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# **DSP-232+**

## **Upgrade Kit A.06113**

Revision 3

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Installation  
and  
Operation  
Manual



## **WARRANTY**

### **TIMEWAVE TECHNOLOGY INC. LIMITED ONE YEAR WARRANTY**

#### **WHO IS COVERED**

This warranty is extended only to the original purchaser of the A.06113.

#### **WHAT WE WILL DO**

If your A.06113 fails in normal use because of a defect in workmanship or materials within one year of the date of purchase, we will repair or replace (at our option) the equipment at our factory without charge to you. Timewave will pay for the return of the warranty-repaired unit to you.

#### **WHAT YOU MUST DO**

First, double check your connections and operating procedure. If you're certain that the unit is faulty, notify Timewave Customer Service immediately. If Timewave is unable to resolve the problem by telephone or email, we will give you an RMA number and ask you to return the unit. You must pay all shipping and insurance charges for returning the unit to our factory.

#### **WHAT IS NOT COVERED**

We cannot be responsible for damage caused by accidents, abuse, misuse, improper installation, or unauthorized attempts to repair the unit. This warranty does not cover any parts of the DSP-232 except the A.06113.

#### **SERVICE WARRANTY**

Timewave service work performed in connection with this warranty is warranted to be free from defects in materials and workmanship for 30 days from the date of repair. All other terms of the limited warranty apply to the service warranty.

#### **HOW TO CONTACT TIMEWAVE**

Contact Timewave Customer Service by telephone at (651) 489-5080 or by FAX at (651) 489-5066.

Mailing and shipping address:  
Timewave Technology Inc.  
1025 Selby Ave.  
St. Paul, MN 55104

email: sales@timewave.com  
techsupport@timewave.com  
service@timewave.com

web: www.timewave.com

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# Introduction

Thank you for purchasing the Upgrade kit for the DSP-232+. The Timewave part number of this kit is A.06113.

The kit contains a firmware upgrade that adds a sound card interface command, a Pactor 1600/1400 Hz modem, enables the CW keying output, the Pactor mode, and the mailbox function for Pactor, AMTOR, and packet. Several minor bugs in the DSP-232 are fixed by this firmware release. With this upgrade, the DSP-232 will operate the Baudot, AMTOR, Pactor, Morse, 1200 baud packet and 9600 baud packet modes, as well as sound card modes supported by your PC computer sound card.

The kit has two 128k x8 byte SRAM I.C. chips to increase the mailbox memory size from approximately 18 kbytes to 242 KBytes.

The kit also contains the two circuit boards necessary for the the sound card interface and hardware CW keying output. A new DSP-232 housing top section accommodates the five new jacks added to the back panel of the the DSP-232.

The sound card interface adds transformer isolated I/O for sound card connections. The new Sound Card (SC) command switches the Radio 1 connections from the DSP-232 internal modems to the PC sound card modems. New features on the sound card interface board are adjustable audio input and output levels, simultaneous DSP-232 and sound card reception/decoding and selectable sound card/DSP-232 TX audio data mixing or switching.

The CW keying output modification provides an output to operate a CW key input on modern transceivers. An open collector transistor output pulls a positive voltage (100 volts DC @ 100 mA. maximum) radio key input to ground when the DSP-232 sends morse code. An alternate connection is available for negative keying (-30 VDC @ 20 mA. maximum).

The 10k resistor is a replacement for R31, currently 27K. Replacing this component will increase the sensitivity of your DSP-232.

The enclosed CD contains a demo copy of PK-Term for Windows. This is a 32-bit Windows 95 or later program the supports the DSP-232+. If you decide to purchase PK-Term for Windows, contact Creative Services Software at [sales@cssincorp.com](mailto:sales@cssincorp.com) or (256) 381-6100.

Follow the instructions carefully and you should have no problem in getting the unit on the air. If you do have questions, Timewave has technical support available at (651) 489-5080 and [service@timewave.com](mailto:service@timewave.com).

