

# **Derived Channel Scan Alert**

## Derived Channel / Scan Alert

### Description

The Base Ten receiving system uses derived channel technology to supervise switched telephone network lines. When connected to a control/communicator, the S.T.U. generates a constant supervisory tone on the subscribers telephone line. The supervisory tone is transmitted whether the telephone is on-hook or off-hook. The tone cannot be heard by the human ear and does not interfere with the operation of the subscriber's telephone.

The supervisory tone from each S.T.U. in the derived channel system is monitored by Base Ten Scanners installed in the telephone company's central office. If the Scanner does not "hear" the supervisory tone from the S.T.U., the Scanner immediately polls the S.T.U. for a status check. If the S.T.U. does not respond the Scanner sends an alarm message to the telephone company Host Computer which transfers the signal to the alarm company supervisory terminals.

A modem, Base Ten A.T.U. (Agency Terminal Unit) and printer (or an Omegalarm D6000 Receiver) must be installed at the alarm company central station to complete the derived channel receiving system.\* Two units of each VerSuS system component are normally installed for back-up purposes. The components of the system are supervised by the Host computer. Component failures are reported to telephone company supervisory terminals and/or alarm agency terminals when appropriate.

The derived channel receiving system is configured and monitored by operators at the Host console, the telephone company supervisory terminals and the alarm agency terminals. The Scanners and Host Computer are maintained and operated by the telephone company. The services of the telephone company are commonly shared by local monitoring companies offering derived channel technology. (Additional information on the availability of derived channel telephone services in your area and equipment provided by Base Ten can be obtained from Base Ten Telecom, Inc., One Electronics Drive, Trenton, N.J. Customer Service Department 1-800-227-3836.)

\* The modem, ATU and printer will not be necessary if the central station is equipped with an Omegalarm D6500 Digital Receiver containing a Derived Channel Un. card (available in 1986).

### Operation

The S.T.U. receives power and an alarm input from the control/communicator. The S.T.U. can be connected to any control/communicator which can provide a constant 12VDC (nominal) power supply to the S.T.U. In addition, the S.T.U. can transmit an alarm signal if the control/communicator can provide a separate 12VDC powered output during an alarm condition.

Two methods are used to identify each S.T.U. in the derived channel system. The Host Computer and Scanner identify the location and agency ownership of each S.T.U. using a "Soft I.D." The Soft I.D. is established by the Host Computer when the S.T.U. is put on-line and polled for the first time. The second identifying number is a "Hard I.D." programmed by the alarm installer using DIP switch settings on some STUs or chip programming on others. The Hard I.D. is the account number which identifies the S.T.U. at the alarm company central station.

Under normal conditions the S.T.U. generates a constant tone on the subscriber's telephone line. The tone is in the sub-audible range so that normal use of the telephone is not affected. The supervisory

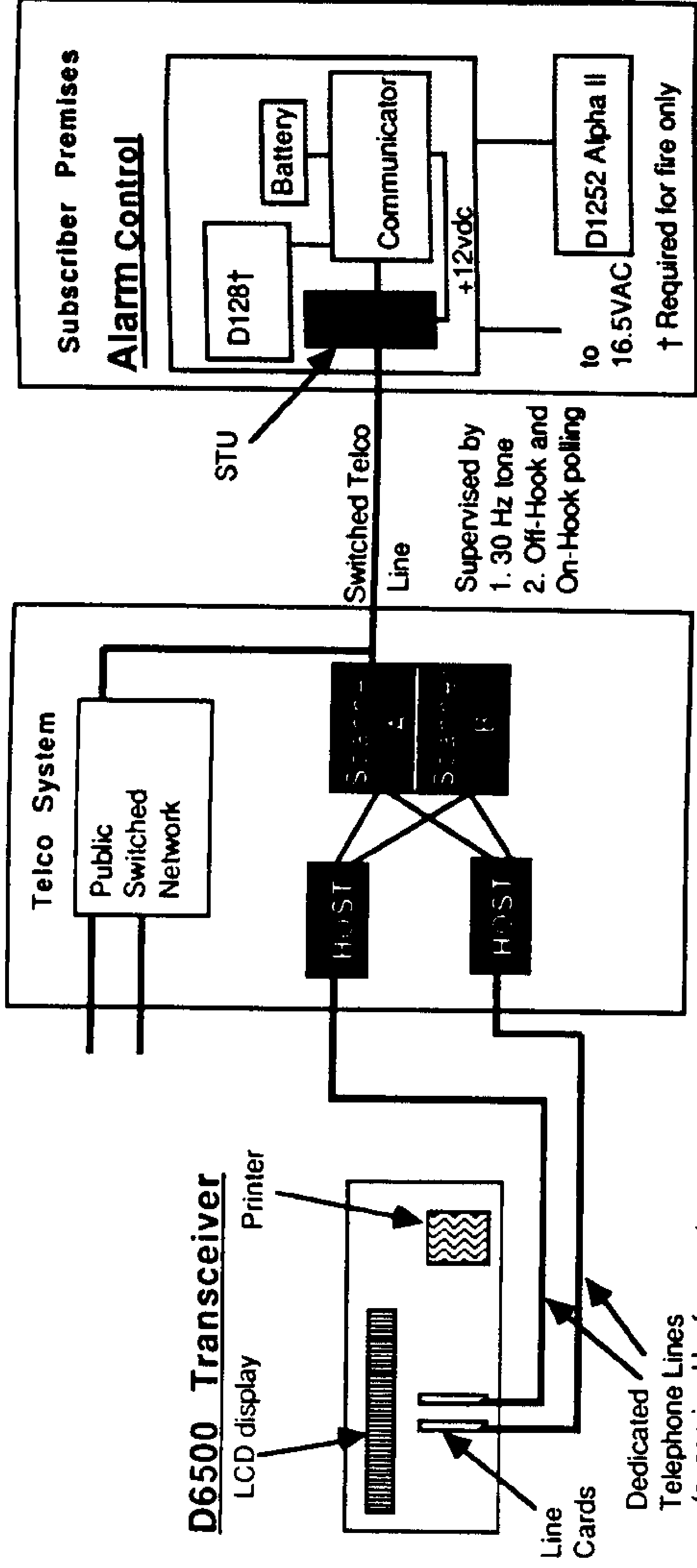
tone is monitored by a Base Ten Systems Scanner at the telephone office. When the subscriber's telephone is on-hook the Scanner audibly polls the S.T.U. in turn with other STU's in the system. The Scanner polls the S.T.U.s to maintain current status on each unit in the derived channel system. Normally, polling is suspended when the telephone is off-hook, as long as the supervisory tone is present; however the Scanner can be programmed so that polling continues even if the telephone is off-hook. In either case, if the supervisory tone is interrupted, the Scanner immediately polls the S.T.U. to update the status of the system.

