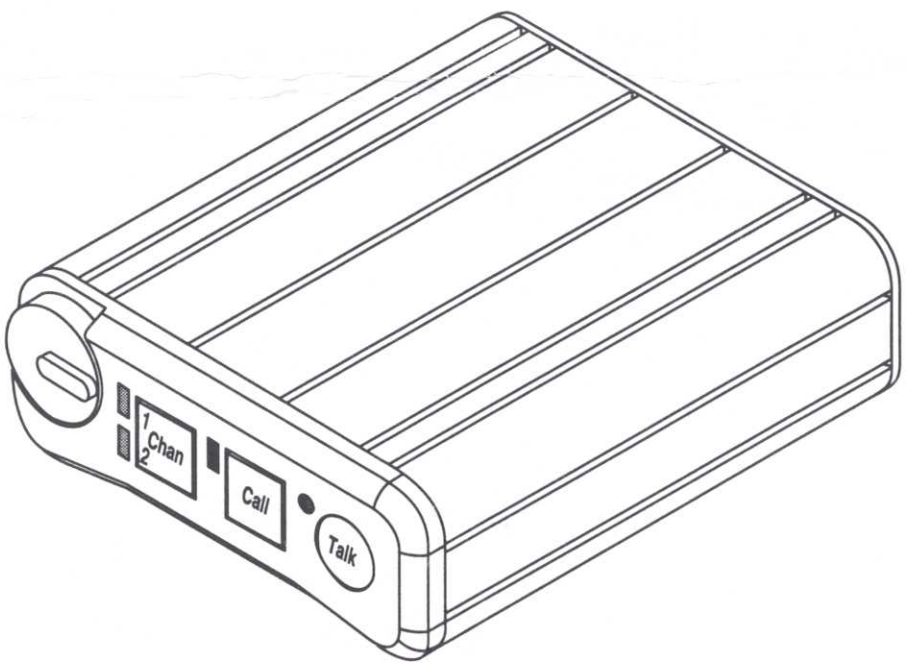
USER MANUAL

BP-350

Portable Programmable Two-Channel User Station



RTS™

9350-7487-000 Rev A 3/95

PROPRIETARY NOTICE

The RTS product information and design disclosed herein were originated by and are the property of Telex Communications, Inc. Telex reserves all patent, proprietary design, manufacturing, reproduction, use and sales rights thereto, and to any article disclosed therein, except to the extent rights are expressly granted to others.

COPYRIGHT NOTICE

UNPACKING AND INSPECTION

Immediately upon receipt of the equipment, inspect the shipping container and the contents carefully for any discrepancies or damage. Should there be any, notify the freight company and the dealer at once.

WARRANTY INFORMATION

RTS products are warranted by Telex Communications, Inc. to be free from defects in materials and workmanship for a period of three years from the date of sale.

The sole obligation of Telex during the warranty period is to provide, without charge, parts and labor necessary to remedy covered defects appearing in products returned prepaid to Telex. This warranty does not cover any defect, malfunction or failure caused beyond the control of Telex, including unreasonable or negligent operation, abuse, accident, failure to follow instructions in the Service Manual or the User Manual, defective or improper associated equipment, attempts at modification and repair not authorized by Telex, and shipping damage. Products with their serial numbers removed or effaced are not covered by this warranty.

To obtain warranty service, follow the procedures entitled "Procedure For Returns" and "Shipping to Manufacturer for Repair or Adjustment".

This warranty is the sole and exclusive express warranty given with respect to RTS products. It is the responsibility of the user to determine before purchase that this product is suitable for the user's intended purpose.

ANY AND ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY ARE LIMITED TO THE DURATION OF THIS EXPRESS LIMITED WARRANTY.

NEITHER TELEX NOR THE DEALER WHO SELLS RTS PRODUCTS IS LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND.

CUSTOMER SUPPORT

Technical questions should be directed to:

Customer Service Department
RTS/Telex,
2550 Hollywood Way, Suite 207
Burbank, CA 91505 U.S.A.
Telephone: (818) 566-6700
Fax: (818) 843-7953

RETURN SHIPPING INSTRUCTIONS

PROCEDURE FOR RETURNS

If a repair is necessary, contact the dealer where this unit was purchased.

If repair through the dealer is not possible, obtain a RETURN AUTHORIZATION from:

Customer Service Department
Telex Communications, Inc.
Telephone: (800) 828-6107
Fax: (800) 323-0498

DO NOT RETURN ANY EQUIPMENT DIRECTLY TO THE FACTORY WITHOUT FIRST OBTAINING A RETURN AUTHORIZATION.

Be prepared to provide the company name, address, phone number, a person to contact regarding the repair, the type and quantity of equipment, a description of the problem and the serial number(s).

SHIPPING TO MANUFACTURER FOR REPAIR OR ADJUSTMENT

All shipments of RTS products should be made via United Parcel Service or the best available shipper, prepaid. The equipment should be shipped in the original packing carton; if that is not available, use any suitable container that is rigid and of adequate size. If a substitute container is used, the equipment should be wrapped in paper and surrounded with at least four inches of excelsior or similar shock-absorbing material. All shipments must be sent to the following address and must include the Return Authorization.

Factory Service Department
Telex Communications, Incorporated
West 1st Street
Blue Earth, MN 56013 U.S.A.

Upon completion of any repair the equipment will be returned via United Parcel Service or specified shipper collect.

TABLE OF CONTENTS

PROPRIETARY NOTICE ii

COPYRIGHT NOTICE ii

UNPACKING AND INSPECTION ii

WARRANTY INFORMATION ii

RETURN SHIPPING INSTRUCTIONS ii

SECTION 1: DESCRIPTION AND SPECIFICATIONS 1-1

DESCRIPTION 1-1

GENERAL 1-1

FEATURES 1-1

CONNECTIONS AND CONTROLS 1-1

SPECIFICATIONS 1-1

GENERAL 1-1

INTERFACE REQUIREMENTS 1-1

HEADPHONE AMPLIFIER 1-1

DYNAMIC MICROPHONE AMPLIFIER 1-1

ELECTRET MICROPHONE AMPLIFIER 1-2

CONNECTOR PIN CONFIGURATIONS 1-2

SECTION 2: OPERATION 2-1

EXTERNAL CONNECTIONS AND CONTROLS 2-1

BP-350 OPERATING MODES 2-1

INTERNAL JUMPERS AND ADJUSTMENTS 2-1

SECTION 3: REPLACEMENT PARTS 3-1

MECHANICAL PARTS 3-1

ELECTRICAL PARTS 3-1

SECTION 4: DIAGRAMS 4-1

SECTION 1: DESCRIPTION AND SPECIFICATIONS

DESCRIPTION

GENERAL

The BP-350 is a portable user station for use with RTS 2-wire intercom systems. The BP-350 is a microprocessor controlled two-channel intercom belt pack with connections for headset/earset microphone or separate carbon microphone.

