



# DTC25U TRANSCODER

## INSTRUCTION MANUAL

PINEAPPLE TECHNOLOGY, INC



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# Section I

Safety  
Notices



I ---SAFETY NOTICES

**\*\* READ THIS SECTION BEFORE INSTALLATION \*\***

SEVERE ELECTRICAL SHOCK OR BURNS MAY OCCUR  
IF THIS EQUIPMENT IS USED IMPROPERLY.

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NEVER WORK ON THIS EQUIPMENT ALONE. ALWAYS HAVE ANOTHER PERSON PRESENT  
WHILE WORKING ON ELECTRICAL CIRCUITS OR MOVING EQUIPMENT. COMMUNICATIONS  
TO EMERGENCY SERVICES SHOULD BE AVAILABLE AT ALL TIMES.

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BEFORE CONNECTING THIS EQUIPMENT TO ANY AC ELECTRICAL SOURCE READ THE  
SECTION ON INSTALLATION. ALL ELECTRICAL WIRING FOR THIS EQUIPMENT MUST BE  
PERFORMED BY QUALIFIED ELECTRICIANS. ALL WIRING MUST BE COMPLIANT WITH  
LOCAL ELECTRICAL CODES.

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POWER AMPLIFIERS AND SUPPLIES ARE HEAVY. TO INSTALL THIS EQUIPMENT IN RACKS  
USE TWO (2) PERSONS TO AVOID POSSIBLE INJURIES.

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NEVER OPEN THE CABINET ENCLOSURE OR UNPLUG CABLES OR WIRES WHILE THIS  
EQUIPMENT IS OPERATING.

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***ALL SERVICE WORK MUST BE PERFORMED BY QUALIFIED TECHNICIANS ONLY.  
IF ONE IS NOT AVAILABLE LOCALLY, CONTACT PINEAPPLE TECHNOLOGY, INC. FOR  
A LIST IN YOUR AREA.***

# Section II

## Transmitter Specifications



## II – DTC25U SPECIFICATIONS

Power Output .....	25W Average
RF Output Impedance.....	50 ohms
Frequency Range.....	470 – 806 MHz
Frequency Stability.....	± 1,000 Hz
Error Vector Magnitude.....	4% Maximum
Digital Signal to Noise.....	27 dB
Group Delay with Output Filter.....	± 25 ns
Harmonic Output.....	-50 dB
Spurious Output.....	-50 dB
Spectrual Mask with Output Filter.....	-46 dB @ Channel Edge -85 dB ± 6 MHz Ref. channel edge below average transmitted power (Watts/5.4 MHz)
Phase Noise.....	-106 dBc/Hz @ 20 kHz
Operating Temperature.....	-10 to +35 degrees Celsius Ambient +14 to +95 degrees Fahrenheit Ambient
Altitude.....	5,000 ft without additional cooling
Cooling Requirement.....	Built in, except where noted
Connectors.....	F Connector Input, N Connector Output
Power Consumption.....	500W maximum
AC Line Voltage.....	85 – 120 VAC Single Phase
Weight.....	100 lbs
Dimensions.....	21” x 16” x 24” (W x H x D) Standard

THESE SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

# Section III

## Transmitter Installation



### III -- TRANSCODER INSTALLATION

To ensure long and reliable trouble-free service from the DTC25U transcoder the following steps for installation are recommended:

1. **MECHANICAL INSTALLATION:** The DTC25U Transcoder was designed to be installed in a building protected from the weather. The building should have a hard-surface floor such as concrete with a moisture barrier. This barrier could be pressure-treated wood sub flooring which could be anchored to the concrete and to the transmitter to make the installation earthquake resistant.

Allow a minimum of three feet around the transmitter cabinet for service access. The top of the transmitter should be clear for three feet above to allow the air to exhaust from the transmitter.

Provisions for air inlet and exhaust from the room must allow air flow with minimal obstruction. In the event that the room temperature exceeds 35° Celsius (95° F), cooling air must be provided so that the room temperature will not exceed 35 degrees Celsius under worse case conditions.

Notice: This equipment is **HEAVY** and must be handled by professional movers with proper equipment. Any damage caused by the installers is not covered under warranty. Check to ensure that installing crews have proper insurance coverage.