**Line Security Alert:** If the Scanner detects the absence of the tone and/or does not receive a response to polling interrogation within 90 seconds an alarm message is generated from the Scanner on behalf of the "missing" S.T.U. The Scanner generates the data necessary to identify the missing S.T.U. and passes it on to the Host Computer. The Host Computer then sorts the data and forwards the alarm message to the the telephone company supervisory terminals and to the monitoring agency.

**Alarm Processing:** When the S.T.U. receives an alarm input from the control panel, the S.T.U.'s supervisory tone is removed from the telephone line. The Scanner detects the absence of the tone and polls the S.T.U. for the pending message. The S.T.U. responds with the alarm message which is then passed from the Scanner to the Host computer. The Host computer sorts the data and forwards the alarm message to the monitoring agency.

**Control Command Output:** The Control Command Output provides a dry contact output to a user-selected device connected to the S.T.U. The output is activated by the "OUTPUT ON" and "OUTPUT OFF" commands entered at the alarm agency terminal. This output cannot be used to power the external device.

# Future Radionics/Base Ten System Configuration



Dedicated Telephone Lines (supervised by frequent bidirectional message exchanges).

Pattern Key	
	Alarm Equipment
	Derived Channel Equip. (STU)
	Base Ten derived channel equipment

Signals sent via...	Signals received...
...D8122 (STU)	Telco Line Supervision Alarm-Burg Alarm-Fire Trouble-Burg Trouble-Fire Restoral-Alarm, Burg Restoral-Alarm, Fire Restoral-Trouble Opening/Closing Zonex
...D6500 (Monitoring Receiver)	STU on & off Control Output on & off

# Ademco 698 STU

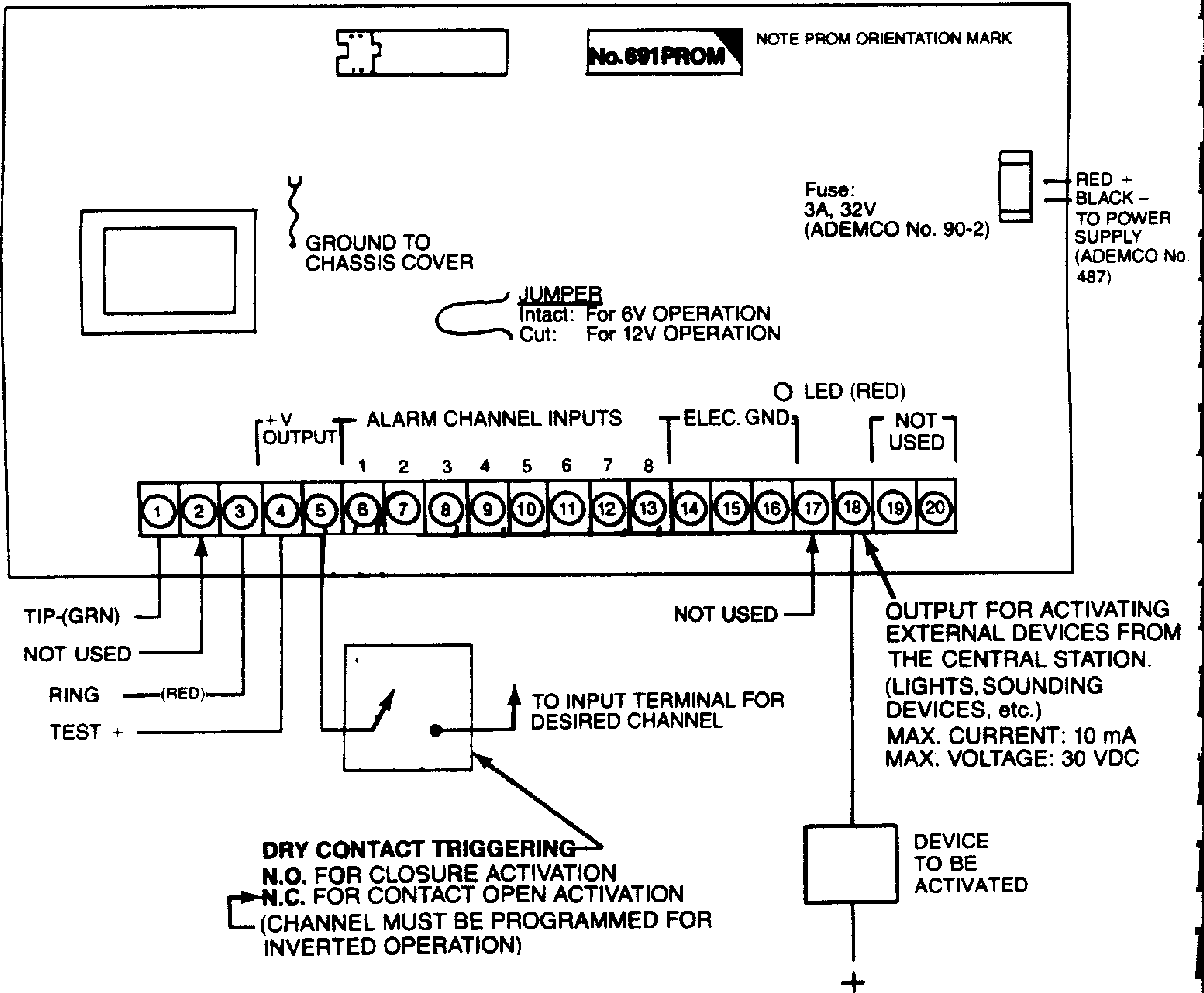


DIAGRAM DESCRIBING No. 698 STU CONNECTIONS

**PROGRAMMING SECTION I: THE CHANNEL OPTIONS**

**ALARM INPUT SELECT**

<u>SELECTION OPTIONS</u>	<u>SELECTION CODE</u>
<b>NO ALARM CONNECTIONS</b>	8
<b>NORMAL INPUT W/NO DELAY</b>	1
Normal: Input voltage less than 1.7 volts.	
Alarm: Input voltage exceeds 3.3 volts.	
<b>INVERTED INPUT W/NO DELAY</b>	3
Normal: Input voltage exceeds 3.3 volts.	
Alarm: Input voltage less than 1.7 volts.	
<b>NORMAL W/A 16 SECOND DELAY</b>	5
<b>INVERTED INPUT W/A 16 SECOND DELAY</b>	7

**REPORT SELECT**

The INPUT SELECT determines the type and amount of information included in each report. **INSTALLATIONS USING THE ADEMCO No. 685 RECEIVER REQUIRE LONG REPORT WITH NO PREVIOUS ALARM REPORT** (Code 6).