FEATURES

Features of the BP-350 include:

- Call function that allows the user to send or receive signals to other devices on the intercom channel, including Audible Call Alert
- Microprocessor controlled Microphone Kill Detect
- Powered externally, via the intercom system power supply on channel one
- Headset/earset jack set for intercom operation

CONNECTIONS & CONTROLS

The BP-350 has the following connections and controls:

- Intercom volume control
- Headset connectors that accept either an XLR type 4-pin male connector or a 1/4" stereo phone plug
- Line connector that accepts an XLR type 3-pin male connector for intercom lines and power input

SPECIFICATIONS

GENERAL

Channel Supplied Power Requirements:
30 VDC nominal (standard RTS line), 45 to 70 mA

Environmental Requirements:
Storage: -20°C to 80°C; 0% to 95% humidity, non-condensing
Operating: 0°C to 50°C; 0% to 95% humidity, non-condensing

Dimensions:
5.0" (127 mm) H x 3.5" (88.9 mm) W x 1.8" (45.7 mm) D

Weight:
1.5 pounds (0.68 kg)

INTERFACE REQUIREMENTS

Headset/Earset:
50 to 200Ω dynamic microphone
50 to 600Ω headphones

RTS Intercom Channel:
Output Level: 0.775 Vrms (0 dBu) nominal
Input Impedance: 200Ω ±5%
Bridging Impedance: greater than 10,000Ω
Call Signalling:
Send: 20 kHz ±100 Hz, 0.5 Vrms ±10%
Receive: 20 kHz ±800 Hz, 100 mVrms
Mic-Off Frequency Detect:
24 kHz ±800 Hz, 100 mVrms
Noise Contribution: less than -60 db on the line
Common Mode Rejection Ratio: greater than 40 dB from the line

HEADPHONE AMPLIFIER

Voltage Gain:
20 ±3 dB from the line

Maximum Output:
60 mW into 150Ω

Frequency Response:
200 Hz to 8 kHz +1/-4db nominal

Audible Alert:
1 kHz, at the headset/earset

Total Harmonic Distortion:
Less than 0.2% nominal at 50 mW from the line

Sidetone:
20 dB minimum range, adjustable

DYNAMIC MICROPHONE AMPLIFIER:

Voltage Gain:
Mic to Channel; 45 ±3 dB, before limiting
Mic to Headphone; adjustable, 65 dB ±10% range into 150Ω

Frequency Response:
200 Hz to 8 kHz +1/-4db nominal

Total Harmonic Distortion:
Less than 0.2% nominal at Channel output

ELECTRET MICROPHONE AMPLIFIER:

Voltage Gain:
Mic to Channel; 27 ±3 dB, before limiting
Mic to Headphone; adjustable, 45 dB ±10% into 150Ω

Frequency Response:
200 Hz to 8 kHz +1/-4db nominal

Total Harmonic Distortion:
Less than 0.2% nominal at Channel output

CONNECTOR PIN CONFIGURATIONS

Headset Connector
Type: 1/4" Stereo Plug

Tip	Microphone input high
Ring	Headphone high
Sleeve	Common

Intercom Channel Connector
Type: XLR-3F

Pin 1	Common
Pin 2	Intercom channel 1 (audio) and +30 VDC
Pin 3	Intercom channel 2 (audio)

Headset Connector
Type: XLR-4F

Pin 1	Headset microphone low
Pin 2	Headset microphone high
Pin 3	Headphone low
Pin 4	Headphone high

SECTION 2: OPERATION

EXTERNAL CONNECTIONS & CONTROLS

NOTE: The numbers refer to the callouts in Figure 2-1.

1. Volume Control

   Use this control to adjust the headset/earset listen level.

2. *Chan* Button

   The *Chan* button allows the user to select which intercom channel is active. The yellow indicator next to the *1* or *2* lights to show the active channel. Press the *Chan* button to change the channel selection, the yellow indicator for that channel will light.

3. *Call* Button and Indicator

   The Call function allows the user to send or receive signals to other devices on the intercom channel selected. The *Call* button operates in two ways:

   Call receive:

   When there is an incoming call signal, the indicator is red. (If Audible Call Alert is enabled, incoming calls will cause beeps in the headset/earset.)

   Call send:

   To send a call signal to all stations on a the intercom channel selected, press and hold the *Call* button until a verbal response is received. The indicator will glow red.

4. *Talk* Button and Indicator

   The *Talk* button activates the headset/earset microphone and operates in two ways:

   Latched Mode:

   Tap the button once to talk. The indicator will glow green. Tap the button again when finished with a conversation.

   Momentary Mode:

   Press and hold the button to talk momentarily. Release the button when finished talking.

5. Sidetone Control

   When using a headset, this control adjusts your own voice level heard in the earphones. To adjust the level, tap the *Talk* button once to turn on the headset microphone. Then, use a small flat-blade screwdriver to increase or decrease your voice level while talking into the microphone. (This control is accessable by removing one screw of belt clip.)

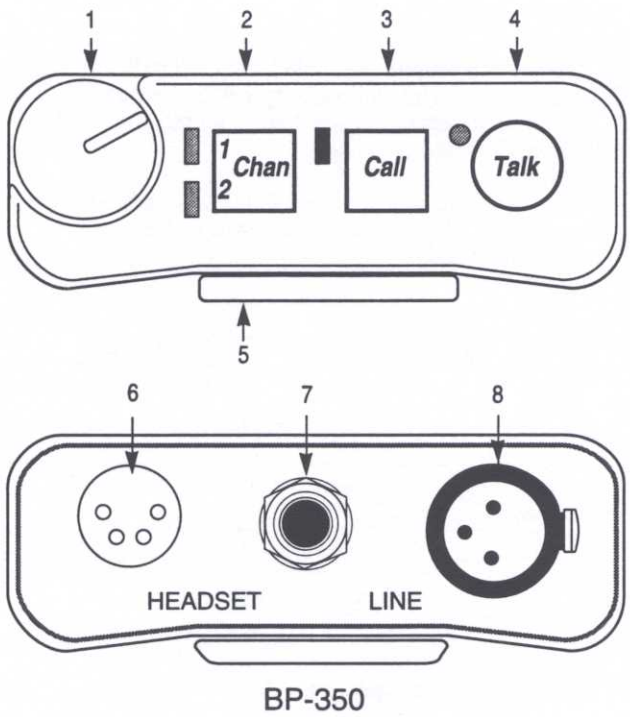


Figure 2-1. BP-350 Connections and Controls

6. Headset Connector

   This connector accepts an RTS boom-microphone headset.

7. Microphone Connector

   This connector accepts a carbon microphone headset with a 1/4" stereo phone plug.

8. Intercom Channel Connector

   The BP-350 is connected to the line via a 3-pin female connector. The BP-350 is powered from the intercom system power supply and will turn on with the intercom system.

BP-350 OPERATING MODES

The BP-350 uses four modes of operation to control the Microphone Kill and Audible Call Alert features. These features are described below:

Microphone Kill Feature:

When this feature is enabled and a Mic Kill signal is received from the intercom channel, the BP-350 microphone will be turned off.

When this feature is disabled, the Mic Kill signal will have no affect on microphones attached to the BP-350.

Audible Call Alert Feature:

When this feature is enabled, the *Call* indicator will glow red and an audible beep will be heard in the headset/earset whenever there is an incoming call from the intercom channel.

When this feature is disabled, the *Call* indicator will glow red, but no audible beep will be heard for incoming calls.

