SS2000D

CONTROLLER/ENCODER

INSTALLATION AND OPERATION INSTRUCTIONS

F E D E R A L   S I G N A L   C O R P O R A T I O N
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SS2000D
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SAFETY NOTICES

People's lives depend on your selection of suitable equipment and installation sites and your safe installation, service, and operation of our products. Federal Signal recommends the following publications from the Federal Emergency Management Agency for assistance with planning an outdoor warning system: 1. The "Outdoor Warning Guide (CPG 1-17), 2. "Civil Preparedness, Principles of Warning" (CPG 1-14), 3. FEMA-REP-1, Appendix 3 (Nuclear Plant Guideline), and 4. FEMA-REP-10 (Nuclear Plant Guideline). Contact Federal Warning System's Customer Care Center at: http://www.federalwarningsystems.com or 1-800-524-3021 for further information about these publications.

It is important to read, understand and follow all instructions shipped with this product. In addition, listed below are some other important safety instructions and precautions you should follow.

PLANNING

- If suitable warning equipment is not selected, the installation site for the siren is not selected properly or the siren is not installed properly, it may not produce the intended optimum audible warning. Follow Federal Emergency Management Agency (FEMA) recommendations.

- If sirens are not activated in a timely manner when an emergency condition exists, they cannot provide the intended audible warning. It is imperative that knowledgeable people, who are provided with the necessary information, are available at all times to authorize the activation of the sirens.

- When sirens are used out of doors, people indoors may not be able to hear the warning signals. Separate warning devices or procedures may be needed to effectively warn people indoors.

- The sound output of sirens is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan siren placement, post warnings, and restrict access to areas near sirens.

- Activating the sirens may not result in people taking the desired actions if those to be warned are not properly trained about the meaning of siren sounds. Siren users should follow FEMA recommendations and instruct those to be warned of correct actions to be taken.

- A siren that doesn't work won't provide any warning. After installation, service, or maintenance, test the siren system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

- If future service and operating personnel do not have these instructions to refer to, the siren system may not provide the intended audible warning and service personnel may be exposed to death, permanent hearing loss, or other bodily injury. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to new recruits and trainees. Also give a copy to anyone who is going to service or repair the siren.

SAFETY NOTICES

People's lives depend on your safe installation, service and operation of our products. It is important to read, understand and follow all instructions shipped with this product. In addition, listed below are some other important safety instructions and precautions you should follow:

INSTALLATION & SERVICE

- Electrocution or severe personal injury can occur when performing various installation and service functions such as making electrical connections, drilling holes, or lifting equipment. Therefore experienced electricians in accordance with national, state and any other electrical codes having jurisdiction should perform installation. All work should be performed under the direction of the installation or service crew safety foreman.

- The sound output of sirens is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan siren placement, post warnings and restrict access to areas near the sirens. Sirens may be operated from remote control points. Whenever possible, disconnect all siren power including batteries before working near the siren.

- After installation or service, test the siren system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

- If future service personnel do not have these warnings and all other instructions shipped with the equipment to refer to, the siren system may not provide the intended audible warning and service personnel may be exposed to death, permanent hearing loss, or other bodily injury. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to new recruits and trainees. Also, give a copy to anyone who is going to service or repair the sirens. For additional copies, call the Federal Warning Systems Customer Care Center at 800-524-3021 or write to them at 2645 Federal Signal Drive, University Park, IL 60466.

OPERATION

- Failure to understand the capabilities and limitations of your siren system could result in permanent hearing loss, other serious injuries or death to persons too close to the sirens when you activate them or to those you need to warn. Carefully read and thoroughly understand all safety notices in this manual and all operations-related-items in all instruction manuals shipped with equipment. Thoroughly discuss all contingency plans with those responsible for warning people in your community, company, or jurisdiction.

Limited Warranty

*The Signal Division, **Federal Signal Corporation,** warrants each new product to be free from defects in material and workmanship, under normal use and service, for a period of two years (one year for Informer, EAS, and Federal software products) on parts replacement and one year on labor from the date of delivery to the first user-purchaser. Federal Warning Systems warrants every 2001 Siren (Top of pole only) to be free from defects in material, per our standard warranty, under normal use and service for a period of Five years on parts replacement.*

During this warranty period, the obligation of Federal is limited to repairing or replacing, as Federal may elect, any part or parts of such product which after examination by Federal discloses to be defective in material and/or workmanship.

Federal will provide warranty for any unit which is delivered, transported prepaid, to the Federal factory or designated authorized warranty service center for examination and such examination reveals a defect in material and/or workmanship.

This warranty does not cover travel expenses, the cost of specialized equipment for gaining access to the product, or labor changes for removal and re-installation of the product. The Federal Signal Corporation warranty shall not apply to components or accessories that have a separate warranty by the original manufacturer, such as, but not limited to, batteries.

This warranty does not extend to any unit which has been subjected to abuse, misuse, improper installation or which has been inadequately maintained, nor to units which have problems related to service or modification at any facility other than Federal factory or authorized warranty service centers.

THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL FEDERAL BE LIABLE FOR ANY LOSS OF PROFITS OR ANY INDIRECT OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY SUCH DEFECT IN MATERIAL WORKMANSHIP.

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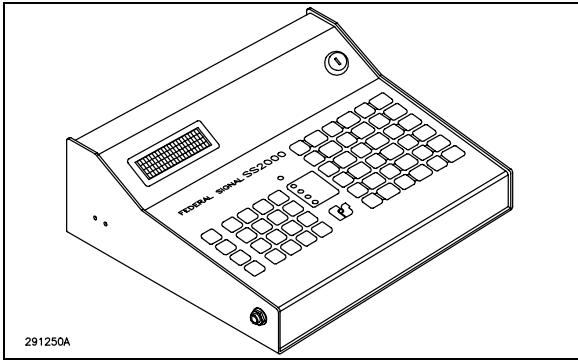

Fig. 1.1: SS2000 Desk Model
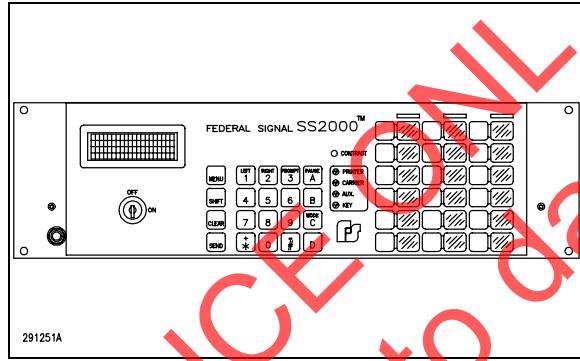
Fig. 1.2: SS2000 19" Rack Mount

1-1. GENERAL

The SS2000D is a versatile, low cost two-way status monitoring digital siren controller. The FSK encoded command sequences are programmable and stored in non-volatile memory for retention even when electrical power is removed. Command sequences and operating parameters may be up or downloaded to the user's host computer. Power for the unit is supplied by a standard AC wall outlet and backed-up with an optional battery.

The SS2000D functions as a stand-alone FSK encoder for siren control. With an optional printer, reports can be generated for each activation showing the function activated and the time and date of activation. Reports indicate siren site number, type of siren, detailed status of siren, and time and date of the report.

All SS2000D controllers feature a four line backlit wide angle LCD display, a Quick Touch[R] activation keypad, and 18 user programmable function keys. Four LEDs are used to indicate printer, RF carrier detect, key press and computer communication status. A key lock is

provided to secure the controller's keypad. There is also an adjustable 600 ohm input and output to enable easy connection to standard radio and land line mediums.

A speaker is built in for monitoring incoming system traffic and outgoing transmissions.

A microphone input is provided to connect live voice to the communication system.

Peripherals:

SS-REMOTE:
The SS-REMOTE is an interface unit to the SS2000D which enables activation from remote contact closures. Up to 20 functions may be activated from distances exceeding 1 mile.

SFCDWARE:
SFCDWARE is a Windows[R] application software program for control, status logging and management of siren systems. SFCDWARE functions as the system console for a compressive siren control system. For detailed information on SFCDWARE, please refer to the SFCDWARE operator's manual.