For this option

ENTER CODE

**EITHER LONG OR SHORT REPORTS.....ENTER NOTHING**

If only one channel is triggered then a short report is issued with only that channel reported. With more than one channel triggered, a long report is issued indicating the status of all channels. This entry will appear as a **U** (unused) when previewed.

**LONG REPORTS ONLY.....2**

When any channel is triggered, a long report is issued indicating the status of all channels.

**EITHER LONG OR SHORT REPORT W/NO PREVIOUS ALARM REPORTING...4**

STU will report either LONG or SHORT, as described above, with the exception of PREVIOUS ALARM reports. The STU **will not** report transitions from ALARM to PREVIOUSLY REPORTED.

**LONG REPORTS ONLY W/NO PREVIOUS ALARM REPORTING.....6**

STU will send LONG REPORTS only and **will** report PREVIOUS REPORT messages (outstanding) upon reporting subsequent alarm messages.

# Ademco 698 STU

## CHANNEL ACTIVATION/RESTORE

Configuring this entry determines how channel activity will be reported. If channel activation is selected, then an alarm will simply be reported. If CHANNEL ACTIVATION/RESTORE is selected, an activation will be reported and when the activation has been removed, a RESTORE message will be reported.

### SELECTION OPTIONS

### SELECTION CODE

Both CHANNEL ACTIVATION and RESTORE REPORTED  
CHANNEL ACTIVATION ONLY REPORTED

1  
8

### SELECT INPUT TYPE

This option determines which channel will report an OPEN/CLOSE message.

### SELECTION OPTION

### SLIDE SWITCH POSITION

NORMAL REPORTING  
OPEN/CLOSE REPORTING

DOWN = D  
UP = U

## PROGRAMMING SECTION II: SYSTEM OPTIONS

### SUBSCRIBER IDENTIFICATION NUMBER

This option enables the scanner to identify the unit. Enter the identification number as requirements dictate.

### WAIL TONE DELAY

In an off-hook situation there is a possibility that the STU will not be polled. If this were to happen, the STU, in order to gain the attention of the scanner, will issue a **Wail Tone** which will cause the scanner to poll it out of sequence. The installer can determine the length of time required to initiate the wail tone (from the moment that the alarm occurred) by programming a code into the PROM. The delay options progress in five second increments from 0 to 1275 seconds. (Sixty seconds is the recommended delay.)

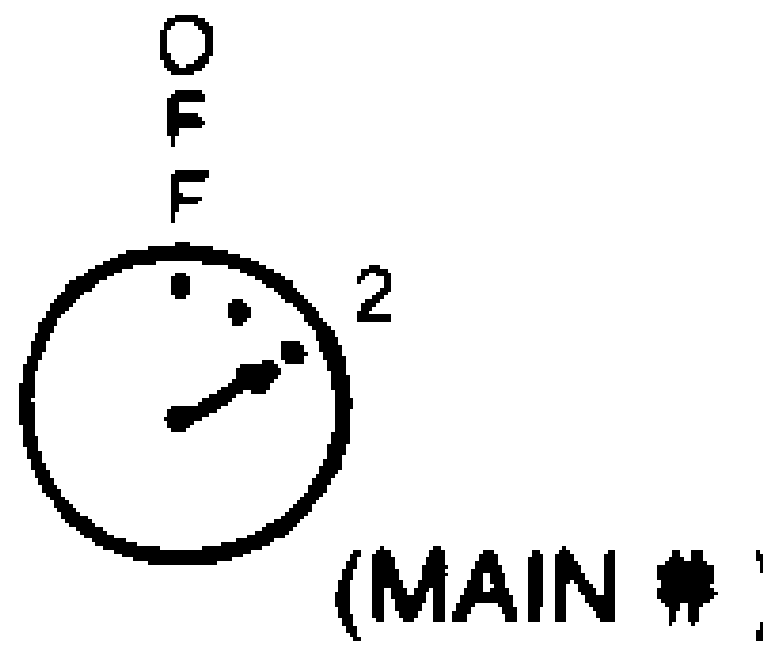
### EXAMPLE:

DELAY (in seconds)    BINARY    SWITCH POSITIONS (U = Up    D = Down)

DELAY (in seconds)	BINARY	Bit wghts.	1	2	4	8	16	32	64	128
0 (no wail tone)	0		D	D	D	D	D	D	D	D
5	1		U	D	D	D	D	D	D	D
10	2		D	U	D	D	D	D	D	D
15	3		U	U	D	D	D	D	D	D
30	6		D	U	U	D	D	D	D	D
50	12		D	D	U	U	D	D	D	D

# PROM PROGRAM COMPILATION SHEET

Compile all PROM selection on this sheet **BEFORE** programming the PROM. Refer to the text for programming procedures. (The circle indicates the rotary switch position and the rectangle indicates the position of the **PHONE** switch.)