TABLE 2-1. OPERATING MODES

MODE (beeps)	MIC KILL	AUDIBLE CALL ALERT
1	Disabled	Disabled
2 (Default)	Enabled	Disabled
3	Disabled	Enabled
4	Enabled	Enabled

Changing Modes of Operation:

Perform the following steps to change the BP-350 mode of operation.

1. Both the *Talk* and *Call* indicators should be off.
2. Press and hold both the *Talk* and *Call* keys, then release both keys. The *Call* indicator should now glow red.

   (The number of beeps heard in the headset/earset indicates the current mode of operation.)
3. Press the *Call* key to change to the next mode of operation. Each press of the *Call* key will cause the BP-350 to change to the next mode of operation.
4. When the desired mode is reached, press the *Talk* key to select that mode and exit the mode changing function.

   NOTE: Each time the intercom system power is turned on, the BP-350 will reset to the default mode of operation (Mode 2).

INTERNAL JUMPERS AND ADJUSTMENTS

There is an internal jumper and adjustment that affect operation. These are described below. To gain access to the jumper and adjustment, disconnect all power and line connections. Remove two screws from the top of each side of the case and two screws from the bottom of each side of the case. The jumper and adjustment locations are shown in Figure 2-2.

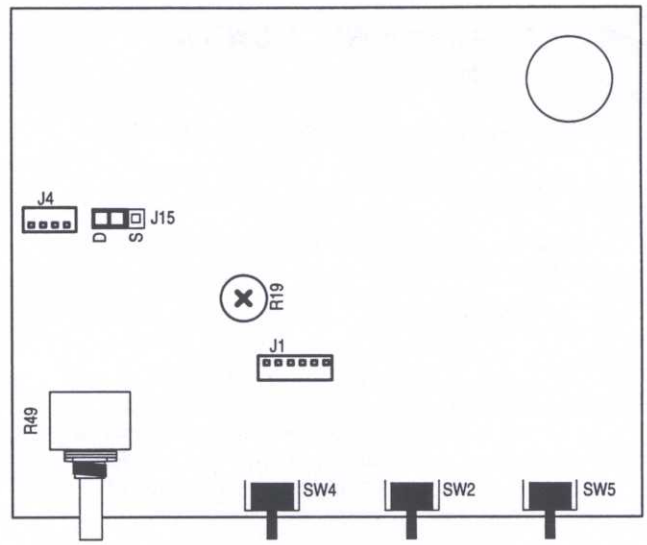


Figure 2-2. Internal Jumpers

Side Tone Adjustment (R19)

The side tone adjustment is accessible either internally (refer to Figure 2-2) or by removing the belt clip mounting screw shown in Figure 2-1.

To adjust the level of your own voice heard in the earphones, tap the *Talk* button once to turn on the headset microphone. Then, use a small flat-blade screwdriver to increase or decrease your voice level while talking into the microphone.

TABLE 2-2. INTERNAL JUMPERS

JUMPER/ SWITCH NUMBER	JUMPER OR SWITCH FUNCTION	DEFAULT SETTING
J15	Differential / Single-ended Dynamic Mic Single-ended Mic: Pins 1&2 shorted Differential Mic: Pins 2&3 shorted	Pins 1&2 shorted

SECTION 3. REPLACEMENT PARTS

WHERE TO OBTAIN PARTS

Parts may be obtained directly from Telex at:

Telex/RTS Systems
9600 Aldrich Ave. So.
Minneapolis, MN 55420
800-828-6107
Fax: 800-323-0498

MECHANICAL PARTS

FINAL ASSEMBLY (Refer to Figure 4-1 for Item No. locations)		
Item No.	**Description**	**Part No.**
1	Case, BP350	90607374-012
2	Top Plate	90707374-006
3	Not Used	
4	Circuit Board Assembly	90307487-000
5	Knob, Nylon Body	9160563-601
6	Boot, Knob	9160563-602
7	Screw, 4-40 x 0.25, Flat Head	800124-001
8	Belt Clip	358776
9	Screw, 4-40 x 0.25, Pan Head	51845-038
10	Keypad	19067374-001
11	Plate	91107374-000
12	Pushnut	51900-002
13	Screw, 6-32 x 3/16, Pan Head	51845-073
14	Washer, Lock, #6	50086-001

CONNECTOR PLATE ASSEMBLY (Refer to Figure 4-2 for Item No. locations)		
Item No.	**Description**	**Part No.**
1	Connector Plate	90807486-000
2	Connector, XLR-3F	40055-10
3	Connector, XLR-4F	40055-13
4	Jack, Phono, Stereo, 1/4"	2013001300
5	Connector, 6-pin	59958-006
6	Connector, 4-pin	59958-004
7	Contact, Connector	59958-200

ELECTRICAL PARTS

CIRCUIT BOARD ASSEMBLY (Refer to Figures 4-3 through 4-7)		
Ref. No.	**Description**	**Part No.**
	Crystal Insulator	59225-500
	Support Bracket	64106-003
C1	Capacitor, CM, SM, 18 pF, 50V	102879-135
C2	Capacitor, CM, SM, 18 pF, 50V	102879-135

CIRCUIT BOARD ASSEMBLY (Refer to Figures 4-3 through 4-7)		
Ref. No.	**Description**	**Part No.**
C3	Capacitor, EL, 47 µF, 25V	51821-625
C4	Capacitor, EL, SM, 1 µF, 50V	102884-606
C5	Capacitor, EL, SM, 10 µF, 25V	102884-412
C6	Capacitor, CM, SM, 100 pF, 50V	102879-204
C7	Capacitor, EL, SM, 4.7 µF, 35V	102884-510
C8	Capacitor, CM, SM, 1000 pF, 50V	102881-327
C9	Capacitor, CM, SM, 1000 pF, 50V	1028Bl-327
C10	Capacitor, CM, SM, 1500 pF, 50V	102881-329
C11	Capacitor, CM, SM, 1500 pF, 50V	102881-329
C12	Capacitor, EL, SM, 4.7 µF, 35V	102884-510
C13	Capacitor, CM, SM, 1000 pF, 50V	102881-327
C14	Capacitor, CM, SM, 1000 pF, 50V	102881-327
C15	Capacitor, EL, 470 µF, 35V	517004-036
C17	Capacitor, CM, SM, 0.01 µF, 50V	102881-339
C18	Capacitor, CM, SM, 0.01 µF, 50V	102881-339
C19	Capacitor, EL, SM, 4.7 µF, 35V	102884-510
C20	Capacitor, EL, 100 µF, 25V	51821-626
C21	Capacitor, CM, SM, 0.01 µF, 50V	102881-339
C22	Capacitor, CM, SM, 0.1 µF, 50V	102881-351
C23	Capacitor, CM, SM, 1000 pF, 50V	102881-327
C24	Capacitor, NP, 10 µF, 25V	52710-078
C25	Capacitor, NP, 10 µF, 25V	52710-078
C26	Capacitor, NP, 10 µF, 25V	52710-078
C27	Capacitor, EL, SM, 4.7 µF, 35V	102884-510
C28	Capacitor, NP, 10 µF, 25V	52710-078
C29	Capacitor, CM, SM, 0.01 µF, 50V	102881-339
C30	Capacitor, NP, 10 µF, 25V	52710-078
C31	Capacitor, CM, SM, 0.1 µF, 50V	102881-351
C32	Capacitor, CM, SM, 0.1 µF, 50V	102881-351
C33	Capacitor, CM, SM, 0.01 µF, 50V	102881-339
C34	Capacitor, EL, SM, 4.7 µF, 35V	102884-510
C35	Capacitor, CM, SM, 0.01 µF, 50V	102881-339
C36	Capacitor, EL, SM, 1 µF, 50V	102884-606
C37	Capacitor, CM, SM, 0.1 µF, 50V	102880-226
C38	Capacitor, CM, SM, 1500 pF, 50V	102879-218
C39	Capacitor, EL, SM, 1 µF, 50V	102884-606
C40	Capacitor, EL, SM, 1 µF, 50V	102884-606
C41	Capacitor, EL, SM, 1 µF, 50V	102884-606
C42	Capacitor, CM, SM, 100 pF, 50V	102B79-144
C43	Capacitor, EL, SM, 1 µF, 50V	102884-606
C44	Capacitor, EL, 100 µF, 25V	51821-626
C45	Not Used	
C46	Capacitor, CM, SM, 150 pF, 50V	102879-206
C47	Capacitor, CM, SM, 100 pF, 50V	102879-144
C48	Capacitor, CM, SM, 0.01 µF, 50V	102881-339
C49	Capacitor, CM, SM, 100 pF, 50V	102879-204
C50	Not Used	
C51	Capacitor, EL, SM, 4.7 µF, 35V	102884-510
C52	Capacitor, EL, SM, 4.7 µF, 35V	102884-510
C53	Capacitor, CM, SM, 0.01 µF, 50V	102881-339
C54	Capacitor, CM, SM, 0.01 µF, 50V	102B81-339
C55-C59	Not Used	
C60	Capacitor, CM, SM, 0.01 µF,50V	102881-339

