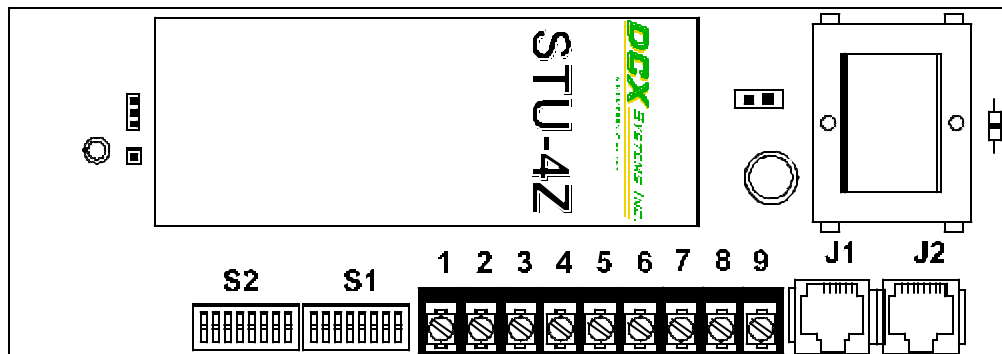


**Line Supervisory/Four-Input Line Communicator for Fire/Burglary Applications**

**Subscriber Terminal Unit Installation/Troubleshooting Guide**



STU-4Z

**Thank you for purchasing one of our Derived Channel products. Please refer to this guide for installing and/or troubleshooting the STU-4Z. If you have any questions, or need technical assistance please contact our technical support team at 800-761-9070.**

*The material and instructions in this guide are believed to be accurate and reliable. However, DCX Systems, Inc. assumes no responsibility for inaccuracies. DCX Systems, Inc. reserves the right to modify and/or revise the contents of this guide at any time without notice. If any inconsistencies are found please forward a corrected copy to DCX Systems, Inc.*

**Introduction**

The STU-4Z is a Derived Channel communicator that provides line supervision and four input zones for alarm applications. It operates in conjunction with any fire alarm or burglary panel to transmit line integrity and alarm information over the Derived Channel multipleX (DCX) Network.

The STU-4Z is designed to mount inside an existing alarm panel. The STU provides a local output (TB1, terminal 7) that can be connected to a user-specified device. For fire applications (see Figure 1, JP2: 1-2), this is a Loss Of Communication (LOC) output that changes state three (3) minutes after communication is lost. For burglary applications (see Figure 1, JP2: 2-3), this output is controlled by the central monitoring center and is typically used for manual ring back.

**Power Requirements**

The STU-4Z is powered from the control panel. Current consumption is 50 ma @ 12 VDC.

The STU-4Z is connected to the panel's auxiliary or accessory power output, which is provided for such applications. When connected to this terminal, the STU-4Z's current draw should, when added to the load of the control panel, allow the control panel to operate under back-up power for the time specified by UL (see UL Compliance Verification, page 5). Refer to the power requirements of the control panel to calculate the load.

STU<sup>®</sup> and Subscriber Terminal Unit<sup>®</sup> are registered trademarks of DCX Systems, Inc.

## Summary Reporting

When the alarm annunciator output of the host panel is used to trigger the alarm report to the alarm monitoring station, an alarm caused for any reason, or present on any loop, will appear the same to the alarm monitoring station. This is referred to as summary reporting. When the STU-4Z is used in conjunction with a digital dialer the dialer reports the control panel's alarm detail information, as required for UL Grade AA, and the STU reports the summary alarm.

## Control Output

**Ring-back: output control jumper JP2: 2-3.** "Ring- back" refers to the method of verifying that the system is operating and armed. When the system is armed, the alarm monitoring station may send a signal to the STU to turn on and a signal to turn off the control output.

Two modes of ring-back are possible with the STU-4Z: (1) the alarm monitoring station can initiate ring-back through the digital dialer on the control panel or (2) it can send a signal to the OUTPUT terminal of the STU-4Z. If the STU Annunciator (optional) is connected, as shown in Figure 1, this Annunciator will be turned on and off.

**LOC: output control jumper JP2: 1-2.** "LOC" means Loss Of Communication. The output pin on the STU will change state three (3) minutes after communication is lost. **Off-Hook Polling (OHP) or Delayed Off-Hook Polling (DOHP) MUST BE ENABLED when using the LOC output.**

## Reporting Functions

The STU-4Z continually communicates system status to a Derived Channel multipleX network, security scanner (located at the telephone company). If the status changes, the scanner communicates the following information directly to the alarm monitoring station.

