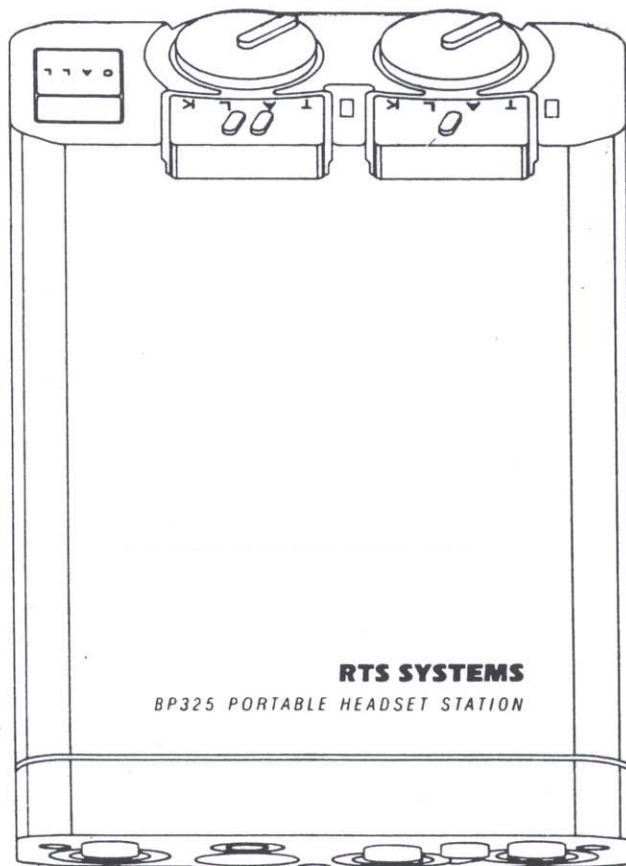


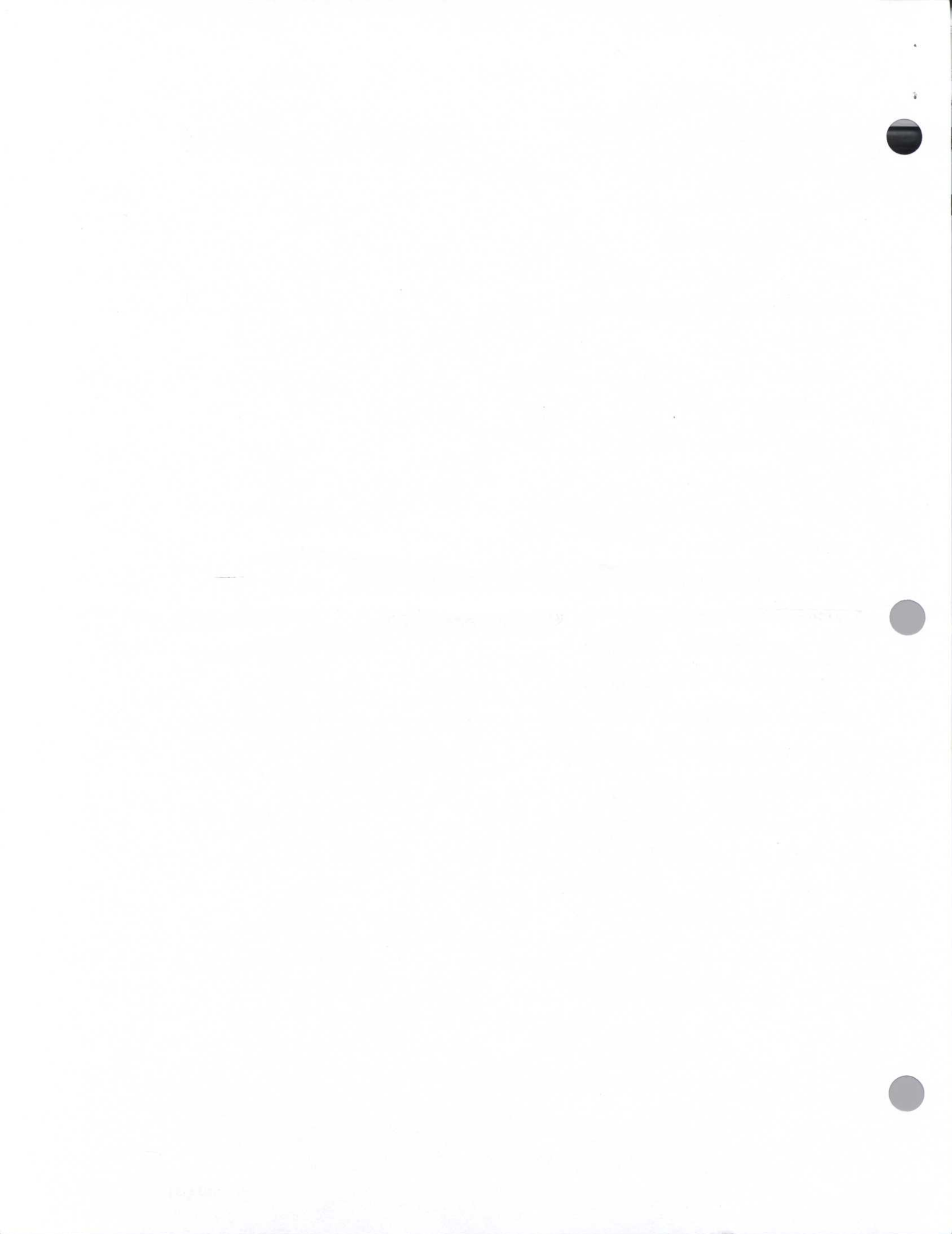
# USER MANUAL

**MODEL BP325**

## Belt-Pack Intercom Station



# **RTS**<sup>TM</sup>



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## PATENT NOTICE

This equipment contains and uses a design embodied in United States Patent No. 4,358,644: "A Bilateral Current Source for a Multi-terminal Intercom". This design employs a two-wire to four-wire converter.

## 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,  
12000 Portland Avenue South..  
Burnsville, MN 55337 U.S.A.  
Telephone: (952) 884-4051  
Fax: (800) 323-0498

## 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: (877) 863-4169  
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.

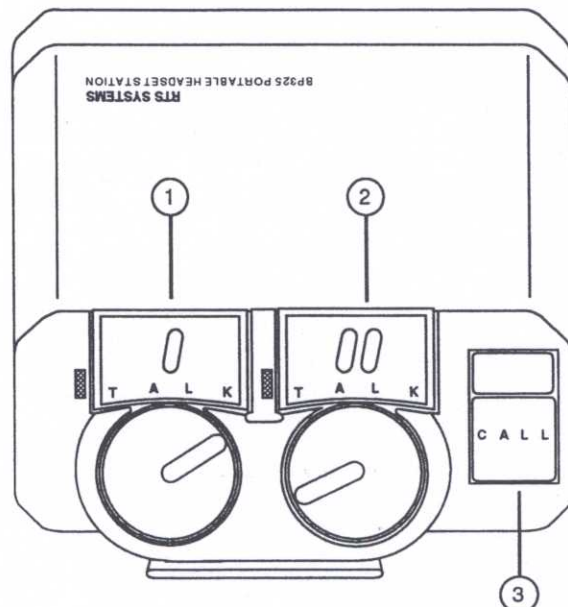
Factory Service Department  
Telex Communications, Incorporated  
West 1st Street  
Blue Earth, MN 56013 U.S.A.

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

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1. Channel 1 talk button, indicator light and listen volume control.
2. Channel 2 talk button, indicator light and listen volume control.
3. Call button and indicator light.
4. Carbon-mic headset jack. May also be used for external mic switch. See "Programable Options".
5. Program volume control. Active only when using the line loop connector for optional program input. See "Programable Options".
6. Monaural dynamic-mic headset jack.



7. Intercom line loop connector for connection to additional intercom stations. May also be used for external program input, external mic switch, or a non-standard power source. See "Programable Options" and "Alternate Powering Methods".
8. Intercom line connector. For connection to intercom system.
9. Stereo dynamic-mic headset jack.
10. Rear cover removal to set options: Loosen two screws (10a) and remove one screw (10b).

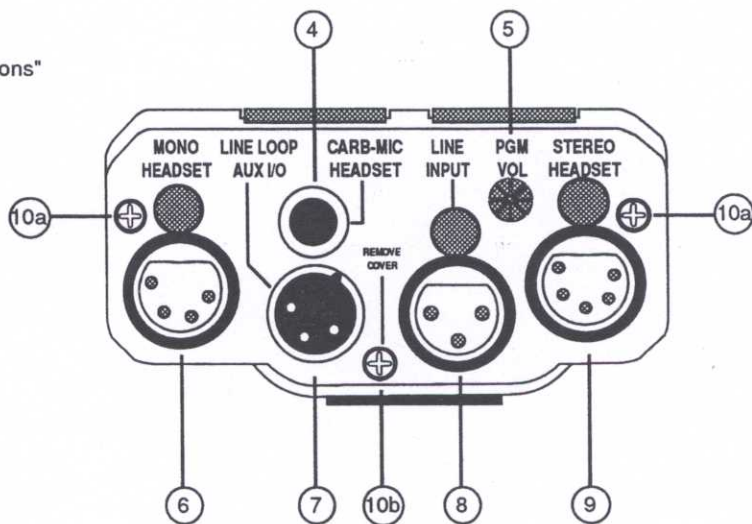


Figure 1. BP325 Reference View

## CONNECTIONS AND OPERATION

This section describes operation of the BP325 as supplied from the factory. Use of an RTS power supply to power the intercom system is assumed. For options and use of an alternate power source, see "Programmable Options", page 3 and "Alternate Powering Methods, page 5.

### CONNECTIONS

#### Headset

Connect a headset using one of the three headset connectors on the back panel. The MONO HEADSET and STEREO HEADSET connectors are for monaural or stereo dynamic-mic headsets. The CARB-MIC HEADSET connector is for a monaural carbon-mic headset. Refer to the specifications for pin-outs of these connectors if needed.

#### Intercom Channels

Connect the BP325 to the intercom system using the LINE INPUT connector on the back panel.

If desired, connect an additional intercom station to the intercom system using the LINE LOOP connector on the back panel.

