

SVL
System Validator and Logger
Version 1.00

Printings:

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TABLE OF CONTENTS

SPECIFICATIONS	1
1.0 GENERAL DESCRIPTION	2
1.1 Description	2
1.2 Capabilities and Features	2
2.0 INSTALLATION AND SETUP	2
2.1 Inspection.....	2
2.2 SVL Back View and Connector Labels	3
2.3 SVL Front View and Description	3
2.4 Jumper Settings	4
2.5 Dip Switch Settings	5
2.6 Power Connection.....	6
2.7 RDB/RNDL Connection.....	6
2.8 Terminal or Modem Connection.....	6
3.0 VALIDATION/DISPATCH DATA ACCUMULATION	7
3.1 Description	7
3.2 Bench Test.....	7
3.3 Logging Onto the System.....	8
3.4 Logging Off the System.....	8
3.5 Moving Through the Menu Structure.....	9
3.6 Level 000 Main Level	9
3.7 Level 100 User Table	10
110 Single User	10
120 Group of Users.....	10
130 ASCII Download.....	11
140 XMODEM Download	11
150 XMODEM Upload.....	12
3.8 Level 200 Block Inhibit	12
210 Edit Block	12
220 ASCII Download.....	13
3.9 Level 300 System Status	13
310 Real-Time System Status	13
320 System Reset.....	13
3.10 Level 400 Configuration Parameters.....	14
410 Validation	14
420 Dispatch Load Levels.....	14
430 DSR/DCD.....	15
440 Update Passwords.....	15
450 User Defined System ID	15
3.11 Level 500 Dispatch Data	16
510 Data Accumulation.....	16
520 XMODEM Download	16
530 Clear Data.....	17
540 Minimum Record Time	17
PARTS LIST	18
SCHEMATICS	21

SPECIFICATIONS

Input voltage	12.5 - 18 VDC
Standby current @ 13.8 VDC	480 mA
Temperature range	0 to +70 deg C
Relative humidity	90% at 50 deg C
Weight	3.1 lb.
Dimensions	19" x 6.75" x 1.75"

1.0 GENERAL DESCRIPTION

1.1 Description

The microprocessor controlled SVL was designed to function as an ID validator and dispatch data logger for an LTR trunking system. The SVL will provide time slot 21 validation information on the repeater data bus as well as collecting dispatch accounting information for mobile IDs that appear on the repeater data bus. Dispatch IDs in the SVL can be set as either low or high priority and will be validated based upon dynamic loading. The SVL also contains a block inhibit feature which allows only one mobile ID in a defined group to transmit at a time.

1.2 Capabilities and Features

- ◆ Provides validation through time slot 21 on the repeater data bus.
- ◆ Supports both EF Johnson RDB and Uniden RNDL bus.
- ◆ Second sync mode which acts as a backup to the primary sync unit on the repeater data bus.
- ◆ Dispatch data accounting information is stored in battery backed RAM.
- ◆ Low and high priority dispatch users controlled through dynamic loading.
- ◆ Block inhibit which allows only one mobile ID in a defined group to transmit at a time.

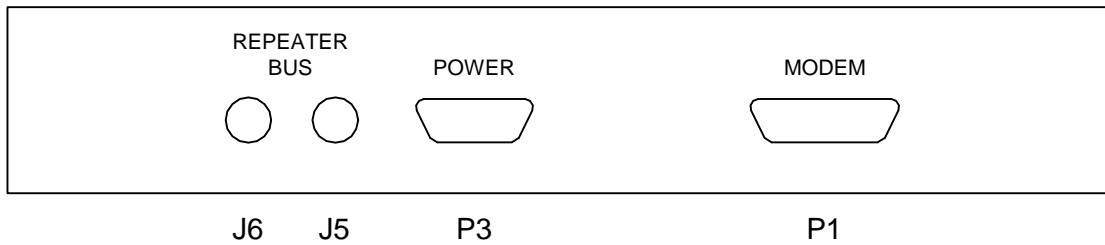
2.0 INSTALLATION AND SETUP

2.1 Inspection

Please refer to the checklist packed with the SVL in order to familiarize yourself with the unit and to also insure you have everything you need before you start the actual installation. In the event you are missing a part from the checklist please call our Customer Services Department at 1-701-280-1122.