**Loss of telephone line.** The alarm monitoring station receives an immediate report if the telephone line is lost or cut.

**Alarms.** Alarms are reported by loops. The STU-4Z can pinpoint which of the four loops is violated. Loop 1 reports to pin 1 on the Derived Channel Receiver at the alarm monitoring station. Loop 2 reports to pin 2, Loop 3 reports to pin 3, etc.

**Loop restores.** After an alarm reports and the cause of the alarm is removed, the loop is restored to normal status. The STU-4Z then sends a "restoral" message to the central station.

**Customer account number.** The alarm monitoring station's customer account number is included with every report for identification and billing purposes. This is the "Hard I.D." of the Derived Channel Protocol.

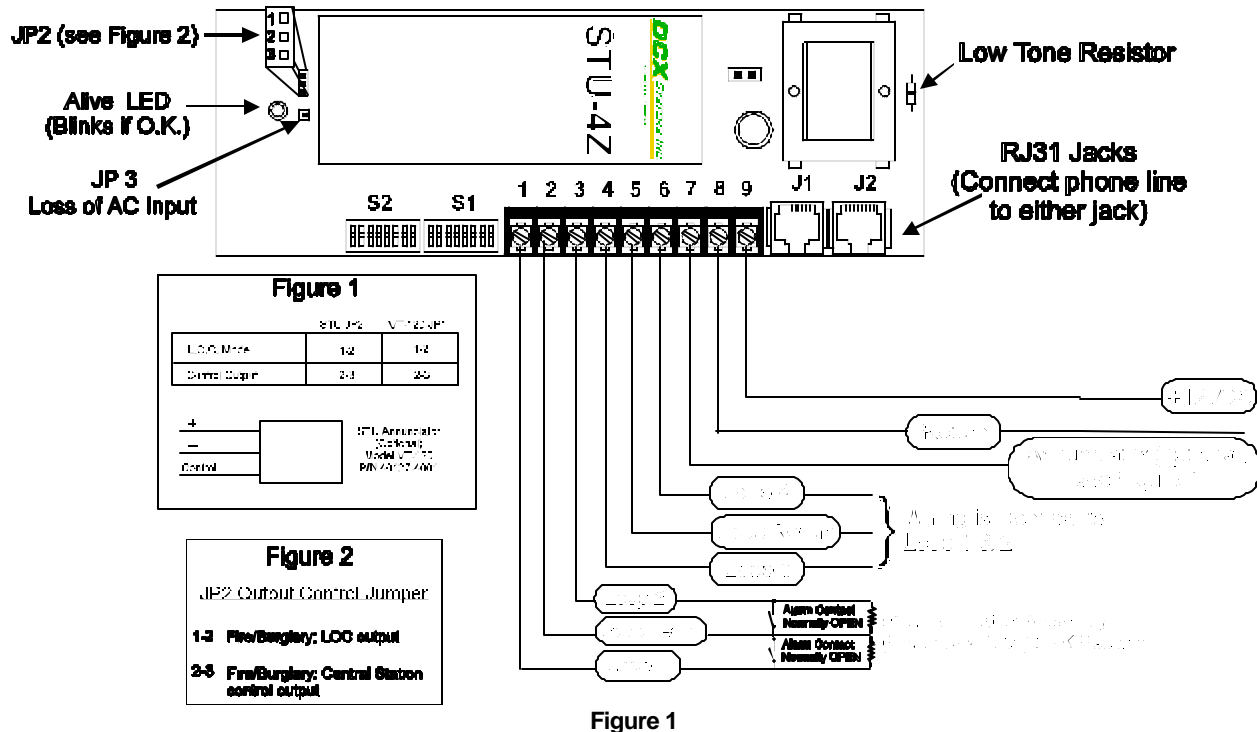
**Low battery.** If the input power is low (less than 11VDC) for more than five (5) seconds, a low battery alarm is sent to the central monitoring station. When the battery is sufficiently recharged, a battery restore message is sent.

