UL-Listed Derived Channel Communicator for Fire/Burglary Applications

Subscriber Terminal UnitÒ Installation/Troubleshooting Guide

Thank you for purchasing one of our Derived Channel products. Please refer to this guide for installing and/or troubleshooting the STU-2Z-UL. If you have any questions, or need technical assistance please contact our technical support team at 800-761-9070.

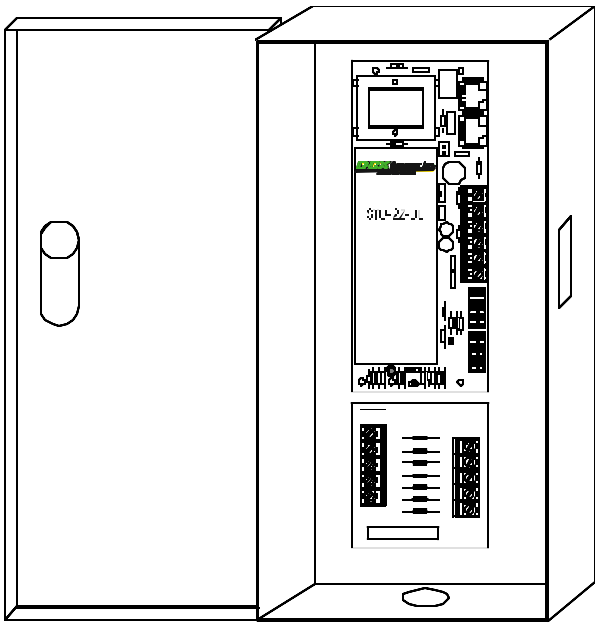
The material and instructions in this guide are believed to be accurate and reliable. However, DCX Systems, Inc. assumes no responsibility for inaccuracies. DCX Systems, Inc. reserves the right to modify and/or revise the contents of this guide at any time without notice. If any inconsistencies are found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

Introduction

The STU-2Z-UL is a Derived Channel communicator which can be the control panel's only communicator, or it can be used in conjunction with a digital dialer. When used with a digital dialer, alarm summary information is communicated via the STU-2Z-UL, and detailed information is communicated by the digital dialer. The STU-2Z-UL is comprised of the following subassemblies:

Interface board. The interface board has two primary functions: It allows either 12V or 24V to power the STU-2Z-UL, and it supplies two (2) voltage triggered alarm inputs that can be connected to the main control panel. When using the +12V input on the interface board, the supply voltage must be more than 9 VDC and less than 18 VDC. The communicator board will begin reporting low battery between 11 VDC and 9 VDC.

When using the +24V input of the interface board, the supply voltage must be more than 19.5 VDC and less than 30 VDC. The communicator board will begin reporting low battery between 19 and 22 VDC.



Front View of STU-2Z-UL

Derived Channel Subscriber Terminal Unit. The STU-2Z-UL will send an alarm signal when the main panel activates its own alarm annunciator (bell, siren, strobe, etc.) output. When the main panel activates the alarm output, a positive voltage is available over the duration of the "bell time out", as determined by the main panel. The positive voltage trigger input(s) on the interface board will detect this voltage and send an alarm to the alarm monitoring station.

If the optional STU Annunciator is used, the control panel must also support its current (additional 50mA max.), but only while the Annunciator is on. Refer to the ring-back or LOC section under Control Output, page 2.

Locking cabinet with tamper switch. The tamper switch is mounted but not wired in the cabinet. Refer to Figure 2 on page 5.

Power Requirements

The STU-2Z-UL is powered from the control panel. Current consumption is 50 ma @ 12 VDC and 60 ma @ 24 VDC on the control panel.

When powered by the control panel, the STU-2Z-UL is connected to the panel's auxiliary or accessory power output, which is provided for such applications. When connected to this terminal, the STU-2Z-UL'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 6). Refer to the power requirements of the control panel to calculate the load.

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-2Z-UL 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-2Z-UL: (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-2Z-UL. If the STU Annunciator (optional) is connected, as shown in Figure 2, this Annunciator will be turned on.

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

Reporting Functions

The STU-2Z-UL 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-2Z-UL can pinpoint which of the two 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 restores. After an alarm report, the STU-2Z-UL communicates when the cause of alarm is removed and the loop is restored to normal status.

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 for more than 5 seconds, a low battery signal is communicated to the alarm monitoring station. A restoral message is sent 25 minutes after power is restored.

