

**RYCOM INSTRUMENTS INC.**  
9351 East 59th Street  
Raytown, Missouri 64133

**OPERATION MANUAL**  
**6041**  
**SELECTIVE LEVEL METER**

Serial No. \_\_\_\_\_

Manual Part No. 030 00036 00

# MODEL 6041 FREQUENCY SELECTIVE LEVEL METER

## WARRANTY

This instrument is under warranty for one year from date of delivery against defects in material and workmanship (EXCEPTION — BATTERY). We will repair or replace products that prove to be defective during the warranty period. No other warranty is expressed or implied. We are not liable for consequential damages.

## FACTORY SERVICE

The Rycom Model 6041 was designed for dependable operation with recommended annual adjustment and calibration. If, however, your 6041 is not working properly, return it to the factory for repair. We recommend that the 6041 be returned in the original containers in which it was received. See RE-PACKAGING instructions CHAPTER 3, section 3.6.

Rycom Instruments, Inc.  
9351 E. 59th Street  
Raytown, Missouri 64133 U.S.A.  
Telephone: 800-851-7347 or 816-353-2100  
TWX: 910-771-2182  
Answbk: "Rycominstr"

Normally, we will repair and ship back any instrument within 10 days, unless the instrument is unrepairable. In this case, we will advise you.

If you need information, call the Rycom Factory Repair Department at 816-353-2100. If you return your 6041 for service or repair, be sure to include the following information:

1. Name and address of owner.
2. Brief description of symptoms or trouble.

## WARNINGS, SAFETY PRECAUTIONS AND IMPORTANT NOTES

The user should become familiar with the following warnings, cautions and important notes prior to using this instrument. Rycom Instruments Inc. assumes no liability for the user's failure to comply with any of the listed recommendations for the safe operation of the instrument.

### WARNING

#### INSTRUMENT GROUNDING

1. This instrument is equipped with a three-conductor a.c. power cable. To minimize shock hazard, the power cable must be connected to a power outlet providing a protective (earth) ground connection. An extension cord providing only a two wire connection **must not** be employed with this instrument. The power plug ground terminal **must not** be removed.
2. All devices connected to this instrument should be suitably connected to a protective (earth) ground to minimize shock hazard.

### WARNING

#### LIVE CIRCUITS

Dangerous voltages capable of causing death are present within this instrument. Disconnect the power cord from the instrument before removing the instrument cover. Only qualified maintenance personnel should remove the covers and/or attempt to make adjustments or component replacements in this instrument. Another person capable of rendering first aid or resuscitation should be present during any service procedure.

### WARNING

#### PARTS SUBSTITUTION

To prevent the introduction of safety hazards, unauthorized substitutions of parts or circuit modifications to this instrument should **not** be permitted. Return the unit to Rycom Instruments Inc. for service and repair to ensure that the safety features are maintained.

### CAUTION

Any d.c. voltage applied across the "BAL" Input connectors will store an electrical charge on the input coupling capacitors. If a d.c. voltage in excess of 50 volts is removed from the input connectors, it is advisable to short out the input connectors to discharge the capacitors. This will avoid a possible mild electric shock in the event that these input connectors are accidentally touched before the capacitors have discharged.

### NOTE

The lead acid starved electrolyte battery employed in this unit is sealed and classified as "dry" under International Air Transport Association Restricted Articles Regulation #210. The battery is not subject to Federal hazardous material regulations and is not considered to be a restricted article by the Civil Aviation Authority and the U.S. Department of Transportation. Local governments, however, may have created regional ordinances relating to the disposal of batteries. It is, therefore, suggested that a check be made with local authorities before disposal of batteries is made by normal means. In the event that difficulty is experienced, defective batteries may be returned to Rycom for disposal.

The battery employed with this unit may be stored for up to three years at room temperature. The battery cycle life ranges from 200 cycles of 100% discharge to 2000 cycles of 25% discharge.

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# CHAPTER 1

## GENERAL INFORMATION

### 1.0 INTRODUCTION

This Operation Manual describes the 6041 Selective/Wide Band Level Meter and Frequency Counter (SLM). Included are applications, information on how to use and maintain this equipment, together with abbreviated technical specifications, electrical features and mechanical features. For additional information, refer to the 6041 Selective Level Meter INSTRUCTION MANUAL, Part No. 030 00034 00.

### 1.1 APPLICATION OF THE INSTRUMENT

The 6041 SLM is a portable field or bench instrument designed to make precision measurements of both level and frequency on frequency division multiplex (FDM) equipment baseband signals. Although its primary application was intended to be on high-density long-haul microwave systems, the 6041 SLM may be employed on any communications equipment requiring selective/wide band level or frequency measurements.

### 1.2 ELECTRICAL FEATURES

The key electrical features of the 6041 SLM are as follows:

- Level Accuracy —  $\pm 0.2$  dB
- Auto Level Ranging
- AFC Tuning in the Selective Frequency Mode
- Precision Frequency Counter
- Analog Tuning Meter
- Level Out
- LCD Digital Displays
- Field Operation

### 1.3 MECHANICAL FEATURES

The key mechanical features of the 6041 SLM are as follows:

- Field Portable
- Die Cast Aluminum Front Panel
- Aluminum Chassis, Case and Cover

### 1.4 TECHNICAL SPECIFICATION SUMMARY

The following is a partial listing of the 6041 specifications which are pertinent to the immediate operation of this instrument. Refer to the 6041 Selective Level Meter INSTRUCTION MANUAL, Part No. 030 00034 00, for a complete listing of the 6041 specifications.

Parameters shown in the following 6041 Selective/Wide Band Level Meter specification summary as being "typical", "nominal" or "approximate" are provided only as non-warranted supplemental information having possible value in the application of the instrument.