## Specifications

Power .....	9.5-15
	VDC
Current.....	70 mA
	max.
Current (with local output fully loaded) .....	120 mA
	max.
Output .....	50 mA open
	collector

Account no. programming (Hard ID) ..... dip-  
switch  
Temperature rating ..... 32°F to  
120°F  
Size ..... 7.00" L x 2.9" W x  
1.5"h  
Wail delay ..... 60  
seconds  
Ringer equivalence .....  
1.7 B

Installation



**1. Connecting the alarm loops.** Connect the loops to the STU-4Z and use an EOL Termination Assembly (P/N 21024-0001 ) to supervise the loop. The loop can be tripped in two ways: by breaking (opening) the loop or by shorting (closing) the loop. Breaking the loop causes a fault report to be sent to the central monitoring station, whereas shorting the loop causes an alarm report to be sent to the central monitoring station. These loops are connected to terminals 1 through 6 on the terminal block (see Figure 1).

Digit	8	4	2	1
0	-	-	-	-
1	-	-	-	C
2	-	-	C	-
3	-	-	C	C
4	-	C	-	-
5	-	C	-	C
6	-	C	C	-
7	-	C	C	C

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

Figure 2

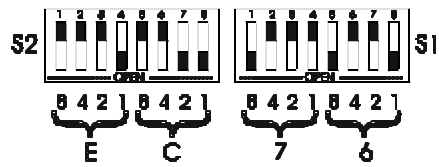
Examples of switch settings are provided below.

**Important:** Applying voltage to the alarm loops will damage the STU and void the warranty

**2. Programming the Account number.** The account number (Hard ID) is set using dip-switch assemblies S2 and S1 (see figure 2). Each of the switch assemblies is divided into two sets of four switches for the purpose of programming the account number. Each set of four switches represents one of the account number digits. Figure 2 shows how to set the four switches to obtain an account number digit. Closed switches are denoted by "C" and open switches by "-".

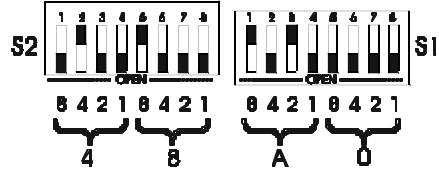
Example 1: Account Number EC76

(NOTE: ■ indicates depressed rocker switch)



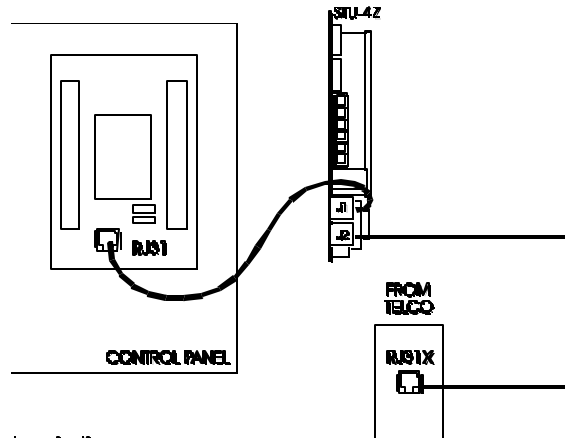
Example 2: Account Number 48A0

(NOTE: ■ indicates depressed rocker switch)



**3. Connecting the telephone line.** The STU-4Z provides two 8-pin modular connecting jacks, J1 and J2. The telephone line connects between the alarm control panel and the STU-4Z, as shown in Figure 3, using two DCX double-ended (P/N 96052-0001) or single-ended (P/N 96043-0001) cables.

**Important:** When the STU-4Z is used with a digital dialer, connect the STU-4Z between the RJ31X and the alarm panel so that the digital line seizure will not affect the operation of the STU-4Z.



**Important**

Note that the STU-4Z is hooked up between the Telco RJ31X jack and the Control Panel.

Figure 3

**4. Connecting the power.** The STU-4Z requires 12 VDC nominal power to operate. This power, generally available from the auxiliary power of the control panel, is connected to terminals 8 (GND) and 9 (+12VDC) on the terminal block (See Figure 1).

**5. Connecting the central monitoring station.** Once the system has been installed correctly with the account number programmed, it must be brought on line (or “upped”) by the central monitoring station. Advise the central monitoring station operator that the system is ready to be put on line. If the system does not respond, review connections and check the account number. Refer to the troubleshooting guidelines on page 6.

