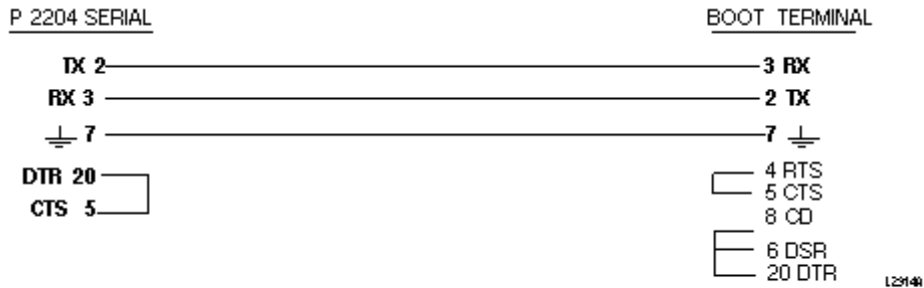


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1- INTRODUCTION

This procedure describes how to perform an Auto Fine Tune (AFT) of the Erbtec RF Amplifier installed in RF/PEN 1 or RF/PEN 2 Cabinets. AFT is specific to the Erbtec RF Amplifier and does not apply to solid-state RF amplifiers. AFT is done to tune the input and output stages of the amplifier so as to make efficient use of RF energy and maximize RF output power. The procedure should be done anytime it is suspected that the tuning in one of the amplifier input or output stages have changed. This may happen when a vacuum tube, high voltage capacitor, or capacitor tuning motor is replaced. Hardware that has aged and gone out of tolerance may also require AFT. A properly maintained and functioning amplifier should not often require AFT. There are several ways to run AFT. One common method is to use the RF amp serial port interface cable (2124497-46) provided with the system (usually in a plastic pouch tie-wrapped in the top of the RF/PEN 1 or RF/PEN 2 Cabinet) and a field laptop (emulating a VT 100 terminal) to command the Erbtec Amplifier to run the AFT. The cable can also be built, if necessary, from parts acquired locally. See Illustration 1-1 below. Note that the Boot Terminal in this diagram refers to the field laptop running a terminal emulation program.



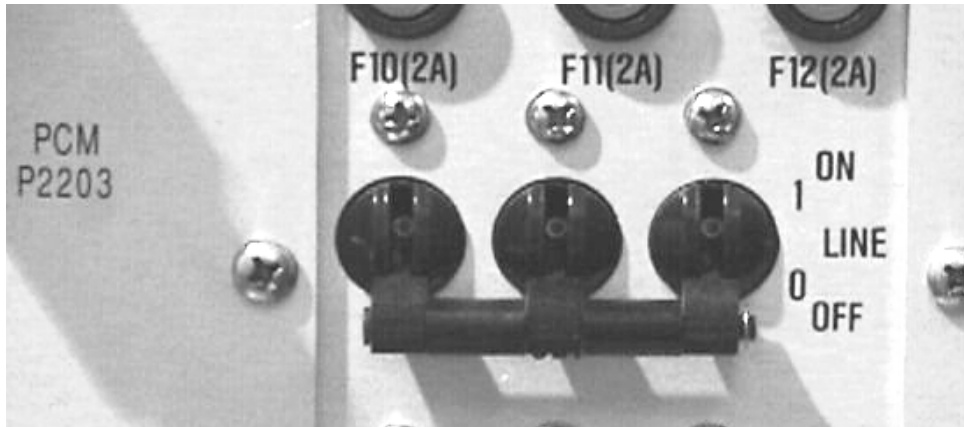
RS-232 NULL-MODEM CABLE DIAGRAM
ILLUSTRATION 1-1

2- HARDWARE / SPECIAL TOOLS REQUIRED

Item	Description	Part Number
1.	RF Amp Serial Port Interface Cable	2124497-46
2.	RF Power Measurement Kit	46-317724G1 or G2
3.	RF Test Cables Kit (if not using RF Pwr Meas. Kit)	46-255816G1
4.	Dummy load (not needed if provided in RF Pwr Meas. Kit)	46-255837p10 or 46-317724P14

3- SYSTEM HARDWARE RECONFIGURATION

1. Confirm that the system is not scanning.
2. Open the rear door of the RF/PEN 1 or RF/PEN 2 Cabinet.
3. Locate the CB1 circuit breaker on the rear, right-side of the Erbtec RF Amplifier and place it in the down (OFF) position. See Illustration 3-1.



