLATOR  
BELAR ELECTRONICS  
10-2-91



TUM-100/101 A5 MODULE  
COMPONENT LAYOUT  
BELAR ELECTRONICS

## A5 BOARD TVM-100/101

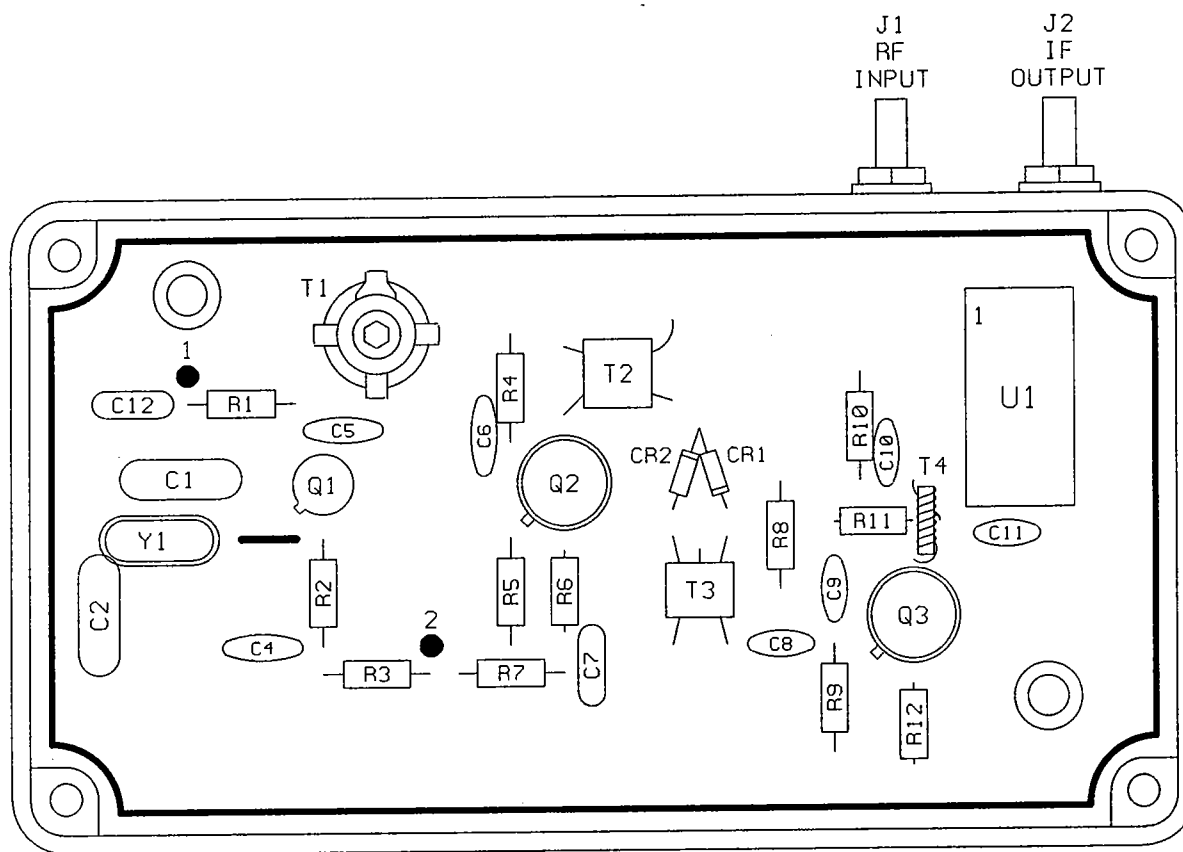
| Reference Designation | Description                                                                          | Part Number |
|-----------------------|--------------------------------------------------------------------------------------|-------------|
| C1                    | C: FIXED MICA 15pF 5%                                                                | 0140-1505   |
| C2                    | C: FIXED MICA 24pF 5%                                                                | 0140-2405   |
| C4 thru C6            | C: FIXED CERAMIC 0.01uF 100V                                                         | 0151-0003   |
| C7,C8                 | C: FIXED CERAMIC 0.1uF 50V                                                           | 0151-0006   |
| CR1,CR2               | DIODE: 1N4446                                                                        | 1900-0002   |
| J1,J2                 | J: SMB, CHASSIS MOUNT<br>(J1 & J2 ARE MOUNTED ON CASE)                               | 0360-0041   |
| P1 thru P3            | PIN: 3 POSITION                                                                      | 0365-0030   |
| --                    | JUMPER: 2 POSITION<br>(USED WITH P1 THRU P3)                                         | 0365-0028   |
| Q1                    | TRANSISTOR: 2N5179                                                                   | 1850-0023   |
| Q2                    | TRANSISTOR: 2N5109                                                                   | 1850-0031   |
| R1                    | R: METAL FILM 1.8k 2% 1/4W                                                           | 0751-1822   |
| R2                    | R: METAL FILM 1.6k 2% 1/4W                                                           | 0751-1622   |
| R3                    | R: METAL FILM 910 2% 1/4W                                                            | 0751-9112   |
| R4                    | R: METAL FILM 2.2k 2% 1/4W                                                           | 0751-2222   |
| R5                    | R: METAL FILM 1.6k 2% 1/4W                                                           | 0751-1622   |
| R6                    | R: METAL FILM 75 2% 1/4W                                                             | 0751-7502   |
| R7                    | R: METAL FILM 270 2% 1/4W                                                            | 0751-2712   |
| T1                    | TRANSFORMER: VARIABLE                                                                | Belar       |
| T2                    | TRANSFORMER: RF, VHF                                                                 | Belar       |
| T3                    | TRANSFORMER: RF TAPPED, VHF                                                          | Belar       |
| U1                    | IC: SRA-1                                                                            | 1845-0001   |
| Y1                    | XTAL: VHF LOW, 41.25MHz ABOVE AURAL<br>VHF HIGH, 41.25MHz ABOVE AURAL (DIVIDED BY 2) |             |