**ABBREVIATED TECHNICAL SPECIFICATION**  
**6041 SELECTIVE/WIDE BAND LEVEL METER & FREQUENCY COUNTER**  
 (For complete Technical Specifications,  
 see 6041 Instruction Manual No. 030 00034 00)

**FREQUENCY**

Range:

Impedance	Bandwidth (Hz)			WIDE BAND Level Meter & Frequency Counter
	50	100	3,100 or C Msg. Equiv.	
50Ω, 75Ω	300 Hz to 3.5 MHz	400 Hz to 3.5 MHz	12 kHz to 3.5 MHz	300 Hz to 3.5 MHz
124Ω, 135Ω 150Ω	4 kHz to 2.0 MHz		12 kHz to 2.0 MHz	4 kHz to 2.0 MHz
600Ω	300 Hz to 100 kHz	400 Hz to 100 kHz	12 kHz to 100 kHz	300 Hz to 100 kHz

Certain impedance settings are usable over wider but non-guaranteed frequency ranges.

**Signal/Frequency**

Counter Accuracy:

$\pm 4 \times 10^{-7}$  ( $\pm 0.4$  PPM) or  $\pm$ LSD whichever is greater after 3 minute warm-up.

**Resolution:**

Selectable:-

10 Hz with fast update, signal count and center passband  
 1 Hz with 2 second update, signal count only

**Automatic Frequency**

Control (AFC):

AFC phase locked to internal precision reference oscillator  
 Selectable ON/OFF.

**LEVEL (1)**

Range:

Selective Level Meter:-

-99.9 dBm to 20.9 dBm. 0.1 dB resolution

Wideband Level Meter:-

-59.9 dBm to 20.9 dBm. 0.1 dB resolution

Frequency Counter:-

500  $\mu$  V to 2.4 V rms in 50 ohm, bridging mode

dBm Reference Impedance:

Selectable, 50Ω, 75Ω, 124Ω, 135Ω, 150Ω, 600Ω

Ranging:

Automatic (AUTO RANGE) or manual in eleven 10 dB steps  
 (seven 10 dB steps wide band level meter)

ACCURACY, Frequency Dependent

Impedance (2)	FREQUENCY RANGE (kHz)			
	SELECTIVE Level Meter		WIDE BAND Level Meter	
	0.3 to 3,250	3,250 to 3,500	0.3 to 3,250	3,250 to 3,500
75Ω Unbal Terminated	±0.2 dB	+0.0 dB -0.5 dB	±0.2 dB	+0.0 dB -0.5 dB
50Ω, 124Ω 135Ω, 150Ω, 600Ω, Unbal Terminated	Typically, Same as Above		Typically, Same as Above	

Referred to -30 dBm, CAL RANGE, AFC (ON) at 23°C for Bal. Terminated typically add ±0.1 dB above 1 kHz and ±0.2 below 1 kHz

ACCURACY, Range Dependent

Impedance (2)	LEVEL RANGE (dBm)				
	SELECTIVE Level Meter			WIDE BAND Level Meter	
	-99.9 to -90	-89.9 to 0	0 to +20.9	-59.9 to -50	-49.9 to +20
75Ω Unbal Terminated	±1.0 dB	±0.2 dB	±0.3 dB	±0.6 dB	±0.2 dB
50Ω, 124Ω, 135Ω, 150Ω Unbal Terminated	Typically, Same as Above			Typically, Same as Above	
124Ω Bal Terminated	±1.0 dB	±0.3 dB	±0.4 dB	±0.7 dB	±0.3 dB
50Ω, 75Ω, 135Ω, 150Ω Bal Terminated Typical	Typically, Same as Above			Typically, Same as Above	
600Ω Bal Terminated*	Typical ±1.2 dB	Typical ±0.5 dB	Typical ±0.6 dB	Typical ±0.85 dB	Typical ±0.45 dB
Referred to 250 kHz measured at RANGE Maximum levels, AFC (ON) at 23°C					

\*600 Ω measurement referred to 50 kHz

Note 1: Level measurement accuracy measured after a warm-up period of 30 minutes and after level calibration, unless otherwise noted.

Note 2: With precision terminations, accuracy of bridging measurements, including 50 ohm, is typically the same as terminated measurements.

## ACCURACY,

Temperature Dependent:	See 6041 Instruction Manual
Analog Peaking Indicator:	
Range:-	Switchable, typically 20 dB without set point and 4 dB FSD with manual 0 dB set point adjustment
Resolution:-	Nominally, 1 dB in 20 dB range and 0.2 dB in 4 dB range
Input Over-Range Indicator:	Red flashing LED indicator reports over-range signal inputs. Level display is simultaneously blanked
Input Under-Range Indicator:	Amber flashing LED indicator reports under-range signal inputs which may cause measurement errors
Maximum Input:	
Unbalanced port:-	d.c. coupled, +30 dBm bridging or terminated
Balanced ports:-	a.c. coupled, +30 dBm bridging or terminated $\pm 200$ V (d.c. plus peak a.c.)
Wide Band Mode Indicator:	Green LED indicator reports valid Level Range Selection (-40 to +20 dBm) in Wide Band Mode only

**WARM-UP CHARACTERISTICS** See 6041 Instruction Manual

## LEVEL CALIBRATION REFERENCE

Calibration Level: -30.0 dBm  $\pm 0.25$  dB at 23°C  
Frequency: 250 kHz  $\pm 30$  Hz

## SELECTIVITY

Wide Band Filter:  
  3100 Hz nominal:- 3100 Hz  $\pm 10\%$  at -3 dB points  
Narrow Band Filter:  
  50 Hz nominal:- 50 Hz  $\pm 10\%$  at -3 dB points

## INPUT

Impedance: Terminated — 50 $\Omega$ , 75 $\Omega$ , 124 $\Omega$ , 135 $\Omega$ , 600 $\Omega$   
Bridging — 50 $\Omega$ , 75 $\Omega$ , 124 $\Omega$ , 135 $\Omega$ , 150 $\Omega$ , 600 $\Omega$   
Typically 5 k $\Omega$  shunted by 55 pF  
Automatic level correction with impedance selected  
Automatic compensation of bridging errors