CIRCUIT BOARD ASSEMBLY (Refer to Figures 4-3 through 4-7)		
Ref. No.	**Description**	**Part No.**
C61, C62	Not Used	
C63	Capacitor, CM, SM, 0.01 µF, 50V	102881-339
C64	Capacitor, EL, SM, 4.7 µF, 35V	102884-510
C65	Capacitor, CM, SM, 1000 pF, 50V	102881-327
C66	Not Used	
C67	Capacitor, EL, SM, 10 µF, 25V	102884-412
C68	Not Used	
C69	Capacitor, CM, SM, 0.33 µF, 50V	102BB0-239
C70	Capacitor, CM, SM, 0.1 µF, 50V	102881-351
D1	Diode, SM, Silicon, 100V	58711-201
D2	Diode, SM, Silicon, 100V	58711-201
D3	Diode, SM, Silicon, 100V	58711-201
D4	Diode, SM, Switching, BAV70	102252-000
D5	Not Used	
D6	Diode, SM, Switching, BAW56	102253-000
D7, D8	Not Used	
D9	Diode, SM, Silicon, 100V	58711-201
D10	Diode, SM, Silicon, 100V	58711-201
DS1	LED, Rectangular, Yellow	58685-102
DS2	LED, Rectangular, Yellow	58685-102
DS3	LED, T-1, Green	58714-000
DS4	LED, Rectangular, Red	58685-100
J1	Connector, ST Locking, 0.059, M-6	59958-106
J2	Not Used	
J3	Connector, ST Header, 0.100, M-3	590089-003
J4	Connector, ST Locking, 0.059, M-4	59958-104
J5-J14	Not Used	
J15	Connector, ST Header, 0.100, M-3	590089-003
Q1	Transistor, SM, SI NPN, MMBTA13	54749-000
Q2	Transistor, SM, SI NPN, MMBTA13	54749-000
Q3, Q4, Q5	Not Used	
Q6	Transistor, SM, P-FET, SST175	54687-201
Q7	Transistor, SM, SI NPN, MMBTA13	54749-000
Q8	Transistor, SM, SI NPN, MMBTA13	54749-000
Q9	Transistor, SM, SI NPN, MMBTA13	54749-000
Q10	Transistor, SM, SI NPN, MMBTA13	54749-000
Q11	Transistor, SM, SI NPN, MMBTA13	54749-000
Q12	Transistor, SM, SI NPN, MMBTA13	54749-000
Q13	Transistor, SM, SI NPN, MMBTA13	54749-000
Q14	Transistor, SM, SI NPN, MMBTA13	54749-000
Q15	Transistor, SM, SI NPN, MMBTA13	54749-000
Q16, Q17	Not Used	
Q18	Transistor, SM, SI NPN, MMBTA13	54749-000
R1	Resistor, SM, 22.1 kΩ, 1%, 1/8W	102404-333
R2	Resistor, SM, 22.1 kΩ, 1%, 1/8W	102404-333

CIRCUIT BOARD ASSEMBLY (Refer to Figures 4-3 through 4-7)		
Ref. No.	**Description**	**Part No.**
R3	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R4	Resistor, SM, 100 kΩ, 1%, 1/8W	102404-400
R5-R11	Not Used	
R12	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R13	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R14	Resistor, SM, 47 kΩ, 5%, 1/8W	102513-473
R15	Resistor, SM, 47 kΩ, 5%, 1/8W	102513-473
R16	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R17	Resistor, SM, 150 kΩ, 5%, 1/8W	102513-154
R18	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R19	Potentiometer, 10 kΩ, 1/3W	57148-069
R20	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R21	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R22	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R23	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R24	Resistor, SM, 124 Ω, 1%, 1/8W	102404-109
R25	Resistor, SM, 124 Ω, 1%, 1/8W	102404-109
R26	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R27	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R28	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R29	Resistor, SM, 75 kΩ, 5%, 1/8W	102513-753
R30	Not Used	
R31	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R32	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R33	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R34	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R35	Resistor, SM, 75 kΩ, 5%, 1/8W	102513-753
R36	Resistor, SM, 100 kΩ, 5%, 1/8W	102513-104
R37	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R38	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R39	Resistor, SM, 100 kΩ, 5%, 1/8W	102513-104
R40	Resistor, SM, 6.8 kΩ, 5%, 1/8W	102513-682
R41	Resistor, SM, 100 kΩ, 5%, 1/8W	102513-104
R42	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R43	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R44	Resistor, SM, 100 kΩ, 5%, 1/8W	102513-104
R45	Resistor, SM, 100 kΩ, 5%, 1/8W	102513-104
R46	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R47	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R48	Not Used	
R49	Potentiometer, 10 kΩ, 10%, 0.05W	54131-005
R50	Resistor, SM, 22 kΩ, 5%, 1/8W	102513-223
R51	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R52	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R53	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R54	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R55	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R56	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R57	Resistor, SM, 15 kΩ, 5%, 1/8W	102513-153
R58	Resistor, SM, 51 kΩ, 5%, 1/8W	102513-513
R59	Resistor, SM, 3.9 kΩ, 5%, 1/8W	102513-392