NOTE: J1 & J2 ARE  
MOUNTED ON CASE

-15V FROM  
POWER SUPPLY

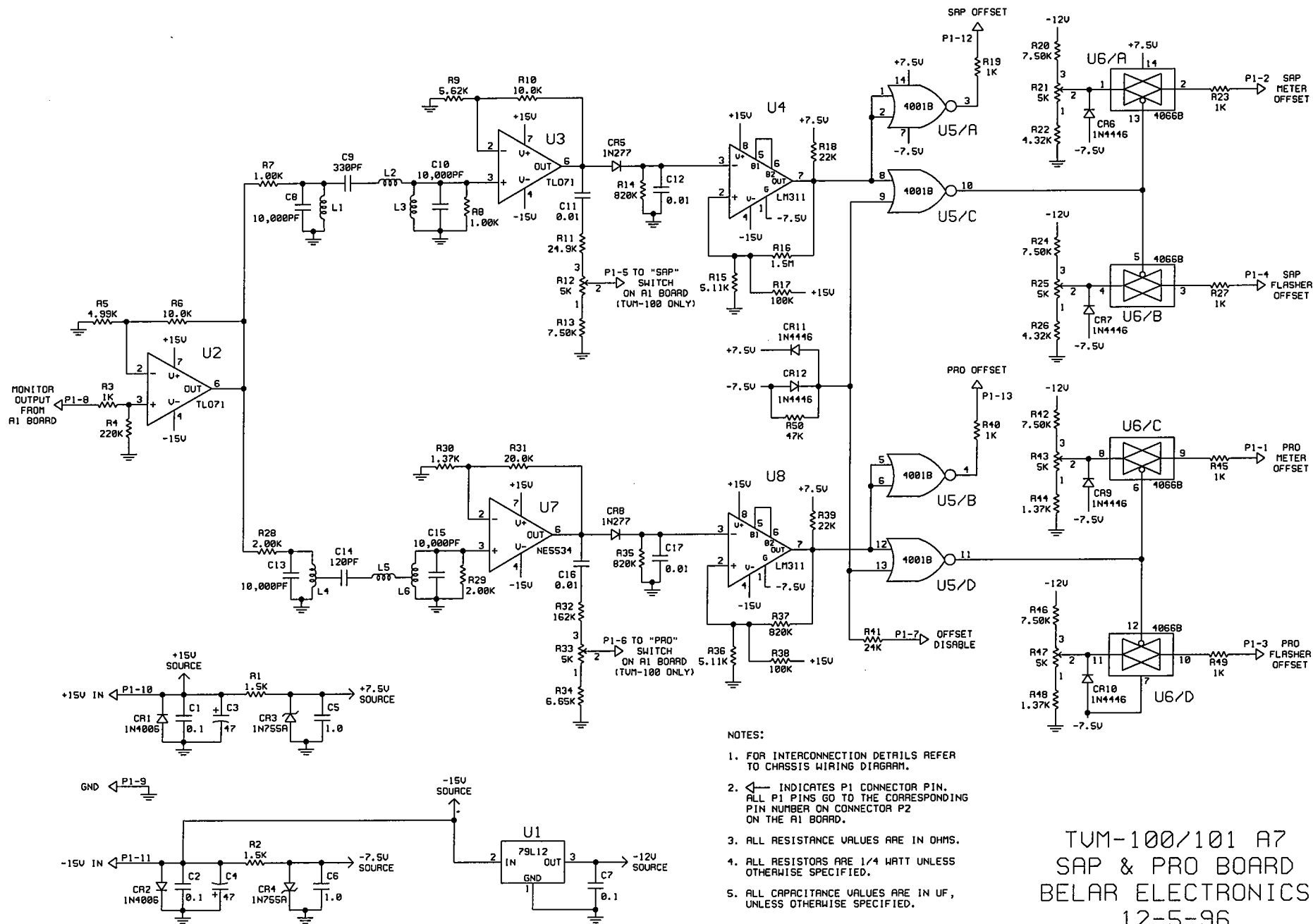
TVM-100/101 A6 MODULE  
UHF LOCAL OSCILLATOR  
BELAR ELECTRONICS  
10-3-91

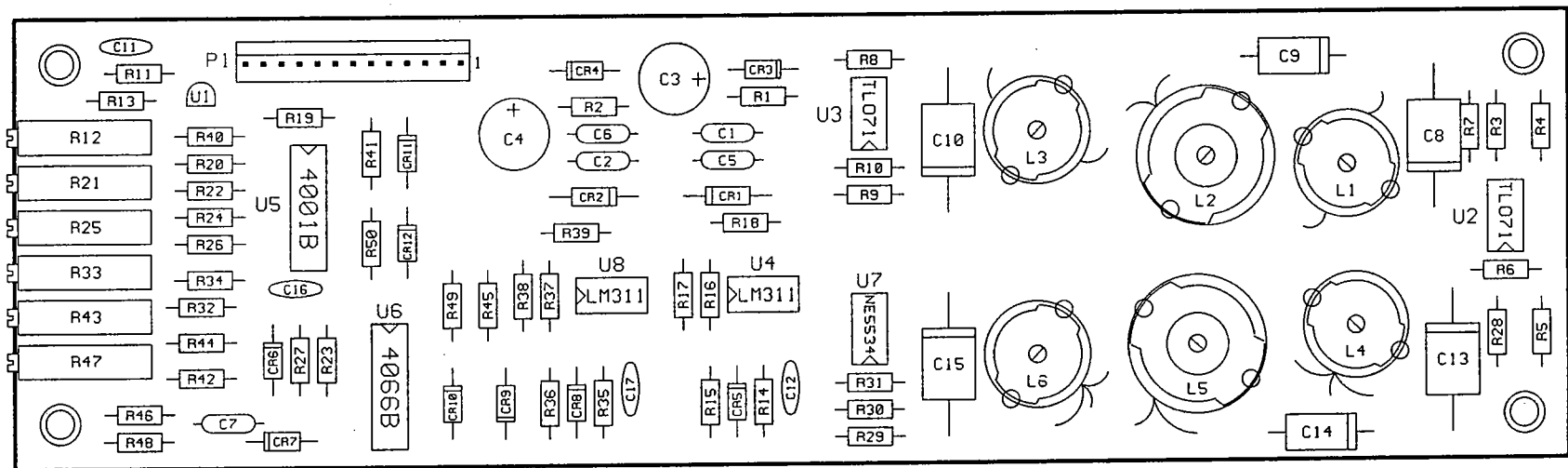


TUM-100/101 A6 MODULE  
 COMPONENT LAYOUT  
 BELAR ELECTRONICS

## A6 BOARD TVM-100/101

| Reference<br>Designation | Description                                            | Part Number |
|--------------------------|--------------------------------------------------------|-------------|
| C1                       | C: FIXED MICA 15pF 5%                                  | 0140-1505   |
| C2                       | C: FIXED MICA 24pF 5%                                  | 0140-2405   |
| C4                       | C: FIXED CERAMIC 0.01uF 100V                           | 0151-0003   |
| C5,C6                    | C: FIXED CERAMIC 0.001uF 1kV                           | 0151-0002   |
| C7                       | C: FIXED CERAMIC 0.1uF 50V                             | 0151-0006   |
| C8,C9                    | C: FIXED CERAMIC 0.001uF 1kV                           | 0151-0002   |
| C10                      | C: FIXED CERAMIC 0.01uF 100V                           | 0151-0003   |
| C11                      | C: FIXED CERAMIC 0.001uF 1kV                           | 0151-0002   |
| C12                      | C: FIXED CERAMIC 0.1uF 50V                             | 0151-0006   |
| CR1,CR2                  | DIODE: 1N4446                                          | 1900-0002   |
| J1,J2                    | J: SMB, CHASSIS MOUNT<br>(J1 & J2 ARE MOUNTED ON CASE) | 0360-0041   |
| Q1                       | TRANSISTOR: 2N5179                                     | 1850-0023   |
| Q2,Q3                    | TRANSISTOR: 2N5109                                     | 1850-0031   |
| R1                       | R: METAL FILM 1.2k 2% 1/4W                             | 0751-1222   |
| R2                       | R: METAL FILM 1.6k 2% 1/4W                             | 0751-1622   |
| R3                       | R: METAL FILM 910 2% 1/4W                              | 0751-9112   |
| R4                       | R: METAL FILM 2.2k 2% 1/4W                             | 0751-2222   |
| R5                       | R: METAL FILM 1.6k 2% 1/4W                             | 0751-1622   |
| R6                       | R: METAL FILM 75 2% 1/4W                               | 0751-7502   |
| R7                       | R: METAL FILM 270 2% 1/4W                              | 0751-2712   |
| R8                       | R: METAL FILM 4.7k 2% 1/4W                             | 0751-4722   |
| R9                       | R: METAL FILM 330 2% 1/4W                              | 0751-3312   |
| R10,R11                  | R: METAL FILM 200 2% 1/4W                              | 0751-2012   |
| R12                      | R: METAL FILM 33 2% 1/4W                               | 0751-3302   |
| T1                       | TRANSFORMER: VARIABLE                                  | Belar       |
| T2                       | TRANSFORMER: RF, UHF                                   | Belar       |
| T3                       | TRANSFORMER: RF TAPPED, UHF                            | Belar       |
| T4                       | TRANSFORMER: RF AUTO, UHF                              | Belar       |
| U1                       | IC: SRA-1W                                             | 1845-0002   |
| Y1                       | XTAL: 41.25MHz ABOVE AURAL (DIVIDED BY 6)              |             |