2. **GROUNDING:** Transmitter grounding is **VERY IMPORTANT** and must be done correctly for safety and operational reasons. A typical installation may be done as follows:

Use a heavy gauge wire such as 16 AWG stranded copper. The bonding between the transmitter and the ground rods must be good quality and protected from corrosion. The ground wires should run over the floor and be connected to the ground rods located outside the building. The wire should not go thru the concrete floor but over and around it.

3. **AC WIRING:** The DTC25U transcoder comes with a three wire 110 VAC standard plug for connection to a 110 VAC electrical outlet. It is recommended that the electrical outlet be protected with its own separate breaker and used only for the transcoder.

NOTICE: All wiring of this type, except for the actual connection to the AC plug, must be done by a QUALIFIED ELECTRICIAN and must conform to LOCAL and NATIONAL wiring CODES.

Consult with your electrician to ensure that the proper breaker size is selected for the main circuit.

4. **ANTENNA CONNECTION:** The transcoder is equipped with an N connector for output power to the transmit antenna and an F connector for connection from the receive antenna.



# Section IV

Transmitter  
Turn-On



**IV --- TRANSCODER TURN-ON PROCEDURE (Page 1 of 3)**

See the previous section on installation before proceeding with this section. Improper installation of the transcoder can cause serious damage to the equipment or operating personnel and may void manufacturers warranty. Initial turn on and check out is very important for the broadcast engineer to learn how to setup and operate the transcoder. Following these steps will ensure long and reliable operation:

1. Check the transcoder output load or antenna for proper installation and connection to the transcoder.
2. Inspect the transcoder front and back to check for broken items or lose fitting items. These must be replaced or properly secured before turning the transcoder on. Pay special attention to all RF connectors including transmit coaxial cable and antenna.
3. Check the AC breaker and on/off switches to ensure that all are in the OFF position.
4. Verify the switch on the power strip at the back of the cabinet and the power switch on the front of the LTX Mainframe are in the OFF position. Plug in the AC power cord to a nearby 110 AC electrical connector with associated, appropriately sized, circuit breaker.
5. Verify the output power level on the Drake Upconverter is set to minimum ( **GAIN** fully CCW ). See Fig 1 below for location. On the LTX Mainframe verify **XMTR** switch is in **STBY**.
6. Refer to the transcoder and upconverter instruction manuals in the DTC25U User Manual to locate the key functions and become familiar with the unit. Insure that all connections, including the DC power connection and the RF (IF) connection, between the 8VSB Regenerator and Upconverter have been made.
7. Verify, using the front panel display on the transcoder upconverter, that the correct output channel has been selected. At this time, no connection should be made to the transcoder input at the back of the unit. Any following measurements will be done using the Null Packets generated inside the transcoder.
8. Turn-on the switch located on the power strip at the rear of the DTC25U. Note: The Larcen Transcoder will come on at this time as well as the cabinet fan. A green light indication should be seen on the Drake Upconverter and, after a few minutes, the two green lights on the transcoder will turn red indicating proper operation.
9. Locate and turn on the front panel breaker found on the LTX Mainframe and set the **XMTR** switch to the **ON** position.

**MAKE THE FOLLOWING OBSERVATIONS**

<u>METER READINGS</u>	<u>TYPICAL</u>
DC SUPPLY VOLTAGE	32 VDC
PA1 DRIVER CURRENT	1.7 AMPS ± 20%
PA2 FINAL CURRENT	2.7 AMPS ± 20%
PA3 FINAL CURRENT	1.3 AMPS ± 20%
RF OUTPUT POWER	10 TO 50%
RFL'D POWER	< 10%
<u>NOTE STATUS LIGHTS</u>	
FAN	GREEN
TEMP	GREEN
+DC	GREEN

THE FAN SHOULD BE MAKING SOME NOISE



IV --- TRANSCODER TURN-ON PROCEDURE (Page 2 of 3)

**Note:** Allow the DTC25U to warm up for at least one (1) hour before making the final adjustment.  
 If transmitter is not warmed up, the output power will require re-adjustment to proper level when it is warm.