CIRCUIT BOARD ASSEMBLY (Refer to Figures 4-3 through 4-7)		
Ref. No.	**Description**	**Part No.**
R60	Resistor, SM, 100 kΩ, 5%, 1/8W	102513-104
R61	Resistor, SM, 1.5 kΩ, 5%, 1/8W	102513-152
R62	Resistor, SM, 3.9 kΩ, 5%, 1/8W	102513-392
R63	Resistor, SM, 51 kΩ, 5%, 1/8W	102513-513
R64	Resistor, SM, 15 kΩ, 5%, 1/8W	102513-153
R65	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R66	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R67	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R68	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R69	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R70	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R71	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R72	Resistor, SM, 1 kΩ, 5%, 1/8W	102513-102
R73	Resistor, SM, 100 kΩ, 5%, 1/8W	102513-104
R74	Resistor, SM, 1.3 kΩ, 5%, 1/8W	102513-132
R75	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R76	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R77	Resistor, SM, 15.8 kΩ, 1%, 1/8W	102404-319
R78	Resistor, SM, 1 kΩ, 5%, 1/8W	102513-102
R79	Resistor, SM, 1 kΩ, 5%, 1/8W	102513-102
R80	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R81	Resistor, SM, 6.8 kΩ, 5%, 1/8W	102513-682
R82	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R83, R84	Not Used	
R85	Resistor, SM, 91 kΩ, 5%, 1/8W	102513-913
R86	Resistor, SM, 75 kΩ, 5%, 1/8W	102513-753
R87	Resistor, SM, 6.8 kΩ, 5%, 1/8W	102513-682
R88	Resistor, SM, 0 Ω, 5%, 1/8W	102513-000
R89	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R90	Resistor, SM, 0 Ω, 5%, 1/8W	102513-000
R91	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R92	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R93	Resistor, SM. 2.4 kΩ, 5%, 1/8W	102513-242
R94	Resistor, SM, 15 kΩ, 5%, 1/8W	102513-153
R95	Resistor, SM, 8.25 kΩ, 1%, 1/8W	102404-288
R96	Resistor, SM, 1 MΩ, 5%, 1/8W	102513-105
R97	Resistor, SM, 1 kΩ, 5%, 1/8W	102513-102
R98	Resistor, SM, 91 kΩ, 5%, 1/8W	102513-913
R99	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R100	Resistor, SM, 11 kΩ, 5%, 1/8W	102513-113
R101	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R102	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R103	Resistor, SM, 15 kΩ, 5%, 1/8W	102513-153
R104	Resistor, SM, 51 kΩ, 5%, 1/8W	102513-513
R105	Resistor, SM, 3.9 kΩ, 5%, 1/8W	102513-392
R106	Resistor, SM, 15 kΩ, 5%, 1/8W	102513-153
R107	Resistor, SM, 51 kΩ, 5%, 1/8W	102513-513

CIRCUIT BOARD ASSEMBLY (Refer to Figures 4-3 through 4-7)		
Ref. No.	**Description**	**Part No.**
R108	Resistor, SM, 3.9 kΩ, 5%, 1/8W	102513-392
R109	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R110	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R111	Resistor, SM, 100 kΩ, 5%, 1/8W	102513-104
R112	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R113	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R114	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R115	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R116	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R117	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R118	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R119	Resistor, SM, 20 kΩ, 1%, 1/8W	102404-329
R120	Resistor, SM, 0 Ω, 5%, 1/8W	102513-000
R121	Resistor, SM, 10 Ω, 1%, 1/8W	102404-000
R123	Resistor, SM, 1 kΩ, 5%, 1/8W	102513-102
R124	Resistor, SM, 10 Ω, 1%, 1/8W	102404-000
R125	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R126	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R127	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R128	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R129	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R130	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R131	Resistor, SM, 100 kΩ, 5%, 1/8W	102513-104
R132	Resistor, SM, 100 kΩ, 5%, 1/8W	102513-104
R133, R134	Not Used	
R135	Resistor, SM, 10 Ω, 5%, 1/8W	102513-100
R136	Resistor, SM, 10 kΩ, 1%, 1/8W	102404-300
R137	Resistor, SM, 1 kΩ, 5%, 1/8W	102513-102
R138	Resistor, SM, 10 Ω, 1%, 1/8W	102404-000
R139-R145	Not Used	
R146	Resistor, SM, 0 Ω, 5%, 1/8W	102513-000
SW1	Not Used	
SW2	Switch, Tactile, PC Mount, SPST	57544-002
SW3	Not Used	
SW4	Switch, Tactile, PC Mount, SPST	57544-002
SW5	Switch, Tactile, PC Mount, SPST	57544-002
TP1	Nut, Self Clinching, 4-40	59832-002
TP2	Nut, Self Clinching, 4-40	59832-002
U1	IC, Voltage Regulator, LM78L05	58710-000
U2	IC, Quad Op Amp, 4156	53264-101
U3	IC, Quad Op Amp, 4136	53264-100
U4	IC, SM, Dual Op Amp, LM833	16030833-SM
U5	IC, SM, Dual Comparator, TLC393	59641-001
U6	IC, SM, Programmed, XC68HC705	90157374-000
U7	IC, SM, Quad Audio Switch, SSM2404	511062-000
X1	Crystal, 4.00 MHz	59219-006

SECTION 4. DIAGRAMS

Drawing Number	Title
9010-7487-000	Figure 4-1. Final Assembly, BP-350
9020-7486-000	Figure 4-2. Connector Plate Assembly, BP-350
9030-7487-000	Figure 4-3. PC Board Assembly, BP-350
9027-7487-000	Figure 4-4. Schematic, Sheet 1 of 4, BP-350
9027-7487-000	Figure 4-5. Schematic, Sheet 2 of 4, BP-350
9027-7487-000	Figure 4-6. Schematic, Sheet 3 of 4, BP-350
9027-7487-000	Figure 4-7. Schematic, Sheet 4 of 4, BP-350