## Connectors:

Unbalanced:- BNC female nom. 75 $\Omega$   
Balanced:- Banana jack nom. 600 $\Omega$

## OTHER PARAMETERS

### INTRINSIC DISTORTION

Noise Power Ratio (NPR)

(Equivalent 600

channel system, 75 $\Omega$

Unbalanced):

$\geq 55$  dB for 40 dB increase in sensitivity measured in any band-stopped slot in band

### DEMODULATOR

#### OUTPUTS

Loudspeaker

(Internal):

External Audio

Output:

Recorder Output:

AM, USB, LSB

Output greater than 50 milliwatts, adjustable level

$\geq 10$  dBm into 600  $\Omega$  load 5% THD, adjustable level

Linear dB scaled output, +4.0 VDC output at range ref. level 0.0 VDC at 20 dB below range ref. level 2 k $\Omega$  source impedance

## POWER REQUIREMENTS

AC Supply:

Battery Operation:

Battery Capacity:

115 VAC  $\pm 10\%$ , 50-60 Hz for operation and/or battery charging

Internal rechargeable battery

Approximately 8 hour normal operation. 6 hour low battery protection cut-off typical

3 hour nominal operation below 5°C. A discharged battery will recharge overnight

Battery Discharge

Protection:

25 minutes LO BAT. advance warning on LCD display. Low voltage battery shut-off after time-out with manual reset

Auxiliary Power

(AUX+12V):

12.6 VDC minimum, 2.5 amp maximum to 0.080 in. front panel tip jack

## MISCELLANEOUS

### TEMPERATURE RANGE

Operate:

-10°C to +55°C

Storage:

-40°C to +85°C

## NOTES

## CHAPTER 2 OPERATING INSTRUCTIONS

### 2.0 RECEIVING INFORMATION

When the 6041 is received, unpack it and thoroughly inspect it for any damage. Refer to TABLE 2-1, for a listing of standard items supplied with the 6041. Check the equipment received against your purchase order to identify any option, special characteristics or other equipment which may have been ordered but not listed in this table. Save the shipping carton, to facilitate return to the factory should the need arise.

DESCRIPTION	RYCOM NO.	QTY/ ASSY	MFR CODE	MFR PART NUMBER
*6041, 50/3100 HZ, 115 VAC	001 00077 00	1	18410	001 00077 00
Power Cord	151 00025 00	1	82389	P-2392
6041 Instruction Manual	030 00034 00	1	18410	030 00034 00
6041 Operation Manual	030 00036 00	1	18410	030 00036 00

**Table 2-1. STANDARD 6041 SUPPLIED ITEMS**

\*Other Models Available

To verify that the 6041 is in good working condition, follow the procedures outlined in section 2.2 OPERATING THE 6041.

If the 6041 is damaged or fails to operate properly, refer to Chapter 3, MAINTENANCE, for information on how to return the unit to the factory.

### 2.1 FRONT PANEL CONTROLS, INDICATORS AND CONNECTORS

A locator diagram and brief description of the front panel controls, indicators and connectors is shown in FIGURE 2-1 and TABLE 2-2. For additional information, refer to Chapter 2 of the 6041 Selective Level Meter INSTRUCTION MANUAL.

