

Appendix

Technical Publication
AP-0015R2

Quick Installation Guide for TXR Generators

HF Series Generators

REVISION HISTORY

REVISION	DATE	REASON FOR CHANGE
0	JAN 7, 2004	First edition
1	OCT 16, 2007	General Update & Improvement
2	AGO 06, 2009	Dip-Switch configuration of HT Controller

This Document is the English original version, edited and supplied by the manufacturer.

The Revision state of this Document is indicated in the code number shown at the bottom of this page.

ADVISORY SYMBOLS

The following advisory symbols will be used throughout this manual. Their application and meaning are described below.



DANGERS ADVISE OF CONDITIONS OR SITUATIONS THAT IF NOT HEDED OR AVOIDED WILL CAUSE SERIOUS PERSONAL INJURY OR DEATH.



ADVISE OF CONDITIONS OR SITUATIONS THAT IF NOT HEDED OR AVOIDED COULD CAUSE SERIOUS PERSONAL INJURY, OR CATASTROPHIC DAMAGE OF EQUIPMENT OR DATA.



Advise of conditions or situations that if not heeded or avoided could cause personal injury or damage to equipment or data.

Note 

Alert readers on pertinent facts and conditions. Notes represent information that is important to know but which do not necessarily relate to possible injury or damage to equipment.

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SECTION 1 INSTALLATION

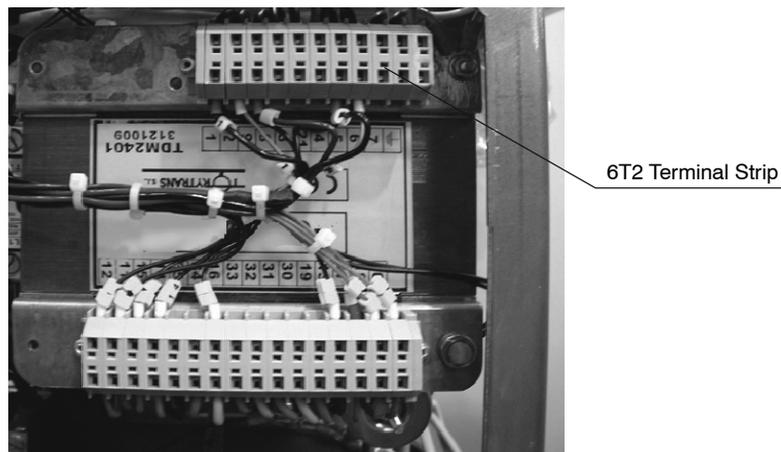


THIS DOCUMENT PROVIDES A STEP BY STEP GUIDE AND IS NOT INTENDED TO TAKE THE PLACE OF THE SERVICE MANUAL. AS STEPS ARE COMPLETED CHECK OFF THE LIST TO THE LEFT OF EACH NUMBER OR PARAGRAPH.

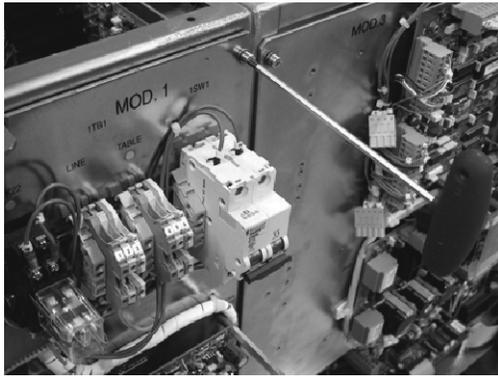
1. Place the Power Module close to its permanent position. For easy interconnection and calibration place the Generator Cabinet on a table or pedestal; or mount it to the wall using the Wall Support provided.
2. Verify that wire marked “*” on Transformer 6T2 terminal strip is matched to the incoming power. Identify the Generator type: Single-Phase, Three-Phase or Battery Powered.

	POWER SUPPLY LINE FOR SINGLE-PHASE OR BATTERY POWERED GENERATORS			
	110 VAC or Stand-Alone option	208 VAC	220 / 230 VAC	240 VAC
Cable-* in Transformer 6T2	TB-3 or TB-8	TB-21	TB-4 or TB-5	TB-6 or TB-7

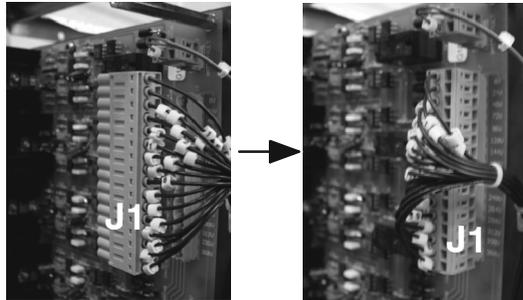
	POWER SUPPLY LINE FOR THREE-PHASE GENERATORS				
	220 / 230 / 240 VAC	400 VAC	415 VAC	440 VAC	480 VAC
Cable-* in Transformer 6T2	TB-4 or TB-5	TB-8	TB-7	TB-9	TB-10



3. ***THIS POINT ONLY APPLIES TO BATTERY POWERED GENERATORS.***
 - a. Open hinged door to access to Charger Module (Mod 1) by removing the Allen screws.
 - b. Verify that wire marked “*” is connected to Transformer 2T1 terminal strip - 110 (for 110 VAC).
 - c. Remove plastic covers over Charger Board and Line Monitor Board.
 - d. Plug J1 into the Charger Board, it is unplugged at the factory for safety.
 - e. Verify Jumper SW1 connection between SW1-5 and SW1-4 (110 VAC).
 - f. Re-install plastic covers.



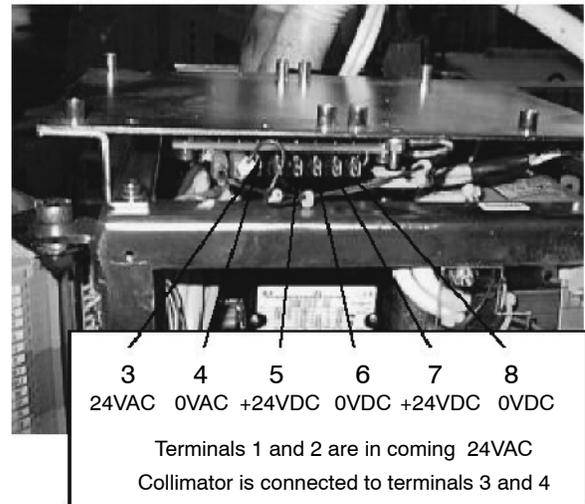
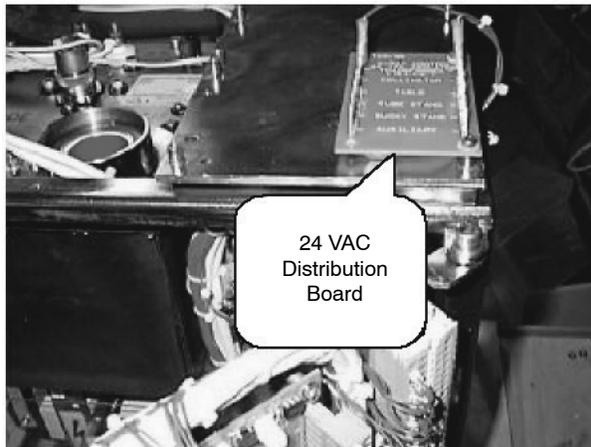
J1 Connection



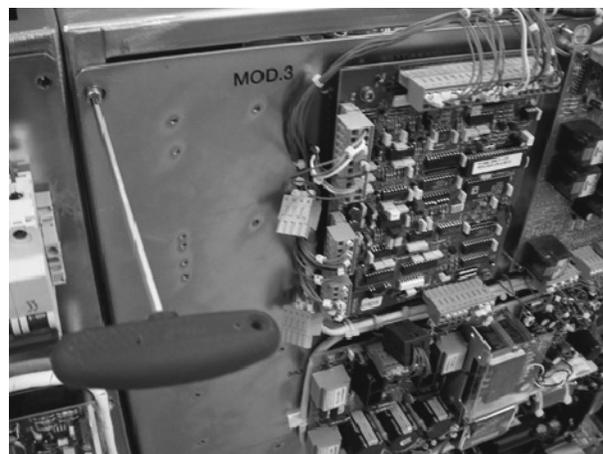
SW1 Jumper



- TXR products require 24 VAC for locks. At top of the Generator cabinet a 24 VAC Distribution Board has been added to connect these locks.



- Remove Allen screws that secure hinged door on MOD3 side.