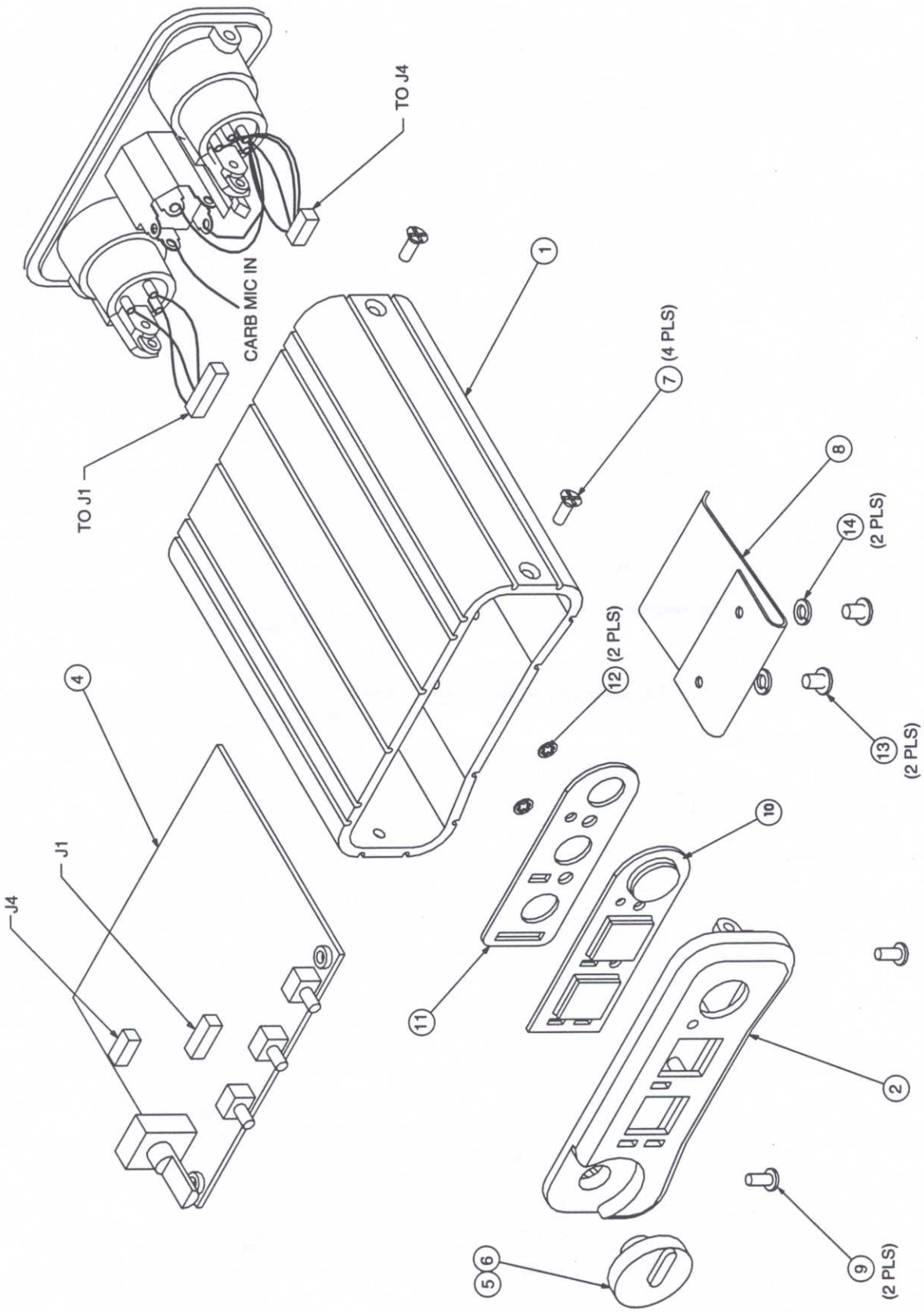
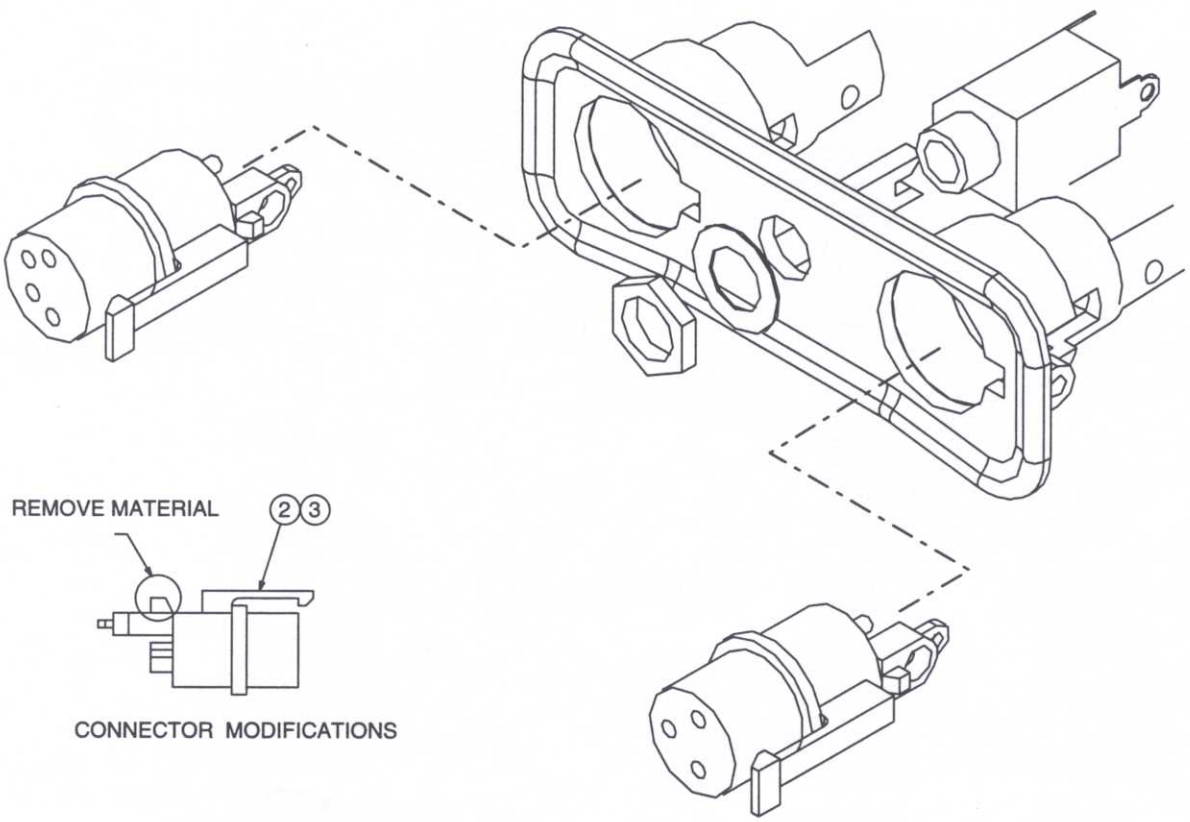
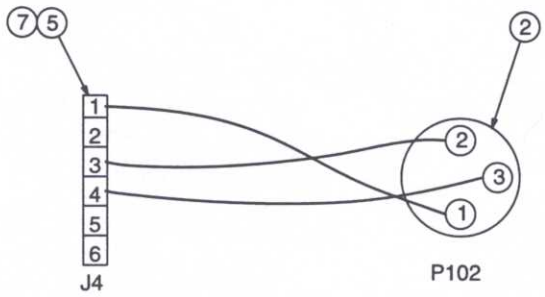