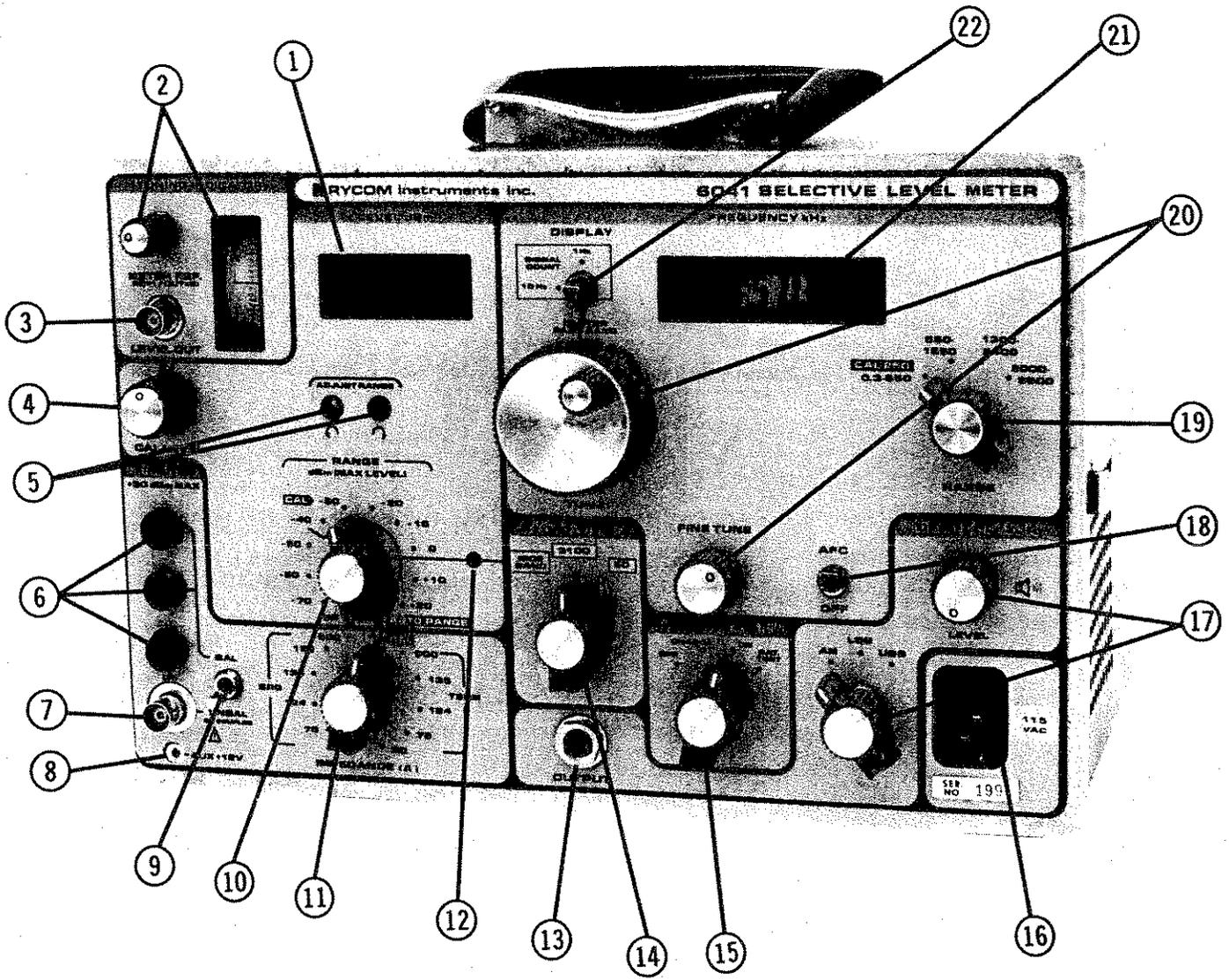


FIGURE 2-1 FRONT PANEL CONTROLS, INDICATORS AND CONNECTORS

**TABLE 2-2. FRONT PANEL Controls, Indicators and Connectors**

FIG. 2-1 ITEM NO.	NAME	FUNCTION
1.	"LEVEL dBm" Display	Digitally indicates input signal levels in dBm with 0.1 dB resolution.
2.	"TUNING INDICATOR" Display and Control	Indicates relative input levels with selectable 4 or 20 dB full-scale resolution. Also indicates battery condition
3.	"LEVEL OUT" BNC Connector	Linear dB scaled dc level output for long-term signal level measurements
4.	"CAL LEVEL" Control	User calibration adjustment using 6041 internal calibration reference level
5.	"ADJUST RANGE" Indicators	Indicate direction to turn the "RANGE dBm (MAX LEVEL)" control for best measurement accuracy
6.	"BAL" Input Connectors	Balanced Input banana style connectors
<p><b>CAUTION</b> Read warning note on page i regarding d.c. voltages on the "Bal" Input Connectors</p>		
7.	"UNBAL" Input Connector	Unbalanced Input BNC style connector
8.	"AUX +12V" Connector	Allows an external 12 Vdc power source for 6041 or allows 6041 to supply power to an external adapter
9.	"BAL/UNBAL" Switch	Allows user selection of BAL or UNBAL input connectors
10.	"RANGE dBm (MAX LEVEL)" Control	Adjusts 6041 level sensitivity in 10 dB steps or selects AUTO RANGE position
11.	"IMPEDANCE ( $\Omega$ )" Switch	Selects input impedance in Bridging or Termination modes
12.	"WIDE BAND" Indicator	Indicates valid WIDE BAND "RANGE dBm (MAX LEVEL)" control positions
13.	"OUTPUT" Audio Connector	Supplies audio output to headset
14.	"SELECTIVITY Hz" Switch	Selects WIDEBAND or 3100 and 50 Hz frequency selective modes
15.	"POWER" Switch	Selects power off, battery charge, 6041 on or battery test
16.	"115 VAC or 230 VAC" Connector	The line cords mates with this connector for AC operation of the 6041
17.	"DEMODULATOR LEVEL" Control and Switch	Selects AM or SSB (single sideband) (upper or lower) detection in 3100 or 50 Hz selectivity mode

**TABLE 2-2. FRONT PANEL Controls, Indicators and Connectors (cont.)**

FIG. 2-1 ITEM NO.	NAME	FUNCTION
18.	"AFC (Automatic Frequency Control)" Switch	Automatically frequency locks the input signal in 3100 or 50 Hz selectivity modes for consistent level readings
19.	"RANGE" Switch	Selects active band of frequencies that can be tuned in the 3100 or 50 Hz selective modes
20.	"TUNE/FINE TUNE" Controls	Provides coarse and fine frequency tuning in the 3100 or 50 Hz selectivity modes
21.	"FREQUENCY kHz" Display	Digitally indicates the input signal frequency
22.	"DISPLAY" Switch	Selects the 1 Hz or 10 Hz resolution signal count modes or the center pass band (OFF in wide band) mode

## 2.2 OPERATING THE 6041

**CAUTION**  
Read the warning notes on page i  
before performing any  
operations in this section.

For battery operation of the 6041, remove the a.c. power line cord from the a.c. power connector on the 6041 front panel and store it in the lid compartment.

For a.c. power operation of the 6041, remove the a.c. power line cord from the 6041 lid compartment and insert the cord into the a.c. power connector shown in FIGURE 2-1, item 16. Be sure that you power the 6041 from the correct a.c. voltage as shown on the factory label located just to the right of the 6041 a.c. power connector. Otherwise, internal damage to the 6041 could result.

Turn the "POWER SWITCH" to the "BAT. TEST" position and observe the "TUNING INDICATOR" meter. A properly charged battery will read in the BAT. OK area of the meter or slightly above. When the battery is undercharged, the 6041 may be operated from an a.c. power source. However, it is advisable to recharge an undercharged battery before attempting battery operation of the unit. To recharge the battery, connect the a.c. power line cord as described above and turn the "POWER" switch to the "CHARGE" position. A full charge for a maximum of 16 hours is required for a good battery. Refer to Chapter 3, MAINTENANCE for procedures on battery removal and replacement.

The procedures for making basic types of measurements with the 6041 are outlined in Tables 2-3, 2-4, 2-5, and 2-6. These procedures assume that the 6041 is properly set up for a.c. or battery operation and is ready to turn "ON".