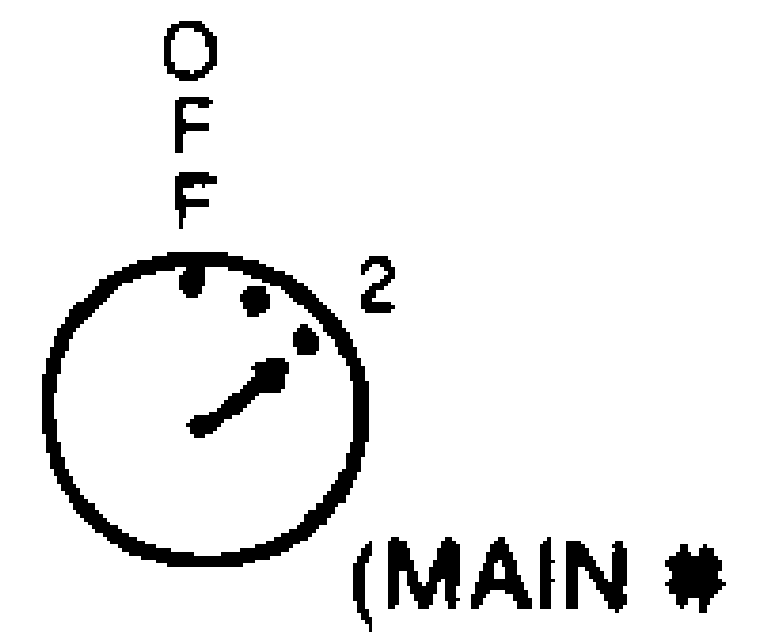

**SECONDARY**  
 (MAIN #)

**ALARM INPUT**  
and **REPORT SELECT**  
(ENTER FROM KEYPAD)

**ALARM INPUTS 1-8**

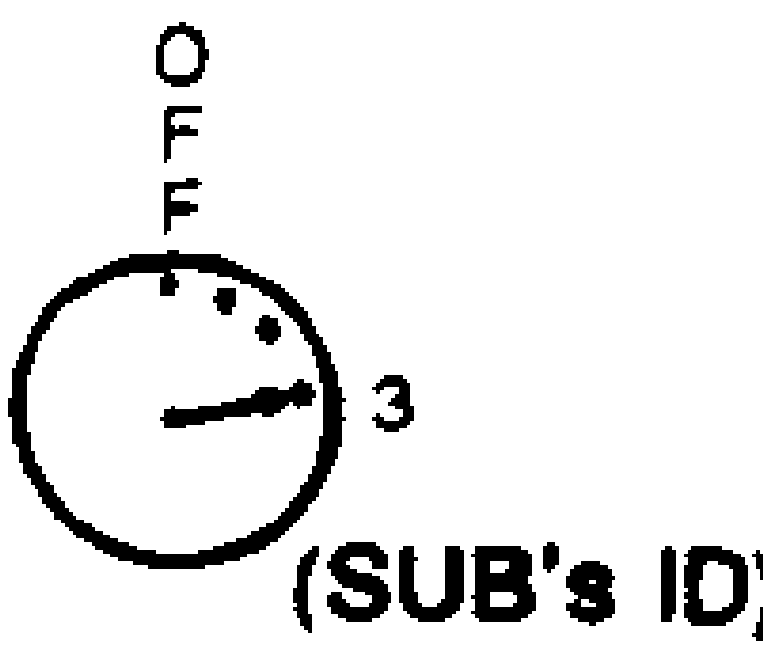
1	2	3	4	5	6	7	8	ENTER "8" HERE	REPORT SEL 7
							8	8	8

For all systems using a No. 685 Receiver enter a "6" here.


**PRIMARY**  
 (MAIN #)

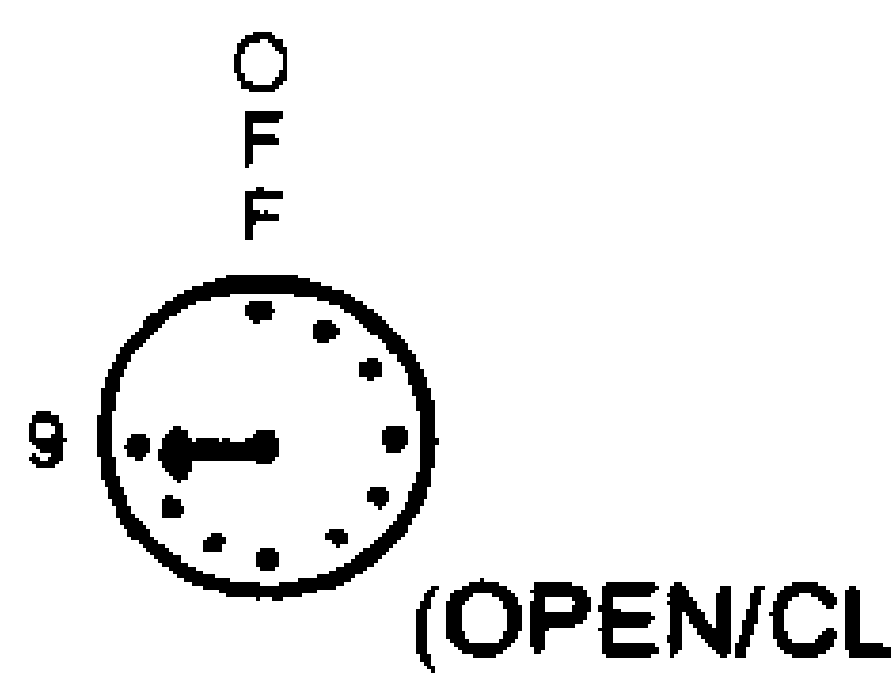
**CHANNEL ACTIVATION/RESTORE**  
(ENTER FROM KEYPAD)

1	2	3	4	5	6	7	8


**PRIMARY**  
 (SUB's ID)

**SUBSCRIBER ID**  
(ENTER FROM KEYPAD)

--	--	--	--

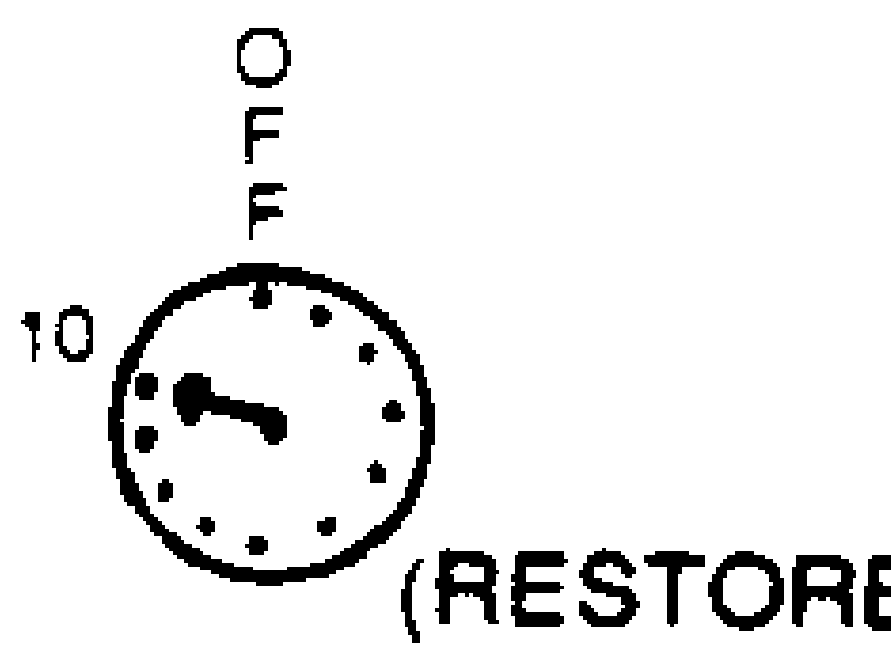

**(OPEN/CLOSE)**  
**SELECT INPUT TYPE**

(ENTER FROM SLIDE SWITCHES)