# DSP-232+ Upgrade Kit

## Section 1

### DSP-232 Upgrade Kit Installation

#### Installation steps

Please check the contents of the kit at this time. You should have received:

- 1 Sound Card Interface/CW keying output upgrade assembly  
( two boards connected by a ribbon cable)
- 3 Eprom I.C. ver. 1.0H (U4, U5, U33)
- 2 128k x 8 SRAM I.C. (U6, U7)
- 1 10k Ohm, 1/4 watt resistor
- 1 DSP-232 top housing assembly
- 2 Round knurled nuts for 3.5 mm jacks
- 1 DSP-232+ Upgrade Installation and Operation instructions
- 1 Warranty card
- 1 Timewave CD ROM (also contains this document in .pdf format)

Here are the tools you will need:

- Wire Cutters
- Needle nose pliers
- Phillips Screwdriver
- Jeweler's screwdriver
- Flat blade screwdriver
- 3/16" hex nut driver
- Solder pencil and solder
- Solder sucker tool or solder wick for cleaning the pads on R31

Clear an area to work on your DSP-232+. You should take standard electro-static discharge (ESD) precautions when working on any ham equipment.

Here are the steps in the upgrade procedure:

## **Disassembly**

*Keep all removed parts, some are necessary to re-assemble the DSP-232*

1. Remove all cables and power from the unit.
2. Remove the two 3/16 nuts from the DB-9 serial port interface.
3. Remove knurl nuts from receive jacks 1 and 2.
4. Remove the six screws from the sides and back of the DSP-232.
5. Remove the top cover of the DSP-232.

## **EPROM Installation**

1. Position the unit with the face toward you. Locate U4 and U5 in the center of the board.
2. Note the position of U4 and U5 in the socket (notch toward the front of the unit). The chip is inserted toward the back of the IC socket (Pins 1, 2, 31 and 32 are not used).
3. Use a small flat blade screwdriver to remove U4. Be sure to insert the blade between the IC and the socket, **NOT UNDER THE SOCKET**.
4. Examine the pins on the new chip. Be sure the legs of the IC are not bent
5. Place the chip in the socket and seat. Examine the chip carefully to make sure that the legs of the IC are in the socket and are not bent and folded under the IC.

Repeat steps 3 through 5 for IC U5.

Repeat steps 3 through 5 for IC U33. Note the position of U33 in the socket (notch toward the rear of the unit). **This is the reverse of U4 and U5.**

## **Mailbox Memory Upgrade**

### **Increasing the size of your mailbox**

You purchased your DSP-232 with the standard 18K mailbox (32K RAM). You may increase the size of the mailbox in your DSP-232 by installing either one or two additional SRAM chips. If you install only one, you will have a 150K mailbox (160K RAM). If you install two chips, you will have a 242K mailbox (256K RAM). The firmware in your DSP-232 does not need to be changed. All that is necessary is to install the additional SRAM chip(s).

### **To install additional mailbox space do the following:**

#### **SRAM Installation**

1. Position the unit with the face toward you. Locate U6 and U7 in the center of the board.
2. NOTE the position of U6 and U7 in the socket (notch toward the front of the unit). The chip is inserted toward the back of the IC socket (Pins 1, 2, 31 and 32 are not used).
3. Use a small flat blade screwdriver to remove U4. Be sure to insert the blade between the IC and the socket, NOT UNDER THE SOCKET.
4. Examine the pins on the new U6 chip. Be sure the legs of the IC are not bent
5. Place the chip in the socket and seat. Examine the chip carefully to make sure that the legs of the IC are not bent and folded under the IC and are in the socket.

Repeat steps 6 through 8 for IC U7. This completes the memory upgrade.