Figure 4-1. BP-350 Final Assembly
9010-7487-000





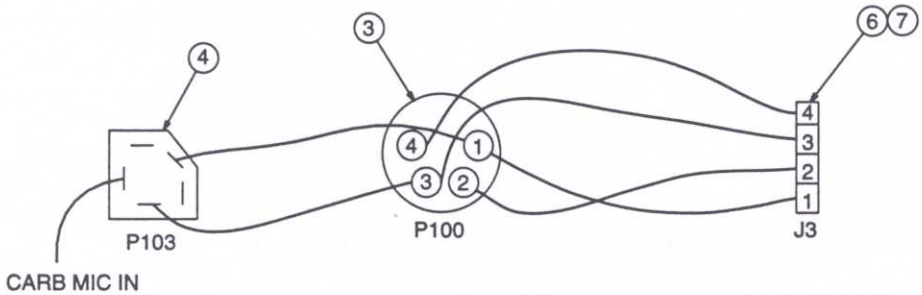


Figure 4-2. BP-350 Connector Plate Assembly
9020-7486-000

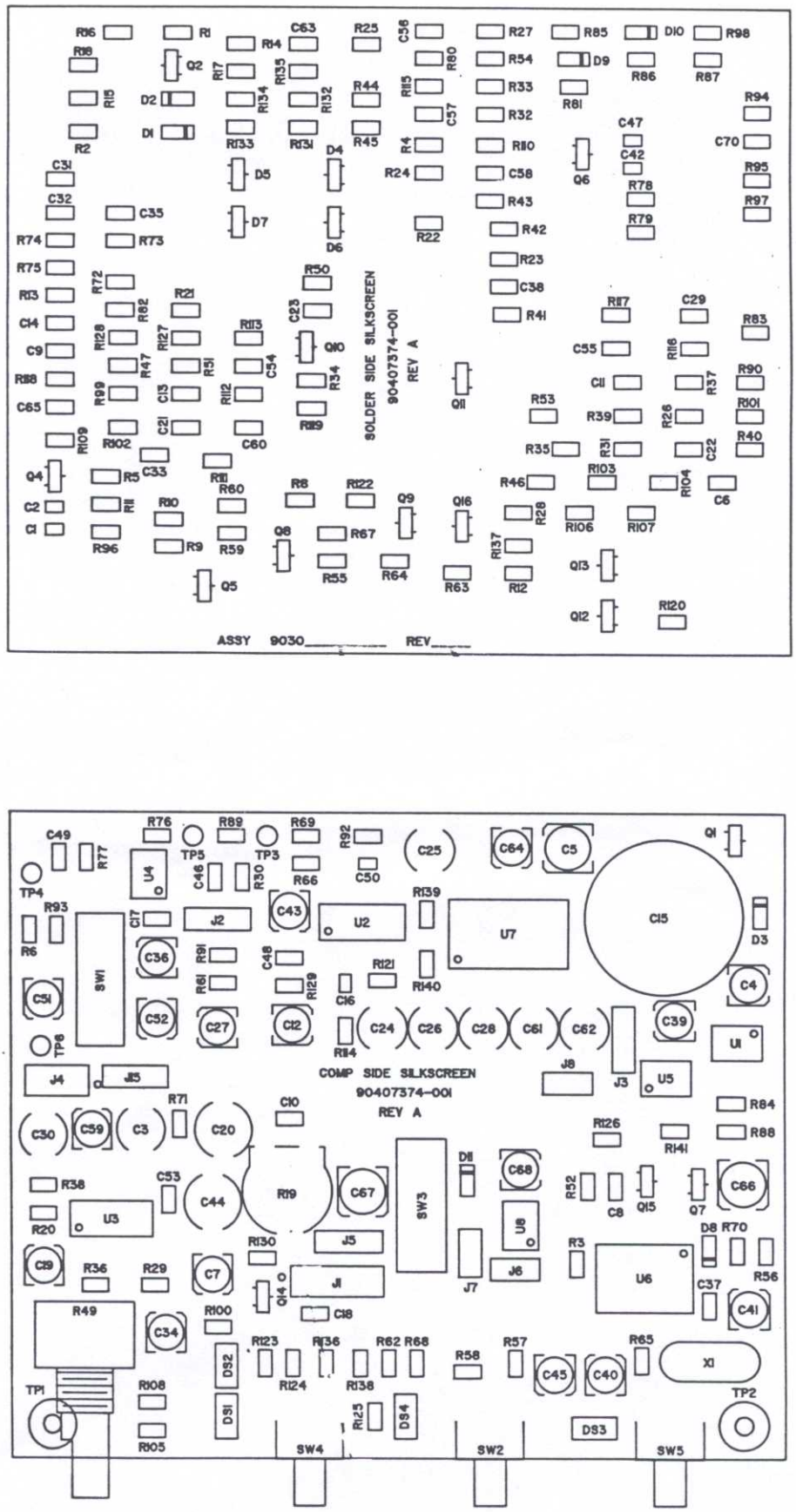


Figure 4-3. BP-350 PC Board Assembly
9030-7487-000

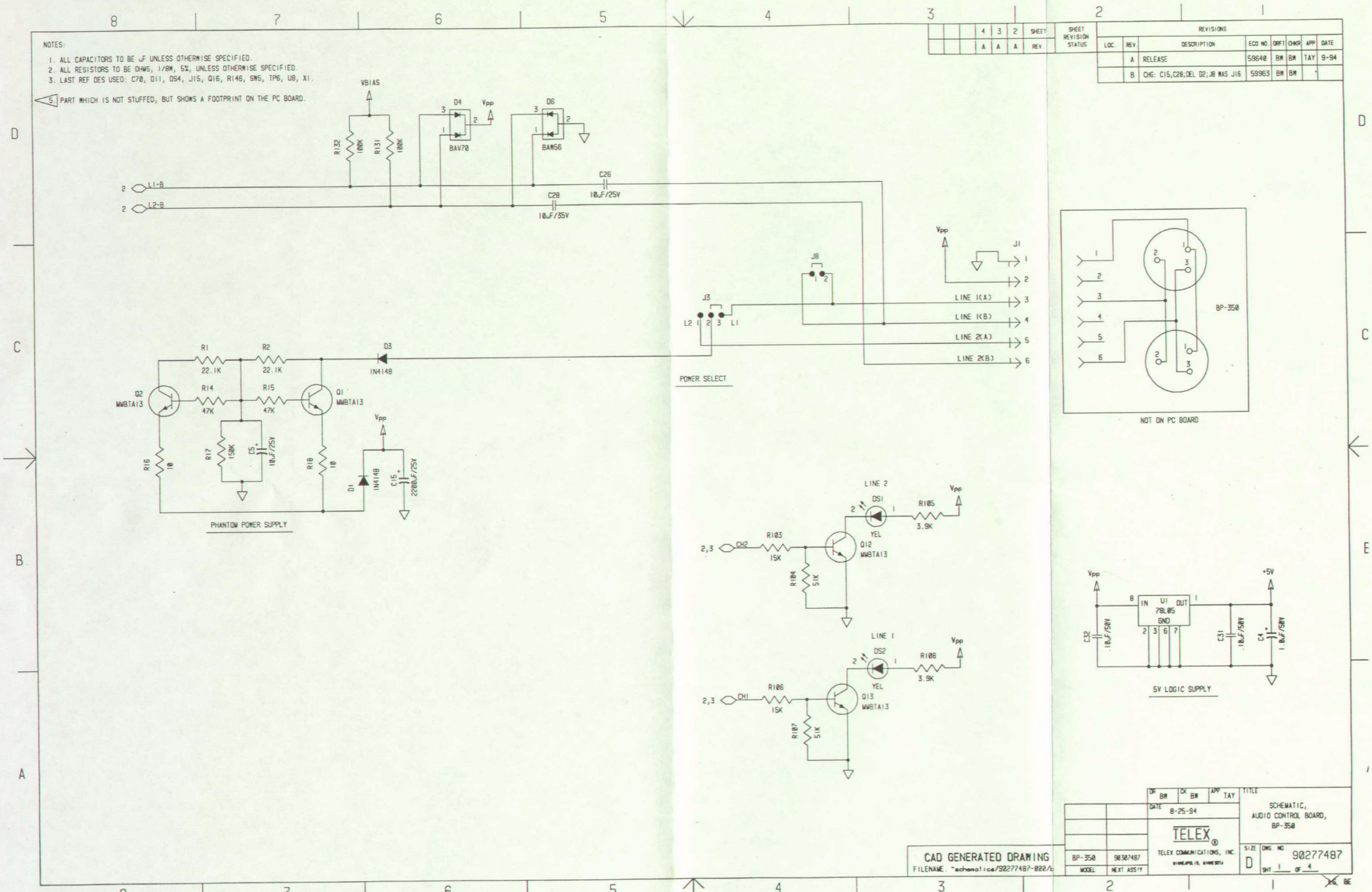


Figure 4-4. BP-350 Schematic, Sheet 1 of 4
9027-7487-000

LINE TRANCEIVER

SHEET	SHEET REVISION STATUS
REV.	

REVISIONS							
LOC.	REV.	DESCRIPTION	ECO NO.	DRFT	CHKR	APP	DATE
	A	RELEASE	59640	BM	BM	[illegible]	[illegible]

LINE-OUT
AUDIBLE-CALL
SIDETONE
LISTEN SUMMER
VOLUME CONTROL
10% TAPER
CONNECTION POINT FOR CARBON MIC RING
PHONE-HIGH
PHONE-LOW
HEADPHONE DRIVER
SSM-2404
SW3
FREQ-DET
L1-B
L2-B
CH1
CH2
Q11 MMBTA13

CAD GENERATED DRAWING
FILENAME: SEE SHT 1

DR	CK	APP	TITLE
BM	BM	[illegible]	SCHEMATIC, AUDIO CONTROL BOARD, BP-350