### OPERATION

1. Attach the BP325 to your belt or other convenient location using the belt clip on the rear panel.
2. Put on the headset and adjust the listen volume controls while listening to the intercom channels.
3. A TALK button may be activated in either of two ways:

**Momentary Mode:** Press and hold the TALK button, then speak into the microphone. The green talk LED will remain lit while the TALK button is held. Release the TALK button when finished talking. The talk LED will turn off.

**Latching Mode for Hands-free Conversation:** Tap the TALK button (do not press and hold). The green talk LED will turn on and remain on. When finished talking, tap the TALK button again. The talk LED will turn off.

4. Calling an intercom channel:
  - a. Turn on the TALK button for the channel to be called (the green talk LED should be lit).
  - b. Press and hold the CALL button. The red call LED will light while the button is pressed, indicating that a call signal is being sent. When a response is heard, release the CALL button and begin your conversation.
  - c. Turn off the TALK button when finished with your conversation.
5. Receiving a call:
  - a. When there is an incoming call on a channel, the red call LED will flash.
  - b. If a talk LED is also flashing, this indicates that you need to activate that TALK button to begin your conversation.
  - c. If no talk LED is flashing, this indicates that the TALK button is already on; simply begin your conversation.
6. Sending a Talk-off Signal: The BP325 can generate an inaudible signal which can be used to deactivate the talk buttons on other intercom stations connected to an intercom channel. (May be used with models BP325, MCE325 and MRT327). This feature is useful when an unattended intercom station has its microphone activated and is causing noise on an intercom channel. To send a talk-off signal:
  - a. Turn off both TALK buttons on the BP325.
  - b. Tap the CALL button three quick taps. The red call LED will turn on for about 2 seconds.
  - c. While the red call LED is on, momentarily press the TALK button for the channel that has the TALK button to be turned off. This will send the signal and turn off the remote TALK button.

## PROGRAMMABLE OPTIONS

Several internal option switches and jumpers can modify the belt pack's operation. The factory settings are summarized below. To change any of the factory settings, remove the rear cover screws as shown in Figure 1. Jumper and switch locations are shown on the label inside the rear cover.

### FACTORY SETTINGS

#### Jumpers (W1-W7)

No.	Description	Factory setting
W1	CH1 Intercom Audio Listen	On <sup>Option note 1</sup>
W2	CH2 Intercom Audio Listen	On <sup>Option note 1</sup>
W3	Program input to left headphone	Off <sup>Option note 2</sup>
W4	Program input to right headphone	Off <sup>Option note 2</sup>
W5	Stereo/Mono operation	Stereo <sup>Option note 3</sup>
W6	Not Used	
W7	CARB-MIC Jack Function	Headset <sup>Option note 4</sup>

#### DIP Switches (S1)

No.	Description	Factory setting
1	Call Signal Transmit Disable	Off
2	Momentary Only Talk Button, CH2	Off <sup>Option note 5</sup>
3	CH2 Talk Disable	Off <sup>Option note 6</sup>
4	CH1 Talk Disable	Off <sup>Option note 6</sup>
5	Momentary Only Talk Button, CH1	Off <sup>Option note 5</sup>
6	Talk-off Transmit Enable	On <sup>Option note 7</sup>
7	Not used	Off
8	Talk-off Receive Enable	On <sup>Option note 8</sup>

### OPTION NOTES

- Listen is factory set to be on all the time on both channels. Setting W1 to the off position will disable intercom listen audio on channel 1 (usually the left headphone of a stereo headset). Setting W2 to the off position will disable intercom listen audio on channel 2 (usually the right headphone of a stereo headset). Listen disable could be used, for example, when you want to use the left side of a stereo headphone exclusively for program audio input and the right side for a single channel of intercom audio. In this case you would:
  - Set W1 to "off" to disable channel 1 intercom audio listen to the left headphone.
  - Set DIP switch 4 to "on" to disable channel 1 talk. (See option note 6.)
  - Setup the left channel for program input. (See option note 2.)
- To use program audio input:
  - Unplug the LINE LOOP connector from J6, and plug it into J5. (Refer to the label inside the BP325 rear cover.)
  - If you are using a stereo headset: set W3 and/or W4 to "on" to route the program audio to the left headphone, right headphone or both headphones. If you are using a mono headset, set both W3 and W4 to "on".
  - Connect the program source to the LINE LOOP connector using an XLR-3-32 female receptacle wired as follows:
    - Pin 1 - Common
    - Pin 2 - Program input high
    - Pin 3 - Program input low
  - Adjust program input volume using the PGM VOL control on the back panel.



3. W5 applies to a stereo dynamic-mic headset connected to the STEREO HEADSET jack. With W5 set in the stereo position, intercom channel 1 will be heard in the left headphone only, and channel 2 will be heard only in the right. In the mono position, both intercom channels (and program audio if connected) will be heard in both headphones. If you are using monaural headphones connected to the MONO HEADSET jack, W5 may be left in the stereo position.
4. The CARB-MIC connector may be used to connect either a headset or an external mic on/off switch. (If you are using a carbon-mic headset, but still wish to use an external mic switch, the LINE LOOP connector may alternatively be used for the mic switch. See note 9, below.) To use the CARB-MIC connector for an external mic on/off switch:
  - a. Place jumper W7 in the "EXT MIC SW" position.
  - b. Use a stereo phone plug to connect the external switch to the CARB-MIC HEADSET jack:
 

Tip - Remote Mic Switch Normal-open Contact  
 Ring - No connection  
 Sleeve - Remote Mic Switch Common
  - c. To use the external mic switch, first set one or both TALK buttons to the latched-on position. Then, press the external mic switch to turn the TALK button(s) on. Release the mic switch to turn the TALK button(s) off. Note: the TALK buttons may still be turned on or off from the BP325; however, the external mic switch will not work unless the TALK buttons are first turned on at the BP325.
5. As supplied, the TALK buttons feature a dual-action momentary/latching operation: press and hold for momentary talk, then release when finished; or tap to latch "on" for hands-free talk, and tap again to turn off when finished talking. If desired, the latching operation may be defeated, and the TALK buttons may be operated in momentary mode only.
6. Setting DIP switch 3 to the "on" position will disable the channel 2 TALK button. Setting DIP switch 4 to the "on" position will disable the channel 1 TALK button.
7. As supplied, the BP325 can generate an inaudible talk-off signal which can be used to deactivate the talk buttons on other intercom stations connected to an intercom channel. To turn this feature off, set DIP switch 6 to the "off" position.
8. As supplied, other intercom stations can deactivate the TALK buttons on the BP325 using the talk-off feature from their intercom stations. To disable this feature, set DIP switch 8 in the "off" position.
9. Using the LINE LOOP connector for an external mic on/off switch:
  - a. Unplug the LINE LOOP connector from J6 on the circuit board, and plug it into J4.
  - b. Connect the external mic switch to the LINE LOOP connector using an XLR-3-32 female receptacle wired as follows:
 

Pin 1 - Remote Mic Switch Common  
 Pin 2 - No connection  
 Pin 3 - Remote Mic Switch Normal-open Contact
  - c. To use the external mic switch, first set one or both TALK buttons to the latched-on position. Then, press the external mic switch to turn on the TALK button(s). Release the mic switch to turn off the TALK button(s). Note: the TALK buttons may still be turned on or off from the BP325; however, the external mic switch will not work unless the TALK buttons are first turned on at the BP325.

## SIDETONE ADJUSTMENT

You can change the level of your own voice heard in your headphones while talking on an intercom channel. Adjust R39 to change your voice level when talking on channel 1. Adjust R52 to change your voice level when talking on channel 2.

## ALTERNATE POWERING METHODS

### GENERAL

When using an RTS power supply to power the intercom system, power is carried to the BP325 on pin 2 of the LINE INPUT connector along with the channel 1 audio. Pin 1 is the DC return. The unique design of RTS power supplies permits power to be carried on an audio channel. RTS power supplies also provide the proper terminating impedance for each intercom channel. If a non-RTS power supply is used, there are two alternatives for connecting power and intercom audio.

The first method uses channel 1 only to connect the non-RTS power supply. Audio on channel 1 will be unusable as the power supply will look like a short circuit at audio frequencies. Channel 2, however, will still be operational. Also, channel 2 will require a terminating impedance, since this is not supplied by the non-RTS power supply.

The second method allows the use of a non-RTS power supply while still maintaining two audio channels. This method requires an additional wire to the belt pack, and the LINE LOOP connector will not be usable for connecting another intercom station. Also, each intercom channel must be properly terminated. The two methods are discussed below.

### METHOD ONE: ONE CHANNEL OPERATION WITH A NON-RTS POWER SUPPLY

Using an XLR-3-32 female connector, connect the external power source and the channel terminating components to the LINE INPUT connector as shown in Figure 2.

If desired, the LINE LOOP connector may be used to connect power and audio to an additional intercom station.

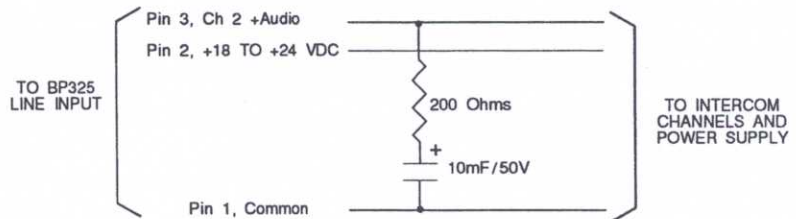


Figure 2. LINE INPUT Connector Wiring for 1-Channel Operation with Non-RTS Power Supply

### METHOD TWO: TWO CHANNEL OPERATION WITH A NON-RTS POWER SUPPLY

1. Referring to Figure 1, remove all three screws (10a and 10b) on the back connector panel of the BP325. Remove the rear cover/belt clip assembly.
2. There are two connectors that connect the main circuit board to the front panel circuit board. Pry the tabs on these two connectors to disconnect them. Remove the back connector panel and main circuit board from the belt pack.
3. On the bottom side of the main circuit board, cut the trace as shown in Figure 3.
4. Reassemble the main circuit board and rear connector panel to the belt pack.

Note: If the rear connector panel becomes separated from the main circuit board at any time, make sure that the shaft of the program volume control knob inserts into the program volume control potentiometer on the main circuit board during reassembly.