This unit was thoroughly inspected before leaving the factory. If the outer package appears damaged, please inspect the unit for possible damage immediately. Any dents, scratches, or marks suggest rough handling in shipping. Please notify the shipper if you find any indications of mishandling. If you have any concerns about the condition of the SVL when you receive it, please don't hesitate to call our Customer Services Department.

2.2 SVL Back View and Connector Labels



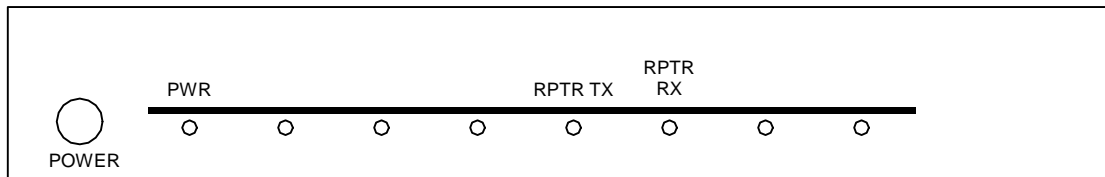
J6: BNC Repeater Data Bus Port

J5: BNC Repeater Data Bus Port

P3: DB-15 Power Connector

P1: DB-25 Terminal or Modem Connector

2.3 SVL Front View and Description



POWER - This is the power switch for the unit.

PWR - This LED lights when power is applied to the unit.

RPTR TX - This LED lights when data is being transmitted onto the repeater data bus.

RPTR RX - This LED lights when data is being received from the repeater data bus.

2.4 Jumper Settings

The following table serves as a quick reference to the jumpers on the SVL. A more detailed description of the individual jumpers is given following the table.

Jumper #	Setting	Function
5	A-B B-C	Monitor DSR Signal Monitor DCD Signal
18 - 22	---	Terminal Baud Rate Select
31	A-B B-C	Selects 100 Ohm Pullup For RNDL Selects 100 Ohm Pulldown For RDB
32	A-B B-C	Selects Uniden Output Drivers Selects EFJ Output Drivers
33	A-B B-C	Selects Uniden Input Buffers Selects EFJ Input Buffers

JP5 - This jumper determines if DSR or if DCD is monitored. DSR is monitored if JP5 is jumpered to A-B, and DCD is monitored if JP5 is jumpered to B-C.

JP18 - JP22 - These jumpers are used to select the terminal baud rate. Only ONE of these jumpers should be in at any time. The selected baud rate is determined as follows:

	Baud Rate
JP18 IN	9600
JP19 IN	4800
JP20 IN	2400
JP21 IN	1200
JP22 IN	600

JP31 - This jumper determines if a 100 Ohm pulldown or pullup resistor is connected to the RDB or RNDL bus. If the EF Johnson RDB bus is being used, JP31 should be jumpered to B-C and if the Uniden RNDL bus is being used, JP31 should be jumpered to A-B. However, for both busses, only the units at either end of the bus need to have this resistor connected to the bus. If this unit is not located at the end of the bus, the shorting block on JP31 should be removed and not installed in either position.

JP32 - This jumper selects if EF Johnson RDB output drivers are used or if Uniden RNDL output drivers are used. If the Uniden RNDL bus is being used, JP32 should be jumpered to A-B. If the EF Johnson RDB bus is being used, JP32 should be jumpered to B-C.

JP33 - This jumper selects if EF Johnson RDB input buffers are used or if Uniden RNDL input buffers are used. If the Uniden RNDL bus is being used, JP33 should be jumpered to A-B. If the EF Johnson RDB bus is being used, JP33 should be jumpered to B-C.

NOTE: All other jumpers are factory set as required and should not be changed.

2.5 Dip Switch Settings

The following describes the function of each of the dip switches on the SVL. After changes are made to the switches, the SVL should be reset so that the new switch settings will be read.