DATE 8-25-94

TELEX®
TELEX COMMUNICATIONS, INC.
MINNEAPOLIS, MINNESOTA

MODEL	NEXT ASS'Y	SIZE	DWG NO	REV
BP-350	50307487-000	D	90277487	

SHT 2 OF 4

Figure 4-5. BP-350 Schematic, Sheet 2 of 4
9027-7487-000

LOGIC AND SIGNAL CONTROL

SHEET REV.	SHEET REVISION STATUS	REVISIONS						
		LOC.	REV	DESCRIPTION	ECO NO.	DRFT	CHKR	APP	DATE
			A	RELEASE	59640	BM	BM		

CAD GENERATED DRAWING
FILENAME: SEE SHT 1

DR BM	CK BM	APP	TITLE: SCHEMATIC, AUDIO CONTROL BOARD, BP-350
DATE 8-25-94			
TELEX® TELEX COMMUNICATIONS, INC. MINNEAPOLIS, MINNESOTA			SIZE D — DWG. NO. 90277487 — SHT 3 OF 4
BP-350 MODEL	90387487-000 NEXT ASS'Y		

Figure 4-6. BP-350 Schematic, Sheet 3 of 4
9027-7487-000

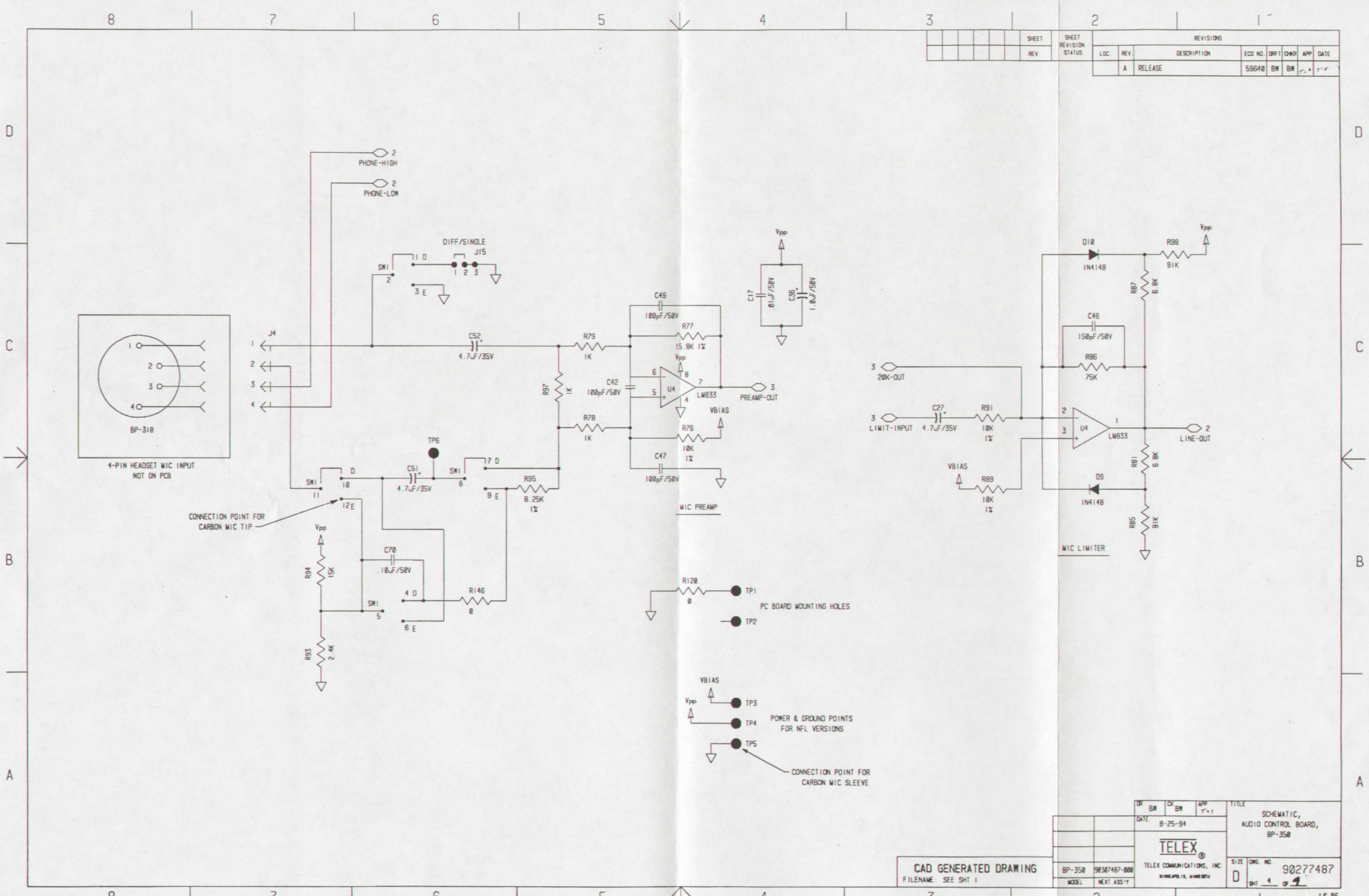


Figure 4-7. BP-350 Schematic, Sheet 4 of 4
9027-7487-000