UL-Listed Derived Channel
Communicator for Fire/Burglary Applications

Subscriber Terminal Unit ®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-11Z-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-11Z-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-11Z-UL, and detailed information is communicated by the digital dialer. The STU-11Z-UL is comprised of the following subassemblies: STU-11Z-UL, AC Adapter, and a pre-wired enclosure/tamper switch with wiring and space provision for a rechargeable battery.

Derived Channel Subscriber Terminal Unit. The STU-11Z provides eleven user programmable zones and an output that can be operated from the alarm company central station.

Locking cabinet with tamper switch. The tamper switch is mounted but not wired in the cabinet.

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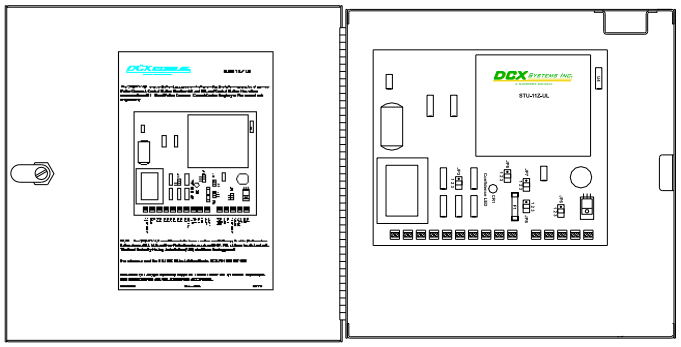


STU-11Z-UL (front view)

Specifications

FCC Part 68 Compliance

FCC Registration Number.....CKH78V-70802-XT-N
Ringer Equivalence Number.....1.6B

Power Requirements

AC Voltage.....10.5 to 13.5 VRMS
DC Voltage.....6.0 to 15.0V
Ripple Voltage, maximum.....200mVRMS, full load
Current, average maximum.....150mA

Control Outputs - AUX0, AUX

Maximum Voltage.....30 VDC
Maximum Current Sink.....10 mA

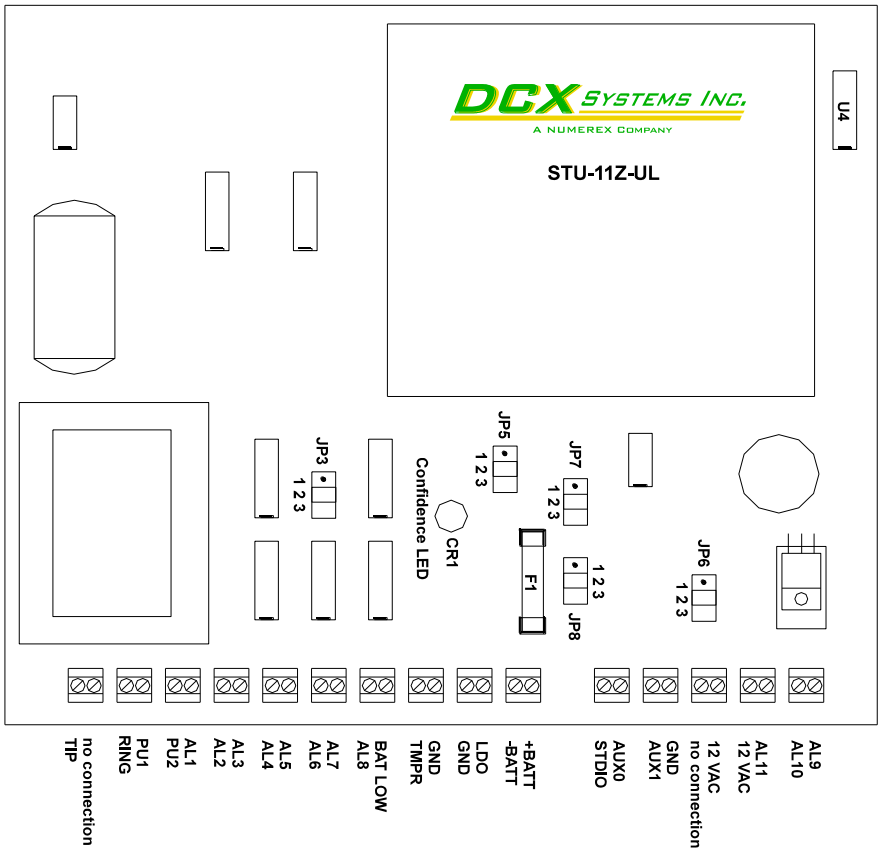
Alarm Triggering Levels

Normally Open: Normal State.....3.3-15 VDC
Alarm State.....0-1.7 VDC

Normally Closed: Normal State.....0-1.7 VDC
Alarm State.....3.3-15 VDC

Supervised:	Normal State	≈2.5 VDC
	Alarm State	0 - 1.7 VDC
	Fault Condition	3.3 - 15 VDC

Installation



Jumper Settings Table

JP3 Alarm Zone Type
1-2 Supervised
2-3 Normally open or closed

JP5 DC Source Voltage, if any
1-2 6 volts DC
2-3 12 volts DC

JP6 Power Source Type
1-2 AC source is used
2-3 No AC source is used

JP7 DC Source Voltage, if any
1-2 6 volts DC
2-3 12 volts DC

JP8 Comm. Error Output (STUDIO)
1-2 Enabled
3-4 Disabled

Figure 1

Mounting Instructions

1. Use the slotted holes at the top to hang the enclosure then fix in its final position with two circular screw holes at the bottom.