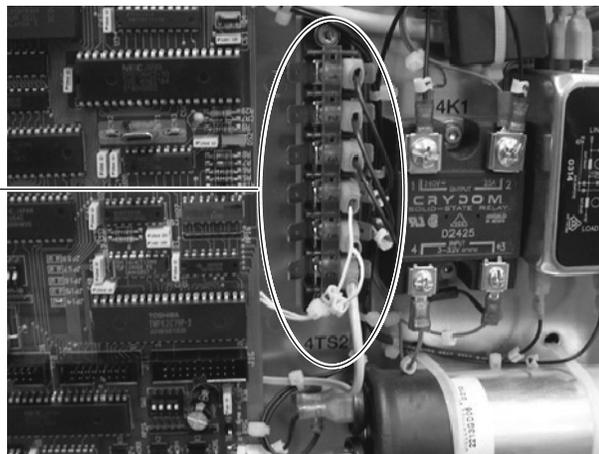


6. The Terminal Strip 4TS2 is located on Module 4 (back of Module 3) of the hinged door. Connect the X-ray Tube Rotor wiring as follows:

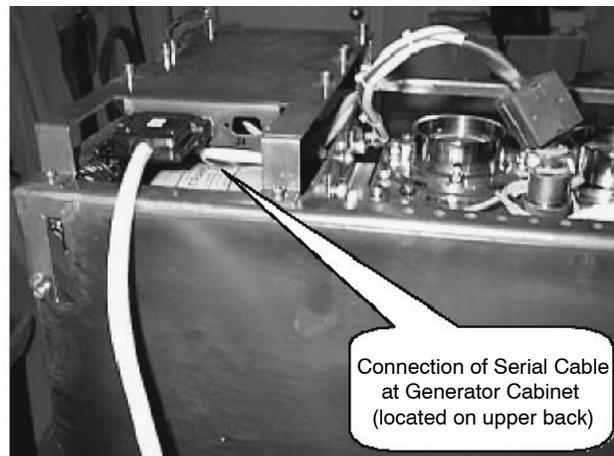
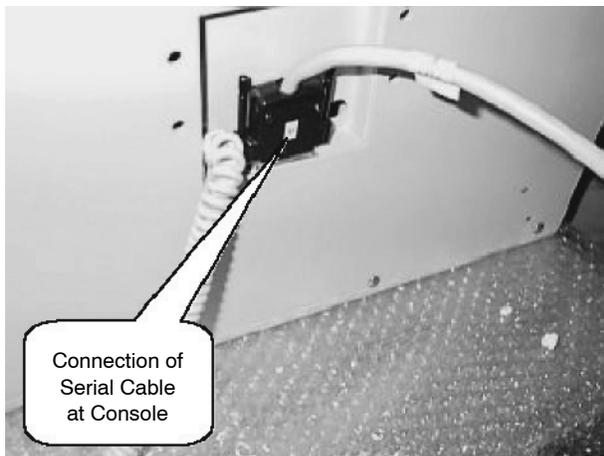
WIRE FROM X-RAY TUBE	CONNECTION IN 4TS2
BLACK	4TS2-1
RED	4TS2-2
WHITE	4TS2-3
THERMAL	4TS2-4
THERMAL	4TS2-5
GROUND *	4TS2-6

** If X-ray Tube have not a shielded Ground wire, terminal 4TS2-6 is not used.*

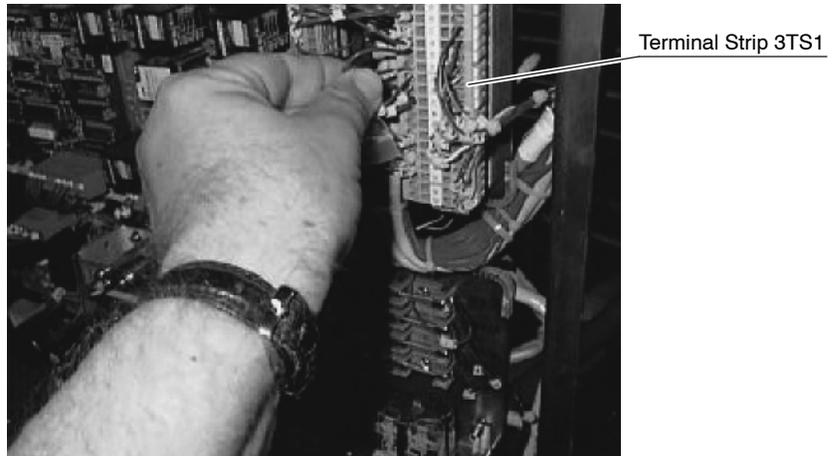
4TS2 Terminal Strip



7. Carefully connect the J5 side of the Serial cable to the Console and then route the Handswitch wire. Connect the J1 side of the Serial cable from the Console to the Generator Cabinet.



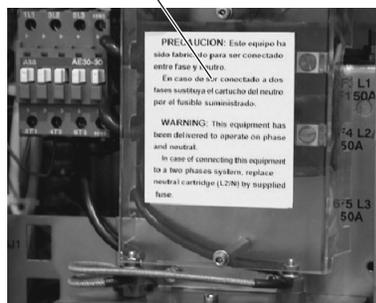
8. Add insulating compound or insulating oil to both High Voltage Transformer receptacles. Connect both High Voltage cables (Anode and Cathode) from the X-ray Tube to the HV Transformer receptacles.
9. The Terminal Strip 3TS1 is located on Module 3 (out-side of hinged door). Verify or connect a jumper between terminals 3TS1-22 and 3TS1-23 to bypass the Door Interlock.



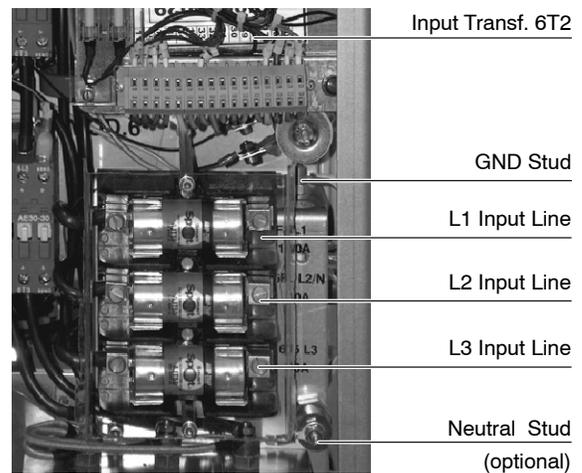
10. ***THIS POINT ONLY APPLIES TO LINE POWERED GENERATORS.***

Remove the plastic cover over the Line Fuses and connect the Line Power cables to the right side of the Fuses at L1 & L2 for Single Phase Generators and also at L3 for Three Phase Generators.

Plastic Cover over Line Fuses



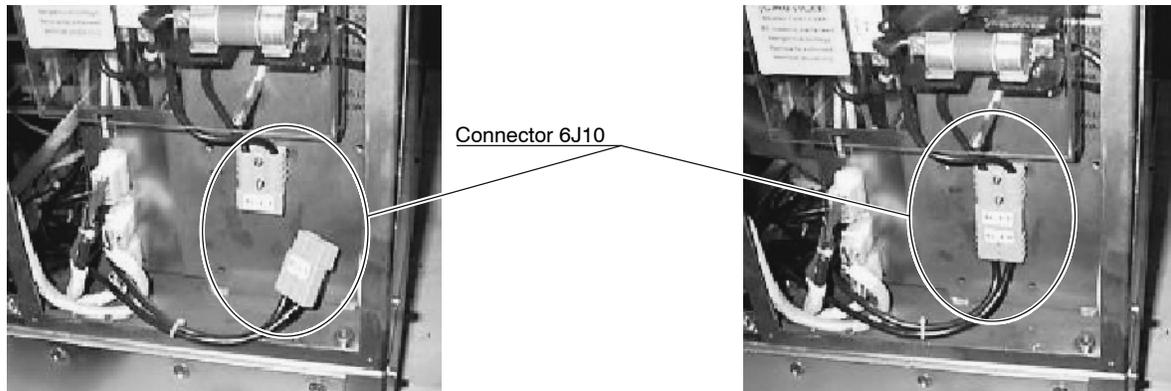
Single Phase



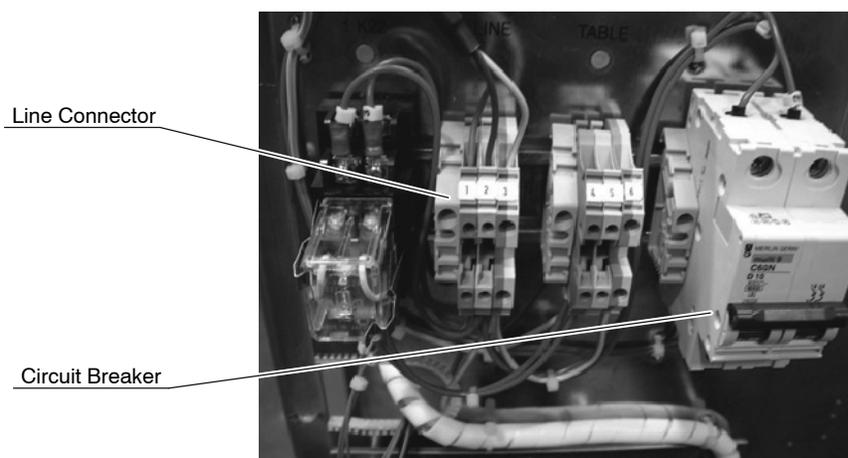
Three Phase

11. ***THIS POINT ONLY APPLIES TO BATTERY POWERED GENERATORS.***

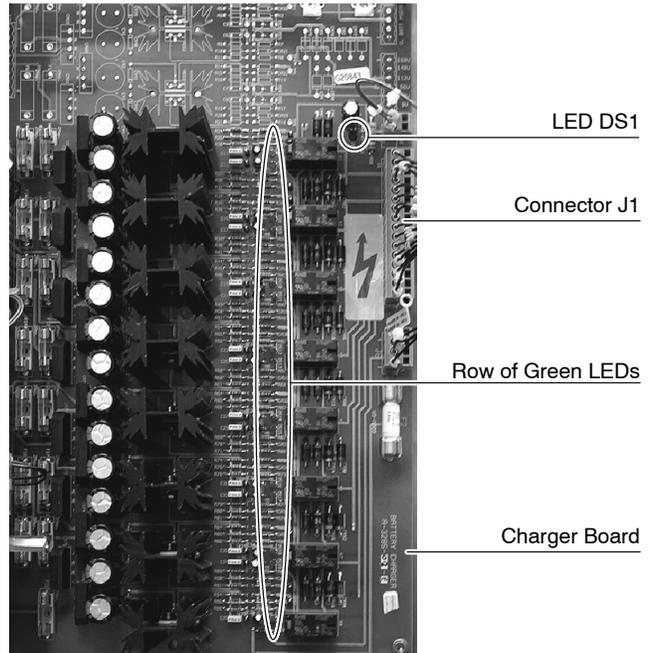
- a. Connector 6J10 on the right side of Generator Cabinet (Module 6) is unplugged for safety during transport. Plug it in.