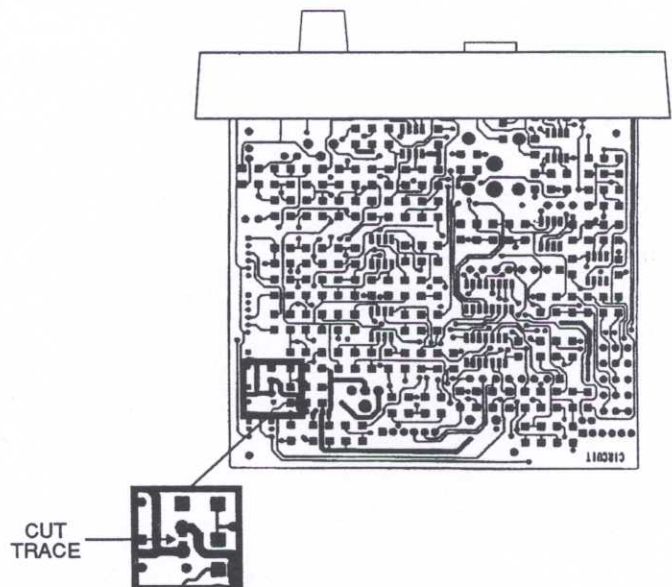


Figure 3. Bottom View of the Main Circuit Board

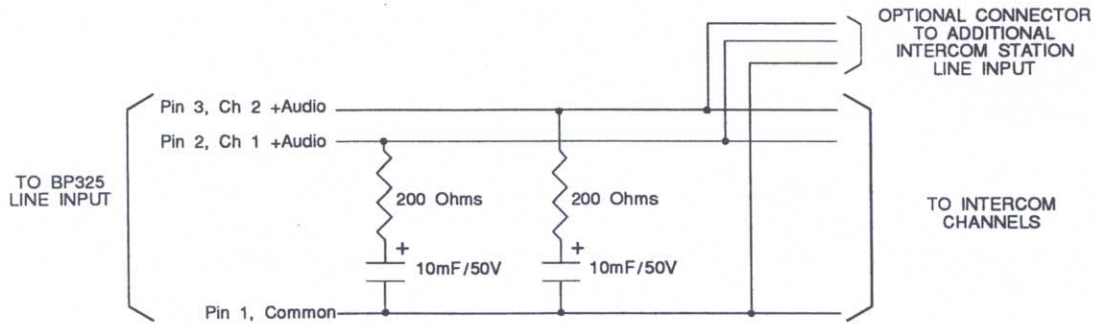
5. Referring to the label on the inside of the rear cover, unplug the LINE LOOP connector from J6 and plug it into J4.
6. Reassemble the rear cover.
7. Using an XLR-3-32 female receptacle, connect the external power source to the LINE LOOP connector as shown in Figure 4. Connect +DC to pin 2 and connect power supply common to pin 1.
8. Using an XLR-3-32 male plug, connect intercom channels and termination components as shown in Figure 5. Plug this connector into the LINE INPUT jack of the BP325.

Pin 3 ————— No Connection

Pin 2 ————— +18 to +24 VDC

Pin 1 ————— Common

**Figure 4. LINE LOOP Connector Wiring for 2-Channel Operation with Non-RTS Power Supply**



**Figure 5. LINE INPUT Connector Wiring for 2-Channel Operation with Non-RTS Power Supply**

## SPECIFICATIONS

### Dimensions

5.00" High x 3.75" Wide x 2.05" Deep  
(127mm x 96.3mm x 52.1mm)

### Weight

0.5 pounds (225 grams)

### Exterior

Polystyrene and polycarbonate mix; gray textured main body

### Power Requirements

#### Input DC Voltage

+18 to +35 volts DC, operating; -200 to +36 volts DC without damage

#### DC Current

No signal: 27 milliamperes  
Average talk (25 ohm headphones, 10 dB below clipping): 43 mA  
Average talk + call light: 60 mA

### Impedance Across Intercom Line

10,000 ohms typical

### Ambient Temperature Range

Operating: 0° C to 50° C  
Storage: -40° C to 125° C

### Noise Contribution to 200-ohm Intercom Line

-75 dBu

### Headphone Amplifier

Maximum Voltage Gain: 30 dB  
Frequency Response: 100 Hz to 8 kHz, +/-3 dB  
Headphone impedance: 50 to 600 ohms  
Output Power: 150 mW/50 ohms  
Output voltage level: 8 volts peak-to-peak

### Microphone Preamplifier

Maximum Voltage Gain: 54 dB  
Frequency Response: 100 Hz to 8 kHz, +/-3 dB  
Input Impedance: 1,000 ohms, balanced  
Limiter Range: 30 dB

### Program Input

Maximum input level: +20 dBu  
Nominal input level: -10 to +8 dBu  
Frequency response: 100 Hz to 12 kHz, +/-3 dB

### Monaural Dynamic-mic Headset Connector

XLR-4-31 receptacle (J13)  
Pin 1 - Microphone low  
Pin 2 - Microphone high  
Pin 3 - Common  
Pin 4 - Headphone high

### Stereo Dynamic-mic Headset Connector

XLR-5-31 receptacle (J14)  
Pin 1 - Microphone low  
Pin 2 - Microphone high  
Pin 3 - Common  
Pin 4 - Headphone left high  
Pin 5 - Headphone right high

### Carbon-mic Headset Connector (J1)

1/4-inch, 3-conductor Phone Jack

#### Used for Headset

Tip - Carbon microphone  
Ring - Headphone  
Sleeve - Common

#### Used for Mic Switch

Tip - Remote switch normal-open contact  
Ring - No connection  
Sleeve - Remote switch common

### Intercom Line Input Connector (J11)

XLR-3-31 female receptacle  
Pin 1 - Common  
Pin 2 - Channel 1 intercom audio and +DC  
Pin 3 - Channel 2 intercom audio

### Line Loop/Aux Connector (J10)

XLR-3-32 male receptacle

#### Used for Loop-through:

Pin 1 - Common  
Pin 2 - Channel 1 intercom audio and +DC  
Pin 3 - Channel 2 intercom audio

#### Used for Program Input:

Pin 1 - Common  
Pin 2 - Program input high  
Pin 3 - Program input low

#### Used for Remote Mic Switch and/or External Power:

Pin 1 - Common  
Pin 2 - +18 to +24 volts DC  
Pin 3 - Remote switch normal-open contact

### SPECIFICATION NOTES:

0 dBu = 0.775 volts rms

0 dBm = 1 milliwatt

All product information and specifications subject to change without notice.

## REPLACEMENT PARTS

### WHERE TO OBTAIN PARTS

Parts may be obtained directly from Telex at:

Telex Communications, Inc.  
12000 Portland Avenue South,  
Burnsville, MN 55337 U.S.A.  
Telephone: (877) 863-4169  
Fax: (800) 323-0498

### MECHANICAL PARTS

FINAL ASSEMBLY (Refer to AS6738 Drawing for Item No. locations)			
Item No.	Qty	Description	Part No.
1	1	FRONT/TOP PANEL ASSY	9020673700
2	1	REAR PANEL ASSY	9020673600
4	1	BOTTOM CASE WITH CLIP	9020563500
6	3	SCREW, #4-40 X 3/4"	1008407600
7	1	LABEL, PROGRAMMING INSTR	9170684200
8	1	KNOB, PROGRAM VOLUME	9160677500
10	1	LABEL, BELT CLIP	9170688400
11	1	LABEL, SERIAL NUMBER	N/A

FRONT/TOP PANEL ASSY (Refer to AS6737 Drawing for Item No. locations)			
Item No.	Qty	Description	Part No.
1	1	FRONT CASE	9020563601
2	1	FRONT PANEL CIRCUIT BOARD ASSY	9030663400
3	1	MAIN CIRCUIT BOARD ASSY	9030663500
4	3	SCREW, #4-40 X 3/8"	1008407000
5	1	BUTTON, TALK CH1	9160563603
6	1	BUTTON, TALK CH2	9160563604
7	1	BUTTON, CALL	9160563605
8	1	LENS, CALL	9150563606
9	2	KNOB	9160563602
10	2	KNOB BODY, NYLON	9160563601
11	6	JUMPER, E-CAM 282-11-10	2515001500
12	2	PUSHNUT FASTENER	1005021100

REAR PANEL ASSY (Refer to AS6736 Drawing for Item No. locations)			
Item No.	Qty	Description	RTS Part No.
1	1	REAR PANEL	9080563700
2	1	CONNECTOR, MALE INSERT, 3-PIN	2018006900
3	1	CONNECTOR, FEMALE INSERT, 4-PIN (3 PCS) (INCLUDES ITEMS 7 & 8)	2019001900
4	1	CONNECTOR, FEMALE INSERT, 5-PIN (3 PCS) (INCLUDES ITEMS 7 & 8)	2019002000

REAR PANEL ASSY (Refer to AS6736 Drawing for Item No. locations)			
Item No.	Qty	Description	RTS Part No.
5	1	CONNECTOR, FEMALE INSERT, 3-PIN (3 PCS) (INCLUDES ITEMS 7 & 8)	2019002100
6	3	SCREW (FOR ITEMS 2-5)	1005017500
7	3	LATCH (INCLUDED WITH ITEMS 3-5)	1005017700
8	3	SPRING (INCLUDED WITH ITEMS 3-5)	1005017600
9	3	RELEASE LEVER	9160563701
10	2	HOUSING, 3-PIN	59958003
11	2	HOUSING, 6-PIN	59958006
12	15	CRIMP CONNECTOR (FOR ITEMS 10 AND 11)	59958200