#### **Sensitivity Resistor Installation**

Next locate U23 (located 1" above the battery. U23 is parallel to front panel. R31 is located next to the left-hand end of U23. It is currently a 27K resistor (Color code red, purple, orange and gold). Use a small soldering iron to remove and replace R31 with the 10K resistor supplied with the upgrade kit. This completes the sensitivity upgrade

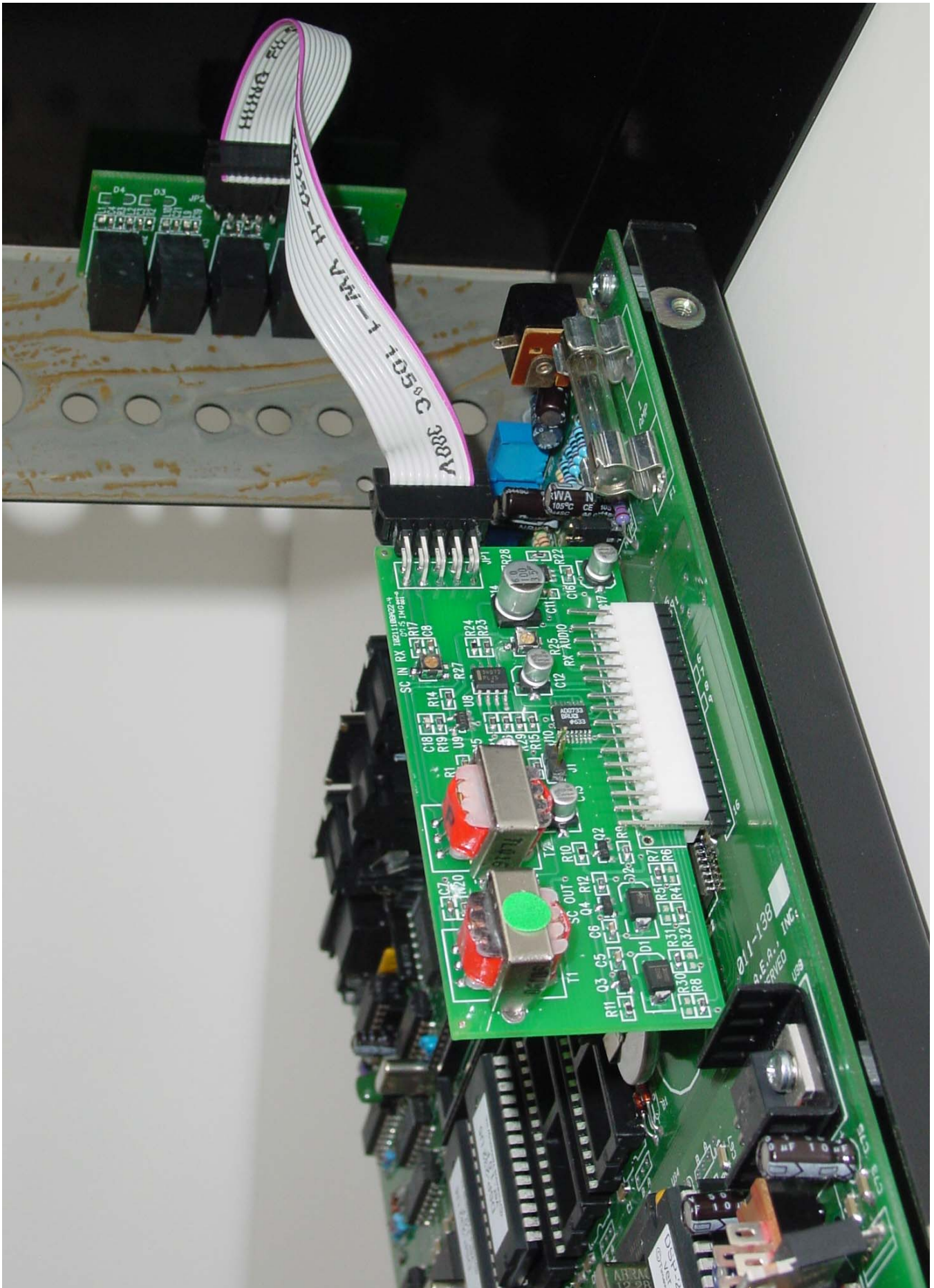
## Sound Card Interface / CW Keying Board Installation