10. Select the **FWD Power** setting on the rotary switch associated with the front panel meter on the LTX Mainframe assembly. Slowly adjust the power level setting on the Drake Upconverter while observing the output power level on the front panel meter until the meter reading indicates 100% output power.

**RECORD AND RETAIN THE FOLLOWING OBSERVATIONS FOR FUTURE REVIEW IF NECESSARY.**

<u>METER READINGS</u>	<u>TYPICAL</u>
DC SUPPLY VOLTAGE	32 VDC
PA1 DRIVER CURRENT	1.8 AMPS ± 20%
PA2 FINAL CURRENT	3.4 AMPS ± 20%
PA3 FINAL CURRENT	2.8 AMPS ± 20%
RF OUTPUT POWER	90 TO 100%
RFL'D POWER	< 10%
<u>NOTE STATUS LIGHTS</u>	
FAN	GREEN
TEMP	GREEN
+DC	GREEN



FIG. 1



IV --- TRANSCODER TURN-ON PROCEDURE (Page 3 of 3)

11. The receive signal antenna can now be connected to the input of the transcoder as required.

**Note: The receive antenna should be located so that it will not pick up the transmitter output signal. Even when the input and output channel separation may seem to be considerable, the input receiver front end can be over loaded. This will reduce the sensitivity of the receiver resulting in degraded or loss of signal when viewed at the DTC25U transmit out.**

# Section V

Theory  
of  
Operation



## V --- THEORY OF OPERATION (Page 1 of 2)

### A. INTRODUCTION

The DTC25U transcoder was designed to meet or exceed all FCC applicable specifications for TV broadcast equipment. Special attention was given to the selection of sub-assemblies and components to achieve maximum reliability and minimum down time. The construction of the DTC25U is BASIC and MODULAR with most components field replaceable. Special emphasis was placed on "KEEPING IT SIMPLE" and returning to more traditional transmitter layouts and instrumentation.

Refer to the DTC25U block diagram for an overview of the transmitter architecture. This will give the technician basic information needed to understand the operation of the transmitter and the function of each subassembly.

SEE SECTION VI.A FOR PARTS LIST AND BLOCK DIAGRAM.

### B. XC100LC Regenerative Transcoder

#### B-1 Exciter

Refer to the Larcan user manual for information on the exciter portion of the transcoder.

SEE SECTION VI.B FOR SCHEMATIC AND PARTS LIST

#### B-2. Drake Up Converter

Refer to Drake user manual for information on the operation of this portion of the transcoder.



## V. THEORY OF OPERATION (CONTINUED) (Page 2 of 2)

### C. LTX Mainframe Power Amplifier

**Cabinet** - The cabinet is constructed of heavy gauge steel and is very durable. This enclosure is painted black and is resistive to harsh environment. Standard 19 inch rack mounting.

LTX-D1 Mainframe Assembly - Internal sub-assemblies include the following:

1. DC Power Supply
2. RF Deck
3. Status Monitoring (1A0035)
4. Output Power Detector Board (1A0027)
5. Reflected Power Detector (1A0029) and Shutdown Switch
6. Metering and Monitoring Assembly (1A0300)

For details of this sections above, see appropriate sections in this manual.

### D. BPUD100 Digital Mask Filter

The FCC Stringent Mask filter supplied with the DTC25U transcoder is designed to completely satisfy the FCC Rules for a low power TV transmitter and translator.

This is a closed unit and does not require field adjustment.

### E. Optional Low Pass Filter

This low pass filter is required and will be supplied with DTC25U translators that operate on Channels 22 - 24, 32 - 36 and 38 for the specific purpose of providing "out of band" protection to Radio Navigation Satellite Services.