1-2. SPECIFICATIONS

1-2-1. THE SS2000D

Electrical

Power Supply Input................... 11.5 - 20 VDC
Battery Input............................ 11.5 - 20 VDC
Input Current .... 400 mADC (MAX)
Audio Output........................... Balanced 600 ohm, -55dbm to 0dbm
Audio Input.............................. Balanced 600 ohm, -35dbm to 0dbm
Distortion................................. < 3.0%

Encode / Decode Modem Format
MSK... 1200 BAUD
(MSK is a Minimal Shift Keyed digital format)

Decode Sensitivity.................... <8-10dB S/N or 12dB SINAD

Relay Outputs........................... 3 DPDT 1.25A at 24 VDC
                                                    0.4A at 120 VAC

Carrier Detect........................... Active High   4.5 - 14 VDC
                                                    Active Low   0 - 3.0 VDC

VOX... -35dbm to 0dbm

SPEAKER: Power Handling................. 1 watt
                        Impedance................. 8 ohms

MICROPHONE: Input Level.............. 10mV - 100mV p-p
                              Input Impedance....... 12K ohms
                              Input Jack............... 1/4" phone
                              Pinouts: Tip.........Audio
                                              Ring.......PTT
                                              Shield....Gnd

Communication Ports
Parallel Port..............................IBM Compatible Printer Port
Serial Port Protocol...................RS232 9600 BAUD, N, 8, 1, Xmodem Standard

Environmental
Operating Temperature............. 0º to 50ºC

Physical
Size.................... Desk model, 11.57 x 10.25 x 4.20   L x W x H inches
                              Rack model, 19.00 x 10.09 x 5.24

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1-2-2. SS-REMOTE SPECIFICATIONS:

Electrical:

Input Voltage	14.5 Volts
Input Current	15 mAmps (Typical)
Maximum Input Contact Resistance	500 ohms
Max. tolerable induced voltage	500 Volts
Input/Output Isolation (opto coupler)	5000 Vac

Maximum length of Remote Connector Cable (10 ohm/ 1000 ft)	30,000 ft.
Maximum wire gauge	12 AWG
Maximum length of I^2C connector	3 ft.

Maximum number of remote contacts	20
Remote input debounce	1/4 sec.

Physical:

Size	11.4 x 4.0 x 2.08 inches
Weight	1.0 lb.
Color	Black
Operating Temperature	0° to 50ºC

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1-3. SS2000D OPERATION

The SS2000D keypad is secured with a key lock switch. When the key is in the OFF position, the LCD displays the "** Keypad Locked **" message along with the following information: (See figure 1.1)
- The type of the controller.
- Current software revision

```
** Keypad Locked **
Federal Signal
SS2000D
REV: x.x
```

Fig 1.1: Keypad Locked

When the key is turned to ON position, the keypad becomes enabled and STANDBY screen displays on the LCD. The unit is now ready to accept the commands. (See figure 1.2)

```
Press Function Key
F1..F18 to Activate

SS2000D (s) STANDBY
```
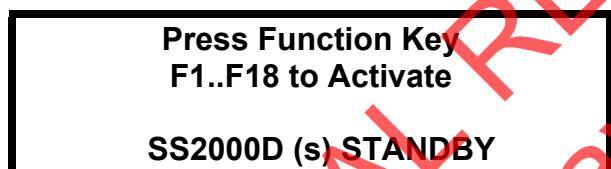
Fig 1.2: Standby Screen

Communication Modes:

The SS2000D has an extensive yet simple to operate command structure. There are two communication modes for the SS2000D. These modes are depicted in the middle of line 4 of the SS2000D LCD by a single character on the STANDBY screen. The User should select these modes carefully as they affect the way the SS2000D will operate. Selecting the wrong communication mode may cause undesirable operation of the unit. The mode's setting is stored in FLASH memory. Powering down the unit

does not alter the user selected settings. These modes are defined as follows:

STANDALONE MODE (s):
This is the stand alone operating mode and is represented by (s). **Configuration values (DAT file) can be downloaded or uploaded in this mode ONLY.** (See section 3.5 and 3.6 for downloading and uploading of DAT file). Standalone mode is generally used only when SFCDWARE and a personal computer is not connected to the SS2000D. The SS2000D cannot communicate with SFCDWARE in this mode.

*COMPUTER MODE (c):
This mode is represented by 'c' in the lower center of the LCD. In this mode the SS2000D can communicate with the SFCDWARE computer. **When used with SFCDWARE, the SS2000D must always be set to computer mode**.

To switch between modes press 'SHIFT' and then press 'MODE' from the MAIN MENU.

Note: In this manual the SS2000D is shown to be in the Standalone (s) mode. The Computer mode (c) is not different from the users point of view, except for UPLOAD, DOWNLOAD modes and the differences discussed above . Hence, this manual also applies to computer(c) modes of operation.

Commands or functions are divided into two broad categories:
- Instant Mode functions (STANDBY SCREEN): From this screen the user can activate sirens by pressing function keys or request status. This is the default screen that should be displayed at all times unless it is desired to access menu-mode functions (Fig 1.2).

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- MENU Mode functions (SYSTEM MENU): These functions deals with programming, configuring, calibrating, monitoring, downloading, uploading and setting up the SS2000D unit. These are as shown in fig. 1.3.

1. Printer	**2. Config**
3. Calib	**4. Program**
5. Download	**6. Upload**
System Menu	
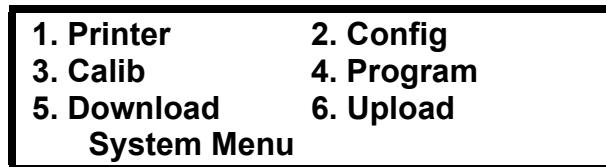
Fig 1.3: System Menu

To choose a function from the System MENU, press the number corresponding to the function.

Press MENU key to switch between STANDBY and SYSTEM MENU screens. Besides selecting the Instant Mode functions the following operations are directly possible from the STANDBY screen.

SHIFT+MODE: Changes the communication mode.

System Watchdog Timer:

The SS2000D has a built in Watch Dog Timer feature that can be used to alert an operator of potential problems with the SS2000D when more than one SS2000D is used in the control system. The AUX relay output is held closed by the SS2000D until it loses power, stops operating correctly, or if it does not receive a request for report from another control station in over 60 minutes.

To use this feature, the SS2000D's must poll each other to check communications status at least once an hour. If an SS2000D does not receive a poll request in over an hour, the SS2000D will open the AUX relay output to signal that an error has been detected.

SECTION II
INSTANT MODES

2-1. AUTOMATIC MODE

Automatic mode provides the user a quick and easy method of sending activation commands.

```
 F01: Function 1
 Select:
 All,   Zone  or   SITE
 AUTOMATIC    STANDBY
```

Fig 2.1: Automatic Mode

To access AUTOMATIC MODE:
There are two ways to access Auto Mode:
1. Press one of the eighteen pre-programmed function keys.
2. Activate an input on the SS-REMOTE.

Automatic mode is indicated by the word AUTOMATIC in the lower left corner of the LCD. The current status is displayed in the lower right corner. (Refer to fig. 2.1).

Each function button is programmed for one of three possible operating modes:
- MAN Mode - (Manual Send) - The operator will be asked to select a destination site.
- APS Mode - (Automatic Prompt Send) - The operator will be prompted for SEND.
- AS Mode - (Automatic Send) - No other key presses are required, the activation is immediately transmitted.

To select destination site:
When Automatic Mode screen is displayed, Press the **All, Zone or Site** key to select the type of activation. If "All" is selected, the function shown will immediately be transmitted to All sites in your system. If Zone or Site is selected, you will be prompted to enter a Zone or Site number (fig 2.2). After entering in a valid Zone or Site number, press send to transmit the function to the selected zone or site. Note: Press CLEAR at any time to clear out and re-enter the site number.

```
 F01: Function 1

 Enter Site:000
 Automatic    Standby
```

Fig 2.2: Site Number Prompt

To exit AUTOMATIC mode:
Press CLEAR key to abort automatic mode and return to the STANDBY screen at any time. If the Site Number Prompt screen is displayed and the site number is non-zero, press CLEAR twice to return to STANDBY.