### ELECTRICAL PARTS

MAIN CIRCUIT BOARD		
Ref No.	Description	Part No.
C1	CAPACITOR, EL, SM, 47 UF, 10V	102884215T
C2	CAPACITOR, CM, SM, 10 PF, 50V	102879271T
C3	CAPACITOR, EL, SM, 47 UF, 10V	102884215T
C4, C5	CAPACITOR, CM, SM, 1000 PF, 50V	102879216T
C5	CAPACITOR, CM, SM, 1000 PF, 50V	102879216T
C6 - C8	CAPACITOR, CM, SM, 0.1 UF, 50V	102880226T
C9	CAPACITOR, EL, SM, 47 UF, 10V	102884215T
C10	CAPACITOR, CM, SM, 470 PF, 50V	102879212T
C11	CAPACITOR, CM, SM, 0.1 UF, 50V	102880226T
C12	CAPACITOR, EL, SM, 22 UF, 35V	1099R2263GT
C13	CAPACITOR, CM, SM, 0.01 UF, 50V	102881339T
C14	CAPACITOR, CM, SM, 1000 PF, 50V	102879216T
C15	CAPACITOR, CM, SM, 10 PF, 50V	102879271T
C16	CAPACITOR, EL, SM, 1 UF, 50V	102884606T
C17	CAPACITOR, CM, SM, 0.1 UF, 50V	102880226T
C18 - C21	CAPACITOR, CM, SM, 10 PF, 50V	102879271T
C22 - C24	CAPACITOR, EL, SM, 22 UF, 35V	1099R2263GT
C25	CAPACITOR, CM, SM, 10 PF, 50V	102879271T
C26	CAPACITOR, EL, SM, 22 UF, 35V	1099R2263GT
C27 - C29	CAPACITOR, CM, SM, 10 PF, 50V	102879271T
C30 - C32	CAPACITOR, EL, SM, 22 UF, 35V	1099R2263GT
C33	CAPACITOR, CM, SM, 10 PF, 50V	102879271T
C34, C35	CAPACITOR, EL, SM, 1 UF, 50V	102884606T
C36, C37	CAPACITOR, CM, SM, 1000 PF, 50V	102879216T
C38	CAPACITOR, EL, SM, 1 UF, 50V	102884606T
C39	CAPACITOR, CM, SM, 10 PF, 50V	102879271T
C40	CAPACITOR, EL, SM, 47 UF, 10V	102884215T
C41	CAPACITOR, EL, RAD, 2200 UF, 16V	1502R2284E
C42, C43	CAPACITOR, EL, SM, 47 UF, 10V	102884215T
C44, C45	CAPACITOR, CM, SM, 0.1 UF, 50V	102880226T
C46	CAPACITOR, EL, SM, 22 UF, 35V	1099R2263GT
C100, C101	CAPACITOR, EL, SM, 1 UF, 50V	102884606T
C102, C103	CAPACITOR, CM, SM, 10 PF, 50V	102879271T
C104, C105	CAPACITOR, CM, SM, 10 PF, 50V	102879271T
C106	CAPACITOR, CM, SM, 0.1 UF, 50V	102880226T
C107	CAPACITOR, CM, SM, 1000 PF, 50V	102879216T
C108, C109	CAPACITOR, CM, SM, 0.1 UF, 50V	102880226T
C110	CAPACITOR, EL, SM, 47 UF, 10V	102884215T
C111	CAPACITOR, CM, SM, 0.1 UF, 50V	102880226T
C112	CAPACITOR, CM, SM, 1000 PF, 50V	102879216T
C113, C114	CAPACITOR, CM, SM, 0.1 UF, 50V	102880226T

MAIN CIRCUIT BOARD		
Ref No.	Description	Part No.
C115	CAPACITOR, EL, SM, 47 UF, 10V	102884215T
C116, C117	CAPACITOR, EL, SM, 1 UF, 50V	102884606T
CC1 - CC7	CAPACITOR, CM, SM, 0.1 UF, 50V	102880226T
CC10 - CC14	CAPACITOR, CM, SM, 0.1 UF, 50V	102880226T
D1 - D3	DIODE, SM, SWITCHING, BAV70	102252000T
D4, D5	DIODE, 1N6481	16016481SMT
D6	DIODE, SUPPRESSOR, ISMC33A	16010004SMT
D7 - D13	DIODE, SM, SWITCHING, BAV70	102252000T
D101 - D103	DIODE, SM, SWITCHING, BAV70	102252000T
FB1, FB2	#73 SHIELD BEAD	2404000100
J1	JACK, PC MT, 3/8" H	2013004900
J2, J3	HEADER, 6-PIN	59958106
J4 - J7	HEADER, 3-PIN	59958103
J8, J9	CONNECTOR, 6-POSITION, JST FJ-6P	20070143SM
Q1	TRANSISTOR, FET, SST5484	16025484SMT
Q2, Q3	TRANSISTOR, SM, SI NPN, MMBT5088	102210000T
Q10	TRANSISTOR, FET, MMBT5087	16025087SMT
Q11	TRANSISTOR, SM, SI NPN, MMBT5088	102210000T
Q12 - Q14	TRANSISTOR, FET, MMBT5087	16025087SMT
Q15	TRANSISTOR, SM, SI NPN, MMBT5088	102210000T
R1, R2	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R3	RESISTOR, SM, 1K OHM, 5%, 1/8W	102513102T
R4	RESISTOR, SM, 301 OHM, 1%, 1/8W	102404146T
R5	RESISTOR, SM, 3.01K OHM, 1%, 1/8W	102404246T
R6	RESISTOR, SM, 301 OHM, 1%, 1/8W	102404146T
R7	RESISTOR, SM, 3.01K OHM, 1%, 1/8W	102404246T
R8	RESISTOR, SM, 1K OHM, 5%, 1/8W	102513102T
R9, R10	RESISTOR, SM, 620 OHM, 5%, 1/8W	102513621T
R11	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R12, R13	RESISTOR, SM, 22 OHM, 5%, 1/8W	102513220T
R14	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R15 - R17	RESISTOR, SM, 5.1 MEG OHM, 5%, 1/8W	102513515T
R18	RESISTOR, SM, 200 OHM, 5%, 1/8W	102513201T
R19	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R20	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R21	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R22	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R23	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R24	RESISTOR, SM, 15K OHM, 5%, 1/8W	102513153T
R25	RESISTOR, SM, 10K OHM, 5%, 1/8W	102513103T
R26	RESISTOR, SM, 200 OHM, 5%, 1/8W	102513201T
R27	RESISTOR, SM, 100 OHM, 5%, 1/8W	102513101T
R28	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R29	RESISTOR, SM, 1K OHM, 5%, 1/8W	102513102T
R30	RESISTOR, SM, 10K OHM, 5%, 1/8W	102513103T
R31	RESISTOR, SM, 1K OHM, 5%, 1/8W	102513102T
R32	RESISTOR, SM, 220K OHM, 5%, 1/8W	102513224T
R33	RESISTOR, SM, 1K OHM, 5%, 1/8W	102513102T
R34	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R35	RESISTOR, SM, 68K OHM, 5%, 1/8W	102513683T
R36 - R38	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R39	POTENTIOMETER, LINEAR, 10K OHM, 25%, 0.1W	14090065SMT
R40, R41	RESISTOR, SM, 60.4K OHM, 1%, 1/8W	102404375T
R42, R43	RESISTOR, SM, 20K OHM, 1%, 1/8W	102404329T
R44	RESISTOR, SM, 100 OHM, 5%, 1/8W	102513101T
R45	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R46	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R47	RESISTOR, SM, 68K OHM, 5%, 1/8W	102513683T
R48	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T

MAIN CIRCUIT BOARD		
Ref No.	Description	Part No.
R49	RESISTOR, SM, 1K OHM, 5%, 1/8W	102513102T
R50, R51	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R52	POTENTIOMETER, LINEAR, 10K OHM, 25%, 0.1W	14090065SMT
R53, R54	RESISTOR, SM, 60.4K OHM, 1%, 1/8W	102404375T
R55, R56	RESISTOR, SM, 20K OHM, 1%, 1/8W	102404329T
R57	RESISTOR, SM, 100 OHM, 5%, 1/8W	102513101T
R58 - R60	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R61	RESISTOR, SM, 60.4K OHM, 1%, 1/8W	102404375T
R62	RESISTOR, SM, 10K OHM, 1%, 1/8W	102404300T
R63	RESISTOR, SM, 60.4K OHM, 1%, 1/8W	102404375T
R64	RESISTOR, SM, 10K OHM, 1%, 1/8W	102404300T
R65	TRIMPOT, 50K	1412100601
R66	RESISTOR, SM, 10K OHM, 5%, 1/8W	102513103T
R67	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R68	RESISTOR, SM, 10K OHM, 5%, 1/8W	102513103T
R69	RESISTOR, SM, 2.7 OHM, 5%, 1/8W	1025132R7T
R70	RESISTOR, SM, 10K OHM, 5%, 1/8W	102513103T
R71	RESISTOR, SM, 1.1K OHM, 5%, 1/8W	102513112T
R72	RESISTOR, SM, 30 OHM, 5%, 1/8W	102513300T
R73 - R76	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R77	RESISTOR, SM, 200 OHM, 5%, 1/8W	102513201T
R78, R79	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R80	RESISTOR, SM, 22 OHM, 5%, 1/8W	102513220T
R81	RESISTOR, SM, 30 OHM, 5%, 1/8W	102513300T
R82 - R84	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R85	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R101 - R104	RESISTOR, SM, 100K OHM, 5%, 1/8W	102513104T
R105	RESISTOR, SM, 270K OHM, 5%, 1/8W	102513274T
R106	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R107	RESISTOR, SM, 270K OHM, 5%, 1/8W	102513274T
R108 - R111	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R112	RESISTOR, SM, 2.2 MEG OHM, 5%, 1/8W	102513225T
R113 - R115	RESISTOR, SM, 270K OHM, 5%, 1/8W	102513274T
R116 - R118	RESISTOR, SM, 470K OHM, 5%, 1/8W	102513474T
R119 - R121	RESISTOR, SM, 47K OHM, 5%, 1/8W	102513473T
R122	RESISTOR, SM, 3K OHM, 5%, 1/8W	102513302T
R123	RESISTOR, SM, 39 OHM, 5%, 1/8W	102513390T
R124	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R125	RESISTOR, SM, 47K OHM, 5%, 1/8W	102513473T
R126	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R127	RESISTOR, SM, 47K OHM, 5%, 1/8W	102513473T
R128	RESISTOR, SM, 2.7 OHM, 5%, 1/8W	1025132R7T
R129	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
R130	RESISTOR, SM, 2.7 OHM, 5%, 1/8W	1025132R7T
R131	RESISTOR, SM, 22K OHM, 5%, 1/8W	102513223T
RP1, RP2	RESISTOR NETWORK, 22K OHM X 9, PIN 1 COM, 1.5W	1411220200
RR1 - RR6	RESISTOR, SM, 22 OHM, 5%, 1/8W	102513220T
S1	SWITCH, DIP, LOW PROFILE	19090002SMS
U1	IC, DUAL OP AMP, LM833	16030833SMT
U2	IC, ANALOG SWITCH, 4053B	53266123S
U3, U4	IC, SM, LP JFET INPUT OP AMP, TL062	16030131SMS
U5	IC, SM, DUAL OP AMP, MC34072	16030140SMS
U6, U7	IC, SM, LP JFET INPUT OP AMP, TL062	16030131SMS
U8	IC, VOLTAGE REGULATOR, LM317	53290000
U10	IC, SM, ADJ MICROPOWER VREG, LP2951CM	59631000S
U11	IC, QUAD SCHMIDT 2 INPUT NAND, 4093B	53266117
U12	IC, HD63701VOCP	1603014400S
U13, U14	IC, OP AMP, NATIONAL LM386N-1	53281000