Specifications

Power (12 VDC input)	9.5-15 VDC
Power (24 VDC input)	19-28 VDC
Current	75mA max
Current(with local output fully loaded)	125 mA max
Output	50 mA open collector
Account no. programming (Hard I.D.)	dip switch
Temperature rating	32 to 120° F
Size	13.25"Lx5.25"Wx2.25"D
Wail Delay	60 seconds
Ringer equivalence	1.7B

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

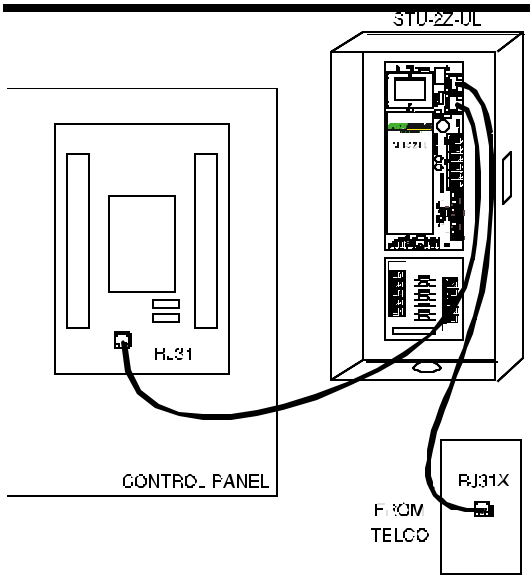
Note: If the host uses an N/O tamper, wire in parallel with the existing switch. For an N/C tamper, wire in series with the switch.

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.

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 ifpower 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.

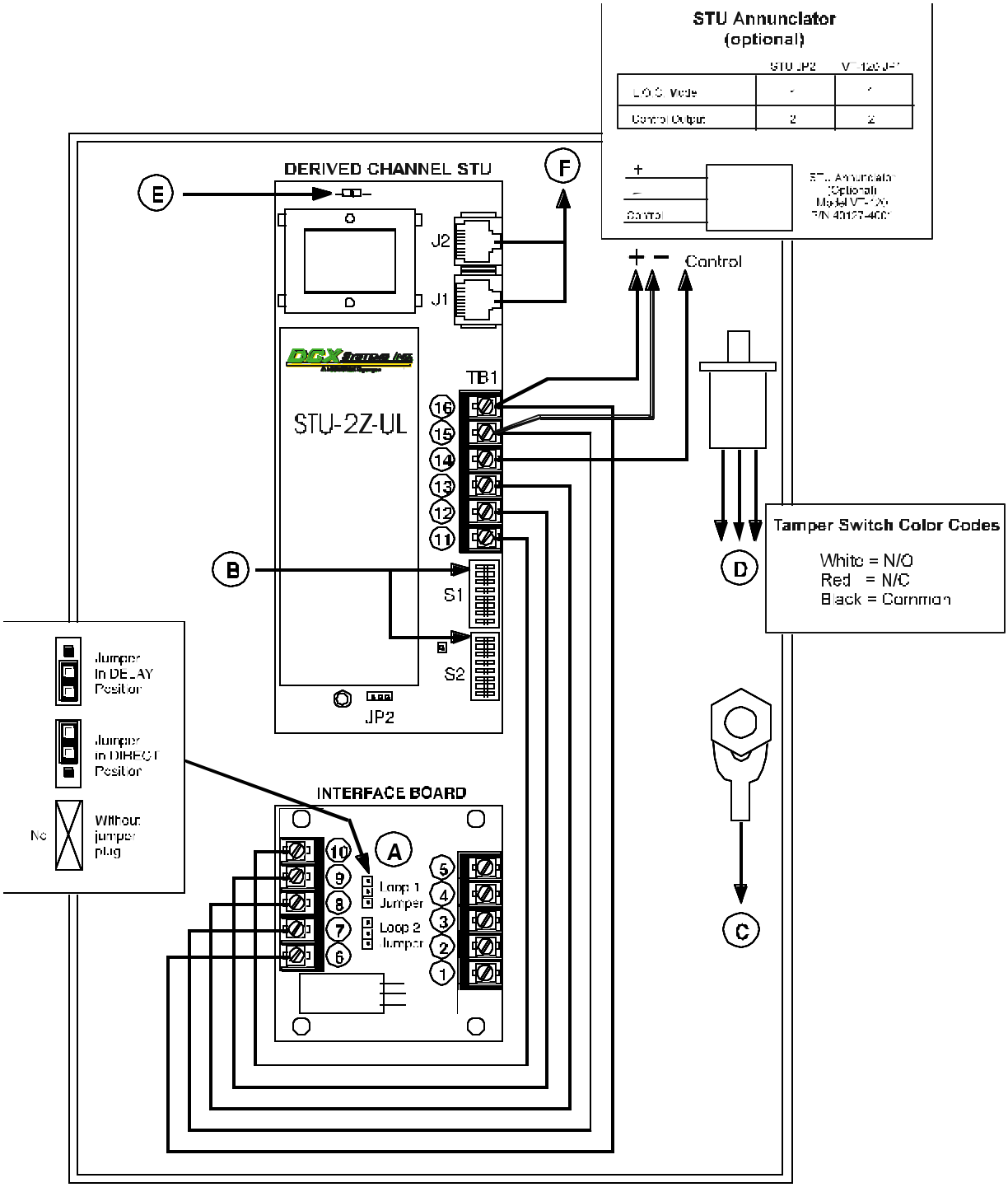
D. Tamper switch: An SPDT tamper switch is provided with the STU-2Z-UL. This should be connected to the tamper switch to the control panel to extend its tamper protection to include the case of the STU-2Z-UL and the interconnecting conduit. If the control uses an N/O tamper, wire in parallel with the 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.