1. Remove the two black jumpers from the pins on the J5 Option Jack near the right side of the DSP-232.
2. Slide the 15 pin SCI/CW board connector P1 on the 16 pins of J5 Option Jack near the right side of the DSP-232. The components on the CW keying board should face the right edge of the DSP-232. Make sure all the pins fit into the corresponding jacks on P1. The pin on J5 nearest to the front of the DSP-232 should be not be inserted into the SCI/CW board connector P1. See Figure 1 for orientation of the board.
3. Mount the SCI/CW keying jack in five round holes in the top of the back panel of the new DSP-232+ top housing assembly. Orient the jack board so that it will not touch any components on the main PC board when the cover is in place. The jack board will be upside down when the cover is installed. See Figure 1 for correct orientation of the board.
4. Connect the ribbon cable as shown in the picture in Figure 1. Note the orientation of the ribbon cable and connectors. Position them exactly as shown in the picture.
5. You should only have two black jumpers remaining – they are not used. Tape them to the inside cover of your manual in case you should decide to use them later.

## Re-assembly

1. Replace the cover and replace all screws and nuts removed in steps 2-4.
2. Reconnect the cables to the unit. Reset the unit and start operating!





## Section 2

### Connecting the DSP-232+

#### 2.1 CW keying Connections for the DSP-232

The 3.5mm phone plug from your radio's keying input should have the tip connected to the CW keying line and the sleeve connected to ground. Plug the 3.5 mm plug from radio's keying input into the CW Keying out (J11) - the jack nearest the DSP-232 power connector.

**Your radio must be keyed by pulling the positive keying input line to ground. Contact Timewave if you wish to use you DSP-232 with an older transmitter with grid-block keying.**

#### 2.2 Sound Card Interface Connections for the DSP-232

Carefully study the DSP-232+ Block Diagram (Figure 2) on the next page.

Connect the PC sound card inputs and outputs as shown on the block diagram using the supplied 3.5 mm stereo audio cables.