MAIN CIRCUIT BOARD		
Ref No.	Description	Part No.
U15	IC, SM, DARL TRANS ARRAY, ULN2004A	16030008SMS
Y100	CRYSTAL, 4MHZ, FOX FFX-SM-4.00M	33010009SM
	IC, SM, TRIPLE 2 CHANNEL MUX, 4053	53266123
	CONNECTOR, ST HEADER, 0.100, M3	2007009900
	CAPACITOR, EL, SM, 22 UF, 35V	1099R2263GT
	IC, QUAD SCHMIDT 2 INPUT NAND, 4093B	53266117
	HEADER, 3-POSITION SINGLE ROW (PROGRAMMING JUMPER)	2007009900
	TRIMPOT SHAFT	2703002900
	HEATSINK	4502001600

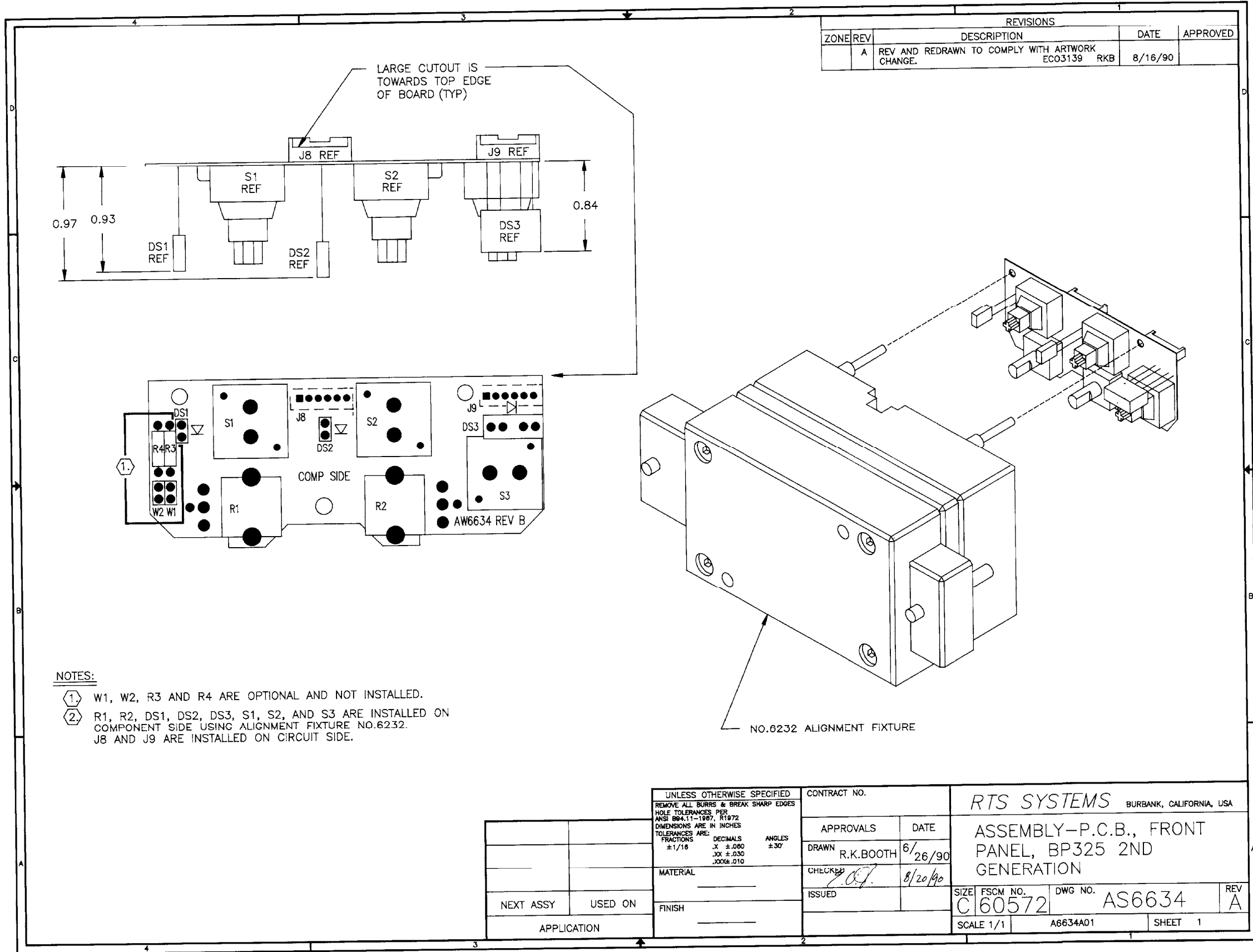
FRONT PANEL CIRCUIT BOARD		
Ref No.	Description	Part No.
DS1, DS2	LED, YELLOW	1801575100
DS3	LED, RED	1801002000
J8, J9	CONNECTOR, 6-PIN	2007014400
R1, R2	POT, 10 K, AUDIO	1406003901
S1 - S3	SWITCH, MOMENTARY KEYBOARD	1911004000

## DIAGRAMS

Drawing Number	Title
AS6634	Front Panel Circuit Board Component Layout
AS6635	Main Circuit Board Component Layout
AS6736	Rear Panel Assembly
AS6737	Front/Top Panel Assembly
AS6738	Final Assembly
SD6634	Schematic Diagram, Front Panel Circuit Board
SD6635	Schematic Diagram, Main Circuit Board

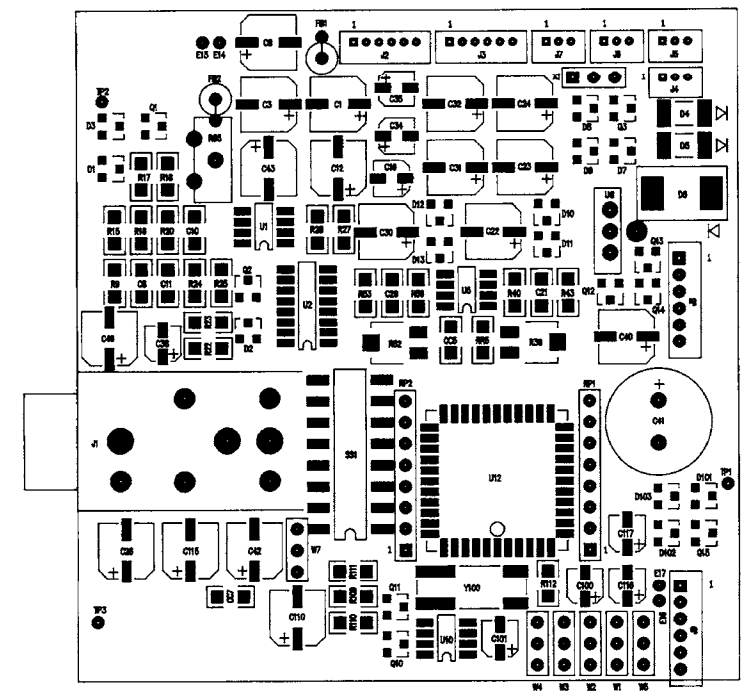
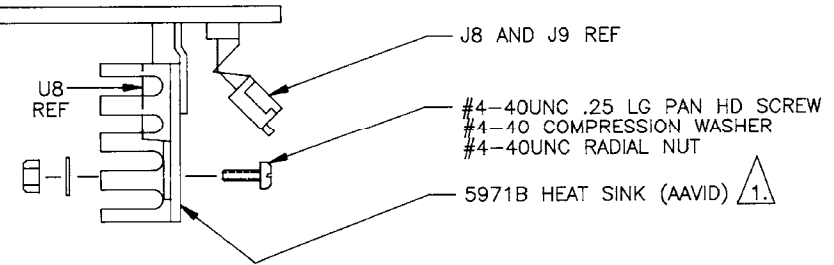


AS6634  
 ASSY-P.C.B., FRONT PANEL BP325 2ND GEN

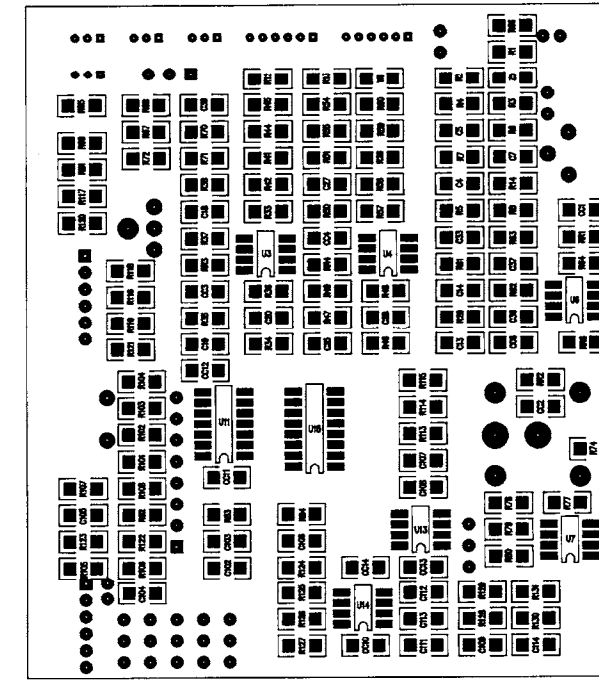


**AS6635 B**  
**ASSY-PCB, MAIN BD, BP325**

ZONE	REV	DESCRIPTION
	A	REV AND REDRAWN ARTWORK CHANGES.
	B	REV AND REDRAWN ARTWORK CHANGES.