Figure 2


STU Annunciator
(optional)
DERIVED CHANNEL STU
E
F
J2
J1
TB1
STU-2Z-UL
S1
S2
JP2
B
+ – Control
D
Tamper Switch Color Codes
White = N/O
Red = N/C
Black = Common
Jumper in DELAY Position
Jumper in DIRECT Position
No
Without jumper plug
INTERFACE BOARD
A
Loop 1 Jumper
Loop 2 Jumper
C

UL Compliance Verification

For high line security, UL Grade AA, the following conditions must be met:

- The control panel must be UL listed and configured for alarm monitoring station connection. All detailed alarm information must be sent via DACT to the DACR at the same alarm monitoring station that the STU-2Z-UL reports to.
- The STU assembly must report all alarm conditions from the control panel. The bell or siren output of the control panel must be used to send alarms to the STU-2Z-UL. All alarm conditions must actuate this output.
- All wiring between the control and the STU-2Z-UL must be in conduit as per standard NFPA wiring practices. The conduit shall be less than 20 feet in length. Power and ground must be connected as in Figure 2.
- All wiring to the control unit must be routed at least 2 inches away from the high voltage parts or high voltages wires in the control panel. Also, all wires must be routed and secured away from sharp edges in the control panel and the STU-2Z-UL enclosure.
- Current draw of the STU-2Z-UL system should, when added to load of the control panel, allow the control panel to operate under back-up power for the time specified by UL. Refer to Power Requirements, page 2.
- Either the Trigger 1 or Trigger 2 input, but not both, can be used as the alarm summary input. The other input can be used to provide additional information.
- The DELAY/DIRECT Jumper must be set in the DELAY position for the alarm summary input.
- The tamper switch in the cabinet of the STU-2Z-UL must be mounted on the key lock edge of the enclosure.

Important! **Once installed, the alarm monitoring station *must* enable delayed off-hook polling, or off-hook polling for UL Grade AA burglary service.**

Radio Frequency Interference

The STU-2Z-UL generates and uses radio frequency energy and, if not installed properly, may cause interference to radio and television reception. The STU-2Z-UL 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-2Z-UL does cause radio or television interference, which can be determined by disconnecting the power, the user is encouraged to try to correct the problem by one or more of the following:

- Reorienting the receiving antenna,
- Relocating the STU away from the receiver, or
- Connecting 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

SYMPTOM	CAUSE	POSSIBLE CURE
Confidence LED does not blink	No power applied to STU	1. Check power connections 2. Check voltage levels 3. Replace STU
Confidence LED stays on	STU problem	1. Replace STU
Low battery alarm	Low battery	1. Check battery leads and connections 2. Check battery voltage 3. Replace STU
Alarm zone does not register	Zone circuit resistance	1. Measure voltage across Trigger and GRN
Self test error alarm	Bad STU	1. Replace STU
STU “not responding”	Attempted break-in	1. Verify that phone line has not been cut
	Bad TIP/RING connection	1. Check TIP and RING connections at the STU and at the line tap-off point
	No power to STU	1. Check power connections 2. Check voltage levels 3. Replace STU
	STU connecting to wrong line	1. Verify that no chirps are heard on current line. Identify line with chirps and connect it to STU
	STU incompatible with other equipment on line	1. Disconnect all telephones and other equipment from the line. If STU now “responding” a compatibility problem may exist
Chirps on the phone line when in use	Alarm condition	1. Check to see if any alarm devices connected to the STU are active
	No supervisory tone from STU	1. Verify that there are no active alarms 2. Verify adequate supervisory tone level. With phone on-hook, measure AC volts across TIP and RING terminals: V>0.3 VRMS 3. Replace STU
	Noisy phone line	1. Verify and report to Telco if Necessary
	Network or Bell Central Office problem	1. Only after completing all of the above tests, call Telco repair. Tell them the Soft ID of the STU and the telephone number.
	Excessive line loading	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.
“motorboating”/Echo on line	CPE	1. Cut Low Tone Jumper 2. Call DCX, STU may need modification

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).