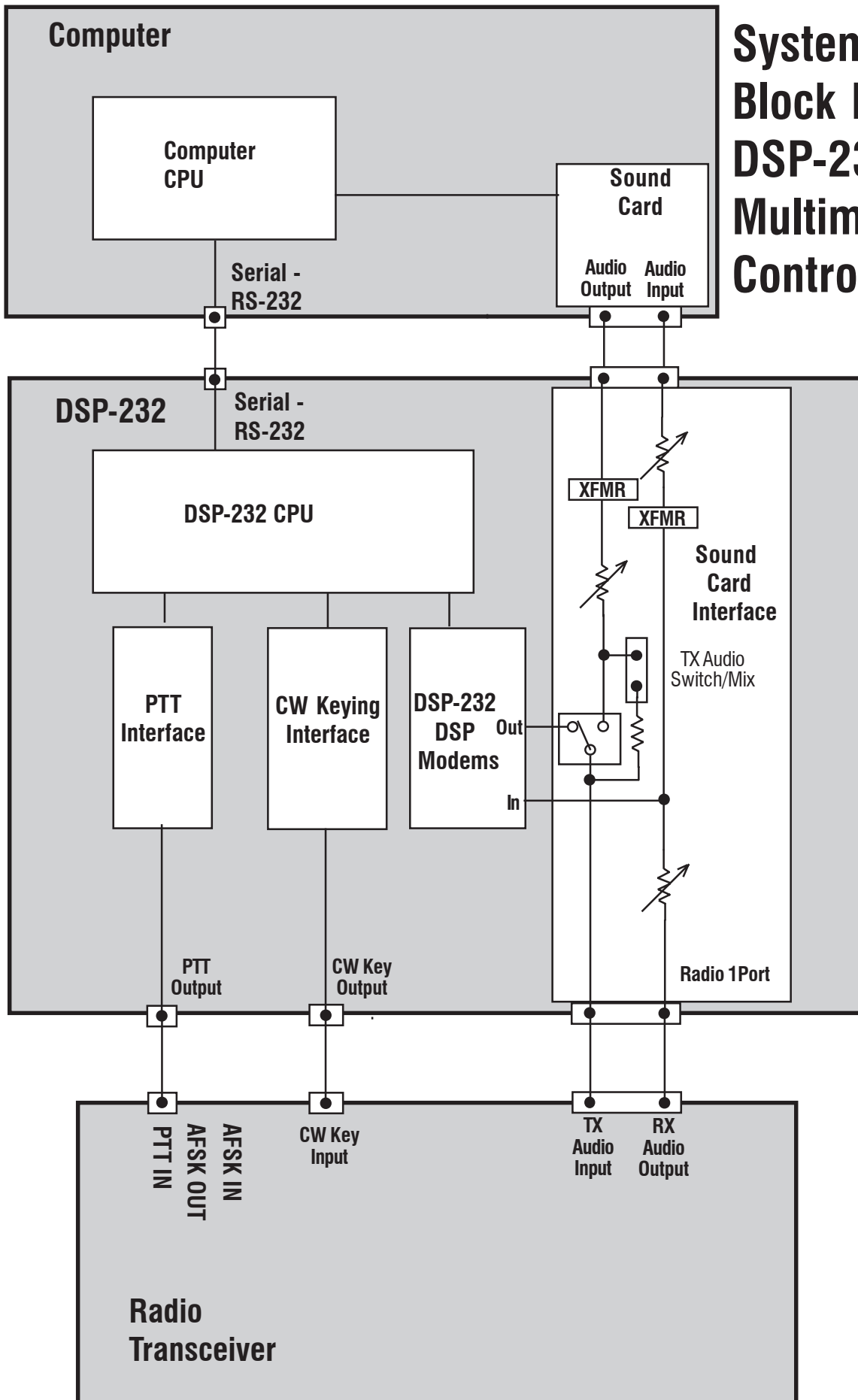
The sound card output plug connects to the DSP-232 sound card output jack J9.

You may connect the your PC sound card loudspeaker plug to J12 on the DSP-232 output jack. This eliminates the need for a Y cable adaptor for the speaker.

The Sound Card input plug connects to the DSP-232 sound card input jack J10.

The Sound Card interface adds transformer-isolated I/O for sound card connections. The new Sound Card (SC) command switches the Radio 1 connections from the DSP-232 internal modems to the PC sound card modems. New features on the sound card interface board are adjustable audio input and output levels, simultaneous DSP-232 and sound card reception/decoding and selectable sound card/DSP-232 TX audio data mixing or switching.

# System Block Diagram DSP-232 + Multimode Controller



## Section 3

### DSP-232 Upgrade Operation

The DSP-232 upgrade allows you to operate Pactor and use the mailbox feature for AMTOR, Pactor and packet. Follow the instructions in the DSP-232 operating manual to operate in these modes. You will need a PC software program for the mode you wish to use. PK-Term for Windows fully supports the DSP-232. Download the latest demo copy of PK-Term for Windows from <http://www.cssincorp.com>. A copy is also on the Timewave CD for your convenience.

The Sound Card Interface adds transformer-isolated I/O for sound card connections. The new Sound Card (SC) command switches the Radio 1 connections from the DSP-232 internal modems to the PC sound card modems. New features on the sound card interface board are adjustable audio input and output levels, simultaneous DSP-232 and sound card reception/decoding and selectable sound card/DSP-232 TX audio data mixing or switching.

The CW Keying output feature added by the DSP-232 Upgrade requires no changes to your operating procedure for CW. Follow the instructions in the DSP-232 operating manual to operate in this mode.