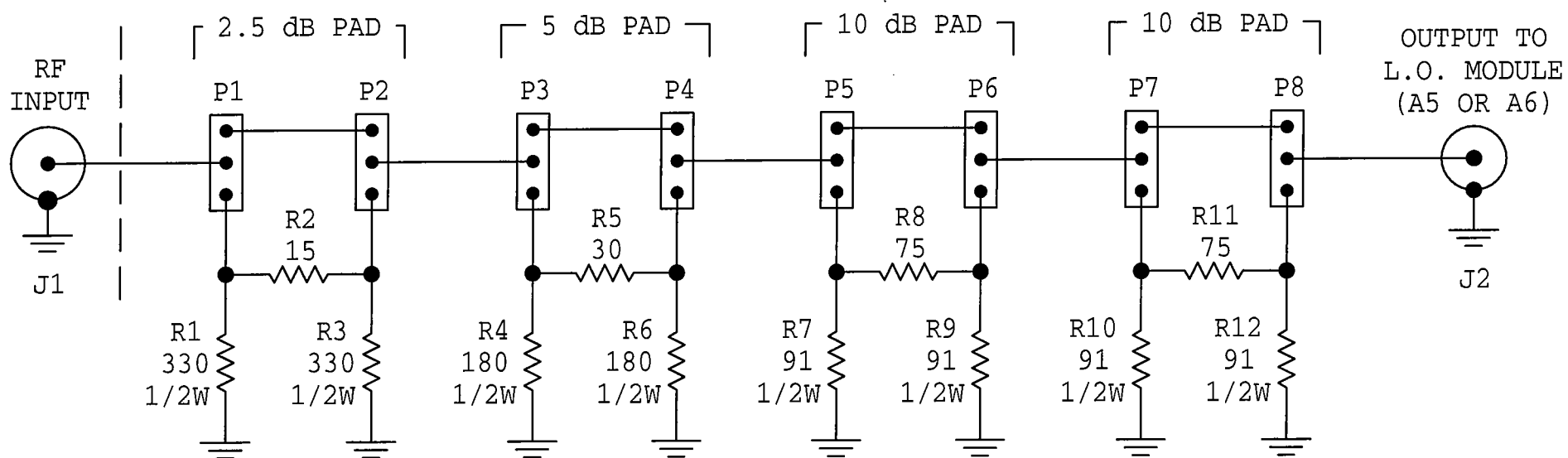
TUM-100/101 A7 BOARD  
 COMPONENT LAYOUT  
 BELAR ELECTRONICS

## A7 BOARD TVM-100/101

| Reference Designation | Description                      | Part Number |
|-----------------------|----------------------------------|-------------|
| C1,C2                 | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C3,C4                 | C: FIXED ELEC 47uF 50V           | 0180-0017   |
| C5,C6                 | C: FIXED CERAMIC 1.0uF 50V       | 0151-0008   |
| C7                    | C: FIXED CERAMIC 0.1uF 50V       | 0151-0006   |
| C8                    | C: FIXED POLY 10,000pF 2.5% 160V | 0130-1032   |
| C9                    | C: FIXED POLY 330pF 2.5% 160V    | 0130-3312   |
| C10                   | C: FIXED POLY 10,000pF 2.5% 160V | 0130-1032   |
| C11,C12               | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| C13                   | C: FIXED POLY 10,000pF 2.5% 160V | 0130-1032   |
| C14                   | C: FIXED POLY 120pF 2.5% 160V    | 0130-1212   |
| C15                   | C: FIXED POLY 10,000pF 2.5% 160V | 0130-1032   |
| C16,C17               | C: FIXED CERAMIC 0.01uF 100V     | 0151-0003   |
| CR1,CR2               | DIODE: 1N4006                    | 1900-0016   |
| CR3,CR4               | DIODE: IN755A                    | 1900-0023   |
| CR5                   | DIODE: 1N277 GERMANIUM           | 1900-0001   |
| CR6,CR7               | DIODE: IN4446                    | 1900-0002   |
| CR8                   | DIODE: 1N277 GERMANIUM           | 1900-0001   |
| CR9 thru CR12         | DIODE: 1N4446                    | 1900-0002   |
| L1                    | INDUCTOR:                        | Belar       |
| L2                    | INDUCTOR:                        | Belar       |
| L3                    | INDUCTOR:                        | Belar       |
| L4                    | INDUCTOR:                        | Belar       |
| L5                    | INDUCTOR:                        | Belar       |
| L6                    | INDUCTOR:                        | Belar       |
| P1                    | PLUG: 13 PIN, PC MOUNT           | 0365-0041   |
| R1,R2                 | R: METAL FILM 1.5k 2% 1/4W       | 0751-1522   |
| R3                    | R: METAL FILM 1k 2% 1/4W         | 0751-1022   |
| R4                    | R: METAL FILM 220k 2% 1/4W       | 0751-2242   |
| R5                    | R: METAL FILM 4.99k 1%           | 0721-4991   |
| R6                    | R: METAL FILM 10.0k 1%           | 0721-1002   |
| R7,R8                 | R: METAL FILM 1.00k 1%           | 0721-1001   |
| R9                    | R: METAL FILM 5.62k 1%           | 0721-5621   |
| R10                   | R: METAL FILM 10.0k 1%           | 0721-1002   |
| R11                   | R: METAL FILM 24.9k 1%           | 0721-2492   |
| R12                   | R: VAR COMP 5k, 10 TURN          | 2100-0026   |
| R13                   | R: METAL FILM 7.50k 1%           | 0721-7501   |
| R14                   | R: METAL FILM 820k 2% 1/4W       | 0751-8242   |
| R15                   | R: METAL FILM 5.11k 1%           | 0721-5111   |
| R16                   | R: FIXED CARBON 1.5M 5% 1/4W     | 0683-1555   |
| R17                   | R: METAL FILM 100k 1%            | 0721-1003   |
| R18                   | R: METAL FILM 22k 2% 1/4W        | 0751-2232   |
| R19                   | R: METAL FILM 1k 2% 1/4W         | 0751-1022   |
| R20                   | R: METAL FILM 7.50k 1%           | 0721-7501   |
| R21                   | R: VAR COMP 5k, 10 TURN          | 2100-0026   |
| R22                   | R: METAL FILM 4.32k 1%           | 0721-4321   |