# Section VI

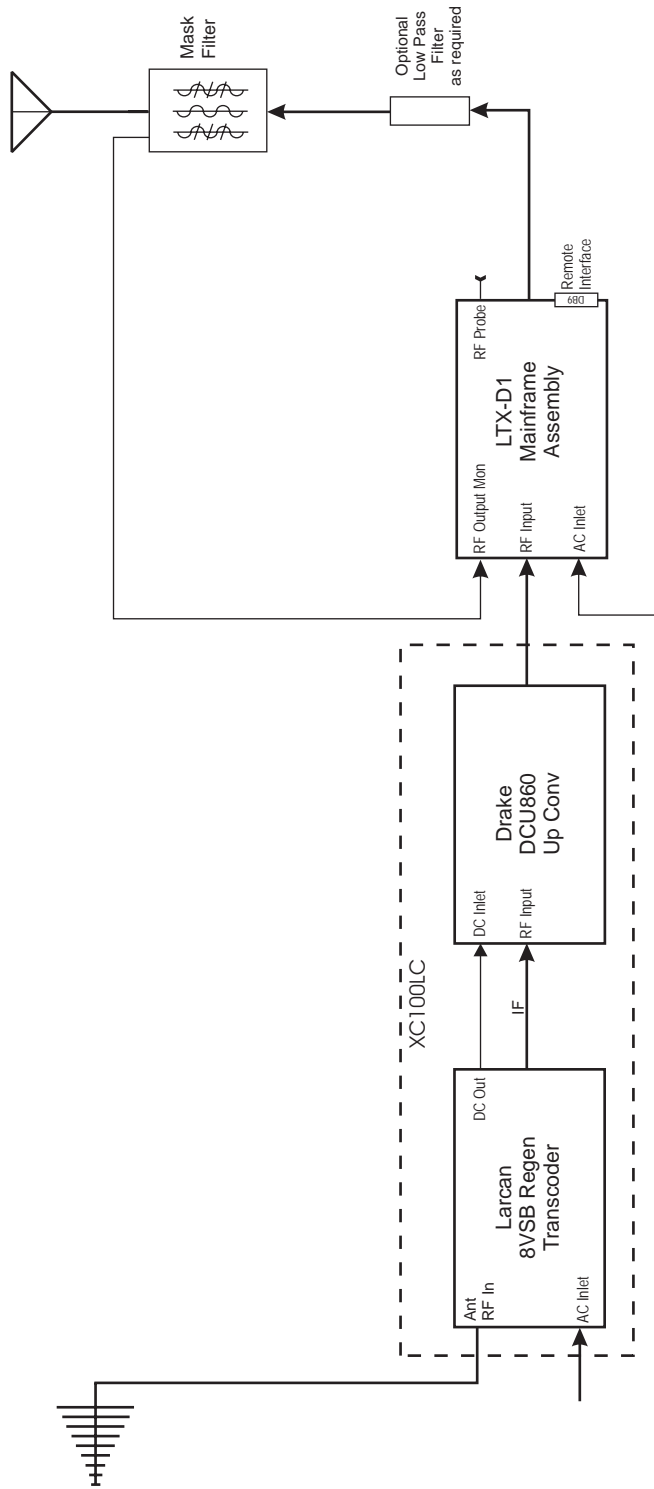
Schematic  
and  
Parts List





**A. DTC25U Assembly Tree**

Item	Qty	Type	P/N	Title	Detail
Top		CAT	DTC25U	UHF TV TRANSCODER 25 W RM	LARCAN EXCITTER/CONVERTER
1	1	PS	BPUD100	DIGITAL MASK FILTER UHF TV	100 WATTS RMS
2	1	PL	LTXMAINFRAME	LTX SERIES XMTR 100 W UHF	BASIC UNIT
3	1	PS	XC100LC	TRANSCODER, LARCAN	UHF DIGITAL TRANSLATOR