**6. Low Tone Jumper.** Certain Customer Premise Equipment (CPE) may be incompatible with the Low Tone Frequency of the system, causing a “motorboating” noise on the line. Cutting the Low Tone Jumper (see Figure 1) reduces the low tone amplitude and may stop the “motorboating”.

**UL Compliance Verification**

The installation shall be performed as in this guide, and all wiring must comply with the NFPA and/or the NEC standards.

The table below offers guidance to the UL requirements so that UL AA grade service for Central Station Burglary and Central monitoring station Protective (Fire) signally can be met.

<b>Function /Grade of Service</b>	<b>Grade AA</b>	<b>AA, Fire</b>	<b>Fire</b>
1. Off-hook polling (2 min.)	Yes	Yes	*
2. Supervised zone	No	Yes	Yes
3. Closing ring back (STU or digital communicator)	Yes	Yes	No
4. Zone input delay	No	No	No
5. Central Station UL 827	N/A	Yes	Yes
6. Central station UL 611	Yes	Yes	N/A
7. Approved control panel	UL 1610	UL 1610, UL 864	UL 864
8. Backup power	UL 1610	UL 1610, UL 864	UL 864
9. Summary fire report	Yes, if detail report provided by digital communicator		
10. Summary burglar report	Yes, if detail report provided by digital communicator		
11. Alert tone (wailer)	60 second delay		

\* Yes, if LOC output is used: no, otherwise

**Radio Frequency Interference**

The STU-4Z generates and uses radio frequency energy and, if not installed properly, may cause interference to radio and television reception. The STU-4Z has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications of Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. If the STU-4Z does cause radio or television interference, which can be determined by disconnecting power, the user is encouraged to try and correct the problem by one or more of the following:

- Reorient the receiving antenna
- Relocate the STU away from the receiver
- Connect the alarm panel to another power circuit

The installer may find the following booklet prepared by the FCC helpful: "How to Identify and Resolve Radio/TV Interference Problems." This booklet is available from the US Government Printing Office, Washington, DC 20402. Stock No.004-000-00345-4.

**Industry CANADA Compliance**

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par le ministre des communications.

**Troubleshooting**

<b>SYMPTOM</b>	<b>CAUSE</b>	<b>POSSIBLE CURE</b>
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. Check power</li> <li>2. Replace STU</li> </ol>
Low battery alarm	Low battery	<ol style="list-style-type: none"> <li>1. Check voltage</li> </ol>
Alarm zone does not register	Zone circuit resistance	<ol style="list-style-type: none"> <li>1. Check loop resistance (0 ohms when contacts are closed)</li> </ol>
Constant fault on alarm zone	EOL resistor not installed	<ol style="list-style-type: none"> <li>1. Install EOL resistor (2.2k)</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>
	Noisy phone line or phone line over spec. (1500ohms)	<ol style="list-style-type: none"> <li>1. Verify and report problem to Telco if necessary</li> </ol>
	No power to STU	<ol style="list-style-type: none"> <li>1. Check power connections</li> <li>2. Check voltage levels</li> </ol>
	STU connected 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 the 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 adequate supervisory tone level. With phone onhook, measure AC volts across TIP and RING terminals: <math>V &gt; 0.3</math> VRMS</li> <li>2. 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).</li> </ol>

## **Standard Hardware Warranty**

### **DCX SYSTEMS, INC. ONE-YEAR LIMITED WARRANTY**

DCX Systems, Inc. warrants the original purchaser that this hardware will be free from defects in material and workmanship for **one (1) year** from the date of shipment. During this warranty period, DCX Systems, Inc. will correct any defects in material or workmanship, or any failure of the product to perform to specifications, at no charge for labor and materials. Any replacement and/or repaired parts are warranted for the remainder of the original warranty or **ninety (90) days**, whichever is longer. The original owner must promptly notify DCX Systems, Inc. in writing that there is a defect in material or workmanship. Written notice in all events must be received by DCX Systems, Inc. before expiration of the warranty period.

### **INTERNATIONAL WARRANTY**

The Warranty for all of our international customers is the same as for any customer within the United States, with the following exception: DCX Systems, Inc. is not responsible for any customs fees, taxes, or VAT that may be due.