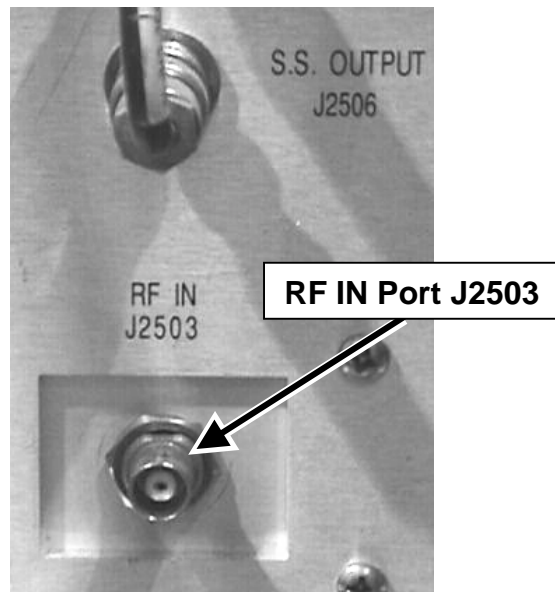
**ERBTEC RF AMPLIFIER CB1 CIRCUIT BREAKER IN DOWN (OFF) POSITION
ILLUSTRATION 3-1**

3- SYSTEM HARDWARE RECONFIGURATION (Continued)

4. Locate the BODY PORT J2804, HEAD PORT J2803, and RF IN J2503 port on the rear of the Erbtec RF amplifier. See Illustrations 3-2 and 3-3.



ERBTEC RF AMPLIFIER HEAD AND BODY PORTS
ILLUSTRATION 3-2



ERBTEC RF AMPLIFIER RF IN PORT J2503
ILLUSTRATION 3-3

- a. Remove the cable connected to HEAD PORT J2803 and set it aside.
 - b. Remove the cable connected to BODY PORT J2804 and set it aside.
 - c. Remove the cable connected to RF IN J2503 and set it aside.
5. Obtain an N-female to HN-male adaptor from the RF Power Measurement Kit or the RF Cables Kit and connect the HN-male end of the connector to BODY PORT J2804 on the rear of the Erbtec RF amplifier.

3- SYSTEM HARDWARE RECONFIGURATION (Continued)

Note

The system hardware will be configured to run AFT first in Head mode.

6. Obtain an N-male to N-male RF cable from the RF Power Measurement Kit or the RF Cables Kit.
 - a. Connect one end of the RF cable to the N-female HEAD PORT J2803 on the rear of the Erbtec RF amplifier.
 - b. Connect the other end of the cable to the input of the high-power dummy load obtained from the RF Power Measurement Kit or an equivalent unit.

4- LAPTOP PREPARATION FOR AFT

The field laptop will be configured as a VT-100 communications terminal in order to command the Erbtec RF amplifier, via the serial link, to run AFT. HyperTerminal will be used to configure the laptop to perform as a VT-100 communications terminal. HyperTerminal must be properly configured or else it will not be possible to establish communication via the serial link with the Erbtec amplifier.



Disable any software running in the background on the laptop, such as Personal Digital Assistant (PDA) syncing or “Hotlink” programs, that take exclusive control of the COM 1 port and will prevent HyperTerminal from using this port. Failure to do this will result in COM 1 port availability errors when attempting to configure the port from HyperTerminal.