1	2	3	4	5	6	7	8

UP = OPEN/CLOSE REPORTS

DOWN = NORMAL REPORTS


**(RESTORE)**  
**WAIL TONE DELAY**

(ENTER FROM SLIDE SWITCHES)

--	--	--	--	--	--	--	--

UP = 1

DOWN = 0



# STU-11Z-UL

## Installation

**DEX SYSTEMS INC.**  
A WATSON SCIENTIFIC COMPANY

STU-11Z-UL

### Jumper Settings Table

<b>JP3 Alarm Zone Type</b>
1-2 Supervised
2-3 Normally open or closed
<b>JP5 DC Source Voltage, if any</b>
1-2 8 volts DC
2-3 12 volts DC
<b>JP6 Power Source Type</b>
1-2 AC source is used
2-3 No AC source is used
<b>JP7 DC Source Voltage, if any</b>
1-2 8 volts DC
2-3 12 volts DC
<b>JP8 Comm. Error Output (STUDIO)</b>
1-2 Enabled
2-4 Disabled

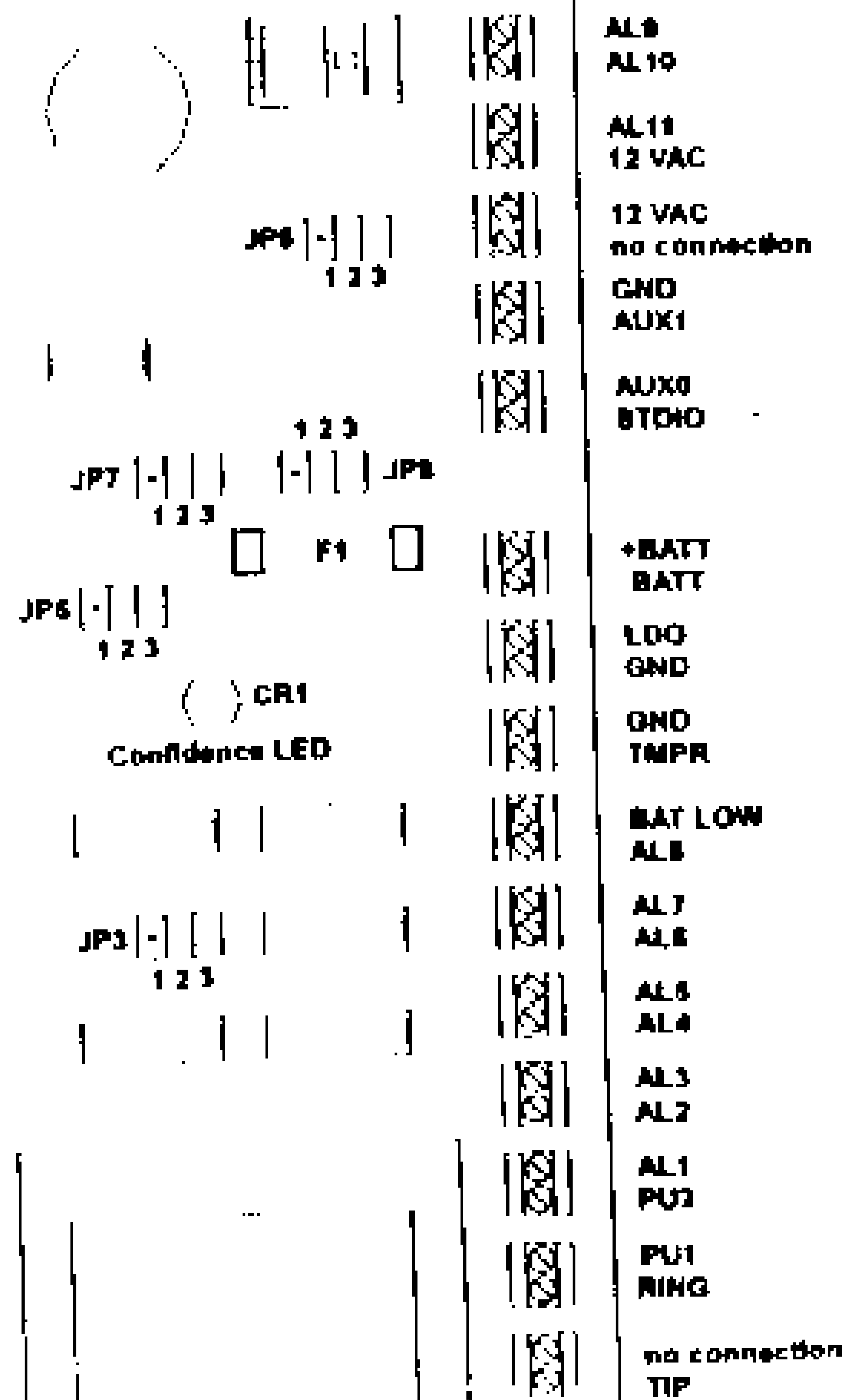


Figure 1

# DCX STU-11Z-UL

## Programming the STU<sup>®</sup>PROM

### General

Before a STU can be installed in a home or business, it must be programmed for that location. The programmable component on the STU is the PROM, which is at location U4 on the circuit board (see Fig).

The type of PROM used in the STU is an off-the-shelf item, readily obtainable. The PROM is made by Signetics, designated as a N82S123N, and National Semiconductor, designated as a DM74S288N.

PROM programmers are available from several manufacturers. This procedure describes the programming procedure using the ADEMCO 690A programmer.

### Programming with the ADEMCO 690A

Turn the rotary switch to the OFF position and plug in the programmer. Set the PROM TYPE switch to RED. Set the OPTION/CHANNEL SELECTION switches down (away from the rotary switch). Insert PROM in the NEW PROM socket with the marked end (with a dot, groove, cut or line) to the left.

### Programming Alarm Zone and Report Type

Turn the rotary switch to MAIN#. The DISPLAY should show "U" and the green AC POWER LED should light (and stay lit throughout the programming procedure). Set the PHONE NUMBER switch to SECONDARY. Press down and hold the PROGRAM switch until the following steps are completed:

1. Enter the Activation Type for each zone (1 through 11) sequentially on the keypad starting with Zone 1. The Selections are shown in the table below.

Option Required	Code
Normally Closed, no delay	1
Supervised, no delay	2
Normally Open, no delay	3
Normally Closed, 16 second delay	5
Supervised, 16 second delay	6
Normally Open, 16 second delay	7
No alarm Connection	8

2. After all 11 alarm zones are entered, program the Report Type. As the last entry is made, the programmer should buzz. Choose the report selection from the table.