TOP SIDE



BOTTOM SIDE

NOTES:

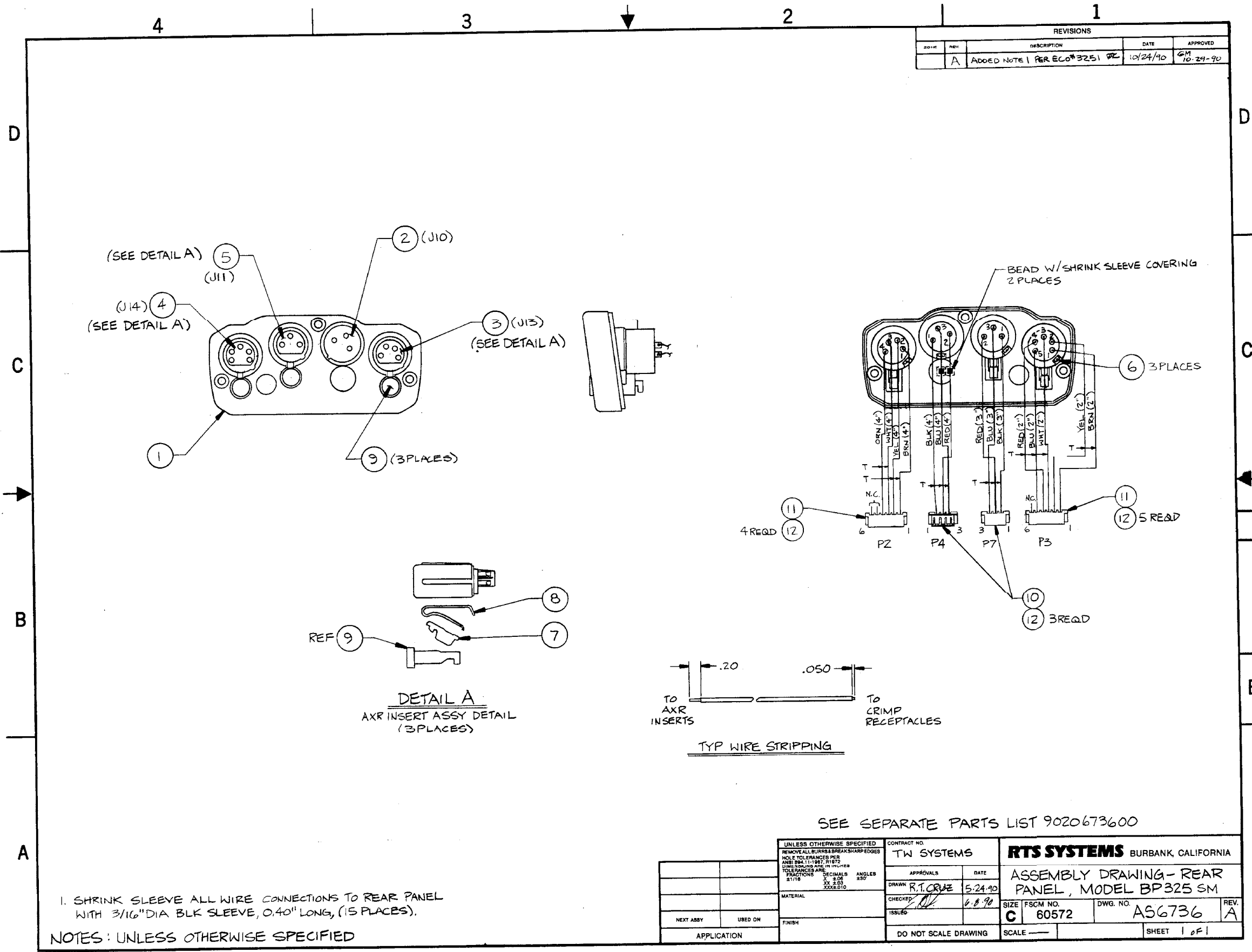
1. ATTACH HEATSINK TO REGULATOR (U8) WITH #4-40UNC SCREW, #4-40 COMPRESSION WASHER AND #4-40UNC RADIAL NUT.

		UNLESS OTHERWISE SPECIFIED REMOVE ALL BURRS & BREAK SHARP EDGES HOLE TOLERANCES PER ANSI B94.11-1997, R1872 DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/16 .X ±.060 ±.5° XX ±.030 XXX ±.010		CONTRACT NO.		RTS	
				APPROVALS		DATE	
AS6737		BP325		DRAWN R.K. BOOTH		3/15/90	
NEXT ASSY		USED ON		CHECKED			
APPLICATION		FINISH		ISSUED		SIZE FSCM C 60	
						SCALE 2/1	

EASH FILE CORP. IRVINE, CA      BPH 22

**AS6736**

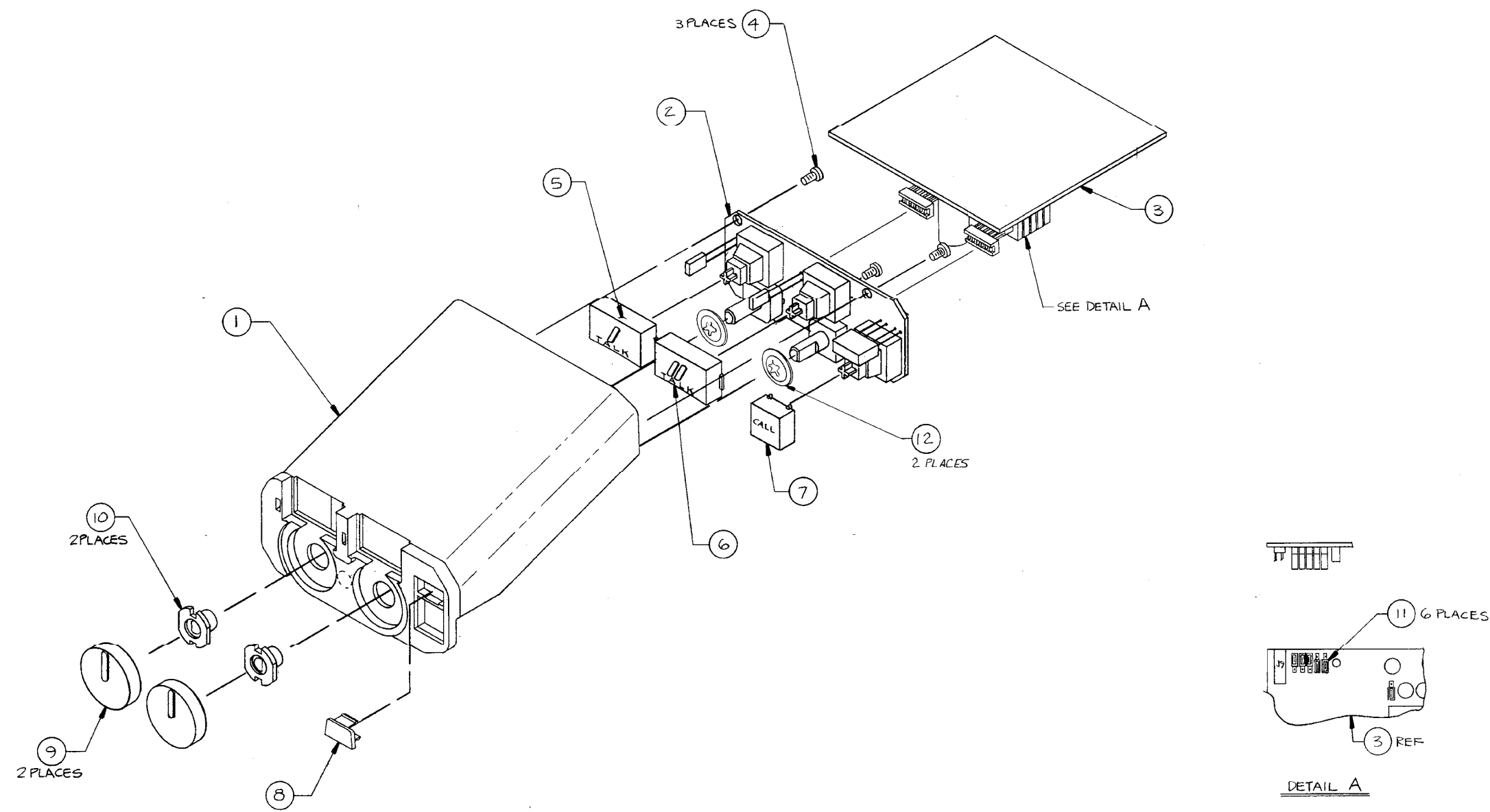
**ASSY DWG - REAR PNL - BP325 SMT**



Arch - Eng. Supply Co. 357-0001

8 7 6 5 4 3 2 1

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
A		CHGD LOCATION OF ITEM 11 PER ECO# 3251	10-25-90	G.M. 10-29-90
B		ADD PUSHBUTTON FASTENER, BALL POINT YEK ECO # 54908	12/12/91	M.J. M.O.