- b. Connect the Line Power cable to Line Connector (wire-1 to left, wire-2 to middle, ground wire to right). These connections are color coded.



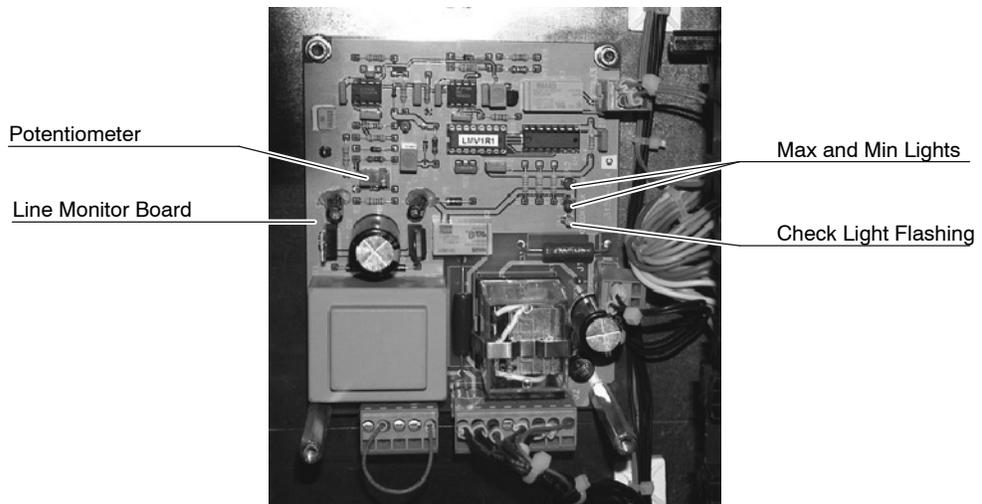
- c. Turn On the Circuit Breaker. Visually check that all green lights and LED DS1 are lit on the Charger Board.



- d. Visually verify that **LED DL1 (yellow) is flashing** on the Line Monitor Board (2A3). The **MAX and MIN LEDs (red)** on the Line Monitor Board check the line coming in, **neither should be on**.

Potentiometer POT1 is factory adjusted. If MAX or MIN LED is ON, first check that Mains Voltage is according to specifications on page 1 of this guide. If Mains Voltage is correct, adjust POT1 (CW up, CCW lower) measuring between TP-1 and TP-2 on Line Monitor Board. Potentiometer adjustment should be:

$$\text{Potentiometer} = \frac{\text{Mains Voltage}}{\text{Nominal Voltage}} \times 2.5$$



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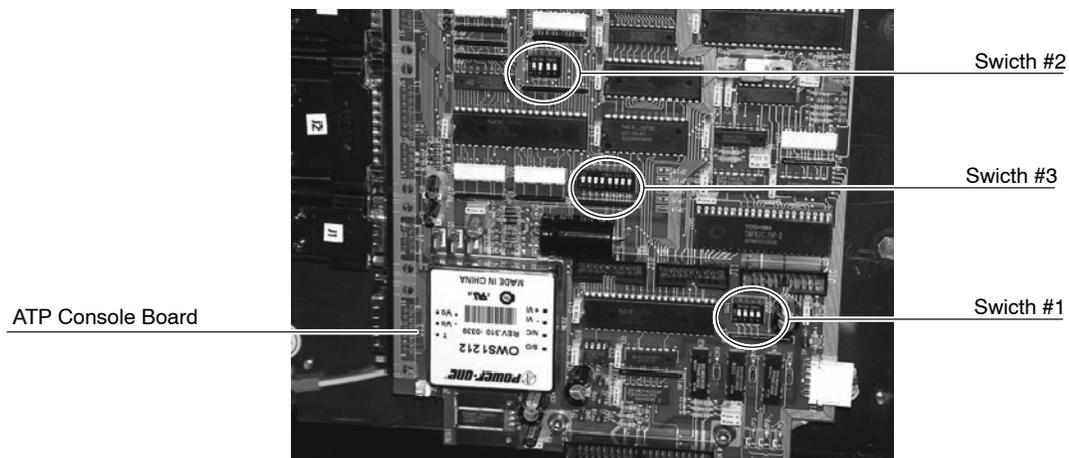
SECTION 2 CONFIGURATION

2.1 PROPER DIP SWITCH SELECTIONS ON THE ATP CONSOLE CPU BOARD

Note 

The ATP Console CPU Board is located on Module 4 side of the Hinged Door.

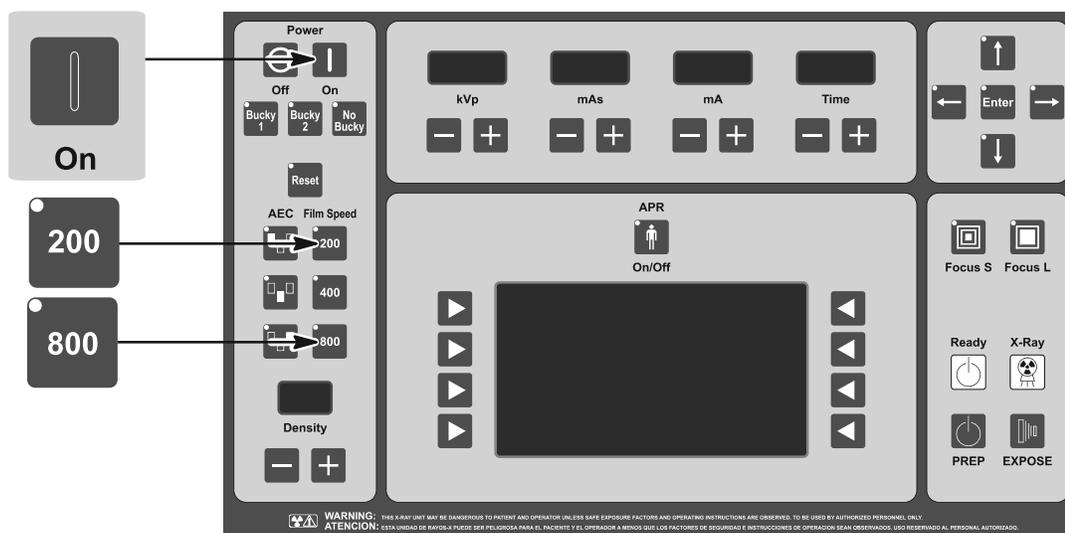
1. Locate Switches #1, #2 and #3 on the ATP Console CPU Board from the illustration.
 - Switch #1 contains four Dip Switches.
 - Switch #2 contains four Dip Switches.
 - Switch #3 contains eight Dip Switches (for factory use).



2. **Configuration of Switch #1.**
 - **For use with 60 Hertz Line Supply:** All four Dip Switches must be placed in the down (OFF) position.
 - **For use with 50 Hertz Line Supply:** The first Dip Switch must be placed in the up (ON) position. The second, third and fourth Dip Switches must be placed in the down (OFF) position.
3. **Configuration of Switch #2.** The first, third and fourth Dip Switches must be placed in the up (ON) position. The second Dip Switch must be placed in the down (OFF) position.
4. **Configuration of Switch #3.** All eight Dip Switches must be placed in the down (OFF) position.

2.2 CONFIGURING THE WORKSTATIONS

1. With the Generator OFF, make sure Dip 3 of Switch #2 on the ATP Console CPU Board (Module 4 side) is placed in the closed (ON) position (Service Mode enabled).
2. Turn ON the Line Power and then the Console power. Wait for the self testing to finish, then enter in configuration mode by maintaining pressed Power ON, "200" and "800" simultaneously for at least two seconds until all of the workstations push-buttons are illuminated.



3. **Results you should see:**

A display of numbers will be visible on the kVp, mAs, mA and time displays. The visible numbers will either be 0, 1, 2, etc.

The Console is equipped to operate in five different modes (workstations). The three push-buttons at the upper-left provide a way to program for different operations. See the following tables for proper selections.