Pineapple Technology, Inc.  
Rocklin, CA

DTC25U  
Digital Transcoder

SIZE	15.5CM X 10.5CM	REV	B
SCALE	1:1	SHEET	1

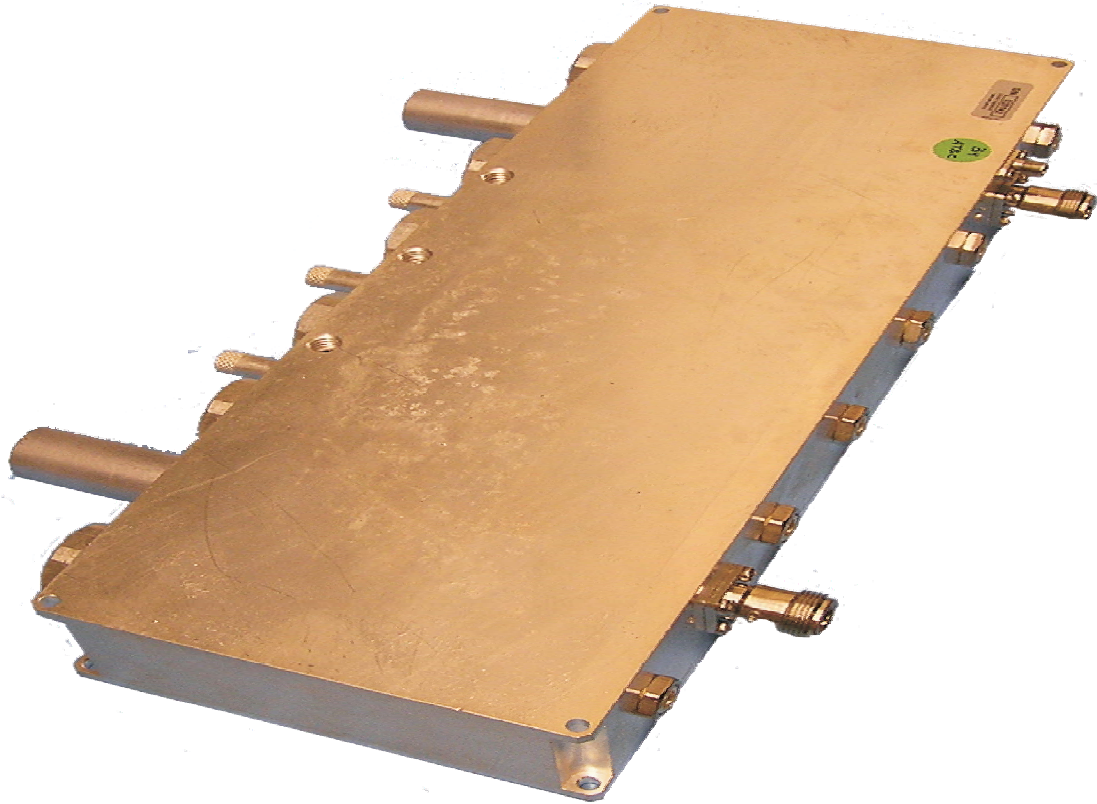


**B. LTX-D1 Mainframe Assembly Tree**

Item	Qty	Type	P/N	Title	Detail
Top		PL	LTXMAINFRAN	LTX SERIES XMTR 100 W UHF	BASIC UNIT
1	1	PS	MF9529A	LTX HEAT SINK HOLDER	AL 090
2	1	PS	MF9531A	LTX FRONT PANEL	0125 AL W/PAINT AND SILK
3	1	PS	MF9532A	LTX CHASSIS	090 AL ALODYNE W/REAR SILK
4	1	PS	MF9533A	LTX AIR DAM DEFLECTOR	050 AL ALODYNE
5	1	PS	MF9534A	LTX TOP COVER	O60 AL ALODYNE
6	1	PL	MF9535	LTX100U HEAT SINK	STD HEAT SINK W/U250LD FP
7	0	PS	MF9536	LTX100 VHF HIGH HEAT SINK	STD PTI HS MATERIAL
8	0	PS	MF9537	LTX100 VHF LOW BAND HEAT SINK	STD PTI HS MATERIAL
9	0	PS	MF9538	LTX200U HEAT SINK	U250LD MTG WITH DRIVER
10	1	PS	PC9515	COUPLER GP COVER TMM3 0125	USE ON ALL -30dB COUPLERS
11	1	PS	PC9514	UHF -30 dB COUPLER TMM3 0125	DUAL DIRECTIONAL
12	0	PS	PC9513	VHF HB -30 dB COUPLER TMM3015	DUAL DIRECTIONAL
13	0	PS	PC9512	VHF LB -30 dB COUPLER TMM30125	DUAL DIRECTIONAL
14	1	PS	660104	LTX MULTI-FUNCTION METER	HOYT MODEL 3135 ANALOG MTR
15	1	PS	AC3108	CIRCUIT BREAK/ ON/OFF SWITCH	115 VAC 10 A RESETABLE
16	1	PS	AC1003	FILTER, AC LINE	110/220 AC PLUG
17	1	PS	990200	FILTER, AIR DRY	COMAIR FILTER/GUARD ASS,Y
18	1	PS	851035	FAN AC 115 100 CFM 115 VAC	COMAIR-ROTRON MUFFIN XL AC MX2A3
19	1	PS	CA5110	CABLE ASSEMBLY 10 WIRE	10 WIRE SOC TO SOC CONNECTOR
20	4	PS	480300	CON 2 PIN HEADER	AMP A23837-ND
22	1	PS	AC2010	DC POWER SUPPLY 115/220 VAC	320 WATTS 27-31 VDC