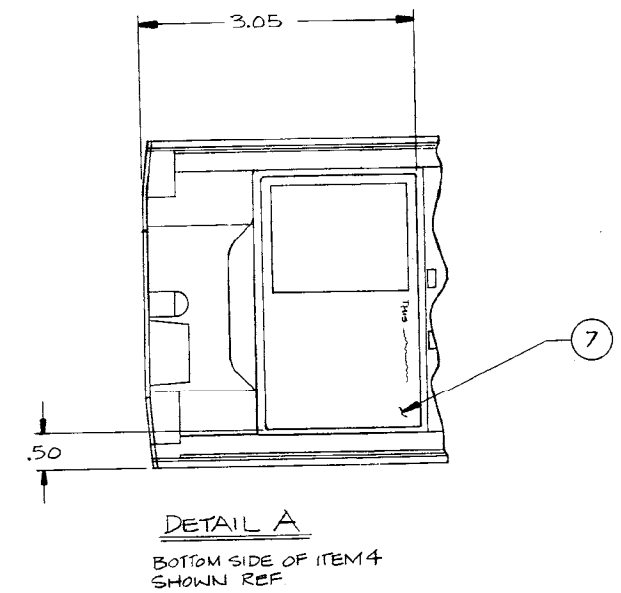
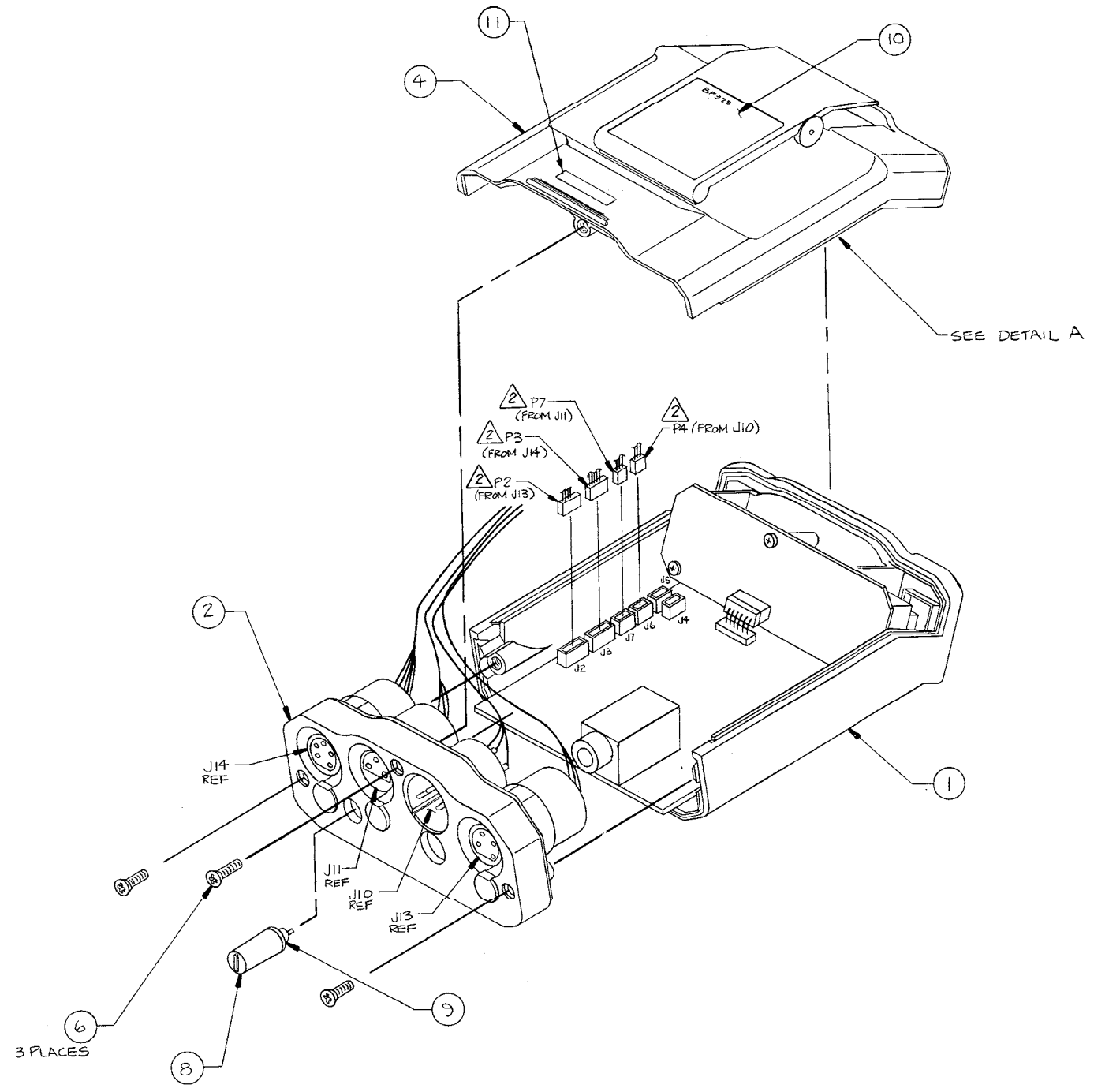
SEE SEPARATE PARTS LIST 9020673700

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XXX ±	CONTRACT NO. <b>TW SYSTEMS</b>		<b>RTS SYSTEMS</b> BURBANK, CALIFORNIA	
	APPROVALS	DATE	ASSEMBLY DRAWING— FRONT/TOP PANEL, BP325 SMT	
	DRAWN <i>R.T. CRUZ</i>	5-29-90		
	CHECKED <i>[Signature]</i>	6-8-90		
MATERIAL	ISSUED	SIZE <b>D</b>	FSCM NO. <b>60572</b>	DWG. NO. <b>AS6737</b>
FINISH	DO NOT SCALE DRAWING	SCALE	SHEET 1 OF 1	

NOTES: UNLESS OTHERWISE SPECIFIED

B.E.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ADDED NOTE 2 PER ECO# 3251	10-25-90	SM
	B	UPDATE ARTWORK, ITEM 11 ECD 50151	10-16-92	JL
	C	CHNG VIEW OF ITEM 11 ECD 60581	5-22-95	AL



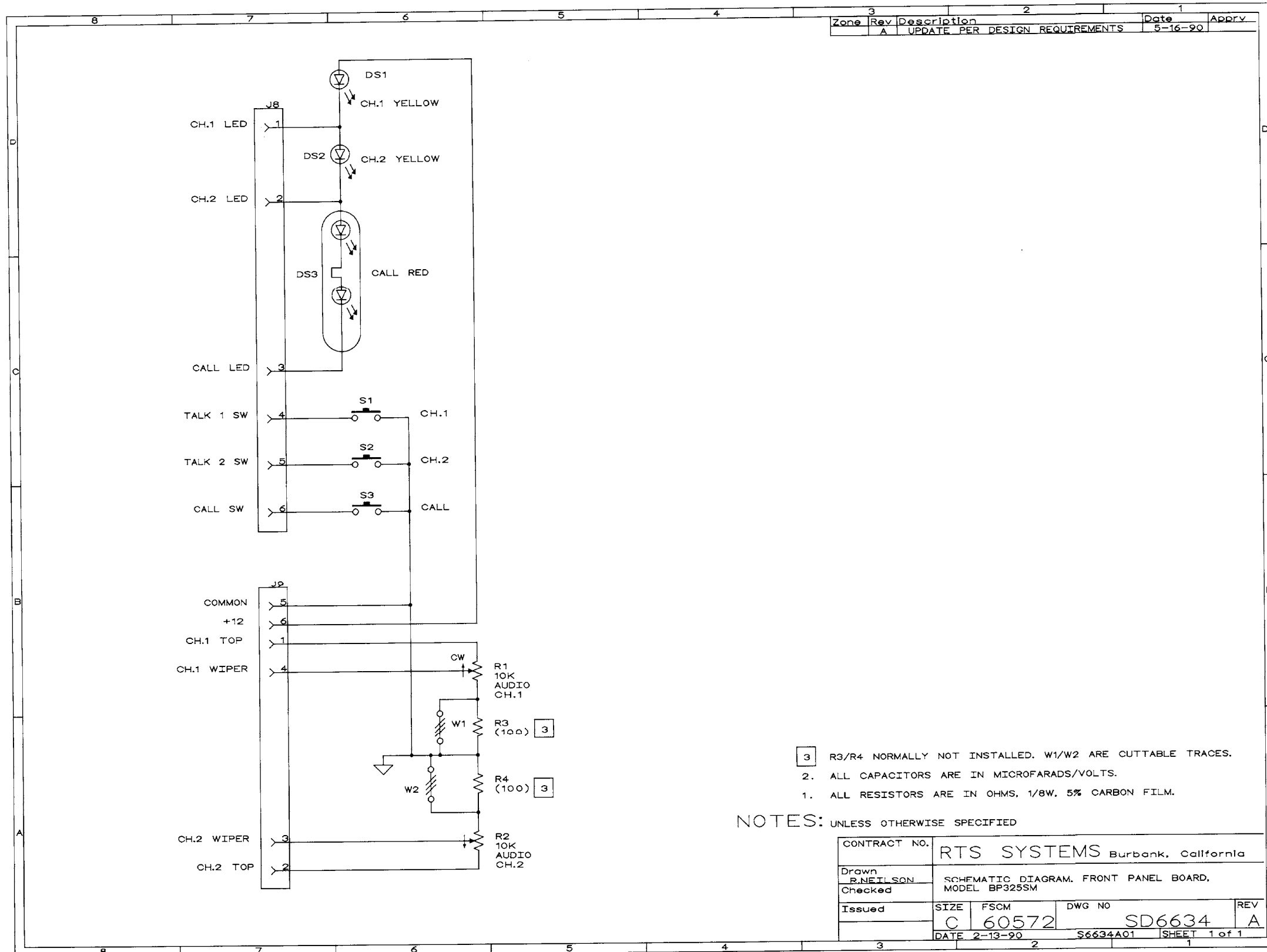
SEE SEPARATE PARTS LIST 9010673800

△ ROUTE WIRES AS SHOWN, AWAY FROM HEATSINK.  
 1. SEE SCHEMATIC DIAGRAM SD6635 FOR REF.  
 NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES .XX ± . .XXX ± .	CONTRACT NO.		RTS SYSTEMS BURBANK, CALIFORNIA	
	TW SYSTEMS		FINAL ASSEMBLY —	
	APPROVALS	DATE	USER STATION, PROGRAMMABLE	
	DRAWN RTCRUZ	5-30-90	MODEL BP325 SMT	
MATERIAL	CHECKED E. J.	6-8-90	SIZE FSCM NO.	DWG. NO.
FINISH	ISSUED		D 60572	AS6738
DO NOT SCALE DRAWING			SCALE	SHEET 1 OF 1