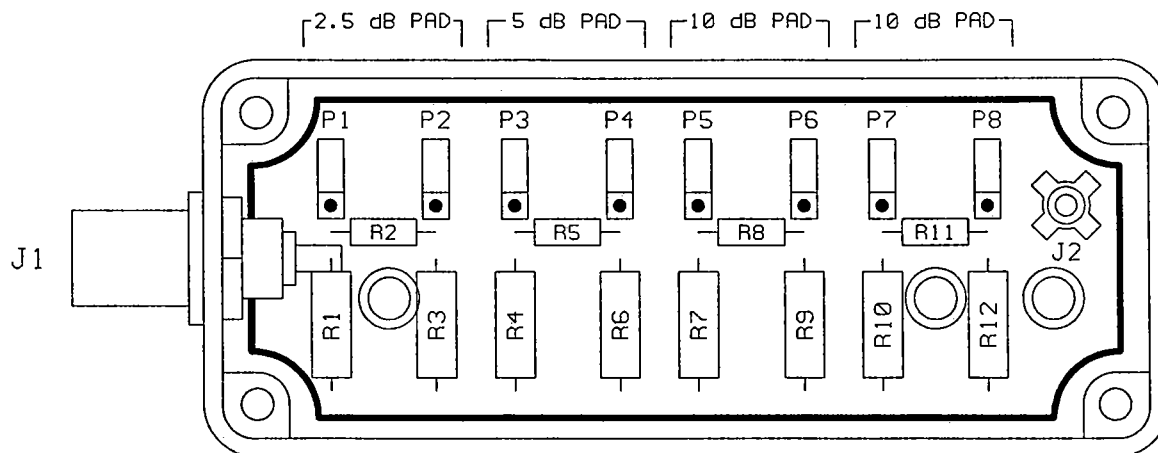
A7 BOARD TVM-100/101 CONT.

| Reference<br>Designation | Description                | Part Number |
|--------------------------|----------------------------|-------------|
| R23                      | R: METAL FILM 1k 2% 1/4W   | 0751-1022   |
| R24                      | R: METAL FILM 7.50k 1%     | 0721-7501   |
| R25                      | R: VAR COMP 5k, 10 TURN    | 2100-0026   |
| R26                      | R: METAL FILM 4.32k 1%     | 0721-4321   |
| R27                      | R: METAL FILM 1k 2% 1/4W   | 0751-1022   |
| R28, R29                 | R: METAL FILM 2.00k 1%     | 0721-2001   |
| R30                      | R: METAL FILM 1.37k 1%     | 0721-1371   |
| R31                      | R: METAL FILM 20.0k 1%     | 0721-2002   |
| R32                      | R: METAL FILM 162k 1%      | 0721-1623   |
| R33                      | R: VAR COMP 5k, 10 TURN    | 2100-0026   |
| R34                      | R: METAL FILM 6.65k 1%     | 0721-6651   |
| R35                      | R: METAL FILM 820k 2% 1/4W | 0751-8242   |
| R36                      | R: METAL FILM 5.11k 1%     | 0721-5111   |
| R37                      | R: METAL FILM 820k 2% 1/4W | 0751-8242   |
| R38                      | R: METAL FILM 100k 1%      | 0721-1003   |
| R39                      | R: METAL FILM 22k 2% 1/4W  | 0751-2232   |
| R40                      | R: METAL FILM 1k 2% 1/4W   | 0751-1022   |
| R41                      | R: METAL FILM 24k 2% 1/4W  | 0751-2432   |
| R42                      | R: METAL FILM 7.50k 1%     | 0721-7501   |
| R43                      | R: VAR COMP 5k, 10 TURN    | 2100-0026   |
| R44                      | R: METAL FILM 1.37k 1%     | 0721-1371   |
| R45                      | R: METAL FILM 1k 2% 1/4W   | 0751-1022   |
| R46                      | R: METAL FILM 7.50k 1%     | 0721-7501   |
| R47                      | R: VAR COMP 5k, 10 TURN    | 2100-0026   |
| R48                      | R: METAL FILM 1.37k 1%     | 0721-1371   |
| R49                      | R: METAL FILM 1k 2% 1/4W   | 0751-1022   |
| R50                      | R: METAL FILM 47k 2% 1/4W  | 0751-4732   |
| U1                       | IC: 79L12CP                | 1826-0019   |
| U2, U3                   | IC: TLO71                  | 1826-0004   |
| U4                       | IC: LM311                  | 1826-0009   |
| U5                       | IC: 4001B                  | 1822-0015   |
| U6                       | IC: 4066B                  | 1822-0018   |
| U7                       | IC: NE5534                 | 1826-0025   |
| U8                       | IC: LM311                  | 1826-0009   |



NOTE: J1 IS MOUNTED ON CASE.

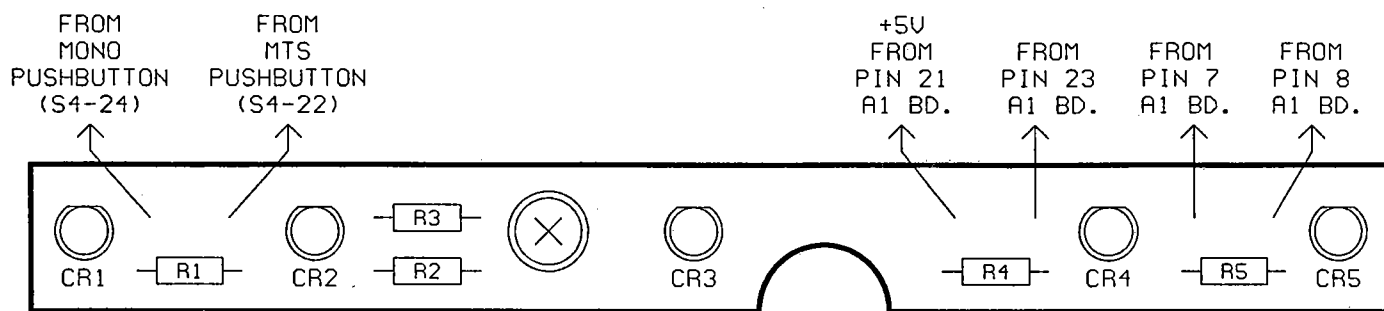
TVM-100/101 A10  
ATTENUATOR MODULE  
BELAR ELECTRONICS  
1-11-94



TVM-100/101 A10 MODULE  
COMPONENT LAYOUT

#### A10 MODULE TVM-100/101

| Reference Designation | Description                                                     | Part Number            |
|-----------------------|-----------------------------------------------------------------|------------------------|
| J1                    | JACK: BNC                                                       | 0360-0005              |
| J2                    | JACK: SMB, PC MOUNT                                             | 0360-0040              |
| P1 thru P8            | PIN: 3 POSITION<br>JUMPER: 2 POSITION<br>(USED WITH P1 THRU P8) | 0365-0030<br>0365-0028 |
| R1                    | R: METAL FILM 330 2% 1/2W                                       | 0771-3312              |
| R2                    | R: METAL FILM 15 2% 1/4W                                        | 0751-1502              |
| R3                    | R: METAL FILM 330 2% 1/2W                                       | 0771-3312              |
| R4                    | R: METAL FILM 180 2% 1/2W                                       | 0771-1812              |
| R5                    | R: METAL FILM 30 2% 1/4W                                        | 0751-3002              |
| R6                    | R: METAL FILM 180 2% 1/2W                                       | 0771-1812              |
| R7                    | R: METAL FILM 91 2% 1/2W                                        | 0771-9102              |
| R8                    | R: METAL FILM 75 2% 1/4W                                        | 0751-7502              |
| R9, R10               | R: METAL FILM 91 2% 1/2W                                        | 0771-9102              |
| R11                   | R: METAL FILM 75 2% 1/4W                                        | 0751-7502              |
| R12                   | R: METAL FILM 91 2% 1/2W                                        | 0771-9102              |