Switch 2 - SW2:

1 - 4 : Not used.

5 : Uniden/EF Johnson Data Bus.

The setting of this switch determines if the data on the RDB/RNDL bus is of the EF Johnson or the Uniden format. OFF indicates Uniden format and ON indicates EF Johnson format.

6 : Area

This switch is used to program the area bit. OFF gives an area of 0 and ON gives an area of 1.

7,8 : Mode

These switches are used to program the mode. The settings for the different modes are as follows:

8	7	Mode
OFF	OFF	Normal
OFF	ON	1st sync
ON	OFF	2nd sync
ON	ON	Normal

Normal - The SVL should be set to this mode unless the SVL needs to generate sync on the repeater data bus.

1st Sync - This mode enables the SVL to generate sync on the repeater data bus. The SVL should be the only device generating sync on the repeater data bus.

2nd Sync - In this mode, the SVL will back up the primary sync device. If the device generating primary sync fails, the SVL will start generating sync. It will start generating sync 5 seconds after primary sync is lost. It will also stop generating sync if it detects that the primary sync device has started generating sync again. Only one device on the system should be programmed as secondary sync.

Switch 3 - SW3: Not used.

Switch 4 - SW4: Not used.

Switch 5 - SW5: Not used.

2.6 Power Connection

Connector P3 is used to connect power to the SVL. 13.8VDC should be connected to pin 1 of P3 and ground should be connected to pin 7 of P3. The remaining pins of P3 are not used and should not be connected.

2.7 RDB/RNDL Connection

The BNC connectors J5 and J6 are used to connect to the EF Johnson RDB bus or to the Uniden RNDL bus. The SVL should be daisy-chained with the other devices on the repeater bus. A BNC cable should be used with the connection being made to either J5 or J6.

2.8 Terminal or Modem Connection

A terminal or computer can be connected directly to the SVL's modem port P1 by using a female DB-25 to male DB-25 cable with the following connections:

Computer Female DB-25	SVL Male DB-25
3	2 TXD
2	3 RXD
20	6 DSR
7	7 GND

A modem can be connected to the SVL's modem port to allow the SVL to be accessed remotely. This connection should be made with a male DB-25 to male DB-25 cable with the following connections:

Modem Male DB-25	SVL Male DB-25
2	2 TXD
3	3 RXD
6	6 DSR
7	7 GND

NOTE: If it is desired to use DCD instead of DSR, pin 8 on the modem end and the SVL end should be tied together instead of pin 6.

3.0 VALIDATION/DISPATCH DATA ACCUMULATION

3.1 Description

The SVL provides time slot 21 validation information on the repeater data bus. All IDs from 1 to 255 on each of the 20 repeaters can be programmed as invalid, dispatch low, dispatch high, or interconnect. Any block of IDs can be assigned to a group which allows only one ID from the group to transmit at a time. Dynamic loading levels can be set to limit dispatch use during periods of high system activity. This information is then used for validating the mobile users on any channel appearing on the repeater data bus.

Validation can be enabled and disabled. When disabled, the SVL will not put anything into time slot 21. When enabled, the SVL will put either an idle message or validation information into time slot 21. This allows an SVL to be used as a backup validator to an existing validator on the system.

Dispatch data accumulation can also be enabled and disabled. When enabled, accounting information (minutes, seconds, and PTT counts) for ID's of type dispatch (low or high) is stored for download at a later time. A maximum of 9,999 minutes will be stored, while the PTT count will "roll over" after 65,535. When enabled, dispatch data accumulation will take place regardless of whether or not validation is enabled or disabled.

3.2 Bench Test

Before installing the SVL at a remote site, perform a complete functional test by connecting a terminal or computer directly to the SVL. This will allow the menus described in the manual to be reviewed and the users to be validated before the SVL is installed at the repeater site.

If using a computer, a communications package will be needed. Most communications packages include a local terminal mode enabling the computer to talk directly to the SVL without using the telephone network. Read the communications package instructions to determine how to configure it correctly. The correct settings for talking to the SVL are:

Baud Rate: 1200 (Set by the factory but may be changed)
Data Bits: 7
Stop Bits: 1
Parity: EVEN

If the cable was wired correctly and the communications package was set up correctly, then "**Enter your PASSWORD -->**" should appear on the screen when <RETURN> is pressed on the computer keyboard.