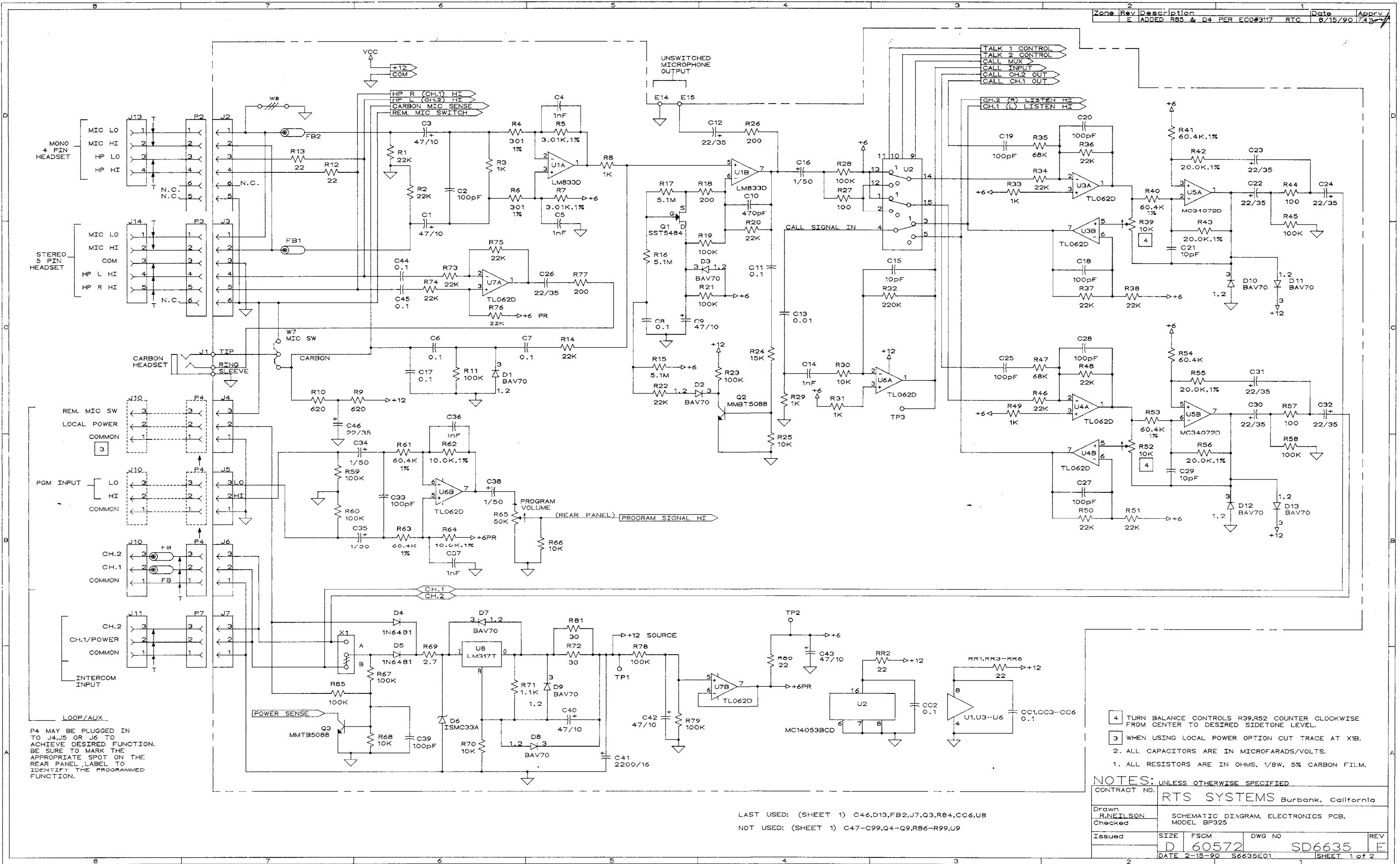
BEIG

EAS FILE CORP. IRVINE, CA  
 SD 6634 1 of 1  
 SCHEM - FRONT PANEL BOARD. BP325SM



- 3 R3/R4 NORMALLY NOT INSTALLED. W1/W2 ARE CUTTABLE TRACES.  
 2. ALL CAPACITORS ARE IN MICROFARADS/VOLTS.  
 1. ALL RESISTORS ARE IN OHMS, 1/8W, 5% CARBON FILM.
- NOTES: UNLESS OTHERWISE SPECIFIED

CONTRACT NO.		RTS SYSTEMS Burbank, California		
Drawn	E. NELSON	SCHEMATIC DIAGRAM, FRONT PANEL BOARD, MODEL BP325SM		
Checked		SIZE	FSCM	DWG NO
Issued		C	60572	SD6634
		DATE	2-13-90	S6634A01 SHEET 1 of 1



P4 MAY BE PLUGGED IN TO J4, J5 OR J6 TO ACHIEVE DESIRED FUNCTION. BE SURE TO MARK THE APPROPRIATE SPOT ON THE REAR PANEL LABEL TO IDENTIFY THE PROGRAMMED FUNCTION.

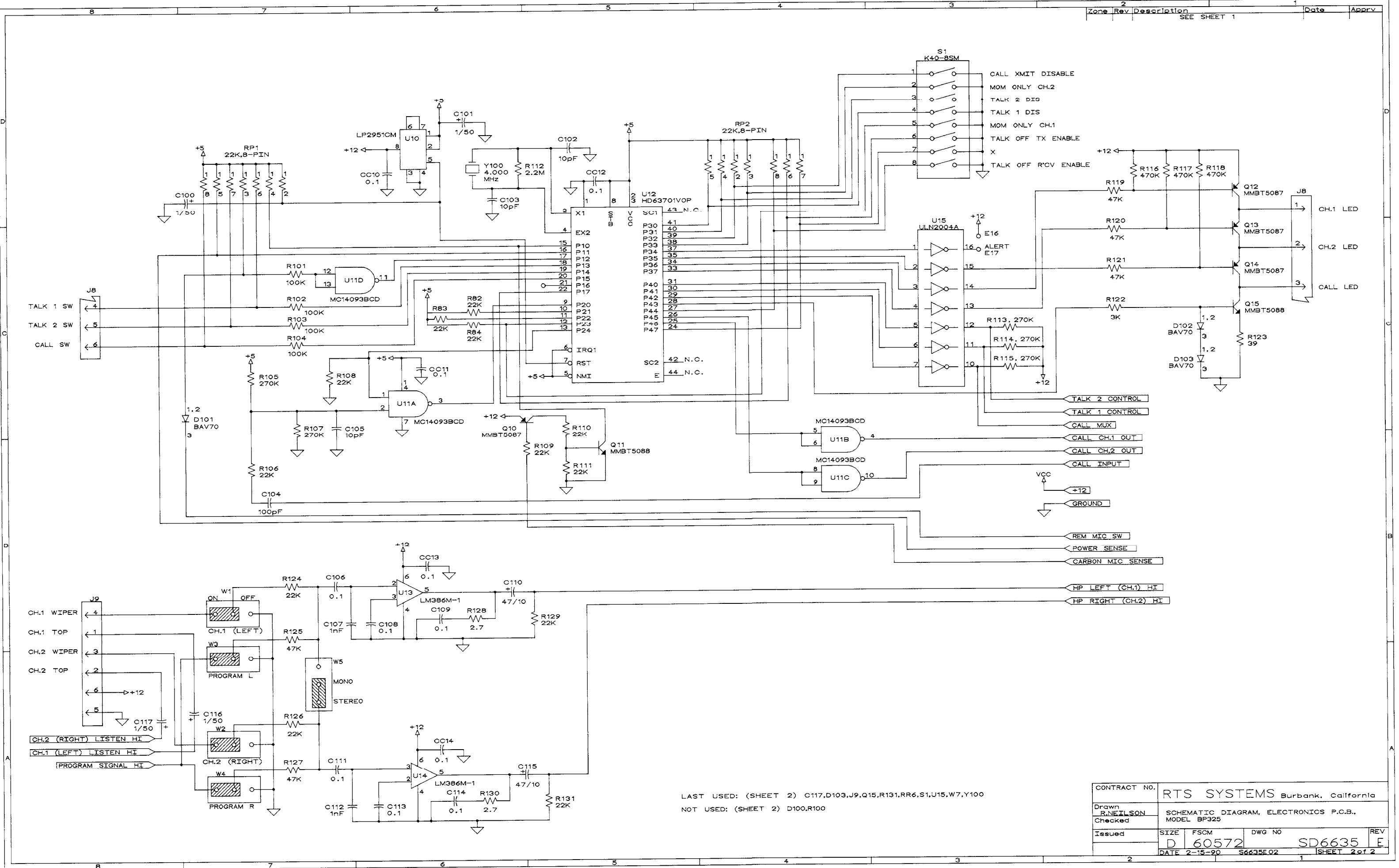
- 4 TURN BALANCE CONTROLS R39,R52 COUNTER CLOCKWISE FROM CENTER TO DESIRED SIDETONE LEVEL.
- 3 WHEN USING LOCAL POWER OPTION CUT TRACE AT X1B.
- 2. ALL CAPACITORS ARE IN MICROFARADS/VOLTS.
- 1. ALL RESISTORS ARE IN OHMS, 1/8W, 5% CARBON FILM.

**NOTES:** UNLESS OTHERWISE SPECIFIED

CONTRACT NO.		RTS SYSTEMS Burbank, California	
Drawn	R.NELSON	SCHEMATIC DIAGRAM, ELECTRONICS PCB, MODEL BP325	
Checked		Issued	
SIZE	FSCM	DWG NO	REV
D	60572	SD6635	E
DATE	2-15-90	S6635E01	SHEET 1 of 2

LAST USED: (SHEET 1) C46,D13,FB2,J7,Q3,R84,CC6,U8  
 NOT USED: (SHEET 1) C47-C99,Q4-Q9,R86-R99,U9

Zone	Rev	Description	Date	Apprv
		SEE SHEET 1		



LAST USED: (SHEET 2) C117,D103,J9,Q15,R131,RR6,S1,U15,W7,Y100  
 NOT USED: (SHEET 2) D100,R100

CONTRACT NO.		RTS SYSTEMS Burbank, California		
Drawn	R. NELSON	SCHEMATIC DIAGRAM, ELECTRONICS P.C.B., MODEL BP325		
Checked		SIZE	FSCM	DWG NO
Issued		D	60572	SD6635
		DATE	2-15-90	S6635E02
				ISHEET 2 of 2