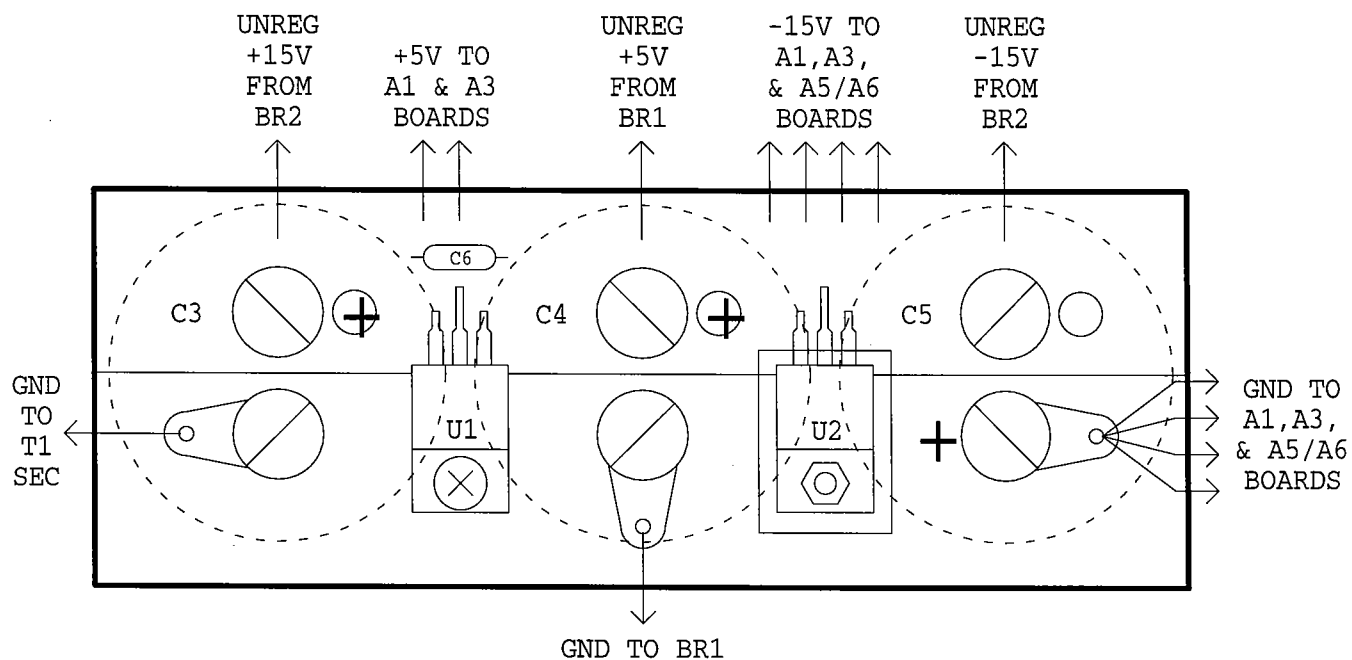


TVM-100/101 A11 BOARD  
COMPONENT LAYOUT

#### A11 BOARD TVM-100/101

| Reference Designation | Description               | Part Number |
|-----------------------|---------------------------|-------------|
| CR1                   | LED: YELLOW MV5353        | 1910-0002   |
| CR2                   | LED: GREEN MV5253         | 1910-0003   |
| CR3                   | LED: RED MV5053           | 1910-0001   |
| CR4                   | LED: YELLOW MV5353        | 1910-0002   |
| CR5                   | LED: RED MV5053           | 1910-0001   |
| R1 thru R5            | R: METAL FILM 160 2% 1/4W | 0751-1615   |

(SEE CHASSIS WIRING DIAGRAM FOR A11 BOARD SCHEMATIC)



TVM-100/101  
A12 POWER SUPPLY BOARD  
COMPONENT LAYOUT  
(ONLY USED PRIOR TO TVM-100 SERIAL NUMBER 200511 &  
TVM-101 SERIAL NUMBER 230271)

A12 BOARD TVM-100/101

| Reference Designation | Description                | Part Number |
|-----------------------|----------------------------|-------------|
| C3 thru C5            | C: FIXED ELEC 3500uF 40V   | 0180-0026   |
| C6                    | C: FIXED CERAMIC 0.1uF 50V | 0151-0006   |
| U1                    | IC: 7805C                  | 1826-0014   |
| U2                    | IC: 7915C                  | 1826-0033   |

(SEE CHASSIS WIRING DIAGRAM FOR A12 BOARD SCHEMATIC)

# 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 TVM-100 or TVM-101 Precision TV Aural 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.

# **Instructions for installing the BELAR PWM-1 PEAK WEIGHTING MODULE in your Belar TVM-100/TVM-101 Precision TV Aural Modulation Monitor**

Before proceeding, please:

- Read through these entire 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
  - Mounting template
  - PWM-1 foil label for back of unit
  - Coaxial jumper cable
  - Instruction book

**Overview:** The PWM-1 is installed in the back of the cover of your TVM-100/TVM-101. The installation procedure involves removing the cover, making a hole for the switch (note: TVM-100 S/N 200065 / TVM-101 S/N 230044 and later already have this hole), applying the foil label, installing the switch (with attached circuit board), making the electrical connections, and reinstalling the cover.

|                 |                            |                                             |
|-----------------|----------------------------|---------------------------------------------|
| Tools required: | small Phillips screwdriver | small round file or similar                 |
|                 | center punch or awl        | Exacto knife or similar                     |
|                 | 1/4" drill                 | IC removal tool (or small flat screwdriver) |

**Note:** References to the TVM-100 apply equally to the TVM-101.

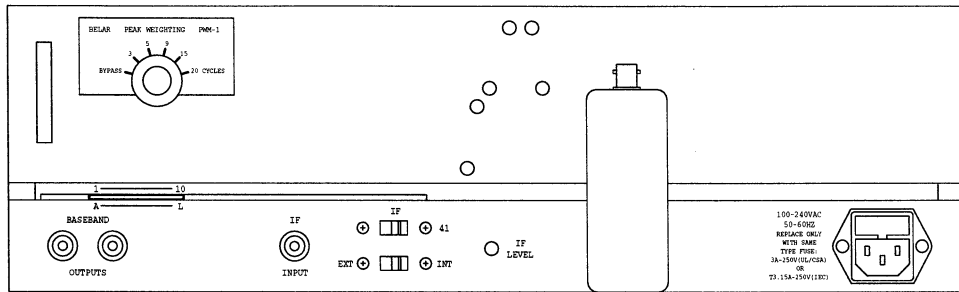
- 1 Unplug all cords from the TVM-100, and remove it from the equipment rack.
- 2 Remove the TVM-100 top cover.
- 3 Using a scissors, cut the template supplied where indicated. (The two templates are identical -- one is a spare.)
- 4 Tape the template to the outside rear of the TVM-100 cover, using the left and top edges as a guide.
- 5 Center punch and drill a 1/4" hole as shown by the template.
- 6 Using the template, carefully mark label position on rear cover. This will help you properly position the foil label when you apply it later.
- 7 Remove the template and deburr the hole.
- 8 Carefully peel the label backing away from bottom of label, and fold it over so about 3/8" of the label is exposed. Locate the label on the cover using the marks you made in step 6, and carefully press the bottom of label against the panel.