3.3 Logging Onto the System

After connecting a computer or terminal to the SVL, the following message should be displayed:

Enter your PASSWORD -->

At this point, the SVL is waiting for the password to be entered. The SVL will allow three attempts to enter a valid password. If a valid password is not entered in these three attempts, the SVL will display an error message and will not allow any logon attempts for 30 seconds. The SVL will accept two different passwords that allow two different levels of access. The two access levels are the REVIEW level and the CHANGE level.

REVIEW Access Level

The review access level is entered by entering the review password. The default review password is "REVIEW". This access level allows all information to be reviewed but not changed. The password for this access level can be changed only in the change access level.

CHANGE Access Level

The change access level is entered by entering the change password. The default change password is "CHANGE". This access level allows all information to be reviewed and changed.

3.4 Logging Off the System

Logging off the SVL is complete when the prompt "**Enter Your PASSWORD -->**" is displayed on the screen. This can be done quickly by repeatedly pressing the <ESC> key. It is a good practice to completely log off the SVL so that unauthorized personnel cannot gain access to your system and change any of your system information (including your password) by bypassing the password protected logon procedure.

As an added safety feature, Level 430 DSR/DCD is offered. DSR/DCD is factory set to disabled but it can be set to enabled to automatically log the user off the system when the modem loses carrier.

NOTE: The cable connecting the SVL to the computer, terminal, or modem must have either DSR or DCD wired. If the cable is not wired properly and DSR/DCD is enabled, the SVL will immediately log you off the system and you will not be allowed to log onto the system again until DSR/DCD is wired correctly.

3.5 Moving Through the Menu Structure

```
System ID: User Defined System ID  
Enter Menu Level or <RETURN> for HELP
```

Once logged onto the SVL, the above screen will be displayed. The user defined system ID can be changed in Level 450. This message is displayed only on initial logon. A system operator responsible for more than one system may use this message area to describe the city or owner of the system.

The last line of this initial screen is requesting the operator to enter a menu level. By pressing <RETURN> at this point, the Level 000 Main Menu shown in section 3.6 will be displayed. Levels in the SVL are designated by three numbers. If the current level is 000 (Main Menu Level) and a "4" were entered, the new level would be Level 400 (Configuration Parameters). At this point the user could enter a "5" to reach the terminal level of 450 (User Defined System ID). A terminal level is any level where system reviewing or changing is performed. Level 450 could also be reached by entering "450" when the prompt "**Enter Menu Level or <RETURN> for HELP**" is displayed. You could move from Level 000 to Level 450 in one step and eliminate visits to intermediate menu levels.

3.6 Level 000 Main Level

```
Level: 000 Main Menu  
  
1. User Table  
2. Block Inhibit  
3. System Status  
4. Configuration Parameters  
5. Dispatch Data  
  
Enter selection or <RETURN> to exit this menu >
```

This is the main menu of the SVL. All of the menu sub-levels can be entered from here.

3.7 Level 100 User Table

```
Level: 100 User Table

1. Single User
2. Group of Users
3. ASCII Download
4. XMODEM Download
5. XMODEM Upload

Enter selection or <RETURN> to exit this menu >
```

This menu group allows changes to be made to the user table. The user table defines a level of access for each home repeater and ID code. The following are the types of access that can be entered for each user:

1. Interconnect
2. Dispatch high
3. Invalid
4. Dispatch low

110 Single User

This menu level allows the access type of a single home repeater and ID code in the user table to be viewed and optionally changed. The operator will be asked to enter the home repeater and the ID code of the user to be viewed. The user's access type will be displayed and the operator will be asked if the access type is to be changed. If "Y" is answered, a new access type can be entered.

The operator is allowed to change the access types of IDs 251 to 255. These IDs are defaulted to dispatch high but can be changed if desired. Care should be taken when changing these IDs since, for example, some interconnects use ID 253 to reserve the repeater.