The input sensitivity added by the DSP-232 Upgrade requires no changes to your operating procedures. The DSP-232 will require less input signal after the modification is installed.

There are three level adjustment trimpots on the DSP-232+ Sound card interface board. The functional names of trimpots are printed on the PC board near each trimpot.

#### “SC OUT” Sound Card Output level adjustment

If the sound card output audio level is high enough to over-drive the DSP-232 input, use this trimpot to lower the level.

#### “SC IN RX” Sound Card In level adjustment

This trimpot adjusts the level from the DSP-232 output to the sound card input.

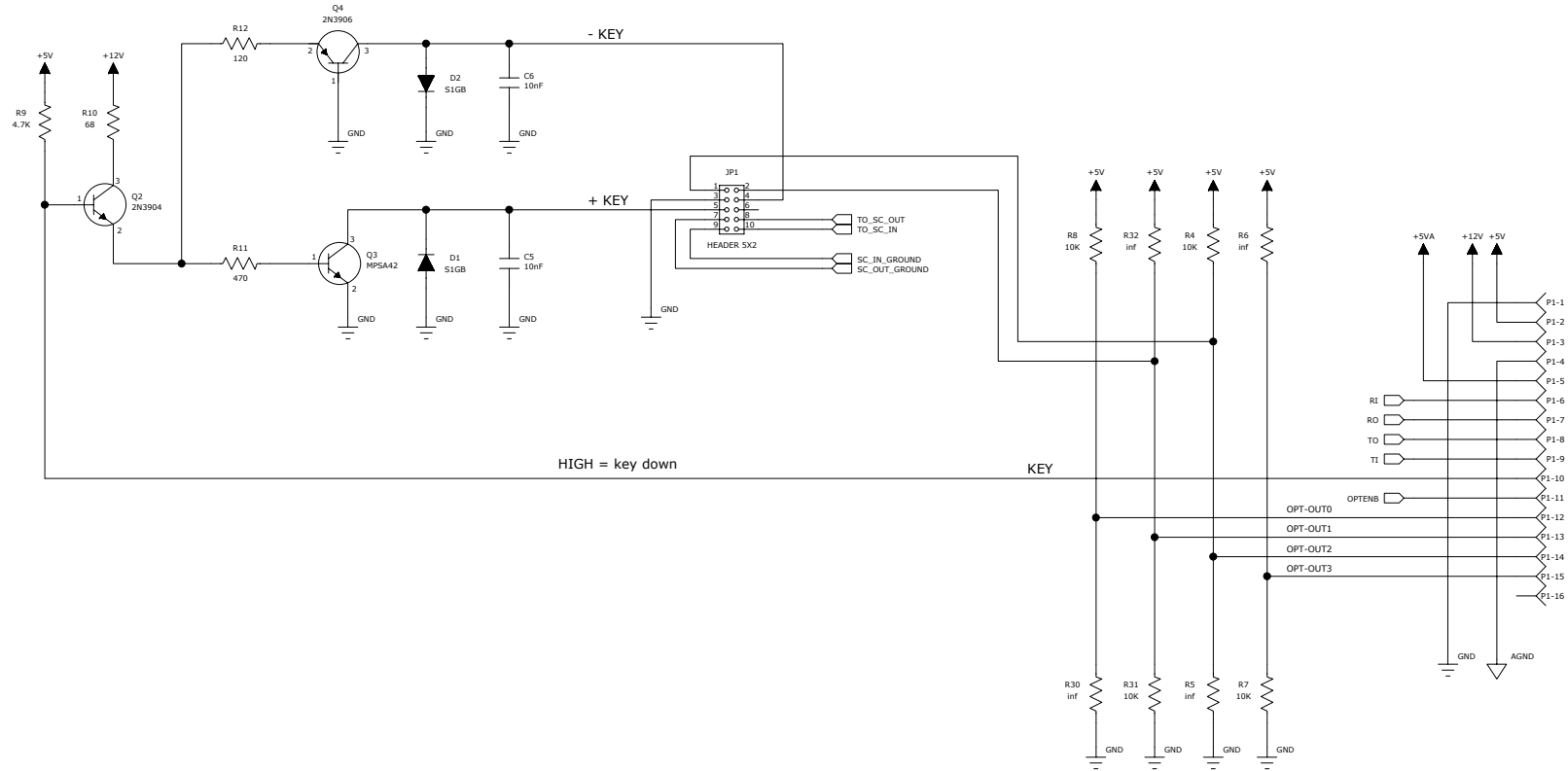
#### “RX AUDIO” Receive Audio Input level adjustment