- 9 Slowly peel label backing from the bottom up, while pressing label against panel. This will avoid air bubbles under label.
- 10 Roll label flat with a rubber roller, or rub the label backing over the surface of the label to flatten.
- 11 Using an Exacto knife, cut a hole in the label around the edge of the switch mounting hole.
- 12 Remove the nut and lockwasher from the PWM-1 rotary switch.
- 13 Install the PWM-1 module on the inside rear of the TVM-100 top cover, with the gold pins toward the top. Mount the lockwasher and nut and tighten securely, making sure that the module remains horizontal.
- 14 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. If the pointer does not line up with the position marks on the label, remove the knob, loosen the nut and rotate the module slightly. Tighten the nut and reinstall the knob.
- 15 Lay the TVM-100 top cover just behind the unit with the PWM-1 knob facing down. Rest the cover on the input attenuator.
- 16 Unplug the coaxial cable from pins 13 and 14 on the TVM-100 A1 board. (See diagram at the rear of the manual.) These pins are marked "BB1" and "G". Plug the center conductor of the coax you just removed onto pin 3 of the module, and the shield onto ground pin 4 (see PWM-1 Component Layout drawing).
- 17 Plug one end of the center conductor of the coaxial cable (supplied) onto pin 1 of the module and the shield onto ground pin 2. Plug the center conductor of the other end onto pin 13 on the TVM-100 A1 board and the shield onto ground pin 14. (Ground pin 14 is the one closest to the thumbwheel.)
- 18 Remove U40 (TLO71) from the TVM-100 A1 board. (See diagram at the rear of the manual.) Note the position of pin 1.
- 19 Insert the 8 pin DIP plug from the module into U40's socket on the TVM-100 A1 board. The notch on the DIP plug denotes pin 1. This pin should be inserted toward the unit front panel. If the DIP plug is inserted properly, the flat cable should exit the DIP plug toward the rear of the unit.
- 20 Carefully rotate the top cover into position and temporarily secure it with two mounting screws.

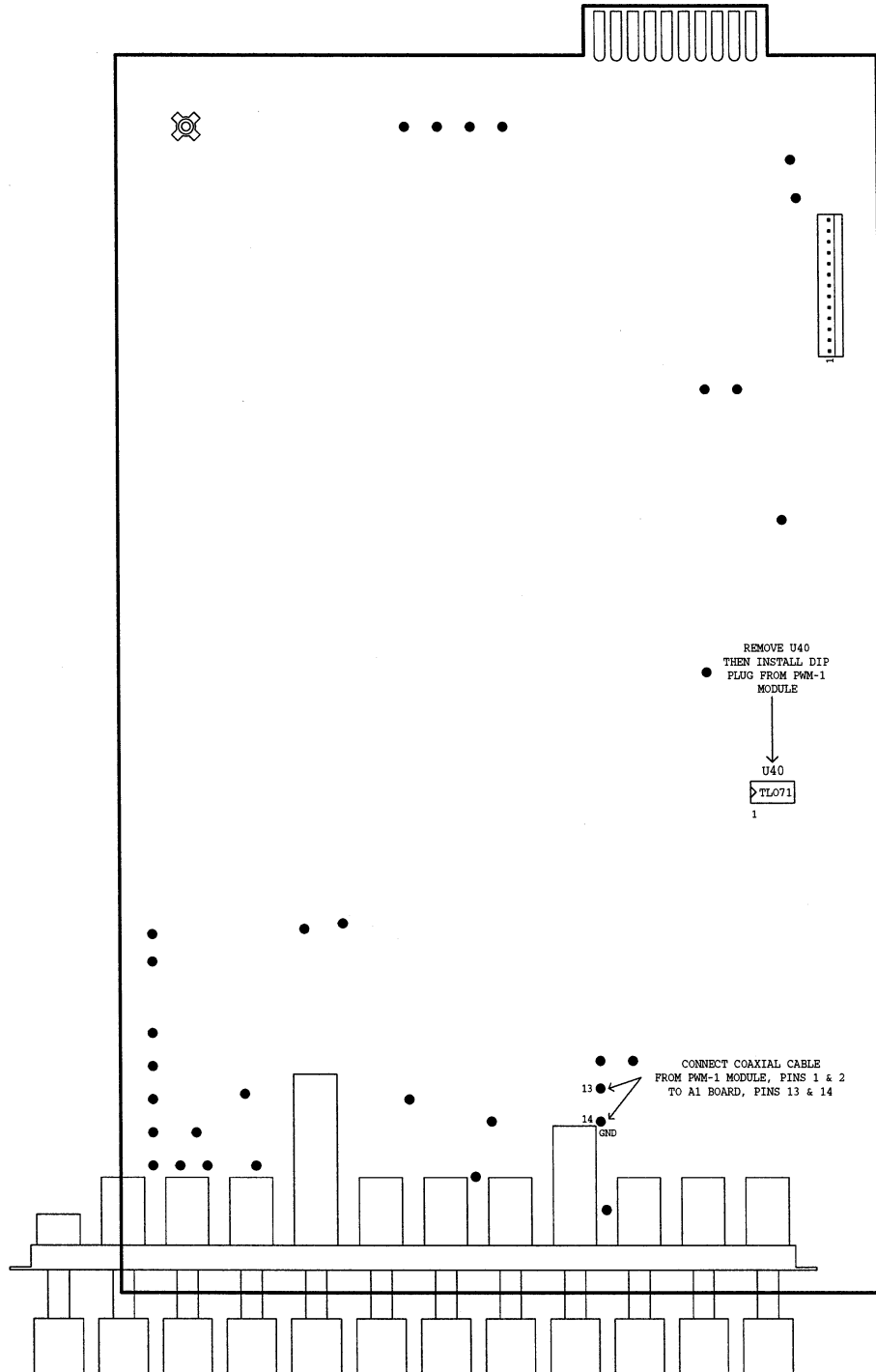
NOTE: The gain of the PWM-1 is factory set and installation of the module should not require any field adjustments. The following steps are included for the user who wishes to verify the PWM-1 module gain after installation.

- 21 Depress the TVM-100 "CAL" and "PEAK" pushbuttons. Set the PWM-1 switch to the "BYPASS" position. Plug the TVM-100 line cord in and allow unit to warm up for about 15 minutes.
- 22 Increase the thumbwheel setting on the TVM-100 front panel until the "PEAK MOD" LED goes out. Decrease the thumbwheel setting until the LED just comes on. Make a note of the thumbwheel position.
- 23 Move the PWM-1 switch to the "3 CYCLES" position. Again, rotate the thumbwheel setting on the TVM-100 until the "PEAK MOD" LED just comes on. This point should be the same as in the "BYPASS" position. If not, remove the cover and carefully rotate it to gain access to the PWM-1 module gain adjustment pot.