120 Group of Users

This menu level allows the access type of a group of ID codes on a single repeater in the user table to be viewed and optionally changed. The operator will be asked to enter the home repeater, the start ID code, and the ending ID code of the group of users to be viewed and/or changed. The operator will be asked if the current access types of the users in the selected group should be displayed. The operator will then be asked if the access type for the group should be changed. The access type of all the users in the selected group can then be set to the same access type.

130 ASCII Download

This menu level allows the user table to be viewed in condensed form. The operator will be asked if the download is to be in printer format. If "N" is answered, the table will be displayed one repeater at a time on the screen and a <RETURN> will have to be entered to view the next repeater. If a "Y" is answered, the user table will be displayed three repeaters at a time with a formfeed character inserted between each group of three repeaters. This method is ideal for capturing the user table to a disk with a communications package and then printing it out on a printer.

The types of access displayed in the download are defined as follows:

- I = Interconnect
- H = Dispatch high
- . = Invalid
- L = Dispatch low

140 XMODEM Download

This menu level allows the operator to download the user table to a computer for backup or for transferring the table to another system. Only ID codes that are not invalid are transferred to minimize transfer time. Upon entering this menu level, the following message will be displayed:

Press <RETURN> to continue or <ESC> to abort

The operator can cancel the download by pressing <ESC>. If <RETURN> is pressed, the following message will be displayed:

Start the transfer from your communications program

The XMODEM download should then be started from the communications program. See the operating manual for the communications program being used for more information.

150 XMODEM Upload

This menu level allows a previously downloaded user table to be uploaded to the SVL. The operator is asked if the current user table should be deleted. If a "Y" is answered, all user IDs will be set as invalid except for the user IDs from 251 to 255 which will be set as dispatch high. In most cases, the user table should be deleted since the upload file contains only those IDs that are not invalid. The only IDs that will be modified in the user table are those that are present in the uploaded file. After the table is reset, the following message will be displayed:

Press <RETURN> to continue or <ESC> to abort

The operator can cancel the download by pressing <ESC>. If <RETURN> is pressed, the following message will be displayed:

Start the transfer from your communications program

The XMODEM upload should then be started from the communications program. See the operating manual for the communications program being used for more information.

3.8 Level 200 Block Inhibit

Level: 200 Block Inhibit
1. Edit Block
2. ASCII Download
Enter selection or <RETURN> to exit this menu >

This menu group allows the block inhibit group number of ID codes to be viewed and changed.

210 Edit Block

This menu level allows the block inhibit group number of a block of ID codes on a single repeater to be viewed and optionally changed. The operator will be asked to enter the home repeater, the start ID code, and the ending ID code of the block of users to be viewed and/or changed. The operator will be asked if the current group numbers of the users in the selected block should be displayed. The operator will then be asked if the group number for the selected block of IDs should be changed. The group number of all the users in the selected block can then be set to the desired group number.

Up to 256 block inhibit groups (numbered 0 - 255) can be defined. Any number of user IDs can be assigned to each group. Only one ID from each group is allowed to use the system at any given time. All other IDs in the group will be invalidated if they attempt to access the system when another ID from their group is already busy on the system. Group 0 is the factory default group for all IDs and the block inhibit feature is not applied to IDs in this group. Any number of IDs in group 0 can access the system at any given time.

220 ASCII Download

This menu level allows all user IDs assigned to each block inhibit group (except group 0) to be viewed. The operator will be asked if all groups are to be displayed. If "N" is answered, the operator will be asked to enter the group number and then the user IDs in that group will be displayed. If a "Y" is answered, the operator will be asked if the download is to be in printer format. If "N" is answered, all user IDs in each group will be displayed one screen at a time. If a "Y" is answered, all user IDs in each group will be displayed with a formfeed character inserted between each page. This method is ideal for capturing the download to a disk with a communications package and then printing it out on a printer.

3.9 Level 300 System Status

Level: 300 System Status
1. Real-Time System Status
2. System Reset
Enter selection or <RETURN> to exit this menu >

This menu group allows the system status to be viewed in real time. It also allows the system to be reset.