MENU
Alternates between STANDBY screen and SYSTEM MENU.

CLEAR
- Clears the function key list if in STANDBY.
- Aborts the transmission if in TRANSMIT.

SEND
Transmits the FSK FRAME

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2-2. REPORT MODE

Report mode (used in two-way systems only) is used to poll sites and obtain their current status. A single site or all sites can be selected for polling. The list of sites to be polled for "All Sites" is defined in the configuration parameters (see CONFIG mode). A report request message is sent to each site in the site list. If a response is not received within the specified report time-out period (also defined in CONFIG mode), the request is re-transmitted. This process is repeated for the number of report retries (specified in the CONFIG mode). If a site's response is received, it is formatted and sent to the printer.

```
Select:
      ALL  or  SITE

 REPORT        STANDBY
```
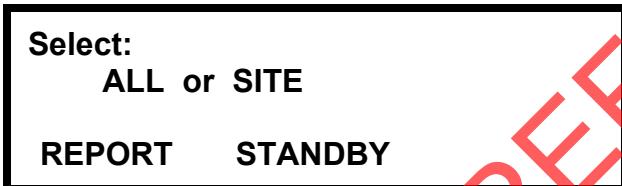
Fig 2.3: Report Mode

To access Report Mode:
Press REPORT from the STANDBY screen. The report mode display appears on the LCD with STANDBY as unit status (fig 2.3).

To select destination site:
When REPORT Mode screen is displayed, Press the **All, or Site** key to select the type of Poll. If "All" is selected, the All polling sequence will immediately begin. The SS2000D will poll each site configured in your poll string parameter, one at a time. If SITE is selected, you will be prompted to enter a Site number (fig 2.4). After entering in a valid Site number, press send to start transmission. Note: Press CLEAR at any time to clear out and re-enter the site number.

```
Select:

 Enter Site:000
 REPORT        Standby
```

Fig 2.4: Site Number Prompt

To exit REPORT MODE:
Press CLEAR to exit to STANDBY screen. If the Site Number Prompt screen is displayed with a non-zero site number, press CLEAR twice to exit to STANDBY screen.

KEYs and their related functions specific to Report Mode are as follows:

> **MENU**
> Exits to SYSTEM MENU.
>
> **SEND**
> Begins report polling sequence.
> Note: If All is selected, pressing SEND is not required.
>
> **CLEAR**
> Aborts report polling sequence.

SECTION III
SYSTEM MENU MODES

3-1. PRINTER MODE

The purpose of the PRINTER mode is to monitor the printer status. In this mode line one of the LCD displays messages regarding printer's status. Printer LED, which goes on every time the SS2000D send something to the printer, can also be turned off in this mode.

```
 Printer  Off
 LED ON - Press CLEAR

 PRINTER      STANDBY
```

Fig 3.1: Printer Mode

To access PRINTER mode:
- Press number '1' from SYSTEM MENU.
- PRINTER MODE messages with the unit status STANDBY appears on the LCD.
- First line of the LCD displays the Printer Status Messages, which are as follows:

> **NO Paper**
> Printer is out of paper or the paper is jammed.

> **Printer Off**
> Printer's Select or On-line switch is toggled off.

> **Printer Error**
> Printer malfunction.

> **Printer OK**
> Printer is ready.

> **LED ON - Press CLEAR**
> This message is displayed on the second line of the LCD. The SS2000D turns the printer LED on whenever it sends some data to the printer. The printer LED can be turned off here by pressing CLEAR key.

To exit the PRINTER MODE:
Press MENU to exit to STANDBY.

KEYs and their related functions specific to Printer Mode are as follows:

MENU
Exits to STANDBY.

CLEAR
Clears the printer alert LED.

3-2. CONFIG MODE

The SS2000D contains a data file which configures the SS2000D for proper operation. The Config Mode is used to view and edit the data in this file.

The entries in this mode are extremely critical for the total system operation. Therefore, the user accessing this mode must be well familiar with the overall system requirements and configurations.

When CONFIG mode is accessed, the user is prompted to enter a password. The password should be keyed in followed by the SEND key. Once a valid password is entered, user may review or modify parameters.

```
Enter         Password



CONFIG        STANDBY
```

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Fig 3.2a: Config Mode-password

To access CONFIG MODE:
- Press '2' from the SYSTEM MENU.
- CONFIG mode appears on the LCD with unit status as STANDBY as shown in fig. 3.2a.
- Enter password followed by SEND key to review or modify the configuration parameters. Upon entering the valid password first configuration parameter is displayed on the LCD, as shown in fig. 3.2b.

```
1. FRONT PORCH              time

100                         msec
CONFIG      STANDBY
```
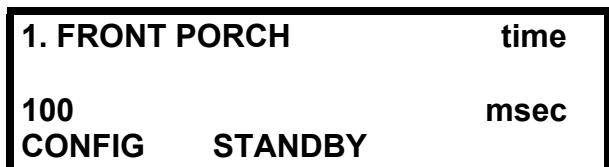
Fig 3.2b: Config Mode-review

To review configuration parameters:
- Each SEND key press brings up the next configuration parameter for review.

To modify configuration parameters:
- With the required parameter on the display press CLEAR key to enter 'modify' session. The LCD changes as shown in fig. 3.2c.

```
1. FRONT PORCH              time
 5...9999                   msec

 CONFIG      STANDBY
```

Fig 3.2c: Config Mode - modify

- Line 1 displays parameter count # and parameter name.
- Line 2 displays minimum and maximum acceptable values for that particular parameter. (or it will be 0...1 for yes/no type of replies.)
- Third line is for user to enter new value.

- If a mistake is made, press CLEAR to erase the entry and re-enter.
- When done with entering the new value press SEND **twice** to secure and confirm the new entry. This terminates the 'modify' session and puts the user back into 'review' session.

To exit CONFIG MODE:
- Press MENU to exit to STANDBY

KEYs and their related actions are as follows:

MENU
Exits to the STANDBY screen.

CLEAR
Clears the current parameter and begins modify session.

DIGITS
Accepts the digits appropriate for the current parameter to be modified.

SEND
During 'review' session, proceeds to the next configuration parameter.
During 'modify' session, validates the newly entered value for the current parameter. If a valid entry has been made, the new value is re displayed. *To save a valid entry and to move on to the next step, SEND has to be pressed twice.*

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CONFIGURATION PARAMETERS
Count, name (label), limits and definitions:

1. FRONT PORCH on time: *5 to 9999 msec*. Dead carrier delay before FSK transmission.

2. BACK PORCH time: 5 to 9999 *msec* Dead carrier delay before terminating FSK transmission

3. Pause duration: *5 to 9999 msec* The amount of time system will pause when it sees a pause (=) character during data transmission. Multiple pauses can be cascaded.

4. Report timeout: *1 to 9999 sec* The time that SS2000D will wait for remote siren site to respond to a report request before re-sounding or quitting the report request to that particular remote site.

5. Report Attempts: *1 to 9* Number of times the request for report will be sent to a non-responding remote site.

6. Carrier Detect active state: *0 or 1* 0 = active low, 1 = active high

7. Trunking Mode: *0 or 1* 0 = disabled, 1 = enabled

8. Use Printer: *0 or 1* 0 = no printer, 1 = printer

9. Password: *up to 5 digits* Password to access CONFIG mode.

10. Date:

Month	*1 to 12*
Day	*1 to 31*
Year	*1993 to 2100*

11. Time:

Hour	*1 to 23*
Minutes	*1 to 59*
Seconds	*1 to 59*

12. Unit ID: *0 to 9.* This is the SS2000D FSK packet address. Usually set to 0 for single SS2000D systems.

Addresses 0 to 4 are reserved for Primary SS2000D's. Addresses 5 to 9 are reserved for Secondary SS2000D's.