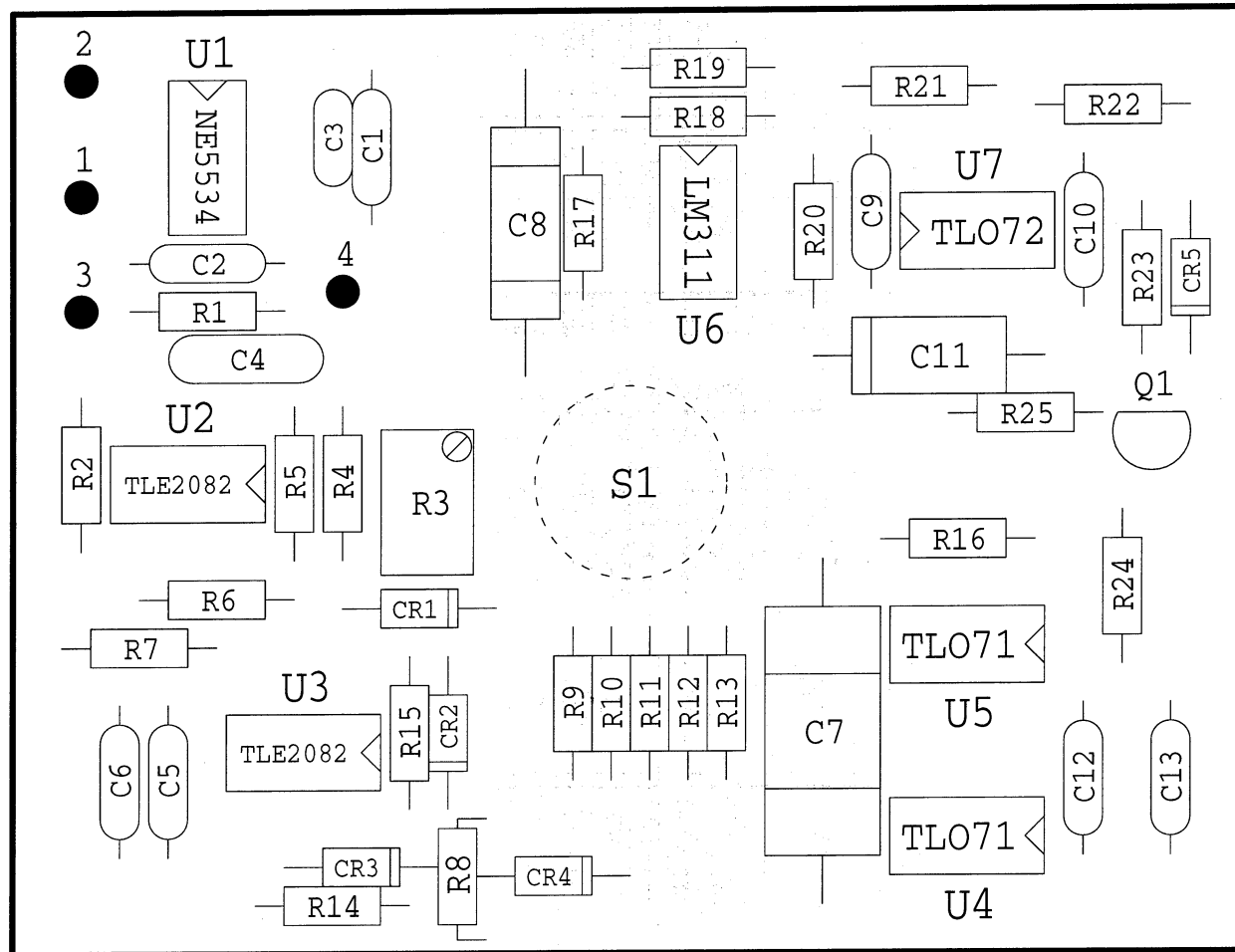
- 24 With the PWM-1 still in the "3 CYCLES" position, set the TVM-100 thumbwheel to the same position you noted in step 22. Adjust R3 on the module until the LED is off, then reverse the adjustment rotation until the LED just comes on and stays on. When the adjustment has been properly made, the "PEAK MOD" LED should come on at the same thumbwheel position in both the "BYPASS" and "3 CYCLES" positions of the PWM-1. When the adjustment is complete, unplug the TVM-100 line cord and install the cover using all the mounting screws.
- 25 Reinstall the TVM-100, and reconnect all cords. This completes the module installation.



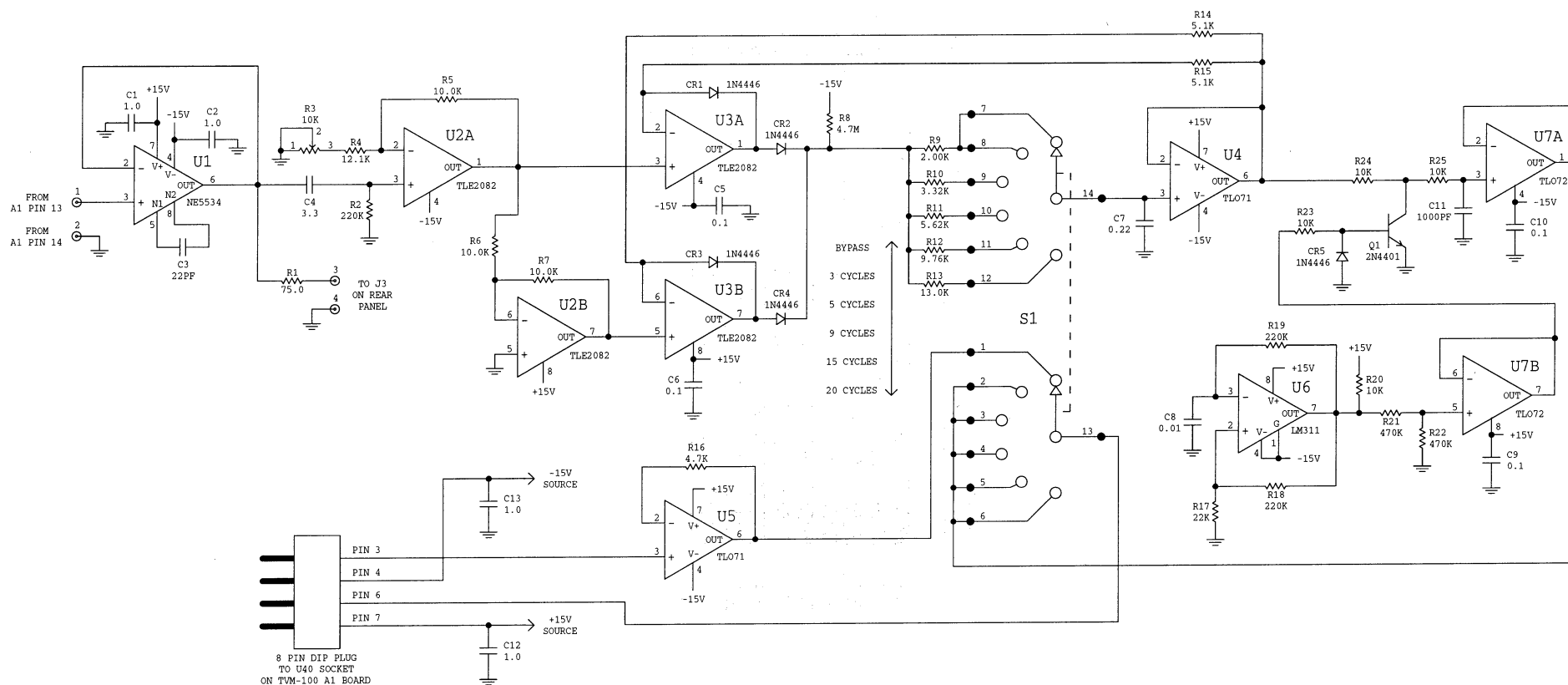
TVM-100 CHASSIS REAR VIEW  
WITH PWM-1 INSTALLED