2. Make sure all cable routing conforms to the requirement of FCC part 15B (see page 6). Place the wiring connecting the STU, alarm panel, and charger into conduit as stated in the UL compliance section. The conduit length must not exceed 20 feet.

3. Attach the AC adapter to a UL listed gang box. For UL listed fire applications, ensure the AC outlet is a dedicated 120v AC circuit, and attach the adapter with a transformer enclosure (see Figure 2).

4. Add and wire battery as indicated in the UL compliance section.

Wiring Instructions

1. Jumper settings and PROM (JP3, JP5-JP8, U4) Referring to the Jumper Settings Table above, set the jumpers correctly for this installation. Verify that the PROM (U4) is properly installed - notch, dot or line on PROM towards the terminal blocks.

Note: *The PROM must be programmed before the STU will operate. If your central station/STU supplier did not provide a programmed PROM, see the programming section (see page 4).*

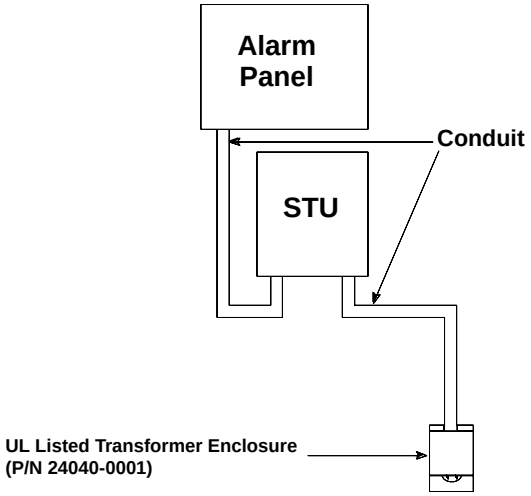


Figure 2

2. Telephone line connection (TIP, RING). The STU TIP and RING terminals must be wired to the correct telephone line. Polarity of the connections is not

important. At locations with more than one line, the correct line may be identified by calling the Central Station and asking them to "up the STU," alerting them that they will not receive a response. A telephone test ("butt") set may be used in the monitor mode to identify the correct line by listening for chirps. When the line is identified, the Central Station should be told to "down the STU."

3. Alarm inputs (AL1-AL11, PU1, PU2). Alarm zones may be normally open, normally closed, or supervised. This is preprogrammed into the PROM. The 5VDC pull-ups (PU1, PU2) may be used to hookup the zone circuits.

Note: *Supervised zones must be terminated with a normally open switch bridged by a 22kΩ resistor.*

4. Other signal inputs (BAT LOW, TMPR). A tamper switch is connected between the TMPR terminal and a GND terminal. If there is no tamper switch, connect a jumper between TMPR and GND. A low battery signal from an alarm panel (if any) should be connected to the BAT LOW terminal.

5. Pull-ups 1 and 2. These terminals provide +5 VDC to be used as pull-ups for auxiliary output functions or other low power applications

Caution: The pull-up terminal should not be used to supply power to equipment. No more than 10mA of current may be drawn from each of the terminals.

6. Auxiliary outputs and LD0. Auxiliary output AUX0 is an open-collector output that is under direct control of the central station. AUX1 provides an autoclosing signal when an alarm input is configured as being an opening/closing type. When an alarm loop closure is detected, following an opening, the output will turn on for 5 seconds, then turn off. Either auxiliary output may be used to switch a relay, power a buzzer, or light a lamp.

Caution: The current drawn from these outputs must be no greater than 10mA. If the on-board pull-ups are used this limit will not be exceeded. External supplies must not exceed 30 VDC and must limit the maximum possible current draw to 10 mA or less.

LD0 presents a different connection point to the AUX0 output. It adds a pull-up load resistor of 390Ω in series with the open-collector output.

7. STUDIO output (STDIO terminal). The STUDIO output may be used to indicate communication problems in the alarm transport network (cut or "down" telephone line, for instance) or that an alarm been acknowledged. Its normal output voltage is +5 VDC, but if the output is active, the voltage will go to 0VDC. This function is enabled by setting jumper JP8 to 1-2.

Note: *offhook or delayed offhook polling must be enabled if this output is used or false alarms will be generated.*

Caution: The STUDIO output has a very limited current-supplying capability. Its output should only be used to drive a current amplifier or low-current relay.