Primary SS2000D's will capture the Automatic siren reports after they poll the system or a site. Secondary SS2000D's can poll the system for status reports, but will not redirect Automatic siren reports to their base address.

13. Alarm Interval: *0-3* Specifies the frequency of automatic alarms:
- 0 = disabled
- 1 = daily
- 2 = weekly
- 3 = monthly

Note: If monthly is chosen, the Alarm Day defaults to the first week of the month.

If the interval = 0, skip to parameter 14.

Alarm Day	*1 to 7*

Alarm Time

Alarm Hour	*0 to 23*
Alarm Minute	*1 to 59*
Alarm Function	*1 to 50*

14. Comm Mode: *0 or 1*
- 0 = Standalone Mode
- 1 = Computer Mode

Must be set to Computer Mode if used with SFCDWARE, otherwise set to Standalone Mode.

15. Site Addresses: #001#002. . .#255 Up to 255 sites may be programmed, each beginning with a '#'. Lists the sites to be polled during an ALL REPORT.

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16. Review Repeaters Allows the viewing of repeater paths programmed for each siren site. SS2000D transmissions will hop through these repeaters to reach a fringe site. Note: Repeaters paths can only be programmed by uploading a DAT file (UPLOAD MODE).

3-3. CALIBRATION MODE

The SS2000D typically operates with radios attached. The output level FSK frames going into the attached radio is adjusted using Calibration mode. Calibration mode allows the user to transmit a modem tone for 10 uninterrupted seconds. Refer to section 4-2 for adjustment information.

Note: Typically a deviation of 4.0 KHz is used for most radio systems.

```
Press              Send/Enter


CAL        STANDBY
```
Fig 3.3: Calibration Mode

To access CALIBRATION (CAL) MODE:
• Press '3' from the SYSTEM MENU.
• CAL mode appears on the LCD with unit status as STANDBY as shown in fig. 3.3.

To transmit calibration character:
• Press SEND to begin transmission.
• The SS2000D transmits the mark modem tone for a continuous 10 seconds and then shuts it off.
• To transmit again simply press SEND again.

To exit CAL MODE:
• Press MENU to exit to STANDBY.

KEYs and their related actions specific to CAL Mode are as follows:

MENU
Exits to STANDBY.

SEND
Transmits the mark modem tone.

3-4. PROGRAM MODE

Program mode allows the ability to review or change the activation code programmed under the function buttons F01 - F18.

```
 Press function key


PROGRAM       STANDBY
```
Fig 3.4: Program Mode

To access PROGRAM MODE:
• Press '4' from the SYSTEM MENU.
• PROGRAM mode appears on the LCD with unit status as STANDBY as shown in fig. 3.4.

To review or program a function key:
1. Press desired function key button to review or program. The current activation code programmed for this function key appears on the LCD as shown in fig 3.4a

```
F01: Function 1
Code: 1
Site: 001
Mode: MAN        STANDBY
```

Fig 3.4a: Program Mode

- Line1: Function key number and name.
- Line2: Activation code.
- Line3: Destination site(s) to receive this code.
- Line4: Function key mode.

Function Key Modes:

- MAN (Manual) - The operator will be prompted for the destination site(s) and SEND.

- APS (Auto Prompt Send) - The operator will be prompted for SEND only. The destination site(s) will be as shown on line 3 of the LCD.

- AS (Auto Send) - The activation code will be transmitted immediately upon pressing function button. Destination site(s) will be as shown on line 3 of the LCD.

2. Press MENU to exit program mode without changing the contents of function button. Press CLEAR to change the information programmed for this function button. The LCD changes as shown in fig 3.4b.

```
F01: Function  1
ENTER CODE NUMBER  (1-50)
97=CAN    98=QT    99=MR
00
```

Fig 3.4b Program Mode

Enter a valid activation code (1-50) and press SEND. The predefined codes are:
    97 = Cancel (CAN)
    98 = Quiet Test (QT)
    99 = Reset (MR)
The LCD changes as shown in fig 3.4c.

```
F01: Function  1
ENTER  MODE
1=MAN  2=APS  3=AS
1
```

Fig 3.4c Program Mode

Enter the operating mode for this function key (see above for a description of the operation modes) and press SEND.

If the selected mode is MAN, programming for this button is completed when the SEND button is pressed. The LCD will change as shown in fig 3.4. If the selected mode is APS or AS, you will be prompted for the destination site(s), the LCD changes as shown in fig 3.4d

```
F01: Function 1
ENTER TYPE
ALL, ZONE  or  SITE
ALL
```

Fig 3.4d Program Mode

Press ALL, Zone or Site depending on the type of activation desired and press SEND.

If ALL is selected, programming for this button is completed and the LCD will change as shown in fig 3.4. If ZONE or SITE is selected, you will be prompted for the Zone or Site number and the LCD changes as shown in fig 3.4e

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```
F01: Function 1
ENTER SITE ADDRESS
      (1 - 255)
000
```

Fig 3.4e Program Mode

Enter the desired Zone or Site number and press SEND. This completes programming for this button. The LCD changes as shown in fig 3.4. You may press MENU to exit program mode or press a function key to review or program another function button.

Caution

It is important that all function buttons be reviewed for accuracy and tested for proper operation after programming. People's lives depend on the function buttons being programmed correctly.

To exit Program MODE:
   Press MENU to exit to STANDBY. (Only available when the LCD screen of fig 3.4 is displayed).

KEYs and their related actions specific to Program mode are as follows:

   MENU
   Exits to STANDBY.

   CLEAR
   Clears the user entry field (line 4).

3-5. DOWNLOAD MODE

The SS2000D configuration parameters may be stored in a remote computer and transferred into the SS2000D as needed. This allows centralized maintenance and storage of parameters with the flexibility to modify and download as needed. Downloading is performed using the XMODEM communications protocol.

Configuration parameters are normally stored in a file with DAT extension. Some parameters, such as function key definitions and repeater paths can only be set up by uploading a DAT file.

The Download mode is ONLY accessible when the SS2000D is operating in the Standalone (s) mode. In computer mode, an attempt to access Download mode displays 'Download Mode Not Accessible' message.

```
 Press SHIFT SEND to
      DOWNLOAD
  or   MENU  to  EXIT
 DOWNLOAD  STANDBY
```

Fig 3.5a: Download Mode

To access DOWNLOAD mode:
- Press '5' from the EXTENDED MENU.
- DOWNLOAD mode appears on the LCD with unit status as STANDBY as shown in fig. 3.5a.

To download configuration values (DAT file):
- Upon accessing Download Mode the user is given a choice to either quit Download Mode by pressing MENU key or to continue with downloading by pressing SHIFT+SEND keys.
- If the user chooses to press SHIFT+SEND then following screen pulls up:

```
 DOWNLOAD IN PROGRESS
     ** RAM ERASED **
 USE XMODEM PROTOCOL
 DOWNLOAD      STANDBY
```

Fig 3.5b: Download Mode

- At this time the user must pull up XMODEM protocol on the attached computer and enter the desired file name to start downloading.
- Upon completion of download process the display shows fig. 3.5c. The SS2000D is now fully configured.

```
 DOWNLOAD COMPLETE
 SHIFT+SEND to repeat
    MENU  to  EXIT
 DOWNLOAD  STANDBY
```

Fig 3.5c: Download Mode

To exit DOWNLOAD Mode:
- Press MENU to exit to STANDBY.

Note: User may NOT quit the Download Mode when downloading is in process. (i.e., fig. 3.5b is on display).

KEYs and their related actions specific to Download Mode are as follows:

MENU
Exits to STANDBY.

SHIFT+SEND
Goes to XMODEM receive mode.

3-6. UPLOAD MODE

The SS2000D configuration parameters may be transferred back to a computer attached to the serial port, using UPLOAD mode. Optionally, the configuration parameters may be dumped to a locally attached printer.

The configuration parameters upload in a standard ASCII format. This may be re-directed to a file with the PC communications package.
The Upload mode is ONLY accessible when the SS2000D is operating in the Standalone (s) mode. In other operating modes an attempt to access Upload mode displays 'Upload Mode Not Accessible' message.

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```
┌─────────────────────────────────────────┐
│ Press SEND to UPLOAD                     │
│ Press 'D' to DUMP                        │
│                                          │
│ UPLOAD         STANDBY                   │
└─────────────────────────────────────────┘
```

Fig 3.6: Upload Mode

To access UPLOAD mode:
- Press '6' from the EXTENDED MENU.
- UPLOAD mode appears on the LCD with unit status as STANDBY as shown in fig. 3.6.