- Select the first workstation to be configured (Bucky 1, Bucky 2, No Bucky) by pressing the respective push-button, only this push-button blinks and the console shows one of the following values:

DISPLAY	FUNCTION	VALUE	DESCRIPTION
1 st Value	SELECT THE TUBE	0	No-configured workstation
		1	Tube-1
		2	Tube-2
2 nd Value	SELECT THE DEVICE (WORKING MODE)	0	Direct (No Bucky)
		1	Bucky-1
		2	Bucky-2
		3	Standard Tomo *1)
		4	Standard RF
3 rd Value	SELECT THE ION CHAMBERS BEING USED (ONLY WITH AEC)	0	No AEC
		1	Ion Chamber-1
		2	Ion Chamber-2
		3	Ion Chamber-3
		4	Ion Chamber-4
<p><i>Notes.- Some values may not be configurable, depending on Generator model. *1) Only when the Tomo is controlled by the Generator.</i></p>			

- Set the new value by pressing the Density “+” or “-” buttons located at the bottom left corner of the Operator Console. When the first value is “0”, the second and third value are “0”.

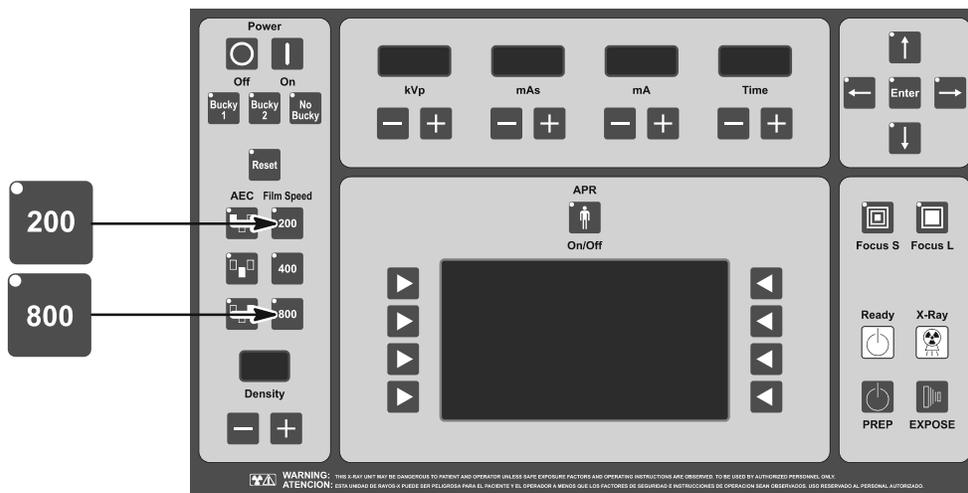
The following table is an example of a 2 tube System with 2 Buckys and no Ion Chambers.

Button	kVp	mAs	mA	Time
Bucky 1	1 (tube 1)	1 (Bucky 1)	0 (no Ion Chamber)	0
Bucky 2	2 (tube 2)	2 (Bucky 2)	0 (no Ion Chamber)	0
No Bucky	1 (tube 1)	0 (No Bucky)	0 (no Ion Chamber)	0

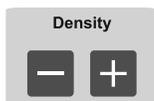
6. Continue Configuration for the remaining Workstations.
7. Exit from configuration by pressing the “200” and “800” pushbuttons down simultaneously for at least two seconds until you hear an audible double beep. This sound signals that you have successfully saved the workstations you had selected. **Configuration of the Workstations is now completed.**

2.3 CONFIGURING THE TUBE TYPE

1. To configure the X-ray Tube type, it is necessary to enter into Calibration Mode by pressing the “200” and “800” push-buttons simultaneously. The light of the selected workstation blinks (*Bucky 1, Bucky 2 or No Bucky*).



2. Press the “mA Increase” push-button until you reach the maximum mA capacity. Press the “mA Increase” push-button twice more to reach the Extended Memory Code “E02”, that will appear on the mA Display.

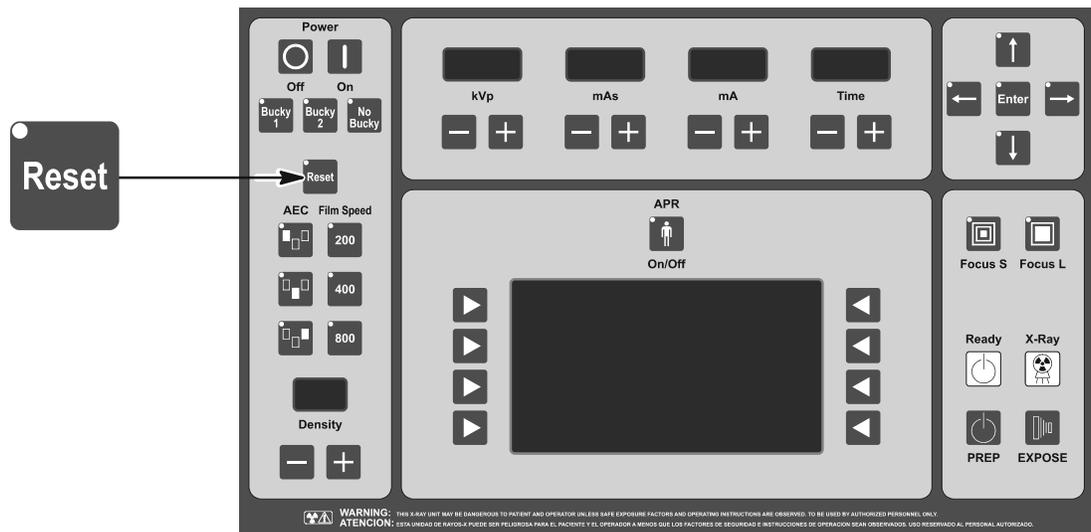


3. In order to configure the X-ray Tube type and model, press the “+” or “-” Density push-buttons until one of the Tube Type numbers listed below is shown on the kVp Display. (The entire list of Tube Data is found in your Service Manual on the last page of the Configuration Section).

Normally one of the following three Tube capacities is chosen:

TUBE NUMBER (kVp Display)	TUBE CODE (ID) (mAs Display)	MODEL	FOCAL SPOT	POWER RATINGS		KHU
				LS (kW)	HS (kW)	
001	139	TOSHIBA E7239X	1.0 / 2.0	22 / 45	-	133
003	140	TOSHIBA E7242X	0.6 / 1.5	18 / 49	-	187
004	090	TOSHIBA E7252X	0.6 / 1.2	15 / 42	26 / 73	300

4. Verify that the Tube code (ID) shown on the mAs Display is the same as the tube code listed in the table above or in the Tube Table of the Service Manual.
5. Press the “Reset” Push-button to save and permanently store the X-ray Tube configuration. You will once again hear an audible beep to confirm that you have successfully saved your selection.



Note 

At this point, if your selected Bucky is still blinking, you are already in Service Mode and ready for Autocalibration. If your selected Bucky is not blinking, press “200” and “800” simultaneously for at least two seconds to enter Service Mode.

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SECTION 3 CALIBRATION

3.1 PREVIOUS TASKS

Before calibration, keep in mind that:

1. To calibrate and measure the kVp output, a Non-Invasive kVp Meter is needed.

Place and center a Non-Invasive kVp Meter on the X-ray Tube output at the required SID (*refer to the Non-Invasive kVp Meter documentation*).

2. To calibrate and measure the mA or mAs, a mAs Meter needs to be plugged to the banana plug connection at the top of the HV Transformer.



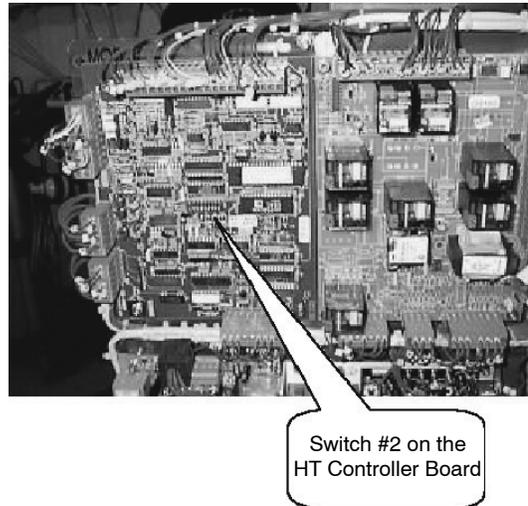
The cross bar (link plate) should not be connecting the banana plug. Turn the Generator OFF to connect the mAs meter if you did not connect one at the beginning.

Remember to re-install the cross bar between the banana plug connections after removing the mAs meter.

Remove the cross bar (link)
and plug the mAs meter here.



3. Before calibration procedure, verify that the Dip Switches of Switch #2 of the HT Controller Board (A3000-xx) are in the "OFF" position. This board is located on Module 3 at the hinged door.



3.2 DIGITAL KV LOOP OPEN

Extended Memory Location E06 contains the calibration factor for Digital kV Loop Open.

Note 

*The Value in E06 Memory Location is only related to the Generator performance (it is not related to the X-ray Tube(s) or another components installed), **this Memory Location is factory adjusted**. Only perform this procedure if the HT Controller Board and/or HV Transformer have been replaced in the unit. For that, refer to the Service Manual - Calibration Chapter.*

3.3 DIGITAL mA LOOP CLOSED

Extended Memory Locations E03 and E05 contain the calibration factor for Digital mA Loop Closed.