23	6	PS	INHOUSE_LAB	PTI LABOR	LOADED
24	8	PS	INHOUSE-ENG	ENG TESTING AND FIXIT	LOADED
25	1	PL	1A0300	LTX100 METERING CIRCUIT	FRONT PANEL ASSEMBLY
26	1	PL	1A0027	PWR MONITOR CK	PC9052B CBR
27	1	PL	1A0035	PA STATUS BOARD	PC9061H
28	1	PL	1A0026	VSWR/PWR DET BRD	PC9051A
29	1	CAT	DRV/10-40	DRIVER AMP WITH ALC CKT PO10W	
31	1	PS	BPU150N	BP FILTER 150 W UHF	470-862 MHz
32	0	PS	BPVH300N	BP FILTER 300W VHF HB CL3NV (M)	TYPE N CONNECTORS
33	0	PS	BPVL200N	BP FILTER LTX XMTR VHF LB	TYPE N CONNECTORS 200 W
34	1	PS	990280	FINGER GUARD 6"	FINGER GUARD 150MM METAL
35	1	PS	851030	PATRIOT AC FAN 110 V	XL100 EXHAUSE FAN
36	1	PS	481501	AURAL FEMALE PNL CONNECTOR	XLR TYPE 3 PIN
37	1	PS	481502	AURAL MALE PLUE XLR	3 PIN
38	1	PS	484025	TOGGLE ON/OFF	FLAT LVR 2 PIN
39	1	PS	491350		



SECTION VI - SCHEMATIC AND PARTS LISTS  
SUB-SECTION C - DTC25U



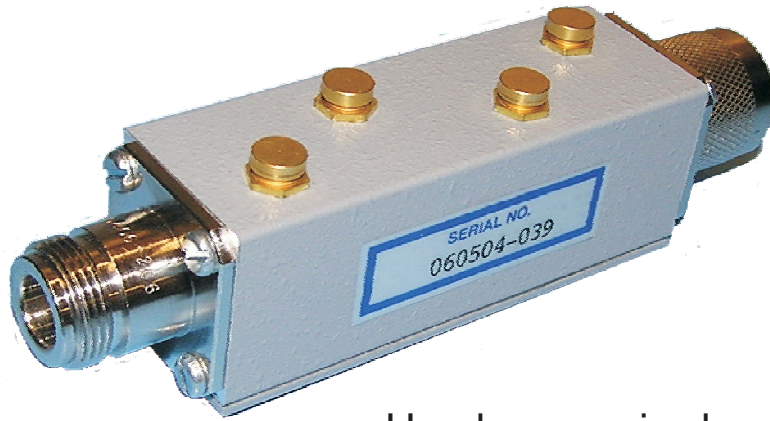
No Serviceable Parts

Pineapple Technology, Inc.  
Rocklin, CA

BPUD100 Stringent Mask Filter

SIZE	ESCM NO.	DWG NO.	REV
SCALE			SHEET

SECTION VI - SCHEMATIC AND PARTS LISTS  
SUB-SECTION D - DTC25U



Used as required

No Serviceable Parts

Pineapple Technology, Inc.  
Rocklin, CA

Low Pass Filter  
CIRCUIT DIAGRAM

SIZE	ESCM NO.	DWG NO.	REV
SCALE			SHEET

# Section VII

Recommended  
Routine  
Maintenance



### VII --- ROUTINE MAINTENANCE

Routine Maintenance on the transmitter is very simple and straight forward. PTI recommends the following steps to ensure long and eliable trouble-free service.