1. On the laptop, position the mouse cursor into the lower left corner of the screen and click **Start**, then **Run**.
2. Type **hypertrm** in the entry box and then click **OK**.
3. **IF** the system reports that HyperTerminal is **not** found, then it must be installed. Do the following:
 - a. Select **Start**, then **Settings**, then **Control Panel**, then **Add/Remove Programs**.
 - b. At the top of the *Add/Remove Programs Properties* window select **Windows Setup**.
 - c. Scroll down the menu from the left scroll bar and select **Communications**.
 - d. Scroll down the menu from the left scroll bar and click on the check mark box to the left of **HyperTerminal**. A check mark will appear in the left box when it has been selected. Click on **OK**.
 - e. At the *Add/Remove Programs Properties* window click on **OK**. The system will indicate that it is attempting to load this program.
 - f. Windows 95 users will, at this point, be asked to reboot. Select **Yes**. After the reboot repeat step 1.
 - g. Windows 98 users will notice that the installation ends but will not see any special prompt.
3. In the *Connection Description* window enter **Erbtec** as the *Name*.
4. Select the GE logo as the icon and then click **OK**.
5. In the *Connect To* window, left mouse click on the down-arrow mark in the *Connect using* box. Select **Direct to Com1** and then click **OK**.

4- LAPTOP PREPARATION FOR AFT (Continued)

6. Refer to Table 4-1 and configure the *COM1 Properties* windows as shown.

TABLE 4-1
COMMUNICATIONS SETTINGS

Bits per second	9600
Data Bits	8
Stop Bits	1
Parity	none
Flow Control	Xon/Xoff

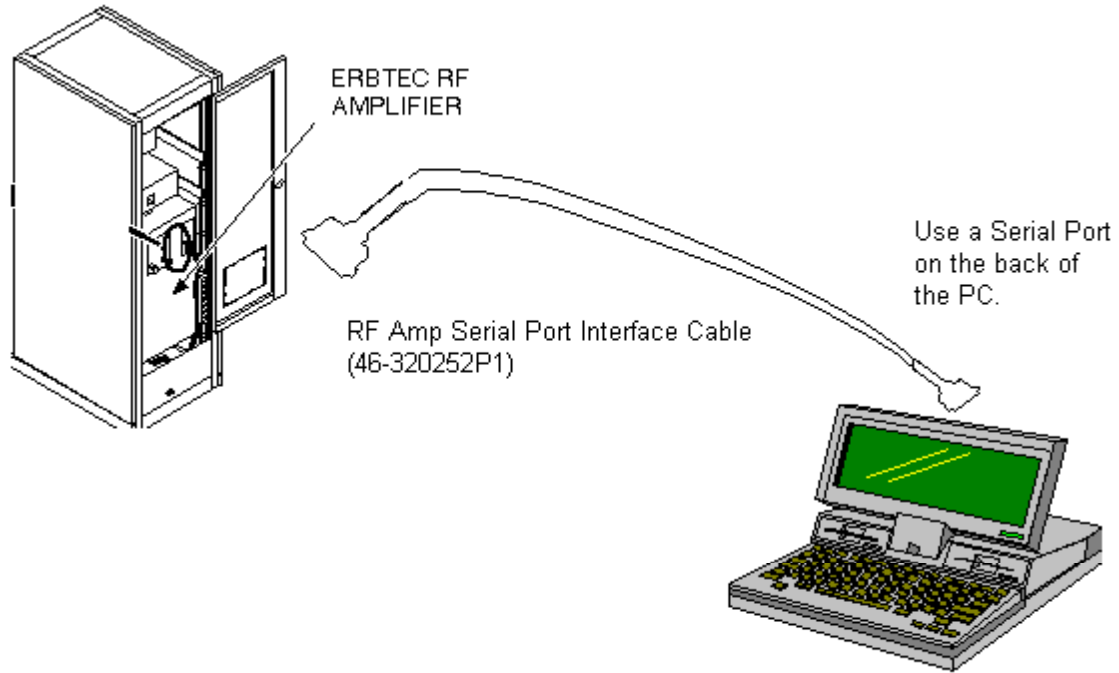
7. Select and click on **OK** when done.
8. Select File from the top of the window and then click on Save. This saves this configuration for future use as an entry labeled *Erbtec.ht*.