Option Required	8 Pin STU	11 Pin STU
Long or short reports with previous reporting	Leave Blank	1
Long reports only with previous reporting	2	3
Long or short reports without previous reporting	4	5
Long reports only without previous reporting	6	7

3. Release the PROGRAM switch. The DISPLAY should show the value of the first entry made (for Zone 1).

### Programming the Active/Restore Codes

Set the PHONE NUMBER slide switch to PRIMARY. Leave the rotary switch at MAIN #.

Press down and hold the PROGRAM switch until the following steps are completed:

1. Enter the ACTIVATION/RESTORE code for each zone sequentially on the keypad starting with Zone 1 and concluding with Zone 11. Program the options as shown in the table below:

Option Required	Switch
ACTIVATION and RESTORE	1
ACTIVATION only	8

2. Only active zones need to be programmed. The buzzer will not sound this time as the last entry is made. Release the PROGRAM switch. The DISPLAY should show the value of the first entry made (for Zone 1).

*Note: When using an ADEMCO 690A programmer if 0 is used in the subID, you can not program a 0 or it will be transmitted as an "A", you must skip that location.*

# DCX STU-11Z-UL

## Programming the Subscriber I.D.

The PROM must now be assigned a Subscriber ID Number. Turn the rotary switch to SUB's ID#. The programmer may buzz when this is done.

Ignore this sound. Press down and hold the PROGRAM switch until the following steps are completed:

1. Enter the ID digits sequentially on the keypad. As the last entry is made, the programmer should buzz. Release the PROGRAM switch.

## Programming OPEN/CLOSE Zones

The PROM may now be programmed for OPEN/CLOSE zones. Set the rotary switch to OPEN/CLOSE. The CHANNEL OPTION MODE LED should now be lit. Verify that the OPTION/CHANNEL SELECTION switches are all down. Set the OPTION/CHANNEL SELECTION switches as shown in the table.

*Note: Only zones 1 to 8 can be programmed as OPEN/CLOSE zones.*

Option Required	Switch
OPEN/CLOSE Zones	UP
Normal ALARM Zones	DOWN

Press the PROGRAM switch. The LEDs should light for every switch in the up position. Release the PROGRAM switch.

## Programming the WAIL DELAY

The Alert Tone (Wail) Delay will now be programmed into the PROM. Set the rotary switch to RESTORE. Set all the OPTION/CHANNEL SELECTION switches to the down position. Set the OPTION/CHANNEL SELECTION switches as shown in the table.

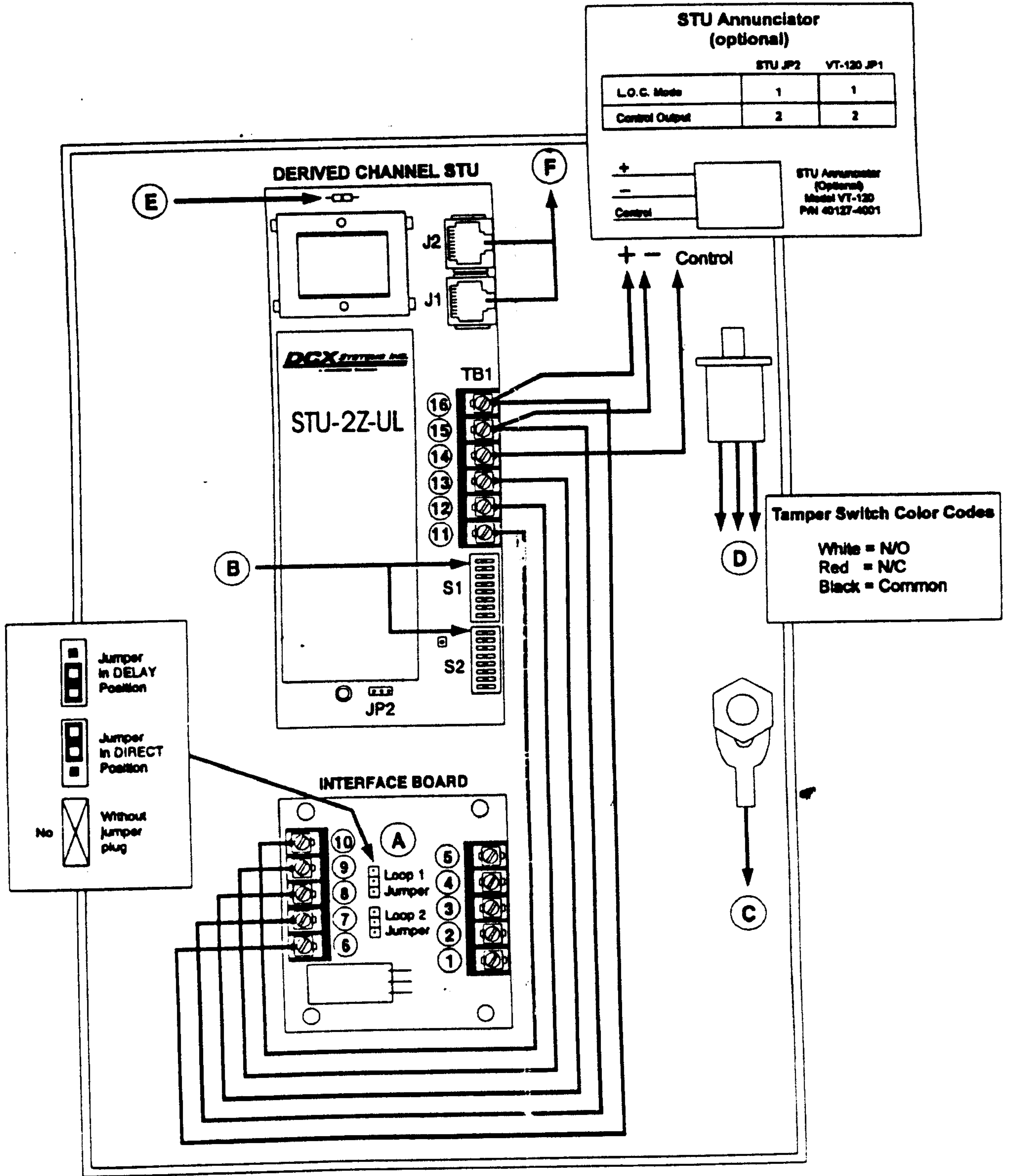
Delay	1	2	3	4	5	6	7	8
30	D	U	U	D	D	D	D	D
60	D	D	U	U	D	D	D	D
90	D	U	D	D	U	D	D	D

DCX Systems, Inc. strongly recommends that the delay be set to 60 seconds. Press the PROGRAM switch and the LEDs should light for every switch in the UP position. Release the PROGRAM switch.