A 600 ohm dBm to Voltage Conversion Table is located on the inside of the 6041 lid compartment.

**TABLE 2-3 SELECTIVE LEVEL MEASUREMENT OF A KNOWN SIGNAL**

STEP	PROCEDURE
<b>TURN-ON PROCEDURE</b>	
1.	Turn "POWER" switch to "ON". Let the 6041 warm up for 3 minutes.
<b>CALIBRATION PROCEDURE</b>	
2.	Turn "SELECTIVITY Hz" switch to 3100, (C-MSG option) or 50, (100 option), depending upon which filter will be used for the final signal measurement.
3.	Turn "RANGE dBm (MAX LEVEL)" switch to "CAL -30".
4.	Turn "IMPEDANCE ( $\Omega$ )" switch to "CAL".
5.	Turn frequency kHz "RANGE" switch to "CAL 250, 0.3-650".
6.	Flip "AFC" switch to "AFC".
7.	Flip "DISPLAY" switch to "SIGNAL COUNT 10 Hz".
8.	Adjust "TUNE" and "FINE TUNE" knobs toward a frequency display reading of $0250.00 \pm 0.04$ kHz; 6041 will lock onto signal, and frequency display will show that signal is locked by displaying SIGNAL COUNT, AFC, and the actual CAL oscillator frequency.
9.	Adjust "CAL LEVEL" knob for a -30.0 dBm reading on "LEVEL dBm" display.
<b>MEASUREMENT PROCEDURE</b>	
10.	Turn "IMPEDANCE ( $\Omega$ )" switch to characteristic impedance of circuit to be tested in either the bridging "BRG" or terminating "TERM" mode.
11.	Flip "BAL UNBAL" switch to input connector mode required to measure test point of circuit.
12.	Connect 6041 to test point of circuit using selected "BAL" or "UNBAL" input connector with appropriate test cables.
13.	Turn "RANGE dBm (MAX LEVEL)" switch to range of expected signal level, or to "AUTO RANGE" for automatic range selection.
14.	Turn frequency kHz "RANGE" switch to band of frequencies required to tune known input signal.
15.	Flip "DISPLAY" switch to "CENTER PASS BAND".
16.	Flip "AFC" switch to "OFF".
17.	Adjust "TUNE" and "FINE TUNE" knobs to desired input frequency.
18.	Flip "AFC" switch to "AFC" to capture signal.
19.	Readjust "RANGE dBm (MAX LEVEL)" switch to proper range as required. Use blinking "ADJUST RANGE" indicators as a guide.
20.	Read the input level and frequency from the "LEVEL dBm" and "FREQUENCY kHz" displays. If 1 Hz resolution is desired on the frequency reading, flip "DISPLAY" switch to "SIGNAL COUNT 1 Hz" position.
21.	If audio output is required, turn "DEMODULATOR" switch to desired position and adjust "LEVEL" control for desired listening level. Plug headset into the "DEMODULATOR OUTPUT" connector as required.

**TABLE 2-4 SELECTIVE LEVEL MEASUREMENT OF AN UNKNOWN SIGNAL**

STEP	PROCEDURE
1.	Repeat steps 1 through 12 in Table 2-3.
2.	Turn "RANGE dBm (MAX LEVEL)" switch to "AUTO RANGE".
3.	Adjust "DEMODULATOR LEVEL" control volume to desired level.
4.	Turn "DEMODULATOR" switch to desired type of demodulation.
5.	Flip "AFC" switch to "AFC".
6.	Flip "DISPLAY" switch to "CENTER PASS BAND".
7.	Turn frequency kHz "RANGE" switch to starting band of frequencies desired.
8.	Rotate "TUNE" knob to either end of tuning range. Slowly rotate "TUNE" knob through entire range until unknown signal is found. Use "FINE TUNE" knob as necessary. Otherwise change frequency kHz "RANGE" switch to another band and repeat step 8.
9.	If unknown signal is found, repeat steps 20 and 21 of Table 2-3. If unknown signal is not found, the test is completed.

**TABLE 2-5 WIDE BAND SIGNAL MEASUREMENT**

STEP	PROCEDURE
1.	Repeat step 1 of Table 2-3.
2.	Turn "SELECTIVITY Hz" switch to "WIDE BAND".
3.	Repeat steps 3, 4, 7, and 9 of Table 2-3.
4.	Repeat steps 10, 11, 12, 13, 19, and 20 of Table 2-3.
5.	If "FREQUENCY kHz" display reading is not stable, it is because of noise or multiple signals and is no cause for concern. Flip the "DISPLAY" switch to "CENTER PASS BAND" to turn off the frequency display, if desired.

**TABLE 2-6 FREQUENCY COUNTER**

STEP	PROCEDURE
1.	Repeat steps 1 and 2 of Table 2-5.
2.	Turn "RANGE dBm (MAX LEVEL)" switch to "AUTO RANGE".
3.	Turn "IMPEDANCE ( $\Omega$ )" switch to "50 ohm BRG".
4.	Repeat steps 7, 11 and 12 of table 2-3.
5.	Read the input signal frequency on the "FREQUENCY kHz" display. If 1 Hz resolution is desired, flip "DISPLAY" switch to "SIGNAL COUNT 1 Hz". If frequency display reading is not stable it is due to either multiple signals, noise, or too low a level amplitude of the input signal.

## CHAPTER 3 MAINTENANCE

### 3.0 GENERAL

This section of the Operation Manual covers simple maintenance work which may be performed by the 6041 operator paying due attention to the live circuit warning notice appearing here and in the front of this manual.

#### WARNING

Dangerous voltages capable of causing death are present within this instrument. Disconnect the power cord from the instrument before removing the case covers.