Note

This configuration can be used again in the future by clicking on **Erbtec.ht** from the *HyperTerminal* window.

5- PERFORMING AFT

1. Connect one end of the Serial Port Cable to the 25 pin Sub-D SERIAL PORT P2204 on the rear of the Erbtec RF Amplifier and the other end to the 9 pin Sub-D COM1 serial port on the rear of the laptop. See Illustration 5-1.



ERBTEC AMP TO LAPTOP SERIAL CONNECTION
ILLUSTRATION 5-1

2. Place the CB1 circuit breaker on the rear of the Erbtec RF Amplifier in the up (ON) position.

Note

Your laptop should now be ready to use as a terminal with the Erbtec RF amplifier. If, in the next step, it will not communicate with the Erbtec RF amplifier, cycle the CB1 breaker on the rear of the amplifier and then try to establish communication again.

5- PERFORMING AFT (Continued)

Note

The leading ‘o’ used in the following commands is a lower-case letter ‘o’, *not* a zero.

- From the terminal window on the laptop, perform Head AFT as follows:

<u>Prompt</u>	<u>OutPut</u>
Connected	s <Enter> To communicate with Erbtec RF Amplifier.
Ready	o1 <Enter> This brings the Erbtec to Standby mode. If already at Standby, only a new line is returned. Verify that Standby LED is on, and that Wait LED is off. If previously off, there will be a six-minute wait to go to Standby.
Standby	head <Enter> . This sets the Erbtec to head mode. Either upper- or lower-case. Verify that the Head LED is on. If AFT is run in head mode, it should be run again in body mode.
Body or Head	a+ <Enter> . Turns AFT on. "AFT enabled" appears.
AFT enabled	o3 <Enter> . Brings the amp to operate state. The "Wait" LED comes on briefly while AFT is performed. "Wait" and "Operate" LEDs should be on at this time. If AFT is successful, the "Wait" LED should go off, the "Operate" LED should remain on, and no errors should be visible on the laptop terminal display.
operate	o1 <Enter> . This returns the Erbtec to Standby mode.
Standby	

- Confirm that the STANDBY LED on the front of the Erbtec RF amplifier is illuminated. If it is not illuminated, repeat the last step in the table above to put it into Standby mode.



The purpose of typing “N” in the next step is to save the final motor positions as determined by AFT. If AFT fails, do not type N. Redo AFT until it passes. If AFT fails, typing “N” will save erroneous motor positions.

Note

If AFT is being done as part of a Planned Maintenance (PM) schedule, then just type **N <Enter>**. The new tuning positions are saved to memory. If AFT is being done following IPA tube replacement, type **N** followed by the **serial number** of the new IPA tube and **<Enter>**. A string of ASCII HEX characters will appear, representing the new "heater on time meter," and the new tuning positions will also be saved to memory.

5- PERFORMING AFT (Continued)

5. From the terminal window on the laptop, save the motor positions as follows:

<u>Prompt</u>	<u>OutPut</u>
Standby	N <Enter> (if retuning existing tube) or N (serial number) <Enter> (when installing & tuning a new tube).

6. Disconnect the cable connected to HEAD PORT J2803 on the rear of the Erbtec RF amplifier and reconnect it to the N-female end of the adaptor connected earlier to BODY PORT J2804 on the rear of the Erbtec RF amplifier. This places the dummy load on BODY PORT J2804.

Note

The leading 'o' used in the following commands is a lower-case letter 'o', *not* a zero.