## Finishing

This concludes the programming of the PROM. Set the rotary switch to OFF and remove the PROM.

Figure 2



# STU-2Z-UL

## Interface Board

Number	Name	Wiring Connections:
1	12V Power	Connect to AUX output on the control panel if panel power is normally 12 VDC.
2	24 V Power	Connect to AUX output on the control panel if power is normally 24VDC
3	GND	This is the power return; it is connected to the AUX power return on the control panel. It is also the trigger voltage input return to control panel.
4	Trigger 2	Voltage-trigger input. With the connections shown, a voltage of more than +4 V at the trigger pin will cause an alarm report. (The maximum voltage allowed is 40 V.)
5	Trigger 1	Voltage-triggered input (see above).  Note: If dry contacts are to be used instead of voltage for the alarm inputs, disconnect the wires from inputs 11, 12, and 13 and connect dry contacts with a 2.2K EOL resistor. Contacts should be normally open between input 11 & 12 for Zone 1 and between 12 & 13 for Zone 2.

Number	Wiring Connections: Interface/Communicator
6 and 16	Connects to (+) positive of 12 VDC.
7 and 15	Connects to (-) negative of 12 VDC.
8 and 13	Voltage Trigger for Zone 2
9 and 12	Common for Loops 1 and 2
10 and 11	Voltage trigger for Zone 1
14	Connects to buzzer or other annunciation devices to indicate alarm monitoring station confirmation, or may be used to operate a user-defined device. 50 mA open collector. (UL ring-back)

### UL Wiring Legends

- A. **Direct/Delay jumpers:** With jumper plugs in DIRECT position, the voltage-trigger inputs respond instantly. In DELAY position, the first 15-19 seconds of signal is blocked.
- B. **Hard I.D. dip switch:** See page 3 for instructions on setting customer identification account number.
- C. **Chassis GND:** This is a safety ground and must connect to the GND terminal on the panel.
- D. **Tamper switch:** An SPDT tamper switch is provided with the STU-2Z-UL. This should be connected to the tamper switch to the control panel to extend its tamper protection to include the case of the STU-2Z-UL and the interconnecting conduit. If the control uses an N/O tamper, wire in parallel with the existing switch. If it uses an N/C tamper, wire the switch in series.
- E. **Low tone jumper:** Reduces amplitude of Low Tone when cut, for compatibility with certain fax and answering machines. Refer to the DCX Compatibility Guide (P/N 30001-0591).
- F. **Phone line:** Plug the phone cord in either RJ-31X Jack on the STU-2Z-UL. Connect the red and green wires of the phone cord in parallel with the outgoing phone line from the control panel's DAC Transmitter. The DACT is still able to dial out in this configuration and the STU-2Z-UL is bridged across the line. The STU-2Z-UL must be connected between the control panel and the telephone company switching equipment (see Figure 1). In other words, the DACT line seizure must not disconnect the STU-2Z-UL from the outgoing line.

# STU-2Z-UL

## Installation

Follow the sequence below to install the STU-2Z-UL to a host system; refer to Figure 2 throughout.

**1. UL Grade AA.** For UL Grade AA installations, carefully review UL Compliance Verification (page 6) for compliance requirements before continuing.

**2. Wiring to control panel.** For UL compliance, wiring must be in a conduit per NFPA standards. See the wiring connections tables on page 4.

**3. Delay/Direct jumpers.** Locate the loop jumper pins (A on Figure 2) on the interface board. If the interface board is used for summary reporting from an alarm annunciator output, the jumper in the DELAY position will block any alarm signal that lasts less than 15 seconds, preventing the ring-back bell from being reported as an alarm. This function will operate whether the control panel alarm output is in pulse or continuous mode.

*With the jumper in the DELAY position, a bell must continue for at least 19 seconds to cause an alarm out-put. When the alarm output is pulsed, if the ON period of the output is at least 0.2 seconds and the OFF period is no more than 1.5 seconds, the trigger input will operate the same as with a continuous input voltage.*

*With the jumper in the DIRECT position, the voltage trigger inputs respond instantly.*

**4. Programming the account number.** The account number (Hard I.D.) is set using dip switches (B on Figure 2) on the communication board. The switches are divided into four groups of four. Each group of four switches represents one number of the Hard I.D. The placement of each number starts from the left, as in the examples below. The account number is based on the hexadecimal numbering system and can be any number from 0001 to EFFF. To program the account number, set the dip switches according to the table below.

Digit	8	4	2	1
0	off	off	off	off
1	off	off	off	on
2	off	off	on	off
3	off	off	on	on
4	off	on	off	off
5	off	on	off	on
6	off	on	on	off
7	off	on	on	on

Digit	8	4	2	1
8	on	off	off	off
9	on	off	off	on
A	on	off	on	off
B	on	off	on	on
C	on	on	off	off
D	on	on	off	on
E	on	on	on	off
F	on	on	on	on

Note: "off" is marked "open" on the switches

**5. Chassis ground.** Connect the chassis ground (C in Figure 2) to the GND terminal on the control panel.

**6. Tamper switch.** The tamper switch (D in Figure 2) provided with the STU-2Z-UL should be connected to the tamper switch on the control panel.