310 Real-Time System Status

The status of each repeater is displayed in real-time along with the group number (if not 0) of the ID using each repeater. The screen is updated as the status of a repeater changes. The current dynamic load level is also displayed. The following is a list of the different states that a repeater may be in:

1. Idle - The repeater is present on the repeater data bus but is currently not active.
2. Busy - The repeater is currently active. The ID code that the repeater is currently handling is also displayed.
3. Invalid - The repeater is active with an invalid ID code. The invalid ID code is also displayed.
4. Missing - The repeater is not present on the repeater data bus.

To exit this menu, an <ESC> must be pressed.

320 System Reset

This menu level allows the operator to reset the SVL. When this menu level is entered, the operator is asked if the SVL should be reset. A "Y" will cause the SVL to reset and a "N" will exit this menu level.

3.10 Level 400 Configuration Parameters

```
Level: 400 Configuration Parameters

1. Validation
2. Dispatch Load Levels
3. DSR/DCD
4. Update Passwords
5. User Defined System ID

Enter selection or <RETURN> to exit this menu >
```

This menu group allows the system configuration to be updated. This enables the configuration to be changed to meet the needs of the operator.

410 Validation

This menu level allows the operator to enable and disable validation. When validation is disabled, all users are allowed to use the system. When validation is enabled, all user IDs appearing on the repeater data bus are looked up in the user table. If the user is invalid, they will be invalidated using time slot 21. The user ID will also be invalidated if another user from the same block inhibit group as the user ID is currently busy on the system. If the user is a dispatch or interconnect user, they will be allowed access to the system unless the current dynamic load level is inhibiting either low or high priority dispatch.

When validation is disabled, the SVL will not put anything into time slot 21. When enabled, the SVL will put either an idle message or validation information into time slot 21. This allows an SVL to be used as a backup validator to an existing validator on the system. Only one unit on the system should be generating time slot 21 information at any given time.

420 Dispatch Load Levels

This menu level allows the operator to set the load levels for low and high priority dispatch users. This allows low and high priority dispatch users to be enabled and disabled depending upon system activity. A percentage can be entered for low (or high) priority dispatch users and when the dynamic load level is greater than or equal to the percentage entered, all low (or high) priority dispatch users will be disabled. A new dynamic load percentage is calculated every 30 seconds. This percentage is based on the total amount of available airtime and the total amount of used airtime for the entire system from the previous 5 minutes.

430 DSR/DCD

The SVL has a safety feature to automatically log the operator off the system when either the data set ready or data carrier detect signal is lost. DSR/DCD is initially disabled from the factory. This menu level allows DSR/DCD to be enabled or disabled by the operator.

DSR/DCD should be enabled to insure you are logged off the system when the modem becomes disconnected. This will keep an unauthorized person from being able to log onto the system by bypassing the password prompt.

JP5 determines if DSR or if DCD is monitored for a disconnect. The factory setting for JP5 is A-B which is DSR. For DCD this jumper should be set to B-C.

440 Update Passwords

Both the REVIEW and CHANGE passwords may be changed from this menu level. The REVIEW access level allows all information on the system to be reviewed but not changed. The CHANGE access level allows all system information to be reviewed and changed. The default passwords for the REVIEW and CHANGE access levels are "REVIEW" and "CHANGE", respectively.

If the operator decides to change the passwords, the new password entered must be from one to eight alpha-numeric characters in length. The characters entered for the new password will not be echoed to the screen. Because this may introduce a possible mistyping error, the password must be entered twice with the second password entry used as a verification precaution.

NOTE: The SVL does not differentiate between upper and lower case passwords (EXAMPLE: "A" = "a").

450 User Defined System ID

The user defined system ID is a 31 character alpha-numeric string which is the first line displayed on the screen after a successful logon attempt. It is also included at the beginning of a dispatch data download. The system ID can be used to identify your company name, city, name of this site, or any other identifying message.

If more than 31 characters are entered as a new system ID, only the first 31 characters will be saved. The system ID may be in either upper or lower case.