To upload the data to the computer screen:
- Pressing SEND while fig. 3.6 is displayed on the LCD uploads the configuration parameters to the computer screen in ASCII format. (Computer screen acts as a DUMB terminal in this case.)

To send the data to the printer:
- Pressing 'D' while fig. 3.6 is displayed on the LCD sends the configuration parameters to the locally attached printer.

To exit UPLOAD Mode:
- Press MENU to exit to MAIN MENU.

KEYs and their related actions specific to Upload Mode are as follows:

MENU
Exits to STANDBY

SEND
Sends configuration parameters to the serial port in ASCII format.

"REPORT"
Print configuration parameters to the printer.

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3-7. CONFIGURATION PARAMETERS FILE FORMAT:

The SS2000D configuration file may be put together on a computer in the form of an ASCII text file and downloaded serially using XMODEM protocol via RS232 serial connection. Normally, such a file has DAT extension. Though, this is not necessary but recommended to match the Federal's nomenclature.

DAT file has five sections. **The beginning of each section must be marked by a set of braces { }. Any text that appears between the braces is treated as comments.** Following explains each section.

{
Configuration section
}

- The configuration parameters must be listed in the order specified below.
- All parameters must be included, whether used or not.
- Each configuration parameter value must be followed by a semicolon.
- Comments may follow semicolon.
- Each comment must be followed by a new line.

Configuration Parameter	Optional comment field
12345;.................................	password (up to 5 characters)
50;	front porch time (5 to 9999 msec)
50;	back porch time (5 to 9999 msec)
500;	pause duration (5 to 9999 msec)
5;	report time-out (1 to 9999 sec)
3;	report attempts (1 to 9)
0;	CD active state(0 or 1)
0;......................................	Trunking mode (0 = disabled, 1 = enabled)
1;	Use attached printer (0 = no, 1 = yes).
15;	Alarm hour. (0 to 23)
00;	Alarm minute. (0 to 59)
0;.....................................	Alarm Function (0-50)
#001#002#003;	Remote site numbers (for report polling)
00;....................................	Alarm Interval
00;....................................	Alarm Day
00;	Unit ID (01 to 99)
00;....................................	Standalone, or Computer mode (0=S, 1=C)
2;#001;#003;......................	Repeater Chains (See following detail)

```
{
            Function key section
}
```

- There are four distinct fields.
- Each field is terminated by a semicolon.
- Comment filed is followed by a new line character.

Function key #;	Function key label;	FUNCTION;	Optional	comments
1;	Tornado;	1;1;001;	Tornado	warning
2;	Function key 2;	2;1;001;	codes for	F02
3;	Function key 3;	3;1;001;	codes for	F03
4;	Function key 4;	4;1;001;	codes for	F04

Function key # : a decimal number from 1 to 20, indicating the function key on the SS2000D where the associated function is intended to go, followed by a semicolon

Function key label : can be up to 16 ASCII characters followed by a semicolon.

Function is the function (1-50) the siren will sound when this function key is pressed.
(Function 97 = Cancel; 98 = Quiet Test; 99 = Reset)

Optional comments : optional text followed by a new line.

```
{
            Report Message Section   (Used in two-way systems only)
}
```

There are no user programmable options in this section. This section can only be modified by Federal Signal's Applications Engineers. The User must NOT change this section when creating a custom DAT file.

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```
{
        function report section
}
```

Function Number;	Function Description;	Comments
1;	Function 1;	Optional comment field
2;	Function 2;	
3;	Function 3;	
4;	Function 4;	
5;	Function 5;	
6;	Function 6;	
.		
.		
.		
50;	Function 50;	

Function number: 1-50 represents 50 functions. Field terminated by semicolon (Note: FCT type sirens only allow 6 functions)

Function description: Can be 16 characters long. User can customize the function description. Field terminated by semicolon.

Comment field: (Optional) terminated by new line.

```
{
            repeater  section
}
```

Destination site	Repeater Path
2;	#001#003;
3;	#004#005;

Destination site: The site this path applies to.

Repeater Path: A list of sites beginning with '#' to function as repeaters to communicate with the destination site.