White = Normally Open, close on alarm

Red = Normally Closed, open on alarm

Black = Common

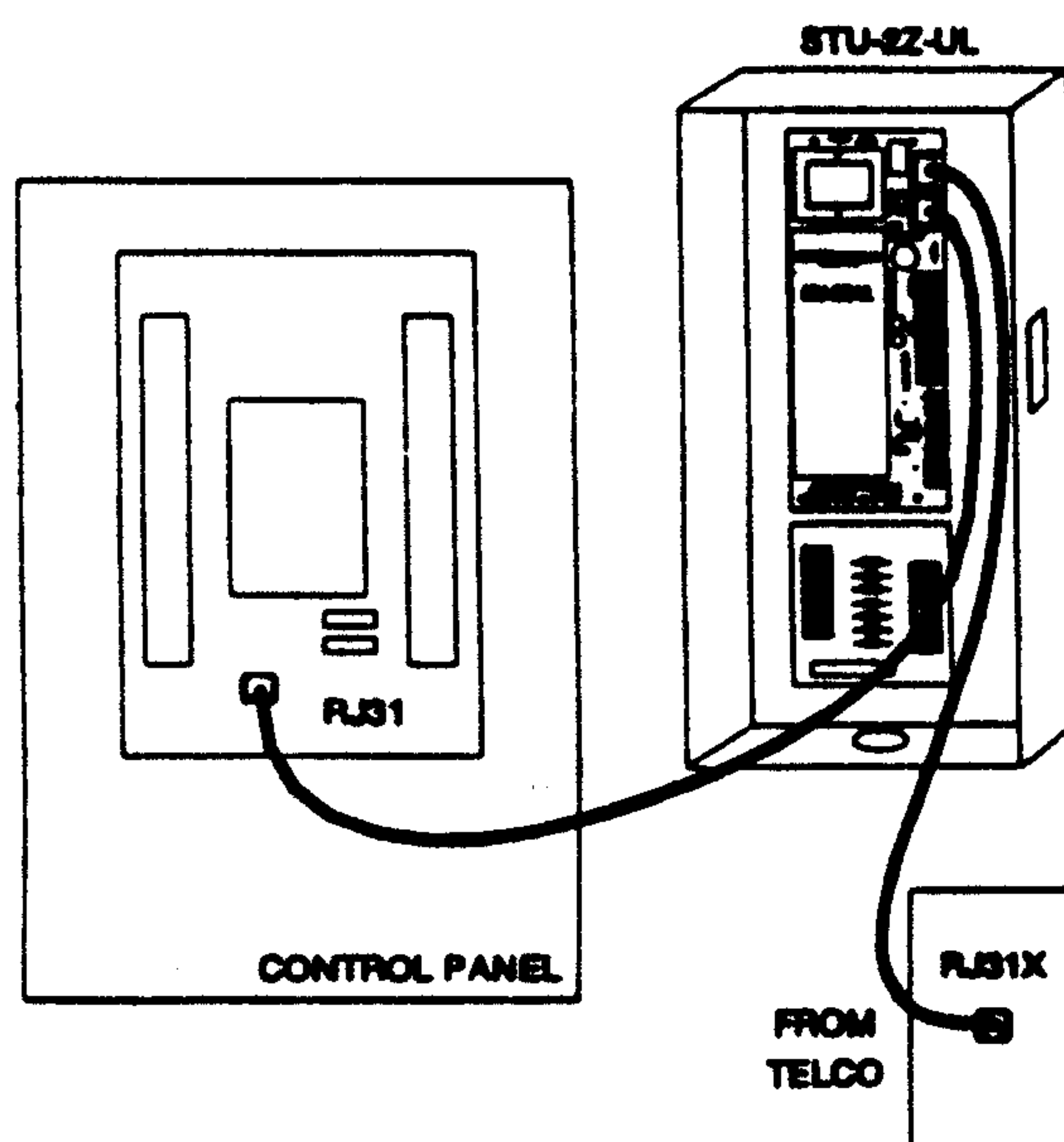
Note: If the host uses an N/O tamper, wire in parallel with the existing switch. For an N/C tamper, wire in series with the switch.

**7. Low Tone Jumper.** Certain CPE may be incompatible with the Low Tone Frequency of the system, causing a "motorboating" noise on the line. Cutting the Low Tone Jumper (E in figure 2) reduces the low tone amplitude and may stop the "motorboating".

Note: Cutting this jumper will not solve the chirping problems.

**8. Phone line connections.** Connect the phone line as per Figure 1: Plug a phone cord in either RJ-31X jack on the communicator board (F in figure 2). Connect the red and green wires of the phone cord in parallel with the outgoing phone line from the control panel's digital dialer (the digital dialer is still able to dial out in this configuration). The STU-2Z-UL must be connected between the control panel and the telephone company switching equipment. The digital dialer line seizure must not disconnect the STU-2Z-UL from the outgoing line. See Radio Interference, page 6, for further information about connection requirements.

Figure 1



Note: The STU-2Z-UL is wired between the telco RJ31X jack and the control panel.

# STU-2Z-UL

## Troubleshooting

SYMPTOM	CAUSE	POSSIBLE CURE
Confidence LED does not blink	No power applied to STU	<ol style="list-style-type: none"> <li>1. Check power connections</li> <li>2. Check voltage levels</li> <li>3. Replace STU</li> </ol>
Confidence LED stays on	STU problem	<ol style="list-style-type: none"> <li>1. Replace STU</li> </ol>
Low battery alarm	Low battery	<ol style="list-style-type: none"> <li>1. Check battery leads and connections</li> <li>2. Check battery voltage</li> <li>3. * Replace STU</li> </ol>
Alarm zone does not register	Zone circuit resistance	<ol style="list-style-type: none"> <li>1. Measure voltage across Trigger and GRN</li> </ol>
Self test error alarm	Bad STU	<ol style="list-style-type: none"> <li>1. Replace STU</li> </ol>
STU "not responding"	Attempted break-in	<ol style="list-style-type: none"> <li>1. Verify that phone line has not been cut</li> </ol>
	Bad TIP/RING connection	<ol style="list-style-type: none"> <li>1. Check TIP and RING connections at the STU and at the line tap-off point</li> </ol>
	No power to STU	<ol style="list-style-type: none"> <li>1. Check power connections</li> <li>2. Check voltage levels</li> <li>3. Replace STU</li> </ol>
	STU connecting to wrong line	<ol style="list-style-type: none"> <li>1. Verify that no chirps are heard on current line. Identify line with chirps and connect it to STU</li> </ol>
	STU incompatible with other equipment on line	<ol style="list-style-type: none"> <li>1. Disconnect all telephones and other equipment from the line. If STU now "responding" a compatibility problem may exist</li> </ol>
Chirps on the phone line when in use	Alarm condition	<ol style="list-style-type: none"> <li>1. Check to see if any alarm devices connected to the STU are active</li> </ol>
	No supervisory tone from STU	<ol style="list-style-type: none"> <li>1. Verify that there are no active alarms</li> <li>2. Verify adequate supervisory tone level. With phone on-hook, measure AC volts across TIP and RING terminals: <math>V &gt; 0.3</math> VRMS</li> <li>3. Replace STU</li> </ol>
	Noisy phone line	<ol style="list-style-type: none"> <li>1. Verify and report to Telco if Necessary</li> </ol>
	Network or Bell Central Office problem	<ol style="list-style-type: none"> <li>1. Only after completing all of the above tests, call Telco repair. Tell them the Soft ID of the STU and the telephone number.</li> </ol>
	Excessive line loading	<ol style="list-style-type: none"> <li>1. Check the Ringer Equivalence Number (REN) of all devices on the telephone line (on the label of each device). The REN must be less than 5.</li> </ol>
*"motorboating"/Echo on line	CPE	<ol style="list-style-type: none"> <li>1. Cut Low Tone Jumper</li> <li>2. Call DCX, STU may need modification</li> </ol>