3.11 Level 500 Dispatch Data

Level: 500 Dispatch Data 1. Data Accumulation 2. XMODEM Download 3. Clear Data 4. Minimum Record Time Enter selection or <RETURN> to exit this menu >
--

This menu group allows Dispatch Data Accumulation to be enabled, downloaded (XMODEM), or cleared. It also allows the operator to enter a minimum record time for download.

510 Data Accumulation

This menu allows the operator to enable or disable dispatch data accumulation. When it is enabled, the airtime and PTT count for mobile IDs of type dispatch are stored in the battery backed onboard RAM and are available for download. When disabled, storage does not take place. Data remains in the RAM until the clear selection is made.

520 XMODEM Download

This menu level allows the operator to download the accumulated dispatch data to a computer. Only data for ID codes that are of type dispatch (low or high) will be downloaded. Upon entering this menu level, the following message will be displayed:

Enter date mm/dd/yy:

The operator should enter a date in the above format. Two numbers must be entered for the month (00-12), day (00-31), and year (00-99). The slashes between the entries should also be included. If the above format is not followed, the date will need to be re-entered. The entered date will appear in the header of the downloaded data. Upon entering a valid date, the following message will be displayed:

Press <RETURN> to continue or <ESC> to abort

The operator can cancel the download by pressing <ESC>. If <RETURN> is pressed, the following message will be displayed:

Start the transfer from your communications program

The XMODEM download should then be started from the communications program. See the operating manual for the communications program being used for more information.

NOTE: Dispatch Data is downloaded in a coded format that will have to be processed with the EXPAND3P program in order to view the information in a readable form.

530 Clear Data

This menu level allows the operator to clear the dispatch data counters. If "Y" is entered, all accumulated data will be lost and reset to zeros. Before clearing the counters, ensure that the current data is downloaded if necessary.

540 Minimum Record Time

This menu level allows the operator to enter a minimum accumulated dispatch time for records that are to be downloaded. Any record with a dispatch time less than this number will not be downloaded. The current minimum record time is displayed at the top of the menu after the words "Minimum Record Time:". The operator may enter a time ranging from 00 seconds to 59 seconds. Upon entering a valid time, the value is stored in the EEPROM and will remain the minimum record time until changed. The default value for minimum record time is 3 seconds.

PARTS LIST

SVL PC BOARD 101-0240

Item	Reference	Description	Part No.	Qty.
1	C1,5,6,7,10,11,13,14, 15,16,17,20,21,22,24, 25,26,27,33,34,77,84, 91	.1uF MONO. CAP	362-0001	23
2	C2,101	10uF 50V ELEC. CAP	360-5106	2
3	C3	1000uF 35V ELEC.CAP	360-0018	1
4	C8,9,35	18pF MONO. CAP	362-0007	3
5	C18,29,30,31,32	1uF 50V ELEC.CAP	360-0001	5
6	C36	.01uF MONO. CAP	362-0003	1
7	D1,2	LED 4 POS. BAR GREEN	112-0013	2
8	D3	LED YELLOW XC526Y	112-0003	1
9	D4	LED RED XC5569R	112-0001	1
10	E1,2,3,4,5,6,14,20	FERRITE BEAD	306-0007	8
11	F1	3 AMP FUSE	290-0007	1
12	F1	CLIP PCB MOUNT	291-0001	2
13	F1	COVER-FUSE	291-0005	1
14	J5,6	BNC CONNECTOR	231-0024	2
15	JP1,2,3,4,30,38,41	STAPLE JUMPER .100	265-0016	7
16	JP5,21,31,32,33	SHORTING PLUG	234-0046	5
17	JP5,31,32,33	3 POS. JUMPER POST	231-1003	4
18	JP18,19,20,21,22	2 POS. JUMPER POST	231-1002	5
19	P1	DB25 FEMALE R/A	231-0004	1
20	P3	DB15 FEMALE	231-0031	1
21	P1,3	#4 HEX NUT	199-0010	4
22	P1,3	#4 x 3/8 PHIL. SCREW	199-3056	4
23	R1	1 POS. POST	231-1001	2
24	R1	10W 5 OHM PANEL RES.	318-0002	1
25	R2	93.1K 1% 1/4W RES	311-9312	1
26	R3	232K 1% 1/4W RES	311-2323	1
27	R4	17.8K 1% 1/4W RES	311-1782	1
28	R5,15,26,27,141,152, 153	10K 5% 1/4W RES	312-0011	7
29	R7,8,132,136,137	200 5% 1/4W RES	312-0039	5
30	R16,17	470 OHM 5% 1/4W RES	312-0028	2
31	R99	100 5% 1/4W RES	312-0010	1
32	R116,117,119	1K 5% 1/4W RES	312-0019	3
33	R146	100K 5% 1/4W RES	312-0003	1
34	SW1	SWITCH ASSY. ON/OFF	611-0040	1
35	SW2	8 POSITION DIP SWITCH	613-0003	1
36	TP1,2,3	TEST POINT	200-0013	3
37	U1	UA7805 TO-220 IC	130-0022	1
38	U3	32KX8 LOWPWR CMOS IC	130-0275	1