Note 

*Values in E03 and E05 Memory Locations are only related to the Generator performance (they are not related to the X-ray Tube(s) installed). **These Memory Locations are factory adjusted.** Only perform this procedure if the HT Controller Board and/or HV Transformer have been replaced in the unit. For that, refer to the Service Manual - Calibration Chapter.*

3.4 AUTO-CALIBRATION OF DIGITAL mA LOOP OPEN

To achieve the most accurate calibration, **this procedure has to be automatically performed by the Generator (Auto-calibration).**

The Calibration procedure should be manually performed only if Auto-calibration is not possible. In this case, refer to the Service Manual (Calibration Chapter - Section "Manual Calibration of Digital mA Loop Open").

Auto-calibration of the Filament Current Numbers is divided in two separated procedures related to the mA stations configured for the Small or Large Focal Spots. Start with the Small Focal Spot (first group) and continue with the Large Focal Spot (second group).



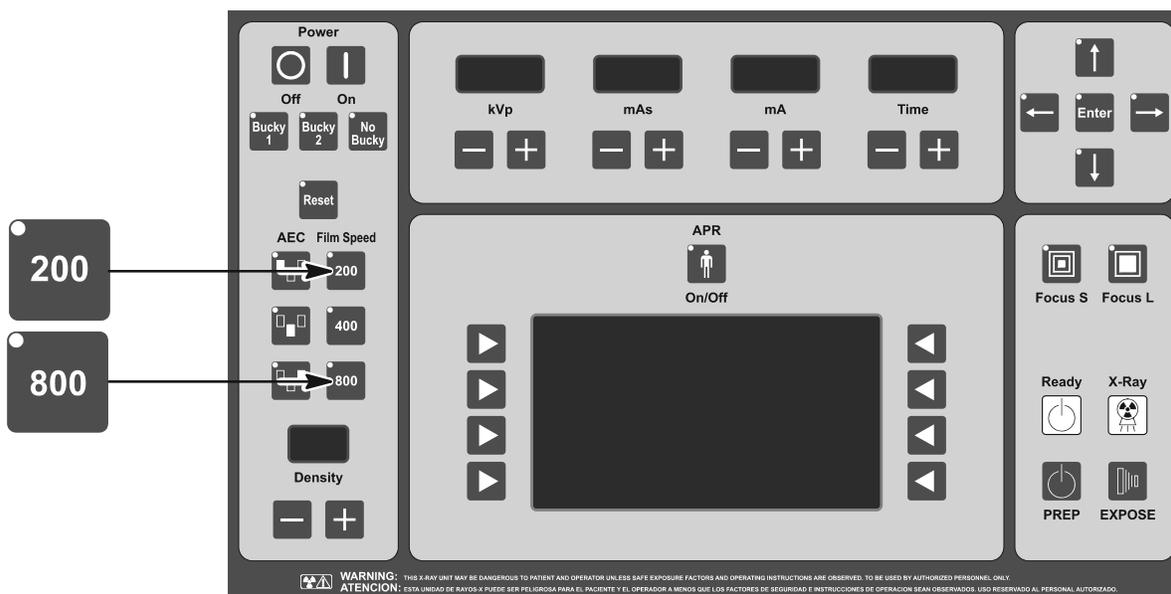
EACH TIME THAT AUTO-CALIBRATION IS ACTIVATED IN A mA STATION (OR IN "E01" MEMORY LOCATION), ALL THE FILAMENT CURRENT NUMBERS OF THE SELECTED FOCAL SPOT ARE AUTOMATICALLY SET TO "344". SO A NEW COMPLETE CALIBRATION OF THE FILAMENT CURRENT NUMBERS FOR THIS FOCAL SPOT WILL BE REQUIRED.

Auto-calibration starts with the minimum available mA station for the selected Focal Spot at 50 kV and follows with the other combinations of mA stations for the selected Focal Spot at 80 kV, 120 kV and 40 kV.

1. For this procedure, set Dip Switch 4 of Switch #2 on the HT Controller Board back in the “**ON**” position (Digital mA Loop Open / Filament Current Constant).

1. Select the “*No Bucky*” workstation (Direct).

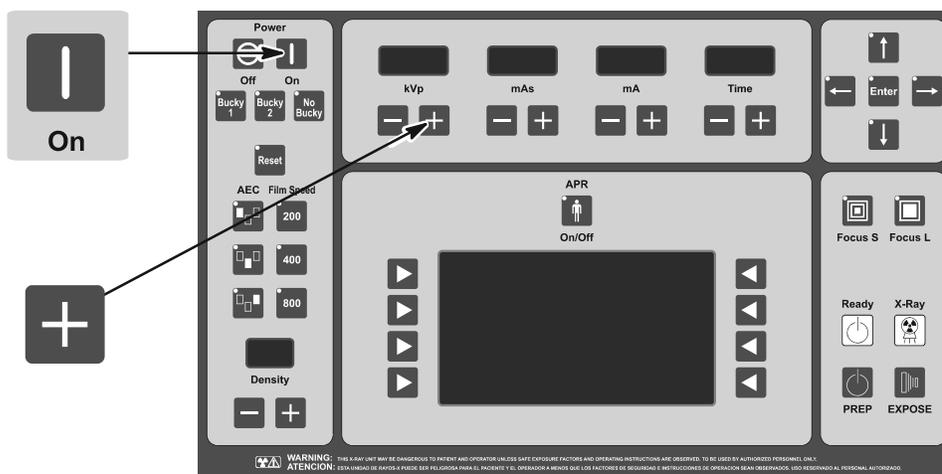
2. Enter calibration mode by pressing the “200” and “800” push-buttons simultaneously and select one of the configured mA stations for the **Small Focal Spot** (Light will be blinking for workstation selected if you are in Service Mode).



3. Enter Auto-calibration mode by pressing the “Power On” and “kV increase” push-buttons simultaneously for 2 seconds. After releasing both push-buttons, code “222” will be flashing on the Console waiting for confirmation to then enter Auto-calibration mode.

Press the “kV increase” and “Power On” push-buttons again until code “222” disappears on the Console to confirm Auto-calibration mode.

Auto-calibration is activated after releasing both push-buttons. At this moment, the Generator will check the mA stations available for the **Small Focal Spot**. When 50 kV at 10 mA is displayed in the display windows, the Unit is ready for Auto-calibration.



4. Check that the Heat Units available for the X-ray Tube are 100% (kV Display shows “H - -” on the Console).
5. Keep the Handswitch push-button fully pressed or use the Exposure Controls on the Console to perform continuous exposures.



Auto-calibration can be stopped momentarily by releasing the Handswitch push-button or the Exposure Controls. Do not exit from Auto-calibration before the procedure has been completed.

If the Heat Units available for the X-ray Tube are less than 40%, exposures are inhibited momentarily and code “111” will be flashed on the Console accompanied by an alarm. In this case, release the Handswitch or Exposure Controls to stop momentarily the Auto-calibration procedure. The alarm will stop when the X-ray Tube begins to cool and recovers the Heat Units capacity. Exposures can be performed again even though code “111” is shown on the Console.

At this point, it is recommended to wait until the Heat Units available are close to 80% of the X-ray Tube capacity without making any exposure.

The Generator will try to calibrate each kV / mA combination for ten (10) attempts (maximum). If calibration is aborted (after ten attempts), code “888” will flash on the Console until the “Power On” push-button is pressed to exit Calibration. Calibration might also abort due to space charge during calibration of the lowest kV at the highest mA stations for the Focal Spot selected, so code “777” will be flashing on the Console until the “Power On” push-button is pressed.



IF AUTO-CALIBRATION IS ABORTED (CODE “888” OR “777”), CONTINUE AUTO-CALIBRATION FOR THE OTHER FOCAL SPOT. CHECK AT THE END OF AUTO-CALIBRATION WHICH KV / MA COMBINATIONS HAVE NOT BEEN AUTO-CALIBRATED FOR EACH FOCAL SPOT (THESE COMBINATIONS HAVE THE FILAMENT CURRENT NUMBER SET TO “344”). MANUALLY CALIBRATE THESE KV / MA COMBINATIONS AS EXPLAINED IN THE SERVICE MANUAL (CALIBRATION CHAPTER - “MANUAL CALIBRATION OF DIGITAL mA LOOP OPEN”).

When Auto-calibration is successfully performed, code “999” will be flashing on the Console until press the “Power On” push-button for 2 seconds to exit from Auto-calibration mode. The “999” code will disappear when you have successfully exited Calibration.

6. To calibrate the **Large Focal Spot**, select one of the configured mA stations for the Large Focal Spot by pressing the mA “+” push-button. Repeat steps 2.- 5.

Before starting the exposures, it is recommended to wait until the Heat Units available are closed to the 80% of the X-ray Tube capacity.

7. After performing both procedures (for Small and Large Focal Spots), select in calibration mode each combination of the available mA stations at the kV break points (40, 50, 80 and 120 kV). Press the "Reset" push-button to read on the kV Display the new value of the Filament Current Number stored for each combination and write down the new values in the Data Book.

Note that the highest mA station for Small Focal Spot may have numbers larger than the lowest mA station for Large Focal Spot. This is normal.