#### **SCHEDULE: DAILY OR WEEKLY SERVICE**

1. Check output power level to ensure that the meter is reading in the GREEN. If the level has changed adjust the output level to 100% using the modulator output level adjust.
2. Check and record all meter readings in the station log.
3. Review readings and compare to history for possible variation that could indicate problems.
4. Check the air inlet filter and clean if necessary. If it looks dirty, it is dirty. Snap off the front grill and wash the filter with light detergent and dry thoroughly before reinstalling. DO NOT use oils on the filter.
5. Clear any items placed in front or in the rear of the transmitter that may restrict air flow.

**NOTICE: SMALL FURRY ANIMALS LOVE THE WARMTH THE TRANSMITTER PROVIDES. ALWAYS CHECK FOR ANY ACTIVITY BY THESE VISITORS AND SET TRAPS OR BAIT AS NECESSARY.**

SCHEDULE: MONTHLY +

All the items listed above with air filter cleaning necessary.

NOTE: REPLACEMENT FILTERS ARE AVAILABLE THRU MOST ELECTRONIC DISTRIBUTERS.  
LOOK FOR COMAIR ROTRON P/N: 020172



# Section VIII

Adjustments  
and  
Tuning



### VIII --- ADJUSTMENTS AND TUNING

The DTU25C is a new series of digital transcoders offered by Pineapple Technology, Inc. The latest in LDMOS device and circuit technology are employed to ensure reliable and serviceable operation for many years.

There are very few adjustments necessary to maintain full service condition. Typically the gain adjustment shown in the initial Transcoder Turn-On Procedure (Section IV) of this manual should require minimal attention. The front meter panel has been set up so that 100% indication in Forward Power is equivalent to 25W average output power.

The input frequency (channel) can be adjusted, within the auspices of the broadcasting re-transmission rights, to the appropriate required channel (See Larcen Manual). The transmitter output must remain on the channel licensed by the FCC and in accordance with the supplied digital mask filter.

# Section IX

Problem  
Solving  
&  
Troubleshooting



## IX - PROBLEM SOLVING & TROUBLE SHOOTING (Page 1 of 2)

The DTC25U is a "MODULAR ASSEMBLY" where most of the sub-assemblies can be removed and or replaced as necessary as necessary to maintain full service. To service this transmitter, it is best to become familiar with the various sub-assemblies by reviewing the transmitter block diagram and it's associated subs shown in the introduction. Any work performed on a transmitter licensed by the FCC must be performed by qualified personnel.

### FAILURE ANALYSIS STARTS WITH THE FOLLOWING ASSUMPTIONS:

1. The transmitter is connected to an AC source which is within the specified voltage range and has ample power to run the transmitter.
2. The antenna has been checked out and a proper match has been verified.
3. The room temperature is < +35 degrees Celsius (+95 degrees Fahrenheit)
4. There are no restrictions in the air flow in or out of the building.
5. The video and aural signals to the modulator comply with stated specifications.

### CHECKING THE WARNING LIGHTS

There are several warning signals visible on the front of the transmitter that will alert the technician of possible problems. When viewed from the front, all the lights should be GREEN indicating normal operation. An alert signal is indicated by a RED light. We will focus on RED alert signals in this section.

#### LTX Mainframe Assembly

##### FAN FAULT

RED indicates that the fuse supplying AC to the fan has failed. The fuse is located just inside the front panel near the top. See Fig. 1 for location.  
CHECK: FUSE AND/OR FAN