#### **To obtain service under this warranty, please follow this procedure:**

1. With your product name and serial # ready, call our Customer Service Department at 1-215-830-8520. DCX Systems, Inc. regular office hours are 8:30 am to 5:00 p.m. EST, Monday through Friday.
2. A DCX Systems technician may troubleshoot your problem over the telephone. If the technician determines that a product is defective and that your product should be replaced, he will ask you to return the defective product to the place of purchase.
  - DCX Purchases: If the place of purchase was DCX Systems, our technician will transfer you to the Customer Repair Department who will issue a Return Material Authorization (RMA) number. An RMA number must accompany all equipment returned to DCX Systems for repair/replacement along with a brief description of the problem. The RMA number must appear on the outside of the box. No returns will be accepted without an RMA number.
  - Distributor Purchases: If the place of purchase was a distributor, then the product must be returned to that distributor along with a brief description of the problem. The distributor will call DCX Systems for an RMA number and return the product to DCX Systems.

Returned products should be shipped to:

DCX Systems, Inc.  
Attn.: RMA # \_\_\_\_\_  
2360 Maryland Road  
Willow Grove, PA 19090

Upon receipt of the product, DCX Systems, Inc. will, at its option, repair or replace components or the system to whatever extent it deems necessary to restore the product to proper operating condition. Within the United States, DCX Systems, Inc. will pay for shipping back to you via the method of DCX Systems, Inc. choice. Expedited methods are available upon request for an additional charge. Customers from outside North America (the USA & Canada) are responsible for shipping costs in both directions.

DCX Systems, Inc. products are warranted FOB Willow Grove, PA.

### **CONDITIONS TO VOID WARRANTY**

This warranty covers normal use. DCX Systems, Inc. does not warranty or cover:

- \* damage during shipment.
- \* damage caused by disaster such as fire, flood, wind, earthquake, or lightning.
- \* damage caused by unauthorized attachment, alterations, modifications, or foreign objects.
- \* damage caused by peripherals (unless such peripherals were supplied by DCX Systems, Inc.).
- \* defects caused by failure to provide a suitable installation environment for the hardware.
- \* damage caused by use of the hardware for purposes other than those for which it was designed.
- \* damage from improper maintenance.
- \* damage caused by any other abuse, misuse, mishandling, or misapplication.

### **BAD OUT OF THE BOX**

If a DCX Systems product is determined to be "Bad out of the Box", DCX will issue a credit to the purchaser. No credits will be issued for returned product unless an RMA number has been previously assigned to the product and until the product has been received, evaluated, and a Return Product Report has been generated. If the product was purchased from a distributor, the distributor will be responsible for validating the date code, obtaining an RMA number, and ensuring that the product does not demonstrate any conditions that would void the warranty as indicated in the **Conditions To Void Warranty** Section above.

DCX Systems, Inc. liability for failure to repair the hardware product to conform to the warranty after a reasonable number of attempts will be limited to a replacement of the hardware product. These remedies are the Purchaser's **exclusive** remedies for breach of warranty.

Under no circumstances shall DCX Systems, Inc. be liable for any special, incidental, or consequential damages based upon breach of warranty, breach of contract, negligence, strict liability, or any other legal theory. Such damages include, but are not limited to, loss of profits, loss of revenue, loss of the hardware product or any associated equipment, cost of capital, cost of substitute or replacement equipment, facilities or services, down time, purchaser's time, the claims of third parties, including customers, and injury to property.

### **DISCLAIMER OF WARRANTIES**

THE WARRANTY STATED ABOVE IS THE ONLY WARRANTY APPLICABLE TO THIS PRODUCT. ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED (INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR

PURPOSE), ARE HEREBY DISCLAIMED. NO ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY DCX SYSTEMS, INC., ITS AGENTS OR EMPLOYEES SHALL CREATE A WARRANTY OR IN ANY WAY INCREASE THE SCOPE OF THIS WARRANTY.

THIS DISCLAIMER OF WARRANTIES AND LIMITED WARRANTY ARE GOVERNED BY THE LAWS OF THE STATE OF PENNSYLVANIA.

### **OUT OF WARRANTY REPAIR (AFTER THE FIRST YEAR)**

After the first year (which is defined as one year from the date of shipment of the DCX Systems, Inc. product), DCX Systems, Inc. will provide out-of-warranty service at prices shown on the then current repair price list. (For manufacturer discontinued products consult with DCX Systems, Inc. before returning for repair.) DCX Systems, Inc. reserves the right to quote repair prices on an individual basis where parts availability and other factors may apply.