Maintenance of the 6041 unit, beyond that shown in this section, should only be performed by qualified maintenance personnel using information available in Chapters 8 through 12 of the 6041 Instruction Manual No. 030 00034 00. Alternatively, the instrument should be returned to Rycom Instruments Inc., Service Department, 9351 East 59th Street, Raytown, Missouri 64133, telephone (816) 353-2100 for service, maintenance and/or re-calibration. For re-packaging instructions refer to Section 3.6 in this chapter.

### 3.1 ROUTINE INSTRUMENT CHECKOUT

If the 6041 instrument has not been used for some period of time, the BATTERY TEST and CAL procedures referred to in Chapter 2 of this manual should be followed. If the battery is low or the "LOW BAT" signal flashes on the "LEVEL DISPLAY", the "POWER SWITCH" should be turned to the "CHARGE" position with the power cord connected and the battery charged overnight.

### 3.2 FUSE REPLACEMENT

The 6041 Selective Level Meter is provided with two protective fuses located in the power line primary circuit (MDL Slo Blo 3/8A) and the positive battery line (AGA2 2A) respectively. The power line fuse is located on the Power Supply Assembly A15 and the battery line fuse is located on the Power Supply Assembly A1. Both of these assemblies may be accessed for fuse replacement by the following procedure:

(a) The instrument cover is retained to the front panel casting by four screws located at the top and bottom edges. Remove these screws.

(b) Carefully withdraw the instrument from its case and place it on the work bench, top side down viewing the rear.

(c) Refer to the Bottom View of the chassis shown in Figure 3-2. Locate the fuse to be replaced. The primary power circuit fuse A15F1 is located in front of the A15 power transformer as shown and should be replaced by a MDL, Slo Blo 3/8 amp fuse. The positive battery line fuse A1F1 is located on the right hand side of the A1 power supply printed wiring board as shown and should be replaced by a type AGA2 2 amp fuse.

(d) After fuse replacement, the case cover should be replaced and secured by the four screws.

### 3.3 ELAPSED TIME INDICATOR REPLACEMENT

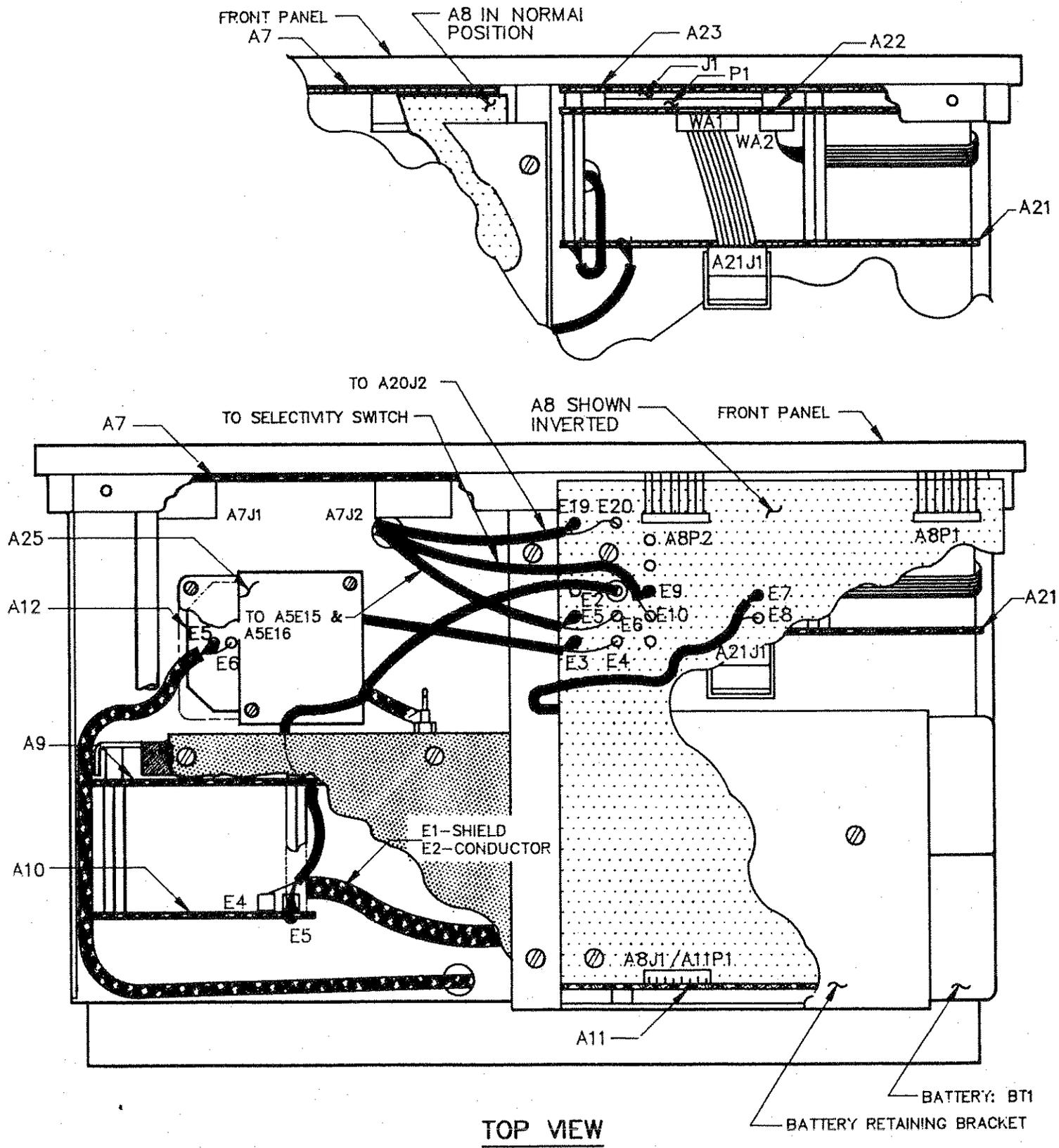
The Elapsed Time Indicator (ETI) AIM1 is an electrolytic fuse-like device which meters the length of time the unit has been turned on for normal operation. The ETI has a maximum reading of 5000 hours and should be replaced when this limit has been reached. Please note that this device is electrically non-reversible and must be replaced when the full scale limit has been reached if useful elapsed time monitoring is to continue. The replacement procedure is as follows:

- (a) Repeat steps (a) and (b) shown in 3.2 above.
- (b) Locate the ETI AIM1 identified in the bottom view of Figure 3-2.
- (c) Gently lever the device out of the fuse clips by inserting a non-metallic screwdriver under the ETI close to each clip in turn. Discard the old ETI and replace with a new one. Note that the wider end of the ETI should be located on the left hand side fuse clip as shown in the illustration.
- (d) After ETI replacement, the case cover should be replaced and secured by the four screws.