```
{
            end report section}
```

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SECTION IV
INSTALLATION

-Caution-

Installation must be performed by an experienced technician in accordance with national, state, and any other electrical codes having jurisdiction.

4.1   General

- The SS2000D features a balanced 600-ohm input and output (optionally set to 10KΩ).
- Relay outputs control Audio output, PTT, MIC disconnect, and the AUX (Watchdog Contact). The AUX relay will open when the SS2000D detects a fault.
- Both N.O. and N.C. contacts are available.
- Carrier Detect can be active High (4 -14v) or Low (0 - 3.0v). This input is optionally pulled to 10 VDC through a 470k resistor or to ground through a 690k resistance.
- An optional VOX circuit can be used if a C.D. output is not available. The VOX logic is derived from the Audio input line voltage and should only be used when it is not possible to get a true C.D. signal.

4.2 Connections and adjustments

Make electrical connections as shown in the figure below. If the radio does not have balanced inputs and outputs, the AUDIO OUT LO, RX LO and PTT COM can all be connected together at the radio ground.
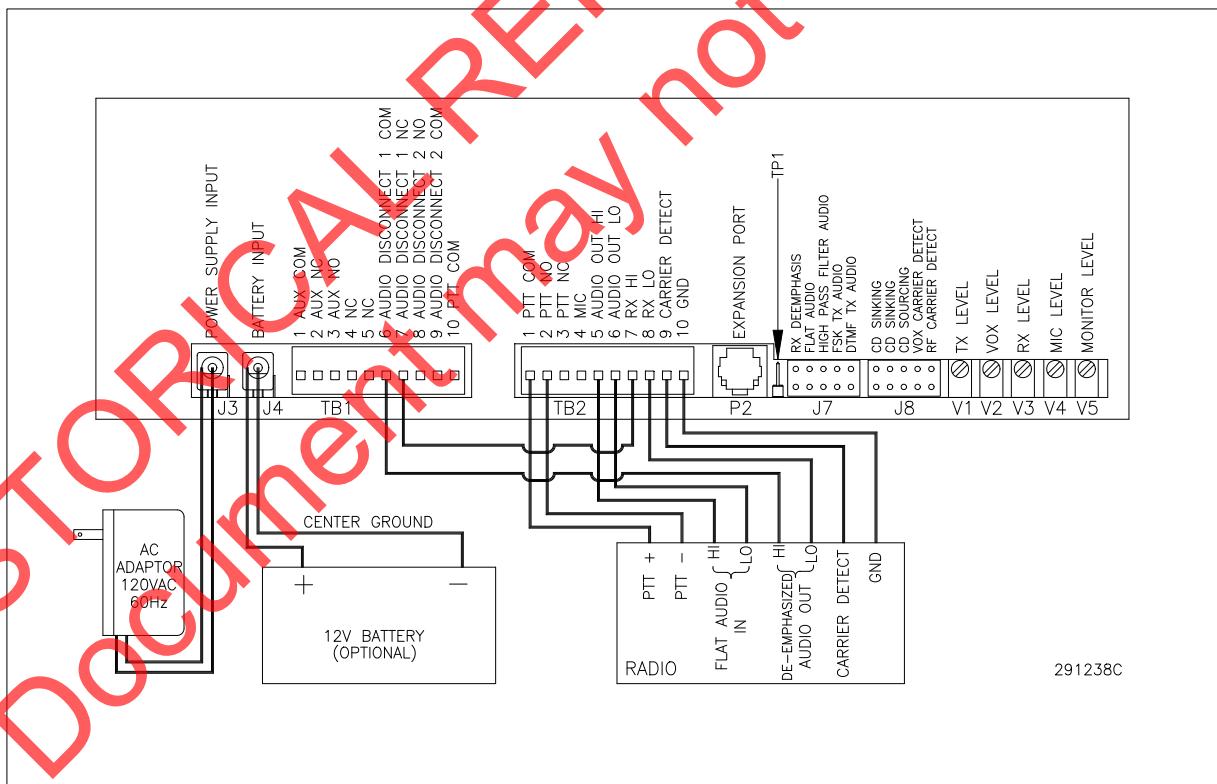
Fig. 4.1: Installation and connection diagram

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Input/Output Impedance Selection

If the SS2000D is connected to a high impedance audio system, remove the jumpers at JU1 and JU2 on the 2001176 PC board to select a 10K impedance.

The jumper at JU2 can also be removed to obtain a lower voltage from radios with high audio voltage level output.

Carrier Detect (C.D.) Setup

C.D. can either be connected directly from a radio transceiver, or it can be derived from the TX audio level. Jumpers at J8 determine how C.D. operates. Refer to section 3-3 if the polarity of the C.D. signal must be changed.

When connecting directly to a radio transceiver, set the jumper on J8 as shown below.

J8
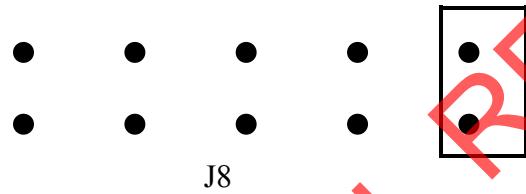
Carrier Detect (Souring) Selection

If the carrier detect signal is a high and low going voltage source, apply a jumper as shown below.

J8
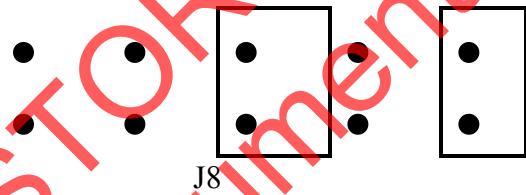
Carrier Detect (Sinking) Selection

If the carrier detect signal is provided by an open collector or relay contact, apply jumpers to J8 as shown below.

J8
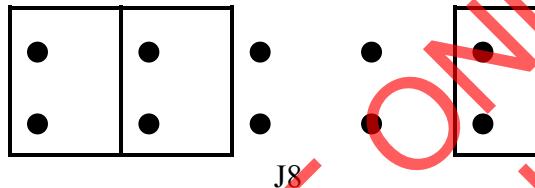
-Caution-
Never place jumpers on J8 as shown below.
This will make the SS2000D inoperable.

J8
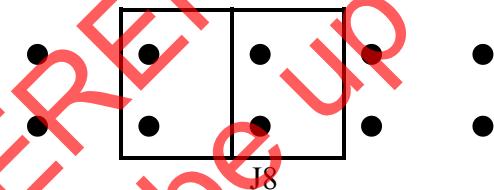
When a Direct Transceiver C.D. connection is not possible, set the jumpers on J8 as shown below to enable the VOX circuit.

J8
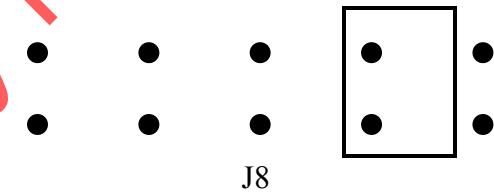
When this setting is used, V2 is used to adjust the audio level required to detect C.D. NOTE: This level should not be set until the RX audio level is set (2-way systems only).

Transmit level (TX)

V1 adjusts the audio output level. This level should be set for a 4 KHz deviation output from the transmitter. Refer to section 3- 3 for the calibration mode instructions.

Receive Level (RX)

V3 Adjusts audio receive level. Adjust V3 for a 550mV to 750mV$_{PP}$ or 200-250mV$_{RMS}$ level at J7-9 or TP1. Refer to the input/output impedance selection at the beginning of this section if the voltage cannot be adjusted down to 250mV$_{RMS}$.

Flat Audio Selection

If private line coding (CTCSS or DPL) is NOT being used, the flat audio path should be selected as shown below.

J7
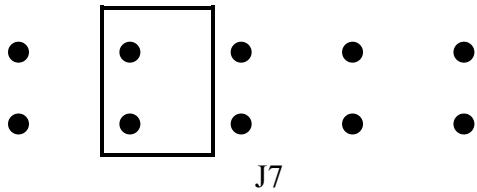
Do not place jumpers to connect the high pass filtered audio and the flat audio at the same time. See High Pass Filtered Audio Selection in the next section.

High Pass Filtered Audio Selection

If private line coding (CTCSS or DPL) is being used, the high pass filtered audio line should be selected as shown below.

J7
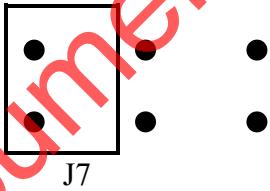
Do not place a jumper in the flat receive audio position when the high pass filtered audio is selected.

RX De-emphasis Selection

If de-emphasis is required on the receive audio signal, select de-emphasis as shown below.

J7
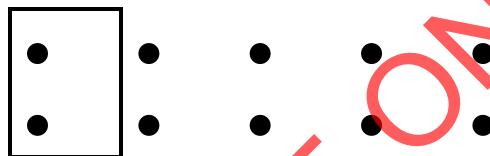
Monitor Speaker Level

Adjust V5 for the desired volume setting. Use the Calibration Mode to generate audio without activating the system.

MIC Level

Adjust V4 for the desired audio level. If using a radio system, this level is typically set for 4khz of deviation.

4.3 SS-REMOTE Installation:

- Make sure the power is off to the SS2000D and the SS-REMOTE units.
- Connect the SS-REMOTE unit to the SS2000D via six line I^{2}C cable. (i.e., connect one end of the I^{2}C cable to the phone jack (P2) on the SS2000D and the other end of the I^{2}C cable to the phone jack (P1) on the SS-REMOTE.)
- Connect the needed remote land line contacts into the jacks (J1-J4) provided at the SS-REMOTE.
- Connect the power to the SS2000D. Wait until MAIN MENU becomes visible on the SS2000D LCD before turning power on to the SS-REMOTE. Closing any of the remote contacts will now trigger the associated function on the SS2000D.

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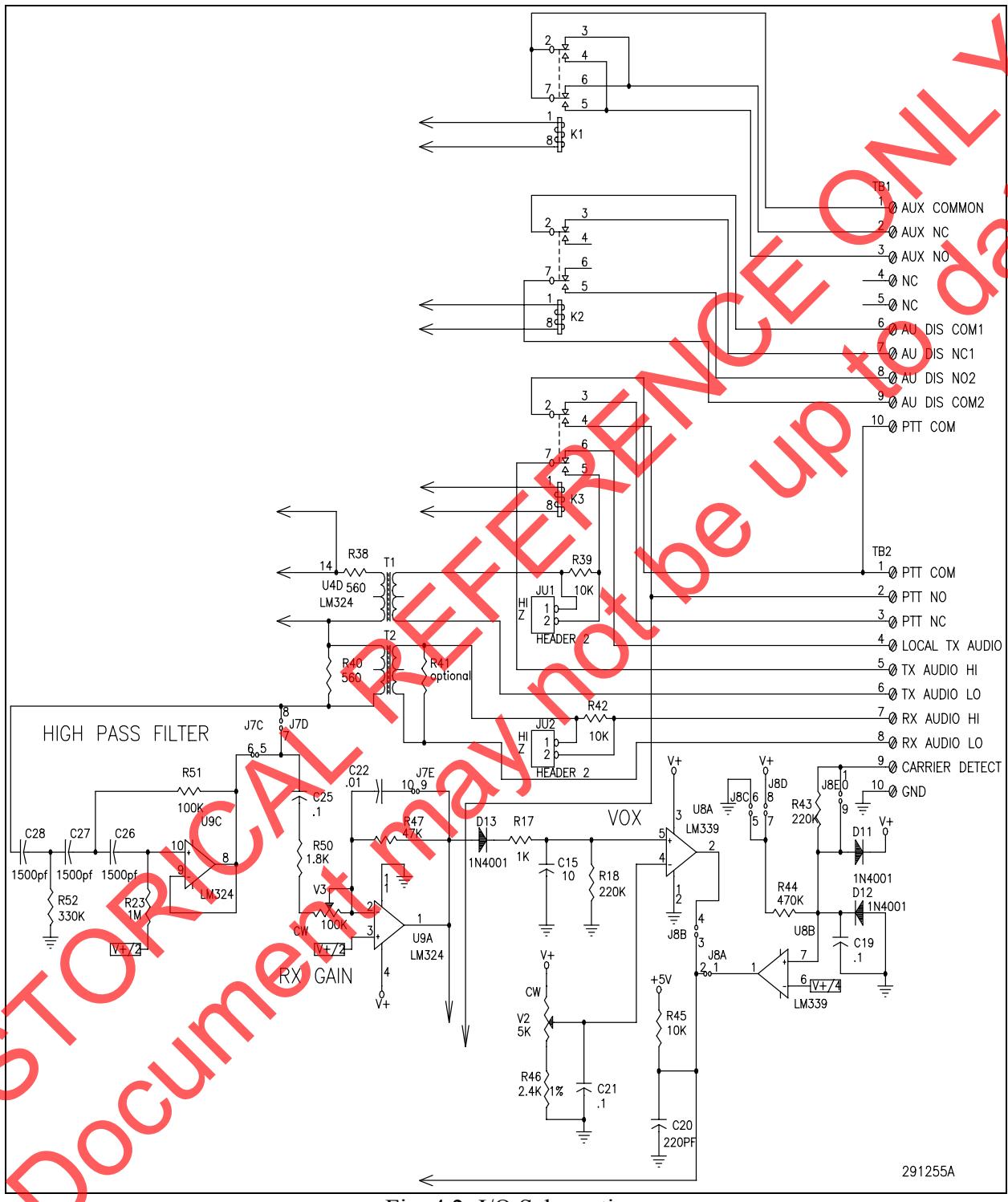
Fig. 4.2: I/O Schematic

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SECTION V
TESTING

5.1 SELF TEST FEATURE

The SS2000D Self Test is a software controlled testing procedure which helps to ensure that the unit is functioning properly and is ready for use. There are 6 functions or parts of the SS2000D that can be tested with the Self Test. They are as follows:

- LCD display
- LEDs and Buzzer
- Keypad and Function keys
- Relays 1, 2, and 3
- FSK Transmit
- FSK Receive

The Self Test does not acknowledge a defect. The test works by comparing actual results with expected results to determine if a problem exists. If any of the actual results differ from the expected results then the unit is defective and needs repair.

Self Test results can be printed on the attached printer, if printer option is enabled in CONFIG mode.

To access SELF TEST:
- Reset the SS2000D.
- There are two ways to reset the unit:
1. Depressing reset button, which is located on the CPU board:
2. Turning off the unit and then back on. (This may be accomplished by removing and inserting the power cord at the back of the unit.)

- As the unit powers up following a reset the LCD back light comes on and the LCD becomes blank with a little click.

- From this moment of time, within 3 seconds press SHIFT+SEND, while the LCD is still blank.
- If correct sequence is followed with proper timings the SS2000D boots up in Self Test mode with Self Test menu on display as shown in fig. 5.1.