This trimpot adjusts the level from the radio audio output to the DSP-232 input.

## **Section 4**

### **DSP-232 CW Output Upgrade kit Schematic Diagrams**

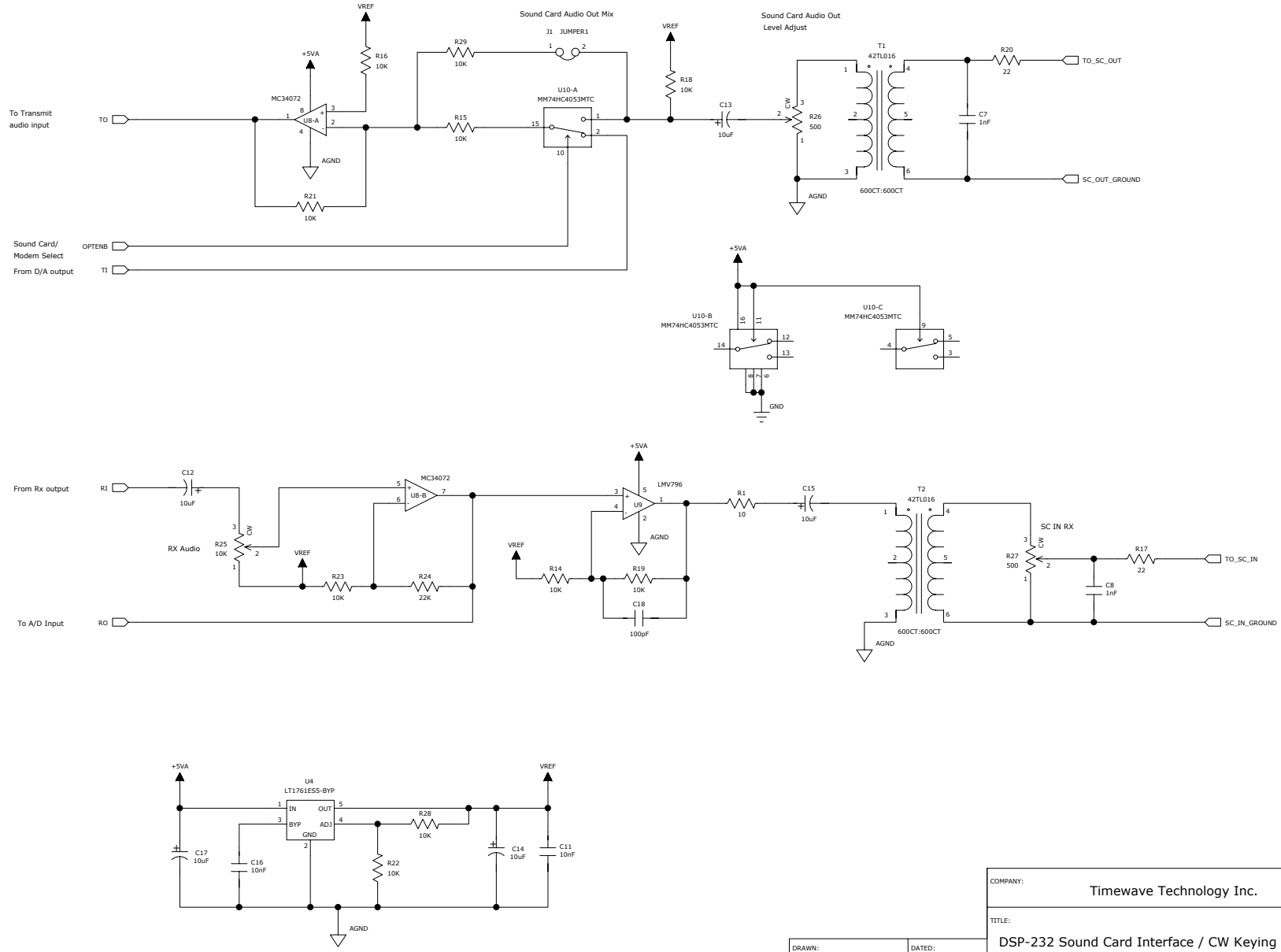
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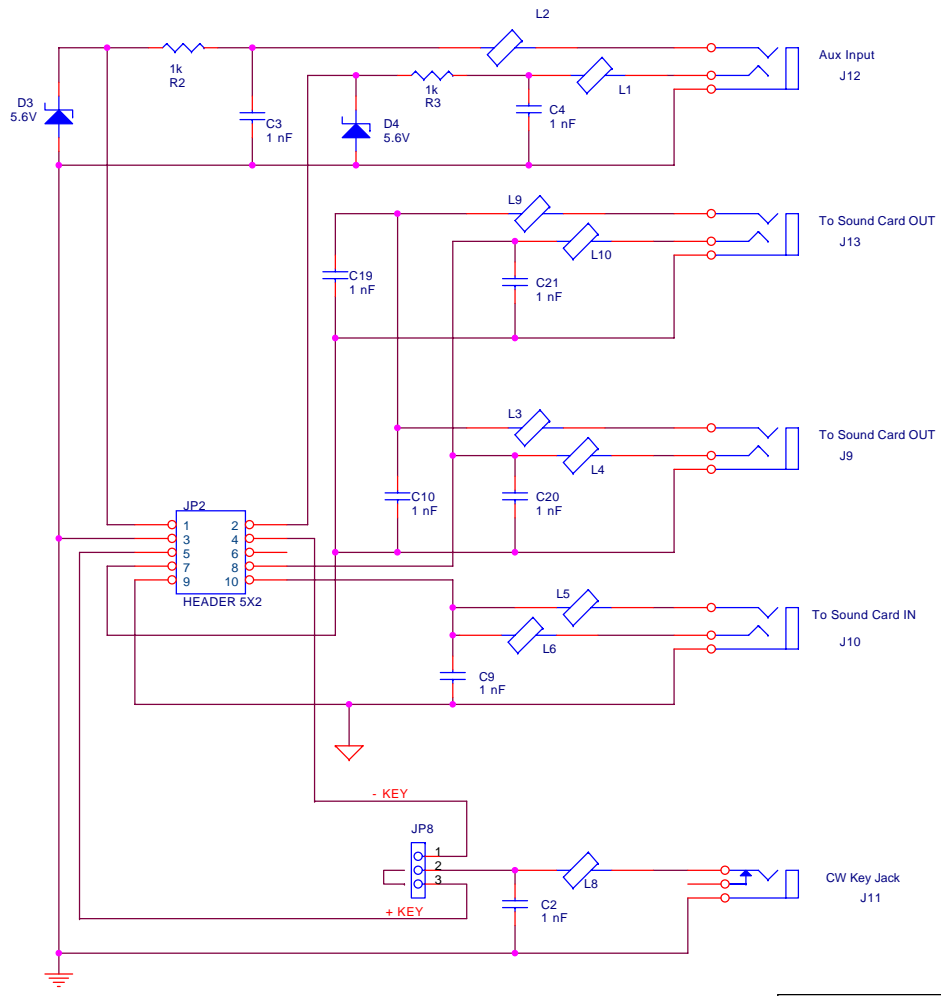
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