Expedited repair service is available for DCX Systems, Inc. manufactured products. A minimum charge of \$100 per order will be charged for this service. Our Customer Repair Department will quote specific expedite fees upon request.

Each product repaired (or replaced) and returned will carry a limited ninety (90) day warranty. This warranty period will be from the date of shipment and will cover only the repairs performed. IN THE EVENT A PRODUCT IS RETURNED FOR REPAIR AND NO TROUBLE IS FOUND, AN OUT-OF-WARRANTY REPAIR CHARGE OF \$50.00 FOR CPE (STUs, etc.) PRODUCT OR \$100 FOR NETWORK PRODUCT (SIMs, BICs, BACs, etc.) WILL APPLY.

### **OUT OF WARRANTY REPAIR PROCEDURE**

In order to receive out-of-warranty repair service:

- Call DCX Systems, Inc. Customer Repair Department. Your Customer Repair Representative will quote appropriate charges, request a Purchase Order number from you, and then issue an RMA number over the phone. **Write this number in clear characters on the outside of the box.**
- Ship the products back to DCX Systems, Inc., freight prepaid and insured. Pack the product carefully, using the original box and packing material. DCX Systems, Inc. assumes no responsibility for equipment during shipment from customer to factory.
- Include a brief note describing the problem. List the name and telephone number of the person directly responsible for maintaining the equipment.

### **TURNAROUND TIME FOR REPAIRED OR REPLACEMENT UNITS**

DCX Systems standard turnaround time for products to get repaired is twenty one days (nominal) to forty five days (worst case).

## Interfacing DCX Systems STU-2Z or STU-4Z to the DMP 1912 and 1912XR Command Processor Panels

These instructions identify the applications and installations requirements for DCX Systems STU-2Z or STU-4Z when used with DMP 1912 and 1912XR Command Processor panels. The STU-2Z or STU-4Z may only be used in conjunction with telephone systems that support DCX Systems Derived Channel multipleX network.

### Burglary

The STU-2Z and STU-4Z are cross listed with these DMP panels as an accessory for Grade AA Central Station Burglar Alarm. For Grade AA, the following conditions must be met.

- The panel must be installed and programmed to meet Grade A burglary alarm system requirements.
- The panel must be programmed for reporting all alarm conditions through the integral DACT to the same central station that monitors the STU-2Z or STU-4Z.
- The STU-2Z or STU-4Z must be mounted in the panel enclosure and wired according to the diagram below.
- Once installed, the central station must enable 2 minute off-hook polling.

### Supplementary Reporting

#### (For Commercial Burglar Alarm Applications.)

The two zones of the STU-2Z or the four zones of the STU-4Z may be used for supplementary reporting by meeting the following requirements:

1. Program Relay Output #1 for all alarm conditions that are required to report alarm on Zone 1 of the STU-2Z or STU-4Z.
2. Program Relay Output #2 for all alarm conditions that are required to report alarm on Zone 2 of the STU-2Z or STU-4Z.

3. Wire the normally-open terminals of Relay Output #1 to Terminal 1 of the STU-2Z or STU-4Z.
4. Wire the common terminal of Relay Output #1 to Terminal 2 of the STU-2Z or STU-4Z.
5. Wire the normally-open terminal of Relay Output #2 to Terminal 3 of the STU-2Z or STU-4Z.
6. Wire the common terminal of Relay Output #2 to Terminal 2 of the STU-2Z or STU-4Z.

### Commercial Fire

When the 1912 or 1912XR is used as a Central Station Alarm Commercial Fire System with one telephone line, in conjunction with DCX Systems STU-2Z or STU-4Z, the following conditions must be met:

- The panel must be installed and programmed to meet commercial fire (reporting) systems requirements.
- The panel must be programmed for reporting all alarm and trouble conditions to the same central station that monitors the STU-2Z or STU-4Z.
- The STU-2Z or STU-4Z must be mounted in the panel enclosure and wired according to the diagram below.
- Once installed, the central station must enable 2-minute off-hook polling.

### Installing the STU-2Z / STU-4Z into the enclosure

The STU board is mounted in the upper right corner of the enclosure by slipping the optional corner mounting bracket over the edge of the enclosure. (DCX Part # 27074-0002 {2Z} or 27078-0001 {4Z}). Connect the STU's power wires and telco cables to the panel terminals and RJ31X as shown below.