PWM-1 MODULE TO TVM-100/101 A1 BOARD  
CONNECTION POINTS  
BELAR ELECTRONICS



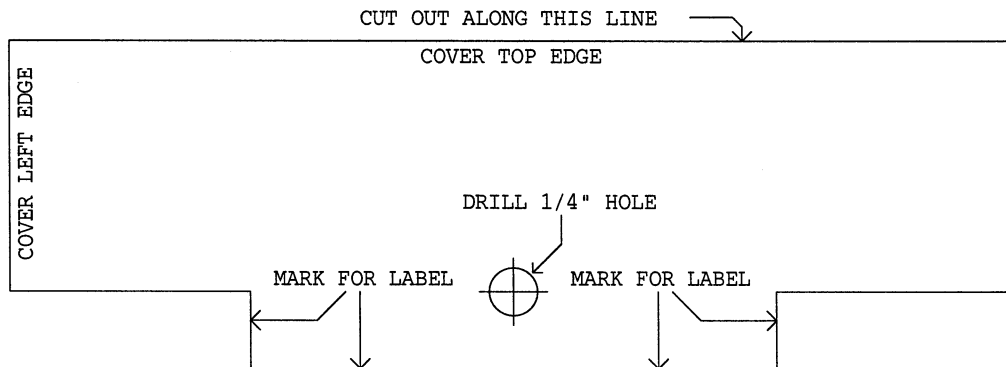
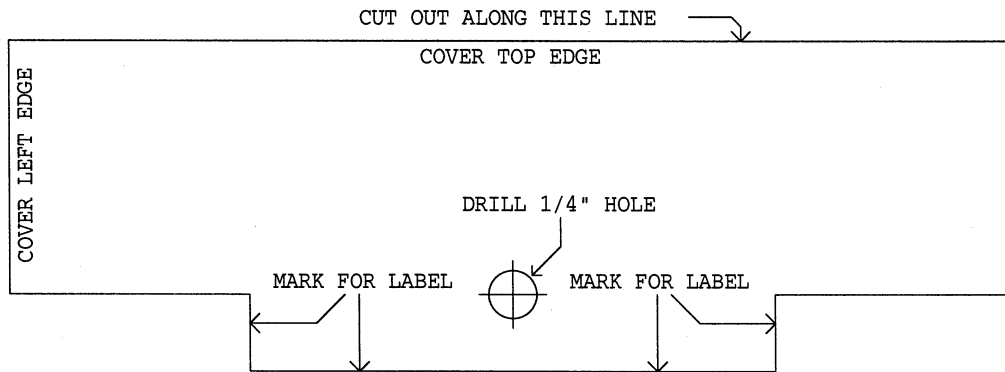
TVM-100 PWM-1 BOARD  
COMPONENT LAYOUT  
BELAR ELECTRONICS



TVM-100 PWM-1  
 PEAK WEIGHTING BOARD  
 BELAR ELECTRONICS  
 9-3-03

PWM-1 BOARD TVM-100

| Reference<br>Designation | Description                     | Part Number |
|--------------------------|---------------------------------|-------------|
| C1,C2                    | C: FIXED CERAMIC 1.0uF 50V      | 0151-0008   |
| C3                       | C: FIXED MICA 22pF 5%           | 0142-2205   |
| C4                       | C: FIXED CERAMIC 3.3uF 50V      | 0151-0011   |
| C5,C6                    | C: FIXED CERAMIC 0.1uF 50V      | 0151-0006   |
| C7                       | C: FIXED FILM 0.22 uF 10% 80V   | 0120-2241   |
| C8                       | C: FIXED FILM 0.01 uF 10% 200V  | 0120-1031   |
| C9,C10                   | C: FIXED CERAMIC 0.1uF 50V      | 0151-0006   |
| C11                      | C: FIXED POLY 1000pF 2.5% 160V  | 0130-1022   |
| C12,C13                  | C: FIXED CERAMIC 1.0uF 50V      | 0151-0008   |
| CR1 thru CR5             | DIODE: 1N4446                   | 1900-0002   |
| Q1                       | TRANSISTOR: 2N4401              | 1850-0028   |
| R1                       | R: METAL FILM 75.0 1%           | 0721-75R0   |
| R2                       | R: METAL FILM 220k 2%           | 0751-2242   |
| R3                       | R: VAR COMP 10k, 10 TURN        | 2100-0024   |
| R4                       | R: METAL FILM 12.1k 1%          | 0721-1212   |
| R5 thru R7               | R: METAL FILM 10.0k 1%          | 0721-1002   |
| R8                       | R: FIXED CARBON 4.7M 5% 1/4W    | 0683-4755   |
| R9                       | R: METAL FILM 2.00k 1%          | 0721-2001   |
| R10                      | R: METAL FILM 3.32k 1%          | 0721-3321   |
| R11                      | R: METAL FILM 5.62k 1%          | 0721-5621   |
| R12                      | R: METAL FILM 9.76k 1%          | 0721-9761   |
| R13                      | R: METAL FILM 13.0k 1%          | 0721-1302   |
| R14,R15                  | R: METAL FILM 5.1k 2%           | 0751-5122   |
| R16                      | R: METAL FILM 4.7k 2%           | 0751-4722   |
| R17                      | R: METAL FILM 22k 2%            | 0751-2232   |
| R18,R19                  | R: METAL FILM 220k 2%           | 0751-2242   |
| R20                      | R: METAL FILM 10k 2%            | 0751-1032   |
| R21,R22                  | R: METAL FILM 470k 2%           | 0751-4742   |
| R23 thru R25             | R: METAL FILM 10k 2%            | 0751-1032   |
| S1                       | SWITCH: ROTARY - 2 POLE, 6 POS. | 3100-0003   |
| --                       | KNOB: 0F3B                      | 0370-0005   |
| U1                       | IC: NE5534                      | 1826-0025   |
| U2,U3                    | IC: TLE2082                     | 1826-0069   |
| U4,U5                    | IC: TLO71                       | 1826-0004   |
| U6                       | IC: LM311                       | 1826-0009   |
| U7                       | IC: TLO72                       | 1826-0038   |



TVM-100 PWM-1 MOUNTING TEMPLATE  
BELAR ELECTRONICS