```
1. LCD          2.LED
3. KEYS         4.RELAY
5. LOOP         6. FSK TX
7. FSK RX       8. QUIT
```

Fig 5.1: Self Test Menu

To run the tests:
- To do a particular test press the number corresponding to it.
- To perform all tests in a sequential manner, press 5 (LOOP option).
- Pressing MENU from any test aborts that test and switches back to SELF TEST menu. In LOOP mode (#5), the MENU button is used to switch to the next test.

To exit SELF TEST:
- From the SELF TEST menu press either of the following to quit Self Test and to enter the MAIN MENU:
    - 8 (QUIT option)
    - SHIFT + SEND

Following sections describes each test in detail.

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5.2   TEST 1 - LCD

```
12345678901234567890
 Checking LCD - Press
 any key to continue
 TEST1        LCD TEST
```

Fig 5.2: Test 1 LCD

Item tested:
Ability of the LCD module to display 4 lines and 20 characters.

Expected results:
The SS2000D LCD should be identical to fig. 5.2.

To exit:
Press any key.

5.3   TEST 2 - LED

```
ALL LEDs MUST BE ON
Press  any  key  to
turn  LEDs off
TEST2          LED TEST
```

Fig 5.1: Test 2 LED

Item tested:
All four LEDs and piezo buzzer.

Expected results:
All four LEDs must turn on and piezo buzzer must sound.

To exit:
Press any key.

5.4   TEST 3 - KEYS

```
** PRESS EACH KEY **
CHECK FOR RESPONSE
Key pressed=
 TEST3        KEYS TEST
```

Fig 5.4: Test 3 - KEYS

Item tested:
All keys on the SS2000D unit.

Expected results:
Each key press must display associated character on the LCD. Following is a list of keys and associated characters. Verify each key press with the list.

Key press	LCD display
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0
ALL	A
ZONE	B
MODE/SITE	C
REPORT	D
*	*
#	#
F1	F01
F2	F02
F3	F03
F4	F04
F5	F05
F6	F06
F7	F07
F8	F08
F6	F06

F7	F07
F8	F08
F9	F09
F10	F10
F11	F11
F12	F12
F13	F13
F14	F14
F15	F15
F16	F16
F17	F17
F18	F18
SHIFT+F17	F19
SHIFT+F18	F20
CLEAR	<--
SHIFT+MENU	M
SHIFT+SEND	S
SHIFT+CLEAR	k
SHIFT+1	,
SHIFT+2	.
SHIFT+3	?
SHIFT+ALL	=
SHIFT+SITE	c
SHIFT+*	+
SHIFT+#	-
MENU	MENU key is used to exit the key test.

To exit:
Press any key.

5.5   TEST 4 - RELAY