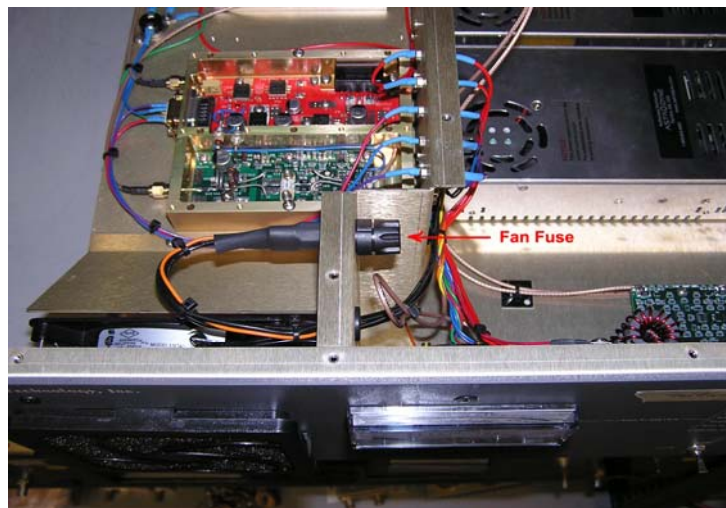


Fig. 1



## IX - PROBLEM SOLVING & TROUBLE SHOOTING (Page 2 of 2)

### TEMP FAULT

RED indicates over temperature of PA or High VSWR

If High VSWR, the light will cycle 10 seconds OFF and 2 seconds ON  
Put transmitter in STANDBY. Investigate antenna installation and connections, check transmission lines and connections. Check that transcoder up converter is on frequency.

If High Temperature, the light will cycle OFF for several minutes then ON for several minutes.

Check: Room temperature

Check: For Blocked Air Filter

Check: For Blocked Air Flow

Check: Transcoder Drive level. Verify output power is at 100% or less.

NOTE: If the AC Power is ON and all LED's are OFF and all meter readings are Zero (0) the DC Power Supply may cycle on and off if the internal fan has failed or Hi temp has failed. The internal DC supply may have failed and needs replacing.

### Transcoder Assembly

The Transcoder Assembly consists of the Larcan receiver and the Drake up converter. For adjustment of the transcoder and understanding fault indications, refer to the Larcan and Drake manuals.

# Section X

Warranty



## **X -- WARRANTY**

The WARRANTY provided by Pineapple Technology, Inc. (PTI) on this transmitter is detailed below. It should be noted that some of the equipment sub-systems have warranty coverage by the original manufacture that differs from the standard warranty provided by PTI. Warranty details on equipment falling into this category may be found in the Manufacturers instruction manual provided with the transmitter. In all cases, replacement units of this equipment are normally in stock at PTI for quick turn service support to our customers during the PTI Standard Warranty period.

### **STANDARD WARRANTY**

Seller warrants that each Product sold by it is free of defects in materials and workmanship. Seller's obligation under said warranty continues for a period of one (1) year from date of shipment. Repairs or replacement of defective parts shall be the sole and exclusive remedy under warranty, at Seller option, provided that Seller may, as an alternative, elect to refund an equitable portion of the purchase price of the product. THIS WARRANTY IS EXPRESSLY IN LIEU OF AND EXCLUDES ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE, USE, OR APPLICATION, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF THE SELLER, UNLESS SUCH OTHER WARRANTIES OBLIGATIONS OR LIABILITIES ARE EXPRESSLY AGREED TO IN WRITING BY SELLER.

### **WARRANTY REPLACEMENT AND REPAIRS**

All claims under warranty must be made promptly after occurrence of circumstances giving rise to thereto and must be received within the applicable warranty period by seller or its authorized representatives. Such claims must be documented on a PTI\* Field Failure Report with a full description of the circumstances giving rise to the claim. Before any products are returned for repair and/or adjustment, written authorization from seller or its authorized representative for the return and instructions as to how and where these products should be shipped must be obtained. This is to include a Return Authorization (RA) number provided by the seller or authorized representative, this must accompany ALL returns. Any product returned to the seller for the examination shall be sent prepaid via the means of transportation indicated as acceptable by seller. Seller reserves the right to reject any warranty claim not promptly reported and any claim on any item that has been altered, i.e. circuit modifications, components removed, or has been shipped by non acceptable means of transportation. When a product has been returned for examination and inspection, or for any other reason, customer shall be responsible for all damage resulting from improper packaging or handling, and for loss in transit, notwithstanding any defect or nonconformity in the product. In all cases the seller has sole responsibility for determining the cause and nature of the failure, and the Seller's determination with regard thereto shall be final. If it is found that Seller's Product has been returned without cause and is still serviceable, customer will be notified and the Product returned at its expense, in addition, a charge for testing and examination may, in Seller's sole discretion be made on Products so returned.

*\* A field Failure Report is included at the end of this manual - Additional Field Failure Reports can be obtained by calling Pineapple Technology, Inc. at (916) 652-1116 or you may download one from our website at [www.ptibroadcast.com](http://www.ptibroadcast.com) in the Warranty section.*