8. Repeat the above calibration process for the second tube.
9. Exit calibration mode.
10. **Set Dip Switch 4 of Switch #2 on the HT Controller Board back in the "OFF" position (Digital mA Loop Closed).**

**Table 3-1
mA Calibration Numbers**

mA STATION	FILAMENT CURRENT NUMBERS AT kV BREAK POINT			
	40	50	80	120
10				
12.5				
16				
20				
25				
32				
40				
50				
64				
80				
100				
125				
160				
200				
250				
320				
400				
500				
640				
800				

Note. - Some Generator models do not contain all the mA stations listed above.

3.5 FINAL CHECKS

Verify that all Configuration and Calibration data have been properly stored in memory.

1. Enter in calibration mode and check that the values noted for the “*Filament Current Numbers*” and “*Extended Memory Locations*” of the Data Book are the same values displayed and stored in memory. Press the “*Reset*” button to read the stored values.
2. Exit from calibration mode and Service mode.
3. Turn the Generator OFF and verify position of Dip Switches of Switch #2 on the HT Controller Board are:
 - Dip Switch 2 in “**Off**” position (enables Filament and Rotor Interlocks).
 - Dip Switch 4 in “**Off**” position (Digital mA Loop Closed).
4. Set Dip Switch 3 of Switch #2 on the ATP Console CPU Board in “**Off**” position to place the Generator in normal operating mode.

SECTION 4 APR EDITING

Any APR Technique may be modified to fit the operator requirements. It is possible to change and store in memory the names (Body Region / Anatomical View / Projection), SID, Thickness value (range and default value), selections (Workstation and AEC) and radiographic parameters related to selected Thickness value.

Note 

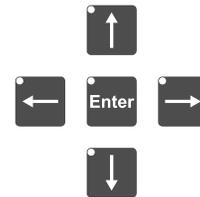
Creating or Deleting an Body Region, Anatomical View, Projection and Thickness can only be performed from the PC APR Editor. (Refer to Section 4 of the Operating Manual).

Proceed in the following way:

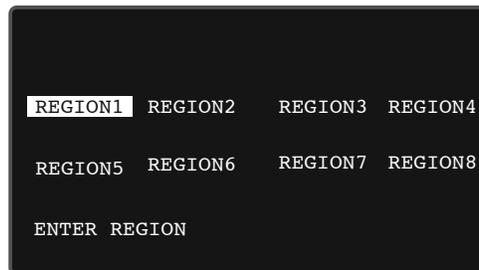


1. With the APR deactivated, press simultaneously "APR ON/OFF" and "Enter" buttons. All the LEDs of the Edition Module buttons lights up.

Edition Module with "Edit-Arrow" buttons and "Enter" button



Display Selector 



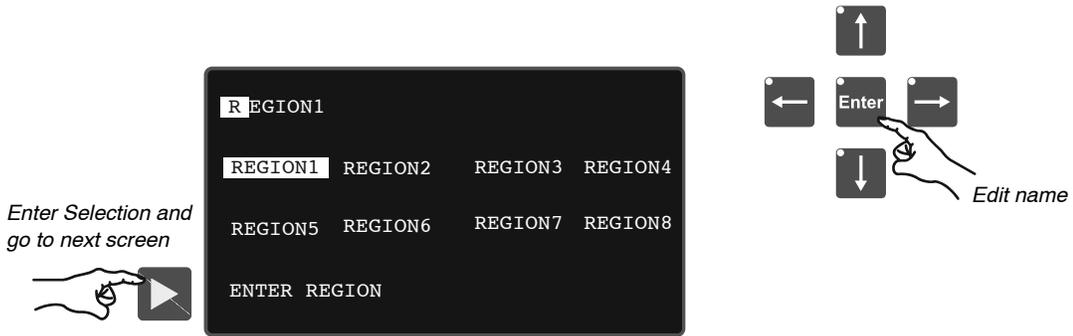
The Edition Module is operated with the "Edit-Arrow" buttons, the "Enter" button and the Display Selectors.

Press the "Edit-Arrow" buttons to scroll in the APR Display. When pressing the Display Selector on the left lower corner, the APR Display will show sequentially the selected Region / View / Projection at the upper line.

- 2. **Body Region.** Once the desired Body Region (highlighted) is chosen with the “Edit-Arrow” buttons, if the operator requires to modify the Region name, go to step 3. If not, press the Display Selector close to “ENTER REGION” to go to step 4.



- 3. **Modify the Region name.** Press “Enter” to edit the name of the selected Region. The first letter of the name is highlighted, the “Up/Down Edit-Arrow” buttons will change the letter in alphanumerical order (plus underscore and blank), the “Right/Left Edit-Arrow” buttons will scroll in the word. Once the name is written, press “Enter” to save the new Region name. If necessary, repeat this process to rename other Regions.

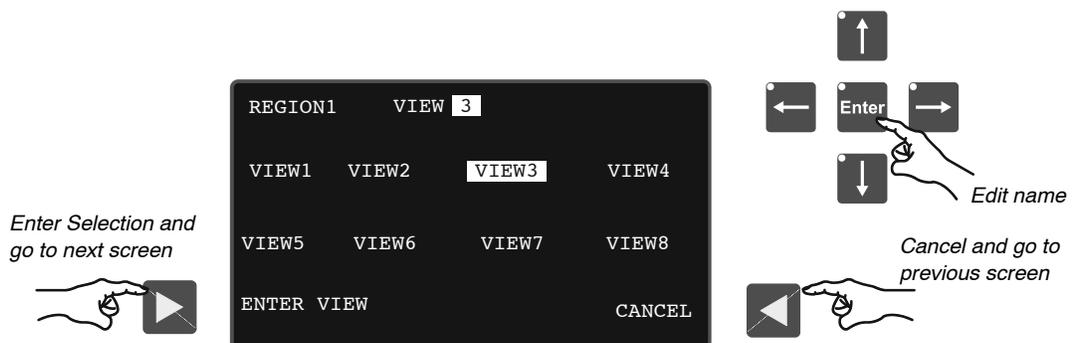


Press the Display Selector close to “ENTER REGION” to go to step 4.

4. **Anatomical View.** Once the desired Anatomical View (highlighted) is chosen with the “Edit-Arrow” buttons, if the operator requires to modify the View name, go to step 5. If not, press the Display Selector close to “ENTER VIEW” to go to step 6.; or “BACK” to return to the previous screen.

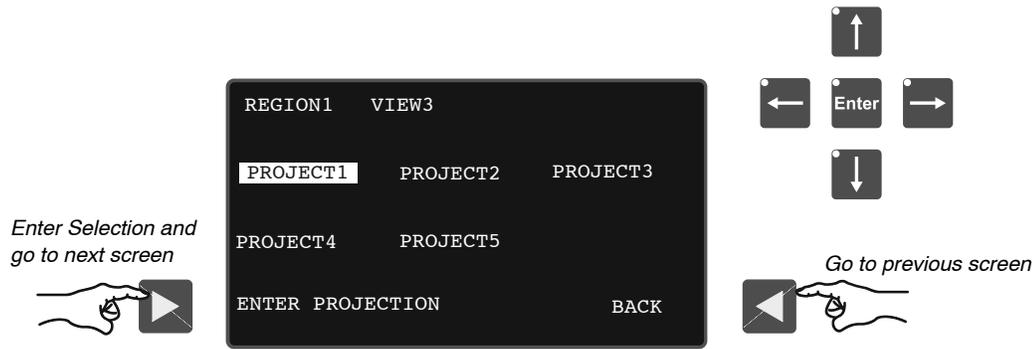


5. **Modify the View name.** Press “Enter” to edit the name of the selected View. The first letter of the name is highlighted, the “Up/Down Edit-Arrow” buttons will change the letter in alphanumerical order (plus underscore and blank), the “Right/Left Edit-Arrow” buttons will scroll in the word. Once the name is written, press “Enter” to save the new View name. If necessary, repeat this process to rename other Views.

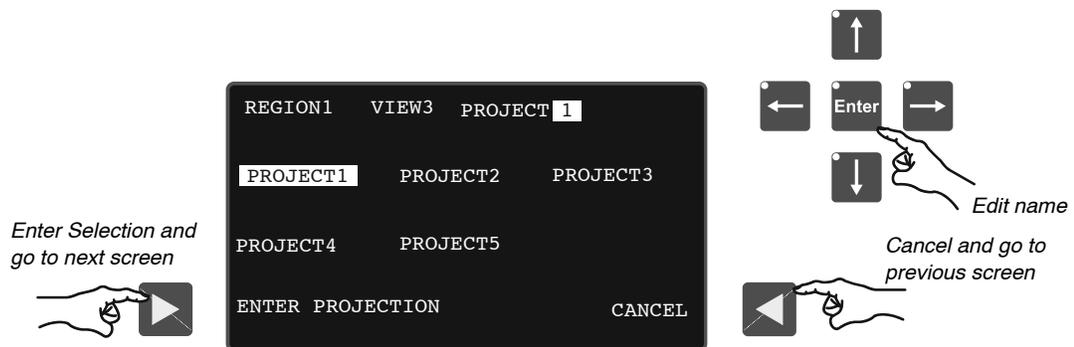


Press the Display Selector close to “CANCEL” to go back to previous screen without saving the changes or press the Display Selector close to “ENTER VIEW” to go to step 6.

6. **Projection.** Once the desired Projection (highlighted) is chosen with the “Edit-Arrow” buttons, if the operator requires to modify the Projection, go to step 7. If not, press the Display Selector close to “ENTER PROJECTION” to go to step 8. or “BACK” to return to the previous screen.