```
1. relay 1      2. relay 2
3. relay 3      4. loop1-3
5. Quit
TEST4        RELAY TEST
```

Fig 5.5a: Test 4 - RELAY 1

Item tested:
Relays 1,2 and 3.

NOTE: An OHM meter or a continuity tester is needed for the test.

Procedure:

Connect the meter or continuity tester leads to the relay contacts. (Refer to chart below and to figure 5.5b.

Relay #   Lead connections
TB1-1,   TB1-3
TB1-9,   TB1-8
TB1-10,   TB2-2

The meter reading should be infinite, indicating an open circuit.
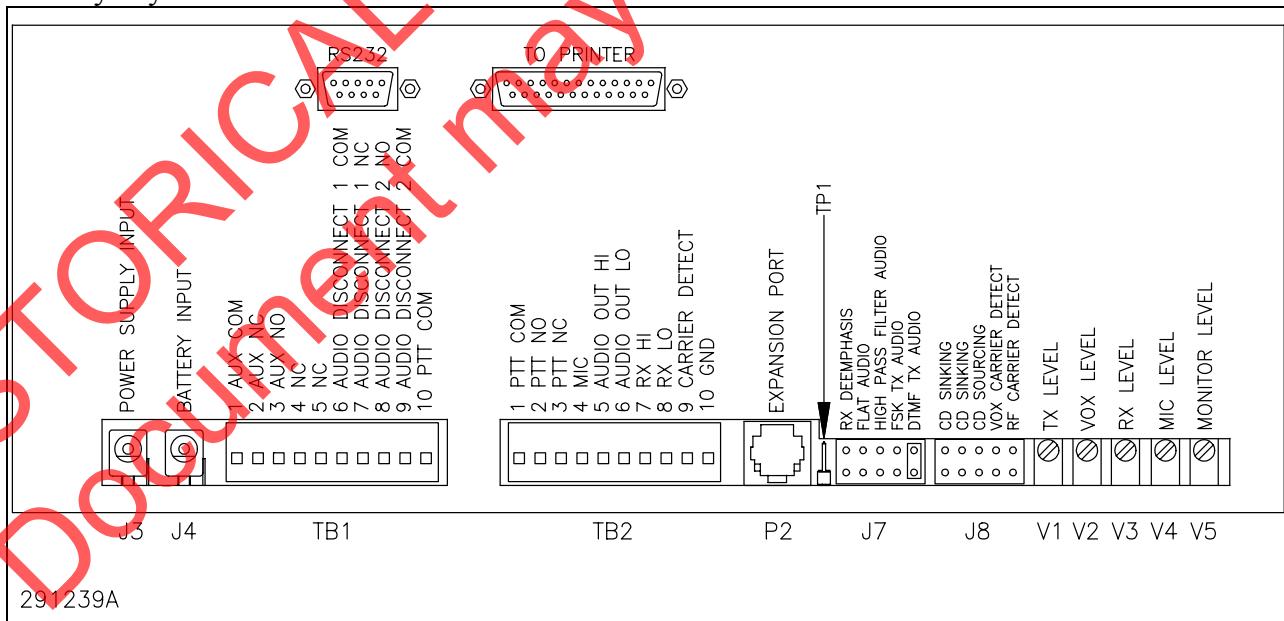

Fig. 5.5b

Set the meter to a 10 Ohm scale.

- Press '1' to activate relay 1.

The meter reading should be no greater than 0.75 Ohms, indicating a closed circuit.

- Press '1' to deactivate relay 1.

The meter reading should again be infinite. Repeat the same procedure for relays 2 and 3.

- Option 4 is a loop test used to test all the relays sequentially.

To exit:
Press the 5 key to quit.

5.6   TEST 5 - FSK TX

FSK TX TEST
Press any key....

Press MENU to quit

Item tested:
FSK Transmit function

Procedure:
- Press 6 from the test menu screen to enter FSK TX test mode

- Press any key to transmit a string of 20 '5' characters. A five looks like a square wave with a 50% duty cycle when viewed with an oscilloscope at TB2-5 and TB2-6.

To exit:
Press MENU key

5.7   TEST 6 - FSK RX

FSK RX TEST
Press any key to quit

Item tested:
FSK Receive function.

To exit:
Press any key.

SECTION VI
PERIPHERALS

6.1 SS-REMOTE

SS-REMOTE is the peripheral unit that provides a land line interface to the SS2000D using remote contacts. Software revision 1.8 or greater is needed in the SS2000D for this enhanced capability. Key features of the SS-REMOTE are:

- Communicates with the SS2000D over I^2C bus.
- Isolated power supply. (12 volts to 22 volts dc.)
- opto isolated inputs for protection against induced voltage spikes and ESD.
- Remote cable length up to 30,000 feet is possible (500 ohms as permissible resistance).
- Maximum remote wire gauge that can be used is 12.
- Additional space of 2.00 inches is needed below the SS2000D (rack mount) for SS-REMOTE unit.
- SS-REMOTE activation **will bypass the key lock** on the SS2000D.
- SS-REMOTE activation will abort the report mode on the SS2000D (if the SS2000D is in the report mode).
- The SS2000D will have the transmit priority over the SS-REMOTE if it is in transmit mode.

Operating Procedure: (Refer to fig. 6-1 for connections.)

- Make sure the power is off to the SS2000D and the SS-REMOTE units.

- Connect the SS-REMOTE unit to the SS2000D via six line I^2C cable. (i.e., Connect one end of the I^2C cable to the phone jack (P2) on the SS2000D and the other end of the I^2C cable to the phone jack (P1) on the SS-REMOTE.)
- Connect all needed remote land line contacts into the connectors (F1-F20) provide at the SS-REMOTE unit.
- Connect the power to the SS2000D. Wait until MAIN MENU becomes visible on the SS2000D LCD before turning the power on to the SS-REMOTE.
- Any remote contact closure can now trigger the associated function on the SS2000D.
- Debounce time for remote key press is 250 msec.
- A key depressed for extended time will not generate multiple key entries.
- A key held depressed will not allow new key presses.

Programming Instructions:

There is no SEND key provided at the remote inputs. However, the software allows the user to program SEND key within the function as a part of the string to be transmitted. Refer to the 'AS' function in section 3.4 of this manual.

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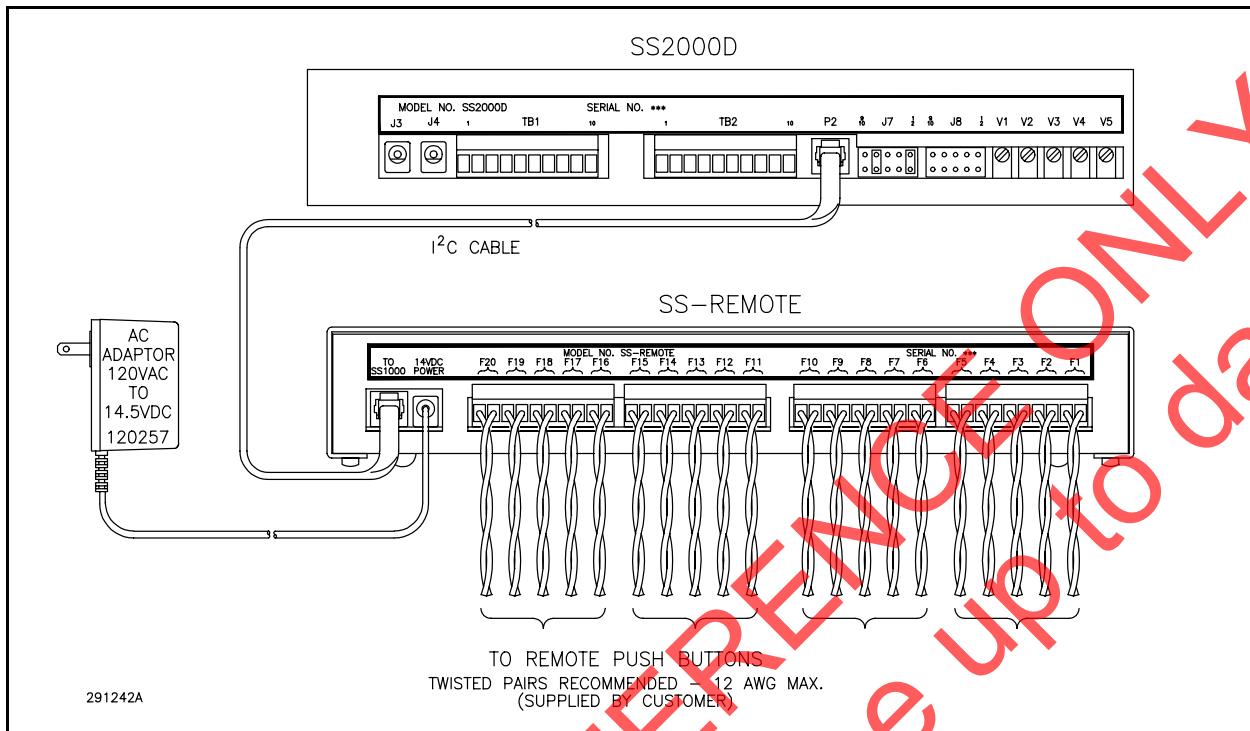
Fig. 6.1

6.2 SFCDWARE is a Windows[R] 95/98 graphical users interface between the operator and the SS2000D. The software automates many of the SS2000D functions and stores reports permanently.

6.3 SSWIN is a Windows[R] 95/98 graphical users interface used to configure the SS2000D.

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SS2000D Wiring Diagram

SECTION VII
ADDENDUM

There are currently no addendums to this manual.

SS2000D

CONTROLLER/ENCODER

INSTALLATION AND OPERATION INSTRUCTIONS

F E D E R A L   S I G N A L   C O R P O R A T I O N
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