7. From the terminal window on the laptop, perform Body AFT as follows:

<u>Prompt</u>	<u>OutPut</u>
Standby	body <Enter> . This sets the Erbtec to body mode. Either upper- or lower-case. Verify that the BODY LED is on.
AFT enabled	o3 <Enter> . Brings the amp to operate state. The "Wait" LED comes on briefly while AFT is performed. "Wait" and "Operate" LEDs should be on at this time. If AFT is successful, the "Wait" LED should go off, the "Operate" LED should remain on, and no errors should be visible on the laptop terminal display.
operate	o1 <Enter> . This returns the Erbtec to Standby mode.
Standby	

8. Confirm that the STANDBY LED on the front of the Erbtec RF amplifier is illuminated. If it is not illuminated, repeat the last step in the table above to put it into Standby mode.



The purpose of typing "N" in the next step is to save the final motor positions as determined by AFT. If AFT fails, do not type N. Redo AFT until it passes. If AFT fails, typing "N" will save erroneous motor positions.

Note

If AFT is being done as part of a Planned Maintenance (PM) schedule, then just type **N <Enter>**. The new tuning positions are saved to memory. If AFT is being done following a tube replacement, type **N** followed by the **serial number** of the new tube and **<Enter>**. A string of ASCII HEX characters will appear, representing the new "heater on time meter," and the new tuning positions will also be saved to memory.

5- PERFORMING AFT (Continued)

9. From the terminal window on the laptop, save the motor positions as follows:

<u>Prompt</u>	<u>OutPut</u>
Standby	N <Enter> (if retuning existing tube) or N (serial number) <Enter> (when installing & tuning a new tube).
Standby	IMPORTANT: for 1.5T systems, type a- <Enter> to turn AFT off. "AFT disabled" appears as seen in the Prompt column below. <i>(If AFT is NOT disabled, 85 faults will result!)</i> Leave AFT enabled for 1.0T and 0.5T systems.
AFT disabled	

6- RESTORATION

1. Place the CB1 circuit breaker on the rear of the Erbtec RF Amplifier in the down (OFF) position.
2. Disconnect the serial cable from the laptop and remove the cable from the P2201 SERIAL PORT on the rear of the Erbtec RF amplifier.
3. Remove the cable and RF adaptor from BODY PORT J2804 on the rear of the Erbtec RF amplifier.
4. Reconnect the cable removed in **Section 3 - SYSTEM HARDWARE RECONFIGURATION** to the BODY PORT J2804 HN-connector.
5. Reconnect the cable removed in **Section 3 - SYSTEM HARDWARE RECONFIGURATION** to the HEAD PORT J2803 N-connector.
6. Reconnect the cable removed in **Section 3 - SYSTEM HARDWARE RECONFIGURATION** to the RF IN J2503 BNC-connector.
7. Place the CB1 breaker on the rear of the Erbtec RF Amplifier in the up (ON) position. It will take the Erbtec amplifier 6 minutes to complete the recovery.
8. Successfully complete one head and one body scan.
9. Position the laptop mouse cursor in the upper left part of the HyperTerminal screen and select **File -> Exit** to close the HyperTerminal program.

REVISION HISTORY

RE V	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
A	May 7, 1998	R. Hawthorne	Initial conversion from toolbook to word.
0	May 18, 1998	R. Hawthorne	Updated Doc with MSI inputs.
1	Dec. 9, 1988	F. Fiore	Added dummy load to procedure
2	Sept. 20, 2000	D. Thome'	Re-wrote this procedure specific to 8X systems. Described HyperTerminal start process. Added a Restoration section.
3	May 16, 2001	D. Thome'	Re-wrote this procedure for RF/PEN 1 and RF/PEN 2 Cabinets irrespective of system type. Corrected errors throughout.
4	May 3, 2002	D. Thome'	Added process to save motor positions after Head AFT.