7. **Modify the Projection name.** Press “Enter” to edit the name of the selected Projection. The first letter of the name is highlighted, the “Up/Down Edit-Arrow” buttons will change the letter in alphanumerical order (plus underscore and blank), the “Right/Left Edit-Arrow” buttons will scroll in the word. Once the name is written, press “Enter” to save the new Projection name. If necessary, repeat this process to rename other Projections.



Press the Display Selector close to “CANCEL” to go back to previous screen without saving the changes or press the Display Selector close to “ENTER PROJECTION” to go to step 8.

8. Once the Display Selector close to “ENTER PROJECTION” has been pressed, the APR Display shows:
 - The name of the Region/View/Projection (upper line).
 - The Thickness values for Minimum Thickness, Default Thickness and Thickness Step that might be applied to the selected Region / View / Projection.

If required, these Thickness values can be edited as described below:



9. **Modify the Minimum Thickness, the Default Thickness or the Thickness Step.** If the operator decides to modify a Thickness value, follow this step, if not, go to next step.

Press the “Edit-Arrow” button to highlight the corresponding line and press “Enter” button to modify the selected Thickness.

“MT: __” (minimum), “DT: __” (default) or “TS: __” (thickness step) appears at the right corner of the Display, then select the desired number with the “Edit-Arrow” buttons and press “Enter” to save the changes and go back to previous screen, or press the Display Selector close to “CANCEL” to go back to previous screen without saving the changes.



Minimum Thickness (MT__) sets the minimum value in centimeters used for the selected Region/View/Projection.

Default Thickness (DT__) sets the default value in centimeters according to the operator preferences.

Thickness Step (TS__) sets the number of centimeters between each thickness value. Each Region/View/Projection may have a maximum of twenty (20) Steps.

Note 

The maximum range for a Thickness value is 99 cm, which means that a Minimum Thickness value too high or a Thickness Step too large will not be allowed if the resulting value is over 99 cm.

Calculate if the Thickness values are allowed by applying the formula:

$$(MT + 19) \times TS$$

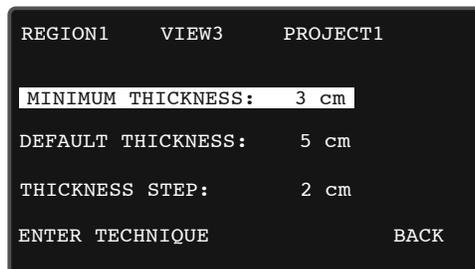
where:

MT = Minimum Thickness

19 = Maximum number of Steps minus one

TS = Thickness Step value

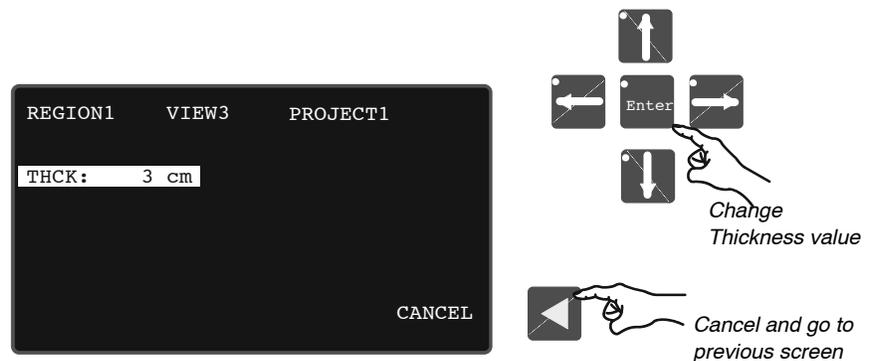
*For example, in the figure below, the formula is $(3+19) \times 2 = 44$ cm. In which "3" is the Minimum Thickness, "19" is the number of Steps (20-1) and "2" is the Thickness Step value. "44" is the resulting maximum Thickness **but** if the Thickness Step value is 8, it would not be allowed as the range is over 99 cm: $(3+19) \times 8 = 168$ cm.*



10. **Modify the Radiographic Technique Values.** In order to modify the Radiographic Technique values for a specific Region/View/Projection, press the Display Selector close to “ENTER TECHNIQUE”.



The Display will show the Region, View, Projection and the Default Thickness (highlighted) for the selected Region/View/Projection. Press “Enter” to edit the APR technique for the displayed Thickness, or before pressing “Enter” modify the Thickness with the “Up/Down Edit-Arrows” if the APR technique to be modified corresponds to another Thickness value.

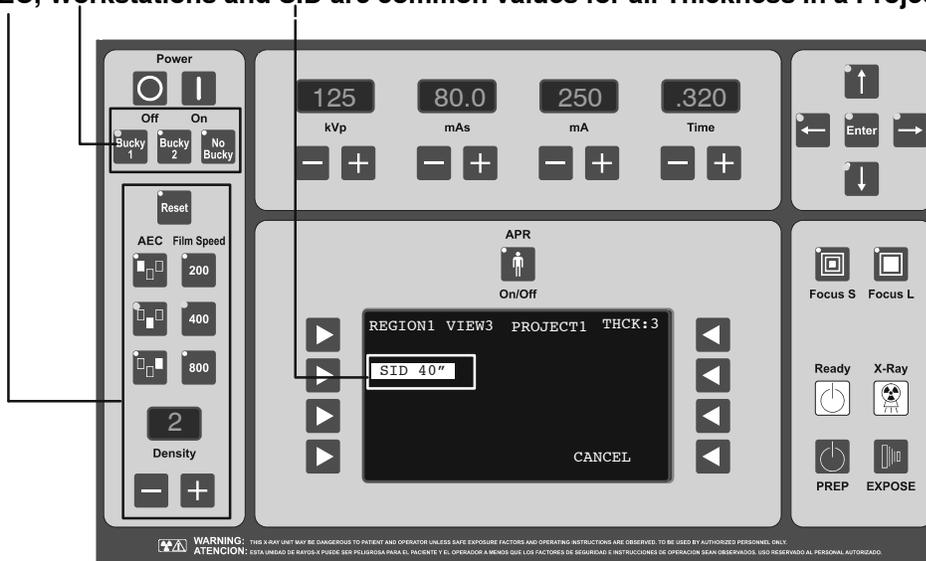


After pressing “Enter”, the Console automatically displays all the radiographic parameters (kVp, mA, mAs, Time), selections (Workstation and AEC) and SID indication related to that Region/View/Projection.

Now, the operator can modify and store the Radiographic Parameters, Workstation, AEC Selections and SID indication (36”, 40”, 60” or 72” selected with the “Up/down Edit-Arrows”).

Keep in mind that all Thickness values of a Projection will share the same AEC values, Workstations and SID, that means that if one of these Parameters is modified, it will affect to all Thickness values for that specific Region - View - Projection.

AEC, Workstations and SID are common values for all Thickness in a Projection.



Note 

If an APR technique is to be stored with AEC parameters, a suitable back-up time (and/or mAs) MUST be stored in the program by the operator.

11. Press “Enter” to save in memory the new parameters and selections assigned to the selected Region/View/Project and Thickness value.
12. Press simultaneously “APR ON/OFF” and “Enter” buttons to exit from the APR edition mode.

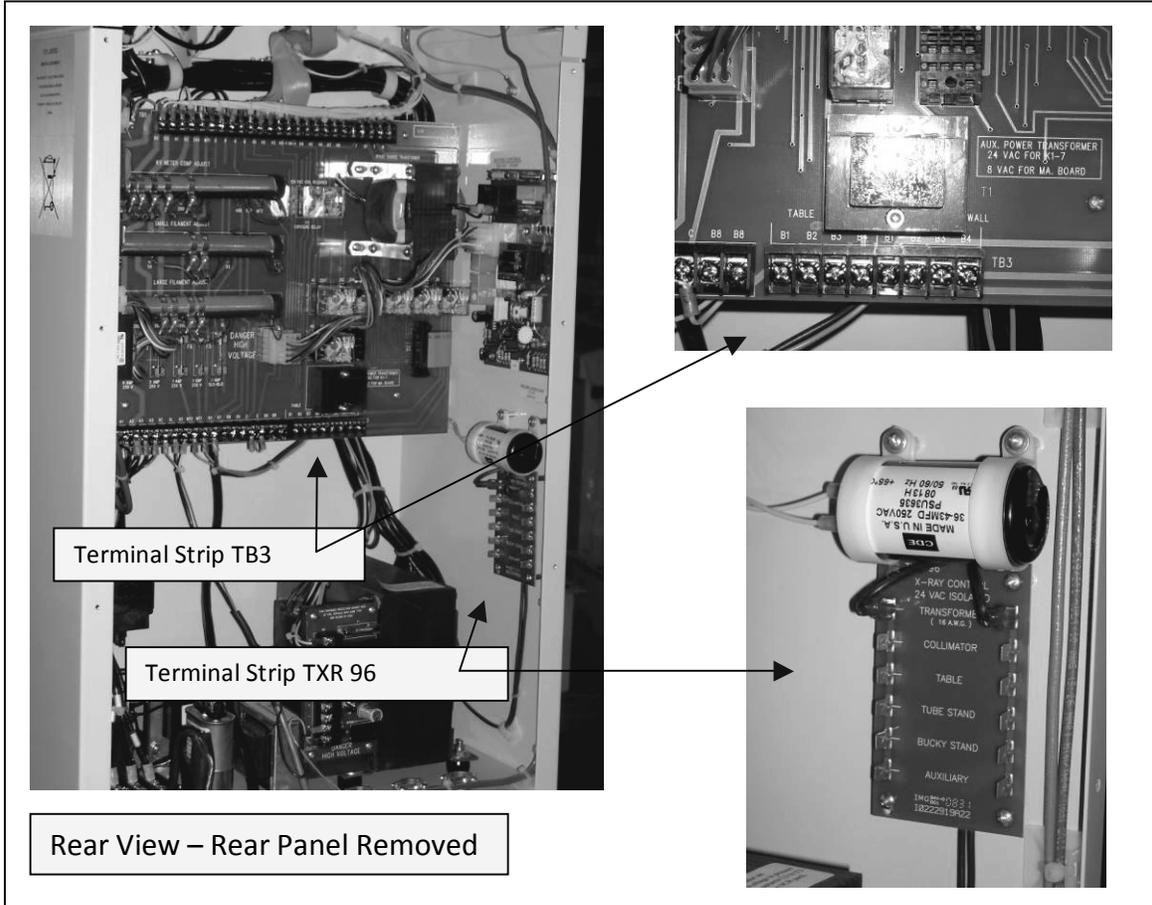
TXR Tingle X-Ray Products, LLC
Technical Pamphlet