8. Power inputs (12VAC, BATT + and -). AC voltage from a power supply must be connected to the 12VAC terminals. Polarity is unimportant. DC voltage from a battery, alarm panel, or DC power supply must be connected to the BATT + and - terminals. JP5-JP7 must be set according to the power sources.

Note: *The STU will not charge a 12VDC battery when using AC. A 6 VDC battery must be used.*

Caution: Polarity of the DC connections must be observed. Incorrect hookup will result in damage to the STU. With the power up, the "confidence" LED should flash every 5 seconds.

7. Voltage tests. If an AC source is connected, verify that the AC voltage across the 12VAC terminals is between 12.5 and 14.5 VAC. The DC source voltage across the BATT + and - terminals (the positive probe is placed on the + terminal) should be between 6.5 and 7.5 VDC for a 6V source, and between 12.5 and 15.0 VDC for a 12V source. The AC ripple voltage on the BATT + and - terminals should be less than 200 mVRMS.

8. Bringing the STU on-line ("up"). With the STU powered up, contact the Central Station and ask them to "up the STU" (bring it on-line). Monitor the line with a telephone test ("butt") set in the monitor mode and listen for chirps.

Caution: Do not interrupt power to the STU after it has been brought on-line. It will go into a permanent "no response" condition until it is upped once again.

9. STU Functional tests. The Central Station should receive indication that the STU is on-line. All alarms should be in the NORMAL state and be seen as such by the Central Station. While listening to the line with the telephone test ("butt") set, activate all alarms. Chirps should be heard on the line. The Central Station should see all alarms and then ***MUST*** acknowledge them all. Remove the test alarm.

Caution: The current drawn from these outputs must be no greater than 10mA. If the on-board pull-ups are used this limit will not be exceeded. External supplies must not exceed 30VDC and must limit the maximum possible current draw to 10mA or less.

Programming the STU®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*.

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.

UL Compliance Verification

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

Function/Grade of Service	Grade AA	AA&FIRE	FIRE
1. Off-hook polling (2 minute)	Yes	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 a digital communicator		
10. Summary Burglary report	Yes, if detail report provided by a digital communicator		
11. Alert tone (Wailer)	60 second delay recommended by DCX Systems, Inc.		

- The Unit requires a 6 VDC battery (Yuasa NP-46).
- The wiring between the host alarm control panel and STU-11Z-UL and the wiring between the power outlet/charger unit and the STU shall be in conduit and in accordance with the NEC/NFPA 70 1990 wiring practices.
- The provided tamper switch much be employed.

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-11Z-UL generates and uses radio frequency energy and, if not installed properly, may cause interference to radio and television reception. The STU-11Z-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-11Z-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. Check fuse F1 4. Replace STU
Confidence LED stays on	STU problem	1. Verify that the PROM properly installed 2. Replace STU
Low battery alarm	No battery	1. Check fuse F1 2. Check jumpers JP5, JP6, JP7 3. Check battery leads and connections 4. Check battery voltage
	Battery not charging	1. Check AC voltage at 12VAC terminals
Box alarm	Faulty tamper switch	1. If no tamper switch, verify that TMPR is connected to GND 2. Verify switch closure with STU lid closed 3. Replace STU
Alarm zone does not register	Zone circuit resistance	1. Perform a continuity test of alarm zones. 2. Replace STU
	PROM problem	1. Verify that the PROM has been properly programmed 2. Replace STU
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. Check fuse F1 4. Replace STU
	STU connecting to wrong line	1. Verify that no chirps are heard on current line. 2. 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 is 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 onhook, measure AC volts across TIP and RING terminals: V>0.3 VRMS 3. Disconnect CPE
	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). The REN must be less than 5.

Warranty

DCX SYSTEMS' 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 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 in writing that there is a defect in material or workmanship. Written notice in all events must be received by DCX Systems before expiration of the warranty period.

INTERNATIONAL WARRANTY

The Warranty for international customers is the same as for any customer within the United States, with the following exception: DCX Systems 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 1-800-761-9070. DCX Systems' 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. If that 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.

   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 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 will pay for shipping back to you via the method of DCX Systems choice. Expedited methods are available upon request for an additional charge. International customers (outside the USA) are responsible for shipping costs in both directions.

DCX Systems products are warranted FOB Willow Grove, PA.

This warranty covers normal use. DCX Systems 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).
* 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.

DCX Systems' 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 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, 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 product), DCX Systems will provide out-of-warranty service at prices shown on the then current repair price list. (For Manufacture Discontinued products consult with DCX Systems before returning for repair.) DCX Systems 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-manufactured products. A minimum $100 charge 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 WILL APPLY.

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

- Call DCX Systems' 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, freight prepaid and insured. Pack the product carefully, using the original box and packing material. DCX Systems 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.