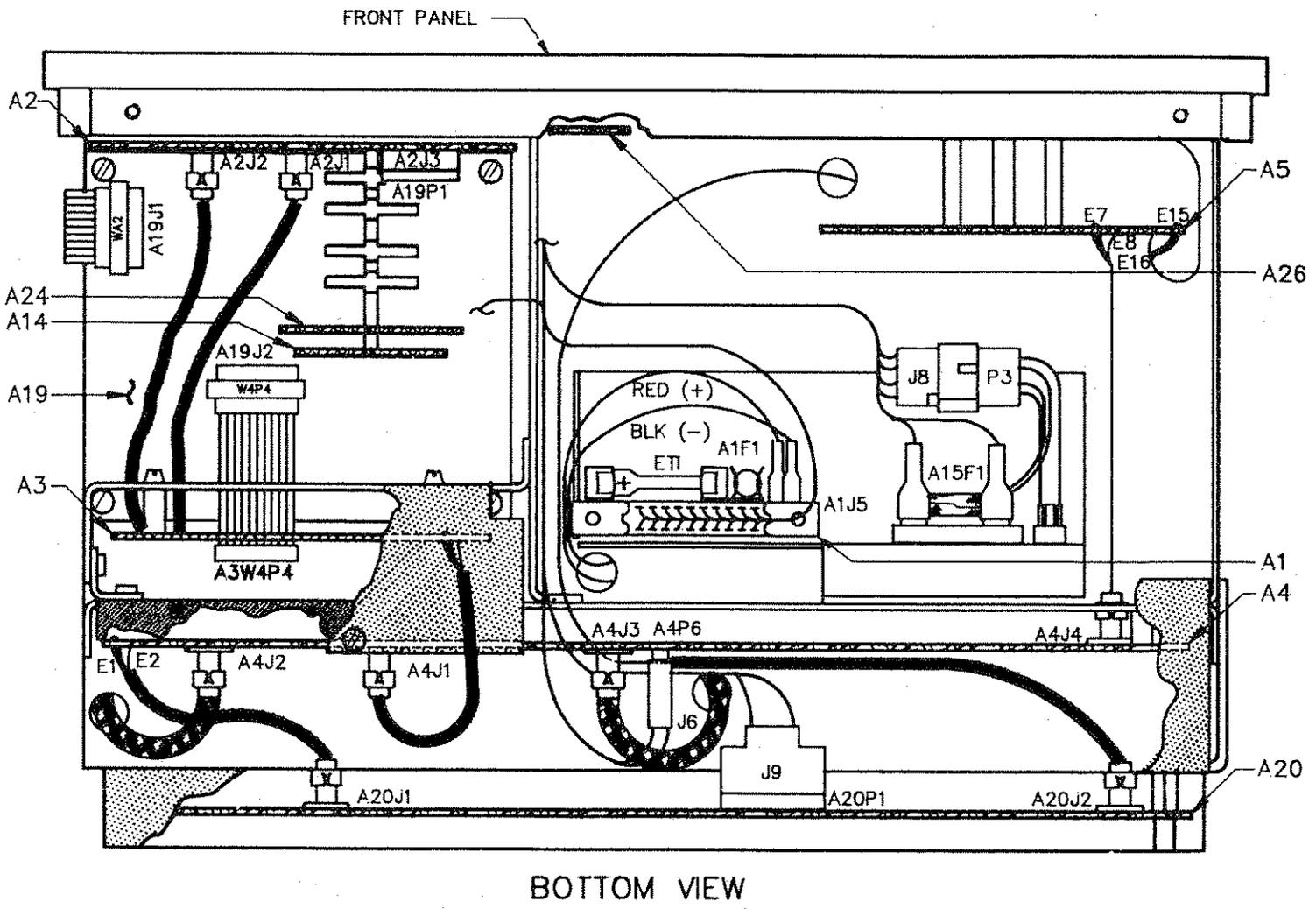
### 3.4 BATTERY REPLACEMENT

When it has been determined that the battery has inadequate capacity or other impaired performance, despite careful re-charging, it may be replaced by the following procedure:

- (a) Repeat step (a) shown in 3.2 above.
- (b) Carefully withdraw the instrument from its case and place it on the work bench bottom side down viewing the rear.
- (c) Locate the battery using the Top View of Figure 3-1.
- (d) Remove the two screws securing the battery hold-down bracket and remove this bracket.
- (e) Withdraw and support the battery to the left hand side of the instrument and remove the two female battery connectors. Discard the old battery (See the Note which appears in the front of this manual regarding battery disposal).
- (f) Install the new battery making sure that the red positive female connector is mated with the positive  $\oplus$  marked battery terminal and the black negative female connector is mated with the negative  $\ominus$  marked battery terminal.
- (g) Replace the battery hold-down bracket and mounting screws.
- (h) Replace the case cover and secure with the four screws.
- (i) After replacing the battery, select the "BAT TEST" position on the "POWER" switch and recharge the battery if the meter reading does not indicate in the OK zone.