INTERFACE CABLE
Bucky to X-Ray Control

A nine conductor, 18 AWG cable is provided to supply control and power wiring for both the bucky and the table or wall stand electric locks. All bucky's are pre-wired at the table or wall stand.

TXR Standard Frequency Generators – Models 425 & 525			
Table			
Generator –		PROGENCY TRUE SPEED BUCKY (pre-wired)	
Terminal Strip - TB3 (on board in center of cabinet) Left Side of Strip (marked table)	Wire Color	Terminal Strip	Wire Color
B1	Blue	1	Blue
B2	Orange	2	Orange
B3	White	3	White
B4	Yellow	N	Yellow
B8	Brown	L	Brown
Any labeled earth ground in cabinet	Green	Ground	Green
Terminal Strip – TXR 96 (mounted on right side of control cabinet)		Table Lock Printed Circuit Board	
Left Table Tab	Red	24 VAC	Red
Right Table Tab	Black	24 VAC	Black
		Note: Red and Black continue through bucky junction box. Both terminate at table lock printed circuit board.	
Spare		Spare	Purple
Wall Stand			
Generator –		PROGENCY TRUE SPEED BUCKY (pre-wired)	
Terminal Strip - TB3 Right Side (marked wall)	Wire Color	Terminal Strip	Wire Color
B1	Blue	1	Blue
B2	Orange	2	Orange
B3	White	3	White
B4	Yellow	N	Yellow
B8	Brown	L	Brown
Any labeled earth ground in cabinet	Green	Ground	Green
Terminal Strip – TXR 96 (mounted on right side of control cabinet)		Wall Stand Lock Printed Circuit Board	
Left Table Tab	Red	24 VAC	Red
Right Table Tab	Black	24 VAC	Black
		Note: Red and Black continue through bucky junction box. Both terminate at wall stand lock printed circuit board.	
Spare		Spare	Purple

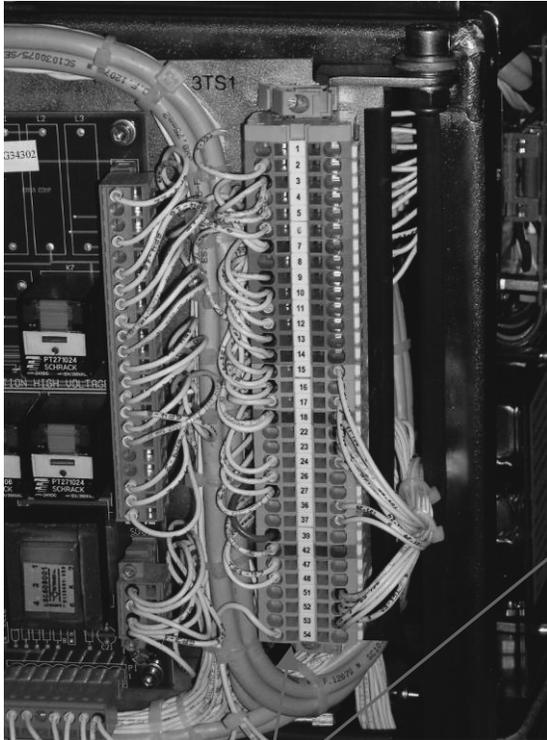
TXR Standard Frequency Generators - Pictures



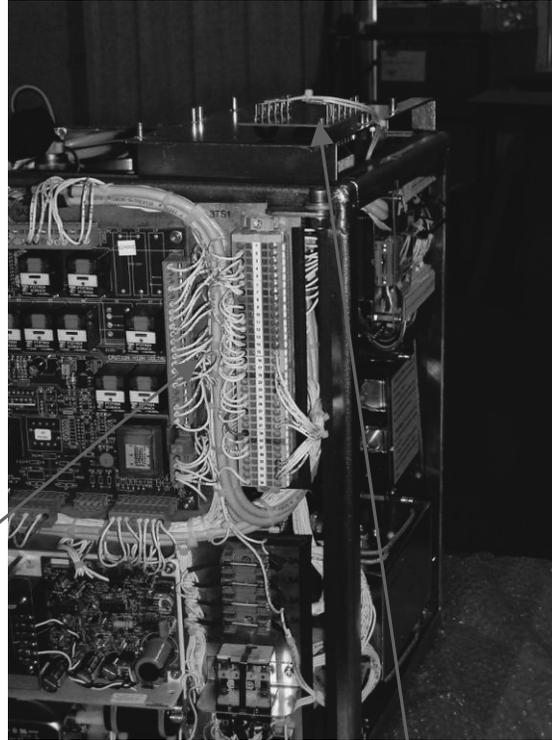
TXR Tingle X-Ray Products, LLC
Technical Pamphlet

High Frequency Generators – SHF Series			
Table			
Generator –		PROGENCY TRUE SPEED BUCKY (pre-wired)	
Terminal Strip – 3TS1 (located on right side of swing out door)	Wire Color	Terminal Strip	Wire Color
3TS1-5	Blue	1	Blue
3TS1-6	Orange	2	Orange
3TS1-4	White	3	White
3TS1-3	Brown	L	Brown
3TS1-1	Yellow	N	Yellow
Any labeled earth ground in cabinet	Green	Ground	Green
Terminal Strip – TXR 96 (mounted on top of control unit)		Table Lock Printed Circuit Board	
Left Table Tab	Red	24 VAC	Red
Right Table Tab	Black	24 VAC	Black
		Note: Red and Black continue through bucky junction box. Both terminate at table lock printed circuit board.	
Spare		Purple	Spare
NOTE – Add following jumpers in generator			
1) Jump 3TS1-2 to 3TS1-3			
2) Jump 3TS1-1 to 3TS1-27			
Wall Stand			
Generator –		PROGENCY TRUE SPEED BUCKY (pre-wired)	
Terminal Strip – 3TS1 (located on right side of swing out door)	Wire Color	Terminal Strip	Wire Color
3TS1-12	Blue	1	Blue
3TS1-13	Orange	2	Orange
3TS1-11	White	3	White
3TS1-10	Brown	L	Brown
3TS1-8	Yellow	N	Yellow
Any labeled earth ground in cabinet	Green	Ground	Green
Terminal Strip – TXR 96 (mounted on top of control unit)		Wall Stand Lock Printed Circuit Board	
Left Table Tab	Red	24 VAC	Red
Right Table Tab	Black	24 VAC	Black
		Note: Red and Black continue through bucky junction box. Both terminate at wall stand lock printed circuit board.	
Spare		Purple	Spare
NOTE – Add following jumpers in generator			
1) Jump 3TS1-9 to 3TS1-10			
2) Jump 3TS1-8 to 3TS1-27			

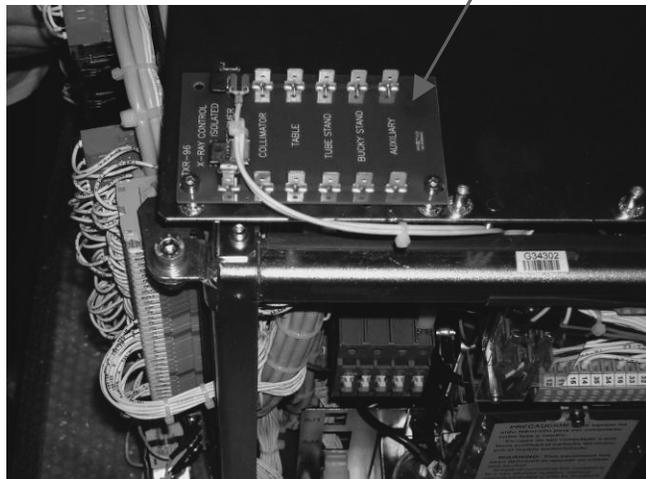
High Frequency Generators - Pictures



Terminal Strip 3TS1



Terminal Strip TXR 96



Cover - Removed