39	U3	RAM SOCKET DS1213C	130-0357	1
40	U4	X2864BD-150 IC	130-0281	1
41	U5	27C512-12J IC	130-0319	1
42	U6,7	PALI6L8B-2CN IC	130-0295	2
43	U9	74HC373 IC	130-0218	1
44	U10	74HC374 IC	130-0228	1
45	U11	74HCT541 IC	130-0301	1
46	U12	ICL7665 IC	130-0242	1
47	U13	80C196KB IC	131-3006	1
48	U15	MM74C00N IC	130-0084	1
49	U17	8251A IC	130-0165	1
50	U18,19,20,21	74LS20N IC	130-0174	4
51	U22	7407 IC	130-0154	1
52	U24	MAX232 IC	130-0235	1
53	U25	74LS04 IC	130-0137	1
54	U26	74LS393 IC	130-0193	1
55	U34	SN75121N IC	130-0168	1
56	U35	SN75122N IC	130-0167	1
57	U36	75138 IC	130-0262	1
58	U1	NUT HEX 4-40	199-0010	1
59	U1	WASHER STAR #4	199-2001	1
60	U1	SCREW 4-40 x 3/8 PH	199-3056	1
61	U1	INSULATOR TO-220	210-0103	1
62	U3,4,5,17	28 PIN DIP SOCKET	220-0008	4
63	U6,7,9,10,11	20 PIN DIP SOCKET	220-0009	5
64	U12	8 PIN DIP SOCKET	220-0003	1
65	U13	68 PIN PLCC SOCKET	220-0012	1
66	U15,18,19,20,21,22, 25,26	14 PIN DIP SOCKET	220-0002	8
67	U24,34,35,36	16 PIN DIP SOCKET	220-0001	4
68	X1	12 MHZ CRYSTAL	305-0002	1
69	X2	2.4576 MHZ CRYSTAL	305-0010	1
70		SVL PC BOARD	900-0240	1

SVL CABINET

Item	Description	Part No.	Qty.
1	#6 PEM NUT	199-0031	12
2	#8 PEM NUT	199-0036	4
3	BNC CABINET NUT	199-0043	2
4	#8 STAR WASHER	199-2003	2
5	BNC STAR WASHER	199-2108	2
6	SCREW 4-40 x 3/8 PH	199-3056	2
7	SCREW 6-32 x 1/4 PH	199-3070	11
8	SCREW 6-32 x 1/4 BLACK	199-3080	5
9	SCREW 8-32 x 3/8	199-4042	2
10	SERIAL NUMBER LABEL	199-6009	1
11	SPACER 6-32 x 1/4	200-0038	8
12	SPACER 4-40 x 3/8	200-0305	2
13	HANDLE 3 x 1 x .250	204-0001	1
14	SVL TOP COVER	900-6031A	1
15	SVL CHASSIS	900-6032S	1
16	SVL 19" FACEPLATE	900-6041S	1

SCHEMATICS

Insert
Schematics
here