**FIGURE 3-1 LOCATION OF INTERNAL FIELD REPLACEABLE COMPONENTS, CONNECTORS AND PRINTED WIRING BOARDS**



FUSES:  
 A1F1 AGA2 2 AMP  
 A15F1 - MDL 3/8 AMP  
 SLO BLO

**FIGURE 3-2 LOCATION OF INTERNAL FIELD REPLACEABLE COMPONENTS, CONNECTORS AND PRINTED WIRING BOARDS**

### 3.5 FIELD REPLACEABLE PARTS

The following table lists those common field replaceable parts which may be installed by the 6041 operator.

**TABLE 3-2 FIELD REPLACEABLE PARTS**

REF DES	DESCRIPTION	RYCOM NO.	QTY ASSY	MFR CODE	MFR PART NUMBER
BT1	Battery 12V Rechargeable	770 00017 00	1	57053	0809-0020
A15F1	Fuse, MDL, Slo-Blo, 3/8A	723 00006 00	1	75915	313.375
A1F1	Fuse, 2 Amp type AGA2	723 00002 00	1	75915	301.002
AIM1	Elapsed Time Indicator	741 00001 00	1	89597	T-000-4
—	Knob, round, blue, 0.72 O.D.	800 00009 01	3	18410	800 00009 01
—	Knob, round, blue, 0.5 O.D.	800 00027 00	1	18410	800 00027 00
—	Knob, Pointer, Blue, 1.23 O.D.	800 00028 00	6	18410	800 00028 00
—	Knob, Spinner, Blue, 1.75 O.D.	800 00030 00	1	18410	800 00030 00
—	Rubber Bumper 8-32 insert	802 00041 00	6	83330	2462
WA1	A.C. Power Cord W/Molded Plugs	151 00025 00	1	82389	P-2392

### 3.6 RE-PACKAGING

**Original Packaging** — If the original shipping cartons and packing material have been retained, it is recommended that the instrument be packed for shipment in the same manner as it was received. Make sure that the shipping containers are securely sealed. If the instrument is being returned to Rycom for repair, a suitable tag indicating the type of service required should be attached to the instrument case. The outside container should be marked "FRAGILE" to ensure careful handling.

**New Packaging** — The following general instructions should be followed for repackaging the instrument using commercially available materials:

(a) Use a single wall carton having a 275 lb. rating. The carton should provide approximately 3/4 inch space around 6 sides of the instrument.

(b) Use a layer of shock absorbing material such as 3/4 inch semi-rigid polyethelene foam around 5 sides of the instrument. Place the instrument in the box along with an attached tag indicating the type of service required and the return address. Place the remaining layer of shock absorbing material on top and seal the carton. Note that the shock absorbing material should tightly secure the instrument within the carton to prevent movement.

(c) Place the instrument in its shipping carton in a second double wall carton having a 275 lb. rating lined with 3/4 inch of the shock absorbing material on all sides. Note that the shock absorbing material should tightly secure the original carton on all sides to prevent movement.

(d) Seal the outside shipping carton securely with fiberglass reinforced adhesive tape.

(e) Mark the shipping carton "FRAGILE" to ensure careful handling.

(f) Affix shipping address labels to the carton in at least two places.

A4		A8		A9		A12		A21		A22	
TERM NO	WIRE COLOR	TERM NO	WIRE COLOR	TERM NO	WIRE COLOR						
E1	SHLD	E1	BLK	E3	YEL	E1	W/V	E1	SHLD	E1	W/V
E2	COND	E2	COND			E2	R/B	E2	COND	E2	R/BK
		E3	SHLD	A10		E3	SHLD	E3	BLK	TO POWER SW	
A5		E4	COND	TERM NO	WIRE COLOR	E4	COND	E4	R/W	E3	W/BL
TERM NO	WIRE COLOR	E5	SHLD	E1	SHLD	E5	SHLD	E5	SHLD	E4	R/BK
E1	NONE	E6	COND	E2	COND	E6	COND	E6	COND	TO A1J5	
E2	RED	E7	SHLD	E3	R/BK			E8	W/V	E5	R/BL
E3	R/BK	E8	COND	E4	COND	A19		E9	GRN	E6	R/W
E4	NONE	E9	SHLD	E5	SHLD	TERM NO	WIRE COLOR	TO HARNESS			
E5	NONE	E10	COND	E6	BLU	E1	BLK	E10	BLU	A25	
E6	NONE	E11	W/O			E2	R/B	E11	ORN	TERM NO	WIRE COLOR
E7	SHLD	E12	W/BL	A11		E3	W/S	E12	YEL	E1	RED
E8	COND	E13	BLK	TERM NO	WIRE COLOR	E4	VIO	E13	GRN	E2	YEL
E9	BLK	E14	RED	E1	W/G	E6	YEL	TO METER			
E10	GRN	E15	W/BL	E2	V/W	E7	W/Y	E14	RED	A26	
E11	W/G	E16	R/BL	E3	YEL	E8	GRN	TO METER		TERM NO	WIRE COLOR
E12	VIO	E17	R/W	E4	W/V			E15	V/W	E1	W/S
E13	W/V	E18	NONE			A19		E16	RED		
E14	NONE	E19	SHLD	A11		TERM NO	WIRE COLOR	TO METER REF			
E15	SHLD	E20	COND	E1	W/G	E1	W/G	E17	W/Y		
E16	COND	E21	NONE	E2	V/W	E2	V/W	E18	W/S		
		E22	W/Y	E3	YEL	E3	YEL	E19	ORN		
		E23	GRN	E4	W/V			E20	W/Y		
		E24	BLU					E21	W/R		
								E23	BL/W		
								E24	W/O		
								E25	W/BL		
								E26	BUS		
								E27	RED		
								TO CAL LEVEL			
								E28	BUS		
								E29	W/G		
								E30	VIO		

TABLE 3-1 LOCATION OF AMP CONNECTORS BY WIRE COLOR

## NOTES

## NOTES